Annual Report of AICRP on Sugarcane 2013-14
Entomology Section, VSI, Pune.

I)ALL INDIA COORDINATED RESEARCH PROGRAMME

1. Project no. : E. 4.1.1 (AICRP'S)
2. Discipline : Agril. Entomology
3. Title of the project : Evaluation of zonal varieties /genotypes for their reaction against major insect pests.
4. Title of experiment : Field screening of sugarcane varieties/genotypes in IVT Early to major pests.
5. Objective : To grade the entries in the trials for their behavior towards damage by key pests in the area.
6. Year of commencement : 1985 – 86 (Continuing)
7. Year of implementation : 2013 -2014(1st year)
8. Source of finance : ICAR/VSI Pune.
9. Project leader and :Shri.R.G.Yadav, Scientific Officer& Head, Entomology
Associate : Mrs.P.V.Gadade, Research Assistant, Entomology
10. Details of experiment:
a)Treatments :Fifteen (12+3)
1. Co10004, 2.Co10005, 3.Co10006, 4.Co10024, 5.Co10026, 6.Co10027, 7.CoM10081, 8.CoM10082, 9. CoN 10071 10. CoN 10072 11.CoT 10366 12. CoT 10367 13. Co 85004(Std.), 14. Co 94008 (Std.), 15.CoC 671 (STD.)
b) Design : RBD
c) Replication : Two
d) Type of soil : Heavy
e) Plot size : Gross:6 m x 6 rows x1.2 mt,Net:5 m x 4 rows x 1.2 mt.
f) Location : Vasantdada farm,VSI, Pune
g) Date of planting : 21.01.2013
h) Date of harvesting : 28.11.2013
i) Method of observations:

Early shoot borer: Observations to be recorded in post-germination phase at 30 days interval up to 120 days (At 30,60,90 and 120 DAP).Two middle rows were selected from each plot and total germinated shoots were counted. The shoots affected by early shoot borer showing "dead hearts" were counted. Calculated the % incidence as per the following formula,

$$\% \text{ Incidence} = \frac{\text{Number of dead hearts}}{\text{Total number of shoots}} \times 100$$

Cumulative incidence of up to 120 DAP should be calculated. Number of bored plants/ha be also recorded.

The grade of infestation was given as under,

30 DAP			60 DAP			90 DAP			90 DAP			Cumulative % incidence	No.of bored plants/ha
No.of shoots (I+II+III)	No. of dead hearts (I+II+III)	% Incidence	No.of shoots (I+II+III)	No. of dead hearts (I+II+III)	% Incidence	No.of shoots (I+II+III)	No. of dead hearts (I+II+III)	% Incidence	No.of shoots (I+II+III)	No. of dead hearts (I+II+III)	% Incidence		

No. of shoots observed at 120 DAP + Dead hearts at 30, 60 and 90 DAP
No. of dead hearts observed at 120, 30, 60 and 90 DAP

Cumulative % at 120 DAP = Total no.of dead hearts observed at 120+ no. of dead hearts observed at 30,60,90 DAP x 100
No. of shoot observed at 120 DAP + dead hearts at 30,60,90 DAP

No.of bored plants/ha will be calculated on the basis of cumulative percentage

No.of bored plants/ha = No. of dead hearts observed at 120, 30, 60 and 90 DAPx 10000/net plot area in sq.mt

Grade	% Incidence
Less Susceptible (LS)	below 15
Moderately Susceptible (MS)	15.1-30
Highly Susceptible (HS)	above 30

Internode borer/stalk borer/root borer: Minimum twenty-five canes were selected randomly from each plot and total no. of internodes and internodes affected due to internode borer in each cane were counted. Calculated the % incidence on cane basis,% intensity on nodal basis(by considering total number of nodes on observed cane will be recorded to compute infestation index).Infestation index will be recorded for internode borer and stalk borer, whereas only percent incidence will be observed for root borer on external visible symptoms up to six month as per following formula,

$$\% \text{ Incidence} = \frac{\text{Number of affected canes}}{25(\text{Cane})} \times 100$$

$$\% \text{ Intensity} = \frac{\text{Number of affected internodes}}{\text{Total number of internodes}} \times 100$$

$$\text{Infestation index} = \frac{\% \text{ Incidence} \times \% \text{ Intensity}}{100}$$

The grade of infestation was given as under,

Grade	Internode borer	Stalk borer	Root borer
	% Incidence	Infestation index	% Incidence
Less Susceptible (LS)	below 20	below 2	below 15
Moderately Susceptible (MS)	20.1-40	2.1-5	15.1-30
Highly Susceptible (HS)	above 40	Above 5	Above 30

Pyrilla : The population of nymph and adult to be recorded from a unit of 10 canes(20 leaves)
Average population of nymphs and adults per leaf will be recorded.
Observations on egg mass and cocoons of ecto-parasite, *Epiricania melanoluca* will be recorded.
Observations to be recorded at an interval of fortnight and pick incidence of pyrilla and its ecto-parasitoids will be reported in the report.

The grade of infestation was given as under,

Grade	Pyrilla (nymph and adult) / leaf
Less Susceptible (LS)	below 5
Moderately Susceptible (MS)	5.1-20
Highly Susceptible (HS)	above 20

White fly:

Population of nymph and puparia will be recorded from a unit of 10 cane (20 leaves) from proximal, middle and distal region.

Average population per 2.5 sq.cm will be recorded.

The grade of infestation was given as under

Grade	White fly (nymph and puparia) / 2.5 sq.cm
Less Susceptible (LS)	below 2.0
Moderately Susceptible (MS)	2.1-5
Highly Susceptible (HS)	above 5

Scale insect:

A. **Natural infestation:-** At harvest 25 canes will be selected randomly from each plot and affected internodes due to Scale insect in each cane will be recorded Calculated the % incidence as per following formula,

$$\% \text{ Incidence} = \frac{\text{Total no of infestated canes (I+II+III)}}{75\text{(Cane)}} \times 100$$

$$\% \text{ Intensity} = \frac{\text{Total no of infestated internodes (I+II+III)}}{\text{Total no of internodes (I+II+III)}} \times 100$$

Grade of infestation was given as under,

Grade	Scale insect (% Incidence)
Less Susceptible (LS)	below 10
Moderately Susceptible (MS)	10.1-35
Highly Susceptible (HS)	above 35

B. **Artificial infestation:** The genotypes of ratoon consisting of single row of 6m/3m for each genotype are evaluated after artificially infesting individual cane in each row with scale infested cut pieces of canes at about five months age of the crop.

The evaluation will be done at harvest by considering following points.

1. The total no. of canes, no.of scale insect infested cane and no. of canes died due to scale insect will be recorded.
2. Number of internodes affected by scale insects in 10 randomly selected canes in each row, total no. of internodes in these 10 canes will also be recorded.
3. Visual rating of genotypes on the basis of degree of scale insect encrustation on internodes will be observed by adopting the following different levels of scale insect encrustation.

