

**VASANTDADA SUGAR INSTITUTE,
PUNE, MAHARASHTRA**

**Annual report of AICRP (S) of Plant Pathology discipline for the year
2012-13**

Project No	: AICRP- PP17-B
Title of the experiment	: Evaluation of zonal varieties for resistance to smut disease under artificial disease conditions.
Objectives	: To gather information on the relative resistance to smut of the entries in zonal varietal trials of the peninsular zone.
Year of commencement	: 1994-95
Year of report	: 2012-13
Location of the experiment	: VSI, Pune
Date of planting	: 17.12.2012
Date of harvesting	: 28.01.2013
Type of soil	: Medium black
Plot No	: C 5, Vasantdada R & D Farm, VSI, Pune
No. of varieties	: 45+5Chekes (Table: 1)
No. of replications	: 2
Design of the experiment	: Rod row trial
Inoculum	: <i>Ustilago scitaminea</i> teliospores collected from commercially cultivated Co 740 and Co 7219 varieties served as source of inoculum.
Method of inoculation	: The method of inoculation consists of dipping of 2 eye-budded setts for 30 to 45 minutes in a smut spore suspension of over 90 % viability and with the spore load of 1 million spores per milliliter.
Plot Size	: Two rows of 5 Mt. lengths. Spacing between rows 120 cm.
Observations	: I) Number of healthy and smut affected stools per row were recorded for disease reaction II) Smut incidence was recorded at fortnightly intervals up to the harvest

Table: 1. Evaluation of sugarcane genotypes for smut resistance, at VSI (ZVT's 2011-12)

Sr. No.	Genotype	Smut incidence (%) (cumulative)	Disease Reaction
I : Initial Varietal Trial – Early (5)			
1.	Co08001	0.00	R
2.	Co08006	11.30	MS
3.	CoN08071	0.00	R
4.	PI08131	31.42	HS
5.	VSI08121	10.00	MR
II: Advanced Varietal Trial – Early I Plant (4)			
1.	Co07012	0.00	R
2.	Co07015	3.12	MR
3.	CoN07071	0.00	R
4.	PI07131	2.94	MR
III. Advance Varietal Trial II Plant Early (5)			
1.	Co06001	18.33	MS
2.	Co06002	5.55	MR
3.	Co06022	14.94	MS
4.	CoM06082	3.33	MR
5.	PI06132	0.00	R
IV. Initial Varietal Trial -Midlate (18)			
1.	Co08007	0.00	R
2.	Co08008	0.00	R
3.	Co08009	0.00	R
4.	Co08016	7.14	MR
5.	Co08018	32.72	HS
6.	Co08019	10.00	MR
7.	Co08020	6.66	MR
8.	CoJN08091 (Not available)	-	-
9.	CoM08081 (Not available)	-	-
10.	CoN08072	0.00	R
11.	CoR08141 (Not available)	-	-
12.	CoSnK08101 (Not available)	-	-
13.	CoVC08061	2.94	MR
14.	CoVC08062	5.54	MR
15.	CoVC08063	10.22	MS
16.	CoVC08064	10.00	MR
17.	CoVC08122	4.34	MR
18.	CoVSI08123.	0.00	R
V: Advanced Varietal Trial Midlate I Plant (6)			
1.	Co07006	0.00	R
2.	Co07007	18.05	MS
3.	Co07008	0.00	R
4.	Co07009	0.00	R
5.	Co07010	0.00	R
6.	CoSnK07103	0.00	R

VI: Advance Varietal Trial II Plant Midlate (11)			
1.	Co06007	15.69	MS
2.	Co06010	0.00	R
3.	Co06012	0.00	R
4.	Co06013	3.24	MR
5.	Co06014	10.00	MR
6.	Co06015	6.25	MR
7.	Co06020	19.58	MS
8.	Co06027	20.22	S
9.	CoM06082	14.29	MS
10.	CoM06084	5.55	MR
11.	CoSnK03632	17.20	MS
Checks			
1.	Co86032	16.66	MS
2.	Co94008	12.50	MS
3.	Co85004	11.85	MS
4.	CoC671	14.5	MS
5.	Co94012	13.64	MS

Results:

The data regarding percent disease incidence and disease reaction is furnished in Table 1 reveals that, out of 50 genotypes including 5 checks screened for their resistance to smut disease under artificial disease condition at VSI, Pune, 17 genotypes were found resistant (R), 16 genotypes were found moderately resistant (MR), 14 genotypes found moderately susceptible (MS), 1 genotypes found susceptible (S) and 2 genotypes were found highly susceptible (HS).

