

**VASANTDADA SUGAR INSTITUTE,  
PUNE, MAHARASHTRA**

**Annual report of AICRP (S) of Plant Pathology discipline for the year  
2013-14**

<b>Project No</b>	: AICRP- PP17-B
<b>Title of the experiment</b>	: Evaluation of zonal varieties of sugarcane for resistance to smut disease under artificial disease conditions.
<b>Objectives</b>	: To gather information on the relative resistance to smut of the entries in zonal varietal trials of the peninsular zone.
<b>Year of commencement</b>	: 1994-95
<b>Year of report</b>	: 2013-14
<b>Location of the experiment</b>	: VSI, Pune
<b>Date of planting</b>	: 17.12.2013
<b>Date of harvesting</b>	: 28.02.2014
<b>Type of soil</b>	: Medium black
<b>Plot No</b>	: Vasantdada R & D Farm, VSI, Pune
<b>No. of varieties</b>	: 33+ 5 Checks (Table: 1)
<b>No. of replications</b>	: 2
<b>Design of the experiment</b>	: Rod row trial
<b>Inoculum</b>	: <i>Sporisorium scitaminea</i> teliospores collected from commercially cultivated varieties of sugarcane in Maharashtra, which served as source of inoculum.
<b>Method of inoculation</b>	: 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.
<b>Plot Size</b>	: Two rows of 5 meter length. Spacing between rows: 120 cm.
<b>Observations</b>	: 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)**

Sr. No.	Genotype	Smut incidence (%) (cumulative)	Disease Reaction
<b>I : Initial Varietal Trial – Early (8)</b>			
1.	Co09002	4.74	MR
2.	Co09003	2.00	MR
3.	Co09004	7.69	MR
4.	Co09005	6.46	MR
5.	Co09006	2.00	MR
6	Co09007	8.33	MR
7	CoN9071	6.42	MR
8	CoN9072	0.00	R
<b>II: Advanced Varietal Trial – Early I Plant (2)</b>			
1.	Co08001	3.84	MR
2.	VSI08121	4.32	MR
<b>III. Advance Varietal Trial II Plant Early (4)</b>			
1.	Co07012	13.89	MS
2.	Co07015	0.00	R
3.	CoN07071	7.91	MR
4.	PI07131	1.50	MR
<b>IV. Initial Varietal Trial -Midlate (10)</b>			
1.	Co09009	2.03	MR
2.	Co09010	19.36	MS
3.	Co09012	2.63	MR
4.	Co09013	6.77	MR
5.	Co09014	0.0	R
6.	Co02040	0.0	R
7.	CoN09073	Not available	-
8.	CoN09074	-do-	-
9.	CoSnk05102	0.00	R
10.	CoVSI09121	6.25	MR
<b>V. Advanced Varietal Trial Midlate I Plant (5)</b>			
1.	Co08008	3.12	MR
2.	Co08009	3.55	MR
3.	Co08016	5.26	MR
4.	Co08020	0.00	R
5.	CoSnk08101	2.18	MR
<b>VI. Advance Varietal Trial II Plant Midlate (6)</b>			
1.	Co07006	9.16	MR
2.	Co07007	10.84	MS
3.	Co07008	3.57	MR
4.	Co07009	4.16	MR
5.	Co07010	3.63	MR
6.	CoSnk07103	9.77	MR

<b>Checks</b>			
1.	Co86032	6.27	MR
2.	Co94008	6.81	MR
3.	Co85004	7.00	MR
4.	CoC671	5.53	MR
5.	Co94012	6.88	MR

**Results:**

The data about disease incidence and disease reaction furnished in Table 1 reveals that, out of 38 genotypes including 5 checks screened for their resistance to smut disease under artificial disease condition at VSI, Pune, 6 genotypes were found resistant (R), 29 genotypes were found moderately resistant (MR) and 3 genotypes found moderately susceptible (MS).