Artificially infested canes by scale insect will exhibit cent percent incidence, hence per cent incidence may not be necessary.

$$\% \text{ Intensity} = \frac{\text{No. of internodes affected by scale insect in 10 canes}}{\text{Total no of internodes in 10 canes}} \times 100$$

$$\% \text{ drying} = \frac{\text{No. of cane dried due to scale insect attacked}}{\text{Total no of canes in the row}} \times 100$$

Visual rating will be employed for the degree of scale insect encrustation.Even if one internode shows encrustation, the variety will be rated accordingly.The different levels of infestation are given below:

	Degree of scale insect encrustation		**Category**
1	Few scale insects here and there without well established colony on any internode	-	Very light infestation (VL)
2	Scale insect encrustion covering approximately ¼ of internode	-	light infestation (L)
3	Scale insect encrustion covering approximately ½ of internode	-	Moderate infestation (M)
4	Scale insect encrustion covering approximately ¾ of internode	-	Severe infestation (S)
5	Scale insect encrustion covering more than ¾ of internode	-	Very severe infestation (VS)

	The genotypes/varieties are then rated as follows		
1	Genotype/varieties showing 'VL' and Linfestation	-	Less susceptible (LS)
2	Genotype/varieties showing 'M' infestation	-	Moderately susceptible (MS)
3	Genotype/varieties showing 'S' and 'VS' infestation/ those showing drying of canes	-	Highly susceptible (HS)

Mealy bug: At harvest, twenty five canes will be selected randomly from each plot and affected internodes due to Mealy bug will be recorded. Calculate the %incidence and % intensity as per the following formula,

$$\% \text{ Incidence} = \frac{\text{Number of affected canes}}{25(\text{Cane})} \times 100$$

$$\% \text{ Intensity} = \frac{\text{Total number of infected internodes}}{\text{Total number of internodes}} \times 100$$

Grade of infestation given as under,

Grade	**Mealy bug % Incidence**
Less Susceptible (LS)	below 5
Moderately Susceptible (MS)	5.1-30
Highly Susceptible (HS)	above 30

$$\% \text{ Incidence} = \frac{\text{Total no of infested canes (I+II+III)}}{75(\text{Cane})} \times 100$$

$$\% \text{ Intensity} = \frac{\text{Total no of infested internodes (I+II+III)}}{\text{Total no of internodes (I+II+III)}} \times 100$$

Sugarcane Woolly Aphid(SWA): Five canes will be selected from each plot and observe the incidence of SWA on top, middle and bottom leaf in each cane. Observations will be recorded on the basis of percentage leaf area covered by nymphs and adults.

$$\text{Avg SWA Grade} = \frac{\text{Total grade (I+II+III)}}{\text{45(5 Plants X 3 Leaves X 3 Replications)}}$$

% leaf area covered by aphid colony	SWA Grade	Observed grade	Categorization of variety/genotype
Nil	0	-	-
<25%	1	Up to 1.0	Less susceptible (LS)
25-50	2	1.1-3.0	Moderately susceptible (MS)
>50%	3	>3.0	Highly susceptible (HS)

Spittle bug: Twenty five canes will be selected randomly from each plot and presence of spittle bug on cane will be considered as infested cane.

% incidence will be calculated as per following formula:

$$\% \text{ Incidence} = \frac{\text{Total number of affected canes}}{\text{25(Cane)}} \times 100$$

$$\% \text{ Incidence} = \frac{\text{Total number of infested canes (I+II+III)}}{\text{75(Cane)}} \times 100$$

Grade will be calculated as given below:

Grade	**% Incidence**
Less Susceptible (LS)	below 5
Moderately Susceptible (MS)	5.1. -30
Highly Susceptible (HS)	above 30

Termite :

a) **At germination**: After germination carefully dug out 1 m row length (Aprox.4 setts) at 2 places in each plot preferably from boarder lines without affecting setts and observe eye bud damage and cut end damage caused by termite. After taking the observation, setts should be covered with the soil so that maintain the plant population in the experimental plots.,

Calculated the % incidence as per following formula

$$\% \text{ Incidence at germination} = \frac{\text{Total no of setts affected due to eye bud damage or cut end damage}}{\text{Total no.of setts observed}} \times 100$$

$$\% \text{ Incidence at germination} = \frac{\text{Total no of setts affected due to eye bud damage or cut end damage (I+II+III)}}{\text{Total no.of setts observed in spotI \& spot II (I+II+III)}} \times 100$$

b) **At harvest:** Twenty five canes will be randomly selected (preferably from middle row) from each plot. Number of infected cane will be judge on the basis of mud tunnels present on the cane or dry leaf sheath on observed cane. Calculated the % incidence as per following formula

$$\% \text{ Incidence at harvest} = \frac{\text{Total no of infested canes (I+II+III)}}{75(\text{Cane})} \times 100$$

Grade will be calculated as given below:

Grade	**% Incidence**
Less Susceptible (LS)	below 10
Moderately Susceptible (MS)	10.1-35
Highly Susceptible (HS)	above 35

White grub: Grubs population will be recorded by digging 1 sq.m area at 5 different sites in the field. Population per ha. will be calculated as per given formula

$$\text{Population of grubs/ha} = \text{Total no. of grub} \times 2000$$

11. Results:

The data presented in table 1 indicated that the cumulative % incidence of early shoot borer was statistically high and above 30 % in Co86032 (30.50%), Co 94004 (32.67 %), Co10006 (33.92%) and Co10027 (38.68%), while in varieties/genotypes viz..Co M10082 (8.62%), Co N10072 (11.71%), Co 10026 (12.23%) and Co10024 (14.62%) it was statistically low and below 15 %. No. of bored plants/ha by early shoot borer were minimum 11806 and 19444 in CoM 10082 and CoN 10072, while it was maximum 64236 and 60069 in Co 86032 and Co 10006.The % incidence of internode borer was maximum 24.0 % in Co10026, while in other varieties / genotypes screened it was below 20.0 %.In all varieties / genotypes screened % intensity of internode borer was bellow 2.0 %. The infestation index of internode borer was bellow 1.00 in all varieties / genotypes screened. The incidence of mealy bug was found only in Co T 10367 (6.0%), while all other varieties were free from it.

12. Conclusion:

Out of 15 varieties/genotypes screened Co M10082,Co N10072 ,Co 10026 and Co10024 were less susceptible to early shoot borer, while 14 varieties/genotypes showed less susceptible reaction to internode borer and mealy bug.

Table.1 Reaction of sugarcane genotypes/varieties to major insect pest in IVT early.

Sr.no	Varieties/ genotype	Early shoot borer (% incidence)						Top borer			Internode borer			Stalk borer			Root borer
		30 DAP	60 DAP	90 DAP	120 DAP	cum	No. of bored plants/ha	III Brood 5^{th} month	III Brood 7^{th} month	At harvest	% incidence	% intensity	Infestation index	% incidence	% intensity	Infestation index	% incidence
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	IVT early																
1	Co 10004	0	4.05	8.77	5.91	15.97	22917				8.00	0.49	0.04				
2	Co 10005	0	0.00	9.65	7.65	17.88	24653				10.00	0.74	0.08				
3	Co 10006	0	10.80	27.78	14.94	33.92	60069				12.00	1.03	0.12				
4	Co 10024	0	10.41	5.50	4.36	14.62	26389				20.00	1.55	0.32				
5	Co 10026	0	7.92	4.74	4.10	12.23	20486				24.00	1.82	0.43				
6	Co 10027	0	17.48	20.10	16.43	38.68	52083				8.00	0.9	0.14				
7	CoM 10081	0	5.68	15.85	7.04	22.89	39236				14.00	0.99	0.14				
8	CoM 10082	0	2.20	5.28	2.41	8.62	11806				12.00	1.08	0.13				
9	CoN10071	0.79	15.54	16.05	4.62	22.09	43403				14.00	0.94	0.2				
10	CoN10072	0	3.85	5.60	4.00	11.71	19444				2.00	0.14	0.01				
11	CoT 10366	0	4.26	15.43	13.24	29.76	34722				8.00	0.55	0.04				
12	CoT 10367	0	9.89	5.62	6.69	18.69	26736				4.00	0.28	0.02				
13	Co 86032(std)	0	33.20	9.77	9.23	30.50	64236				10.00	0.76	0.1				
14	Co 94004(std)	0	14.35	11.59	12.94	32.67	47222				8.00	0.54	0.04				
15	Coc 671(std)	0	27.80	10.60	7.82	28.78	48264				14.00	1.19	0.18				
	S.E $\pm$					5.23											
	C.D at 5%					15.83					N.S						
	C.V					32.74											

