All India Coordinated Research Project on Sugarcane

(Indian Council of Agricultural Research)

TECHNICAL REPORT

PLANT PATHOLOGY

(2019 – 2020)

Compiled by

Dr. R. Viswanathan
Head, Division of Crop Protection
ICAR- Sugarcane Breeding Institute
Principal Investigator
AICRP(S) - Plant Pathology

and

Dr. V. Jayakumar
Dr. R. Selvakumar

ICAR-SUGARCANE BREEDING INSTITUTE

Coimbatore- 641 007

Cover Photos

Front cover: Sugarcane plant exhibiting severe pokkah beong symptoms

Back cover: Red rot scenario in Uttar Pradesh

CONTENTS

Dt. 16.09.2020

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

Summary

About 17 centres participated in the Plant Pathology programme and contributed their progress in 10 projects. Differential host studies to identify variation in red rot were conducted at 12 centres in all the zones with 95 new isolates along with designated pathotypes on the 19 host differentials. More number of variants have been isolated from the popular varieties such as BO 128, Co 89003, Co 0238, CoC 24, CoSe 95422, CoJ 85, CoJ 88, CoLk 94184 and CoS 8436. During this season, deviant behaviour of the new isolates was found especially from North West and North Cental zones and the newly emerged pathotype(s) are capable of knocking down the popular varieties Co 0238, Co 89003, CoS 8436, CoSe 95422 in large areas in the subtropical region. Epidemic occurrence of red rot in the subtropical region is a serious concern and there is a need to tackle the menace through disease-free seed and other disease management strategies. Prevalence of red rot has been reported in the tropical region at moderate level mostly in Tamil Nadu. Scientists in various centers have done excellent job in the screening front. About 14 centres have carried out red rot testing, 12 centres for smut testing, six for wilt resistance and 12 centres for yellow leaf disease. Large numbers of entries were identified as R/MR to red rot, smut and wilt from all the four zones. During the season, many centres have evaluated ISH and IGH clones for red rot resistance. Survey for natural incidence of diseases across the country revealed that still red rot continues to occupy prime importance in Uttar Pradesh and Bihar there is growing importance of smut in subtropical region. In addition, occurrence of wilt, YLD, grassy shoot, rust, *pokkah boeng* and brown spot at varying proportions were recorded in different states. This season, many centres recorded YLD resistance in the ZVT entries and reported moderate to severe occurrences of YLD under field conditions on the popular sugarcane varieties. Impact of YL disease on sugarcane was demonstrated from the trials by comparing virus-free and virus-infected seed canes at Coimbatore, Cuddalore and Anakapalle; however this major area of work to address varietal degeneration is not given due importance by the centres. Due to lack of Pathology posts in the regular centres, disease scenarios are not known from Maharashtra and Karnataka. The centres generated useful information on *C. falcatum* variation, varietal resistance, *pokkah boeng* epidemiology and management, identifying resistant clones of IGH/ ISH and assessing natural incidence of diseases.

I compliment all the scientists for their hard work and for submitting the report in time. I profusely thank Dr A. D. Pathak, Director, ICAR-IISR, Lucknow and Project Coordinator and his team for supporting the work. I personally thank my colleagues Dr. V. Jayakumar, Dr. R. Selvakumar, Principal Scientists and Mr. K. Manivannan, STA for their help in compilation. I am also grateful to Dr. Bakshi Ram, Director of the Institute for his valuable support and providing necessary facilities for the work.

(**R. Viswanathan**)

PP 14: IDENTIFICATION OF PATHOTYPES IN RED ROT PATHOGEN

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

Location : **i) North Western Zone**
Lucknow, Shahjahanpur, Kapurthala, Uchani and Karnal (SBI)
ii) North Central Zone
Pusa, Seorahi
iii) East Coast Zone
Anakapalle and Cuddalore
iv) Peninsular Zone
Navsari, Coimbatore, Thiruvalla

Year of Start: 1983-84 (continuing project)

New isolates showing pathogenic variability from the previously reported pathotypes at different centers will be confirmed at the following centres, Lucknow and Uchani (North West Zone), Anakapalle (East Coast zone) and SBI, Coimbatore (Peninsular zone). The participating centres will deposit such working isolates at the above mentioned centres latest by June 15 of each year. The zonal centers will also maintain the type cultures.

Sugarcane differentials (19): Co 419, Co 975, Co 997, Co 1148, Co 7717, Co 62399, CoC 671, CoJ 64, CoS 767, CoS 8436, BO 91, Baragua (*S. officinarum*), Kakhai (*S. sinense*) and SES 594 (*S. spontaneum*), Co 7805, Co 86002, Co 86032, CoS 95422 and CoV 92102.

No. of isolates: Virulent isolates collected from red rot affected canes of commercially cultivated varieties in the zone.

Method of inoculation: Plug method of inoculation is to be used (Details vide PP 17). Inoculations with each isolate to be done on all the differentials with freshly prepared spore suspension. All inoculations are to be completed in 2 days by last week of August.

Observation: One observation at 60^{th} day after inoculation

Evaluation: The canes are to be split open longitudinally. Inoculated canes free from borer infestation and other damages are taken for evaluation. Based on parameters *viz.* nodal transgression, lesion width, white spots, top yellowing/drying, rind infection and sporulation over the rind, the host reaction is categorized into three groups *viz.*, Resistant (R), Susceptible (S) and Intermediate (I) as follows:

R: Lesion width laterally restricted, nodal transgression up to 2 nodes, white spots, rind infection, sporulation over the rind and yellowing/drying of tops absent.

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 yellowing/drying of tops absent or present.

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 yellowing/drying of tops absent.

RESULTS OF THE PREVIOUS YEAR

NORTH WEST ZONE

LUCKNOW

Sixteen new isolates were evaluated for their virulence along with CF07, CF08 and CF09 on 19 designated differentials. Except Co 0238 isolates, the virulence pattern of other isolates more or less matched with the existing pathotypes of this zone. It was observed that Co 0238 isolates were exhibiting I reaction on BO 91, Co 7717, CoJ 64, Co 419, CoSe 95422 and Baragua, S reaction to Co 975, Co 62399, CoC 671, Co 86002, CoV 92102 and Khakai and R to CoS 8436, CoS 767, Co 997, Co 1148, Co 86032, SES 594 and Co 1148. Thus indicating the existence of gained virulence of BO 91, Co 975, Co 62399, Co 86002 and CoV 92102 and loss of virulence of CoJ 64, CoS 767, Co 997, CoS 8436, Co 1148 and Co 86032. The virulence pattern of Co 0238 isolates did not match with the red rot isolate of CoLk 8102 and also with designated pathotypes namely CF07, CF08 and CF09 of sub-tropical zone, thus clearly indicating the existence of gained specific virulence of Co 0238 isolates on its host which is different from the existing pathotypes of this zone.

SHAHJAHANPUR

A total of seven pathotypes and three isolates of *C. falcatum* were tested on 19 host differentials. Among all differentials, the varieties CoJ 64 exhibited universal S reaction except CF01, CF02 and Khakai also exhibited S reaction to all isolates except CF11. Two differentials *viz*, CoSe 95422 and SES 594 exhibited R to all the designated pathotypes. Baragua exhibited R raection except CF07 and Cf0238 pathotypes/isolate. Co 1148 behaved as S to all pathotypes/isolates except Cf8436 (R) and Cf 0238 (I). The variety BO 91 exhibited R reaction to all the isolates except I reaction to CF09 and Cf 8436. Two varieties CoJ 64 and CoS 767 exhibited contrast reaction to three local isolates, while same showed S reaction with CF07, CF08 and CF09. Study revealed that the local isolates Cf8436, Cf07250 and Cf0238 exhibited pathogenic variability on host differentials.

KAPURTHALA

Eight new isolates *viz*., Cf64 from CoJ 64 (Ajnala sugar mills area), Cf85 from CoJ 85, Cf89003-1, Cf89003-2, Cf89003-3 (Batala sugar mills area) and Cf89003-4 (Morinda sugar mills area) from Co 89003, Cf6/5 from Sel. K 6/5 and Cf12/13 from Sel. K 12/13 (Kapurthala Research Station) along with two pathotypes (CF08 and CF09) were independently inoculated on 19 differentials. Among the isolates, Cf89003-1 and Cf89003-4 were identified as virulent as pathotypes and showed reaction similar to the pathotype CF08. Isolates, Cf89003-3, Cf64 and Cf85 were found quite similar to CF08. Isolates Cf12/13 followed by Cf89003-2 and Cf6/5 were most virulent among tested isolates indicated the newly collected isolates behaved differently from the pathotypes but it needs further confirmation for considering as new pathotype.

UCHANI

All the designated pathotypes along with six isolates *viz*., XXXII (CoJ 85), RR XXXIII (CoJ 85), RR XXXIV (CoJ 64) and RR XXXV (CoJ 64) and RR XXXVI (Co 89003), RR XXXII (CoS 8436) collected from different areas of Haryana. Observations indicate that all the isolates exhibited S reaction on Co 997 and CoC 671 and R reaction on BO 91 and SES 594 and Co 419, Co 975, Co 1148, Co 7717, CoJ 64, CoS 767, Co 7805 and Co 86002 exhibited differential reactions. Isolates RR XXXII, RR XXXIII, RR XXVIV and RR XXXV showed R reaction on CoC 671, CoS 8436, BO 91, SES 594, CoSe 95422 and CoV 92102 and S reaction on Co 419, Co 975, Co 997, Co 1148, Co 7717, Co 62399, CoC 671 and CoJ 64 i.e., similarity with CF08.

KARNAL

A set of 7 pathotypes and five isolates collected from CoS 8436 (3), Co 89003 (1) and CoJ 88(1) were inoculated on 19 sugarcane differentials. The overall disease reaction indicated that there was a clear pathogenic variation on test host differentials. Among the designated pathotypes, CF11 found to be most virulent followed by CF01, CF09, CF08, CF02, CF03 and CF07. Of the three Cf8436 isolates, Cf8436 (Karnal) and Cf8436 (Bihar) exhibited I / S reactions on CoS 8436 with. Isolate Cf89003 collected from the variety Co 89003 was too virulent and expressed I to S reaction on 11 host differentials, suggests the possible emergence of new pathotype in the subtropics. Further, the isolate Cf88 collected from variety CoJ 88 in UP also expressed S reaction to eight host differentials; whereas the differential SES 594 showed complete R against all the isolates.

NORTH CENTRAL ZONE

PUSA

Ten sugarcane differentials were inoculated with the pathotypes CF07 and CF08 and 12 isolates collected from different cane growing areas of Bihar. The result indicated that the differentials Co 1148 and Khakai produced S reaction whereas, differentials BO 91 and SES 594 showed R reaction while, differentials Co 419, CoS 8436, Co 62399, Co 975, CoV 92102 and CoSe 95422 showed differential reaction against all the test isolates. The data showed that pathotype CF07 and isolates RR_1, RR_2, RR_3, RR_5, RR_6 and RR_{12} produced R reaction on Co 419 and Co 975, pathotype CF07 and isolates RR_1, RR_2, RR_3, RR_5, RR_6 and RR_{12} showed I reactions on CoS 8436, Co 62399, CoV 92102 and CoSe 95422, i.e., pathotype CF07 and these isolates exhibited similar pathological behavior. Pathotype CF08 and isolates RR_4, RR_7, RR_8, RR_9, RR_{10} and RR_{11} showed I reaction on differentials Co 419 and Co 975. Pathotype CF08 and isolates RR_4, RR_7, RR_8, RR_9, RR_{10}, RR_{11} showed S reaction on differentials CoS 8436, Co 62399, CoV 92102 and CoSe 95422.

SEORAHI

Seven pathotypes CF01, CF02, CF03, CF07, CF08, CF09 and CF11 along with 7 isolates *viz*., R1601Seo (CoSe 92423), R1602Seo (UP 9530), R1701Seo (Co 0238), R1702Seo (CoS 8436), R1703Seo (CoS 07250), R1704Seo (CoSe 92423) and R1705Seo (CoJ 88) were inoculated on 19 differentials. The virulence pattern of the isolates was found similar to the existing pathotypes of this zone and there was no emergence of new pathotype.

EAST COAST ZONE

ANAKAPALLE

Six new isolates collected from sugarcane cultivars CoA 89085, 2017T 275, CoV 89101, Co 62175, 99A 53 and 93V 297 were tested for pathogenic variability on 19 host differentials. Only the isolates recovered from CoA 89085, 2017T 275 and Co 62175 have produced I reaction on the host differential Kakhai. The reaction of the six collected isolates was found similar to the existing pathotype CF06 with minor variations. All the isolates tested were able to breach the resistance of Co 7805. Differential reaction was observed on the differentials Co 419, Co 997, CoC 671, Co J 64, Kakhai and Co 86032. The isolates from CoA 89085, 2017T 275, 99A 53 and 93V 297 collected from Chittoor district have produced I reaction on the host differentials Co 419 and CoC 671, while isolates collected from Co 62175 and CoV 89101 have produced S reaction. Though, minor variations were observed in the reaction of various isolates on host differentials, most of the isolates were similar to the existing pathotype of *C. falcatum* in Andhra Pradesh.

CUDDALORE

Nineteen sugarcane differentials were inoculated with *C. falcatum* isolated from varieties *viz.,* CoC 24, CoV 09356, CoM 0265 and TNAU Si8 and designated pathotype CF06 and CF12. In the differential BO 91, the isolate from CoC 24 and CoV 09356 showed

I reaction, while all other isolates registered R reaction. In the differential Co 7717 the isolate from CoC 24 and CoV 09356 recorded S reaction while it was I reaction to the designated pathotypes CF06 and CF12. In the differential CoJ 64 the isolate from CoC 24 showed S reaction while it was I reaction to CF06. All these reactions indicated that the isolate from CoC 24 and CoV 09356 exhibited variation from the designated pathotype CF06.

PENINSULAR ZONE

NAVSARI

Three isolates collected from CoC 671 (CF06), Co 86032 (Cf86032), and Co 86002 (Cf86002) were inoculated on 19 differentials. Results revealed that Co 62399, CoJ 64, CoS 8436, BO 91, Baragua and SES 594 showed R reaction for all the isolates, while entries Co 419, Co 1148, CoS 767 and Co 7805 exhibited I reaction to all the isolates. The entries CoV 92102 and CoSe 95422 showed S reaction to CF06 and I reaction to Cf86032 and Cf86002 respectively, whereas entry Co 7717 exhibited I reaction to CF06 and Cf86032 and R reaction to Cf86002. The entries Co 975, Co 997, CoC 671, Khakai, Co86032 and Co 86002 showed S reaction to all the isolates.

COIMBATORE

Three new isolates (CfC24-Thandavarayanpattu, Cf06022-Pennadam, CfM0265-RK pet) along with 5 old isolates (Cfv09356-Keerangudi, Cf86027- Nathakadu, Cf2001-13-Perambakkam, Cf06022- Kuttalam and Cf99006-Mundiampakkam) and 2 reference pathotypes (CF06 and CF12) were inoculated on 18 sugarcane differentials and disease intensity was rated. Among them two new isolates CfM0265-RK Pet and CfC24 Thandavarayanpattu and 3 old isolates *viz.*, CfV09356-Keerangudi, Cf2001-13-Perambakkam and Cf06022-Kuthalam exhibited more virulence than reference pathotypes. The old isolate Cfv09356-Keerangudi showed high virulence for the second consecutive year and also exhibited differential reaction from both the reference pathotypes. Among the new isolates Cf06022-Pennadam showed least virulence and also exhibited differential reaction on many varieties when compared to the old isolate of Cf06022.

THIRUVALLA

Three new isolates *viz.*, CfC24 (Thandavarayanpattu), Cf06022 (Pennadam), CfM0265 (RK Pet) and five old isolates *viz.*, CfV09356 (Keerangudi), Cf86027 (Nathakadu), Cf2001-13 (Perampakkam), Cf06022 (Kuthalam), Cf99006 (Mundiampakkam) along with the designated pathotypes CF06 and CF12 were inoculated and tested against 19 differentials. The results indicated that among the isolates, CfV09356 (Keerangudi), Cf2001-13 (Perampakkam), Cf06022 (Kuthalam) and CfM0265 (RK Pet) behaved differently from the pathotypes CF06 and CF12. These isolates exhibited more virulence than standard pathotypes. All the other isolates showed almost similar reactions to that of CF06 and CF12.

RESULTS OF THE CURRENT YEAR

NORTH WEST ZONE

LUCKNOW

Thirteen new isolates *i.e.* twelve isolates from the popular cv Co 0238 (IR-171, IR-172, IR-173, IR-174, IR-175, IR-176, IR-177, IR-178, IR-179, IR-180, IR-181 and IR-182) and one isolate from CoLk 8102 (IR-183) were evaluated for their virulence along with CF07, CF08 and CF09 on 19 designated differentials by plug method of inoculation. The virulence pattern of IR-183 matched more or less with the existing pathotypes of this zone as reported earlier (2018-19). The red rot virulence pattern of Co 0238 isolates (IR-178 to IR-182) did not match with the existing pathotypes of the Sub-tropical zone. It was observed that Co 0238 isolates giving I reaction on Co 7717, CoJ 64, Co 419, CoSe 95422, Baragua and Khakai and S reaction on Co 975, Co 62399, CoC 671, Co 86002 and CoV 92102. The

virulence pattern of Co 0238 isolates did not match with the isolate of CoLk 8102 and also with designated pathotypes namely CF07, CF08 and CF09, clearly indicating the existence of specific virulence of Co 0238 isolates on its host which is different from the existing pathotypes of this zone (Table 1).

SHAHJAHANPUR

Seven designated pathotypes and 10 isolates including seven isolates of Co 0238 were tested for their pathogenic variability. The higher aggressiveness was exhibited by CF11. Among the seven designated pathotypes CF11 exhibited more virulence. Out of 10 isolates, Cf 0238 VI found virulent and exhibited eight S and three X reactions. Of the seven isolates of Co 0238, six viz., Cf0238 I, II, III, IV and V expressed less virulence on the set of host differentials. The differential CoS 8436 succumbed only to the self originated isolate Cf8436. The differential Co 997 displayed S reaction to Cf8436, Cf07250 and Cf97264 isolates. Two differentials such as CoC 671 and Co 86032 showed S behaviour to all isolates except Cf97264 isolate. The differential Co 62399 showed universal S reaction to the all 7 isolates of Cf0238 (I to VII). Five differentials namely CoS 767, CoS 8436, CoSe 95422, BO 91 and SES 594 consistently showed R reactions to all 7 isolates of Co 0238. Three old isolates Cf8436, Cf07250 and Cf97264 exhibited universal R reaction on Baragua and SES 594. All local isolates namely Cf8436, Cf07250 and Cf0238 (I-VII) exhibited pathogenic variability on host differentials. Based on this pathogenic behaviour, the isolates of Cf0238 were found as an emergence of new strain in sub-tropical India (Table 2).

KAPURTHALA

Nine isolates *viz*., Cf89003-2, Cf89003-1-Chunni Kamal, Cf89003-2-Chunni Kamal, Cf89003-Pathankot, Cf89003-Nakodar and Cf89003-Ajnala from Co 89003, Cf85-Ajnala and Cf85-Batala from CoJ 85, Cf88-Bhogpur from CoJ-88 along with two pathotypes (CF08 and CF09) were inoculated on 19 differentials. Among the isolates, Cf89003-1-Chunni Kamal and Cf89003-2-Chunni Kamal showed similar reaction and were found as virulent as pathotype CF08 except intermediate reaction on host differentials Co 7717. Cf89003-Pathankot and Cf85-Batala were found similar to pathotype CF08. Isolates Cf89003-Ajnala, Cf85-Ajnala and Cf88-Bhogpur were less virulent than pathotype CF08 by exhibiting intermediate to S reaction on 10 host differentials. The disease development by isolate Cf89003-2 showed pathogenic variation by showing I reaction on host differentials CoV 92102 compare to tested isolates and pathotypes and was found most virulent (Table 3).

UCHANI

All the designated pathotypes *viz*., CF01, CF02, CF03, CF07, CF08, CF09 and CF11 along with seven isolates *viz*., XXXVIII (CoJ 85), RR XXXVIIII (CoJ 85), RR XXXX (CoJ 64) and RR XXXXI (Co 89003) and RR XXXXII (Co 89003), RR XXXXIII (CoS 8436) RR XXXXVII (CoS 8436) collected from different mill zone areas were used for pathogenic variability. Observations indicated that all the pathotypes/isolates exhibited R reaction on BO 91, SES 594 and CoV 92102, whereas S reaction on Co 997 and CoC 671. Isolates RR XXXVIII, RR XXXVIIII and RR XXXX showed R reaction on CoS 767, CoS 8436, BO 91, Baragua, SES 594, CoSe 95422, CoV 92102 and Co 86032 and S reaction on Co 419, Co 975, Co 997, Co 1148, Co 62399, CoC 671, CoJ 64 and Khakai and were more virulent and showed similarity with CF08 pathotype. Isolates RR XXXXI and RR XXXXII were also virulent and showed pathogenic variation and exhibited I to S reactions on several differentials, which may be the possibility of emergence of new pathotype in the subtropics. However, the isolates RR XXXXIII and RR XXXVII from CoS 8436 showed S and R reaction respectively on CoS 8436 (Table 4).

