ANNUAL REPORT FOR THE YEAR 2016-17
All India Coordinated Research Project on Sugarcane

DIVISION OF PLANT PATHOLOGY
REGIONAL AGRICULTURAL RESEARCH STATION, ANAKAPALLE
ACHARYA N. G. RANGA AGRICULTURAL UNIVERSITY

PLANT PATHOLOGY DISCIPLINE

Regional Agricultural Research Station, Anakapalle experiments conducted under
All India Coordinated Research Project on Sugarcane during 2016-2017

S. No	Project No	Project title
1	**PP14 & 14(a)**	Identification of pathotypes in red rot pathogen and maintenance of isolates of red rot pathogen
2	**PP 17 (a)**	Evaluation of zonal varieties for resistance to red rot
3	**PP 17 (b)**	Evaluation of zonal varieties for resistance to smut.
4	**PP 17 (c)**	Evaluation of zonal varieties for resistance to wilt.
5	**PP 17 (d)**	Evaluation of zonal varieties for resistance to YLD
6	**PP 22**	Survey of sugarcane diseases occurring in the area on important sugarcane varieties
7	**PP 31**	Screening, epidemiology and management of top rot in sugarcane.
8	**PP 33**	Management of yellow leaf disease through meristem culture

ANNUAL REPORT FOR THE YEAR 2016-17
All India Coordinated Research Project on Sugarcane

Plant Pathology

I. **Project No.** : PP 14

II. **Project title** : Identification of pathotypes / races in red rot pathogen

III. **Serial number of the year of experimentation**: 35

IV. **Location** : Regional Agricultural Research Station, Anakapalle

V. **Objectives, results of past years and future line of work:**

This experiment is conducted with an objective to gather information on the major pathotypes of red rot pathogen from different areas / Zones. The study conducted from 1983-84 to 2014-15 indicated the existence of four distinct pathotypes in red rot fungus viz., Cf 04 (CO 419) Cf 05 (Co 997), Cf 06 (Co C 671) and Cf 10 (85 A 261) in coastal Andhra Pradesh.

VI. **Technical programme of work on which the report is based:**

The technical programme of work for the year 2016-17 was discussed and finalized during Annual group meet of AICRP on sugarcane held at RAU, Pusa, December, 2015.

VII **Discipline wise technical report:**

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a. **Isolates of red rot fungus used for inoculations:**

S. No.	Variety from which isolate was collected	Year of collection	Place of collection
1	Co 419	2015	SBI , Coimbatore
2	Co C 671	2015	SBI , Coimbatore
3	Co 997	2015	SBI , Coimbatore
4	85 A 261 (Co A 89085)	2015	SBI , Coimbatore
5	81 V 48	2016	Munagapaka (Visakhapatnam Dt)
6	Co 62175	2016	Juthada (Visakhapatnam Dt)
7	CoA 09321	2016	Elaswaram (west Godavari Dt.)
8	Co Or 12346	2016	Anakapalle (Visakhapatnam Dt.)

b. **Date of Planting** : February 2016

c. **Varieties (19)** : 1. *Baragua* (*S. officinarum*); 2. *Khakai* (*S. sinense*); 3. SES 594 (*S. spontaneum*); 4. CoS 767; 5. BO 91; 6. CoC 671; 7. Co 7717; 8. Co 997; 9. CoJ 64; 10. Co 1148; 11. Co 419; 12. Co 62399; 13. Co 975; 14. CoS 8436, 15. Co 7805, 16. Co 86002, 17. Co 86032, 18. CoV 92102 and 19. CoSe 95422

d. **Fertilizer application** : 112, 100 and 120 kg N, P_2O_5 and K_2O / ha respectively. Entire P_2O_5 and K_2O were applied as basal dose. N fertilizer (Urea) was applied two equal splits at 45 and 90 days after planting.

e. **Irrigations** : 12-15 irrigations were given during the crop growth period.

f. **Plant Protection** : --

g. **Date of inoculation** : 28.09.2016

h. **Plot size** : 2.5 m x 0.8 m x 18 rows = 36 sq.m / variety

i. **Design** : Single series

j. **Replications** : Non – replicated

k. **Method of inoculation** : Plug method

l. **Name and designation of the participating Scientist :**

1. Dr. N. Raj Kumar, Scientist (Plant Pathology)
2. Dr. K. V. Krishna Kumar, Sr. Scientist (Plant Pathology)
3. Dr. M. Bharathalakshimi, Principal Scientist (Sugarcane)

m. **Results recorded during the previous year:**

The experiment conducted during 2015-65 with four existing and four new isolates red rot isolates indicated the existence of one pathotype of red rot fungus Cf 671 (Cf 06) in coastal Andhra Pradesh.

n. **Results obtained during this year**

Observations for the extent of disease spread in each variety – isolate combination was recorded at 60 days after inoculation. For assessing the virulence of each isolate, about 30 standing canes were sampled in each variety. The canes were examined for external symptoms of the disease like yellowing or drying of tops. Later, the canes were split opened longitudinally and scored for internal characters of the disease like lesion width, white spots and extent of nodal transgression. Based on the disease (host reaction), the varieties were classified into three groups viz., Resistant (R), Susceptible (S) and intermediate (I) as follows.

R: Lesion width laterally restricted, nodal transgression up to two nodes, white spots, rind infection, sporulation over the rind and yellowing and drying of tops absent.

S: Lesion width laterally spreading, nodal transgression more than two nodes, white spots progressive or restricted; in case of progressive white spots, rind infection, sporulation over the rind and yellowing or drying of tops absent or present.

I: Lesion width laterally restricted or spreading: nodal transgression more than two nodes, white spots present of absent (restricted type), rind infection, sporulation over the rind and yellowing or drying of tops absent.

Our results (Table-1) on testing of eight isolates of *C. falcatum* obtained from Co 419, Co C 671, Co 997, 85 A 261, Co 62175, 81 V 48, Co Or 12346 and Co A 09321 and tested on 19 host differentials revealed no variation/deviation in reaction. This indicates that all the tested eight isolates have not exhibited any apparent variability. However, molecular studies need to be further investigated to ascertain the variability if any among these isolates. Overall, our results suggest the prevalence of Cf06 as a prevalent pathotype in Andhra Pradesh.

VIII **Technical programme of the year next to the reporting year:**

This experiment is being continued during 2017-18.

IX. **Technical summary of the individual report:**

Our results on testing of eight isolates of *C. falcatum* obtained from Co 419, Co C 671, Co 997, 85 A 261, Co 62175, 81 V 48, Co Or 12346 and Co A 09321 and tested on 19 host differentials revealed no variation/deviation in reaction. This indicates that all the tested eight isolates have not exhibited any apparent variability

X. **Salient findings:**

The present study clearly indicated the existence only one pathotype of red rot fungus Cf 06 in Coastal Andhra Pradesh.

Table: 1 – Reaction of differential varieties to different red rot isolates (2016-2017)

S.No	Pathotype/ Isolate	Source	Reaction of host differentials																	
			Co 419	Co 975	Co 997	Co 1148	Co 7717	Co 62399	CoC 671	CoJ 64	CoS 767	CoS 8436	BO 91	Baragua	Kakhai	SES 594	Co 7805	Co 86002	Co 86032	CoV 92102	CoSe 95422
1.	CF 04	Co 419	S	S	S	S	S	R	S	R	R	R	R	R	S	R	S	S	I	S	R
2.	CF 05	Co 997	S	S	S	S	I	R	S	I	R	R	R	R	S	R	S	S	I	R	R
3.	CF 06	CoC 671	S	S	S	S	S	I	S	R	R	R	R	R	I	R	S	I	R	I	R
4.	CF 10	CoA 89085	S	S	S	I	S	I	S	I	R	R	R	R	I	R	I	I	I	I	R
5.	New isolate-1	Co 62175	S	S	S	S	S	R	S	R	R	R	R	R	R	R	S	S	S	S	R
6	New isolate-2	81 V 48	S	S	S	S	S	S	S	R	R	R	R	R	I	R	I	I	R	S	R
7	New isolate-3	CoOr 12346	S	S	S	S	S	S	S	R	R	R	R	R	I	R	I	I	R	I	R
8	New isolate-4	CoA 09321	S	S	S	S	S	S	S	R	R	R	R	R	I	R	I	I	R	I	R

R: Resistant I: Intermediate S: Susceptible

I **Project No.** : PP 17 (a)

II **Project title** : Evaluation of Zonal varieties for resistance to red rot

III. **Serial number of the year of experimentation**: 29

IV. **Location** : Regional Agricultural Research Station, Anakapalle

V. **Objectives, results of past years and future line of work:**

This experiment is being conducted every year to obtain information on relative resistance of varieties included in Zonal varietal trial.

Out of 24 varieties / genotypes tested during 2012-13 by nodal only four entries (Co V 09356, Co c01061, Co 86249 and CoA 11322) manifested top drying indicating its susceptibility and the remaining 20 entries reacted as resistant. In the plug method out of 24 varieties / genotypes tested by plug method of inoculation six entries (COC 08336, COA 92081, COA 10321, CO Or 10346, CO 87043 and COC 10336) showed resistance while 4 entries COV 92102, COA 11323, COA 11326 and COSi 96071 showed moderately resistant reaction to Cf 04, Cf 06 and Cf 05. Out of 25 entries tested, 5 entries reacted as resistant, 3 as moderately resistant and 16 as highly susceptible to Cf 04, Cf 05 and Cf 06.

Out of 20 entries tested during 2013-14 only five entries (Co 419, C0 C 671, Co 671, C0 7219 and Co 86249) manifested top drying indicating its susceptibility and the remaining 15 entries reacted as resistant**.** Out of 20 varieties / genotypes tested by plug method of inoculation seven entries (Co A 12321, Co A 12322, Co A 12324, Co A 11321, Co A 11324, Co C 11336 and Co A 92081) showed resistance while 3 entries Co A 11323, Co A 11326 and Co C 10336 showed moderately resistant reaction to Cf 04, Cf 06 and Cf 05.