Sr.no	Varieties/genotype	Pyrilla		white fly per 2.5 sq.cm SMW=	Scale insect				Mealy bug		Av. SWA Grade SMW=	Mites	Thrips	Black bug /leaf SMW=	Spittle bug	Termite (%)		White grub
					Nat.Infe		Art.Infe		% incidence	% intensity		No.of grubs/ha SMW=	% intensity SMW=		% incidence SMW=	Germination	Harvest	No.of grubs/ha SMW=
		N+A /leaf SMW=	EME/CE per plant SMW=		% incidence	% intensity	% incidence	% drying										
		19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
1	Co 10004								0.00	0								
2	Co 10005								0.00	0								
3	Co 10006								0.00	0								
4	Co 10024								0.00	0								
5	Co 10026								0.00	0								
6	Co 10027								0.00	0								
7	CoM 10081								0.00	0								
8	CoM 10082								0.00	0								
9	CoN10071								0.00	0								
10	CoN10072								0.00	0								
11	CoT 10366								0.00	0								
12	CoT 10367								6.00	0.27								
13	Co 86032(std)								0.00	0								
14	Co 94004(std)								0.00	0								
15	Coc 671(std)								0.00	0								
	S.E ±																	
	C.D at 5%								N.S									
	C.V																	

1. Project No : E 4.1.2
2. Discipline **:** Agril Entomology
3. Title of project **:** Evaluation of zonal varieties/ genotypes for their reaction against major insect pests.
4. Title of experiment **:** Field screening of sugarcane varieties/ genotypes in AVT Early (II plant) to major pests.
5. Objective **:** To grade the entries in the trial for their behavior towards damage by key pest in the area.
6. Year of commencement :1982–83 (Change of varieties as per AICRP'S Programme)
7. Year of implementation **:** 2013-14 (2 Year)
8. Source of finance : ICAR/VSI, Pune
9. Project leader and : Shri. R.G. Yadav, Scientific Officer & Head,Entomology
Associate **:** Mrs.P.V.Gadade,Research Assistant, Entomology
10. Details of experiment:
a) Treatments **:** Five (2+3)
1. Co08001, 2.VSI 08121, 3. Co85004 (Std.), 4. Co94008 (Std.) and 5. CoC671 (Std.)
b. Design **:** RBD
c) Replications **:** four
d) Type of soil **:** Heavy
e) Plot size: Gross **:** 6M. X 2.4 M^2 **Net:** 5 M X 2.4 M^2
f) Location **:** Vasantdada farm
g) Date of planting **:** 24.01.13
h) Date of harvesting **:** 24.12.13
i) Method of observations: The observations were recorded as given in trial E.4.1.1
11. Results:
The data in table 2 reveled that the cumulative per cent incidence of early shoot borer was above 15.0 % in Co 85004(15.02 %), Co 94008 (19.65%) and CoC 671 (19.89), while it was below 15 % in Co08001 (11.88%) and VSI 08121(14.62%).The no. of bored plants/ha by early shoot borer were minimum 21528 in VSI 08121, while it was maximum 34549 and 35243 in Co 94008 and CoC 671.The % incidence of internode borer was below 20 % in all varieties/genotypes screened. The % intensity of internode borer was maximum 1.52 % in Co 08001, while it was below 1.0% in other varieties/genotypes screened. The infestation index of internode borer was below 1.0 in all varieties/genotypes screened. The percent incidence of mealy bug was maximum 2.00 % in Co 94008, while VSI 08121, Co 85004 and CoC 671 were free from it.

12. Conclusion:

Out of 5 varieties/genotypes screened Co08001 and VSI 08121 were less susceptible to early shoot borer, while all varieties/genotypes showed less susceptible reaction to internode borer and mealy bug.

Table.2 Reaction of sugarcane genotypes/varieties to major insect pest in AVT II plant early.

Sr. no	Varieties/ genotype	Early shoot borer (% incidence)						Top borer			Internode borer			Stalk borer			Root borer
		30 DAP	60 DAP	90 DAP	120 DAP	cum	No. of bored plants/ha	III Brood 5th month	III Brood 7th month	At harvest	% incidence	% intensity	Infestation index	% incidence	% intensity	Infestation index	% incidence
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	AVT II plant early																
1	Co 08001	0	3.85	8.31	3.22	11.88	24826				20	1.52	0.33	1			
2	Co 08121	0	6.28	7.88	3.94	14.62	21528				8	0.52	0.04	2			
3	Co 85004(std)	0.28	6.56	7.86	4.26	15.02	29167				9	0.73	0.1	3			
4	Co 94008(std)	0	14.16	15.18	1.91	19.65	34549				15	0.99	0.22	4			
5	Coc 671(std)	0.25	3.09	16.09	5.19	19.89	35243				13	0.97	0.14	5			
	S.E ±																
	C.D at 5%					NS					NS						
	C.V																

Sr. no	Varieties/genotype	Pyrilla		white fly per 2.5 sq.cm SMW=	Scale insect				Mealy bug		Av. SWA Grade SMW=	Mites	Thrips	Black bug /leaf SMW=	Spittle bug	Termite (%)		White grub
					Nat.Infe		Art.Infe		% incidence	% intensity								
		N+A /leaf SMW=	EME/ CE per plant SMW=		% incidence	% intensity	% incidence	% drying				No.of grubs/ ha SMW=	% intensity SMW=		% incidence SMW=	Germination	Harvest	No.of grubs/ha SMW=
		19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
1	Co 08001								1.00	0.17								
2	Co 08121								0.00	0								
3	Co 85004								0.00	0								
4	Co 94008								2.00	0.28								
5	Coc 671(std)								0.00	0								
	S.E ±																	
	C.D at 5%								NS									
	C.V																	

1. Project No : E 4.1.3
2. Discipline **:** Agril Entomology
3. Title of project **:** Evaluation of zonal varieties/ genotypes for their reaction against major insect pests.
4. Title of experiment **:** Field screening of sugarcane varieties/ genotypes in AVT Early (Ratoon) to major pests.
5. Objective **:** To grade the entries in the trial for their behavior towards damage by key pest in the area.
6. Year of commencement : 1982 – 83
(Change of varieties as per AICRP'S Programme)
7. Year of implementation **:** 2012-13 (2^{nd} Year)
8. Source of finance : ICAR/VSI, Pune
9. Project leader and :Shri.R.G.Yadav,Scientific Officer & Head,Entomology
Associate **:** Mrs.P.V.Gadade,Research Assistant, Entomology
10. Details of experiment:
a. Treatments : Five (2+3)
1. Co08001, 2.VSI 08121, 3. Co85004 (Std.),4. Co94008 (Std.), and 5. CoC671 (Std.)
b. Design **:** RBD
c. Replication **:** Three
d. Type of soil **:** Heavy
e. Plot size **:** Gross 6M x 2.4 M^2 Net 5 M x 2.4 M^2
f. Location **:** Vasantdada farm, VSI, Pune
g) Date of ratooning **:** 21.02. 13
h) Date of Harvesting **:** 16.01.14
i) Method of observations: The observations were recorded as given in trial E.4.1.1
11. Results:
The data presented in table 3 indicated that the cumulative % incidence of early shoot borer was statistically high in VSI 08121 (17.76%), CoC 671(18.32 %) and Co 94008 (19.09 %), while it was significantly low in Co08001 (11.06 %). The no. of bored plants/ha by early shoot borer was minimum 20486 in VSI 08121, while it was maximum 34375 in Co 85004. The % incidence of internode borer was below 20 % .The % incidence of internode borer was above 20.00 % in Co 94008 (22.00 %), CoC 671(23.00 %) and Co08001 (23.00 %) while in varieties viz. Co 85004 (11.00 %) and VSI 08121(13.00%) it was below 20.00%. The % intensity of internode borer was found maximum in Co 08001(1.70%) and CoC 671(1.63 %).while it was minimum in Co 85004(0.72%). In all varieties/ genotypes screened infestation index of internode borer was below 1.0. The % incidence of mealy bug was below 5.00% in all varieties/genotype screened except Co94008.

