## PROJECT NUMBER: AS 42

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|---|---|---|
| **Title** | | **Agronomic evaluation of promising sugarcane genotypes** |
| **Objective** | | To work out agronomy of sugarcane genotypes of advance varietal trial (AVT) |
| **Year of start** | | 2007-2008 (with new set of genotype of AVT) |
| **Year of completion** | | Continuing |
| **Locations** | | All centres |
| **Planting season** | | Autumn/ Spring/ Special season<br>(Experiment will be conducted in one crop season only with two plants & one ratoon) |
| **Treatments** | | |
| **1. Varieties** | | Minimum of three promising genotypes (from AVT) |
| **2. Fertilizer levels** | | 75% of the recommended dose of N |
| | | 100% of the recommended dose of N |
| | | 125% of the recommended dose of N |
| **Design** | | RBD |
| **Replications** | | 3-4 |
| **Plot size** | : | In the first year, the plot size will depend on the availability of seed, but in the second year, it will be 6 rows of at least 6 m length. |
| **Row spacing** | : | Recommended row spacing for a particular season in the concerned zone |

**Note:** 1. Seed material of the test varieties may be obtained from concerned breeder of the centre.

2. Separate trials may be laid out for early and mid-late groups.

**Observations to be recorded** :

i) Initial soil fertility status for available NPK, soil texture, physico-chemical properties of the soil.

ii) Data on germination, tillers, millable canes, cane yield, juice quality, CCS%, CCS yield of plants/ ratoon crop.

iii) Other specific characteristics of the genotypes.

iv) Planting and harvesting dates, name of variety, fertilizers applied, irrigations, plant protection measures etc.

## SUMMARY OF RESULTS OBTAINED DURING LAST YEAR (2012-13)

## NORTH WEST ZONE

### 1. Faridkot

Among early genotypes, CoPb 09181 (105.1 t/ha) significantly out yielded other two entries however, sucrose content was lowest among them (16.69%). For mid-late group CoH 08264 and CoH 08263 were better in cane yield than CoPb 08217 with sucrose% in juice as 16.42, 15.47 and 16.52% respectively. The significant response to N fertilizer was up to 100% of recommended dose.

### 2. Kota

CoH-6247 being at par with CoPK-05191 and Co-06033 produced significantly higher cane yield of 81.11 t/ha. However, COPK-05191, in addition to giving a very good yield (79.25 t/ha) also maintained its superiority over other genotype in terms of cane quality. Cane yield did not improve significantly beyond recommended dose of fertilizer.

### 3. Ludhiana

For early group Co 07025 recorded the highest cane yield (91.4 t/ha) while the standard check CoJ 83 recorded highest Pol % juice and CCS % (12.74%). Similarly the lowest yield was due Co 0118 (81.2 t/ha) but was statistically close to that of CoJ 83 The cane yield increased appreciably with 100% and 125% of recommended nitrogen but the significant response with respect to cane yield was observed only up to 100 % of recommended nitrogen (150 kg/ha)**.**

Among mid-late genotypes CoPb 06219 recorded the highest cane yield being significantly better than the genotype CoPb 05211 and comparable to standard check CoJ 88. The highest yielder CoPb 06219 exhibited the poorest cane quality in terms of Pol % and CCS% (10.48) against check CoJ88 (14.04%). Overall performance of CoH 6266 was better. Fertilizing the crop with 100% recommended dose of nitrogen i.e. 150 kg N $ha^{-1}$ significantly improved cane yield over 75% of the recommended dose of nitrogen but was at par to 125% of the recommended dose of nitrogen.

### 4. Lucknow

Sugarcane genotype, CoH 06265 produced significantly higher number of millable cane and cane yield (76.37 t/ha) and sugar yield (9.36 t/ha). Significant response to fertility level was observed upto 100% of recommended N.

### 5. Uchani

In early group Variety CoLk 7201 and Co 7025 being at par produced significantly higher cane yield as compared to variety Co 7023 and CoH 7261, whereas in mid late group varieties CoLk 7203, CoPb 7212 and CoS 7234 being at par produced significantly higher cane yield as compared to variety CoH 7263. Highest sugar yield was recorded in variety Co 7025 (10.08 t/ha) and CoPb 7212 (11.15 t/ha) in early and mid-late groups respectively. All the varieties in both the groups responded up to recommended dose of nitrogen.

**6. Shahjahanpur**

Genotype CoSe 01424 produced significantly higher ratoon cane yield of 66.30 t/ha closely followed by CoS 7250 with cane yield of 64.81 t/ha. CCS percent in cane was found significantly higher in genotype CoS 8272 as compared to CoS 7250 and CoSe 01424. In case of nitrogen levels significantly higher ratoon cane yield (68.52 t/ha) was obtained with 125% of the recommended dose of nitrogen and it was at par with 100% recommended N.

**7. Pantnagar**

Among genotypes, Co Pant 5224 (85.9 t/ha) performed better closely followed by Co Pant 4222 (85.0 t/ha) and Co Pant 6224 (84.8 t/ha).However, in sugar yield Co Pant 5224 and Co Pant 4222 were close to each other. Cane yield, NMC and average cane weight were higher in 125 % of the recommended (150 kg N) over 75 or 100 % recommended in sugarcane.

**8. Sriganganagar**

In early group, variety CoPK 5191 with cane yield of 95.16 t/ha yielded significantly more than that of Co 6617 (85.46 t/ha) but was statistically at par with that of Co 05009 (91.73 t/ha). However in case of CCS% CoPK 5191 was inferior to that of both the varieties. Under mid-late group, Co Pant 05224 with cane yield of 96.36 t/ha was at par with that of Co 05011 & check CoS 767 (98.16 t/ha) but all these varieties were significantly superior to CoH 5269. Significant response in respect of cane yield was observed upto 100% of RDN, though numerical increase in cane yield was recorded up to 125% of RDN.

## PENINSULAR ZONE

**9. Coimbatore**

Co 0403 recorded the highest cane yield (101.95 t/ha) closely followed by Co 05007, 06010, Co 06022 and Co 86032. Co 06020 recorded the lowest cane yield in the plant crop where as in ratoon the highest yield of Co 0403 (104.15 t/ha) was close to that of Co 006010. The effect of nitrogen levels was not significant both in plant as well as ratoon.

**10. Kolhapur**

Amongst the early maturing genotypes, Co 05002 (112.78 t/ha) was found significantly superior in respect of cane yield, but was close to CoSnk 05101 (109.98 t/ha). Both of the varieties were also having almost similar CCS yield. Cane yield though increased appreciably up to 125% of RDF but was significant up to 100% of RDF only.

Amongst the tested early genotypes as in ratoon crop, Co 05002 significantly out yielded all the varieties in respect of cane & sugar yield. The highest cane yield was recorded at 125 % RDN: $P_2O_5$: $K_2O$. Significant fertilizer response was observed upto 100% of RDF however, it increased significantly upto 125% of RDF.

In mid-late genotypes, CoSnk 05104 was found superior in respect of cane and CCS yield but was at par with Co 05007 and CoVSI 05122. The highest cane yield was recorded at 125 % RDN: $P_2O_5$: $K_2O$ but was close to 100% of RDF.

For mid-late group ratoon the genotype CoSnk 05104 was found superior in respect of cane and CCS yield closely followed by Co 05007 and CoVSI 05122. Cane yield was not

significantly affected by fertilizer levels however sugar yield responsed significantly upto 100% of RDF.

**11. Mandya**

Promising genotype of AVT trial Co 7008 performed at par with the check variety Co 86032. Recommended dose of fertilizer was sufficient to realize higher cane yield compared with either increase or decrease of 25 per cent of recommended dose.

**12. Padegaon**

In autumn planting, genotypes CoM 05082 recorded significantly higher cane and CCS yields (135.70 & 18.35 t/ha) than the other genotypes. However, it was at par with CoSnk 5104 in respect of CCS yield. The application of 125 percent recommended dose of nitrogen produced considerably higher cane and CCS yields followed by 100 % recommended dose of nitrogen but was on par with each other. During spring season the genotype CoM 05082 recorded significantly higher cane and CCS yields (120.82 and 16.00 t/ha) than the other genotypes. However, it was at par with CoSnk 5104 in respect of CCS yield. The application of 125 % recommended dose of nitrogen to spring sugarcane produced significantly higher cane and CCS yields, followed by 100% recommended dose of nitrogen.

**13. Pune**

Co VSI 03102 recorded significantly higher cane, CCS yields & B:C ratio (106.03, 17.39, 1: 3.11 respectively) than the other genotypes under study. However it was on par with the check variety Co 86032. Application 125% of recommended fertilizer dose of NPK to suru season sugarcane produced significantly higher cane yield (100.70 t/ha), CCS yield (16.62 t/ha) & B: C ratio (1: 2.89) than the other doses of NPK fertilizer applications.

**14. Powarkheda**

For plant crop of the early genotypes, Co Snk 3632 gave significantly higher cane yield of 93.72 t/ha than Co C 671 (85.49 t/ha) and Co 0403(83.74 t/ha). Application of 125 % RDN gave significantly higher cane yield of (92.18 t/ha) than 75% RDN (81.79 t/ha) but increase in cane yield was at par in-between 100 and 125% RDN.

For ratoon of the the early genotypes Co Snk 3632 gave higher cane yield of (62.52 t/ha) than Co C 671 (59.29 t/ha) and Co 0403(58.88 t/ha). Application of 125 % RDF NPK gave significantly higher cane yield (63.44t/ha) than 75 % RDN (55.73 t/ha) but increase in cane yield was at par in-between 100 and 125% RDF NPK.

Among the mid late genotypes (plant crop) Co 0214 gave significantly higher cane yield of (97.29 t/ha) than Co 86032 (88.65 t/ha) and Co 0409 (86.97 t/ha). Application of 125 % RDN gave significantly higher cane yield of (95.40 t/ha) than 75 % RDN (85.32 t/ha) but increase in cane yield was at par in-between 100 and 125% RDN.

Ratoon crop of the mid late genotypes Co 0214 gave significantly higher cane yield of (77.74 t/ha) than Co 86032 (68.69 t/ha) and Co 0409 (67.18 t/ha). Application of 125 % RDF NPK gave significantly higher cane yield of (75.69 t/ha) than 75 % RDF NPK (65.71 t/ha) but increase in cane yield was at par in-between 100 and 125% RDF NPK.

**15. Sankeshwar**

Pooled analyses of two-year data of plant crop revealed that the variety CoM 265 significantly out yielded all other varieties under test. Co 94012 was superior in CCS yield. Varieties responded upto 125% fertilizers. The varieties Co 94012 and CoM 265 ware good in plant cane as well as ratoon cane (good ratooners). In ratoon crop, cane yield of the variety CoM 265 (80.73 t/ha) being at par with CoSnk 05102 (79.11 t/ha) and Co 94012 (75.28 t/ha) significantly excelled all other varieties. In case of CCS yield varieties did not respond significantly to fertilizer levels in ratoon crop.

**16. Thiruvalla**

The genotype Co 6012 with higher cane and sugar yield (93.41 & 13.87 t/ha) being close to Co 6027 (90.16 & 13.58 t/ha) was superior over CoM 06084. All the genotypes performed better at 100 % of the recommended dose of N.

**17. Akola**

During the season 2011-12 the total rainfall received was 515.8 mm which was 34.6 percent less than normal (789 mm). Due to shortage of irrigation water, the experiment could not be planted during 2012-13 and 2013-14.

**18. Navsari**

The highest cane yield recorded was of CoN 07072 (135.34 t/ha) which was at par with that of CoN 09073 (128.82t/ha). In case of CCS yield CoN 07072 significantly excelled all the varieties except Co 0403. The significant response to N level was up to 125% of RD.

**East Coast Zone**

**19. Anakapalle**

The results showed that for early group of genotypes application of nitrogen at 125% (88.9 t/ha) and 100% (87.8 t/ha) were found at par but these registered significantly higher cane yield than 75% recommended dose of nitrogen. The cane yield of both new early sugarcane genotypes 2004A55 (87.3t/ha) and 2001A63 (88.0 t/ha) were on par and significantly higher than check variety 93A145 (82.9 t/ha).

Performance of new promising mid late sugarcane genotypes *viz.,* 96A3 and 99A5 along with check Co 7219 was studied under graded levels of Nitrogen nutrient under ratoon irrigated conditions at Regional Agricultural Research Station, Anakapalle during 2012-13 season. The results showed that application of 'N' at 100% recommended dose registered significantly higher cane yield of 80.8 t/ha than lower level of 75% recommended N (70.2 t/ha). Further increase in the level of N to 125% (85.1 t/ha) did not found to improved the cane yield to a significant level. Among the mid late genotypes under test 99 A 5 proved significantly superior (87.1 t/ha) over 96 A 3 (80.2 t/ha) and check variety Co 7219 (74.2 t/ha).

**20. Cuddalore**

The genotype C 260628 significantly registered the maximum millable cane, individual cane weight, cane yield and sugar yield in both spring and autumn season. Regarding the juice quality, the variety Co 86032 registered the highest commercial cane sugar (CCS) per cent in spring and autumn seasons and was on par with the entry C 260628. Prescription of 125 per cent of the recommended dose of nitrogen significantly registered higher values of yield components, cane and sugar yield compared to 75 of RDN but was at par with that of 100 per cent of recommended dose of nitrogen.

**21. Nayagarh**

Variety Co Or 8346 significantly out yielded all other varieties under test in respect of cane yield (88.55 t/ha) and CCS yield (10.26 t/ha). Significant response was observed up to 125% of the recommended dose of N.

## NORTH CENTRAL ZONE

**22. Pusa**

In early group, BO 153 recorded significantly higher cane yield (84.69 t/ha) than CoP 031 though was at par with BO 150 (82.53 t/ha) while, in mid-late group, BO 154 having cane yield of 94.68 t/ha significantly out yielded CoP 042 but at par with CoP 061 (89.24 t/ha). Higher cane yield was recorded at 125% of recommended dose of N but on par with100% N level in early group whereas in mid-late group response was significant up to 125% of RDN.

**23. Sheorahi**

In both autumn and spring seasons, variety CoSe 8457 gave significantly higher number of millable cane and yield than that of CoSe 8458 and CoSe 5451. Millable canes and cane yield increased significantly up to 125% of the recommended NPK.

## NORTH EAST ZONE

**24. Buralikson**

Under early group, no significant varietal difference was observed where as it was significant in mid-late group where maximum yield of 70.29 t/ha was observed in CoBln 07503. The yield level of this variety was statistically close to CoBln 07502 & CoBln 04174. All these three varieties performed significantly better than CoBln 05502. The cane yield under both the group increased significantly up to 100% RDN & declined at 125% of RDN.

**Centres allotted :** 24

**A. N.W. Zone**: 8, Faridkot, Kota, Lucknow, Ludhiana, Pantnagar, Shahjahanpur, Sriganganagar and Uchani.

**B. Peninsular Zone**: 10, Coimbatore, Kolhapur, Mandya, Navsari, Padegaon, Powerkheda, Pune, Thiruvalla, Navsari and Sankeshwar.

**C. E.C. Zone**: 3, Anakapalle, Cuddalore and Nayagarh.

**D. N.C. Zone**: 2, Pusa and Seorahi.

**E. N.E. Zone:** 1, Buralikson.

**Centres Reported :** 24

**A. N.W. Zone**: 8

**B. Peninsular Zone**: 10

**C. E.C. Zone**: 3

**D. N.C. Zone** : 2

**E. N.E. Zone** : 1

## CURRENT YEAR (2013-14) REPORT

### Zone wise and centre wise results

### NORTH WEST ZONE

### 1. FARIDKOT

The experiment was started in 2012-13 with new set of early and mid-late genotypes. Experiments on plant crop were carried out during 2012-13 and 2013-14, whereas experiment on ratoon was conducted during 2013-14. This experiment has been completed with two plants and one ratoon crop.

**Plant crop**

**A. Early group**

Three genotypes (CoPb 09181, CoPb 08211 and CoPb 08212) were evaluated at the fertilizer levels (N1: 112.5; N2: 150.0 and N3: 187.5) in a sandy loam soil with pH 8.1, EC 0.32 dS/m containing organic carbon 0.35%, $P_2O_5$: 12.5 kg per ha and $K_2O$: 622.5 kg per ha. Results indicated that genotype CoPb 09181 was significantly better in cane yield (128.9 t/ha) and cane weight (1823g) than both the genotypes (Table AS 42.1.1). Number of millable cane was the highest in CoPb 08212 followed by CoPb 09181. Sucrose % was at better in CoPb 08211 than both the genotypes. There was increase in cane yield up to 125% recommended N but statistically significant increase was there with 100% recommended N.

**Table AS 42.1.1:** Agronomical evaluation of promising sugarcane genotypes (early)

| Treatments | Germination (%) | No. of Shoots 000/ha | NMC 000/ha | Cane length (cm) | Cane diameter (cm) | Single cane wt. (g) | Cane yield (t/ha) | Sucrose (%) |
|---|---|---|---|---|---|---|---|---|
| **Genotypes** | | | | | | | | |
| CoPb 09181 | 32.5 | 146.2 | 112.8 | 275 | 2.86 | 1823 | 128.9 | 14.72 |
| CoPb 08211 | 28.8 | 133.6 | 88.3 | 249 | 2.71 | 1057 | 70.6 | 17.11 |
| CoPb 08212 | 36.5 | 168.7 | 133.4 | 291 | 2.39 | 1198 | 94.3 | 15.87 |
| CD (5%) | 2.1 | 13.0 | 16.9 | 16 | 0.24 | 283 | 11.4 | 0.85 |
| **N levels (kg N/ha)** | | | | | | | | |
| 112.5 | 32.1 | 140.9 | 102.7 | 262 | 2.59 | 1267 | 89.2 | 15.61 |
| 150.0 | 32.3 | 150.2 | 112.7 | 272 | 2.69 | 1395 | 101.2 | 15.91 |
| 187.5 | 33.3 | 157.4 | 119.1 | 281 | 2.67 | 1416 | 103.4 | 16.19 |
| CD (5%) | NS | 13.0 | NS | NS | NS | NS | 11.4 | NS |

**Date of Planting**: 07.03.2013

**B. Mid-late Group**

Genotypes CoPb 08217, CoH 08263 and CoH 08264 were evaluated under the fertilizer levels N1: 112.5; N2: 150.0 and N3: 187.5 on a soil similar in properties as reported for early group experiment. CoH 08263 was significantly better in cane yield (124.6 t/ha) than CoPb 08217 (111.6 t/ha) and was at par with CoH 08264 (121.3 t/ha). Sucrose % was the highest in CoPb 08264 followed by CoH 08217 (Table AS 42.1.2). There was increase in number of millable canes and cane yield up to 125% recommended N but statistically significant increase was there with 100% recommended N.

**Table AS 42.1.2:** Agronomical evaluation of promising sugarcane genotypes (mid-late)

| Treatments | Germination (%) | No. of Shoots 000/ha | NMC 000/ha | Cane length (cm) | Cane diameter (cm) | Single cane wt. (g) | Cane yield (t/ha) | Sucrose (%) |
|---|---|---|---|---|---|---|---|---|
| Genotypes | | | | | | | | |
| CoPb 08217 | 32.0 | 159.8 | 106.8 | 262 | 2.60 | 1354 | 111.6 | 13.86 |
| CoH 08263 | 29.0 | 161.0 | 113.6 | 240 | 2.85 | 1357 | 124.6 | 13.18 |
| CoH 08264 | 29.0 | 147.0 | 98.7 | 233 | 2.82 | 1432 | 121.3 | 14.98 |
| CD (5%) | NS | NS | 8.7 | 17 | 0.18 | NS | 9.7 | 0.64 |
| N levels (kg N/ha) | | | | | | | | |
| 112.5 | 29.8 | 150.6 | 95.7 | 240 | 2.64 | 1282 | 108.9 | 13.77 |
| 150.0 | 30.7 | 155.1 | 110.8 | 243 | 2.76 | 1417 | 123.7 | 14.08 |
| 187.5 | 29.5 | 162.2 | 112.7 | 253 | 2.86 | 1444 | 124.8 | 14.16 |
| CD (5%) | NS | NS | 8.7 | NS | NS | NS | 9.7 | NS |

**Ratoon crop**

**A. Early group**

**Treatments:**

- **Genotypes:** 3
  (CoPb 09181, CoPb 08211 and CoPb 08212)
- **Fertilizer levels (kg N/ha):** 3
  ($N_1$: 168.75; $N_2$: 225.0 and $N_3$: 281.25)

**Design:** Factorial RBD, Replications**:** Three

**Date of Planting**: 15.02.2012 **Date of ratooning:** 10.02.2013

**Results:**

**Genotypes**

CoPb 09181 was significantly better in cane yield (76.3 t/ha) than both the genotypes (Table AS 42.1.3). Number of millable cane was the highest in CoPb 08212 followed by CoPb 09181. Sucrose % was at better in CoPb 08212 than both the genotypes.

**N Levels**

There was increase in cane yield and millable canes up to 125% recommended N but statistically significant increase was there with 100% recommended N.

**Table AS 42.1.3:** Agronomical evaluation of promising sugarcane genotypes (early ratoon)

| **Treatments** | **No. of Shoots 000/ha** | **NMC 000/ha** | **Cane length (cm)** | **Cane diameter (cm)** | **Single cane wt. (g)** | **Cane yield (t/ha)** | **Sucrose (%)** |
|---|---|---|---|---|---|---|---|
| Genotypes | | | | | | | |
| CoPb 09181 | 159.9 | 90.6 | 181 | 2.83 | 873 | 76.3 | 16.42 |
| CoPb 08211 | 115.6 | 72.3 | 139 | 2.76 | 878 | 55.0 | 17.52 |
| CoPb 08212 | 199.4 | 98.0 | 195 | 2.55 | 838 | 69.7 | 18.16 |
| CD (5%) | 24.7 | 8.2 | 34 | NS | NS | 3.1 | NS |
| N levels (kg N/ha) | | | | | | | |
| 112.5 | 149.5 | 79.9 | 164 | 2.68 | 814 | 60.6 | 16.99 |
| 150.0 | 158.5 | 89.2 | 171 | 2.73 | 872 | 69.2 | 17.49 |
| 187.5 | 166.9 | 91.7 | 180 | 2.73 | 903 | 71.2 | 17.61 |
| CD (5%) | NS | 8.2 | NS | NS | NS | 3.1 | NS |

**B. Midlate Group**

**Treatments:**

- **Genotypes:** 3
  (CoPb 08217, CoH 08263 and CoH 08264)
- **Fertilizer levels (kg N/ha):** 3
  ($N_1$: 168.75; $N_2$: 225.0 and $N_3$: 281.25)

**Date of Planting**: 15.02.2012 **Date of ratooning:** 11.02.2013

**Results:**

CoH 08263 was significantly better in cane yield (81.5 t/ha) than CoPb 08217 (61.4 t/ha) and CoH 08264 (59.3 t/ha). Sucrose % was the highest in CoPb 08264 followed by CoH 08217 (Table AS 42.1.4). There was increase in number of millable canes and cane yield up to 125% recommended N but statistically significant increase was there with 100% recommended N.

**Table AS 42.1.4:** Agronomical evaluation of promising sugarcane genotypes (mid-late ratoon)

| **Treatments** | **No. of Shoots 000/ha** | **NMC 000/ha** | **Cane length (cm)** | **Cane diameter (cm)** | **Single cane wt. (g)** | **Cane yield (t/ha)** | **Sucrose (%)** |
|---|---|---|---|---|---|---|---|
| Genotypes | | | | | | | |
| CoPb 08217 | 167.6 | 95.0 | 194 | 2.77 | 1040 | 61.4 | 15.48 |
| CoH 08263 | 186.0 | 115.4 | 184 | 2.96 | 1217 | 81.5 | 14.83 |
| CoH 08264 | 121.5 | 78.9 | 157 | 3.05 | 1092 | 59.3 | 16.80 |
| CD (5%) | 13.6 | 10.3 | 15 | 0.14 | 66 | 9.7 | 1.02 |
| N levels (kg N/ha) | | | | | | | |
| 112.5 | 152.0 | 89.1 | 175 | 2.88 | 1064 | 59.6 | 15.13 |
| 150.0 | 160.2 | 98.2 | 177 | 2.95 | 1136 | 70.3 | 16.02 |
| 187.5 | 162.9 | 102.0 | 182 | 2.95 | 1150 | 72.2 | 15.95 |
| CD (5%) | NS | 10.3 | NS | NS | 66 | 9.7 | NS |

**Summary**

**Early Group**: On the basis of two plant crops CoPb 09181 was found promising in cane yield among the early group of varieties. The ratoon yield of CoPb 09181 is significantly better than other genotypes. Although sucrose% of CoPb 09181 was less than other genotypes in plant crop but it was at par in ratoon crop.

**Midlate Group:** CoH 08263 performed well on the basis of two plants and one ratoon in cane yield. In case of sucrose% CoH 08264 was better than other genotypes on the basis of two plants and one ratoon.

**Table AS 42.1.5:** Cane yield (t/ha) and sucrose% of early maturing sugarcane genotypes in Plant I – Ratoon – Plant II cycle

| Treatment | Cane Yield (t/ha) | | | | Sucrose % | | | |
|---|---|---|---|---|---|---|---|---|
| | **Plant I (2012-13)** | **Plant II (2013-14)** | **Mean** | **Ratoon (2013-14)** | **Plant I (2012-13)** | **Plant II (2013-14)** | **Mean** | **Ratoon (2013-14)** |
| Genotypes | | | | | | | | |
| CoPb 09181 | 105.1 | 128.9 | 117.0 | 76.3 | 16.69 | 14.72 | 15.7 | 16.42 |
| CoPb 08211 | 61.6 | 70.6 | 66.1 | 55.0 | 19.56 | 17.11 | 18.3 | 17.52 |
| CoPb 08212 | 88.5 | 94.3 | 91.4 | 69.7 | 18.63 | 15.87 | 17.3 | 18.16 |
| CD (5%) | 8.9 | 11.4 | | 3.1 | 0.60 | 0.85 | | NS |
| N levels (RDN) | | | | | | | | |
| 75% | 78.5 | 89.2 | 83.9 | 60.6 | 18.39 | 15.61 | 17.0 | 16.99 |
| 100% | 87.9 | 101.2 | 94.6 | 69.2 | 18.36 | 15.91 | 17.1 | 17.49 |
| 125% | 88.8 | 103.4 | 96.1 | 71.2 | 18.12 | 16.19 | 17.2 | 17.61 |
| CD (5%) | 8.9 | 11.4 | | 3.1 | NS | NS | | NS |

**Table AS 42.1.6:** Cane yield (t/ha) and sucrose% of mid-late maturing sugarcane genotypes in Plant I – Ratoon – Plant II cycle

| Treatment | Cane Yield (t/ha) | | | | Sucrose % | | | |
|---|---|---|---|---|---|---|---|---|
| | **Plant I (2012-13)** | **Plant II (2013-14)** | **Mean** | **Ratoon (2013-14)** | **Plant I (2012-13)** | **Plant II (2013-14)** | **Mean** | **Ratoon (2013-14)** |
| Genotypes | | | | | | | | |
| CoPb 08217 | 84.3 | 111.6 | 98.0 | 61.4 | 16.52 | 13.86 | 15.19 | 15.48 |
| CoH 08263 | 92.7 | 124.6 | 108.7 | 81.5 | 15.47 | 13.18 | 14.33 | 14.83 |
| CoH 08264 | 100.5 | 121.3 | 110.9 | 59.3 | 16.42 | 14.98 | 15.70 | 16.80 |
| CD (5%) | 10.1 | 9.7 | | 9.7 | 0.75 | 0.64 | | 1.02 |
| N levels (RDN) | | | | | | | | |
| 75% | 82.2 | 108.9 | 95.6 | 59.6 | 16.29 | 13.77 | 15.03 | 15.13 |
| 100% | 95.4 | 123.7 | 109.6 | 70.3 | 15.77 | 14.08 | 14.93 | 16.02 |
| 125% | 100.0 | 124.8 | 112.4 | 72.2 | 16.35 | 14.16 | 15.70 | 15.95 |
| CD (5%) | 10.1 | 9.7 | | 9.7 | NS | NS | | NS |

**2. KOTA:**

The experimental soil was clay loam in texture, alkaline in reaction (8.15) and was medium in available phosphorus (23.6 Kg /ha) and high in available nitrogen (355.0 kg /ha) and potassium (287.0 kg/ha) during both the years having organic carbon 0.55%. The experiments crop was planted on 14.03.2013 and harvested on 15.02.2014.The experiment consisted of 4 genotypes viz; Co-06033, CoLK-07201, CoH-06247 and CoPK-05191(c) and three fertility levels viz; $F_1$ - 75% of the recommended dose of NPK (150:45:.50), 100% of the recommended dose of NPK (200:60:40) and 125% of the recommended dose of NPK (250:75:50).

Perusal of data (Table AS 42.2.1) revealed that among genotypes CoH-06247 recorded significantly higher tiller count, cane length, millable cane and cane yield over other genotypes and at par with Co-06033. Cane variety CoH-06247 recorded the highest cane yield (104.30 t/ha) and millable canes (131220.00 / ha) and found significantly superior to variety CoLK-07201 and check CoPK-05191, whereas at par with Co-06033. Sucrose content, CCS (%) and CCS yield did not significant differs in among genotypes being higher in CoPK-05191 followed by CoH-06247, Co-06033 and CoLK-07201. Among the genotypes CoPK-05191 recorded significant higher sugar yield (12.06 t / ha) over CoLK-07201 and on par with rest of the genotypes. Increasing fertilizer dose from 75 to 125% RDF of recommended did not influence germination, cane length and single cane weight. However, tiller count, millable cane and cane yield increased significantly upto 100% of recommended NPK fertilizer. Cane quality remained unaffected under different fertility levels. Interaction between genotypes and fertility levels were found non-significant during 2013-14.

**Summary:** Among genotypes CoH-06247 produced significantly higher millable cane and cane yield over CoLK-07201 and at par with CoPK-05191 and Co-06033. However, CoPK-05191 also maintained its superiority over other genotypes in terms of cane quality. Cane yield increased significantly up to 100% of the recommended dose of NPK fertilizer in different genotypes during both the years.

**Table: AS 42.2.1:** Effect of genotypes and fertility levels on yield attributes, yield and quality of the sugarcane

| Treatment | Germination (%) | Tillers (000/ha) | Cane length (cm) | Millable cane (000ha) | Single cane weight (g) | Cane yield (t/ha) | Pol % in juice | CCS (%) | CCS yield (t/ha) |
|---|---|---|---|---|---|---|---|---|---|
| **Varieties** | | | | | | | | | |
| CO-06033 | 45.4 | 140.58 | 217.89 | 127.78 | 800.00 | 94.16 | 17.87 | 12.30 | 11.58 |
| COLK-7201 | 42.7 | 131.88 | 201.79 | 116.89 | 817.00 | 88.82 | 17.46 | 12.00 | 10.65 |
| CoH-6247 | 47.5 | 150.81 | 225.78 | 131.22 | 820.00 | 104.30 | 16.74 | 11.47 | 11.97 |
| CoPK-05191(c) | 42.9 | 142.46 | 211.56 | 125.56 | 835.00 | 95.70 | 18.28 | | 12.06 |
| SEm ± | 0.76 | 2.40 | 3.09 | 1.69 | 11.96 | 2.27 | 0.24 | 0.15 | 0.20 |
| CD(P=0.05) | 2.20 | 6.93 | 8.93 | 4.87 | NS | 6.55 | 0.68 | 0.43 | 0.58 |
| CV | 8.34 | 8.31 | 7.07 | 6.60 | 7.12 | 7.75 | 6.58 | 6.04 | 8.55 |
| **Fertility levels** | | | | | | | | | |
| 75 % RDF | 43.8 | 130.93 | 207.08 | 117.42 | 810.20 | 87.90 | 17.21 | 11.70 | 10.68 |
| 100 RDF | 44.5 | 143.14 | 214.84 | 128.17 | 819.50 | 98.47 | 17.60 | 12.10 | 11.74 |
| 125 RDF | 45.5 | 150.22 | 220.83 | 130.50 | 824.30 | 100.88 | 17.94 | 12.40 | 12.26 |
| SEm ± | 1.52 | 4.80 | 6.18 | 3.38 | 12.26 | 3.03 | 0.47 | 0.30 | 0.40 |
| CD(P=0.05) | NS | 13.85 | NS | 9.75 | NS | 8.75 | NS | NS | 1.17 |
| CV | 8.34 | 8.31 | 7.07 | 6.60 | 7.12 | 7.75 | 6 | 6.04 | 8.55 |

## 3. KAPURTHALA

The experiments on early and mid-late genotypes were conducted on loamy soil, tested medium in organic carbon (0.66 %), very high in available P (59.5 kg/ha) and very high in available K (925 kg/ha).

**EARLY MATURITY SET**

For early group trial, three genotypes Co 06032, Co 07025 and CoPb 09181 were tested against check variety CoJ 83 (Table 42.3.1). The genotypes recorded significant differences in terms of growth and cane yield. The genotype CoPb 91 recorded significantly high cane yield (89.5 t $ha^{-1}$) which was 35.6% higher than standard CoJ 83 and was at par with Co 06032. The number of tillers of genotype Co 6032 and CoPb 91 were significantly less than of Co 07025 and check CoJ 83. The number of millable canes of genotypes Co 06032, CoPb 09181 and CoJ 83 were significantly higher (99.0, 98.7 & 89.9 t/ha, respectively) than Co 07025 (64.1 t/ha). Even though the single cane weight of the genotype Co 07025 was significantly higher than Co 06032 & check CoJ 83 and at par with CoPb 09181 but due to more no. of millable canes of CoPb 91 than Co 07025, the cane yield of the former was significantly higher than the latter. The quality aspect of early genotypes revealed that all the genotypes differed significantly in terms of Pol % (juice). The Pol % of the check CoJ 83 was highest followed by CoPb 91, Co 07025 and Co 06032, respectively.

**Table- 42.3.1** Effect of genotypes and fertilizer levels on performance of sugarcane (Early set)

| **Treatment** | **Germination %** | **Tiller Count (000/ha)** | **Cane length (cm)** | **Internodes/ cane** | **Millable canes (000/ha)** | **Cane yield (t/ha)** | **Single Cane wt. (g)** | **Pol % juice** |
|---|---|---|---|---|---|---|---|---|
| Co 06032 | 38.2 | 135.4 | 225.6 | 21.4 | 99.0 | 80.6 | 876.7 | 14.83 |
| Co 7025 | 39.8 | 152.0 | 227.9 | 23.8 | 64.1 | 77.3 | 1270.0 | 15.75 |
| CoPb 91 | 40.1 | 134.8 | 221.6 | 19.3 | 98.7 | 89.5 | 1043.3 | 16.92 |
| CoJ 83 | 42.3 | 155.0 | 181.6 | 24.2 | 89.9 | 66.0 | 725.6 | 18.42 |
| **CD (0.05)** | **NS** | **11.7** | **NS** | **3.4** | **18.5** | **12.0** | **212.6** | **0.61** |
| **Fertility level** | | | | | | | | |
| 75 % of rec. N | 39.3 | 130.0 | 208.3 | 21.9 | 90.9 | 78.4 | 961.7 | 16.10 |
| 100 % of rec. N | 40.2 | 151.2 | 212.9 | 21.9 | 89.6 | 78.9 | 928.3 | 16.45 |
| 125 % of rec. N | 40.8 | 154.4 | 221.3 | 22.7 | 83.3 | 78.2 | 1046.7 | 16.28 |
| **CD (0.05)** | **NS** | **12.1** | **NS** | **NS** | **NS** | **9.9** | **NS** | **NS** |
| V x N | **NS** | **NS** | **NS** | **NS** | **NS** | **NS** | **NS** | **NS** |

Application of either 100% or 125% of the recommended dose of nitrogen to the early maturing genotypes helped in significantly improving the number of tillers, as compared to the treatments 75% of the recommended dose of nitrogen was applied. The other growth parameters like germination, cane length, internodes per cane, followed a similar trend as that of number of tillers but the level of significance could not be achieved. The highest cane yield of 78.9 t $ha^{-1}$ was obtained when the nitrogen was applied at the recommended rates (100 % N).

**Summary:** Genotype CoPb 09181 recorded the highest cane yield while the standard check CoJ 83 recorded highest Pol % juice. The cane yield with 100% of recommended nitrogen was highest i.e.78.9 t/ha and was at par with other two fertilizer levels**.**

**MID-LATE MATURITY SET:**

Among the mid maturing group, all the genotypes CoJ 88, Co Pb 05211, CoH 06266 and CoPb 06219 showed significant differences in terms of growth and cane yield (Table 42.3.2). CoH 06266 recorded the highest cane yield of 88.8 t $ha^{-1}$ which was significantly better than CoPb 05211and CoJ88 but was at par with CoPb 06219. The extent of increase in cane yield with CoH 06266 over the check variety CoJ88 was found to be 20.7%. The number of tillers and millable caes too recorded significant differences and exhibited the trend as CoPb 06219 > CoH 06266 > CoJ 88 > CoPb 05211.

**Table- 42.3.2** Effect of genotypes and fertilizer levels on performance of sugarcane (mid-late)

| **Treatments** | **Germination %** | **Tiller Count (000/ha)** | **Cane length (cm)** | **Internodes /cane** | **Millable canes (000/ha)** | **Cane yield (t/ha)** | **Single Cane wt. (g)** | **Pol % juice** |
|---|---|---|---|---|---|---|---|---|
| CoJ 88 | 35.8 | 136.5 | 185.4 | 21.7 | 101.6 | 73.6 | 734.4 | 19.45 |
| Co Pb 06219 | 40.2 | 162.1 | 208.6 | 23.1 | 108.6 | 88.1 | 804.4 | 14.91 |
| CoH 06266 | 27.2 | 103.5 | 229.9 | 24.2 | 93.3 | 88.8 | 972.1 | 16.25 |
| CoPb 05211 | 30.3 | 84.5 | 184.9 | 23.0 | 85.0 | 69.4 | 801.1 | 17.55 |
| **CD (0.05)** | **10.8** | **7.1** | **NS** | **NS** | **NS** | **10.1** | **NS** | **0.43** |
| **Fertility level** | | | | | | | | |
| 75 % of rec. N | 33.6 | 121.5 | 197.9 | 22.8 | 89.5 | 71.2 | 805.8 | 16.91 |
| 100 % of rec. N | 33.4 | 125.3 | 199.9 | 22.3 | 99.8 | 82.5 | 831.3 | 17.03 |
| 125 % of rec. N | 33.6 | 118.4 | 209.2 | 23.9 | 102.1 | 85.7 | 847.1 | 17.18 |
| **CD (0.0 5)** | **NS** | **NS** | **NS** | **NS** | **NS** | **7.4** | **NS** | NS |
| V x N | NS | NS | NS | **NS** | NS | NS | NS | NS |

The cane quality too was influenced, as the standard check CoJ 88, recorded significantly highest Pol % juice followed by CoPb 05211, CoH 06266 & CoPb 06219, respectively.

Restricting the application of nitrogen to 75% of the recommended dose significantly reduced the cane yield as compared to the 100% or 125% of the recommended dose of nitrogen. Different nitrogen levels did not show any significant effect on other growth parameters and the cane quality recorded except plant height where 150 % N recorded significantly higher plant height than 75% of recommended Nitrogen.

**Summary:** The genotype CoH 06266 recorded the highest cane yield and was comparable to CoPb 6219 being significantly better than the genotype CoPb 05211 & the check CoJ88. The all three new genotypes were significantly poor to check variety CoJ 88 in terms of Pol % juice. Fertilizing the crop with 100% recommended dose of nitrogen i.e. 150 kg N $ha^{-1}$ significantly improved cane yield over 75% of the recommended dose of nitrogen but was at par to 125% of the recommended dose of nitrogen.

**4. LUCKNOW:**

An experiment was conducted to evaluate three sugarcane genotypes (CoH 06265, CoS 06247 and CoH 06266) under three NPK levels (112.5, 45, 45; 150, 60, 60 and 187.5,75,75 kg/ha) with a view to identifying suitable genotype under various fertilizer schedules in spring season. Initial soil chemical analysis indicated that soil was low in organic carbon (0.46%) and available nitrogen (262 kg/ha); medium in phosphorus (39.5 kg $P_2O_5$/ha) and potassium (284 kg $K_2O$ /ha) contents. Sugarcane planting was done in the month of February 2013.

Sugarcane genotype, CoH 06265 produced the highest number of millable cane (102350/ha) followed by CoS 06247 (90840/ha) and CoH 06266 (76830/ha -Table AS 42.4.1). The highest cane length (213.9 cm) was recorded with genotype CoS 06247 but thicker canes (2.477 cm diameter) were harvested with the genotype CoH 06265. Thus both the genotypes could not yield significant difference in individual cane weight. Genotype, CoH 06266 recorded the lowest mean cane weight (924 g). There were no significant differences in sucrose content of different genotypes. The highest cane and sugar yields (88.5 and 11.1 t/ha, respectively) was observed with genotype CoH 06265. It was followed by CoS 06247 (79.4 and 9.96 tonnes cane and sugar yields/ha, respectively).

Mean number of millable canes, cane length, diameter, weight and cane and sugar yields significantly increased up to application of 150, 60, 60 kg NPK/ha. Recommended level of NPK i.e., 150, 60 and 60 kg /ha fetched significantly higher cane (80.12 t/ha) and sugar yields (9.99 t/ha) which was at par with 125% NPK levels. Different fertility levels could not influence the juice quality parameters significantly. The interaction between genotypes and fertility levels were not significant.

**Table AS 42.4.1:** Influence of different treatments on growth, quality and yield of sugarcane crop

| Treatment | NMC (000/ha) | Cane length (cm) | Came diameter (cm) | Cane weight (g) | °Brix | Pol % Juice | Purity % | Cane yield (t/ha) | Sugar yield (t/ha) |
|---|---|---|---|---|---|---|---|---|---|
| **Genotypes** | | | | | | | | | |
| **CoH 06265** | 102.35 | 203.4 | 2.477 | 1059 | 20.59 | 18.15 | 87.99 | 88.5 | 11.10 |
| CoS 06247 | 90.84 | 213.9 | 2.339 | 1186 | 20.46 | 18.12 | 88.15 | 79.4 | 9.96 |
| CoH 06266 | 76.83 | 197.06 | 2.291 | 924 | 20.52 | 17.95 | 87.50 | 63.6 | 7.86 |
| SE m± | 2.84 | 4.22 | 0.048 | 43.20 | 0.058 | 0.067 | 0.19 | 3.50 | 0.26 |
| *CD (P=0.05)* | 8.51 | 12.65 | 0.14 | 129.50 | NS | NS | NS | 10.49 | 0.81 |
| Fertility levels (NPK kg/ha) | | | | | | | | | |
| 112.5,45,45 | 79.80 | 198.3 | 2.187 | 963 | 20.52 | 18.06 | 87.71 | 69.82 | 8.70 |
| 150,60,60 | 93.49 | 211.3 | 2.406 | 1118 | 20.53 | 18.07 | 87.97 | 80.12 | 9.99 |
| 187.5,75,75 | 96.74 | 204.8 | 2.514 | 1088 | 20.52 | 18.10 | 87.96 | 81.46 | 10.19 |
| SE m± | 4.84 | 6.22 | 0.048 | 0.073 | 0.058 | 0.067 | 0.19 | 8.03 | 0.26 |
| **CD (P=0.05)** | 8.51 | 12.65 | 0.14 | 129.50 | NS | NS | NS | 10.49 | 0.81 |

**Summary:** Sugarcane genotype, CoH 06265 produced the highest number of millable cane (102350/ha) followed by CoS 06247 (90840/ha) and CoH 06266 (76830/ha). There were no significant differences in sucrose content of different genotypes. The highest cane and sugar yields (88.5 and 11.1 t/ha, respectively) was observed with genotype CoH 06265. Recommended level of NPK i.e., 150, 60 and 60 kg /ha fetched significantly higher cane (80.12 t/ha) and sugar yields (9.99 t/ha) which was at par with 125% NPK levels.

## 5. PANTNAGAR

Sugarcane crop was planted on March 7, 2013 at 75 cm apart in 10 cm deep furrow. Three budded 4 setts were planted per meter row length. Setts were treated with 0.25 % solution of Carbendazim to prevent from fungal infection if any. Half dose of N (as per treatment) along with full dose of $P_2O_5$ (60 kg/ha) and $K_2O$ (40 kg/ha) were given as basal and remaining N was top dressed in two splits within 90 days after planting. Cultural operations were performed as per recommendation and need of the crop. The experimental soil was silty loam in texture, rich in organic carbon (1.05 %) and medium in available $P_2O_5$ (49.0 kg/ha) and $K_2O$ (240.7 kg/ha) with neutral reaction (pH 7.4). The crop was harvested on 10.03.2014

**Results:** Data given in table AS 42.5.1 revealed that higher germination (44.4%) was recorded in genotype Co Pant 4222 which was significantly higher over Co Pant 5224 and Co Pant 2218. Shoot population at 120 days of crop was highest (146.0) in genotype 5224 which was significantly higher over Co Pant 2218. Average cane weight (individual) was highest (943.0 g) in genotype Co Pant 5224 which was found significantly higher over Co Pant 6224. NMC (000/ha) were recorded highest (88.0) in the genotype Co Pant 5224 which were significantly higher over rest of the genotypes (Co Pant 6224, Co Pant 4222 and Co Pant 2218). Cane yield (ton/ha) was highest in genotype Co Pant 5224 which was significantly higher over rest of the treatments. Highest CCS yield was recorded in genotype Co Pant 2218 which was significantly higher over Co Pant 5224.

Germination % at 45 DAP could not be influenced due to N levels and data was found non-significant. Shoot population was recorded higher in 125 % of the recommended N levels (120 kg N/ha) which was found significantly higher over 75 % of the recommended N at different stage of crop growth (60, 90 and 120 DAP). Average cane weight, NMC, Cane yield (ton/ha) were significantly higher at 125 % of the recommended N over 75 or 100 % of the recommended. CCS yield was highest in 125 % of the recommended N which was significantly higher over 75 and 100 % of the recommended.

**Summary:** Genotype Co Pant 5224 performed better for higher NMC, Cane yield, individual cane weight over rest of the genotypes. However, CCS yield was recorded highest in Co Pant 2218. Higher NMC, average cane weight, shoot population, cane yield and CCS yield were recorded higher in 125 % of the recorded N (150 kg N/ha) over 75 or 100 % the recommended in sugarcane.

**Table AS 42.5.1**: Effects of genotypes and fertility levels on growth and yield of spring planted sugarcane

| Treatment | Germination (%) at 45 DAP | Shoot population (000/ha) | | | Average Cane weight (g) | NMC (000/ha) | Cane yield (t/ha) | Sucrose (%) | C.C.S. t/ha |
|---|---|---|---|---|---|---|---|---|---|
| | | 60 DAP | 90 DAP | 120 DAP | | | | | |
| **Genotypes** | | | | | | | | | |
| CoPant 5224 | 37.7 | 132.8 | 144.0 | 146.0 | 943 | 88.0 | 87.7 | 13.4 | 6.9 |
| CoPant 6224 | 38.0 | 102.3 | 140.1 | 145.5 | 780 | 86.4 | 84.5 | 14.6 | 7.3 |
| CoPant 4222 | 44.4 | 137.6 | 133.3 | 131.7 | 924 | 80.4 | 82.2 | 14.9 | 7.5 |
| CoPant 2218 | 37.2 | 102.9 | 97.6 | 103.4 | 923 | 87.7 | 85.5 | 15.0 | 7.8 |
| SEm ± | 2.2 | 6.6 | 6.6 | 6.4 | 23.8 | 0.2 | 0.2 | 0.07 | 0.2 |
| CD at 5% | 6.6 | 19.6 | 19.6 | 18.9 | 69.9 | 0.6 | 0.6 | 0.2 | 0.6 |
| **Fertility levels (% of Recommended N)** | | | | | | | | | |
| 75 | 37.2 | 104.6 | 122.5 | 125.9 | 793 | 84.4 | 82.9 | 15.6 | 6.9 |
| 100 | 39.1 | 121.4 | 127.4 | 131.1 | 894 | 85.9 | 85.1 | 14.4 | 7.3 |
| 125 | 41.8 | 130.6 | 136.4 | 138.1 | 990 | 86.6 | 86.8 | 13.5 | 8.0 |
| SEm± | 1.9 | 5.7 | 5.7 | 3.5 | 20.6 | 0.1 | 0.2 | 0.06 | 0.2 |
| CD at 5 % | NS | 16.9 | 16.9 | 10.8 | 60.5 | 0.5 | 0.6 | 0.2 | 0.6 |

**(Recommended dose of N was 120 kg/ha)**

## 6. SHAHJAHANPUR

The soil of experimental site was medium in organic carbon (0.66%) and available low in potash (176 kg/ha). Available phosphorus (16.16 kg/ha) with pH 6.58. Planting of crop was done on March, 16, 2013 and harvested on March 11, 2014.

Experimental results (Table AS 42.6.1) indicated that genotypes CoS 07240 gave significantly higher cane yield (86.53 t/ha) than that of genotype CoS 03251. CCS % in cane was found significantly higher in genotype CoS 03251 than that of CoS 07240 and CoS 03261. In case of fertility levels, 125% of recommended dose of NPK produced significantly higher cane yield of 85.61 t/ha than that of 75% of recommended dose of NPK and it was followed by 100% of recommended dose of NPK. CCS % in cane was not affected significantly with different fertilizer levels.

**Summary:** Genotpe CoS 07240 produced significantly higher cane yield of 86.53t/ha followed by CoS 03261 with cane yield of 81.17 t/ha, CCS % in cane was found significantly higher in genotype CoS 03251 as compared to CoS 07240 and CoS 03261. In case of fertilizer levels significantly higher cane yield (85.61 t/ha) was obtained with 125% of the recommended dose of NPK and it was at par with 100% recommended NPK.

**Table AS 42.6.1:** Effect of treatments on germination, shoots, millable canes, cane yield and CCS % of cane (2013-14)

| Treatment | Germination (%) | Shoots (000/ha) | NMC (000/ha) | Cane yield (t/ha) | CCS (%) |
|---|---|---|---|---|---|
| (A) Genotypes | | | | | |
| 1- CoS 03251 | 33.96 | 130.669 | 102.090 | 78.40 | 11.77 |
| 2- CoS 07240 | 52.80 | 150.785 | 120.284 | 86.53 | 11.38 |
| 3- CoS 03261 | 39.42 | 141.140 | 113.379 | 81.17 | 11.16 |
| SE± | 2.87 | 4.31 | 3.97 | 3.60 | 0.11 |
| CD 5% | 6.11 | 9.19 | 8.46 | 7.67 | 0.22 |
| (B) Fertilizer levels | | | | | |
| 1-75% recommended dose of NPK | 48.08 | 149.073 | 106.905 | 74.77 | 11.45 |
| 2-100% recommended dose of NPK | 45.77 | 162.614 | 116.436 | 83.42 | 11.47 |
| 3-125% recommended dose of NPK | 42.33 | 170.909 | 122.414 | 85.61 | 11.38 |
| SE± | 2.87 | 4.31 | 3.97 | 3.60 | 0.11 |
| CD 5% | 6.11 | 9.19 | 8.46 | 7.67 | NS |

## 7. UCHANI

The experiments were conducted on early (Co 7023, Co 7025, CoLk 7201 and CoH 7261) and mid-late (CoLk 7203, CoPb 7212, CoS 7234 and CoH 7263) sugarcane varieties in factorial RBD with three replications. The crop was planted at 75 cm row spacing on March 7, 2013. The soil of the experimental field was clay loam in texture having pH 8.0, EC 0.4 $dSm^{-1}$, organic carbon 0.38%, available P 12.0 kg/ha and available K 168 kg/ha. Recommended doses of phosphorus (50 kg $P_2O_5$/ha) and potash (50 kg $K_2O$/ha) were applied at the time of planting whereas nitrogen as per treatments was applied in three equal splits taking 150 kg/ha as recommended. The harvesting of the experiment was done on February 20, 2014.

In early group, significantly higher germination was recorded in variety CoLk7201 ( 55.1%) and CoH 7261( (55.1%) as compared to Co7023 ( 51.1%) and Co 7025 ( 49.9%). Variety CoLk 7201 and Co 7025 being at par produced significantly higher number of millable canes and cane yield as compared to variety Co 7023 and CoH 7261 (Table AS 42.7.1). Variety CoLk 7201 (11.21 t/ha) produced highest sugar yield followed by Co 07025 (10.90 t/ha), CoH 7261 (10.38 t/ha) and lowest in Co 7023 (10.18 t/ha). Recommended and 25 % higher doses of N being at par recorded significantly higher number of tillers, millable canes and cane and sugar yield over 75% of recommended dose of N.

The data presented in table AS 42.7.2 revealed that in mid-late group, significantly higher germination was recorded in variety COS 7234 ( 59.0 %) and CoPb 7212( 56.3%) as compared to CoH 7263 ( 49.1%) and CoLk 7203(42.9%). Varieties CoPb 7212 and CoS7234 being at par produced significantly higher number of millable canes as compared to CoLk 7203 and CoH 7263. Varieties CoLk 7203, CoPb 7212 and CoS7234 being at par recorded significantly higher cane yield as compared to variety CoH 7263. Highest sugar yield was recorded in variety CoPb 7212 (12.25 t/ha) followed by CoLk 7203(11.92 t/ha), CoS 7234 (11.82 t/ha) and lowest in CoH 7263 (11.31 t/ha). Recommended and 25 % higher doses of N being at par recorded significantly higher number of tillers, millable canes and cane and sugar yield over 75% of recommended dose of N.

**Summary:** In early group Variety CoLk 7201 ( 91.5 t/ha) and Co 7025 ( 88.2 t/ha) being at par produced significantly higher cane yield as compared to variety CoH 7261 ( 84.5 t/ha) and Co 7023 ( 82.1 t/ha) Whereas in mid late group varieties CoPb 7212 ( 99.5 t/ha), CoLk 7203 ( 98.2 t/ha) and CoS7234 ( 96.9 t/ha) being at par produced significantly higher cane yield as compared to variety CoH 7263 ( 92.4 t/ha). All the varieties in both the group responded up to recommended dose of nitrogen fertilizers.

**Table AS 42.7. 1:** Effect of different fertility levels on growth, yield and quality of early group varieties

| Treatment | Germination (%) | No. of tillers (000/ha) | No. of millable canes (000/ha) | Single cane weight (g) | Cane yield (t/ha) | CCS (%) | Sugar yield (t/ha) |
|---|---|---|---|---|---|---|---|
| **Genotypes** | | | | | | | |
| Co 7023 | 51.1 | 126.5 | 96.9 | 857 | 82.1 | 12.39 | 10.18 |
| Co 7025 | 49.9 | 132.6 | 100.5 | 888 | 88.2 | 12.35 | 10.90 |
| CoLk 7201 | 55.1 | 138.9 | 105.0 | 882 | 91.5 | 12.24 | 11.21 |
| CoH 7261 | 55.1 | 125.0 | 95.9 | 891 | 84.5 | 12.29 | 10.38 |
| CD at 5% | 2.7 | 5.9 | 5.7 | 17.9 | 3.6 | .09 | 0.25 |
| **Nitrogen dose** | | | | | | | |
| 75% of recom. | 52.7 | 122.0 | 92.1 | 852 | 77.6 | 12.29 | 9.53 |
| Recommended | 53.2 | 133.2 | 101.8 | 891 | 89.6 | 12.35 | 11.07 |
| 125% of recom. | 52.5 | 137 | 104.8 | 895 | 92.6 | 12.33 | 11.41 |
| CD at 5% | NS | 5.1 | 5.2 | 16.2 | 2.9 | NS | 0.21 |

* Recommended Nitrogen - 150 kg /ha

**Table AS 42.7.2:** Effect of different fertility levels on growth, yield and quality of mid- late group varieties

| Treatment | Germination (%) | No. of tillers (000/ha) | No. of millable canes (000/ha) | Single cane weight (g) | Cane yield (t/ha) | CCS (%) | Sugar yield (t/ha) |
|---|---|---|---|---|---|---|---|
| **Genotypes** | | | | | | | |
| CoLk 7203 | 42.9 | 138.9 | 106.2 | 934 | 98.2 | 12.14 | 11.92 |
| CoPb 7212 | 56.3 | 152.2 | 115.0 | 875 | 99.5 | 12.30 | 12.25 |
| CoS 7234 | 59.0 | 155.1 | 117.2 | 835 | 96.9 | 12.20 | 11.82 |
| CoH 7263 | 49.1 | 134.0 | 99.6 | 938 | 92.4 | 12.24 | 11.31 |
| CD at 5% | 3.4 | 5.4 | 4.9 | 20 | 4.2 | .07 | 0.53 |
| **Nitrogen dose** | | | | | | | |
| 75% of recom. | 51.8 | 136.8 | 102.3 | 849 | 85.3 | 12.18 | 10.39 |
| Recommended | 52.8 | 147.5 | 111.8 | 915 | 100.7 | 12.24 | 12.33 |
| 125% of recom. | 50.8 | 150.8 | 114.4 | 925 | 104.3 | 12.23 | 12.76 |
| CD at 5% | NS | 4.7 | 4.3 | 17 | 3.7 | NS | 0.46 |

## 8. SRIGANGANAGAR

### EARLY GROUP:

The experiment was conducted on sandy loam soil having initial pH 8.2, EC 0.34 dS/m, OC 0.35%, $P_2O_5$ 22 kg/ha and $K_2O$ 356 kg/ha. Planting was done on 9.3.2013 and harvest was performed on 15.01.2014. In early group two new genotypes CoPb 09181 and CoH 09263 were tested against local check variety Co 6617. The genotypes recorded significant difference in terms of growth and cane yield. Genotype CoPb 09181 recorded highest cane yield of 87.29 t/ha which was significantly higher over the genotype CoH 09263 (72.29 t/ha) but was comparable to local check Co 6617 (86.52 t/ha). Genotype CoPb 09181 also recorded significantly heavier, thicker and longer canes than both the genotypes. The genotype CoPb 09181 (17.39%) was significantly better in sucrose % than the local check Co 6617 (17.08%) and CoH 09263 (16.24%).

In different N levels, application of either recommended or 125% of the recommended dose of N significantly improved yield and yield attributes as compared to 75% of the recommended dose of nitrogen. However, differences between recommended and 125% N for yield and yield attributes were non-significant. Different N levels did not show any significant effect on cane quality. Interaction between genotypes and N levels were also found non-significant.

**Summary:** Genotype CoPb 09181 recorded highest cane yield of 87.29 t/ha which was significantly higher over the genotype CoH 09263 (72.29 t/ha) but was comparable to local check Co 6617 (86.52 t/ha). In different N levels, application of either recommended or 125% of the recommended dose of N significantly improved yield and yield attributes as compared to 75% of the recommended dose of nitrogen.

**Table AS 42.8.1:** Effect of different nitrogen levels on growth, yield and quality of early genotypes

| Treatment | Germination (%) | Tiller (000/ha) | NMC (000/ha) | Cane length (m) | Cane diameter (cm) | Single cane wt (kg) | Cane yield (t/ha) | Sucrose % |
|---|---|---|---|---|---|---|---|---|
| **Genotypes** | | | | | | | | |
| CoPb 09181 | 38.72 | 138.27 | 71.29 | 2.28 | 2.81 | 1.16 | 87.29 | 17.39 |
| CoH 09263 | 41.57 | 151.29 | 90.75 | 1.93 | 2.32 | 0.90 | 73.29 | 16.24 |
| Co 6617 | 42.72 | 154.57 | 95.62 | 2.06 | 2.29 | 0.96 | 86.52 | 17.08 |
| CD at 5% | 2.67 | 4.96 | 8.29 | 0.16 | 0.08 | 0.07 | 6.12 | 0.26 |
| **Nitrogen levels (% of recommended 150 kg N/ha)** | | | | | | | | |
| 75 | 41.75 | 141.75 | 74.27 | 1.98 | 2.39 | 0.92 | 76.29 | 17.36 |
| 100 | 41.16 | 149.32 | 88.74 | 2.13 | 2.69 | 0.99 | 84.76 | 17.21 |
| 125 | 40.87 | 152.29 | 93.35 | 2.19 | 2.76 | 1.11 | 86.53 | 17.19 |
| CD at 5% | NS | 4.96 | 8.29 | 0.16 | 0.08 | 0.07 | 6.12 | NS |

**MID-LATE GROUP:**

In midlate group, three genotypes namely Co 09022, CoH 09264 and CoLk 09204 were tested. All the genotypes showed significant differences in terms of growth, yield and cane quality. The genotype CoH 09264 recorded significantly thicker (2.48 cm) and heavier (1.28 kg) canes as well as higher cane yield (98.38 t/ha) than rest of the genotypes under testing. While the highest tillering and number of millable canes were recorded with variety CoLk 09204. Highest sucrose % was also recorded by the genotype CoLk 09204 (17.17%) but at par with Co 09022 (16.98%).

The yield and yield attributes were influenced significantly due to different nitrogen levels. Highest cane yield was recorded in 125% N of the recommended (150 kg N/ha) which was significantly higher over 75% of the recommended N but at par with the recommended level of nitrogen. Different nitrogen levels did not show any significant effect on the cane quality recorded at the time of harvesting. Similarly, interaction between genotypes and N levels were also found non-significant.

**SUMMARY**: The genotype CoH 09264 recorded significantly thicker (2.48 cm) and heavier (1.28 kg) canes as well as higher cane yield (98.38 t/ha) than rest of the genotypes under testing. The yield and yield attributes were influenced significantly due to different nitrogen levels. Highest cane yield was recorded in 125% N of the recommended (150 kg N/ha) which was significantly higher over 75% of the recommended N but at par with the recommended level of nitrogen.

**Table AS 42.8.2:** Effect of different nitrogen levels on growth, yield and quality of midlate genotypes

| Treatment | Germination (%) | Tiller (000/ha) | NMC (000/ha) | Cane length (m) | Cane diameter (cm) | Single cane wt (kg) | Cane yield (t/ha) | Sucrose % |
|---|---|---|---|---|---|---|---|---|
| **Genotypes** | | | | | | | | |
| Co 09022 | 36.63 | 153.83 | 92.25 | 2.212 | 2.29 | 0.94 | 86.29 | 16.98 |
| CoH 09264 | 39.41 | 149.57 | 73.57 | 2.43 | 2.48 | 1.28 | 98.38 | 16.62 |
| CoLk 09204 | 38.76 | 164.24 | 106.61 | 2.38 | 2.31 | 0.98 | 90.47 | 17.17 |
| CD at 5% | 2.51 | 5.23 | 7.93 | 0.14 | 0.06 | 0.08 | 4.36 | 0.24 |
| **Nitrogen levels (% of recommended 150 kg N/ha)** | | | | | | | | |
| 75 | 38.14 | 152.29 | 84.26 | 2.19 | 2.31 | 0.96 | 88.29 | 17.03 |
| 100 | 37.96 | 158.38 | 98.39 | 2.33 | 2.38 | 1.17 | 94.47 | 16.99 |
| 125 | 37.43 | 160.71 | 102.45 | 2.39 | 2.41 | 1.22 | 96.38 | 16.93 |
| CD at 5% | NS | 5.23 | 7.93 | 0.14 | 0.06 | 0.08 | 4.36 | NS |

## PENINSULAR ZONE

### 9. COIMBATORE

The experiment was continued during 2013-14 with the first plant crop of a new set of four promising sugarcane clones (Co 08001, Co 08008, Co 08016 and Co 08020) with Co 86032 as check. The experiment was planted on 2.4.2013. Germination was good in all varieties except Co 08001. However, because of the absence of rains during the initial stages of growth and the very poor quality of irrigation water the crop growth was not good. Many plants dries up and as the field had many gaps, the trial was discontinued. Recommended dose of N for the region is 225 kg/ha.

### 10. KOLHAPUR

**EARLY GROUP:**

It was revealed that, the growth parameters were affected significantly due to various genotypes except single cane weight. The sugarcane genotype CoN 07071 recorded significantly higher germination (55.47 %) and millable height (273.67 cm) over rest of the genotypes. Whereas, another genotype PI 07132 recorded significantly higher number of tillers (1,24,510 $ha^{-1}$) as well as number of millable canes (1,22,880 $ha^{-1}$) and number of internodes (21.25 $cane^{-1}$) but was found at par with PI 06132 in respect to number of tillers (1,17,020 $ha^{-1}$) and number

of millable canes (1,14,060 $ha^{-1}$). The standard check variety CoC 671 recorded significantly highest diameter of internode (3.49 cm) and numerically highest single cane weight (1.23 kg).

All growth parameters were found non-significant except germination due to different levels of fertilizer. Significantly higher germination (22.15 %) was recorded at 75 % RD N: $P_2O_5$: $K_2O$ $ha^{-1}$ and was found at par with other levels of fertilizer. Among the fertilizer levels, 100 % RD N:$P_2O_5$:$K_2O$ $ha^{-1}$ numerically higher number of tillers (1,14,180 $ha^{-1}$), number of millable canes (1,11,360 $ha^{-1}$) and millable height (247.67 cm) whereas, 125 % RD N:$P_2O_5$:$K_2O$ $ha^{-1}$ fertilizer level recorded numerically highest diameter of internode (3.09 cm), number of internodes (20.01 $cane^{-1}$) and single cane weight (1.20 kg). The interaction effect between genotypes and fertilizer levels was found to be non- significant as far as growth parameters are concerned.

The cane yield was influenced significantly due to different sugarcane genotypes. Among the tested genotypes, PI 07132 recorded significantly higher cane yield (128.05 t $ha^{-1}$) followed by PI 06132 (124.53 t $ha^{-1}$) and CoN 07071 (123.06 t $ha^{-1}$) and found at par with each other. However, significantly higher CCS yield (20.39 t $ha^{-1}$) was recorded by CoN 07071 and found at par with PI 06132 (20.09 t $ha^{-1}$) and PI 07132 (19.65 t $ha^{-1}$).

The cane and CCS yield were influenced significantly due to different fertilizer levels. The fertilizer level 125 % RD N: $P_2O_5$:$K_2O$ $ha^{-1}$ recorded significantly higher cane yield (126.72 t $ha^{-1}$) and CCS yield (20.60 t $ha^{-1}$) followed by 100 % RD N:$P_2O_5$:$K_2O$ $ha^{-1}$ which recorded cane yield (115.44 t $ha^{-1}$) and CCS yield (18.83 t $ha^{-1}$). The interaction effect between genotypes and fertilizer levels was found to be non-significant.

The quality parameters were affected significantly due to various genotypes. The standard check variety CoC 671 recorded significantly higher brix (23.25 %), sucrose (21.25 %) and CCS percentage (17.55 %), whereas significantly higher purity (94.03 %) was recorded by PI 06132.

The quality parameters were influenced significantly except sucrose percentage due to different fertilizer levels. The fertilizer level 75 % RD N: $P_2O_5$:$K_2O$ $ha^{-1}$ recorded significantly higher brix (22.15 %) and CCS percentage (16.71 %) whereas, 125 % RD N:$P_2O_5$:$K_2O$ $ha^{-1}$ recorded significantly higher purity (95.09 %). he quality parameters *viz.*, purity and CCS percentage were affected significantly due to the interaction effect between genotypes and fertilizer levels.

**Table AS 42.10. 1:** Mean data on growth parameters as affected by various treatments

| Sr. No. | Treatment | Growth parameters | | |
|---|---|---|---|---|
| | | Germination at 45 DAP ( %) | No. of tillers (000' ha$^{-1}$) | NMC ( 000'ha$^{-1}$) |
| **A.** | **Genotype** | | | |
| | $V_1$: PI 06132 | 50.44 | 117.02 | 114.06 |
| | $V_2$: PI 07132 | 49.54 | 124.51 | 122.88 |
| | $V_3$ : CoN 07071 | 55.47 | 107.84 | 105.00 |
| | $V_4$: CoC 671 | 46.54 | 101.20 | 98.72 |
| | S.E.+ | 2.23 | 3.37 | 3.38 |
| | C.D. 0.05 | 6.84 | 9.87 | 9.92 |
| **B** | **Fertilizer levels** | | | |
| | $N_1$: 75 % RD N:$P_2O_5$:$K_2O$ | 22.15 | 111.72 | 109.41 |
| | $N_2$ : 100 % RD N:$P_2O_5$:$K_2O$ | 21.94 | 114.18 | 111.36 |
| | $N_3$ : 125 % RD N:$P_2O_5$:$K_2O$ | 21.69 | 112.03 | 109.73 |
| | S.E. ± | 2.02 | 2.91 | 2.93 |
| | C.D. 0.05 | 5.92 | N.S. | N.S. |
| | Interaction (A x B) | | | |
| | S.E.± | 4.04 | 5.8 | 5.8 |
| | C.D. 0.05 | N.S. | N.S. | N.S. |
| | **G.M.** | **50.50** | **112.64** | **110.16** |

**Table AS 42.10.2:** Mean data on growth parameters as affected by various treatments

| Sr. No. | Treatment | Growth parameters | | | |
|---|---|---|---|---|---|
| | | Millable height (cm) | Diameter (cm) | No. of internodes Per cane | Single cane weight (kg) |
| **A.** | **Varieties** | | | | |
| | $V_1$: PI 06132 | 225.56 | 2.96 | 18.73 | 1.12 |
| | $V_2$: PI 07132 | 228.00 | 2.66 | 21.25 | 1.17 |
| | $V_3$ : CoN 07071 | 273.67 | 3.02 | 19.57 | 1.17 |
| | $V_4$: CoC 671 | 251.11 | 3.49 | 19.76 | 1.23 |
| | S.E. ± | 2.12 | 0.068 | 0.24 | 0.036 |
| | C.D. 0.05 | 6.21 | 0.20 | 0.71 | N.S. |
| **B** | **Fertilizer levels** | | | | |
| | $N_1$: 75 % RD N:$P_2O_5$:$K_2O$ | 241.25 | 3.05 | 19.57 | 1.18 |
| | $N_2$ : 100 % RD N:$P_2O_5$:$K_2O$ | 247.67 | 2.95 | 19.92 | 1.14 |
| | $N_3$ : 125 % RD N:$P_2O_5$:$K_2O$ | 244.83 | 3.09 | 20.01 | 1.20 |
| | S.E. ± | 1.83 | 0.059 | 0.21 | 0.031 |
| | C.D. 0.05 | N.S. | N.S. | N.S. | N.S. |
| | Interaction (A x B) | | | | |
| | S.E. ± | 3.66 | 0.12 | 0.42 | 0.062 |
| | C.D. 0.05 | N.S. | N.S. | N.S. | N.S. |
| | **G.M.** | **244.58** | **3.03** | **19.83** | **1.17** |

**Table AS 42.10.3:** Mean cane and CCS yield ($tha^{-1}$) as affected by various treatments

| Sr. No. | Treatment | Yield (t $ha^{-1}$) | |
|---|---|---|---|
| | | **Cane** | **CCS** |
| **A.** | **Genotype** | | |
| | $V_1$: PI 06132 | 124.53 | 20.09 |
| | $V_2$: PI 07132 | 128.05 | 19.65 |
| | $V_3$ : CoN 07071 | 123.06 | 20.39 |
| | $V_4$: CoC 671 | 97.29 | 17.05 |
| | S.E. ± | 4.06 | 0.66 |
| | C.D. 0.05 | 11.91 | 1.95 |
| **B** | **Fertilizer levels** | | |
| | $N_1$: 75 % RD $N:P_2O_5:K_2O$ | 112.52 | 18.46 |
| | $N_2$ : 100 % RD $N:P_2O_5:K_2O$ | 115.44 | 18.83 |
| | $N_3$ : 125 % RD $N:P_2O_5:K_2O$ | 126.72 | 20.60 |
| | S.E. ± | 3.52 | 0.58 |
| | C.D. 0.05 | 10.31 | 1.69 |
| | Interaction (A x B) | | |
| | S.E. ± | 7.03 | 1.154 |
| | C.D. 0.05 | N.S. | N.S. |
| | **G.M.** | **118.23** | **19.29** |

**Table AS 42.10.4:** Mean data on quality parameters as affected by various treatments

| Sr. No. | Treatment | Quality parameters | | | |
|---|---|---|---|---|---|
| | | **Brix %** | **Sucrose %** | **Purity %** | **CCS %** |
| **A** | **Genotype** | | | | |
| | $V_1$: PI 06132 | 21.47 | 20.18 | 94.03 | 16.05 |
| | $V_2$: PI 07132 | 20.64 | 19.39 | 93.96 | 15.43 |
| | $V_3$ : CoN 07071 | 22.36 | 20.89 | 93.45 | 16.75 |
| | $V_4$: CoC 671 | 23.25 | 21.25 | 91.42 | 17.55 |
| | S.E. ± | 0.094 | 0.14 | 0.61 | 0.09 |
| | C.D. 0.05 | 0.27 | 0.42 | 1.8 | 0.25 |
| **B** | **Fertilizer levels** | | | | |
| | $N_1$: 75 % RD $N:P_2O_5:K_2O$ | 22.15 | 20.30 | 91.7 | 16.71 |
| | $N_2$ : 100 % RD $N:P_2O_5:K_2O$ | 21.94 | 20.37 | 92.85 | 16.48 |
| | $N_3$ : 125 % RD $N:P_2O_5:K_2O$ | 21.69 | 20.61 | 95.09 | 16.15 |
| | S.E. ± | 0.81 | 0.12 | 0.53 | 0.08 |
| | C.D. 0.05 | 0.24 | N.S. | 1.56 | 0.22 |
| | Interaction (A x B) | | | | |
| | S.E. ± | 0.162 | 0.25 | 1.062 | 0.15 |
| | C.D. 0.05 | N.S. | N.S. | 3.11 | 0.44 |
| | **G.M.** | **21.93** | **20.43** | **93.21** | **16.45** |

**Summary:** Among the tested genotypes, PI 07132 recorded significantly higher cane yield (128.05 t $ha^{-1}$) followed by PI 06132 (124.53 t $ha^{-1}$) and CoN 07071 (123.06 t $ha^{-1}$) and found at par with each other. However, significantly higher CCS yield (20.39 t $ha^{-1}$) was recorded by CoN 07071 and found at par with PI 06132 (20.09 t $ha^{-1}$) and PI 07132 (19.65 t $ha^{-1}$). The cane and CCS yield were influenced significantly due to different fertilizer levels. The fertilizer level 125 % RD N: $P_2O_5$:$K_2O$ $ha^{-1}$ recorded significantly higher cane yield (126.72 t $ha^{-1}$) and CCS yield (20.60 t $ha^{-1}$) followed by 100 % RD N:$P_2O_5$:$K_2O$ $ha^{-1}$ which recorded cane yield (115.44 t $ha^{-1}$) and CCS yield (18.83 t $ha^{-1}$). The interaction effect between genotypes and fertilizer levels was found to be non-significant.