Project No. : AICRP-S, PP22
Title of the experiment : Survey of sugarcane diseases naturally occurring in the area on important sugarcane varieties in Maharashtra State.
Objective : To gather the information on sugarcane diseases naturally occurring in the area on varieties for compiling an all India disease status report yearly.
Location of the experiment: Maharashtra, VSI (Peninsular zone), Pune
Year of start : 1989-90
Year of report : 2012-13

Observations:

During Survey, the major and minor diseases of sugarcane were recorded on different commercially cultivated varieties of sugarcane in Maharashtra State. The sugarcane disease situation in Maharashtra is given in Table 2.

Table2: Major and minor diseases recorded on different commercially cultivated varieties of sugarcane in Maharashtra State 2012-13

Sr. No.	Disease	Name of area surveyed	% Disease incidence (Clump basis)	Varieties affected	Crop Stage when observed	Any other information
1	Whip Smut	Dist.: Latur, Jalna, Beed, Jalgaon, Wardha, Nagpur, Wasim,	10 to 12 %	Co86032, Co7219, CoC671	All stages	The incidence of the disease in Marathawada, Khandrsh and Vidarbha region is increasing.
2	Grassy Shoot	Throughout Maharashtra	Up to 7 %	CoC671, Co86032, Co 8014, CoM 0265, Co94012, VSI 434	All crop stages	-----
3	Pineapple	Throughout Maharashtra	2 %	CoC671, Co86032, CoM0265	Germination	Observed in ill-drained soils.
4	Sett rot	Central and North-East part	-	CoC671, Co86032, Co8014	Germination	Observed in ill-drained soils.
Foliar Diseases						
1	Pokkah boeng	Throughout Maharashtra	8 % (Leaf basis)	CoC671, Co7527, Co94012, CoVSI 9805, CoM 0265 CoVSI 434, Co86032	Monsoon period, especially severe in crop planted in suru season.	Disease stages viz., Chlorosis, top rot and knife cut stages were noted.
2	Rust	Throughout Maharashtra	4 % (Leaf basis)	CoC671, Co7527, Co94012, CoVSI 9805, VSI 434, Co92005.	After the monsoon period.	The disease is being observed to a lesser extent in summer and winter seasons.
3	Eye spot	Southern Zone: Kolhapur, Sindudurg, Sangli, Satara districts	3 % , Leaf basis	CoC671, Co7527, Co 94012, Co8014, Co740, Co7219, Co 86032, CoM0265	After monsoon period and maturity period	The disease is restricted in Southern zone.
4	Banded chlorosis	Central part of Maharashtra	-	CoC671, Co86032, CoM0265	February, March	Light- green to white or yellow horizontal patches/ bands on younger leaves. The single patch of 2 to 3 inch length was observed on individual leaf.
5	Mosaic	Throughout Maharashtra	-	Co740, Co7219. Co94012, CoC671, Co86032, VSI434	Throughout the year	
7	Brown spot caused by <i>Cercospora longipes</i>	South Maharashtra- Kolhapur and Sangli Districts		CoM0265, Co86032	After monsoon season	The severity of the disease was more in CoM0265 in Kolhapur District.

- 1. Project No.** : AICRP- PP 28 (a)
- 2. Title of Project** : Management of rust disease of sugarcane.
- 3. Title of Experiments** : Management of rust disease of sugarcane.
- 4. Objectives** : To find out the effective method of rust management.
- 5. Location** : Vasantdada R&D Farm
- 6. Year of Start** : 2004-2005
- 7. Year of Report** : 2012-2013 (Revised in 2011-12)
- 8. Experimental Details** : RBD / R-4 / T5 / DP: 15.12.2011, DOH: 04.03.2013
- 9. Treatment details** :
- I: Variety of sugarcane** - CoVSI 9805
- II : Fungicides**
- | | |
|-----------------------------|----------|
| T1: Chlorothalonil (Kavach) | - 0.25% |
| T2: Propineb (Antracol) | - 0.25% |
| T3: Triadimefon (Bayleton) | - 0.10% |
| T4: Mancozeb (Dithane M-45) | - 0.20 % |
| T5: Control (untreated) | |
- III: Time of application of fungicides**
- Sprays of the fungicides were carried out after the initiation of the disease. Consecutive three sprays at an interval of 15 days (as per the AICRP (S) Programme)

10. Method of observations:

Observations regarding disease incidence were recorded before each spray. The percent disease incidence was worked on the basis of number of infected and disease free leaves per cane. Ten (10) canes in each treatment were selected randomly for the observations. The other observations regarding the different parameters were recorded at the time of harvesting of the crop. The detail observations are presented in Table 3.

