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RESEARCH REPORT FOR ANNUAL GROUP MEETING

ON

SUGARCANE PATHOLOGY

2013-2014

**CENTRAL SUGARCANE RESEARCH STATION,
PADEGAON, TAL. PHALTAN, DIST. SATARA.**

Sugarcane Pathology Section, C.S.R.S. Padegaon	
STAFF POSITION (2013-14)	
Sugarcane Specialist -- Dr. S. M. Pawar (From 1.10.11)	
ALL INDIA CO-ORDINATED RESEARCH PROJECT: (AICRP)	
1.	Sugarcane Pathologist: Dr. D.V. Indi (from 20/12/2010)

AICRP ON SUGARCANE (ICAR) - RESEARCH HIGHLIGHTS (2013-14)

1. In the “Evaluation of zonal varieties/genotypes for resistance to smut under artificial conditions, 4 genotypes from IVT Early viz., Co 10004, Co 10026, CoM 10082 and CoT 10366, one genotype i.e. Co 08001 from AVT–Early (II Plant), 04 genotypes viz., CoM 10083, CoM 10084, CoT 10368 and PI 10132 from IVT-Midlate and 2 genotypes viz., Co 08009 and CoSnk 08101 from AVT-Midlate -II Plant showed resistant reaction to smut disease.
2. During the year 2013-2014, the incidence of diseases like smut, grassy shoot, Pokka bong, rust, YLD and brown spot was observed in different areas. The grassy shoot disease (GSD) was noticed in Solapur, Sangli, Satara, Pune and Ahmednagar districts. Pokka bong was noticed on different varieties in Satara, Solapur, Pune and Sangli districts. The rust disease was noticed on almost all the cultivated sugarcane varieties in Satara, Solapur and Pune districts. The incidence of YLD was noticed in Sangli and Satara districts. Brown spot was a major problem observed predominantly in Sangli, Satara, Solapur, Pune and Ahmednagar districts because of frequent rains and high humidity during rainy season.
3. In the chemical management of rust of sugarcane, Mancozeb (0.30 %) was found to be the most effective fungicide which recorded the least disease intensity and the highest cane yield coupled with superior juice quality parameters. It was followed by Chlorothalonil 0.25 %.
4. In the experiment on standardization of inoculation method for screening sugarcane genotypes for resistance to brown rust, the leaf whorl inoculation with urediniospores suspension recorded higher average no. of rust pustules (10.46 per sq. inch) and higher no. of leaves bearing rust pustules (7.7) as compared to the clip inoculation method (08.33 per sq. inch and 7.6 respectively). This indicates that the leaf whorl inoculation method is better for screening than the clip inoculation method.

A.I.C.R.P. ON SUGARCANE, C.S.R.S., PADEGAON

PART-I : ONGOING PROGRAMME

Expt. No. PP 17B. Evaluation of zonal varieties/genotypes for resistance to smut

Objective: To gather information on the relative resistance of the entries in zonal varietal trial to smut disease.

Experimental Details

- | | |
|---|--|
| 1. Plot size: 6 M x 1 Rows | 5. Date of planting: 08/01/2013 |
| 2. Fertilizer dose: 250:115:115 Kg N, P ₂ O ₅ & K ₂ O/ ha | |
| 3. No. of genotypes: 33+ 9 Ch. = 42 | 6. Date of harvest: 27/01/2014 |
| 4. Season: <i>Suru</i> | 7. Replications: 2 |

Smut Reaction Assessment key

Smut Reaction	Incidence (%)
1. Resistant (R):	0.00
2. Moderately Resistant (MR):	0.01 to 10.00
3. Moderately Susceptible (MS):	10.01 to 20.00
4. Susceptible (S):	20.01 to 30.0
5. Highly Susceptible (HS):	More than 30.00

Results: The results are presented in Table 1.