**MID-LATE GROUP:**

It was revealed that, the growth parameters were affected significantly due to various genotypes except number of tillers and single cane weight. The sugarcane genotype Co 08008 recorded significantly higher germination (61.75 %) and found at par with rest of the genotypes except standard check variety Co 99004. Another sugarcane genotype Co 09009 recorded significantly higher number of millable canes (1,13,880 $ha^{-1}$) whereas, significantly higher millable height (262 cm) was recorded by standard check variety Co 99004. Significantly higher diameter (3.10 cm) and number of internodes (18.27 $cane^{-1}$) were recorded by Co 08016.

All growth parameters were found non-significant except number of internodes due to different levels of fertilizer. The fertilizer level 100 % RD N: $P_2O_5$:$K_2O$ $ha^{-1}$ recorded significantly higher number of internodes (18.02 $cane^{-1}$) and found at par with 125 % RD N: $P_2O_5$:$K_2O$ $ha^{-1}$ fertilizer level (17.85 $cane^{-1}$). The interaction effect between genotypes and fertilizer levels was found to be non- significant.

The cane yield and CCS yield were influenced significantly due to different sugarcane genotypes. Among the tested genotypes, Co 08016 recorded significantly higher cane yield (118.68 t $ha^{-1}$) and CCS yield (17.60 t $ha^{-1}$) and found at par with Co 09009 and Co 08008. The cane and CCS yield were influenced non-significantly due to different fertilizer levels and interaction effect between genotypes and fertilizer levels.

The quality parameters were found to be influenced significantly due to various genotypes except purity. The standard check variety Co 99004 recorded significantly higher brix (22.92 %), sucrose (21.42 %) and CCS percentage (15.20 %), but found at par with Co 08016 (14.81 %) only in respect of CCS percentage. Different levels of fertilizers had significant impact only in respect of brix where 125 % RD N:$P_2O_5$:$K_2O$ $ha^{-1}$ fertilizer level recorded significantly higher brix (22.69 %).

The quality parameters *viz.* purity and CCS percentage were affected non significantly due to the interaction effect between genotypes and fertilizer levels.

**SUMMARY:** The cane yield and CCS yield were influenced significantly due to different sugarcane genotypes. Among the tested genotypes, Co 08016 recorded significantly higher cane yield (118.68 t $ha^{-1}$) and CCS yield (17.60 t $ha^{-1}$) and found at par with Co 09009 and Co 08008. The cane and CCS yield were influenced non-significantly due to different fertilizer levels and interaction effect between genotypes and fertilizer levels.

**Table AS 42.10.5:** Mean data on growth parameters as affected by various treatments

| Sr. No. | Treatment | Growth parameters | | |
|---|---|---|---|---|
| | | Germination at 45 DAP ( %) | No. of tillers (000' $ha^{-1}$) | NMC ( 000'$ha^{-1}$) |
| **A.** | **Genotype** | | | |
| | $V_1$: Co 08008 | 61.75 | 112.65 | 107.42 |
| | $V_2$: Co 08016 | 60.54 | 113.46 | 110.69 |
| | $V_3$: Co 09009 | 59.94 | 117.08 | 113.88 |
| | $V_4$: Co 99004 | 49.84 | 107.20 | 99.54 |
| | S.E. ± | 2.001 | 2.4 | 2.19 |
| | C.D. 0.05 | 5.87 | N.S. | 6.43 |
| **B** | **Fertilizer levels** | | | |
| | $N_1$: 75 % RD N:$P_2O_5$:$K_2O$ | 58.16 | 109.88 | 105.18 |
| | $N_2$ : 100 % RD N:$P_2O_5$:$K_2O$ | 56.15 | 113.53 | 109.02 |
| | $N_3$ : 125 % RD N:$P_2O_5$:$K_2O$ | 59.75 | 114.38 | 109.45 |
| | S.E. ± | 1.73 | 2.09 | 1.9 |
| | C.D. 0.05 | N.S. | N.S. | N.S. |
| | Interaction (A x B) | | | |
| | S.E. ± | 3.47 | 4.17 | 3.8 |
| | C.D. 0.05 | N.S. | N.S. | N.S. |
| | **G.M.** | **58.02** | **112.60** | **1.47** |

**Table AS 42.10.6:** Mean data on growth parameters as affected by various treatments

| Sr. No. | Treatment | Growth parameters | | | |
|---|---|---|---|---|---|
| | | Millable height (cm) | Diameter( cm) | No. of internodes Per cane | Single cane weight (kg) |
| **A.** | **Genotype** | | | | |
| | $V_1$: Co 08008 | 251.00 | 2.66 | 16.24 | 1.35 |
| | $V_2$: Co 08016 | 256.33 | 3.10 | 18.27 | 1.57 |
| | $V_3$: Co 09009 | 234.56 | 2.61 | 18.12 | 1.49 |
| | $V_4$: Co 99004 | 262.00 | 2.84 | 17.93 | 1.47 |
| | S.E. ± | 1.39 | 0.06 | 0.30 | 0.051 |
| | C.D. 0.05 | 4.07 | 0.16 | 0.87 | N.S. |
| **B** | **Fertilizer levels** | | | | |
| | $N_1$: 75 % RD N:$P_2O_5$:$K_2O$ | 248.83 | 2.73 | 17.06 | 1.41 |
| | $N_2$ : 100 % RD N:$P_2O_5$:$K_2O$ | 251.50 | 2.82 | 18.02 | 1.44 |
| | $N_3$ : 125 % RD N:$P_2O_5$:$K_2O$ | 252.58 | 2.80 | 17.85 | 1.56 |
| | S.E. ± | 1.2 | 0.05 | 0.26 | 0.04 |
| | C.D. 0.05 | N.S. | N.S. | 0.75 | N.S. |
| | Interaction (A x B) | | | | |
| | S.E. ± | 2.4 | 0.1 | 0.51 | 0.09 |
| | C.D. 0.05 | N.S. | N.S. | N.S. | N.S. |
| | **G.M.** | **250.97** | **2.80** | **17.64** | **1.47** |

**Table AS 42.10.7:** Mean cane and CCS yield (t $ha^{-1}$) as affected by various treatments

| Sr.No. | Treatment | Yield (t $ha^{-1}$) | |
|---|---|---|---|
| | | **Cane** | **CCS** |
| **A.** | **Genotype** | | |
| | $V_1$: Co 08008 | 112.34 | 16.23 |
| | $V_2$: Co 08016 | 118.68 | 17.60 |
| | $V_3$ : Co 09009 | 117.24 | 16.99 |
| | $V_4$: Co 99004 | 100.30 | 15.25 |
| | S.E. ± | 3.23 | 0.49 |
| | C.D. 0.05 | 9.47 | 1.43 |
| **B** | **Fertilizer levels** | | |
| | $N_1$: 75 % RD N:$P_2O_5$:$K_2O$ | 107.95 | 15.83 |
| | $N_2$ : 100 % RD N:$P_2O_5$:$K_2O$ | 113.86 | 16.63 |
| | $N_3$ : 125 % RD N:$P_2O_5$:$K_2O$ | 114.62 | 17.10 |
| | S.E. ± | 2.8 | 0.42 |
| | C.D. 0.05 | N.S. | N.S. |
| | Interaction (A x B) | | |
| | S.E. ± | 5.59 | 0.84 |
| | C.D. 0.05 | N.S. | N.S. |
| | C.V. % | **112.40** | **16.52** |

**Table AS 42.10.8:** Mean data on quality parameters as affected by various treatments

| Sr. No. | Treatment | Quality parameters | | | |
|---|---|---|---|---|---|
| | | **Brix %** | **Sucrose%** | **Purity%** | **CCS%** |
| **A** | **Genotype** | | | | |
| | $V_1$: Co08008 | 21.92 | 20.41 | 93.16 | 14.46 |
| | $V_2$: Co08016 | 22.42 | 20.90 | 93.23 | 14.81 |
| | $V_3$: Co09009 | 22.03 | 20.47 | 92.96 | 14.49 |
| | $V_4$: Co99004 | 22.92 | 21.42 | 93.47 | 15.20 |
| | S.E. ± | 0.16 | 0.16 | 0.5 | 0.14 |
| | C.D. 0.05 | 0.46 | 0.49 | N.S. | 0.41 |
| **B** | **Fertilizer levels** | | | | |
| | $N_1$ : 75 % RD N:$P_2O_5$:$K_2O$ | 22.07 | 20.67 | 93.67 | 14.68 |
| | $N_2$ : 100 % RD N:$P_2O_5$:$K_2O$ | 22.19 | 20.65 | 93.03 | 14.62 |
| | $N_3$ : 125 % RD N:$P_2O_5$:$K_2O$ | 22.69 | 21.09 | 92.93 | 14.93 |
| | S.E. ± | 0.14 | 0.14 | 0.44 | 0.12 |
| | C.D. 0.05 | 0.4 | N.S. | N.S. | N.S. |
| | Interaction (A x B) | | | | |
| | S.E. ± | 0.27 | 0.28 | 0.885 | 0.24 |
| | C.D. 0.05 | N.S. | N.S. | N.S. | N.S. |
| | **G.M.** | **22.32** | **20.80** | **93.21** | **14.74** |

**11. MANDYA**

The planting material was conserved for the next season as there was drought period and non-availability water in the channel for irrigation to the crop.

**12. PADEGAON**

**EARLY GROUP:**

Data presented in table AS 42.12.1 revealed that the genotype Co 06002 recorded the highest cane (121.44 t $ha^{-1}$) and CCS yield (16.52 t $ha^{-1}$) and was significantly superior to all other genotypes. It was followed by Co 06032 (114.77 t $ha^{-1}$ cane and 15.60 t $ha^{-1}$ CCS yield). The nitrogen levels had a significant effect on both cane and CCS yields. Significantly the highest cane (123.33 t $ha^{-1}$) and CCS (16.68 t/ha) yields were recorded with application of 125% recommended dose of nitrogen. It was followed by 100 % recommended dose of nitrogen (113.81 and 15.32 t $ha^{-1}$). The interactions between genotypes and fertilizer levels were found to be non- significant for both cane and CCS yields.

The data presented in table AS 42.12. 2 revealed that the effect of genotypes was significant for all the parameters except germination per cent and height. The genotype, Co 06002 recorded significantly the highest tillering ratio (1.65), cane girth (9.6 cm), number of internodes per cane (24), millable canes per hectare (103910 $ha^{-1}$) and average weight per cane (1.18 kg). However, it was at par with PI 06032 in respect of cane girth, and average weight per cane.

Effect of N levels was significant for the tillering ratio, number of internodes per cane, NMC and average cane weight. Application of 125% recommended dose of nitrogen recorded the highest tillering ratio (1.65), number of internodes per cane (23), NMC (103690 $ha^{-1}$) and average cane weight (1.20 kg $cane^{-1}$). The application of 100 % recommended N was found at par with 125 % recommended N in respect of tillering ratio only. The interactions between genotypes and N levels with respect to all the parameter were found to be non-significant. The genotypes, N levels and their interactions did not have any significant influence on juice quality parameters (Table AS 42.12.3).

**SUMMARY:** The genotype Co 06002 was found significantly superior for cane and CCS yields than the other genotypes followed by PI 06032. The application of 125 % recommended dose of nitrogen produced significantly higher cane and CCS yields followed by 100 % recommended dose of nitrogen.

**Table AS 42.12.1:** Cane and CCS yield of sugarcane genotypes at varying N levels

| Treatments | Cane yield (t ha$^{-1}$) | CCS yield (t ha$^{-1}$) |
|---|---|---|
| **A) Genotypes** | | |
| $V_1$– Co 06001 | 110.06 | 14.69 |
| $V_2$ – Co 06002 | 121.44 | 16.52 |
| $V_3$– Co 06022 | 107.40 | 14.23 |
| $V_4$ – PI 06032 | 114.77 | 15.60 |
| $V_5$ – CoC 671 | 112.59 | 15.18 |
| **SE±** | **0.68** | **0.25** |
| **C.D. at 5%** | **1.90** | **0.72** |
| **B) N levels** | | |
| $F_1$ - 75% N | 102.73 | 13.72 |
| $F_2$ - 100% N | 113.81 | 15.32 |
| $F_3$ – 125 % N | 123.23 | 16.68 |
| SE± | 2.43 | 0.46 |
| C.D. at 5% | 6.56 | 1.20 |
| C) Interactions | | |
| SE± | 4.84 | 0.84 |
| C.D. at 5% | NS | NS |
| General Mean | 113.25 | 15.24 |

**Table AS 42.12.2:** Growth and yield attributes of sugarcane genotypes at varying N levels

| Treatment | Germination (% ) | Tillering ratio | Height (cm) | Girth (cm) | No. of internodes cane$^{-1}$ | Millable canes (000 ha$^{-1}$) | Avg. cane wt. (kg) |
|---|---|---|---|---|---|---|---|
| **A) Genotypes** | | | | | | | |
| $V_1$– Co 06001 | 65.38 | 1.58 | 270 | 9.3 | 22 | 97.09 | 1.13 |
| $V_2$ – Co 06002 | 70.58 | 1.65 | 284 | 9.6 | 24 | 103.91 | 1.18 |
| $V_3$– Co 06022 | 65.41 | 1.57 | 264 | 8.9 | 21 | 95.14 | 1.13 |
| $V_4$ – PI 06032 | 69.31 | 1.61 | 281 | 9.5 | 23 | 98.20 | 1.17 |
| $V_5$ – CoC 671 | 65.78 | 1.61 | 274 | 9.4 | 22 | 98.16 | 1.14 |
| **SE±** | 1.74 | 0.008 | 8.16 | 0.06 | 0.14 | 0.60 | 0.004 |
| **C.D. at 5%** | **NS** | **0.022** | **NS** | **0.16** | **0.38** | **1.68** | **0.012** |
| **B) N levels9.** | | | | | | | |
| $F_1$ - 75% N | 64.83 | 1.55 | 261 | 9.1 | 20 | 93.49 | 1.10 |
| $F_2$ - 100% N | 68.07 | 1.60 | 273 | 9.4 | 22 | 98.32 | 1.16 |
| $F_3$ – 125 % N | 68.97 | 1.65 | 289 | 9.5 | 23 | 103.69 | 1.20 |
| **SE±** | 2.04 | 0.03 | 9.50 | 0.24 | 0.28 | 1.08 | 0.014 |
| C.D. at 5% | NS | 0.08 | NS | NS | 0.81 | 2.80 | 0.038 |
| C) Interactions | | | | | | | |
| SE± | 4.32 | 0.10 | 9.78 | 0.63 | 0.72 | 2.42 | 0.06 |
| C.D. at 5% | NS | NS | NS | NS | NS | NS | NS |
| General Mean | 67.29 | 1.60 | 274 | 9.34 | 22 | 98.50 | 1.15 |

**Table AS 42.12.3:** Quality parameters of sugarcane genotypes at varying N levels

| Treatments | Brix (c ) | Sucrose (%) | Purity (%) | CCS (%) |
|---|---|---|---|---|
| **A) Genotypes** | | | | |
| $V_1$– Co 06001 | 21.68 | 19.77 | 85.11 | 13.35 |
| $V_2$ – Co 06002 | 21.53 | 19.61 | 84.04 | 13.25 |
| $V_3$– Co 06022 | 22.08 | 19.64 | 87.02 | 13.48 |
| $V_4$ – PI 06032 | 20.96 | 19.56 | 87.30 | 13.59 |
| $V_5$ – CoC 671 | 22.36 | 19.62 | 89.10 | 13.60 |
| **SE±** | 1.52 | 0.78 | 2.04 | 0.32 |
| **C.D. at 5%** | **NS** | **NS** | **NS** | **NS** |
| **B) N levels** | | | | |
| $F_1$ - 75% N | 22.00 | 19.63 | 85.34 | 13.36 |
| $F_2$ - 100% N | 21.68 | 19.64 | 86.75 | 13.46 |
| $F_3$ – 125 % N | 21.50 | 19.65 | 87.47 | 13.54 |
| **SE±** | 0.98 | 0.15 | 1.32 | 0.14 |
| **C.D. at 5%** | **NS** | **NS** | **NS** | **NS** |
| **C) Interactions** | | | | |
| **SE±** | 1.18 | 0.52 | 0.90 | 0.28 |
| C.D. at 5% | NS | NS | NS | NS |
| General Mean | 21.72 | 19.64 | 86.52 | 13.45 |

**Table AS 42.12.4:** Soil properties at harvest in different treatments

| Treatment | pH | EC ($dSm^{-1}$) | O.C.% | Available nutrient status (kg $ha^{-1}$) | | |
|---|---|---|---|---|---|---|
| | | | | N | $P_2O_5$ | $K_2O$ |
| **A) Genotypes** | | | | | | |
| $V_1$– CoSnk 5103 | 8.04 | 0.34 | 0.59 | 183 | 15.9 | 242 |
| $V_2$ – CoM 05082 | 8.06 | 0.34 | 0.56 | 179 | 15.2 | 243 |
| $V_3$– CoSnk 5104 | 8.04 | 0.33 | 0.61 | 180 | 15.8 | 251 |
| $V_4$ – Co 99004 | 8.03 | 0.35 | 0.56 | 186 | 17.7 | 272 |
| $V_5$ – CoC 671 | 8.02 | 0.38 | 0.55 | 192 | 18.9 | 279 |
| **B) N levels** | | | | | | |
| $F_1$ - 75% N | 8.02 | 0.33 | 0.58 | 178 | 18.2 | 268 |
| $F_2$ - 100% N | 8.03 | 0.34 | 0.57 | 183 | 15.9 | 258 |
| $F_3$ – 125 % N | 8.06 | 0.35 | 0.56 | 191 | 16.2 | 247 |
| General Mean | 8.03 | 0.34 | 0.57 | 182 | 16.7 | 257 |
| Initial | 8.12 | 0.36 | 0.66 | 252 | 18.6 | 322 |

**MID-LATE GROUP:**

Data presented in table AS 42.12.5 revealed that the genotype Co 86032 recorded significantly the highest cane (124.15 t $ha^{-1}$) and CCS (17.14 t $ha^{-1}$) yields. It was followed by Co 06015. The N levels had a significant effect on both cane and CCS yields. Significantly the highest cane (123.57 t $ha^{-1}$) and CCS (17.00 t $ha^{-1}$) yields were recorded with the application of 125% recommended dose of N. It was followed by 100% recommended dose of N (117.26 t $ha^{-1}$ and 16.07 t $ha^{-1}$)

The interactions between genotypes and fertilizer levels were found to be non-significant for both cane and CCS yields.

The data presented in table AS 42.12.6 revealed that the effect of genotypes was found significant for all the parameters except number of millable canes and average cane weight. The genotype Co 86032 recorded significantly the highest germination (70.46 %), tillering ratio (1.80), millable height (292 cm), cane girth (9.5 cm), number of internodes per cane (24), and weight per cane (1.27 kg). However, it was at par with Co 06015 in respect of germination percentage and cane girth. Effect of N levels was significant for the millable height, number of internodes per cane and average cane weight. Application of 125% recommended dose of nitrogen recorded significantly the highest millable height (284 cm), number of internodes per cane (25.0) and the average cane weight (1.27 kg) over other levels. It was closely followed by 100 % recommended dose of nitrogen for all these parameters.

The interactions between genotypes and nitrogen levels in respect of all the parameter were found to be non- significant. The genotypes, N levels and their interactions did not have significant influence on juice quality parameters (Table AS 42.12.7).

**SUMMARY:** The genotypes Co 86032 recorded significantly higher cane and CCS yields than the other genotypes and it was followed by Co-06015. The application of 125 percent recommended dose of nitrogen produced significantly higher cane and CCS yields followed by 100 % recommended dose of nitrogen.

**Table AS 42.12.5:** Cane and CCS yield of sugarcane genotypes at varying N levels

| Treatment | Cane yield (t $ha^{-1}$) | CCS yield (t $ha^{-1}$) |
|---|---|---|
| **A) Genotypes** | | |
| $V_1$– Co 06012 | 118.38 | 16.31 |
| $V_2$ – Co 06015 | 120.07 | 16.24 |
| $V_3$– Co 06027 | 113.35 | 15.62 |
| $V_4$ – CoM 06082 | 112.11 | 15.14 |
| $V_5$ – Co 86032 | 124.15 | 17.14 |
| **SE±** | **0.47** | **0.20** |
| **C.D. at 5%** | **1.36** | **0.58** |

| Treatment | Cane yield (t ha$^{-1}$) | CCS yield (t ha$^{-1}$) |
|---|---|---|
| **B) N levels** | | |
| $F_1$ - 75% N | 111.99 | 15.20 |
| $F_2$ - 100% N | 117.26 | 16.07 |
| $F_3$ – 125 % N | 123.57 | 17.00 |
| **SE±** | **2.24** | **0.27** |
| **C.D. at 5%** | **5.82** | **0.73** |
| **C) Interactions** | | |
| **SE±** | **4.56** | **0.35** |
| **C.D. at 5%** | **NS** | **NS** |
| **General Mean** | **117.61** | **16.09** |

**Table AS 42.12.6:** Growth and yield attributes of sugarcane genotypes at varying N levels

| Treatment | Germination % | Tillering ratio | Height (cm) | Girth (cm) | No of internodes cane$^{-1}$ | Millable canes (000 ha$^{-1}$) | Avg. cane wt. (kg) |
|---|---|---|---|---|---|---|---|
| **A) Genotypes** | | | | | | | |
| $V_1$– Co 06012 | 66.74 | 1.66 | 279 | 9.2 | 23 | 97.10 | 1.22 |
| $V_2$ – Co 06015 | 70.45 | 1.71 | 281 | 9.3 | 23 | 94.74 | 1.27 |
| $V_3$– Co 06027 | 66.48 | 1.60 | 275 | 9.0 | 22 | 96.98 | 1.17 |
| $V_4$ – CoM 06082 | 64.40 | 1.51 | 263 | 8.9 | 22 | 100.27 | 1.12 |
| $V_5$ – Co 86032 | 70.46 | 1.80 | 292 | 9.5 | 24 | 97.85 | 1.27 |
| SE± | 0.92 | 0.03 | 1.05 | 0.08 | 0.12 | 1.85 | 0.07 |
| C.D. at 5% | 2.70 | 0.07 | 2.94 | 0.20 | 0.34 | NS | NS |
| **B) N levels** | | | | | | | |
| $F_1$ - 75% N | 65.50 | 1.61 | 271 | 8.9 | 21 | 96.74 | 1.16 |
| $F_2$ - 100% N | 67.73 | 1.66 | 278 | 9.2 | 23 | 97.62 | 1.20 |
| $F_3$ – 125 % N | 69.91 | 1.70 | 284 | 9.5 | 25 | 97.80 | 1.27 |
| SE± | 2.18 | 0.05 | 2.18 | 0.28 | 0.22 | 1.42 | 0.03 |
| C.D. at 5% | NS | NS | 6.34 | NS | 0.64 | NS | 0.08 |
| **C) Interactions** | | | | | | | |
| SE± | 4.36 | 0.08 | 5.20 | 0.48 | 0.63 | 3.02 | 0.05 |
| C.D. at 5% | NS | NS | NS | NS | NS | NS | NS |
| **General Mean** | **67.71** | **1.65** | **278** | **9.2** | **23** | **97.39** | **1.21** |

**Table AS 42.12.7.** Quality parameters of sugarcane genotypes at varying N levels

| Treatment | Brix (c ) | Sucrose (%) | Purity (%) | CCS (%) |
|---|---|---|---|---|
| **A) Genotypes** | | | | |
| $V_1$– Co 06012 | 21.42 | 19.67 | 90.11 | 13.78 |
| $V_2$ – Co 06015 | 21.64 | 19.74 | 90.59 | 13.53 |
| $V_3$– Co 06027 | 21.24 | 19.59 | 88.37 | 13.78 |
| $V_4$ – CoM 06082 | 21.08 | 19.56 | 81.17 | 13.51 |
| $V_5$ – Co 86032 | 22.08 | 19.79 | 90.67 | 13.81 |
| **SE±** | **0.43** | **0.17** | **1.54** | **0.16** |
| **C.D. at 5%** | **NS** | **NS** | **NS** | **NS** |
| **B) N levels** | | | | |
| $F_1$ - 75% N | 21.19 | 19.63 | 88.31 | 13.57 |
| $F_2$ - 100% N | 21.36 | 19.63 | 89.85 | 13.71 |
| $F_3$ – 125 % N | 21.93 | 19.74 | 90.58 | 13.76 |
| **SE±** | **0.36** | **0.10** | **0.93** | **0.09** |
| **C.D. at 5%** | **NS** | **NS** | **NS** | **NS** |
| **C) Interactions** | | | | |
| **SE±** | **0.48** | **0.22** | **1.14** | **0.24** |
| **C.D. at 5%** | **NS** | **NS** | **NS** | **NS** |
| **General Mean** | **28.55** | **19.66** | **89.58** | **13.68** |

**Table AS 12.12.8:** Soil properties at harvest in different treatments

| Treatment | pH | EC ($dsm^{-1}$) | O.C.% | Available nutrient status (kg $ha^{-1}$) | | |
|---|---|---|---|---|---|---|
| | | | | N | $P_2O_5$ | $K_2O$ |
| **A) Genotypes** | | | | | | |
| $V_1$– Co 06012 | 8.1 | 0.36 | 0.6 | 186 | 17.5 | 268 |
| $V_2$ – Co 06015 | 8.11 | 0.37 | 0.59 | 181 | 16.2 | 253 |
| $V_3$– Co 06027 | 8.08 | 0.35 | 0.61 | 184 | 16.9 | 255 |
| $V_4$ – CoM 06082 | 8.08 | 0.39 | 0.58 | 189 | 17.7 | 270 |
| $V_5$ – Co 86032 | 8.09 | 0.39 | 0.59 | 195 | 19.4 | 275 |
| **B) N levels** | | | | | | |
| $F_1$ - 75% N | 8.08 | 0.34 | 0.61 | 181 | 18.6 | 272 |
| $F_2$ - 100% N | 8.08 | 0.37 | 0.59 | 186 | 16.5 | 265 |
| $F_3$ – 125 % N | 8.09 | 0.39 | 0.57 | 194 | 16.9 | 255 |
| **General Mean** | **8.09** | **0.37** | **0.59** | **187** | **17.5** | **262** |
| **Initial** | **8.12** | **0.36** | **0.68** | **271** | **17.9** | **312** |

**13. PUNE**

The field experiment on a site having pH 8.23, E C 0.55 dS/m, organic carbon 0.51%, available N 280.98 kg/ha, available P 17.04 kg/ha and available K 332.08 kg/ha was conducted to develop the Agronomy for new promising sugarcane genotypes. Data regarding growth, yield and quality contributing characters at harvest of 1st plant crop are presented in table AS 42.13.1. Genotype PI07131 gave maximum cane yield of 114.16 t/ha which was significantly superior over the rest of the genotypes but at par with CoC 671 (104.70 t/ha). The cane yield differences due to fertilizer levels were found insignificant. The cane yield increased with increased levels of fertilizers Maximum cane yield was 102.29 t/ha due to application of 125 % recommended dose of NPK (250:115:115 kg NPK/ha) followed by 75 % RDF (99.16 t/ha) and 100 % RDF (98.31 t/ha).

The differences in CCS t/ha due to different genotypes did not influence significantly. The maximum CCS t/ha (15.38 t/ha) was recorded in genotype PI07131 which was followed by check variety CoC 671 (13.94 t/ha). The CCS t/ha was increased with increased levels of NPK being maximum of 14.02 t/ha due to application of 125 % RDF of NPK. The interaction due to genotypes and fertilizer levels was not significant.

The weight per cane was maximum in PI07131 (1.75 Kg) than the check variety CoC 671 (1.55 kg) and rest of genotypes. In case of fertilizer levels the single cane weight did not differ significantly due to levels of fertilizers. Interaction was also not significant. The data on number of millable cane (NMC) at harvest was significantly affected due to various genotypes. The genotype PI07131 produced maximum number of millable canes (0.81 Lac/ha) at harvest followed by check variety Co 86032 (0.78 lac/ha) The number of millable canes at harvest recorded significantly higher (0.72 lac/ha) at 100 % and 125% of NPK of recommended dose of fertilizers, than application of 75 % RDF (0.68 Lac/ha) The interaction due to genotypes and fertilizer levels was significant.

The differences in germination percentage at 45 days after planting among the genotypes under study were significant. The genotype Co 8001(74.04%) recorded maximum germination as compared to other genotypes. In case of fertilizer levels the germination did not differ significantly due to levels of fertilizers. Interaction was also not significant.

The differences in tillering at 90 and 120 days were significant among the genotypes under study. The genotype PI07131 produced maximum (1.16 and 1.49 Lac /ha) number of tillers at 90 and 120 days respectively which was significantly higher than the rest of the genotypes and standard checks. The differences due to levels of fertilizers were non- significant. Maximum tillers at 90days (1.03 Lac /ha) and 120 days (1.35 Lac /ha) after planting were obtained due to application of 125 % recommended dose of NPK. The interaction between the factors under study was not significant.

The differences in number of internodes at harvest were no significant among the genotypes under study. The genotype PI07131produced maximum (18.1) number of internodes per cane, but it was less than the check varieties CoC 671 (19.1) and Co 86032 (.18.2) In case of fertilizer levels the number of internodes did not differ significantly due to levels of fertilizers. Interaction was also not significant.

The differences in cane girth among the genotypes under study were no significant. The genotype PI07131 showed maximum (3.30 cm) cane girth at harvest than the check variety CoC 671 (3.25cm) and rest of genotypes. The girth of cane increased significantly with increase in the level of fertilizer being maximum (3.28 cm) due to application of 125 % recommended dose of fertilizer followed by application of 100 % RDF (3.11cm) The girth of cane was no significant due to interaction between genotypes and fertilizer levels.

The genotype PI07131 showed maximum total height (284 cm) and millable height (238 cm) at harvest which was significantly higher than the other genotypes Co 8001 (total height 256 cm and millable height 238 cm) and check varieties. The differences in total and millable height of cane at harvest did not influence significantly due to levels of NPK. The interaction was also not significant.

The juice quality parameter measured in terms of Brix %, Sucrose % and CCS % was differed significantly due to different genotypes. However, differences in Purity % due to different genotypes were not significant. Maximum Brix % (24.14), CCS % (15.01) and Sucrose % (21.06) was noticed in check variety Coc671 followed by genotype PI07131 i.e. (22.80), (13.77) and (19.58) respectively. The B: C ratio differed significantly due to different genotypes. The maximum (1:2.26) B: C ratio was obtained in genotype PI07131 followed by check variety CoC 671 (1:2.07). The B: C ratio was found maximum 1:2.02 due to application of 125 % RDF of NPK which was followed by application of 75 % RDF (1:1.99) and 100 % RDF (1:1.91). The interaction effect due to factors under study was not significant.

**SUMMARY:** Among the various genotypes evaluated, the cane yield of genotype PI07131 was significantly higher (114.16 t/ha) over the genotypes Co 8001 and Co 7015 but at par with CoC 671 and Co86032. Maximum cane yield 102.29 t/ha was recorded due to application of 125 % RDF. Maximum Brix % (22.80) and Sucrose % (19.58) was noticed in genotype PI07131 than the other genotypes under study. Maximum B: C ratio (1:2.26) was also obtained with genotype PI07131. Final conclusion could be drawn after having ratoon and second plant crop studies.

**Table AS 42.13.1:** Yield and growth attributes of sugarcane genotypes with varying NPK levels

| Treatment | Cane yield (t/ha) | B:C Ratio | CCS (t/ha) | Wt. per cane Kg. at harvest | NMC (lac/ha) at harvest | Germination % 45 DAP | Tillering 90 DAP (lac/ha) | Tillering 120 DAP (lac/ha) |
|---|---|---|---|---|---|---|---|---|
| **A. Genotype** | | | | | | | | |
| 1.Co8001 | 96.50 | 1.97 | 13.37 | 1.43 | 0.70 | 74.04 | 1.08 | 1.47 |
| 2.PI07131 | 114.16 | 2.26 | 15.38 | 1.75 | 0.81 | 66.14 | 1.16 | 1.49 |
| 3. Co7015 | 83.09 | 1.64 | 13.79 | 1.38 | 0.66 | 73.88 | 1.00 | 1.09 |
| 4. CoC671 | 104.70 | 2.07 | 13.94 | 1.55 | 0.57 | 70.42 | 0.70 | 1.10 |
| 5. Co86032 | 101.15 | 1.93 | 12.70 | 1.44 | 0.78 | 65.55 | 0.97 | 1.41 |
| SE± | 5.75 | 0.10 | 0.82 | 0.07 | 0.02 | 2.12 | 0.68 | 0.04 |
| CD at 5% | 18.74 | 0.36 | NS | NS | 0.08 | 6.14 | 0.22 | 0.16 |
| **B. Fertilizer level** | | | | | | | | |
| 1.75%RDF | 99.16 | 1.99 | 13.53 | 1.50 | 0.68 | 68.55 | 0.98 | 1.31 |
| 2.100%RDF | 98.31 | 1.91 | 13.95 | 1.47 | 0.72 | 69.35 | 0.94 | 1.27 |
| 3.125%RDF | 102.29 | 2.02 | 14.02 | 1.56 | 0.72 | 72.09 | 1.03 | 1.35 |
| SE± | 3.68 | 0.07 | 0.80 | 0.04 | 0.03 | 1.64 | 0.02 | 0.03 |
| CD at 5% | NS | NS | NS | NS | 0.02 | NS | NS | NS |
| **A x B Interaction (Genotype x fertilizer levels)** | | | | | | | | |
| SE± | 8.86 | 0.17 | 1.68 | 0.11 | 0.02 | 3.68 | 0.07 | 0.07 |
| CD at 5% | NS | NS | NS | NS | 0.09 | NS | NS | NS |
| CV% | 17.26 | 16.90 | 17.86 | 16.60 | 11.60 | 9.75 | 20.79 | 11.55 |

**Table AS 42.13.1b**: Growth and quality attributes of sugarcane genotypes with varying NPK levels at harvest

| Treatment | No of internodes per cane | Girth of cane at harvest (cm) | Total cane ht. (cm) at harvest | Millable cane ht. (cm) at harvest | Brix % | Sucrose % | CCS % | Purity % |
|---|---|---|---|---|---|---|---|---|
| **A. Genotype** | | | | | | | | |
| 1.Co8001 | 17.7 | 3.10 | 256 | 213 | 22.01 | 19.09 | 13.50 | 89.75 |
| 2.PI07131 | 18.1 | 3.30 | 284 | 238 | 22.80 | 19.58 | 13.77 | 89.81 |
| 3. Co7015 | 16.7 | 3.01 | 254 | 217 | 22.31 | 19.18 | 13.49 | 88.90 |
| 4. CoC671 | 19.1 | 3.25 | 251 | 209 | 24.14 | 21.06 | 15.01 | 91.62 |
| 5. Co86032 | 18.2 | 3.09 | 236 | 204 | 20.80 | 19.39 | 13.75 | 90.56 |
| SE± | 0.61 | 0.07 | 6.61 | 7.18 | 0.36 | 0.36 | 0.30 | 0.75 |
| CD at 5% | NS | NS | 21.52 | 23.36 | 1.20 | 1.19 | 1.00 | NS |
| **B. Fertilizer level** | | | | | | | | |
| 1.75%RDF | 17.7 | 3.06 | 247 | 210 | 22.74 | 19.54 | 13.97 | 90.02 |
| 2.100%RDF | 18.1 | 3.11 | 247 | 216 | 21.81 | 19.79 | 13.82 | 89.96 |
| 3.125%RDF | 18.1 | 3.28 | 265 | 222 | 22.68 | 19.65 | 13.93 | 90.43 |
| SE± | 0.28 | 0.04 | 5.46 | 4.78 | 0.21 | 0.29 | 0.26 | 0.66 |
| CD at 5% | NS | 0.14 | NS | NS | 0.63 | NS | NS | NS |
| **A x B Interaction (Genotype x fertilizer levels)** | | | | | | | | |
| SE± | 0.82 | 0.11 | 11.97 | 0.11 | 0.58 | 0.65 | 0.56 | 1.43 |
| CD at 5% | NS | NS | NS | NS | NS | NS | NS | NS |
| CV% | 10.38 | 0.73 | 7.71 | 9.93 | 4.94 | 5.58 | 6.67 | 2.51 |

**14. POWARKHEDA**

**EARLY GROUP:**

The field experiment was planted on 13.12.2012 on a soil having pH 7.48, EC 0.39 dS/m, organic carbon 0.60%, available N 235 kg/ha, available P 16.61 kg/ha and available K 473 kg/ha. The germination percentage did not differ significantly. The germination percentage recorded higher with Co 06022 (49.65%) than Co C 671(48.43%) and Co 06002 (48.26%).

**Tillers (000'/ha):** Among varieties Co 06022 showed significantly higher number of tillers recorded with (79.45) than Co C 671 (71.36) and Co 06002 (68.00). The tillers recorded in-between Co C 671 and Co 06002 were at par. Fertility levels showed significantly differences for tillers. The significantly higher number of tillers recorded with 125% recommended dose of N (76.61) as compared with 75% recommended dose of N (67.25).Both the levels of RDF N (100 and 125%) showed at par tillers but were significantly higher than the 75% RDF N.

**Plant Height (cm):** Among varieties Co 06022 showed significantly higher plant height (255 cm) as compared to Co C 671 (236 cm) and Co 06002(234 cm). Fertilizer levels showed significant influence on plant height. The maximum plant height (248 cm) recorded with 125% RDF N and the differences were significantly higher than the plant height obtained due to application of 75% RDF N (231 cm). The plant height also increased significantly due to application of 100 % RDF N (243 cm) than 75% RDF N. Both the levels of RDF N(100 and 125%) showed at par plant height but were significantly higher than the 75% RDF N.

**Number of Millable Canes (000'/ha):** The NMC differed significantly due to varieties and fertility levels. Among varieties the NMC recorded significantly higher with Co 06022 (73.04) as compared to Co C 671 (66.66) and Co 06002 (64.22). The NMC recorded in-between Co C 671 and Co 06002 were at par. The NMC increased with the increase in fertilizer levels. Significantly higher NMC (71.02) recorded with 125% RDF N than 75% RDF N (62.85). The NMC recorded in between 100% RDF N and 125% RDF N were at par.

**Brix (%):** The brix values ranged from 21.33 to 21.85 per cent for varieties and 21.47 to 21.55 per cent in fertilizer levels. However, brix values did not differ significantly due to varieties and fertilizer levels.

**Cane Yield (t/ha):** Among varieties Co 06022 recorded significantly higher cane yield (72.08 t/ha) than Co C 671 (65.16 t/ha) and Co 06002 (63.31 t/ha) but the cane yield obtained at par in between Co C 671 (65.16 t/ha) and Co 06002 (63.31 t/ha). Application of fertilizer doses increased cane yield correspondingly with the increase in fertilizer levels and significantly higher cane yield (70.06 t/ha) obtained due to application of 125 % RDF N than 75% RDF N (62.00 t/ha). The cane yield obtained at par in-between 100 and 125 % RDF N.

**Summary:** Results revealed that among the early genotypes Co 06022 gave significantly higher cane yield of 72.08 t/ha than Co C 671 (65.16 t/ha) and Co 06002(63.31 t/ha). Application of 125 % RDF N gave significantly higher cane yield of (70.06 t/ha) than 75 % RDF N (62.00 t/ha) but increase in cane yield was at par in-between 100 and 125% RDF N.

**Table AS 42.14.1:** Effect of different fertility levels on growth, yield and quality of early maturing sugarcane genotypes

| S. No. | Treatments | Germination (%) | Tillers (000'/ha) | Plant Height (cm) | NMC (000'/ha) | Brix (%) | Cane Yield (t/ha) |
|---|---|---|---|---|---|---|---|
| | **Genotypes** | | | | | | |
| **1** | Co 06022 | 49.65 | 79.45 | 252 | 73.04 | 21.37 | 72.08 |
| **2** | Co 06002 | 48.26 | 68.00 | 234 | 64.22 | 21.33 | 63.31 |
| **3** | Co C 671 | 48.43 | 71.36 | 236 | 66.66 | 21.85 | 65.16 |
| | **S Em +** | **0.91** | **2.10** | **2.01** | **1.81** | **0.01** | **2.11** |
| | **CD at 5%** | **NS** | **6.29** | **6.01** | **5.42** | **NS** | **6.32** |
| | **Fertilizer dose (% Recommended N)** | | | | | | |
| **1** | 75% | 48.29 | 67.25 | 231 | 62.85 | 21.47 | 62.00 |
| **2** | 100% | 48.52 | 74.96 | 243 | 70.05 | 2153 | 68.49 |
| **3** | 125% | 49.53 | 76.61 | 248 | 71.02 | 21.55 | 70.06 |
| | **S Em +** | **0.91** | **2.10** | **2.01** | **1.81** | **0.01** | **2.11** |
| | **CD at 5%** | **NS** | **6.29** | **6.01** | **5.42** | **NS** | **6.32** |

**MID-LATE GROUP:**

**Germination (%):** The germination percentage did not differ significantly due to varieties or fertility levels. However, germination percentage ranged from 51.85 to 53.93 percent for varieties and 52.62 to 53.21 percent for fertility levels.

**Tillers (000'/ha):** Among varieties Co 06010 recorded higher numbers of tillers (94.47) than Co JN 86-600 (77.50) . Application of fertilizer levels recorded higher number of tillers. Significantly higher number of tillers obtained at 125% RDF N (89.45) and 100% RDF N

(86.34) as compared to number of tillers recorded with 75% RDF N (80.81). Number of tillers recorded at par in between 100 and 125% recommended dose of N.

**Plant height (cm):** Among varieties Co 06010 showed significantly higher plant height (224 cm) as compared to Co 06015 (210 cm), Co 06027 (211 cm) and Co JN 86-600 (210 cm).The plant height recorded in between Co 06015, Co 06027 and Co JN 86-600 were at par. Fertilizer levels showed significant influence in plant height. Application of fertilizer levels increased plant height significantly and recorded higher plant height (244 cm) due to application of 125% RDF N than 100% RDF N (211 cm) and 75% RDF N (187 cm).

**Brix (%):** The brix values did not differ significantly either due to varieties or fertility levels. However, among varieties the brix value ranged from 21.21 to 22.16 for varieties and 21.91 per cent for fertility levels.

**Table AS 42.14.2:** Effect of different fertility levels on growth yield and quality of late maturing sugarcane genotypes

| S. N. | Treatments | Germin--ation (%) | Tillers (000'/ha) | Plant Height (cm) | NMC (000'/ha) | Brix (%) | Cane Yield (t/ha) |
|---|---|---|---|---|---|---|---|
| | **Genotypes** | | | | | | |
| **1** | Co 06010 | 52.66 | 94.47 | 224 | 86.66 | 22.13 | 87.58 |
| **2** | Co 06015 | 53.06 | 88.61 | 210 | 79.73 | 22.16 | 80.90 |
| **3** | Co 06027 | 51.85 | 81.54 | 211 | 73.56 | 22.15 | 73.46 |
| **4** | Co JN 86-600 | 53.93 | 77.50 | 210 | 67.07 | 21.21 | 66.91 |
| | **S Em +** | **1.84** | **2.06** | **4.03** | **1.86** | **0.01** | **1.75** |
| | **CD at 5%** | **NS** | **6.01** | **10.80** | **5.45** | **NS** | **5.12** |
| | **Fertilizer dose (% Recommended N)** | | | | | | |
| **1** | 75% | 52.62 | 80.81 | 187 | 71.81 | 21.91 | 72.35 |
| **2** | 100% | 53.21 | 86.34 | 211 | 77.78 | 21.91 | 78.27 |
| **3** | 125% | 52.80 | 89.45 | 244 | 80.68 | 21.91 | 81.02 |
| | **S Em +** | **1.84** | **2.06** | **4.03** | **1.86** | **0.01** | **1.75** |
| | **CD at 5%** | **NS** | **6.01** | **10.80** | **5.45** | **NS** | **5.12** |

**Number of Millable Canes (NMC '000'/ha):** Among varieties the NMC population recorded significantly higher with Co 06010 (86.66) as compared to Co 06015 (79.73), Co 06027 (73.56) and Co JN 86-600 (67.07),. The NMC increased significantly due to application of fertilizer levels. Significantly higher NMC (80.68) recorded with 125% RDF N than 75% RDF N (71.81). The NMC values recorded with 100 and 125% RDF N was at par.

**Cane yield (t/ha):** The cane yield was influenced significantly due to different varieties. However, among varieties Co 06010 recorded significantly higher cane yield of (87.58 t/ha) than Co 06015 (80.90 t/ha), Co 06027 (73.46 t/ha) and Co JN 86-600 (66.91 t/ha). Application of fertilizer doses increased cane yield with the increase in fertilizer levels. The cane yield was significantly higher with 125% RDF N (81.02 t/ha). Than 75% RDF N (72.35 t/ha). The cane yield recorded with 100 and 125% RDF N was at par.

**Summary:** Results revealed that among the mid late genotypes Co 06010 gave significantly higher cane yield of (87.58 t/ha) than Co 06015 (80.90 t/ha), Co 06027 (73.46 t/ha) and Co JN 86-600 (66.91 t/ha). Application of 125 % RDF N gave significantly higher cane yield ((81.02 t/ha) than 75 % RDF N (72.35 t/ha) but increase in cane yield was at par in-between 100 and 125% RDF N.

**15. SANKESHWAR**

The experiment could not be carried out.

**16. NAVSARI**

***PLANT CROP:***

The field experiment was planted on 3rd January 2013 on a soil containing Organic carbon 0.55 %, available N 369 kg/ha, available $P_2O_5$ 30.88 kg/ha and available $K_2O$ 409 kg/ha. The recommended dose of fertilizers for the region was taken as 250-125-125 kg NPK/ha. The results are given in table AS 42. 16. 1 & 2. Germination % at 30 and 45 DAP were recorded significantly highest with variety $V_2$ (CoN 07072) and remained at par with $V_4$ (CoN 09073) while it was not influenced due to different fertilizer levels. Significantly higher no. of tillers were counted with variety $V_2$ but at par with $V_4$ .The fertilizer level $F_3$ (125 % RDN) and $F_2$ (100 % RDN) resulted in significantly higher tillers and remained at par with each other in almost all the three growth stages. Variety $V_2$ and $V_4$ recorded significantly highest NMC (111.67 &110.21 $ha^{-1}$) respectively. The fertilizer level $F_3$ and $F_2$ resulted in significantly highest NMC $ha^{-1}$ (109.12 & 106.30 $ha^{-1}$) and remained at par with each other.

Highest cane and CCS (132.58 & 17.27 t $ha^{-1}$) yields were noticed with variety $V_2$ but remained at par with $V_1$ regarding CCS yield. The fertilizer level $F_3$ and $F_2$ resulted in

significantly higher cane and CCS (130.67 &17.31 t $ha^{-1}$) yields but at par with $F_2$ regarding cane yield. Highest quality parameters were recorded with $V_2$ and $V_1$ and remained at par with each other; lowest fibre % was also noticed with these varieties. Fertilizer levels did not show any significant effect on quality parameters. Interaction between variety and fertilizer level was failed to show significant results for above all parameters.

**SUMMARY:** Highest cane and CCS (132.58 & 17.27 t $ha^{-1}$) yields were noticed with variety Co N 07072 but remained at par with Co 0403 regarding CCS yield. The fertilizer level $F_3$ and $F_2$ resulted in significantly higher cane and CCS (130.67 &17.31 t $ha^{-1}$) yields but at par with $F_2$ regarding cane yield.

**Table AS 42.16.1:** Growth, yield parameters, cane and CCS yield of sugarcane as influenced by sugarcane varieties and various fertilizer levels

| Treatment | Germination % at 45 DAP | No. of tillers at 90 DAP 000/ha | No. of tillers at 180 DAP 000/ha | NMC 000/ha at harvest | Cane yield (t/ha) | CCS yield (t/ha) |
|---|---|---|---|---|---|---|
| **Variety** | | | | | | |
| $V_1$-Co 0403 | 49.09 | 155.12 | 132.75 | 95.07 | 123.24 | 16.73 |
| $V_2$- CoN 07072 | 59.45 | 170.78 | 145.46 | 111.67 | 132.58 | 17.27 |
| $V_3$- Co 6015 | 54.59 | 158.00 | 134.90 | 96.878 | 118.11 | 15.18 |
| $V_4$-CoN 09073 | 58.07 | 166.56 | 143.17 | 110.21 | 121.29 | 14.96 |
| S.Em.± | 1.81 | 3793.61 | 3247.47 | 3800.24 | 2.97 | 0.46 |
| C.D. at 5% | 5.30 | 11126.18 | 9524.41 | 11145.62 | 8.70 | 1.36 |
| **Fertilizer levels** | | | | | | |
| $F_1$-75 % of RDN | 53.62 | 148.97 | 130.61 | 94.95 | 116.58 | 14.93 |
| $F_2$-100 % of RDN | 57.25 | 166.45 | 141.95 | 106.30 | 124.17 | 15.85 |
| $F_3$-125 % RDN | 55.03 | 172.43 | 144.66 | 109.12 | 130.67 | 17.31 |
| S. Em. ± | 1.56 | 3285.37 | 2812.39 | 3291.11 | 2.57 | 0.40 |
| C.D. at 5% | NS | 9635.55 | 8248.38 | 9652.39 | 7.53 | 1.18 |
| C.V. % | 9.80 | 7.00 | 7.01 | 11.10 | 7.79 | 8.70 |
| Interaction | NS | NS | NS | NS | NS | NS |

**Table AS 42.16.2:** Juice quality parameters of sugarcane as influenced by sugarcane varieties and various fertilizer levels

| **Treatment** | **Pol (%) juice** | **Purity (%)** | **Fibre (%)** | **Pol (%) cane** | **C.C.S. (%)** |
|---|---|---|---|---|---|
| **Variety** | | | | | |
| $V_1$-Co 0403 | 19.41 | 92.30 | 14.15 | 14.72 | 13.56 |
| $V_2$- CoN 07072 | 19.00 | 91.75 | 14.21 | 14.40 | 13.02 |
| $V_3$- Co 6015 | 18.28 | 91.30 | 14.64 | 13.78 | 12.83 |
| $V_4$-CoN 09073 | 17.74 | 91.06 | 14.26 | 13.44 | 12.35 |
| S.Em.$\pm$ | 0.21 | 0.29 | 0.12 | 0.16 | 0.21 |
| C.D. at 5% | 0.61 | 0.85 | 0.36 | 0.47 | 0.61 |
| **Fertilizer levels** | | | | | |
| $F_1$-75 % of RDN | 18.45 | 92.07 | 14.54 | 13.92 | 12.79 |
| $F_2$-100 % of RDN | 18.52 | 91.66 | 14.18 | 14.04 | 12.77 |
| $F_3$-125 % RDN | 18.56 | 91.90 | 14.22 | 14.29 | 13.26 |
| S. Em. $\pm$ | 0.18 | 0.25 | 0.11 | 0.14 | 0.18 |
| C.D. at 5% | NS | NS | NS | NS | NS |
| C.V. % | 3.33 | 0.95 | 2.60 | 3.39 | 4.84 |
| Interaction | NS | NS | NS | NS | NS |

**RATOON:**

The field experiment was initiated with ratoon on 12$^{th}$ March 2013 on a soil containing organic carbon 0.55 %, available N 369 kg/ha, available $P_2O_5$ 30.88 kg/ha and available $K_2O$ 409 kg/ha. The recommended dose of fertilizers for the region was taken as 250-125-125 kg NPK/ha. The crop was harvested on 16$^{th}$ March 2014. The results are given in table AS 42.16.3 & 4. Significantly highest sprouting (%) 45 DAI was recorded with variety $V_2$ (CoN 07072) and $V_4$ (CoN 09073) & remained at par with each other. The fertilizer levels failed to show significant effect on sprouting. No. of tillers were noticed significantly highest by variety $V_2$ & $V_4$ & remained at par with each other. The fertilizer level $F_3$ (125 % RDN) & $F_2$ (100 % RDN) resulted in significantly higher tillers & remained at par with each other in almost all the three growth stages.

Significantly highest NMC (109.89 $ha^{-1}$), cane (127.57 t $ha^{-1}$) and CCS (17.24 t $ha^{-1}$) yields were recorded with $V_2$ & remained at par with $V_4$ except CCS yield which at par with $V_1$. The fertilizer level $F_3$ and $F_2$ resulted in significantly higher NMC (106.70 $ha^{-1}$), cane (125.55 t $ha^{-1}$) & CCS (16.94 t $ha^{-1}$) yields and remained at par with each other.

Almost all the quality parameters were recorded higher with V2 and V1 & being at par with each other except fibre % & CCS %. The various fertilizer levels failed to show significant effect on quality. Interaction between various varieties & fertilizer levels was observed non-significant for all these parameters.

**SUMMARY**: Significantly highest NMC (109.89 $ha^{-1}$), cane (127.57 t $ha^{-1}$) and CCS (17.24 t $ha^{-1}$) yields were recorded with $V_2$ & remained at par with $V_4$ except CCS yield which at par with $V_1$. The fertilizer level $F_3$ and $F_2$ resulted in significantly higher NMC (106.70 $ha^{-1}$), cane (125.55 t $ha^{-1}$) & CCS (16.94 t $ha^{-1}$) yields and remained at par with each other.

**Table AS 42.16.3:** Growth, yield parameters, cane and CCS yield of sugarcane as influenced by sugarcane varieties and various fertilizers levels

| Treatment | Sprouting (%) 45 DAP | Tillers at 90 DAP 000/ha | Tillers at 180 DAP 000/ha | NMC 000/ha at harvest | Cane yield (t/ha) | CCS yield (t/ha) |
|---|---|---|---|---|---|---|
| **Variety** | | | | | | |
| $V_1$-Co 0403 | 43.74 | 152.99 | 129.91 | 92.30 | 118.41 | 16.04 |
| $V_2$- CoN 07072 | 58.42 | 169.32 | 140.18 | 109.89 | 127.57 | 17.24 |
| $V_3$- Co 6015 | 51.56 | 155.84 | 131.34 | 97.53 | 114.27 | 15.21 |
| $V_4$-CoN 09073 | 55.52 | 163.99 | 138.57 | 107.90 | 120.72 | 15.83 |
| S.Em.± | 2.05 | 3927.47 | 2762.13 | 3840.91 | 2.89 | 0.46 |
| C.D. at 5% | 6.01 | 11518.76 | 8100.97 | 11264.89 | 8.49 | 1.34 |
| **Fertilizer levels** | | | | | | |
| $F_1$-75 % of RDN | 54.16 | 147.02 | 127.13 | 94.71 | 113.66 | 15.24 |
| $F_2$-100 % of RDN | 52.22 | 164.03 | 137.89 | 104.30 | 121.51 | 16.06 |
| $F_3$-125 % RDN | 50.55 | 170.56 | 139.98 | 106.70 | 125.55 | 16.94 |
| S. Em. ± | 1.77 | 3401.29 | 2392.08 | 33326.32 | 2.51 | 0.39 |
| C.D. at 5% | NS | 9975.54 | 7015.65 | 9755.68 | 7.35 | 1.16 |
| C.V. % | 11.75 | 7.34 | 6.14 | 11.31 | 7.22 | 8.50 |
| Interaction | NS | NS | NS | NS | NS | NS |

**Table AS 42.16.4:** Juice quality parameters of sugarcane as influenced by sugarcane varieties and various fertilizer levels

| Treatment | Pol (%) juice | Purity (%) | Fibre (%) | Pol (%) cane | C.C.S. (%) |
|---|---|---|---|---|---|
| **Variety** | | | | | |
| $V_1$-Co 0403 | 19.37 | 91.99 | 14.16 | 14.69 | 13.54 |
| $V_2$- CoN 07072 | 19.31 | 91.44 | 13.84 | 14.71 | 13.51 |
| $V_3$- Co 6015 | 18.85 | 90.81 | 14.58 | 14.22 | 13.32 |
| $V_4$-CoN 09073 | 18.61 | 91.07 | 14.23 | 14.10 | 13.11 |
| S.Em.± | 0.16 | 0.26 | 0.27 | 0.12 | 0.21 |
| C.D. at 5% | 0.47 | 0.77 | 0.78 | 0.34 | NS |
| **Fertilizer levels** | | | | | |
| $F_1$-75 % of RDN | 19.07 | 91.10 | 14.39 | 14.42 | 13.41 |
| $F_2$-100 % of RDN | 18.92 | 91.18 | 14.17 | 14.35 | 13.21 |
| $F_3$-125 % RDN | 19.11 | 91.71 | 14.05 | 14.52 | 13.49 |
| S. Em. ± | 0.14 | 0.23 | 0.11 | 0.10 | 0.18 |
| C.D. at 5% | NS | NS | NS | NS | NS |
| C.V. % | 2.54 | 0.86 | 5.61 | 2.44 | 4.68 |
| Interaction | NS | NS | NS | NS | NS |

## 17. THIRUVALLA

The experiment was conducted with three promising cultures namely, $V_1$ - CoM 06084, $V_2$ - Co 6027 and $V_3$ - Co 6012 and three nitrogen levels – ie., 75($F_1$), 100($F_2$) and 125 %($F_3$) of the recommended dose of N (100% of the recommended dose of N = 165 kg/ha). The crop (plant crop) was planted on 24.01.2013 and harvested on 20.01.2014.For ratoon management, the existing crop was harvested on 28.01.2013.

In the plant crop, growth parameters, cane yield and sugar yield etc. were significantly influenced by the genotypes and mineral nutrition with different doses of nitrogen. Among the varieties tried, the variety Co 6012 ($V_3$) recorded maximum values for cane length, cane girth, single cane weight and millable cane count and thus resulted in highest cane yield (92.23 t/ha) and sugar yield (12.00 t/ha).

The yield attributing factors and cane yield were significantly influenced by different levels of nitrogen. Application of N at 125% of R.D ($F_3$) had recorded maximum cane yield (85.80 t/ha) and it was significantly superior to mineral nutrition with N at 75%($F_1$) and was on par with N supplementation at 100% of the R.D ($F_2$).Similarly maximum sugar yield was also obtained for $F_3$ (12.00t/ha) which was on par with that of $F_2$(10.74t/ha). The interaction effect between variety and N levels were found significant only for CCS% and sugar yield at harvest.

Similar trend was noticed in the case of ratoon crop also where the growth and yield attributes were significantly influenced by the genotypes and mineral nutrition with varying doses of N. Maximum cane length, cane girth, millable cane count ,cane yield(103.47t/ha) and sugar yield etc. were recorded by the variety Co 6012($V_3$) followed by Co 6027($V_2$).Supplementation of N at 125% of the R.D ($F_3$) had resulted in maximum growth and cane yield(97.24t/ha) and was on par with N application at 100% of the R.D. Maximum sugar yield was also obtained for $F_3$(11.45 t/ha) which was also on par with that of $F_2$(11.18 t/ha). Interaction effect was not significant.

**Summary:** It can be concluded from the study that the genotype Co 6012 is promising as it has recorded the highest cane and sugar yield both in plant crop and ratoon followed by the genotype Co 6027. All the genotypes performed better at 125 % of the recommended dose of N.

**Table AS 42.17.1:** Cane yield and juice quality as influenced by varieties and fertilizer levels (plant crop)

| **Treatments** | **Cane length (cm)** | **Cane girth (cm)** | **Single cane wt (kg)** | **MCC (`000/ha)** | **SMT Brix (%)** | **CCS (%)** | **Cane yield (t/ha)** | **Sugar yield (t/ha)** |
|---|---|---|---|---|---|---|---|---|
| $V_1$ | 213.81 | 9.03 | 1.27 | 62.21 | 17.24 | 13.15 | 74.93 | 9.41 |
| $V_2$ | 228.71 | 9.18 | 1.46 | 82.23 | 18.27 | 13.20 | 81.46 | 10.74 |
| $V_3$ | 243.62 | 9.47 | 1.63 | 90.76 | 19.63 | 12.91 | 92.93 | 12.00 |
| **CD (0.05)** | **11.85*** | **NS** | **0.2*** | **8.50*** | **1.50*** | **0.78*** | **9.8*** | **1.30*** |
| $F_1$ | 223.85 | 9.17 | 1.40 | 76.22 | 18.00 | 13.32 | 81.82 | 10.43 |
| $F_2$ | 228.61 | 9.22 | 1.45 | 77.60 | 18.32 | 13.16 | 81.70 | 10.72 |
| $F_3$ | 233.68 | 9.28 | 1.51 | 81.37 | 18.82 | 12.84 | 85.80 | 10.99 |
| **CD (0.05)** | **11.85*** | **NS** | **0.2*** | **8.50** | **1.50** | **0.78*** | **9.8*** | **1.30*** |
| $V_1F_1$ | 209.50 | 9.00 | 1.22 | 61.55 | 17.00 | 13.20 | 79.57 | 9.15 |
| $V_1F_2$ | 213.10 | 9.03 | 1.25 | 62.18 | 17.23 | 13.09 | 71.77 | 9.40 |
| $V_1F_3$ | 218.83 | 9.06 | 1.34 | 62.93 | 17.50 | 13.15 | 73.47 | 9.67 |
| $V_2F_1$ | 223.93 | 9.12 | 1.42 | 80.45 | 17.83 | 13.67 | 76.46 | 10.45 |
| $V_2F_2$ | 228.47 | 9.18 | 1.46 | 82.57 | 18.10 | 13.23 | 81.46 | 10.77 |
| $V_2F_3$ | 233.73 | 9.24 | 1.49 | 83.67 | 18.87 | 12.72 | 86.43 | 11.00 |
| $V_3F_1$ | 238.13 | 9.38 | 1.56 | 86.67 | 19.17 | 13.07 | 89.43 | 11.70 |
| $V_3F_2$ | 244.16 | 9.47 | 1.63 | 88.06 | 19.63 | 13.02 | 91.87 | 12.00 |
| $V_3F_3$ | 248.47 | 9.54 | 1.69 | 97.54 | 20.10 | 12.63 | 97.50 | 12.32 |
| **VxF CD (0.05)** | **NS** | **NS** | **NS** | **NS** | **NS** | **1.53*** | **NS** | **1.78*** |

**Table AS 42.17.2:** Cane yield and juice quality as influenced by varieties and fertilizer levels (ratoon)

| Treatments | Cane length (cm) | Cane girth (cm) | Single cane wt (kg) | MCC (`000/ha) | SMT Brix (%) | CCS (%) | Cane yield (t/ha) | Sugar yield (t/ha) |
|---|---|---|---|---|---|---|---|---|
| $V_1$ | 222.18 | 9.21 | 1.44 | 72.53 | 17.54 | 11.84 | 83.50 | 9.90 |
| $V_2$ | 238.25 | 9.51 | 1.62 | 90.76 | 18.54 | 11.62 | 92.49 | 10.75 |
| $V_3$ | 255.61 | 9.96 | 1.85 | 102.97 | 19.90 | 12.32 | 103.47 | 12.75 |
| **CD (0.05)** | **12.45*** | **NS** | **0.1*** | **9.20*** | **1.53*** | **0.75*** | **9.5*** | **1.50*** |
| $F_1$ | 233.16 | 9.47 | 1.57 | 84.92 | 18.28 | 11.96 | 89.79 | 10.77 |
| $F_2$ | 238.10 | 9.55 | 1.63 | 87.82 | 18.67 | 12.07 | 92.43 | 11.18 |
| $F_3$ | 244.79 | 9.66 | 1.71 | 93.52 | 19.03 | 11.76 | 97.24 | 11.45 |
| **CD (0.05)** | **12.45*** | **NS** | **0.1*** | **9.20** | **1.53** | **0.75*** | **9.5*** | **1.78*** |
| $V_1F_1$ | 217.93 | 9.14 | 1.36 | 69.09 | 17.30 | 11.64 | 80.70 | 9.40 |
| $V_1F_2$ | 221.23 | 9.21 | 1.41 | 71.76 | 17.53 | 12.05 | 83.19 | 10.05 |
| $V_1F_3$ | 222.37 | 9.29 | 1.54 | 76.72 | 17.80 | 11.83 | 86.62 | 10.25 |
| $V_2F_1$ | 233.57 | 9.43 | 1.58 | 88.22 | 18.13 | 11.76 | 89.24 | 10.50 |
| $V_2F_2$ | 238.56 | 9.49 | 1.62 | 90.46 | 18.50 | 11.72 | 91.72 | 10.75 |
| $V_2F_3$ | 242.63 | 9.60 | 1.68 | 93.60 | 19.00 | 11.39 | 96.51 | 11.00 |
| $V_3F_1$ | 247.95 | 9.85 | 1.76 | 97.43 | 19.40 | 12.48 | 99.43 | 12.41 |
| $V_3F_2$ | 254.50 | 9.93 | 1.86 | 101.23 | 20.00 | 12.45 | 102.39 | 12..75 |
| $V_3F_3$ | 264.36 | 10.10 | 1.93 | 110.24 | 20.30 | 12.06 | 108.61 | 13.10 |
| **VxF CD (0.05)** | **NS** | **NS** | **NS** | **NS** | **NS** | **NS** | **NS** | **NS** |

**18. AKOLA**

Owing to scarcity of irrigation water the project could not be carried out during the year.

## EAST COAST ZONE

### 19. ANAKAPALLE

***EARLY GROUP:***

Initial soil analysis was done. Soil is neutral in pH (7.46), normal in E.C(0.18 $dSm^{-1}$) low in organic carbon (0.56%), low in available nitrogen (241 kg N /ha), medium in available phosphorus (66.5 kg/ha), high in available potassium (242 kg / $K_2O$ /ha). Experiment was planted on 23.02.2013 and it was harvested on 25.03.2014.

Germination percentage was recorded at 35 days after planting expressed in % and presented in Table 2. Not much variation was observed in germination per cent with nitrogen doses. Among different genotypes 2004A55 recorded highest per cent germination than 2001A63 and test variety 93A145. Number of millable canes varied significantly due to different nitrogen doses (Table AS 42.19.1). Application of nitrogen fertilizer at 100% and 125% recommended dose to early sugarcane genotypes significantly increased the number of millable canes (99,073/ha and 98,003/ha respectively) as compared to 75% recommended dose of nitrogen fertilizer (92,592/ha). Among the genotypes 2004A55 recorded significantly higher number of millable canes (1,02,604/ha) than 2001 A63 (98,003/ha) and check variety 93A145 (95,920/ha).

Significant difference in juice sucrose (%) was not observed either with genotypes or doses of nitrogen. Commercial cane sugar percent was calculated treatment wise. Commercial cane sugar percent did not vary with the levels of nitrogen fertilizer. Among different new early sugarcane genotypes 2004A55 registered higher CCS % but found on par with check variety 93A145.

Cane yield of early maturing sugarcane genotypes differed significantly due to different levels of nitrogen. Application of 125% recommended dose of N registered significantly higher cane yield of 93.1 t/ha as compared to 75% RDN (86.7 t/ha) but found on par with application of 100% recommended nitrogen (89.7 t/ha). New early promising genotypes 2004 A 55 (93.7 t/ha) and 2001 A 63 (91.1 t/ha) registered significantly higher cane yields than the check variety 93 A 145. Sugar yield was calculated based on CCS% and cane yield. Significant variations were not found in sugar yield both with the levels of nitrogen and genotypes.

**SUMMARY:** Performance of new promising early sugarcane genotypes viz., 2004 A 55 and 2001 A 63 along with standard check 93 A 145 was studied under different levels of nitrogen under irrigated conditions at Regional Agricultural Research Station, Anakapalle during 2013-14 season. The results showed that application of nitrogen at 125% (93.1t/ha) and 100% (89.7 t/ha) recommended dose registered significantly higher cane yield than 75% recommended dose of nitrogen (86.7 t/ha). The cane yield of both new early sugarcane genotypes 2004A55 (93.7t/ha) and 2001A63 (91.1 t/ha) were on par and significantly superior as compared to check variety. 93A145 (88.6 t/ha).

**Table AS 42.19.1:** Yield and quality of promising sugarcane genotypes (early group-plant crop)

| Treatment | Germination (%) | NMC/ha | Cane yield (t/ha) | Juice sucrose (%) | CCS (%) | Sugar yield (t/ha) |
|---|---|---|---|---|---|---|
| **Varieties** | | | | | | |
| **2004A55** | 75.9 | 1,02,604 | 93.7 | 16.2 | 13.4 | 12.4 |
| **2001A63** | 69.4 | 98,003 | 91.1 | 16.1 | 12.8 | 11.9 |
| **93A145** | 68.7 | 95,920 | 88.6 | 16.4 | 13.8 | 12.1 |
| **SEm ±** | 1.02 | 713 | 1.24 | - | 0.22 | - |
| **C.D (0.05)** | 3.0 | 2092 | 3.7 | NS | 0.65 | NS |
| **N levels (Rec.dose-112 Kg N/ha)** | | | | | | |
| **N1- 75% RDN** | 71.4 | 92,592 | 86.7 | 16.2 | 13.1 | 11.4 |
| **N2-100% RDN** | 73.1 | 99,073 | 89.7 | 16.4 | 13.7 | 12.4 |
| **N3-125% RDN** | 69.6 | 98,147 | 93.1 | 16.3 | 13.4 | 12.1 |
| **SEm ±** | 1.2 | 824 | 1.44 | - | - | - |
| **C.D (P=0.05)** | 3.4 | 2416 | 4.2 | NS | NS | NS |
| **Interaction** | | | | | | |
| **VxN** | NS | NS | NS | NS | NS | NS |
| **C.V %** | 5.3 | 3.0 | 4.5 | 5.3 | 5.1 | 9.13 |

**MID-LATE GROUP:**

Initial soil analysis was done. Soil is neutral in pH (7.22), normal in E.C(0.187dSm$^{-1}$) low in organic carbon (0.46%), low in available nitrogen (192 kg N /ha), medium in available phosphorus (47.9 kg/ha) and high in available potassium (251 kg / $K_2O$ /ha). Experiment was planted on 23.02.2013 and it was harvested on 25.03.2014. Germination per cent was recorded at 35 days after planting expressed in % and presented in table AS 42.19.2. Germination percentage did not vary significantly due to application of different doses of nitrogen fertilizers. 2007A126 variety recorded significantly higher germination percentage than other new mid late genotypes and the check variety Co7219. Tiller population at 180 days after planting varied significantly with mid late sugarcane genotype and levels of nitrogen. Among different sugarcane genotypes 2004A104 and 2007A126 recorded significantly higher number of tillers. Application of nitrogen at 125% recommended dose registered significantly higher number of tillers (1,15,413/ha ) than 75% (1,04,810/ha ) and 100% (1,08,437/ha ) recommended nitrogen.

Significant differences in number of millable canes at harvest were observed due to

different sugarcane genotypes and levels of nitrogen nutrient. Application of nitrogen at 125% recommended dose registered significantly higher number of millable canes (67,909/ha) than 100% (61,767/ha) recommended nitrogen. Significantly lowest number of millable canes were recorded in application of 75% (56,490/ha) plot. Among the new genotypes 2007A126 had higher number of millable canes (71,314/ha) than 2004A104 (59,294/ha) and 2007A177 (42,452/ha). How ever the check variety Co7219 recorded higher number of millable canes (75,160/ha) than other test varieties. Cane juices were analyzed for sucrose content at harvest. Percent juice sucrose did not vary with sugarcane genotypes and application of different nitrogen doses. Commercial cane sugar percent was calculated treatment wise. Commercial cane sugar percent did not vary with application of different doses of nitrogen fertilizers. Among genotypes, the check variety Co7219 recorded higher per cent CCS percentage (12.1) as compared to new genotypes under study.

Cane yield per plot was recorded expressed in t/ha and presented in table AS 42.19.2. Cane yield of new mid late sugarcane genotypes under irrigated conditions varied significantly due to different N levels. Application of nitrogen at 125% recommended dose registered significantly higher cane yield of 85.1 t/ha than lower levels of 75% (74.1 t/ha) and 100% (78.7 t/ha) recommended nitrogen. Among the new mid late genotypes under test, 2007A126 proved superior (84.1 t/ha) than 2004A104 (76.1 t/ha) and 2007A177 ((68.0 t/ha).However the check variety Co 7219 recorded higher cane yield of 88.9 t/ha. Sugar yields followed the same trend as that of cane yield.

**Summary**: The results showed that application of 'N' at 125% recommended dose registered significantly higher cane yield of 85.1 t/ha than lower levels of 75% (74.1 t/ha) and 100% (78.7 t/ha) recommended nitrogen. Among the three new mid late genotypes under test 2007A126 proved superior (84.1 t/ha) to 2004A104 (76.1 t/ha) and 2007A177 ((68.0 t/ha). Due to heavy rainfall (573.6 mm) received during the month of October when crop is in grand growth and maturity phase the experimental field was subjected to water logging and the crop was lodged, under such abnormal situation. As check such the variety Co 7219 performed better and recorded higher cane yield (88.9 t/ha).

**Table AS 42.19.2:** Yield and quality of promising sugarcane genotypes (mid late group-plant crop)

| Treatment | Germination (%) | Tiller population/ha at 180DAP | NMC/ha | Cane yield (t/ha) | Juice sucrose (%) | CCS (%) | Sugar yield (t/ha) |
|---|---|---|---|---|---|---|---|
| **Varieties** | | | | | | | |
| **2004A104** | 78.9 | 1,18,571 | 59,294 | 76.1 | 15.8 | 11.8 | 9.0 |
| **2007A177** | 60.0 | 89,271 | 42,452 | 68.0 | 16.1 | 11.7 | 7.9 |
| **2007A126** | 82.9 | 1,17,589 | 71,314 | 84.1 | 15.3 | 11.1 | 9.4 |
| **Co7219** | 72.3 | 1,12,782 | 75,160 | 88.9 | 16.6 | 12.1 | 10.8 |
| **SEm +** | 0.87 | 1722 | 472 | 0.94 | - | 0.35 | |
| **C.D (0.05)** | 2.6 | 5049 | 1383 | 2.8 | NS | 0.50 | - |
| **N levels (Rec.dose-112 Kg N/ha)** | | | | | | | |
| **N1- 75% RDN** | 73.8 | 1,04,810 | 56,490 | 74.1 | 16.4 | 11.8 | 8.7 |
| **N2-100% RDN** | 72.0 | 1,08,437 | 61,767 | 78.7 | 15.3 | 11.6 | 9.1 |
| **N3-125% RDN** | 74.7 | 1,15,413 | 67,909 | 85.1 | 16.6 | 11.7 | 10.0 |
| **SEm +** | - | 1491 | 408 | 0.81 | - | NS | |
| **C.D (P=0.05)** | NS | 4373 | 1197 | 2.4 | NS | | - |
| **Interaction** | | | | NS | NS | NS | |
| **C.V %** | 3.5 | 4.0 | 3.0 | 4.5 | 9.0 | | |

**20. CUDDLORE**

The experiment was laid out during 2013 – 14 in randomized block design with three replications. Three sugarcane genotypes viz., CoA09 321, CoA 08 323,CoC 09 336 and CoC 08 336 were compared with the standards Co 86032 and CoC (SC) 24. In addition, the effect of three levels of nitrogen fertilization (75, 100 and 125 per cent of recommended dose) was also studied.