VI **Technical programme on which the report is based:**

The technical programme of work for the year 2016-17 was discussed and finalized during Annual group meet of AICRP on sugarcane held at RAU, Pusa, December, 2015.

VII. **Discipline wise technical report**

a. **Date of planting** : March 2016

b. **Varieties (32)** : Co 07013, Co 13023, Co 13024, Co A 14321 (2009 A 107), Co A 14322 (2009 A 235), CoC 14336, Co V 14356, CoC 01060, CoA 92081, Co A 12321 (2006 A 64), Co A 12322 (2006 A 102), Co 13025, Co 13027, Co 13028, Co 13029, Co 13030, Co 13031, Co 13032, CoA 14323 (2009 A 252), CoA 14324 (2009 A 385), CoC 14337, PI 14376, PI 14377, CoV 92102 (C), Co 86249 (C), Co 419, CoC 671, Co 997, 85 A 261, Co 6907, Co 7219, Co 7706.

c. **Fertilizer application** : 112, 100 and 120 kg N, P_2O_5 and K_2O / ha respectively. Entire P_2O_5 and K_2O were applied as basal dose. N fertilizer (Urea) was applied two equal splits at 45 and 90 days after planting.

d. **Irrigations** : 12-15 irrigations were given during the crop growth period.

e. **Plant protection** : --

f. **Date of inoculations** :

1. **Nodal cotton swab method** : September 2016
2. **Plug method** : September 2016

g. **Plot size** : 10 m x 0.8 x 2 rows = 16 sq.m / variety`

h. **Design** : Single series

i. **Replications** : Non – replicated

j. **Dates of harvesting** : December, 2016

1. **Cotton swab method** : November, 2016
2. **Plug method** : November, 2016

k. **Name and designation of the participating scientist:**

1. Dr. N. Raj Kumar, Scientist (Plant Pathology)
2. Dr. K. V. Krishna Kumar, Sr. Scientist (Plant Pathology)
3. Dr. M. Bharathalakshimi, Principal Scientist (Sugarcane)

l. **Results recorded during the previous year:**

During 2015-16 out of 24 entries tested, 8 entries (Co 419, C0C 671, Co 997, 85 A 261, Co 6907, CoA 11323, CoA 13324 and Co 13327) manifested top drying indicating its susceptibility and the remaining 16 entries reacted as resistant to Cf 04, Cf 05 and Cf 06. out of 24 varieties / genotypes tested by plug method of inoculation five entries (Co A 12321, Co A 12322, Co A 11321, Co A 13325 and Co A 92081) showed resistance while 5 entries Co A 11326, Co A 13328, CoA 13321, CoA 13322 and Co V 13356 showed moderately resistant reaction to Cf 04, Cf 06 and Cf 05.

m. **Results obtained during this year:**

1.**Cotton swab method:**

Observations for the incidence of nodal infection and internal spread in each variety / genotype was recorded at 60 days after inoculation and the results are presented in Table –2.

Thirty two varieties / genotypes were tested for their reaction to three pathotypes (Cf 04, Cf 05 and Cf 06) of red rot fungus individually by cotton swab and plug method of inoculation. In the cotton swab method, out of 32 entries tested 9 entries (Co 419, Co C 671, Co 997, Co 6907, Co A 14322, Co V 14356, Co 13032, Co A 14324 and PI 14376) showed susceptible reaction to all the three pathotypes (Cf 04, Cf 05 and Cf 06) of red rot fungus and the remaining entries reacted as resistant.

2. Plug method:

Observations on external and internal symptoms were recorded at 60 days after inoculation. Thirty inoculated canes were sampled in each entry for assessing the host reaction. Canes were observed for external symptoms like yellowing or drying of tops. Later, the canes were split opened longitudinally and recorded for internal characteristics of the disease like lesion width, white spots and extent of nodal transgression. Based on the average score of above four characters, reaction of the varieties / genotypes were graded on 0-9 scale and the data are presented in Table – 3.

Results presented in table – 3 revealed that Out of 32 varieties / genotypes tested by plug method of inoculation five entries (Co A 12321, Co A 12322, Co A 11321, Co A 13325 and Co A 92081) showed resistance while 5 entries Co A 11326, Co A 13328, CoA 13321, CoA 13322 and Co V 13356 showed moderately resistant reaction to Cf 04, Cf 06 and Cf 05 pathotypes. (Table-3)**.**

VIII Technical programme of the year next to the reporting year:

This experiment is being continued during 2017-18.

IX. Technical summary of the individual report:

Thirty two varieties / genotypes were tested for their reaction to three pathotypes (Cf 04, Cf 05 and Cf 06) of red rot fungus individually by cotton swab and plug method of inoculation. In the cotton swab method, out of 32 entries tested 9 entries (Co 419, Co C 671, Co 997, Co 6907, Co A 14322, Co V 14356, Co 13032, Co A 14324 and PI 14376) showed susceptible reaction to all the three pathotypes (Cf 04, Cf 05 and Cf 06) of red rot fungus and the remaining entries reacted as resistant.

Out of 32 varieties / genotypes tested by plug method of inoculation five entries (Co A 12321, Co A 12322, Co A 11321, Co A 13325 and Co A 92081) showed resistance while 5 entries Co A 11326, Co A 13328, CoA 13321, CoA 13322 and Co V 13356 showed moderately resistant reaction to Cf 04, Cf 06 and Cf 05 pathotypes.

X. Salient findings:

In the cotton swab method, out of 32 entries tested 9 entries (Co 419, Co C 671, Co 997, Co 6907, Co A 14322, Co V 14356, Co 13032, Co A 14324 and PI 14376) showed susceptible reaction to all the three pathotypes (Cf 04, Cf 05 and Cf 06) of red rot fungus and the remaining entries reacted as resistant.

Out of 32 varieties / genotypes tested by plug method of inoculation five entries (Co A 12321, Co A 12322, Co A 11321, Co A 13325 and Co A 92081) showed resistance while 5 entries Co A 11326, Co A 13328, CoA 13321, CoA 13322 and Co V 13356 showed moderately resistant.

Table 2: Reaction of varieties / genotypes to three pathotypes of red rot fungus in Plug method at 60 days after inoculation (2016-2017)

S.No	Variety	Plug Method					
		CF 04		CF05		CF 06	
		Score	Grade	Score	Grade	Score	Grade
IVT Early (9+2)							
1	Co 07013	5.4	MS	4.8	MS	5.2	MS
2	Co 13023	3.2	MR	2.8	MR	3.6	MR
3	Co 13024	2.7	MR	3.4	MR	3.8	MR
4	**Co A 14321 (2009 A 107)**	**1.8**	**R**	**2.2**	**MR**	**1.6**	**R**
5	Co A 14322 (2009 A 235)	6.4	S	6.6	S	6.2	S
6	CoC 14336	5.2	MS	4.7	MS	4.4	MS
7	Co V 14356	8.3	HS	8.8	HS	8.7	HS
8	CoC 01060 (C)	1.4	R	1.2	R	1.2	R
9	CoA 92081 (C)	1.2	R	1.6	R	1.8	R
10	Co A 12321 (2006 A 64)	1.8	R	2.8	MR	1.6	R
11	Co A 12322 (2006 A 102)	3.6	MR	3.2	MR	2.4	MR
IVT Midlate (12+2)							
12	Co 13025	2.8	MR	3.4	MR	3.2	MR
13	Co 13027	3.5	MR	2.9	MR	2.6	MR
14	**Co 13028**	**1.6**	**R**	**1.5**	**R**	**1.2**	**R**
15	Co 13029	2.4	MR	2.8	MR	3.3	MR
16	**Co 13030**	**1.4**	**R**	**1.8**	**R**	**1.2**	**R**
17	Co 13031	3.2	MR	3.1	MR	2.8	MR
18	Co 13032	8.6	HS	8.7	HS	8.4	HS
19	**CoA 14323 (2009 A 252)**	**1.0**	**R**	**1.4**	**R**	**1.2**	**R**
20	CoA 14324 (2009 A 385)	7.1	S	6.8	S	7.4	S
21	CoC 14337	3.4	MR	2.7	MR	2.4	MR
22	PI 14376	8.8	HS	8.6	HS	8.8	HS
23	PI 14377	3.1	MR	2.6	MR	2.2	MR

24	CoV 92102 (C)	3.1	MR	2.8	MR	2.4	MR
25	Co 86249 (C)	2.4	MR	1.8	R	1.6	R
26	Co 419	8.6	HS	8.6	HS	8.6	HS
27	CoC 671	8.6	HS	8.5	HS	8.6	HS
28	Co 997	8.7	HS	8.8	HS	8.5	HS
29	85 A 261	8.2	HS	8.6	HS	8.1	HS
30	Co 6907	8.4	HS	8.2	HS	8.6	HS
31	Co 7219	8.3	HS	8.1	HS	8.7	HS
32	Co 7706	8.2	HS	8.6	HS	8.9	HS

Table 3: Reaction of varieties / genotypes to the three pathotypes of red rot fungus by Cotton swab method at 60 days after inoculation (2016-2017)

S.No	Variety	Cotton swab Method					
		CF 04		CF05		CF 06	
		Score	Grade	Score	Grade	Score	Grade
IVT Early (9+2)							
1	Co 07013	0.0	R	0.0	R	0.0	R
2	Co 13023	0.0	R	0.0	R	0.0	R
3	Co 13024	0.0	R	0.0	R	0.0	R
4	Co A 14321 (2009 A 107)	0.0	R	0.0	R	0.0	R
5	Co A 14322 (2009 A 235)	8.2	S	8.5	S	8.6	S
6	CoC 14336	0.0	R	0.0	R	0.0	R
7	Co V 14356	8.8	S	8.2	S	8.4	S
8	CoC 01060 (C)	0.0	R	0.0	R	0.0	R
9	CoA 92081 (C)	0.0	R	0.0	R	0.0	R
10	Co A 12321 (2006 A 64)	0.0	R	0.0	R	0.0	R
11	Co A 12322 (2006 A 102)	0.0	R	0.0	R	0.0	R
IVT Midlate (12+2)							
12	Co 13025	0.0	R	0.0	R	0.0	R
13	Co 13027	0.0	R	0.0	R	0.0	R
14	Co 13028	0.0	R	0.0	R	0.0	R
15	Co 13029	0.0	R	0.0	R	0.0	R