- 1) IVT-(Early):** Out of 12 genotypes included in IVT (Early), **4 genotypes** viz., Co 10004, Co 10026, CoM 10082 and CoT 10366 showed **resistant** reaction to smut. **Four** genotypes viz., Co 10005, Co 10027, CoN 10072 and CoT 10367 showed **moderately resistant** reaction. **Two** genotypes viz., Co 10024 and CoM 10081 showed **moderately susceptible** reaction to smut disease, whereas **one** genotype i.e. Co 10006 showed **susceptible** and one genotype i.e. CoN 10071 showed **highly susceptible** reaction to smut disease.
- 2) AVT-Early (II Plant):** Out of 02 genotypes, **one** genotype i.e. Co 08001 showed **resistant** reaction **one** genotype i.e. VSI 08121 showed **moderately susceptible** reaction to smut disease.
- 3) IVT-Midlate:** Out of 14 genotypes tested, **04** genotypes viz., CoM 10083, CoM 10084, CoT 10368 and PI 10132 showed **resistant** reaction to smut. **Two** genotypes i.e. Co 10033 and CoT 10369 showed **moderately resistant** reaction. Three genotypes viz., Co 10017, Co 10031 and PI 10131 showed **susceptible** reaction whereas **5** genotypes viz., Co 10015, CoN 10073, Co VC 10061, Co VSI 10121 and Co VSI 10122 showed **highly susceptible** reaction to smut.
- 4) AVT-Midlate -II Plant:** Out of 05 genotypes tested, **2** genotypes viz., Co 08009 and CoSnk 08101 showed **resistant** reaction; **one** genotype i.e. Co 08020 was **moderately resistant** and **two** genotypes viz., Co 08008 and Co 08016 were **moderately susceptible**.

Table 1. Incidence of smut on sugarcane genotypes from AICRP trials under artificially inoculated conditions

Sr. No.	Genotype	Smut %	Reaction	Sr. No.	Genotype	Smut %	Reaction
IVT – Early (12)							
1	Co 10004	0.00	R	22	CoT 10368	0.00	R
2	Co 10005	3.92	MR	23	CoT 10369	4.92	MR
3	Co 10006	26.47	S	24	CoVc 10061	43.28	HS
4	Co 10024	19.05	MS	25	Co VSI 10121	71.43	HS
5	Co 10026	0.00	R	26	Co VSI 10122	56.86	HS
6	Co 10027	8.06	MR	27	PI 10131	25.58	S
7	CoM 10081	12.31	MS	28	PI 10132	0.00	R
8	CoM 10082	0.00	R	AVT– Midlate II Plant (05)			
9	CoN 10071	44.44	HS	29	Co 08008	15.22	MS
10	CoN 10072	8.20	MR	30	Co 08009	0.00	R
11	CoT 10366	0.00	R	31	Co 08016	15.87	MS
12	CoT 10367	2.94	MR	32	Co 08020	4.92	MR
AVT – Early II Plant (02)				33	CoSnk 08101	0.00	R
13	Co 08001	0.00	R	Checks			
14	VSI 08121	14.81	MS	34	Co 85004	17.86	MS
IVT– Midlate (14)				35	Co 94008	6.00	MR
15	Co 10015	40.38	HS	36	CoC 671	16.67	MS
16	Co 10017	24.19	S	37	Co 86032	18.60	MS
17	Co 10031	28.57	S	38	Co 99004	14.29	MS
18	Co 10033	5.08	MR	39	CoM 265	0.00	R
19	CoM 10083	0.00	R	40	Co 740	45.45	HS
20	CoM 10084	0.00	R	41	Co 7219	33.33	HS
21	CoN 10073	33.33	HS	42	Co 7527	50.00	HS

Expt. No. PP 22 Survey of sugarcane diseases naturally occurring in the area on important sugarcane varieties

Objective: To gather information on the diseases naturally occurring in the area on varieties for compiling an all India disease status report yearly.

Results: The results have been presented in Table 2.