KARNAL

Twelve *C. falcatum* isolates comprising of seven established pathotypes and five isolates collected from CoS 8436 (2), Co 89003 (1), CoJ 88 (1) and CoLk 94184 (1) were inoculated on a set of 19 sugarcane differentials by plug method of inoculation. The overall disease reaction indicated that there was a clear pathogenic variation on the different host differentials. The pathogenic reaction on differential hosts shown that designated pathotype CF11 found to be most virulent followed by CF02, CF09, CF01, CF08, CF07 and CF03. Both the isolates from variety CoS 8436, i.e., (Cf8436-Karnal) and Cf8436 (Bihar) exhibited I/S reactions on differential CoS 8436. The isolate Cf89003 collected from variety Co 89003 was also virulent and expressed I to S reactions on 11 host differentials, suggests the possible emergence of new pathotype in the subtropics. Further, isolate Cf88 (UP) showed S to nine host differentials, whereas new isolate CfLk94184 from variety CoLk 94184(UP) also showed S to seven host differentials (Table 5).

NORTH CENTRAL ZONE

PUSA

Eighteen sugarcane differentials were inoculated with two pathotypes CF07, CF08 and 13 isolates collected from different cane growing areas of Bihar. Differentials Co 1148, Khakai, CoJ 64 and Co 997 showed S reaction, differentials, BO 91, Baragua and SES 594 showed R reaction whereas, differentials CoS 8436, Co 419, Co 62399, CoSe 95422, Co 975, CoV 92012, CoC 671, Co 7717, CoS 767, Co 86002 and Co 7805 produced differential reaction against all the test isolates. Pathotype CF07 and isolates RR_4, RR_7, RR_8, RR_9, RR_{10} and RR_{13} produced R reaction on differentials Co 419, Co 975 and Co7805, whereas the pathotypes CF07 and above mentioned isolates produced I reaction on differentials CoS 8436, Co 62399, CoSe 95422, CoV 92012, CoC 671, Co 7717, CoS 767 and Co 86002. Hence, on the basis of results, pathotype CF07 and isolates RR_4, RR_7, RR_8, RR_9, RR_{10} and RR_{13} exhibited similar pathological behaviour. The pathotype CF08 and isolates RR_1, RR_2, RR_3, RR_5, RR_6, RR_{11} and RR_{12} showed S reaction on CoS 8436, Co 62399, CoSe 95422, CoV 92102, CoC 671, CO 7717, CoS 767 and Co 86002. Therefore, pathotype CF08 and isolates RR_1, RR_2, RR_3, RR_5, RR_6, RR_{11} and RR_{12} exhibited similar pathological behavior (Table 6).

SEORAHI

Seven pathotypes along with 7 isolates *viz*., R1701Seo (Co 0238), R1801Seo (Co 0238), R1802Seo (Co 0238), R1803Seo (Co 0238), R1804Seo (Co 0238), R1805Seo (Co 0238) and R1806Seo (Co 0238) were inoculated on 19 differentials. Except the isolates obtained from Co 0238, the virulence pattern of the other isolates were more or less matched with the existing pathotypes of this zones. It was observed that Co 0238 isolates have specific virulence, thus the development of a new specific virulenct isolate at this area that is capable of knocking down the popular variety Co 0238 (Table 7).

EAST COAST ZONE

ANAKAPALLE

Six isolates collected from CoV 89101, Co 62175, 99A 53, 93V 297, CoA 89085 and 2017T 275 were tested for pathogenic variability on a set of 19 host differentials. Most of the isolates were unable to infect the differentials *viz*., Co 975, Co 1148, Co 7717, Co 62399, CoJ 64, CoS 767, CoS 8436, BO 91, Baragua, SES 594, Co 86002 and CoSe 95422. Most of the isolates produced I to S reaction on Co 419, Co 997, CoC 671, Co 7805 and Co 86032. The isolates, CoA 89085 and 2017T 275 and 99A 53 from Chittoor district have produced I reaction on CoC 671, while isolate collected from Visakhapatnam (CoV 89101) produced S reaction. Among all the isolates tested for pathogenic variability, the isolates, 99A 53 and 93V 297 from Chittoor district were found to be less aggressive compared to the other test

isolates. The reaction of the six isolates collected from various genotypes was found similar to the existing pathotype, CF06 with minor variations (Table 8).

CUDDALORE

Sugarcane differentials were inoculated with isolates collected from CoM 0265, CoC 24, CoV 09356 and Co 86032 along with the designated pathotypes CF06 and CF12. In the differential CoJ 64 the isolate from CoC 24 showed S reaction while it was I in reaction to CF06. In BO 91, the isolates from CoC 24 and CoV 09356 had showed I reaction, while all other isolates registered R reaction. In Co 7717 the isolates from CoC 24 and CoV 09356 recorded S reaction, while it was I for designated pathotypes CF06 and CF12. All these reaction indicated the isolate from CoC 24 and CoV 09356 exhibited limited variations from designated pathotype CF06. The isolate from Co 86032 behaved similar to designated pathotype CF06 (Table 9).

PENINSULAR ZONE

NAVSARI

Six new isolates collected from different cane growing areas of south Gujarat along with two designated pathotypes CF06 and CF12 were tested on 19 differentials. The results revealed that the differentials CoJ 64, CoS 8436, Baragua and SES 594 showed R reaction, Co 997, Co 1148, CoS 767, Khakai, Co 7805 and CoSe 95422 showed I reaction, while CoC 671 showed S reaction to all isolates whereas Co 419, Co 975, Co 7717, Co 62399, BO 91, CoV 92102, Co 86002 and Co 86032 showed different reaction against all isolates. All the reactions indicated that the local isolates *viz., Cf*0265, *Cf*97009 (Mahuva), *Cf*671 (Gandevi), *Cf*97009 (Gandevi), *Cf*86002 (Gandevi) and *Cf*86032 (Chalthan) exhibited least variation from designated pathotypes CF06 and CF12 (Table 10).

COIMBATORE

Two new isolates (Cf86027-Vellalapalayam and Cfc24-Mandagapattu) along with 6 old isolates (Cf2001-13-Perambakkam, Cf06022-Kuthalam, Cf99006-Mundiampakkam, Cfc24-Thandavarayanpatti, Cf06022-Pennadam and Cf0265 RK pet) and 2 designated pathotypes (CF06 and CF12) were inoculated and disease intensity was rated. Among these, two old isolates *viz*., Cf06022-Kuthalam and Cf06022-Pennadam exhibited more virulence followed Cf2001-13-Perambakkam and Cfc24-Mandagapattu. Another new isolate Cf86027-Vellapalayam exhibited least virulence. The isolate Cfc24-Thandavarayanpatti showed distinct differential reaction on two varieties, i.e., R reaction on Co 975 (while all other isolates exhibited I reaction) and S reaction on Baragua (while all other isolates exhibited either R or I reaction). The isolates Cf99006-Mundiampakkam and Cfc24-Thandavarayanpatti showed distinct R reaction on CoJ 64, while all other isolates showed I reaction. The isolate Cf06022-Kuthalam exhibited I reaction on CoS 8436 while all other isolates exhibited R reaction and Cf06022-Pennadam exhibited S reaction on CoSe 95322 while other isolates exhibited I reaction (Table 11).

THIRUVALLA

Two new isolates *viz*., Cf86027 (Vellalapalayam), CfC24 (Mandagapattu) and six old isolates *viz*., Cf 2001-13 (Perampakkam), Cf 06022 (Kuthalam), Cf 99006 (Mundiampakkam), CfC24 (Thandavarayanpattu), Cf06022 (Pennadam), Cf0265 (RK Pet) along with the designated pathotypes for Peninsular zone CF06 and CF12 were inoculated and tested for red rot resistance against nineteen differentials by plug method. The disease development indicated that, all the isolates, except Cf86027 (Vellalapalayam) and CfC24 (Thandavarayanpattu) behaved differently from the standard pathotypes CF06 and CF12. They showed more susceptibility on the differentials Co 1148, Co 7717, Co 62399, Khakai and Co 7805 (Table 12).

PP17: EVALUATION OF ZONAL VARIETIES FOR RED ROT, SMUT, WILT AND YLD

PP 17A: EVALUATION OF ZONAL VARIETIES FOR RED ROT

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

Locations:

North West Zone : Lucknow, Kapurthala, Uchani, Shahjahanpur, Karnal, Pantnagar
North Central Zone : Pusa, Motipur and Seorahi
East Coast Zone : Anakapalle and Cuddalore
Peninsular zone : Thiruvalla, Navsari, Coimbatore

Year of start : 1986-87 (Continuing project)

Varieties: All the centres will test all the entries of early and midlate groups under IVT and AVT of the respective zones. Entries of Inter zonal varietal trial (IZVT) are also to be tested, if listed. The seed material for this programme is to be obtained from the respective breeders of the centres. One 6 metre row of at least 20 clumps for inoculation with each pathotype by plug/nodal method. Any red rot susceptible variety of the same maturity group may be used as standard (check).

Inoculum: (Pathotypes to be used):

North West Zone : CF08 & CF09 (To be inoculated separately)
North Central Zone: CF07 & CF08 (To be inoculated separately)
East Coast Zone : CF04 & CF06 (To be inoculated separately)
Peninsular Zone : CF06 & CF12 (To be inoculated separately)

(Note: If pathotypes are not available, CF07, CF08 and CF09 may be obtained from IISR, Lucknow and CF04 & CF06 from RARS, Anakapalle).

Freshly sporulating 7 day old culture in Petri dishes will be taken. The spore mass will be washed with 100 ml of sterile water and collected in a flask. Conidial suspension at a spore concentration of one million spores per ml will be prepared for inoculation. Fresh inoculum should always be used for inoculation.

Methods of inoculation:

1. Plug Method: Two canes in each of the 20 clumps to be inoculated. Inoculation is to be done in the middle of the 3rd exposed internode from bottom and two drops of the spore suspension are to be placed with a large syringe in each cane and sealed with plastic clay (plasticine) or modeling clay.

2. Cotton Swab Nodal Method: (All the centres) Two canes in each of 20 clumps will be inoculated by removing leaf sheath (lower most green leaf sheath) and immediately placing cotton swab (dipped in freshly prepared inoculum suspension) around the cane covering nodal region. The cotton swab should be held in place by wrapping parafilm® over the swab.

Evaluation

Cotton Swab Nodal method: One observation at the end of 60 days after inoculation. Observe for spindle infection i.e. presence of mid rib lesions with or without conidia, presence of acervuli at nodes specially on leaf scar, root primordial and growth ring. Record the intensity of the acervuli at node. Scrap the node and see if lesions are developing into stalks. Wherever lesions are progressive towards susceptibility the entries are rated as

susceptible. If the lesions are dark and restricted to rind tissues, the clones are rated as resistant. Atleast 15 stalks are to be evaluated to assess disease reaction.

Plug method: The canes to be split open longitudinally sixty days after inoculation along the point of inoculation. Inoculated canes free from borer infestation and other damages are taken for evaluation. This is graded on the international scale of 0-9 as follows:

Variety/ genotype ---------- Method of inoculation ----------

No. of canes evaluated	Condition of tops*	Lesion width**	White spot (WS)***	Nodal transgression (NT)****	Total score	Remarks
1.						
2 to						
15						

*1. Condition of top: Green (G) – 0, Yellow (Y)/Dry (D)-1

**2. Lesion width above inoculated internode is assigned the score of 1, 2 or 3

***3.White spot assigned score of 1 or 2 according to whether it is restricted or progressive

****4.N.T. No. of nodes crossed above the inoculated internode and given the score as:

1 if one node is crossed

2 if two nodes are crossed

3. if three nodes are crossed (maximum) or more

Average Score = Total Score/No. of canes evaluated

Disease reaction: 0-9 Scale

0.0 to 2.0 -R

2.1 to 4.0 -MR

4.1 to 6.0 -MS

6.1 to 8.0 -S

8.0 to 9.0 -HS

Note: Average score is taken into account for assigning the disease reaction.

The varieties which show susceptibility by plug method, but have not shown nodal susceptibility are to be retested by nodal method. If these are not susceptible by the nodal method, they may be considered for release.

RESULTS OF THE PREVIOUS YEAR

NORTH WEST ZONE

LUCKNOW

In IVT (Early) out of 9 genotypes tested, one genotype Co 15027 was found R by both the methods of inoculation against both the pathotypes. Six genotypes *viz*., Co 15023, CoLk 15201, CoLk 15203, CoLk 15204, CoLk 15205 and CoPb 15212 were rated as MR by plug method and R by nodal method of inoculation against both the pathotypes. One genotype Co 15024 was rated as MS by plug method and S by nodal method, one genotype CoPb 15211 was rated as MS against pathotype CF08 and S against pathotype CF09 by plug method, whereas resistant R against pathotype CF08 and S against CF09 by nodal method of inoculation. In Advanced Varietal Trial (Early)–I Plant all the 4 genotypes *viz.,* Co 14034, CoLk 14201, CoPb14181 and CoPb14211 were rated as MR by plug method of inoculation and R by nodal method against both the pathotypes. In Advanced Varietal Trial (Early)-II Plant, out of 3 genotypes, two *viz*., Co 13034 and CoPb 13181 were rated as MR by plug method and R by nodal method of inoculation against both the pathotypes. One genotype CoS 13231 was found R by both the methods of inoculation against both the pathotypes.

In IVT (Mid late), out of 11 genotypes tested, 8 *viz*., Co 15026, CoLk 15206, CoLk 15207, CoLk 15208, CoLk 15209, CoPb 15213, CoS 15233 and CoS 15234 were rated MR by plug method of inoculation and R by nodal method of inoculation against both the red rot pathotypes. One genotype CoS 15232 was rated as MR against pathotype CF08 and MS against pathotype CF09 by plug method, whereas R by nodal method of inoculation against both the pathotypes. Two genotypes CoPb 15214 and CoS 15231 were rated MS by plug method of inoculation and R by nodal method of inoculation against both the red rot pathotypes. In Advanced Varietal Trial (Mid late)-I Plant out of 7 genotypes tested, one genotype CoLk 14203 was R by both the methods of inoculation against both pathotypes, six genotypes *viz*., Co 14035, CoH 14261, CoLk 14204, CoPb 14184, CoPb 14185 and CoS 14233 were rated as MR by plug method and R by nodal method against both the pathotypes. In Advanced Varietal Trial (Mid late)-II Plant, all the 5 genotypes *viz*., Co 13035, CoH 13263, CoPant 13224, CoPb 13182 and CoLk 13204 were rated MR by plug method of inoculation and R by nodal method of inoculation against both the red rot pathotypes.

SHAHJAHANPUR

Thirty nine entries were evaluated for red rot resistance and details are given below.

IVT Early: Among 9 entries tested 4 *viz*., Co 15023, CoLk 15201, CoLk 15204, CoPb 15211 were rated as R/MR to CF08 by plug and nodal cotton swab method. The four entries *viz*, Co 15023, Co 15024, Co 15027, CoLk 15204 were identified as R/MR to CF09 by plug and nodal cotton swab method. Six entries were screened as R to CF08 and 4 entries were rated as R CF09 by nodal cotton swab method against both pathotypes (Table 14).

IVT Mid late: Out of eleven entries, 8 *viz*, Co 15026, CoLk 15206, CoLk 15207, CoLk 15208, CoLk 15209, CoPb 15213, CoS 15232 and CoS 15234 were recorded as R/MR to CF08 and CF09 by plug and nodal cotton swab method. One entry CoPb 15214 was rated as S/HS to both the pathotypes by plug and nodal cotton swab method.

AVT Early (I plant): Among four enreies 2 entries CoLk 14201 and CoPb 14181 were MR by plug method and R by nodal method against both the pathotypes CF08 and CF09. Two entries *i.e*., Co 14034 and CoPb 14211 were evaluated as MS to CF08 and CF09 by plug method. The genotype Co 14034 was rated as S to CF09, while CoPb 14211 behaved as R to both pathotypes by nodal cotton swab method.

AVT Early (II Plant): Among 3 entries were tested CoS 13231 was identified as MR and R to both pathotypes CF08 and CF09 by plug and nodal cotton swab method of inoculation, respectively. Two entries *viz*, Co 13034 and CoPb 13181 were identified as MR and S, respectively to CF08 by plug method. Co 13034 was screened as R against CF08 and CF09 by nodal cotton swab method.

AVT Mid late (I Plant): All seven entries namely Co 14035, CoH 14261, CoLk 14204, CoLk 14203, CoS 14233, CoPb 14185 and CoPb 14184 was identified as R/MR against CF08 by plug and nodal cotton swab method. These all entries also behaved as R/MR against CF09 except CoS 14233 which was MS by plug method. All seven were examined as R against CF08 and CF09 by nodal cotton swab method of inoculation.

AVT Mid late (II Plant): Among 5 entries tested 2 entries Co 13035 and CoPb 13182 were assessed as MR by plug and R by nodal cotton swab method against CF08 and CF09. The genotype CoPant 13224 behaved as MR and MS by plug method against CF08 and CF09, respectively while it was rated as R against both the pathotypes by both the methods.

KAPURTHALA

Thirty-nine genotypes along with standard checks were tested against red rot pathotypes CF08 and CF09 separately by plug and nodal cotton swab methods. In IVT (Early) six genotypes *viz*., Co 15023, Co 15024, Co 15027, CoLk 15201, CoLk 15205 and CoPb 15211 behaved as MR/R by plug and nodal cotton swab methods against both the pathotypes. In

AVT (Early) Plant I, three entries (CoLk 14201, CoPb 14181 and CoPb 14211) behaved as MR/R by both the methods against two pathotypes. In AVT (Early) Plant II, only one genotype (CoS 13231) showed MR/R reaction. In IVT (Mid late), nine entries namely, Co 15026, CoLk 15206, CoLk 15207, CoLk 15208, CoLk 15209, CoPb 15213, CoS 15232, CoS 15233 and CoS 15234 were found MR/R by plug and nodal cotton swab methods against both the pathotypes. In AVT (Mid late) Plant I, entries namely Co 14035, CoH 14261, CoLk 14203, CoLk 14204, CoPb 14184 and CoPb 14185 behaved as MR/R. In AVT (Mid late) Plant II, two entries (CoPant 13224 and CoPb 13182) found MR/R by plug and nodal cotton swab methods with both the pathotypes.

UCHANI

In AVT (early) Plant-I, 3 entries *viz*., Co 14034 and CoLk 14201, showed MR reaction by plug and R by nodal cotton swab methods against both the pathotypes. However, CoPb 14211 exhibited MS reaction by plug and R reaction by nodal cotton swab method against both the pathotypes. In AVT (early) plant-II, the entries Co 13034 and CoS 13231 found MR by plug and R by nodal method against CF08 and CF09. However, CoPb 13181 showed MS reaction by both methods against CF08 and CF09. In AVT (mid late) plant-I, 6 entries *viz*., Co 14035, CoH 14261, CoLk 14204, CoPb 14184, CoPb 14185 and CoS 14233 were R/MR by plug and R by nodal cotton swab method against CF08 and CF09. The genotype CoLk 14203 showed MR/MS reaction by plug method and R reaction by nodal method of inoculation to both CF08 and CF09 pathotypes. In AVT (mid late) Plant-II, 3 entries *viz*., Co 13035, CoH 13263 and CoPb 13182 showed R/MR reaction by plug and R reaction by nodal method against CF08 and CF09. However, entries CoPant 13224 and CoLk 13204 showed MS reaction by plug and R by nodal methods. In IVT (early), 6 entries *viz*., Co 15023, Co 15024, Co 15027, CoLk 15204, CoLk 15205 and CoPb 15211 showed MR reaction by plug and R by nodal method and CoLk 15203 showed S reaction against CF08 and CF09 by both the methods. However, CoPb 15212 found MS by plug and R by nodal method against CF08 and CF09. In IVT (mid late), 8 entries *viz*., Co15026, CoLk 15206, CoLk 15207, CoLk 15208, CoLk 15209, CoS 15232, CoS 15233 and CoS 15234) showed MR reaction by plug and R reaction by nodal cotton swab method of inoculation and CoLk 15206 and CoS 15234 showed R reaction by plug method to CF09. The entry CoPb 15214 showed S reaction against CF08 and CF09 by both methods, whereas CoS 15231 showed MS reaction by plug and S by nodal cotton swab method.

KARNAL

Thirty nine zonal varieties along with 7 standards were evaluated for red rot resistance against CF08 and CF09. Two entries i.e. CoLk 15203 IVT (E) and CoPb 15214 IVT (ML) exhibited S/HS reactions by plug and cotton swab methods of inoculation. Four entries *viz*., CoPb 13181, CoS 15231, CoS 14233 and CoPb 13182 showed MS reaction with CF08 pathotype. However, remaining entries were R or MR to red rot.