Table 3: Effect of fungicides on growth parameters and incidence of rust disease of sugarcane

Sr. No.	Treatments	Germination (%)	Total height of cane (cms)	Mill able height of cane (cm)	Internodes per cane (nos.)	Length of internodes (cm)	Girth of Internode (cm)	Mill able canes ('000/ha)
1.	T1: Chlorothalonil (Kavach) 0.25%	65.38	239.45	212.50	22.90	12.50	11.90	78.14
2.	T2: Propineb (Antracol) - 0.25 %	68.38	251.20	220.35	24.45	13.05	12.15	83.66
3.	T3: Triadimefon (Bayleton) - 0.10 %	66.25	244.50	206.90	22.65	12.60	11.05	71.65
4.	T4: Mancozeb (Dithane M-45) -0.20%	65.75	242.85	211.80	23.35	13.10	11.45	71.34
5	T5: Control (Untreated)	64.13	240.00	215.90	21.70	11.93	10.83	63.68
	S.E. \pm	2.68	6.78	7.04	0.77	0.36	0.58	3.27
	CD at 5%	NS	NS	NS	NS	NS	NS	10.09
	C.V.%	8.12	5.57	6.60	6.70	5.80	10.15	8.89

Table 3 continues

Sr. No.	Treatments	Cane yield (t/ha)	CCS (%)	CCS (t/ha)	Disease incidence after 3rd spray (%)	Disease Control (%)
1.	T1: Chlorothalonil (Kavach) 0.25%	133.43	15.15	20.20	27.14	47.05
2	T2: Propineb (Antracol) - 0.25 %	143.75	15.16	21.80	11.60	77.65
3.	T3: Triadimefon (Bayleton) - 0.10 %	124.08	15.01	18.56	26.00	49.57
4.	T4: Mancozeb (Dithane M-45) -0.20%	128.08	14.39	18.44	18.72	63.43
5.	T5: Control (Untreated)	103.26	14.61	15.07	51.69	0.00
	S.E. \pm	4.02	0.31	0.62	1.83	3.25
	CD at 5%	12.40	NS	1.91	5.63	10.01
	C.V.%	6.36	4.24	6.60	13.54	13.68

11. Result and discussion:

- i. Germination:** The germination percentage did not influence significantly due to fungicides under study. However, maximum germination was recorded in T2 (Propineb -Antracol- 0.25%) i.e. 68.38 %.
- ii. Total height of cane:** There was non-significant difference in treated and untreated plots. The total height of cane was maximum in T2 (Propineb - Antracol) - 0.25 %) i.e.251.20 cm. While, lowest cane height was noticed in control i.e.240 cms.
- iii. Mill able height of cane:** There was non-significant difference in treated and untreated plots. The mill able cane height was maximum in T2 (Propineb - Antracol - 0.25%) i.e. 220.35 cms.
- iv. No. of internodes per cane:** There was non-significant difference in treated and untreated plots. The number of internodes in cane were numerically at higher side in T2 (Propineb - Antracol 0.25%) i.e. 24.45, while, lowest in control (21.70).
- v. Length of internode:** The difference in length of internodes was not significant in treated and untreated plots. In treatment T4 (Mancozeb-Dithane M-450.20%), the length of internodes was more (13.10 cm) than all other the treatments.
- vi. Girth of internode:** There is no significant influence on girth of internodes due to treatments under study. However, numerically the internode girth was maximum in T2 (Propineb- Antracol- 0.25%) i.e. 12.15 cm compared to all other the treatments including control.
- vii. No. of mill able canes per ha:** The per hectare mill able canes were influenced significantly due to treatments. The numbers of mill able canes per hectare were highest in T2 (Propineb- Antracol -0.25%) i.e. 83,660/ha. This was followed by T1 (Chlorothalonil-Kavach- 0.25% 78140 /ha).
- viii. Yield of cane:** The cane yield differed significantly due to various treatments under study. The cane yield was maximum in T2 (Propineb -Antracol - 0.25%) i.e. 143.75 t/ha. This was significantly superior over the control (103.26 t/ha). The second best treatment T1 (Chlorothalonil-Kavach-0.25%) also showed similar trend as that of T2.
- ix. CCS %:** The percent commercial cane sugar did not influence significantly due to fungicides. The CCS % was maximum in T2 (Propineb - Antracol - 0.25%) i.e.15.16 %, while lower was in T5 (Control, 14.61 %).