**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** : 2013-14

**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 2013-14**

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, Kolhapur, Sangli, Satara	5 to 7 %	Co86032, CoC671	All stages	The incidence of the disease in Marathawada, Khandrsh and Vidarbha region is more.
2	Grassy Shoot	Throughout Maharashtra	Up to 10 %	CoC671, Co86032, CoM 0265, Co94012, VSI 434	All crop stages	-----
3	Pineapple	Throughout Maharashtra	Up to 5 %	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.
<b>Foliar Diseases and abnormality</b>						
1	Pokkah boeng	Throughout Maharashtra	Up to 20 % (Leaf basis)	CoC671, Co7527, CoVSI 9805, CoM 0265 CoVSI 434, Co86032	Monsoon period, especially severe in suru planted crop.	Disease stages viz., Chlorosis, top rot and knife cut stages.
2	Rust	Throughout Maharashtra	Up to 15 % (Leaf basis)	CoC671, CoVSI 9805, VSI 434, Co92005	After the monsoon period.	The disease is being observed throughout the year but the incidence is less in summer and winter seasons.
3	Eye spot	Southern Zone: Kolhapur, Sindudurg, Sangli, Satara districts	Up to 10 % (Leaf basis)	CoC671, Co7527, Co 86032, CoM0265, Co92005	After monsoon period and maturity period	The disease is restricted in Southern zone.
4	Mosaic	Throughout Maharashtra	-	CoC671, Co86032, VSI434	Throughout the year	---
5	Brown spot caused by <i>Cercospora longipes</i>	South Maharashtra- Kolhapur and Sangli Districts	Up to 20 %	CoM0265, Co86032	After monsoon season	The severity of the disease was more in CoM0265 in South part of the state.
6	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.

**Project No.** : AICRP- PP 28 (a)

**Title of Project** : Management of rust disease of sugarcane.

**Title of Experiments** : Management of rust disease of sugarcane.

**Objecives** : To find out the effective method of rust management.

**Location** : Vasantdada R&D Farm

**Year of Start** : 2004-2005

**Year of Report** : 2013-14 (Revised in 2011-12)

**Experimental Details** : RBD / R-4 / T5 / DP –19.12.12, DOH – 06.01.14

**Treatment details** :

**I: Variety of sugarcane:** CoVSI9805

**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)

**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%	74.00	269.00	248.10	25.65	12.90	10.61	88.54
2.	T2: Propineb (Antracol) - 0.25 %	77.13	282.6	259.60	25.75	13.52	10.84	94.41
3.	T3: Triadimefon (Bayleton) - 0.10 %	76.25	275.5	253.25	25.85	12.50	10.75	86.17
4.	T4: Mancozeb (Dithane M-45) -0.20%	76.75	276.00	255.40	25.80	13.20	10.60	92.07
5	T5: Control (Untreated)	71.63	266.25	244.70	24.30	12.10	10.49	84.99
	<b>S.E. <math>\pm</math></b>	<b>3.44</b>	<b>16.89</b>	<b>5.26</b>	<b>0.94</b>	<b>0.50</b>	<b>0.12</b>	<b>13.12</b>
	<b>CD at 5%</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>
	<b>C.V.%</b>	<b>6.42</b>	<b>3.97</b>	<b>4.14</b>	<b>7.33</b>	<b>7.63</b>	<b>2.20</b>	<b>20.80</b>

**Table 3 continues**

<b>Sr. No.</b>	<b>Treatments</b>	<b>Cane yield (t/ha)</b>	<b>CCS (%)</b>	<b>CCS (t/ha)</b>	<b>Disease incidence after 3<sup>rd</sup> spray (%)</b>	<b>Disease Control (%)</b>	<b>Cost Benefit ratio</b>
1.	T1: Chlorothalonil (Kavach) 0.25%	110.08	12.81	14.10	25.98	52.86	1: 2.15
2	T2: Propineb (Antracol) - 0.25 %	122.31	13.37	16.37	14.21	74.21	1: 2.46
3.	T3: Triadimefon (Bayleton) - 0.10 %	108.30	13.04	14.12	22.96	58.34	1: 2.16
4.	T4: Mancozeb (Dithane M-45) -0.20%	115.50	13.15	15.18	18.92	65.67	1.2.37
5.	T5: Control (Untreated)	104.19	12.65	13.18	55.12	0.00	1:2.10
	<b>S.E. <math>\pm</math></b>	<b>2.06</b>	<b>0.36</b>	<b>0.62</b>	<b>1.45</b>	<b>0.96</b>	
	<b>CD at 5%</b>	<b>4.84</b>	<b>NS</b>	<b>1.42</b>	<b>NS</b>	<b>2.09</b>	
	<b>C.V.%</b>	<b>2.79</b>	<b>3.85</b>	<b>5.70</b>	<b>7.51</b>	<b>2.71</b>	