PANTNAGAR

In nodal cotton swab method, among 43 genotypes, for CF08, 40 genotypes shown R reaction, whereas 3 genotypes showed S reaction. For CF09, 38 genotypes shown R reaction and 5 genotypes shown S reaction. In plug method, 2 genotypes were found R, 23 MR and 13 MS, 4 S and 1 HS reaction for CF08 pathotype, whereas, 21 were MR, 13 MS and 8 S and 1 shown HS reaction and none of genotypes were found R for CF09 pathotype.

NORTH CENTRAL ZONE

PUSA

Twenty four entries were tested using CF07 and CF08 pathotypes by adopting plug and cotton swab methods of inoculation. By plug method of inoculation, single entry (CoSe 01421) showed R reaction, 21 entries showed MR reaction, whereas 2 entries showed MS

reaction against CF07. Single entry CoP 06436 showed R reaction, 19 showed MR reaction, whereas remaining 4 entries showed MS reaction against CF08. In cotton swab method, two entries CoLk 15466 and CoLk 15468 showed S reaction against both the pathotypes. Entry CoSe 15455 showed S reaction to CF08 and entry CoSe 15453 showed S reaction to CF07, rest of the entries showed R to both the pathotypes.

MOTIPUR

In IVT (Early) out of 9 genotypes tested, seven *viz*., CoLk 15466, CoLk 15467, CoP 15436, CoP 15437, CoSe 15451, CoSe 15455 and CoSe 15456 were rated as MR by plug method of inoculation and R by nodal method of inoculation against CF07 and CF08. Genotype CoSe 15452 was rated as MR against pathotype CF07 and MS against CF08 by plug method whereas R by nodal method of inoculation against both the pathotypes. In AVT (Early)-I Plant, out of 4 genotypes, CoSe 14454 was rated as R against both the pathotypes by both the methods. Two genotypes *viz*., CoLk 14206 and and CoSe 14451 were rated MR by plug method and R by nodal method against both the pathotypes. In AVT (Early)-II Plant, all the three genotypes CoP 13437, CoSe 13451 and CoSe 13452 were rated as MR by plug method and R by nodal method against CF07 and CF08. In IVT (Mid late) out of 10 genotypes, 7 v*iz*., CoLk 15468, CoLk 15469, CoP 15438, CoP 15439, CoP 15440, CoP 15441 and CoSe 15454 were rated as MR by plug method and R by nodal method against both the pathotypes. The clone CoSe 15453 was rated as MS by plug method and R by nodal method against both the pathotypes. In AVT (Mid late)-I Plant, all 5 genotypes *viz*., CoLk 14208, CoLk 14209, CoP 14438, CoP 14439 and CoSe 14455 were rated MR by plug method and R by nodal method against both the pathotypes.

SEORAHI

In IVT (Early), in plug method, 8 genotypes were rated as MR and one genotype (CoBln 15501) as MS to CF07. Seven genotypes were found MR and two genotypes (CoP 15436 and CoP 15437) were rated as MS to CF08 and MR to CF07. In cotton swab method, 9 genotypes were found R to both designated pathotypes. In IVT (Mid late), **i**n plug method, 8 genotypes were rated as MR to CF07 and 1 genotype (CoLk 15469) was found MS to CF07 and MR to CF08. Eight genotypes were rated as MR to CF 08, genotype CoP 15440 was rated as MS to CF08 and MR to CF07 while genotype CoBln 15502 was rated as HS to CF07 and S to CF08. In cotton swab method, 9 genotypes were rated as R while one genotype CoBln 15502 was rated as S to CF07 and all genotypes were R to CF08 pathotype.
Advanced varietal trial (Early): In plug method, none was found resistant, 3 genotypes were rated as MR to CF07, one genotype (CoP 14437) was rated as MS to CF07 and MR to CF08, while all the genotypes were found MR to pathotype CF08. In cotton swab method, 4 entries were tested and all were rated as R to both the pathotypes. In AVT (Mid late), in plug method, out of five varieties tested none was found R, 4 genotypes were found to be MR to CF07, one genotype (CoP 14438) was rated as MS to CF07 and MR to CF08, while all the genotypes were found MR to CF08. In cotton swab method, 5 entries were evaluated and all were rated as R to both pathotypes.

NORTH EAST ZONE

BURALIKSON

Under IVT (early) group, CoP 15436 showed R reactions to CF07 and MR to CF08 in plug method. The check CoSe 95422 showed MS reaction to both the isolates in plug method but S to CF08 in cotton swab method. In IVT (Midlate) CoSe 15453 showed MS reaction to CF07 in plug method and S to CF08 in cotton swab method. In AVT early, CoP 14437 showed R reaction to CF07 in plug method but MR to CF08 and R reaction to both the pathotypes in cotton swab method. In AVT early second plant, CoSe 13451 was rated as

MS to CF08 in plug as well as in cotton swab method. In AVT midlate group, CoLk 14209 showed R reaction to CF07 in plug method but MR to CF08.

EAST COAST ZONE

ANAKAPALLE

The genotypes were tested for their reaction to the pathotype CF06 by cotton swab and plug methods of inoculation. In the cotton swab method, out of 34 entries, four checks (Co 419, CoC 671, Co 997, and Co 6907) manifested top drying indicating their susceptibility and the remaining entries reacted as R to CF06. In plug method of inoculation, five entries and two standards (CoA 16321, CoV 16357, CoC 15336, CoA 14321, Co 13028, CoA 92081 and Co 86249) showed R while 12 entries and 3 standards, Co 13023, Co 13029, Co 13031, CoA 14323, CoA 16322, CoC 14337, CoC 15338, CoC 16339, PI 14337, CoV 15356, CoV 16356, Co 01061, CoOr 03151, CoV 92102 and Co 06030 showed MR reaction to CF06.

CUDDALORE

Among the 20 clones screened in plug method using CF06 pathotype, clones *viz*., Co 13023, Co 13028, Co 13029, Co 13031, CoA 14321, CoA 16321, CoA 16322, CoA 14323, CoC 14336, CoC 15338, CoC 14337, CoC 16336, CoC 16337, CoC 16338, CoC 16339, CoV 15356, CoV 16356, CoV 16357, and PI 14377 were found to be MR and the entry CoC 15336 was MS to red rot. In cotton swab method all the 20 clones were found to be R.

PENINSULAR ZONE

NAVSARI

Out of 51 clones evaluated by plug method, none of the entries exhibited R reaction. Twenty nine entries viz., Co 12009, Co 12012, Co 12019, Co 13003, Co 13004, Co 13006, Co 13008, Co 13009, Co 13013, Co 13018, Co 15002, Co 15005, Co 15006, Co 15007, Co 15009, Co 15017, Co 15018, Co 15020, Co 15021, MS 13081, CoN 15071, CoN 15072, CoN 13072, CoN 13073, CoSnk 13101, CoSnk 15101, CoVc 15063, VSI 12121 and VSI 15122 showed MR reaction against red rot. Thirteen entries *viz*., Co 12008, Co 13002, Co 13014, Co 13020, Co 15010, Co 15015, CoSnk 15102, CoSnk 15103, CoVc 15061, PI 15132, CoSnk 13106, PI 13132, and CoM 12085 exhibited MS reaction, rest of the entries displayed S to HS reaction by plug method. In cotton swab method all entries exhibited R reaction and among checks five exhibited R reaction and only CoC 671 showed S reaction.

THIRUVALLA

In AVT (1st Plant), out of the 17 entries, three *viz.,* Co 13013, CoN 13073, CoSnk 13101 exhibited R reaction, 7 entries *viz.,* Co 13002, Co 13009, CoN 13072, MS 13081, CoSnk 13103, CoSnk 13106, PI 13132 exhibited MR reaction, 6 entries *viz.,* Co 13003, Co 13004, Co 13006, Co 13008, Co 13014, Co 13020 exhibited MS reaction, one entry Co 13018 exhibited S reaction against the pathotype CF06 in plug method of inoculation. Out of the seventeen entries tested against CF12 by plug method of inoculation, one *viz*., Co13009 showed R reaction, 10 entries *viz.,* Co 13002, Co 13003, Co 13008, Co 13013, CoN 13072, CoN 13073, MS 13081, CoSnk 13101, CoSnk 13103, PI 13132 showed MR reaction, four entries Co 13004, Co 13014, Co 13020, CoSnk 13106 showed MS reaction and 2 entries Co 13006, Co 13018 showed S reaction. In nodal method, except five entries *viz*., Co 13004, Co 13006, Co 13014, Co 13018 and Co 13020 all others showed R reaction to both CF06 and CF12. In AVT (II Plant) against CF06, MR reaction was recorded in two entries *viz.,* Co 12009 and Co 12019, MS reaction in Co 12008, Co 12012 and S reaction Co 12007, Co 12024, CoM 12085, VSI 12121 by plug method of inoculation. Against the isolate CF12, two entries Co 12008, Co 12012 recorded MR reaction, Co 12009 and Co 12019, VSI 12121 recorded MS reaction and Co 12007, Co 12024, CoM 12085 recorded S reaction in plug method of inoculation. In nodal method, five entries *viz.,* Co 12007, Co 12008, Co 12009, Co 12012, Co 12019 showed R reaction to both the pathotypes CF06 and CF12.

COIMBATORE

About 57 IVT entries were evaluated for red rot resistance by plug and nodal methods against *C. falcatum* pathotype CF06. Based on disease severity and rating score, 37 and 47 entries were identified as resistant in plug and nodal methods, respectively.

RESULTS OF THE CURRENT YEAR

NORTH WEST ZONE

LUCKNOW

In IVT (Early) out of 9 genotypes tested, one genotype CoLk 16201 was found R by both the method of inoculation against both the pathotypes. Seven genotypes *viz*., Co 15025, Co 16029, CoLk 16202, CoPb 16181, CoPant 16221, CoPant 16222 and CoS 16231 were rated as MR by plug method and R by nodal method of inoculation against both the pathotypes. In AVT (Early)-I Plant, out of 6 genotypes, five genotypes *viz.,* Co 15023, Co 15027, CoLk 15201, CoLk 15205 and CoPb 15212 were rated as MR by plug method and R by nodal method of inoculation against both the pathotypes. One genotype *viz*., Co 15024 was rated MS by plug method and S by nodal method against both the pathotypes. In Advanced Varietal Trial (Early)-II Plant, out of 4 genotypes tested, three *viz*., CoLk 14201, CoPb 14181 and CoPb 14211 were rated as MR by plug method and R by nodal method of inoculation against both the pathotypes. One genotype Co 14034 were rated MS by plug method and R by nodal method against both the red rot pathotypes. In IVT (Mid late), out of 7 genotypes tested, five *viz*., CoLk 16203, CoLk 16204, CoPant 16223, CoS 16232 and CoS 16233 were rated MR by plug method and R by nodal method of inoculation against both the pathotypes. One genotype Co 16030 was rated as MS against pathotype CF08 and S against CF09 by plug method, whereas rated as S by nodal method against both the pathotypes. In AVT (Mid late)-I Plant, out of 7 genotypes 7, one 7 CoLk 15206 was found R by both the methods against both the pathotypes. The others 6 genotypes *viz*., Co 15026, CoLk 15207, CoLk 15209, CoPb 15213, CoS 15232 and CoS 15233 were rated MR by plug method and R by nodal method against both the pathotypes. In AVT (Mid late)-II Plant, out of 7 genotypes, 6 clones *viz*., Co 14035, CoH 14261, CoLk 14203, CoLk 14204, CoPb 14184 and CoPb 14185 were rated MR by plug and R by nodal method against both the pathotypes. One genotype CoSe 14233 was MS against both the pathotypes by plug method of inoculation, whereas as R by nodal method against both the pathotypes (Table 13).

SHAHJAHANPUR

Forty entries were tested for red rot resistance in six trials (Table 14).

IVT Early: Of nine entries, 7 entries *viz*., Co 15025, Co 16029, CoLk 16201, CoLk 16202, CoPant 16221, CoPant 16222 and CoS 16231 were evaluated as R/MR to both the pathotypes (CF08 and CF09) by plug and nodal cotton swab method. One entry CoPb 16181 was graded as MS to CF08 and MR to CF09 by plug and R by nodal cotton swab method. One entry CoPb 16211 was found S/HS to CF08 and CF09 by both thr methods.

IVT Mid late: All the seven entries *viz*; Co 16030, CoLk 16203, CoLk 16204, CoPb 16212, CoPant 16223, CoS 16232 and CoS 16233 were recorded as R/MR to CF08 and CF09 by plug and nodal cotton swab method of inoculation.

AVT Early (I plant): Six entries were tested, in that Co 15023, Co 15027 and CoLk 15205 exhibited R/MR reaction by plug and R by nodal cotton swab method. Two entries Co 15024 and CoPb 15212 exhibited MS behaviour to CF08 whereas it was MR and MS to CF09, respectively. CoLk 15201 was found MR to CF08 and MS to CF09 by plug and R to both pathotypes by nodal cotton swab method.

AVT Early (II Plant): Out of 4 entries, two *viz*; CoLk 14201, CoPb 14181 were screened as MR/R to both pathotypes and remaining two entries i.e. Co 14034 and CoPb 14211 were rated as MS to CF08; MS and MR to CF09, respectively, and R by nodal method.
AVT Mid late (I Plant): All seven entries were assessed as R/MR by plug and R by nodal cotton swab method against both the pathotypes.
AVT Mid late (II Plant): All seven entries were graded as R/MR by plug and R by nodal cotton swab method against CF08 and CF09.

KAPURTHALA

In IVT (Early), five entries *viz*., Co 16029, CoLk 16201, CoPb 16181, CoPant 16222 and CoS 16231 behaved as MR/R by plug and nodal cotton swab methods against both the pathotypes. In AVT (Early) Plant I, four entries *viz*., Co 15023, Co 15027, CoLk 15201 and CoLk 15205 behaved as MR/R by both the methods. In AVT (Early) Plant II, three entries CoLk 14201, CoPb 14181 and CoPb 14211 showed MR/R reaction. In IVT (Mid late), all the entries *viz*., Co 16030, CoLk 16203, CoLk 16204, CoPb 16212, CoPant 16223, CoS 16232 and CoS 16233 were found MR/R by both the methods against both the pathotypes. In AVT (Midlate) Plant I, the genotypes *viz*., Co 15026, CoLk 15206, CoLk 15207, CoLk 15209, CoPb 15213 and CoS 15233 behaved as MR/R. In AVT (Mid late) Plant II, entries Co 14035, CoH 14261, CoLk 14203, CoLk 14204, CoPb 14184 and CoPb 14185 behaved as MR/R by plug and nodal cotton swab methods with both the pathotypes (Table 15).

UCHANI

In AVT (early) Plant- I the entries *viz*., Co 15023, Co 15024 and CoLk 15205 showed MR reaction by plug and R reaction by nodal cotton swab methods against CF08 and CF09 pathotypes. However, Co 15027, CoLk 15201 and CoPb 15212 were found MR by plug against CF08 and MS against CF09 and R by nodal cotton swab methods. Among standards CoJ 64 behaved as HS/S by both plug and nodal cotton swab methods but Co 0238 and Co 05009 showed MR reaction by plug and R by nodal cotton swab methods against CF08 and CF09. In AVT (early) Plant-II the entries *viz*., CoLk 14201, CoPb 14181 showed MR reaction by plug and R reaction by nodal cotton swab methods against CF08 and CF09 pathotypes. However, Co 14034 and CoPb 14211 exhibited MR/MS reaction by plug and R reaction by nodal cotton swab methods against CF08 and CF09 pathotypes. In AVT (Midlate) Plant-I, all the entries *viz*., Co 15026, CoLk 15206, CoLk 15207, CoLk 15209, CoPb 15213, CoS 15232 and CoS 15233 showed MR reaction by plug and R reaction by nodal cotton swab methods of inoculations to both CF08 and CF09 pathotypes. In AVT (Midlate) Plant-II all the seven entries *viz*., Co 14035, CoH 14261, CoLk 14203, CoLk 14204, CoPb 14184, CoPb 14185 and CoS 14233 showed R/MR reaction by plug and R by nodal cotton swab methods against CF08 and CF09. In IVT (early) 5 entries *viz*., Co 16025, Co 16029, CoPb 16181, CoPb 16222 and CoS 16231 showed MR reaction by plug and R reaction by nodal cotton swab methods against CF08 and CF09 pathotypes, whereas CoLk 16201, CoLk16202 and CoPant 16221 showed MR/MS reaction against CF08 and CF09 by plug and R reaction by nodal cotton swab methods against CF08 and CF09. However, CoPb 16211 was found S by plug and nodal cotton swab methods against both the pathotypes. In IVT (Midlate) 4 entries *viz*., CoLk 16203, CoLk 16204, CoS 16232 and CoS 16233 showed MR reaction by plug and R reaction by nodal cotton swab methods to both CF08 and CF09 pathotypes. The entries Co 16030, CoPb 16212, CoPant 16223 showed MR/MS reaction by plug against against CF08 and CF09 and R reaction by nodal cotton swab methods of inoculations to both CF08 and CF09 (Table 16).

KARNAL

Forty IVT entries were evaluated for red rot resistance by plug and cotton swab methods of inoculation against CF08 and CF09. One IVT (E) entry CoPb 16211 exhibited

HS reaction with CF08 and CF09 by both plug and cotton swab methods, whereas, entry CoLk 15201 (AVT (E)–I Plant) rated as MS to both the isolates by plug method. However, remaining entries were found R or MR to both the inocula and methods (Table 17).

PANTNAGAR

In nodal cotton swab method, among 46 genotypes 40 showed R whereas 3 genotypes showed S reaction against both the pathotypes. In plug method, 3 genotypes were found R, 29 were MR and 10 were MS, 1 was S and 2 were HS for CF08, whereas 2 genotypes were found R, 30 were MR and 10 wee MS, 1 was S and 2 were HS reaction for CF09 pathotype. Disease reaction data was not available for the genotype Co 15023 because all the plants of this entry were destroyed by the wild animal (Table 18).

NORTH CENTRAL ZONE

PUSA

In plug method of inoculation, one entry CoP 16439 showed R reaction against CF07 and CF08, whereas, 3 entries *viz*., CoLk 16468, CoP 16439 and CoP 9301 were R against CF08, 18 entries showed MR reaction against both the pathotypes. Two entries *viz*., CoSe 16453 and CoLk 16466 showed MS and one entry CoLk 16469 showed S reaction against CF07. One entry CoLk 16469 showed MS reaction to CF08, three entries *viz*., CoLk 16466, CoLk 16467 and BO 156 showed S reaction to CF07 and two entries CoSe 16451 and CoLk 16469 were found S. Rest of the entries showed R to both the pathotypes in cotton swab method of inoculation (Table 19).

MOTIPUR

In IVT (Early) out of 8 genotypes tested, six *viz*., CoP 16436, CoP 16437, CoLk 16466, CoLk 16467, CoLk 16468 and CoBln 16501 were rated as MR by plug method and R by nodal method against both the pathotypes. Genotype CoP 16438 was rated as MR against pathotype CF07 and MS against CF08 by plug method, whereas R against CF07 and S against CF08 by nodal method. In AVT (Early)-I Plant, out of five genotypes, 3 genotypes *viz.,* CoLk 15466, CoLk 15467 and CoSe 15455 were rated as MR by plug method and R by nodal method against both the red rot pathotypes. Two genotypes CoP 15436 and CoSe 15452 were rated as MR against pathotype CF07 and MS against CF08 by plug method

In AVT (Early)-II Plant, out of 4 genotypes tested, CoLk 14206 was recorded as R by both the method of inoculation. Three genotypes *viz*., CoP 14437, CoSe 14451 and CoSe 14454 were rated as MR by plug method and R by nodal method against both pathotypes. In IVT (Mid late) out of 9 genotypes tested, one genotype CoLk 16470 was recorded as R by both the method of inoculation against both the pathotypes. Seven genotypes v*iz*., CoP 16439, CoP 16440, BO 156, CoLk 16469, CoLk 16471, CoSe 16452 and CoBln 16502 were rated as MR by plug method and R by nodal method against both the pathotypes.

In AVT (Mid late)-I Plant out of 7 genotypes tested, CoP 15439 was rated as R against both the pathotypes. Five genotypes namely CoLk 15468, CoLk 15469, CoP 15438, CoP 15440 and CoSe 15454 were rated as MR by plug method and R by nodal method of inoculation against both the pathotypes. In AVT (Mid late)-II Plant all five genotypes tested were rated as MR by plug method and R by nodal method of inoculation (Table 20).

SEORAHI

IVT (Early): In plug method out of eight genotypes none of them were found R against red rot. Five genotypes were rated as MR, one genotype (CoP 16438) was rated as MS to CF07 and MR to CF08, while CoLk 16466 was rated as MS to both pathotypes. Six genotypes were rated MR, while genotype CoBln 16501 was rated as S to CF07 and HS to CF08. In nodal cotton swab method 7 genotypes were found R and rest was S.