During the year 2013-2014, the incidence of diseases like smut, grassy shoot, Pokka bong, rust, YLD and brown spot was observed in different areas. Smut incidence was noticed on CoM 0261 at Asta, Dist. Sangli where farmers are growing the variety although it is not recommended. The grassy shoot disease (GSD) was noticed in Solapur, Sangli, Satara, Pune and Ahmednagar districts on all the varieties. Pokka bong was noticed on CoVSI 9805 and Co 86032 in Satara district, CoM 0265 in Solapur and Pune districts and CoM 0261 in Sangli district. The rust disease was noticed on almost all the cultivated sugarcane varieties viz., Co 86032, CoM 0265, CoVSI 9805, CoC 671 and Co 92005 in Satara, Solapur and Pune districts. The incidence of YLD was noticed in Sangli and Satara districts on Co 86032. Brown spot was a major problem observed predominantly in Sangli, Satara, Solapur, Pune and Ahmednagar districts because of frequent rains and high humidity during rainy season.

Table 2. Survey of sugarcane diseases in the region during 2013

Sr. No.	Area Surveyed	Variety	Different diseases/disorders noticed					
			Smut	GSD	Pokkah boeng	Rust	YLD	Brown Spot
1	Vihe, Charegaon Tal. Patan, Dist. Satara.	CoM 0265 Co 86032 CoVSI 9805 Co 92005		Y Y Y	Y Y	Y Y Y	Y	Y Y
2	Kival, Kalwade Tal. Karad, Dist. Satara	CoM 0265 Co 86032 Co 92005		Y Y Y		Y		Y Y
3	Sangavi, Malegaon Bk. Tal. Baramati, Dist. Pune	CoM 0265		Y	Y			Y
4	Rahuri Campus, Tal. Rahuri, Dist. Ahmednager	CoM 0265 Co 86032		Y Y				Y
5	Dhom, Wai, Bhuinj, Asale, Pande, Bavadhan Tal. Wai Dist. Satara.	CoM 0265		Y				Y
6	Ruhu Tal. Haveli Dist. Pune.	Co 86032 CoVSI 9805 CoC 671		Y Y Y		Y Y		
7	Aalegaon, Rui Tal. Madha, Dist. Solapur	CoM 0265 Co 86032		Y Y	Y	Y		Y
8	Karkhel, Varkute, Malawadi, Devapur Tal. Dahiwadi, Dist. Satara.	Co 86032		Y				
9	Bhavaninager, Katewadi, Bori Tal. Indapur, Dist. Pune	CoM 0265		Y				Y
10	Kasbe Digraj, Sangali, Asta, Bawahi, Islampur, Valwa Tal. Valwa and Miraj Dist. Sangli	CoM 0265 Co 86032 CoM 0261	Y	Y	Y		Y	Y

Expt. No. PP 28A Management of rust of Sugarcane

Objective: To find out effective chemical for management of sugarcane rust.

Experimental Details

Design: R.B.D.

Replications: Four

Plot size: 6.0 x 6.0 m (5 Rows of 6 m) **Fertilizer dose:** 250:115:115 Kg N, P₂O₅ & K₂O/ ha

Season: *Suru* 2013-14

Date of Planting: 28/01/2014

Variety: Co VSI 9805

Treatment details:

Treat. No.	Fungicide a.i.	Trade name	Spray conc. (%)
T ₁	Chlorothalonil	Kavach 75 WP	0.25
T ₂	Propineb	Antracol	0.20
T ₃	Triadimefon	Bayleton 25 WP	0.10
T ₄	Mancozeb	Indofil M-45 75 WP	0.30
T ₅	Water sprayed control		

Spray Schedule: 1) 22/08/2013 (Immediately after disease appearance)
2) 03/09/2013
3) 19/09/2013
4) 04/10/2013

Results: The results on intensity of rust disease, cane yield and quality parameters as influenced by different treatments are presented in Table 3. The results on germination percentage at 45 DAP were not significant. The germination in different treatments ranged from 52.50 to 61.75 %. All the fungicides had a significant influence on the rust intensity, cane yield and CCS yield. Among the treatments, Mancozeb 0.3 % recorded the lowest rust intensity of 11.25 % and the highest per cent disease control of 81.0 %, cane yield of 100.56 t/ha, CCS % of 14.38 %, CCS yield of 14.46 t/ha and the sucrose content of 19.92 %. It was followed by Chlorothalonil 0.25 % which recorded the rust intensity of 15.50 % and the per cent disease control of 73.8 %, cane yield of 97.92 t/ha, CCS % of 14.23 %, CCS yield of 13.94 t/ha and the sucrose content of 19.93 %.