## **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. 77.13 %.
- 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.282.6 cm. While, lowest cane height was noticed in control i.e.266.25 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. 259.60 cms.
- iv. No. of internodes per cane:** There was non-significant difference in treated and untreated plots. The numbers of internodes in cane were numerically at higher side in T3 (Triadimefon- Bayleton - 0.10 %) i.e. 25.85, while, lowest in control (24.30).
- v. Length of internode:** The difference in length of internodes was not significant in treated and untreated plots. In treatment T2 (Propineb- Antracol- 0.25%) the length of internodes was more (13.52 cms) 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. 10.84 cms compared to all other the treatments including control.
- vii. No. of mill able canes per hectare (ha):** The per hectare mill able canes were influenced non- significantly due to treatments. The numbers of millable canes per hectare were highest in T2 (Propineb- Antracol -0.25%) i.e. 94410. This was followed by T4 (Mancozeb-Dithane M-45-0.20%) i.e.92070.
- 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. 122.31 t/ha. This was significantly superior over the control (104.19 t/ha.). The second highest yield was obtained in T4 (Mancozeb, Dithane M-45-0.20%) i.e.115.50t/ha.

- 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.13.37 %, while lower was in T5 (Control, 12.65 %).
- x. 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.16.37 t/ha. which was significantly more than the treatments T1, T3, T4, and T5.
- xi. 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.74.21 %, which is significantly superior over rest of the treatments including control.
- xii. Cost Benefit Ratio:** The maximum disease BC ration was obtained from T2 (Propineb-Antracol @ 0.25%) i.e.1: 2.46 which is numerically superior over rest of the treatments including control.

**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. The Propineb (Antracol) at 0.25% was found superior for controlling the disease up to 74.21% than other fungicides in testing.

<b>Project No.</b>	: AICRP: PP31 (a & b)
<b>Title of the Project</b>	: Screening, epidemiology and management of pokkah boeng in sugarcane
<b>Title of the experiment</b>	: <b>A. Varietal Screening</b> Screening of promising genotypes of sugarcane against the pokkah boeng disease of sugarcane
<b>Location</b>	: Vasantdada R & D Farm.
<b>Date of Planting</b>	: 22.12.2012
<b>Date of Harvesting</b>	: 06.01.2014
<b>Soil type</b>	: Medium Black
<b>No. of treatments</b>	: 12 genotypes/ varieties
<b>Design of the experiment</b>	: Rod Row trial
<b>No. of replications</b>	: 2
<b>Plot size</b>	: Two rows of 6 m length, spacing bet <sup>n</sup> rows: 120 cm
<b>Treatment Details</b>	: As per the AICRP (S) program, 12 genotypes were screened against pokkah boeng disease in sugarcane under natural condition.

### Results and Discussion:

The data regarding disease incidence (%) of genotypes, tested against pokkah boeng disease under natural condition presented in Table 5. Out of the 12 genotypes, none of the genotype was found free from the natural disease incidence of pokkah boeng throughout the year. Genotypes under testing *viz.*, CoVSI9805, VSI434, CoC671, Co86032, Co419, CoVSI0405, Co85004, CoVSI0309, CoM0265, CoVSI03102, CoVSI2000-01 and Co94012 were found susceptible to pokkah boeng disease under natural condition.

**Table 5: Variety wise incidence and disease reaction of pokkah boeng disease under natural condition.**

Sr. No.	Name of the variety	% Disease Incidence	Disease reaction	Sr. No.	Name of the variety	% Disease Incidence	Disease reaction
1	CoVSI9805	14.51	S	7	Co85004	5.29	MS
2	VSI434	9.44	MS	8	CoVSI0309	3.50	R
3	CoC671	8.21	MS	9	CoM0265	5.36	MS
4	Co86032	4.91	R	10	CoVSI03102	1.74	R
5	Co419	3.58	R	11	CoVSI2000-01	3.54	R
6	CoVSI0405	15.98	S	12	Co94012	11.38	S

### B. Epidemiology of disease

The incidence of pokkah disease was initiated in the second week of June 2013. This area received pre-monsoon rains in 3<sup>rd</sup> week of May (Meteorological week – 21<sup>st</sup>). The minimum and maximum temperature of 24 °C and 37.29°C was noted during these meteorological weeks, humidity ranges from 34.00 to 77.57 %, while rainfall was 8.2 mm in 21<sup>st</sup> meteorological week.