Initial Varietal Trial (Mid late): In plug method out of nine genotypes five were rated as MR to both designated pathotypes, while four *viz*., BO 156, CoLk 16470, CoLk 16469 and

CoBln 16502 were rated as S to both pathotypes. In cotton swab method 6 genotypes were rated as R, 2 *viz*., BO 156 and CoLk 16469 were S and CoBln 16502 was rated as R to CF07 and S to CF08.

AVT (Early): In plug method out of 5 genotypes none was found R. Of these, 4 genotypes were rated as MR to CF08 and 1genotype (CoLk 15467) was rated as MR to CF07 and MS to CF08, while all genotypes were found MR to CF07. In cotton swab method all were rated as resistant to both designated pathotypes.

AVT (Mid late): In Plug method out of 7 varieties tested none was found R, 5 genotypes were found MR to both pathotypes, one genotype (CoLk 15469) was rated as MS to CF08 and S to CF07, while genotype (CoP 15440) was rated as MS to CF07 and S to CF08. In nodal method all were rated as resistant to both designated pathotypes (Table 21).

NORTH EAST ZONE

BURALIKSON

In IVT early group, all the entries except CoLk 16466 and CoLk 16467 showed MR reactions to CF07. The entries CoLk 16468 and CoBln 16501 showed R reactions to CF08, others were MR. In cotton swab method, all entries showed R reactions except CoP 16436 and CoLk 16466 which showed S reaction against CF07. In IVT (Midlate), CoP 16439 showed R reaction against both the isolates in both the method. In AVT early group, CoLk 15467 showed MR to CF07 in plug method but R to CF08 to both the isolates in cotton swab method. In AVT early second plant, CoP 14437 was rated as R in CF07 in plug and cotton swab method, but moderately susceptible to CF08 in plug method. In AVT Midlate CoLk 15469 showed R reaction to CF07 in plug method but MR to CF08 (Table 22).

EAST COAST ZONE

ANAKAPALLE

Thirty four entries were tested for their reaction to the pathotype CF06 by plug and cotton swab methods of inoculation. In plug method, fourteen entries *viz*., CoA 17321, CoA 17322, CoA 17323, CoC 17336, CoA 17324, CoC 17337, CoOr 17346, PI 17337, CoA 16321, CoV 16357, CoC 15336, CoOr 15346, CoA 92081 and Co 86249 showed R to CF06. In the cotton swab method, out of 34 entries tested, four entries *viz*., Co 419, CoC 671, Co 997, and Co 6907 showed S and the remaining entries reacted as R (Table 23).

CUDDALORE

Among the 21 clones screened for resistance to red rot by plug method using CF06 pathotype the clones *viz*., CoA 17321, CoA 17322, CoA 17323, CoC 17336, CoA 16321, CoC 16337, CoV 16356, CoC 15338, CoV 15356, CoA 17324, CoC 17337, CoOr 17346, PI 17376, PI 17377, CoC 15339, CoOr 15346, CoC 16339 and CoV 16357 were found to be MR, 3 clones *viz*., CoC 16336, CoC 15336 and CoC 16338 were MS to red rot. In cotton swab method all 21 clones were found to be R (Table 24).

PENINSULAR ZONE

NAVSARI

In plug method 47 genotypes were tested using CF06 and CF12. In IVT out of 15 genotypes tested Co 16006, Co 16010, Co 16017, CoN 16071, CoM 16082 and CoR 16142 showed R reaction, 7 genotypes showed MR reaction and 2 showed MS reaction. The clones Co 16006, Co 16017, CoN 16071 and CoM 16082 exhibited R reaction, 10 genotypes showed MR reaction and CoVC 16062 showed MS reaction against CF12. In AVT-I plant out of 15 genotypes tested only one genotype i.e. Co14004 found with R reaction, 12 genotypes were rated MR reaction, Co 14027 and CoSnk 14102 were rated with MS reaction against CF06. Against CF12, Co 14004 showed R reaction, 13 genotypes were MR and CoSnk 14102 was rated as MS. In AVT-II plant, 12 genotypes were recorded as MR and 5 were MS against CF06 whereas two entries *viz.,* Co 13009 and Co 13013 were R, 11

genotypes were MR and 4 genotypes were MS against CF12 pathotype. In cotton swab nodal method all 47 entries exhibited R reaction against both CF06 and CF12 (Table 25).

THIRUVALLA

Out of the 17 entries tested in AVT (II Plant) MR reaction was recorded in eleven varieties *viz.,* Co 13003, Co13009, Co 13013, Co 13020, CoN13073, CoN13072, MS 13081, CoSnk 13101, CoSnk 13103, CoSnk 13106, PI 13132. Against CF12, ten entries *viz.,* Co 13008, Co13009, Co 13013, Co 13020, CoN13073, CoN13072, CoSnk 13101, CoSnk 13103, CoSnk 13106, PI 13132 recorded MR reaction, six clones *viz.,* Co13002, Co 13003, Co 13004, Co 13006, Co 13014, MS 13081 recorded MS reaction and one variety *viz.,* Co 13018 recorded S reaction in plug method of inoculation. In Nodal cotton swab method, all entries except Co 13004, Co 13006, Co 13014 and Co 13018 showed R reaction. In AVT (I Plant), out of the 15 entries, two *viz.,* Co 14012, CoT l14111 exhibited MR reaction, ten entries *viz.,* Co 14002, Co 14004, Co 14016, Co 14030, Co 14032, CoN 14073, CoSnk 14103, CoT 14367, CoVc 14062, MS 14082 exhibited MS reaction, one entry Co 14027 exhibited S reaction against CF06 in plug method of inoculation. In plug method against CF12, three entries *viz.,* Co 14002, Co 14012, CoT l14111 showed MR reaction, nine entries *viz.,* Co 14004, Co 14016, Co 14030, Co 14032, CoN 14073, CoSnk 14103, CoT 14367, CoVc 14062, MS 14082 showed MS reaction and one entry Co 14027 showed S reaction. In Nodal cotton swab method, eight entries *viz*., Co 14002, Co 14012, Co 14016, CoSnk 14103, CoT 14367, CoT l14111, CoVc 14062 and MS 14082 showed R reaction to both CF06 and CF12. In IVT, out of the fifteen entries, one *viz.,* CoR 16141 exhibited MR reaction, seven entries *viz.,* Co 11015, Co 16006, Co 16010, Co 16018, CoM 16081, CoM 16082, PI 16131 exhibited MS reaction, six entries *viz.,* Co 16009, Co 16017, CoVc 16061, CoVc 16062, CoN 16071, CoVSI 16121 exhibited S reaction against CF06 in plug method. Out of the fifteen entries tested against CF12, by plug method of inoculation, one *viz.,* CoR 16141 showed MR reaction, eleven entries *viz.,* Co 11015, Co 16006, Co 16009, Co 16010, Co 16017, Co 16018, CoN 16071, CoM 16081, CoM 16082, CoVSI 16121, PI 16131 showed MS reaction. In Nodal cotton swab method, six entries *viz*., Co 11015, Co 16006, Co 16018, CoM 16082, CoVSI 16121, CoR 16141 showed R reaction to CF06, and against CF12, all these six entries and PI 16131 showed R reaction (Table 26).

COIMBATORE

About 15 IVT entries were evaluated for red rot resistance by plug and nodal methods against pathotype CF06. Based on disease severity and rating score, 13 and 15 entries were identified as R in plug and nodal methods, respectively. Two entries behaved as MS in plug method and all entries behaved as R in nodal method of inoculation (Table 27).

SUMMARY

The entries showing R or MR to red rot by plug & nodal cotton swab method of evaluation are listed below

NORTH WEST ZONE (Table 13 to 18)

LUCKNOW

IVT (Early)	:	Co 16025, Co 16029, CoLk 16201, CoLk 16202, CoPb 16181, CoPant 16221, CoPant 16222 and CoS 16231
IVT (Midlate)	:	CoLk 16203, CoLk 16204, CoPant 16223, CoS 16232 and CoS 16233
AVT (Early) I Plant	:	Co 15023, Co 15027, CoLk 15201, CoLk 15205 and CoPb 15212
AVT (Early) II Plant	:	CoLk 14201, CoPb 14181 and CoPb 14211
AVT (Midlate) I Plant	:	Co 15026, CoLk 15206, CoLk 15207, CoLk 15209, CoPb 15213, CoS 15232, CoS 15233
AVT(Midlate) II Plant	:	Co 14035, CoH 14261, CoLk 14203, CoLk 14204, CoPb 14184 and

CoPb 14185

SHAHJAHANPUR

IVT (Early)	:	Co 15025, Co 16029, CoLk 16201, CoLk 16202, CoPant 16221, CoPant 16222, CoS 16231
IVT (Midlate)	:	Co 16030, CoLk 16203, CoLk 16204, CoPb 16212, CoPant 16223, CoS 16232, CoS 16233
AVT (Early) I Plant	:	Co 15023, Co 15027, CoLk 15205
AVT (Early) II Plant	:	CoLk 14201, CoPb 14181
AVT (Midlate) I Plant	:	Co 15026, CoLk 15206, CoLk 15207, CoLk 15209, CoPb 15213, CoS 15232, CoS 15233
AVT (Midlate) II Plant	:	Co 14035, CoH 14261, CoLk 14203, CoLk 14204, CoPb 14184, CoPb 14185, CoS 14233

KAPURTHALA

IVT (Early)	:	Co 16029, CoLk 16201, CoPb 16181, CoPant 16222, CoS 16231
IVT (Midlate)	:	CoLk 14201, CoPb 14181, CoPb 14211
AVT (Early) I Plant	:	Co 15023, Co 15027, CoLk 15201, CoLk 15205
AVT (Early) II Plant	:	CoLk 14201, CoPb 14181, CoPb 14211
AVT (Midlate) I Plant	:	Co 15026, CoLk 15206, CoLk 15207, CoLk 15209, CoPb 15213, CoS 15233
AVT (Midlate) II Plant	:	Co 14035, CoH 14261, CoLk 14203, CoLk 14204, CoPb 14184, CoPb 14185

UCHANI

IVT (Early)	:	Co16025, Co16029, CoPb 16181, CoPant 16222, CoS 16231
IVT (Midlate)	:	CoLk 16203, CoLk 16204, CoS 16232, CoS 16233
AVT (Early) I Plant	:	Co 15023, Co 15024, CoLk 15205
AVT (Early) II Plant	:	CoLk 14201, CoPb 14181
AVT (Midlate) I Plant	:	Co 15026, CoLk 15206, CoLk 15207, CoLk 15209, CoPb 15213, CoS 15232, CoS 15233
AVT (Midlate) II Plant	:	Co 14035, CoH 14261, CoLk 14204, CoPb 14184, CoPb 14185, CoS 14233

KARNAL

IVT (Early)	:	Co 15025, Co 16029, CoLk 16201, CoLk 16202, CoPant 16221, CoPant 16222, CoS 16231
IVT (Midlate)	:	Co 16030, CoLk 16203, CoLk 16204, CoLk 16212, CoPant 16223, CoS 16232, CoS 16233
AVT (Early) I Plant	:	Co 15023, Co 15024, Co 15027, CoLk 15205
AVT (Early) II Plant	:	Co 14034, CoLk 14201, CoPb 14181, CoPb 14211
AVT (Midlate) I Plant	:	Co 16030, CoLk 16203, CoLk 16212, CoPant 16223, CoS 16232, CoS 16233
AVT (Midlate) II Plant	:	Co 14035, CoH 14261, CoLk 14203, CoLk 14204, CoPb 14184, CoPb 14185, CoS 14233

PANT NAGAR

IVT (Early)	:	Co 15025, Co 16029, CoPant 16221, CoPant 16222, CoS 16231
IVT (Midlate)	:	Co 16030, CoLk 16203, CoLk 16204, CoPant 16223, CoS 16232
AVT (Early) I Plant	:	Co 15024, CoLk 15205, CoPb 15212
AVT (Early) II Plant	:	CoLk 14201
AVT (Midlate) I Plant	:	Co 15026, CoLk 15206, CoLk 15207, CoLk 15209, CoPb 15213, CoS 15233
AVT (Midlate) II Plant	:	Co 14035, CoH 14261, CoLk 14203, CoLk 14204, CoPb 14184, CoPb

14185, CoS 14233

NORTH CENTRAL ZONE (Table 19 to 21)

PUSA

IVT (Early)	:	CoBln 16501, CoBln 16502, CoLk 16470, CoLk 16468, CoLk 16471, CoP 16437, CoP 16438, CoP 16440, CoP 16439, CoP 16436, CoP 9301, CoSe 16452

MOTIPUR

IVT (Early)	:	CoBln 16501, CoLk 16466, CoLk 16467, CoLk 16468, CoP 16436, CoP 16437
IVT (Midlate)	:	BO 156, CoBln 16502, CoLk 16469, CoLk 16470, CoLk 16471, CoP 16439, CoP 16440, CoSe 16452
AVT (Early) I Plant	:	CoLk 15466, CoLk 15467, CoSe 15455
AVT (Early) II Plant	:	CoLk 14206, CoSe 14451, CoSe 14454
AVT(Midlate) I Plant	:	CoLk 15468, CoLk 15469, CoP 15438, CoP 15439, CoP 15440, CoSe 15454
AVT (Midlate) II Plant	:	CoLk 14208, CoLk 14209, CoP 14438, CoP 14439, CoSe 14455

SEORAHI

IVT (Early)	:	CoLk 16467, CoLk 16468, CoP 16436, CoP 16437, CoSe 16451
IVT (Mid late)	:	CoP 16439, CoP 16440, CoSe 16452, CoSe 16453, CoLk 16471
AVT (Early) I Plant	:	CoLk 15466, CoP 15436, CoSe 15455, CoSe 15452
AVT (Mid late)	:	CoLk 15468, CoP 15438, CoP 15439, CoSe 15454, CoSe 15453

NORTH EAST ZONE (Table 22)

BURALIKSON

IVT (Early)	:	CoBln 16501, CoLk 16468, CoP 16437, CoP 16438
IVT (Midlate)	:	CoBln 16502, , CoP 16440, CoP 16439, CoSe 16452
AVT (Early) I Plant	:	CoLk 15436, CoLk 15466, CoLk 15467
AVT (Early) II Plant	:	CoP 14437
AVT (Midlate) I Plant	:	CoLk 15468, CoLk 15469, CoP 15438, CoP 15439, CoP 15440
AVT (Midlate) II Plant	:	CoLk 14209, CoP 14439

EAST COAST ZONE (Table 23 to 24)

ANAKAPALLE

IVT (Early)	:	CoA 17321, CoA 17322, CoA 17323, CoC 17336
IVT (Midlate)	:	CoA 17324, CoC 17337, CoOr 17346, PI 17376, PI 17377
AVT (Early) I Plant	:	CoA 16321, CoV 16356
AVT (Early) II Plant	:	CoC 15336, CoC 15338, CoV 15356
AVT (Midlate) I Plant	:	CoC 16339, CoC 15339, CoOr 15346, CoV 16357

CUDDALORE

IVT (Early)	:	CoA 17321, CoA 17322, CoA 17323, CoC 17336
IVT (Midlate)	:	CoA 17324, CoC 17337, CoOr 17346, PI 17376, PI 17377
AVT (Early) I Plant	:	CoA 16321, CoC 16337, CoV 16356
AVT (Early) II Plant	:	CoC 15338, CoV 15356
AVT (Midlate) I Plant	:	CoC 15339, CoC 16339, CoOr 15346, CoV 16357

PENINSULAR ZONE (Table 25 to 27)

NAVSARI

IVT (Early)	:	Co 16006, Co 16009, Co 16010, Co 16017, Co 16018, CoN 16071, CoM 16081, CoM 16082, CoR 16141, CoR 16142, CoVc 16061,

		CoVSI 16121, PI 16131
AVT (Early) I Plant	:	Co 14002, Co 14004, Co 14012, Co 14016, Co 14030, Co 14032, CoN 14073, CoSnk 14103, CoT 14367, CoTI 14111, CoVc 14062, MS 14081, MS 14082
AVT (Early) II Plant	:	Co 13002, Co 13003, Co 13004, Co 13006, Co 13009, Co 13013, CoN 13072, CoN 13073, CoSnk 13101, CoSnk 13103, MS 13081, PI 13132

THIRUVALLA

IVT (Early)	:	CoR 16141
AVT (Early) I Plant	:	Co 14012, CoTl 14111
AVT (Early) II Plant	:	Co 13009, Co 13013, Co 13020, CoN 13073, CoN 13072, CoSnk 13101, CoSnk 13103, CoSnk 13106, PI 13132

COIMBATORE

IVT (Early)	:	Co 16006, Co 16009, Co 16010, Co 16017, Co 16018, CoN 16071, CoM 16081, CoM 16082, CoR 16141, CoR 16142, CoVc 16061, CoVSI 16121, PI 16131

PP 17B: EVALUATION OF ZONAL VARIETIES FOR SMUT

Objective: To gather information on the relative resistance of the entries to smut inoculation in zonal trials of the respective zones

Locations:

North West Zone : Lucknow, Kapurthala, Shahjahanapur, Pantnagar
North Central Zone : Pusa, Seorahi
East Coast Zone : Anakapalle, Cuddalore
Peninsular Zone : Coimbatore, Thiruvalla, Navsari and Pune

Year of Start: 1994-95 (continuous project)

Varieties: All the entries of early and midlate group under IVT and AVT of the respective zones. The seed material is to be obtained from the respective breeders of the centre.

Inoculum: *Sporisorium scitamineum* (Syn. *Ustilago scitaminea*) teliospores freshly collected from smut susceptible sugarcane varieties will serve as source of inoculum.

Storage: Freshly collected whips are air dried by keeping under shade and teliospores are collected in butter paper bags and are stored in desiccators under anhydrous calcium chloride. Spore viability is to be ensured before inoculation.

Three budded setts of the test clones/entries to be pre-soaked in smut teliospore suspension (spore load @ 10^6 spores ml^{-1}) for a period of 30 min along with the respective checks/standards for R and S categories and planted in 6m/20' rows. Field observations to be made from the time of whip emergence (around 45 days) at fortnightly intervals and the number of smut infected clumps to be recorded. Evaluation is based on the percentage of clumps infected (No. of affected clumps/total clumps 100). It is required to maintain at least 15 to 20 clumps in each genotype before arriving at the percentage infection.

The following grading was followed for calculating the disease reaction.

0 %	: Resistant (R)
0.1 to 10 %	: Moderately Resistant (MR)
10.1 to 20 %	: Moderately Susceptible (MS)
20.1 to 30 %	: Susceptible (S)
Above 30%	: Highly susceptible (HS)

RESULTS OF THE PREVIOUS YEAR

NORTH WEST ZONE

LUCKNOW

Out of 39 genotypes tested, 12 genotypes *viz.,* Co 15023, Co 15024, Co 13034, CoPb 13181, CoLk 15206, CoLk 15208, CoPb 15213, CoPb 15214, CoS 15231, CoS 15234, Co 14035 and CoH 13263 were rated as R. Six genotypes *viz*., CoLk 15203, CoLk 15205, Co 14034, CoH 14261, CoPb 13182 and CoLk 13204 were rated as MR. Ten genotypes *viz*., CoPb 15211, CoLk 14201, CoPb 14211, CoS 13231, CoS 15232, CoS 15233, CoLk 14203, CoPb 14185, Co 13035 and CoPant 13224 were rated as MS, 7 genotypes *viz*., Co 15027, CoPb 15212, CoPb 14181, CoLk 15207, CoLk 15209, CoLk 14204, CoPb 14184 and CoS 14233 were S and 3 genotypes CoLk 15201, CoLk 15204 and Co 15026 were rated as HS.

SHAHJAHANPUR

Eleven entries tested in IVT (Mid late) and among them six entries Co 15026, CoLk 15206, CoLk 15208, CoPb 15214, CoS 15233 and CoS 15232 were rated as R. In AVT Early

(I Plant), all entries were found MR except Co 14034 which was MS against smut. In AVT Early (II Plant), two entries were observed as R and one CoS 13231 behaved as S against smut. In AVT Mid late (I Plant), the study revealed that five entries CoH 14261, CoLk 14204, CoPb 14185 and CoS 14233 were assessed as R/MR whereas Co 14035, CoPb 14184 and CoLk 14203 were identified as MS against smut. In AVT Mid late (II Plant), three (CoH 13263, CoLk 13204, CoPb 13182) out of five entries were identified as R/MR while Co 13035 and CoPant 13224 rated as MS to smut.

KAPURTHALA

Out of 39 genotypes, three *viz*., Co 15027, CoLk 15207 and CoH 14261 were rated as R and 24 *viz*., Co 15023, Co 15024, CoLk 15201, CoLk 15205, CoPb 15211, CoPb 15212, CoLk 14201, CoPb 14211, CoPb 13181, CoS 13231, CoLk 15206, CoPb 15213, CoPb 15214, CoS 15231, CoS 15232, CoS 15233, CoS 15234, Co 14035, CoLk 14204, CoPb 14184, CoPb 14185, CoS 14233, CoH 13263 and CoPant 13224 were rated as MR. Of the remaining entries, nine genotypes were rated as MS and three entries were rated as S.

