

ANNUAL REPORT OF AICRP

THE EXPERIMENTS CONDUCTED UNDER AICRP ON SUGARCANE PATHOLOGY GENDA SINGH SUGARCANE BREEDING AND RESEARCH INSTITUTE, SEORAHI, KUSHINAGAR, U.P. DURING- 2015 - 2016

PP- 14 Identification of pathotypes of red rot pathogen.

Objective: To gather information on the major pathotypes of red rot from different areas/zones.

Location: North Central Zone, G.S.S.B.R.I., Seorahi, Kushinagar, U.P.

Year of start: 1989-90(Continuing project)

Differentials/Varieties/genotypes:

01-Co 419	02- Co 975	03- Co 997	04-Co 1148
05- Co 7717	06- Co 62399	07-CoC 671	08-CoJ 64
09-CoS 767	10-CoS 8436	11-BO 91	12-Baragua
13-Khakai	14-SES 594	15-CoSe 95422	16-CoSe 92423

No. of isolates: Virulant isolates collected from red rot affected canes of commercially cultivated varieties in zones.

Date of inoculation: 22/24-08-2015

Method of inoculation:

Plug method of inoculation was used (details vide PP-17). Inoculation with four pathotypes and three new isolates. Each new isolates and pathotypes were done on all the differentials with the same spore suspension. All inoculations were completed in 2 days by the last week of August 2015. 30 canes of each of 17 differentials were inoculated with each of the above cited isolates of the red rot fungus individually. Observations to the extent of disease development were recorded after 60 days of inoculations. The canes were splited open longitudinally 60 days after inoculation along the point of inoculation. Inoculated canes free from borer infestation and other changes were taken for evaluation. Based on the parameters, viz. Nodal transgression, lesion width, white spots, condition of top, green/ yellow/dry, rind infestation and sporulation over the rind, the host reaction is categorized into three groups, viz. (R) Resistant, (S) Susceptible, (I) Intermediate as follows:

Resistant(R): Lesion width laterally restricted, nodal transgression up to 2 nodes; white spots; rind infection, sporulation over the rind and yellow/dry of top absent.

Susceptible (S): Lesion width laterally spreading, Nodal transgression more than 2 nodes; white spots progressive or restricted; in case of progressive white spots, rind infection, sporulation over the rind and yellow/dry of top absent or present.

Intermediate(I): Lesion width laterally restricted or spreading, nodal transgression more than 2 nodes; white spots absent or present (restricted type); rind infection, sporulation over the rind and yellow/ drying of tops absent.

RESULTS

The final data recorded 60 days after inoculation were presented in table 1. At Seorahi, 4 pathotypes viz. CF 07, CF 08, CF 09 and CF 11 along with 3 isolates, isolate-1 (isolated from CoLk 8102) isolate-2 (isolated from CoSe 98231) and isolate-3 (isolated from CoSe 92423) were inoculated on 16 differentials, viz. Co 419, Co 975, Co 997, Co 1148, Co 7717, Co 62399, CoC 671, CoJ 64, CoS 767, CoS 8436, BO 91, Baragua, Khakai , SES 594, CoSe 95422 and

CoSe 92423, by plug method of inoculation with 7 days old culture of red rot pathogen. The reaction of isolate-1 was found similar reaction to CF 07 and CF08. Isolate-3 was found to similar reaction with CF09 and isolate-2 were found to similar reaction with CF 11 on all the differentials, whereas isolate-2 recorded susceptible reaction over 7 differentials, isolate-1 recorded susceptible reaction over 04 differentials and isolate-3 recorded susceptible reaction over 07 differentials. Therefore, isolate-2 and isolate-3 (CoSe 98231 and CoSe 92423) proved to be more virulent than isolate-1 (CoLk8102) in the (Table-1).

PP 17(a): Evaluation of I.V.T./A.V.T./Zonal varieties for resistance to red rot.

Objective: To gather information on the relative resistance to red rot of the entries in zonal varietal trials of the respective zones.

Location: North Central Zone, Seorahi.

Year of commencement: 1989-90 (Continuing project).