12. Conclusion:

Out of 5 varieties/genotypes screened Co08001 and Co 85004 were less susceptible to early shoot borer, while 2 and 5 varieties/genotypes showed less susceptible reaction to internode borer and mealy bug.

Table.3 Reaction of sugarcane genotypes/varieties to major insect pest in AVT Ratoon early.

Sr.no	Varieties/genotype	Early shoot borer (% incidence)						Top borer			Internode borer			Stalk borer			Root borer
		30 DAP	60 DAP	90 DAP	120 DAP	cum	No. of bored plants/ha	III Brood 5th month	III Brood 7th month	At harvest	% incidence	% intensity	Infestation index	% incidence	% intensity	Infestation index	% incidence
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	AVT Ratoon early																
1	Co 08001	0.93	6.70	3.48	1.52	11.06	28472				23.00	1.7	0.42				
2	Co 08121	0.25	10.40	7.23	3.93	17.76	20486				13.00	1.11	1.15				
3	Co 85004(std)	1.46	9.89	2.74	1.44	12.79	34375				11.00	0.72	0.09				
4	Co 94008(std)	0.62	11.80	6.07	2.76	19.09	22743				22.00	1.48	0.38				
5	CoC 671(std)	0.40	7.87	9.90	2.37	18.32	25694				23.00	1.63	0.43				
	S.E ±					2.38											
	C.D at 5%					7.18					NS						
	C.V					32.2											

Sr. no	Varieties/genotype	Pyrilla		white fly per 2.5 sq.cm SMW=	Scale insect				Mealy bug		Av. SWA Grade SMW=	Mites	Thrips	Black bug /leaf SMW=	Spittle bug	Termite (%)		White grub
					Nat.Infe		Art.Infe											
		N+A /leaf SMW=	EME/ CE per plant SMW=		% incidence	% intensity	% incidence	% drying	% incidence	% intensity		No.of grubs/ ha SMW=	% intensity SMW=		% incidence SMW=	Germination	Harvest	No.of grubs/ ha SMW=
		19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
1	Co 08001								3.00	0.37								
2	Co 08121								4.00	0.25								
3	Co 85004(std)								5.00	0.69								
4	Co 94008(std)								0.00	0								
5	CoC 671(std)								1.00	0.12								
6	S.E ±																	
7	C.D at 5%								NS									
8	C.V																	

1. Project No : E 4.1.4
2. Discipline **:** Agril Entomology
3. Title of project **:** Evaluation of zonal varieties/ genotypes for their reaction against major insect pests.
4. Title of experiment **:** Field screening of sugarcane varieties/ genotypes in IVT Midllate to major pests.
5. Objective **:** To grade the entries in the trial for their behavior towards damage by key pest in the area.
6. Year of commencement : 1982 – 83
(Change of varieties as per AICRP'S Programme)
7. Year of implementation **:** 2013-14
8. Source of finance : ICAR/VSI, Pune
9. Project leader and : Shri. R.G. Yadav, Scientific Officer & Head, Entomology
Associate **:** Mrs.P.V.Gadade, Research Assistant, Entomology
10. Details of experiment:
a. Treatments : Sixteen (14+2)

1. Co 10015 2. Co 10017 3. Co 10031 4. Co 10033 5. CoM 10083 6. CoM 10084 7. Co N 10073 8. Co T 10368 9 Co T 10369. 10. Co Vc 10061 11. Co VSI 10121 12. Co VSI 10122 13. PI 10131 14. PI 10132 15. Co 86032 (std) and 16. Co 99004 (std)

b. Design **:** RBD
c. Replication **:** Two
d. Type of soil **:** Heavy
e. Plot size **:** Gross 6m x 6 R X 1.2 m Net 5m x 4 R X 1.2 m
f. Location **:** Vasantdada farm, VSI, Pune
g) Date of Planting **:** 19.01.2013
h) Date of Harvesting **:** 27.01.2014
i) Method of observations **:** The observations were recorded as given in trial E.4.1.1

11. Results:

The data in Table 4 indicated that cumulative % incidence of early shoot borer was maximum in Co10017 (24.60%) and CoT10368 (22.73 %), while it was statistically low in varieties viz. CoM10084 (4.58%), Co10031 (6.60%), Co99004 (6.68%), Co10033 (10.30%), PI10131 (12.38%), and CoT10369 (13.44%). The no. of bored plants/ha by early shoot borer was maximum 55556 and 46181 in Co 10017 and Co 86032,while it was minimum 7986 and 8333 in Co 99004 and CoM 10084.The % incidence of internode borer was maximum 14 % in CoVc 10061,while CoT 10369 and CoVSI 10121 were free from it. The % intensity of internode borer was maximum 1.10% in CoVc 10061, while in other varieties/genotypes screened it was below 1.00 %. The infestation index of internode borer was below 1.00 in all varieties/ genotypes screened. The incidence of mealy bug was observed in CoT10369 (4.00%), Co10015 (2.00 %), CoT10368 (2.00%), PI10132 (2.00%),Co 86032 (2.00%) and Co 99004 (2.00 %), while other varieties/genotypes screened were free from it.

12. Conclusion:

All 16 varieties/genotypes screened showed less susceptible reaction to internode borer and mealy bug, while 8 varieties/genotypes showed less susceptible reaction to early shoot borer.

Table.4 Reaction of sugarcane genotypes/varieties to major insect pest in IVT Midllate.

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Sr. no	Varieties/ genotype	Early shoot borer (% incidence)						Top borer			Internode borer			Stalk borer			Root borer
		30 DAP	60 DAP	90 DAP	120 DAP	cum	No. of bored plants/ha	III Brood 5^{th} month	III Brood 7^{th} month	At harvest	% incidence	% intensity	Infestation index	% incidence	% intensity	Infestation index	% incidence
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	IVT Midllate																
1	Co 10015	0	10.56	8.66	4.01	17.76	37153				4.00	0.28	0.02				
2	Co 10017	0	12.11	14.31	5.76	24.60	55556				6.00	0.41	0.05				
3	Co 10031	0	0.41	4.08	2.55	6.60	12153				6.00	0.45	0.03				
4	Co 10033	0.49	3.17	8.05	1.75	10.30	22569				8.00	0.55	0.04				
5	Com 10083	0.45	4.66	4.62	5.75	13.79	26389				2.00	0.14	0.01				
6	Com 10084	0	1.18	2.28	1.33	4.58	8333				2.00	0.13	0.01				
7	Co N 10073	0.60	2.13	8.97	3.42	15.78	27431				10.00	0.72	0.07				
8	Co T 10368	0	7.82	13.45	7.54	22.73	37847				2.00	0.14	0.01				
9	Co T 10369	0.00	9.88	5.50	2.19	13.44	26389				0.00	0	0				
10	Co Vc 10061	0	4.90	9.31	2.22	14.17	25347				14.00	1.1	0.24				
11	Co VSI 10121	0	7.19	6.42	5.26	16.32	27083				0.00	0	0				
12	Co VSI 10122	0.65	9.66	14.06	4.51	22.50	41319				4.00	0.28	0.01				
13	PI 10131	0	3.22	7.90	2.32	12.38	22222				12.00	0.79	0.14				
14	PI 10132	0.64	7.57	11.02	7.84	20.37	38542				10.00	0.69	0.07				
15	Co 86032 (std)	0	17.65	6.09	8.05	22.71	46181				12.00	0.77	0.1				
16	Co 99004 (std)	0	2.37	3.88	1.95	6.98	7986				2.00	0.15	0.01				
	S.E $\pm$					3.06											
	C.D at 5%					9.13					NS						
	C.V					28.22											