PANTNAGAR

Out of 44 genotypes 12 were found R, 8 MR, remaining genotypes showed various degrees of susceptibility, i.e., 11 MS, 10 S and 3 HS.

NORTH CENTRAL ZONE

PUSA

Among 24 entries tested 15 entries *viz*., CoBln 15502, CoLk 15466, CoLk 15467, CoP 15436, CoP 15437, CoSe 15451, CoLk 94184, CoLk 15468, CoP 06436, CoP 9301, CoP 15438, CoP15439, CoSe 01421, CoSe 15454, CoSe 15457 were graded as R, whereas, 9 entries *viz*., CoBln 15501, CoP 15440, CoP 15441, CoLk 15469, CoSe 15452, CoSe 15455, CoSe 15456, CoSe 15453 and BO 91 showed MR reaction against smut disease.

MOTIPUR

Out of 31 genotypes tested, 19 genotypes *viz.,* CoBln 15502, CoLk 15466, CoLk 15467, CoSe 15451, CoLk 14206, CoLk 14208, CoLk 14209, CoLk 15468, CoLk 15469, CoP 14437, CoP 15437, CoSe 14451, CoP 15438, CoP 15439, CoP 14438, CoP 14439, CoSe 15454, CoSe 15457 and CoSe 14455 were rated as R. Nine genotypes *viz.,* CoSe 15452, CoSe 15455, CoSe 15456, CoSe14454, CoP 13437, CoSe 13451, CoSe 13452, CoP 15441 and CoSe 15453 were rated as MR.

SEORAHI

In IVT (Early), among 9 genotypes evaluated 6 were rated as R, 1 as MR, CoP 15436 as MS and CoBln 15501 as S. In IVT (Mid late), 10 genotypes were evaluated, of which 7 were rated as R, two as MR and CoP 15440 as MS. In AVT (Early), 4 clones were evaluated and in that 1 genotype (CoP 14437) was rated as S and rest of the genotypes were found as R/MR. In AVT (Mid late), 5 were evaluated and the genotype CoP 14438 was rated as MS, while reamaining genotypes was found as R/MR.

EAST COAST ZONE

ANAKAPALLE

Out of 33 genotypes tested, 1 entriy and 3 standards showed R reaction (Co 13023, CoC 01061, Co 06030 and Co 86249), while 7 entries and 2 standards showed MR reaction (Co 7219, Co 13029, Co 13031, CoA 14321, CoC 16337, CoC 16339, CoC 14337, CoV 16356 and CoV 92102) and the remaining entries showed MS to HS reaction.

CUDDALORE

Among 20 entries screened 6 clones *viz*., CoA 16321, CoV 16356, CoC 15336, CoC 15338, CoC 16339 and CoC 14337 were found MR, nine *viz*., Co 13023, Co 13028, Co 13031, CoA 14321, CoA 16322, CoC 16336, CoC 16337, CoV 16357, PI 14377 were MS and

four clones *viz*., CoV 15356, CoC 14336, CoC 16338 and Co 13029 were S and one clone CoA 14323 was found to be HS.

PENINSULAR ZONE

KOLHAPUR

Out of 51 genotypes/entries in ZVT, 5 genotypes *viz*., Co 15006, Co 15015 and Co 15017 from IVT and Co 13002 and CoN 13073 from AVT I were found to be R to smut. In total, 35 genotypes were found to be MR, whereas, 6 genotypes were MS and 7 genotypes *viz*., Co 15007, CoSnk 15102 and Co 15020 (from IVT) and Co 12007 and Co 12008 (from AVT II plant) were found S to smut.

PUNE

Out of 49 genotypes including 2 standard checks screened, 21 genotypes *viz.,* Co 12012, Co 12019, Co 13002, Co 13003, Co 13004, Co 13006, Co 13008, Co 13014, Co 13020, Co 15009, Co 15010, Co 15018, Co 15020, Co 15021, CoN 15071, MS 13081, CoSnk 13103, CoSnk 13106, CoM 12085, CoVc 15061 and CoVSI 15121 were found R, 3 *viz.,* Co 15007, CoN13073 and VSI 12121 were found MR, 15 were found MS, 5 were S and remaining 5 were HS.

NAVSARI

Out of 51 entries evaluated 32 entries exhibited R reaction *viz*., Co 12007, Co 12012, Co 12019, Co 12024, Co 13002, Co 13003, Co 13008, Co 13009, Co 13013, Co 13018, Co 15002, Co 15005, Co 15006, Co 15009, Co 15010, Co 15015, Co 15017, Co 15018, CoN 15071, CoN 13072, CoN 13073, CoM 12085, CoSnk 13101, CoSnk 15104, CoVc 15061, VSI 15122, CoVc 15063, CoVc 15064, MS 13081, PI 15131, PI 15132 and PI 13132. Similarly eight entries *viz*., Co 14005, CoVSI 15121, Co 15021, CoN 15072, CoSnk 15103, Co 13004, Co 13020 and Co 12008 showed MR reaction, 7 entries Co 12009, Co 13006, CoSnk 15102, CoVC 15062, CoSnk 13103, CoSnk 13106 and VSI 12121 exhibited MS reaction and rest of the entries showed S to HS reaction.

COIMBATORE

About 20 IVT entries were screened for smut resistance and among them three entries *viz*., Co 15006, Co 15009 and Co 15015 were rated as R to smut.

RESULTS OF THE CURRENT YEAR

NORTH WEST ZONE

LUCKNOW

Out of 40 genotypes tested, 20 entries *viz.,* Co 14034, Co 14035, Co 15023, Co 15024, Co 16025, Co 16029, Co 16030, CoLk 15201, CoLk 15205, CoLk 14201, CoLk 16203, CoS 16233, CoLk 15206, CoLk 15207, CoPant 16221, CoPant 16222, CoPb 14211, CoPb 15213, CoLk 14203 and CoS 15233 were rated as R. Ten genotypes *viz*., Co 15026, CoH 14261, CoLk 16202, CoS 16231, CoPb 14181, CoLk 16204, CoPant 16223, CoS 16232, CoPb 14184 and CoPb 14185 were rated as MR, 4 genotypes namely Co 15027, CoPb 16181, CoPb 16212 and CoS 15232 were rated as MS and 4 genotypes namely CoLk 14204, CoLk 16201, CoPb 16211 and CoS 14233 were rated as S and 2 genotypes CoLk 15209 and CoPb 15212 were rated as HS (Table 13).

SHAHJAHANPUR

In IVT (Early), out of nine entries 7 exhibited R to MR reaction, 2 entries CoLk 16201 and CoPb 16211 were found as S and MS, respectively. In IVT (Mid late), four entries were screened as MR and two were identified as MS and one entry CoLk 16204 was rated as S. In AVT Early (I Plant), out of six entries 4 were observed as R and two were MS. In AVT Early (II Plant), four entries were evaluated in that 2 were observed as R two behaved as S and MS, respectively. In AVT Mid late (I Plant), out of seven, 3 entries *viz*; CoLk 15206, CoS

15232, CoS 15233 were rated as R/MR, whereas three entries showed MS and one was rated as S. In AVT Mid late (II Plant), three out of seven entries were identified as R/MR, 3 as MS and one as S (Table 14).

KAPURTHALA

Out of 40 genotypes, three namely Co 15025, Co 16030 and CoPb 16181 were rated as R and 25 genotypes *viz*., Co 15023, Co 15024, Co 15027, CoLk 14204, CoLk 15206, CoLk 15207, Co 16029, CoH 14261, CoLk 16201, CoLk 16202, CoLk 16203, CoPb 16211, CoPant 16221, CoPant 16222, CoPant 16223, CoPb 15212, CoPb 14211, CoPb 16212, CoS 16232, CoPb 15213, CoPb 14184, CoPb 14185, CoS 14233 CoS 15233 and CoS 16231 were rated as MR. Of the remaining entries, 11 were rated as MS and one entry was rated as S (Table 15).

UCHANI

In IVT (early) out of nine 2 entries *viz*. Co 16029 and CoPant 16222 were found to be R and 5 namely Co 16025, CoLk 16202, CoPb 16211, CoPb 16181 and CoPant 16221 showed MR reaction. In IVT (midlate) out of Seven entries 1 entry Co 16030 showed R reaction and CoLk 16203, CoLk 16204, CoPb 16212, CoPant 16223, CoS 16232 and CoS 16233 exhibited MR reaction. In AVT (early) Plant I, 6 genotypes were evaluated and out of which 4 entries *viz*. Co 15023, CoLk 15201, CoLk 15205 and CoPb 15212 were found MR. In AVT (early) Plant II, 4 genotypes were evaluated, in that only CoLk 14201 was found R and 2 entries Co 14034 and CoPb 14181 showed MR reaction. In AVT (Mid late) Plant I out of seven entries 4 entries *viz*., CoLk 15206, CoLk 15207, CoPb 15213 and CoS 15233 showed MR reaction. In AVT (Midlate) Plant II, out of 7 entries CoH 14261 was found R and entries Co 14035, CoLk 14203, CoPb 14184, CoPb 14185 and CoS 14233 showed MR reaction (Table 16).

PANTNAGAR

Out of 46 genotypes screened 22 were found R, 13 were MR, 4 were MS, 1 was S and 6 were HS (Table 18).

NORTH CENTRAL ZONE

PUSA

Twenty three sugarcane varieties were evaluated and it was observed that eleven entries *viz*., BO 91, CoBln 16501, CoBln 16502, CoLk 16470, CoLk 16468, CoLk 16471, CoLk 94184, CoP 16437, CoP 16439, CoP 9301, and CoSe 16451 were rated as R, whereas twelve entries *viz*., BO 156, CoLk 16466, CoLk 16467, CoLk 16469, CoP 16438, CoP 16440, CoP 16436, CoP 2061, CoSe 01421, CoSe 16452, CoSe 16453 and CoSe 95422 were graded as MR (Table 19).

MOTIPUR

Out of thirty eight genotypes tested, 22 genotypes *viz.,* CoBln 16501, CoBln 16502, CoP 16436, CoP 16437, CoLk 15466, CoLk 15467, CoLk 14206, CoP 14437, CoLk 16470, CoLk 16471, CoLk 15468, CoLk 15469, CoP 15438, CoP 15439, CoSe 15454, CoLk 14208, CoLk 14209, CoP 14438, CoP 14439 and CoSe 14451, CoSe 14455 and CoSe 16451 were rated as R. Thirteen genotypes *viz.,* BO 156, CoLk 16466, CoLk 16467, CoLk 16468, CoP 16438, CoP 16440, CoSe 14452, CoSe 15455, CoSe 14454, CoLk 16469, CoSe 16452, CoSe 16453 and CoSe 15453 were rated as MR. Three genotypes *viz.,* CoP 15440, CoP 16439 and CoP 15436 were rated as MS and 5 genotypes *viz.,* CoLk 16470, CoP 15440, CoP 16438, CoSe 15452 and CoSe 16452 and were rated as S (Table 20).

SEORAHI

In IVT (Early) 6 genotypes were found as R and 2 genotypes *viz*., CoBln 16501 and CoLk 16466 were rated as S. In IVT (Mid late) out of 9 genotypes 3 were found as R, 3 genotypes were MS and 3 genotypes were S. In AVT (Early) out of five genotypes 2 were

found R, while 3 were rated as S. In AVT (Mid-late) out of 7 genotypes 4 were found as R, 2 genotypes were MS, while one genotype was rated as S (Table 21).

EAST COAST ZONE

ANAKAPALLE

Out of 34 genotypes tested, one genotype (Co 06030) was found R, while eight entries *viz*., CoC 17337, CoOr 17346, CoC 16336, CoOr 15346, CoC 16339, CoC 01061, CoV 92102 and Co 86249 showed MR reaction and the remaining entries showed MS, S and HS reaction (Table 23).

CUDDALORE

Among 21 clones screened for resistance to smut six clones *viz.,* CoA 16321, CoA 17324, CoC 15338, CoC 16339, CoC 17337 and CoOr 15346 were MR, 10 clones *viz*., CoA 17322, CoA 17323, CoC 17336, CoC 16336, CoC 16337, CoV 16356, CoC 15336, CoOr 17346, CoC 15339 and PI 17377 were MS, 3 clones *viz*., CoA 17321, CoC 16338 and CoV 16357 were S and 2 clone *viz.,* PI 17376 and CoV 15356 were HS (Table 24).

PENINSULAR ZONE

NAVSARI

Among 47 genotypes tested, twenty five genotypes *viz.,* Co 11015, Co 13002, Co 13003, Co 13008, Co 13009, Co 13013, Co 13018, Co 14032, Co 16006, Co 16009, Co 16010, Co 16017, Co 16018, CoM 16081, CoN 13072, CoN 16071, CoN 14073, CoR 16142, CoSnk 13101, CoT 14367, MS 13081, CoN 13073, CoVc 16061, CoVc 16062 and PI 13132 were rated as R. Seven genotypes namely Co 13004 and Co 13020, Co 14002, Co 14030, CoSnk 14102, CoSnk 14103 and MS 14082 were rated as MR. Six genotypes *viz.,* Co 13006, CoR 16141, CoSnk 13103, CoSnk 13106, PI 16131 and MS 14082 were exhibited as MS. Five genotypes *viz.,* Co 13014, Co 14004, CoM 16082, CoVSI 16121 and CoVc 14062 were found as S and 4 genotypes namely Co 14012, Co 14016, Co 14027 and CoTI 14111 were rated as HS (Table 25).

PUNE

Forty-eight entries were screened for resistance to smut disease and out of these 33 genotypes *viz.,* Co 13008, Co 13004, Co 13003, Co 13006, Co 13020, Co 14002, Co 14005, Co 14012, Co 14032, Co 15009, Co 15010, Co 16006, Co 16010, CoM 16081, CoM 16082, CoN 12073, CoN 14073, CoN 16071, CoSnk 13106, CoSnk 13103, CoSnk 14103, CoT 14367, CoSnk 14102, Co 14030, CoVc 15061, CoVc 16062, CoVSI 16121, CoR 16141, CoTL 14111, MS 13081, MS 14082 and PI 16131 were reacted as R, 7 genotypes *viz.,* Co 16017, Co 16018, CoR 16142, CoVc 14062, CoVc 15063, CoVc 16061 and MS 14081 were MR, 2 genotypes *viz.,* Co 14027 and Co 14004 were MS, 5 genotypes *viz.,* Co 14016, Co 15021, Co 16009, Co 16015 and Co7219 were S and Co 740 reacted as HS (Table 28).

COIMBATORE

Among the 15 IVT entries evaluated for smut, four entries *viz*., Co 16018, CoM 16081, CoR 16142 and CoVc 16062 were identified as R, whereas one entry CoM 16082 was identified as MR (Table 27).

SUMMARY

Entries showing R and MR against smut are as follows

NORTH WEST ZONE (Table 13 to 16 and Table 18)

LUCKNOW

IVT (Early)	:	Co 16025, Co 16029, CoLk 16202, CoPant 16221, CoPant 16222, CoS 16231
IVT (Midlate)	:	Co 16030, CoLk 16203, CoLk 16204, CoPant 16223, CoS 16232, CoS

16233

AVT (Early) I Plant : Co 15023, Co 15024, CoLk 15201, CoLk 15205

AVT (Early) II Plant : Co 14034, CoLk 14201, CoPb 14181, CoPb 14211

AVT (Midlate) I Plant : Co 15026, CoLk 15206, CoLk 15207, CoPb 15213, CoS 15233

AVT (Midlate) II Plant : Co 14035, CoH 14261, CoLk 14203, CoPb 14184, CoPb 14185

SHAJAHANPUR

IVT (Early) : Co 15025, Co 16029, CoLk 16202, CoPb 16181, CoPant 16221, CoPant 16222, CoS 16231

IVT (Midlate) : Co 16030, CoLk 16203, CoPant 16223, CoS 16232

AVT (Early) I Plant : Co 15023, Co 15024, Co 15027, CoPb 15212

AVT (Early) II Plant : Co 14034, CoLk 14201

AVT (Midlate) I Plant : CoLk 15206, CoS 15232, CoS 15233

AVT (Midlate) II Plant Co 14035, CoH 14261, CoPb 14185

KAPURTHALA

IVT (Early) : Co 15025, Co 16029, CoLk 16201, CoLk 16202, CoPb 16211, CoPb 16181, CoPant 16221, CoPant 16222, CoS 16231

IVT (Midlate) : Co 16030, CoLk 16203, CoPb 16212, CoPant 16223, CoS 16232

AVT (Early) I Plant : Co 15023, Co 15024, Co 15027, CoPb 15212

AVT (Early) II Plant : CoPb 14211

AVT (Midlate) I Plant : CoLk 15206, CoLk 15207, CoPb 15213, CoS 15233

AVT (Midlate) II Plant : CoH 14261, CoLk 14204, CoPb 14184, CoPb 14185, CoS 14233

UCHANI

IVT (Early) : Co 16025, Co 16029, CoLk 16202, CoPb 16211, CoPb 16281, CoPant 16221, CoS 16231

IVT (Midlate) : Co 16030, CoLk 16203, CoLk 16204, CoPb 16212, CoPant 16223, CoS 16232, CoS 16233

AVT (Early) I Plant : Co 15023, Co 15024, Co 15027, CoLk 15201, CoLk 15205, CoPb 15212

AVT (Early) II Plant : Co 14034, CoLk 14201, CoPb 14181

AVT (Midlate) I Plant : CoLk 15206, CoLk 15207, CoPb 15213, CoS 15233

AVT (Midlate) II Plant : Co 14035, CoH 14261, CoLk 14203, CoPb 14184, CoPb 14185, CoS 14233

PANT NAGAR

IVT (Early) : Co 15025, Co 16029, CoLk 16202, CoPant 16221, CoPant 16222, CoS 16231, CoPb 16181

IVT (Midlate) : Co 16030, CoLk 16204, CoPant 16223, CoS 16233

AVT (Early) I Plant : Co 15024, Co 15027, CoLk 15201, CoLk 15205, CoPb 15212

AVT (Early) II Plant : Co 14034, CoLk 14201, CoPb 14211

AVT (Midlate) I Plant : CoLk 15206, CoLk 15207, CoPb 15213, CoS 15233

AVT (Midlate) II Plant : Co 14035, CoH 14261, CoLk 14204, CoPb 14184, CoS 14233

NORTH CENTRAL ZONE (Table 19 to 21)

PUSA

: CoBln 16501, CoBln 16502, CoLk 16470, CoSe 16451, CoSe 16452, CoSe 16453, CoLk 16468, CoLk 16471, CoLk 16466, CoLk 16467, CoLk 16469, CoP 16437, CoP 16438, CoP 16439, CoP 16440, BO 156, CoP 16436, CoP 9301

MOTIPUR

IVT (Early) : CoBln 16501, CoP 16436, CoP 16437, CoP 16438, CoLk 16466, CoLk

16467, CoLk 16468, CoSe 16451

IVT (Midlate) : CoBln 16502, CoP 16439, CoP 16440, BO 156, CoLk 16469, CoLk 16470, CoLk 16471, CoSe 16452, CoSe 16453

AVT (Early) I Plant : CoLk 15466, CoLk 15467, CoSe 15452, CoSe 15455

AVT (Early) II Plant : CoLk 14206, CoP 14437, CoSe 14451, CoSe 14454

AVT (Midlate) I Plant : CoLk 15468, CoLk 15469, CoP 15438, CoP 15439, CoSe 15453, CoSe 15454

AVT (Midlate) II Plant : CoLk 14208, CoLk 14209, CoP 14438, CoP 14439, CoSe 14455

SEORAHI

IVT (Early) : CoP 16436, CoP 16437, CoP 16438, CoLk 16467, CoLk 16468, CoSe 16451

IVT (Mid late) : CoP 16440, BO 156, CoSe 16452

AVT (Early) I Plant : CoP 15436, CoSe 15452

AVT (Midlate) I Plant : CoP 15438, CoP 15439, CoP 15440, CoSe 15454

EAST COAST ZONE (Table 23 and 24)

ANAKAPALLE

IVT (Early) : Nil

IVT (Midlate) : CoC 17337, CoOr 17346

AVT (Early) I Plant : CoC 16336

AVT- (Early) II Plant : Nil

AVT- (Midlate) I Plant : CoOr 15346, CoC 16339

CUDDALORE

IVT (Early) : Nil

IVT (Midlate) : CoA 17324, CoC 17337

AVT (Early) I Plant : CoA 16321

AVT- (Early) II Plant : CoC 15338

AVT- (Midlate) I Plant : CoC 16339, CoOr 15346

PENINSULAR ZONE (Table 25 and 27 to 28)

PUNE

IVT (Early) : Co16006, Co 16010, CoM 16081, CoM 16082, CoN 16071, CoR 16141, CoVSI 16131, CoVc 16062, PI 16131

AVT (Early) I Plant : Co14002, Co 14012, Co 14030, Co 14032, CoN 14073, CoSnk 14102, CoSnk 14103, CoT 14367, CoT 14111, MS 14082

AVT (Early) II Plant : Co 13002, Co 13003, Co 13004, Co 13006, Co 13008, Co 13009, Co 13013, Co 13014, Co 13018, CoN 13072, CoN 13073, CoSnk 13101, CoSnk 13103, CoSnk 13106, MS 13081

NAVSARI

IVT(Early) : Co 11015, Co 16006, Co 16009, Co 16010, Co 16017, Co 16018, CoM 16081, CoN 16071, CoR 16142, CoVc 16061, CoVc 16062

AVT(Early) I Plant : Co 14030, Co 14032, CoN 14073, CoSnk 14102, CoSnk 14103, CoT 14367, MS 14081

AVT(Early) II Plant : Co 13002, Co 13003, Co 13004, Co 13008, Co 13009, Co 13013, Co 13018, Co 13020, CoN 13072, CoN 13073, CoSnk 13101, MS 13081, PI 13132

COIMBATORE

: Co 16018, CoM 16081, CoM 16082, CoR 16142, CoVc 16062

PP 17C: EVALUATION OF ZONAL VARIETIES FOR WILT

Location : Lucknow, Kapurthala, Pusa, Motipur, Anakapalle, Navsari

Year of Start : 2000-2001

Varieties : Entries of AVT of the respective zones for the year

Plot size and Planting: Two rows of 5m length planted under wilt sick soils

Standards : Any wilt susceptible and resistant variety of the zone.