1-Initial Varietal Trial (Early) varieties:

Entries (5): CoLk12207, CoLk12208, CoP12436, CoP12437 and CoSe12451

Standard (2): BO130 and CoSe95422

2-Advanced Varietal Trial (Early) I Plant

Entries (4):CoP11436, CoP11437, CoP11438 and CoSe11451

Standard (2): BO130 and CoSe95422

3-Initial Varietal Trial (Mid-late)

Entries (6): CoLk09204, CoLk12209, CoP12438, CoP12439, CoSe12452 and CoSe12453

Standard (3): BO91, CoP9301 and CoSe92423

4- Advanced Varietal Trial (Mid-late) I Plant:

Entries (7): BO155, CoP11439, CoP11440, CoSe11453, CoSe11454, CoSe 11455 and CoSe11456

Standard (3): BO91, CoP9301 and CoSe92423

5- Advanced Varietal Trial (Mid-late) II Plant:

Enteries (3): CoSe10451, CoSe10452 and CoSe10453

Standard (3): BO91, CoP9301 and CoSe92423

RESULTS

At Genda Singh Sugarcane Breeding and Research Institute, Seorahi- Kushinagar; all the varieties including checks of different trials were evaluated by Plug, Nodal and Cotton swab methods of inoculation using pathotypes; viz. CF 07 and CF 08 separately and mixed inoculums of CF 07 and CF 08 pathotypes for Initial varietal trial (Early), Advanced varietal trial (Early) II Plant, Initial varietal trial (Mid- late), Advanced Varietal trial (Mid-late) I Plant and Advanced Varietal trial (Mid-late) II Plant. The inoculation was done in 2nd week of July 2015 by Nodal /Cotton swab method and in the last week of August by Plug method.

PLUG METHOD

Alone inoculum (CF07 and CF08) reaction:

Initial Varietal Trial (Early): 5 varieties were evaluated against red rot, none behaved as resistant viz. CoLk 12207, CoLk 12208, CoP 12436, CoP 12437 and CoSe 12451 were rated as moderately resistant to red rot disease.

Advanced Varietal Trial (Early) I Plant: 4 varieties were evaluated against red rot, none behaved as resistant, 4 varieties, *viz.* CoP 11436, CoP 11437, CoP 11438 and CoSe 11451 were rated as moderately resistant to red rot disease.

Initial Varietal Trial (Mid-late): 6 varieties were evaluated against red rot, none behaved as resistant, CoLk 09204, CoLk 12209, CoP 12438, CoP 12439, CoSe 12452 and CoSe 12453 were rated as moderately resistant to red rot disease.

Advanced Varietal Trial (Mid-late) I Pant: 7 varieties were evaluated against red rot, none behaved as resistant, 7 varieties, *viz.* BO155, CoP 11439, CoP 11440, CoSe 11453, CoSe 11454, CoSe 11455 and CoSe 11456 were rated as moderately resistant to red rot disease.

Advanced Varietal Trial (Mid-late) II Plant: 3 varieties were evaluated against red rot, none behaved as resistant *viz.* CoSe 10451, CoSe 10452 and CoSe 10453 were rated as moderately resistant to red rot disease.

SUMMARY

The disease reaction of red rot two pathotypes Cf07 and Cf08 on 25 varieties under AVT (Early and midlate), IVT (Early and Midlate) were found resemble reaction of both inoculums by plug and nodal method in the (Table-2).

Mixed inoculum (CF07 and CF08) reaction:

Initial Varietal Trial (Early): 5 varieties were evaluated against red rot disease, 4 varieties *viz.* CoLk 12207, CoLk 12208, CoP 12437 and CoSe 12451 were rated as moderately resistant to red rot, while one variety CoP 12436 was rated as moderately susceptible to red rot disease.

Advanced Varietal Trial (Early) I Plant: 4 varieties were evaluated against red rot, 02 varieties CoP 11436 and CoP 11437 were rated as moderately susceptible, while two varieties CoP 11438 and CoSe 11451 were rated as highly susceptible to red rot disease.

Initial Varietal Trial (Mid-late): 6 varieties were evaluated against red rot disease, 5 varieties *viz.* CoLk 09204, CoLk 12209, CoP 12439, CoSe 12452 and CoSe 12453 were rated as moderately resistant to red rot while one variety CoP 12438 was rated as moderately susceptible to red rot disease.

Advanced Varietal Trial (Mid-late) I Pant: 7 varieties were evaluated against red rot disease, 5 varieties *viz.* BO155, CoP 11439, CoSe 11453, CoSe 11455 and CoSe 11456 were rated as moderately resistant, 01 variety CoP 11440 was rated as moderately susceptible, while one variety CoSe 11454 was rated as susceptible to red rot disease.

Advanced Varietal Trial (Mid-late) II Plant: 3 varieties were evaluated against red rot disease, 01 variety CoSe 10451 was rated as moderately resistant, while two varieties CoSe 10452 and CoSe 10453 were rated as susceptible to red rot disease.

SUMMARY

By plug method (Table-2) out of 25 varieties which were evaluated, 15 varieties were found moderately resistant, 05 varieties moderately susceptible, 03 varieties were rated susceptible and 02 varieties were rated as highly susceptible to red rot disease.

