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Sugarcane Pathology

No. CA/PLP/...272.....
Dated.....30.05.2012.....

To,
Dr. R. Viswanathan
Head, Division of Crop Protection &
Principal Investigator
Plant Pathology (AICRP on Sugarcane)
Sugarcane Breeding Institute (ICAR)
Coimbtore-641007 (TN)

Reference: 1. Letter F.No.1-42/2011-12/SBI/CPTN dard May 5, 2012 from Dr. R. Viswanathan
SBI, Coimbtore
2. Letter F.No.17-33/2012-PCS dated May 7, 2012 from Dr. O.K.Sinha IISR, Lucknow

Sub: Annual Report of AICRP on Sugarcane (Plant Pathology) for the year 2011-12

Sir

In response to above references on subject concerned I am enclosing herewith the Annual Report of AICRP on Sugarcane (Plant Pathology) for the year 2011-12 for further necessary action at your end.

Yours sincerely,

(R.K.Sahu)

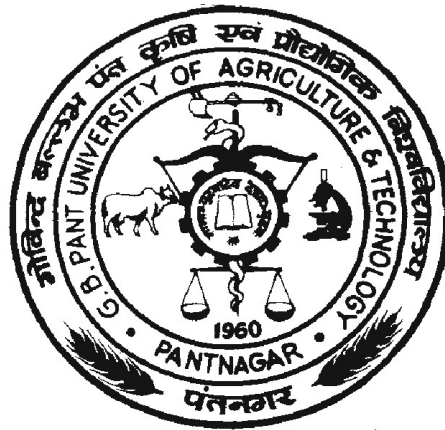
Cc: Dr. O.K.Sinha, Project Coordinator (Sugarcane) IISR, Post Dilkusha, Rai Bareilly Road
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Annual Report

(2011-2012)

AICRP ON SUGARCANE PATHOLOGY



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**Annual Report-2011-2012
AICRP ON SUGARCANE PATHOLOGY**

During 2011 crop season, 33 genotypes and five checks, obtained from Sugarcane breeder, Pantnagar were screened and evaluated for red-rot and smut diseases under natural as well as artificial inoculation condition. These genotypes were planted in one replication in two rows of 6 mt. for red-rot and in two replications with 3.0 mts row for smut evaluation. However, row to row distance of 75 cm was maintained for both the experiments. Planting was done on 02-04-2011 in D-6 block of N.E. Borlogue Crop Research Centre, Pantnagar. All recommended agronomical practices were followed to raise and maintain a good crop stand.

Inoculation:

Artificial inoculations for both the diseases were carried out as per technical programme for **PP-17**. For red rot, two pathotypes of *Colletotrichum falcatum*, **Cf-08** and **Cf-09** were obtained from IISR Lucknow. Pure cultures were grown on oatmeal agar medium and incubated at $28\pm 1^{\circ}\text{C}$. Freshly sporulated 7 days old cultures were taken from petridishes and the spore mass was washed with 100 ml sterilized distilled water and collected in flasks. Conidial suspension at a spore concentration of one million spores (approximately) per ml was prepared and used for artificial inoculations. Artificial inoculations by **nodal method** were carried out on 20th and 21st August, 2011, by **cotton swab method** from 22nd to 24th August and by **plug method** from 25th to 26th August, 2011. First row was inoculated with Cf-08 and second with Cf-09 pathotype. Both rows were divided into two equal halves; the first half was inoculated by nodal method whereas the second half by plug method. Two canes from each clump were selected for inoculation by cotton swab method.

Artificial inoculations for smut were done by steeping three bud sets for 30 minutes in a spore suspension of over 90% viability and a spore load of one million spores per ml just before planting. Smut infected whips, for the purpose, were collected from the field and air dried by keeping under shade and stored in desiccators having anhydrous calcium chloride in the base of desiccators.