Observations: 1. Germination count at 45 days of planting

2. Appearance of wilt symptoms on the standing canes (on clumps)

3. At the end of 10 months, 10 clumps are to be uprooted with roots. All canes from the clumps will be split open longitudinally and the wilt severity index scored on a 0-4 scale.

Evaluation : 0-4 Scale of wilt severity index

Grade	Symptoms
0	Healthy canes and roots with no external or internal symptoms of wilt.
1	No wilting or drying of leaves, no stunting or shrinking of the stalk or rind, slight pith formation with yellow discolouration of the internal tissues in one or two lower internodes only. No cavity formation or fungal growth seen. Apparently normal and healthy roots.
2	Mild yellowing of top leaves and drying of lower leaves, mild stunting and shrinking of the stalk and rind. Yellowish discolouration of the internal tissues extends to three or four bottom internodes. Slight cavity formation of the pith, no fungal growth seen, slightly discoloured roots.
3	Mild yellowing of top leaves and drying of lower leaves, mild stunting and shrinking of the stalk and rind. Light brown discolouration of the internal tissues throughout the entire length of the cane except the top. Severe pith and cavity formation. Sparse fungal growth observed in the pith cavities.
4	Complete yellowing and drying of the leaves, marked stunting, shrinking and drying of the stalk and rind, dark brown discolouration of the internal tissues extending throughout the entire length of the cane. Large pith cavities with profuse over growth of the associated fungi. Most of the roots necrotic with dark discoloration and dislodge easily from the stalks. Roots mildly discoloured and slightly necrotic.

The mean wilt severity index is worked out based on the number of canes sampled.

Mean wilt severity index = Sum of wilt indices of individual stalks/Number of stalks sampled

Note: Varieties were screened for wilt resistance in wilt sick plot.

RESULTS OF THE PREVIOUS YEAR

LUCKNOW

Out of 39 genotypes tested, 10 genotypes *viz*., Co 14034, Co 15023, Co 15026, CoPb 14185, CoPb 15211, CoPb 15213, CoPb 15214, CoS 13231, CoS 14233 and CoS 15231, were found S to wilt. Remaining 29 genotypes *viz*., Co 13034, Co 13035, Co 14035, Co 15024, Co 15027, CoH 13263, CoH 14261, CoLk 13204, CoLk 14201, CoLk 14203, CoLk 14204, CoLk 15201, CoLk 15203, CoLk 15204, CoLk 15205, CoLk 15206, CoLk 15207, CoLk 15208, CoLk 15209, CoPant 13224, CoPb 13181, CoPb 13182 CoPb 14181, CoPb 14184, CoPb 14211, CoPb 15212, CoS 15232, CoS 15233 and CoS 15234 were found R.

KAPURTHALA

Among the 39 evaluated genotypes, 22 were R to wilt, 14 (Co 13034, Co 13035, Co 14035, Co 15024, CoLk 13204, CoLk 14203, CoPant 13224, CoPb 13182 CoPb 14181, CoPb 14184, CoPb 14185, CoPb 15214, CoS 13231 and CoS 14233) were MR and three viz., Co 14034, CoH 13263 and CoPb 14211 were MS.

PUSA

Among 24 entries evaluated, eight (CoLk 15466, CoLk 15467, CoP 9301, CoP 06436 CoP 15436, CoP 15437, CoP 15438 and CoP 15439) were found free from wilt, whereas, 11 entries (BO 91, CoBln 15502, CoLk 94184, CoLk 15454, CoLk 15469, CoP 15441, CoSe 01421, CoSe 15451, CoSe 15452, CoSe 15455 and CoSe 15457) were graded as MR, four entries (CoBln 15501, CoSe 15456, CoLk 15468 and CoP 15440) were found as MS and entry CoSe 15453 showed S reaction to wilt.

MOTIPUR

Out of 31 genotypes tested under natural condition, three genotypes viz., CoSe 15452, CoSe 13451 and CoBln 15502 were rated as S to wilt. Remaining 28 genotypes viz., CoBln 15501, CoLk 14206, CoLk 14208, CoLk 14209, CoLk 15466, CoLk 15467, CoLk 15468, CoLk 15469, CoP 13437, CoP 14437, CoP 14438, CoP 14439 CoP 15436, CoP 15437, CoP 15438, CoP 15439, CoP 15440, CoP 15441, CoSe 13452, CoSe 14451, CoSe 14454, CoSe 14455, CoSe 15451, CoSe 15453, CoSe 15454, CoSe 15455, CoSe 15456 and CoSe 15457 were found resistance (R) to wilt.

ANAKAPALLE

Out of 33 genotypes tested, six entries (Co 86249, Co 06030, Co 13031, CoC 01061, CoOr 03151 and CoV 15356) showed R reaction while 12 entries (Co 7706, Co 13023, Co 13028, CoA 14321, CoA 89085, CoA 14323, CoC 14337, CoC 16337, CoC 16338, CoC 16339, CoV 16357 and PI 14337) reacted as MR and remaining showed S to HS reaction.

NAVSARI

Out of 25, 17 entries viz., Co 12009, Co 12024 Co 13002, Co 13004, CO 13006, Co 13008, Co 13009, Co 13013, Co 13018, Co 13020, CoN 13072, CoN 13073, CoSnk 13101, CoSnk 13106, MS 13081, PI 13132 and VSI 12121 showed MR reaction. Six entries viz., Co 12007, Co 12019, Co 13003, Co 13014, CoSnk 13103 and CoM 12085 exhibited MS reaction to wilt.

RESULTS OF THE CURRENT YEAR

LUCKNOW

Out of 38 genotypes tested under natural conditions, five genotypes viz., CoLk 16470, CoP 15440, CoP 16438, CoSe 15452 and CoSe 16452 were rated as susceptible (S) to wilt. Remaining 33 genotypes were found R against wilt of sugarcane (Table 13).

KAPURTHALA

Among 40 evaluated genotypes, 18 namely Co 15027, CoH 14261, CoLk 14201, CoLk 14204, CoLk 15201, CoLk 15205, CoLk 15206, CoLk 15207, CoLk 15209, CoLk

16201, CoLk 16203, CoPant 16221, CoPb 15212, CoPb 15213, CoPb 16181, CoS 15233, CoS 16231 and CoS 16233 behaved as R and 15 genotypes viz., Co 14035, Co 15024, Co 15026, Co 16029, CoLk 14203, CoLk 16202, CoLk 16204, CoPant 16223, CoPb 14181, CoPb 14184, CoPb 14185 , CoPb 16211, CoPb 16212, CoS 14233 and CoS 16232 as MR (Table 15).

PUSA

Among 23 evaluated entries single entry (CoSe 16451) was free from wilt whereas, 17 entries (BO 91, CoBln 16501, CoBln 16502, CoLk 16466, CoLk 16468, CoLk 16469, CoLk 16471, CoLk 16477, CoLk 94184, CoP 16436 , CoP 16437, CoP 16439, CoP 16440, CoP 2061, CoP 9301, CoSe 01421 and CoSe 16452) were graded as MR., the remaining five entries (BO 156, CoLk 16467, CoP 16438, CoSe 16453 and CoSe 95422) showed MS reaction against wilt (Table 19).

MOTIPUR

Out of 38 genotypes tested under natural condition, five genotypes *viz.,* CoLk 16470, CoP 15440, CoP 16438, CoSe 15452 and CoSe 16452 were rated as S to wilt and remaining 33 genotypes were found R against wilt (Table 20).

ANAKAPALLE

Out of 32 genotypes tested, seven entries (Co 86249, Co 01061, Co 06030, CoOr 03151, CoV 15356, PI 17376 and PI 17377) showed R, while four entries CoC 15339, CoC 16337, CoC 16338, CoOr 15346 reacted as MR and the remaining showed S to HS reaction (Table 23).

NAVSARI

Among the 32 genotypes tested under wilt sick plot, only Co 14004 genotype was found R to wilt while 25 genotypes *viz.,* Co 13002, Co 13003, Co 13004, Co 13006, Co 13008, Co 13009, Co 13013, Co 13020, Co 14002, Co 14012, Co 14016, Co 14030, Co 14032, CoN 13072, CoN 13073, CoN 14073, CoSnk 13101, CoSnk 13103, CoSnk 14102, CoT 14367, CoTI 14111, CoVc 14062, MS 13081, MS 14081 and PI 13132 were found MR to wilt, where as six genotypes *viz.,* Co 13014, Co 13018, Co 14027, CoSnk 13106, CoSnk 14103 and MS 14082 showed MS to wilt (Table 25).

SUMMARY

The entries showing R or MR to wilt are listed below

LUCKNOW

IVT (Early)	:	Co 16025, CoLk 16202, CoPb 16181, CoPant 16221, CoPant 16222
AVT (I Plant, Early)	:	Co 15023, Co 15024, CoLk 15201, CoLk 15205, CoPb 15212
AVT (II Plant, Early)	:	Co 14034, CoPb 14181, CoPb 14211
IVT (Mid Late)	:	Co 16030, CoLk 16203, CoLk 16204, CoPb 16212, CoS 16232, CoS 16233
AVT (I Plant Midlate)	:	Co 15026, CoLk 15206, CoLk 15207, CoLk 15209, CoS 15232, CoS 15233
AVT (II Plant midlate)	:	Co 14035, CoH 14261, CoLk 14204, CoPb 14184, CoPb 14185

KAPURTHALA

IVT (Early)	:	Co 16029, CoLk 16201, CoLk 16202, CoPb 16211, CoPb 16181, CoPant 16221, CoS 16231
AVT (I Plant, Early)	:	Co 15024, Co 15027, CoLk 15201, CoLk 15205, CoPb 15212
AVT (II Plant, Early)	:	CoLk 14201, CoPb 14181
IVT (Mid Late)	:	CoLk 16203, CoLk 16204, CoPb 16212, CoPant 16223, CoS 16232, CoS 16233

AVT (I Plant midlate)	:	Co 15026, CoLk 15206, CoLk 15207, CoLk 15209, CoPb 15213, CoS 15233
AVT (II Plant midlate)	:	Co 14035, CoH 14261, CoLk 14203, CoLk 14204, CoPb 14184, CoPb 14185, CoS 14233

PUSA

IVT (Early)	:	CoBln 16501, CoLk 16466, CoLk 16468, CoP 16436, CoP 16437, CoSe 16451
IVT (Midlate)	:	CoBln 16502, CoLk 16469, CoLk 16470, CoLk 16471, CoP 16439, CoP 16440, CoSe 16452

MOTIPUR

IVT (Early)	:	CoP 16436, CoP 16437, CoLk 16466, CoLk 16467, CoLk 16468, CoSe 16451, CoBln 16501
AVT (I Plant, Early)	:	CoLk 15466, CoLk 15467, CoP 15436, CoSe 15455
AVT (II Plant, Early)	:	CoLk 14206, CoP 14437, CoSe 14451, CoSe 14454
IVT (Mid Late)	:	CoP 16439, CoP 16440, BO 156, CoLk 16469, CoLk 16471, CoSe 16453, CoBln 16502
AVT (I Plant midlate)	:	CoLk 15468, CoLk 15469, CoP 15438, CoP 15439, CoSe 15453, CoSe 15454
AVT (II Plant midlate)	:	CoLk 14208, CoLk 14209, CoP 14438, CoP 14439, CoSe 14455

ANAKAPALLE

AVT (I Plant, Early)	:	CoC 16337
AVT (II Plant, Early)	:	CoV 15356
IVT (Mid Late)	:	PI 17376, PI 17377
AVT (II Plant midlate)	:	CoC 15339, CoC 16338, CoOr 15346

NAVSARI

AVT (I Plant, Early)	:	Co 14002, Co 14004, Co 14012, Co 14016, Co 14027, Co 14030, Co 14032, CoN 14073, CoSnk 14102, CoT 14367, CoTI 14111, CoVc 14062, MS 14081
AVT (II Plant, Early)	:	Co 13002, Co 13003, Co 13004, Co 13006, Co 13008, Co 13009, Co 13013, Co 13020, CoN 13072, CoN 13073, CoSnk 13101, CoSnk 13103, MS 13081, PI 13132

PP 17D: YELLOW LEAF (YL)

YL disease symptoms of mid rib yellowing are expressed during 6-8 months crop stage. If disease severity increases, the yellowing spreads to laminar region and later there will be drying of affected mid rib and adjoining laminar tissue from leaf tip downwards along the mid rib. Another important symptom would be bunching of leaves in the crown. Highly susceptible variety will exhibit severe foliage drying during maturity stage. In place of yellow discoloration, purple or pinkish purple discoloration may also be seen on the mid rib and lamina. Canes of the affected plant do not dry. To assess YL severity, the following 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.

YL severity grades:

(The colour photographs of YL symptoms displaying severity grades are available in the soft copy of the technical programme).

Disease grade	Description
0	No symptom of the disease
1	Mild yellowing of midrib in one or two leaves, no sign of typical bunching of leaves caused by YL
2	Prominent yellowing of midrib on all the leaves in the crown. No bunching of leaves
3	Progress of midrib yellowing to laminar region in the whorl, yellowing on the upper leaf surface, and bunching of leaves
4	Drying of laminar region from leaf tip downwards along the midrib, typical bunching of leaves as a tuft
5	Stunted growth of the cane combined with drying of symptomatic leaves

Mean of the severity grades to be computed and the following YL severity scale is to be used to assign disease reaction of the variety.

YL severity scale:

Disease grade Score	Description 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

RESULTS OF THE PREVIOUS YEAR

LUCKNOW

Out of 39 genotypes tested, 4 genotypes *viz.,* Co 14034, CoPb 15213, CoH 14261 and CoPb 13182 were rated as S against YL, remaining 35 genotypes *viz.,* Co 13034, Co 13035, CoLk 13204, Co 14035, Co 15023, Co 15024, Co 15026, Co 15027, CoH 13263, CoLk 14201, CoLk 14203, CoLk 14204, CoLk 15201, CoLk 15203, CoLk 15204, CoLk 15205, CoLk 15206, CoLk 15207, CoLk 15208, CoLk 15209, CoPant 13224, CoPb 14181, CoPb 14211, CoPb 13181, CoPb 15211, CoPb 15212, CoPb 15214, CoS 13231, CoS 15231, CoS 15232, CoS 15233, CoS 15234, CoPb 14184, CoPb 14185 and CoS 14233 were found R.

SHAHJAHANPUR

Thirty nine entries of the six trials were screened against the incidence of Yellow leaf disease. Study revealed that all entries of six trials were R/MR against YL.

KAPURTHALA

Out of nine entries of IVT (E), 6 were found R while two entries *viz*., Co 15027 and CoPb 15212 were MR and one entry (CoLk 15205) as MS. In AVT (E-I), two entries *viz*., Co 14034 and CoPb 14211 were R and two (CoLk 14201 and CoPb 14181) as MR. In AVT (E-II), two entries (Co 13034 and CoS 13231) were R, while entry CoPb 13181 was found MR. Among 11 entries of IVT (ML), eight *viz*., Co 15026, CoLk 15206, CoLk 15207, CoLk 15209, CoPb 15213, CoS 15231, CoS 15232 and CoS 15234 were R while three entries (CoLk 15208, CoPb 15214 and CoS 15233) were MR. In AVT (ML-I), five entries (Co 14035, CoLk 14204, CoPb 14184, CoPb 14185 and CoS 14233) were R and two (CoH 14261 and CoLk 14203) were MR. In AVT (ML-II), 3 entries viz., CoH 13263, CoPant 13224 and CoPb 13182 were found R whereas entries Co 13035 and CoLk 13204 were MR. None of entry showed S or HS reaction.

UCHANI

Twenty AVT (early & mid late) and 20 IVT (early & mid late) entries of zonal varietal trials along with standard checks were evaluated for resistance to YL. In AVT (early) Plant-1, only CoLk 14201 entry found moderately resistant against YL. Three varieties namely Co 14034, CoPb 14211 and CoPb 14181 showed moderately susceptible reaction to YL. In AVT (Mid late) Plant-1, entries viz., CoH 14261, CoPb 14184, CoPb 14185 and CoS 14233 showed MR reaction to YL. In AVT (Midlate) –II, entry CoH 13263 showed resistant reaction and in IVT (early) four entries viz. Co 15024, Co 15027 CoPb 15211 and CoPb 15212 were found MR against YL. In IVT (mid late), three entries viz., CoLk 15206, CoLk 15207 and CoLk 15209, showed resistant reaction and three entries namely, Co 15026, CoS 15233 and CoS 15234 exhibited moderately resistant against YL.

PANTNAGAR

Out of 43 genotypes, 22 were resistant, 10 were MR, 6 were MS, 4 were S and one was HS against YL.

MOTIPUR

Out of 31 genotypes tested under natural condition, five genotypes *viz.,* CoLk 14209, CoP 15437, CoP 15438, CoSe 13451 and CoSe 15453 were rated as susceptible (S) against YL. Whereas remaining 26 genotypes *viz.,* CoBln 15501, CoBln 15502, CoLk 14206, CoLk 14208, CoLk 15466, CoLk 15467, CoLk 15468, CoLk 15469, CoP 13437, CoP 14437, CoP 14438, CoP 14439, CoP 15436, CoP 15439, CoP 15440, CoP 15441, CoSe 14451, CoSe 14454, CoSe 15451, CoSe 15452, CoSe 15455, CoSe 15456, CoSe 13452, CoSe 15454, CoSe 14455 and CoSe 15457 were found R to YL.

SEORAHI

In, IVT (E), out of nine genotypes six genotypes were rated as resistant, one genotype CoP 15437 as MR and two genotype *viz.* CoBln 15501 and CoLk 15466 were rated as MS to YL. In IVT (Mid-late), eight genotypes exhibited resistance and in AVT (E) of four genotypes evaluated two genotypes exhibited resistance and other two genotypes exhibited moderate resistance. In AVT (Mid late), four genotypes exhibited resistance and one genotype CoP 14438 exhibited MR against to YL.

ANAKAPALLE

Out of 33 genotypes screened under natural conditions, the entries, viz., Co 419, Co 997, Co 6907, Co 7219, Co 7706, Co 06030, Co 13028, Co 13029, Co 13031, CoA 16321, CoA 89085, CoC 671, CoC 16338 and CoV 92102 were found resistant to YL. The

genotypes viz., CoA 92081, CoA 14321, CoA 16332, CoC 14336, CoC 14337, CoC 16336, CoC 16337, CoOr 03151 and PI 14337 were found to be MR against YL.

NAVSARI

A total of 51 entries along with 6 checks were evaluated for resistance to yellow leaf disease. Out of 51 varieties of zonal trial evaluated to YL, 45 entries showed resistant reaction. Four entries viz., Co 12008, Co 12024, Co 13020 and Co 15018 were exhibited moderately resistant reaction. Two entries viz., CoSnk 15104 and PI 15132 displayed susceptible reaction. Amongst six checks three checks viz, Co 94008, CoC 671 and CoSnk 05103 were found resistant and Co 99004 as moderately resistant. Only one check Co 85004 exhibited MS reaction and Co 86032 was observed susceptible reaction to YL.

PUNE

Out of the 14 genotypes genotypes, 6 *viz.*, 14-22, 59-20, 191-3, Co 419, CoM 9057, CoVSI 9805 and MS 10001 were observed free from the disease. Six varieties *viz.*, Co 94012, CoC 671, CoM 0265, VSI 434, and VSI 08005 showed MR reactions, while Co 86032 and CoVSI 03102 reacted as MS.