16	Co 13030	0.0	R	0.0	R	0.0	R
17	Co 13031	0.0	R	0.0	R	0.0	R
18	Co 13032	8.3	S	8.1	S	8.6	S
19	CoA 14323 (2009 A 252)	0.0	R	0.0	R	0.0	R
20	CoA 14324 (2009 A 385)	8.2	S	8.6	S	8.5	S
21	CoC 14337	0.0	R	0.0	R	0.0	R
22	PI 14376	8.4	S	8.1	S	8.6	S
23	PI 14377	0.0	R	0.0	R	0.0	R
24	CoV 92102 (C)	0.0	R	0.0	R	0.0	R
25	Co 86249 (C)	0.0	R	0.0	R	0.0	R
26	Co 419	8.4	S	8.6	S	8.3	S
27	CoC 671	8.8	S	8.2	S	8.6	S
28	Co 997	8.3	S	8.1	S	8.6	S
29	85 A 261	8.2	S	8.1	S	8.4	S
30	Co 6907	8.3	S	8.6	S	8.4	S
31	Co 7219	0.0	R	0.0	R	0.0	R
32	Co 7706	0.0	R	0.0	R	0.0	R

I **Project No.** : PP 17 (b)

II **Project title** : Evaluation of Zonal varieties for resistance to smut

III. **Serial number of the year of experimentation**: 22

IV. **Location** : Regional Agricultural Research Station, Anakapalle

V. **Objectives, results of past years and future line of work:**

This experiment is being conducted every year to select genotypes resistant to smut which are included Zonal varietal trial.

VI **Technical programme on which the report is based:**

The technical programme of work for the year 2016-17 was discussed and finalized during Annual group meet of AICRP on sugarcane held at RAU, Pusa, December, 2015.

VII. **Discipline wise technical report**

a. **Date of planting** : March 2016

b. **Varieties (32)** : Co 07013, Co 13023, Co 13024, Co A 14321 (2009 A 107), Co A 14322 (2009 A 235), CoC 14336, Co V 14356, CoC 01060, CoA 92081, Co A 12321 (2006 A 64), Co A 12322 (2006 A 102), Co 13025, Co 13027, Co 13028, Co 13029, Co 13030, Co 13031, Co 13032, CoA 14323 (2009 A 252), CoA 14324 (2009 A 385), CoC 14337, PI 14376, PI 14377, CoV 92102 (C), Co 86249 (C), Co 419, CoC 671, Co 997, 85 A 261, Co 6907, Co 7219, Co 7706.

c. **Fertilizer application** : 112, 100 and 120 kg N, P_2O_5 and K_2O / ha respectively. Entire P_2O_5 and K_2O were applied as basal dose. N fertilizer (Urea) was applied two equal splits at 45 and 90 days after planting.

d. **Irrigations** : 12-15 irrigations were given during the crop growth period.

e. **Plant protection** : --

f. **Plot size** : 5 m x 0.8 x 2 rows = 8 sq.m / variety`

g. **Design** : Single series

h. **Date of harvest** : January, 2017

i. **Inoculum** : *Sporisorium scitamineum* (Syn. *Ustilago scitaminea)* teliospores freshly collected from smut susceptible sugarcane varieties will serve as source of inoculum.

j. **Storage**

Freshly collected smut whips were shade dired and teliospores collected by scraping and sieving. The smut spore powder so collected was packed in butter paper covers which were stored in a desiccators using calcium chloride as desiccant. Spore viability was tested before inoculation.

k. **Method of inoculation**:

The method of inoculation consists of steeping of setts (three bud) for 30 minutes in a spore suspension of over 90% viability and with a spore load of one million spores per milliliter.

l. **Name and designation of the participating scientist:**

1. Dr. N. Raj Kumar, Scientist (Plant Pathology)
2. Dr. K.V. Krishna Kumar, Sr. Scientist (Plant Pathology)
3. Dr. M. Bharathalakshimi, Principal Scientist (Sugarcane)

m. **Results recorded during the previous year:**

During 2014-15 out of 17 varieties / genotypes tested, none of the entries showed resistant reaction while one entry (CoOr 12346) exhibited resistant reaction, while Co 997 reacted as moderately resistant, three entries (Co A 11321, Co A 11325 and Co C 11336) reacted as moderately susceptible. The remaining 12 entries showed susceptible to highly susceptible reaction.

Out of 24 varieties / genotypes tested during 2015-16, six entries showed resistant reaction (CoA 13328, CoA 13325, CoA 13324, CoA 13326, CoV 13356 and Co 29094) while five entries Co 997, Co 7706, CoA 13327, CoA 13322 and CoA 13321 reacted as moderately resistant.. The remaining 14 entries showed susceptible to highly susceptible reaction.

n. **Results obtained during this year:**

Smut incidence was recorded at fortnightly intervals from the appearance of first smut whip. At each observation, affected clumps were rogued out to avoid secondary infection. Based on the percent smut incidence, the entries were grouped into different categories and the data are furnished in Table-4.

The data presented in Table –4 indicated that out of 32 entries were evaluated against smut under artificially inoculated conditions nine entries viz. Co 13023, Co 13024, CoC 14336, Co 13025, Co 13028, Co 13030, Co 13031 Co 13032, and CoA 14323 exhibited moderately resistant reaction and the remaining entries as moderately susceptible, susceptible and highly susceptible..

VIII. **Technical programme of the year next to the reporting year:**
This experiment is being continued during 2017-18

IX. **Technical summary of the individual report:**

Out of 32 entries were evaluated against smut under artificially inoculated conditions nine entries viz. Co 13023, Co 13024, CoC 14336, Co 13025, Co 13028, Co 13030, Co 13031 Co 13032, and CoA 14323 exhibited moderately resistant reaction

X. **Salient findings:**

Out of 32 entries were evaluated against smut under artificially inoculated conditions nine entries viz. Co 13023, Co 13024, CoC 14336, Co 13025, Co 13028, Co 13030, Co 13031 Co 13032, and CoA 14323 exhibited moderately resistant reaction

Table 4: Reaction of varieties / genotypes to smut (2016- 2017)

S.No	Variety	Percent sett Germination	Percent smut incidence	Reaction
IVT Early (9+2)				
1	Co 07013	76	7.8	MR
2	Co 13023	72	6.4	MR
3	Co 13024	78	8.7	MR
4	Co A 14321 (2009 A 107)	76	8.5	MR
5	Co A 14322 (2009 A 235)	68	24.6	S
6	CoC 14336	90	7.4	MR
7	Co V 14356	82	18.8	MS
8	CoC 01060 (C)	80	46.2	HS
9	CoA 92081 (C)	70	51.6	HS
10	Co A 12321 (2006 A 64)	78	48.4	HS
11	Co A 12322 (2006 A 102)	76	44.6	HS
IVT Midlate (12+2)				
12	Co 13025	84	8.4	MR
13	Co 13027	76	27.4	S
14	Co 13028	82	7.8	MR
15	Co 13029	46	18.2	MS
16	Co 13030	64	6.4	MR

17	Co 13031	44	8.8	MR
18	Co 13032	56	7.2	MR
19	CoA 14323 (2009 A 252)	72	9.2	MR
20	CoA 14324 (2009 A 385)	88	17.8	MS
21	CoC 14337	78	28.2	S
22	PI 14376	82	16.4	MS
23	PI 14377	86	8.2	MR
24	CoV 92102 (C)	80	26.4	S
25	Co 86249 (C)	76	18.6	MS
26	Co 419	86	38.6	HS
27	CoC 671	62	22.5	MS
28	Co 997	76	6.2	MR
29	85 A 261	92	61.4	HS
30	Co 6907	82	54.7	HS
31	Co 7219	68	48.6	HS
32	Co 7706	66	5.4	MR

R: Resistant MR: Moderately Resistant MS: Moderately susceptible
S: Susceptible HS: Highly susceptibl

I **Project No.** : PP 17 (C)

II **Project title** : Evaluation of Zonal varieties for resistance to wilt

III. **Serial number of the year of experimentation**: 06

IV. **Location** : Regional Agricultural Research Station, Anakapalle

V. **Objectives, results of past years and future line of work:**

To select genotypes resistant to wilt among the agronomically important selections.

VI **Technical programme on which the report is based:**

The technical programme of work for the year 2016-17 was discussed and finalized during Annual group meet of AICRP on sugarcane held at RAU, Pusa, December, 2015.