The data documented on varied growth, yield and quality parameters for the respective cropping seasons are presented in Tables1 & 2. Among the entries, the clone CoC 09 336 significantly registered the maximum germination of 81.25 per cent. The levels of nitrogen application did not showed any significant results on germination. The clone C260628 significantly registered the higher tiller population 1,93,400 $ha^{-1}$. Irrespective of the varieties, the application of 125 per cent of recommended nitrogen along with recommended dose of P&K numerically registered the maximum tillers of 1,90,200 $ha^{-1}$.

The entry CoC 09 336 significantly registered the maximum millable cane (1,30,000 $ha^{-1}$), individual cane weight (1.52 kg), cane yield (146.4 t ha-1) and sugar yield (17.16 t ha-1) in spring season. The same entry was also recorded significantly the maximum millable cane (1,35,800 $ha^{-1}$), individual cane weight (1.70 kg), cane yield (148.0 t $ha^{-1}$) and sugar yield (17.77 t $ha^{-1}$) in autumn season. Regarding the juice quality, the sugarcane variety CoC 09 336

6registered the highest commercial cane sugar (CCS) per cent of 12.65 and 13.26 respectively in spring and autumn seasons and was on par with the entry CoC 24 which recorded 12.35 and 12.82 per cent commercial cane sugar.

Among the levels of nitrogen, the prescription of 125 per cent of the recommended dose of nitrogen significantly registered higher values of yield components, cane and sugar yield as compared to 75 and 100 per cent of recommended dose of nitrogen. The 125 per cent recommended nitrogen gave the maximum millable cane (1,35,400 $ha^{-1}$), individual cane weight (1.48 kg), cane yield (138.9 t $ha^{-1}$) and sugar yield (16.25 t ha-1) in spring season. The same treatment also recorded significantly the maximum millable cane (1,34,000 $ha^{-1}$), individual cane weight (1.54 kg), cane yield (141.6 t $ha^{-1}$) and sugar yield (16.21 t $ha^{-1}$) in autumn season. Regarding the juice quality, the 125 per cent of nitrogen application recorded the highest commercial cane sugar (CCS) per cent of 12.60 and 12.94 respectively in spring and autumn seasons and was on par with the 100 per cent nitrogen which recorded 12.19 and 12.62 per cent commercial cane sugar.

**Table AS 42.20.1:** Performance of sugarcane genotypes under varied levels of N (spring)

| Treatments | Germination (%) | Tillers ('000 $ha^{-1}$) | Millable canes ('000 $ha^{-1}$) | Individual cane weight (kg) | Cane yield (t $ha^{-1}$) | CCS (%) | Sugar yield (t $ha^{-1}$) |
|---|---|---|---|---|---|---|---|
| **Genotypes** | | | | | | | |
| Co A 09 321 | 73.80 | 182.00 | 120.30 | 1.33 | 124.8 | 11.62 | 14.71 |
| Co A 08 323 | 68.30 | 170.30 | 115.80 | 1.21 | 118.5 | 11.56 | 14.40 |
| CoC 09 336 | 81.25 | 193.40 | 130.00 | 1.52 | 146.4 | 12.65 | 17.16 |
| CoC 08 336 | 65.40 | 168.10 | 110.20 | 1.10 | 114.2 | 11.12 | 13.38 |
| CoC 24 | 78.16 | 187.2 | 123.50 | 1.41 | 135.0 | 12.35 | 14.82 |
| Co 86032 | 76.50 | 185**.0** | 121.10 | 1.38 | 128.0 | 12.00 | 14.27 |
| **CD (p=0.05)** | 4.00 | 5.20 | 5.75 | 0.07 | 8.00 | 0.50 | 0.70 |
| **N Levels** | | | | | | | |
| 75% RD N | 70.75 | 168.40 | 104.10 | 1.22 | 110.2 | 10.88 | 13.50 |
| 100% RD N | 76.12 | 180.80 | 124.70 | 1.31 | 126.3 | 12.19 | 15.60 |
| 125% RD N | 78.40 | 190.20 | 135.40 | 1.36 | 138.9 | 12.52 | 16.25 |
| **CD (p=0.05)** | NS | 12.12 | 6.80 | 0.08 | 9.25 | 0.72 | 0.85 |

**Table AS 42.20.2**: Performance of sugarcane genotypes under varied levels of N (autumn)

| Treatment | Germination (%) | Tillers ('000 $ha^{-1}$) | Millable canes ('000 $ha^{-1}$) | Individual cane weight (kg) | Cane yield (t $ha^{-1}$) | CCS (%) | Sugar yield (t $ha^{-1}$) |
|---|---|---|---|---|---|---|---|
| **Genotypes** | | | | | | | |
| CoA 09 321 | 71.00 | 160.00 | 117.00 | 1.40 | 126.60 | 12.25 | 15.62 |
| CoA 08 323 | 65.50 | 149.80 | 113.40 | 1.30 | 119.90 | 11.32 | 13.43 |
| CoC 09 336 | 78.70 | 172.40 | 135.80 | 1.70 | 148.00 | 13.26 | 17.77 |
| CoC 08 336 | 62.80 | 146.90 | 108.00 | 1.21 | 116.80 | 11.12 | 13.41 |
| CoC 24 | 75.40 | 166.30 | 120.60 | 1.52 | 137.20 | 12.82 | 16.05 |
| **Co** 86032 | 73.50 | 162.50 | 117.00 | 1.40 | 130.00 | 12.05 | 15.70 |
| **CD (p=0.05)** | 2.12 | 4.00 | 5.60 | 0.06 | 5.92 | 0.53 | 0.86 |
| **N Levels** | | | | | | | |
| 75% RD N | 68.00 | 147.00 | 107.50 | 1.30 | 112.00 | 11.10 | 14.00 |
| 100% RD N | 73.00 | 160.40 | 123.30 | 1.45 | 128.50 | 12.62 | 15.40 |
| 125% RD N | 75.90 | 170.50 | 134.00 | 1.54 | 141.60 | 12.94 | 16.21 |
| **CD (p=0.05)** | 1.70 | 4.98 | 7.25 | 0.07 | 8.25 | 0.70 | 0.92 |

**SUMMARY:** The genotype CoC 09 336 significantly registered the maximum millable cane, individual cane weight, cane yield and sugar yield in both spring and autumn season. Regarding the juice quality, the clone CoC 09 336 registered the highest commercial cane sugar (CCS) per cent in spring and autumn seasons and was on par with the entry CoC 24.

Prescription of 125 per cent of the recommended dose of nitrogen significantly registered higher values of yield components, cane and sugar yield compared to 75 and 100 per cent of recommended dose of nitrogen.

## 21. NAYAGARH

The experiment planted on 24.12.12 was laid out in factorial randomized block design with three genotypes from AVT namely CoC 07336, Co A 08324 and Co Or 8346 along with one standard check *i.e*. Co 6907 on red laterite soil of the experimental farm of Sugarcane Research Station, Nayagarh. The soil was acidic (pH 5.12) in reaction with electrical conductivity of 0.178 $dsm^{-1}$. Available N content was in lower range (159 kg/ha), but the soil was medium in available P (19.8 kg/ha) and (K 148 kg/ha) content. The crop was harvested on 15.11.13. The genotype Co Or 8346 produced the highest average cane yield of 83.91 t/ha with application of 100 % RDN and was closely followed by Co 6907 (82.59 t/ha) and Co A 08324 (80.82 t/ha). All the three varieties were statistically superior to CoC 07336 which produced an average cane yield of 72.34 t/ha. All the sugarcane varieties exhibited higher response to either 75 or 100 % RDN which declined at 125 % RDN level except CoA 08324 which exhibited higher response to 125 % RDN. Among the four genotypes tried in the said experiment CoC 07336

produced the lowest average cane and CCS (7.51 t/ ha) yield. Moreover this variety flowers profusely during 6the month of October – November, hence found unsuitable for local situation.

**SUMMARY:** The genotype Co Or 8346 produced the highest average cane yield of 83.91 t/ha with application of 100 % RDN and was closely followed by Co 6907 (82.59 t/ha) and Co A 08324 (80.82 t/ha).

**AS 42.21.1:** Effect of genotypes and fertility levels on germination, tiller count, yield and juice quality

| Treatment | Germination % at 45 DAP | No of tillers (000/ha) at 90 DAP | No of tillers (000/ha) at 120 DAP | NMC (000/ha) | Cane yield (t/ha) | Juice Brix % | Juice Sucrose% | CCS % | CCS yield (t/ha) |
|---|---|---|---|---|---|---|---|---|---|
| **Genotypes** | | | | | | | | | |
| **CoC 07336** | 44.17 | 64.97 | 62.43 | 60.61 | 72.34 | 18.11 | 15.32 | 10.37 | 7.51 |
| **CoA 08324** | 51.79 | 75.00 | 72.46 | 68.44 | 80.82 | 18.59 | 15.64 | 10.55 | 8.54 |
| **Co Or 8346** | 60.31 | 81.83 | 79.29 | 73.76 | 83.91 | 18.86 | 15.90 | 10.75 | 9.06 |
| **Co 6907** | 50.83 | 79.90 | 77.36 | 72.26 | 82.59 | 18.77 | 15.41 | 10.27 | 8.50 |
| **SEm ±** | 2.346 | 3.479 | 3.512 | 2.713 | 2.221 | 0.141 | 0.145 | 0.136 | 0.279 |
| **CD at 5 %** | 6.881 | 10.202 | 9.202 | 7.958 | 6.514 | 0.413 | 0.425 | NS | 0.818 |
| **N levels** | | | | | | | | | |
| **75 %** | 51.00 | 79.40 | 76.86 | 71.87 | 80.56 | 18.68 | 15.83 | 10.73 | 8.69 |
| **100 %** | 52.98 | 77.98 | 75.44 | 70.76 | 84.05 | 18.80 | 15.62 | 10.47 | 8.81 |
| **125 %** | 51.36 | 68.89 | 66.35 | 63.68 | 75.03 | 18.27 | 15.25 | 10.25 | 7.70 |
| **SEm ±** | 2.032 | 3.013 | 3.113 | 2.350 | 1.924 | 0.122 | 0.126 | 0.118 | 0.242 |
| **CD at 5 %** | NS | 8.83 | 8.840 | 6.891 | 5.642 | 0.357 | 0.368 | 0.346 | 0.708 |

**AS 42.21.2:** Interaction effect of different genotypes at various fertility level on cane yield

| Genotypes | | Mean table | | |
|---|---|---|---|---|
| | N1 | N2 | N3 | Mean |
| **CoC 07336** | 61.03 | 83.52 | 72.47 | 72.34 |
| **CoA 08324** | 84.73 | 77.41 | 80.34 | 80.82 |
| **Co Or 8346** | 91.70 | 89.24 | 70.80 | 83.91 |
| **Co 6907** | 84.79 | 86.45 | 76.52 | 82.59 |
| **Mean** | 80.56 | 84.15 | 75.03 | 79.92 |
| | V | N | V x N | |
| Sem | 2.221 | 1.924 | 3.848 | |
| CD 5% | 6.514 | 5.642 | 11.283 | |
| CV % | 8.34 | | | |

## NORTH CENTRAL ZONE

### 22. PUSA

**Plant crop**

**Early group:**

Planting of experiment was done on 4th February 2013.The data on growth parameters yield attributes and cane yield as observed at harvest on 5.02.2014 and as affected by different early promising genotypes of sugarcane and levels of nitrogen application during spring season revealed that variety, CoP 112 recorded significantly higher number of tillers (168.0 thousand /ha) , millable canes (120.0 thousand /ha) and cane yield (101.0 t/ha) and was statistically similar to CoP 111 (Table AS 42.22.1). However, pol. Percent juice was not affected by the varieties. Among the nitrogen levels, application of 125 % RDN recorded significantly higher number of tillers (176.2 thousand /ha), millable canes (124.0 thousand /ha) and cane yield (107.04 t/ha) though, it was on par with 75 % RDN in case of millable canes only (Table 3). Pol. Per cent juice remains unaffected by level of nitrogen.

**MID-LATE GROUP:**

Among the Varieties, CoP 092 recorded significantly higher number of tillers (180.1 thousand /ha), millable canes (126.0 thousand /ha) and cane yield (107.2 t/ha) was significantly superior to BO 155. Varieties had no significant impact on pol percent juice (Table AS 42.22.2) though comparatively higher values was obtained due to the variety CoP 092 (16.82 %)

Highest number of tillers (194.2 thousand /ha) and millable canes (133.0 thousand /ha) were obtained with application of 125 % of recommended N, which were significantly higher than 100 and 75 % of recommended N. Maximum cane yield (111.0 t/ha) was obtained with application of 125 % of recommended N, which was statistically at par with 100 % of recommended N and significantly higher than 75 % of recommended N. N level failed to show any significant effect on pol percent of juice.

**Summary:** In early group, CoP 092 recorded significantly higher cane yield (107.2 t/ha) than BO 155 though was at par with CoP 123 (98.0 t/ha) while, in mid-late group CoP112having cane yield of (101.0 t/ha) significantly out yielded CoP 111 but at par with CoP 081 (95.0 t/ha). Higher cane yield was recorded at 125 % of recommended dose of nitrogen but on par with 100 % RDF in early group where as in mid-late group response was significantly up to 125 % of RDF.

**Table AS 42.22.1:** Effect of early promising genotypes of sugarcane and levels of nutrients

| Treatment | Germination % | No. of tillers ('000/ha) | NMC ('000/ha) | Cane yield (t/ha) | Pol % in juice | Pol in Cane |
|---|---|---|---|---|---|---|
| $V_1$ CoP 111 | 36.5 | 128.2 | 102.0 | 80.0 | 16.74 | 14.46 |
| $V_2$ B. O. 112 | 36.7 | 168.0 | 120.0 | 101.00 | 17.41 | 14.69 |
| $V_3$ CoP 0181 | 27.9 | 148.2 | 114.0 | 95.0 | 16.85 | 14.66 |
| SEm ± | 1.66 | 6.64 | 4.57 | 3.35 | 0.199 | - |
| CD (P = 0.05) | 5.0 | 19.9 | 13.8 | 10.0 | NS | - |
| CV % | 14.8 | 13.5 | 12.3 | 10.92 | 3.52 | - |
| **Levels of Nutrients**: | | | | | | |
| $F_1$ 75% | 33.5 | 122.2 | 97.0 | 75.0 | 17.10 | 14.77 |
| $F_2$ 100% | 32.7 | 146.0 | 115.0 | 94.0 | 17.07 | 14.57 |
| $F_3$ 125% | 35.0 | 176.2 | 124.0 | 107.0 | 16.83 | 14.47 |
| SEm ± | 1.66 | 6.64 | 4.59 | 3.35 | 0.199 | - |
| CD. (P = 0.05) | NS | 19.9 | 13.8 | 10.0 | NS | - |
| CV % | 14.79 | 13.5 | 12.3 | 10.9 | 3.52 | - |

**Table AS 42.22.2:** Effect of mid- late promising genotypes of sugarcane and levels of nutrients

| Treatment | Germination % | No. of tillers ('000/ha) | NMC ('000/ha) | Cane yield (t/ha) | Pol % in juice | Pol in cane |
|---|---|---|---|---|---|---|
| $V_1$ CoP 123 | 31.0 | 160.9 | 121.0 | 98.0 | 16.66 | 13.95 |
| $V_2$ CoP 092 | 33.4 | 180.1 | 126.0 | 107.2 | 16.82 | 14.13 |
| $V_3$ BO 155 | 33.4 | 134.8 | 107.0 | 90.0 | 16.62 | 14.31 |
| SEm ± | 1.53 | 7.20 | 3.94 | 3.89 | 0.181 | - |
| CD at 5% | 4.6 | 21.6 | 11.8 | 11.7 | NS | - |
| CV % | 14.1 | 13.6 | 10.00 | 11..9 | 3.26 | - |
| **Levels of Nutrients** | | | | | | |
| $F_1$ 75% | 31.7 | 125.2 | 101.0 | 84.0 | 16.78 | 14.23 |
| $F_2$ 100% | 32.8 | 156.4 | 120.0 | 100.2 | 16.72 | 14.12 |
| $F_3$ 125% | 33.3 | 194.2 | 133.0 | 111.0 | 16.60 | 14.04 |
| SEm ± | 1.53 | 7.20 | 3.94 | 3.89 | 0.181 | - |
| CD. (P = 0.05) | NS | 21.6 | 11.8 | 11.7 | NS | - |
| CV % | 14.1 | 13.6 | 10.0 | 11.9 | 3.26 | - |

**Ratoon crop**

**Early group:**

The data on growth parameters yield attributes and cane yield as affected by different early promising genotypes of sugarcane and levels of nitrogen application during spring season have been gathered from the experiment where ratoon was initiated on 25.2.2013 and the crop was harvested on 10.2.2014.

Among the three early genotypes, BO 153 recorded significantly higher number of tillers and number of millable cane than BO 150 and CoP 031 and all the genotypes differed significantly among themselves. BO 153 recorded significantly higher cane yield (67.81 t/ha) than CoP 031 (55.59 t/ha) though at par with BO 150 (64.77 t/ha).

Application of 25% of recommended dose of N recorded significantly higher numbers of tillers, number of millable cane and cane yield than 75% recommended dose though at par with 100% recommended dose. Pol % in juice was not influenced significantly due to application of different levels of nitrogen. Interaction effect of V x F was found to be non-significant.

**MID-LATE GROUP:**

Among the three genotypes BO 154 recorded significantly higher number of tillers and NMC than other genotypes. BO 154 recorded significantly higher cane yield (75.24 t/ha) than CoP 042 (54.92 t/ha) though at par with CoP 2061 (67.12 t/ha). The later two were also similar in respect to cane yield. Pol% in juice was more in CoP 042 (16.78) than other genotypes.

Use of 125% of recommended dose of N recorded significantly higher number of tillers, number of millable canes and cane yield than 75% recommended dose, though at par with 100% of recommended dose. Pol% in juice remained unaffected by levels of nitrogen.
Interaction effect of V x F was found to be non-significant.

**Summary:** The genotypes BO 153 registered maximum cane yield in spring season in early group but was at par with BO 150. Under mid-late group BO 154 yielded significantly more than that of CoP 042 but was at par with CoP 2061 in spring season. Varieties response up to 125 % RDN and were on par with 100 % RDN.

**Table AS 42.22.3:** Effect of early promising genotypes of sugarcane and levels of nitrogen (Ratoon)

| Treatment | Clump (000 /ha) | No. of tillers ('000/ha) | NMC ('000/ha) | Cane yield (t/ha) | Pol % in juice |
|---|---|---|---|---|---|
| $V_1$ CoP 031 | 46.48 | 154.48 | 86.44 | 55.59 | 16.15 |
| $V_2$ BO 150 | 39.05 | 131.33 | 80.18 | 64.77 | 16.31 |
| $V_3$ BO 153 | 49.75 | 182.27 | 94.88 | 67.81 | 16.56 |
| CD (P =0.05) | 3.60 | 20.19 | 10.64 | 5.88 | NS |
| **Levels of Nitrogen** : | | | | | |
| $N_1$ 75% | 43.00 | 133.94 | 72.37 | 53.92 | 16.42 |
| $N_2$ 100% | 45.96 | 161.88 | 90.22 | 62.79 | 16.40 |
| $N_3$ 125% | 46.36 | 172.07 | 98.92 | 70.94 | 16.76 |
| CD. (P =0.05) | 3.60 | 20.19 | 10.64 | 5.88 | NS |

**Table AS 42.22.4:** Effect of mid- Late promising genotypes of sugarcane and levels of nitrogen (Ratoon)

| Treatments | Clump (000/ha) | No. of tillers ('000/ha) | NMC ('000/ha) | Cane yield (t/ha) | Pol % in juice |
|---|---|---|---|---|---|
| $V_1$ CoP 042 | 41.85 | 112.81 | 81.26 | 54.92 | 16.78 |
| $V_2$ CoP 061 | 48.77 | 157.14 | 96.33 | 67.12 | 16.20 |
| $V_3$ BO 154 | 50.18 | 186.16 | 114.70 | 75.74 | 16.40 |
| CD (P =0.05) | NS | 17.20 | 11.04 | 6.43 | NS |
| **Levels of Nitrogen** | | | | | |
| $N_1$ 75% | 44.51 | 131.66 | 81.73 | 52.33 | 16.55 |
| $N_2$ 100% | 46.41 | 158.47 | 99.47 | 67.12 | 16.48 |
| $N_3$ 125% | 49.88 | 137.96 | 110.59 | 77.83 | 16.35 |
| CD. (P =0.05) | NS | 17.20 | 11.05 | 6.43 | NS |

**23. SHEORAHI**

The experimental soil was low in organic corbon (0.35 %) and available phosphorus (17.50 kg/ha) and medium in potash (104.0 kg/ha) with pH 8.40. The experiment was planted on October 17, 2012 and harvested on March 10, 2014.

The data (Table AS 42.23.1) showed that higher no. of millable cane and cane yield were found in variety CoSe 11453 than that of CoSe 11451 and CoSe 11454. Application of 125 % Recommended dose of N PK gave higher cane yield than 75% and 100% recommended dose of N P K

**Summary:** Variety CoSe 11453 produced higher number of millable canes and cane yield as compared to CoSe 11451 and CoSe 11454 Cane yield increased with 125% recommend dose of N P K.

**Table AS 42.23.1:** Effect of treatments on germination, shoots, millable canes, cane yield and sucrose % of cane

| Treatments | Germination % | Shoots (,000/ha) | NMC (,000/ha) | CaneYield (T/ha) | Sucrose (%) |
|---|---|---|---|---|---|
| (A)varieties | | | | | |
| 01-CoSe 11451 | 38.15 | 183 | 138 | 77.74 | 16.73 |
| 02-CoSe 11453 | 42.86 | 195 | 143 | 87.83 | 17.11 |
| 03-CoSe 11454 | 36.87 | 176 | 142 | 82.05 | 16.41 |
| SE + | 1.03 | 3204 | 944 | 0.566 | 0.19 |
| C D (5%) | 2.13 | 6880 | 2001 | 1.214 | N.S. |
| (B) Fertilizer level | | | | | |
| 75 % reco. NPK | 38.76 | 170 | 140 | 81.83 | 16.52 |
| 100% reco.NPK | 37.99 | 189 | 141 | 82.28 | 16.79 |
| 125% reco. NPK | 41.12 | 194 | 143 | 83.51 | 16.95 |
| S.E. | 1.03 | 3204 | 944 | 0566 | 0.19 |
| C.D. (5%) | N.S. | 6880 | N.S. | N.S. | N.S. |

## NORTH EASTERN ZONE

### 25. BURALIKSON

***Early group***

**Plant crop**

The genotypes were planted on 22nd March, 2013 and harvested on 12th February 2014. The experimental field was clay loam in texture, poor in organic carbon (0.35%), low in available P (16.4 kg $P_2O_5$/ha) and medium in available K (172 kg $K_2O$/ha) with ph 4.4

The data on second year trial of effect of four early genotypes and three nitrogen levels is presented in Table AS-42-01. All the four genotypes showed significant differences in terms of growth and cane yield. Among the four genotypes CoBln07501 recorded significantly higher number of shoots (114.85 thousand/ha), higher cane yield (88.43 t/ha) which is statistically at par with CoBln 03172 which recorded 111.27 thousand/ ha and 87.29 t/ha respectively.

In case of different levels of nitrogen, application of 125% of RD of N recorded significantly higher number of shoots (113.79 thousand/ha) and millable canes (104.01 thousand/ha) than the other nitrogen levels. The same treatment also recorded significantly the highest cane yield (90.74t/ha) which is statistically at par with 100% RD of N (87.77 t/ha). However there were no significant differences recorded in case of juice quality parameters due to genotypes and nitrogen levels.

**SUMMARY:** Among the four genotypes of early group plant crop CoBln07501 recorded significantly higher number of shoots (114.85 thousand/ha), higher cane yield (88.43 t/ha) which is statistically at par with CoBln 03172 which recorded 111.27 thousand/ ha and 87.29 t/ha respectively. As far levels of N similar cane yields were recorded with 100 and 125% N levels.

**Table AS 42.24.1:** Effect of genotypes (early group) and fertilizer levels on performance of Sugarcane (plant crop)

| Treatment | Germ-ination (%) | No. of shoots (000/ha) | NMC (000/ha) | Cane length (m) | Cane dia-meter (cm) | Sucrose (%) | Cane yield (t/ha) | CCS (%) |
|---|---|---|---|---|---|---|---|---|
| **Genotypes** | | | | | | | | |
| CoBln 04172 (17/99) | 44.36 | 110.13 | 100.42 | 2.59 | 2.40 | 16.69 | 73.84 | 10.98 |
| CoBln 05501 (185/00) | 44.36 | 109.64 | 102.45 | 2.59 | 2.37 | 16.43 | 79.58 | 9.88 |
| CoBln03172 | 43.14 | 111.27 | 102.12 | 2.62 | 2.42 | 16.12 | 87.29 | 10.66 |
| CoBln07501 | 45.22 | 114.85 | 100.49 | 2.60 | 2.52 | 15.73 | 88.43 | 9.34 |
| CD at 5% | NS | 2.91 | NS | NS | 0.07 | NS | 8.10 | NS |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Fertility Levels** | | | | | | | | |
| $F_1$ (75% of Recommanded N) | 41.17 | 109.0 | 92.51 | 2.54 | 2.41 | 16.29 | 77.38 | 9.93 |
| $F_2$ (100% of Recommanded N) | 46.55 | 111.47 | 100.09 | 2.61 | 2.38 | 16.11 | 87.77 | 10.57 |
| $F_3$ (125% of Recommanded N) | 47.46 | 113.79 | 104.01 | 2.59 | 2.46 | 16.33 | 90.74 | 10.14 |
| CD at 5% | 2.64 | 2.52 | 5.41 | NS | NS | NS | 7.01 | NS |

## Ratoon Crop

The first year ratoon crop was harvested on 25.02.2014. The data on growth, cane yield and quality parameters are presented in Table AS-42-02. All the four genotypes showed significant differences on growth and cane yield. Among the four genotypes, CoBln 03172 recorded significantly higher number of shoots (71.45 thousand/ha), number of millable canes (77.77 thousand/ha) and cane yield (66.25t/ha) followed by CoBln 07501 which recorded 71.18 thousand/ha, 73.84 thousand 63.87 t/ha respectively.

However no significant differences were recorded in terms other growth and juice quality parameters. In case of different nitrogen levels, application of 125% RD of N recorded significantly higher number of millable canes (74.58 thousand/ha) and cane yield (64.53 t/ha) than the other two nitrogen levels.

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**Table AS 42.24.2:** Effect of genotypes (early group) and fertilizer levels on performance of Sugarcane (ratoon crop)

| **Treatment** | **No.of shoots (000/ha)** | **NMC (000/ha)** | **Cane length (m)** | **Cane dia-meter (cm)** | **Sucrose (%)** | **Cane yield (t/ha)** | **CCS (%)** |
|---|---|---|---|---|---|---|---|
| **Genotypes** | | | | | | | |
| CoBln 04172 (17/99) | 63.40 | 70.24 | 2.53 | 2.37 | 16.69 | 56.71 | 10.98 |
| CoBln 05501 (185/00) | 65. 15 | 68.86 | 2.54 | 2.39 | 16.43 | 57.74 | 10.88 |
| CoBln03172 | 71.45 | 77.77 | 2.57 | 2.41 | 16.12 | 66.25 | 10.67 |
| CoBln07501 | 71.18 | 73.84 | 2.58 | 2.47 | 15.73 | 63.87 | 10.03 |
| CD at 5% | 4.94 | 2.80 | NS | NS | NS | 4.75 | NS |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Fertility Levels** $F_1$ (75% of Recommanded N) | 65.16 | 69.88 | 2.49 | 2.34 | 16.29 | 57.64 | 10.68 |
| $F_2$ (100% of Recommanded N) | 68.46 | 73.58 | 2.60 | 2.42 | 16.10 | 62.74 | 10.89 |
| $F_3$ (125% of Recommanded N) | 69.78 | 74.58 | 2.57 | 2.47 | 16.34 | 64.53 | 10.32 |
| CD at 5% | NS | 2.4 | 0.07 | 0.06 | NS | 4.12 | NS |

Pooled data of two plant crop and ratoon crop presented in table AS-42-03 indicated that no significant difference on cane yield was recorded among four genotypes. However, application of 125% RD of N recorded significantly higher cane yield (75.23t/ha) followed by application of 100% RD of N (73. 87t/ha). Among the four genotypes, CoBln 04172 recorded significantly higher sucrose content (17.27%) followed by CoBln 05501 (16.96%), but no significant difference on CCS% was recorded due to genotypes, nitrogen levels and their interaction as well.

**Table AS 42.24.3:** Pooled data of two plant crop and one ratoon crop

| **Treatments** | **NMC (000/ha)** | **Yield (t/ha)** | **Sucrose%** | **CCS%** |
|---|---|---|---|---|
| **Genotypes** CoBln 04172 (17/99) | 75.87 | 70.51 | 17.27 | 11.50 |
| CoBln 05501 (185/00) | 81.10 | 72.78 | 16.96 | 11.13 |
| CoBln03172 | 83.73 | 73.45 | 16.90 | 11.35 |
| CoBln07501 | 82.61 | 72.76 | 16.19 | 10.44 |
| CD at 5% | 5.27 | NS | 0.75 | NS |
| **Fertility Levels** $F_1$ (75% of Recommanded N) | 76.70 | 69.03 | 16.89 | 11.07 |
| $F_2$ (100% of Recommanded N) | 82.11 | 73.87 | 16.77 | 11.19 |
| $F_3$ (125% of Recommanded N) | 82.92 | 75.23 | 16.83 | 11.06 |
| CD at 5% | 4.56 | 4.91 | NS | NS |

## MID-LATE GROUP:

The genotypes were planted on 28 March, 2013 and harvested on 8th April, 2014. The experimental field was clay loam in texture, poor in organic carbon (0.35%), low in available P (16.4 kg $P_2O_5$/ha) and medium in available K (172 kg $K_2O$/ha) with ph 4.5.

Among the four mid-late genotypes, CoBln 04174 recorded significantly the highest cane yield (79.28t/ha) which is statistically at par with CoBln 07503 (79.14 t/ha). The same genotypes also recorded significantly the highest number of shoots (101.42 thousand/ha) and number of millable canes (93.41 thousand/ha), respectively.

In case of different levels of nitrogen significant differences on cane yield and its attributing characters were recorded. Application of 125% RD of N recorded significantly the higher number of millable canes (93.72 thousand/ha) and cane yield (82.71 t/ha) which is at par with the application of 100% RD of N which registered NMC (90.23 thousand/ha) and cane yield (80.11 t/ha), respectively. But, there was no significant differences observed on juice quality parameters among the four genotypes, nitrogen levels and their interaction as well.

**Table AS 42.24.4:** Effect of genotypes (mid-late group) and fertilizer levels on performance of Sugarcane (plant crop)

| **Treatments** | **Germination (%)** | **No. of shoots (000/ha)** | **NMC (000/ha)** | **Cane length (m)** | **Cane dia-meter (cm)** | **Sucrose (%)** | **Cane yield (t/ha)** | **CCS (%)** |
|---|---|---|---|---|---|---|---|---|
| **Genotypes** | | | | | | | | |
| CoBln 07502 | 43.34 | 86.48 | 80.33 | 2.46 | 2.36 | 17.60 | 69.21 | 11.38 |
| CoBln 07503 | 43.26 | 98.63 | 91.40 | 2.51 | 2.40 | 17.62 | 79.14 | 11.38 |
| CoBln04174 (12/99) | 43.55 | 101.42 | 93.41 | 2.49 | 2.45 | 17.95 | 79.28 | 11.71 |
| CoBln05502 (11/00) | 40.02 | 92.73 | 87.94 | 2.54 | 2.48 | 17.22 | 74.17 | 11.06 |
| CD at 5% | 1.84 | 4.08 | 4.48 | NS | NS | NS | 8.46 | NS |
| **Fertility Levels** | | | | | | | | |
| $F_1$ (75% of Recommanded N) | 39.82 | 90.40 | 86.13 | 2.50 | 2.43 | 17.84 | 68.66 | 11.66 |
| $F_2$(125% of Recommanded N) | 43.24 | 97.44 | 90.23 | 2.49 | 2.42 | 17.58 | 80.11 | 11.39 |
| $F_3$ (125% of Recommanded N) | 44.58 | 103.27 | 93.72 | 2.51 | 2.42 | 17.36 | 82.71 | 11.10 |
| CD at 5% | 1.59 | 4.34 | 2.81 | NS | NS | NS | 7.32 | NS |

**Ratoon crop**:

The data on cane yield, its attributing characters and juice quality parameters of first year ratoon crop is presented in table AS 42.24.5. From the table it is depicted that there was no significant difference observed on cane yield and its quality parameters observed among the four genotypes. However, application of different nitrogen levels showed signification difference on cane and juice quality parameters. The highest cane yield (67.17t/ha) was recoded when 125% RD of N was applied which is statistically superior to 75% RD of N which recorded cane yield (57.17 t/ha) but statistically at par with 100 % RD of N which registered cane yield (65.21 t/ha).

**Table AS 42.24.5**: Effect of genotypes (mid-late group) and fertilizer levels on performance of Sugarcane (ratoon crop)

| **Treatment** | **No. of shoots (000/ha)** | **NMC (000/ha)** | **Cane length (m)** | **Cane dia-meter (cm)** | **Sucrose (%)** | **Cane yield (t/ha)** | **CCS (%)** |
|---|---|---|---|---|---|---|---|
| **Genotypes** | | | | | | | |
| CoBln 07502 | 82.13 | 72.26 | 2.48 | 2.40 | 16.22 | 65.11 | 10.70 |
| CoBln 07503 | 85.14 | 75.96 | 2.49 | 2.40 | 16.15 | 64.12 | 10.56 |
| CoBln04174 (12/99) | 81.27 | 73.29 | 2.52 | 4.45 | 16.03 | 64.51 | 10.46 |
| CoBln05502 (11/00) | 75.65 | 65.93 | 2.51 | 2.39 | 15.80 | 59.47 | 10.46 |
| CD at 5% | 4.58 | 4.95 | NS | NS | NS | NS | NS |
| **Fertility Levels** | | | | | | | |
| $F_1$ (75% of Recommanded N) | 77.77 | 68.49 | 2.46 | 2.35 | 16.12 | 57.53 | 10.64 |
| $F_2$ (100% of Recommanded N) | 81.82 | 73.08 | 2.50 | 2.43 | 15.96 | 65.21 | 10.27 |
| $F_3$ (125% of Recommanded N) | 83.56 | 74.01 | 2.55 | 2.45 | 16.14 | 67.17 | 10.73 |
| CD at 5% | 3.96 | 4.29 | NS | 0.07 | NS | 4.538 | 0.30 |

Pooled data of two plant crop and ratoon crop presented in table AS-42-06. Among the four mid-late genotypes, CoBln 07503 significantly recorded the highest cane yield (71.19 t/ha) which is statistically at par with CoBln 04174 (70.59 t/ha). In case of nitrogen levels, application of 125% RD of N recorded sighnificaly higher yield (73.65 t/ha) which is statistically at par 100% RD of N (72.06t/ha). However there was no significant difference observed on Juice quality among genotypes, nitrogen levels and their interaction as well.

**Table AS 42.24.6:** Pooled data of two plant and one ratoon crop

| Treatment | NMC (000/ha) | Yield (t/ha) | Sucrose% | CCS% |
|---|---|---|---|---|
| **Genotypes** | | | | |
| CoBln 07502 | 81.8 | 67.68 | 11.36 | 11.36 |
| CoBln 07503 | 83.06 | 71.19 | 11.33 | 11.33 |
| CoBln04174 (12/99) | 81.75 | 70.59 | 11.22 | 11.22 |
| CoBln05502 (11/00) | 77.08 | 65.38 | 11.11 | 11.11 |
| CD at 5% | 2.4 | 4.35 | NS | NS |
| **Fertility Levels** | | | | 11.29 |
| $F_1$ (75% of Recommanded N) | 77.71 | 63.61 | 11.29 | |
| $F_2$ (100% of Recommanded N) | 81.38 | 72.06 | 11.25 | 11.25 |
| $F_3$ (125% of Recommanded N) | 83.68 | 73.65 | 11.22 | 11.22 |
| CD at 5% | 2.1 | 3.77 | NS | NS |

## PROJECT NO. : AS 63

| | | |
|---|---|---|
| **Title** | | **Plant geometry in relation to mechanization in sugarcane.** |
| **Objective** | | 1. To workout optimum plant geometry for use of farm machinery.<br>2. To study varietal response to different planting geometry. |
| **Year of start** | | 2011-2012 |
| **Year of completion** | | 2013-2014 |
| **Locations** | | Lucknow, Pantnagar, Pune, Navsari, Thiruvalla, Faridkot, Pusa, Padegaon, Ludhiana, Modipuram and Kolhapur. |
| **Treatments** | | |
| **1. Plant geometry** | | i) 120 cm row distance<br>ii) 150 cm row distance<br>iii) 30:120 cm for subtropical region (Paired)<br>iv) 30:150 cm for tropical region (Paired) |
| **2. Genotype** | | **Four Genotypes with distinct plant morphological traits** |
| **Design** | | Split plot |
| **Replications** | : | 4 |
| **Plot size** | : | 6.0 m x 8.0 m |
| **Date of planting** | : | Subtropical : February – March<br>Tropical : December - January |
| **Observations to be recorded** | : | i) Germination count at 35 DAP<br>ii) Tiller population at 90, 120 and 180 DAP<br>iii) Plant height at 120 & 180 DAP<br>iv) Juice sucrose at one month prior to harvest and at harvest.<br>v) Number of millable canes, length and girth of the cane at harvest.<br>vi) Cane and sugar yield. |

**SUMMARY OF THE LAST YEAR's (2012-13) RESULTS**

**PROJECT NO.: AS 63**

**1. Lucknow**

Variety CoSe 92423 produced significantly higher cane yield (68.3 t/ha) than CoS 94257 and CoS 96275 but was at par with that of CoLk 94184 (67.0 t/ha). Row spacing 120:30 was found to be significantly superior over 120 & 150cm spacing.

**2. Faridkot**

Significantly maximum number of millable cane of $106.6\times10^3$/ha was recorded at 30:120cm spacing. Among varieties CoJ88 produced more NMC but was at par with that of CoJ64 & CoPb09181. CoPb09181 yielded maximum (92.6 t/ha) cane yield at 30:120cm what was on par with that of its own yield at 120cm and CoJ88 at 30:120cm what was on par with that of its own yield at 120cm and CoJ88 at 30:120cm (91.5 t/ha) and 120cm (87.0 t/ha).

All the varieties except CoS 8436 showed the reduction in cane yield when planted at 150 cm row spacing.

**3. Pantnagar**

Highest cane yield was recorded from 30: 120 cm paired row and genotype Co Pant 90223 among rest of the genotype. CCS yield was also highest in paired row (30: 120 cm) spacing and in genotypes Co Pant 90223.

**4. Navsari**

Row spacing of 120 cm significantly outyielded 150 cm and 30:150 cm spacing in respect of cane and CCS yield having highest & lowest cane yield of 129.41 t/ha and 112.95 t/ha at 120 & 30:150 cm spacing. Among varieties, CoN 05701 significantly excelled all the varieties in respect of both cane & CCS yield.

**5. Padegaon**

The row spacing of 120 cm recorded the highest cane (122.13 t $ha^{-1}$) and CCS yield (17.03 t $ha^{-1}$). However, it was at par with the row spacing of 150 cm for both cane (119.45 t $ha^{-1}$) and CCS yields (16.48 t $ha^{-1}$). Significantly highest cane (136.74 t $ha^{-1}$) and CCS (18.87 t $ha^{-1}$) yields were recorded by the variety CoM 0265 followed by Co 86032 (121.22 and 16.80 t $ha^{-1}$). The sugarcane variety CoC 671 was found to be the most superior with respect to juice quality.

**6. Pune**

Mechanized farming at 150 cm row spacing was found superior in terms of sugarcane yield, sugar yield, net monetary returns and B: C ratio. The performance of CoM0265 and CoVSI03102 was found superior in sugarcane yield, sugar yield, net monetary returns and B: C ratio as compared to Co86032 and CoVSI9805. The highest sugar yield of 21.86 t/ha was found

in CoVSI03102 and CoM0265. The use of mechanical sugarcane planter and earthing up equipment was found beneficial in sugarcane cultivation in plant cane.

**7. Kolhapur**

Among the varieties tested, CoM 0265 and Co 86032 were the highest cane & sugar yielder and were significantly superior over Co 99010 and 92005. Row spacing of 75.150 cm, being maximum yielder, did not differ significantly with other spacings (120 and 150 cm).

**8. Thiruvalla**

It can be concluded from the study that the row distance of 30 x 150 cm was found to be suitable for getting maximum cane and sugar yield. The variety Madhuri responded well to different row spacings and it has recorded the highest cane and sugar yield followed by the variety Co 05007.

**9. Pusa**

Among the plant geometry, maximum number of tiller (170.1×103/ha) millable cane (116.77×103/ha) and cane yield (90.1 t/ha) were recorded under paired row planting (30:120). NMC and cane yield recorded at 30:120 cm and 120 cm were at par with each other but significantly higher than that of 150 cm spacing.

Among the varieties, BO 153 significantly outyielded all the varieties. However, in case of Pol% juice, maximum value of 17.71% was recorded in CoP 9301 which was at par with that of CoLk 94184. Interaction Effect of PxV was found to be non-significant.

**Centres allotted : 10**

**A. N.W. Zone**: 4, Lucknow, Faridkot, Ludhiana and Pantnagar.

**B. Peninsular Zone**: 5, Navsari, Padegaon, Pune, Kolhapur and Thiruvalla.

**C. N. C. Zone:** 01, Pusa

**Centres Reported : 9 Centres not reported:** 01, Ludhiana

## CURRENT YEAR (2013-14) REPORT

### Zone wise and centre wise results are presented below

### NORTH WEST ZONE

### 1. FARIDKOT

At wider row spacing of 150 cm there was significant reduction in shoots, millable canes and cane yield (Table AS 63.1.1). Although there is improvement in cane diameter and single cane weight at wider spacing. In paired row (120:30 cm) there are more number of shoots and millable canes but there is significant reduction in cane weight.

Among the varieties CoPb 09181, CoS 8436 and CoJ 88 are significantly better than CoJ 64. CoPb 09181 has the highest single cane weight and cane yield. CoJ 88 has the highest number of shoots and millable canes. CoJ 88 has the highest sucrose % followed by CoJ 64 and CoPb 09181.

On the basis of two years data it can be concluded that paired row (120:30 cm) is the best method on the basis of cane yield (Table AS 63.1.2) and sugarcane variety CoPb 09181 is better in can yield than other three varieties.

**SUMMARY**: On the basis of two years data it can be concluded that paired row (120:30 cm) is the best method on the basis of cane yield (Table AS 63.1.2) and sugarcane variety CoPb 09181 is better in can yield than other three varieties.

**Table AS 63.1.1:** Growth, yield and quality of sugarcane under different planting methods and varieties

| Treatment | Ger. (%) | Tillers 000/ha | NMC 000/ha | Cane length (cm) | Cane diameter (cm) | Single cane wt. (g) | Cane Yield (t/ha) | Sucrose (%) |
|---|---|---|---|---|---|---|---|---|
| **Plant geometry** | | | | | | | | |
| 120 cm row distance | 30.2 | 127.9 | 89.4 | 239 | 2.68 | 1247 | 90.2 | 15.64 |
| 150 cm row distance | 31.4 | 108.9 | 77.7 | 228 | 2.74 | 1325 | 75.8 | 15.64 |
| 30:120 cm paired | 34.5 | 177.3 | 120.8 | 241 | 2.62 | 1097 | 98.4 | 15.28 |
| CD (5%) | NS | 18.5 | 15.8 | NS | NS | 100 | 16.4 | NS |
| **Varieties** | | | | | | | | |
| CoPb 09181 | 30.5 | 130.4 | 85.4 | 274 | 2.94 | 1691 | 124.8 | 15.04 |
| CoJ 64 | 34.1 | 139.8 | 107.2 | 220 | 2.53 | 1001 | 66.4 | 15.97 |
| CoJ 88 | 29.6 | 140.2 | 92.6 | 245 | 2.52 | 1105 | 78.4 | 16.36 |
| CoS 8436 | 34.0 | 141.6 | 98.9 | 203 | 2.73 | 1096 | 82.8 | 14.71 |
| CD (5%) | 3.1 | NS | 13.6 | 26 | 0.21 | 121 | 10.2 | 0.93 |

**Table AS 63.1.2:** Cane yield of sugarcane under different planting methods and varieties at Faridkot during 2012-13 and 2013-14

| Treatment | Cane yield (t/ha) | | |
|---|---|---|---|
| | 2012-13 | 2013-14 | Average |
| **Plant geometry** | | | |
| 120 cm row distance | 63.7 | 90.2 | 77.0 |
| 150 cm row distance | 58.1 | 75.8 | 67.0 |
| 30:120 cm paired | 74.4 | 98.4 | 86.4 |
| CD (5%) | 7.1 | 16.4 | |
| **Varieties** | | | |
| CoPb 09181 | 82.3 | 124.8 | 103.6 |
| CoJ 64 | 59.7 | 66.4 | 63.1 |
| CoJ 88 | 79.6 | 78.4 | 79.0 |
| CoS 8436 | 54.0 | 82.8 | 68.4 |
| CD (5%) | 4.7 | 10.2 | |

## 2. LUCKNOW

Field experiment was conducted to workout optimum plant geometry of different varieties for use of farm machinery. The experiment consisted of 12 treatment combinations with 3 planting geometries viz., 120, 150 and 30x120 cm row spacings and 4 varieties viz., CoS 96275, CoSe 92423, CoS 94257 and CoLk 94184. The experiment was laid out in split plot design allocating plant geometry in main plot and varieties in sub plots. The treatments were replicated thrice in the experiment.

The data on ratoon sugarcane growth, yield attributes and yield indicate that significant highest shoot population (166.71 thousands/ha), number of millable canes (141.44 thousand/ha) and cane yield (73.56 t/ha) was observed at 30x120 cm row spacing (Table AS 63.2.1). Variety CoSe 92423 recorded significantly highest yield (66.59 t/ha) to CoS 96275 and CoS 94257, however it was found similar to CoLk 94184 (63.59 t/ha). The quality parameters were not affected by plant geometry but significantly highest sugar yield was obtained at 30x120 cm spacing. Different genotypes showed significant variation for different quality observations. Significantly highest brix (22.11), pol % (19.84) with purity of 89.71% and CCS % (13.82) was harnessed by CoLk 94184. This genotype also fetched significantly highest sugar yield (8.79 t/ha), which was closely followed by CoSe 92423.

**Table AS 63.2.1:** Ratoon cane growth, yield attributes and yield under different planting geometries and genotypic variations

| **Treatment** | **Shoot count 180 DAP** | **NMC (000/ha)** | **Cane length (cm)** | **Cane girth (cm)** | **Av. Cane weight (g)** | **Cane yield (t/ha)** |
|---|---|---|---|---|---|---|
| Row spacing | | | | | | |
| 120 cm | 138.72 | 107.32 | 181.98 | 2.35 | 0.79 | 61.58 |
| 150 cm | 116.33 | 90.14 | 179.36 | 2.48 | 0.93 | 52.68 |
| 30x120 | 166.71 | 141.44 | 182.28 | 2.39 | 0.82 | 73.56 |
| CD (P = 0.05) | 17.60 | 14.35 | NS | NS | NS | 8.65 |
| Genotypes | | | | | | |
| CoS 96275 | 132.67 | 104.89 | 173.03 | 2.30 | 0.71 | 59.48 |
| CoSe 92423 | 144.47 | 119.56 | 185.73 | 2.61 | 0.92 | 66.59 |
| CoS 94257 | 144.76 | 104.16 | 178.23 | 2.54 | 0.92 | 60.77 |
| CoLk 94184 | 140.43 | 123.25 | 187.81 | 2.58 | 0.83 | 63.59 |
| CD (P = 0.05) | 6.73 | 8.73 | 6.27 | 0.16 | 0.18 | 4.59 |

**Table AS 63.2.2:** Effect of planting geometries and genotypes on quality attributes and sugar yield

| Treatment | $^{0}$Brix | Pol (%) | Purity (%) | CCS (%) | CCS (t/ha) |
|---|---|---|---|---|---|
| **Planting Geometries** | | | | | |
| Row spacing | | | | | |
| 120 cm | 20.45 | 17.98 | 87.85 | 12.40 | 7.63 |
| 150 cm | 20.55 | 18.10 | 87.92 | 12.49 | 6.59 |
| 30x120 | 20.59 | 18.00 | 87.33 | 12.38 | 9.09 |
| CD (P = 0.05) | NS | NS | NS | NS | 0.97 |
| **Genotypes** | | | | | |
| CoS 96275 | 21.15 | 18.69 | 88.33 | 12.93 | 7.64 |
| CoSe 92423 | 19.17 | 16.51 | 86.12 | 11.28 | 7.55 |
| CoS 94257 | 19.68 | 17.05 | 86.58 | 11.68 | 7.10 |
| CoLk 94184 | 22.11 | 19.84 | 89.71 | 13.82 | 8.79 |
| CD (P = 0.05) | 1.23 | 1.33 | 1.10 | 1.16 | 0.79 |

**Summary:** Variety CoSe 92423 produced significantly higher cane yield (68.3 t/ha) than CoS 94257 and CoS 96275 but was at par with that of CoLk 94184 (67.0 t/ha). Row spacing 120:30 was found to be significantly superior over 120 & 150cm spacing.

**3. PANTNAGAR**

Sugarcane crop varieties (Co Pant 3220, Co Pant 90223, Co Pant 90222 and Co Pant 99214) were planted at different spacing (120, 150, 30: 120 cm paired row and 75 cm row distance) were planted on 9.3.2013 and harvesting was done on 15.3.2014. Three budded 4 setts per meter row length were planted after treatment with 0.25 % solution of Carbendazim to prevent fungal infection, if any. Recommended dose of N, P and K (120 : 60 : 40 kg/ha) was applied, in which half N full $P_2O_5$ and $K_2O$ were applied as basal and remaining half N was applied within 90 days after planting in two splits. Cultural operations (weeding, hoeing, irrigation, pest management etc.) were performed as per recommendation and need of the crop. The experimental soil was silty loam in texture, rich in organic matter (1.05 %) and medium in available $P_2O_5$ (49.0 kg/ha) and $K_2O$ (240.7 kg/ha) with neutral pH (7.5). The crop was harvested on March 15, 2014.

Germination % was not affected due to any of the planting geometry. Highest shoot population (97.6) was recorded in 30: 120 cm (paired row planting at 120 DAP stage) which was significantly higher over rest of the planting geometry. Higher NMC and cane yield and girth of the cane were recorded in 75 cm distance sown sugarcane which was significantly higher over rest of the treatments. Individual cane weight was higher in paired row planting (30: 120 cm) which was significantly higher over 75 cm sown crop. Highest plant height was recorded in 150 cm distance planted crop which was significantly higher over rest of the treatments. (Table AS 63.3.1)

Significantly higher germination at 45 DAP was recorded in Co Pant 90223 which was significantly higher over genotype Co Pant 99214. Higher shoot population at 120 DAP was recorded in genotype Co pant 99214. Significantly higher NMC (000/ha) were recorded in genotypes Co Pant 90223 which was significantly higher over rest of the genotypes. Cane yield among all the genotypes was recorded highest in Co pant 90223 which were significantly higher over rest of the treatments. Higher CCS yield was also recorded in genotype Co Pant 90223. Heavier cane was recorded in Co Pant 97222 which was significantly higher over rest of the genotypes. Genotype 90223 was produced lengthy cane among all the genotypes which was recorded significantly higher over rest of the genotypes; where as the girth of the cane was highest in co pant 3220. (Table-2)

**Summary:** Highest cane yield, NMC were recorded in 30: 120 cm paired row sown cane. Length and girth of the cane higher was higher in 150 cm sown crop and girth in 75 cm sown crop. Among all the genotypes sown in the experiment Co Pant 90223 produced significantly higher cane yields over rest of the genotypes. NMC, Sucrose %, CCS yield, length of the cane were also higher in Co Pant 90223.

**Table AS 63.3.1:** Sugarcane growth, cane yield (t/ha), sucrose (%) and CCS (t/ha) influenced by plant geometry and genotypes in relation to mechanization in sugarcane

| Treatments | Germination (% at 45 DAP) | Shoot population (000/ha) | | NMC (000/ha) | Cane yield (t/ha) | Sucrose (%) | CCS t/ha | Per cane weight (g) | Cane length (cm) | Plant girth (cm) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 90 DAP | 120 DAP | | | | | | | |
| **Plant Geometry (Row distance cm.)** | | | | | | | | | | |
| 120 | 33.4 | 53.9 | 55.6 | 46.6 | 43.2 | 13.9 | 8.3 | 960.0 | 208.5 | 1.5 |
| 150 | 34.1 | 44.3 | 47.7 | 40.5 | 41.5 | 13.9 | 8.1 | 954.0 | 211.6 | 1.8 |
| 30: 120 cm (paired row) | 35.4 | 96.8 | 97.6 | 63.3 | 56.1 | 13.8 | 8.2 | 970.0 | 179.3 | 1.4 |
| 75 cm | 34.9 | 83.9 | 85.0 | 69.0 | 67.0 | 13.8 | 8.0 | 940.0 | 180.0 | 2.2 |
| SEm± | 1.1 | 1.1 | 1.1 | 1.3 | 1.2 | 0.09 | 0.09 | 9.0 | 1.2 | 0.3 |
| CD at 5 % | NS | 3.2 | 3.3 | 3.9 | 3.6 | NS | 0.27 | 27.0 | 3.6 | 1.2 |
| **Genotypes** | | | | | | | | | | |
| Co Pant 3220 | 35.3 | 72.8 | 74.6 | 51.7 | 48.8 | 14.0 | 8.2 | 930.0 | 189.0 | 2.3 |
| Co Pant 90223 | 36.4 | 71.6 | 73.2 | 60.4 | 56.0 | 14.1 | 8.4 | 950.0 | 205.0 | 1.6 |
| Co Pant 97222 | 34.3 | 66.4 | 68.0 | 54.9 | 49.3 | 13.4 | 7.7 | 1000.0 | 195.0 | 1.5 |
| Co Pant 99214 | 31.8 | 68.2 | 70.7 | 52.5 | 53.7 | 14.1 | 8.3 | 940.0 | 188.0 | 1.5 |
| SEm± | 1.1 | 1.1 | 1.1 | 1.3 | 1.2 | 0.09 | 0.09 | 10.0 | 1.2 | 0.3 |
| CD at 5 % | 3.1 | 3.2 | 3.3 | 3.9 | 3.6 | 0.27 | 0.27 | 30.0 | 3.6 | NS |

**4.Kapurthala**

The soil of the experimental field being loamy in nature, tested medium in organic carbon (0.66 %), very high in available P (59.5 kg/ha) and very high in available K (925 kg/ha). The data revealed that the crop planted at diffrent geometry showed non-significant differences with respect to germination, however plant height, cane length, no. of millable canes were significantly high when crop was planted at 30: 120 cm paired row system than at 120 & 150 cm spacing, whereas the later two were at par with each other. Similar trend was also observed in cane yield where the paired row planting produced significantly high cane yield (110.1 t/ha) than 120 & 150 cm spacing.

Among different varieties the variety CoJ 64 recorded significantly higher tiller count, plant height and cane length than all other three varieties. The variety CoJ 83 produced significantly lower number of millable canes than all other varieties. The variety CoS 8436 gave highest cane yield (86.3 t/ha) followed by CoJ 88, CoJ 83 and CoJ 64, respectively. However,

the differences were non-significant. No Interaction effects were observed among varieties and plant geometries.

**Summary:** All the varieties performed better under 30: 120 cm paired row system than at 120 & 150 cm row spacing.

**Table AS 63.4.1:** Plant geometry in relation to mechanization in sugarcane

| Treatment | Germination % | Tiller Count (000/ha) | | | Plant Height (cm) | | Cane length (cm) | Millable canes (000/ha) | Cane yield (t/ha) |
|---|---|---|---|---|---|---|---|---|---|
| | | 90 | 120 | 180 | 120 | 180 | | | |
| 150 cm spacing | 40.3 | 80.5 | 99.4 | 107.6 | 127.5 | 173.4 | 175.3 | 85.4 | 63.1 |
| 120 cm spacing | 41.4 | 81.9 | 102.2 | 109.4 | 134.4 | 178.2 | 174.8 | 100.5 | 74.2 |
| 30: 120 cm | 36.4 | 91.9 | 107.1 | 117.2 | 144.1 | 189.6 | 198.6 | 113.1 | 81.0 |
| **CD (0.05)** | **NS** | **NS** | **NS** | **NS** | **8.1** | **10.8** | **12.9** | **9.5** | **17.5** |
| i) CoJ 64 | 44.9 | 94.7 | 113.4 | 119.3 | 149.3 | 205.8 | 213.6 | 106.5 | 74.3 |
| ii) CoJ 83 | 34.7 | 95.8 | 100.1 | 106.9 | 136.5 | 173.3 | 181.0 | 93.8 | 67.1 |
| iii) CoJ 88 | 38.4 | 77.8 | 99.2 | 111.4 | 132.5 | 176.3 | 171.7 | 99.6 | 72.5 |
| iv) CoS 8436 | 39.4 | 70.7 | 98.9 | 108.0 | 123.0 | 166.1 | 164.3 | 98.7 | 76.1 |
| **CD (0.05)** | **NS** | **20.2** | **NS** | **11.2** | **NS** | **22.4** | **17.0** | **11.0** | **NS** |
| **G X V** | NS | NS | NS | NS | NS | **NS** | NS | NS | **NS** |

## PENINSULAR ZONE

### 5. PADEGAON

Data revealed that the row spacing of 120 cm recorded significantly the highest cane yield (124.43 t $ha^{-1}$) and CCS yield (18.46 t $ha^{-1}$). However, it was at par with the row spacing of 150 cm for both cane (121.25 t $ha^{-1}$) and CCS yields (17.70 t $ha^{-1}$), respectively. Significantly the highest cane (138.60 t $ha^{-1}$) and CCS (20.24 t $ha^{-1}$) yields were recorded with the variety CoM 0265. It was followed by Co 86032 (123.01 and 18.42 t $ha^{-1}$).

The interactions between planting geometry and the genotypes in respect of cane and CCS yields were found to be non significant.

The effect of row spacing was found significant for the millable height, cane girth and number of millable canes. The row spacing of 120 cm recorded significantly the highest millable cane height (301 cm) but it was at par with 150 cm row spacing. A similar trend was noticed for the cane girth (10.8 cm) and number of millable canes $ha^{-1}$ (91180 $ha^{-1}$). The effect of genotypes was found significant on all the growth parameters except germination percentage and number of internodes. The genotype CoM 0265 registered significantly higher tillering ratio(1.81), millable height (312 cm), cane girth (11.1 cm), number of milliable cane (96400 $ha^{-1}$) and the average cane weight (1.44 kg $cane^{-1}$). It was found at par with Co 86032 except number of milliable canes.

**SUMMARY:** The row spacing of 120 cm recorded the highest cane (124.43 t $ha^{-1}$) and CCS yield (18.46 t $ha^{-1}$). However, it was at par with the row spacing of 150 cm for both cane (121.25 t $ha^{-1}$) and CCS yields (17.70 t $ha^{-1}$). Significantly the highest cane (138.60 t $ha^{-1}$) and CCS (20.24 t $ha^{-1}$) yields were recorded by the variety CoM 0265 followed by Co 86032 (123.01 and 18.42 t $ha^{-1}$). The sugarcane variety CoC 671 was found to be the most superior with respect to juice quality.

**Table AS 63.5.1:** Mean cane and CCS yield as affected by various treatments

| Treatment | Cane yield (t $ha^{-1}$) | CCS yield (t $ha^{-1}$) |
|---|---|---|
| **A) Planting geometry** | | |
| $P_1$ 100 cm row distance | 113.79 | 16.98 |
| $P_2$ 120 cm row distance | 124.43 | 18.46 |
| $P_3$ 150 cm row distance | 121.25 | 17.70 |
| $P_4$ 30 x 150 cm row distance | 109.15 | 15.90 |
| **SE+** | **1.48** | **0.46** |
| **C.D at 5%** | **4.26** | **1.19** |
| **B) Genotypes** | | |
| $V_1$ CoM 0265 | 138.60 | 20.24 |
| $V_2$ Co 86032 | 123.01 | 18.42 |
| $V_3$ Co 94012 | 105.98 | 14.88 |
| $V_4$ CoC 671 | 101.03 | 15.51 |
| **SE+** | **2.14** | **0.58** |
| **C.D at 5%** | **6.84** | **1.51** |
| **C) Interaction** | | |
| **SE+** | **5.36** | **0.93** |
| **C.D at 5%** | **NS** | **NS** |
| **General mean** | **117.15** | **17.26** |

**Table AS 63.5.2:** Growth and yield attributes as affected by various treatments

| Treatment | Germ. (% ) | Tillering ratio | Height (cm) | Girth (cm) | No. of internodes cane$^{-1}$ | Millable canes (000ha$^{-1}$) | Wt. cane$^{-1}$ (kg) |
|---|---|---|---|---|---|---|---|
| **A) Planting geometry** | | | | | | | |
| $P_1$ 100 cm row distance | 74.87 | 1.58 | 297 | 10.4 | 28 | 84.49 | 1.34 |
| $P_2$ 120 cm row distance | 76.50 | 1.73 | 301 | 10.8 | 29 | 91.18 | 1.37 |
| $P_3$ 150 cm row distance | 76.20 | 1.68 | 299 | 10.6 | 28 | 89.09 | 1.36 |
| $P_4$ 30 x 150 cm row distance | 73.45 | 1.59 | 283 | 9.7 | 27 | 82.67 | 1.32 |
| **S.E.+** | **1.38** | **0.08** | **1.12** | **0.14** | **1.54** | **1.44** | **0.03** |
| **C.D. at 5%** | **NS** | **NS** | **3.34** | **0.38** | **NS** | **3.81** | **NS** |
| **B) Genotypes** | | | | | | | |
| $V_1$ CoM 0265 | 77.14 | **1.81** | 312 | 11.1 | 30 | 96.40 | 1.44 |
| $V_2$ Co 86032 | 76.38 | 1.70 | 302 | 10.7 | 29 | 88.85 | 1.38 |
| $V_3$ Co 94012 | 74.75 | 1.60 | 288 | 10.2 | 27 | 82.48 | 1.28 |
| $V_4$ CoC 671 | 72.75 | 1.50 | 278 | 9.5 | 26 | 79.70 | 1.27 |
| **S.E.+** | **1.96** | 0.07 | **2.42** | **0.18** | **1.78** | **1.74** | **0.04** |
| **C.D. at 5%** | **NS** | **0.18** | **6.29** | **0.45** | **NS** | **5.04** | **0.11** |
| **C ) Interaction** | | | | | | | |
| **S.E.+** | **3.64** | **0.15** | **4.26** | **0.64** | **2.08** | **3.20** | **0.06** |
| **C.D. at 5%** | **NS** | **NS** | **NS** | **NS** | **NS** | **NS** | **NS** |
| **General mean** | **75.25** | **1.65** | **295** | **10.37** | **28** | **86.86** | **1.34** |

**Table AS 63.5.3:** Quality parameters as affected by various treatments

| Treatments | Brix(c ) | Sucrose (%) | Purity( %) | CCS (%) |
|---|---|---|---|---|
| **A) Planting geometry** | | | | |
| $P_1$ 100 cm row distance | 21.51 | 19.86 | 92.78 | 14.93 |
| $P_2$ 120 cm row distance | 21.21 | 19.78 | 92.80 | 14.84 |
| $P_3$ 150 cm row distance | 21.30 | 19.67 | 91.93 | 14.62 |
| $P_4$ 30 x 150 cm row distance | 21.26 | 19.54 | 92.69 | 14.55 |
| **S.E.+** | **0.15** | **0.14** | **0.56** | **0.24** |
| **C.D. at 5%** | **NS** | **NS** | **NS** | **NS** |
| **B) Genotypes** | | | | |
| $V_1$ CoM 0265 | 21.13 | 19.59 | 92.57 | 14.63 |
| $V_2$ Co 86032 | 21.59 | 19.68 | 92.74 | 14.94 |
| $V_3$ Co 94012 | 20.57 | 19.57 | 91.82 | 14.04 |
| $V_4$ CoC 671 | 21.90 | 20.01 | 93.06 | 15.34 |
| **S.E.+** | **0.14** | **0.08** | **0.74** | **0.20** |

| | | | | |
|---|---|---|---|---|
| **C.D. at 5%** | **0.36** | **0.22** | **NS** | **0.56** |
| **C) Interaction** | | | | |
| **S.E.±** | **0.38** | **0.30** | **0.93** | **0.42** |
| **C.D. at 5%** | **NS** | **NS** | **NS** | **NS** |
| **General Mean** | **21.32** | **19.71** | **92.55** | **14.74** |

**6. PUNE**

**Pooled data of two plant crops and one ratoon crop**

**Cane yield**

The significant variation in cane yield was observed among the treatments of different furrow spacing. The highest cane yield of 135.21 t/ha was observed under the mechanized farming at 30-150 cm row spacing (T3) followed by 132.75 t/ha under furrow spacing of 150 cm irrigation(T2). The lowest yield of 119.31 t/ha was observed in conventional farming at 100 cm row spacing (T4). The yield obtained in treatments T3 and T2 was statistically significant as compared to control i.e. treatment T4. The increase in cane yield in treatments of 30-150 cm row spacing (T3) and 150 cm row spacing (T2) were 13.33 and 11.26 % respectively as compared to conventional planting at 100 cm row spacing (T4). The yield obtained in 120 cm row spacing was 119.33 t/ha and which was on par with control.

Among the different genotypes the significant differences in cane yield were observed. The highest cane yield of 148.90 t/ha was observed with CoM0265 followed by 128.82 t/ha of CoVSI03102. The yield obtained with CoM0265 and CoVSI03102 were statistically significant as compared to yields of CoVSI9805 (118.22 t/ha) and Co86032 (110.66 t/ha). The interaction of different furrow spacing and genotypes did not show significant differences in cane yield.

**C.C.S (Commercial cane sugar)**

The data on C.C.S. % and sugar yield t/ha recorded at harvest is presented in table AS 63.6.1. The highest C.C.S. % of 16.20% was recorded in variety CoVSI03102, which was significant to all other varieties. The C.C.S. % in CoVSI9805 (15.42%) and Co86032 (15.21%) were significantly superior to variety COM0265 (14.59%). The sugar yield in 30 - 150 cm row spacing was highest (20.44 t/ha) followed by 20.33 t/ha in row spacing of 150 cm and these were statistically significant to row spacing of 100 and 120 cm.

In sub-treatments, the highest sugar yield of 21.73 t/ha was observed in variety CoM 0265 and 20.88 t/ha in CoVSI 03102 and they were significantly superior to sugar yields in CoVSI 9805 (18.18 t/ha) and Co86032 (17.76 t/ha). The interaction of different row spacing and genotypes did not show significant differences in sugar yield

**Economics**

The highest monetary returns of Rs. 310975 were obtained in furrow spacing of 30-150 cm followed by Rs. 305325 in furrow spacing of 150 cm and they were statistically significant to furrow spacing of 120 cm (Rs. 288930) and 100 cm (Rs. 274418). The highest net monetary returns of Rs. 201390 were obtained in furrow spacing of 150 cm, while lowest net monetary

returns of Rs. 175484 were obtained in conventional planting at 100 cm row spacing. The highest B: C ratio of 1: 2.94 was observed in furrow spacing of 150 cm and it was significant as compared to all remaining main treatments (Table AS 63.6.2). As regards to different varieties, the highest monetary returns of Rs. 342481 were obtained in CoM0265 followed by Rs. 296297 in CoVSI03102. The highest B: C ratio of 1:3.20 was observed in CoM0265 followed by 1: 2.77 in CoVSI03102.

The data on net monetary returns and B: C ratio with different furrow spacing and genotypes was not significant.

**SUMMARY:**

Mechanized farming at 150 cm row spacing was found superior in terms of sugarcane yield (132.75 t/ha), sugar yield (20.33 t/ha), net monitory returns (Rs. 305325 per ha) and B: C ratio (1:2.94). Performance of CoM0265 and CoVSI03102 was found superior in sugarcane yield, sugar yield, net monetary returns and B: C ratio as compared to Co86032 and CoVSI9805. The use of mechanical sugarcane planter and earthing up equipment is found beneficial in sugarcane cultivation in plant cane.

**Table AS 63.6.1:** Cane and sugar yield contributing characters (pooled data of two plant cane and one ratoon crop)

| Treatment | Cane Yield t/ha | Sugar Yield t/ha | NMC/ ha | Millable height cm | No. of Internodes | Girth cm | C.C.S. % at harvest |
|---|---|---|---|---|---|---|---|
| Furrow Spacing | | | | | | | |
| T1: 120 cm row spacing | 119.33 | 19.32 | 83457 | 255.95* | 24.50* | 10.33* | 15.41* |
| T2: 150 cm row spacing | 132.75* | 20.33* | 85603* | 257.26* | 23.87* | 10.36* | 15.35* |
| T3: 30 x 150 cm row spacing | 135.21* | 20.44* | 90799* | 255.40* | 24.06* | 10.22* | 15.12 |
| T4: 100 cm row spacing | 119.31 | 18.46 | 89172 | 247.91 | 22.56 | 9.87 | 15.54* |
| S. E ± | 3.83 | 0.37 | 736.72 | 1.72 | 0.28 | 0.07 | 0.05 |
| C.D. at 5% | 12.22 | 1.16 | 2350 | 5.49 | 0.89 | 0.23 | 0.15 |
| Genotypes | | | | | | | |
| V1: CoVSI9805 | 118.22 | 18.18 | 75797 | 244.20 | 22.06 | 10.69* | 15.42* |
| V2: Co86032 | 110.66 | 17.76 | 88183* | 244.45 | 23.31 | 8.77 | 15.21* |
| V3: CoM0265 | 148.90* | 21.73* | 100850* | 275.36* | 25.12* | 10.65* | 14.59 |
| V4: CoVSI03102 | 128.82* | 20.88* | 84203* | 252.50* | 24.50* | 10.68* | 16.20* |
| S. E ± | 3.56 | 0.31 | 917.41 | 1.66 | 0.27 | 0.06 | 0.05 |
| C.D. at 5% | 1019 | 0.87 | 2624 | 4.76 | 0.77 | 0.17 | 0.15 |
| **Interaction** | N.S. | N.S. | N.S. | N.S. | N.S. | N.S. | N.S. |
| S. E ± | 7.26 | 0.64 | 1752 | 3.36 | 0.55 | 0.13 | 0.11 |
| C.D. at 5% | N.S. | N.S. | N.S. | N.S. | N.S. | N.S. | N.S. |

Date of planting: 14.12.2012 Date of harvest: 25.12.2013

**Table AS 63.6.2:** Economics of Mechanized farming and varieties (Pooled data of two plant cane and one ratoon crop)

| Treatment | Cost of cultivation (Rs. /ha) | Cane Yield (t/ha) | Monitory returns (Rs./ha) @ Rs. 2300/ t | Net Monitory returns (Rs./ha) | B: C Ratio |
|---|---|---|---|---|---|
| Furrow Spacing | | | | | |
| T1: 120 cm row spacing | 107590 | 119.33 | 288930 | 181340 | 2.68 |
| T2: 150 cm row spacing | 103935 | 132.75* | 305325* | 201390* | 2.94* |
| T3: 30 x 150 cm row spacing | 118530 | 135.21* | 310975* | 192446 | 2.62 |
| T4: 100 cm row spacing | 98935 | 119.31 | 274418 | 175484 | 2.77 |
| S. E ±<br>C.D. at 5% | -------- | 3.83<br>12.22 | 5408.51<br>17251.42 | 5124.82<br>17251.37 | 0.05<br>0.16 |
| Genotypes | | | | | |
| V1: CoVSI9805 | 107247 | 118.22 | 271983 | 164736 | 2.54 |
| V2: Co86032 | 107247 | 110.66 | 268887 | 161639 | 2.51 |
| V3: CoM0265 | 107247 | 148.90* | 342481* | 235234* | 3.20* |
| V4: CoVSI03102 | 107247 | 128.82* | 296297* | 189050* | 2.77* |
| S. E ±<br>C.D. at 5% | ---------- | 3.56<br>1019 | 4107.80<br>11747 | 4107.42<br>11746.96 | 0.04<br>0.11 |
| **Interaction** | -------- | N.S. | N.S. | N.S. | N.S. |
| S. E ±<br>C.D.at 5% | -------- | 7.26<br>N.S. | 8937<br>N.S. | 8936<br>N.S. | 0.08<br>N.S. |

## 7. KOLHAPUR

Data regarding growth parameters revealed that significantly higher diameter of internode (3.07 cm) was recorded by 150 cm and 75:150 cm row distance. Whereas, 150cm row distance recorded significantly higher number of internodes (21.51 cane$^{-1}$) followed by 120 cm row distance (21.44 cane$^{-1}$). All growth parameters were influenced significantly except single cane weight due to different sugarcane genotypes. The sugarcane variety CoM 0265 recorded significantly higher number of tillers (1,13,880 ha$^{-1}$), number of millable canes (1,13,880 ha$^{-1}$), millable height (253 cm) and diameter of internode (3.14 cm). The sugarcane genotype Co 99010 recorded significantly higher germination (50.00 %) and found at par with rest of genotypes except Co 92005. However, Co 92005 recorded significantly higher number of internodes (21.99 cane$^{-1}$).

**Cane yield and CCS yield**

All cane and CCS yield were influenced significantly due to different sugarcane genotypes. The sugarcane variety CoM 0265 recorded significantly higher cane yield (130.27 t ha$^{-1}$) and CCS yield (18.43 t ha$^{-1}$) and found at par with Co 86032 which recorded 119.32 t ha$^{-1}$ and 16.83 t ha$^{-1}$ cane and CCS yield, respectively. It was revealed that, plant geometry had non significant effect on cane yield and CCS yield. The interaction effect between genotypes and plant geometry had no significant effect on cane and CCS yield.