COIMBATORE

IVT and AVT entries were screened for YL severity based on the 0-5 scale. Of the 26 entries in IVT, 12 entries were apparently free with YL viz. Co 14005, Co 15002, Co 15007, Co 15018, Co 15021, CoN 15071, CoN 15072, CoSnk 15103, CoSnk 15104, CoVc 15061, CoVc 15063, PI 15132, and VSI 15122; three entries, Co 15006, CoVc 15062, and CoVc 15064 had exhibited disease severity grade of more than 3 and the remaining entries had severity grades in the range of 1-3. Out of 17 entries in AVT, 50% of the entries were apparently free from YL and only four entries viz. Co 13013, Co 13004, Co 13018 and CoSnk 13103 had come under the susceptible category with disease severity grades in the range of 2-3. In AVT II plant as well as in ratoon only one entry, Co 12024 was highly susceptible to YL with severity grade more than 3.

RESULTS OF THE CURRENT YEAR

LUCKNOW

Out of 40 genotypes tested under natural conditions, 10 genotypes *viz.,* Co 15027, Co 16029, CoLk 14201, CoLk 14203, CoLk 16201, CoPant 16223, CoPb 15212, CoPb 15213, CoPb 16211 and CoS 16231 were rated as S against YL and remaining 30 genotypes were found R (Table 13).

SHAHJAHANPUR

Among all 40 entries, nine apparently showed no YL and rated as R reaction. Among IVT (E), there were four entries viz. Co 15025, CoPb 16181, CoPb 16211 and CoPant 16222 were found as R and three entries such as Co 16029, CoLk 16202 and CoS 16231 were MR. In IVT (Mid late), of seven entries, CoLk 16204, CoPant 16223 and CoPb 16212 exhibited as MR and CoLk 16203 as R to MR. In AVT Early (I Plant), three entries *viz,* Co 15027, CoLk 15201 and CoLk 15205 were found as R and Co 15023 was observed as MR. In AVT Early (II Plant), all four entries *viz.*, Co 14034, CoLk 14201, CoPb 14181 and CoPb 14211 showed MR reaction. In AVT Mid late (I Plant), one entry CoLk 15206 was rated as R and three entries such as Co 15026, CoLk 15209, CoS 15232 were MR. In AVT Mid late (II plant), the four entries namely Co 14035, CoH 14261, CoLk 14203 and CoPb 14184 were MR against YL (Table 14).

KAPURTHALA

Out of 40 entries, 17 were free from YL and 16 were categorized as MR whereas six were MS. Check entries Co 0238 and CoS 767 showed S and MS to YL (Table 15).

UCHANI

Of the six genotypes from AVT (early) Plant-1, only CoPb 15212 was found MR against YL. In AVT (early) Plant II, two genotypes CoLk 14201 and CoPb 14181 were resistant and one entry Co 14034 was found MR against YL. In AVT (Midlate) Plant-I, two entries *viz*., CoPb 15213 and CoS 15233 were R to YL, 4 genotypes *viz*., CoLk 15206, CoLk 15207, CoLk 15209 and CoS 15232 showed MR reaction against YL. In AVT (Mid late)-II, three genotypes CoH 14261, CoLk 14203 and CoPb 14184 were MR and in IVT (early), CoS 16231 showed resistant reaction and Co-16025 was MR against YL. Out of 7 entries from IVT (midlate), CoS 16233 showed R reaction and four entries namely, Co 16030, CoLk 16203, CoLk 16204 and CoPant 16223 exhibited MR reaction (Table 16).

KARNAL

Among 48 clones screened, 33 were apparently free from the YL symptoms. The disease severity on rest of the clones was observed as MR (Co 0238, Co 05011, CoLk 15201, and CoS 14233), and MS reactions (CoH 14261, CoLk 14203, CoPb 14181, CoPb 14184, CoPb 14185, CoPb 14211, CoPb 15213, CoS 767, CoS 15232 and CoS 15233). ZVT clone CoLk 14204 (AVT-ML-II) expressed S reaction to YL (Table 17).

PANTNAGAR

Out of 46 entries, 12 genotypes were found R, 19 MR and 13 MS and two genotypes were found to be S (Table 18).

PUSA

Out of 23 entries screened against YL disease, two entries (CoLk 16466 and CoLk 16469) showed MS, six entries (BO 156, CoBln 16501, CoLk 16471, CoLk 94184, CoSe 95422 and CoSe 16453) showed MR and rest 15 entries showed R (Table 19).

MOTIPUR

Out of 38 genotypes tested under natural conditions, six genotypes *viz.,* CoBln 16501, CoLk 14209, CoLk 16470, CoP 15438, CoP 16440 and CoSe 15453 were rated as S against YL, whereas remaining 32 genotypes were R (Table 20).

SEORAHI

Among the eight genotypes of IVT (Early), 4 genotypes were rated as R, 3 genotypes as MR and 1 genotype *viz.,* CoBln 16501 was rated as MS to YL. In IVT (Midlate), nine genotypes were evaluated and of these, 6 genotypes exhibited R, 2 genotypes were found MS and a genotype *viz.* CoBln 16502 was rated as S to YL. In AVT (Early), five genotypes were evaluated and of these three genotypes exhibited R, whereas two genotypes exhibited MR against to YL. In AVT (Midlate), seven genotypes were evaluated and of these, six genotypes exhibited R and one genotype exhibited MR against to YL (Table 21).

ANAKAPALLE

Out of 30 genotypes screened, MR reaction was observed in the genotypes, Co 86249, CoA 17321, CoA 17323, CoA 17324, CoA 92081, CoC 15339, CoC 16336, CoC 16337, CoC 16338, CoC 16339, CoOr 15346, CoOr 17346 and PI 17337 (Table 23).

CUDDALORE

Natural incidence of YL was recorded and eleven clones *viz*., CoA 17322, CoA 17323, CoA 17324, CoC 17336, CoC 16337, CoC 16339, CoC 15339, CoOr 15346, CoOr 17346, CoV 16356 and PI 17377 registered MR. Ten clones *viz.,* CoA 16321, CoA 17321, CoC 15336, CoC 15338, CoC 16336, CoC 16338, CoC 17337, CoV 15356, CoV 16357, and PI 17376 were found MS to YL (Table 24).

NAVSARI

Among the 15 genotypes in IVT, 12 genotypes were apparently free from YL *viz.,* Co 11015, Co 16006, Co 16009, Co 16010, Co 16017, Co 16018, CoM 16081, CoM 16082, CoN 16071, CoR 16141, CoVSI 16121 and CoVc 16061; one genotypre CoVc 16062 was

exhibited MR to YL while two genotypes namely CoR 16142 and PI 16131 had exhibited MS to YL. Out of 15 genotypes in AVT-I, 9 genotypes *viz.,* Co 14002, Co 14004, Co 14012, Co 14032, CoN 14073, CoSnk 14102, CoT 14367, CoTI 14111 and CoVc 14062 were apparently free from YL. Four genotypes *viz.,* Co 14016, Co 14027, MS 14081 and MS 14082 had come under MR to YL while genotype Co14030 and CoSnk 14103 was exhibited MS and S against YL, respectively. Out of 17 genotypes in AVT-II, 16 genotypes *viz.,* Co 13002, Co 13003, Co 13004, Co 13006, Co 13008, Co 13009, Co 13013, Co 13014, Co 13018, CoN 13072, CoN 13073, CoSnk 13101, CoSnk 13103, CoSnk 13106, MS 13081 and PI 13132 were found free from YL while only Co 13020 was showed MR to YL (Table 25).

PUNE

Eight varieties *viz.,* 14-22, Co 94012, CoC 671, CoM 9057, CoM 0265, CoVSI 9805, CoVSI 03102 and VSI 434 were observed free from the disease, while six clones *viz.,* 59-20, 191-3, Co 419, Co 86032, MS 10001 and VSI 08005 reacted as MR.

COIMBATORE

Of the 15 entries in IVT, 9 entries *viz.* Co 11015, Co 16006, Co 16018, CoM 16081, CoM 16082, CoN 16071, CoR 16141, CoR 16142 and PI 16131 were apparently free from YL. Three entries *viz.*, Co 16010, CoVc 16061 and CoVc 16062 were HS to YL with severity grade of 4. In AVT I plant, out of 15 entries, 8 entries were apparently free from YL and two entries *viz.*, Co 14027 and CoVc 14062 were identified as HS and S to YL and the remaining entries were MS with severity grade of 2-3. In AVT II plant and ratoon, out of 17 entries, 9 entries were free from the disease and CoSnK 13103 was identified as S (Table 27).

SUMMARY

The entries showing R or MR to YL are listed below

LUCKNOW

IVT (Early)	:	Co 16025, CoLk 16202, CoPb 16181, CoPant 16221, CoPant 16222
AVT (Early) Plant - I	:	Co 15023, Co 15024, CoLk 15201, CoLk 15205, CoPb 15212
AVT (Early) Plant - II	:	Co 14034, CoPb 14181, CoPb 14211
IVT (Midlate)	:	Co 16030, CoLk 16203, CoLk 16204, CoPb 16212, CoS 16232, CoS 16233
AVT (Midlate) Plant - I	:	Co 15026, CoLk 15206, CoLk 15207, CoLk 15209, CoS 15232, CoS 15233
AVT (Midlate) Plant - II	:	Co 14035, CoH 14261, CoLk 14204, CoPb 14184, CoPb 14185

KAPURTHALA

IVT (Early)	:	Co 15025, CoLk 16201, CoLk 16202, CoPb 16211, CoPb 16181, CoPant 16221, CoS 16231
AVT (Early) Plant - I	:	Co 15023, Co 15024, Co 15027, CoLk 15201, CoLk 15205, CoPb 15212
AVT (Early) Plant - II	:	Co 14034 , CoLk 14201, CoPb 14211
IVT (Midlate)	:	Co 16030, CoLk 16204, CoPb 16212, CoPant 16223, CoS 16232, CoS 16233
AVT (Midlate) Plant - I	:	Co 15026, CoLk 15206, CoLk 15207, CoLk 15209, CoS 15232, CoS 15233
AVT (Midlate) Plant - II	:	Co 14035, CoH 14261, CoLk 14203, CoPb 14184 and CoPb 14185

UCHANI

AVT (Early) Plant I	:	CoPb 15212
AVT (Early) Plant II	:	Co 14034, CoLk 14201 and CoPb 14181
IVT (Early)	:	Co 16025 and CoS 16231

IVT (Midlate)	:	CoLk 16203, CoLk 16204 CoPant 16223, CoS 16233 and CoS 16030
AVT (Midlate) Plant I	:	CoLk 15206, CoLk 15207, CoLk 15209, CoPb 15213, CoS 15233, CoS 15232
AVT (Midlate) Plant II		CoH 14261, CoLk 14203 and CoPb 14184

SHAHJAHANPUR

IVT (Early)	:	Co 15025, Co 16029, CoLk 16202, CoPant 16222, CoPb 16211, CoPb 16181, CoS 16231
IVT (Midlate)	:	CoLk 16203, CoLk 16204, CoPant 16223, CoPb 16212
AVT (Early) Plant I	:	Co 15023, Co 15027, CoLk 15201, CoLk 15205
AVT (Early) Plant II	:	Co 14034, CoLk 14201, CoPb 14181, CoPb 14211
AVT (Mid Late) Plant I	:	Co 15026, CoLk 15206, CoLk 15209, CoS 15232
AVT (Mid Late) Plant II	:	Co 14035, CoH 14261, CoLk 14203, CoPb 14184

PANTNAGAR

IVT (Early)	:	Co 15025, Co 16029, CoLk 16202, CoPant 16221, CoPant 16222, CoPb 16181, CoS 16231,
AVT (Early) Plant I	:	Co 15023, Co 15024, Co 15027, CoLk 15201, CoLk 15205, CoPb 15212
AVT (Early) Plant II	:	Co 14034 , CoLk 14201
IVT (Midlate)	:	Co 16030, CoLk 16204, CoPant 16223, CoS 16233
AVT (Midlate) Plant I	:	CoLk 15206, CoLk 15207, CoPb 15213, CoS 15233
AVT (Midlate) Plant II	:	Co 14035, CoH 14261, CoLk 14204, CoPb 14184, CoPb 14185, CoS 14233

PUSA

IVT (Early)	:	CoBln 16501, CoP 16436, CoLk 16467, CoLk 16468, CoP 16437, CoP 16438, CoSe 16451
IVT (Midlate)	:	BO 156, CoBln 16502, CoLk 16470, CoLk 16471, CoP 16439, CoP 16440, CoSe 16452, CoSe 16453

SEORAHI

IVT (Early)	:	CoLk 16466, CoLk 16467, CoLk 16468, CoP 16436, CoP 16437, CoP 16438, CoSe 16451
IVT (Midlate)	:	CoP 16439, CoP 16440, BO 156, CoLk 16470, CoSe 16452, CoSe 16453
AVT (Early) Plant I	:	CoLk 15467, CoLk 15466, CoP 15436, CoSe 15455, CoSe 15452
AVT (Midlate) Plant I	:	CoLk 15468, CoLk 15469, CoP 15438, CoP 15439, CoP 15440, CoSe 15454, CoSe 15453

MOTIPUR

IVT (Early)	:	CoP 16436, CoP 16437, CoP 16438, CoLk 16466, CoLk 16467, CoLk 16468, CoSe 16451
AVT (Early) Plant I	:	CoLk 15466, CoLk 15467, CoP 15436, CoSe 15452, CoSe 15455
AVT (Early) Plant II	:	CoLk 14206, CoP 14437, CoSe 14451, CoSe 14454
IVT (Midlate)	:	CoP 16439, BO 156, CoLk 16469, CoLk 16471, CoSe 16452, CoSe 16453, CoBln 16502
AVT (Midlate) Plant I	:	CoLk 15468, CoLk 15469, CoP 15439, CoP 15440, CoSe 15454

ANAKAPALLE

IVT (Early)	:	CoA 17321, CoA 17323
IVT (Midlate)	:	CoA 17324, CoOr 17346, PI 17377
AVT (Early) I Plant	:	CoC 16336, CoC 16337, CoV 16356

AVT (Early) II Plant	:	CoV 15356
AVT (Midlate) II Plant	:	CoC 15339, CoOr 15346, CoC 16338, CoC 16339

NAVSARI

IVT (Early)	:	Co 11015, Co 16006, Co 16009, Co 16010, Co 16017, Co 16018, CoM 16081, CoM 16082, CoR 16141, CoVc 16061, CoVc 16062, CoN 16071, CoVSI 16121
AVT (Early) Plant I	:	Co 14002, Co 14004, Co 14012, Co 14016, Co 14027, CoSnk 14102, Co 14032, CoN 14073, CoT 14367, CoTI 14111, CoVc 14062, MS 14081, MS 14082
AVT (Early) Plant II	:	Co 13002, Co 13003, Co 13004, Co 13006, Co 13008, Co 13009, Co 13013, Co 13014, Co 13018, Co 13020, CoN 13072, CoN 13073, CoSnk 13101, CoSnk 13103, CoSnk 13106, MS 13081, PI 13132

COIMBATORE

IVT (Early)	:	Co 11015, Co 16006, Co 16009, Co 16017, Co 16018, CoM 16081, CoM 16082, CoN 16071, CoR 16141, CoR 16142, CoVSI 16121, PI 16131
AVT (Early) Plant I	:	Co 14002, Co 14004, Co 14012, Co 14016, Co 14030, Co 14032, CoM 14081, CoM 14082, CoN 14073, CoSnk 14102, CoSnk 14103, CoT 14367, CoT 14367, CoTl 14111
AVT (Early) Plant II	:	Co 13002, Co 13003, Co 13004, Co 13006, Co 13008, Co 13009, Co 13013, Co 13014, Co 13018, Co 13020, PI 13132, CoN 13072, CoN 13073, CoSnk 13101, CoSnk 13106, MS 13081, PI 13132

PP 22: SURVEY OF SUGARCANE DISEASES NATURALLY OCCURRING IN THE AREA ON IMPORTANT VARIETIES

Objectives: To gather information on the diseases naturally occurring in the area on varieties to compile all India status report yearly.
Location: Lucknow, Karnal (SBI), Uchani, Pantnagar, Shahjahanpur, Kapurthala, Pusa, Seorahi, Buralikson, Anakapalle, Cuddalore, Nayagarh, Coimbatore, Padegaon, Tiruvalla, Navsari, Pune, Sankeshwar, Kolhapur and Akola.
Year of Start: 1989-1990
Observations: Periodic observations in June, September and December in all locations to gather information on the % incidence of diseases on all varieties of the area (General survey).

FINDINGS OF THE PREVIOUS YEAR
NORTH WEST ZONE
LUCKNOW

Incidence of red rot was found associated in the varieties *viz*., Co 0238, CoSe 95422, CoJ 64, CoS 8436, CoS 88230, CoS 95255, CoSe 01424 and CoS 91269. Variety Co 0238 was noticed with red rot infection at most of the location of Uttar Pradesh to the tune of 10% to 55%. In general, incidence of red rot was low on the other varieties. Whereas in some fields of CoSe 95422, CoS 8436, and CoSe 92423 the red rot incidence was also recorded up to 25%. Incidence of smut was observed in CoSe 92423, CoS 88230, CoS 91269 and Co 0238. Incidence GSD was noticed in CoS 91269 (20-30%). The incidence of the minor disease pokkah boeng was higher up to the 25% in the variety Co 0238.

KARNAL

Red rot was noticed in the variety CoS 8436 and CoJ 88. Smut incidence was observed in traces to 5% in Co 89003, Co 0238, Co 05011, and CoH 160. Pokkah boeng was prevailing in most of the cultivated varieties in the zone with trace to 17.5% incidence. Top rot was noticed in the varieties Co 89003, Co 0238, CoH 160, CoH 167, CoJ 85 and CoS 8436. Trace of GSD was recorded in varieties CoJ 88 and Co 0238 and wilt on variety Co 89003. Incidence of *Sugarcane bacilliform virus* was also found (5%) on the variety Co 89003.

UCHANI

Red rot was observed on plant and ratoon crop of varieties like Co 89003, CoJ 85 and CoS 8436 ranging from 2 to 17 per cent. Top rot was also observed on Co 0238, CoJ 85 and CoH 119 ranging from 2 to 40 per cent. Wilt was noticed in Co 89003, Co 05011, CoS 8436 and CoH 119 ranging from 5 to 25 per cent. Wilt in association with root borer and red rot was also noticed in Co 89003. Severe incidences of smut ranging from 5-40 percent recorded in Co 89003, Co 0118, Co 0238, Co 05011, CoH 119 and CoH 160. Grassy shoot disease was observed in Co 89003, Co 0118, Co 0238, CoH 119, CoH 160, CoS 767 and CoS 8436. Pokkha boeng appeared on varieties Co 89003, Co 0118, Co 0238, Co 05011, CoH 119, CoH 160, CoJ 85 and CoS 8436 ranging from traces - 40 percent. Yellow leaf disease (YLD) was noticed in traces to 10 % on varieties viz., Co 89003, Co 0238, Co 05011, CoH 119, CoH 160 and CoS 8436 incidence of mosaic in traces was observed in Co 89003, Co 0118, CoH 119 and CoS 8436. Incidence of brown spot ranging from 5-45 per cent was noticed in Co118, Co 0238, CoH 167 and CoH 160.

PANTNAGAR

Red rot was observed in the variety CoS 8436 and smut icidence upto 30% was observed in Co 0238 and CoPant 99214. Low incidence of wilt was observed in CoS 8436 and CoJ 85. Low incidence of GSD seen in Co 0118, Co 0238, CoPant 05224, CoPant 03220, CoSe 1434 and CoS 88230. YLD was seen in some pockets in CoPant 03220, CoPant 84212, CoPant 05224, CoS 767 and CoPant 90223. Ring spots and eye spots were seen on CoPant 99214, CoJ 85 and CoS 07250. The cultivars viz., Co 0238, Co 0239 and CoPant 03220 were found infected with PB.

SHAHJAHANPUR

Incidence of red rot severity varied from traces to 98 percent on Co 0238 and from 5% to 25% on CoJ 88, CoS 97264, CoPant 84211 was observed. Smut was reported on Co 0238, Co 0118, CoJ 88 and CoS 13231. Mixed infection of red rot and wilt also noticed from 5-50 percent on the variety Co 0238. Grassy shoot disease was observed on Co 0238, Co 0118, Co 98014, CoS 08279, UP 05125 and CoLk 94184 ranging from trace to 50 percent. The incidence of pokkah boeng varied from trace to 50 percent on Co 0238, Co 0118, CoS 08272, CoS 8436, CoS 08279, CoLk 94184, CoS 97264, UP 05125 and CoJ 88. YLD was noticed on CoS 09232, Co 0238 and CoS 08272 ranging from 10 to 30 per cent. Sugarcane mosaic, top rot, leaf binding diseases and leaf scald were also noticed on various varieties.

KAPURTHALA

Red rot was observed with an incidence from traces to 10% on varieties Co 89003, CoJ 64 and CoJ 85. Wilt incidence of traces to 6.0 per cent was observed on Co 89003 and CoS 8436. Smut incidence was observed on varieties Co 0238, Co 89003 and CoJ 88 from traces to 16%. Pokkah boeng disease was observed on varieties Co 0238 and CoPb 91 (traces to 25%). Red stripe/top rot disease was observed in traces on CoJ 85 and GSD was observed with an incidence of traces to 4% on Co 0238.