Sr. no	Varieties/genotype	Pyrilla		white fly per 2.5 sq.cm SMW=	Scale insect				Mealy bug		Av. SWA Grade SMW=	Mites	Thrips	Black bug /leaf SMW=	Spittle bug	Termite (%)		White grub
					Nat.Infe		Art.Infe		% incidence	% intensity								
		N+A /leaf SMW=	EME/CE per plant SMW=		% incidence	% intensity	% incidence	% drying				No.of grubs/ha SMW=	% intensity SMW=		% incidence SMW=	Germination	Harvest	No.of grubs/ha SMW=
		19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
1	Co 10015								2.00	0.09								
2	Co 10017								0.00	0								
3	Co 10031								0.00	0								
4	Co 10033								0.00	0								
5	Com 10083								0.00	0								
6	Com 10084								0.00	0								
7	Co N 10073								0.00	0								
8	Co T 10368								2.00	0.09								
9	Co T 10369								4.00	0.16								
10	Co Vc 10061								0.00	0								
11	Co VSI 10121								0.00	0								
12	Co VSI 10122								0.00	0								
13	PI 10131								0.00	0								
14	PI 10132								2.00	0.09								
15	Co 86032 (std)								2.00	0.16								
16	Co 99004 (std)								2.00	0.09								
	S.E $\pm$																	
	C.D at 5%								NS									
	C.V																	

1. Project no. : E. 4.1.5 (AICRP'S)
2. Discipline : Agril. Entomology
3. Title of the project : Evaluation of zonal varieties /genotypes for their reaction against major insect pests.
4. Title of experiment : Field screening of sugarcane varieties in AVT II Plant Midllate to major pests.
5. Objective : To grade the entries in the trials for their behavior towards damage by key pests in the area.
6. Year of commencement : 1985 – 86 (Continuing)
(Change of varieties as per AICRP'S programme)
7. Year of implementation : 2013 -2014(2^{nd} year)
8. Source of finance : ICAR/VSI Pune.
9. Project leader and :Shri.R.G.Yadav, Scientific Officer& Head,Entomology
Associate : Mrs.P.V.Gadade,Research Assistant, Entomology
10. Details of experiment:
a) Treatments : Seven (5+2)
1. Co08008, 2.Co08009, 3.Co08016, 4.Co08020, 5.Snk08101, 6.Co86032(Std.) and 7.Co99004 (Std.)
b) Design **:** RBD
c) Replication **:** Three
d) Type of soil **:** Heavy
e) Plot size **:** Gross 6 m x 2.4 m^2, Net 5 m x 2.4 m^2.
f) Location **:** Vasantdada farm/VSI,Pune
g) Date of planting **:** 24.01.2013
h) Date of harvesting **:** 24.12.2013
i) Method of observations: The observations were recorded as given in trial E.4.1.1

11. Results:

The data presented in Table 5 indicated that cumulative % incidence of early shoot borer was higher in Co86032 (27.71%), Co08016 (22.80%) and CoSnk 08101 (19.77%), while it was significantly low in Co08009 (8.10%), Co08008 (8.88%) ,Co8020 (12.24%) and Co99004(15.01 %). The no. of bored plants/ha by early shoot borer were maximum 62037 and 23241 in Co 86032 and Co 08016,while it was minimum 16204 and 19676 in Co 08009 and Co99004.The % incidence of internode borer was maximum in CoSnk 08101 (14.67%) and Co8008 (16.00%), while it was minimum in Co86032 (5.33 %) and Co99004 (6.67%). The intensity of internode borer was less than 1% in all varieties/ genotypes screened. The infestation index of internode borer was below 1.0 in all varieties/ genotypes screened. The % incidence of mealy bug was maximum 5.33% in CoSnk 08101,while Co08008, Co08016 and Co 08020 were free from it.

12. Conclusion:

All 7 varieties/genotypes screened showed less susceptible reaction to internode borer, while 3 and 6 varieties/genotypes showed less susceptible reaction to early shoot borer and mealy bug.

Table.5 Reaction of sugarcane genotypes/varieties to major insect pest in AVT II plant Midllate.

Sr. no	Varieties/ genotype	Early shoot borer (% incidence)						Top borer			Internode borer			Stalk borer			Root borer
		30 DAP	60 DAP	90 DAP	120 DAP	cum	No. of bored plants/ha	III Brood 5th month	III Brood 7th month	At harvest	% incidence	% intensity	Infestation index	% incidence	% intensity	Infestation index	% incidence
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	AVT II plant Midllate.																
1	Co 08008	0.31	2.12	5.28	1.09	8.88	20139				16.00	0.94	0.17				
2	Co 08009	0.33	2.20	4.90	1.24	8.10	16204				12.00	0.88	0.16				
3	Co 08016	0.21	2.40	8.07	2.31	22.80	53241				8.00	0.53	0.05				
4	Co 08020	0.16	3.01	7.81	2.16	12.24	22222				10.67	0.62	0.08				
5	CoSnk 08101	0.13	3.68	8.78	2.50	19.77	46065				14.67	0.95	0.18				
6	Co 86032(std)	0.16	3.92	9.81	3.75	27.71	62037				5.33	0.32	0.02				
7	Co 99004(std)	0.14	4.02	9.42	4.05	15.01	19676				6.67	0.52	0.04				
	S.E ±					4.19											
	C.D at 5%					12.68					NS						
	C.V					46.15											

Sr. no	Varieties/genotype	Pyrilla		white fly per 2.5 sq.cm SMW=	Scale insect				Mealy bug		Av. SWA Grade SMW=	Mites	Thrips	Black bug /leaf SMW=	Spittle bug	Termite (%)		White grub
					Nat.Infe		Art.Infe											
		N+A /leaf SMW=	EME/ CE per plant SMW=		% incidence	% intensity	% incidence	% drying	% incidence	% intensity		No.of grubs/ ha SMW=	% intensity SMW=		% incidence SMW=	Germination	Harvest	No.of grubs/ ha SMW=
		19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
1	Co 08008								0.00	0								
2	Co 08009								2.67	0.18								
3	Co 08016								0.00	0								
4	Co 08020								0.00	0								
5	CoSnk 08101								5.33	0.71								
6	Co 86032(std)								4.00	0.33								
7	Co 99004(std)								4.00	0.53								
	S.E ±																	
	C.D at 5%								NS									
	C.V																	

1. Project No : E 4.1.6
2. Discipline **:** Agril Entomology
3. Title of project **:** Evaluation of zonal varieties/ genotypes for their reaction against major insect pests.
4. Title of experiment **:** Field screening of sugarcane varieties/ genotypes in AVT Ratoon Midlate to major pests.
5. Objective **:** To grade the entries in the trial for their behavior towards damage by key pest in the area.
6. Year of commencement : 1982 – 83
(Change of varieties as per AICRP'S Programme)
7. Year of implementation **:** 2013-14 (2 Year)
8. Source of finance : ICAR/VSI, Pune
9. Project leader and : Shri. R.G. Yadav, Scientific Officer & Head, Entomology
Associate **:** Mrs.P.V.Gadade, Research Assistant, Entomology
10. Details of experiment:
a) Treatments **:** Seven (5+2 **)**
1.Co08008, 2.Co08009, 3.Co08016, 4.Co08020, 5.Snk08101, 6.Co86032(Std.) and 7.Co99004 (Std.)
b) Design **:** RBD
c) Replication **:** Three
d) Type of soil **:** Heavy
e) Plot size **:** Gross 6M x 2.4 M^2Net 5 M x 2.4 M^2
f) Location **:** Vasantdada farm, VSI, Pune
g) Date of ratooning **:** 21.2.2013
h) Date of Harvesting **:** 16.01.2014
i) Method of observations: The observations were recorded as given in trial E.4.1.1