## The weather data of VSI, Pune: Year 2013

Met. Week No.	Date		Temperature (°C)		Humidity (%)		Rainfall (mm)	Rainy days
	From	To	Min	Max.	Min	Max.		
1	01.01.2013	07.01.2013	11.70	33.20	24.00	93.00	0.0	0
2	08.01.2013	14.01.2013	11.10	31.10	27.70	90.40	0.0	0
3	15.01.2013	21.01.2013	12.30	34.30	16.00	88.00	0.0	0
4	22.01.2013	28.01.2013	11.41	31.41	34.14	96.14	0.0	0
5	29.01.2013	04.02.2013	15.10	33.10	29.00	83.70	0.0	0
6	05.02.2013	11.02.2013	16.60	33.30	30.00	86.10	0.0	0
7	12.02.2013	18.02.2013	15.90	33.60	24.60	86.60	0.0	0
8	19.02.2013	25.02.2013	13.90	35.40	16.40	78.90	0.0	0
9	26.02.2013	04.03.2013	14.50	36.50	17.00	71.00	0.0	0
10	05.03.2013	11.03.2013	15.80	35.98	17.71	55.85	0.0	0
11	12.03.2013	18.03.2013	19.00	36.70	18.30	83.70	6.00	1
12	19.03.2013	25.03.2013	18.10	37.70	14.90	66.90	0.0	0
13	26.03.2013	01.04.2013	18.60	38.00	17.10	69.90	0.0	0
14	02.04.2013	08.04.2013	19.50	38.50	15.00	74.00	0.0	0
15	09.04.2013	15.04.2013	21.70	40.40	13.0	62.10	0.0	0
16	16.04.2013	22.04.2013	19.57	36.71	17.14	81.71	0.4	1
17	23.04.2013	29.04.2013	22.90	39.70	17.70	66.90	0.0	0
18	30.04.2013	06.05.2013	24.00	40.09	17.60	66.60	1.6	1
19	07.05.2013	13.05.2013	23.40	40.00	18.20	77.00	0.0	0
20	14.05.2013	20.05.2013	25.12	37.22	32.57	78.42	0.0	0
21	21.05.2013	27.05.2013	24.00	37.29	34.00	77.57	8.2	1
22	28.05.2013	03.06.2013	24.14	36.86	35.14	79.57	0.0	0
23	04.06.2013	10.06.2013	23.20	35.20	53.60	79.20	12.00	1
24	11.06.2013	17.06.2013	23.30	28.90	68.10	90.70	9.8	2
25	18.06.2013	24.06.2013	19.30	25.10	57.70	78.10	10.60	2
26	25.06.2013	01.07.2013	22.30	27.80	72.30	93.00	23.40	4
27	02.07.2013	08.07.2013	22.00	29.00	70.00	94.00	1.0	1
28	09.07.2013	15.07.2013	21.80	26.40	75.80	94.80	6.4	2
29	16.07.2013	22.07.2014	22.00	25.30	83.30	95.60	8.0	2
30	23.07.2013	29.07.2013	22.00	26.00	81.80	95.60	28.40	3
31	30.07.2013	05.08.2013	21.45	27.34	70.42	97.14	0.8	1
32	06.08.2013	12.08.2013	20.80	28.30	69.50	94.50	1.4	2
33	13.08.2013	19.08.2013	21.90	29.30	65.10	94.10	3.00	4
34	20.08.2013	26.08.2013	22.00	28.90	60.70	89.70	3.6	3
35	27.08.2013	02.09.2013	20.00	27.50	71.00	96.00	0.0	0

36	03.09.2013	09.09.2013	23.00	32.00	49.60	92.30	12.80	1
37	10.09.2013	16.09.2013	20.98	31.30	57.00	99.85	65.20	7
38	17.09.2013	23.09.2013	20.84	28.92	62.57	96.42	40.80	4
39	24.09.2013	30.09.2013	21.00	28.60	62.00	93.60	1.6	2
40	01.10.2013	07.10.2013	21.00	31.50	56.50	94.50	12.40	1
41	08.10.2013	14.10.2013	20.80	30.80	55.40	93.20	0.2	1
42	15.10.2013	21.10.2013	20.30	32.70	46.00	95.60	1.2	2
43	22.10.2013	28.10.2013	20.10	31.70	46.70	94.30	7.8	1
44	29.10.2013	04.11.2013	18.30	32.30	41.30	96.00	0.2	1
45	05.11.2013	11.11.2013	15.87	29.90	43.71	98.71	10.21	1
46	12.11.2013	18.11.2013	13.20	29.70	34.50	91.20	0.0	0
47	19.11.2013	25.11.2013	14.00	31.60	36.10	94.00	0.0	0
48	26.11.2013	02.12.2013	17.50	30.00	49.50	95.50	35.40	3
49	03.12.2013	09.12.2013	14.10	29.60	41.90	96.10	11.80	3
50	10.12.2013	16.12.2013	7.42	29.52	29.00	100.00	0.0	0
51	17.12.2013	23.12.2013	11.00	30.00	27.70	94.70	0.0	0
52	24.12.2013	31.12.2013	13.60	29.10	41.70	94.30	0.0	0