VII. **Discipline wise technical report**

a. **Date of planting** : March 2016

b. **Varieties (24)** : Co 07013, Co 13023, Co 13024, Co A 14321 (2009 A 107), Co A 14322 (2009 A 235), CoC 14336, Co V 14356, CoC 01060, CoA 92081, Co A 12321 (2006 A 64), Co A 12322 (2006 A 102), Co 13025, Co 13027, Co 13028, Co 13029, Co 13030, Co 13031, Co 13032, CoA 14323 (2009 A 252), CoA 14324 (2009 A 385), CoC 14337, PI 14376, PI 14377, CoV 92102 (C), Co 86249 (C), Co 419, CoC 671, Co 997, 85 A 261, Co 6907, Co 7219, Co 7706.

c. **Fertilizer application** : 112, 100 and 120 kg N, P_2O_5 and K_2O / ha respectively. Entire P_2O_5 and K_2O were applied as basal dose. N fertilizer (Urea) was applied two equal splits at 45 and 90 days after planting.

d. **Irrigations** : 12-15 irrigations were given during the crop growth period.

e. **Plant protection** : --

f. **Plot size** : 5 m x 0.8 x 2 rows = 8 sq.m / variety`

g. **Design** : Single series

h. **Date of harvest** : January, 2017

i. **Method of inoculation** : Plug method

j. **Inoculum** : Cane growing areas of the state visited during July-August, 2015 and wilt affected cane samples from different varieties were collected. Isolates obtained from the samples will be maintained on PDA. About 30 standing canes will be

inoculated in each variety with each isolate by adopting plug method of inoculation.

k. Data to be collected:

1. Germination count at 45 days after planting
2. Appearance of wilt symptoms on the standing canes
3. At the end of 10 months 10 clumps are to be uprooted with roots. All the canes from the clumps will be split open longitudinally and the wilt severity index scored on a 0- 4 scale

0.0- 0.9 = Resistant
1.0- 1.9= Moderately Resistant
2.0- 2.9= Moderately susceptible
3.0- 3.9= Susceptible
>4.0 = Highly Susceptible

Grade	**Symptoms**
0	Healthy canes and roots with no external symptoms of wilt
1	No wilting or drying of leaves, no stunting or shrinking of the stalk or rind, slight pith formation with yellow discolouration of the internal tissues in one or two lower internodes only. No cavity formation or fungal growth seen. Apparently normal and healthy roots
2	Mild yellowing of top leaves and drying of lower leaves, mild stunting and shrinking of the stalk and rind. Yellowish discolouration of internal tissues extending to three or four bottom internodes. Slight cavity formation of the pith, no fungal growth seen, slightly discoloured roots.
3	Mild yellowing of top leaves and drying of lower leaves, mild stunting and shrinking of the stalk and rind. Light brown discolouration of the internal tissue throughout the entire length of the cane expect the top. Severe pith and cavity formation. Sparse fungal growth observed in the pith cavities.
4	Complete yellowing and death of the leaves, marked stunting, shrinking and drying of the stalk and rind, dark brown discolouration of the internal tissues extending throughout the entire length of the cane. Large pith cavities with profuse over growth of the associated fungi. Most of the roots necrotic with dark discolouration which dislodge easily from the stalks. Roots mildly discoloured and slightly necrotic.

$$\text{Mean wilt severity index} = \frac{\text{Sum of wilt incidences of individual stalks}}{\text{Number of stalk samples}}$$

l. **Name and designation of the participating scientist:**

1. Dr. N. Raj Kumar, Scientist (Plant Pathology)
2. Dr. K.V. Krishna Kumar, Sr. Scientist (Plant Pathology)
3. Dr. M. Bharathalakshimi, Principal Scientist (Sugarcane)

m. **Results recorded during the previous year:**

During 2015-16 twenty four varieties / genotypes were tested, out of them two entries (Co A 13325 and CoA 13321) showed resistant reaction while seven entries (Co 7706, CoA 12321, CoA 11323, CoA 13328, CoA 13324, CoA 13322 and Co 29094) reacted as moderately resistant.

Out of 17 varieties / genotypes tested during 2014-15, seven entries (Co A 12321, Co A 12322, Co A 11323, Co A 11326, Co C 11336, CoOr 12346 and Co A 92081) showed resistant reaction while two entries (Co A 12323 and Co A 12324) reacted as moderately resistant.

n. **Results obtained during this year:**

Observations on external and internal symptoms were recorded at 90 days after inoculation. Thirty inoculated canes were sampled in each entry for assessing the host reaction. Canes were observed for external symptoms like yellowing and death of the leaves, marked stunting, shrinking and drying of the stalk and rind, dark brown discolouration of the internal tissues extending throughout the entire length of the cane. Large pith cavities with profuse over growth of the associated fungi. Most of the roots necrotic with dark discolouration which dislodge easily from the stalks. Roots mildly discoloured and slightly necrotic, reaction of the varieties / genotypes were graded on 0-4 scale.

The data presented in Table –5 indicated that out of 32 varieties / genotypes tested, conditions 3 entries viz., Co 13031, CoA 14323 (2009 A 252), and CoC 14337 exhibited resistant reaction and the remaining entries as moderately susceptible, Moderately resistant and highly susceptible.

VIII. **Technical programme of the year next to the reporting year:**

This experiment is being continued during 2017-18.

IX. **Technical summary of the individual report:**

Out of 32 varieties / genotypes tested, conditions 3 entries viz., Co 13031, CoA 14323 (2009 A 252), and CoC 14337 exhibited resistant reaction and the remaining entries as moderately susceptible, Moderately resistant and highly susceptible..

X. **Salient findings:**

Out of 32 varieties / genotypes tested, conditions 3 entries viz., Co 13031, CoA 14323 (2009 A 252), and CoC 14337 exhibited resistant reaction.

Table 5: Reaction of varieties / genotypes to wilt during 2016- 2017 by plug method of inoculation.

S. No	Varieties	Germination count At 45 DAP	Mean wilt severity index	Reaction
IVT Early (9+2)				
1.	Co 07013	84	2.6	MS
2.	Co 13023	80	1.4	MR
3.	Co 13024	94	1.8	MR
4.	Co A 14321 (2009 A 107)	94	1.2	MR
5.	Co A 14322 (2009 A 235)	88	1.6	MR
6.	CoC 14336	92	3.6	S
7.	CoV 14356	94	3.8	S
8.	CoC 01060 (C)	84	1.2	MR
9.	CoA 92081 (C)	88	2.8	MS
10.	Co A 12321 (2006 A 64)	90	1.8	MR
11.	Co A 12322 (2006 A 102)	96	2.4	MS
IVT Midlate (12+2)				
12.	Co 13025	84	2.4	MS
13	Co 13027	86	2.8	MS
14	Co 13028	93	2.2	MS
15	Co 13029	84	2.6	MS
16	Co 13030	82	2.6	MS
17.	Co 13031	88	0.6	R
18.	Co 13032	84	3.4	S
19.	CoA 14323 (2009 A 252)	94	0.2	R
20.	CoA 14324 (2009 A 385)	92	3.8	S
21.	CoC 14337	94	0.4	R
22.	PI 14376	92	3.8	S

23.	PI 14377	90	1.6	MR
24.	CoV 92102 (C)	96	1.8	MR
25	Co 86249 (C)	84	1.4	MR
26	Co 419	94	4.8	HS
27	CoC 671	88	4.4	HS
28	Co 997	83	4.2	HS
29	85 A 261	88	3.8	S
30	Co 6907	92	4.6	HS
31	Co 7219	88	3.2	S
32	Co 7706	84	1.6	MR

R: Resistant MR: Moderately Resistant MS: Moderately susceptible
S: Susceptible HS: Highly susceptible

I **Project No.** : PP 7 (d)

II **Project title** : Evaluation of genotypes for resistance to YLD

III. **Serial number of the year of experimentation**: 03

IV. **Location** : Regional Agricultural Research Station, Anakapalle

V. **Objectives, results of past years and future line of work:**

To select genotypes resistant to YLD among the agronomically important selections.

VI **Technical programme on which the report is based:**

The technical programme of work for the year 2016-17 was discussed and finalized during Annual group meet of AICRP on sugarcane held at RAU, Pusa, December, 2015.

VII. **Discipline wise technical report**

a. **Date of planting** : March 2016

b . **Varieties** : 60

c. **Fertilizer application** : 112, 100 and 120 kg N, P_2O_5 and K_2O / ha respectively. Entire P_2O_5 and K_2O were applied as basal dose. N fertilizer (Urea) was applied two equal splits at 45 and 90 days after planting.

d. Techniques to be adopted.

a. Treatments.

Two budded setts of test entries from short crop

b. Varieties

Genotypes included in zonal varietal trial, preliminary yield trial and initial evaluation trial will be tested for two years

c. Design Each entry will be planted in two rows of 5 m. length placed at 0.8 m. apart.

d. Replications Non - replicated.

e. Plot size Gross and net 8.0 Sq. m. / Variety (Two rows of 5 m length)

f. Spacing 80 cm. between two adjacent rows.

g. Seed rate Twenty five (two budded) setts / row of 5 m length.

h. Fertilizers 112,100,120 kg N, P_2O_5 and K_2O per hectare. P_2O_5 and K_2O will be applied as basal dose. N fertilizer will be applied in two equal split doses at 45 and 90 days after planting.

i. Irrigations Once in six days during summer and need based later.

j. Period of harvest January, 2016

k. Season : 2015-2016

e. Inoculation methodology : Natural incidence

13. Duration Recurring study; promising entries will be screened for 3 years.

14. Data to be collected

YLD severity grades:

Disease grade	Description
0	No symptom of the disease
1	Mild yellowing of midrib in one or two leaves, no sign of typical bunching of leaves caused by YLD
2	Prominent yellowing of midrib on all the leaves in the crown. No bunching of leaves
3	Progress of midrib yellowing to laminar region in the whorl, yellowing on the upper leaf surface, and bunching of leaves
4	Drying of laminar region from leaf tip downwards along the midrib, typical bunching of leaves as a tuft
5	Stunted growth of the cane combined with drying of symptomatic leaves

Mean of the severity grades to be computed and the following YLD severity scale is to be used to assign disease reaction of the variety.

YLD severity scale :

Score	Disease reaction
0.0 - 1.0	Resistant
>1.0 – 2.0	Moderately resistant
>2.0 – 3.0	Moderately susceptible
>3.0 – 4.0	Susceptible
>4.0 – 5.0	Highly susceptible

Symptoms of Yellow Leaf Disease displaying different severity grades

l. **Name and designation of the participating scientist:**

1. Dr. N. Raj Kumar, Scientist (Plant Pathology)
2. Dr. K.V. Krishna Kumar, Sr. Scientist (Plant Pathology)
3. Dr. M. Bharathalakshimi, Principal Scientist (Sugarcane)

m. **Results recorded during the previous year:**

Out of 52 varieties / genotypes screened during 2014-15 one variety 2006 A 64 showed resistant reaction against YLD under natural conditions, while four entries 2011 A 259, 2011 A 313, 2011 A 262 and 2011 A 294 recorded moderately resistant reaction and remaining are susceptible.