11. Results:

The data presented in Table 6 indicated that the cumulative % incidence of early shoot borer was statistically higher in Co08008 (17.91%), CoSnk08101 (18.15 %), Co08020 (19.46 %) and Co86032 (23.23%), while it was statistically low in Co08009 (10.79 %), Co99004 (14.65%) and Co08016 (15.36%). The no. of bored plants/ha by early shoot borer were maximum 59491 in Co 86032,while it was minimum 23380 in Co 99004.The % incidence of internode borer was maximum in CoSnk 08101 (36.00%), while it was below 20 % in Co08016 (14.67%), Co8009 (17.33%) and Co08020(18.67%). The % intensity of internode borer was maximum in Cosnk08101 (2.21%) while it was minimum in Co08016 (0.95%).The infestation index of internode borer was below 1.0 in all varieties/genotypes screened. The % incidence of of mealy bug was maximum 6.67 % in Co 08016, while Co080008, Co08009, CoSnk08101, Co99004 were free from it.

12. Conclusion:

Out of 7 varieties/genotypes screened 2, 3 and 6 varieties/genotypes found less susceptible reaction to early shoot borer, internode borer and mealy bug, respectively.

Table.6 Reaction of sugarcane genotypes/varieties to major insect pest in AVT Ratoon Midllate.

Sr. no	Varieties/genotype	Early shoot borer (% incidence)						Top borer			Internode borer			Stalk borer			Root borer
		30 DAP	60 DAP	90 DAP	120 DAP	cum	No. of bored plants/ha	III Brood 5th month	III Brood 7th month	At harvest	% incidence	% intensity	Infestation index	% incidence	% intensity	Infestation index	% incidence
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	AVT Ratoon Midllate																
1	Co 08008	0.67	13.16	5.65	1.41	17.91	51157				25.33	1.9					
2	Co 08009	0.50	4.17	5.98	1.66	10.79	23843				17.33	1.37					
3	Co 08016	1.03	11.24	7.54	2.04	15.36	58565				14.67	0.95					
4	Co 08020	2.75	6.26	9.53	2.84	19.46	36111				18.67	1.53					
5	CoSnk 08101	1.14	12.19	6.99	1.73	18.15	55324				36.00	2.21					
6	Co 86032(std)	2.55	18.28	8.35	2.19	23.23	59491				24.00	1.62					
7	Co 99004(std)	0.29	13.71	4.58	1.52	14.65	23380				21.33	1.66					
	S.E ±					2.39											
	C.D at 5%					7.25					NS						
	C.V					26.27											

Sr. no	Varieties/genotype	Pyrilla		white fly per 2.5 sq.cm SMW=	Scale insect				Mealy bug		Av. SWA Grade SMW=	Mites	Thrips	Black bug /leaf SMW=	Spittle bug	Termite (%)		White grub
					Nat.Infe		Art.Infe											
		N+A /leaf SMW=	EME/CE per plant SMW=		% incidence	% intensity	% incidence	% drying	% incidence	% intensity		No.of grubs/ha SMW=	% intensity SMW=		% incidence SMW=	Germination	Harvest	No.of grubs/ha SMW=
		19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
1	Co 08008								0.00	0								
2	Co 08009								0.00	0								
3	Co 08016								6.67	0.65								
4	Co 08020								4.00	0.4								
5	CoSnk 08101								0.00	0								
6	Co 86032(std)								1.33	0.15								
7	Co 99004(std)								0.00	0								
	S.E ±																	
	C.D at 5%								NS									
	C.V																	

1. Project no. : E. 28 (AICRP's)
2. Discipline : Agril. Entomology
3. Title of the project : Survey and surveillance of sugarcane insect pests.
4. Title of experiment : Survey and surveillance of sugarcane insect pests.
5. Objective : To identify the key insect pests of sugarcane in the area and their natural enemies..
6. Year of commencement **:** 2003-04
7. Year of implementation : 2013 –2014
8. Source of finance : ICAR/VSI, Pune.
9. Project leader and :Shri.R.G.Yadav, Scientific Officer & Head, Entomology.
Associate : Mrs.P.V.Gadade,Research Assistant, Entomology

10. Method of observations:

i) Roving survey of sugarcane fields at 5-8 Km distance be recorded.

ii) Report containing information on location, variety, date of planting. spacing, fertilizer doses and inter crops, if any.

iii) Observations on incidence of borers be recorded by examining 100 canes at five places (four corners and in the middle), sucking pests by examining 20 canes and others as mentioned in technical programme of E 4.1.

11. Results

The % incidence of early shoot borer was in the range of 0.0 to 2.00 %. The % incidence and intensity of mealy bug was found maximum 50.00 % and 5.79% respectively in December 2012 ratoon crop of Co86032 variety. All plots were free from infestation of scale insect. The % incidence of internode borer was maximum 50.00 % in December 2012 ratoon crop of Co86032 variety. The % incidence and intensity of internode borer was in the range of 0.00 to 50.00 % and 0.00 to 5.55 % respectively. (Table 7).

12. Conclusion:

The % incidence of early shoot borer was in the range of 0.0 to 2.00 %. The infestation of internode borer and mealy bug was noticed maximum in 15 month old Co 86032 ratoon crop.

Table 7: % incidence /intensity of major pests at Vighnahar SSK ltd. Junnar, Dist. Pune.

Sr. No.	Name of the Farmer	Village	Variety	Date of planting/ ratoon	Name of the Pest						
					Early shoot borer	Mealy bug		Scale insect		Internode borer	
					% Inci.	% inci.	% inten.	% inci.	% inten.	% inci.	% inten.
1	Sh. Mande Dnyaneshwar K.	Ozar	Co M 0265	13 Aug 2013		0.00	0.00	0.00	0.00	0.00	0.00
2	Sh. Mande Prakash Shankar	Ozar	Co M 0265	Aug2013		0.00	0.00	0.00	0.00	0.00	0.00
3	Sh. Mande chintaman Bhau	Ozar	CoM 0265	Jan 2014 (R)	1.96	-	-	-	-	-	-
4	Sh. Mande Anil Ganpat	Ozar	Co 86032	15 Aug 2013		0.00	0.00	0.00	0.00	20.00	5.55
5	Sh. Mande Babanrao Vitthal	Ozarn	Co M0265	Aug 2013		0.00	0.00	0.00	0.00	0.00	0.00
6	Sou. Hande Sunita Rajesh	Hivare (Bk)	CoM 0265	Feb 2014	2.00	-	-	-	-	-	-
7	Sh. Deshmutha Prashant V.	-do-	CoM 265	Nov2014 (R)	0.00	-	-	-	-	-	-
8	Sou. Khilari Pramila Jayram	Ozar	Co M 0265	Jan 2013 (R)	0.00	--	-	-	-	-	-
9	Sh. Thorat Shrikant D	Tejwade	Co M 0265	Aug 2013	0.00	-	-	-	-	-	-
10	Sh. Patel Shekhalal Sajan	Nimgaon sava	Co 86032	Dec.2012 (R)	-	50.00	5.79	0.00	0.00	50.00	1.93
11	Sh. Tattu Baban Vishvanatha	Pargaon(c/a Arale)	Co 86032	Dec 2012 (R)	-	30.00	2.62	0.00	0.00	20.00	0.87
12	Sh. Kate Raoba Dhondu	Nimgaon sava	CoM 0265	Sep 2013		0.00	0.00	0.00	0.00	0.00	0.00