The sugarcane genotypes influenced quality parameters significantly. The sugarcane variety Co 92005 recorded significantly higher brix (21.90 %), sucrose (20.26 %) and CCS percentage (14.34 %) and found at par with Co 86032 in respect of sucrose (19.91 %) and CCS percentage (14.16 %). However, CoM 0265 recorded significantly higher purity (94.24 %) which was also found at par with Co 86032 (93.28 %). The interaction effect between genotypes and plant geometry had significant effect on quality parameters.

**SUMMARY**: All cane and CCS yield were influenced significantly due to different sugarcane genotypes. The sugarcane variety CoM 0265 recorded significantly higher cane yield (130.27 t ha$^{-1}$) and CCS yield (18.43 t ha$^{-1}$) and found at par with Co 86032 which recorded 119.32 t ha$^{-1}$ and 16.83 t ha$^{-1}$ cane and CCS yield, respectively. It was revealed that, plant geometry had non significant effect on cane yield and CCS yield.

**Table AS 63.7.1:** Mean data on growth parameters as affected by various treatments (2013-14 Plant Cane II)

| Sr. No. | Treatment | Growth parameters | | |
|---|---|---|---|---|
| | | **Germination at 45 DAP ( %)** | **No. of tillers (000' ha$^{-1}$)** | **NMC ( 000'ha$^{-1}$)** |
| **A.** | **Plant geometry** | | | |
| | 120 cm row distance | 46.15 | 112.32 | 113.16 |
| | 150 cm row distance | 48.13 | 120.49 | 118.20 |
| | 75:150 cm | 49.39 | 124.79 | 116.47 |
| | S.E.± | 1.06 | 4.22 | 3.36 |
| | C.D. 0.05 | N.S. | N.S. | N.S. |
| | C.V. | 7.67 | 12.26 | 10.03 |
| **B** | **Genotype** | | | |
| | Co 86032 | 48.33 | 123.48 | 118.83 |
| | CoM 0265 | 47.96 | 129.75 | 125.00 |
| | Co 92005 | 45.26 | 107.94 | 106.28 |
| | Co 99010 | 50.00 | 115.62 | 113.66 |
| | S.E.± | 1.07 | 2.90 | 2.64 |
| | C.D. 0.05 | 3.19 | 8.61 | 7.84 |
| | C.V. | 6.72 | 7.29 | 6.83 |
| | Interaction (A x B) | | | |
| | S.E.± | 1.609 | 4.345 | 3.96 |
| | C.D. 0.05 | 4.489 | 12.054 | 10.98 |
| | **G.M.** | **47.89** | **119.20** | **115.94** |

**Table AS 63.7. 2:** Mean data on growth parameters as affected by various treatments. (2013-14 Plant Cane II)

| Sr. No. | Treatment | Growth parameters | | | |
|---|---|---|---|---|---|
| | | **Millable height (cm)** | **Diameter (cm)** | **No. of internodes Per cane** | **Single cane weight (kg)** |
| **A.** | **Plant geometry** | | | | |
| | 120 cm row distance | 240.92 | 2.90 | 21.44 | 1.29 |
| | 150 cm row distance | 247.92 | 3.07 | 21.51 | 1.30 |
| | 75:150 cm | 245.75 | 3.07 | 20.90 | 1.24 |
| | S.E.±<br>C.D. 0.05<br>C.V. % | 3.40<br>N.S.<br>4.81 | 0.03<br>0.11<br>3.33 | 0.06<br>0.24<br>1.0 | 0.05<br>N.S.<br>14.88 |
| **B** | **Genotype** | | | | |
| | Co 86032 | 248.78 | 3.05 | 20.91 | 1.17 |
| | CoM 0265 | 253.00 | 3.14 | 20.98 | 1.39 |
| | Co 92005 | 246.56 | 2.91 | 21.99 | 1.30 |
| | Co 99010 | 231.11 | 2.95 | 21.26 | 1.25 |
| | S.E. ±<br>C.D. 0.05<br>C.V. % | 3.78<br>11.23<br>4.63 | 0.04<br>0.11<br>3.59 | 0.14<br>0.4<br>1.92 | 0.07<br>N.S.<br>15.57 |
| | Interaction ( A x B ) | | | | |
| | S.E. ±<br>C.D. 0.05 | 5.67<br>15.72 | 0.05<br>0.15 | 0.20<br>0.91 | 0.99<br>N.S. |
| | **G.M.** | **244.86** | **3.01** | **21.28** | **1.28** |

**Table AS 63.7. 3:** Mean data on growth parameters as affected by various treatments (2013-14 Season II)

| Sr. No. | Treatments Details | Yield (t ha$^{-1}$) | | Quality parameters | | | |
|---|---|---|---|---|---|---|---|
| | | Cane | CCS | Brix % | Sucrose % | Purity % | CCS % |
| **A.** | **Plant geometry** | | | | | | |
| 1 | 120 cm row distance | 117.33 | 16.60 | 21.28 | 19.92 | 93.65 | 14.09 |
| 2 | 150 cm row distance | 115.71 | 16.15 | 21.32 | 19.77 | 92.74 | 13.96 |
| 3 | 75:150 cm | 118.99 | 16.88 | 21.57 | 20.05 | 92.97 | 14.22 |
| | S.E. ± | 3.50 | 0.58 | 0.12 | 0.24 | 0.69 | 0.20 |
| | C.D. 0.05 | N.S. | N.S. | N.S. | N.S. | N.S. | N.S. |
| | C.V. | 10.34 | 12.12 | 1.95 | 4.11 | 2.57 | 5.02 |
| **B** | **Genotype** | | | | | | |
| 1 | Co 86032 | 119.32 | 16.83 | 21.34 | 19.91 | 93.28 | 14.16 |
| 2 | CoM 0265 | 130.27 | 18.43 | 21.07 | 19.85 | 94.24 | 13.99 |
| 3 | Co 92005 | 115.04 | 15.82 | 21.90 | 20.26 | 92.54 | 14.34 |
| 4 | Co 99010 | 104.73 | 15.09 | 21.23 | 19.63 | 92.42 | 13.89 |
| | SE ± | 4.18 | 0.58 | 0.12 | 0.13 | 0.39 | 0.09 |
| | CD 0.05 | 12.43 | 1.73 | 0.37 | 0.38 | 1.17 | 0.28 |
| | C.V. | 10.69 | 10.56 | 1.73 | 1.92 | 1.27 | 2.01 |
| | Interaction ( A x B ) | | | | | | |
| | SE ± | 6.27 | 0.87 | 0.18 | 0.19 | 0.59 | 0.14 |
| | CD 0.05 | 17.39 | 2.24 | 1.12 | 1.16 | 1.17 | 2.25 |
| | **G.M.** | **117.34** | **16.54** | **21.39** | **19.91** | **93.12** | **14.09** |

**8. NAVSARI**

Various plant geometries did not show any significant effect on germination % at 30 & 45 DAP and no. of tillers at 90 & 180 DAP. However, at 120 DAP significantly higher no. of tillers were noticed with plant geometry $P_1$ (120 cm). Various varieties did not show any significant effect on germination %. Significantly higher no. of tillers were recorded with variety $V_3$ (Co 86032), $V_2$ (CoN 04131) and $V_1$ (CoN 05071) and remained at par with one other at almost all three growth stages. Interaction of plant geometry and variety found significant at 120 DAP. Significantly higher no. of tillers was recorded with $P_1V_2$ and at par with $P_1V_3$ and $P_3V_3$. Significantly the highest and lowest plant height was recorded with $P_1$ and $P_3$ respectively. Higher plant height noticed with $V_3$ and being at par with $V_1$ and $V_2$ while at 180 DAP significantly highest

and lowest plant height was observed with plant geometry $P_1$ and $P_2$ respectively. Varieties $V_3$, $V_2$ and $V_1$ recorded significantly higher plant height and remained at par with one other. Interaction between plant geometry and variety was observed non significant.

Significantly highest and lowest NMC (112.55 & 102.00 $ha^{-1}$) were noticed with $P_1$ and $P_3$ respectively. Higher NMC was recorded by variety $V_3$ and remained at par with $V_1$. Interaction between plant geometry and variety found significant. Significantly highest NMC was noticed with $P_1V_1$ and remained at par with $P_1V_2$, $P_1V_3$ and $P_2V_3$. Significantly higher cane length, cane (127.9 t/ha) and CCS (16.94 t/ha) yields were observed with plant geometry $P_1$ (120 cm row spacing) while variety $V_1$ (Co N 05071) recorded significantly highest cane length, cane girth, cane and CCS yields however it remained at par with $V_4$ with regards to cane length and girth.

Non significant differences were observed due to various plant geometries and varieties for almost all the quality parameters except purity % which was recorded highest with $V_3$ and remained at par with $V_4$ and $V_2$. Interaction between plant geometry and variety not get the level of significance regarding yield and quality parameters.

Plant geometry $P_1$ and variety $V_1$ noticed with highest gross realization (Rs 365585 and 375820), net return (Rs 236199 and 246454) and B: C ratio (2.83 and 2.91) respectively.

**SUMMARY:** Significantly higher cane length, cane (127.9 t/ha) and CCS (16.94 t/ha) yields were observed with plant geometry $P_1$ (120 cm row spacing) while variety $V_1$ (Co N 05071) recorded significantly highest cane length, cane girth, cane and CCS yields however it remained at par with $V_4$ with regards to cane length and girth.

**Table AS 63.8.1:** Growth and number of millable canes of sugarcane as influenced by plant geometry and various varieties

| Treatment | Germination % at 30 DAP | Germination % at 45 DAP | No. of tillers at 90 DAP 000/ha | No. of tillers at 120 DAP 000/ha | No. of tillers at 180 DAP 000/ha | Plant height (cm) at 120 DAP | Plant height (cm) at 180 DAP | NMC 000/ha |
|---|---|---|---|---|---|---|---|---|
| **Plant geometry** | | | | | | | | |
| $P_1$ – 120 cm | 70.19 | 73.34 | 179.89 | 194.35 | 166.79 | 472.11 | 446.69 | 112.55 |
| $P_2$ – 150 cm | 69.33 | 71.82 | 175.03 | 183.12 | 155.94 | 369.69 | 371.94 | 104.03 |
| $P_3$ – 30:150 cm | 70.09 | 72.84 | 176.31 | 185.33 | 156.91 | 362.64 | 373.40 | 102.00 |
| S.Em.± | 1.15 | 1.11 | 6043.82 | 2388.96 | 4870.10 | 9.36 | 10.18 | 2200.65 |
| C.D. at 5% | NS | NS | NS | 8266.82 | NS | 32.39 | 35.23 | 7615.17 |
| C.V. % | 6.59 | 6.11 | 13.65 | 5.09 | 12.18 | 9.33 | 10.25 | 8.26 |
| **Variety** | | | | | | | | |
| $V_1$ – CoN 05071 | 70.08 | 73.14 | 178.74 | 187.72 | 161.91 | 410.61 | 404.83 | 111.51 |
| $V_2$ – CoN 04131 | 70.03 | 72.52 | 184.21 | 193.61 | 160.87 | 397.31 | 408.72 | 107.97 |
| $V_3$ – Co 86032 | 70.34 | 73.36 | 187.88 | 196.80 | 169.23 | 426.15 | 425.32 | 117.189 |
| $V_4$ – Co 99004 | 69.03 | 71.65 | 157.48 | 172.27 | 147.53 | 371.85 | 350.51 | 89.43 |
| S. Em. ± | 1.28 | 1.15 | 6028.60 | 4568.21 | 5306.93 | 11.24 | 13.18 | 2774.78 |
| C.D. at 5% | NS | NS | 17911.73 | 13255.57 | 15399.10 | 32.63 | 38.23 | 8051.58 |
| C.V. % | 6.36 | 5.50 | 11.79 | 8.43 | 11.50 | 9.70 | 11.49 | 9.02 |
| **Interaction** | NS | NS | NS | Sig. | NS | NS | NS | Sig. |

**Table AS 63.8.2:** Juice quality parameters of sugarcane as influenced by plant geometry and various varieties

| Treatment | Millable Cane length (cm) | Millable Cane girth (cm) | Cane yield (t/ha) | CCS (t/ha) |
|---|---|---|---|---|
| **Plant geometry** | | | | |
| $P_1$ – 120 cm | 273.05 | 2.46 | 127.90 | 16.94 |
| $P_2$ – 150 cm | 253.95 | 2.43 | 110.70 | 14.79 |
| $P_3$ – 30:150 cm | 261.58 | 2.43 | 113.02 | 15.10 |
| S.Em.± | 3.76 | 0.016 | 3.70 | 0.43 |
| C.D. at 5% | 13.02 | NS | 12.79 | 1.49 |
| C.V. % | 5.73 | 2.65 | 12.62 | 11.06 |
| **Variety** | | | | |
| $V_1$ – CoN 05071 | 2879.99 | 2.49 | 128.91 | 17.23 |
| $V_2$ – CoN 04131 | 251.56 | 2.43 | 115.39 | 15.15 |
| $V_3$ – Co 86032 | 240.94 | 2.43 | 112.63 | 15.26 |
| $V_4$ – Co 99004 | 278.94 | 2.45 | 111.89 | 14.80 |
| S. Em. ± | 5.96 | 0.017 | 3.69 | 0.57 |
| C.D. at 5% | 17.30 | 0.05 | 10.71 | 1.65 |
| C.V. % | 7.86 | 2.45 | 10.91 | 12.62 |
| **Interaction** | NS | NS | NS | NS |

## 9. THIRUVALLA

The experiment was conducted with four genotypes (Co VSI 5122, Co Snk 05105, Co 05007, Madhuri) with different row spacing of $G_1$ (120cm row distance ), $G_2$ (150 cm row distance) and $G_3$ (30 x 150 cm). The crop was planted on 19-2-2013 and harvested on 12-2- 2014. The results revealed that the MCC, single cane weight, cane yield and sugar yield etc.were significantly influenced by the row spacing. Row spacing of 30x150 cm ($G_3$) recorded the highest MCC (88970/ha**)**, cane (96.67/ha) and sugar yield (10.57 t/ha).

Among the genotypes evaluated, Madhuri(V4) had recorded significantly higher cane girth, MCC, single cane weight followed by the variety Co 05007 ($V_3$). The variety Madhuri recorded the highest cane yield (88.04t/ha) and sugar yield (12.03t/ha).However in cane yield, it was statistically on par with the variety $V_3$ (Co 05007).

The results of the quality analysis revealed that the variety CoVSI 5122 recorded the highest brix value (18.64%).

The interaction effect between varieties and row spacings were found to be non significant.

**Summary:** It can be concluded from the study that the row distance of 30 x 150 cm was found to be suitable for getting maximum cane and sugar yield. The variety Madhuri responded well to different row spacing and it has recorded the highest cane and sugar yield followed by the variety Co 05007.

**Table AS 63.9.1:** Cane yield and juice quality as influenced by plant geometry and genotypes

| **Treatment** | **Cane length (cm)** | **Cane girth (cm)** | **MCC (`000/ ha)** | **Single cane wt. (kg)** | **SMT Brix(%)** | **CCS (%)** | **Cane yield (t/ha)** | **Sugar yield (t/ha)** |
|---|---|---|---|---|---|---|---|---|
| $G_1$ | 221.19 | 8.90 | 75.36 | 1.38 | 16.97 | 12.88 | 81.00 | 10.46 |
| $G_2$ | 228.08 | 9.04 | 83.03 | 1.48 | 17.02 | 11.77 | 88.07 | 10.37 |
| $G_3$ | 241.68 | 9.17 | 88.97 | 1.54 | 17.13 | 10.97 | 96.67 | 10.57 |
| **CD (0.05)** | **9.60*** | **NS** | **5.97*** | **0.1*** | **NS** | **NS** | **3.60*** | **0.50*** |
| $V_1$ | 222.31 | 8.46 | 72.97 | 1.39 | 18.64 | 12.11 | 74.00 | 8.98 |
| $V_2$ | 226.40 | 8.91 | 79.31 | 1.46 | 16.04 | 11.48 | 86.94 | 9.84 |
| $V_3$ | 232.48 | 9.23 | 84.30 | 1.49 | 16.39 | 11.53 | 93.87 | 10.75 |
| $V_4$ | 240.08 | 9.55 | 90.55 | 1.54 | 17.09 | 12.36 | 95.51 | 12.22 |
| **CD (0.05)** | **9.20*** | **0.35*** | **6.75*** | **0.11*** | **NS** | **NS** | **4.05*** | **0.90*** |
| $G_1V_1$ | 214.70 | 8.32 | 60.08 | 1.32 | 18.47 | 12.68 | 70.83 | 9.00 |
| $G_1V_2$ | 218.47 | 8.75 | 64.80 | 1.36 | 16.10 | 12.54 | 79.00 | 9.93 |
| $G_1V_3$ | 222.30 | 9.12 | 72.66 | 1.40 | 16.30 | 12.74 | 84.73 | 10.80 |
| $G_1V_4$ | 229.30 | 9.42 | 70.55 | 1.47 | 17.03 | 13.55 | 89.43 | 12.11 |
| $G_2V_1$ | 217.93 | 8.45 | 58.20 | 1.40 | 18.63 | 11.98 | 75.84 | 8.85 |
| $G_2V_2$ | 223.03 | 8.92 | 62.29 | 1.49 | 16.03 | 11.35 | 87.17 | 9.90 |
| $G_2V_3$ | 230.93 | 9.22 | 68.22 | 1.51 | 16.40 | 11.48 | 92.76 | 10.65 |
| $G_2V_4$ | 240.43 | 9.55 | 68.25 | 1.54 | 17.00 | 12.28 | 98.53 | 12.10 |
| $G_3V_1$ | 234.30 | 8.60 | 69.44 | 1.47 | 18.83 | 11.70 | 77.33 | 9.05 |
| $G_3V_2$ | 237.70 | 9.06 | 72.64 | 1.54 | 16.00 | 10.56 | 94.66 | 10.00 |
| $G_3V_3$ | 244.20 | 9.34 | 83.13 | 1.57 | 16.47 | 10.37 | 104.33 | 10.80 |
| $G_3V_4$ | 250.50 | 9.67 | 92.11 | 1.61 | 17.23 | 11.26 | 110.56 | 12.45 |
| GxV CD(0.05) | NS | NS | NS | NS | NS | NS | NS | NS |

## NORTH CENTRAL ZONE

### 10. PUSA

Planting geometry did not exert marked variation on germination percentage of sugarcane. 30:120 cm row spacing produced maximum number of tillers (180.5 thousand /ha), millable canes (121.9 thousand /ha) and cane yield (93.3 t/ha) was statistically similar to 120 cm row spacing and significantly superior to 150 cm row spacing. Planting geometry failed to have any significant influence on pol percent juice.

Varieties exerted marked effect on germination count and the highest germination of 36.3 percent was recorded with the variety CoP 9301. However, significantly higher number of tillers (176.5 thousand /ha), millable canes (115.9 thousand /ha) and cane yield (88.5 t/ha) were obtained with the variety BO 153. Among the variety CoP 9301 showed significantly higher pol percentage (17.71 %) followed in order by CoLK 94184, BO 153 and BO 139 (Table AS 63.10.1).

**Table AS 63.10.1**: Effect of plant geometry for use of farm machinery in sugarcane

| Treatment | Germination % | No. of tillers (000/ha) | NMC (000/ha) | Cane yield (t/ha) | Pol % in juice |
|---|---|---|---|---|---|
| **Plant geometry** | | | | | |
| 120 cm ($P_1$) | 32.9 | 138.9 | 98.1 | 76.6 | 17.20 |
| 150 cm ($P_2$) | 31.3 | 99.1 | 71.2 | 62.8 | 17.13 |
| 30:120 cm ($P_3$) | 32.0 | 108.5 | 121.9 | 93.3 | 17.45 |
| SEm ± | 2.92 | 11.90 | 7.90 | 5.21 | 0.245 |
| CD (P = 0.05) | NS | 47.0 | 31.1 | 20.5 | NS |
| CV% | 15.84 | 14.9 | 14.1 | 11.7 | 2.46 |
| **Varieties** | | | | | |
| BO 139 ($V_1$) | 25.2 | 111.5 | 85.2 | 79.6 | 16.88 |
| BO 153 ($V_2$) | 34.0 | 176.5 | 115.9 | 88.1 | 17.15 |
| CoP 9301 ($V_3$) | 36.3 | 122.00 | 85.2 | 66.1 | 17.71 |
| CoLK 94184 ($V_4$) | 32.8 | 148.0 | 101.9 | 76.0 | 17.30 |
| SEm ± | 1.33 | 5.21 | 3.25 | 2.8 | 0.117 |
| CD (P = 0.05) | 4.0 | 15.5 | 9.7 | 8.3 | 0.35 |
| CV% | 12.5 | 11.2 | 10.1 | 10.8 | 2.03 |

**Summary:** Plant geometry 30:120 cm (paired row) performed significantly beter in cane yield followed by 120 cm row distance. Varieties BO 153 produced significantly higher cane yield (88.5 t/ha) than CoP 9301 and CoLK 9484 but was at par with that of BO 139 (79.6 t/ha).

## PROJECT NO. : AS 64

| | | |
|---|---|---|
| **Title** | : | **Response of sugarcane crop to different plant nutrients in varied agro-ecological situations** |
| **Objective** | : | To study differential response of sugarcane crop to different nutrients. |
| **Year of start** | : | 2012-13 (with modified treatments) |
| **Year of completion** | : | 2014-15 |
| **Locations** | : | All participating centres. |
| **Treatments** | : | i) Control (No fertilizer)<br>ii) N<br>iii) NP<br>iv) NPK<br>v) NPK+S<br>vi) NPK+Zn<br>vii) NPK+Fe<br>viii) NPK+Mn<br>ix) NPK+S+Zn<br>x) NPK+S+Zn+Fe<br>xi) NPK+S+Zn+Fe+Mn<br>xii) Soil test based fertilizer application.<br>xiii) FYM@ 20t/ha. |
| **Design** | : | RBD |
| **Replications** | : | Three |
| **Plot size** | : | 6 rows; 8m length. |
| **Date of planting** | : | Sub-tropical: February – March<br>Tropical : December – January |

**Note:**
- S : 40/60 kg/ha elemental sulphur (subtropical/ tropical).
- Zn : 25/50 kg/ha $ZnSO_4$/ha (subtropical/ tropical).
- Fe : Foliar spray @ 1% $FeSO_4$ thrice at weekly interval during vegetative stage.
- Mn : 5/10 kg $MnSO_4$/ha (subtropical/ tropical).
- NPK : As per recommendations.

**Observations to be recorded** :

i) Germination count at 35 DAP.
ii) Tiller population at 90, 120 and 180 DAP.
iii) Plant height at 120 & 180 DAP.
iv) Juice sucrose at one month prior to harvest and at harvest.
v) Number of millable canes, length and girth of the cane at harvest.
vi) Cane and sugar yield.
Vi) Soil analysis: Initial and final Soil O.C., Soil pH, EC, N,P,K, Fe, Mn, Zn, S.
vii) Analysis of FYM for chemical properties.

**SUMMARY OF THE RESULTS FOR LAST YEAR (2012-13)**

**PROJECT NO. AS 64**

**NORTH WEST ZONE**

**1. Faridkot**

Cane yield in all the nutritional treatments was significantly better than control. Application of all additional nutrients (except S) with recommended nitrogen fertilizer gave significantly higher cane yield. There was improvement in cane yield when all the nutrients were applied in combination with each other.

**2. Kota**

Application of NPK+Zn +S (200+60+40+40+25 kg/ha) was found suitable increasing cane yield and gave higher yield which was significantly superior to control, N, NP, NPK and soil test based fertilizer application.

**3. Ludhiana**

Soil test based fertilizer application should be followed for attaining optimum cane yield. In the absence of fertility report of the field, one should only apply the nitrogenous fertilizer at recommended dose of 150 kg $ha^{-1}$ to get the optimum yield.

**4. Lucknow**

Cane yield (t/ha) was influenced significantly by various nutrient management treatments. Highest cane yield of 75.56 t/ha was recorded with treatment receiving (NPK+S+Zn+Fe) followed by the treatment $T_6$ (NPK+Zn) $T_9$ (NPK+S+Zn) $T_{12}$ (FYM 20 t/ha), $T_5$ (NPKS) and $T_{11}$ (NPKS Zn Fe Mn) with yield of 63.62 t/ha as compared to other treatments. All these treatments were at par in respect of cane yield.

**5. Uchani**

The application of N over control, NP over N alone, NPK over NP, and NPKS over NPK significantly increased cane yield. The application of individual micronutrient (Fe, Mn and Zn) in combination NPK did not significantly increase cane yield over NPK. However,

the combined application of these micro nutrients significantly increased cane yield over NPK alone.

**6. Shahjahanpur**

Application of NPK + S+Zn+Fe+Mn produced significantly higher cane yield (89.93t/ha) than that of N, NP, NPK and control treatment. Plant nutrients did not influence CCS percent in cane.

**7. Pantnagar**

The highest cane yield was observed when crop was fertilized with NPK+Zn+S (120+60+40+40+25 kg/ha). The cane yield was also found similar to to that of NPK+S+Zn+Fe, 120+60+40+40+25kg/ha+1% spray thrice in weekly interval at vegetative stage and in treatment where Mn was given @ 50 kg/ha along with the nutrients given in previous one.

**8. Sriganganagar**

Treatment receiving NPKS Zn Fe Mn ($T_{11}$) yielded maximum cane yield 95.39 t/ha which was closely followed by $T_{10}$ (NPKS Zn Fe) $T_9$ (NPKS Zn) $T_6$ (NPKS Zn) $T_7$ (NPK Fe) and $T_5$ (NPKS). However, in case of sucrose% juice all the treatments but $T_2$ (N) & $T_3$ (NP) were at par with maximum value of 17.52% in $T_{11}$.

**PENINSULAR ZONE**

**9. Kolhapur**

Application of recommended dose of N: $P_2O_5$ :$K_2O$ along with S + $ZnSO_4$ + $FeSO_4$ + $MnSO_4$ found superior in respect of cane and CCS yield, which was on par with application of recommended dose of fertilizer as per soil test.

**10. Mandya**

Higher cane yield was recorded with application of nutrients based on soil test (93.53 t $ha^{-1}$) which was significantly superior over control (50.55 t $ha^{-1}$), N alone (54.56 t $ha^{-1}$) and NP only (64.07 t $ha^{-1}$), but was at par with application of all the three primary nutrients in combination with secondary and micro nutrients. Similar trends were also observed in respect of yield attributes.

**11. Navsari**

Soil based application of nutrients (250 kg N, 125 kg $P_2O_5$ and 62.5 kg $K_2O$/ ha significantly outyielded other treatments with cane yield of 129.84 t/ha followed by $T_4$ (Recommended dose of NPK) with yield level of 115.64 t/ha. In case of CCS yield, the value obtained in $T_{12}$ (Soil based nutrients) *i.e.* 17.42 t/ha was at par with that of $T_4$ and $T_6$ (NPK Zn).

**12. Powarkheda**

The cane yield obtained at $T_9$ (NPKS Zn), $T_{10}$ ($T_9$+Fe) and $T_{11}$ ($T_9$+Fe Mn) was almost similar. These treatments alongwith the other treatments except $T_{11}$ (Control), $T_2$ (N only) $T_3$ (NP) and $T_{13}$ and $T_{13}$ (FYM) wee found to be at par in respect of cane yield.

**13. Sankeshwar**

Soil test based application of fertilizer gave higher cane and CCS yield. In case of cane yield, the yield obtained at NPKS Zn Fe Mn, NPKS Zn Fe & NPKS Zn were at par with each other.

**14. Thiruvalla**

The maximum cane yield of 101.38 t/ha was recorded in $T_{12}$ Soil test based nutrients application was at par with that $T_6$ (NPK Zn), $T_{11}$ (NPK Zn Fe Mn) and $T_{10}$ (NPK S Zn Fe) where as in cae of sugar yield maximum yield of 15.20 t/ha was observed in $T_6$ (NPK Zn) which was closely followed by $T_{11}$ & $T_{12}$.

**15. Pune**

The effect of differential response of sugarcane crop to different nutrients on yield and quality of preseasonal sugarcane was studied in R & D farm of Vasantdada Sugar Institute. The results concluded that the application @ 100% recommended dose of fertilizer (400:170:170), 25 kg/ha$FeSO_4$ , 20 kg /ha $ZnSO_4$ ,10 kg MnSo4, 60 kg Sulphur increased cane yield by 10.55% over control, however this yield level (143.83 t/ha) was found to be at par with that of $T_{10}$ (NPKS Zn Fe), $T_9$ (NPKS Zn) and $T_5$ (NPKS). In case net return, maximum value of Rs. 2,07,407/ha was estimated in $T_9$ which was statistically close to $T_{11}$, $T_{10}$, $T_5$ and $T_6$ (NPK Zn).

**16. Padegaon**

Considering the higher yields of cane, commercial cane sugar and CCS %, the application of recommended dose of NPK along with ferrous sulphate, Zinc sulphate, Manganese Sulphate and Sulphur ($T_{11}$) was found to be significantly over superior than other treatments except its application with Mn ($T_{10}$).

## EAST COAST ZONE

**17. Anakapalle**

The results of the study indicated that application of macro nutrients (N, P, K) along with Fe, Zn and also Mn and S registered significantly higher cane yield of 83.6 t/ha as compared to application of N alone (69.0 t/ha) or N and P (74.4 t/ha) or N, P and K (76.3 t/ha) or N, P, K and S (78.2 t/ha) or N, P, K and Zn (78.2 t/ha) or application of FYM @ 20 t/ha (64.0 t/ha), but found on par with application of nutrients based on soil test (82.9 t/ha) or

N, P, K + S + Zn + Fe (81.4 t/ha) or NPK + Fe (81.1 t/ha) or NPK + Zn (80.5 t/ha) or NPK + Mn (79.8 t/ha). Control registered significantly lowest cane yield of 51.3 t/ha.

**18. Cuddalore**

The treatment ($T_{11}$) NPK + S + Zn + Fe + Mn registered significantly higher growth and yield parameters in both first and second plant crop and it was comparable with the treatment $T_{10}$ and $T_{12}$.

**19. Nayagarh**

The treatment no. 10 (NPKS Zn Fe) registered maximum cane yield of 78.62 t/ha which reduced to 73.92 t/ha after addition of manganese but the difference was non-significant. The yield obtained at $T_{10}$ was also at par with that of NPKS Zn (77.13 t/ha) and NPKS (72.52 t/ha). However no significant difference in CCS yield due to various treatments was observed.

**NORTH CENTRAL ZONE**

**20. Pusa**

The application of fertilizers on soil test basis i.e ( 200kg N, 100kg P, 100 kg K, 25 kg $ZnSO_4$ & 40 kg S) recorded highest cane yield which was on par with treatment receiving NPK + S + Zn + Fe + Mn but significantly superior over rest of the treatments.

**21. Sheorahi**

Application on S, Zn, Fe and Mn alongwith NPK ($T_{11}$) gave significantly higher cane yields than other treatments except $T_9$ (NPKS S Zn) and $T_{10}$ (NPK S Zn Fe) treatments. Sucrose was not affected significantly by different treatments.

**NORTH EAST ZONE**

**22. Buralikson**

Treatment receiving fertilizer based on soil test ($T_{12}$) yielded significantly higher cane yield (86.0 t/ha) than others except $T_{11}$ (NPK S Zn Fe Mn). But in case of sucrose% in juice maximum value of 20.0% was recorded in $T_6$ (NPK S Zn).

**Centres allotted :** All the participating centres

**Centres Reported :** 22

**A. N.C.Zone** : 8, All allotted centres.

**B. Peninsular Zone** : 8, All but Coimbatore and Akola

**C. E.C. Zone** : 3, Anakapalle, Nayagarh and Cuddalore.

**D. N.C.Zone** : 2, Pusa and Seorahi.

**E. N.E.Zone** : 1, Buralikson.

## CURRENT YEAR (2013-14) REPORT

## NORTH WEST ZONE

### 1. FARIDKOT

Experiment was carried out in a sandy loam soil with pH 8.4, EC 0.47 dS/m, organic carbon 0.35%, $P_2O_5$ 6.25 kg/ ha, $K_2O$ 455 kg/ ha, S 98 ppm, Zn 1.83 ppm, Fe 3.46 ppm and Mn 4.5 ppm. The crop was planted on 10.2.2013. Cane yield with soil test based fertilizer application was the highest (123.2 t/ha) and was at par with additional application of Zn, Fe, Mn and their combination to recommended NPK i.e. $T_7$ to $T_{11}$ (Table 4) and was significantly better than control ($T_1$), application of FYM @20 t/ha ($T_{13}$), Application of N ($T_2$), NP ($T_3$), NPK ($T_4$) and NPK+S ($T_5$). Same is the case with number of millable canes.

**Table AS 64.1.1:** Growth, yield and quality of sugarcane during 2013-14 under various treatments

| **Treatment** | **Germination (%)** | **No. of Shoots 000/ha** | **NMC 000/ha** | **Cane length (cm)** | **Cane dia. (cm)** | **Cane wt. (g)** | **Cane yield (t/ha)** | **Sucrose (%)** |
|---|---|---|---|---|---|---|---|---|
| $T_1$: No fertilizer | 29.5 | 165.1 | 82.9 | 273 | 2.68 | 1492 | 95.6 | 13.98 |
| $T_2$: N (150 kg/ha) | 29.3 | 193.0 | 96.2 | 282 | 3.02 | 1620 | 106.2 | 14.89 |
| $T_3$: NP | 28.3 | 193.7 | 95.4 | 283 | 2.85 | 1637 | 106.8 | 14.68 |
| $T_4$: NPK | 29.1 | 195.1 | 95.2 | 271 | 2.78 | 1642 | 108.1 | 14.95 |
| $T_5$: NPK +S | 28.5 | 199.2 | 94.9 | 273 | 2.93 | 1720 | 109.5 | 14.67 |
| $T_6$: NPK +Zn | 28.1 | 195.6 | 105.1 | 279 | 2.93 | 1753 | 116.8 | 14.41 |
| $T_7$: NPK +Fe | 28.3 | 203.4 | 102.9 | 288 | 3.21 | 1760 | 112.7 | 14.83 |
| $T_8$: NPK +Mn | 29.6 | 194.9 | 106.7 | 270 | 3.03 | 1783 | 108.4 | 14.98 |
| $T_9$: NPK +S +Zn | 27.8 | 230.7 | 107.9 | 274 | 2.95 | 1738 | 117.3 | 15.28 |
| $T_{10}$: NPK +S + Zn + Fe | 26.8 | 196.4 | 103.3 | 272 | 2.74 | 1753 | 115.6 | 14.60 |
| $T_{11}$: NPK +S + Zn + Fe + Mn | 30.5 | 194.7 | 101.1 | 279 | 2.90 | 1867 | 113.9 | 14.88 |
| $T_{12}$: Soil test based (190 kg N and 30 kg $P_2O_5$/ha) | 29.1 | 214.8 | 111.4 | 283 | 2.86 | 1827 | 123.2 | 14.70 |
| $T_{13}$: FYM 20 t/ha | 28.4 | 210.8 | 93.6 | 287 | 2.89 | 1823 | 101.3 | 14.49 |
| CD (5%) | NS | NS | 12.2 | NS | NS | NS | 11.8 | NS |

**SUMMARY:** Cane yield with soil test based fertilizer application (190 kg N and 30 kg $P_2O_5$/ha) was the highest (123.2 t/ha) and was at par with additional application of Zn, Fe, Mn and their combination to recommended NPK i.e. $T_7$ to $T_{11}$ and was significantly better than control ($T_1$), application of FYM @20 t/ha ($T_{13}$), Application of N ($T_2$), NP ($T_3$), NPK ($T_4$) and NPK+S ($T_5$).

**2. KOTA**

The experiment was planted on March 15, 2013 and harvested on Feb. 20, 2014.Germination percent (51.00) at 35 DAP and cane length (264.43 cm) at harvest was recorded highest in $T_{10}$ which was significantly higher over rest of the treatments except $T_9$ and $T_{11}$.Tiller population at 90 (1, 63,530.00/ha) and 120 (1, 76,870.00/ha) DAP stage of crop growth was recorded maximum in treatment $T_9$ which was significantly higher over remaining of the treatments and at par with $T_{10}$ and $T_{11}$. Cane girth, millable cane (1, 27,200.00/ha), cane yield (97.33 t/ha) and CCS (12.86 t/ha) were recorded significantly higher by application of NPK+ S+ Zn ($T_9$) over $T_1$, $T_2$, $T_3$ and $T_4$ except the rest of treatments. The higher cane yield was the cumulative effect of higher cane length, girth and NMC/ha which were higher in this treatment over the rest. CCS % was also highest (13.22) in $T_9$ which was found significantly superior over control but at par with the rest of treatment which was due to higher juice sucrose percent in cane at harvest during 2013-14.Initial medium organic carbon content, available nitrogen and high potassium nutrients affected cane yield in treatment, where nutrients were applied alone (N or NP or NPK) as well as in combination of NPK with other nutrients like S, Zn, Fe and Mn. The highest available NPKS in soil was recorded in the treatment $T_9$ (320, 23.90, 248.87 and 12.30 kg / ha), respectively which was significantly higher over $T_1$, $T_2$ and $T_3$ in nitrogen except rest, phosphorus in rest of treatments except $T_5$ and $T_6$, potassium in $T_1$, $T_2$, $T_3$, $T_{10}$ and $T_{11}$ except rest and sulphur in $T_1$,$T_2$, $T_3$,$T_7$ and $T_8$ except rest of the treatments. Available Zn, Fe and Mn were found highest in $T_6$ (0.60 mg/kg), $T_7$ (20.16 mg/kg), and $T_6$ (28.15 mg/kg), respectively treatment soil which was significantly higher over $T_1$treatment except rest of the treatments. However, Zn value of the best treatment at par with $T_7$ and $T_8$, Fe value with $T_6$ $T_3$ and $T_8$ and Mn value with $T_3$. Non-significant variation in residual soil nutrient status might be the fact that all the treatments received same amount of NPK (AS 64.2).

There were differences in cost of cultivation, gross return and net return owing to different treatment cost. Maximum gross return, net return and B:C ratio recorded in the treatment $T_9$ which was fertilized with NPK+Zn+S. however, maximum cane production cost (Rs 1,09,500 / ha) recorded in treatment $T_{13}$ owing to higher cost of FYM and lower

added of nutrients, whereas minimum production cost ,GR and NR recorded in control plot($T_1$).

**Summary:** Application of NPK+Zn +S (200+60+40+40+5 kg/ha) was found suitable increasing cane yield and CCS which was significantly superior to control, N, NP, NPK,FYM treatments ,soil test based fertilizer application and NPK +Mn and at par with rest of the treatments on the basis of pooled analysis of three years.

**Table AS 64.2.1:** Physico- chemical properties of the experimental field at Kota

| Parameters | Analyzed Value | Critical limit |
|---|---|---|
| Textural class | Clay loam | - |
| Bulk density (mg / $m^3$) | 1.42 | - |
| Particle density (mg / $m^3$) | 2.65 | - |
| Porosity (%) | 46.00 | - |
| EC ($ds/m^2$) | 0.25 | - |
| Soil pH (1:2.5) | 8.20 | - |
| Organic carbon (%) | 0.54 | 0.5 |
| Available N (Kg / ha) | 362 | 250 |
| Available $P_2O_5$ (Kg / ha) | 23.50 | 23 |
| Available $K_2O$ (Kg / ha) | 283 | 144 |
| Available Zn DTPA(mg / kg soil) | 0.546 | 0.6 |
| Available S (mg / kg soil ) | 9.60 | 10 |
| Available Fe DTPA(mg / kg soil) | 13.24 | 4.5 |
| Available Mn DTPA (mg / kg soil) | 20.78 | 2.0 |

**Table: AS 64.6:** Effect of different plant nutrients on cane yield and CCS yield in sugarcane in 3 consecutive years (2011-12, 2012-13 and 2013-14)

| Treatment | Cane yield (t/ha) | | | | CCS (%) | | | | CCS (t/ha) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2011-12 | 2012-13 | 2013-14 | Pooled | 2011-12 | 2012-13 | 2013-14 | Pooled | 2011-12 | 2012-13 | 2013-14 | Pooled |
| T1 – Control (No fertilizer) | 50.67 | 58.40 | 65.27 | 58.11 | 11.94 | 12.53 | 11.67 | 12.05 | 6.04 | 7.32 | 7.62 | 6.99 |
| T2 – N | 67.00 | 75.10 | 80.33 | 74.14 | 12.86 | 13.50 | 12.36 | 12.91 | 8.60 | 10.12 | 9.93 | 9.55 |
| T3 – NP | 72.00 | 79.80 | 81.63 | 77.81 | 12.15 | 12.75 | 12.10 | 12.33 | 8.74 | 10.17 | 9.87 | 9.59 |
| T4 - NPK | 77.67 | 80.40 | 83.00 | 80.36 | 12.26 | 12.87 | 13.16 | 12.76 | 9.52 | 10.26 | 10.93 | 10.24 |
| T5 – NPK+S | 78.30 | 87.30 | 88.57 | 84.72 | 12.92 | 13.56 | 13.12 | 13.20 | 10.12 | 11.83 | 11.62 | 11.19 |
| T6 – NPK+Zn | 78.67 | 88.90 | 89.53 | 85.70 | 13.17 | 13.82 | 13.06 | 13.35 | 10.78 | 10.27 | 11.69 | 10.91 |
| T7 – NPK+Fe | 77.33 | 88.30 | 88.93 | 84.85 | 13.45 | 12.18 | 13.14 | 12.92 | 10.40 | 10.75 | 11.68 | 10.94 |

| Treatment | Cane yield (t/ha) | | | | CCS (%) | | | | CCS (t/ha) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2011-12 | 2012-13 | 2013-14 | Pooled | 2011-12 | 2012-13 | 2013-14 | Pooled | 2011-12 | 2012-13 | 2013-14 | Pooled |
| T8 – NPK+Mn | 73.00 | 81.80 | 84.37 | 79.46 | 12.83 | 13.47 | 13.14 | 13.15 | 9.36 | 11.01 | 11.08 | 10.48 |
| T9 – NPK+S+Zn | 82.46 | 95.30 | 97.33 | 91.70 | 11.60 | 14.18 | 13.22 | 13.00 | 9.56 | 13.46 | 12.86 | 11.96 |
| T10 - NPK+S+Zn+Fe | 78.45 | 91.60 | 94.50 | 88.18 | 12.13 | 12.73 | 13.16 | 12.67 | 9.51 | 11.51 | 12.44 | 11.15 |
| T11 - NPK+S+Zn+Fe +Mn | 81.33 | 91.50 | 93.20 | 88.70 | 11.92 | 12.51 | 13.15 | 12.53 | 9.69 | 11.46 | 12.25 | 11.13 |
| T12-Soil test based fertilizer application | 75.00 | 79.40 | 82.27 | 78.89 | 12.55 | 13.17 | 12.76 | 12.83 | 9.41 | 10.46 | 10.50 | 10.12 |
| T13- FYM @ 20 t/ha | - | 74.80 | 75.53 | 75.17 | - | 12.62 | 12.91 | 12.77 | - | 9.43 | 9.75 | 9.59 |
| SEm | 5.31 | 5.11 | 4.64 | 4.31 | 0.31 | 0.37 | 0.40 | 0.31 | 0.88 | 0.96 | 0.65 | 0.73 |
| CD at 5% | 16.08 | 15.50 | 14.08 | 11.96 | 0.95 | 1.12 | 1.20 | 0.87 | 2.68 | 2.90 | 1.96 | 2.02 |

## 3. KAPURTHALA

The soil of the experimental field being loamy in nature , tested medium in organic carbon (0.66 %), very high in available P (59.5 kg/ha) and very high in available K (925 kg/ha).The data presented in table 64.3.1 showed non-significant differences in germination , growth parameters and cane yield of sugarcane when different nutrients were applied in variable combinations .

Among all the treatments applied, the treatment where only N & P was applied recorded the highest cane yield of 111.6 t $ha^{-1}$ which showed a significant increase of 49.4 % over the control plot where no nutrient was applied and was at par with the treatments where N alone (109.7 t/ha) or in combination with P, K, and S .The soil test based fertilizer application also recorded statistically similar cane yield (107.1 t/ha). Number of millable canes recorded with application of N alone were significantly higher to control and the treatments supplemented with NPK with combinations of Zn, S, and Fe &Mn while it was at par to all other treatments. Application of nitrogen alone sustained similar level of productivity as that of other treatments. Even with application of all the nutrients in $T_{11}$ i.e. NPK + S + Zn + Fe + Mn, no additional yield could be obtained. Hence, the results indicate that in the absence of soil test reports, the Punjab farmer can go for the sole application of recommended dose of nitrogenous fertilizer i.e. 150 kg N $ha^{-1}$ without suffering any significant loss in the cane yield. Applying additional nutrients like P, K, S, Zn, Mn, Fe failed to cause any appreciable effect in the cane yield and seemed to increase

only the cost of production. Applying different nutrients in variable combinations could not influence the quality aspects in terms of Pol% and CCS%.

**Summary**: Soil test based fertilizer application should be followed for attaining optimum cane yield. In the absence of fertility report of the field, one should only apply the nitrogenous fertilizer at recommended dose of 150 kg $ha^{-1}$ to get the optimum yield.

**Table AS 64.3.1:** Effect of application of different plant nutrients on productivity of sugarcane

| Treatment | | Germination % | Tiller Count (000/ha) | Cane length (cm) | Internodes / cane | Single Cane wt. (g) | Millable canes (000/ha) | Cane yield (t/ha) | Pol % juice | CCS % |
|---|---|---|---|---|---|---|---|---|---|---|
| $T_1$ | Control | 37.0 | 117.8 | 169.0 | 16.9 | 706.7 | 106.4 | 74.7 | 16.67 | 11.40 |
| $T_2$ | N | 36.8 | 165.9 | 196.7 | 17.0 | 830.0 | 124.4 | 109.7 | 17.68 | 12.30 |
| $T_3$ | NP | 34.9 | 159.3 | 203.0 | 17.7 | 826.7 | 121.9 | 111.6 | 18.22 | 12.78 |
| $T_4$ | NPK | 35.0 | 144.2 | 202.7 | 18.0 | 863.3 | 117.6 | 100.3 | 18.66 | 13.06 |
| $T_5$ | NPK + S | 34.6 | 140.4 | 204.0 | 18.2 | 856.7 | 120.8 | 104.6 | 16.80 | 11.30 |
| $T_6$ | NPK + Zn | 31.7 | 146.2 | 203.0 | 18.2 | 853.3 | 114.0 | 99.2 | 16.82 | 11.75 |
| $T_7$ | NPK + Fe | 33.1 | 143.7 | 195.0 | 18.4 | 859.7 | 115.1 | 100.4 | 18.13 | 12.62 |
| $T_8$ | NPK + Mn | 33.6 | 153.6 | 189.3 | 17.6 | 866.7 | 116.8 | 100.6 | 16.84 | 11.76 |
| $T_9$ | NPK + S + Zn | 35.1 | 181.8 | 197.3 | 18.9 | 879.0 | 113.1 | 98.2 | 17.93 | 12.48 |
| $T_{10}$ | NPK + S + Zn + Fe | 31.3 | 160.9 | 196.0 | 18.0 | 893.3 | 110.7 | 99.2 | 19.22 | 13.46 |
| $T_{11}$ | NPK + S + Zn + Fe + Mn | 32.3 | 149.9 | 194.7 | 18.1 | 896.7 | 107.3 | 98.8 | 18.20 | 12.68 |
| $T_{12}$ | Soil Test Based fert. appln | 33.7 | 180.3 | 198.0 | 17.0 | 893.3 | 118.9 | 107.1 | 18.18 | 12.72 |
| $T_{13}$ | FYM @ 20 t/ha | 35.0 | 177.2 | 195.0 | 16.8 | 726.7 | 107.7 | 79.4 | 16.61 | 11.38 |
| **CD (0.05)** | | **NS** | **27.6** | **19.3** | **NS** | **76.9** | **10.3** | **18.9** | **NS** | **NS** |

## 4. LUCKNOW

A field experiment was initiated during first week of April, 2013, to study the response of sugarcane to different nutrients. Twelve nutrient treatments in RBD having three replications with sugarcane (Cv. CoSe 92423) was planted. The recommended fertilizer dose was 150 kg N, 60 kg $P_2O_5$ and 60 kg $K_2O$ $ha^{-1}$. The other nutrient 40 kg S, 25 kg $ZnSO_4$, 10 kg $FeSO_4$ and 5 kg $MnSO_4$ $ha^{-1}$ were applied as per the treatment. Twelve nutrient treatments in RBD having three replications with sugarcane (Cv. CoSe 92423) was studied for response of sugarcane to different nutrients.

Initially soil was low in organic carbon (0.31%), available nitrogen (208.5 kg $ha^{-1}$), phosphorus (11.88 kg $P_2O_5$ $ha^{-1}$) and medium in potassium (202.87 kg $K_2O$ $ha^{-1}$) contents. Growth parameter on tiller population at 90 and 120 days after planting, NMC, yield attributes, cane yield and cane juice quality were recorded.

Cane yield (t/ha) was influenced by various nutrient management treatments, however they were non-significant. Higher cane yield (57.06 t/ha) was recorded with treatment T9 (NPK + S + Zn) followed by the treatment T11 (NPK+S+Zn+Fe+Mn) with cane yield (51.31 t/ha) and T6 (NPK+Zn), cane yield (50.49 t/ha) as compared to other treatments. Lowest cane yield was recorded with control plot (41.96 t/ha) (Table 1). The initial lower soil organic carbon content and available nitrogen, phosphorus and medium potassium nutrients affected cane yield in treatments, where nutrient were applied alone (N or NP or NPK) as compared to in combination of NPK with other nutrient like S, Zn, Fe and Mn. Cane quality parameters were not affected by any of the nutrient applied. Application of recommended dose of NPK (150:60:60 kg/ha) with S (40 kg/ha) and Zn (25 kg $ZnSO_4$/ha) produced higher cane yield (57.06 t/ha).

**SUMMARY:** Cane yield (t/ha) was influenced by various nutrient management treatments, however they were non-significant. Higher cane yield (57.06 t/ha) was recorded with treatment T9 (NPK + S + Zn) followed by the treatment T11 (NPK+S+Zn+Fe+Mn) with cane yield (51.31 t/ha) and T6 (NPK+Zn), cane yield (50.49 t/ha) as compared to other treatments. Lowest cane yield was recorded with control plot (41.96 t/ha).

**Table AS 64.4.1:** Growth, yield and juice quality parameters of sugarcane to different nutrients

| Treatment | Shoot count ('000/ha) | | NMC | Cane yield | Juice quality parameters at harvest (%) | | |
|---|---|---|---|---|---|---|---|
| | 90 DAP | 120 DAP | ('000/ha) | (t/ha) | Brix | Sucrose | Purity |
| T1 Control | 114.5 | 125.9 | 99.53 | 41.96 | 19.22 | 16.61 | 86.43 |
| T2 N | 117.2 | 128.9 | 101.95 | 45.65 | 18.91 | 16.29 | 86.17 |
| T3 NP | 106.8 | 117.6 | 92.93 | 46.25 | 18.69 | 16.09 | 86.06 |
| T4 NPK | 80.3 | 88.3 | 69.83 | 47.90 | 18.77 | 16.03 | 85.39 |
| T5 NPKS | 101.9 | 112.1 | 88.62 | 45.86 | 18.71 | 16.02 | 85.57 |
| T6 NPKZn | 98.9 | 108.9 | 86.06 | **50.49** | 18.94 | 16.12 | 85.15 |
| T7 NPKFe | 106.7 | 117.4 | 92.79 | 44.11 | 18.61 | 15.92 | 85.62 |
| T8 NPKMn | 78.9 | 86.9 | 68.68 | 43.59 | 19.17 | 16.58 | 86.47 |
| T9 NPKSZn | 114.8 | 126.2 | 99.80 | **57.06** | 19.19 | 16.67 | 86.93 |
| T10 NPKSZnFe | 101.9 | 112.1 | 88.62 | 49.93 | 19.01 | 16.31 | 85.80 |
| T11 NPKSZnFeMn | 117.2 | 128.9 | 101.95 | **51.31** | 19.05 | 16.36 | 85.90 |
| 12 FYM 20 t/ha | 110.6 | 121.6 | 96.16 | 48.29 | 18.35 | 15.64 | 85.23 |
| CD (5%) | 21.0 | 23.1 | 18.26 | NS | NS | NS | NS |

DAP: Days after planting

## 5. PANTNAGAR

Sugarcane variety Co Pant 90223 was planted on March 12, 2013 at 75 cm row to row distance, keeping 3 budded 4 setts per meter row length. Setts were treated with 0.25% solution of Carbendazim to prevent fungal infection if any. Fertilizer was applied as per treatment. Full dose of Phosphorus, Potassium, Sulphur, Zinc and Manganese were applied along with half of the N as basal. Remaining N (half) was applied within 90 days of sowing (before mansoon). Iron (Fe) was applied @ 1.0 % spray in weekly interval at vegetative stage (tillering). Total six (6) irrigations were given. Cultural operations were performed as per recommendation and need of the crop. Crop was harvest on March 12, 2014.

Data revealed that higher germination at 45 DAP was recorded in the treatment NPK + S+ Zn (120+60+40+40+25 kg/ha) ($T_9$) which was significantly higher over rest of the treatment except $T_{10}$ and $T_{11}$. Shoot population was also recorded higher in $T_9$ at 60, 90 120 and 150 DAP. At 150 DAP shoot population was higher in $T_9$ which was significantly higher over $T_1$, $T_2$, $T_3$, $T_4$, $T_{12}$ and $T_{13}$. Cane girth, length, cane weight, NMC, Cane yield and CCS yield were also recorded higher in $T_9$ (NPK + S + Zn applied 120+6o+40+40+25 kg/ha). Significantly higher cane yield was recorded in $T_9$ which was significantly higher over rest of the treatments except $T_{10}$, $T_{11}$ and $T_{12}$ (Table - 3). Data given in Table- 4(a) revealed that higher S (available) was recorded in $T_{11}$ (54.8 kg/ha) which was significantly higher over $T_1$, $T_2$, $T_3$, $T_4$ and $T_{12}$. Available Zn was highest in $T_{10}$ (1.05 mg $kg^{-1}$) soil.

**Summary:** Highest cane yield 84.3 ton/ha was recorded in treatment $T_9$ (NPK+S+Zn applied 120+6o+40+40+25 kg/ha). Almost similar cane yield 84.1 ton/ha was recorded in $T_{10}$ (in which NPK+S+Zn along with Fe 1.0 %) spray was done thrice at vegetative growth stage at weekly interval. The cane yield was non-significant in $T_9$, $T_{10}$ and $T_{11}$. Data revealed that higher S (available) was recorded in $T_{11}$ (54.8 kg/ha) which was significantly higher over $T_1$, $T_2$, $T_3$, $T_4$ and $T_{12}$. Available Zn was highest in $T_{10}$ (1.05 mg $kg^{-1}$) soil.

**Table AS 64.5.1:** Effect of different treatments on sugarcane growth, yield and quality

| Treatment | Germination (%) | Shoot population (000 $ha^{-1}$) | | | | Cane girth (cm) | Cane length (cm) | Cane wt. (g) | NMC (000 $ha^{-1}$) | Cane yield (t $ha^{-1}$) | Juice sucrose % (at harvest) | CCS Yield (t $ha^{-1}$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 45 DAP | 60 DAP | 90 DAP | 120 DAP | 150 DAP | | | | | | | |
| $T_1$ | 33.2 | 105.2 | 124.1 | 127.5 | 116.9 | 1.7 | 165.7 | 933 | 64.6 | 60.4 | 16.6 | 7.9 |
| $T_2$ | 36.0 | 116.9 | 129.5 | 133.8 | 130.0 | 1.6 | 220.7 | 1000 | 67.5 | 67.4 | 15.6 | 7.3 |
| $T_3$ | 37.5 | 121.6 | 130.9 | 134.4 | 142.7 | 1.8 | 232.3 | 833 | 68.2 | 67.9 | 17.7 | 9.2 |
| $T_4$ | 37.7 | 123.3 | 131.5 | 135.2 | 146.0 | 1.8 | 235.0 | 866 | 69.5 | 68.4 | 17.0 | 9.6 |
| $T_5$ | 41.6 | 129.9 | 135.6 | 137.5 | 156.0 | 1.8 | 243.7 | 766 | 73.8 | 70.1 | 17.5 | 9.6 |
| $T_6$ | 41.7 | 136.4 | 137.4 | 139.9 | 199.6 | 1.8 | 248.0 | 1033 | 77.5 | 72.1 | 16.9 | 9.0 |
| $T_7$ | 39.8 | 126.7 | 136.2 | 139.2 | 180.4 | 1.7 | 240.0 | 1100 | 76.1 | 71.7 | 15.5 | 9.5 |
| $T_8$ | 38.3 | 125.1 | 133.3 | 136.9 | 151.5 | 1.7 | 269.7 | 1066 | 72.0 | 68.2 | 16.2 | 9.6 |
| $T_9$ | 46.9 | 140.1 | 144.0 | 149.1 | 225.0 | 2.1 | 270.7 | 1183 | 93.4 | 84.3 | 16.9 | 10.6 |
| $T_{10}$ | 45.6 | 139.0 | 142.2 | 144.9 | 219.0 | 1.7 | 256.3 | 1066 | 81.6 | 84.1 | 16.4 | 9.6 |
| $T_{11}$ | 44.8 | 138.2 | 141.3 | 143.1 | 201.0 | 1.8 | 250.3 | 1033 | 78.8 | 75.3 | 17.8 | 10.3 |
| $T_{12}$ | 35.3 | 119.3 | 128.1 | 132.4 | 123.5 | 1.7 | 212.3 | 1066 | 65.4 | 73.3 | 16.9 | 11.1 |
| $T_{13}$ | 39.5 | 134.8 | 135.2 | 137.3 | 148.0 | 1.8 | 229.3 | 1000 | 70.8 | 67.9 | 15.6 | 9.2 |
| SEm± | 0.8 | 4.2 | 4.2 | 4.2 | 25.0 | 0.2 | 0.9 | 568 | 4.7 | 3.8 | 0.7 | 0.4 |
| CD at 5 % | 2.4 | 14.4 | 14.4 | 14.4 | 75.0 | 0.7 | 2.7 | 16.5 | 13.9 | 11.2 | 0.22 | 1.3 |

**Table AS 64.5.2:** Effect of different nutrients on nutrient availability in soil as influenced by the application of different micro/macro nutrients in sugarcane

| Treatments | pH | EC ($dSm^{-1}$) | Organic Carbon (%) | Available N ($kg\ ha^{-1}$) | Available P ($kg\ ha^{-1}$) | Available K ($kg\ ha^{-1}$) | Available S ($kg\ ha^{-1}$) | Available Zn ($mg\ kg^{-1}$) (soil) | Available Fe ($mg\ kg^{-1}$) (soil) | Available Mn ($mg\ kg^{-1}$) (soil) |
|---|---|---|---|---|---|---|---|---|---|---|
| $T_1$ | 6.8 | 2.1 | 1.03 | 175.4 | 41.5 | 174.5 | 41.4 | 0.79 | 30.8 | 35.5 |
| $T_2$ | 6.7 | 2.0 | 1.09 | 174.7 | 39.3 | 170.5 | 39.5 | 0.69 | 29.9 | 34.4 |
| $T_3$ | 6.9 | 2.0 | 1.18 | 172.7 | 35.3 | 171.3 | 36.5 | 0.68 | 29.7 | 33.8 |
| $T_4$ | 6.9 | 2.1 | 1.34 | 167.6 | 37.6 | 173.2 | 40.5 | 0.66 | 31.9 | 32.5 |
| $T_5$ | 7.0 | 0.2 | 1.09 | 170.5 | 38.0 | 175.6 | 48.6 | 0.73 | 30.9 | 31.9 |
| $T_6$ | 7.0 | 2.0 | 1.12 | 166.2 | 38.9 | 179.2 | 44.2 | 1.06 | 33.8 | 32.3 |
| $T_7$ | 6.8 | 0.19 | 1.14 | 160.8 | 40.9 | 178.5 | 40.1 | 0.68 | 33.9 | 32.6 |
| $T_8$ | 6.8 | 0.19 | 1.19 | 167.8 | 40.9 | 179.1 | 46.7 | 0.67 | 32.1 | 44.3 |
| $T_9$ | 7.0 | 2.1 | 0.96 | 164.9 | 40.6 | 180.0 | 47.5 | 1.05 | 31.9 | 32.2 |
| $T_{10}$ | 7.1 | 2.1 | 1.14 | 164.1 | 40.3 | 181.3 | 54.3 | 1.07 | 31.9 | 44.4 |
| $T_{11}$ | 6.8 | 2.1 | 1.06 | 163.3 | 39.6 | 183.7 | 54.8 | 1.06 | 33.9 | 44.2 |
| $T_{12}$ | 6.7 | 2.0 | 1.19 | 172.2 | 37.9 | 170.0 | 39.4 | 0.66 | 31.3 | 35.9 |
| CD at 5 % | NS | NS | NS | NS | NS | NS | 10.2 | NS | NS | NS |

## 6. SHAHJAHANPUR

The experimental field was medium in organic carbon (0.66%), available potash (176 kg/ha) and low in available phosphorus (16.16 kg/ha) with pH 6.58. Experimental crop was planted on March, 17, 2013 and harvested on March 26, 2014.

The experimental data proved that application of S, Zn, Fe and Mn along with NPK ($T_{11}$) produced significantly higher number of shoots, NMC and cane yield that that of other treatments. CCS % in cane was not affected significantly with use of different plant nutrients.

**Summary:** Application of NPK + S + Zn + Fe + Mn produced significantly higher cane yield (91.67 t/ha) than that of N, NP, NPK and control treatment. Plant nutrient did not influence CCS percent in cane.

**Table AS 64.6.1:** Effect of treatments on germination, shoots, millable canes cane yield and CCS % (2013-14)

| Treatment | Germi. % | Shoots (000/ha) | | | NMC (000/ha) | Cane yield (t/ha) | CCS % |
|---|---|---|---|---|---|---|---|
| | | 90 DAP | 120 DAP | 150 DAP | | | |
| $T_1$- Control (No fertilizer) | 40.37 | 137.267 | 146.897 | 137.731 | 95.023 | 67.59 | 10.47 |
| $T_2$- N | 40.58 | 153.702 | 166.897 | 153.240 | 104.166 | 76.27 | 10.17 |
| $T_3$- NP | 41.37 | 162.846 | 175.778 | 163.078 | 110.879 | 80.44 | 10.41 |
| $T_4$- NPK | 41.57 | 166.318 | 181.365 | 166.434 | 113.078 | 83.10 | 10.01 |
| $T_5$- NPK + S | 41.17 | 169.791 | 184.027 | 171.179 | 118.054 | 85.09 | 10.01 |
| $T_6$- NPK + Zn | 42.16 | 171.526 | 186.920 | 169.559 | 116.897 | 86.45 | 10.51 |
| $T_7$- NPK + Fe | 42.90 | 169.906 | 184.490 | 168.402 | 114.467 | 85.65 | 10.46 |
| $T_8$- NPK + Mn | 41.76 | 168.749 | 181.712 | 166.432 | 114.814 | 84.61 | 10.33 |
| $T_9$- NPK + S + Zn | 42.16 | 179.165 | 189.351 | 178.008 | 120.948 | 89.24 | 10.52 |
| $T_{10}$- NPK + S + Zn + Fe | 42.46 | 177.892 | 190.045 | 176.735 | 121.874 | 90.62 | 10.01 |
| $T_{11}$- NPK + S + Zn + Fe + Mn | 41.47 | 184.026 | 193.286 | 182.291 | 123.958 | 91.67 | 10.22 |
| $T_{12}$- Soil test based fertilizer application | 41.47 | 175.693 | 185.531 | 174.999 | 120.717 | 85.99 | 10.31 |
| SE± | 0.88 | 5.74 | 5.57 | 4.24 | 5.49 | 3.52 | 0.29 |
| CD 5% | NS | 11.91 | 11.56 | 8.80 | 11.38 | 7.29 | N.S |

**7. UCHANI**

The experiment was conducted on clay loam in texture having pH 8.6, EC 0.44 $dsm^{-1}$, organic carbon 0.36%, available P 10.2 kg/ha and available K 129.2 kg/ha, available S (12.2 kg/ha), available Zn (0.9 ppm) and available Fe (3.9 ppm) and available Mn (7.8 ppm). Sugarcane variety CoH 119 (Mid group) was planted on March 24, 2013 at 75 cm spacing in randomized block design with three replications. Recommended doses of phosphorus (50 kg $P_2O_5$/ha), potash (50 kg $K_2O$/ha) and Sulphur (60 kg/ha) were applied at the time of planting whereas recommended dose of nitrogen (150 kg N/ha) was applied in three equal splits as top dressing (April, May & June). Zinc, Fe and Mn were applied thrice (April, May & June) as foliar spray. The crop was irrigated at 8-10 days

intervals during pre-monsoon period and 20 days interval during post monsoon period. The plant crop was harvested on January 30, 2014.

Treatment $T_{11}$- NPK+Zn+S+Fe+Mn gave highest number of millable canes (86.9 thousnads/ha), cane yield ( 84.5 t/ha) , sucrose ( 16.96 %), purity( 86.40%) and CCS ( 11.97 %). The application of N over control, NP over N alone, NPK over NP, and NPKS over NPK significantly increased cane yield of plant crop (Table AS 64.7.1). The application of individual micronutrient (Fe, Mn and Zn) in combination NPK did not significantly increased cane yield over NPK alone. However, the combined application of these micro nutrients significantly increased the cane yield over NPK alone.

**Summary:** The application of individual micronutrient (Fe, Mn and Zn) in combination NPK did not significantly increase cane yield over NPK. However, the combined application of these micro nutrients significantly increased cane yield over NPK alone. The application of N over control, NP over N alone, NPK over NP, and NPKS over NPK significantly increased cane yield.

**Table AS 64.7.1:** Effect of different treatments on sugarcane growth and yield of plant crop

| **Treatment** | **NMC (000/ha)** | **Cane height (cm)** | **Cane girth (cm)** | **Cane yield (t/ha)** | **Sucrose (%)** | **Purity (%)** | **CCS (%)** |
|---|---|---|---|---|---|---|---|
| $T_1$: Control (No fertilizer) | 72.8 | 145.0 | 2.18 | 45.61 | 13.62 | 76.63 | 9.33 |
| $T_2$: N | 76.3 | 160.2 | 2.33 | 62.83 | 14.39 | 81.01 | 9.88 |
| $T_3$: NP | 78.4 | 166.1 | 2.53 | 69.97 | 14.66 | 84.76 | 10.02 |
| $T_4$: NPK | 81.7 | 171.6 | 2.68 | 75.16 | 15.26 | 87.85 | 10.61 |
| $T_5$: NPK + S | 83.1 | 176.6 | 2.73 | 78.93 | 15.99 | 90.11 | 10.92 |
| $T_6$: NPK + Zn | 82.0 | 172.0 | 2.69 | 76.26 | 15.28 | 89.46 | 10.63 |
| $T_7$: NPK + Fe | 82.3 | 171.8 | 2.70 | 76.57 | 15.31 | 89.30 | 10.64 |
| $T_8$: NPK + Mn | 82.3 | 171.7 | 2.72 | 75.47 | 15.34 | 89.15 | 10.66 |
| $T_9$: NPK + S + Zn | 83.7 | 177.3 | 2.78 | 79.20 | 16.07 | 90.41 | 11.23 |
| $T_{10}$: NPK + S + Zn + Fe | 85.8 | 183.0 | 2.84 | 82.97 | 16.48 | 92.43 | 11.71 |
| $T_{11}$: NPK + S + Zn + Fe + Mn | 86.9 | 188.4 | 2.89 | 84.48 | 16.96 | 92.92 | 11.97 |
| $T_{12}$: Soil test based fertilizer application | 81.3 | 170.67 | 2.69 | 75.10 | 15.27 | 86.40 | 10.62 |
| CD at 5% | 2.1 | 4.78 | 0.05 | 3.20 | 0.36 | 3.07 | 0.31 |

## 8. SRIGANGANAGAR

The field experiment was conducted to study the response of sugarcane crop to different plant nutrients with respect to yield and quality of sugarcane. The soil of the experimental field being sandy loam in texture, alkaline in reaction (8.2), tested low in organic carbon (0.34%), medium in available $P_2O_5$ (22 kg/ha) and high in available $K_2O$ (356 kg/ha). Early maturing variety Co6617 was planted on 07.03.2013 at 75 cm spacing in randomized block design with three replications and harvested on 15.01.2014.

The results indicated that number of tillers, NMC, cane length, single cane weight, cane yield and sucrose % were influenced significantly due to different nutrient treatments while, the effect on germination and cane diameter were non significant. The significant increase in yield and yield attributes was recorded due to application of NPK alone or along with secondary nutrient like sulphur and micronutrients (Zn, Fe & Mn) over control, alone application of nitrogen and FYM @ 20 t/ha. The soil application of $ZnSo_4$ @ 25 kg/ha ($T_6$) and thrice one per cent foliar spray of $FeSo_4$ at weekly interval during vegetative stage ($T_7$) along with NPK gave significantly higher cane yield over NPK alone ($T_4$). The maximum cane yield of 98.38 t/ha was obtained with the combined application of sulphur, Zn, Fe and Mn along with recommended NPK ($T_{11}$) which was closely followed by $T_{10}$ (NPK, S, Zn, Fe), $T_9$ (NPK, S, Zn), $T_6$ (NPK, Zn) and $T_7$ (NPK, Fe). The combined application of micronutrients and NPK fertilizers significantly increased over $T_2$ (N) and $T_3$ (NP) but at par with the rest of the treatments. Data further indicated that soil application of $MnSo_4$ @ 5 kg/ha could not brought significant influence on cane yield as well as sucrose %.

**SUMMARY:** The maximum cane yield of 98.38 t/ha was obtained with the combined application of sulphur, Zn, Fe and Mn along with recommended NPK ($T_{11}$) which was closely followed by $T_{10}$ (NPK, S, Zn, Fe), $T_9$ (NPK, S, Zn), $T_6$ (NPK, Zn) and $T_7$ (NPK, Fe). The combined application of micronutrients and NPK fertilizers significantly increased over $T_2$ (N) and $T_3$ (NP) but at par with the rest of the treatments.

**Table AS 64.8.1:** Effect of treatments on growth, yield and quality of sugarcane crop at Sriganganagar

| Treatments | Germination (%) | Tiller (000/ha) | NMC (000/ha) | Cane length (m) | Cane diameter (cm) | Single cane wt (kg) | Cane yield (t/ha) | Sucrose (%) at harvest |
|---|---|---|---|---|---|---|---|---|
| T1- Control (No fertilizer) | 40.29 | 118.98 | 77.29 | 1.78 | 2.18 | 0.85 | 57.28 | 17.38 |
| T2- N (150 kg/ha) | 38.37 | 130.94 | 82.47 | 2.08 | 2.24 | 0.97 | 75.37 | 16.48 |
| T3- NP (40 kg $P_2O_5$/ha) | 38.84 | 142.59 | 88.38 | 2.17 | 2.27 | 1.04 | 83.16 | 17.14 |
| T4- NPK (40 kg $K_2O$/ha) | 39.14 | 151.92 | 90.54 | 2.26 | 2.31 | 1.10 | 87.89 | 17.36 |
| T5- NPK + S (40 kg/ha) | 40.27 | 157.29 | 92.61 | 2.28 | 2.32 | 1.16 | 90.84 | 17.39 |
| T6- NPK + Zn (25 kg/ha) | 40.87 | 158.34 | 93.68 | 2.30 | 2.34 | 1.19 | 95.10 | 17.41 |
| T7- NPK + Fe (1% foliar) | 39.93 | 153.06 | 92.73 | 2.29 | 2.33 | 1.18 | 94.98 | 17.38 |
| T8- NPK + Mn (5 kg/ha) | 39.42 | 151.29 | 90.59 | 2.26 | 2.29 | 1.12 | 88.27 | 17.36 |
| T9- NPK + S + Zn | 40.58 | 158.38 | 95.39 | 2.31 | 2.34 | 1.20 | 95.97 | 17.43 |
| T10- NPK + S + Zn + Fe | 40.63 | 159.88 | 96.76 | 2.32 | 2.35 | 1.26 | 97.08 | 17.56 |
| T11- NPK + S + Zn + Fe + Mn | 40.67 | 166.21 | 98.54 | 2.34 | 2.37 | 1.27 | 98.38 | 17.58 |
| T12- Soil test based Fert. | 39.78 | 152.38 | 90.29 | 2.27 | 2.32 | 1.12 | 89.47 | 17.38 |
| T13- FYM @ 20 t/ha | 40.12 | 129.86 | 81.63 | 1.91 | 2.22 | 0.94 | 72.39 | 17.40 |
| CD at 5 % | NS | 6.29 | 5.92 | 0.06 | NS | 0.12 | 6.78 | 0.22 |

## PENINSULAR ZONE

### 9. KOLHAPUR

The data pertaining to growth parameters were found to have influenced significantly due to various treatments. Among the treatments, $T_{10}$ (N:$P_2O_5$:$K_2O$+S+Zn+Fe) recorded significantly higher germination (50.40 %), number of tillers (1,30,320 $ha^{-1}$), number of millable canes (1,26,800 $ha^{-1}$), millable height (249.55 cm) and diameter (3.42 cm). however, treatment $T_{11}$ (N:$P_2O_5$:$K_2O$+S+Zn+Fe+Mn) and $T_{12}$ (soil test based fertilizer application) recorded significantly higher number of internodes (20.85 $cane^{-1}$) and single cane weight (1.29 kg), respectively.

The data pertaining to cane and CCS yield indicated that different treatments affected the cane and CCS yield significantly. The treatment $T_{11}$ (N:$P_2O_5$:$K_2O$+S+Zn+Fe+Mn) recorded significantly higher cane yield (120.83 t $ha^{-1}$) and CCS yield (17.84 t $ha^{-1}$). Quality parameters of sugarcane juice *viz.*, brix and sucrose, purity and CCS percentage were influenced non- significantly due to various treatments.

