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SUGARCANE-PLANT PATHOLOGY

ALL INDIA COORDINATED RESEARCH PROJECT ON SUGARCANE

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Annual Report of AICRP on Sugarcane Plant Pathology
For 2015- 2016

PP.17 (b): **Evaluation of zonal varieties/genotypes for their resistance against smut disease**

Objectives: To evaluate the entries of zonal varieties, AVT-I (E), AVT –II (E), AVT-I (ML) and AVT-II (ML) for their resistance to smut.

Plot size: Three meter long row planted with 10,three-bud setts with 2 replications.

Location: Zonal Agriculture Research Station, Powarkheda

Entries: All available entries (early and mid-late)

Inoculum: Freshlycollected*Ustilagoscitaminea*teliospores.

Inoculation: The method of inoculation consists of steeping of setts for 30 minutes in a spore suspension of over 90 % viability and with a spore load of one million spores per ml.

Observation: Incidence of smut was recorded as below:

0.0%	:	Resistant (R)
More than 0.0 to 10%	:	Moderately Resistant (MR)
More than 10 to 20%	:	Moderately Susceptible (MS)
More than 20 to 30%	:	Susceptible (S)
More than 30 %	:	Highly Susceptible (HS)

Standards: Variety Co.7219 was used as check

Date of Planting: 27/02/2015

Year of Reporting: 2015 - 2016

Result:A total of twenty two Advance Varietal Trial genotypes (eleven in each group early and mid late) and twenty seven Initial Varietal Trial genotypes (early -13 & mid late -14) along with one check namely Co 7219 were evaluated for their reaction against smut disease of sugarcane. The per cent incidence of smut on different genotypes and their resistance reaction was presented in table 1, 2, 3 and 4. Among AVT – II (early), two genotypes (Co 09007 &CoN 09072) were found to be moderately resistant whereas in the AVT – I (Early) one genotypes namely CoT 10366 and five genotypes i.e. Co 10004, Co 10024, Co 10026, Co 10027 andCoT 10367 were found to be resistant and moderately resistant to smut disease of sugarcane, respectively. Among AVT – I (mid late), three genotypes namely CoT 10368, CoT 10369 and CoVC 10061 were found to be resistant whereas five genotypes i.e. Co 09009, Co 10031, CoM 10083, PI 10131 and PI 10132 exhibited moderately resistant reaction to smut disease. In IVT (early), seven genotypes namely Co 11004, Co 11016, Co

11017, Co 11018, CoM 11081, CoT 11366 and PI 11131 were found to be resistant while remaining genotypes showed moderately resistant to susceptible reaction. Among IVT(Mid late), six genotypes namely Co 11005, Co 11007, Co 11012, Co 11020, Co 11021 and Co 11023 were found to be resistant and remaining genotypes exhibited moderately resistant to moderately susceptible reaction to smut disease of sugarcane. Standard check (Co.7219) exhibited susceptible reaction with the incidence of 22.8 per cent whereassmut incidence ranged between 0.0 to 24.6 per cent in different genotypes.

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PP 17 D: Evaluation of zonal varieties/genotypes for their resistance against Yellow leaf disease (YLD).

Objectives: To evaluate AVT and IVT entries for their resistance to Yellow leaf disease.

Location: Zonal Agriculture Research Station, Powarkheda

Entries: All available entries (early and mid-late).

Inoculation: Naturally occurring

Methodology: To assess YLD severity, 0-5 disease severity grades are to be given during maturity stages of the crop (3 observations by 8^{th}, 10^{th} and 12^{th}months). Each time, minimum of 25 canes (free from other biotic stresses) are to be scored. 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.

Observation: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

Year of Reporting: 2015 - 2016

Result:A total twenty two AVT genotypes(early -11 andmid late -11) were observed for their resistance to yellow leaf disease (YLD) of sugarcane. YLD severity on different entries were recorded and presented in table 5 and 6. In the early group, seven genotypes i.e. Co 09004, Co 10005, Co 10006, Co 10024, Co 10027, CoT 10366 and CoT 10367exhibited resistantreaction to YLD whereasremaining were found to be moderately resistant to moderately susceptible. In the mid late group, nine genotypes i.e. Co 09009, Co 10015, Co

10017, Co 10031, Co 10033, CoM 10083, CoT 10368, CoVC 10061 and PI 10132 were exhibited resistant reaction to YLD whereas remaining two entries were found to be moderately resistant.