During 2015-16 out of 51 varieties / genotypes two varieties screened CoA 12321 (2006 A 64) and Co A 12322 (2006 A 102) showed resistant reaction against YLD under natural conditions, while ten entries Co 7219, 2011 A 259, 2011 A 313, 2011 A 262, 2011 A 294, 2012 A 145, 2012 A 264, Co A 13326, CoA 13321 and CoA 13323 recorded moderately resistant reaction

n. **Results obtained during this year:**

Out of 64 varieties / genotypes Three entries 2006 A 64, **Co 13029**, Co 7602 showed resistant reaction against YLD under natural conditions, while five entries Co 7219, CoA 12322, CoA 14323, CoC 13336 and PI 15376 recorded moderately resistant reaction and remaining are susceptible.

VIII. Technical programme of the year next to the reporting year:

This experiment will be concluded during 2017-18.

IX. Technical summary of the individual report:

Out of 64 varieties / genotypes Three entries 2006 A 64, **Co 13029**, Co 7602 showed resistant reaction against YLD under natural conditions, while five entries Co 7219, CoA 12322, CoA 14323, CoC 13336 and PI 15376 recorded moderately resistant reaction.

X. Salient findings:

Out of 64 varieties / genotypes Three entries 2006 A 64, **Co 13029**, Co 7602 showed resistant reaction against YLD under natural conditions, while five entries Co 7219, CoA 12322, CoA 14323, CoC 13336 and PI 15376 recorded moderately resistant reaction.

Table 14: Reaction of sugarcane clones for resistance to YLD (2015-16)

S. No	Varieties	Mean YLD severity index	Reaction
1.	Co 13013	3.8	S
2.	Co 13023	3.4	S
3.	Co 13024	3.2	S
4.	Co A 14321 (2009 A 107)	3.6	S
5.	Co A 14322 (2009 A 235)	3.3	S
6.	CoC 14336	3.7	S
7.	CoV 14356	3.4	S
8.	CoC 01060 (C)	3.9	S
9.	CoA 92081 (C)	4.3	HS
10.	Co A 12321 (2006 A 64)	0.7	R
11.	Co A 12322 (2006 A 102)	1.4	MR
12.	Co 13025	3.5	S
13	Co 13027	3.8	S
14	Co 13028	3.2	S
15	**Co 13029**	**0.4**	**R**
16	Co 13030	3.6	S
17.	Co 13031	3.9	S
18.	Co 13032	3.4	S
19.	CoA 14323 (2009 A 252)	1.6	MR
20.	CoA 14324 (2009 A 385)	3.5	S
21.	CoC 14337	3.3	S
22.	PI 14376	3.6	S
23.	PI 14377	3.7	S
24.	CoV 92102 (C)	3.1	S
25	Co 86249 (C)	3.8	S

26	2013 A 9	3.4	S
27	2013 A 18	2.6	MS
28	2013 A23	3.1	S
29	2013 A27	3.5	S
30	2013 A 90	3.9	S
31	2013 A102	3.5	S
32	2013 A177	3.3	S
33	2013 A 188	3.1	S
34	2013 A 193	3.9	S
35	2013 A206	3.5	S
36	2013 A212	3.6	S
37	2013 A 217	3.2	S
38	CoC 15336	2.3	MS
39	CoC 15337	3 .2	S
40	CoC 15338	3 .1	S
41	CoV 15356	3 .5	S
42	Co 13023	2 .8	MS
43	Co A 14321	2 .2	MS
44	CoC 14336	3 .6	S
45	CoA 13322	2 .3	MS
46	CoA 13323	2 .7	MS
47	CoC 13336	1 .8	MR
48	CoC 13337	3 .6	S
49	CoV 13356	2 .3	MS
50	CoC 15339	3 .7	S
51	CoC 15340	2 .2	MS
52	Co Or 15346	2 .6	MS
53	PI 15376	1 .4	MR

54	PI 15377	2.8	MS
55	Co 286249	3.8	S
56	Co 13031	3.4	S
57	**Co 7602**	**0.7**	**R**
58	Co 419	3.8	S
59	CoC 671	4.4	HS
60	Co 997	4.6	HS
61	85 A 261	3.2	S
62	Co 6907	2.5	MS
63	Co 7219	1.2	MR
64	Co 7706	4.6	HS

R: Resistant, MR: Moderately Resistant, MS: Moderately Susceptible, S: Susceptible, HS: Highly Susceptible

I **Project No.** : PP 22

II **Project title** : Survey of sugarcane diseases occurring in the area on important sugarcane varieties.

III. **Serial number of the year of experimentation**: 28

IV. **Location** : A general survey was conduced in the state of Andhra Pradesh.

V. **Objectives:**

To gather information on diseases naturally occurring on sugarcane and to compile a status report on all India basis.

VI **Technical programme on which the report is based:**

The technical programme of work for the year 2016-17 was discussed and finalized during Annual group meet of AICRP on sugarcane held at RAU, Pusa, December, 2015.

VII. **Discipline wise technical report**

a) Name and designation of the participating scientist:

1. Dr. N. Raj Kumar, Scientist (Plant Pathology)
2. Dr. K.V. Krishna Kumar, Sr. Scientist (Plant Pathology)
3. Dr. M. Bharathalakshimi, Principal Scientist (Sugarcane)

b) Results obtained during previous year:

During 2015-16 Red rot, smut, yellow leaf disease, grassy shoot, top rot, ring spot, rust and wilt diseases were recorded on sugarcane.

Red rot 10-40 % incidence was observed on Co 62175, 81 A 99, 93 V 297 and 81 V 48 in Visakhapatnam and East Godavari districts. Compared to 2013-14 the cultivation of Co 62175 was reduced due to severe incidence of red rot during 2011-12 in Srikakulam Dt. But this year also noticed the red rot incidence where the farmers who were growing ratoon crop of Co 62175, 81 V 48 and 81 A 99. Smut disease incidence was noticed in all most all sugarcane growing areas of Andhra Pradesh ranging from 10-35 % mostly on ratoon crop of Co A 92081,CoV 09356 (2003V46), 91 V 83 . Wilt incidence also was observed 10-30 % in Coastal areas of Andhra Pradesh on Co 8368, 87 A 380, Co7219, 91 V 83, CoA 92081, Co 62175 and 81 A99. Yellow leaf disease is increasing year after year in all sugarcane growing areas of Andhra Pradesh in all the varieties. During 2015-16 the incidence is 10- 70 % in East Godavari and Visakhapatnam dt.Rust, ring spot and GSD are predominant diseases recorded during the period 2015-16 on sugarcane. 10 -20 % rust and ring spot incidence is observed in some areas even after 2-3 months after planting and also increasing their incidence year after year.

c) Results obtained during this year:

A general survey was conducted to study and record the natural occurrence of diseases on important sugarcane varieties in Andhra Pradesh and the results are presented in Table – 6.

Red rot 10-40 % incidence was observed on Co 62175, 81 A 99, 93 V 297, S-12 and 81 V 48 in Visakhapatnam, Chittor and Srikakulam districts. Smut disease incidence was noticed in all most all sugarcane growing areas of Andhra Pradesh ranging from 10-45 % mostly on ratoon crop of Co A 92081, Co V 09356 (2003V46), 91 V 83 and 97 R 83. Wilt incidence also was observed 10-30 % in Coastal areas of Andhra Pradesh on Co 86032, 87 A 380, Co 7219, 91 V 83, Co A 92081, Co 62175 and 81 A 99. Yellow leaf disease is increasing year after year in all sugarcane growing areas of Andhra Pradesh in all the varieties and recorded 10-70%.

Top rot, rust, ring spot and GSD are predominant diseases recorded during the period 2016-17 on sugarcane. Rust and ring spot diseases are observed in some areas even after 2-3 months after planting.

Though leaf scald disease once appeared on a stray note few years back and oflate not seen in cane growing areas, is again seen emerging on a economically significant note especially during 2016 and 2017. This is attributed to the fact of growing NBV1, a commercial variety from Navabharat ventures Ltd, Samalkot sugar factory that has been showing increased susceptibility over years. Before, this disease assumes epidemic form, overwhelming anxiousness is necessitated to devise comprehensive and sustainable strategies, lest chances of becoming a major havoc is imminent especially in NC Andhra Pradesh.

VIII. **Technical programme of the next year to the reporting year:**

The experiment is being continued during 2017-18.

Table: 6 -Natural Occurrence of sugarcane diseases in Andhra Pradesh during 2016-2017

Disease	**Name of area surveyed**	**% disease incidence (Clump basis)**	**Varieties affected**	**Crop stage when observed**	**Any other information**
Red rot	Juthada, Tandava, Munagapaka, Ompolu, Chuchukonda, Arabupalem, Jagannadhapuram, Thimmarajupet, Haripalem, Khajipalem, Pedapadu, Ummalada, Mulakapalle, Alaparthi, Darlapudi, Etikoppaka, Nagulapalli, Achutapuram, Kothuru, Kasimkota, Veduruparti, Ramanayudipalem, Turangulapalem, Maamidivada, Chodavaram, Narsipatnam, Tandava, Etikoppaka Pulaparthi(Visakhapatnam Dt)	20-30	81A 99 81 V 48 Co 62175	Grand growth stage	Ratoon crop and water logging conditions