NODAL METHOD

Mixed inoculum (CF07 and CF08) reaction by nodal method:

Initial Varietal Trial (Early): 5 varieties were evaluated against red rot disease, 4 varieties *viz.* CoLk 12207, CoLk 12208, CoP 12437 and CoSe 12451 were rated as resistant to red rot, while one variety CoP 12436 was rated as moderately resistant to red rot.

Advanced Varietal Trial (Early) I Plant: 4 varieties were evaluated against red rot disease, two varieties CoP 11436 and CoP 11437 were rated as moderately resistant, while two varieties CoP 11438 and CoSe 11451 were rated as susceptible to red rot disease.

Initial Varietal Trial (Mid-late): 6 varieties were evaluated against red rot disease, 5 varieties viz. CoLk 09204, CoLk 12209, CoP 12439, CoSe 12452 and CoSe 12453 were rated as resistant to red rot, while one variety CoP 12438 was rated as moderately resistant to red rot disease.

Advanced Varietal Trial (Mid-late) I Plant: 7 varieties were evaluated against red rot, 5 varieties viz. BO155, CoP 11439, CoSe 11453, CoSe 11455 and CoSe 11456 were rated as resistant to red rot, 01 variety CoP 11440 was rated as moderately resistant, while one variety CoSe 11454 was rated as moderately susceptible to red rot.

Advanced Varietal Trial (Mid-late) II Plant: 3 varieties were evaluated against red rot disease, 01 variety CoSe 10451 was rated as resistant, while 02 varieties CoSe 10452 and CoSe 10453 were rated as moderately susceptible to red rot disease.

SUMMARY

By nodal method (Table-2) out of 25 varieties which were evaluated, 15 varieties were rated as resistant, 05 varieties moderately resistant, 03 varieties moderately susceptible and 02 varieties were founded susceptible to red rot disease.

COTTON SWAB METHOD

Results recorded by the cotton swab method were the same as the results recorded by the Nodal method of inoculation.

P 17 (b): Evaluation of pre-zonal/zonal varieties/genotypes for resistance to smut.

Objective: To gather information on the relative resistance to smut of the entries in pre-zonal/zonal trials of the respective zones.

Location: North Central zone, Seorahi, Kushinagar, U.P.

Year of commencement: 1997-98

Variety: As per PP 17

Method: The method of inoculation consists of steeping of sets (three budded) for 30 minutes in spore suspensions of over 90 per cent viability with a spore load of one million spores per milliliter. The data were presented in (Table 3).

Date of Planting: 24-02-2015

Date of inoculation: 24-02-2014

RESULTS

Initial Varietal Trial (Early): 5 varieties were evaluated against smut disease, 2 varieties viz. CoLk 12207 and CoP 12437 were rated as resistant, 01 variety CoSe 12451 was rated as moderately resistant, 01 variety CoP 12436 was rated as susceptible, while one variety CoLk 12208 was rated as highly susceptible to smut disease.

Advanced Varietal Trial (Early) I Plant: 4 varieties were evaluated against smut, 02 varieties viz. CoP 11437 and CoSe 11451 were rated as moderately susceptible, while 02 varieties CoP 11438 and CoP 11436 were rated as highly susceptible to smut.

Initial Varietal Trial (Mid-late): 6 varieties were evaluated against smut disease, all varieties *viz.* CoLk 09204, CoLk 12209, CoP 12438, CoP 12439, CoSe 12452 and CoSe 12453 were rated as resistant to smut disease.

Advanced Varietal Trial (Mid-late) I Pant: 7 varieties were evaluated against smut disease, all varieties *viz.* BO155, CoP 11439, CoP 11440, CoSe 11453, CoSe 11454, CoSe 11455 and CoSe 11456 were rated as resistant to smut.

Advanced Varietal Trial (Mid-late) II Plant: 3 varieties were evaluated against smut disease, 02 varieties CoSe 10451 and CoSe 10452 were rated as resistant, while 01 variety CoSe 10453 was rated as moderately resistant to smut.

SUMMARY

Out of 25 varieties which were evaluated against smut disease, 17 varieties were rated as resistant, 02 varieties were rated as moderately resistant, 02 varieties were rated as moderately susceptible, 01 variety was rated as susceptible and 03 varieties were found highly susceptible to smut (Table -2).

PP 22: Survey of sugarcane diseases naturally occurring in the area on varieties for compiling an All India Disease status report yearly.

Location: North Central Zone, Seorahi, Kushinagar, U.P.

Year of commencement: 1989-90

Observation: Periodic observation in June, September and December in all locations, to gather information on the incidence of diseases in all the varieties of the area (General survey).