- x. Commercial Cane Sugar (CCS t/ha):** There is significant difference in treated and untreated plots. The CCS (t/ha.) was found maximum in T2 (Propineb - Antracol - 0.25%) i.e.21.80 t/ha. which was significantly more than the treatments T1, T3, T4, and T5.
- xi. Rust disease incidence after 3rd spray:** There is significant difference in treated and untreated plots. The minimum disease incidence was noted in T2 (Propineb-Antracol 0.25%) i.e.18.54% after 3rd spray, which was significantly lowest than other treatments under study.
- xii. Rust disease control:** There is significant difference in treated and untreated plots. The maximum disease control was observed in T2 (Propineb-Antracol @ 0.25%) i.e.77.65 %, which was numerically superior over rest of the treatments including control.

12. Conclusion

All the fungicides viz. chlorothalonil (Kavach @ 0.25%), Propineb (Antracol @ 0.25%), Triadimefon (Bayleton @ 0.10 %) and Mancozeb (Dithane M-45 @ 0.20%) are found effective in minimizing the rust disease incidence. But none of the fungicides found effective to control the rust disease cent percent. However, Propineb (Antracol) at 0.25% was found superior for controlling the disease up to 77.65% than other fungicides in testing

- 1. Project No.** : AICRP- PP31 (a & b)
2. Title of the Project : Varietal Screening (a)
3. Title of the experiment : Screening of promising genotypes of sugarcane against the pokkah boeng disease of sugarcane
4. Name of the Scientist (s) : B.H.Pawar, D.B.Gawade V.C.Vasekar.
5. Location : Vasantdada R & D Farm.
6. Date of Planting : 15.12.2012
Date of Harvesting : 06.02.2013
7. Soil type : Medium Black
8. No. of treatments : 12 genotypes/ varieties
9. Design of the experiment : Rod Row trial
10. No. of replications : 2
11. Plot size : Two rows of 6 m length, spacing betⁿ rows: 120 cm
12. Treatment Details : As per the AICRP (S) program, 12 genotypes were screened against pokkah boeng disease in sugarcane under natural condition.

13. Results and Discussion:

The data regarding disease incidence (%) of genotypes, tested against pokkah boeng disease under natural condition presented in Table 4. Out of the 12 genotypes, 4 genotypes including CoVSI03102 were found free from the natural disease incidence of pokkah boeng throughout the year and reacted as resistant. Whereas, 4 genotypes reacted as moderately susceptible, 2 were reacted susceptible and one genotype as highly susceptible to pokkah boeng under natural disease condition.

Table No. 4: Screening and epidemiology of pokkah boeng in sugarcane

Sr. No.	Name of the variety	% Disease Incidence	Disease reaction
1	CoVSI9805	10.73	S
2	VSI434	5.86	MS
3	CoC671	13.81	S
4	Co86032	7.91	MS
5	Co419	6.32	MS
6	CoVSI0405	23.88	HS
7	Co85004	4.19	R
8	CoVSI0309	4.46	R
9	CoM0265	6.25	MS
10	CoVSI03102	0.00	R
11	CoVSI2000-01	0.50	R
12	Co94012	8.06	MS

b. Epidemiology of disease

The incidence of pokkah disease was noticed in the first week of July 2012. The area received pre-monsoon rains in 3rd week of June (Meteorological week – 25th and 26th). The minimum and maximum temperature of 23.59^oC and 32.49^oC was noted during these meteorological weeks, humidity ranges from 44.43 to 84.29 %, while rainfall was 14.20 mm and 1.60 mm in 24th and 25th meteorological week.