**SUMMARY:** The data pertaining to cane and CCS yield indicated that different treatments affected the cane and CCS yield significantly. The treatment $T_{11}$

($N:P_2O_5:K_2O+S+Zn+Fe+Mn$) recorded significantly higher cane yield (120.83 t $ha^{-1}$) and CCS yield (17.84 t $ha^{-1}$).

**Table AS 64.9.1**: Mean data on growth parameters as affected by various treatments

| Tr. No | Treatment | Growth parameters | | |
|---|---|---|---|---|
| | | **Germination ( %) at 45 DAP** | **No. of Tillers ( 000'$ha^{-1}$)** | **NMC ( 000'$ha^{-1}$)** |
| 1 | Control | 33.24 | 49.74 | 43.27 |
| 2 | N | 36.40 | 71.22 | 64.41 |
| 3 | $N + P_2O_5$ | 39.77 | 98.31 | 87.25 |
| 4 | $N + P_2O_5 + K_2O$ | 43.40 | 104.91 | 101.00 |
| 5 | $N:P_2O_5:K_2O$ +S | 43.34 | 116.99 | 114.55 |
| 6 | $N:P_2O_5:K_2O$ +Zn | 46.37 | 114.76 | 113.14 |
| 7 | $N:P_2O_5:K_2O$ +Fe | 44.48 | 108.95 | 113.48 |
| 8 | $N:P_2O_5:K_2O$ +Mn | 43.99 | 112.23 | 109.30 |
| 9 | $N:P_2O_5:K_2O$ +S+Zn | 47.31 | 127.23 | 123.86 |
| 10 | $N:P_2O_5:K_2O$ +S+Zn+Fe | 50.40 | 130.32 | 126.80 |
| 11 | $N:P_2O_5:K_2O$ +S+Zn+Fe+Mn | 49.98 | 128.88 | 126.63 |
| 12 | Soil test based fertilizer application | 49.14 | 124.40 | 122.96 |
| 13 | FYM @ 20 t/ha | 36.49 | 57.36 | 50.23 |
| | **Mean** | **43.41** | **103.48** | **99.76** |
| | SE± | 3.49 | 7.64 | 7.72 |
| | CD 0.05 | 10.57 | 23.13 | 23.36 |
| | CV % | 11.38 | 10.44 | 10.94 |

**Table AS 64.9.2:** Mean data on growth parameters as affected by various treatments

| Tr. No | Treatment | Growth parameters | | | |
|---|---|---|---|---|---|
| | | **Millable height (cm)** | **Diameter (cm)** | **No. of internodes per cane** | **Single cane weight (kg)** |
| 1 | Control | 197.20 | 1.98 | 16.30 | 0.78 |
| 2 | N | 217.68 | 2.96 | 18.25 | 0.85 |
| 3 | $N + P_2O_5$ | 237.01 | 3.17 | 18.95 | 0.92 |
| 4 | $N:P_2O_5:K_2O$ | 239.31 | 3.25 | 18.65 | 1.15 |
| 5 | N:P2O5 :$K_2O$ +S | 242.18 | 3.37 | 18.55 | 1.12 |
| 6 | $N:P_2O_5:K_2O$ +Zn | 240.80 | 3.40 | 19.50 | 1.11 |
| 7 | $N:P_2O_5:K_2O$ +Fe | 242.81 | 3.39 | 18.90 | 1.12 |

| Tr. No | Treatment | Growth parameters | | | |
|---|---|---|---|---|---|
| | | Millable height (cm) | Diameter (cm) | No. of internodes per cane | Single cane weight (kg) |
| 8 | N:$P_2O_5$ :$K_2O$ + Mn | 245.18 | 3.26 | 19.10 | 1.08 |
| 9 | N:$P_2O_5$ :$K_2O$ + S+ Zn | 249.05 | 3.23 | 18.95 | 1.14 |
| 10 | N:$P_2O_5$ :$K_2O$ +S+Zn+Fe | 249.55 | 3.42 | 20.41 | 1.14 |
| 11 | N:$P_2O_5$ :$K_2O$ +S+Zn+Fe+Mn | 245.66 | 3.41 | 20.85 | 1.24 |
| 12 | Soil test based fertilizer application | 245.02 | 3.36 | 20.21 | 1.29 |
| 13. | FYM @ 20 t/ha | 222.50 | 2.95 | 18.10 | 0.83 |
| | **GM** | **236.46** | **3.17** | **18.98** | **1.06** |
| | SE± | 9.18 | 0.16 | 0.55 | 0.10 |
| | CD 0.05 | 27.77 | 0.47 | 1.67 | 0.30 |
| | CV % | 5.49 | 6.94 | 4.11 | 13.10 |

**Table AS 64.9.3:** Mean cane and CCS yield (t $ha^{-1}$) as affected by various treatments

| Sr. No. | Treatment | Yield (t $ha^{-1}$) | |
|---|---|---|---|
| | | Cane | CCS |
| 1 | Control | 40.01 | 5.62 |
| 2 | N | 60.85 | 8.68 |
| 3 | N + $P_2O_5$ | 76.14 | 11.04 |
| 4 | N:$P_2O_5$ :$K_2O$ | 99.58 | 14.49 |
| 5 | N:$P_2O_5$ :$K_2O$ +S | 105.640 | 15.31 |
| 6 | N:$P_2O_5$ :$K_2O$ +Zn | 110.96 | 15.92 |
| 7 | N:$P_2O_5$ :$K_2O$ +Fe | 113.66 | 15.96 |
| 8 | N:$P_2O_5$ :$K_2O$ + Mn | 115.10 | 16.36 |
| 9 | N:$P_2O_5$ :$K_2O$ + S+ Zn | 118.61 | 16.75 |
| 10 | N:$P_2O_5$ :$K_2O$ +S+Zn+Fe | 119.30 | 17.11 |
| 11 | N:$P_2O_5$ :$K_2O$ +S+Zn+Fe+Mn | 120.83 | 17.84 |
| 12 | Soil test based fertilizer application | 118.65 | 17.17 |
| 13 | FYM @ 20 t/ha | 68.31 | 9.76 |
| | **GM** | **94.83** | **14.00** |
| | SE± | 9.39 | 1.29 |
| | CD 0.05 | 28.42 | 3.89 |
| | CV % | 13.62 | 12.99 |

**Table AS 64.9.4:** Mean data on quality parameters as affected by various treatments

| Tr. No | Treatment | Quality parameters | | | |
|---|---|---|---|---|---|
| | | **Brix%** | **Sucrose %** | **Purity %** | **CCS %** |
| 1 | Control | 20.94 | 19.80 | 94.53 | 14.12 |
| 2 | N | 21.69 | 20.15 | 92.90 | 14.26 |
| 3 | N + $P_2O_5$ | 21.44 | 20.31 | 94.73 | 14.50 |
| 4 | N:$P_2O_5$ :$K_2O$ | 21.69 | 20.43 | 94.17 | 14.54 |
| 5 | N:$P_2O_5$ :$K_2O$ +S | 21.44 | 20.30 | 94.69 | 14.49 |
| 6 | N:$P_2O_5$ :$K_2O$ +Zn | 21.44 | 20.17 | 94.06 | 14.35 |
| 7 | N:$P_2O_5$ :$K_2O$ +Fe | 20.94 | 19.75 | 94.29 | 14.06 |
| 8 | N:$P_2O_5$ :$K_2O$ + Mn | 21.44 | 20.03 | 93.44 | 14.21 |
| 9 | N:$P_2O_5$ :$K_2O$ + S+ Zn | 21.19 | 191.88 | 93.84 | 14.13 |
| 10 | N:$P_2O_5$ :$K_2O$ +S+Zn+Fe | 21.44 | 20.16 | 94.01 | 14.34 |
| 11 | N:$P_2O_5$ :$K_2O$ +S+Zn+Fe+Mn | 21.94 | 20.74 | 94.52 | 14.79 |
| 12 | Soil test based fertilizer application | 21.44 | 20.29 | 94.65 | 14.48 |
| 13 | FYM @ 20 t/ha | 21.44 | 20.11 | 93.78 | 14.29 |
| | **GM** | **21.42** | **20.16** | **94.12** | **14.35** |
| | SE± | 0.24 | 0.24 | 0.82 | 0.20 |
| | CD 0.05 | N.S. | N.S. | N.S. | N.S. |
| | CV % | 1.60 | 1.67 | 1.23 | 1.96 |

## 10. PADEGAON

**Pooled report for 2011-14**

The pooled data of three years with respect to cane and CCS yield indicated that, the application of NPK + Zn + S+ Fe+ Mn ($T_{11}$) recorded significantly the highest cane and CCS yield (153.02 and 22.98 t $ha^{-1}$) and it was found at par with application of fertilizer based on soil test ($T_{12}$) (150.41 and 22.28 t $ha^{-1}$,respectively) and application of NPK + Zn + S+ Fe ($T_{10}$) (149.59 and 22.20 t $ha^{-1}$ ,respectively).

As regards the average cane weight, application of NPK + Zn + S+ Fe+ Mn ($T_{11}$) recorded significantly the highest average cane weight (1.65 kg) and application of NPK + Mn ($T_8$ ) recorded significantly highest NMC (99.12 000' $ha^{-1}$) over other treatments. The CCS % was not significantly affected by the different treatments.

**Soil chemical properties:**

The soil pH was not significantly affected by the different treatments. The soil EC was increased in all the treatments over initials in three years, however the pooled results showed that the significantly lowest EC of 0.83 $dSm^{-1}$ was recorded in control ($T_1$). As regards the soil organic carbon content, significantly the highest

figures were recorded by application of NPK + Zn + S+ Fe+ Mn ($T_{11}$) (0.91 % ) and it was found at par with application of fertilizer based on soil test ($T_{12}$) and application of NPK + Zn + S+ Fe ($T_{10}$) (0.89 and 0.88 % , respectively). Significantly the highest available N of soil at harvest was recorded by application of N ($T_2$) (248 kg $ha^{-1}$) and it was at par with all other treatments except control ($T_1$). Application of NPK + Zn + S+ Fe+ Mn ($T_{11}$) (26.30 kg $ha^{-1}$) was superior in respect of available P status of soil, however application of fertilizer based on soil test ($T_{12}$) recorded the significantly the highest available K (300 kg $ha^{-1}$) in soil at harvest of sugarcane.

**Nutrient uptake:**

The data revealed that significantly higher uptake of N was recorded by application of fertilizers based on soil test ($T_{12}$) (275 kg $ha^{-1}$) while significantly higher uptake of P and K was noticed by application of NPK + Zn + S+ Fe+ Mn ($T_{11}$) (48.92 and 305 kg $ha^{-1}$) which was superior to all other treatments. In general, 1.77 to 2.29 kg N, 0.26 to 0.31 kg P and 1.83 to 2.01 kg K were required to produce one tone of cane yield.

**SUMMARY:** Application of NPK + Zn + S+ Fe+ Mn to sugarcane recorded significantly higher yields of cane and commercial cane sugar and it is comparable with application of fertilizers based on soil test.

**Table AS 64.10.1:** Effect of different treatments on cane and CCS yield of sugarcane (Pooled)

| Treat. | Yield (t $ha^{-1}$) | | | | CCS (t $ha^{-1}$) | | | |
|---|---|---|---|---|---|---|---|---|
| | 2011-12 | 2012-13 | 2013-14 | Mean | 2011-12 | 2012-13 | 2013-14 | Mean |
| $T_1$ | 117.72 | 66.30 | 69.61 | 84.54 | 17.56 | 9.52 | 10.06 | 12.38 |
| $T_2$ | 136.87 | 88.45 | 91.87 | 105.73 | 19.87 | 12.46 | 13.28 | 15.20 |
| $T_3$ | 153.34 | 98.30 | 101.71 | 117.78 | 22.02 | 14.14 | 14.73 | 16.96 |
| $T_4$ | 179.85 | 118.70 | 117.78 | 138.78 | 25.65 | 16.91 | 17.21 | 19.92 |
| $T_5$ | 181.47 | 115.40 | 122.15 | 139.67 | 27.18 | 17.04 | 17.91 | 20.71 |
| $T_6$ | 181.97 | 120.45 | 123.86 | 142.09 | 26.86 | 16.98 | 18.04 | 20.63 |
| $T_7$ | 173.25 | 122.73 | 120.97 | 138.98 | 25.05 | 16.67 | 17.75 | 19.82 |
| $T_8$ | 181.38 | 120.52 | 120.27 | 140.72 | 26.88 | 16.44 | 17.65 | 20.32 |
| $T_9$ | 185.33 | 119.40 | 122.81 | 142.51 | 27.61 | 17.90 | 18.00 | 21.17 |
| $T_{10}$ | 187.45 | 128.96 | 132.37 | 149.59 | 27.69 | 19.47 | 19.45 | 22.20 |
| $T_{11}$ | 191.45 | 131.26 | 136.34 | 153.02 | 28.74 | 20.91 | 19.31 | 22.98 |
| $T_{12}$ | 185.99 | 128.91 | 136.32 | 150.41 | 27.55 | 19.26 | 20.05 | 22.28 |
| $T_{13}$ | 124.17 | 74.56 | 83.31 | 94.01 | 17.91 | 10.78 | 12.04 | 13.58 |
| SE± | 6.78 | 3.28 | 4.03 | 2.25 | 2.12 | 0.52 | 0.62 | 0.41 |
| CD at 5% | 20.34 | 9.58 | 11.77 | 6.58 | 6.36 | 1.51 | 1.81 | 1.21 |

**Table AS 64.10.2:** Effect of different treatments on Average Cane Weight and Number of Milleable Canes of sugarcane (Pooled)

| Treat. | Average Cane weight (kg) | | | | NMC (000 ha$^{-1}$) | | | |
|---|---|---|---|---|---|---|---|---|
| | 2011-12 | 2012-13 | 2013-14 | Mean | 2011-12 | 2012-13 | 2013-14 | Mean |
| $T_1$ | 1.54 | 0.99 | 1.08 | 1.20 | 76.44 | 66.97 | 64.66 | 69.36 |
| $T_2$ | 1.75 | 1.01 | 1.12 | 1.29 | 78.21 | 87.57 | 81.78 | 82.52 |
| $T_3$ | 1.86 | 1.07 | 1.17 | 1.37 | 82.44 | 91.87 | 87.18 | 87.16 |
| $T_4$ | 2.05 | 1.05 | 1.35 | 1.48 | 87.73 | 113.05 | 87.03 | 95.94 |
| $T_5$ | 2.09 | 1.08 | 1.38 | 1.52 | 86.83 | 106.85 | 88.51 | 94.06 |
| $T_6$ | 2.10 | 1.08 | 1.32 | 1.50 | 86.65 | 111.53 | 93.60 | 97.26 |
| $T_7$ | 1.98 | 1.12 | 1.37 | 1.49 | 87.50 | 109.58 | 88.30 | 95.13 |
| $T_8$ | 2.05 | 1.06 | 1.26 | 1.46 | 88.48 | 113.70 | 95.20 | 99.12 |
| $T_9$ | 2.08 | 1.27 | 1.28 | 1.54 | 89.10 | 94.02 | 96.20 | 93.11 |
| $T_{10}$ | 2.10 | 1.34 | 1.42 | 1.62 | 89.26 | 96.24 | 93.22 | 92.91 |
| $T_{11}$ | 2.12 | 1.33 | 1.49 | 1.65 | 90.31 | 98.69 | 91.51 | 93.50 |
| $T_{12}$ | 2.10 | 1.26 | 1.49 | 1.62 | 88.57 | 102.31 | 91.49 | 94.12 |
| $T_{13}$ | 1.57 | 1.02 | 1.20 | 1.26 | 79.09 | 73.10 | 69.62 | 73.94 |
| SE± | 0.09 | 0.03 | 0.06 | 0.05 | 1.26 | 2.85 | 3.74 | 3.67 |
| CD at 5% | 0.28 | 0.09 | 0.17 | 0.15 | 3.81 | 8.33 | 10.91 | 10.74 |

**Table AS 64.10.3:** Effect of different treatments on CCS % of sugarcane (Pooled)

| Treatment | CCS (%) | | | |
|---|---|---|---|---|
| | 2011-12 | 2012-13 | 2013-14 | Mean |
| $T_1$ | 14.92 | 14.35 | 14.45 | 14.57 |
| $T_2$ | 14.52 | 14.09 | 14.45 | 14.35 |
| $T_3$ | 14.36 | 14.38 | 14.48 | 14.41 |
| $T_4$ | 14.26 | 14.25 | 14.61 | 14.37 |
| $T_5$ | 14.98 | 14.77 | 14.67 | 14.81 |
| $T_6$ | 14.76 | 14.10 | 14.56 | 14.47 |
| $T_7$ | 14.46 | 14.60 | 14.67 | 14.58 |
| $T_8$ | 14.82 | 14.87 | 14.67 | 14.79 |
| $T_9$ | 14.90 | 14.99 | 14.66 | 14.85 |
| $T_{10}$ | 14.77 | 15.10 | 14.69 | 14.85 |
| $T_{11}$ | 15.01 | 15.34 | 14.16 | 14.84 |
| $T_{12}$ | 14.81 | 14.94 | 14.71 | 14.82 |
| $T_{13}$ | 14.42 | 14.46 | 14.46 | 14.45 |
| SE± | 0.71 | 0.07 | 0.07 | 0.14 |
| CD at 5% | NS | 0.21 | NS | NS |

**Table AS 64.10.4:** Effect of different treatments on soil chemical properties at harvest of sugarcane (Pooled)

| Treat. | pH | | | | EC ($dSm^{-1}$) | | | |
|---|---|---|---|---|---|---|---|---|
| | **2011-12** | **2012-13** | **2013-14** | **Mean** | **2011-12** | **2012-13** | **2013-14** | **Mean** |
| ***Initial*** | ***7.9*** | ***7.28*** | ***7.68*** | | ***0.35*** | ***1.61*** | ***0.78*** | |
| $T_1$ | 7.87 | 7.51 | 7.78 | 7.72 | 0.16 | 1.51 | 0.83 | 0.83 |
| $T_2$ | 7.34 | 7.43 | 7.76 | 7.51 | 0.22 | 1.59 | 0.90 | 0.90 |
| $T_3$ | 7.63 | 7.50 | 7.83 | 7.65 | 0.26 | 1.65 | 0.93 | 0.95 |
| $T_4$ | 7.69 | 7.40 | 7.73 | 7.61 | 0.28 | 1.66 | 0.94 | 0.96 |
| $T_5$ | 7.83 | 7.46 | 7.71 | 7.67 | 0.27 | 1.56 | 0.90 | 0.91 |
| $T_6$ | 7.73 | 7.36 | 7.74 | 7.61 | 0.28 | 1.64 | 0.93 | 0.95 |
| $T_7$ | 7.86 | 7.33 | 7.73 | 7.64 | 0.29 | 1.62 | 0.91 | 0.94 |
| $T_8$ | 7.88 | 7.41 | 7.74 | 7.68 | 0.31 | 1.63 | 0.92 | 0.95 |
| $T_9$ | 7.81 | 7.40 | 7.76 | 7.66 | 0.33 | 1.54 | 0.87 | 0.91 |
| $T_{10}$ | 7.67 | 7.44 | 7.80 | 7.64 | 0.32 | 1.61 | 0.89 | 0.94 |
| $T_{11}$ | 7.93 | 7.40 | 7.76 | 7.70 | 0.38 | 1.65 | 0.93 | 0.99 |
| $T_{12}$ | 7.91 | 7.49 | 7.86 | 7.75 | 0.36 | 1.68 | 0.93 | 0.99 |
| $T_{13}$ | 7.71 | 7.30 | 7.60 | 7.54 | 0.19 | 1.53 | 0.83 | 0.85 |
| SE± | 0.04 | 0.01 | 0.039 | 0.06 | 0.06 | 0.01 | 0.023 | 0.017 |
| CD at 5% | 0.11 | 0.03 | 0.115 | NS | 0.18 | 0.03 | 0.068 | 0.051 |

**Table 64.10.5:** Effect of different treatments on soil chemical properties at harvest of sugarcane (Pooled)

| Treat. | Organic Carbon (%) | | | | Available N ($kg\ ha^{-1}$) | | | |
|---|---|---|---|---|---|---|---|---|
| | **2011-12** | **2012-13** | **2013-14** | **Mean** | **2011-12** | **2012-13** | **2013-14** | **Mean** |
| ***Initial*** | ***0.8*** | ***0.87*** | ***0.67*** | | ***219*** | ***176*** | ***256*** | |
| $T_1$ | 0.69 | 0.86 | 0.68 | 0.74 | 215 | 168 | 240 | 208 |
| $T_2$ | 0.73 | 0.91 | 0.73 | 0.79 | 281 | 196 | 267 | 248 |
| $T_3$ | 0.74 | 0.91 | 0.74 | 0.80 | 247 | 202 | 260 | 236 |
| $T_4$ | 0.74 | 0.99 | 0.78 | 0.84 | 260 | 201 | 251 | 237 |
| $T_5$ | 0.71 | 0.91 | 0.73 | 0.78 | 262 | 203 | 249 | 238 |
| $T_6$ | 0.76 | 1.00 | 0.78 | 0.85 | 277 | 197 | 240 | 238 |
| $T_7$ | 0.78 | 0.94 | 0.76 | 0.83 | 279 | 198 | 250 | 242 |
| $T_8$ | 0.76 | 0.93 | 0.75 | 0.81 | 278 | 200 | 243 | 240 |
| $T_9$ | 0.81 | 0.96 | 0.78 | 0.85 | 277 | 207 | 247 | 244 |
| $T_{10}$ | 0.83 | 1.01 | 0.79 | 0.88 | 278 | 201 | 244 | 241 |
| $T_{11}$ | 0.90 | 1.03 | 0.81 | 0.91 | 279 | 200 | 247 | 242 |
| $T_{12}$ | 0.86 | 1.03 | 0.79 | 0.89 | 281 | 204 | 229 | 238 |
| $T_{13}$ | 0.78 | 0.89 | 0.81 | 0.83 | 254 | 188 | 252 | 231 |
| SE± | 0.12 | 0.03 | 0.03 | 0.015 | 2.00 | 1.48 | 6.24 | 6.79 |
| CD at 5% | 0.36 | 0.08 | NS | 0.045 | 6.07 | 4.25 | 18.21 | 19.82 |

**Table AS 64.10.6:** Effect of different treatments on soil chemical properties at harvest of sugarcane (Pooled)

| Treat. | Available $P_2O_5$ (kg $ha^{-1}$) | | | | Available $K_2O$ (kg $ha^{-1}$) | | | |
|---|---|---|---|---|---|---|---|---|
| | 2011-12 | 2012-13 | 2013-14 | Mean | 2011-12 | 2012-13 | 2013-14 | Mean |
| ***Initial*** | ***24.5*** | ***22*** | ***19.1*** | | ***219*** | ***176*** | ***256*** | |
| $T_1$ | 14.46 | 20.82 | 17.48 | 17.59 | 269 | 174 | 271 | 238 |
| $T_2$ | 19.79 | 21.70 | 17.06 | 19.52 | 284 | 204 | 265 | 251 |
| $T_3$ | 20.13 | 23.09 | 23.62 | 22.28 | 285 | 212 | 255 | 250 |
| $T_4$ | 22.76 | 23.84 | 20.81 | 22.47 | 312 | 228 | 329 | 290 |
| $T_5$ | 23.79 | 22.36 | 20.03 | 22.06 | 327 | 236 | 321 | 294 |
| $T_6$ | 25.47 | 24.23 | 20.70 | 23.47 | 330 | 236 | 316 | 294 |
| $T_7$ | 27.54 | 23.60 | 20.60 | 23.91 | 332 | 240 | 317 | 296 |
| $T_8$ | 27.20 | 24.73 | 21.33 | 24.42 | 333 | 242 | 322 | 299 |
| $T_9$ | 28.42 | 25.63 | 21.43 | 25.16 | 333 | 236 | 319 | 296 |
| $T_{10}$ | 29.10 | 25.62 | 21.28 | 25.33 | 335 | 241 | 319 | 298 |
| $T_{11}$ | 31.79 | 26.05 | 21.05 | 26.30 | 337 | 244 | 313 | 298 |
| $T_{12}$ | 30.42 | 27.07 | 21.07 | 26.19 | 335 | 250 | 315 | 300 |
| $T_{13}$ | 18.48 | 22.32 | 18.66 | 19.82 | 294 | 180 | 286 | 253 |
| SE± | 1.00 | 0.34 | 0.62 | 1.39 | 0.93 | 0.84 | 7.22 | 5.46 |
| CD at 5% | 3.05 | 1.01 | 1.81 | 4.07 | 2.82 | 2.44 | 21.10 | 15.96 |

**Table AS 64.10.7:** Effect of different treatments on nutrient uptake nutrient requirement of sugarcane at harvest (Pooled)

| Treat. | N uptake (Kg $ha^{-1}$) | | | | N requirement (Kg $t^{-1}$) | | | |
|---|---|---|---|---|---|---|---|---|
| | 2011-12 | 2012-13 | 2013-14 | Mean | 2011-12 | 2012-13 | 2013-14 | Mean |
| $T_1$ | 115 | 201 | 128 | 148 | 0.98 | 3.03 | 1.84 | 1.95 |
| $T_2$ | 217 | 229 | 248 | 232 | 1.59 | 2.59 | 2.71 | 2.29 |
| $T_3$ | 229 | 235 | 248 | 237 | 1.49 | 2.39 | 2.44 | 2.11 |
| $T_4$ | 237 | 234 | 259 | 244 | 1.32 | 1.97 | 2.20 | 1.83 |
| $T_5$ | 244 | 235 | 267 | 249 | 1.34 | 2.04 | 2.19 | 1.86 |
| $T_6$ | 269 | 230 | 275 | 258 | 1.48 | 1.91 | 2.23 | 1.87 |
| $T_7$ | 276 | 232 | 261 | 256 | 1.59 | 1.89 | 2.16 | 1.88 |
| $T_8$ | 283 | 233 | 267 | 261 | 1.56 | 1.93 | 2.22 | 1.90 |
| $T_9$ | 289 | 240 | 263 | 264 | 1.56 | 2.01 | 2.15 | 1.91 |
| $T_{10}$ | 297 | 234 | 266 | 266 | 1.58 | 1.81 | 2.01 | 1.80 |
| $T_{11}$ | 313 | 232 | 260 | 268 | 1.63 | 1.77 | 1.91 | 1.77 |
| $T_{12}$ | 312 | 237 | 276 | 275 | 1.68 | 1.84 | 2.03 | 1.85 |
| $T_{13}$ | 177 | 221 | 167 | 188 | 1.43 | 2.96 | 2.00 | 2.13 |
| SE± | 1.29 | 1.45 | 5.12 | 15.60 | -- | -- | -- | -- |
| CD at 5% | 3.90 | 4.25 | 14.95 | 45.53 | -- | -- | -- | -- |

**Table AS 64.10.8:** Effect of different treatments on nutrient uptake nutrient requirement of sugarcane at harvest (Pooled)

| Treat. | P uptake (Kg ha$^{-1}$) | | | | P requirement (Kg t$^{-1}$) | | | |
|---|---|---|---|---|---|---|---|---|
| | 2011-12 | 2012-13 | 2013-14 | Mean | 2011-12 | 2012-13 | 2013-14 | Mean |
| $T_1$ | 28.59 | 27.20 | 17.50 | 24.43 | 0.24 | 0.41 | 0.25 | 0.30 |
| $T_2$ | 35.19 | 28.08 | 22.58 | 28.62 | 0.26 | 0.32 | 0.25 | 0.27 |
| $T_3$ | 53.54 | 29.47 | 24.24 | 35.75 | 0.35 | 0.30 | 0.24 | 0.30 |
| $T_4$ | 58.29 | 30.22 | 27.29 | 38.60 | 0.32 | 0.25 | 0.23 | 0.27 |
| $T_5$ | 57.36 | 28.74 | 27.99 | 38.03 | 0.32 | 0.25 | 0.23 | 0.26 |
| $T_6$ | 60.80 | 30.61 | 29.02 | 40.14 | 0.33 | 0.25 | 0.23 | 0.27 |
| $T_7$ | 59.21 | 29.98 | 27.65 | 38.95 | 0.34 | 0.24 | 0.23 | 0.27 |
| $T_8$ | 62.08 | 31.11 | 27.28 | 40.16 | 0.34 | 0.26 | 0.23 | 0.28 |
| $T_9$ | 66.87 | 32.01 | 29.44 | 42.77 | 0.36 | 0.27 | 0.24 | 0.29 |
| $T_{10}$ | 68.24 | 32.00 | 32.00 | 44.08 | 0.36 | 0.25 | 0.24 | 0.28 |
| $T_{11}$ | 80.24 | 32.43 | 34.10 | 48.92 | 0.42 | 0.25 | 0.25 | 0.31 |
| $T_{12}$ | 78.21 | 33.45 | 32.79 | 48.15 | 0.42 | 0.26 | 0.24 | 0.31 |
| $T_{13}$ | 21.86 | 28.70 | 21.37 | 23.98 | 0.18 | 0.38 | 0.26 | 0.27 |
| SE± | 1.10 | 0.34 | 0.77 | 4.99 | -- | -- | -- | -- |
| CD at 5% | 3.34 | 1.01 | 2.25 | 14.56 | -- | -- | -- | -- |

**Table AS 64.10.9:** Effect of different treatments on nutrient uptake nutrient requirement of sugarcane at harvest (Pooled)

| Treat. | K uptake (Kg ha$^{-1}$) | | | | K requirement (Kg t$^{-1}$) | | | |
|---|---|---|---|---|---|---|---|---|
| | 2011-12 | 2012-13 | 2013-14 | Mean | 2011-12 | 2012-13 | 2013-14 | Mean |
| $T_1$ | 130 | 202 | 112 | 148 | 1.10 | 3.05 | 1.60 | 1.92 |
| $T_2$ | 202 | 233 | 167 | 201 | 1.48 | 2.63 | 1.81 | 1.98 |
| $T_3$ | 221 | 241 | 181 | 214 | 1.44 | 2.45 | 1.78 | 1.89 |
| $T_4$ | 269 | 257 | 217 | 248 | 1.49 | 2.16 | 1.85 | 1.83 |
| $T_5$ | 299 | 264 | 219 | 261 | 1.65 | 2.29 | 1.79 | 1.91 |
| $T_6$ | 304 | 265 | 224 | 265 | 1.67 | 2.20 | 1.81 | 1.89 |
| $T_7$ | 334 | 268 | 217 | 273 | 1.93 | 2.19 | 1.80 | 1.97 |
| $T_8$ | 337 | 271 | 217 | 275 | 1.86 | 2.25 | 1.81 | 1.97 |
| $T_9$ | 353 | 265 | 223 | 280 | 1.90 | 2.22 | 1.81 | 1.98 |
| $T_{10}$ | 360 | 269 | 258 | 296 | 1.92 | 2.09 | 1.95 | 1.99 |
| $T_{11}$ | 370 | 273 | 272 | 305 | 1.93 | 2.08 | 2.00 | 2.00 |
| $T_{12}$ | 361 | 278 | 262 | 300 | 1.94 | 2.16 | 1.92 | 2.01 |
| $T_{13}$ | 154 | 209 | 147 | 170 | 1.24 | 2.80 | 1.77 | 1.94 |
| SE± | 2.07 | 0.83 | 6.13 | 17.74 | -- | -- | -- | -- |
| CD at 5% | 6.27 | 2.43 | 17.91 | 51.80 | -- | -- | -- | -- |

## 11. PUNE

**Plant crop**

All the treatments of application nutrients individually or in combination (N,P,K, S, Zn, Fe, Mn) and soil test based fertilizer application was found significantly superior over absolute control. The maximum cane yield of 137.29 t $ha^{-1}$ was obtained due to the combine application of Sulphur, Zn, and Fe along with recommended NPK followed by 136.47 t $ha^{-1}$ due combine application of Sulphur, Zn, Fe and Mn with RDF and 136.00 t $ha^{-1}$ due combine application of Sulphur and Zn with RDF which were found on par. Therefore, the results revealed that sugar cane responded to the recommended dose of NPK (400 :170: 170 ), Sulphur @ 60 kg /ha and $ZnSO_4$ @ 20 kg/ha

**CCS Yield**

The Commercial Cane Sugar yield was found highest 19.84 t $ha^{-1}$ in treatment of NPK + S followed by 19.73 t $ha^{-1}$in the treatment of NPK + S + Zn , 19.60 t $ha^{-1}$ in treatment of NPK + S + Zn + Fe and 19.43 t $ha^{-1}$ in treatment of NPK + S + Zn + Fe + Mn was found significantly superior over RDF (17.47 t $ha^{-1}$) . All the treatments of individual nutrients and in combination were found at par with each other except the treatment of soil test based fertilizer application.

**Plant population**

The plant population presented in Table 2 showed that maximum significant plant population 106.55 thousand $ha^{-1}$ was recorded in treatment T9 of recommended NPK + S+ Zn was found significantly superior over RDF (100.64 t $ha^{-1}$).

**Growth observation**

The growth parameters viz. milliable cane height and girth of cane were numerically increased in all treatments but not significantly differed. The maximum milliable cane height (242.0 cm) was found in treatment T8 of NPK + Mn. Cane girth and numbers of internodes were remained more or less same in all the treatments.

**Biometric observation**

The germination at 45 days after planting varied from 67.67 – 70.33 %. The data of germination percentage was found to be statistically non significant. The tillering ratio varied from 2.10 – 2.32 showed insignificant difference.

**Juice quality**

The juice quality parameters with respect to Brix, Pol, Purity and CCS percent are presented in Table. 4 indicated that the juice quality was not affected

**Economic evaluation**

All the treatment combination of macronutrient and micronutrient was found significantly superior over absolute RDF except in treatment NPK + Mn and treatment of

FYM. The maximum cost benefit ratio 3.36 in treatment of NPK + S + Zn + Fe followed by 3.34 in treatment soil test based fertilizer application.

**SUMMARY:** The effect of differential response of sugarcane crop to different nutrients on yield and quality of preseasonal sugarcane was studied in medium black soil. There was no individual response observed to S, Zn and Fe nutrients, however, RDF along with S+Zn+Fe combination gave maximum cane yield of 137.29 t $ha^{-1}$ followed by 136.47 t $ha^{-1}$ $^{in}$ RDF with S+Zn+Fe+Mn combination and 136.00 t $ha^{-1}$ RDF with S+Zn which were found at par and sigmificant over only RDF (124.41 t $ha^{-1}$). It reveals that application of RDF (400:170:170 ) along with sulphur @ 60 kg/ha and ZnSO4@ 20 kg/ha increased cane yield by 9.31% cane yield.

**Table AS 64.11.1:** Response of sugarcane crop to different nutrients on Cane yield, CCS yield and No. Milliable canes

| **Treatment** | **Cane yield (t $ha^{-1}$)** | **CCS yield (t $ha^{-1}$)** | **No. of Milliable canes ('000 $ha^{-1}$)** |
|---|---|---|---|
| T1 | 98.13 | 14.24 | 88.70 |
| T2 | 112.86 | 15.46 | 93.54 |
| T3 | 118.33 | 17.64 | 98.35 |
| T4 | 124.41 | 17.47 | 100.64 |
| T5 | 132.57 | 19.84 | 102.00 |
| T6 | 132.23 | 18.69 | 100.46 |
| T7 | 131.79 | 18.30 | 98.32 |
| T8 | 122.39 | 17.31 | 97.96 |
| T9 | 136.00 | 19.73 | 106.55 |
| T10 | 137.29 | 19.60 | 104.75 |
| T11 | 136.47 | 19.43 | 103.38 |
| T12 | 130.14 | 18.61 | 100.63 |
| T13 | 124.14 | 17.86 | 97.32 |
| SE +- | 1.55 | 0.63 | 1.47 |
| CD at 5% | 4.54 | 1.85 | 4.31 |

**Table AS 64.11.2:** Response of sugarcane crop to different nutrients on Biometric and growth observation

| Treatments | Milliable cane height (cm) | Cane Girth (cm) | Internodes/ cane | Germination (%) | Tillering Ratio |
|---|---|---|---|---|---|
| T1 | 228.0 | 9.1 | 20 | 67.6 | 2.10 |
| T2 | 226.6 | 9.2 | 20 | 69.0 | 2.16 |
| T3 | 248.3 | 10.0 | 20 | 68.67 | 2.25 |
| T4 | 242.6 | 9.6 | 20 | 69.0 | 2.31 |
| T5 | 233.3 | 9.7 | 21 | 70.0 | 2.32 |
| T6 | 233.3 | 10.2 | 20 | 70.0 | 2.30 |
| T7 | 231.0 | 9.6 | 20 | 70.0 | 2.27 |
| T8 | 242.0 | 9.7 | 21 | 69.0 | 2.25 |
| T9 | 231.3 | 9.6 | 21 | 68.3 | 2.28 |
| T10 | 238.3 | 9.7 | 21 | 70.0 | 2.23 |
| T11 | 224.6 | 9.8 | 21 | 70.3 | 2.32 |
| T12 | 222.6 | 9.7 | 20 | 69.3 | 2.25 |
| T13 | 239.3 | 10.2 | 21 | 69.6 | 2.22 |
| SE +- | 8.18 | 0.28 | 0.63 | 0.55 | 0.07 |
| CD at 5% | NS | NS | NS | NS | NS |

**Table AS 64.11.3:** Response of sugarcane crop to different nutrients on Cane juice quality

| Treatment | Brix (%) | Pol (%) | Purity (%) | Commercial Cane Sugar (%) |
|---|---|---|---|---|
| T1 | 21.20 | 20.08 | 94.71 | 14.52 |
| T2 | 20.73 | 19.30 | 93.07 | 13.70 |
| T3 | 21.51 | 20.55 | 95.48 | 14.91 |
| T4 | 21.39 | 19.65 | 91.77 | 14.02 |
| T5 | 21.69 | 20.65 | 95.23 | 14.97 |
| T6 | 20.94 | 19.63 | 93.73 | 14.13 |
| T7 | 20.57 | 19.28 | 93.73 | 13.88 |
| T8 | 19.37 | 18.46 | 95.37 | 13.39 |
| T9 | 20.33 | 19.35 | 95.16 | 14.02 |
| T10 | 21.75 | 20.46 | 94.05 | 14.75 |
| T11 | 20.97 | 19.65 | 93.53 | 14.12 |
| T12 | 21.30 | 20.10 | 94.38 | 14.52 |
| T13 | 21.32 | 20.10 | 94.26 | 14.51 |
| SE +- | 0.43 | 0.48 | 1.02 | 0.40 |
| CD at 5% | NS | NS | NS | NS |

**TableAS 64.11.4:** Response of sugarcane crop to different nutrients on economic evaluation

| Treatment | Cane yield (t/ha) | Gross monetary return | Cost of cultivation | Net profit | BC ratio |
|---|---|---|---|---|---|
| T1 | 98.13 | 225699.0 | 74020 | 151679.0 | 3.05 |
| T2 | 112.86 | 259578.0 | 78794 | 180784.0 | 3.29 |
| T3 | 118.33 | 272151.3 | 86865 | 185286.3 | 3.13 |
| T4 | 124.41 | 286150.7 | 91659.2 | 194491.5 | 3.12 |
| T5 | 132.57 | 304903.3 | 93159.2 | 211744.1 | 3.27 |
| T6 | 132.23 | 304129.0 | 92213.2 | 211915.8 | 3.30 |
| T7 | 131.79 | 303117.0 | 91884.2 | 211232.8 | 3.30 |
| T8 | 122.39 | 281489.3 | 92069.2 | 189420.1 | 3.06 |
| T9 | 136.00 | 312800.0 | 93713.2 | 219086.8 | 3.34 |
| T10 | 137.29 | 315767.0 | 93938.2 | 221828.8 | 3.36 |
| T11 | 136.47 | 313881.0 | 94348.2 | 219532.8 | 3.32 |
| T12 | 130.14 | 299329.7 | 91659.2 | 207670.5 | 3.27 |
| T13 | 124.14 | 285529.7 | 109020.0 | 176509.7 | 2.62 |
| SE +- | 1.55 | 7178.0 | | 266707.8 | 0.05 |
| CD at 5% | 4.54 | 14814.7 | | NS | 0.12 |

**Ratoon Crop**

All the treatments of application nutrients (N,P,K, S, Zn, Fe, Mn) and soil test based fertilizer application was found significantly superior over absolute control. The maximum cane yield was obtained due to the combine application of Sulphur, Zn, and Fe along with recommended NPK (118.48 t $ha^{-1}$) followed by combined application of Sulphur, Zn, Fe and Mn along with RDF (117.90 t $ha^{-1}$), combine application of Sulphur, Zn along with RDF (115.18 t $ha^{-1}$) and application of soil test based fertilizer application (114.33 t $ha^{-1}$) which was significantly superior over only RDF (104.92 t $ha^{-1}$). Therefore, the results revealed that sugar cane responded to RDF with S+Zn+Fe combination.

All the treatments of application individual nutrient with RDF, combination of nutrients with RDF (N,P,K, S, Zn, Fe, Mn) and soil test based fertilizer application was found significantly superior over Control The Commercial Cane Sugar yield was found highest 17.33 t $ha^{-1}$ in treatment of NPK + S + Zn + Fe followed by 17.17 t $ha^{-1}$ in the treatment of NPK + S + Zn + Fe + Mn, 16.88 t $ha^{-1}$ in the treatment of NPK + S + Zn and application of soil test based fertilizer application (15.72 t $ha^{-1}$) was found significantly superior over RDF and at par with each other.

The plant population showed that maximum significant plant population 94.41 thousand $ha^{-1}$ was recorded in treatment T11 of recommended NPK + S+ Zn + Fe +Mn. All the treatments are at par with each other except treatment T2 and T3.The growth parameters viz. milliable cane height and girth of cane were numerically increased in all treatments but not significantly differed. The maximum milliable cane height (244.7 cm) was found in treatment T8 of NPK + Mn. Cane girth and numbers of internodes were remained more or less same in all the treatments.

The juice quality parameters with respect to Brix, Pol, and Purity and CCS percent were not affected. The maximum benefit cost ratio was obtained due to application of soil test based fertilizer application (5.10) followed by combine application of Sulphur, Zn, and Fe along with recommended NPK (5.06) followed by combine application of Sulphur, Zn, Fe and Mn along with RDF (5.00) which was significantly superior over only RDF (4.68) and at par with each other.

**SUMMARY:** The effect of differential response of sugarcane crop to different nutrients on yield and quality of sugarcane ratoon crop was studied the results showed similar insignificant results to individual sulphur, Zn, Fe and Mn nutrients. However, cane yield responses to RDF with S+Zn+Fe combination gave maximum cane yield of 118.48 t $ha^{-1}$ which was significant over RDF (104.92 t $ha^{-1}$).

**Table AS 64.11.5:** Response of sugarcane crop to different nutrients on Cane yield, CCS yield and No. Milliable canes (Ratoon)

| **Treatment** | **Cane yield (t $ha^{-1}$)** | **CCS yield (t $ha^{-1}$)** | **No. of Milliable canes ('000 $ha^{-1}$)** |
|---|---|---|---|
| T1 | 84.23 | 11.31 | 77.14 |
| T2 | 94.29 | 13.33 | 84.26 |
| T3 | 98.09 | 13.82 | 81.74 |
| T4 | 104.92 | 15.34 | 90.31 |
| T5 | 106.99 | 15.44 | 94.12 |
| T6 | 109.34 | 15.45 | 90.85 |
| T7 | 110.77 | 16.29 | 92.85 |
| T8 | 110.48 | 15.87 | 88.89 |
| T9 | 115.18 | 16.88 | 94.18 |
| T10 | 118.48 | 17.33 | 93.78 |
| T11 | 117.90 | 17.17 | 94.41 |
| T12 | 114.33 | 15.72 | 91.77 |
| SE +- | 3.22 | 0.60 | 3.00 |
| CD at 5% | 6.68 | 1.24 | 6.22 |

**Table AS 64.11.6:** Response of sugarcane crop to different nutrients on Biometric and growth observation (Ratoon)

| Treatment | Milliable cane height (cm) | Cane Girth (cm) | Internodes/ cane |
|---|---|---|---|
| T1 | 220.3 | 9.0 | 19.3 |
| T2 | 225.7 | 9.4 | 18.3 |
| T3 | 226.3 | 9.2 | 18.7 |
| T4 | 219.0 | 9.3 | 18.7 |
| T5 | 239.0 | 9.3 | 19.8 |
| T6 | 234.7 | 9.4 | 20.0 |
| T7 | 243.7 | 9.3 | 20.3 |
| T8 | 244.7 | 9.2 | 21.0 |
| T9 | 231.0 | 9.2 | 20.0 |
| T10 | 235.0 | 9.3 | 20.3 |
| T11 | 238.7 | 9.3 | 20.7 |
| T12 | 241.0 | 9.3 | 19.0 |
| SE +-<br>CD at 5% | 10.28<br>NS | 0.16<br>NS | 1.30<br>NS |

**Table AS 64.11.7:** Response of sugarcane crop to different nutrients on Cane juice quality (Ratoon)

| Treatment | Brix (%) | Pol (%) | Purity (%) | Commercial Cane Sugar (%) |
|---|---|---|---|---|
| T1 | 20.3 | 18.8 | 92.6 | 13.4 |
| T2 | 21.1 | 19.7 | 93.3 | 14.2 |
| T3 | 21.4 | 19.7 | 92.1 | 14.1 |
| T4 | 21.6 | 20.3 | 93.9 | 14.6 |
| T5 | 21.1 | 20.0 | 94.4 | 14.4 |
| T6 | 21.1 | 20.0 | 94.8 | 14.1 |
| T7 | 21.1 | 20.2 | 95.8 | 14.7 |
| T8 | 21.1 | 19.9 | 94.3 | 14.4 |
| T9 | 21.2 | 20.3 | 94.9 | 14.7 |
| T10 | 21.4 | 20.2 | 94.6 | 14.6 |
| T11 | 21.5 | 20.3 | 94.6 | 14.7 |
| T12 | 20.4 | 19.1 | 93.2 | 13.8 |
| SE +-<br>CD at 5% | 0.51<br>NS | 0.56<br>NS | 1.08<br>NS | 0.44<br>NS |

**Table AS 64.11.8:** Response of sugarcane crop to different nutrients on economic evaluation (Ratoon)

| Treatment | Cane yield (t/ha) | Gross monetary return | Cost of cultivation | Net profit | BC ratio |
|---|---|---|---|---|---|
| T1 | 84.23 | 193736.7 | 36265.2 | 157471.5 | 5.34 |
| T2 | 94.29 | 216859.3 | 39845.7 | 177013.6 | 5.44 |
| T3 | 98.09 | 225607.0 | 46751.2 | 178855.8 | 4.83 |
| T4 | 104.92 | 241323.7 | 51549.4 | 189774.3 | 4.68 |
| T5 | 106.99 | 246069.3 | 53049.4 | 193020 | 4.64 |
| T6 | 109.34 | 251474.3 | 52103.4 | 199371 | 4.83 |
| T7 | 110.77 | 254771.0 | 51774.4 | 202996.7 | 4.92 |
| T8 | 110.48 | 254111.7 | 51959.4 | 202152.3 | 4.89 |
| T9 | 115.18 | 265906.3 | 53603.4 | 211303.9 | 4.94 |
| T10 | 118.48 | 272511.7 | 53828.4 | 218683.3 | 5.06 |
| T11 | 117.90 | 271162.3 | 54238.4 | 216924 | 4.99 |
| T12 | 114.33 | 262966.7 | 51549.4 | 211417.3 | 5.10 |
| SE +- | 3.22 | 81650.9 | | 7412.5 | 0.15 |
| CD at 5% | 6.68 | NS | | NS | 0.30 |

**Initial Soil characteristics under experimental plot**

| Soil characteristics | Analytical Value Initial |
|---|---|
| pH | 8.15 |
| Electrical Conductivity ($dSm^{-1}$ ) | 0.23 |
| Organic carbon ( % ) | 0.52 |
| Available Nitrogen (kg $ha^{-1}$) | 320 |
| Available Phosphate(kg $ha^{-1}$) | 34.5 |
| Available Potash (kg $ha^{-1}$) | 485 |
| Soil Texture | Clay |
| DTPA extractable Cu ( ppm ) | 12.5 |
| DTPA extractable Fe ( ppm ) | 13.0 |
| DTPA extractable Mn ( ppm ) | 23.5 |
| DTPA extractable Zn ( ppm ) | 2.17 |

## 12. POWARKHEDA

The germination percentage was not influenced due to various treatments during experimentation. However, germination per cent ranged between 54.09 to 57.95 per cent among treatments. The number of tillers increased significantly due to application of all plant nutrients and there was beneficial effect observed in increasing the number of tillers either with the application of the alone plant nutrients or in combination with major plant nutrients. The number of tillers increased significantly due to application of N alone (63.04), NP (64.35), NPK (64.36),FYM (64.51) and highest number of tillers recorded in NPK+S+Zn+Fe+Mn (69.06) than control plot (51.08).However, number of tillers values recorded in combination of N,NP,NPK and other micro nutrients was at par.

The plant height increased significantly due to application of all plant nutrient treatments than control (145 cm). The significant increase in plant height was more apparent due to application of N alone (202 cm),NP (221 cm),FYM (257 cm) than control plots (145 cm) and plant height recorded at par among all plant nutrient treatments. The NMC influenced significantly due to application of nutrients either alone or in combination with NPK. Significantly higher NMC values recorded at N alone (59.34), NP (59.57), NPK (59.57) than control (46.45). The application of NPK showed significantly higher values of NMC than the application of N, NP and FYM but was at par in between an N and FYM. Application of micronutrients with NPK although showed higher values of NMC but increase in NMC did not differ significantly.

The cane yield increased significantly due to application of plant nutrients either alone or in combination with NPK. The increase in cane yield was recorded higher with application of N alone (65.74 t/ha), NP (75.31t/ha), NPK (82.87 t/ha) and FYM (67.28 t/ha) than control (42.82 t/ha). Application of all micronutrients with NPK although showed increase in cane yield but increase in yield did not differ significantly. The value of brix per cent did not differ significantly due to various treatments during experimentation. The brix percentage ranged between 20.94 to 21.25 per cent.

**Summary:** The cane yield and yield attributes increased significantly due to application of major plant nutrients viz. N, NP and NPK than control (without fertilizers). Application of micronutrients with NPK although showed beneficial effects on crop growth and yield of the crop but increase in cane yield did not differ significantly.

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**Table AS 64.12.1:** Effect of different treatments on growth, yield and quality of sugarcane

| Treatment | Germination (%) | Tillers (000'/ha) | Height (cm) | NMC (000'/ha) | Brix (%) | Yield (t/ha) |
|---|---|---|---|---|---|---|
| Control | 56.10 | 51.08 | 145.00 | 46.45 | 21.13 | 42.82 |
| N | 55.17 | 63.04 | 202.00 | 59.34 | 21.24 | 65.74 |
| NP | 54.55 | 64.35 | 221.67 | 59.57 | 21.24 | 75.31 |
| NPK | 56.56 | 64.36 | 259.67 | 59.57 | 21.24 | 82.87 |
| NPK+S | 56.02 | 65.59 | 273.67 | 60.80 | 21.25 | 84.41 |
| NPK+Zn | 54.32 | 66.36 | 274.33 | 61.57 | 21.24 | 85.49 |
| NPK+Fe | 57.10 | 66.67 | 274.67 | 61.88 | 20.94 | 86.19 |
| NPK+Mn | 54.71 | 66.90 | 275.33 | 62.11 | 21.23 | 86.19 |
| NPK+S+Zn | 54.09 | 67.13 | 275.67 | 62.27 | 21.23 | 88.35 |
| NPK+S+Zn+Fe | 56.56 | 68.13 | 276.67 | 63.35 | 21.22 | 88.81 |
| NPK+S+Zn+Fe+Mn | 54.71 | 69.06 | 277.00 | 64.35 | 21.22 | 88.73 |
| Soil test based | 57.95 | 66.44 | 275.33 | 61.73 | 21.22 | 84.72 |
| FYM @ 20 t/ha | 57.56 | 64.51 | 257.33 | 59.03 | 21.22 | 67.28 |
| **S Em ±** | **4.67** | **2.25** | **2.48** | **2.26** | **0.05** | **1.83** |
| **CD at 5%** | **NS** | **6.55** | **7.23** | **6.58** | **NS** | **5.32** |

**Initial soil fertility status:**

| S.No. | Properties | Value |
|---|---|---|
| 1. | Available N | 235 kg/ha |
| 2. | Available $P_2O_5$ | 16.61 kg/ha |
| 3. | Available $K_2O$ | 473 kg/ha |
| 4. | S | 16 kg/ha |
| 5. | Zn | 0.58 ppm |
| 6. | Fe | 6.36 |
| 7. | pH | 7.48 |
| 8. | EC | 0.39 mmhos/cm |
| 9. | OC (%) | 0.60 % |
| 10. | Soil Texture | Clay loam (deep black soils) |

## 13. SANKESHWAR

Results indicated that germination % was significantly superior in T6 NPK+Zn (59.64%) and was on par with T8 NPK+Mn (59.03%) T12 FYM/CSPMC @ 20 t/ha (58.02%) T9 NPK+S+Zn (57.10%) and T10 NPK+S+Zn+Fe (56.48%) over control T1 Control (No fertilizer) (51.54%). Tillers, were significantly superior in T9 NPK+S+Zn (122000/ha), $T_5$ NPK+S (117000/ha), $T_6$ NPK+Zn (115000/ha), and $T_{10}$ NPK+S+Zn+Fe (113000/ha) over $T_1$ Control (No fertilizer) (102000/ha). Cane height and cane girth were not influenced by the nutrients treatments.

There was significant difference in Number of millable canes. $T_{10}$ NPK+S+Zn+Fe recorded significantly higher NMC (99000/ha) and was on per with $T_{11}$ NPK+S+Zn+Fe+Mn (94000/ha) over other treatments and control T1 (80000/ha). Significantly higher cane yield was recorded in $T_{10}$ NPK+S+Zn+Fe (115.29t/ha) over $T_1$ Control (96.20t/ha). CCS yield was significantly superior in $T_{10}$ NPK+S+Zn+Fe (15.86t/ha) followed by $T_{12}$ FYM/CSPMC @ 20 t/ha (15.59t/ha) and $T_{11}$ NPK+S+Zn+Fe+Mn (15.58t/ha) over control (13.44t/ha)

Quality parameters like Brix, was non significant. POL%, was significantly higher in $T_{12}$ FYM/CSPMC @ 20 t/ha (22.05%) over control (20.24%) Purity% was significantly higher in $T_{12}$ FYM/CSPMC @ 20 t/ha (93%) over control (88%) and CCS % was significantly superior in $T_{12}$ FYM/CSPMC @ 20 t/ha (15.62%) over control (13.98%)

**SUMMARY:** Application of balanced recommended fertilizers (RDF NPK 250; 75; 190; kg/ ha) along with Sulphur 60 kg /ha+ Zinc 50kg /ha + Ferrous12.5 kg /ha will give higher cane yield and CCS yield

**Table AS 64.13.1:** Growth Parameters as influenced by different sources of Nutrients

| Treatment | Germination % | | | Tiller at 90 days 000/ha | | |
|---|---|---|---|---|---|---|
| | 2011-12 | 2012-13 | 2013-14 | 2011-12 | 2012-13 | 2013-14 |
| T 1 - Control ( No Fertilizer) | 51.54 | 52.7 | 52.1 | 77 | 80.13 | 78.56 |
| T 2 – N | 52.39 | 53.55 | 52.9 | 80 | 83.52 | 81.76 |
| T 3 – NP | 52.00 | 53.16 | 52.5 | 85 | 89.82 | 87.41 |
| T 4 – NPK | 52.78 | 53.93 | 53.3 | 111 | 114.88 | 112.94 |
| T 5 - NPK+S | 54.39 | 55.55 | 54.9 | 117 | 120.22 | 118.61 |
| T 6 - NPK+Zn | 59.64 | 60.80 | 60.2 | 115 | 118.88 | 116.94 |
| T 7 - NPK+Fe | 55.63 | 56.79 | 56.2 | 108 | 111.49 | 109.745 |
| T 8 - NPK+Mn | 59.03 | 60.18 | 59.6 | 118 | 121.96 | 119.98 |
| T 9 - NPK+S+Zn | 57.10 | 58.26 | 57.6 | 122 | 125.56 | 123.78 |
| T 10 - NPK+S+Zn+Fe | 56.48 | 57.63 | 57.06 | 113 | 116.83 | 114.915 |
| T 11 - NPK+S+Zn+Fe+Mn | 54.16 | 55.32 | 54.74 | 112 | 115.8 | 113.9 |
| T 12 - FYM/CSPMC @ 20 T/Ha | 58.02 | 59.18 | 58.60 | 111 | 114.98 | 112.99 |
| T 13 - Soil test based | | 55.24 | 55.24 | | 107.08 | 107.08 |
| CV% | 5.79 | 5.45 | 5.73 | 5.17 | 4.94 | 3.00 |
| S.EM + | 1.84 | 1.77 | 1.84 | 3.36 | 3.28 | 1.81 |
| C.D. @ 5 % | 5.42 | 5.17 | 5.42 | 9.86 | 9.58 | 5.33 |

**Table AS 64.13.2:** Growth Parameters as influenced by different sources of Nutrients

| Treatment | Cane height in cm | | | Cane girth in cm | | |
|---|---|---|---|---|---|---|
| | 2011-12 | 2012-13 | 2013-14 | 2011-12 | 2012-13 | 2013-14 |
| T 1 - Control ( No Fertilizer) | 284 | 276 | 280 | 2.30 | 2.40 | 2.35 |
| T 2 – N | 278 | 270 | 274 | 2.31 | 2.41 | 2.36 |
| T 3 – NP | 288 | 280 | 284 | 2.33 | 2.42 | 2.38 |
| T 4 – NPK | 277 | 269 | 273 | 2.32 | 2.43 | 2.38 |
| T 5 - NPK+S | 286 | 278 | 282 | 2.26 | 2.36 | 2.31 |
| T 6 - NPK+Zn | 274 | 266 | 270 | 2.27 | 2.38 | 2.33 |
| T 7 - NPK+Fe | 269 | 261 | 265 | 2.40 | 2.50 | 2.45 |
| T 8 - NPK+Mn | 273 | 265 | 269 | 2.40 | 2.33 | 2.37 |
| T 9 - NPK+S+Zn | 285 | 277 | 281 | 2.42 | 2.43 | 2.43 |
| T 10 - NPK+S+Zn+Fe | 284 | 276 | 280 | 2.26 | 2.36 | 2.31 |
| T 11 - NPK+S+Zn+Fe+Mn | 280 | 272 | 276 | 2.30 | 2.40 | 2.35 |
| T 12 - FYM/CSPMC @ 20 T/Ha | 281 | 273 | 277 | 2.16 | 2.26 | 2.21 |
| T 13 - Soil test based | | 261 | 261 | | 2.53 | 2.53 |
| CV% | 5.42 | 5.78 | 5.50 | 7.99 | 7.42 | 7.66 |
| S.EM + | 8.76 | 9.25 | 8.76 | 0.10 | 0.10 | 0.106 |
| **C.D. @ 5 %** | NS | NS | NS | NS | NS | ns |

**Table AS 64.13.3:** Yield Parameters as influenced by different sources of Nutrients

| Treatment | NMC 000/HA | | | Single cane weight in kg | | |
|---|---|---|---|---|---|---|
| | **2011-12** | **2012-13** | **2013-14** | **2011-12** | **2012-13** | **2013-14** |
| T 1 - Control ( No Fertilizer) | 80 | 83 | 82.00 | 0.76 | 0.78 | 0.77 |
| T 2 – N | 81 | 84 | 82.6 | 1.06 | 1.9 | 1.48 |
| T 3 – NP | 83 | 86 | 84.6 | 1.03 | 1.8 | 1.42 |
| T 4 – NPK | 86 | 89 | 88.3 | 1.80 | 1.7 | 1.75 |
| T 5 - NPK+S | 85 | 88 | 87.0 | 1.86 | 1.8 | 1.83 |
| T 6 - NPK+Zn | 87 | 90 | 89.3 | 1.76 | 1.7 | 1.73 |
| T 7 - NPK+Fe | 89 | 92 | 90.6 | 1.70 | 1.9 | 1.80 |
| T 8 - NPK+Mn | 80 | 83 | 82.0 | 1.78 | 1.8 | 1.79 |
| T 9 - NPK+S+Zn | 90 | 93 | 91.6 | 1.80 | 1.9 | 1.85 |
| T 10 - NPK+S+Zn+Fe | 99 | 102 | 101.3 | 2.03 | 1.8 | 1.92 |
| T 11 - NPK+S+Zn+Fe+Mn | 94 | 97 | 96.0 | 1.86 | 1.6 | 1.73 |
| T 12 - FYM/CSPMC @ 20 T/Ha | 84 | 87 | 86.0 | 1.81 | 1.7 | 1.76 |
| T 13 - Soil test based | | 98 | 98.0 | | 1.8 | 1.8 |
| CV% | 2.86 | 2.76 | 2.71 | 7.90 | 6.96 | 7.66 |
| S.EM + | 1.34 | 1.44 | 1.38 | 0.08 | 0.07 | 0.08 |
| C.D. @ 5 % | 3.94 | 4.22 | 4.05 | 0.28 | NS | 0.25 |

**Table As 64.13.4:** Yield Parameters as influenced by different sources of Nutrients

| Treatment | **Cane Yield t/ha** | | | **CCS Yield t/ha** | | |
|---|---|---|---|---|---|---|
| | **2011-12** | **2012-13** | **2013-14** | **2011-12** | **2012-13** | **2013-14** |
| T 1 - Control ( No Fertilizer) | 56.20 | 50.30 | 53.23 | 9.44 | 6.98 | 7.42 |
| T 2 – N | 67.81 | 62.52 | 65.03 | 10.35 | 8.49 | 8.89 |
| T 3 – NP | 69.56 | 64.03 | 66.83 | 10.76 | 8.82 | 9.27 |
| T 4 – NPK | 102.05 | 98.56 | 100.73 | 14.15 | 13.52 | 13.89 |
| T 5 - NPK+S | 101.12 | 97.63 | 99.55 | 14.21 | 13.59 | 13.92 |
| T 6 - NPK+Zn | 103.28 | 99.69 | 101.74 | 13.95 | 13.28 | 13.66 |
| T 7 - NPK+Fe | 104.82 | 101.33 | 103.50 | 14.70 | 14.08 | 14.45 |
| T 8 - NPK+Mn | 96.09 | 73.09 | 84.80 | 13.56 | 10.26 | 11.93 |
| T 9 - NPK+S+Zn | 105.64 | 112.42 | 109.75 | 14.99 | 15.77 | 15.49 |
| T 10 - NPK+S+Zn+Fe | 115.29 | 122.07 | 118.90 | 15.86 | 16.59 | 16.23 |
| T 11 - NPK+S+Zn+Fe+Mn | 109.75 | 116.52 | 113.00 | 15.58 | 16.35 | 15.95 |
| T 12 - FYM/CSPMC @ 20 T/Ha | 99.75 | 106.57 | 103.21 | 15.59 | 16.47 | 16.04 |
| T 13 - Soil test based | | 120.83 | 120.83 | | 16.53 | 16.53 |
| CV% | 12.27 | 11.83 | 6.51 | 4.07 | 12.05 | 7.31 |
| S.EM + | 1.34 | 6.44 | 3.50 | 0.33 | 0.91 | 0.5 |
| C.D. @ 5 % | 3.93 | 18.80 | 10.28 | 0.99 | 2.66 | 1.62 |

**Table AS 64.13.5:** Quality parameters as influenced by different sources of nutrients

| Treatment | BRIX % | | | POL % | | |
|---|---|---|---|---|---|---|
| | 2011-12 | 2012-13 | 2013-14 | 2011-12 | 2012-13 | 2013-14 |
| T 1 - Control ( No Fertilizer) | 22.96 | 22.50 | 22.85 | 20.24 | 19.73 | 20.13 |
| T 2 – N | 23.06 | 22.63 | 22.95 | 20.80 | 19.97 | 19.97 |
| T 3 – NP | 23.46 | 22.53 | 23.35 | 20.37 | 19.88 | 20.26 |
| T 4 – NPK | 23.33 | 23.03 | 23.22 | 20.23 | 19.90 | 20.12 |
| T 5 - NPK+S | 23.43 | 22.93 | 23.32 | 20.45 | 19.95 | 20.34 |
| T 6 - NPK+Zn | 23.49 | 23.06 | 23.38 | 19.94 | 20.23 | 19.83 |
| T 7 - NPK+Fe | 23.26 | 23.50 | 23.15 | 20.37 | 19.76 | 20.26 |
| T 8 - NPK+Mn | 23.53 | 23.36 | 23.42 | 20.53 | 20.20 | 20.42 |
| T 9 - NPK+S+Zn | 23.89 | 23.56 | 23.78 | 20.72 | 20.58 | 20.61 |
| T 10 - NPK+S+Zn+Fe | 23.36 | 23.06 | 23.25 | 20.13 | 20.14 | 20.02 |
| T 11 - NPK+S+Zn+Fe+Mn | 23.66 | 23.63 | 23.55 | 20.65 | 20.41 | 20.54 |
| T 12 - FYM/CSPMC @ 20 T/Ha | 23.69 | 23.03 | 23.58 | 22.05 | 20.33 | 21.94 |
| T 13 - Soil test based | | 23.33 | 25.33 | | 20.71 | 20.71 |
| CV% | 2.92 | 2.89 | 2.93 | 2.61 | 3.12 | 2.62 |
| S.EM + | 0.39 | 0.38 | 0.39 | 0.30 | 0.36 | 0.30 |
| C.D. @ 5 % | NS | NS | NS | 0.90 | NS | 0.90 |

**Table AS 64.13.6: Quality parameters as influenced by different sources of nutrients**

| Treatment | CCS % | | | PURITY % | | |
|---|---|---|---|---|---|---|
| | 2011-12 | 2012-13 | 2013-14 | 2011-12 | 2012-13 | 2013-14 |
| T 1 - Control ( No Fertilizer) | 13.98 | 13.60 | 13.89 | 88 | 88 | 88.00 |
| T 2 – N | 13.79 | 13.80 | 13.70 | 87 | 87 | 87.00 |
| T 3 – NP | 13.96 | 13.73 | 13.88 | 87 | 86 | 86.50 |
| T 4 – NPK | 13.86 | 13.61 | 13.78 | 86 | 86 | 86.00 |
| T 5 - NPK+S | 14.05 | 13.69 | 13.97 | 87 | 87 | 87.00 |
| T 6 - NPK+Zn | 13.51 | 13.94 | 13.43 | 85 | 85 | 85.00 |
| T 7 - NPK+Fe | 14.02 | 13.33 | 13.94 | 87 | 87 | 87.00 |
| T 8 - NPK+Mn | 14.11 | 13.83 | 14.02 | 87 | 87 | 87.00 |
| T 9 - NPK+S+Zn | 14.20 | 14.15 | 14.11 | 87 | 86 | 86.50 |
| T 10 - NPK+S+Zn+Fe | 13.75 | 13.84 | 13.67 | 86 | 86 | 86.00 |
| T 11 - NPK+S+Zn+Fe+Mn | 14.20 | 13.96 | 14.11 | 87 | 87 | 87.00 |
| T 12 - FYM/CSPMC @ 20 T/Ha | 15.62 | 14.06 | 15.53 | 93 | 93 | 93.00 |
| T 13 - Soil test based | | 14.36 | 14.36 | | 88 | 88.00 |
| CV% | 2.98 | 3.89 | 2.98 | 2.01 | 1.95 | 1.98 |
| S.EM + | 0.24 | 0.31 | 0.24 | 1.01 | 0.98 | 1.00 |
| C.D. @ 5 % | 0.71 | NS | 0.70 | 2.98 | 2.87 | 2.93 |

**14. NAVSARI**

The data pertaining to initial soil fertility status, growth yield parameters and after harvest soil status indicated significantly higher tiller count at 90 DAP was recorded with treatment $T_{12}$ (soil test based fertilizer application) but remained at par with $T_{11}$. At 120 DAP significantly higher no. of tillers was observed with $T_{12}$ but observed at par with $T_{11}$, $T_{10}$, $T_7$, $T_5$, $T_4$ and $T_3$ similarly at 180 DAP also it was found highest with $T_{12}$ but was at par with almost the treatments except $T_1$, $T_2$, $T_3$, $T_{13}$ and $T_{14}$. Significantly highest and lowest plant height at 180 DAP was noticed with $T_{12}$ and $T_{13}$ respectively.

Significantly highest and lowest NMC was noticed under $T_{12}$ and $T_1$ respectively. Significantly highest millable cane length was recorded with $T_{12}$ and remained at par with almost all the treatments except $T_1$, $T_{13}$ and $T_{14}$. Difference for cane length and girth were observed non significant.

Cane yield (124.62 t $ha^{-1}$) was recorded significantly highest with $T_{12}$ and was at par with $T_4$ and $T_5$. CCS yield (16.71 t $ha^{-1}$) was also noticed highest with $T_{12}$ but was at par with $T_4$, $T_5$, $T_6$, $T_7$, $T_{10}$ and $T_{12}$. Lowest CCS yield was observed under control plot. Various qualities parameters were not influenced by various nutrient management treatments.

**SUMMARY:** There was no significant difference was observed due to various nutrients on soil pH, OC % and available nitrogen. Lowest EC was noticed with $T_{10}$ and was at par with $T_6$ and $T_{11}$. Available $P_2O_5$ was observed significantly highest in $T_3$; $K_2O$ with $T_6$; S with $T_{10}$; Fe with $T_7$; Mn with $T_{13}$ and Zn with $T_{10}$ over control plot.

**Initial Soil Analysis:**

| **Parameter** | **Soil value** |
|---|---|
| pH (1:10) | 7.60 |
| EC (1:10) dsm-$^1$ | 0.396 |
| Organic carbon (%) | 0.615 |
| Available N (kg/ha) | 508 |
| Available $P_2O_5$ (kg/ha) | 69.52 |
| Available $K_2O$ (kg/ha) | 606 |
| Available S (mg/kg) | 3.36 |
| Fe (ppm) | 1.608 |
| Mn (ppm) | 0.084 |
| Zn (ppm) | 0.102 |

**Application of Soil test based fertilizer:**

1. N - Recommended dose (RD) of nitrogen only i.e. 250 kg N/ha
2. P - Decrease RDP by 50 % i.e. 62.5 kg $P_2O_5$/ha
3. K - Decrease RDK by 50 % i.e. 62.5 kg $K_2O$/ha
4. S - 20 kg/ha
5. Fe - 50 kg/ha
6. Mn - 40 kg/ha
7. Zn - 25 kg/ha

**Table AS 64.14.1**: Growth and yield of sugarcane as influenced by different plant nutrients

| **Treatment** | **NMC** 000 **ha$^{-1}$** | **Plant height (cm) at 180 DAP** | **No. of tillers at 90 DAP 000/ha** | **No. of tillers at 120 DAP 000/ha** | **No. of tillers at 180 DAP 000/ha** | **Millable length (cm) at harvest** | **Millable Girth (cm) at harvest** | **Cane yield (t/ha)** | **CCS yield (t/ha)** |
|---|---|---|---|---|---|---|---|---|---|
| $T_1$ | 86.04 | 126.77 | 113.68 | 122.76 | 108.34 | 193.66 | 2.66 | 51.20 | 6.84 |
| $T_2$ | 91.15 | 129.07 | 129.21 | 148.21 | 124.92 | 224.80 | 2.72 | 93.11 | 13.01 |
| $T_3$ | 101.61 | 133.62 | 129.75 | 160.01 | 131.70 | 242.63 | 2.74 | 102.01 | 13.61 |
| $T_4$ | 102.41 | 150.10 | 147.89 | 162.48 | 140.74 | 238.20 | 2.72 | 118.14 | 16.33 |
| $T_5$ | 98.61 | 132.38 | 137.10 | 152.68 | 135.42 | 230.46 | 2.77 | 112.45 | 15.05 |
| $T_6$ | 96.63 | 137.77 | 140.94 | 147.41 | 134.34 | 232.20 | 2.77 | 110.34 | 15.65 |
| $T_7$ | 100.77 | 153.34 | 145.69 | 159.36 | 134.87 | 244.94 | 2.76 | 106.49 | 14.87 |
| $T_8$ | 96.59 | 154.25 | 137.86 | 149.44 | 138.79 | 242.30 | 2.79 | 105.80 | 14.11 |
| $T_9$ | 99.95 | 133.47 | 153.36 | 150.22 | 152.82 | 234.21 | 2.76 | 106.48 | 14.32 |
| $T_{10}$ | 97.60 | 158.53 | 142.07 | 157.96 | 140.70 | 233.60 | 2.75 | 107.69 | 15.22 |
| $T_{11}$ | 101.14 | 138.07 | 171.92 | 164.17 | 146.08 | 249.71 | 2.77 | 108.37 | 15.30 |
| $T_{12}$ | 115.55 | 162.53 | 179.77 | 171.94 | 160.72 | 259.30 | 2.78 | 124.62 | 16.71 |
| $T_{13}$ | 97.43 | 122.30 | 138.78 | 108.61 | 111.26 | 179.87 | 2.75 | 63.90 | 8.95 |
| $T_{14}$ | 92.98 | 129.10 | 143.83 | 112.28 | 118.20 | 217.20 | 2.77 | 67.01 | 9.17 |
| S.Em ± | 4136.80 | 7.93 | 5876.61 | 7163.96 | 9231.05 | 14.15 | 0.05 | 4.59 | 0.71 |
| C.D.at 5% | 12025.40 | 23.06 | 17082.90 | 20825.14 | 26834.02 | 41.14 | NS | 13.35 | 2.07 |
| C.V.% | 7.28 | 9.81 | 7.08 | 8.40 | 11.91 | 10.65 | 3.41 | 8.09 | 10.11 |

**Table AS 64.14.2: Juice quality parameters of sugarcane as influenced by different plant nutrients**

| Treatment | CCS % | Pol % juice | Purity % | Pol % cane | Fibre % |
|---|---|---|---|---|---|
| $T_1$ | 13.40 | 19.41 | 91.22 | 14.73 | 14.10 |
| $T_2$ | 13.97 | 19.67 | 91.45 | 14.91 | 14.20 |
| $T_3$ | 13.32 | 19.26 | 90.81 | 14.60 | 14.23 |
| $T_4$ | 13.82 | 19.60 | 91.41 | 14.89 | 14.01 |
| $T_5$ | 13.38 | 19.08 | 91.08 | 14.41 | 14.47 |
| $T_6$ | 14.17 | 19.86 | 90.83 | 15.06 | 14.16 |
| $T_7$ | 13.97 | 19.66 | 91.50 | 14.94 | 14.01 |
| $T_8$ | 13.31 | 19.06 | 91.33 | 14.49 | 14.00 |
| $T_9$ | 13.49 | 19.28 | 91.53 | 14.58 | 14.36 |
| $T_{10}$ | 14.13 | 20.11 | 91.33 | 15.23 | 14.27 |
| $T_{11}$ | 14.14 | 19.79 | 91.83 | 14.95 | 14.45 |
| $T_{12}$ | 13.41 | 19.57 | 90.63 | 14.81 | 14.32 |
| $T_{13}$ | 14.00 | 19.76 | 91.22 | 14.94 | 14.40 |
| $T_{14}$ | 13.71 | 19.49 | 90.84 | 14.75 | 14.32 |
| S.Em ± | 0.34 | 0.29 | 0.55 | 0.23 | 0.19 |
| C.D.at 5% | NS | NS | NS | NS | NS |
| C.V.% | 4.24 | 2.56 | 1.05 | 2.66 | 2.31 |

**Table AS 64.14.3:** Soil properties after harvest of crop as influenced by different plant nutrients

| Treatment | pH | EC (1:2.5) $dsm^{-1}$ | OC% | Available N (kg/ha) | Available $P_2O_5$ (kg/ha) | Available $K_2O$ (kg/ha) | Available S (ppm) | Available Fe (ppm) | Available Mn (ppm) | Available Zn (ppm) |
|---|---|---|---|---|---|---|---|---|---|---|
| $T_1$ | 8.20 | 0.25 | 0.60 | 162.33 | 26.67 | 245.67 | 11.64 | 15.89 | 54.67 | 0.51 |
| $T_2$ | 8.52 | 0.27 | 0.60 | 194.00 | 32.67 | 259.67 | 11.54 | 15.49 | 59.06 | 0.51 |
| $T_3$ | 8.31 | 0.31 | 0.64 | 217.00 | 55.67 | 258.33 | 11.87 | 16.31 | 68.84 | 0.65 |
| $T_4$ | 8.47 | 0.26 | 0.59 | 167.67 | 36.67 | 304.67 | 12.44 | 17.57 | 64.55 | 0.63 |
| $T_5$ | 8.46 | 0.24 | 0.65 | 178.67 | 24.67 | 350.00 | 15.68 | 19.04 | 67.83 | 0.67 |
| $T_6$ | 8.50 | 0.21 | 0.63 | 161.33 | 27.33 | 383.67 | 12.04 | 16.05 | 66.84 | 0.53 |
| $T_7$ | 8.50 | 0.25 | 0.67 | 178.33 | 28.67 | 380.00 | 13.81 | 22.19 | 68.57 | 0.59 |
| $T_8$ | 8.43 | 0.33 | 0.68 | 195.33 | 34.67 | 321.33 | 13.66 | 19.97 | 62.45 | 0.46 |
| $T_9$ | 8.45 | 0.26 | 0.72 | 197.00 | 37.00 | 305.67 | 15.83 | 18.50 | 70.70 | 0.71 |
| $T_{10}$ | 8.55 | 0.18 | 0.73 | 183.00 | 34.67 | 363.67 | 16.49 | 16.43 | 69.63 | 0.77 |
| $T_{11}$ | 8.58 | 0.22 | 0.79 | 160.67 | 54.00 | 320.00 | 15.57 | 18.30 | 63.59 | 0.74 |
| $T_{12}$ | 8.49 | 0.26 | 0.62 | 191.67 | 54.33 | 362.67 | 13.35 | 18.59 | 68.11 | 0.67 |
| $T_{13}$ | 8.53 | 0.25 | 0.72 | 183.67 | 33.00 | 274.33 | 12.97 | 15.41 | 71.32 | 0.45 |
| $T_{14}$ | 8.34 | 0.23 | 0.65 | 201.33 | 34.00 | 284.00 | 12.97 | 18.59 | 69.84 | 0.51 |
| S.Em ± | 0.14 | 0.02 | 0.05 | 14.04 | 3.74 | 20.55 | 0.65 | 1.16 | 2.70 | 0.04 |
| C.D.at 5% | NS | 0.04 | NS | NS | 10.89 | 59.74 | 1.89 | 3.38 | 7.85 | 0.12 |
| C.V.% | 2.86 | 10.51 | 13.08 | 13.24 | 17.67 | 11.29 | 8.32 | 11.37 | 7.07 | 11.86 |
| Initial | 7.60 | 0.396 | 0.615 | 508 | 69.52 | 606 | 3.36 | 1.608 (mg/kg) | 0.084 | 0.102 |

## 15. THIRUVALLA

The experiment was conducted to study the response of sugarcane crop to different plant nutrients. The crop was planted on 7.02.2013 and harvested on 2-2-2014. The initial soil fertility status had shown that the soil is medium in available N, high in available P and K and the levels of S, Mn, Fe, and Zn were adequate. Soil sample analysis after the experiment revealed that the soil status of available N, P, Fe, S, and Zn were statistically influenced by the treatments.