Disease situation during the current year:

Survey was conducted to adjudge the performance of approved and promising varieties of sugarcane against diseases. During the course of survey during the year 2015-2016, cultivar CoSe 92423, CoSe 98231, Co 0238 and UP 05125 were found affected with smut (1 - 5%), particularly in ratoon crops in the Kushinagar, Deoria, Basti and Maharajganj districts. The incidence of GSD (1 - 6%) was also recorded in the Kushinagar and Basti districts on cultivars, Co 0238 and CoS 08279. The pokkah boeng disease (1-5%) was also recorded on Co 0238 and CoS 08279 in the Kushinagar, Bast and Balarampur districts.

NORTH CENTRAL ZONE

SEORAH- 2015-2016

Table -1: Pathogenic behavior of isolates of *C. falcatum* on a set of differentials.

SL. No.	Pathotype /isolates	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	Khakai	SES 594	CoSe 95422	CoSe 92423
1	CF 07	CoJ 64	I	S	I	S	I	I	I	I	S	I	I	S	I	R	I	I
2	CF 08	CoJ 64	I	S	I	S	I	I	I	R	S	I	I	S	I	R	S	I
3	CF 09	CoS 767	S	I	S	S	I	I	I	S	I	I	I	S	I	R	S	S
4	CF 11	CoJ 64	I	S	I	S	S	I	S	I	I	S	R	I	S	R	I	S
5	Isolate-1	CoLk 8102	I	S	I	S	I	I	I	R	S	I	I	S	I	R	I	I
6	Isolate-2	CoSe 98231	I	S	I	S	S	I	S	I	I	S	R	I	S	R	I	S
7	Isolate-3	CoSe 92423	S	I	S	S	I	I	I	S	I	I	I	S	I	R	S	S

Table-2 Reaction of red rot and smut against the entries of different experiments of PP 17 under AICRP(S) 2015-16

S.N.	Variety	Disease Reaction								Cotton Swab	Smut Reaction
		CF 07		CF 08		Mixed Inoculums					
		Plug	Nodal	Plug	Nodal	Plug	Nodal				
Initial Varietal Trial (Early)											
1	CoLk 12207	MR	R	MR	R	MR	R	R	R	R	
2	CoLk 12208	MR	R	MR	R	MR	R	R	R	HS	
3	CoP 12436	MR	R	MR	R	MS	MR	MR	MR	S	
4	CoP 12437	MR	R	MR	R	MR	R	R	R	R	
5	CoSe 12451	MR	R	MR	R	MR	R	R	R	MR	
Advance Varietal Trial (Early) I Plant											
1	CoP 11436	MR	R	MR	R	MS	MR	MR	MR	HS	
2	CoP 11437	MR	R	MR	R	MS	MR	MR	MR	MS	
3	CoP 11438	MR	R	MR	R	HS	S	S	S	HS	
4	CoSe 11451	MR	R	MR	R	HS	S	S	S	MS	
Initial Varietal Trial (Mid-late) I Plant											
1	CoLk 09204	MR	R	MR	R	MR	R	R	R	R	
2	CoLk 12209	MR	R	MR	R	MR	R	R	R	R	
3	CoP 12438	MR	R	MR	R	MS	MR	MR	MR	R	

4	CoP 12439	MR	R	MR	R	MR	R	R	R
5	CoSe 12452	MR	R	MR	R	MR	R	R	R
6	CoSe 12453	MR	R	MR	R	MR	R	R	R
Advance Varietal Trial (Mid-late) I Plant									
1	BO 155	MR	R	MR	R	MR	R	R	R
2	CoP 11439	MR	R	MR	R	MR	R	R	R
3	CoP 11440	MR	R	MR	R	MS	MR	MR	R
4	CoSe 11453	MR	R	MR	R	MR	R	R	R
5	CoSe 11454	MR	R	MR	R	S	MS	MS	R
6	CoSe 11455	MR	R	MR	R	MR	R	R	R
7	CoSe 11456	MR	R	MR	R	MR	R	R	R
Advance Varietal Trial (Mid-late) II Plant									
1	CoSe 10451	MR	R	MR	R	MR	R	R	R
2	CoSe 10452	MR	R	MR	R	S	MS	MS	R
3	CoSe 10453	MR	R	MR	R	S	MS	MS	MR

Table 3: Survey of sugarcane diseases naturally occurring in the area on important sugarcane varieties.

Incidence of sugarcane diseases in Eastern (U.P.) during 2015-2016

Disease	Affected Varieties	Area	Percent incidence
Red rot	-----	-----	-----
Wilt	-----	-----	-----
Smut	CoSe 92423, CoSe 98231, Co 0238 and UP 05125	Kushinagar, Deoria Basti and Balarampur	01 - 05
G.S.D.	Co 0238, CoSe 92423, CoS 08279 and CoSe 01434	Kushinagar, Basti, Balarampur and Maharajanj	1.0-6.0
Pokkah Boeng	Co 0238 and CoS 08279	Kushinagar, Basti and Balarampur	01 - 05