The weather data of VSI, Pune-2012-13

Met. Week No.	Date		Temperature (°C)		Humidity (%)		Rainfall (mm)	Rainy days
	From	To	Min	Max.	Min	Max.		
1	02.01.12	08.01.12	13.71	31.41	29.16	88.14	0.00	0
2	09.01.12	15.01.12	7.23	26.13	22.57	84.71	0.00	0
3	16.01.12	22.01.12	7.56	28.73	28.86	96.29	0.00	0
4	23.01.12	29.01.12	11.21	29.24	28.43	94.43	0.00	0
5	30.01.12	05.02.12	11.51	29.77	28.57	89.29	0.00	0
6	06.02.12	12.02.12	8.73	30.60	21.00	84.71	0.00	0
7	13.02.12	19.02.12	10.50	32.41	22.71	89.57	0.00	0
8	20.02.12	26.02.12	11.39	33.89	19.43	82.86	0.00	0
9	27.02.12	04.03.12	8.76	34.81	17.00	86.14	0.20	01
10	05.03.12	11.03.12	8.20	33.87	17.71	88.14	0.00	0
11	12.03.12	18.03.12	11.81	35.97	16.00	69.71	0.00	0
12	19.03.12	25.03.12	13.81	37.34	14.57	64.14	2.00	01
13	26.03.12	01.04.12	15.37	37.87	16.43	74.00	0.00	0
14	02.04.12	08.04.12	17.03	38.70	17.71	77.00	0.00	0
15	09.04.12	15.04.12	18.14	39.26	17.71	83.43	0.00	0
16	16.04.12	22.04.12	18.97	37.44	24.29	86.14	0.00	0
17	23.04.12	29.04.12	17.79	39.64	16.14	65.71	0.00	0
18	30.04.12	06.05.12	18.90	38.44	19.43	78.71	0.00	0
19	07.05.12	13.05.12	22.74	36.73	23.86	80.00	0.00	0
20	14.05.12	20.05.12	21.61	38.90	16.71	74.71	0.00	0
21	21.05.12	27.05.12	23.63	37.89	22.00	74.43	0.00	0
22	28.05.12	03.06.12	24.00	34.34	34.00	71.57	0.00	0
23	04.06.12	10.06.12	23.00	32.60	40.00	87.29	0.40	02
24	11.06.12	17.06.12	22.26	32.37	46.43	89.14	14.20	05
25	18.06.12	24.06.12	23.59	32.49	44.43	84.29	1.60	02
26	25.06.12	07.07.12	22.84	31.90	47.86	92.71	4.00	03
27	02.07.12	08.07.12	22.73	29.19	57.57	94.29	3.80	03

28	09.07.12	15.07.12	22.90	31.40	49.14	87.86	0.00	0
29	16.07.12	22.07.12	22.69	29.21	62.43	94.29	0.60	01
30	23.07.12	29.07.12	22.84	27.84	64.29	93.14	0.00	0
31	30.07.12	05.08.12	21.41	27.10	72.14	99.14	0.00	0
32	06.08.12	12.08.12	21.77	27.77	70.43	99.43	1.80	01
33	13.08.12	19.08.12	21.09	28.83	59.86	97.00	8.00	03
34	20.08.12	26.08.12	21.04	30.07	55.71	97.43	0.00	0
35	27.08.12	02.09.12	22.07	29.74	62.71	98.71	5.40	02
36	03.09.12	09.09.12	21.49	27.71	71.57	100.00	2.70	01
37	10.09.12	16.09.12	20.87	28.36	64.00	98.00	0.00	0
38	17.09.12	23.09.12	20.63	30.73	48.71	95.86	0.00	0
39	24.09.12	30.09.12	19.63	32.21	39.86	99.00	39.80	03
40	01.10.12	07.10.12	21.64	29.81	57.14	100.00	0.00	0
41	08.10.12	14.10.12	19.46	32.26	31.71	99.86	0.00	0
42	15.10.12	21.10.12	16.56	31.31	29.14	96.29	0.00	0
43	22.10.12	28.10.12	19.31	30.81	42.00	96.71	0.00	0
44	29.10.12	04.11.12	16.36	29.93	33.71	95.43	0.20	01
45	05.11.12	11.11.12	16.63	30.84	31.71	92.00	0.00	0
46	12.11.12	18.11.12	13.11	29.07	26.14	87.71	0.00	0
47	19.11.12	25.11.12	12.29	29.97	30.86	89.43	0.00	0
48	26.11.12	02.12.12	13.87	31.00	28.57	93.14	0.00	0
49	03.12.12	09.12.12	16.16	30.56	35.43	89.57	0.00	0
50	10.12.12	16.12.12	11.00	30.80	26.57	97.00	0.00	0
51	17.12.12	23.12.12	10.59	29.13	30.00	93.14	0.00	0
52	23.12.12	30.12.12	10.01	29.84	35.86	96.00	0.00	0