Table 3. Effect of different fungicides on intensity of rust disease, cane yield and quality parameters

Treatments		Conc.	Germ. % at 45 DAP*	PDI*	PDC	Cane yield (t/ha)	CCS %	CCS yield (t/ha)	Brix	Purity %	Sucrose %
T ₁	Chlorothalonil	0.25 %	52.50 (46.67)	15.50 (23.15)	73.8	97.92	14.23	13.94	21.00	94.89	19.93
T ₂	Propineb	0.20 %	61.75 (52.21)	17.25 (24.50)	70.9	95.97	14.23	13.65	20.88	95.28	19.89
T ₃	Tridemefon	0.10 %	53.25 (46.85)	22.25 (28.12)	62.4	95.83	14.20	13.60	20.25	97.24	19.68
T ₄	Mancozeb	0.30 %	55.25 (48.00)	11.25 (19.47)	81.0	100.56	14.38	14.46	20.50	97.19	19.92
T ₅	Water sprayed control	--	61.50 (51.96)	59.25 (50.32)	--	85.76	14.08	12.08	20.63	95.43	19.68
SE±			2.61	1.00		3.02	0.13	0.41	0.26	1.16	0.13
CD at 5 %			NS	3.08		9.29	NS	1.28	NS	NS	NS
C.V. %			10.63	6.88		6.34	1.82	6.13	2.53	2.42	1.32

* Figures in parentheses are the arc-sines to which the statistical analysis pertains.

Expt. PP-28B: Methodology for screening sugarcane genotypes for resistance to brown rust (*Puccinia melanocephala*)

Objective: To standardize methodology for inoculation of urediniospores of sugarcane brown rust and rating of resistance.

Year of Start: *Suru* 2013-14

Date of Planting: 08/01/2013

Date of first disease appearance: 19/08/2013

Date of Inoculation: 20/08/2013

Inoculation Methodology:

1) Clip Inoculation in Leaf Whorl:

As soon as brown rust appeared in the field, rust affected leaves were selected and leaf bits (clips) measuring 8-10 cm were prepared. Ten rust free plants of same susceptible variety were selected in different location. In 3 shoots of each plant (clump), 2-3 clips were inserted in the leaf whorl of each shoot.

2) Leaf Whorl Inoculation:

As soon as brown rust appeared in the field, rust affected leaves were selected. Suspension of urediniospores (10^4 - 10^5 spores/ml) was prepared in sterilized distilled water and 1 ml freshly prepared suspension was poured in each leaf whorl. A total of 10 clumps were inoculated @ 3 shoots per clump.

The inoculated plants were marked by cutting 1/3rd of the tips of the uppermost leaves to identify them for recording observations.

Observations: After 4 weeks, following observations were recorded.

- i) Average no. of rust pustules per square inch and
- ii) No. of leaves bearing rust pustules

Results: The results are presented in Table 4. It is evident from the results that in the leaf whorl inoculation method, higher average no. of rust pustules (10.46 per sq. inch) and higher no. of leaves bearing rust pustules (7.7) was recorded as compared to the clip inoculation method (08.33 per sq. inch and 7.6 respectively). This indicates that the leaf whorl inoculation method is better for screening than the clip inoculation method.

Table 4. Evaluation of inoculation methods for screening sugarcane genotypes against brown rust

Sr. No.	Inoculation Methodology	Average no. of rust pustules/inch²	No. of leaves bearing rust pustules
1.	Clip Inoculation in Leaf Whorl	8.33	7.6
2.	Leaf Whorl Inoculation	10.46	7.7

PART-II: TECHNICAL PROGRAMME FOR THE YEAR 2014 -2015

- PP 17B** Evaluation of Zonal varieties / genotypes for resistance to smut.
- PP 17D** Evaluation of Zonal varieties / genotypes for resistance to YLD.
- PP 22** Survey of sugarcane disease naturally occurring in the area on important sugarcane varieties.
- PP 28A** Management of rust of sugarcane.
- PP 28B** Methodology for screening sugarcane genotypes for resistance to brown rust (*Puccinia melanocephala*)