	Pulimeru, Gorinta, Vadlamuru, Rangampeta, Chedalada, Umalam, Samalkot, Elaswaram, yerravarm, Chelluru, (Samalkot, Elaswaram, yerravarm, Chillangi, Velanki, Kattamuru, Peravaram, (East Godavari dt)	10-20	93 V 297 81 V 48	Grand growth stage	
	Paradi, Seetarampuram, Mettavalasa, Karada, Pinapenki, Nandabalagi, Kusumuru, Nandigam, Gangannapadu, Terlam, Rajupet (Vijayanagaram Dt)	>5	93 A 297 Co 86032	Grand growth stage	
	Sankili sugarfactory area Srikakulam Dt	15-20	PI 001401 93 A 297 Co 86032	Grand growth stage	
Smut	Paradi, Seetarampuram, Mettavalasa, Karada, Pinapenki, Nandabalagi, Kusumuru, Nandigam, Gangannapadu, Terlam, Rajupet (Vijayanagaram Dt)	15-20	CoA 92081 Co 6907 Co 86032 2003 V 46	Grand growth stage	More during April to June And ratoon crop
	Juthada, Tandava, Munagapaka, Ompolu, Chuchukonda, Arabupalem, Jagannadhapuram, Thimmarajupet, Haripalem, Khajipalem, Pedapadu, Ummalada, Mulakapalle, Alaparthi, Darlapudi, Etikoppaka, Nagulapalli, Achutapuram, Kothuru, Kasimkota, Veduruparti, Ramanayudipalem, Turangulapalem, Maamidivada, Chodavaram, Narsipatnam, Tandava, Etikoppaka Pulaparthi (Visakhapatnam Dt)	25- 30	Co6907 Co A 92081	Tillering to cane formation	
	Mukundapuram, Sankili (Srikakulam Dt)	20-30	CoA 92081 CoA 99082 (93 A145)	Tillering to cane formation	
	Pulimeru, Gorinta, Vadlamuru, Rangampeta, Chedalada, Umalam, Samalkot, Elaswaram, yerravarm, Chelluru, (Samalkot, Elaswaram, yerravarm, Chillangi, Velanki, Kattamuru, Peravaram, (East Godavari dt)	20-30	Co A 92081, CoV 09356 (2003V46), 91 V 83	Tillering	

Wilt	Paradi, Seetarampuram, Mettavalasa, Karada, Pinapenki, Nandabalagi, Kusumuru, Nandigam, Gangannapadu, Terlam, Rajupet (Vijayanagaram Dt)	10-20	CoA 92081 Co 6907 Co 86032 2003 V 46	Grand growth stage	More in water logging conditions and ratoon crop
	Juthada, Tandava, Munagapaka, Ompolu, Chuchukonda, Arabupalem, Jagannadhapuram, Thimmarajupet, Haripalem, Khajipalem, Pedapadu, Ummalada, Mulakapalle, Alaparthi, Darlapudi, Etikoppaka, Nagulapalli, Achutapuram, Kothuru, Kasimkota, Veduruparti, Ramanayudipalem, Turangulapalem, Maamidivada, Chodavaram, Narsipatnam, Tandava, Etikoppaka Pulaparthi (Visakhapatnam Dt)	20- 25	Co6907 Co A 92081	Tillering to cane formation	
	Mukundapuram, Sankili (Srikakulam Dt)	15-20	CoA 92081 CoA 99082 (93 A145)	Tillering to cane formation	
	Pulimeru, Gorinta, Vadlamuru, Rangampeta, Chedalada, Umalam, Samalkot, Elaswaram, yerravarm, Chelluru, (Samalkot, Elaswaram, yerravarm, Chillangi, Velanki, Kattamuru, Peravaram, (East Godavari dt)	20-25	Co A 92081, CoV 09356 (2003V46), 91 V 83	Tillering	
YLD	Juthada, Tandava, Munagapaka, Ompolu, Chuchukonda, Arabupalem, Jagannadhapuram, Thimmarajupet, Haripalem, Khajipalem, Pedapadu, Ummalada, Mulakapalle, Alaparthi, Darlapudi, Etikoppaka, Nagulapalli, Achutapuram, Kothuru, Kasimkota, Veduruparti, Ramanayudipalem, Turangulapalem, Maamidivada, Pulaparthi(Visakhapatnam Dt)	15-35	Co6907, 2001 A 63, Co A 9208,1 Co6907	Grand growth stage	Drought situation followed by heavy rains Ratoon crop and water logging conditions
	Pulimeru, Gorinta, Vadlamuru, Rangampeta, Chedalada, Umalam, Samalkot, Elaswaram, yerravarm, Chelluru, (Samalkot, Elaswaram, yerravarm, Chillangi, Velanki, Kattamuru, Peravaram, (East Godavari dt)	30-35	Co A 92081, 86 V 15 2003V46, 2001 A 63 91 V 83, CoV 92102	Grand growth stage	

	Chelluru, Muramanda, Dulla	40-60	2003 V 46, 87 A 298, 98 A 22,87 A 380, 86 V 96	Grand growth stage	
	Paradi, Seetarampuram, Mettavalasa, Karada, Pinapenki, Nandabalagi, Kusumuru, Nandigam, Gangannapadu, Terlam, Rajupet (Vijayanagaram Dt)	50- 60	Co A 92081, 2003V46,.	Grand growth stage	
	Sankili sugarfactory area Srikakulam Dt	15-20	PI 001401 93 A 297 Co 86032	Grand growth stage	
Mosaic	Bobbili, Salur, Gajapatinagaram, Cheepurupalli, Ranastalam, Rajam, Terlam , Nemalam (Vijayanagaram Dt)	10-30	CoA 92081, Co 86032, Co 8368, CoV 09356 (2003V46)	Grand growth stage	Drought situation followed by heavy rains Ratoon crop and water logging conditions
	Juthada, Tandava, Munagapaka, Ompolu, Chuchukonda, Arabupalem, Jagannadhapuram, Thimmarajupet, Haripalem, Khajipalem, Pedapadu, Ummalada, Mulakapalle, Alaparthi, Darlapudi, Etikoppaka, Nagulapalli, Achutapuram, Kothuru, Kasimkota, Veduruparti, Ramanayudipalem, Turangulapalem, Maamidivada, Pulaparthi(Visakhapatnam Dt)	15-35	Co6907, 2001 A 63, Co A 9208,1 Co6907	Grand growth stage	
	Pulimeru, Gorinta, Vadlamuru, Rangampeta, Chedalada, Umalam, Samalkot, Elaswaram, yerravarm, Chelluru, (Samalkot, Elaswaram, yerravarm, Chillangi, Velanki, Kattamuru, Peravaram, (East Godavari dt)	30-35	Co A 92081, 86 V 15 2003V46, 2001 A 63 91 V 83, CoV 92102	Grand growth stage	
	Chelluru, Muramanda, Dulla	35-45	2003 V 46, 87 A 298, 98 A 22, 87 A 380, 86 V 96	Grand growth stage	
	Bheemasinghi, Bobbili	35-40	Co A 92081, 2003V46	Grand growth stage	

GSD	Juthada, Tandava, Munagapaka, Ompolu, Chuchukonda, Arabupalem, Jagannadhapuram, Thimmarajupet, Haripalem, Khajipalem, Pedapadu, Ummalada, Mulakapalle, Alaparthi, Darlapudi, Etikoppaka, Nagulapalli, Achutapuram, Kothuru, Kasimkota, Veduruparti, Ramanayudipalem, Turangulapalem, Maamidivada, Pulaparthi(Visakhapatnam Dt)	10-20	C0 7219 CoA 92081	Tillering	More severe in ratoons
	Pulimeru, Gorinta, Vadlamuru, Rangampeta, Chedalada, Umalam, Samalkot, Elaswaram, yerravarm, Chelluru, (Samalkot, Elaswaram, yerravarm, Chillangi, Velanki, Kattamuru, Peravaram, (East Godavari dt)	10-20	Co A 92081, CoV 09356 2003V46	Tillering	
	Paradi, Seetarampuram, Mettavalasa, Karada, Pinapenki, Nandabalagi, Kusumuru, Nandigam, Gangannapadu, Terlam, Rajupet (Vijayanagaram Dt)	5-10	CoA 92081, Co 6907	Grand Growth	
Rust and Ring spot	Paradi, Seetarampuram, Mettavalasa, Karada, Pinapenki, Nandabalagi, Kusumuru, Nandigam, Gangannapadu, Terlam, Rajupet, Bobbili, Salur, Gajapatinagaram (Vijayanagaram Dt)	10-15	CoA 92081 2003 V 46 Co 86032	Grand growth stage	Increased during November
	Juthada, Tandava, Munagapaka, Ompolu, Chuchukonda, Arabupalem, Jagannadhapuram, Thimmarajupet, Haripalem, Khajipalem, Pedapadu, Ummalada, Mulakapalle, Alaparthi, Darlapudi, Etikoppaka, Nagulapalli, Achutapuram, Kothuru, Kasimkota, Veduruparti, Ramanayudipalem, Turangulapalem, Maamidivada, Pulaparthi(Visakhapatnam Dt)	10-20	Co6907, C0 7219 CoA 92081	Tillering to cane formation	

	Pulimeru, Gorinta, Vadlamuru, Rangampeta, Chedalada, Umalam, Samalkot, Elaswaram, yerravarm, Chelluru (East Godavari dt)	10-25	CoA 92081 CoA 99082 (93 A145) Co86032, CoA 06321 (2001A63) 2003V46	Grand growth stage	
	Mukundapuram, Sankili (Srikakulam Dt)	10-15	CoA 92081	Grand growth stage	
Top rot	Samalkot, Elaswaram, yerravarm, Chelluru (East Godavari dt)	20-30	CoV 09356 (2003V46) 91 V 83	Tillering to cane formation	Observed in rainy season
	Nagulapalli, Achutapuram, Kothuru, Munagapaka (Visakhapatnam Dt)	20-30	Co6907 CoA 99082 (93 A145) Co 7219	Tillering to cane formation	
Leaf Scald	Eleswaram	5	NBV-1 NBV-2	Tillering to cane formation	--

I **Project No.** : PP 31

II **Project title** : Screening, epidemiology and management of top rot in sugarcane.

III. **Serial number of the year of experimentation**: 05

IV. **Location** : Regional Agricultural Research Station, Anakapalle

V. **Objectives, results of past years and future line of work:**

This experiment is being conducted every year from 2011-12 to obtain information on relative resistance of varieties included in Zonal varietal trial. During 2011-12, 51 entries / genotypes were tested for their reaction to top rot disease under natural conditions.

VI **Technical programme on which the report is based:**

The technical programme of work for the year 2016-17 was discussed and finalized during Annual group meet of AICRP on sugarcane held at RAU, Pusa, December, 2015.