1. No. of experiment : E. 30 (AICRP's)
2. Discipline : Agril. Entomology.
3. Title of the project : Monitoring of insect pests and bio agents in sugarcane agro- ecosystem.
4. Title of experiment : Monitoring of insect pests and bio agents in sugarcane agro- ecosystem.
5. Objective : To monitor the key insect pests and natural enemies in the area.
6. Year of commencement **:** 2006-2007
7. Year of implementation : 2013 –2014
8. Source of finance : ICAR/VSI Pune.
9. Project leader and : Shri.R.G.Yadav, Scientific Officer & Head, Entomology.
Associate : Mrs.P.V.Gadade,Research Assistant, Entomology
10. Details of Experiment
a. Location : Vasantdada Farm, VSI, Pune
b.Variety : CoVSI 03102
c. Date of Planting : 27.01.2013
d. Date of Harvesting : Jan.14 (for Seed)
11. Method of observation:
: i) Planting of sugarcane variety recommended for the region in 0.2 ha area.
ii) All recommended practices to be followed except application of insecticide.

Observations to be recorded: Observations on incidence of borers be recorded by examining 100 canes at five places (four corners and in middle), sucking pests by examining 20 canes and others as mentioned in technical programme of E 4.1.
ii) Meteorological data (weekly averages) to be recorded on: temperature (max & min), relative humidity, no. of rainy days and total rainfall.

12. Results and Discussion

The per cent incidence of early shoot borer was maximum 21.19 % in May 2013 while it was minimum 0.29 % in Feb 2013.(Table 8) .The incidence of internode borer was maximum 12.00% in Dec.2013. The intensity of internode borer was maximum 0.77 % in Dec.2013 and infestation index of internode borer was maximum 0.09 in Dec.2013. The incidence of mealy bug was observed in July 2013(8.00 %) and Oct.2013(4.00%). Intensity of mealy bug was maximum 1.26 % in July 2013.

13. Conclusion

The % incidence of early shoot borer noticed maximum 21.19 % in May 2013. The % incidence, intensity and infestation index of internode borer was noticed maximum 12.00%, 0.77 % and 0.09 in the month of Dec.2013. The incidence and intensity of mealy bug was observed maximum 8.00 % and 1.26% in July 2013.

Table 8 : The % incidence / intensity of major insect pests during 2013-14.

Sr. No	Month	Early shoot borer	Internode borer			Mealy bug	
		% incidence	% incidence	% intensity	Infestation index	% incidence	% intensity
1	February 2013	0.29					
2	March 2013	3.71					
3	April 2013	14.85					
4	May 2013	21.19					
5	June 2013		0.00	0.00	0.00	0.00	0.00
6	July 2013		0.00	0.00	0.00	8.00	1.26
7	August 2013		0.00	0.00	0.00	0.00	0.00
8	Sept.2013		4.00	0.37	0.01	0.00	0.00
9	Oct.2013		8.00	0.61	0.04	4.00	0.61
10	Nov.2013		8.00	0.58	0.04	0.00	0.00
11	Dec.2013		12.00	0.77	0.09	0.00	0.00

1. Project No : E.33
2. Discipline **:** Agril Entomology
3. Title of the project : Bioefficacy of insecticides against mealy bugs in sugarcane
4. Title of experiment **:** Bioefficacy of insecticides against mealy bugs in sugarcane
5. Objective : To evaluate efficacy of insecticides against mealy bugs in sugarcane

The trial was vitiated because there was negligible incidence of mealy bug in sugarcane

1. Project No : E.36
2. Discipline **:** Agril Entomology
3. Title of the project :Management of borers complex of sugarcane through lures.
4. Title of experiment **:**Management of borers complex of sugarcane through lures.
5. Objective : To manage sugarcane borers (Early shoot borer,top borer,internode borer and stalk borer) through pheromone lures.

The trial was not conducted because we have received pheromone lures from PCI Ltd,Babglore.

1. Project No : E.37 (AICRP'S)

2. Discipline **:** Agril Entomology

3.Title of the project : Bioefficacy of new insecticides for control of sugarcane early shoot borer.

4.Tital of experiment **:** Bioefficacy of new insecticides for control of sugarcane early shoot borer

5. Objective **:** To find out effective strategy for the management of early shoot borer

6. Year of commencement **:** 2013-2014

7. Year of implementation : 2013 –2014

8. Source of finance : ICAR/VSI Pune.

9. Project leader and : Shri.R.G.Yadav, Scientific Officer & Head, Entomology.

Associate : Mrs.P.V.Gadade, Research Assistant, Entomology

10. Details of Experiment

a. Treatment

T 1- Soil application of Fipronil 0.3G @25kg/ha at the time of planting and 60 DAP

T 2-Soil application of Chlorantraniliprol 0.4 G @22.5kg/ha at the time of planting and 60 DAP

T 3-Spraying of Chlorantraniliprole18.5 SC @ 375 ml/ha at 30 and 60 DAP

T 4-Spraying of Spinosad 2.5 SC @ 1600 ml/ha at 30and 60DAP

T5- Spraying of Flubendiamide39.5% @ 250 ml/ha at 30 and 60 DAP

T6- Spraying of Flufenoxuron 10 EC @ 1 litre/ha at 30 and 60DAP (Not Available)

T7- Soil application of Phorate 10 G 15 kg/ha at the time of planting and60 DAP

T 8- Soil application of Carbofuron 3G @ 33 kg/ha at the time of planting and 60 DAP

T 9-Untreated control

b. Design : RBD

c.Replication : Three

d.Type of soil : Heavy

e. Plot size **:** Gross-6 m x 7.2 m^2 Net: 6 x 4.8 m^2

f. Location **:** Vasantdada Farm, VSI, Pune

g. Variety **:** Co 86032

h. Date of Planting **:** 24.01.2013

i. Date of Harvesting **:** 24.01.2014

j. Method of observation : Germination percentage at 30 and 45 DAP. Tillering per cent at 120 DAP. ESB infestation will be recorded by counting number og dead hearts easily pulled out and emitting offensive odour as well as the total number of shoots /plant in each net plot on 45,60,90 and 120 DAP. The percent incidence of shoot borer will be worked out by following formula

$$\% \text{ incidence} = \frac{\text{No. of dead hearts}}{\text{Total no of shoots}} \times 100$$

The cumulative percent infestation will be worked out by taking progressive total of infected shoots in proportion to total shoot formed.

Yield, growth and quality parameters.

a. Germination %
b. Tillering percent at 120 DAP
c. No. of millable canes
d. Cane yield (tonn/ha)
e. Growth parameters (total cane height(cm),millable cane height(cm),number of internodes and girth of cane
f. Quality parameters

11. Results:

The germination percent at 30 DAP was lowest (56.65 %) in spraying of Chlorantronilliprol 18.5 Sc @375 ml /ha at 30 and 60 DAP and highest 65.94% in spraying of Flubendiamide 39.5% @250 ml/ha at 30 & 60DAP. The germination percent at 45 DAP was lowest (75.81%) in spraying of Spinosad 2.5 % SC @1600 ml/ha at 30 & 60DAP and highest 86.18 % in spraying of Flubendiamide 39.5 % @250 ml/ha at 30 & 60DAP.(Table 9)

At 120 DAP tillering ratio was highest 2.75 in spraying of Spinosad 2.5 % SC @1600 ml/ha at 30 & 60DAP and it was lowest 1.89 in untreated control.