Treatment variation due to different combination of plant nutrients were significant for yield parameters, cane and sugar yield. The maximum cane length was obtained from the application of NPK+Zn which was significantly superior to treatments receiving N, NP, NPK+Mn, FYM and control and was on par with all other treatments. Single cane weight, MCC, CCS were found to be statistically significant. Application of soil test based recommendation recorded highest MCC of 100240/ha.

The soil test based recommendations ($T_{12}$) recorded the maximum cane yield (110.08t/ha) and sugar yield (12.85t/ha) and was on par with the recommended dose of NPK+Zn ($T_6$) . The control plot recorded the lowest sugar and cane yield.

**Summary:** It can be concluded that for obtaining higher cane and sugar yield ,fertilizer application as per soil test based recommendations and recommended dose of NPK+Zn (50 kg $ZnSO_4$ /ha) were found to be the best .

**Table AS 64.15.1:** Cane yield and juice quality as influenced by different plant nutrients

| Treatment | | Cane length (cm) | Cane girth (cm) | Cane weight (kg) | MCC ('000/ ha) | CCS (%) | Cane yield (t/ha) | Sugar yield (t/ha) |
|---|---|---|---|---|---|---|---|---|
| $T_1$ | Control | 193.05 | 9.41 | 1.15 | 60.58 | 13.98 | 60.08 | 8.40 |
| $T_2$ | N | 207.25 | 9.73 | 1.26 | 65.13 | 13.15 | 67.31 | 8.85 |
| $T_3$ | NP | 212.13 | 9.80 | 1.31 | 67.75 | 13.86 | 72.50 | 10.05 |
| $T_4$ | NPK | 220.44 | 9.90 | 1.33 | 76.08 | 13.07 | 75.33 | 9.58 |
| $T_5$ | NPK+S | 225.62 | 9.92 | 1.35 | 82.00 | 12.90 | 95.33 | 12.30 |
| $T_6$ | NPK+Zn | 234.78 | 10.03 | 1.43 | 90.06 | 12.29 | 102.90 | 12.42 |
| $T_7$ | NPK+ Fe | 222.81 | 9.80 | 1.28 | 75.18 | 13.77 | 73.33 | 10.10 |
| $T_8$ | NPK+ Mn | 197.00 | 9.54 | 1.20 | 63.44 | 14.61 | 71.78 | 10.52 |
| $T_9$ | NPK+S+Zn | 226.33 | 9.91 | 1.34 | 85.88 | 11.42 | 96.33 | 11.00 |
| $T_{10}$ | NPK+S+Zn+Fe | 230.17 | 9.83 | 1.40 | 87.62 | 13.80 | 87.33 | 12.05 |
| $T_{11}$ | NPK+S+Zn+Fe+Mn | 228.96 | 9.80 | 1.30 | 85.96 | 12.90 | 81.05 | 10.43 |
| $T_{12}$ | Soil test based application | 240.09 | 10.22 | 1.50 | 100.24 | 11.67 | 110.08 | 12.85 |
| $T_{13}$ | FYM @20 t/ha | 200.22 | 9.56 | 1.20 | 63.92 | 13.69 | 66.35 | 9.08 |
| **CD (0.05)** | | **13.75*** | **NS** | **0.10*** | **11.65*** | **1.20*** | **10.75*** | **1.18*** |

| INITIAL FERTILITY STATUS OF THE EXPERIMENTAL SITE | | | | | | |
|---|---|---|---|---|---|---|
| **Available N (Kg/ha soil)** | **Available P (Kg/ha soil)** | **Available K (Kg/ha soil)** | **S (ppm)** | **Fe (ppm)** | **Zn (ppm)** | **Mn (ppm)** |
| 287.6 | 21.5 | 255.2 | 5.80 | 71.42 | 4.20 | 8.75 |

| FINAL FERTILITY STATUS OF THE EXPERIMENTAL SITE | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Treat-ments** | **Available N (Kg/ha soil)** | **Available P (Kg/ha soil)** | **Available K (Kg/ha soil)** | **S (ppm)** | **Fe (ppm)** | **Zn (ppm)** | **Mn (ppm)** |
| $T_1$ | 185.33 | 17.47 | 200.37 | 6.17 | 195.33 | 1.57 | 26.00 |
| $T_2$ | 249.30 | 19.50 | 226.73 | 4.66 | 205.00 | 2.03 | 39.33 |
| $T_3$ | 222.07 | 21.00 | 253.93 | 6.30 | 105.67 | 2.21 | 51.18 |
| $T_4$ | 212.67 | 20.45 | 250.66 | 6.46 | 173.53 | 2.26 | 56.64 |
| $T_5$ | 234.03 | 20.16 | 219.60 | 5.10 | 100.00 | 2.50 | 43.08 |
| $T_6$ | 228.47 | 22.43 | 246.75 | 6.93 | 244.37 | 2.40 | 45.29 |
| $T_7$ | 184.87 | 15.53 | 219.43 | 4.27 | 262.67 | 2.20 | 44.44 |
| $T_8$ | 233.17 | 15.00 | 210.33 | 4.20 | 189.03 | 2.10 | 46.60 |
| $T_9$ | 213.70 | 20.32 | 239.23 | 7.90 | 88.77 | 2.02 | 41.00 |
| $T_{10}$ | 171.67 | 17.50 | 235.60 | 3.73 | 229.00 | 2.93 | 51.61 |
| $T_{11}$ | 260.70 | 19.97 | 237.03 | 7.98 | 303.33 | 1.96 | 59.62 |
| $T_{12}$ | 203.52 | 18.47 | 239.03 | 4.12 | 160.33 | 2.41 | 36.67 |
| $T_{13}$ | 192.50 | 22.10 | 182.87 | 6.95 | 150.77 | 2.05 | 43.65 |
| **CD (0.05)** | **10.46*** | **NS** | **11.10*** | **NS** | **14.55*** | **NS** | **5.09*** |

## EAST COAST ZONE

### 16. ANAKAPALLE

The soil of experimental field was low in organic carbon (0.44%), low in available nitrogen (208 kg N /ha), medium in available phosphorus (39.1 kg/ha), high in available potassium (325 kg / $K_2O$ /ha), optimum in Sulphur, low in Zinc (0.44 ppm), low in Iron (2.7 ppm) and sufficient in Manganese (2.5 ppm).

Application of nitrogen, phosphorus and potassium along with other micronutrients Zn, S, Mn and Fe or soil test based fertilizer application registered higher per cent germination (88.6 and 87.9 respectively) whereas only nitrogen applied plots registered 80.0 per cent Control plot (no fertilizer) registered lesser germination per cent of 79.5 per cent. Number of tillers at 180 days after planting was recorded at harvest, application of N,P and K along with micronutrients on soil test basis recorded significantly higher number of tillers at 180 DAP and found on par with application of N, P, K + Fe or N, P, K + S + Zn + Fe+ Mn or N, P, K + S + Zn + Fe or N ,P, K + Zn. Control plot recorded significantly less number of tillers (1,25,714) at 180 DAP. Application of N P K + S + Zn + Fe + Mn (300.1 cm) registered significantly higher

length of millable canes as compared to application of other nutrient combinations. No fertilizer applied plot recorded lesser length of millable canes (244.0 cm).

Application of N,P and K along with micronutrients on soil test basis recorded significantly higher number of millable canes (89,912/ha) and it was on par with application of N P K + S + Zn + Fe + Mn (88,920/ha) than other nutrient treatments. No fertilizer applied plot (62,102/ha) recorded significantly lower number of millable canes.

Application of N,P and K along with micronutrients on soil test basis (91.6 t/ha) registered significantly higher cane yield as compared to application of N alone (80.7 t/ha) or N and P (82.0 t/ha) or application of FYM @ 20 t/ha (73.3 t/ha), but found on par with application of N, P, K + S + Zn + Fe +Mn (91.0 t/ha) or NPK +S+Zn (90.7 t/ha) or N,P,K + Fe (90.5 t/ha) or of N, P, K + S + Zn + Fe (90.3 t/ha) or NPK + Mn (89.7 t/ha) or NPK + Zn (89.1 t/ha) or N, P, K + S (87.5 t/ha) or N,P and K (87.2 t/ha). No fertilizer applied plot registered significantly lower cane yield of 55.0 t/ha.

CCS % varied significantly due to different nutrient treatments. Application of N, P and K along with micronutrients on soil test basis recorded higher CCS% (14.7) as compared to other nutrient combinations. Sugar yield was calculated based on CCS% and cane yield. Sugar yield ranged from 11.0 to 13.5 t/ha in different nutrient applied plots. No fertilizer applied plot registered the lowest sugar yield of 7.5 t/ha.

**Summary:** The results of the study indicated that, application of N,P and K along with micronutrients on soil test basis (91.6 t/ha) registered significantly higher cane yield as compared to application of N alone (80.7 t/ha) or N and P (82.0 t/ha) or application of FYM @ 20 t/ha (73.3 t/ha), but found on par with application of N, P, K + S + Zn + Fe +Mn (91.0 t/ha) or NPK +S+Zn (90.7 t/ha) or N,P,K + Fe (90.5 t/ha) or N, P, K + S + Zn + Fe (90.3 t/ha) or NPK + Mn (89.7 t/ha) or NPK + Zn (89.1 t/ha) or N, P, K + S (87.5 t/ha) or N,P and K (87.2 t/ha). No fertilizer applied plot registered significantly lower cane yield of 55.0 t/ha.

**Table AS 64.16.1:** Yield attributes, yield and quality of sugarcane as influenced by application of different nutrients

| Treatment | Germination Per cent | No. of Tillers at 180 DAP | Cane length (cm) | NMC /ha | Cane yield (t/ha) | CCS (%) | Sugar yield (t/ha) |
|---|---|---|---|---|---|---|---|
| T1: Control (No Fertilizer) | 79.5 | 1,25,714 | 244.0 | 62,102 | 55.0 | 13.7 | 7.5 |
| T2: N | 80.0 | 1,30,238 | 280.9 | 65,120 | 80.7 | 13.6 | 11.0 |
| T3: NP | 80.5 | 1,32,619 | 282.3 | 79,210 | 82.0 | 14.1 | 11.6 |
| T4: NPK | 87.4 | 1,34,286 | 285.8 | 82,112 | 87.2 | 13.7 | 11.9 |
| T5: NPK +S | 88.7 | 1,35,000 | 295.2 | 82,780 | 87.5 | 12.1 | 10.6 |
| T6: NPK + Zn | 85.2 | 1,39,285 | 292.0 | 84,971 | 89.1 | 14.2 | 12.7 |
| *T7: NPK* + Fe | 85.9 | 1,42,619 | 288.8 | 86,218 | 90.5 | 13.2 | 11.9 |
| T8: NPK +Mn | 82.8 | 1,36,905 | 290.6 | 85,121 | 89.7 | 14.0 | 12.6 |
| T9: NPK + S + Zn | 84.6 | 1,38,095 | 297.1 | 86,980 | 90.7 | 14.0 | 12.7 |
| T10: NPK + S + Zn +Fe | 86.5 | 1,39,285 | 295.2 | 86,012 | 90.3 | 14.5 | 13.1 |
| T11: NPK + S + Zn +Fe + Mn | 88.6 | 1,41,428 | 300.1 | 88,920 | 91.0 | 13.2 | 12.0 |
| *T12: Soil test based fertilizer application | 87.9 | 1,42,851 | 297.2 | 89,912 | 91.6 | 14.7 | 13.5 |
| T13: FYM @ 20 t/ha | 82.6 | 1,28,333 | 245.4 | 71,812 | 73.3 | 13.7 | 10.0 |
| S.Em+ | - | 1232 | 2.37 | 480 | 1.69 | 0.49 | - |
| C.D. (P=0.05) | - | 3596 | 6.9 | 1400 | 4.92 | 1.43 | - |

*T12- FYM- 20 t/ha: N-145 Kg /ha: $P_2O_5$-100 Kg/ha: $K_2O$-84 Kg/ha: ZnSO4- 50 Kg/ha: FeSO4-1% spray thrice at weekly interval during vegetative phase

**17. CUDDALORE**

The data on growth and yield parameters of sugarcane, initial and post harvest soil analysis data were recorded and presented in table 1, 2, 3, 4 and 5. The results indicated that, germination was not significant among the treatments. Application of NPK + S + Zn + Fe + Mn through inorganic fertilizers significantly recorded the maximum tiller population of 1,98,100 ha-1 at 90 days after planting and is on par with soil test based fertilizer application with the tiller production of 1,93,700 ha-1. The same trend was also recorded at 120 and 180 days after planting with 1,82,500 ha-1 and 1,74,000 ha-1 of tiller population. The maximum plant height of 164.90 and 200.60 cm was recorded in application of NPK + S + Zn + Fe + Mn through inorganic fertilizers on 120 and 180 days after planting.

Application of NPK + S + Zn + Fe + Mn through inorganic fertilizers significantly recorded the maximum millable cane population of 1,32,400 $ha^{-1}$ and was on par with the soil test based fertilizer application ($T_{12}$) and NPK + S + Zn + Fe ($T_{10}$) which registered the cane population of 1,27,300 ha-1 and 1,26,000 ha-1 respectively. The same treatment (T11) also registered significantly higher cane length, cane girth and individual cane weight of 298.10 cm, 3.33 cm and 1.86 kg and was comparable with the treatment T10 and T12 which recorded 290.00 cm, 2.98 cm and 1.70 kg and 296.20 cm, 2.92 cm and 1.72 kg respectively.

The result on yield parameters revealed that the treatment ($T_{11}$) NPK + S + Zn + Fe + Mn registered significantly higher yield of 159.6 t/ha and it was on par with the treatment T10 and T12 with 152.0 and 154.0 t/ha respectively. The result on juice sucrose on 11th and 12th month indicated that the treatment (T11) NPK + S + Zn + Fe + Mn registered the maximum of 17.78 and 17.98 per cent on 11th and 12th month of sugarcane. The treatment $T_{11}$ registered numerically the maximum of 12. 95 per cent CCS and was on par with the treatment $T_{10}$ and $T_{12}$ which recorded 12.72 and 12.80 per cent. The sugar yield showed the trend of cane yield $T_{11}$ significantly produced the maximum sugar yield of 22.82 t ha-1 and it was comparable with the treatment $T_{10}$ and $T_{12}$ which registered 19.80 t $ha^{-1}$ and 19.01 t $ha^{-1}$.

The initial soil analysis showed insignificant differences among the treatments for most of the soil physical and chemical properties. The significant variation was observed in post harvest soil analysis. Application of NPK + S + Zn + Fe + Mn through inorganic fertilizers significantly increased the uptake of N, P and K which recorded 182.62, 32.25 and 269.23 kg $ha^{-1}$ respectively and it was on par with the treatment ($T_{10}$) which recorded 174.36, 30.36 and 263.32 kg $ha^{-1}$. The results on micro nutrients in post harvest soil sample indicated that the treatment ($T_{11}$) registered 15.65 PPM of Fe and it was on par with T10 and T6. The treatment $T_{11}$ recorded higher Mn (15.63 PPM). With regard to Zn treatment, $T_{10}$ registered the maximum of 1.98 PPM of Zn in soil and was on par with treatment $T_{11}$ which recorded 1.96 PPM. Regarding sulphur, the treatment T11 registered the maximum of 75.63 PPM and was comparable with the treatments $T_{10}$, $T_9$ and $T_5$ which recorded 73.89, 74.56 and 74.65 PPM respectively.

**SUMMARY:** The treatment ($T_{11}$) NPK + S + Zn + Fe + Mn registered significantly higher growth and yield parameters and it was comparable with the treatment $T_{10}$ and $T_{12}$.

**Table AS 64.17.1:** Effect of different plant nutrients on yield characteristics of sugarcane

| Treatment | Millable cane ('000/ha) | Cane length (cm) | Cane girth (cm) | Individual cane weight (kg) |
|---|---|---|---|---|
| $T_1$-Control (No fertilizer) | 60.2 | 158.0 | 1.82 | 0.68 |
| $T_2$ – N | 76.6 | 176.3 | 2.23 | 0.72 |
| $T_3$ – NP | 92.0 | 198.7 | 2.25 | 1.02 |
| $T_4$ –NPK | 111.5 | 254.3 | 2.36 | 1.37 |
| $T_5$ – NPK + S | 105.2 | 259.6 | 2.54 | 1.40 |
| $T_6$ – NPK + Zn | 99.6 | 265.3 | 2.68 | 1.45 |
| $T_7$ – NPK + Fe | 108.0 | 269.0 | 2.70 | 1.45 |
| $T_8$ – NPK + Mn | 108.4 | 275.8 | 2.70 | 1.48 |
| $T_9$ – NPK + S + Zn | 113.8 | 281.3 | 2.79 | 1.46 |
| $T_{10}$ –NPK + S + Zn + Fe | 126.0 | 290.0 | 2.98 | 1.70 |
| $T_{11}$ – NPK + S + Zn + Fe + Mn | 132.4 | 298.1 | 3.33 | 1.86 |
| $T_{12}$ –Soil test based fertilizer application | 127.3 | 296.2 | 2.92 | 1.72 |
| $T_{13}$ – FYM @ 20 t $ha^{-1}$ | 118.1 | 190.4 | 2.31 | 1.65 |
| CD (P = 0.05) | 5.65 | 15.10 | 0.12 | 0.06 |

**Table AS 64.17.2:** Effect of different plant nutrients on yield and quality characteristics of sugarcane

| Treatment | Juice sucrose (%) | | CCS (%) | Cane Yield (t/ha) | Sugar Yield (t/ha) |
|---|---|---|---|---|---|
| | 11th month | 12th month | | | |
| $T_1$-Control (No fertilizer) | 10.24 | 12.02 | 8.38 | 53.1 | 4.10 |
| $T_2$ – N | 13.25 | 15.04 | 10.78 | 92.6 | 9.50 |
| $T_3$ – NP | 14.52 | 15.14 | 10.90 | 120.4 | 12.00 |
| $T_4$ –NPK | 14.64 | 16.25 | 11.42 | 131.0 | 14.85 |
| $T_5$ – NPK + S | 14.78 | 16.22 | 11.88 | 131.3 | 15.62 |
| $T_6$ – NPK + Zn | 15.72 | 16.42 | 12.01 | 131.5 | 15.80 |
| $T_7$ – NPK + Fe | 15.98 | 16.67 | 12.20 | 133.1 | 16.26 |
| $T_8$ – NPK + Mn | 16.12 | 16.86 | 12.35 | 138.2 | 17.07 |
| $T_9$ – NPK + S + Zn | 16.23 | 16.60 | 12.58 | 140.3 | 17.55 |
| $T_{10}$ –NPK + S + Zn + Fe | 17.15 | 17.35 | 12.72 | 152.0 | 19.80 |
| $T_{11}$ – NPK + S + Zn + Fe + Mn | 17.78 | 17.98 | 12.95 | 159.6 | 22.82 |
| $T_{12}$ –Soil test based fertilizer application | 17.22 | 17.42 | 12.80 | 154.0 | 19.01 |
| $T_{13}$ – FYM @ 20 t $ha^{-1}$ | 14.56 | 16.25 | 11.56 | 98.6 | 11.43 |
| CD (P = 0.05) | 0.80 | 0.82 | 0.58 | 7.65 | 0.75 |

**Table AS 64.17.3:** Effect of different plant nutrients on post harvest soil physical and chemical properties

| Treatment | OC (%) | EC ($dSm^{-1}$) | pH | Available N($kg\ ha^{-1}$) | Available P($kg\ ha^{-1}$) | Available K($kg\ ha^{-1}$) | Available Fe(PPM) | Available Mn(PPM) | Available Zn(PPM) | Available S(PPM) |
|---|---|---|---|---|---|---|---|---|---|---|
| $T_1$ | 0.20 | 0.32 | 6.80 | 124.36 | 16.25 | 155.23 | 5.36 | 7.23 | 0.63 | 45.26 |
| $T_2$ | 0.26 | 0.34 | 7.10 | 128.94 | 20.36 | 161.25 | 6.02 | 10.98 | 0.76 | 54.32 |
| $T_3$ | 0.28 | 0.35 | 7.30 | 138.65 | 24.56 | 172.65 | 6.32 | 10.12 | 0.91 | 60.23 |
| $T_4$ | 0.28 | 0.35 | 7.20 | 145.63 | 24.62 | 259.36 | 7.45 | 11.26 | 0.88 | 63.25 |
| $T_5$ | 0.29 | 0.34 | 7.40 | 153.65 | 25.36 | 263.52 | 7.63 | 12.35 | 0.89 | 74.56 |
| $T_6$ | 0.31 | 0.34 | 7.60 | 160.23 | 24.65 | 264.85 | 12.08 | 11.89 | 1.82 | 65.23 |
| $T_7$ | 0.33 | 0.33 | 7.30 | 161.23 | 25.89 | 263.58 | 7.26 | 10.62 | 0.91 | 66.53 |
| $T_8$ | 0.35 | 0.33 | 7.20 | 160.23 | 26.68 | 265.23 | 8.12 | 12.42 | 0.92 | 64.25 |
| $T_9$ | 0.35 | 0.33 | 7.60 | 162.35 | 27.58 | 264.52 | 8.68 | 11.25 | 1.85 | 74.65 |
| $T_{10}$ | 0.36 | 0.32 | 7.70 | 174.36 | 30.36 | 263.32 | 15.23 | 12.12 | 1.99 | 73.89 |
| $T_{11}$ | 0.40 | 0.37 | 7.80 | 182.62 | 32.25 | 269.23 | 15.65 | 15.63 | 1.96 | 75.63 |
| $T_{12}$ | 0.38 | 0.32 | 7.60 | 179.69 | 28.65 | 251.21 | 13.78 | 12.00 | 0.98 | 71.26 |
| $T_{13}$ | 0.48 | 0.28 | 6.90 | 132.65 | 18.26 | 197.65 | 5.86 | 9.23 | 0.72 | 48.65 |
| CD(P=0.05) | 0.03 | 0.01 | 0.39 | 8.05 | 1.31 | 11.20 | 0.45 | 0.51 | 0.06 | 3.00 |

**18. NAYAGARH**

The experimental soil was acidic in reaction with the soil pH ranging from 5.12 to 5.32 with the initial value of 5.26. The soil was low in organic carbon (0.420 to 0.523%), available N (116.3 kg/ha in control plot to 185.5 kg/ha with soil test based fertilizer application), S (1.6 to 2.9 kg/ha) and Zn (0.52 to 0.92 ppm). Available P and K were in medium range of soil fertility, whereas available Fe and Mn content of the soil were in higher range.

Application of soil test based fertilizer dose *i.e*.315:100:60 kg N: $P_2O_5$: $K_2O$ + 60 kg elemental S/ha resulted in higher number of tillers at different growth stages of sugarcane genotype "Sabita" leading to higher cane (85.65 t/ha) and CCS yield (8.84 t/ha). The length (301.2 cm) and girth (2.93 cm) of the canes at harvest were also the higher as compared to all other treatment combinations. This was closely followed by $T_{10}$ *i.e*. RDF 250:100:60 N: P2O5: $K_2O$ kg /ha along with sulphur (60 kg elemental S/ha), zinc (50 kg $ZnSO_4$/ha) and iron (1 % $FeSO_4$ foliar spray thrice in 1 week interval i.e. at 120, 127 and 135 DAP) with cane and CCS yield of 85.36 & 8.68 t/ha, respectively. Application of NPK+ S+ Zn (cane yield of 84.02 and CCS yield of 8.35 t/ha) and combined use of NPK+ S+ Zn+ Fe+ Mn (cane yield of 83.83and CCS yield of 8.66 t/ha) were next in order. NPK+ Fe recorded cane yield of 82.36 and CCS yield of 9.01 t/ha. All the above treatments were at par with the best treatment indicating the obvious influence of micronutrient application on cane and CCS yield.

**SUMMARY:** Application of soil test based fertilizer dose *i.e*.315:100:60 kg N: $P_2O_5$: $K_2O$ + 60 kg elemental S/ha resulted in higher number of tillers at different growth stages of sugarcane genotype "Sabita" leading to higher cane (85.65 t/ha) and CCS yield (8.84 t/ha).

**AS 64.18.1:** Effect of different plant nutrients on yield parameters of sugarcane crop

| Treatment | | Germination% at 35 DAP | No of tillers (000/ha) | | | Length of cane (cm) | | | Girth of cane at harvest (cm) |
|---|---|---|---|---|---|---|---|---|---|
| | | | 90 DAP | 120 DAP | 180 DAP | 120 DAP | 180 DAP | Harvest | |
| $T_1$ | Control | 29.03 | 53.65 | 62.76 | 51.74 | 89.0 | 162.0 | 174.3 | 1.97 |
| $T_2$ | N | 46.78 | 63.98 | 74.22 | 63.54 | 124.0 | 208.3 | 228.5 | 2.33 |
| $T_3$ | NP | 54.21 | 65.10 | 78.47 | 68.58 | 128.0 | 229.3 | 238.8 | 2.43 |
| $T_4$ | NPK | 57.87 | 82.55 | 85.50 | 81.94 | 142.3 | 252.3 | 261.5 | 2.57 |
| $T_5$ | NPK+S | 56.23 | 85.42 | 88.02 | 84.38 | 142.7 | 261.0 | 264.3 | 2.60 |
| $T_6$ | NPK+ Zn | 57.39 | 83.07 | 88.89 | 86.20 | 139.3 | 279.7 | 289.5 | 2.50 |
| $T_7$ | NPK+ Fe | 57.68 | 86.98 | 89.50 | 85.85 | 146.7 | 282.7 | 294.3 | 2.43 |
| $T_8$ | NPK+ Mn | 54.49 | 80.47 | 86.89 | 81.08 | 136.3 | 274.0 | 288.6 | 2.40 |
| $T_9$ | NPK+ S+ Zn | 56.33 | 85.42 | 91.49 | 84.64 | 157.3 | 279.7 | 284.3 | 2.73 |
| $T_{10}$ | NPK+ S+ Zn+ Fe | 57.10 | 86.28 | 92.19 | 86.95 | 173.3 | 286.7 | 298.2 | 2.97 |
| $T_{11}$ | NPK+ S+ Zn+ Fe+ Mn | 53.82 | 79.95 | 92.01 | 84.14 | 163.7 | 268.3 | 277.3 | 2.57 |
| $T_{12}$ | Soil test based fert appln | 59.80 | 87.15 | 92.71 | 88.37 | 177.3 | 275.0 | 301.2 | 2.93 |
| $T_{13}$ | FYM @ 20 t/ha | 50.54 | 60.85 | 70.57 | 63.80 | 128.3 | 228.0 | 239.5 | 2.43 |
| SEm ± | | 4.19 | 3.47 | 4.58 | 4.88 | 10.58 | 10.74 | 11.72 | 0.16 |
| CD at 5 % | | 12.22 | 10.14 | 13.37 | 14.23 | 30.87 | 31.33 | 33.51 | 0.47 |
| CV% | | 12.59 | 7.21 | 8.71 | 10.01 | 11.89 | 6.79 | 9.56 | 10.27 |

**AS 64.18.2:** Effect of different plant nutrients on juice quality and yield of sugarcane

| Treatment | | Brix % 1 month prior to harvest | Brix % at harvest | CCS % at harvest | NMC (000/ha) | Cane yield (t/ha) | CCS (t/ha) |
|---|---|---|---|---|---|---|---|
| $T_1$ | Control | 15.47 | 18.73 | 10.42 | 48.24 | 43.42 | 4.52 |
| $T_2$ | N | 16.13 | 18.91 | 10.27 | 60.04 | 67.00 | 6.90 |
| $T_3$ | NP | 15.73 | 18.81 | 9.89 | 64.78 | 73.65 | 7.33 |
| $T_4$ | NPK | 15.77 | 19.16 | 10.80 | 78.14 | 75.53 | 8.15 |
| $T_5$ | NPK+S | 16.23 | 19.58 | 11.04 | 79.06 | 76.82 | 8.50 |
| $T_6$ | NPK+ Zn | 15.53 | 18.63 | 9.38 | 78.88 | 78.34 | 7.34 |
| $T_7$ | NPK+ Fe | 15.67 | 19.07 | 10.94 | 81.95 | 82.36 | 9.01 |
| $T_8$ | NPK+ Mn | 16.13 | 19.28 | 11.04 | 77.18 | 76.10 | 8.40 |
| $T_9$ | NPK+ S+ Zn | 15.37 | 18.72 | 9.95 | 83.22 | 84.02 | 8.35 |
| $T_{10}$ | NPK+ S+ Zn+ Fe | 15.90 | 19.14 | 10.18 | 84.24 | 85.36 | 8.68 |
| $T_{11}$ | NPK+ S+ Zn+ Fe+ Mn | 15.80 | 19.16 | 10.34 | 83.08 | 83.83 | 8.66 |
| $T_{12}$ | Soil test based fert appln | 16.03 | 19.26 | 10.33 | 84.47 | 85.65 | 8.84 |
| $T_{13}$ | FYM @ 20 t/ha | 15.37 | 18.79 | 10.42 | 59.90 | 57.23 | 6.00 |
| SEm ± | | 0.35 | 0.19 | 0.04 | 4.26 | 7.17 | 0.06 |
| CD at 5 % | | NS | 0.55 | 0.12 | 12.43 | 8.92 | 0.11 |
| CV% | | 3.54 | 1.58 | 0.63 | 9.19 | 10.47 | 5.67 |

**AS 64.18.3:** Effect of different plant nutrients on soil fertility status after harvest of sugarcane crop

| Treatment | | pH | EC ($dsm^{-1}$) | OC (%) | Available (Kg/ha) | | | | Available(ppm) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | N | P | K | S | Fe | Mn | Zn |
| $T_1$ | Control | 5.2 | 0.241 | 0.463 | 116.3 | 16.5 | 135.4 | 2.1 | 23.27 | 55.36 | 0.61 |
| $T_2$ | N | 5.3 | 0.225 | 0.501 | 146.6 | 22.6 | 143.6 | 2.5 | 22.00 | 58.21 | 0.55 |
| $T_3$ | NP | 5.3 | 0.251 | 0.472 | 140.3 | 26.4 | 148.4 | 2.0 | 23.20 | 69.85 | 0.52 |
| $T_4$ | NPK | 5.2 | 0.209 | 0.436 | 141.7 | 25.4 | 137.2 | 2.2 | 26.60 | 75.69 | 0.69 |
| $T_5$ | NPK+S | 5.1 | 0.201 | 0.448 | 153.0 | 23.6 | 149.2 | 2.9 | 22.25 | 57.30 | 0.76 |
| $T_6$ | NPK+ Zn | 5.1 | 0.189 | 0.511 | 145.0 | 24.3 | 165.9 | 2.3 | 25.01 | 55.61 | 0.84 |
| $T_7$ | NPK+ Fe | 5.2 | 0.212 | 0.466 | 150.6 | 28.6 | 158.3 | 1.6 | 24.80 | 61.23 | 0.76 |
| $T_8$ | NPK+ Mn | 5.2 | 0.186 | 0.501 | 149.3 | 27.6 | 153.8 | 1.9 | 24.11 | 67.56 | 0.81 |
| $T_9$ | NPK+ S+ Zn | 5.1 | 0.194 | 0.523 | 139.0 | 26.5 | 154.6 | 2.8 | 22.40 | 56.56 | 0.92 |
| $T_{10}$ | NPK+ S+ Zn+ Fe | 5.2 | 0.208 | 0.466 | 141.6 | 18.6 | 156.8 | 2.7 | 23.75 | 56.33 | 0.91 |
| $T_{11}$ | NPK+ S+ Zn+ Fe+ Mn | 5.2 | 0.183 | 0.420 | 145.5 | 22.6 | 166.2 | 2.5 | 25.30 | 60.38 | 0.88 |
| $T_{12}$ | Soil test based fert appln | 5.2 | 0.197 | 0.429 | 185.5 | 25.6 | 177.5 | 2.8 | 26.75 | 56.33 | 0.72 |
| $T_{13}$ | FYM @ 20 t/ha | 5.2 | 0.208 | 0.431 | 130.7 | 18.8 | 139.6 | 2.0 | 24.61 | 50.33 | 0.68 |
| Initial | | 5.2 | 0.226 | 0.451 | 190.7 | 29 | 239.3 | 3.6 | 28.03 | 67.59 | 0.59 |

## NORTH CENTRAL ZONE

### 19. PUSA

The experimental soil was calcareous, low in organic carbon (0.472%) and available N, K, S & Zn while available P, Fe and Mn were in medium range. The midlate BO 141 variety of sugarcane was planted on 08.03.2013 and harvested on 24.03.2014.

The results indicated that number of tillers, number of millable cane (NMC), single cane weight and cane yield were significantly influenced due to different treatments while, the effect on germination, cane length and girth were non significant (Table 1). The significant increase in tillers, number of millable cane (NMC), single cane weight and cane yield was recorded due to application of NPK alone or along with secondary nutrient like S and micronutrients (Zn , Fe & Mn) over control. However, highest NMC (102420/ha), single cane weight (970 g) and cane yield (99.72t/ha) were recorded in treatment (T12) receiving fertilizer on soil test basis i.e (200kg N, 100kg P, 100 kg K, 25 kg $ZnSO_4$ & 40 kg S) which was on par with treatment (T11) receiving NPK + S + Zn + Fe + Mn but significantly superior over rest of the treatments. The cane yield (77.68 t/ha) was observed in treatment receiving only RDF which was significantly higher over control (42.79 t/ha). The cane yield (61.10 t/ha) was also significantly higher in FYM treated plot over control.

The juice quality viz. brix, sucrose and purity content in cane juice were not affected significantly due to different treatments (Table 2). The sugar yield followed almost similar trend of the cane yield. The post harvest soil showed significant improvement in available soil nutrients *viz.* N, P, K, S, Zn, Fe & Mn in treated plots over control (Table 3). The highest N, P, K, (274.0, 21.65, 125.3 kg/ha,) and S & Zn (14.93 & 0.84 mg/kg) was recorded in $T_{12}$ while, lowest in control. However, the highest Fe & Mn (12.28 & 4.83 mg/kg) was recorded in treatment $T_{11}$. The organic carbon was highest (0.570 %) in FYM treated plot. The effect on pH and EC was non-significant.

**Summary:** The application of fertilizers on soil test basis i.e. (200kg N, 100kg P, 100 kg K, 25 kg $ZnSO_4$ & 40 kg S) was found suitable for maintaining soil fertility, enhancing yield and quality of cane in calcareous soil of Bihar.

**Table AS 64.19.1:** Effect of different plant nutrients on growth and yield attributing parameters and cane yield

| Treatment | Germination (%) | Tillers (x $10^3$/ha) | | Plant height (cm) | | Cane length (cm) | Girth (cm) | Single Cane Weight (g) | NMC (x $10^3$/ha) | Cane Yield ( t/ha) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 120 DAP | 180 DAP | 120 DAP | 180 DAP | | | | | |
| $T_1$ | 36.61 | 66.00 | 74.50 | 170 | 267 | 241 | 2.56 | 673 | 59.33 | 42.79 |
| $T_2$ | 34.57 | 75.66 | 84.00 | 185 | 274 | 253 | 2.62 | 723 | 65.67 | 49.56 |
| $T_3$ | 31.60 | 77.50 | 84.83 | 184 | 268 | 248 | 2.80 | 763 | 70.83 | 56.18 |
| $T_4$ | 30.74 | 90.58 | 102.2 | 178 | 282 | 260 | 2.88 | 857 | 90.66 | 77.68 |
| $T_5$ | 33.70 | 91.42 | 105.3 | 170 | 289 | 261 | 2.97 | 850 | 94.08 | 80.03 |
| $T_6$ | 32.34 | 94.00 | 11150 | 168 | 275 | 266 | 3.01 | 868 | 89.92 | 82.23 |
| $T_7$ | 31.48 | 92.17 | 10.58 | 164 | 280 | 260 | 2.89 | 850 | 93.33 | 79.24 |
| $T_8$ | 31.73 | 87.08 | 104.0 | 167 | 275 | 256 | 2.76 | 853 | 89.33 | 79.33 |
| $T_9$ | 31.36 | 99.17 | 114.5 | 176 | 288 | 266 | 2.86 | 960 | 93.67 | 89.98 |
| $T_{10}$ | 31.79 | 101.4 | 114.5 | 172 | 274 | 266 | 2.98 | 957 | 94.00 | 90.48 |
| $T_{11}$ | 31.42 | 100.1 | 115.3 | 165 | 282 | 275 | 2.87 | 943 | 93.66 | 91.84 |
| $T_{12}$ | 34.88 | 108.2 | 126.3 | 178 | 288 | 272 | 2.84 | 970 | 102.42 | 99.72 |
| $T_{13}$ | 30.93 | 84.58 | 102.4 | 172 | 269 | 253 | 2.76 | 710 | 85.83 | 61.10 |
| SEm ± | 1.72 | 3.89 | 4.33 | 7.06 | 10.43 | 7.13 | 0.09 | 43 | 3.74 | 5.33 |
| CD ( p=0.05) | NS | 11.32 | 12.62 | NS | NS | NS | NS | 124 | 10.91 | 15.54 |
| CV % | 9.20 | 7.41 | 7.16 | 7.03 | 6.44 | 4.74 | 5.75 | 8.3 | 7.40 | 12.01 |

**Table AS 64.19.2:** Effect of different plant nutrients on nutrient status of post harvest soil

| Treatment | pH | EC (dS/m) | Org. C (%) | Avail N (kg/ha) | Avail P (kg/ha | Avail K (kg/ha) | Avail S ( mg/kg) | DTPA Zn ( mg/kg) | DTPA Fe ( mg/kg) | DTPA Mn (mg/kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| $T_1$ | 8.25 | 0.190 | 0.467 | 184.3 | 14.17 | 92.3 | 9.87 | 0.67 | 8.90 | 3.23 |
| $T_2$ | 8.19 | 0.180 | 0.463 | 194.3 | 14.93 | 96.2 | 9.70 | 0.68 | 8.63 | 3.17 |
| $T_3$ | 8.20 | 0.183 | 0.473 | 196.3 | 18.67 | 95.3 | 9.53 | 0.67 | 8.40 | 3.47 |
| $T_4$ | 8.23 | 0.190 | 0.527 | 258.7 | 19.41 | 103.0 | 9.20 | 0.64 | 8.60 | 3.10 |
| $T_5$ | 8.23 | 0.197 | 0.520 | 266.0 | 19.41 | 102.0 | 14.93 | 0.64 | 8.73 | 3.20 |
| $T_6$ | 8.22 | 0.200 | 0.527 | 269.0 | 18.67 | 106.0 | 9.83 | 0.79 | 8.60 | 3.10 |
| $T_7$ | 8.24 | 0.190 | 0.527 | 265.3 | 19.41 | 105.0 | 9.20 | 0.65 | 11.60 | 3.47 |
| $T_8$ | 8.32 | 0.200 | 0.533 | 269.3 | 18.67 | 110.7 | 9.03 | 0.62 | 8.00 | 4.43 |
| $T_9$ | 8.23 | 0.180 | 0.547 | 272.7 | 20.93 | 103.0 | 14.30 | 0.81 | 8.33 | 3.40 |
| $T_{10}$ | 8.23 | 0.190 | 0.543 | 277.0 | 19.41 | 120.3 | 14.17 | 0.80 | 12.27 | 3.20 |
| $T_{11}$ | 8.23 | 0.200 | 0.543 | 264.7 | 20.91 | 119.3 | 14.80 | 0.81 | 12.28 | 4.83 |
| $T_{12}$ | 8.21 | 0.187 | 0.563 | 274.0 | 21.65 | 125.3 | 14.93 | 0.84 | 10.27 | 3.47 |
| $T_{13}$ | 8.23 | 0.183 | 0.570 | 253.7 | 19.49 | 98.0 | 9.87 | 0.68 | 8.60 | 3.33 |
| SEm ± | 0.02 | 0.005 | 0.013 | 6.1 | 0.73 | 2.8 | 0.22 | 0.01 | 0.21 | 0.10 |
| CD(p=0.05) | NS | NS | 0.039 | 17.7 | 2.15 | 8.1 | 0.63 | 0.027 | 0.60 | 0.29 |
| CV % | 0.48 | 5.00 | 4.35 | 4.2 | 4.75 | 4.5 | 3.23 | 2.25 | 3.74 | 4.90 |

**20. SHEORAHI**

The experiment soil was medium in organic (0.35%), low in available phosphorus (18.11 kg/ha) and medium in potas (113 kg/ha) with pH 8.35. The experiment was planted on March, 1,2013 and harvested on march 25,2014. The experimental data indicated that application of S, Zn, Fe and Mn along with NPK ($T_{11}$) produced significantly higher number of shoots millable cane and cane yield than that of rest of the treatments. Sucrose % in cane was not affected significantly with use of different plant nutrients.

**Summary:** Aplication of S, Zn and Mn along with N P K ($T_{11}$) gave significantly higher cane yield than other treatments except T9 and T10 treatments. Sucrose was not effected significantly with different treatments.

**Table AS 64.20.1:** Effect of treatments on germination, shoots, millable canes, cane yield and sucros% of cane

| Treatment | Germination ( %) | Shoots (,000/ha) | NMC(,000/ha) | Yield (t/ha) | Sucrose % |
|---|---|---|---|---|---|
| T1 | 47.21 | 127 | 104 | 64.35 | 17.16 |
| T2 | 46.35 | 139 | 112 | 65.43 | 16.63 |
| T3 | 45.77 | 126 | 115 | 67.44 | 17.70 |
| T4 | 46.12 | 160 | 126 | 69.75 | 17.62 |
| T5 | 46.81 | 163 | 124 | 66.82 | 17.01 |
| T6 | 47.61 | 145 | 121 | 65.74 | 17.60 |
| T7 | 47.84 | 139 | 117 | 65.43 | 17.89 |
| T8 | 47.38 | 162 | 129 | 69.91 | 18.05 |
| T9 | 46.12 | 163 | 131 | 72.08 | 17.38 |
| T10 | 47.61 | 169 | 133 | 72.99 | 17.59 |
| T11 | 46.46 | 174 | 136 | 74.07 | 17.72 |
| T12 | 47.15 | 138 | 113 | 58.95 | 17.59 |
| S.E.+ | 0.65 | 4.47 | 256 | 1.805 | 0.37 |
| C.D.(5%) | N.S. | 13.39 | 7.54 | 5.295 | N.S. |

## NORTH EASTERN ZONE

**21. BURALIKSON**

The experiment was laid out with the objective to study the differential response of sugarcane crop to different nutrients. The experimental crop var. Borak (Co Bln 9103) was planted on 5$^{th}$ April 2013 and harvested on 7$^{th}$ March, 2014. The experimental field was clay loam in texture, poor in organic carbon (0.46%), low in available P (18.22 kg $P_2O_5$/ha) and medium in available K (174 kg $K_2O$/ha) with pH 4.8. The available Fe, Mn and Zn in experimental plot were 68.4 ppm, 5.8 ppm and 0.71 ppm respectively.

Application of different plant nutrients (Table AS 64.21.1) showed significant variances in number of shoots, number of millable canes (NMC) , cane length ,cane diameter, cane yield. The maximum cane yield (98.6 t/ha) was obtained when S, Zn, Fe, Mn was applied along with the recommended dose of fertilizer ($T_{11}$) which is statistically at par with the soil test based fertilizer application (97.6 t/ha). However, application of different plant nutrients recorded statistically superior yield over control ($T_1$).

Similar trend was recorded in case of other yield attributing parameters. However no significant difference was recorded on juice quality parameters.

**SUMMARY:** The maximum cane yield (98.6 t/ha) was obtained when S, Zn, Fe, Mn was applied along with the recommended dose of fertilizer ($T_{11}$) which is statistically at par with the soil test based fertilizer application (97.6 t/ha).

**Table AS 64.21.1:** Effect of different plant nutrients on growth and yield of sugarcane

| **Treatments** | **Germination%** | **No of shoots ('000/ha)** | **NMC ('000/ha)** | **Cane Length (m)** | **Cane Diameter(cm)** | **Yield (t/ha)** | **Sucrose (%)** | **CCS (%)** |
|---|---|---|---|---|---|---|---|---|
| $T_1$ | 39.7 | 78.00 | 75.2 | 2.4 | 2.4 | 56.6 | 18.4 | 11.7 |
| $T_2$ | 41.7 | 81.12 | 80.2 | 2.4 | 2.5 | 66.2 | 18.8 | 12.3 |
| $T_3$ | 37.9 | 75.34 | 75.0 | 2.6 | 2.5 | 76.1 | 19.0 | 12.6 |
| $T_4$ | 47.4 | 87.49 | 85.6 | 2.5 | 2.5 | 88.3 | 19.4 | 12.9 |
| $T_5$ | 47.4 | 90.16 | 90.6 | 2.6 | 2.5 | 91.4 | 19.3 | 12.9 |
| $T_6$ | 46.5 | 88.30 | 87.2 | 2.5 | 2.5 | 96.8 | 19.2 | 12.7 |
| $T_7$ | 48.0 | 91.20 | 89.0 | 2.6 | 2.5 | 87.2 | 19.8 | 13.1 |
| $T_8$ | 45.1 | 85.76 | 85.8 | 2.5 | 2.6 | 88.2 | 19.6 | 12.8 |
| $T_9$ | 44.1 | 83.91 | 84.6 | 2.6 | 2.6 | 95.0 | 19.5 | 12.8 |
| $T_{10}$ | 47.4 | 89.12 | 89.1 | 2.6 | 2.7 | 93.4 | 19.4 | 12.7 |
| $T_{11}$ | 50.4 | 94.96 | 92.7 | 2.7 | 2.7 | **98.6** | 19.6 | 12.9 |
| $T_{12}$ | 49.0 | 92.47 | 90.0 | 2.7 | 2.7 | 97.6 | 20.1 | 13.3 |
| $T_{13}$ | 40.7 | 81.36 | 78.9 | 2.5 | 2.4 | 79.4 | 19.2 | 12.8 |
| SEM(±) | 7.43 | 5.90 | 5.33 | 0.06 | 0.05 | 5.86 | 0.71 | 0.54 |
| CD (5%) | NS | 9.95 | 8.98 | 0.10 | 0.09 | 10.58 | NS | NS |

## PROJECT NO. : AS 65

| | | |
|---|---|---|
| **Title** | : | **Enhancing sugarcane productivity and profitability under wheat-sugarcane cropping system** |
| **Objective** | : | To enhance the productivity of sugarcane under wheat-sugarcane cropping system |
| **Year of start** | : | 2012-13 |
| **Year of completion** | : | Three crop cycles. |
| **Locations** | : | Subtropical centres (Faridkot, Ludhiana, Uchani, Lucknow, Pantnagar, Modipuram, Pusa and Bethuadhari. |
| **Treatments** | : | $T_1$ : Autumn planted sugarcane<br>$T_2$ : $T_1$ + Wheat (1:2)<br>$T_3$ : $T_1$ + Wheat (1:3)<br>$T_4$ : Wheat sown on 15$^{th}$ Nov.- late sugarcane.<br>$T_5$ : Wheat sown on 15$^{th}$ Dec.- late sugarcane.<br>$T_6$ : FIRB sowing of wheat 15$^{th}$ Nov. (75cm with 3 rows of wheat) + sugarcane in furrow in 3$^{rd}$ week of February.<br>$T_7$ : FIRB sowing of wheat 15$^{th}$ Nov. (75cm with 3 rows of wheat) + sugarcane in furrow in 3$^{rd}$ week of March.<br>$T_8$ : $T_6$ with 15$^{th}$ December sowing of wheat.<br>$T_9$ : $T_7$ with 15$^{th}$ December sowing of wheat. |
| **Design** | : | RBD |
| **Replications** | : | Three |
| **Plot size** | : | 6 rows; 8m length. |
| **Date of sowing** | : | As per treatments. |
| **Observations to be recorded** | : | **Wheat:**<br>i) Germination count.<br>ii) Number of tillers at 30,60 and 90DAS.<br>iii) Days to maturity.<br>iv) Straw and grain yield. |

**Sugarcane:**

i) Germination count at 45DAP.
ii) Tiller population at 90,120 and 180DAP.
iii) Plant height at 120 & 180DAP.
iv) Juice sucrose at harvest.
v) Number of millable canes, length, diameter and weight of cane at harvest.
vi) Cane and sugar yield.
vii) Cane equivalent yield.
viii) B: C ratio.

## SUMMARY OF LAST YEAR'S REPORT (2012-13)

## PROJECT: AS 65

## NORTH WEST ZONE

### 1. FARIDKOT

**W**heat sown in November was significantly better than December sowing. Sugarcane sown in furrows of FIRB sown wheat in the months of February and March was significantly better than sugarcane planted after wheat harvest and was at par with autumn sole sugarcane. Same was case for germination, number of shoots, number of millable canes and cane length.

### 2. LUDHIANA

The highest cane equivalent yield of 88.8 t/ha was obtained when sugarcane was relay cropped in February in 15th November sown FIRB wheat ($T_6$) being at par with autumn sugarcane + wheat (1:2) ($T_2$) as well as with the sugarcane relay cropped in March in 15 Nov. wheat but was significantly superior to the sole sugarcane planted either in autumn or spring ($T_1$ & $T_{10}$) as well as to the treatments where sugarcane was relay cropped in 15 Dec. FIRB wheat ($T_8$ & $T_9$) or where sugarcane was planted after wheat harvest.

### 3. LUCKNOW

The findings reveals that wheat grain yield was the highest (46.6 q/ha) in November sown wheat in the treatment T4. Wheat yielded almost the same in flat as well as FIRB method. However, wheat sown in the month of November yielded higher than wheat sown in December due to higher number of earheads per running meters, number of grains per earhead and test weight. Wheat (Nov.) + sugarcane (Feb/March) under FIRB method produced higher wheat yield (44.1 q/ha) over wheat (Nov) +

sugarcane (Oct) in 3:1 row ratio (40.2 q/ha) as well as 2:1 row ratio (33.5 q/ha)). The sugarcane crop is standing in the field.

**4. PANTNAGAR**

Highest grain yield was recovered in 15th November sown crop. The highest grain yield was the effect of higher tiller/$m^2$ in $T_4$. Highest sugarcane yield was recorded from autumn planted cane as compared to either late sown (sown after wheat harvest) or sown in skipped furrow. The cane yield was also influenced due to sowing of wheat 3 rows on ridge (FIRB) in autumn planted cane. Sugarcane quality was also good in autumn planted, cane either sown alone or with 2 or 3 rows of wheat in between two rows of sugarcane. Maximum cane equivalent yield was obtained in out sugarcane + wheat (1:2) closely followed by $T_9$.

**5. UCHANI**

Wheat sown with autumn cane (Oct. 30, 2011) and 15th November on bed or by conventional method produced higher grain yield as compared to wheat sown on 15th December. Autumn planted cane recorded significantly higher germination as compared to spring and late planting. Lowest germination was recorded in late planting of sugarcane after wheat harvest. There was a yield reduction of 44.4% with late planting of sugarcane after wheat harvesting as compared to planting of sugarcane in February or March in standing crop of wheat. The reduction in cane yield due to intercropping of wheat over sole aut. planted cane was 3.6% where as this reduction due to planting of cane after harvest of wheat and relay cropped with wheat was 55.2 and 22.0%, respectively. Cane equivalent yield was higher in sugarcane with 1:2 wheat (129.1 t/ha) and with 1:3 (126.8 t/ha).

## PENINSULAR ZONE

**6. POWARKHEDA**

Aut. sugarcane + wheat (1:2) & (1:3), being at par, significantly outyielded all the treatments in repect of cane equivalent yield. The respective increase over sole aut. sugarcane were 11.30 & 9.29%. A slight improvement was also observed due to relay cropping of sugarcane in the month of February, otherwise there was reduction in cane equivalent yield.

## NORTH CENTRAL ZONE

**7. PUSA**

In the system maximum cane yield of 88.07 t/ha was recorded in the sole aut. Planted cane which was on par with that of sugarcane + wheat (1:2) and FIRB sowing wheat on 15th November and sugarcane in 3rd week of February. The reduction in yield on an average due to intercropping of wheat, planting of sugarcane after harvest of wheat, relay cropping of sugarcane in the 3rd week of February

and March was 8.0%, 30.7%, 14.4% and 16.5%, respectively. In case of cane equivalent yield maximum value of 100.5 t/ha was recorded in intercropping of wheat in 1:3 row ratio.

**CENTRES ALLOTTED**: Faridkot, Ludhiana, Sriganganagar, Uchani, Lucknow, Pantnagar, Modipuram, Pusa and Bethuadhari (9)

**CENTRES REPORTED**: 7

## CURRENT YEAR (2013-14) REPORT

## NORTH WEST ZONE

### 1. FARIDKOT

**DOS of Wheat**: 15.11.2012, 15.12.2012

**Sugarcane**: T1-T3: 10.10.2012, T4-T5: 29.04.2013, T6, T8: 28.02.2013, T7, T9: 28.03.2013

The wheat sown in November is significantly better than December sowing. The sugarcane sown in furrows of FIRB sown wheat in the February and March was significantly better than sugarcane planted after wheat harvest and was at par with autumn sole sugarcane. Same was case for germination, number of shoots, number of millable canes and cane weight.

**Table AS 65.1:** Growth, yield and quality of sugarcane during 2012-14 under various treatments

| Treatment | Germination (%) | No. of Shoots 000/ha | NMC 000/ha | Cane length (cm) | Cane diameter (cm) | Single cane wt. (g) | Cane yield (t/ha) | Sucrose (%) | Wheat yield (q/ha) |
|---|---|---|---|---|---|---|---|---|---|
| $T_1$ | 30.3 | 159.3 | 107.3 | 240 | 2.74 | 989 | 80.2 | 17.27 | - |
| $T_2$ | 29.9 | 110.1 | 96.6 | 204 | 2.52 | 891 | 65.9 | 17.06 | 39.6 |
| $T_3$ | 30.0 | 97.2 | 98.8 | 207 | 2.44 | 898 | 64.9 | 17.30 | 44.8 |
| $T_4$ | 25.7 | 143.0 | 89.6 | 179 | 2.37 | 681 | 51.4 | 15.78 | 51.4 |
| $T_5$ | 26.4 | 176.3 | 88.1 | 177 | 2.31 | 703 | 53.1 | 15.50 | 44.6 |
| $T_6$ | 35.6 | 235.3 | 106.2 | 232 | 2.55 | 832 | 74.1 | 16.26 | 51.0 |
| $T_7$ | 31.8 | 242.2 | 106.1 | 206 | 2.50 | 825 | 72.8 | 16.30 | 50.3 |
| $T_8$ | 35.0 | 256.3 | 109.3 | 208 | 2.52 | 832 | 74.3 | 16.40 | 44.1 |
| $T_9$ | 31.0 | 175.6 | 109.6 | 200 | 2.50 | 843 | 71.9 | 16.34 | 44.6 |
| CD (5%) | 5.2 | 39.2 | 14.1 | NS | NS | 119 | 9.5 | NS | 5.2 |

## 2. KAPURTHALA

The soil of the experimental field being loamy in nature, tested medium in organic carbon (0.66 %), very high in available P (59.5 kg/ha) and very high in available K (925 kg/ha). The experiment was laid out with an objective to provide an option for all the wheat growers to harvest the potential yield of sugarcane through an agronomic intervention of timely planting in standing wheat. This will help the farmers to diversify from the traditional paddy- wheat rotation to wheat – sugarcane relay cropping system. The data presented showed non-significant differences for germination, and cane girth of sugarcane under different methods of wheat- sugarcane intercropping and relay cropping. However, different ways of intercropping wheat in sugarcane and its relay cropping recorded significant differences in terms of tiller count, cane length, number of millable canes and cane yield. The tiller count and cane length was significantly reduced when sugarcane was planted late i.e. after harvesting of wheat crop (both Nov. and Dec. sown crop). Sole sugarcane planted in autumn recorded significantly highest cane length (213.3cm) and millable canes (110.9 t/ha) when compared to sugarcane after harvest of 15 Nov. & 15 Dec. sown wheat and was at par with all other treatments where sugarcane was planted in standing wheat crop either in Feb. or in March.

It was observed that sole sugarcane planted in autumn produced significantly higher cane yield than the sugarcane planted after harvesting of 15 Nov. & 15 Dec. sown wheat crop and also higher than Autumn sown crop where three rows of wheat were planted. The cane yield of autumn sown sole crop was at par with autumn sown crop with two rows of wheat as intercrop and the treatments where sugarcane was planted in standing wheat crop, indicating thereby the possibility of timely planting of sugarcane in furrow irrigated raised bed wheat. The yield of wheat was maximum in the treatment $T_4$ when wheat was sown on 15 Nov. and sugarcane was planted after wheat harvest and it was at par with all the treatments where wheat was sown on 15 Nov. but was significantly better than those treatments where wheat was sown on 15 Dec. The cane equivalent yield was also significantly less when sugarcane was planted after harvesting of 15 Nov. & 15 Dec. sown wheat crop. Highest cane equivalent yield was achieved when autumn sown crop was intercropped with two rows of wheat (90.5 t/ ha) and was at par with treatment ($T_6$ & $T_7$) i.e. sugarcane relay cropped in Feb. and Mar. in 15 Nov. FIRB wheat. It was significantly superior to the sole sugarcane planted in autumn. The cane quality of autumn sown and relay cropped sugarcane was significantly superior to the sugarcane crop planted late after harvesting of wheat.

**SUMMARY:** The highest cane equivalent yield of 90.5 t/ha was obtained in the treatment $T_2$ having autumn sugarcane + wheat (1:2) and was at par with relay cropping in standing wheat crop and significantly better than sole sugarcane crop and where sugarcane was planted after wheat harvest.

**Table AS 65.2:** Effect of planting methods and irrigation levels on performance of sugarcane

| Treatment | | Germination % | Tiller Count (000/ha) | Cane length (cm) | Millable canes (000/ha) | Cane yield (t/ha) | Single cane wt.(g) | Wheat Yield (q/ha) | Cane equivalent yield (t/ha) | Pol % juice |
|---|---|---|---|---|---|---|---|---|---|---|
| **$T_1$** | **Autumn Sugarcane** | **45.3** | **151.4** | **213.3** | **110.9** | **81.3** | **740.0** | **-** | **81.3** | **18.67** |
| $T_2$ | Autumn Sugarcane + Wheat (1:2) | 44.0 | 154.5 | 201.1 | 105.8 | 74.3 | 705.0 | 34.8 | 90.5 | 18.99 |
| $T_3$ | Autumn Sugarcane + Wheat (1:3) | 44.3 | 151.5 | 204.7 | 103.7 | 70.2 | 680.0 | 36.6 | 87.2 | 19.17 |
| $T_4$ | Sug. after harvest of 15 Nov.Wheat | 34.5 | 110.5 | 178.0 | 89.1 | 58.2 | 620.0 | 38.2 | 76.2 | 17.59 |
| $T_5$ | Sug. after harvest of 15 Dec Wheat | 36.2 | 108.0 | 174.0 | 86.9 | 57.4 | 611.0 | 29.4 | 71.1 | 17.69 |
| $T_6$ | Feb. cane in furrows of 15 Nov. FIRB Wheat | 43.0 | 154.2 | 206.0 | 99.1 | 72.3 | 695.0 | 33.1 | 87.7 | 18.69 |
| $T_7$ | Mar. cane in furrows of 15 Nov.FIRB Wheat | 42.7 | 151.3 | 204.8 | 97.3 | 71.6 | 687.0 | 33.9 | 87.4 | 18.97 |
| $T_8$ | Feb. cane in furrows of 15 Dec. FIRB Wheat | 43.4 | 153.0 | 198.9 | 98.3 | 73.2 | 698.0 | 25.8 | 85.2 | 18.32 |
| $T_9$ | Mar. cane in furrows of 15 Dec. FIRB Wheat | 42.4 | 152.8 | 198.0 | 97.2 | 72.0 | 707.0 | 27.0 | 84.6 | 18.57 |
| **CD (0.05)** | | **NS** | **28.3** | **16.8** | **10.1** | **11.1** | **70.3** | **6.3** | **9.1** | **0.62** |

**3.**

**UCHANI**

Data revealed that wheat sown with autumn cane on Oct. 24, 2012 in 1:2 and 1:3 ratio and 15$^{th}$ November on bed or by conventional method produced higher grain yield of (56.6-58.2 q/ha) as compared to wheat sown on 15$^{th}$ December ( 49.4-50.6 q/ha).

**Sugarcane**

Autumn planted cane recorded significantly higher germination, tillers, millable canes and cane yield as compared to spring and late planting. Lowest germination was recorded in late planting of sugarcane after wheat harvest. Treatments $T_1$, $T_2$ and $T_3$ being at par recorded significantly higher number of tillers, millable canes, cane weight ,cane yield and sugar yield as compared to rest of the treatments (Table AS 65.3.1 & Table AS 65.3.2). FIRB sowing of wheat on 15$^{th}$ November + planting of sugarcane in standing crop of wheat in February or March ($T_6$, $T_7$) and FIRB sowing of wheat on 15$^{th}$ December + planting of sugarcane in standing crop of wheat in February or March ($T_8$, $T_9$) being at par produced significantly higher number of tillers, NMC, cane weight, cane yield and sugar yield as compared to late planting of sugarcane after wheat harvesting ($T_4$ and $T_5$). There was a yield reduction of 40.3 % with late planting of sugarcane after wheat harvesting as compared to planting of sugarcane in February or March in standing crop of wheat. Maximum cane equivalent yield was recorded in autumn sugarcane + wheat intercropping system of 1:2 (128.8 t/ha) and 1:3 ratio (127.5 t/ha) and closely followed by FIRB sowing of wheat on 15$^{th}$ November or 15$^{th}$ December + sugarcane in furrows in 3$^{rd}$ week of February or March (106.1- 108.8 t/ha) and lowest in case of late planting of sugarcane after wheat harvesting (72.5-75.8 t/ha).

**Summary:** Wheat sown with autumn cane on Oct. 24, 2012 in 1:2 and 1:3 ratio and 15$^{th}$ November on bed or by conventional method produced higher grain yield of (56.6-58.2 q/ha) as compared to wheat sown on 15$^{th}$ December ( 49.4-50.6 q/ha). Autumn planted cane as sole or intercropped with wheat in 1:2 and 1:3 ratio recorded significantly cane yield as compared to spring and late planting. Lowest germination was recorded in late planting of sugarcane after wheat harvest. There was a yield reduction of 40.3% with late planting of sugarcane after wheat harvesting as compared to planting of sugarcane in February or March in standing crop of wheat. Maximum cane equivalent yield was recorded in autumn sugarcane + wheat intercropping system of 1:2 ( 128.8 t/ha)and 1:3 ratio (127.5 t/ha) and closely followed by FIRB sowing of wheat on 15$^{th}$ November or 15$^{th}$ December + sugarcane in furrows in 3$^{rd}$ week of February or March ( 106.1- 108.8 t/ha) and lowest in $T_4$ and $T_5$ treatments.

**Table AS 65.3.1:** Effect of different treatments on wheat crop and growth parameters of sugarcane crop

| Sr. No. | Treatments | Wheat Grain yield (q/ha) | S. cane germi. (%) | Tillers (000/ha) | NMC (000/ha) | Cane wt.(g) |
|---|---|---|---|---|---|---|
| $T_1$ | Autumn planted sugarcane | --- | 52.4 | 142.9 | 108.8 | 982 |
| $T_2$ | $T_1$ + Wheat (1:2) | 58.2 | 49.5 | 139.7 | 105.0 | 977 |
| $T_3$ | $T_1$ + Wheat (1:3) | 57.8 | 48.4 | 139.3 | 104.2 | 974 |
| $T_4$ | Wheat sown on 15th Nov. followed by sugarcane planting after wheat harvest | 56.6 | 39.4 | 76.3 | 74.6 | 668 |
| $T_5$ | Wheat sown on 15th Dec. followed by sugarcane planting after wheat harvest | 49.4 | 39.4 | 75.0 | 75.0 | 665 |
| $T_6$ | FIRB sowing of wheat 15th Nov. + Sugarcane in furrows in 3rd week of February | 57.1 | 46.2 | 127.6 | 99.7 | 832 |
| $T_7$ | FIRB sowing of wheat 15th Nov. + Sugarcane in furrows in 3rd week of March | 56.8 | 47.5 | 128.1 | 100.1 | 832 |
| $T_8$ | FIRB sowing of wheat 15th Dec. + Sugarcane in furrows in 3rd week of February | 50.3 | 47.8 | 130.2 | 100.2 | 833 |
| $T_9$ | FIRB sowing of wheat 15th Dec. + Sugarcane in furrows in 3rd week of March | 50.6 | 48.0 | 130.8 | 101.4 | 830 |
| CD at 5% | | 1.7 | 2.6 | 5.7 | 6.2 | 20 |

**Table AS 65.3.2:** Effect of different treatments on cane yield, CCS (%) and sugar yield

| Sr. No. | Treatment | Cane yield (t/ha) | Equivalent yield (t/ha) | Total cane yield (t/ha) | CCS (%) | Sugar yield (t/ha) |
|---|---|---|---|---|---|---|
| $T_1$ | Autumn planted sugarcane | 105.9 | --- | 105.9 | 12.42 | 13.15 |
| $T_2$ | $T_1$ + Wheat (1:2) | 101.7 | 27.1 | 128.8 | 12.46 | 12.67 |
| $T_3$ | $T_1$ + Wheat (1:3) | 100.6 | 26.9 | 127.5 | 12.43 | 12.51 |
| $T_4$ | Wheat sown on 15$^{th}$ Nov. followed by sugarcane planting after wheat harvest | 49.4 | 26.3 | 75.8 | 11.22 | 5.54 |
| $T_5$ | Wheat sown on 15$^{th}$ Dec. followed by sugarcane planting after wheat harvest | 49.5 | 23.0 | 72.5 | 11.26 | 5.57 |
| $T_6$ | FIRB sowing of wheat 15$^{th}$ Nov. + Sugarcane in furrows in 3$^{rd}$ week of February | 82.2 | 26.6 | 108.8 | 12.02 | 9.89 |
| $T_7$ | FIRB sowing of wheat 15$^{th}$ Nov. + Sugarcane in furrows in 3$^{rd}$ week of March | 82.5 | 26.4 | 109.0 | 12.08 | 9.97 |
| $T_8$ | FIRB sowing of wheat 15$^{th}$ Dec. + Sugarcane in furrows in 3$^{rd}$ week of February | 82.7 | 23.4 | 106.1 | 12.05 | 9.97 |
| $T_9$ | FIRB sowing of wheat 15$^{th}$ Dec. + Sugarcane in furrows in 3$^{rd}$ week of March | 83.5 | 23.6 | 107.0 | 12.04 | 10.05 |
| CD at 5% | | 5.6 | -- | --- | 0.16 | 0.65 |

## 4. LUCKNOW

The field experiment was conducted during 2012-14 to enhance the productivity of sugarcane under wheat – sugarcane cropping system. The experiment comprising 9 treatments viz.; $T_1$: Autumn planted sugarcane, $T_2$ : $T_1$+ wheat (1:2), $T_3$: $T_1$+ wheat (1:3), $T_4$: wheat sown on 15$^{th}$ November – late sugarcane, $T_5$: wheat sown on 15$^{th}$ December – late sugarcane, $T_6$: wheat sown (three rows) on 15$^{th}$ November under FIRB + sugarcane in furrows at 75 cm in 3$^{rd}$ week of February, $T_7$: wheat sown (three rows) on 15$^{th}$ November under FIRB + sugarcane in furrows at 75 cm in 3$^{rd}$ week of March, $T_8$: $T_6$ with sowing of wheat on 15$^{th}$ December and $T_9$: $T_7$ with sowing of wheat on 15$^{th}$ December was laid out in Randomized Block Design with three replications. The findings reveals that wheat grain yield was the highest (46.6 q/ha) in November sown wheat in the treatment T4. Wheat yielded almost the same in flat as well as FIRB method. However, wheat sown in the month of November yielded higher than wheat sown in December due to higher number of ear heads per running meters, number of grains per ear head and test

weight. Wheat (Nov.) + sugarcane (Feb/March) under FIRB method produced higher wheat yield (44.1 q/ha) over wheat (Nov) + sugarcane (Oct) in 3:1 row ratio (40.2 q/ha) as well as 2:1 row ratio (33.5 q/ha).

Tiller population recorded at different stages indicated that tiller count in autumn planted sole sugarcane and sugarcane planted with wheat in 3rd week of February under FIRB system was higher compared with sugarcane planted with wheat in 3rd week of March under FIRB. The lowest tiller population was observed in sugarcane planted with wheat (1:3) under flat method followed by wheat – sugarcane system. The highest tiller count (231.8 thousands/ha) was recorded in the month of July in sugarcane planted in 3rd week of February with wheat under FIRB system and the lowest (86.4 thousands/ha) in sugarcane + wheat (1:3). The highest plant height (247 cm) was observed in autumn planted sole sugarcane followed by sugarcane + wheat (1:2) and wheat + sugarcane under FIRB system. The cane yield was the highest (89.0 tonnes/ha) in autumn planted sole sugarcane. Sugarcane planted in 3rd week of February in standing wheat under FIRB method (82.5 tonnes/ha) was significantly higher than sugarcane planted in 3rd week of March in wheat under FIRB and sugarcane + wheat (1:2) due to higher NMC, cane length, cane weight and number of internodes. The lowest cane yield was recorded in wheat – sugarcane system (59.3 tonnes/ha) and sugarcane + wheat in1:3 row ratio (60.3 tonnes/ha).

**SUMMARY:** The cane yield was the highest (89.0 tonnes/ha) in autumn planted sole sugarcane. Sugarcane planted in 3rd week of February in standing wheat under FIRB method (82.5 tonnes/ha) was significantly higher than sugarcane planted in 3rd week of March in wheat under FIRB and sugarcane + wheat (1:2) due to higher NMC, cane length, cane weight and number of internodes. The lowest cane yield was recorded in wheat – sugarcane system (59.3 tonnes/ha) and sugarcane + wheat in1:3 row ratio (60.3 tonnes/ha).