VII. **Discipline wise technical report**

a. **Date of planting** : March 2016

b. **Varieties** :

c. **Fertilizer application** : 112, 100 and 120 kg N, P_2O_5 and K_2O / ha respectively. Entire P_2O_5 and K_2O were applied as basal dose. N fertilizer (Urea) was applied two equal splits at 45 and 90 days after planting.

d. **Irrigations** : 12-15 irrigations were given during the crop growth period.

e. **Plant protection** : --

g. **Plot size** : 10 m x 0.8 x 2 rows = 16 sq.m / variety (For screening)

h. **Design** : Single series (For screening)

i. **Replications** : Non – replicated (For screening)

j. **Dates of harvesting** : January, 20175

k. **Name and designation of the participating scientist:**

1. Dr. N. Raj Kumar, Scientist (Plant Pathology)
2. Dr. K.V. Krishna Kumar, Sr. Scientist (Plant Pathology)
3. Dr. M. Bharathalakshimi, Principal Scientist (Sugarcane)

l. **Results recorded during the previous year:**

Out of 24 varieties / genotypes were screened during 2015-16 against top rot disease under natural conditions one entries/varietiy (Co C 671) showed highly susceptible reaction while two entries (Co 419 and Co 997) exhibited susceptible reaction to top rot disease and remaining entries screened were resistant.

During 2014-15 out of 17 varieties / genotypes were screened against top rot disease under natural conditions two entries/varieties (Co C 671 and Co A 12323) showed highly susceptible reaction while three entries Co A 11326, Co 419 and Co 997) exhibited susceptible reaction to top rot disease.

m. **Results obtained during this year:**

Screening: Results presented in table – 9 revealed that Out of 24 varieties / genotypes were screened against top rot disease under natural conditions one entries/varietiy (Co C 671) showed highly susceptible reaction while four entries (Co 13030, Co 419, Co 7219 and Co 997) exhibited susceptible reaction to top rot disease and remaining entries screened were resistant.

Management: Results presented in table – 10 revealed that Sett treatment + Foliar spray-Carbendaizim -0.05% showed the highest percent germination and also low disease incidence of toprot disease (84.16 and 5.84 respectively) compared to the other treatments.

Epidemiology: The disease incidence was initiated during the Ist fortnight of June and gradually increased till November and then the disease was slowdown. Highest disease was observed during the month of October. The disease incidence was positively correlated with the number of rainy days, low temperature and high RH.

VIII. Technical programme of the year next to the reporting year:

This experiment is being continued during 2017-18.

IX. Technical summary of the individual report:

Screening: Out of 24 varieties / genotypes were screened against top rot disease under natural conditions one entries/varietiy (Co C 671) showed highly susceptible reaction while four

entries (Co 13030, Co 419, Co 7219 and Co 997) exhibited susceptible reaction to top rot disease and remaining entries screened were resistant.

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X. Salient findings:

Screening: Out of 24 varieties / genotypes were screened against top rot disease under natural conditions one entries/varietiy (Co C 671) showed highly susceptible reaction while four entries (Co 13030, Co 419, Co 7219 and Co 997) exhibited susceptible reaction to top rot disease and remaining entries screened were resistant.

Management: Sett treatment + Foliar spray- Carbendaizim -0.05% showed the highest percent germination and also low disease incidence of toprot disease (83.4 and 4.1 respectively) compared to the other treatments.

Epidemiology: The disease incidence was initiated during the Ist fortnight of June and gradually increased till November and then the disease was slowdown. Highest disease was observed during the month of October. The disease incidence was positively correlated with the number of rainy days, low temperature and high RH.

Table: 9 – Reaction of Sugarcane clones for resistance to top rot (20016-2017)

S.No	Variety	Per cent infected plants				Reaction
		Mild	Moderate	Severe	Total incidence	
IVT Early (9+2)						
1	Co 07013	6	2	0	8	MR
2	Co 13023	8	3	0	11	MS
3	Co 13024	3	1	0	4	R
4	**Co A 14321 (2009 A 107)**	**4**	**0**	**0**	**4**	**R**
5	Co A 14322 (2009 A 235)	7	2	0	9	MR
6	CoC 14336	6	1	0	7	MR
7	Co V 14356	9	2	1	12	MS
8	CoC 01060 (C)	5	1	0	6	MR
9	CoA 92081 (C)	0	0	0	0	R

10	Co A 12321 (2006 A 64)	0	0	0	0	R
11	Co A 12322 (2006 A 102)	0	0	0	0	R
IVT Midlate (12+2)						
12	Co 13025	4	1	0	5	R
13	Co 13027	7	2	0	9	MR
14	Co 13028	4	1	0	5	R
15	Co 13029	9	2	1	12	MS
16	Co 13030	12	3	1	6	S
17	Co 13031	7	2	0	9	MR
18	Co 13032	5	1	0	6	MR
19	CoA 14323 (2009 A 252)	8	2	0	10	MR
20	CoA 14324 (2009 A 385)	7	1	0	8	MR
21	CoC 14337	9	3	0	12	MS
22	PI 14376	12	4	1	17	S
23	PI 14377	7	2	0	9	MR
24	CoV 92102 (C)	8	3	0	11	MS
25	Co 86249 (C)	6	1	0	7	MR
26	Co 419	12	3	1	16	S
27	CoC 671	21	6	1	28	HS
28	Co 997	11	3	2	16	S
29	85 A 261	0	0	0	0	R
30	Co 6907	4	2	0	6	R
31	Co 7219	12	4	0	16	S
32	Co 7706		1	0	5	R

R: Resistant , MR: Moderately Resistant, MS: Moderately Susceptible, S: Susceptible, HS: Highly Susceptible

Table: 10 Management of toprot disease in sugarcane during 2015-16

Treatments		Germination (%)	Disease incidence
T1	Sett treatment- Overnight soaking with carbendaizim- 0.1% a.i	75.6	15.2
T2	Foliar spray- Carbendaizim -0.05% a.i (3 sprays at 15 days interval from May 15th)	70.3	11.4
T3	**Sett treatment (T1) + Foliar spray- Carbendaizim -0.05% (T2)**	83.4	4.1
T4	Control	61.3	21.8
	SE+	1.34	0.58
	CD at 5 %	NS	1.41
	C.V. %	5.21	4.82

Table: 11- Weather data and top rot incidence at RARS, Anakapalle during crop growth Period of sugarcane during 2015-16

Month	Total rainfall (mm)	No. of rainy days	Temp. °C		RH %		Bright sunshine hrs.	Wind velocity (km.ph)	Evaporation (mm)	Top rot (PDI)
			Max	Min.	FN	AN				
Jan, 2016	0.0	0	30.5	20.9	91	48	6.2	0.7	3.2	0.0
Feb, 2016	0.0	0	33.2	23.1	89	46	6.8	2.2	4.6	0.0
Mar, 2016	0.0	0	35.1	23.8	85	44	7.7	3.6	5.6	0.0
Apr, 2016	0.0	0	36.4	27.6	82	42	7.1	4.9	6.1	0.0
May, 2016	209.2	6	35.8	28.0	83	45	7.9	4.3	6.1	2.6
June, 2016	186.4	9	33.4	27.4	88	59	3.2	2.8	3.7	8.8
July, 2016	158.4	9	31.9	27.0	84	53	4.1	2.3	4.5	18.2
Aug 2016	182.0	10	33.2	27.3	87	70	4.8	2.0	3.8	28.7
Sept, 2016	352.1	18	30.8	26.5	90	57	3.6	1.3	3.0	26.5
Oct, 2016	183.4	7	31.8	24.6	87	66	6.3	1.0	3.7	13.4
Nov, 2016	0.6	0	31.3	20.2	85	69	5.4	1.1	3.1	3.8
Dec, 2016	0	0	30.5	19.0	92	58	6.4	1.0	3.2	0.0

Correlation matrix:

	Rain (mm)	***Rainy days***	***MaxT***	***Min T***	***RH I***	***RH II***	***Wind vel***	***BSSH***	***Evaporation mm***	***PDI***
Rain mm	1	9.00	0.071	0.606	0.034	0.929	-0.701	-0.787	-0.560	0.963
Rainy days	0.900	1	0.181	0.717	-0.001	0.944	-0.773	-0.936	-0.468	0.859
MaxT	0.071	0.181	1	0.765	-0.758	-0.010	-0.066	-0.124	0.754	-0.113
Min T	0.606	0.717	0.765	1	-0.641	0.608	-0.580	-0.661	0.200	0.432
RH I	0.034	-0.001	-0.758	-0.641	1	0.045	0.154	0.069	-0.641	0.256
RH II	0.929	0.944	-0.010	0.608	0.045	1	-0.790	-0.894	-0.629	0.879
Wind vel	-0.701	-0.773	-0.066	-0.580	0.154	-0.790	1	0.730	0.390	-0.616
BSSH	-0.787	-0.936	-0.124	-0.661	0.069	-0.894	0.730	1	0.478	-0.738
Evaporation mm	-0.560	-0.468	0.754	0.200	-0.641	-0.629	0.390	0.478	1	-0.693
PDI	0.963	0.859	-0.113	0.432	0.256	0.879	-0.616	-0.738	-0.693	1

Table. 12: Regression equations for top rot of sugarcane (with significant variables) at RARS, Anakapalle during crop growth period of sugarcane from 2011-12 to 2016-17.

Multiple regression	Equation	R^{*}	Adj $R^{2@}$
Linear	Average PDI =24.82 + 0.15*Rainfall + 0.86*RD+ .85*Min Temp+ 0.76*RH I- 1.30*RH II	0.952	0.994
*Adj R^2 : Adjusted coefficient of determination @R : Coefficient of correlation			

I **Project No.** : PP 33

II **Project title** : Management of yellow leaf disease through meristem culture

III. **Serial number of the year of experimentation**: 01

IV. **Location** : Regional Agricultural Research Station, Anakapalle

V. **Objectives, results of past years and future line of work:**

To produce sugarcane seed cane free from yellow leaf disease through meristem culture.

VI **Technical programme on which the report is based:**

The technical programme of work for the year 2016-17 was discussed and finalized during Annual group meet of AICRP on sugarcane held at RAU, Pusa, December, 2015.

VII. **Discipline wise technical report**

a. **Date of planting** : July 2016

b. **Varieties** : CoV 08356, Co 92081, Co A 14321,Co 7805 and CoA 12323

c. 12. Techniques to be adopted.