PP.22: Survey of sugarcane diseases naturally occurring in this area on the important Sugarcane varieties.

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

Location: Zonal Agriculture Research Station, Powarkheda.

Year of Reporting: 2015-2016

Observations:

Survey of different sugarcane growing areas were undertaken to record the incidence of major diseases like red rot, wilt, smut, GSD, YLDS and Pokkahboeng. Diseases recorded along with area, variety and per cent incidence are given in Table7.

1. **Red rot:** Red rotwas recorded on CoS 88230 near Kareli sugarcane factory and the incidence was 2.0-3.0 percent.
2. **Smut:**It was observed from all the locations i.e. Hoshangabad,Bankhedi, Kareli, Gadarwara, Amla and Betulsugarcane growing area. Mainly, the disease was recorded on Co 86032, Co 99004, Co 7219, Co 94012, Co 80-14, Co J64, Co 0238, Co C 671 and Co 62175.The highest incidence was noticed on Co J 64 up to 11.0 per cent.
3. **Wilt:**It was observed fromKareli, Gadarwara and Bankhedisugarcane growing area. The fields ofCo 94012 and Co J 64 were found to be affected and incidence was recorded up to 25.0 per cent.
4. **Grassy Shoot Disease:**It was observed from Hoshangabad, Kareli and Bankhedi sugarcane growing area. Mainly, GSD was recorded on Co 86032 and Co J 64 with the incidenceof up to 5.0 per cent.
5. **Yellow Leaf Disease Syndrome:**It was observed in very low or in traces from Hoshanngabad and Karelilocations. However, the incidence was recorded up to 10.0 per cent on CoVSI 434.
6. **PokkahBoeng:**It was observed from Hoshangabad, Kareli and Bankhedi sugarcane growing area. The incidence was very low or in traces and ranged between 0.0-5.0 per cent on

Table 1. Reaction of different sugarcane Advance Varietal Trial (early) genotypeagainst smut disease

S.N.	Group	Genotype/ Variety	Per cent Incidence	Grade
1	AVT- (E) II	Co 09004	12.6	MS
2	AVT- (E) II	Co 09007	2.0	MR
3	AVT- (E) II	CoN 09072	5.6	MR
4	AVT-(E) I	Co 10004	1.8	MR
5	AVT-(E) I	Co 10005	11.9	MS
6	AVT-(E) I	Co 10006	13.3	MS
7	AVT-(E) I	Co 10024	6.4	MR
8	AVT-(E) I	Co 10026	7.5	MR
9	AVT-(E) I	Co 10027	1.7	MR
10	AVT-(E) I	CoT 10366	0.0	R
11	AVT-(E) I	CoT 10367	4.6	MR
12	Check	Co 7219	22.8	S

Table 2. Reaction of different sugarcane Advance Varietal Trial (mid late) genotype against smut disease

S.N.	Group	Genotype/ Variety	Per cent Incidence	Grade
1	AVT- (M) I	Co 09009	2.2	MR
2	AVT- (M) I	Co 10015	21.2	S
3	AVT- (M) I	Co 10017	18.5	MS
4	AVT- (M) I	Co 10031	6.7	MR
5	AVT- (M) I	Co 10033	11.5	MS
6	AVT- (M) I	CoM 10083	6.5	MR
7	AVT- (M) I	CoT 10368	0.0	R
8	AVT- (M) I	CoT 10369	0.0	R
9	AVT- (M) I	CoVC 10061	0.0	R
10	AVT- (M) I	PI 10131	1.6	MR
11	AVT- (M) I	PI 10132	3.5	MR
12	Check	Co 7219	22.8	S

Table 3.Reaction of different sugarcane Initial Varietal Trial (Early)genotype against smut disease

S.N.	Group	Genotype/ Variety	Per cent Incidence	Grade
1	IVT-(E)	Co 11001	5.6	MR
2	IVT-(E)	Co 11004	0.0	R
3	IVT-(E)	Co 11016	0.0	R
4	IVT-(E)	Co 11017	0.0	R
5	IVT-(E)	Co 11018	0.0	R
6	IVT-(E)	CoM 11081	0.0	R
7	IVT-(E)	CoM 11082	11.8	MS
8	IVT-(E)	CoM 11083	24.6	S
9	IVT-(E)	CoM 11084	8.4	MR
10	IVT-(E)	CoN 11071	2.3	MR
11	IVT-(E)	CoN 11072	2.8	MR
12	IVT-(E)	CoT 11366	0.0	R
13	IVT-(E)	PI 11131	0.0	R
14	Check	Co 7219	22.8	S