Table AS 65.4: Performance of wheat – sugarcane cropping system under different methods

| Treatments | Wheat grain yield | Tiller count in sugarcane (‘000/ha) | | | Plant height (cm) at Harvest | Yield attributes in sugarcane | | | | Cane yield (t/ha) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 12th April | 11th July | 11th Sept. | | NMC (‘000/h | Cane length (cm) | Cane diamete (cm) | Cane weight (g) | |
| $T_1$ | - | 198.3 | 189.5 | 131.4 | 247 | 107.3 | 218 | 2.39 | 877 | 89.0 |
| $T_2$ | 33.5 | 71.2 | 141.0 | 109.7 | 237 | 91.4 | 210 | 2.36 | 833 | 71.5 |
| $T_3$ | 40.2 | 43.6 | 86.4 | 80.5 | 217 | 75.6 | 193 | 2.33 | 837 | 60.3 |
| $T_4$ | 46.6 | - | 94.7 | 96.4 | 188 | 84.7 | 159 | 2.24 | 743 | 61.3 |
| $T_5$ | 35.0 | - | 96.8 | 99.7 | 183 | 88.7 | 155 | 2.23 | 730 | 59.3 |
| $T_6$ | 43.9 | 79.5 | 231.8 | 146.3 | 239 | 118.9 | 213 | 2.31 | 808 | 82.5 |
| $T_7$ | 44.3 | 56.7 | 206.9 | 122.4 | 223 | 109.4 | 197 | 2.28 | 785 | 73.1 |
| $T_8$ | 37.7 | 82.4 | 229.7 | 143.7 | 241 | 117.5 | 214 | 2.30 | 815 | 81.1 |
| $T_9$ | 37.2 | 59.3 | 209.9 | 126.8 | 226 | 107.1 | 201 | 2.28 | 791 | 72.5 |
| CD | 3.4 | - | 19.4 | 11.8 | 14 | 8.6 | 13 | 0.07 | 41 | 6.2 |

## 5. PANTNAGAR

| Sowing of sugarcane | Sowing of wheat | Harvesting of sugarcane |
|---|---|---|
| $T_1$- 15 October, 2012 | $T_2$, $T_3$, $T_4$, $T_6$ & $T_7$ - 15 Nov., 2013 | 10 January, 2014 |
| $T_2$- 15 October, 2012 | $T_8$ & $T_9$ - 16 Dec. 2013 | 10 January, 2014 |
| $T_3$-15 October, 2012 | | 10 January, 2014 |
| $T_4$- 12 April, 2013 | | 18 April, 2014 |
| $T_5$- 12 April, 2013 | | 18 March, 2014 |
| $T_6$- 2 Feb., 2013 | | 18 March, 2014 |
| $T_7$-21 March, 2013 | | 19 March, 2014 |
| $T_8$- 22 Feb., 2013 | | 19 March, 2014 |
| $T_9$- 21 March, 2013 | | 19 March, 2014 |

Wheat variety UP 2565 and sugarcane variety Co Pant 90223 were planted as per technical programme and details are given in Appendix-3. Wheat and sugarcane crop were raised as per recommended practices and as per need of the crop. The soil of the crop was silty loam in texture having organic carbon (1.05 %) and medium in available $P_2O_5$ (49.0 kg/ha) and $K_2O$ (240.0 kg/ha) with neutral reaction (pH 6.9).

**Results:**

(i) **Wheat:** Highest grain yields 55.3 and 55.4 q/ha were recorded from the treatments $T_4$ and $T_5$, respectively (November, 15 sown crop) which were significantly higher over rest of the treatments.

(ii) **Sugarcane:** Highest cane yield was recorded in the treatment $T_1$ in which sugarcane was planted on October 15 (pure crop). The cane yield was reduced significantly in which sugarcane was planted along with 2 rows ($T_2$) and 3 ($T_3$) rows of wheat in between two rows of sugarcane. Reduction in cane yield was more in which 3 wheat rows were planted in between 2 rows of sugarcane as compared to 2 rows of wheat. Cane yield was improved in which wheat was planted on FIRB and sugarcane was planted in furrows in standing. Wheat (sown on FIRB) in the month of March as compared to sugarcane planted in furrow in FIRB in the month of February. CCS yield was highest in autumn planted cane as compared to rest of the treatments. Equivalent yield of sugarcane was higher 857.8 in the treatment $T_7$ in which wheat was sown on FIRB (3 rows of wheat) and sugarcane was planted in remaining furrows in 3$^{rd}$ week of March. Equivalent yield was also higher in the treatment $T_8$ and $T_9$ in which wheat was sown in December on FIRB and sugarcane was planted in furrows in the month of 3$^{rd}$ week of February & 3$^{rd}$ week of March. Cane equivalent yield was reduced when sugarcane was planted late after harvesting of wheat. Pure crop planted as autumn planted was also not found profitable. It was also found better that in between two rows of sugarcane 2 rows of wheat as compared to 3 rows of wheat.

**Summary:** On the basis of equivalent yield, it was recorded that pure autumn planted sugarcane without wheat sowing was not profitable. However, planting of 2 rows of wheat in between two rows of sugarcane were more profitable than that of 3 rows of wheat. It was also found better that wheat sown on FIRB in the month of November 15 and sugarcane be planted in furrow in 3$^{rd}$ week of March. Late sowing of wheat in 15 December on FIRB and

sugarcane planted in furrow either 3rd week of February or March. Late planting of sugarcane after wheat harvest was not found good.

**Table AS 65.5.1:** Effect on wheat productivity under wheat-sugarcane cropping system

| Treatment | Tillers count in wheat/$m^2$ | | Straw yield (q/ha) | Yield (q/ha) |
|---|---|---|---|---|
| | 60 DAP | 90 DAP | | |
| $T_1$ | - | - | - | - |
| $T_2$ | 280.3 | 284.3 | 46.3 | 48.1 |
| $T_3$ | 281.0 | 290.3 | 50.3 | 51.5 |
| $T_4$ | 330.7 | 335.3 | 51.8 | 55.3 |
| $T_5$ | 267.0 | 273.7 | 51.6 | 55.4 |
| $T_6$ | 249.3 | 254.3 | 42.5 | 42.2 |
| $T_7$ | 256.3 | 258.7 | 42.3 | 42.5 |
| $T_8$ | 279.7 | 290.3 | 29.6 | 31.8 |
| $T_9$ | 280.0 | 290.7 | 28.4 | 31.0 |
| SEm± | 8.7 | 7.9 | 0.4 | 0.3 |
| CD at 5 % | 26.1 | 23.9 | 1.4 | 1.0 |

**Table AS 65.5.2:** Enhancing sugarcane productivity and profitability under wheat-sugarcane cropping system

| Treatment | Ger. % at 45 DAP | Shoot population (000/ha) | | | Plant height at harvest (cm) | Plant girth ( cm) | NMC 000/ ha | Cane weight (g) | Yield (t/ha ) | Sucrose % at Nov. | Sucrose % at harvest | C.C.S. (t/ha ) | Equivalent yield of sugarcane (q/ha) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 90 DAP | 120 DAP | 180 DAP | | | | | | | | | |
| $T_1$ | 20.8 | 70.4 | 83.9 | 219.2 | 227.3 | 2.0 | 90.4 | 1013.3 | 76.6 | 15.1 | 16.7 | 8.3 | 776.0 (-) |
| $T_2$ | 23.2 | 65.0 | 74.9 | 196.2 | 189.0 | 1.9 | 76.0 | 906.7 | 69.1 | 15.1 | 16.1 | 7.4 | 842.0 (150.9) |
| $T_3$ | 24.8 | 62.8 | 73.2 | 180.3 | 206.7 | 1.8 | 70.4 | 920.0 | 63.2 | 15.5 | 16.3 | 6.4 | 770.1 (138.1) |
| $T_4$ | 27.7 | 49.6 | 63.2 | 216.7 | 168.3 | 1.8 | 62.5 | 713.3 | 60.8 | 14.2 | 15.2 | 5.9 | 740.8 (132.8) |
| $T_5$ | 27.4 | 50.4 | 58.7 | 63.1 | 142.7 | 1.7 | 54.1 | 660.0 | 52.0 | 14.0 | 15.3 | 5.1 | 633.6 (113.6) |
| $T_6$ | 26.9 | 52.9 | 69.3 | 88.4 | 178.3 | 1.7 | 74.0 | 873.3 | 67.8 | 15.1 | 15.5 | 6.8 | 826.1 (148.10 |
| $T_7$ | 31.4 | 53.3 | 71.3 | 86.0 | 182.3 | 1.8 | 74.4 | 890.0 | 70.4 | 15.1 | 16.7 | 7.6 | 857.8 (153.8) |
| $T_8$ | 29.5 | 60.3 | 72.5 | 75.6 | 185.7 | 1.8 | 70.4 | 830.0 | 69.3 | 15.4 | 15.6 | 6.8 | 844.4 (151.4) |
| $T_9$ | 31.3 | 48.7 | 58.6 | 75.7 | 171.7 | 1.7 | 71.3 | 820.0 | 69.2 | 15.0 | 16.4 | 6.2 | 843.2 (151.2) |
| SEm± | 1.6 | 0.7 | 0.3 | 0.6 | 1.9 | 0.3 | 0.2 | 12.00 | 0.2 | 0.2 | 0.1 | 0.3 | - |
| CD at 5 % | 4.8 | 2.2 | 1.0 | 1.7 | 5.8 | 1.0 | 0.6 | 36.00 | 0.7 | 0.6 | 0.3 | 0.9 | - |

(Data in parantheses indicate sugarcane equivalent yield of the system)

## NORTH CENTRAL ZONE

### 6. PUSA

Sole sugarcane ($T_1$) recorded significantly higher number of tillers (149.7 thousand sand /ha), millable canes (108.0 thousand /ha), cane yield (83.7 t/ha) and pol. percent (17.21 %) juice was statistically similar to $T_2$ in case of no. of tillers, $T_2$, $T_3$, $T_6$ and $T_8$ in case of millable canes and cane yield, $T_2$, $T_4$, $T_5$, $T_6$, $T_7$, $T_8$ and $T_9$ in case of pol. Per cent juice. Accommodation of three rows of wheat between two rows of sugarcane ($T_3$) recorded higher sugarcane equivalent yield than other intercropping as well as sole sugarcane.

Maximum wheat grain (50.2 q/ha) and straw yield (60.3 q/ha) was recorded due to wheat sown on 15$^{th}$ November followed by late planted sugarcane ($T_4$) was statistically similar to wheat sown on 15$^{th}$ December followed by late sugarcane ($T_5$) and significantly superior to rest of the combinations.

**SUMMARY:** In the system maximum cane yield of 83.7 t/ha was recorded in the sole autumn planted cane which was on par with that of sugarcane + wheat (1:2) and FIRB sowing wheat on 15$^{th}$ November and sugarcane in 3$^{rd}$ week of February. The reduction in yield on an average due to intercropping of wheat, planting of sugarcane after harvest of wheat, relay cropping of sugarcane in the 3$^{rd}$ week of February and March was 9.4 %, 31.0 %, 14.0 % and 15.9 %, respectively. In case of cane equivalent yield maximum value of 100.0 t/ha was recorded in intercropping of wheat 1:3 row ratios.

**Table AS 65.6:** Yield and yield attributing characters of sugarcane under wheat-sugar cropping system

| Treatment | Germination % | No. of tillers (‘000/ha) | NMC (‘000/ha) | Cane yield (t/ha) | Pol % in juice | Germination % | Tiller Row/m | Yield q./ha (grain) | Yield q./ha (straw) | CEY (t/ha) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Sugarcane | | | | | Wheat | | | | |
| $T_1$ | 33.00 | 149.7 | 108.0 | 83.7 | 17.21 | - | - | - | - | 83.6 |
| $T_2$ | 32.00 | 133.0 | 100.2 | 80.2 | 17.01 | 39.0 | 84.0 | 21.3 | 26.6 | 96.1 |
| $T_3$ | 32.00 | 129.6 | 98.0 | 77.2 | 16.43 | 38.0 | 81.0 | 30.7 | 37.9 | 100.0 |
| $T_4$ | 27.66 | 113.2 | 85.6 | 58.9 | 16.92 | 38.0 | 80.0 | 50.2 | 60.3 | 95.9 |
| $T_5$ | 29.00 | 108.5 | 79.3 | 56.5 | 16.66 | 35.0 | 78.0 | 45.6 | 57.0 | 90.4 |
| $T_6$ | 31.00 | 130.6 | 96.3 | 73.1 | 17.17 | 39.0 | 78.0 | 30.7 | 37.3 | 95.8 |
| $T_7$ | 31.00 | 125.5 | 94.1 | 70.9 | 17.20 | 40.0 | 71.0 | 28.1 | 36.7 | 92.1 |
| $T_8$ | 30.00 | 125.9 | 94.8 | 72.2 | 16.58 | 36.0 | 64.0 | 25.2 | 29.4 | 90.6 |
| $T_9$ | 30.00 | 126.9 | 93.1 | 68.5 | 17.00 | 36.0 | 63.0 | 23.7 | 28.4 | 86.0 |
| SEm | 2.750 | 6.09 | 4.39 | 4.08 | 0.230 | 2.95 | 4.24 | 2.42 | 3.04 | - |
| CD (P = 0.05) | NS | 18.3 | 13.2 | 12.2 | 0.69 | NS | 12.9 | 7.33 | 9.2 | - |

## PENINSULAR ZONE

### 7. POWARKHEDA

The results showed that the sugarcane equivalent yield increased significantly higher in intercropping systems except autumn planted Sugarcane + Wheat (1:2) and autumn planted Sugarcane + Wheat (1:3) than sole Sugarcane cropping system. The significantly highest sugarcane equivalent yield (98.59 t/ha) obtain with autumn planted Sugarcane + Wheat (1:2) followed by autumn planted Sugarcane + Wheat (1:3) (96.42 t/ha) intercropping systems. Among these treatment the equivalent yield recorded at par. Treatment T4, T5, T7 and T9 yield reduced due to late planting of Sugarcane. The highest net return (Rs.48014/ha) and B: C ratio (1:1.28) was recorded under autumn planted Sugarcane + Wheat (1:2) intercropping systems followed by autumn planted Sugarcane + Wheat (1:3) (Rs.43246/ha.), Net return and (1: 1.25) B: C ratio intercropping system. The percent increase (10.33%) in sugarcane equivalent yield was also obtained higher with autumn planted Sugarcane + Wheat (1:2) intercropping system followed by autumn planted Sugarcane + Wheat (1:3) (7.91 %) intercropping system then sole sugarcane cropping system.

**SUMMARY:** The significantly highest sugarcane equivalent yield (98.59 t/ha) obtain with autumn planted Sugarcane + Wheat (1:2) followed by autumn planted Sugarcane + Wheat (1:3) (96.42 t/ha) intercropping systems. Among these treatment the equivalent yield recorded at par.

**Table AS 65.7:** Effect of Sugarcane productivity and profitability under wheat-Sugarcane cropping system

| Treatment | Yield main crop (t / ha) | Yield Intercrop (t / ha ) | Sugarcane equivalent yield (t/ ha) | Gross Monitory return (Rs./ ha ) | Cost of cultivation ( Rs/ha ) | Net Return ( Rs /ha ) | B : C Ratio | Increasing equivalent yield ( % ) |
|---|---|---|---|---|---|---|---|---|
| $T_1$ : Autumn Sugarcane | 89.35 | - | 89.35 | 196570 | 159969 | 36601 | 1.22 | - |
| $T_2$: $T_1$ + Wheat (1:2) | 86.47 | 1.72 | 98.59 | 216894 | 168880 | 48014 | 1.28 | 10.33 |
| $T_3$: $T_1$ + Wheat (1:3) | 82.33 | 2.00 | 96.42 | 212126 | 168880 | 43246 | 1.25 | 7.91 |
| $T_4$: Wheat sown on 15 $^{th}$Nov. -late Sugarcane | 57.48 | 1.98 | 71.79 | 157938 | 168880 | -10942 | 0.93 | -19.65 |
| $T_5$: Wheat sown on 15$^{th}$ Dec. -late Sugarcane | 54.80 | 1.96 | 68.61 | 150940 | 168880 | -17940 | 0.89 | -23.21 |
| $T_6$: FIRB Sowing of Wheat 15$^{th}$ Nov+ S. in furrow in 3$^{rd}$ week of Feb. | 77.84 | 2.18 | 93.20 | 205038 | 168880 | 36158 | 1.21 | 4.30 |
| $T_7$: FIRB Sowing of Wheat 15$^{th}$ Nov + S. in furrow in 3 $^{rd}$ week of March.) | 71.90 | 2.16 | 87.12 | 191660 | 168880 | 22780 | 1.13 | -2.49 |
| $T_8$: $T_6$ with wheat on 15$^{th}$ Nov. | 76.35 | 2.18 | 91.71 | 201760 | 168880 | 32880 | 1.19 | 2.64 |
| $T_9$: $T_7$ with wheat On 15$^{th}$ Dec. | 73.45 | 2.16 | 88.67 | 195070 | 168880 | 26190 | 1.15 | -0.76 |
| SEm + | | | 1.85 | | | | | |
| CD at 5 % | | | 5.56 | | | | | |

## 8. PADEGAON

Data revealed that, cane yield and CCS yield (143.61 t $ha^{-1}$ and 20.24 t $ha^{-1}$, respectively) were significantly higher in treatment $T_1$ (autumn planted Sugarcane) than the rest of the treatments. Regarding intercropping, autumn planted sugarcane + wheat (1:2) ($T_2$) produced significantly higher cane yield and CCS yield (134.02 t $ha^{-1}$ and 17.93 t $ha^{-1}$, respectively) than other treatments except autumn planted sugarcane + wheat (1:3) ($T_3$).

As regards intercrop yield FIRB sowing of wheat 15$^{th}$ November (75 cm with 3 rows of wheat) + Sugarcane in furrows in third week of March ($T_7$) recorded higher wheat yield (38.26 q $ha^{-1}$) followed by FIRB Sowing of wheat 15$^{th}$ November (75 cm with 3 rows of wheat) + Sugarcane in furrows in third week of February ($T_6$).

The data indicated that cane equivalent yield due to different treatments differed significantly. Significantly the highest cane equivalent yield (159.08 t $ha^{-1}$) recorded under autumn planted sugarcane + wheat (1:3) ($T_3$) which was at par with autumn planted sugarcane + wheat (1:2) ($T_2$) (156.49 t $ha^{-1}$). The maximum gross monetary returns and net monetary returns were recorded by autumn planted sugarcane + wheat (1:3) ($T_3$) (Rs.3,57,950/- and Rs.2,41,092/-, respectively ) which was followed autumn planted sugarcane + wheat (1:2) ($T_2$) (Rs.3,52,105/- and Rs.2,37,872/-). The benefit: cost ratio was higher in autumn planted sugarcane + wheat (1:2) (3.08) followed by treatment autumn planted sugarcane + wheat (1:3) (3.06).

**SUMMARY:** The autumn planted sugarcane produced significantly higher cane yield and CCS yield (143.61 t $ha^{-1}$ and 20.24 t $ha^{-1}$, respectively). Under intercropping system, autumn planted sugarcane + wheat (1:2) produced significantly higher cane yield and CCS yield (134.02 t $ha^{-1}$ and 17.93 t $ha^{-1}$, respectively). The intercropping of autumn planted sugarcane + wheat (1:2) was found to be more remunerative.

**Table AS 65.8:** Mean cane, CCS and intercrop yields as affected by various treatments

| Treatment | Cane yield (t $ha^{-1}$) | CCS yield (t $ha^{-1}$) | Wheat yield (q $ha^{-1}$) |
|---|---|---|---|
| $T_1$- Autumn planted sugarcane | 143.61 | 18.93 | - |
| $T_2$-Autumn planted sugarcane + Wheat (1:2) | 134.02 | 17.93 | 25.28 |
| $T_3$- Autumn planted sugarcane + Wheat (1:3) | 133.88 | 17.88 | 28.36 |
| $T_4$- Wheat sown on 15$^{th}$ November – Late Sugarcane | 120.34 | 15.97 | 18.62 |
| $T_5$- Wheat sown on 15$^{th}$ December – Late Sugarcane | 110.47 | 14.94 | 17.57 |
| $T_6$- FIRB sowing of wheat 15$^{th}$ November (75 cm with 3 rows of wheat )+ Sugarcane in furrows in third week of February | 91.28 | 12.33 | 33.12 |
| $T_7$- FIRB Sowing of wheat 15$^{th}$ November (75 cm with 3 rows of wheat) + Sugarcane in furrows in third week of March | 85.41 | 11.37 | 38.26 |
| $T_8$- FIRB sowing of wheat 15$^{th}$ December (75 cm with 3 rows of wheat) + Sugarcane in furrows in third week of February. | 91.98 | 12.20 | 29.12 |
| $T_9$- FIRB Sowing of wheat 15$^{th}$ December (75 cm with 3 rows of wheat) + Sugarcane in furrows in third week of March. | 84.44 | 11.25 | 30.21 |
| SE $\pm$ | 2.54 | 0.54 | -- |
| CD at 5% | 7.36 | 1.46 | -- |
| G.M. | 110.60 | 14.90 | 27.56 |

## PROJECT NO. : AS 66

**Title** : **Priming of cane node for accelerating germination.**

**Objectives** :
1. To find out suitable cane node priming technique.
2. To assess the effect of cane node on acceleration of germination.

**Year of start** : 2012-13

**Centres** : All participating centres except Sriganganagar.

**Treatments** :

$T_1$ : Un-primed cane node.

$T_2$ : Treating cane node in hot water at 50$^oC$ for 2 hours.

$T_3$ : Treating cane node in hot water (50$^oC$) urea solution (3%) for 2 hours.

$T_4$ : Priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio.

$T_5$ : Conventional 3-bud sett planting.

*$T_6$ : Primed and sprouted cane node (Incubated for four days after priming).

*Put the single cane node in the slurry of cattle dung, cattle urine and water for 15 minutes. Take out the buds and put in decompos FYM and cover it with sugarcane trash for 4-5 days for sprouting.

**Design** : RBD

**Replications** : Four

**Note:**

1. Cane nodes having bud and root bands with 4-5cm length and 10-15 g in weight will be taken up for planting.
2. Normal package of practices will be followed.
3. After planting cane nodes in furrows, these will be covered with 2-3cm soil layer.
4. At the time of planting, there should be 60% available moisture in the soil.
5. Depth of planting at 10cm with soil coverage of 2.5cm. Plant to plant spacing at 30cm.

**Observations to be recorded** :

i) Germination at 10,20,30 and 40DAP.
ii) Shoot counting at 60,90,120 and 150DAP.
iii) Per clump shoot counting at 60,90,120 and 150DAP.
iv) Number of millable canes, cane length, diameter and weight of cane.
v) Juice quality (brix, pol% juice and purity).
vi) Cane and sugar yields.

## SUMMARY REPORT OF THE LAST YEAR (2012-13)

## NORTH WEST ZONE

### 1. FARIDKOT

Germination% of single bud was significantly better than three budded setts (AS 66.1). Three budded planting was significantly better than all single bud treatments in respect of cane yield. Among single bud treatments priming has some positive effect but not statistically significant.

### 2. KOTA

Priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio was found suitable for increasing germination (30 DAP) and cane yield which was significantly superior over rest of the treatments except primed and sprouted cane node ($T_6$).

### 3. LUDHIANA

Priming of single cane node done by any method could not match the yielding potential of conventional 3 bud sett planted sugarcane. All the traits of primed and unprimed cane nodes were significantly inferior to the conventional 3 bud sett. Although the germination ability of the single cane node when primed was significantly better to unprimed cane node but the slender, thinner, shorter and light weight canes obtained from single cane node proved quite inferior to the canes obtained from conventional 3 bud sett.

### 4. LUCKNOW

Conventional planting with 3-bud setts although produced cane yield at par with primed cane node treatments but with the use of huge seed cane (72 q/ha) whereas only 17.52 q/ha seed cane was used in cane node planting method. The germination percentage of primed cane node in hot water and 3% urea, with cattle dung, urine & water and primed & sprout & role was in the range of 77 to 79% against 41% of conventional 3 bud sutt. at 40 DAP.

### 5. PANTNAGAR

Higher germination at 20 DAP was recorded in the treatment of ($T_3$) - hot water at 50$^oC$ + 3 % urea solution for 2 hours and even sustained at 30 and 40 DAP. Higher cane yield was recorded in the treatment of conventional 3 budded setts which was significantly higher over rest of the treatments except $T_2$- (50 $^oC$ hot water treatment for 2 hours). CCS yield was recorded highest in $T_5$- conventional 3 bud setts sowing.

**6. SHAHJAHANPUR**

Priming of cane node with cattle dung, cattle urine and water produced significantly higher cane yield of 97.68 t/ha and it was followed by treating cane node in hot water ($50^0$C) and urea solution (3%) for two hours with cane yield of 92.59 t/ha against 76.85 t/ha of conventional 3 bud sett planting.

**7. UCHANI**

Three bud planting recorded highest number of shoots, millable canes, cane weight, cane yield, CCS% and sugar yield and significantly outyielded all the treatments. Among priming treatments planting of primed and sprouted cane node ($T_6$) recorded highest germination number of shoots, millable canes, cane weight, cane yield and sugar yield which was at par with that of $T_3$ (Treating in hot water + 3% urea) in respect of cane yield.

**PENINSULAR ZONE**

**8. MANDYA**

The conventional three budded sett performed significantly excelled all other treatments in respect of germination and cane yield.

**9. PADEGAON**

The priming cane node with cattle dung plus cattle urine and water in 1:2:5 ratio for 15 minutes recorded significantly highest cane and CCS yields (132.78 and 18.94 t/ha), but was cane node in hot water for $50^o$c and urea solution (3%) for 2 hours was the next superior at par with that of treating in hot water + 3% urea ($T_3$), treating in hot water ($T_2$) and conventional 3 bud sett planting ($T_5$).

**10. POWARKHEDA**

The germination percentage, cane yield and yield attributes increased significantly due to treatment of priming cane node with cattle dung, cattle urine & water in 1:2:5 ratio(70.31%) than other treatments. But treatments of cane node in hot water 50 C urea solution 3% for 2 hr.(63.67%), primed & sprouted cane node (Incubated for 4 days after priming (62.34%), treating cane node in hot water at 50 C for 2 hr.(61.80%), Conventional 3 bud sett planting (60.63%), Un-primed cane node (58.13%), although showed beneficial effects on germination per cent crop growth and yield of the crop but increase in germination percentage was not reached up to the level of significance.

**11. SANKESHWAR**

As the germination was affected with hot water treatment in treatment no. $T_2$ and $T_3$ and poor germination in $T_4$ so the trial was vitiated.

**12. NAVSARI**

Maximum final germination was recorded in $T_6$ (Primed & sprouted cane) with 70.5% germination which was at par with that of $T_4$ (Priming the cane with cattle dung urea & water) and $T_3$

(Treating in hot water with 3% urea). In case of cane yield $T_4$ significantly outyielded all the treatments prorucing cane yield of 118.9 t/ha.

**13. THIRUVALLA**

The experimental results revealed that the conventional 3-bud sett planting recorded the highest germination percentage, cane and sugar yield and it was on par with Priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio.

**14. AKOLA**

During the season 2011-12 the total rainfall received was 515.8 mm which was 34.6 percent less than normal (789 mm). Due to shortage of irrigation water, the experiment could not be planted during 2012-13 and 2013-14.

## EAST COAST ZONE

**15. ANAKAPALLE**

The results indicated that conventional 3 bud sett planting recorded significantly higher number of millable canes (67188) and cane yield (75.3 t/ha). Priming cane node with cattle dung, urine and water in 1:2:5 ratio performed better and registered higher cane yield of 73.5 t/ha among different priming cane node treatments and there was marked variation between these two treatments *i.e.* ($T_4$ & $T_5$).

**16. CUDDALORE**

Planting of sugarcane with three budded setts ($T_5$) significantly proved superior over all the treatments in respect of germination, growth, quality and yield parameters of sugarcane.

**17. NAYAGARH**

Maximum germination of 51.8% at 40 DAP was recorded in $T_5$ (Conv. 3 bud sett) which was close to that of $T_6$ (Primed & sprouted nodes). The same treatment $T_5$ yielded more (80.75 t/ha) than other treatments but was at par with that of $T_6$ and $T_4$ (Priming in cattle dung, urine & water).

## NORTH CENTRAL ZONE

**18. PUSA**

Conventional 3-bud set planting which was significantly superior over rest of the treatments in respect of germination, millable cane and cane & sugar yield.

**19. SHEORAHI**

All the treatments except unprimed cane node was statistically close to each other with maximum cane yield of 72.62 t/ha in $T_4$ (Priming with cattle dung, urea and water). In case of germination percentage too maximum was recorded in $T_4$ (49.8%) which was closely followed by $T_6$ (Primed & sprouted node) and $T_3$ (Treating in hot water + 3% urea solution).

## NORTH EASTERN ZONE

### 20. BURALIKSON

Conventional 3 bud sett planting ($T_5$) significantly excelled all the treatments in respect of germination having 61.9%. Surprisingly lowest germination was observed in primed & sprouted cane (26.6%). Inspite of significantly more NMC in $T_5$, no significantly variation in yield was observed.

**CENTRES ALLOTTED**: All the participating centres of AICRP(S)

**CENTRES REPORTED**:

**NORTH WEST ZONE:** 7, All except Sriganganagar

**PENINSULAR ZONE:** 7, All except Coimbatore, Kolhapur and Pune

**NORTH CENTRAL ZONE:** 2, Pusa and Seorahi

**NORTH EASTERN ZONE:** 1, Buralikson

**EAST COAST ZONE:** 3, All the centres

**REPORT OF THE CURRENT YEAR (2013-14)**

**Zone wise and Centre wise reports**

**NORTH WEST ZONE**

**PROJECT No. AS 66**

## 1. FARIDKOT

Germination% of single bud was significantly better than three budded setts. Three budded planting was significantly better than all single bud treatments. Among single bud treatments priming has some positive effect but not significant statistically.

**Table AS 66.1:** Growth, yield and quality of sugarcane during 2013-14 under various treatments

| Treatment | Germination (%) | | No. of Shoots 000/ha | NMC 000/ha | Cane length (cm) | Cane diameter (cm) | Single cane wt. (g) | Cane yield (t/ha) | Sucrose (%) |
|---|---|---|---|---|---|---|---|---|---|
| | 30DAS | 40DAS | | | | | | | |
| $T_1$ | 68.3 | 70.7 | 121.7 | 88.9 | 210 | 2.50 | 825 | 62.7 | 16.59 |
| $T_2$ | 69.7 | 72.1 | 142.6 | 93.2 | 207 | 2.63 | 874 | 65.1 | 16.62 |
| $T_3$ | 68.7 | 69.7 | 144.7 | 97.7 | 209 | 2.52 | 800 | 66.0 | 16.03 |
| $T_4$ | 49.6 | 51.0 | 105.1 | 82.4 | 205 | 2.63 | 825 | 65.1 | 16.80 |
| $T_5$ | 38.4 | 43.9 | 174.8 | 108.6 | 235 | 2.55 | 951 | 86.5 | 16.17 |
| $T_6$ | 53.1 | 54.5 | 100.9 | 89.6 | 201 | 2.48 | 827 | 64.4 | 15.53 |
| CD (5%) | 12.2 | 11.3 | 26.2 | 12.2 | 19 | NS | NS | 4.5 | NS |

## 2. KAPURTHALA

The soil of the experimental field being loamy in nature, tested medium in organic carbon (0.66 %), very high in available P (59.5 kg/ha) and very high in available K (925 kg/ha). The objective was to cut down the seed cost and increase germination percentage of the single cane node.

In this experiment the optimum germination was achieved in only T5 where conventional three budded sets were planted whereas all other treatments had very poor germination. Hence the data was not recorded.

## 3. UCHANI

An early maturing variety CoH 160 was planted on clay loam soil in texture having pH 8.2, EC 0.44 $dsm^{-1}$, organic carbon 0.38%, available P 12.0 kg/ha and available K 162 kg/ha. in randomized block design with three replications. The crop was planted at 75 cm row spacing on March 9, 2013. Cane node having buds and root bands with 4-5 cm length were taken for planting. After planting cane nodes in furrows were covered with 2-3cm soil layer. Cane nodes were planted at 10 cm depth with plant to plant spacing of 30 cm. Recommended doses of phosphorus (50 kg $P_2O_5$/ha) and potash (50 kg $K_2O$/ha) were applied at the time of planting whereas nitrogen was applied in three equal splits. The crop was irrigated at 8-10 days intervals during pre-monsoon period and 20 days interval during post monsoon period. The harvesting of the experiment was done on Feb. 22, 2014.

No germination was noticed in any treatments at 10 days after planting. Highest germination was recorded in conventional three budded sett planting and planting of primed and sprouted cane node (Incubated for four days after priming) at 20,30 and 40 days after planting. Three bud planting recorded highest number of shoots (165.5 thousands/ha), millable canes (116.0 thousands/ha), cane weight (812 g), cane yield (92.0 t/ha), CCS (12.12 %) and sugar yield (11.15 t/ha) among all the treatments. Among priming treatments, planting of primed and sprouted cane node ($T_6$) recorded highest germination at 40 DAS (51.5%), number of shoots (90.4 thousands/ha), millable canes (88.0 thousands/ha), cane weight (700 g), cane yield (60.0 t/ha) and sugar yield (7.18 t/ha). Planting of cane node after dipping in hot water ($50^o$ C) +urea solution (3%) for 2 hours (T3) was found second best among priming treatments. Unprimed cane node recorded lowest number of number of shoots, millable canes, cane weight, cane yield and sugar yield.

**SUMMARY:** Three bud planting recorded highest number of shoots (165.5 thousands/ha), millable canes (116.0 thousands/ha), cane weight (812 g), cane yield (92.0 t/ha), CCS (12.12 %) and sugar yield (11.15 t/ha) among all the treatments. Among priming treatments, planting of primed and sprouted cane node ($T_6$) recorded highest germination at 40 DAS (51.5%), number of shoots (90.4 thousands/ha), millable canes (88.0 thousands/ha), cane weight (700 g), cane yield (60.0 t/ha) and sugar yield (7.18 t/ha).

**Table AS 66.3.1:** Effect of different treatments on germination and no. of shoots of sugarcane

| Treatment | | Germination (%) | | | No. of shoots (000/ha) |
|---|---|---|---|---|---|
| | | 20 DAP | 30 DAP | 40 DAP | 120 DAP |
| $T_1$ | Un-primed cane node | 17.6 | 28.2 | 37.6 | 71.7 |
| $T_2$ | Treating cane node in hot water at 50°C for 2 hours. | 19.8 | 30.6 | 40.1 | 75.8 |
| $T_3$ | Treating cane node in hot water (50° C) +urea solution (3%) for 2 hours | 27.5 | 38.3 | 47.8 | 81.8 |
| $T_4$ | Priming cane node with cattle dung, cattle urine and water in1:2:5 ratio. | 19.7 | 33.6 | 44.2 | 76.3 |
| $T_5$ | Conventional 3-bud sett planting. | 33.4 | 42.1 | 52.0 | 165.5 |
| $T_6$ | Primed and sprouted cane node (Incubated for four days after priming) | 30.7 | 41.5 | 51.5 | 90.4 |
| **CD at 5%** | | 2.8 | 3.2 | 4.0 | 9.0 |

**Table AS 66.3.2:** Effect of different treatments on growth and cane yield of sugarcane

| Treatment | | NMC (000/ha) | Cane height (cm) | Cane weight (g) | Cane yield (t/ha) | CCS (%) | Sugar yield (t/ha) |
|---|---|---|---|---|---|---|---|
| $T_1$ | Un-primed cane node | 69.8 | 116 | 663 | 45.1 | 11.92 | 5.37 |
| $T_2$ | Treating cane node in hot water at 50°C for 2 hours. | 73.9 | 134 | 671 | 48.1 | 11.83 | 5.69 |
| $T_3$ | Treating cane node in hot water (50° C) + urea solution (3%) for 2 hours | 79.4 | 175 | 697 | 53.7 | 11.88 | 6.39 |
| $T_4$ | Priming cane node with cattle dung, cattle urine and water in1:2:5 ratio. | 74.4 | 180 | 668 | 48.3 | 11.91 | 5.75 |
| $T_5$ | Conventional 3-bud sett planting. | 116.0 | 224 | 812 | 92.0 | 12.12 | 11.15 |
| $T_6$ | Primed and sprouted node (Incubated for four days after priming) | 88.0 | 186 | 700 | 60.0 | 11.98 | 7.18 |
| CD at 5% | | 6.5 | 17 | 24 | 4.1 | 0.12 | 0.50 |

## 4. LUCKNOW

Results of an experiment planted with the objective of assessing suitable cane node priming technique for accelerating germination indicated that the priming of cane nodes with hot water (50$^{o}$C)+ 3% urea solution for 2 hrs ($T_3$) or cattle dung, cattle urine and water in 1:2:5 ratio and planted directly in the field ($T_4$) or after incubation (4 days) ($T_6$) exhibited significantly higher germination of cane buds (78.21%) at 10, 20, 30 and 40 days after planting (DAP) as compared to un-primed cane nodes ($T_1$) (19.03, 28.64, 39.84 and 54.60%) or treating them with hot water at 50$^{o}$C for 2 hrs. only ($T_2$) (14.58, 30.24, 37.15 and 44.33%). Conventionally planted crop with 3-bud setts produced the lowest germination at all the dates, and it was 38.68% at 40 days after planting. Number of tillers and millable canes and yield of cane also exhibited the same trend as the germination of cane buds obtained in different treatments except in the conventional planting ($T_5$) where number of tillers and millable canes were almost the same with that of $T_3$, $T_4$ and $T_6$ treatments, which was by virtue of three times more number of cane buds planting. Accordingly, cane yields obtained under $T_3$,$T_4$,$T_5$ and $T_6$ treatments being statistically at par among themselves were significantly higher to the tune of 12.65 and 11.29% than that of $T_1$ and $T_2$ treatments (un-primed cane nodes or treated with hot water only). Conventional planting with 3-bud setts although produced cane yield at par with primed cane node treatments but with the use of huge seed cane (72 q/ha) whereas only 17.52 q/ha seed cane was used in cane node planting method. CCS% cane did not differ significantly due to different treatments in the test.

**SUMMARY**: Cane yields obtained under $T_3$,$T_4$,$T_5$ and $T_6$ treatments being statistically at par among themselves were significantly higher to the tune of 12.65 and 11.29% than that of $T_1$ and $T_2$ treatments (un-primed cane nodes or treated with hot water only). Conventional planting with 3-bud setts although produced cane yield at par with primed cane node treatments but with the use of huge seed cane (72 q/ha) whereas only 17.52 q/ha seed cane was used in cane node planting method. CCS% cane did not differ significantly due to different treatments in the test.

**Table AS 66.4.1:** Effect of cane node priming techniques on the growth, yield and quality of sugarcane

| Treatment | Germination % of cane buds | | | | No. of tillers (000/ha) | No. of millable canes (000/ha) | Cane yield (t/ha) | CCS% cane |
|---|---|---|---|---|---|---|---|---|
| | 10 DAP | 20 DAP | 30 DAP | 40 DAP | | | | |
| $T_1$ : Un-primed cane node | 19.03 | 28.64 | 39.84 | 54.60 | 168 | 103 | 67.48 | 11.34 |
| $T_2$ : Treating cane node in hot water at 50°C for 2 hours | 14.58 | 30.24 | 37.15 | 44.33 | 163 | 105 | 68.53 | 11.03 |
| $T_3$ : Treating cane node in hot water (50°C) and 3% urea solution for 2 hours. | 24.33 | 52.35 | 60.76 | 75.68 | 182 | 112 | 75.50 | 11.20 |
| $T_4$ : Priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio | 30.38 | 40.77 | 65.47 | 75.24 | 206 | 117 | 77.53 | 11.13 |
| $T_5$ : Conventional 3-bud setts planting | 7.03 | 15.33 | 28.33 | 38.68 | 215 | 120 | 78.42 | 11.31 |
| Primed and sprouted cane node (incubated for 4 days after priming) | 20.35 | 49.33 | 67.81 | 74.38 | 209 | 117 | 77.54 | 11.09 |
| CD (P=0.05) | 7.08 | 15.80 | 4.51 | 5.47 | 9.01 | 5.91 | 4.56 | NS |

## 5. PANTNAGAR

The sugarcane variety Co Pant 99214 was planted on 19.3.2013 at 75 cm row distance as per technical programme. Recommended dose of NPK (120: 60: 40 kg/ha) was given to the crop. Half dose of nitrogen and full dose of $P_2O_5$ (60 kg/ha) and $K_2O$ (40 kg/ha) were applied as basal and remaining half nitrogen was top dressed in two splits within 90 days after planting (before onset of the mansoon). Cultural operations were given as per recommendation and need of the crop. The soil of experimental field was silty loam in texture rich in organic carbon (1.05 %) and medium in

available $P_2O_5$ (49.0 kg/ha) and $K_2O$ (240.4 kg/ha) with neutral in reaction (pH 7.3). The crop was harvested on 20.3.2014.

Highest germination (52.0) at 20 DAP was recorded in the treatment $T_3$ (setts treated in hot water (50 $^0$C + 3 % urea solution for 2 hours) which was significant higher over untreated (unprimed). Germination % at 30 and 40 DAP was sustained and found highest shoot population at 150 DAP was recorded highest (168.3) in$T_5$ (conventional 3 bud sett planting) which was significantly higher over rest of the treatments. Higher cane yield, NMC, CCS yield were recorded highest in $T_5$ (conventional 3 budded setts). Average cane weight (1002.5 g) was recorded highest in $T_3$ (sett treatment 50 $^0$C + urea solution 3 % for 2 hours) which was significantly higher over $T_2$, $T_4$ and $T_6$. Cane length was higher in $T_6$ which was significantly higher over $T_1$, $T_3$, $T_5$. Cane girth was recorded highest in $T_7$.

**SUMMARY:** Sugarcane setts germination at 20 DAP was improved by treating the setts with urea 3.0 % solution + hot water 50 $^0$C for 2 hours and germination was sustained at 30 and 40 DAP. Highest cane yield and NMC were recorded in $T_5$ (conventional 3 budded setts sown)**.** CCS yield was also higher in this treatment.

**Table AS 66.5.1:** Effect of priming / treatment on germination, growth and yield & quality of sugarcane

| Treatment | Germination % | | | Shoot population % | | | | NMC 000/ha | Yield t/ha | Sucrose % Nov. |
|---|---|---|---|---|---|---|---|---|---|---|
| | 20 DAP | 30 DAP | 40 DAP | 60 DAP | 90 DAP | 120 DAP | 150 DAP | | | |
| $T_1$-Un-primed cane node | 26.9 | 32.5 | 44.5 | 66.0 | 72.4 | 75.3 | 88.5 | 71.3 | 69.0 | 14.8 |
| $T_2$-Treating cane node in hot water at 50 $^oC$ for 2 hours | 44.4 | 50.3 | 60.3 | 72.9 | 106.9 | 108.0 | 109.5 | 82.7 | 86.0 | 15.3 |
| $T_3$-Treating cane node in hot water at (50 $^oC$) urea solution (3 %) for 2 hours | 52.0 | 52.9 | 65.5 | 103.8 | 111.9 | 113.6 | 120.7 | 88.7 | 72.5 | 15.4 |
| $T_4$-Priming cane node with cattle dung, cattle urine and water at 1:2:5 ratio | 43.5 | 46.0 | 57.8 | 91.2 | 112.2 | 113.3 | 110.0 | 78.6 | 73.8 | 15.6 |
| $T_5$-Conventional 3 bud sett planting | 40.8 | 48.8 | 59.0 | 102.3 | 113.9 | 115.5 | 168.3 | 136.0 | 101.7 | 14.6 |
| $T_6$-Primed and sprouted cane node (Incubated for 4 days after priming) | 40.5 | 45.8 | 55.5 | 68.1 | 76.0 | 78.4 | 102.5 | 82.8 | 79.3 | 15.3 |
| SEm± | 3.9 | 2.3 | 2.9 | 1.9 | 2.0 | 1.9 | 1.1 | 4.4 | 9.1 | 0.07 |
| CD at 5 % | 11.6 | 10.0 | 8.7 | 5.7 | 6.2 | 5.8 | 3.5 | 13.4 | 15.5 | 0.23 |

## 6. SHAHJAHANPUR

The experimental field was medium in organic carbon, available potash and low in available phosphorus with pH 6.58. Experimental crop was planted on March, 19, 2013 and harvested on March 28, 2014.

The experimental data showed that significantly higher germination, NMC and cane yield were found in $T_4$ (Priming cane node with cattle dung, cattle urine and 1:2:3 ratio. The data also showed that unprimed cane node followed by $T_6$ (Primed and incubated cane node).

**SUMMARY:** Priming cane node with cattle dung, cattle urine and water 1:2:3 ratio ($T_4$) gave significantly higher germination and cane yield than that of other treatments. $T_6$ and $T_1$ gave poorest germination. CCS % was not affected with different treatments. If cane node primed and planted directly in the field gave better germination than cane node primed and transplanted after sprouting.

**Table AS 66.6:** Effect of treatments on germination, shoots, millable canes, cane yield and CCS %

| Treatment | Germination (%) | Shoots (000/ha) | NMC (000/ha) | Cane yield (t/ha) | CCS % |
|---|---|---|---|---|---|
| $T_1$- Unprimed cane node | 30.20 | 177.254 | 110.068 | 78.47 | 10.71 |
| $T_2$- Treating cane node in hot water at $50^0$C for 2 hours | 33.00 | 179.165 | 105.670 | 75.49 | 11.36 |
| $T_3$- Treating cane node in hot water at $50^0$C and urea solution (3%) | 34.80 | 186.477 | 128.471 | 90.06 | 11.22 |
| $T_4$- Priming cane node with cattle dung, cattle urine and water 1:2:3 ratio | 38.60 | 193.170 | 134.258 | 93.98 | 11.16 |
| $T_5$- Conventional 3 bud sett planting | 36.70 | 161.457 | 106.828 | 74.42 | 11.06 |
| $T_6$- Primed and sprouted cane node incubated for four days after priming | 28.00 | 158.332 | 121.296 | 86.57 | 11.20 |
| **SE±** | **2.25** | **5.09** | **6.54** | **3.08** | **0.31** |
| **CD 5%** | **4.79** | **10.84** | **13.94** | **6.56** | **NS** |

## 7. KOTA

The experiment with CoPK 05191 was planted on March 13,2013 with the objective of assessing suitable cane node priming technique for accelerating germination and to cut down the seed cost. Recommended dose of fertilizer to each treatment was applied.Data revealed that different priming techniques significantly influence the germination at 20, 30 and 40DAP over unprimed and at par with each other except 10 DAP crop growth stage. The germination (%) receded significantly higher in $T_4$ (52.68 %) over rest of the treatment except conventional three bud sett and$T_6$ treatment at 40 DAP. Conventional 3 bud sett ($T_5$), primed cane node in hot water at ($50^0$C) urea solution (3%) for 2 hours ($T_3$), priming cane node with cattle dung, cattle urine and water in 1:2:5 ratios ($T_4$) or $T_6$ germinated cane eyes significantly better when compared with unprimed cane node. Tillers count was also higher in $T_4$ treatment which was significantly superior over $T_1$ treatment at 90,120 and 150 DAP stage of the crop growth. Non- significantly difference was observed at 60 DAP stage of the crop. Number of tillers, cane length, cane girth and millable cane also exhibited the same trend as the germination of cane buds obtained in different treatments. Cane yield (92.35 t/ha) and CCS (11.85 t/ha) were recorded significantly better under priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio ($T_4$) as compared to $T_1$,$T_2$,$T_3$ and $T_5$ and at par with $T_6$ (90.28 t/ ha). The highest cane yield in these

treatments was due to higher cane length, cane girth and NMC/ha. Crop planted by 3-bud sett, use of huge seed cane (70.0q/ha) whereas only 23 q/ha seed cane as used in cane node planting method. Highest brix % 21.10) was also recorded in $T_4$ whereas sucrose % (18.59) and CCS % (12.84) were also recorded in 3-bud sett treatment which was significantly higher unprimed (T1) and at par with rest of the treatments.

**Summary:** Priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio was found suitable for increasing cane yield which was significantly superior over un-primed cane node, conventional 3- bud sett planting treatment, $T_2$ and $T_3$ except $T_6$.The germination percentage of $T_4$ was significantly higher over rest of the treatments except $T_5$ at 40DAP.

**Table AS 66.7:** Effect of various treatments on sugarcane growth and yield

| Treatment | Germination (%) | | Tillers ('000/ha) | Cane length (cm) | Cane girth (cm) | NMC (000 ha) | Yield (t/ha) | CCS (t/ha) |
|---|---|---|---|---|---|---|---|---|
| | 30 DAP | 40 DAP | 150 DAP | | | | | |
| $T_1$ : | 33.63 | 37.83 | 107.80 | 252.55 | 7.60 | 74.10 | 71.55 | 8.16 |
| $T_2$ : | 35.65 | 41.20 | 116.58 | 271.68 | 7.83 | 88.95 | 76.95 | 9.41 |
| $T_3$ : | 37.15 | 45.60 | 116.20 | 272.50 | 8.24 | 89.45 | 75.43 | 9.28 |
| $T_4$ : | 40.65 | 52.68 | 127.90 | 276.03 | 8.88 | 99.20 | 92.35 | 11.85 |
| T5 : | 38.65 | 46.60 | 123.75 | 286.25 | 8.44 | 76.58 | 76.98 | 9.37 |
| $T_6$ : | 37.20 | 51.30 | 126.85 | 285.05 | 8.70 | 96.90 | 90.28 | 11.60 |
| SEm ± | 1.40 | 2.10 | 5.10 | 8.00 | 0.30 | 5.10 | 3.90 | 0.60 |
| CD at 5% | 4.20 | 6.50 | 15.40 | 24.30 | 1.00 | 15.50 | 11.70 | 2.00 |
| CV | 6.50 | 8.10 | 7.30 | 5.10 | 6.70 | 10.10 | 8.30 | 11.20 |

## PENINSULAR ZONE

### 8. NAVSARI

The data related to growth, yield and quality parameters are presented in Table AS 66. 1 to 3. Significantly highest germination % was recorded with treatment $T_6$ (Primed and sprouted cane node (incubated for four days after priming)) at 10, 20, 30 and 40 DAP over unprimed cane node. At 60 and 90 DAP, significantly highest shoot was noticed with $T_6$ and remained at par with almost all the treatments except $T_1$ at 60 DAP while at 90 DAP it was at par with $T_4$ and $T_3$. There was no significant difference among treatments for no. of shoots at 120 and 150 DAP. Significantly higher per clump shoots were found with $T_6$ at 60 & 120 DAP while at 90 & 150 DAP it found highest with $T_4$ and remained at par with $T_6$.

The highest and lowest NMC (109.20 & 81.60 $ha^{-1}$) was noticed with $T_4$ (Priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio) and $T_5$ (Conventional 3 bud sett planting) respectively. There was no significant difference was observed due to various priming techniques on cane length, girth, single cane weight and CCS yield. Significantly highest and lowest cane yield was yield was recorded with $T_4$ (111.57 t $ha^{-1}$) and $T_5$ (91. 80 t $ha^{-1}$) respectively. Almost all the quality parameters were not influenced due to priming treatment except CCS % and pol % juice which noticed highest with $T_1$ however pol % juice remained at par with $T_6$.

**SUMMARY:** There was no significant difference was observed due to various priming techniques on cane length, girth, single cane weight and CCS yield. Significantly highest and lowest cane yield was yield was recorded with $T_4$ (111.57 t $ha^{-1}$) and $T_5$ (91. 80 t $ha^{-1}$) respectively. Almost all the quality parameters were not influenced due to priming treatment except CCS % and pol % juice which noticed highest with $T_1$ however pol % juice remained at par with $T_6$.

**Table AS 66.8:** Growth parameters as influenced by cane node priming technique

| Treatment | Germ % 20 DAP | Germ % 40 DAP | NMC 000/ha | Cane length (cm) | Cane yield (t/ha) | CCS yield (t/ha) |
|---|---|---|---|---|---|---|
| $T_1$ | 38.4 | 55.4 | 84.72 | 219.38 | 93.05 | 12.25 |
| $T_2$ | 42.2 | 61.4 | 86.46 | 211.37 | 95.02 | 11.41 |
| $T_3$ | 44.6 | 67.0 | 93.92 | 239.57 | 97.22 | 11.87 |
| $T_4$ | 47.3 | 64.9 | 109.03 | 239.22 | 111.57 | 13.91 |
| $T_5$ | 39.6 | 53.9 | 81.60 | 235.35 | 91.86 | 11.15 |
| $T_6$ | 52.1 | 72.8 | 91.32 | 225.47 | 97.59 | 12.06 |
| S.Em ± | 2.3 | 3.4 | 4.6 | 10.00 | 4.18 | 0.59 |
| C.D.at 5% | 7.0 | 10.4 | 13.8 | NS | 12.60 | NS |
| C.V.% | 10.6 | 11.1 | 10.11 | 8.76 | 8.56 | 9.74 |

## 9. POWARKHEDA

The germination percentage was influenced significantly due to various treatments during experimentation. However, germination per cent was recorded significantly higher (59.92) in priming cane node with cattle dung, cattle urine & water in 1:2:5 ratio treatment as compared to Un-primed cane node (46.72), but increase in germination per cent did not differ significantly. Planting was done on 10$^{th}$ January 2013.

The number of shoots increased significantly due to treatment of priming cane node with cattle dung, cattle urine & water in 1:2:5 ratio (91.36) as compared to Un-primed cane node (78.63). Except Un-primed cane node, other treatments showed beneficial effect on tillers.The plant height increased significantly due to treatment of priming cane node with cattle dung, cattle urine & water in 1:2:5 ratio (265 cm) as compared to Un-primed cane node (248 cm). Increase in height were at par in between Treating cane node in hot water ($50^0$ C) + urea solution (3%) for 2 hr. (260 cm) and priming cane node with cattle dung, cattle urine & water in 1:2:5 ratio (265 cm) treatments.

The NMC was influenced significantly due to treatments. Significantly higher NMC values recorded of prming cane node with cattle dung, cattle urine & water in 1:2:5 ratio (87.35) as compared to un-primed cane node (74.07) but increase in NMC did not differ significantly. The cane yield increased significantly due to treatment of priming cane node with cattle dung, cattle urine & water in 1:2:5 ratio (86.73 t/ha) as compared to Un-primed cane node (70.68 t/ha). But cane yield did not differ significantly. The value of brix per cent did not differ significantly due to various treatments during experimentation. The brix percentage ranged from 21.25 to 21.34 per cent.

**Summary:** The germination percentage, cane yield and yield attributes increased significantly due to treatment of priming cane node with cattle dung, cattle urine & water in 1:2:5 ratio (59.92%) than other treatments.

**Table AS 66.9:** Effect of different treatments on germination growth, yield and quality of sugarcane

| S.No. | Treatments | Germination (%) | Tillers (000'/ha) | Height (cm) | NMC (000'/ha) | Brix (%) | Yield (t/ha) |
|---|---|---|---|---|---|---|---|
| 1 | Un-primed cane node | 46.72 | 78.63 | 248 | 74.07 | 21.27 | 70.68 |
| 2 | Treating cane node in hot water at 50 C for 2 hr. | 48.91 | 84.57 | 250 | 77.16 | 21.27 | 76.62 |
| 3 | Treat. cane node in hot water (50 C) urea solution (3%) for 2 hr. | 51.33 | 85.34 | 260 | 78.94 | 21.25 | 78.32 |
| 4 | priming cane node with cattle dung, cattle urine & water in 1:2:5 ratio | 59.92 | 91.36 | 265 | 87.35 | 21.26 | 86.73 |
| 5 | Conventional 3 bud sett planting | 49.06 | 88.58 | 246 | 80.86 | 21.34 | 80.25 |
| 6 | primed & sprouted cane node (Incubated for 4 days after priming | 47.81 | 82.64 | 249 | 74.61 | 21.34 | 74.61 |
| **S Em ±** | | **1.67** | **2.03** | **2.08** | **1.77** | **0.03** | **1.68** |
| **CD at 5%** | | **5.04** | **6.12** | **6.26** | **5.32** | **NS** | **5.06** |

**10. PADEGAON**

The field experiment was planted on 16 February 2013 and was harvested on 31.1.2014. The data of second year trial revealed that priming cane node with cattle dung plus cattle urine and water in 1:2:5 ratio ($T_4$) recorded significantly the highest cane and CCS yield (134.68 and 14.33 t $ha^{-1}$). However, it was at par with treating cane node in hot water in 50$^o$c and urea solution (3%) for 2 hours ($T_3$) (131.77 and 14.24 t $ha^{-1}$), treating cane node in hot water in 50$^o$c for 2 hours ($T_4$). (128.86 and 13.62 t $ha^{-1}$) and conventional 3 bud setts planting ($T_5$) (124.48 and 14.18 t $ha^{-1}$).

The data revealed that conventional 3 bud setts planting ($T_4$) recorded significantly higher germination per cent (75.54) and it was found at par with rest of the treatments except treating cane node in hot water in 50 $^0$C for 2 hrs ($T_2$). The priming cane node with cattle dung plus cattle urine and water in 1:2:5 ratio ($T_4$) recorded significantly higher tillering ratio (1.78), millable height (306 cm), cane girth (11.1 cm), number of internodes (30), number millable canes (105180/ha) and weight per cane (1.28 kg). It was followed by treating cane node in hot water in 50$^o$c and urea solution (3%) for 2 hours ($T_3$).The data regarding juice quality parameters are presented in Table 2 revealed that priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio ($T_4$) recorded significantly the highest brix (22.30), sucrose (20.34 %), and CCS (14.33 %). While purity (96.28%) was recorded significantly the highest under treatment $T_5$ (conventional 3 bud setts planting).

**SUMMARY:** The conventional 3 bud setts planting recorded significantly higher germination per cent (75.54) and it was found at par with rest of the treatments except treating cane node in hot water in 50 $^0$C for 2 hrs. The Priming cane node with cattle dung plus cattle urine and water in 1:2:5 ratio for 15 minutes recorded significantly the highest cane and CCS yields (134.68 and 14.33 t/ha), treating cane node in hot water for 50$^o$c and urea solution (3%) for 2 hours was the next superior treatment.

**Table AS 66.10:** Mean cane and CCS yields as affected by various treatments

| Treatment | Cane yield (t/ha) | CCS yield (t/ha)) |
|---|---|---|
| $T_1$ : Un-primed cane node. | 116.96 | 13.68 |
| $T_2$ :Treating cane node in hot water in 50$^o$c for 2 hours. | 128.86 | 13.62 |
| $T_3$ : Treating cane node in hot water in 50$^o$c urea solution (3%) for 2 hours | 131.77 | 14.24 |
| $T_4$ : Priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio | 134.68 | 14.33 |
| $T_5$ : Conventional 3 bud setts planting. | 124.48 | 14.18 |
| $T_6$ Primed and sprouted cane node ( Incubated for four days after priming ) | 119.80 | 13.84 |
| **SE+** | **3.88** | **0.10** |
| **C.D at 5%** | **10.86** | **0.28** |

**11. SANKESHWAR**

As the germination was affected with hot water treatment in treatment no. T2 and T3 and poor germination in T4 so the trial was vitiated.

**12. THIRUVALLA**

The experiment was conducted to find out suitable cane node priming technique and to assess the effect of cane node on acceleration of germination. The crop was planted on 31.01.2013 and harvested on 20.1.2014. The results revealed that the different priming techniques significantly influenced the germination percentage and shoot population. Highest germination percentage and maximum shoot population were recorded in 3-bud sett planting ($T_5$) which was on par with the treatment of priming cane node in cattle dung, cow's urine and water ($T_4$).The lowest value for the above parameters were obtained for unprimed cane node ($T_1$).

Highest cane length (255.74 cm), MCC (105540/ha), cane yield (108.62 t/ha) and sugar yield (13.32 t/ha) were recorded for the 3 bud sett planting ($T_5$) which was on par with the treatment $T_4$. But cane girth, single cane weight, CCS% were not significantly influenced by the treatments.

**SUMMARY:** The results revealed that the conventional 3-bud sett planting recorded the highest germination percentage, cane and sugar yield and it was on par with priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio.

**Table AS 66.12:** Cane yield and juice quality as influenced by cane node priming techniques

| Treatment | | Cane length (cm) | Cane girth (cm) | Cane weight (kg) | MCC ('000/ha) | CCS (%) | Cane yield (t/ha) | Sugar yield (t/ha) |
|---|---|---|---|---|---|---|---|---|
| $T_1$ | Un primed cane node | 228.17 | 9.60 | 1.50 | 73.75 | 14.48 | 78.37 | 11.17 |
| $T_2$ | Cane node in hot water at 50$^o$ c for 2 hours | 243.45 | 9.26 | 1.60 | 89.80 | 14.08 | 90.10 | 12.69 |
| $T_3$ | Cane node in hot water (50$^o$ c) Urea solution (3%))for 2 hours | 247.61 | 9.51 | 1.62 | 90.20 | 12.59 | 95.20 | 11.99 |
| $T_4$ | Cane node in cattle dung, cows urine and water (1:2:5) | 250.08 | 10.12 | 1.65 | 104.72 | 12.35 | 105.80 | 13.07 |
| $T_5$ | 3 bud sett | 255.74 | 10.26 | 1.68 | 105.54 | 12.19 | 108.62 | 13.32 |
| $T_6$ | Primed and sprouted cane node | 222.99 | 9.42 | 1.45 | 89.13 | 16.23 | 80.92 | 11.50 |
| **CD (0.05)** | | **18.76*** | **NS** | **NS** | **9.05*** | **NS** | **8.25*** | **1.70*** |

## EAST COAST ZONE

### 13. ANAKAPALLE

Experiment was planted on 7.3.2013 and harvested on 24.1.2014. Germination is recorded at 30 and 40 days after planting expressed in % and presented in table-4. At 40 DAP, conventional 3 bud sett planting recorded significantly higher per cent germination (85.9). Among different priming cane node treatments, priming cane node with cattle dung, urine and water in 1:2:5 ratio recorded highest germination percent (82.0). Significantly lowest per cent germination was registered in un-primed cane node plot (58.8).

Significant differences were observed in number of millable canes due to different priming cane node treatments. Conventional 3 bud sett planting recorded significantly higher number of millable canes (84,141/ha) but it was on par with priming cane node with cattle dung, urine and water in 1:2:5 ratio (79,471/ha). Un-primed cane node plot registered significantly lower number of millable canes/ha (73,994/ha). Cane yield was recorded at harvest and presented in table AS 66.13. Conventional 3 bud sett planting recorded significantly higher cane yield (84.6 t/ha) than with primed cane nodes planting. However, it was found on par with planting of primed cane nodes treated with cattle dung, urine and water in 1:2:5 ratio (79.5 t/ha). Significantly lowest cane yield of 63.3 t/ha was registered in un-primed cane node treatment (73.4 t/ha). Sugar yield was computed treatment wise. Sugar yield ranged from 10.3 t/ha to 11.5t/ha.

**SUMMARY:** Priming of cane nodes in different methods for accelerating the germination in sugarcane was studied at Regional Agricultural Research Station, Anakapalle during 2013-14 season. The results indicated that conventional 3 bud sett planting recorded significantly higher number of millable canes (84,141/ha) and cane yield (84.6 t/ha). Priming cane node with cattle dung, urine and water in 1:2:5 ratio performed better and registered higher cane yield of 79.5 t/ha among different priming cane node treatments and it was on par with the conventional three budded sett planting.

**Table AS 66.13:** Yield attributes, yield and quality of sugarcane as influenced by priming of cane node treatments

| Treatment | Germination (%) at 30DAP | Germination (%) at 40DAP | NMC/ha | Cane yield (t/ha) | Sugar yield (t/ha) |
|---|---|---|---|---|---|
| T1:Un-primed cane node | 46.7 | 58.8 | 73,994 | 73.4 | 10.7 |
| T2: Treating cane node in hot water in $50^0$C for 2 hours. | 65.4 | 75.8 | 76,238 | 75.3 | 10.6 |
| T3: Treating cane node in hot water ($50^0$ C) + urea solution (3%) for 2 hours | 62.2 | 80.9 | 77,227 | 78.7 | 11.5 |
| T4: Priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio | 70.5 | 82.0 | 79,471 | 79.5 | 11.2 |
| T5: Conventional 3 bud settplanting. | 75.8 | 85.9 | 84,141 | 84.6 | 11.4 |
| T6: Primed and sprouted cane node (incubated for four days after priming) | 49.2 | 60.3 | 74,712 | 74.6 | 10.3 |
| SEm± | 2.4 | 1.09 | 1742 | 1.8 | - |
| C.D (0.05) | 7.3 | 3.3 | 5249 | 5.3 | NS |
| C.V(%) | 7.8 | 2.9 | 4.5 | 4.8 | 6.3 |

## 14. NAYAGARH

Out of the six treatments, conventional method of planting three budded sugarcane setts proved to be the best with highest number of net millable canes (67.50 th/ha), cane (81.28 t/ha) and CCS yield (10.18 t/ha). The treatment next in order was $T_6$ where primed and sprouted cane nodes were planted which could produce NMC of 65.50 ('000 /ha) with cane and CCS yield of 77.00 and 10.54 t/ha, respectively. Planting of primed cane nodes in cattle dung (1): cattle urine (2): water (5) ratio could produce NMC of 64.00 ('000 /ha) cane and CCS yield of 76.75 and 10.78 t/ha, respectively. These three treatments were at par and significantly superior to other treatment combinations. The higher yield parameters i.e. number of shoots/ha, number of shoots per clump, length and girth of cane in the above mentioned treatments were the factors of higher cane and CCS yield. However, the juice quality was not affected by various priming effects. Planting of unprimed cane nodes ($T_1$) was the lowest yielder (cane and CCS yield of 45.05 and 9.09 t/ha, respectively).

**SUMMARY:** Conventional method of planting three budded sugarcane setts proved to be the best with highest number of net millable canes (67.50 thousand/ha), cane (81.28 t/ha) and CCS yield (10.18 t/ha). The treatment next in order was $T_6$ where primed and sprouted cane nodes were planted which could produce NMC of 65.50 ('000 /ha) with cane and CCS yield of 77.00 and 10.54 t/ha, respectively.

**Table AS 66.14.1:** Effect of priming of cane nodes on germination and shoot count at various stages of cane growth

| Treatments | | (Germination% ) | | | No of shoots (000/ha) | | | |
|---|---|---|---|---|---|---|---|---|
| | | 20 DAP | 30 DAP | 40 DAP | 60 DAP | 90 DAP | 120 DAP | 150 DAP |
| $T_1$ | Unprimed cane node | 8.19 | 27.25 | 37.50 | 24.84 | 48.75 | 52.52 | 49.52 |
| $T_2$ | Treating cane nodes in $50^0$C hot water for 2 hrs | 8.31 | 31.25 | 46.75 | 26.49 | 54.84 | 61.50 | 52.48 |
| $T_3$ | Treating cane nodes in ($50^0$C) hot water urea solution(3%) for 2 hrs | 8.65 | 31.20 | 47.07 | 34.83 | 60.87 | 65.25 | 59.75 |
| $T_4$ | Priming of nodes in cattle dung (1): cattle urine (2) : water(5) ratio | 8.45 | 36.15 | 47.13 | 36.39 | 61.48 | 66.25 | 59.75 |
| $T_5$ | Conventional 3 bud sett planting | 10.18 | 38.83 | 53.50 | 49.43 | 66.73 | 75.00 | 69.00 |
| $T_6$ | Primed and sprouted cane nodes | 9.90 | 37.45 | 51.25 | 46.02 | 59.90 | 72.67 | 66.25 |
| SEm $\pm$ | | 0.464 | 1.407 | 2.575 | 3.949 | 2.962 | 2.413 | 2.796 |
| CD at 5 % | | 1.400 | 4.239 | 7.758 | 11.899 | 8.924 | 7.271 | 8.426 |
| CV% | | 10.38 | 8.35 | 10.91 | 11.74 | 10.08 | 7.36 | 9.41 |

**Table AS 66.14.2:** Effect of priming of cane nodes on yield parameters of cane

| Treatments | | No of shoots/clump | | | | Length of cane (cm) | Girth of cane (cm) | Weight of cane (kg) |
|---|---|---|---|---|---|---|---|---|
| | | 60 DAP | 90 DAP | 120 DAP | 150 DAP | | | |
| $T_1$ | Unprimed cane node | 1.00 | 2.00 | 4.50 | 3.25 | 2.3 | 2.2 | 1.67 |
| $T_2$ | Treating cane nodes in $50^0$C hot water for 2 hrs | 1.00 | 2.00 | 5.50 | 3.75 | 2.3 | 2.3 | 1.80 |
| $T_3$ | Treating cane nodes in ($50^0$C) hot water urea solution(3%) for 2 hrs | 1.00 | 3.00 | 5.75 | 4.00 | 2.3 | 2.4 | 1.79 |
| $T_4$ | Priming of nodes in cattle dung (1): cattle urine (2) : water(5) ratio | 1.75 | 3.00 | 5.75 | 3.75 | 2.5 | 2.6 | 1.82 |
| $T_5$ | Conventional 3 bud sett planting | 2.00 | 4.25 | 6.50 | 5.25 | 2.6 | 2.9 | 1.83 |
| $T_6$ | Primed and sprouted cane nodes | 2.00 | 4.00 | 6.00 | 4.50 | 2.5 | 2.8 | 1.85 |
| SEm $\pm$ | | 0.102 | 0.195 | 0.321 | 0.230 | 0.078 | 0.124 | 0.079 |
| CD at 5 % | | 0.308 | 0.589 | 0.966 | 0.692 | 0.235 | 0.375 | NS |
| CV% | | 14.00 | 12.85 | 11.31 | 11.25 | 6.67 | 9.98 | 8.88 |

**Table AS 66.14.3:** Effect of priming of cane nodes on juice quality and yield of cane

| Treatments | | Brix % | Pol % | Purity % | NMC (000/ha) | Cane yield (t/ha) | CCS (t/ha) |
|---|---|---|---|---|---|---|---|
| $T_1$ | Unprimed cane node | 18.51 | 15.25 | 82.39 | 38.00 | 45.05 | 9.09 |
| $T_2$ | Treating cane nodes in $50^0$C hot water for 2 hrs | 17.11 | 13.78 | 80.54 | 49.81 | 58.03 | 9.75 |
| $T_3$ | Treating cane nodes in ($50^0$C) hot water urea solution(3%) for 2 hrs | 18.55 | 15.52 | 83.67 | 50.25 | 63.75 | 10.44 |
| $T_4$ | Priming of nodes in cattle dung (1): cattle urine (2) : water(5) ratio | 19.01 | 15.98 | 84.06 | 64.00 | 76.75 | 10.78 |
| $T_5$ | Conventional 3 bud sett planting | 18.67 | 14.87 | 79.65 | 67.50 | 81.28 | 10.18 |
| $T_6$ | Primed and sprouted cane nodes | 19.17 | 15.79 | 82.37 | 65.50 | 77.00 | 10.54 |
| SEm $\pm$ | | 0.105 | 0.429 | 2.110 | 1.953 | 2.873 | 0.330 |
| CD at 5 % | | 0.317 | NS | NS | 5.886 | 8.656 | NS |
| CV% | | 1.14 | 5.20 | 4.118 | 6.93 | 10.61 | 8.112 |

## 15. CUDDALORE

Among the six treatments, sugarcane planting with three budded setts ($T_5$) recorded significantly the maximum germination of 68.8, 71.4 and 85.2 per cent at 20, 30 and 40 days after planting. There was no germination up to 10 DAP. Planting of three budded setts ($T_5$) significantly recorded the higher shoot count of 98,800 $ha^{-1}$ and 2,00,400 $ha^{-1}$ on 60 and 90 days after planting. The same treatment was also recorded the maximum shoot population of 1,96,100 $ha^{-1}$ and 1,86,000 ha-1 on 120 and 150 days after planting respectively and was on par with the primed and sprouted cane node (Incubated for four days after priming) which recorded 1,80,000 ha-1 and 1,72,100 $ha^{-1}$ respectively.

The results on growth and yield characteristics of sugarcane revealed that, sugarcane planted with three budded setts ($T_5$) recorded significantly the higher per clump shoot count of 4.58 and 11.12 numbers at 60 and 90 days after planting respectively. At 120 and 150 days after planting, the per clump shoot count was the maximum in sugarcane planted with three budded setts ($T_5$) which recorded10.41 and 10.02 numbers and was comparable with the primed and sprouted cane node (Incubated for four days after priming) ($T_6$) which recorded 9.10 and 8.80 numbers respectively. Planting of three budded setts ($T_5$) significantly recorded the higher millable cane population of 1,60,200 $ha^{-1}$. The same treatment has also recorded the maximum cane length, cane diameter and individual cane weight of 285.16 cm, 2.98 cm and 1.56 kg and was on par with the primed and sprouted cane node (Incubated for four days after priming) which recorded 280.32 cm, 2.75 cm and 1.50 kg respectively.

The quality characteristics of sugarcane indicated that, not significant on brix, pole and purity and also commercial cane sugar percent. The sugarcane planting with three

budded sett (T5) significantly recorded the higher cane yield and sugar yield of 165.4 t ha-1 and 19.98 t ha-1 respectively.

**SUMMARY:** Planting of sugarcane with three budded setts ($T_5$) recorded significantly better all the growth, quality and yield parameters of sugarcane.