Results: PP17

A. Red rot

The observations on disease severity were recorded following 0-9 rating scale after 60 days of inoculations. Ten randomly selected plants of a plot were split open longitudinally along the point of inoculation and rated individually for both pathotypes by observing condition of top, lesion width, presence of white spots and nodal transgression. Data on disease reaction are being presented in table 1. In nodal method out of 33 genotypes 23 genotypes were found resistant and 6 moderately resistant, 1 moderately susceptible, 3 susceptible with Cf-08 pathotype. Where as with Cf-09, 26 genotypes were found resistant, 3 moderately resistant and 1 was moderately susceptible and 3 susceptible. . No genotype was found highly susceptible for both the pathotypes. In plug method, 10 genotypes were found resistant, 15 moderately resistant, 5 moderately susceptible and 3 highly susceptible with Cf-08 pathotype, where as, 11 genotypes were found resistant, 15 moderately resistant, 4 moderately susceptible 1 susceptible and 2 highly susceptible with Cf-09 pathotype. In cotton swab method 18 genotypes were found resistant, 12 moderately resistant and 3 susceptible with Cf-08 pathotype where as 20 resistant, 10 moderately resistant and 3 susceptible genotypes were found with Cf-09 pathotype. No genotype, in cotton swab method, was found moderately susceptible or highly susceptible for both the pathotypes.

Table 1: Performance of sugarcane genotypes against Red-rot (2011-12)

Genotypes	Nodal		Plug		Cotton Swab	
	Cf-08	Cf-09	Cf-08	Cf-09	Cf-08	Cf-09
IVT (Early)						
CoPb-8213	S	S	HS	HS	S	S
CoS-8232	R	R	R	R	R	R
CoPb-8212	R	R	MR	MR	R	R
CoPant-8221	MS	R	MS	MR	MR	MR
CoPb-8211	R	R	MR	MR	MR	MR
CoPant-8222	R	R	R	R	R	R
CoS-8231	R	R	R	R	R	R
IVT (ML)						
CoPb-8217	MR	MR	MR	MR	MR	MR
CoH-8263	S	S	HS	S	S	S
CoS-8234	R	R	R	R	R	R
CoLk-8201	R	R	MR	MR	MR	MR
CoH-8261	S	S	HS	HS	S	S
CoPb-8214	MR	MS	MS	MS	MR	MR
CoH-8264	R	R	MR	R	MR	MR
AVT (Early)						
Co-7023	R	R	MR	MR	MR	MR
CoH-7261	MR	MR	MS	MS	MR	MR
CoLk-7201	R	R	R	R	R	R

Co-7025	R	R	MR	MR	R	R
AVT (ML) I						
CoPb-7213	R	R	R	R	R	R
CoS-7234	R	R	R	R	R	R
CoPb-7212	R	R	R	R	R	R
CoS-7232	MR	R	MR	MR	MR	R
CoH-7263	R	R	MS	MS	MR	R
CoH-7264	R	R	MR	MR	R	R
CoLk-7203	MR	R	MR	MR	R	R
CoLk-7202	MR	R	MR	MR	R	R
AVT (ML) II						
CoPant-6224	R	MR	MR	MR	MR	MR
CoH-6266	R	R	MS	MS	MR	MR
CoPb-6219	R	R	MR	MR	R	R
Co-6034	R	R	R	R	R	R
Co-6033	R	R	R	R	R	R
CoS-6247	R	R	MR	MR	R	R
CoH-6265	R	R	MR	MR	R	R
Checks						
CoJ-64	MR	MR	MS	MS	MR	MR
CoPant-84211	MR	MR	MS	MS	MR	MR
CoS-767	MR	MR	MS	MS	MR	MR
CoS-8436	MR	MR	MS	MS	MR	MR
Co-1148	MR	MR	MS	MS	MR	MR

B. Smut

Incidence of smut was recorded by counting infected clumps per row at fortnightly intervals starting from 45 days after planting. Results are given in table 3. These results reveal that out of 33 genotypes 5 genotypes were found resistant whereas, 3 were found moderately resistant. Remaining 28 genotypes showed various degrees of susceptibility. Among them 9 moderately susceptible, 3 susceptible and 13 genotypes were found highly susceptible. Maximum disease incidence (63.1.0%) was recorded in CoS-6247 followed by CoPb-8217 (59.0%) and Co-6034 (55.0%).