Cumulative incidence of early shoot borer was statistically lowest (0.55%) in spraying of Chlorantronilliprol 18.5 SC @ 375 ml/ha at 30 & 60DAP while it was highest (30.77%) in untreated control. Cumulative incidence of early shoot borer was 4.29%, 5.57 %, 6.05 % and 16.63 % in spraying of Flubendiamide 39.5%@250 ml/ha at 30 & 60DAP**,** soil application of Fipronil 0.3 G @25 kg/ha at the time of planting and 60 DAP, Soil application of Chlorantronilliprol 0.4 G @25.5 kg /ha at planting and 60DAP and spraying of Spinosad 2.5% SC @1600 ml/ha at 30 & 60DAP respectively.

No. of bored plants/ha were lowest 4861 in spraying of Chlorantronilliprol 18.5 SC @ 375 ml/ha at 30 & 60DAP, while it was highest 313889 in untreated control.(Table 10)

The total cane height and millable cane height was highest 276.0 and 250.67 respectively, in soil application of Fipronil 0.3 G @25 kg/ha at the time of planting and 60 DAP. Brix %, Pole %, Sucrose and CCS % was statistically highest 19.97,77.66,18.75 and 13.52 respectively in soil application of Phorate 10 g @15 kg/ha at the time of planting and 60 DAP.CCS ton/ha ,single cane weight and yield/ha was statistically maximum 19.07,1.44 and 151.17 respectively in spraying of Spinosad 2.5% SC @1600 ml/ha at 30 & 60DAP. CCS t/ha and yield/ha was statistically lowest 12.90 t/ha and 99.93 t/ha respectively in untreated control. (Table 11.)

12. Conclusion:

In January planted Co 86032 sugarcane, two sprayings of Spinosad 2.5 % SC @ 1600 ml /ha at 30 & 60 DAP, two sprayings of Chlorantronilliprol 18.5 SC @ 375 ml/ha at 30 & 60 DAP, two soil applications chlorantraniliprol 0.4 G @22.5kg/ha at the time of planting and 60 DAP and two sprayings of flubendiamide39.5% @ 250 ml/ha at 30 and 60 DAP were found best for the control of sugarcane Early shoot borer.

Table 9: Growth parameters

sr. no	Treatment	Mean% Germination 30 DAP	Mean% Germination 45 DAP	Tillering ratio 120 DAP
1	T-1 Soil application of Fipronil 0.3G @25kg/ha at the time of planting and 60 DAP	65.38	77.29	2.50
2	T-2 Soil application of Chlorantraniliprol 0.4 G @22.5kg/ha at the time of planting and 60 DAP	59.50	80.19	2.36
3	T-3 Spraying of Chlorantraniliprole18.5 SC @ 375 ml/ha at 30 and 60 DAP	56.65	77.29	2.36
4	T-4 Spraying of Spinosad 2.5% SC @ 1600ml/ha at 30and 60DAP	62.11	75.81	2.75
5	T-5 Spraying of Flubendiamide 39.5 % SC @ 250 ml/ha at 30 and 60 DAP	65.94	86.18	1.98
6	T-7 Soil application of Phorate 10 G 15 kg/ha at the time of planting and60 DAP	60.06	80.19	2.22
7	T-8 Soil application of Carbofuron 3G @ 33 kg/ha at the time of planting and 60 DAP	60.62	81.79	2.19
8	T-9 Untreated control	64.12	83.91	1.89
	SE			
	CD	NS	NS	NS
	CV			

Table.10 -.Per cent incidence of early shoot borer

sr. no	Varieties//genotype	Early shoot borer (% incidence)							Internode borer		
		30DAS	45DAS	60 DAS	90 DAS	120 DAS	Cumulative infestation	No. of bored plants/ha	% incidence	% intensity	Infestation index
1	2	3	4	5	6	7	8	9	11	12	13
1	T1	0.0	1.3	0.53	2.73	2.16	5.57 (13.50)	52083	5.33 (13.17)	0.34	
2	T2	0.0	2.8	1.46	3.73	1.16	6.05 (13.29)	59028	1.33 (3.85)	0.08	
3	T3	0.0	0.5	0.20	0.00	0.32	0.55 (3.38)	4861	5.33 (7.86)	0.34	
4	T4	0.0	0.8	7.39	12.07	4.66	16.63 (24.06)	179167	6.67 (14.80)	0.51	
5	T5	0.0	0.0	0.55	3.11	1.38	4.29 (11.88)	37500	4.00 (9.32)	0.26	
6	T6	0.0	0.0	5.19	19.01	5.89	19.79 (26.12)	206250	5.33 (13.17)	0.36	
7	T7	0.0	1.0	10.41	14.76	11.22	24.32 (29.00)	252083	8.00 (13.51)	0.53	
8	T8	0.2	0.2	23.57	24.00	11.55	30.77 (33.42)	313889	8.00 (12.50)	0.5	
	S.E ±						3.24				
	C.D at 5%						9.82		NS		
	C.V						29.07				

Table. 11:- Growth and quality parameters.

Sr. no	Treatment	Total cane height (cm)	Millable cane height (cm)	No.of internodes	Diameter (cm)	Brix %	pole %	purity	Sucrose	CCS %	CCS ton /ha	Plant Population /ha	Single cane Wieght (Kg)	Yield/ha tonn
1	T1	276.00	250.67	21.00	2.62	19.35	74.23	92.82	17.96	12.88	15.72	100925	1.22	122.01
2	T2	241.67	212.00	18.67	2.58	18.59	71.01	92.32	17.17	12.28	16.35	94212	1.41	133.27
3	T3	249.67	221.67	20.67	2.58	18.97	72.93	92.86	17.62	12.64	15.84	92824	1.34	125.43
4	T4	254.00	226.67	21.33	2.40	19.03	72.79	92.55	17.62	12.62	19.06	104861	1.44	151.17
5	T5	246.67	218.00	20.00	2.56	19.68	75.72	92.94	18.30	13.14	17.64	100231	1.34	134.64
6	T6	228.00	203.00	19.00	2.35	19.97	77.66	93.89	18.75	13.52	14.30	87268	1.21	105.83
7	T7	248.00	221.67	20.67	2.48	19.76	76.50	93.15	18.41	13.22	15.35	93981	1.24	116.25
8	T8	242.00	219.33	20.67	2.80	19.30	74.30	93.17	17.99	12.92	12.90	80092	1.26	99.93
	S.E+					0.18	0.95		0.24	0.20	1.07		0.046	8.05
	C.D at 5%	NS	NS	NS	NS	0.54	2.86	NS	0.72	0.61	3.22	NS	0.14	24.38
	C.V					1.61	2.20		2.31	2.74	11.62		6.2	11.29

RESEARCH PROGRAMME

2014-15 (Planting 2013-14)

Entomology Section

RESEARCH SPONSERED BY ICAR

ALL INDIA COORDINATED RESEARCH PROGRAMME

Project No. **:** E. 4.1
Title **:** Evaluation of zonal varieties/genotypes for their reaction against major insect pest

Project No. **:** E. 4.1.1
Title **:** Field screening of sugarcane varieties / genotypes in IVT Early to major pests

Project No. **:** E. 4.1.2
Title **:** Field screening of sugarcane varieties/ genotypes in AVT I Plant Early to major pests

Project No. **:** E. 4.1.3
Title **:** Field screening of sugarcane varieties / genotypes in IVT Midllate to major pests

Project No. **:** E.28
Title **:** Survey and Surveillance of sugarcane insect pests

Project No. **:** E.30
Title **:** Monitoring of insect pests and bio agents in sugarcane agro-ecosystem

Project No. **:** E 33
Title **:** Bioefficacy of insecticides against Mealy bug in Sugarcane

Project No. **:** E 36
Title **:** Management of borer complex of sugarcane through lures.

Project No. **:** E.37
Title **:** Bioefficacy of new insecticides for control of sugarcane early shoot borer