**Table AS 66. 15.1:** Effect of priming cane node for accelerating germination on growth and yield characteristics of sugarcane

| Treatment | Germination (%) | | | | Shoot counting ('000/ha) | | | |
|---|---|---|---|---|---|---|---|---|
| | 10 DAP | 20 DAP | 30 DAP | 40 DAP | 60 DAP | 90 DAP | 120 DAP | 150 DAP |
| $T_1$ | 0.40 | 40.6 | 46.0 | 49.8 | 52.0 | 105.3 | 100.1 | 92.6 |
| $T_2$ | 0.57 | 48.5 | 50.8 | 62.0 | 62.1 | 160.2 | 154.2 | 149.4 |
| $T_3$ | 0.62 | 53.7 | 56.2 | 65.8 | 68.1 | 167.5 | 162.6 | 154.3 |
| $T_4$ | 0.68 | 58.4 | 61.7 | 72.3 | 77.0 | 175.8 | 170.0 | 163.8 |
| $T_5$ | 0.72 | 68.8 | 71.4 | 85.2 | 98.8 | 200.4 | 196.1 | 186.0 |
| $T_6$ | 0.60 | 56.8 | 62.5 | 70.4 | 78.5 | 185.1 | 180.8 | 172.1 |
| CD (P=0.05) | 0.03 | 2.80 | 3.00 | 3.60 | 3.65 | 8.50 | 7.75 | 7.00 |

**Table AS 66.15.2:** Effect of priming cane node for accelerating germination on growth and yield characteristics of sugarcane

| Treatments | Per clump shoot count (No.) | | | | Millable cane ('000/ha) | Cane length (cm) | Cane diameter (cm) | Individual cane weight (kg) |
|---|---|---|---|---|---|---|---|---|
| | 60 DAP | 90 DAP | 120 DAP | 150 DAP | | | | |
| $T_1$ | 1.25 | 6.10 | 5.55 | 5.24 | 73.20 | 210.53 | 2.08 | 0.88 |
| $T_2$ | 2.43 | 8.25 | 7.89 | 7.10 | 102.50 | 244.40 | 2.50 | 1.30 |
| $T_3$ | 2.85 | 9.30 | 8.80 | 8.52 | 118.60 | 253.10 | 2.62 | 1.45 |
| $T_4$ | 3.41 | 9.21 | 8.62 | 8.31 | 146.40 | 266.92 | 2.74 | 1.49 |
| $T_5$ | 4.58 | 11.12 | 10.41 | 10.02 | 160.20 | 285.16 | 2.98 | 1.56 |
| $T_6$ | 3.60 | 9.90 | 9.10 | 8.80 | 149.50 | 280.32 | 2.75 | 1.50 |
| CD (P=0.05) | 0.15 | 0.64 | 0.45 | 0.70 | 6.52 | 14.50 | 0.12 | 0.06 |

**Table AS 66.15.3:** Effect of priming cane node for accelerating germination on growth and yield characteristics of sugarcane

| Treatments | Brix | Pole (%) | Purity | CCS (%) | Cane Yield (t/ha) | Sugar Yield (t/ha) |
|---|---|---|---|---|---|---|
| $T_1$ | 17.60 | 15.60 | 88.65 | 11.25 | 70.7 | 7.85 |
| $T_2$ | 18.84 | 16.51 | 87.20 | 12.20 | 101.8 | 12.00 |
| $T_3$ | 18.92 | 16.82 | 88.12 | 12.12 | 116.3 | 13.95 |
| $T_4$ | 19.40 | 17.58 | 90.50 | 12.56 | 148.5 | 18.25 |
| $T_5$ | 19.62 | 17.84 | 91.25 | 12.42 | 165.4 | 19.98 |
| $T_6$ | 19.41 | 17.70 | 91.20 | 12.50 | 153.1 | 18.79 |
| CD (P=0.05) | NS | NS | NS | NS | 7.25 | 0.75 |

**Table AS 66.16.1:** Effect of different treatments on germination and tillers at different days after planting (DAP)

| Treatment | Germination (%) | | | | Tillers (x $10^3$/ha) | | | |
|---|---|---|---|---|---|---|---|---|
| | 10 DAP | 20 DAP | 30 DAP | 40 DAP | 60 DAP | 90 DAP | 120 DAP | 150 DAP |
| **$T_1$** | 00 | 6.25 | 14.07 | 17.50 | 14.13 | 25.31 | 34.06 | 44.56 |
| **$T_2$** | 00 | 5.56 | 13.31 | 17.39 | 15.44 | 26.38 | 35.31 | 49.62 |
| **$T_3$** | 00 | 6.02 | 13.70 | 17.73 | 15.63 | 28.13 | 36.31 | 48.68 |
| **$T_4$** | 00 | 7.32 | 16.71 | 21.30 | 18.25 | 29.25 | 36.75 | 50.81 |
| **$T_5$** | 00 | 12.27 | 24.31 | 30.42 | 42.19 | 61.62 | 72.62 | 94.12 |
| **$T_6$** | 00 | 13.05 | 20.00 | 21.62 | 17.25 | 28.75 | 38.18 | 50.00 |
| **SEm ±** | 00 | 1.01 | 1.51 | 1.53 | 1.50 | 2.40 | 2.34 | 2.85 |
| **CD (P=0.05)** | 00 | 3.07 | 4.58 | 4.67 | 4.57 | 7.312 | 7.11 | 8.70 |
| **CV (%)** | 00 | 14.05 | 17.88 | 14.77 | 14.68 | 14.46 | 11.70 | 10.16 |

## NORTH CENTRAL ZONE

### 16. PUSA

The experimental soil was calcareous, low in organic carbon (0.476%) and available N (206 kg/ha), K (98kg/ha) while, medium in available P (16.43 kg/ha). The midlate BO 141 variety of sugarcane was planted on 10.03.2013 and harvested on 22.03.2014. The germination and tillers were significantly higher in treatment $T_5$ receiving conventional 3-bud sett planting over primed and un- primed cane node planting (Table AS 66.16.1). The maximum germination (30.42%) and tillers (94120/ha) were recorded in $T_5$ while, minimum in $T_1$ i.e un- primed cane node planting. The NMC, single cane weight and cane yield were significantly affected due to different treatments while, cane length and girth and juice quality viz.brix, sucrose and purity were non –significant (Table AS 66.16.2). The NMC (81380/ha) and cane yield (77.06 t/ha) were also significantly higher in $T_5$ over rest of the treatments. The uptake of N, P and K by sugarcane crop followed similar trend of cane yield while, there was no significant impact on nutrient status of post harvest soil (Table AS 66.16.3).

**SUMMARY:** The results thus indicated that the conventional 3-bud set planting was superior over primed and unprimed cane node in respect of germination, tillers and cane yield.

**Table AS 66.16.2:** Effect of different treatments on yield attributing parameters and cane yield

| Treatment | NMC (x $10^3$ /ha) | Cane length (cm) | Girth (cm) | Single cane weight (g) | Cane yield (t/ha) | Brix (%) | Sucrose (%) | Purity (%) | Sugar Yield (%) |
|---|---|---|---|---|---|---|---|---|---|
| **$T_1$** | 35.81 | 191 | 3.13 | 796 | 28.40 | 19.53 | 17.33 | 88.71 | 3.41 |
| **$T_2$** | 42.50 | 192 | 2.98 | 782 | 33.11 | 19.23 | 16.95 | 88.15 | 3.87 |
| **$T_3$** | 41.37 | 192 | 2.84 | 800 | 31.64 | 19.50 | 17.24 | 88.42 | 3.78 |
| **$T_4$** | 41.94 | 207 | 3.01 | 783 | 32.93 | 18.98 | 16.57 | 87.32 | 3.74 |
| **$T_5$** | 81.38 | 205 | 3.10 | 945 | 77.06 | 19.05 | 16.68 | 87.53 | 8.86 |
| **$T_6$** | 41.44 | 196 | 3.06 | 786 | 32.66 | 18.78 | 16.42 | 87.46 | 3.71 |
| **SEm ±** | 2.31 | 9.52 | 0.07 | 36 | 2.96 | 0.26 | 0.27 | 0.45 | 0.37 |
| **CD (P=0.05)** | 7.34 | NS | NS | 111 | 9.01 | NS | NS | NS | 1.12 |
| **CV (%)** | 9.76 | 9.64 | 5.19 | 8.91 | 15.07 | 2.69 | 3.25 | 1.03 | 16.07 |

## 17. SEORAHI

The experiment data were recorded and showed that low germination was there with unprimed cane node, however highest germination was in T4 (priming cane node with cattle dung, cattle urine and water 1:2:3 ratio) treatment. Experiment was planted on March 4, 2013 and harvested on March, 24, 2014. The data also showed that significantly higher cane yield was found in T4 treatment.

**Table AS 66.17:** Effect of treatments on germination, shoots, millable canes, cane yield and sucrose % of cane

| Treatment | Germination (%) | Shoots(,000/ha) | NMC (,000/ha) | Yield ( t/ha) | Sucrose (%) |
|---|---|---|---|---|---|
| T1 | 44.29 | 139 | 107 | 58.95 | 16.10 |
| T2 | 49.71 | 144 | 114 | 63.04 | 15.66 |
| T3 | 51.52 | 149 | 117 | 64.59 | 16.00 |
| T4 | 53.80 | 145 | 115 | 66.67 | 15.65 |
| T5 | 45.36 | 143 | 113 | 62.43 | 15.98 |
| T6 | 52.13 | 139 | 112 | 61.58 | 15.90 |
| S.E. | 1.73 | 2.50 | 5.06 | 0.935 | 0.17 |
| C.D. | 5.24 | 7.58 | 5.06 | 2.845 | N.S. |

## NORTH EASTERN ZONE

## 18. BURALIKSON

The experimental crop var. Kolong (CoBln 9102) was planted on 9$^{th}$ of April, 2013 and was harvested on 17$^{th}$ of March, 2014. The experimental soil was clay loam in texture, poor in organic carbon (0.48 %) and low in available P (19.55 kg $P_2O_5$/ ha) and medium in available K (176 Kg $K_2O$/ ha) with pH 5.1.

Priming of cane node showed varied germination percentages as data shown in the table AS 66.18.1. Out of different treatments, conventional 3-bud sett planting ($T_5$) showed significantly higher germination at different days after planting than all other treatments. The germination percentages 13.0, 37.6, 44.1 and 47.9 were recorded after 10, 20, and 30 and 40 days after planting respectively which were statistically significant in comparison to other cane node treatments.

Moreover, similar trend was observed in case of other yield attributing parameters such as NMC (‘000/ha), cane Diameter (cm) & yield (t/ha). Result showed that conventional 3 bud sett planting recorded significantly higher NMC (96.1 thousand/ha), cane diameter (2.5cm) and yield (90.4 tonnes/ha), respectively than all other treatments (Table AS 66.18.2). However, all other priming technique showed significantly higher yield than the un- primed cane node.

**Table AS 66.18.1:** Effect of primed cane node on germination

| **Treatment** | **Germination (% )** | | | |
|---|---|---|---|---|
| | 10 DAP | 20 DAP | 30DAP | 40 DAP |
| $T_1$ | 4.2 | 17.7 | 28.70 | 37.80 |
| $T_2$ | 6.4 | 20.3 | 32.20 | 38.50 |
| $T_3$ | 9.2 | 22.4 | 33.10 | 38.80 |
| $T_4$ | 8.7 | 26.0 | 34.1 | 40.2 |
| $T_5$ | 13.0 | 37.6 | 44.1 | 47.9 |
| $T_6$ | 4.7 | 11.4 | 16.8 | 27.20 |
| SEm | 1.5 | 2.56 | 2.7 | 3.11 |
| CD 5% | 2.26 | 3.85 | 4.07 | 4.68 |

**Table AS 66.18.2:** Effect of primed cane node on yield and quality parameters

| **Treatment** | **NMC ('000/ ha)** | **Cane length (m)** | **Cane Diameter ( cm)** | **Yield (t/ha)** | **Sucrose ( %)** | **CCS (%)** | **Purity (%)** |
|---|---|---|---|---|---|---|---|
| $T_1$ | 81.3 | 2.5 | 2.5 | 61.4 | 20.0 | 13.1 | 79.6 |
| $T_2$ | 85.1 | 2.5 | 2.6 | 79.2 | 20.0 | 13.1 | 80.3 |
| $T_3$ | 86.6 | 2.5 | 2.6 | 82.5 | 19.9 | 13.3 | 79.6 |
| $T_4$ | 87.7 | 2.5 | 2.4 | 85.8 | 19.8 | 12.9 | 79.3 |
| $T_5$ | 96.1 | 2.5 | 2.5 | 90.4 | 19.7 | 12.8 | 78.6 |
| $T_6$ | 71.0 | 2.5 | 2.4 | 71.7 | 19.9 | 13.1 | 80.5 |
| SEM | 2.78 | 0.11 | 0.07 | 8.67 | 0.29 | 0.27 | 1.14 |
| CD 5 % | 4.18 | NS | 0.11 | 13.06 | NS | NS | NS |

## PROJECT NO. : AS 67

**Title** : **Optimization of fertigation schedule for sugarcane through micro-irrigation technique under different agro- climatic conditions.**

**Objective** : To economize water use in cultivation and improve sugarcane productivity.

**Centres** : Cuddalore, Mandya, Lucknow and Coimbatore (2013-14)

**Year of start** : 2012-13

**Year of completion** : 2014-15

**Treatments** :

**A. Irrigation water/ method applied:**

- $I_1$ - Sub-surface drip irrigation at 75% Pan Evaporation (PE)-irrigation once in two days.
- $I_2$ - Sub-surface drip irrigation at 100% PE-irrigation once in two days.
- $I_3$ - Sub-surface drip irrigation at 125% PE-irrigation once in two days.
- $I_4$ - Farmer's practice-surface irrigation.

**B. Nitrogen levels:**

- $N_1$ - 100% recommended dose of nitrogen (RDN).
- $N_2$ - 75% (RDN).
- $N_3$ - 50% (RDN).

**Details of Methodology** :

Recommended variety of sugarcane will be planted in paired rows at recommended spacing for t region. Drip treatments will be placed between sugarcane rows at a depth of 20-25cm. Entire dose P and K fertilizers as per recommendation of the region will be applied. Entire dose of nitrogen af deducting the amount of N supplied through DAP will be applied through urea in differe installments at 10-12 days interval before onset of monsoon as per the recommendation.

**Treatments** : 12

**Design** : Strip plot.

**Replication** : Three

**Plot size** : 10 rows of 10m length.

**Observations to be recorded** :

**1. Soil parameter:**

i) Physical parameters (bulk density and infiltration rate).
ii) Quantity of water applied.
iii) Water use efficiency.

**2. Sugarcane:**

i) Germination
ii) Periodic tiller population and millable cane count.
iii) Growth parameters *i.e.*, cane length, diameter and weight.
iv) Juice quality (brix, pol and purity).
v) Cane and sugar yields.

## SUMMARY REPORT FOR THE LAST YEAR (2012-13)
## NORTH WEST ZONE

### 1. FARIDKOT

Drip irrigation at 125% CPE/IW ratio was significantly better in cane yield than other treatments. When drip irrigation was applied at 100% CPE/IW the cane yield was at par with farmer's practice. Effect of N levels was non-significant.

### 2. LUCKNOW

The number of millable canes, cane yield and irrigation water use efficiency were significantly influenced by irrigation treatments but not by nitrogen levels. Irrigating crop through sub surface drip at 100% PE significantly outyielded all other treatments. The maximum irrigation water use efficiency of 1898 kg/ha$^{-cm}$ was due to sub-surface drip at 75% PE which was significantly higher than 100% & 125% PE.

### 3. CUDDALORE

Due to non availability of drip materials and delay in the supply of drip irrigation system, the experiment could not be conducted during this year. This experiment will be laid out during the ensuing spring season of 2013. The purchase of drip materials is in progress.

## CURRENT YEAR'S REPORT (2013-14)

## ZONE WISE AND CENTRE WISE REPORT

## NORTH WESTERN ZONE

### 1. FARIDKOT

Drip irrigation at 100% and 125% IW/CPE ratio was at par with surface irrigation in millable canes and cane yield. When drip irrigation was applied at 75% IW/ CPE the cane yield was significantly lower than surface irrigation. Cane yield with 100% recommended dose of nitrogen (RDN) was significantly better than 50% RDN and was at par with 75% RDN. Same is the trend for millable canes.

**Table AS 67.1:** Yield and quality of sugarcane under different irrigation methods and nitrogen levels

| Treatment | Germination (%) | No. of Shoots 000/ha | NMC 000/ha | Cane length (cm) | Cane diameter (cm) | Single cane wt. (g) | Cane yield (t/ha) | Sucrose (%) |
|---|---|---|---|---|---|---|---|---|
| **Irrigation water/ method applied:** | | | | | | | | |
| Drip irrigation at 75% Pan Evaporation (PE)- irrigation once in two days | 33.5 | 138.1 | 101.2 | 174 | 2.38 | 713 | 56.7 | 17.84 |
| Drip irrigation at 100% Pan Evaporation (PE)- irrigation once in two days | 32.4 | 149.2 | 115.1 | 182 | 2.44 | 731 | 71.7 | 17.83 |
| Drip irrigation at 125% Pan Evaporation (PE)- irrigation once in two days | 34.9 | 147.2 | 126.9 | 187 | 2.51 | 817 | 74.4 | 18.45 |
| Farmer's practice-surface irrigation | 31.3 | 153.4 | 118.9 | 178 | 2.47 | 770 | 68.8 | 17.64 |
| CD (5%) | NS | NS | 14.8 | NS | NS | NS | 10.0 | NS |
| **N levels (kg N/ha)** | | | | | | | | |
| 100% recommended dose of nitrogen (RDN) | 33.6 | 155.6 | 119.7 | 184 | 2.49 | 775 | 74.1 | 17.54 |
| 75% (RDN) | 31.9 | 144.3 | 115.8 | 178 | 2.45 | 759 | 68.5 | 18.15 |
| 50% (RDN) | 33.7 | 141.1 | 111.1 | 178 | 2.40 | 739 | 61.0 | 18.12 |
| CD (5%) | NS | NS | 5.3 | NS | NS | NS | 6.8 | 0.51 |

## 2. LUCKNOW

Sugarcane ratoon crop was initiated during first week of April, 2013 and the crop was harvested in the last week of March, 2014. It was observed that irrigation treatments significantly influenced shoot count at 60 and 120 days of ratooning. However, nitrogen doses did not influence the shoot count. Irrigation X nitrogen interaction was non-significant at 60 days of ratooning but it was significant at 120 days of ratooning. Length of sugarcane plant leaf was also significantly influenced by irrigation treatments but leaf width remained unaffected with irrigation and nitrogen treatments both. Irrigation treatments significantly affected number of millable canes. However, the effect of nitrogen and interaction of Nitrogen X Irrigation was non-significant on number of millable canes. Cane stalk length and diameter were also significantly influenced by irrigation treatments. Irrigation Xnitrogen interaction effect was also observed on cane stalk length. Highest sugarcane yield of 94.10 t/ha was observed when sugarcane was drip fertigated with recommended dose of nitrogen and water equivalent to 125 % pan evaporation. However, irrigation water use efficiency (IWUE) was the highest at 2946.88

kg/ha-cm when fertigation was done and the amount of irrigation water was kept as 75 per cent of pan evaporation. The sugarcane yield and IWUE was not influenced significantly by doses of nitrogen in fertigation treatments. With surface irrigation, the mean sugarcane yield and IWUE were 76.43 t/ha and 955.32 kg/ha-cm respectively. Sugarcane juice quality generally remained unaffected with irrigation and nitrogen treatments. However lower dose of nitrogen resulted in higher sucrose, brix and purity.

**SUMMARY:** Highest sugarcane yield of 94.10 t/ha was observed when sugarcane was drip fertigated with recommended dose of nitrogen and water equivalent to 125 % pan evaporation. However, irrigation water use efficiency (IWUE) was the highest at 2946.88 kg/ha-cm when fertigation was done and the amount of irrigation water was kept as 75 per cent of pan evaporation.

**Table AS 67.2.1:** Number of millable canes

| **Nitrogen** / **Irrigation** | **Nitrogen application rate** | | | |
|---|---|---|---|---|
| | **N1 = 100% recommended dose of N** | **N2 = 75% recommended dose of N** | **N3 = 50% recommended dose of N** | **Average** |
| I1= Sub Surface Drip at 75% PE | 124222 | 119278 | 117944 | 120481 |
| I2 = Sub Surface Drip at 100% PE | 124111 | 124389 | 121556 | 123352 |
| I3 = Sub Surface Drip at 125% PE | 121944 | 128944 | 122278 | 124389 |
| I4=Farmers practice surface irrigation | 115222 | 120000 | 113944 | 116389 |
| Average | 121375 | 123153 | 118931 | |
| SE (Irrigation) | | | | 2800 |
| CD (Irrigation) | | | | 8908 |
| SE (Nitrogen) | | | | 2425 |
| CD (Nitrogen) | | | | NS |
| SE (IxN) | | | | 2800 |
| CD(IxN) | | | | NS |

**Table AS 67.2.2:** Sugarcane yield (t/ha)

| Nitrogen / Irrigation | Nitrogen application rate | | | |
|---|---|---|---|---|
| | **N1 = 100% recommended dose of N** | **N2 = 75% recommended dose of N** | **N3 = 50% recommended dose of N** | **Average** |
| I1= Sub Surface Drip at 75% PE | 82.39 | 80.89 | 83.99 | 82.42 |
| I2 = Sub Surface Drip at 100% PE | 84.03 | 83.35 | 83.40 | 83.59 |
| I3 = Sub Surface Drip at 125% PE | 94.10 | 91.00 | 89.31 | 91.47 |
| I4=Farmers practice surface irrigation | 79.54 | 76.42 | 73.32 | 76.43 |
| Average | 85.01 | 82.91 | 82.50 | |
| SE (Irrigation) | | | | 1.41 |
| CD (Irrigation) | | | | 4.50 |
| SE (Nitrogen) | | | | 1.22 |
| CD (Nitrogen) | | | | NS |
| SE (IxN) | | | | 1.41 |
| CD(IxN) | | | | NS |

**Table AS 67.2.3:** Irrigation water use efficiency (kg/ha-cm)

| Nitrogen / Irrigation | Irrigation water applied (ha-cm) | Nitrogen application rate | | | |
|---|---|---|---|---|---|
| | | **N1 = 100% recommended dose of N** | **N2 = 75% recommended dose of N** | **N3 = 50% recommended dose of N** | **Average** |
| I1= Sub Surface Drip at 75% PE | 28.5 | 2890.84 | 2838.21 | 2946.88 | 2891.98 |
| I2 = Sub Surface Drip at 100% PE | 38 | 2211.26 | 2193.35 | 2194.81 | 2199.81 |
| I3 = Sub Surface Drip at 125% PE | 47.5 | 1980.99 | 1915.79 | 1880.12 | 1925.63 |
| I4=Farmers practice surface irrigation | 80 | 994.27 | 955.21 | 916.49 | 955.32 |
| Average | | 2019.34 | 1975.64 | 1984.58 | |
| SE (Irrigation) | | | | | 36.89 |
| CD (Irrigation) | | | | | 117.35 |
| SE (Nitrogen) | | | | | 31.95 |
| CD (Nitrogen) | | | | | NS |
| SE (IxN) | | | | | 36.89 |
| CD(IxN) | | | | | NS |

## 3. CUDDALORE

The drip materials for laying out of sub-surface drip irrigation been purchased this year. This experiment will be laid out during the ensuing spring season of 2014.

## SUMMARY OF THE ACHIEVEMENTS FOR THE YEAR 2013-14

India witnessed a good sugarcane year during 2013-14 as national sugarcane production reached 350.02 million tonnes with average productivity of 69.4 t/ha from an area of 5.1 million ha. These figures, though not an all-time high, are marginally better over corresponding figures achieved during previous year. Concerted efforts on the fronts of research, technology development and dissemination pay the dividends gradually and over a long period of time. Conduct of multi-location trials of promising technologies under the aegis of AICRP on Sugarcane is one such effort that has proved its utility and holds promise for future improvements in overall scenario of sugarcane production and productivity in the country. The Crop Production discipline encompassing Agronomy and Soil Science continues to play important role in devising and testing of user friendly technologies for sugarcane cultivation. During the crop season 2013-14 six trials (experiments) were conducted through length and breadth of the country. These were concentrated on aspects such as agronomic evaluation of promising genotypes for their performance potential under varying fertility levels, finding a planting geometry suitable to mechanization needs, response of sugarcane crop to secondary and micro-nutrient inclusion in fertilizer application schedule, suitability of cane node technology for sugarcane planting to save on seed cost and its effect on crop productivity, finding suitable sowing/ planting schedule for wheat and sugarcane in FIRB (furrow irrigated raised beds) method of planting, and efficacy of sub-surface drip method of irrigation in saving of water and raising of crop yield. Most of the centres carried out these trials in the true research spirit and reported the results as per the prescribed format. However, few centres viz, Akola and Mandya faced the constraints like scarcity of irrigation water and could not conduct the trials. A summary table showing no. of centres allotted, conducted and not conducted the stipulated experiments during 2013-14 is given in Appendix I.

The experiment wise summary of the results are presented below:

### AS 42: Agronomic Evaluation of Promising Sugarcane Genotypes

This is a continuing trial which was initiated during 2007-08. It is conducted for three years with one set of genotypes, thereafter genotypes are changed and continue further. From the cropping season 2012-13, the trial is being conducted only in one season and will be concluded after taking two plant crops and one ratoon. This trial was allotted to all 25 centres. Out of that, 20 centres conducted it and only five centres namely Akola, Coimbatore, Mandya, Sankeswar and Bethuadhari failed to conduct it.

### NORTH WEST ZONE

### 1. FARIDKOT

For the plant crop among genotypes CoPb 09181 was promising in cane yield. In mid-late group CoH 08264 and CoH 08263 were better in cane yield. The response to N fertilizer was up to 100% recommended dose.

For ratoon crop, early genotype CoPb 09181 was promising in cane yield. In mid-late group CoH 08264 and CoH 08263 were better in cane yield. The response to N fertilizer was up to 100% recommended dose.

**2. KOTA**

Among early maturing genotypes CoH 06247 produced significantly higher millable cane and cane yield over CoLK 07201 and at par with CoPK 05191 and Co 06033. However, CoPK 05191 also maintained its superiority over other genotypes in terms of cane quality. Cane yield increased significantly up to 100% of the recommended dose of NPK fertilizer in different genotypes during both the years.

**3. KAPURTHALA**

Genotype CoPb 09181 recorded the highest cane yield while the standard check CoJ 83 recorded highest Pol % juice among early genotypes. The cane yield with 100% of recommended nitrogen was highest i.e.78.9 t/ha and was at par with other two fertilizer levels**.**

Among mid-late genotypes, CoH 06266 recorded the highest cane yield and was comparable to CoPb 6219 being significantly better than the genotype CoPb 05211 & the check CoJ88. The all three new genotypes were significantly poor to check variety CoJ 88 in terms of Pol % juice. Fertilizing the crop with 100% recommended dose of nitrogen i.e. 150 kg N $ha^{-1}$ significantly improved cane yield over 75% of the recommended dose of nitrogen but was at par to 125% of the recommended dose of nitrogen.

**4. LUCKNOW**

Sugarcane genotype, CoH 06265 produced the highest number of millable cane (102350/ha) followed by CoS 06247 (90840/ha) and CoH 06266 (76830/ha). There were no significant differences in sucrose content of different genotypes. The highest cane and sugar yields (88.5 and 11.1 t/ha, respectively) was observed with genotype CoH 06265. Recommended level of NPK i.e., 150, 60 and 60 kg /ha fetched significantly higher cane (80.12 t/ha) and sugar yields (9.99 t/ha) which was at par with 125% NPK levels.

**5. PANTNAGAR**

Genotype Co Pant 5224 performed better for higher NMC, Cane yield, individual cane weight over rest of the genotypes. However, CCS yield was recorded highest in Co Pant 2218. Higher NMC, average cane weight, shoot population, cane yield and CCS yield were recorded higher in 125 % of the recorded N (150 kg N/ha) over 75 or 100 % the recommended in sugarcane.

**6. SHAHJAHANPUR**

Genotype CoS 07240 produced significantly higher cane yield of 86.53t/ha followed by CoS 03261 with cane yield of 81.17 t/ha, CCS % in cane was found significantly higher in genotype CoS 03251 as compared to CoS 07240 and CoS 03261. In case of fertilizer levels significantly higher cane yield (85.61 t/ha) was obtained with 125% of the recommended dose of NPK and it was at par with 100% recommended NPK.

**7. UCHANI**

In early group variety CoLk 7201 ( 91.5 t/ha) and Co 7025 ( 88.2 t/ha) being at par produced significantly higher cane yield as compared to variety CoH 7261 ( 84.5 t/ha) and Co 7023 ( 82.1 t/ha) Whereas in mid late group varieties CoPb 7212 ( 99.5 t/ha), CoLk 7203 ( 98.2 t/ha) and CoS7234 ( 96.9 t/ha) being at par produced significantly higher cane yield as compared to variety CoH 7263 ( 92.4 t/ha). All the varieties in both the group responded up to recommended dose of nitrogen fertilizers.

**8. SRIGANGANAGAR**

For early genotypes, CoPb 09181 recorded highest cane yield of 87.29 t/ha which was significantly higher over the genotype CoH 09263 (72.29 t/ha) but was comparable to local check Co 6617 (86.52 t/ha). In different N levels, application of either recommended or 125% of the recommended dose of N significantly improved yield and yield attributes as compared to 75% of the recommended dose of nitrogen.

Genotype CoH 09264 recorded significantly thicker (2.48 cm) and heavier (1.28 kg) canes as well as higher cane yield (98.38 t/ha) than rest of the mid-late genotypes under testing. The yield and yield attributes were influenced significantly due to different nitrogen levels. Highest cane yield was recorded in 125% N of the recommended (150 kg N/ha) which was significantly higher over 75% of the recommended N but at par with the recommended level of nitrogen.

**PENINSULAR ZONE**

**9. KOLHAPUR**

Among the tested early genotypes, PI 07132 recorded significantly higher cane yield (128.05 t $ha^{-1}$) followed by PI 06132 (124.53 t $ha^{-1}$) and CoN 07071 (123.06 t $ha^{-1}$) and found at par with each other. However, significantly higher CCS yield (20.39 t $ha^{-1}$) was recorded by CoN 07071 and found at par with PI 06132 (20.09 t $ha^{-1}$) and PI 07132 (19.65 t $ha^{-1}$). The cane and CCS yield were influenced significantly due to different fertilizer levels. The fertilizer level 125 % RD N: $P_2O_5$:$K_2O$ $ha^{-1}$ recorded significantly higher cane yield (126.72 t $ha^{-1}$) and CCS yield (20.60 t $ha^{-1}$) followed by 100 % RD N:$P_2O_5$:$K_2O$ $ha^{-1}$ which recorded cane yield (115.44 t $ha^{-1}$) and CCS yield (18.83 t $ha^{-1}$). The interaction effect between genotypes and fertilizer levels was found to be non-significant.

The cane yield and CCS yield were influenced significantly due to different sugarcane mid-late genotypes. Among the tested genotypes, Co 08016 recorded significantly higher cane yield (118.68 t $ha^{-1}$) and CCS yield (17.60 t $ha^{-1}$) and found at par with Co 09009 and Co 08008. The cane and CCS yield were influenced non-significantly due to different fertilizer levels and interaction effect between genotypes and fertilizer levels.

**10. PADEGAON**

For the early genotypes, Co 06002 was found significantly superior for cane and CCS yields than the other genotypes followed by PI 06032. The application of 125 % recommended dose of nitrogen produced significantly higher cane and CCS yields followed by 100 % recommended dose of nitrogen.

Among mid-late genotypes Co 86032 recorded significantly higher cane and CCS yields than the other genotypes and it was followed by Co-06015. The application of 125

percent recommended dose of nitrogen produced significantly higher cane and CCS yields followed by 100 % recommended dose of nitrogen.

**11. PUNE**

Among various genotypes evaluated, the cane yield of genotype PI 07131 was significantly higher (114.16 t/ha) over the genotypes Co 8001 and Co 7015 but at par with CoC 671 and Co86032. Maximum cane yield 102.29 t/ha was recorded due to application of 125 % RDF. Maximum Brix % (22.80) and Sucrose % (19.58) was noticed in genotype PI07131 than the other genotypes under study. Maximum B: C ratio (1:2.26) was also obtained with genotype PI07131. Final conclusion could be drawn after having ratoon and second plant crop studies.

**12. POWARKHEDA**

Results revealed that among the early (plant crop) genotypes Co 06022 gave significantly higher cane yield of 72.08 t/ha than Co C 671 (65.16 t/ha) and Co 06002(63.31 t/ha). Application of 125 % RDF N gave significantly higher cane yield of (70.06 t/ha) than 75 % RDF N (62.00 t/ha) but increase in cane yield was at par in-between 100 and 125% RDF N.

Results revealed that among the mid late genotypes Co 06010 gave significantly higher cane yield of (87.58 t/ha) than Co 06015 (80.90 t/ha), Co 06027 (73.46 t/ha) and Co JN 86-600 (66.91 t/ha). Application of 125 % RDF N gave significantly higher cane yield ((81.02 t/ha) than 75 % RDF N (72.35 t/ha) but increase in cane yield was at par in-between 100 and 125% RDF N.

**13. NAVSARI**

Highest plant cane and CCS (132.58 & 17.27 t $ha^{-1}$) yields were noticed with variety Co N 07072 but remained at par with Co 0403 regarding CCS yield. The fertilizer level $F_3$ and $F_2$ resulted in significantly higher cane and CCS (130.67 &17.31 t $ha^{-1}$) yields but at par with $F_2$ regarding cane yield.

In the trial on ratoon significantly highest NMC (109.89 $ha^{-1}$), cane (127.57 t $ha^{-1}$) and CCS (17.24 t $ha^{-1}$) yields were recorded with $V_2$ & remained at par with $V_4$ except CCS yield which at par with $V_1$. The fertilizer level $F_3$ and $F_2$ resulted in significantly higher NMC (106.70 $ha^{-1}$), cane (125.55 t $ha^{-1}$) & CCS (16.94 t $ha^{-1}$) yields and remained at par with each other.

**14. THIRUVALLA**

It can be concluded from the study that the genotype Co 6012 is promising as it has recorded the highest cane and sugar yield both in plant crop and ratoon followed by the genotype Co 6027. All the genotypes performed better at 125 % of the recommended dose of N.

**EAST COAST ZONE**

**15. ANAKAPALLE**

**Mid – late group:**

The results showed that application of 'N' at 125% recommended dose registered significantly higher cane yield of 85.1 t/ha than lower levels of 75% (74.1 t/ha) and 100% (78.7 t/ha) recommended nitrogen. Among the three new mid late genotypes under test

2007A126 proved superior (84.1 t/ha) to 2004A104 (76.1 t/ha) and 2007A177 ((68.0 t/ha). Due to heavy rainfall (573.6 mm) received during the month of October when crop is in grand growth and maturity phase the experimental field was subjected to water logging and the crop was lodged, under such abnormal situation. As check such the variety Co 7219 performed better and recorded higher cane yield (88.9 t/ha).

**Early group:**

Performance of new promising early sugarcane genotypes viz., 2004 A 55 and 2001 A 63 along with standard check 93 A 145 was studied under different levels of nitrogen under irrigated conditions. The results showed that application of nitrogen at 125% (93.1t/ha) and 100% (89.7 t/ha) recommended dose registered significantly higher cane yield than 75% recommended dose of nitrogen (86.7 t/ha). The cane yield of both new early sugarcane genotypes 2004A55 (93.7t/ha) and 2001A63 (91.1 t/ha) were on par and significantly superior as compared to check variety 93A145 (88.6 t/ha).

**16. CUDDALORE**

The genotype CoC 09 336 significantly registered the maximum millable cane, individual cane weight, cane yield and sugar yield in both spring and autumn season. Regarding the juice quality, the clone CoC 09 336 registered the highest commercial cane sugar (CCS) per cent in spring and autumn seasons and was on par with the entry CoC 24. Prescription of 125 per cent of the recommended dose of nitrogen significantly registered higher values of yield components, cane and sugar yield compared to 75 and 100 per cent of recommended dose of nitrogen

**17. NAYAGARH**

The genotype Co Or 8346 produced the highest average cane yield of 83.91 t/ha with application of 100 % RDN and was closely followed by Co 6907 (82.59 t/ha) and Co A 08324 (80.82 t/ha).

## NORTH CENTRAL ZONE

**18. PUSA**

In early group, CoP 092 recorded significantly higher cane yield (107.2 t/ha) than BO 155 though was at par with CoP 123 (98.0 t/ha) while, in mid-late group CoP112 having cane yield of (101.0 t/ha) significantly out yielded CoP 111 but at par with CoP 081 (95.0 t/ha). Higher cane yield was recorded at 125 % of recommended dose of nitrogen but on par with 100 % RDF in early group where as in mid-late group response was significantly up to 125 % of RDF.

In the ratoon trial genotype BO 153 registered maximum cane yield in spring season in early group but was at par with BO 150. Under mid-late group BO 154 yielded significantly more than that of CoP 042 but was at par with CoP 2061 in spring season. Varieties response up to 125 % RDN and were on par with 100 % RDN.

**19. SHEORAHI**

Variety CoSe 11453 produced higher number of millable canes and cane yield as compared to CoSe 11451 and CoSe 11454 Cane yield increased with 125% recommend dose of N P K.

## NORTH EASTERN ZONE

**20. BURALIKSON**

**EARLY GROUP:**

Among the four genotypes of early group plant crop CoBln07501 recorded significantly higher number of shoots (114.85 thousand/ha), higher cane yield (88.43 t/ha) which is statistically at par with CoBln 03172 which recorded 111.27 thousand/ ha and 87.29 t/ha respectively. As far levels of N similar cane yields were recorded with 100 and 125% N levels.

Among the four genotypes taken in ratoon, CoBln 03172 recorded significantly higher number of shoots (71.45 thousand/ha), number of millable canes (77.77 thousand/ha) and cane yield (66.25t/ha) followed by CoBln 07501 which recorded 71.18 thousand/ha, 73.84 thousand 63.87 t/ha respectively. However no significant differences were recorded in terms other growth and juice quality parameters. In case of different nitrogen levels, application of 125% RD of N recorded significantly higher number of millable canes (74.58 thousand/ha) and cane yield (64.53 t/ha) than the other two nitrogen levels.

Pooled data of two plant crop and ratoon crop indicated that no significant difference on cane yield was recorded among four genotypes. However, application of 125% RD of N recorded significantly higher cane yield (75.23t/ha) followed by application of 100% RD of N (73. 87t/ha). Among the four genotypes, CoBln 04172 recorded significantly higher sucrose content (17.27%) followed by CoBln 05501 (16.96%), but no significant difference on CCS% was recorded due to genotypes, nitrogen levels and their interaction as well.

**MID-LATE GROUP:**

Among the four mid-late (plant crop) genotypes, CoBln 04174 recorded significantly the highest cane yield (79.28t/ha) which is statistically at par with CoBln 07503 (79.14 t/ha). The same genotypes also recorded significantly the highest number of shoots (101.42 thousand/ha) and number of millable canes (93.41 thousand/ha), respectively.Application of 125% RD of N recorded significantly the higher number of millable canes (93.72 thousand/ha) and cane yield (82.71 t/ha) which is at par with the application of 100% RD of N which registered NMC (90.23 thousand/ha) and cane yield (80.11 t/ha), respectively.

For ratoon crop there was no significant difference observed on cane yield and its quality parameters observed among the four genotypes. However, application of different nitrogen levels showed signification difference on cane and juice quality parameters. The highest cane yield (67.17t/ha) was recoded when 125% RD of N was applied which is statistically superior to 75% RD of N which recorded cane yield (57.17 t/ha) but statistically at par with 100 % RD of N which registered cane yield (65.21 t/ha).

Pooled data of two plant crop and ratoon crop presented in table AS-42-06. Among the four mid-late genotypes, CoBln 07503 significantly recorded the highest cane yield (71.19 t/ha) which is statistically at par with CoBln 04174 (70.59 t/ha). In case of nitrogen levels,

application of 125% RD of N recorded sighnificaly higher yield (73.65 t/ha) which is statistically at par 100% RD of N (72.06t/ha). However there was no significant difference observed on Juice quality among genotypes, nitrogen levels and their interaction as well.

**Important Observations**

**North West Zone:** Depending on centres, CoPb09181/ 07212, CoH 08264/ 06247/ 06266/ 06265, 09264 CoLk 07201, CoS 07240 and CoPant 05224 seem to be promising varieties. Significant response to N was observed from 100-125% of RDN.

**Peninsular Zone:** Depending on the trials conducted at different centres Co 06002/ 06010/ 06012/ 06022/ 08016, CoN07072, PI 07131 and PI 07132 proved to be superior genotypes. At most of the centres yield increased significantly up to 125% RDN.

**East Coast Zone:** 2004A55, 2001 A 63, CoC 09 336 and CoOr 8346 were observed to be promising genotypes. Response to N was from 100 to 125% of RDN.

**North Central Zone:** CoP 092/ 112, BO 153/ 154 and CoSe 11453 were promising materials responding up to 125% of RDN however at par with 100 % RDN.

**North Eastern Zone:** CoBln 07503/ 7501/ 03172/ 04174 proved to be good genotypes responding up to 125% of RDN.

**AS 63: Plant geometry in relation to mechanization in sugarcane**

The trial was initiated during 2011-12 and will be concluded after harvest of the standing crop (2013-14). The trial was allotted to 11 centres and was conducted by 10 centres in 2013-14. Only one centre *i.e.* Modipuram could not conduct it.

**NORTH WEST ZONE**

**1. FARIDKOT**

On the basis of two years data it can be concluded that paired row (120:30 cm) is the best method on the basis of cane yield and sugarcane variety CoPb 09181 is better in cane yield than the other three varieties.

**2. LUCKNOW**

Variety CoSe 92423 produced significantly higher cane yield (68.3 t/ha) than CoS 94257 and CoS 96275 but was at par with that of CoLk 94184 (67.0 t/ha). Row spacing 120:30 was found to be significantly superior over 120 & 150cm spacing.

**3. PANTNAGAR**

Highest cane yield, NMC were recorded in 30: 120 cm paired row sown cane. Length and girth of the cane higher was higher in 150 cm sown crop and girth in 75 cm sown crop. Among all the genotypes sown in the experiment Co Pant 90223 produced significantly higher cane yields over rest of the genotypes. NMC, Sucrose %, CCS yield, length of the cane were also higher in Co Pant 90223.

**4. KAPURTHALA**

All the varieties performed better under 30: 120 cm paired row system than at 120 & 150 cm row spacing.

## PENINSULAR ZONE

### 5. PADEGAON

The row spacing of 120 cm recorded the highest cane (124.43 t $ha^{-1}$) and CCS yield (18.46 t $ha^{-1}$). However, it was at par with the row spacing of 150 cm for both cane (121.25 t $ha^{-1}$) and CCS yields (17.70 t $ha^{-1}$). Significantly the highest cane (138.60 t $ha^{-1}$) and CCS (20.24 t $ha^{-1}$) yields were recorded by the variety CoM 0265 followed by Co 86032 (123.01 and 18.42 t $ha^{-1}$). The sugarcane variety CoC 671 was found to be the most superior with respect to juice quality.

### 6. PUNE

Mechanized farming at 150 cm row spacing was found superior in terms of sugarcane yield (132.75 t/ha), sugar yield (20.33 t/ha), net monitory returns (Rs. 305325 per ha) and B: C ratio (1:2.94). Performance of CoM 0265 and CoVSI 03102 was found superior in sugarcane yield, sugar yield, net monetary returns and B: C ratio as compared to Co86032 and CoVSI9805. Use of mechanical sugarcane planter and earthing up equipment is found beneficial in sugarcane cultivation in plant cane.

### 7. KOLHAPUR

All cane and CCS yield were influenced significantly due to different sugarcane genotypes. The sugarcane variety CoM 0265 recorded significantly higher cane yield (130.27 t $ha^{-1}$) and CCS yield (18.43 t $ha^{-1}$) and found at par with Co 86032 which recorded 119.32 t $ha^{-1}$ and 16.83 t $ha^{-1}$ cane and CCS yield, respectively. It was revealed that, plant geometry had no significant effect on cane yield and CCS yield.

### 8. NAVSARI

Significantly higher cane length, cane (127.9 t/ha) and CCS (16.94 t/ha) yields were observed with plant geometry $P_1$ (120 cm row spacing) while variety $V_1$ (Co N 05071) recorded significantly highest cane length, cane girth, cane and CCS yields however it remained at par with $V_4$ with regards to cane length and girth.

### 9. THIRUVALLA

It can be concluded from the study that the row distance of 30 x 150 cm was found to be suitable for getting maximum cane and sugar yield. The variety Madhuri responded well to different row spacing and it has recorded the highest cane and sugar yield followed by the variety Co 05007.

### 10. PUSA

Plant geometry 30:120 cm (paired row) performed significantly beter in cane yield followed by 120 cm row distance. Varieties BO 153 produced significantly higher cane yield (88.5 t/ha) than CoP 9301 and CoLK 9484 but was at par with that of BO 139 (79.6 t/ha).

**Important Observations:** Under tropical zone at most of the centres, sugarcane yield performance was found best with 120 cm or 30:150 row spacing. Interaction of variety × spacing was non-significant.

In subtropical zone paired row of planting at 30:120 cm was found to be more effective however, at most of centres it was comparable with that of 120 cm spacing.

**AS 64: Response of sugarcane crop to different plant nutrients in varied agro-ecological situations.**

The trial was, though, initiated in 2011-12, some modifications were made in the treatments during 2012-13, and hence, starting year was considered as 2012-13. It was allotted to all participating 25 centres. Out of that 21 centres conducted it. Four centres namely, Akola, Mandya Coimbatore and Bethuadhari failed to conduct the trial for different reasons.

**NORTH WEST ZONE**

**1. FARIDKOT**

Cane yield with soil test based fertilizer application (190 kg N and 30 kg $P_2O_5$/ha) was the highest (123.2 t/ha) and was at par with additional application of Zn, Fe, Mn and their combination to recommended NPK i.e. $T_7$ to $T_{11}$ and was significantly better than control ($T_1$), application of FYM @20 t/ha ($T_{13}$), Application of N ($T_2$), NP ($T_3$), NPK ($T_4$) and NPK+S ($T_5$).

**2. KOTA**

Application of NPK+ Zn +S (200+60+40+40+5 kg/ha) was found suitable for increasing cane yield and CCS yield, which was significantly superior to control, N, NP, NPK,FYM treatments, soil test based fertilizer application and NPK + Mn.

**3. KAPURTHALA**

Soil test based fertilizer application should be followed for attaining optimum cane yield. In the absence of fertility report of the field, one should only apply the nitrogenous fertilizer at recommended dose of 150 kg $ha^{-1}$ to get the optimum yield.

**4. LUCKNOW**

Cane yield (t/ha) was influenced by various nutrient management treatments, however they were non-significant. Higher cane yield (57.06 t/ha) was recorded with treatment T9 (NPK + S + Zn) followed by the treatment T11 (NPK+S+Zn+Fe+Mn) with cane yield (51.31 t/ha) and T6 (NPK+Zn), cane yield (50.49 t/ha) as compared to other treatments. Lowest cane yield was recorded with control plot (41.96 t/ha).

**5. PANTNAGAR**

Highest cane yield 84.3 ton/ha was recorded in treatment $T_9$ (NPK+S+Zn applied 120+6o+40+40+25 kg/ha). Almost similar cane yield 84.1 ton/ha was recorded in $T_{10}$ (in which NPK+S+Zn along with Fe 1.0 %) spray was done thrice at vegetative growth stage at weekly interval. The cane yield was non-significant in $T_9$, $T_{10}$ and $T_{11}$. Data revealed that higher S (available) was recorded in $T_{11}$ (54.8 kg/ha) which was significantly higher over $T_1$, $T_2$, $T_3$, $T_4$ and $T_{12}$. Available Zn was highest in $T_{10}$ (1.05 mg/kg) soil.

**6. SHAHJAHANPUR**

Application of NPK + S + Zn + Fe + Mn produced significantly higher cane yield (91.67 t/ha) than that of N, NP, NPK and control treatment. Plant nutrient did not influence CCS percent in cane.

**7. UCHANI**

The application of individual micronutrient (Fe, Mn and Zn) in combination NPK did not significantly increase cane yield over NPK. However, the combined application of these micro nutrients significantly increased cane yield over NPK alone. The application of N over control, NP over N alone, NPK over NP, and NPKS over NPK significantly increased cane yield.

**8. SRIGANGANAGAR**

The maximum cane yield of 98.38 t/ha was obtained with the combined application of sulphur, Zn, Fe and Mn along with recommended NPK ($T_{11}$) which was closely followed by $T_{10}$ (NPK, S, Zn, Fe), $T_9$ (NPK, S, Zn), $T_6$ (NPK, Zn) and $T_7$ (NPK, Fe). The combined application of micronutrients and NPK fertilizers significantly increased over $T_2$ (N) and $T_3$ (NP) but at par with the rest of the treatments.

## PENINSULAR ZONE

**9. KOLHAPUR**

The data pertaining to cane and CCS yield indicated that different treatments affected the cane and CCS yield significantly. The treatment $T_{11}$ (N: $P_2O_5$:$K_2O$+S+Zn+Fe+Mn) recorded significantly higher cane yield (120.83 t $ha^{-1}$) and CCS yield (17.84 t $ha^{-1}$).

**10. PADEGAON**

Application of NPK + Zn + S+ Fe+ Mn to sugarcane recorded significantly higher yields of cane and commercial cane sugar and it is comparable with application of fertilizers based on soil test.

**11. PUNE**

The effect of differential response of sugarcane crop to different nutrients on yield and quality of pre-seasonal sugarcane was studied in medium black soil. There was no individual response observed to S, Zn and Fe nutrients, however, RDF along with S+ Zn+ Fe combination gave maximum cane yield of 137.29 t $ha^{-1}$ followed by 136.47 t $ha^{-1}$ $^{in}$ RDF with S+Zn+Fe+Mn combination and 136.00 t $ha^{-1}$ RDF with S+ Zn which were found at par and significant over only RDF (124.41 t $ha^{-1}$). It reveals that application of RDF (400:170:170) along with sulphur @ 60 kg/ha and ZnSO4@ 20 kg/ha increased cane yield by 9.31% cane yield.

The effect of differential response of sugarcane crop to different nutrients on yield and quality of sugarcane ratoon crop was studied the results showed similar insignificant results to individual sulphur, Zn, Fe and Mn nutrients. However, cane yield responses to RDF with S+Zn+Fe combination gave maximum cane yield of 118.48 t $ha^{-1}$ which was significant over RDF (104.92 t $ha^{-1}$).

**12. POWARKHEDA**

The cane yield and yield attributes increased significantly due to application of major plant nutrients viz. N, NP and NPK than control (without fertilizers). Application of

micronutrients with NPK although showed beneficial effects on crop growth and yield of the crop but increase in cane yield did not differ significantly.

**13. SANKESHWAR**

Application of balanced recommended fertilizers (RDF NPK 250; 75; 190; kg/ ha) along with Sulphur 60 kg /ha+ Zinc 50kg /ha + Ferrous12.5 kg /ha will give higher cane yield and CCS yield.

**14. NAVSARI**

There was no significant difference was observed due to various nutrients on soil pH, OC % and available nitrogen. Lowest EC was noticed with $T_{10}$ and was at par with $T_6$ and $T_{11}$. Available $P_2O_5$ was observed significantly highest in $T_3$; $K_2O$ with $T_6$; S with $T_{10}$; Fe with $T_7$; Mn with $T_{13}$ and Zn with $T_{10}$ over control plot.

**15. THIRUVALLA**

It can be concluded that for obtaining higher cane and sugar yield ,fertilizer application as per soil test based recommendations and recommended dose of NPK+Zn (50 kg $ZnSO_4$ /ha) were found to be the best .

## EAST COAST ZONE

**16. ANAKAPALLE**

The results of the study indicated that, application of N,P and K along with micronutrients on soil test basis (91.6 t/ha) registered significantly higher cane yield as compared to application of N alone (80.7 t/ha) or N and P (82.0 t/ha) or application of FYM @ 20 t/ha (73.3 t/ha), but found on par with application of N, P, K + S + Zn + Fe +Mn (91.0 t/ha) or NPK +S+Zn (90.7 t/ha) or N,P,K + Fe (90.5 t/ha) or N, P, K + S + Zn + Fe (90.3 t/ha) or NPK + Mn (89.7 t/ha) or NPK + Zn (89.1 t/ha) or N, P, K + S (87.5 t/ha) or N,P and K (87.2 t/ha). No fertilizer applied plot registered significantly lower cane yield of 55.0 t/ha.

**17. CUDDALORE**

The treatment ($T_{11}$) NPK + S + Zn + Fe + Mn registered significantly higher growth and yield parameters and it was comparable with the treatment $T_{10}$ and $T_{12}$.

**18. NAYAGARH**

Application of soil test based fertilizer dose *i.e.*315:100:60 kg N: $P_2O_5$: $K_2O$ + 60 kg elemental S/ha resulted in higher number of tillers at different growth stages of sugarcane genotype “Sabita” leading to higher cane (85.65 t/ha) and CCS yield (8.84 t/ha).

## NORTH CENTRAL ZONE

**19. PUSA**

The application of fertilizers on soil test basis i.e. (200kg N, 100kg P, 100 kg K, 25 kg $ZnSO_4$ & 40 kg S) was found suitable for maintaining soil fertility, enhancing yield and quality of cane in calcareous soil of Bihar.

**20. SHEORAHI**

Application of S, Zn and Mn along with N P K (T11) gave significantly higher cane yield than other treatments except T9 and T10 treatments. Sucrose was not effected significantly with different treatments.

## NORTH EASTERN ZONE

**21. BURALIKSON**

The maximum cane yield (98.6 t/ha) was obtained when S, Zn, Fe, Mn was applied along with the recommended dose of fertilizer ($T_{11}$) which is statistically at par with the soil test based fertilizer application (97.6 t/ha).

**Important Observations:** At most of the centres located in north-western zone soil test based application of nutrients was found to be the most effective followed by NPKS Zn. Kota centre reported reduction in yield with addition of Fe and Mn. Shahjahanpur and Sriganganagar reported positive influence of addition of Fe and Mn along with other nutrients for yield enhancement. Most of the centres of peninsular zone found application of NPK fortified with S, Zn, Fe and Mn useful for increase in yield, however application of recommended doses of NPK was found best at Powarkheda. Centres of east-coast zone obtained yield enhancement with addition of all themicro-nutrients, except Nayagarh where NPK + S gave the best results. Pusa reported best results with soil test based application of nutrients whereas Seorahi and Buraliksan noted positive influence of S, Zn and Mn along with NPK application at recommended rates.

**AS 65: Enhancing sugarcane productivity and profitability under wheat-sugarcane cropping system**

The project was initiated during 2012-13 and was allotted to seven centres under the subtropical zone. Five centres conducted it. At Lucknow the trial was initiated from 2013-14. For the year 2013-14 the trial was allotted to 09 centres, however Padegaon and Powarkheda voluntarily carried out the trial. Among allotted centres Sriganganagar, Modipuram and Bthuadhari failed to conduct the trial and report the progress. In all 08 centres carried out the trial during the year.

## NORTH WEST ZONE

**1. FARIDKOT**

Wheat sown in November was significantly better than December sowing. The sugarcane sown in furrows of FIRB sown wheat in the February and March was significantly better than sugarcane planted after wheat harvest and was at par with autumn sole sugarcane. Same was case for germination, number of shoots, number of millable canes and cane weight.

**2. KAPURTHALA**

The highest cane equivalent yield of 90.5 t/ha was obtained in the treatment $T_2$ having autumn sugarcane + wheat (1:2) and was at par with relay cropping in standing wheat crop and significantly better than sole sugarcane crop and where sugarcane was planted after wheat harvest.

**3. LUCKNOW**

The cane yield was the highest (89.0 tonnes/ha) in autumn planted sole sugarcane. Sugarcane planted in 3$^{rd}$ week of February in standing wheat under FIRB method (82.5 tonnes/ha) was

significantly higher than sugarcane planted in 3rd week of March in wheat under FIRB and sugarcane + wheat (1:2) due to higher NMC, cane length, cane weight and number of internodes. The lowest cane yield was recorded in wheat – sugarcane system (59.3 tonnes/ha) and sugarcane + wheat in1:3 row ratio (60.3 tonnes/ha).

**4. PANTNAGAR**

On the basis of equivalent yield, it was recorded that pure autumn planted sugarcane without wheat sowing was not profitable. However, planting of 2 rows of wheat in between two rows of sugarcane were more profitable than that of 3 rows of wheat. It was also found better that wheat sown on FIRB in the month of November 15 and sugarcane be planted in furrow in 3rd week of March. Late sowing of wheat in 15 December on FIRB and sugarcane planted in furrow either 3rd week of February or March. Late planting of sugarcane after wheat harvest was not found good.

**5. UCHANI**

Wheat sown with autumn cane on Oct. 24, 2012 in 1:2 and 1:3 ratio and 15th November on bed or by conventional method produced higher grain yield of (56.6-58.2 q/ha) as compared to wheat sown on 15th December ( 49.4-50.6 q/ha). Autumn planted cane as sole or intercropped with wheat in 1:2 and 1:3 ratio recorded significantly cane yield as compared to spring and late planting. Lowest germination was recorded in late planting of sugarcane after wheat harvest. There was a yield reduction of 40.3% with late planting of sugarcane after wheat harvesting as compared to planting of sugarcane in February or March in standing crop of wheat. Maximum cane equivalent yield was recorded in autumn sugarcane + wheat intercropping system of 1:2 (128.8 t/ha)and 1:3 ratio (127.5 t/ha) and closely followed by FIRB sowing of wheat on 15th November or 15th December + sugarcane in furrows in 3rd week of February or March ( 106.1-108.8 t/ha) and lowest in $T_4$ and $T_5$ treatments.

## PENINSULAR ZONE

**6. POWARKHEDA**

The significantly highest sugarcane equivalent yield (98.59 t/ha) obtain with autumn planted Sugarcane + Wheat (1:2) followed by autumn planted Sugarcane + Wheat (1:3) (96.42 t/ha) intercropping systems. Among these treatment the equivalent yield recorded at par.

**7. PADEGAON**

The autumn planted sugarcane produced significantly higher cane yield and CCS yield (143.61 t $ha^{-1}$ and 20.24 t $ha^{-1}$, respectively). Under intercropping system, autumn planted sugarcane + wheat (1:2) produced significantly higher cane yield and CCS yield (134.02 t $ha^{-1}$ and 17.93 t $ha^{-1}$, respectively). The intercropping of autumn planted sugarcane + wheat (1:2) was found to be more remunerative.

## NORTH CENTRAL ZONE

### 8. PUSA

In the system maximum cane yield of 83.7 t/ha was recorded in the sole autumn planted cane which was on par with that of sugarcane + wheat (1:2) and FIRB sowing wheat on 15th November and sugarcane in 3rd week of February. The reduction in yield on an average due to intercropping of wheat, planting of sugarcane after harvest of wheat, relay cropping of sugarcane in the 3rd week of February and March was 9.4 %, 31.0 %, 14.0 % and 15.9 %, respectively. In case of cane equivalent yield maximum value of 100.0 t/ha was recorded in intercropping of wheat 1:3 row ratios.

**Important Observations:** Intercropping of wheat either with 1:2 or 1:3 row ratio in autumn planted sugarcane (November sowing) was found to be more suitable followed by relay cropping of sugarcane either in February or March with 15th November FIRB sown wheat.

### AS 66: Priming of cane node for accelerating germination

The project was started during 2012-13 and was repeated in 2013-14 with allotment to all the participating centres. Out of that 18 centres conducted this trial and 7 centres namely, Akola, Coimbatore, Kolhapur, Pune, Mandya, Sriganganagar and Bethuadhari did not conduct it.

### 1. FARIDKOT

Germination% of single bud was significantly better than three budded setts. Three budded planting was significantly better than all single bud treatments in respect of cane yield. Among single bud treatments priming has some positive effect but not statistically significant.

### 2. KOTA

Priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio was found suitable for increasing cane yield which was significantly superior over un-primed cane node, conventional 3- bud sett planting treatment, $T_2$ and $T_3$ except $T_6$.The germination percentage of $T_4$ was significantly higher over rest of the treatments except $T_5$ at 40DAP.

### 3. KAPURTHALA

In this experiment the optimum germination was achieved in only T5 where conventional three budded sets were planted whereas all other treatments had very poor germination. Hence the data was not recorded.

### 4. LUCKNOW

Cane yields obtained under $T_3$,$T_4$,$T_5$ and $T_6$ treatments being statistically at par among themselves were significantly higher to the tune of 12.65 and 11.29% than that of $T_1$ and $T_2$ treatments (un-primed cane nodes or treated with hot water only). Conventional planting with 3-bud setts although produced cane yield at par with primed cane node treatments but with the use of huge seed cane (72 q/ha) whereas only 17.52 q/ha seed cane was used in

cane node planting method. CCS% cane did not differ significantly due to different treatments in the test.

**5. PANTNAGAR**

Sugarcane setts germination at 20 DAP was improved by treating the setts with urea 3.0 % solution + hot water 50 $^0$C for 2 hours and germination was sustained at 30 and 40 DAP. Highest cane yield and NMC were recorded in $T_5$ (conventional 3 budded setts sown)**.** CCS yield was also higher in this treatment.

**6. SHAHJAHANPUR**

Priming cane node with cattle dung, cattle urine and water 1:2:3 ratio ($T_4$) gave significantly higher germination and cane yield than that of other treatments. $T_6$ and $T_1$ gave poorest germination. CCS % was not affected with different treatments. If cane node primed and planted directly in the field gave better germination than cane node primed and transplanted after sprouting.

**7. UCHANI**

Three bud planting recorded highest number of shoots (165.5 thousands/ha), millable canes (116.0 thousands/ha), cane weight (812 g), cane yield (92.0 t/ha), CCS (12.12 %) and sugar yield (11.15 t/ha) among all the treatments. Among priming treatments, planting of primed and sprouted cane node ($T_6$) recorded highest germination at 40 DAS (51.5%), number of shoots (90.4 thousands/ha), millable canes (88.0 thousands/ha), cane weight (700 g), cane yield (60.0 t/ha) and sugar yield (7.18 t/ha).

**PENINSULAR ZONE**

**8. PADEGAON**

The conventional 3 bud setts planting recorded significantly higher germination per cent (75.54) and it was found at par with rest of the treatments except treating cane node in hot water in 50 $^0$C for 2 hrs. The Priming cane node with cattle dung plus cattle urine and water in 1:2:5 ratio for 15 minutes recorded significantly the highest cane and CCS yields (134.68 and 14.33 t/ha), treating cane node in hot water for 50$^o$c and urea solution (3%) for 2 hours was the next superior treatment.

**9. POWARKHEDA**

The germination percentage, cane yield and yield attributes increased significantly due to treatment of priming cane node with cattle dung, cattle urine & water in 1:2:5 ratio (59.92%) than other treatments.

**10. SANKESHWAR**

As the germination was affected with hot water treatment in treatment no. T2 and T3 and poor germination in T4 so the trial was vitiated.

**11. NAVSARI**

There was no significant difference was observed due to various priming techniques on cane length, girth, single cane weight and CCS yield. Significantly highest and lowest cane yield was yield was recorded with $T_4$ (111.57 t ha$^{-1}$) and $T_5$ (91. 80 t ha$^{-1}$) respectively. Almost all

the quality parameters were not influenced due to priming treatment except CCS % and pol % juice which noticed highest with $T_1$ however pol % juice remained at par with $T_6$.

**12. THIRUVALLA**

The results revealed that the conventional 3-bud sett planting recorded the highest germination percentage, cane and sugar yield and it was on par with priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio.

## EAST COAST ZONE

**13. ANAKAPALLE**

The results indicated that conventional 3 bud sett planting recorded significantly higher number of millable canes (84,141/ha) and cane yield (84.6 t/ha). Priming cane node with cattle dung, urine and water in 1:2:5 ratio performed better and registered higher cane yield of 79.5 t/ha among different priming cane node treatments and it was on par with the conventional three budded sett planting.

**14. CUDDALORE**

Planting of sugarcane with three budded setts ($T_5$) recorded significantly better all the growth, quality and yield parameters of sugarcane.

**15. NAYAGARH**

Conventional method of planting three budded sugarcane setts proved to be the best with highest number of net millable canes (67.50 thousand/ha), cane (81.28 t/ha) and CCS yield (10.18 t/ha). The treatment next in order was $T_6$ where primed and sprouted cane nodes were planted which could produce NMC of 65.50 (’000 /ha) with cane and CCS yield of 77.00 and 10.54 t/ha, respectively.

## NORTH CENTRAL ZONE

**16. PUSA**

The results thus indicated that the conventional 3-bud set planting was superior over primed and unprimed cane node in respect of germination, tillers and cane yield.

**17. SHEORAHI**

The experiment data were recorded and showed that low germination was there with unprimed cane node, however highest germination was in $T_4$ (priming cane node with cattle dung, cattle urine and water 1:2:3 ratio) treatment. Experiment was planted on March 4, 2013 and harvested on March, 24, 2014. The data also showed that significantly higher cane yield was found in T4 treatment.

## NORTH EASTERN ZONE

### 18. BURALIKSON

Result showed that conventional 3 bud sett planting recorded significantly higher NMC (96.1 thousand/ha), cane diameter (2.5cm) and yield (90.4 tonnes/ha), respectively than all other treatments. However, all other priming technique showed significantly higher yield than the un- primed cane node.

**Important Observations:** At most of the centres, conventional 3-bud sett planting was found to be more effective in giving higher yield however, among priming treatments, priming of cane node with cattle dung, cattle urine and water (1:2:5) proved to be more effective.

### AS 67: Optimization of fertigation schedule for sugarcane through micro-irrigation technique under different agro-climatic conditions

This experiment was originally allotted (2011-12) to the four centres namely Faridkot, Mandya, Lucknow and Cuddalore. In the last workshop (2012-13) Coimbatore was added to take up the experiment from 2013-14. This year only Lucknow and Faridkot conducted the trial whereas Mandya and Cuddalore could not conduct it as supply of drip materials was delayed. Cuddalore has informed to initiate it from spring 2014.

## NORTH WEST ZONE

### 1. FARIDKOT

Drip irrigation at 100% and 125% IW/ CPE ratio was at par with surface irrigation in millable canes and cane yield. When drip irrigation was applied at 75% IW/ CPE the cane yield was significantly lower than surface irrigation. Cane yield with 100% recommended dose of nitrogen (RDN) was significantly better than 50% RDN and was at par with 75% RDN. Same was the trend for millable canes.

### 2. LUCKNOW

Highest sugarcane yield of 94.10 t/ha was observed when sugarcane was drip fertigated with recommended dose of nitrogen and water equivalent to 125 % pan evaporation. However, irrigation water use efficiency (IWUE) was the highest at 2946.88 kg/ha-cm when fertigation was done and the amount of irrigation water was kept as 75 per cent of pan evaporation.

**COMMENTS**

- Most of the participating centres have reported the results and other required information like initial soil fertility level, date of planting and harvest and weather conditions as per the suggested format. This need to be regularly followed and may be made more systematic.
- Experiment AS 42 for evaluation of promising genotypes at different fertility levels still need a lot of attention particularly on aspects like selection of genotypes in a AICRP (S) zone, selection of group of genotyeps like early or mid-late, the growing season and naming of varieties as per the standard style followed for naming the entries in AVT trials. Care is required while reporting the results, it should clearly mention the early or mid-late, spring or autumn, plant or ratoon crop.
- Though most of the centres have reported about initial soil fertility levels especially for the trial AS 64, critical limits for the sugarcane crop with respect to a particular micro-nutrient is generally lacking. This information can be obtained from SAUs located in respective state and based on that analysis and interpretation of data should be done.
- The trial on assessing utility of wider spacing for making sugarcane cultivation mechanization friendly though concluded could not clearly establish the variability in response of different varieties to changing spacing. The centres are requested to look into the pooled data for three years and try to find some valid conclusion on this aspect.
- Delving deep in the findings of trial on sugarcane planting with primed and un-primed cane nodes indicate that the planning with primed cane nodes performed better on almost all the centres where investigators were able to get the crop established well. On the other hand many centres reported poor establishment of cane node material and hence the trail was abandoned. It emerges that a careful management of trial is needed to minimize the masking of treatment potential by handling and management related shortcomings. Adequate moisture availability in the field at the time of planting/ transplanting need to be seriously ensured.
- Sub-surface drip irrigation for sugarcane has shown its potential in saving of irrigation water and raising the cane yield. However, observations on root growth pattern, soil wetting zone and root volume need to be included for establishing cause and effect relationship in a scientific manner.
- All the centres are requested to give meaningful summary of different trials by making it more informative and true representative of the findings.

**SUGGESTIONS**

- Trials AS 63 and AS 64 are to be concluded after harvest of the standing crop (plant or ratoon), if any. For the year 2014-15 data based on pooled analysis only must be presented.
- The crop performance, in general, must be given in light of prevailing climatic condition particularly with reference to sucrose content & flowering behaviour.
- Critical limit of micronutrients in the soil must be given especially in AS 64.
- The treatments as decided should not be modified/ deleted.

- One or two pages of research highlights of all the experiments conducted at the centre must be enclosed with the annual report.
- Summary must be clear, to the point and self-explanatory.

## ACKNOWLEDGEMENT

The hard work, sincerity and scientific rigour on the part of investigators at respective centres in implementation of different trials included in this report are acknowledged and put on record that without the same it was not possible to come out with the findings having country wide applicability. Efforts made by Dr V. P. Singh, the former Principal Investigator (Crop Production) and Ex-Director Research, RAU, Pusa (Bihar) in implementation, analysis and interpretation of results are gratefully recorded. All round support and guidance received from Dr O. K. Sinha, Project Coordinator is duly acknowledged and we express our sincere thanks to him for his continuous support and guidance. Facilities and official provisions extended by Director, Indian Institute of Sugarcane Research, Lucknow for effective and timely implementation of various trials are sincerely recorded and acknowledged. The group humbly record its indebtedness to Indian Council of Agricultural Research, New Delhi for providing all required facilities, manpower and guidance in the course of implementation of the programme.

**Annexure I**

## Details of Experiments allotted to and conducted by different Centres during 2012-13

| Sl. No. | Centres | Experimental allotted | | | | | | Experiments conducted | | | | | | Experiments not conducted/reported | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **AS42** | **AS63** | **AS64** | **AS65** | **AS66** | **AS 67** | **AS42** | **AS63** | **AS64** | **AS65** | **AS66** | **AS67** | **AS42** | **AS63** | **AS64** | **AS65** | **AS66** | **AS67** |
| **NORTH WEST ZONE** | | | | | | | | | | | | | | | | | | | |
| 1 | Faridkot* | AS42 | AS63 | AS64 | AS65 | AS66 | AS67 | AS42 | AS63 | AS64 | AS65 | AS66 | AS67 | - | - | - | - | - | - |
| 2 | Kota* | AS42 | - | AS64 | - | AS66 | - | AS42 | - | AS64 | - | AS66 | - | - | - | - | - | - | - |
| 3 | Lucknow | AS42 | AS63 | AS64 | AS65 | AS66 | AS67 | AS42 | AS63 | AS64 | - | AS66 | AS67 | - | - | - | AS65 | - | - |
| 4 | Ludhiana | AS42 | AS63 | AS64 | AS65 | AS66 | - | AS42 | - | AS64 | AS65 | AS66 | - | - | AS63 | - | - | - | - |
| 5 | Pantnagar | AS42 | AS63 | AS64 | AS65 | AS66 | - | AS42 | AS63 | AS64 | AS65 | AS66 | - | - | - | - | - | - | - |
| 6 | Shahjahanpur | AS42 | - | AS64 | - | AS66 | - | AS42 | - | AS64 | - | AS66 | - | - | - | - | - | - | - |
| 7 | Sriganganagar | AS42 | - | AS64 | - | - | - | AS42 | - | AS64 | - | - | - | - | - | - | - | - | - |
| 8 | Uchani | AS42 | - | AS64 | AS65 | AS66 | - | AS42 | - | AS64 | AS65 | AS66 | - | - | - | - | - | - | - |
| **PENINSULAR ZONE** | | | | | | | | | | | | | | | | | | | |
| 9 | Akola | AS42 | - | AS64 | - | AS66 | - | - | - | - | - | - | - | AS42 | - | AS64 | - | AS66 | - |
| 10 | Coimbatore | AS42 | - | AS64 | - | AS66 | - | AS42 | - | - | - | - | - | - | - | AS64 | - | AS66 | AS67 |
| 11 | Kolhapur | AS42 | AS63 | AS64 | - | AS66 | - | AS42 | AS63 | AS64 | - | - | - | - | - | - | - | AS66 | - |
| 12 | Mandya | AS42 | - | AS64 | - | AS66 | AS67 | AS42 | - | AS64 | - | AS66 | - | - | - | - | - | - | AS67 |
| 13 | Navsari | AS42 | AS63 | AS64 | - | AS66 | - | AS42 | AS63 | AS64 | - | AS66 | - | - | - | - | - | - | - |
| 14 | Padegaon | AS42 | AS63 | AS64 | - | AS66 | - | AS42 | AS63 | AS64 | - | AS66 | - | - | - | - | - | - | - |
| 15 | Powarkheda | AS42 | - | AS64 | - | AS66 | - | AS42 | - | AS64 | AS65 | AS66 | - | - | - | - | - | - | - |
| 16 | Pune | AS42 | AS63 | AS64 | - | AS66 | - | AS42 | AS63 | AS64 | - | - | - | - | - | - | - | AS66 | - |
| 17 | Sankeshwar | AS42 | - | AS64 | - | AS66 | - | AS42 | - | AS64 | - | AS66 | - | - | - | - | - | - | - |
| 18 | Thiruvalla | AS42 | AS63 | AS64 | - | AS66 | - | AS42 | AS63 | AS64 | - | AS66 | - | - | - | - | - | - | - |
| **EAST COAST ZONE** | | | | | | | | | | | | | | | | | | | |
| 19 | Anakapalle | AS42 | - | AS64 | - | AS66 | - | AS42 | - | AS64 | - | AS66 | - | - | - | - | - | - | - |
| 20 | Cuddalore | AS42 | - | AS64 | - | AS66 | AS67 | AS42 | - | AS64 | - | AS66 | - | - | - | - | - | - | AS67 |
| 21 | Nayagarh | AS42 | - | AS64 | - | AS66 | | AS42 | - | AS64 | - | AS66 | - | - | - | - | - | - | - |
| **NORTH CENTRAL ZONE** | | | | | | | | | | | | | | | | | | | |
| 22 | Pusa | AS42 | AS63 | AS64 | AS65 | AS66 | - | AS42 | AS63 | AS64 | AS65 | AS66 | - | - | - | - | - | - | - |
| 23 | Seorahi | AS42 | - | AS64 | - | AS66 | - | AS42 | - | AS64 | - | AS66 | - | - | - | - | - | - | - |
| 24 | Bethuadhari* | AS42 | - | AS64 | AS65 | AS66 | - | - | - | - | - | - | - | AS42 | - | AS64 | AS65 | AS66 | |
| **NORTH EAST ZONE** | | | | | | | | | | | | | | | | | | | |
| 25 | Buralikson | AS42 | - | AS64 | - | AS66 | - | AS42 | - | AS64 | - | AS66 | - | - | - | - | - | - | - |

*Previous crops AS62 was conducted by Kota & Bethuadhari and AS61 by Faridkot.