(i) Establishment of aseptic culture : Select the sugarcane variety for YLD-free seed production. Young cane tops are collected from 4-6 month old crop by removing the leaf sheath from field grown plants. The excised shoot tip of about 10 cm long is washed with water and then rinsed with a common disinfectant such as Savlon or Dettol solution followed by washing with sterilized water and dipping in 10% sodium hypochlorite solution for 10 minutes for disinfecting the plant material.

(ii) Inoculation of meristem tip : A wide-mouth flask containing the surface sterilized material is taken inside the laminar flow chamber. The material is washed thoroughly 3-4 times with sterilized distilled water till the odour of chlorine fades away. The minimum possible size (about 2-5 mm) of apical dome is excised with help of a sterile sharp blade and placed in glass bottle containing modified MS medium supplemented with kinetin (0.015 mg/l) and benzyl adenine (1.0 mg/l) as well as sucrose (30 g/l). The apical domes (apical meristem) are incubated at 25° ± 1°C under 16 hr / 8 hr light-dark cycle. The meristem is transferred to fresh medium once in 7-10 days for survival and growth. Initially, the growth would be slow and may take about 30 to 45 days for new shoots to come out.

k.

(iii) Shoot multiplication : The developing shoots are transferred to fresh containers with MS shoot multiplication medium for sub-culturing. A number of shoots emerge soon after and sub-culturing is repeated every 15 to 20 days depending upon the rate of shoot multiplication which may vary with the variety. After 45 to 60 days, the regenerated shoots are transferred to modified MS liquid medium along with kinetin (1.07 mg/ l) and benzyl adenine (0.25 mg/l) as well as sucrose (20 g/l). After 25-30 days, new shoots will arise from the axils of the developing shoots. The multiple shoots developed are separated in small groups and transferred to fresh multiplication medium once in 15-20 days.This process of subculture is repeated for 7-8 cycles until the desired number of shoots is attained.

(iv) Transfer of shoots to rooting medium : Only well-grown shoots with three to four leaves should be transferred to rooting medium. Dry leaves are removed and green leaves trimmed at the tips. While separating, care is taken not to damage the basal portion of the shoots from where the roots would emerge. Groups of five to six shoots are placed in culture tubes containing half-strength MS medium supplemented with 5 mg/l naphthalene acetic acid and 30 g/l sucrose. Roots are formed within 15-25 days and once good root development has taken place the plantlets become ready for transfer to polybags/planting trays.

(v) Hardening of plantlets : Plantlets with well developed shoots and roots are taken out of the glass culture bottles and thoroughly washed with water to remove all traces of the medium. The plantlets with slightly trimmed roots and leaves are sown in polybags/planting trays containing a mixture of separately sieved river sand, silt and vermicompost or farm yard manure in a 1:1:1 ratio. The plantlets are maintained under intermittent mist or are covered with clean transparent plastic sheet until the first new leaves emerge. After 10 to 15 days under high humidity, the plantlets are transferred to shade net-house and maintained for another 4 to 5 weeks. NPK (1.0%) spray is given once in a week after establishment of the plantlets to improve initial growth. The plants become ready for transplanting in field after 45-50 days.

The canes produced in field from tissue culture-raised plants are designated as Breeder Seed which may be further multiplied for production of Foundation Seed and subsequently seed for commercial planting.

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Indexing of plantlets for sugarcane yellow leaf virus (SCYLV)

Indexing of shoots before rooting may be carried out for SCYLV where facilities are available. The protocol is given below:

RT-PCR assays may be performed (Viswanathan *et al.* 2008, 2009). Total RNA is extracted from the first unfurled leaf along with midrib using TRI Reagent. The quality of RNA is checked in 1% agarose gel. The forward primer SCYLV-615F (ATGAATACGGGCGCTAACCGYYCAC) and the reverse primer SCYLV-615R (GTGTTGGGGRAGCGTCGCYTACC) may be used to specifically amplify ~613bp of the SCYLV genome. The total RNA to be reverse transcribed using RevertAid H Minus first strand cDNA synthesis kit (MBI Fermentas, USA), primed with 50 pmol of SCYLV-615R in a thermocycler. The PCR reaction to be performed in a total volume of 25 µl containing 2 µl cDNA, 2.5 µl of 10x PCR buffer containing 15mM $MgCl_2$, 0.5 µl of 10mM dNTP mix, 10 pmol each of forward and reverse primers (SCYLV-615F and SCYLV-615R, 1.25 units of *Taq*, and sterile milliQ water to the final volume.

PCR programme

Initial denaturation at 94°C for 4 min
Denaturation at 94°C for 1 min
Annealing at 65°C for 1 min
Primer extension 72°C for 45 sec
} 30 cycles
Final extension72°C for 10 min.

A 10 µl aliquot of each amplified product to be analyzed by electrophoresis on 1.5% agarose gel stained with ethidium bromide.

k. Name and designation of the participating scientist:

1. Dr. N. Raj Kumar, Scientist (Plant Pathology)
2. Dr. K.V. Krishna Kumar, Sr. Scientist (Plant Pathology)
3. Dr. M. Bharathalakshimi, Principal Scientist (Sugarcane)

l. **Results recorded during the previous year: New Study**

m. **Results obtained during this year:**

Plantlets resulted from tissue culture seedlings of CVs CoA14321, CoA92081 and CoV08356 were up to 1000, 15000 and 1000 respectively. The number of plantlets transplanted for each variety under field conditions was given in Table 13. Results also revealed that YLD incidence (%) was not seen in Breeder seed crop. However, in Foundation seed, YLD incidence ranged from 0-10% in all the three CVs under study (Table 13).

Table 13. Details of Tissue Culture seedlings produced in sugarcane (Cultivar-wise) and their establishment and reaction to Yellow Leaf Disease under field conditions.

S.No.	Name of variety	No. of plantlets during hardening process	No. of plantlets transplanted in field	YLD incidence (%)	
				Breeder Seed crop	Foundation Seed
1	Co A 14321 (2009 A 107)	1000	9135	0	5-10
2	CoA 92081 (87A298)	1500	2460	0	0-5
3	CoV 08356 (2003 V 46)	1000	6500	0	5-10

Table 14. Details of Tissue Culture seedlings produced in sugarcane (Cultivar-wise) at different stages under laboratory conditions.

S.No	Clone	Meristems (45 days)	No of bottles in different Stages						Rooting (30days)
			SI (21days)	S2 (21days)	S3 (21 days)	S4 (21 days)	S5 (21days)	S6 (21days)	
1	CoV 08356 (2003 V 46)	40	5	-	-	-	5	-	-
2	CoA 92081 (87A298)	-	11	112	100		112	280	448
3	CoA 12323 (2006 A 223)	38	5	-	-	-	-	-	-
4	Co A 14321 (2009 A 107)	-	-	-	-	-	84	728	112
5	Co 7805	14	5	-	-	-	-	-	-
	Total	92	26	112	100		201	1008	550

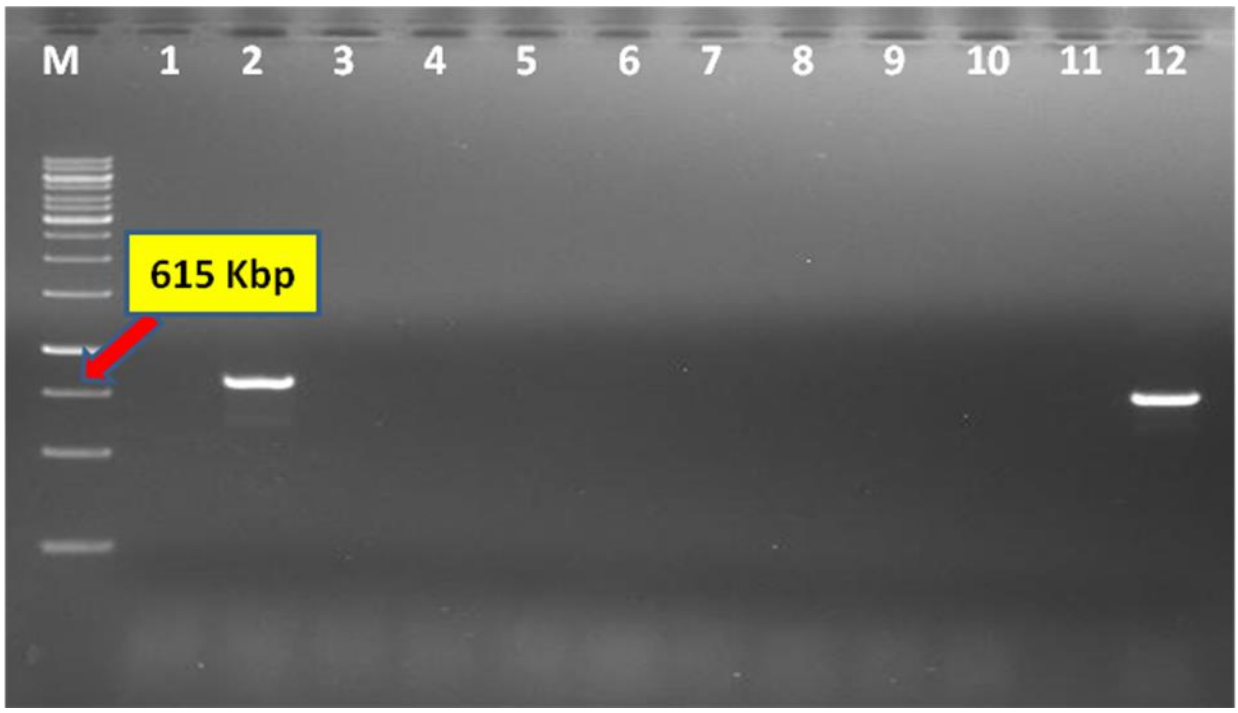

Fig. 1: Agarose gel 1% showing the RT-PCR amplification product obtained from using the sugarcane mosaic specific primers SCYLV-615F and SCYLV-615R) Lane showing positive PCR amplification.