Table 4.Reaction of different sugarcane Initial Varietal Trial (Midlate)genotype against smut disease

S.N.	Group	Genotype/ Variety	Per cent Incidence	Grade
1	IVT-(M)	Co 11005	0.0	R
2	IVT-(M)	Co 11007	0.0	R
3	IVT-(M)	Co 11012	0.0	R
4	IVT-(M)	Co 11019	2.5	MR
5	IVT-(M)	Co 11020	0.0	R
6	IVT-(M)	Co 11021	0.0	R
7	IVT-(M)	Co 11022	6.9	MR
8	IVT-(M)	Co 11023	0.0	R
9	IVT-(M)	Co 11024	6.5	MR
10	IVT-(M)	CoM 11085	5.4	MR
11	IVT-(M)	CoM 11086	3.8	MR
12	IVT-(M)	CoM 11087	12.5	MS
13	IVT-(M)	CoN 11073	4.5	MR
14	IVT-(M)	CoN 11074	6.4	MR
15	Check	Co 7219	22.8	S

Table 5. Reaction of different sugarcane Advance Varietal Trial (Early) genotype against yellow leaf diseases (YLD)

S.N.	Group	Genotype/ Variety	Score	Disease reaction
1	AVT- (E) II	Co 09004	0.0	R
2	AVT- (E) II	Co 09007	1.1	MR
3	AVT- (E) II	CoN 09072	2.1	MS
4	AVT-(E) I	Co 10004	1.3	MR
5	AVT-(E) I	Co 10005	0.0	R
6	AVT-(E) I	Co 10006	0.0	R
7	AVT-(E) I	Co 10024	0.6	R
8	AVT-(E) I	Co 10026	1.2	MR
9	AVT-(E) I	Co 10027	0.0	R
10	AVT-(E) I	CoT 10366	0.0	R
11	AVT-(E) I	CoT 10367	0.0	R

Table 6.Reaction of different sugarcane Advance Varietal Trial (Mid late) genotype against yellow leaf diseases (YLD)

S.N.	Group	Genotype/ Variety	Score	Disease reaction
1	AVT- (M) I	Co 09009	0.0	R
2	AVT- (M) I	Co 10015	0.0	R
3	AVT- (M) I	Co 10017	0.0	R
4	AVT- (M) I	Co 10031	0.0	R
5	AVT- (M) I	Co 10033	0.0	R
6	AVT- (M) I	CoM 10083	0.0	R
7	AVT- (M) I	CoT 10368	0.0	R
8	AVT- (M) I	CoT 10369	1.8	MR
9	AVT- (M) I	CoVC 10061	0.0	R
10	AVT- (M) I	PI 10131	1.5	MR
11	AVT- (M) I	PI 10132	0.0	R

Table 7.Incidence of naturally occurring diseases on sugarcane

S.N.	Disease	Name of area/ location	Per cent Disease Incidence	Varieties	Stage of Crop(month)	Any other information
1	Red rot	Kareli	2-3	CoS 88230	8-9	
2	Smut	Hoshangabad	2-3 1-4 7-10	Co 86032 Co 99004 Co 7219	5-6 & 8–9 month	
		Kareli&Gadarwara	5-9 6-10 4-11	Co 94012 Co 80-14 Co J 64		
		Bankhedi	2-4 4-7 3-4	Co 86032 Co J 64 Co 0238		
		Amla/Betul	1-2 3-5 2-4	Co C 671 Co 86032 Co 62175		
3	Wilt	Kareli&Gadarwara	10-25	Co 94012	8–9 month	
		Bankhedi	0-15	Co J 64		
4	GSD	Hoshangabad	1-3 1-2	Co 86032 Co C 671	7–8 month	
		Bankhedi	1-5	Co 86032		
		Kareli	2-3 3-5	Co 86032 Co J 64		
5	YLDS	Hoshangabad	0-4 traces	Co 99004 Co 86032	8–9 month	
		Kareli	0-10 0-3 traces	CoVSI 434 CoS 88230 Co 86032		
6	Pokkah Boeng	Hoshangabad	traces 0-5 0-3 traces	Co 86032 Co 99004 Co C 671 Co 85004	7–8 month	
		Kareli	0-3 0-3	Co M 265 CoS 88230		
		Bankhedi	0-5 traces	Co 0238 Co 86032		