Table 2: Performance of sugarcane genotypes against Smut (2011-12)

Genotypes	Smut (%)	Reaction
IVT (Early)		
CoPb-8213	11.7	MS
CoS-8232	0.0	R
CoPb-8212	43.7	HS
CoPant-8221	0.0	R
CoPb-8211	12.5	MS
CoPant-8222	12.5	MS
CoS-8231	0.0	R
IVT (ML)		

CoPb-8217	59.0	HS
CoH-8263	12.5	MS
CoS-8234	21.4	S
CoLk-8201	50.0	HS
CoH-8261	15.7	MS
CoPb-8214	47.0	HS
CoH-8264	21.4	S
AVT (Early)		
Co-7023	0.0	R
CoH-7261	10.5	MR
CoLk-7201	50.0	HS
Co-7025	44.4	HS
AVT (ML) I		
CoPb-7213	11.1	MS
CoS-7234	54.1	HS
CoPb-7212	0.0	R
CoS-7232	41.6	HS
CoH-7263	45.4	HS
CoH-7264	12.0	MS
CoLk-7203	15.7	MS
CoLk-7202	38.8	HS
AVT (ML) II		
CoPant-6224	18.7	MS
CoH-6266	21.7	S
CoPb-6219	10.0	MR
Co-6034	55.0	HS
Co-6033	10.0	MR
CoS-6247	63.1	HS
CoH-6265	33.3	HS
Checks		
CoJ-64	8.3	MR
CoPant-84211	13.3	MS
CoS-767	35.0	HS
CoS-8436	9.0	MR
Co-1148	22.7	S
Co-7025*	46.6	HS
CoH-7263*	50.0	HS

* = As standard checks for smut for North east zone Co-1158, Co-740, CoLk-9617, Co-1287 and Co-62175 were not available at Pantnagar centre therefore as per telephonic conversation with Project Coordinator, Dr.O.K.Sinha on 01-04-2011 the susceptible germplasm was used as checks in addition to CoJ-64, CoPant-84211, CoS-767, CoS-8436, Co-1148.

R= Resistant (0%)

MR= Moderately Resistant > 0-10%

MS= Moderately Susceptible > 10-20%

S= Susceptible > 20-30%

HS= Highly Susceptible above 30%

PP 22: Survey of naturally occurring sugarcane diseases

Sl.No.	Disease	Name of area surveyed	Disease incidence	Varieties affected	Crop stage when observed
1.	Redrot	Sitarganj, Kiccha, Gadarpur, Kashipur Sugar Mill, area, Distt. U.S.Nagar	Observed in traces	CoJ-85, CoPant-97222, CoS-8436, CoS-8432, CoPant-99214, CoS-767, CoPant-99259 (incidence was more in Co-1148)	At various stages of crop growth (August onwards)
2.	Smut	do	Observed at some places	do	May-July Octo.-January
3.	Wilt	do	scanty	do	September onwards
4.	RSD	do	scanty	do	August onwards
5.	GSD&Albino	do	Scanty to mild	do	August onwards
6.	Foliar disease (ring spots and eye spots)	do	Scanty to mild	do	August onwards
7.	Banded Sclortial Disease	do	mild	do	During rainy season
8.	YLD	do	Scanty, seen in some pockets	do	November onwards

PP 30: Assessment of field resistance in sugarcane to red rot

As per technical programme 11 genotypes including two checks were selected for this trial. The trial was planted in single replication with two rows of 3.0 mts length. One Kg. of partially broken sorghum grain and sand mixture (1:3 ratio) mixed with 100 ml of distilled water. The thoroughly

mixed medium was sterilized at 15 lb pressure for 2 hours and after two days the medium was inoculated with pathogen Cf-08) and kept for 15 days in incubation. The inoculum was applied in furrows and on the setts just before planting. Disease development in each row was recorded by death of settlings, yellowing and drying of leaves, mid-rib lesions in the whorl and production of dead hearts. Presence of *Colletotrichum falcatum* was confirmed by isolating the pathogen from the affected plant.

S.No.	Variety/Genotype	Resistance Level	Symptoms observed	<i>C. falcatum</i> recovered Yes/No	Any other information
1.	CoPb-7213	S	R*	Yes**	
2.	CoJ-64	MS	MS*	Yes	
3.	CoPb-5211	S	S*	Yes	
4.	Co-1148	S	S*	Yes	
5.	CoPk-5192	MS	MS*	Yes	
6.	CoS-7234	S	R*	No	
7.	CoSe-1424	MS	R*	No	
8.	CoS-767	MS	MS*	Yes	
9.	UP-5233	S	MS*	Yes	
10.	CoLk-7201	MS	R*	No	
11.	CoH-7262	S	S*	Yes	

* Evaluation based on SY (65), SM (90), CR (150), LY (160), CD (180)

** *Colletotrichum falcatum* was recovered from one plant, however rest showed no symptoms.