NORTH CENTRAL ZONE

PUSA

Red rot (2%) incidence was observed on Co 0235 and wilt incidence was noticed in almost all sugarcane growing areas of Bihar ranging from 5-20% on BO 141, Co 0118, Co 0233, Co 0235, Co 0238, Co 03234 and CoPant 97222. Varieties Co 0233, Co 0238, Co 03234, CoP 2061 and CoV 92102 were found affected with smut ranging from (trace to 2%). Pokkah boeng disease was observed on varieties BO 153, BO 154, Co 0118, Co 0233, Co 0238 and Co 03234 ranged between (2-5%). Yellow leaf disease was noticed on Co 0233, Co 0238, CoPant 97222 and CoV 92102 ranging from traces to 2% while, single variety CoLk 94184 was affected with ratoon stunting disease in traces.

SEORAHI

Red rot was recorded with 20 to70 % incidence in Co 0238 and 1 to 10% incidence in the varieties CoSe 92423 and UP 9530. Wilt was observed in the varieties Co 0238 (40%), CoP 9301 (35%) and CoS 08272 (10%) and 1 to 6 per cent incidence in Co 0233, Co 0238, CoP 9301 and CoPb 05191. The incidence of smut varied from 1 to 6% in various varieties such as Co 0118, Co 0238, CoLk 94184, CoS 08279, CoSe 08452, CoSe 01434, CoSe 11453 and CoSe 92423. GSD was noticed with 1 to 6 per cent incidence in Co 0118, Co 0238, CoS 08279, CoSe 01424, CoSe 08452, CoSe 11453, CoLk 94184 and CoS 08272. The incidence of pokkah boeng disease varied from 1 to 10 per cent in cultivars Co 0118, Co 0238, CoLk 94184, CoS 08279, CoSe 01434, CoSe 11453 and CoSe 08452. Stinking rot was recorded in varieties Co 0238 and CoS 08279 and ratoon stunting disease (1 to 3%) was found in CoS 08279 and Co 0238. YL incidence was recorded up to 2 -10 per cent in Co 0118, CoLk 15469, CoLk 15467, CoP 14439 CoP 06436, CoSe 14454, and UP 05125. In the

experimental trial at Seorahi stray incidence of mosaic was noticed in genotypes CoP 13437, CoP 14430, CoP 15440, CoSe 01421, CoSe 13451, CoSe 13452 and CoSe 15453.

MOTIPUR

The incidence of red rot was recorded in the varieties namely BO 130, Co 0238, CoP 06436 and CoSe 95422 to the tune of 3-12 %. Variety Co 0238 was recorded with red rot infection to the tune of 5 to 20 %. YLD was noticed in the varieties viz., BO 130, Co 0118, Co 0238, CoLk 94184 and CoP 06436. Pokkah boeng was observed in the varieties *viz*., BO 130, BO 154, Co 0118, Co 0238, Co 0239, CoLk 94184, CoP 112, CoP 06436, CoP 9301 and CoSe 95422. The incidence of pokkah boeng was found increased in the variety Co 0238 (15- 30%).

NORTH EAST ZONE

BURALIKSON

Red rot was observed upto 4.76-10.53% in Co 740 and Co 997 and wilt was observed in plant as well as ratoon crop ranging from 2.12 to 19.42. Wilt in association with red rot and borer was also observed in Co 740. It was also observed that foliar disease like ring spot was common in all the cane growing areas irrespective of cultivars. The incidence of pokkah boeng varied from traces to 13.15% in many popular varieties of sugarcane. YL infection seems to be increasing as compared to last year.

EAST COAST ZONE

ANAKAPALLE

Red rot incidence was observed in areas where the varieties like 93V 297, 81V 48, 99A 53 and Co 62175 are being cultivated. Smut incidence (2-20%) was observed in almost all the areas surveyed in Andhra Pradesh in the variety CoA 92081. YLD incidence of 5 to 60% incidence was observed in Visakhapatnam, East Godavari and Chittoor districts. The incidence of YLD was found to be higher in areas where the ratoon crops of the varieties, CoV 09356, CoA 92081 and Co 86032. Grassy shoot disease incidence ranging from 1-10% was observed in the varieties, CoA 14321, CoV 09356, Co 86032 and 2003 T 121.

CUDDALORE

The incidence of red rot in varieties *viz.,* Co 86032, CoC 24, CoM 0265 and CoV 09356 and the disease severity ranged from 2 to 28 %. Smut disease was recorded in the varieties Co 86032, CoC 22, CoC 25 and TNAU Si 8 and the disease severity ranged between 2 and 14 %. Wilt was observed in Co 86032 and CoV 09356 with disease severity between 4 and 12 %. Yellow leaf disease was noticed in Co 86032, PI 1401, PI 1110, CoC 24 and CoV 09356 (5 to 25 %). Grassy shoot diseases incidence was noticed in traces.

PENINSULAR ZONE

PUNE

The incidence of smut was increased in Central Maharashtra and Marathwada during last year due to drought. The incidence was more in ratoon crops of Co 86032. The incidence of grassy shoot is increasing in all commercially cultivated varieties. The incidence is more in ratoon crops of Co 419, Co 86032 and CoM 0265. The foliar diseases *viz.,* rust, pokkah boeng, yellow leaf, brown spot and eye spot was common. Rust was severe in Western Maharashtra than other areas. The incidence of brown spot was severe in western part of the state. The incidence of YLD in sugarcane was noticed on Co 86032, CoM 0265 and VSI 08005 up to 20%. The incidence of eye spot and pineapple was observed in sugarcane crop. Pineapple disease was observed in heavily irrigated sugarcane plots. The practice of settling transplanting is increasing and therefore the disease incidence is reduced.

NAVSARI

Wilt, red rot and smut were the major diseases in South Gujarat. The incidence of whip smut was recorded on varieties like Co 86002, Co 97009, Co 99004 and CoM 0265 and

CoSi 95071. The wilt incidence noticed in Co 86002, Co 86032, CoC 671, CoM 0265, CoSi 95071 and MS 10001 varieties. The red rot was recorded in Co 86002, Co 86032, Co 97009, Co 0323 and CoC 671. Highest wilt and red rot incidence was noticed in variety CoC 671 and minimum in Co 86032. In addition to these diseases, the incidence of pokkhah boeng was observed in Co 99004 and CoM 0265. Grassy shoot was observed on Co 86032, CoC 671 and CoM 0265. Yellow leaf disease was noticed on Co 86002, Co 86032 and CoC 671.

THIRUVALLA

The foliar diseases *viz*., ring spot, rust and sheath blight were very common but they were not found in such a severe form to cause any drastic yield loss. The other diseases observed were Pokkah Boeng and mosaic. But none of the diseases were in a severe stage to cause any drastic yield decline.

COIMBATORE

Extensive damage to sugarcane crop due to red rot was found in the cv CoM 0265 in Thiruvallur district. Frequent infections of sugarcane viruses and GSD-phytoplasmas were found in many nursery plots in Sathyamangalam areas. New red rot infections were found on the varieties CoC 24 from Thandavarayanpattu, Mandagapattu and Nellikuppam, an unknown variety (Erikuppam), Co 06022 (Pennadam), Co 86027 (ACSM), Co 06031 (Mundiampakkam and Perambalur), Co 86032 (Nellikuppam) and C 20141 (Nellikuppam) in Tamil Nadu.

FINDINGS OF THE CURRENT YEAR

NORTH WEST ZONE

LUCKNOW

In Uttar Pradesh, red rot was found in CoJ 85, Co 0238, CoSe 95422, CoS 8436, Co 87263, CoLk 8102, CoS 95255, CoSe 01424 and CoS 91269. Red rot was noticed to the tune of 7 to 60% in Co 0238 and up to 30% in fields of CoSe 95422 and CoS 8436. Smut incidence of was observed in Co 0238 to the tune of 5 to 15%. It was also recorded in other varieties like CoSe 92423, CoS 88230 and CoS 91269. Yellow Leaf Disease was observed with the variety Co 0238 ranging 10 to 40% and 15-35% in CoS 91269, CoLk 94184 and CoJ 85. The incidence of PB was noticed in Co 0238 up to 30%, eye spot, brown spot and ring spot were also recorded to the tune of 3 to 10%.

KAPURTHALA

Red rot was observed from traces to 12% on Co 89003 and CoJ 85. Wilt incidence of traces to 8.0% was observed on Co 89003 and CoS 8436. However, severe incidence (>80 %) of red rot and wilt was also observed from two fields of Co 89003 and one field of Co 89003. Some of the plants were also found to form red rot-wilt complex. Smut was observed on varieties Co 0238, Co 89003 and CoJ 88 from traces to 25%. Pokkah boeng was observed on variety Co 0238, CoPb 91 and CoPb 92 (traces to 30%). However, incidence was low on varieties CoPb 91 and CoPb 92. Red stripe/top rot disease was also observed in traces on CoJ 85 and CoPb 93. Grassy shoot disease (GSD) was observed with an incidence of traces to 3% on Co 0238.

SHAHJAHANPUR

Severe incidence of red rot on Co 0238 was observed (70-100%) condition at Ajbapur, Rupapur, Kumbhi, Nigohi, Bisalpur and Hargaon sugar mill areas. The variety CoPk 05191 was with red rot up to 50% at Palia and up to 10 % on CoS 08279. Combined infection of red rot and wilt was also noticed from 15% (CoPk 05191) to 75% (Co 0238). Smut was recorded in the varieties Co 0238, Co 0118, CoH 160, Co 98014, UP 05125 and CoS 13231 with stray to 10% severity. The incidence of wilt varied from 2 to 15% on Co 0238, Co 0118, Co 98014, CoS 08279, CoS 13231, CoSe 11453, CoS 09232 and CoLk

94184. Severity of YL was noticed up to 30% on Co 0238, CoS 09232, CoS 08272, CoS 08279, CoS 12232, CoS 13231, UP 05125, Co 0118, Co 98014 and CoS 08276. The incidence of PB upto 60% was observed on Co 0238, CoS 08272, CoS 08279, CoS 08452, CoS 09232, Co 0118, Co 98014, and CoLk 94184. Leaf fleck was observed on Co 0238 and Co 98014 in Shahjahanpur district. Other diseases such as red strip/top rot (bacterial), mosaic (SCMV), leaf scald, ring spot, banded sclerotial and leaf binding were also noticed.

UCHANI

Red rot was observed on plant and ratoon crop of varieties like Co 89003, CoS 8436 and, CoJ 85 ranging from 2 to 15%. Top rot was also observed on CoJ 85, Co 0238, CoS 8436 and CoH 119 in traces to 28%. Wilt was noticed in Co 05011, Co 89003, CoS 8436, CoH 119 and Co 0238 ranging from 5 to 30%. Wilt in association with root borer and red rot was also noticed in Co 89003. The incidence of smut in the range of 2-42% was observed on plant and ratoon crop in CoH 119, Co 0118, Co 0238, Co 89003, Co 05011 and CoH 160. Grassy shoot disease was observed in traces to 12% on varieties which includes Co 0238, CoH 160, Co 0118, CoH 119, CoS 767, Co 89003, CoS 8436 and Co 05011. The pokkha boeng appeared on varieties CoS 8436, Co 0238, CoH 119, Co 0118, CoH 160, CoJ 85, CoH 167, Co 89003 and Co 05011 ranging from traces to 45%. The yellow leaf disease was noticed in Traces to 12% on varieties *viz*., Co 0238, CoS 8436, CoH 119, CoH 160, Co 05011 and Co 89003. The incidence of mosaic in traces was observed in CoH 119, Co 0118 and Co 89003 varieties and the incidence of eye spot ranging from traces to 22% was noticed in plant and ratoon crop of Co 238, Co118 CoH 167 and CoH 160.

PANTNAGAR

Pokkah boeng was observed in the varieties Co 89003, Co 0118, Co 0238, CoJ 85, CoPant 3220, CoPant 99214, CoPb 91, CoS 8436 and smut icidence upto 30% was observed in CoS 07240 and Co 92423 and grassy shoot was observed on Co 0238, Co 0118 and CoPant 03220.

KARNAL

In Haryana, PB was prevalent in most of the cultivated varieties with mild to 5.0% incidence. Maximum (20%) incidence of smut was noticed on varieties CoH 160, Co 0238 and Co 89003. Traces to severe (20.0%) incidence of wilt were recorded in Co 89003 and CoH 160. Similarly, GSD was reported in Co 89003 (5%) and trace to 2% in varieties viz., CoJ 64, CoJ 85, CoS 8436 and Co 0238. Maximum incidence of leaf fleck disease caused by SCBV was in variety CoH 160 (up to 10%) followed by Co 89003 (5%) and CoS 8436, CoJ 85, CoJ 88, Co 0238 (trace to 3%). Mild to 5% of brown rust incidence was also noticed on CoJ 85) and CoH 160. In Uttar Pradesh, traces to severe incidence of red rot was noticed in Co 0238. Under DSM Sugar, Meerganj incidence of red rot was recorded in varieties CoJ 88 (20-30%) and CoH 167 (20%). By and large, incidence of pokkah boeng was recorded in most of the cultivated varieties.Trace incidence of smut and GSD was also noticed in the variety Co 0238 under Unn Sugar mill. In Uttrakhand, trace incidences of smut, GSD, pokkah boeng and top rot were noticed on the variety Co 0238.

NORTH CENTRAL ZONE

PUSA

Red rot was noticed in Co 0233, Co 0238, CoH 167 in the range from 5 to 10%. Smut was observed in BO 141, Co 0238, CoH 167 and CoP 2061 and the incidence was upto 10% at Riga and Manjhaulia. Wilt was observed in BO 141, Co 0233, CoPant 97222, Co 0238, Co 92006, Co 0118, CoH 167, Co 0118, CoP 9301 and CoV 92102 and was observed upto 20%. Pokkah boeng incidence was observed in BO 141, BO 154, Co 0238, Co 0118, CoV 92102, and CoP 2061 upto 10% and drastically reduced after the monsoon

showers. Yellow leaf disease was also noticed in traces to 5% on varieties, Co 0118, Co 0233, Co 0238, Co Pant 97222, and CoV 92102. Incidence of mosaic and leaf spot diseases were also noticed in traces to 5% in varieties Co 92006, Co 0118, Co 0233, Co Pant 97222 and CoV 92102.

MOTIPUR

In Bihar, varieties *viz.,* CoLk 94184, Co 0118, Co 0238, CoSe 01421, Co 0232, CoSe 96234, CoSe 95422, CoSe 92423, Co 89029, BO 128 and Co 87263 were observed in sugarcane cultivation. The incidence of red rot was recorded in the varieties namely CoSe 92423, CoSe 95422, Co 0238, BO 128 and CoSe 96234 to the tune of 5-35%. The variety Co 0238 was recorded with the red rot infection to the tune of 3% to 35%. Yellow Leaf Disease was noticed in the varieties *viz*., Co 0238, Bo 128, CoP 06436, CoLk 94184 and Co 0118. Higher incidence of YL (15 to 35%) was recorded in some locations of East and West Champaran cultivated with Co 0238 and BO 128. Eye spot, brown spot and ring spot were also recorded. Pokkah Boeng was observed in the varieties *viz*., BO 154, Co 0118, Co 0238, Co 0239, CoP 06436, CoP 9301, CoSe 95422, CoLk 94184, BO 130 and CoP 112.

SEORAHI

Incidence of red rot varied from 4 to 60% on the variety Co 0238 in various sugar factory zones. The incidence of wilt varied from 1 to 15% on the variety Co 0238 and on BO 110 (10%) from Pratappur and Chhatiyaon sugar factory zones. The incidence of smut varied from 1 to 5% in Co 0238, Co 0233, CoJ 88, CoS 8436, and CoSe 01434. GSD was noticed with 1 to 4% incidence in BO 110, Co 0238, CoLk 94184, CoSe 08452, and CoSe 11453. The incidence of PB varied from 1 to 4% in cultivars CoSe 01434, Co 0118, CoSe 08452, CoSe 92423, Co 98014 and Co 0238. Stinking rot was recorded @ 2 to 4% in Co 0238 and CoS 08279 at Seorahi sugar factory zone. Ratoon stunting disease (4 to 5%) was found in varieties like CoS 08279 and Co 0238 at Seorahi and Ramkola sugar factory zone. YL incidence (2–4%) was observed on various genotypes *viz*. CoLk 16470, CoS 11271, CoSe 15452, CoV 92102, CoSe 15454 and mosaic was also noticed in CoSe 16453, CoS 17236 and CoPant 97222 at Seorahi Farm.

NORTH EASTERN ZONE

BURALIKSON

Survey was conducted in various sugarcane growing areas in Golaghat and Morigaon district of Assam. In all the areas, leaf spots were invariably present in all the varieties. Red rot was observed upto 4.2% in Co 997 farmers' field of Bortika. Wilt was observed in plant as well as ratoon crop in Co 997 and mostly associated with borer infestation. Incidence of pokkah boeng was trace and YLD was not observed in any of the fields.

EAST COAST ZONE

ANAKAPALLE

Red rot incidence was observed in Co 62175 and CoV 89101. Smut incidence (5-20%) was observed in CoA 92081, GSD (2-20%) was observed in Co 7805, CoA 14321, ROC 16, CoA 92081, Co 11015, 93V 297 and Co 18009. High incidence of GSD was recorded in CoA 14321 and Co 18009. High incidence of sugarcane mosaic was noticed in CoV 09356, CoVSI 08121, Co 11015, CoA 92081 and Co 7805. PB (5-30%) was observed in 2009A 107, 87A 380, CoLk 94023, VCF 0517, 2012V 123, 93V 297, Co 14002 and 2005V 96 in the areas surveyed. The genotypes, 2009A 107 and 2012V 123 recorded with high Pokkah boeng disease incidence. YL of 5 to 20% was observed in CoV 09356, 93V 297 and 2005A 128. Mosaic was also observed to the tune of 5-20% in CoV 09356, CoA 92081, Co 7805, CoVSI 08121 and Co 11015. High incidence (20%) of mosaic was observed in the ratoon crop of the varieties, CoV 09356 and 87A 298. Wilt incidence (10-20%) was observed in 2009A 107, 81V 48 and 2010V 32. Leaf fleck incidence (15 to 20%) was recorded in CoA

16321, CoA 14321, CoA 92081, 2006A 64, 2006A 223 and 2000A 56. Rust incidence was also noticed during maturity stage of the crop in CoA 92081, 2009A 107 and CoV 09356.

CUDDALORE

The survey conducted in Cuddalore, Kanchipuram, Thiruvallur and Villupuram districts of Tamil Nadu indicated that the presence of red rot disease in varieties *viz.,* CoC 24, CoV 09356, Co 86032, CoM 0265 and Co 06022 and the disease severity ranged from 2 to 14%. Smut disease was recorded in variety TNAU Si 8, CoC 22, Co 86032 and CoC 25 and the disease severity was upto 12%. YL was also noticed in Co 86032, PI 1401, PI 1110, CoC 24 and CoV 09356 with an incidence ranged from 5 to 25%.

PENINSULAR ZONE

NAVSARI

Surveys indicated that wilt, red rot and whip smut were the major diseases while YL and rust in trace amount in South Gujarat region. Area affected under wilt, red rot and whip smut was 2.04, 1.82 and 4.51% respectively. The incidence of whip smut was recorded in CoSi 95071, Co 86002, Co 97009, Co 99004, Co 0238, Co 86032, CoVSI 08005 and MS 1001. Maximum incidence of whip smut was recorded in the varieties Co 86002 and it was 11.65% in Copper Sugar factory area. The wilt was noticed in CoC 671, Co 86032, Co 86002, CoM 0265, CoSi 95071, MS 10001, Co 0238, Co 99006, CoVSI 08005 and Co 97009 varieties and it was 3.87%. The red rot was recorded in the varieties of CoC 671, Co 86002, Co 86032, CoM 0265, CoSi 95071, MS 10001, Co 0238, CoVSI 08005 and Co 97009 and it was 0.35% to 3.91% in all Sugar factories area except Bardoli sugar factory area. In addition to these diseases, the incidence of yellow leaf diseases was observed in Co 86002, Co 86032 and Co 97009 in Mahuva Sugar factory areas. Rust was found in variety MS 10001 in traces at Chalthan sugar factory areas

PUNE

The smut was noticed in ratoon crops of Co 86032 and GSD in CoM 0265 and Co 86032. The natural incidence of foliar diseases *viz.,* rust, pokkah boeng, yellow leaf, brown spot and eye spot has been recorded on sugarcane. Symptoms like chlorosis, top rot and knife cut were noticed in sugarcane crop affected by pokkah boeng. Brown rust of sugarcane was severe in western Maharashtra. The incidence of brown spot disease was severe in western and central Maharashtra on CoM 0265. Yellow leaf disease of sugarcane is increasing in Kolhapur, Sangli, Satara, Pune, Ahmednagar and Solapur districts and it was noted on Co 86032, VSI 08005 and CoM 0265 upto 20%. Last year due to heavy rains, floods, continuous cloudiness and heavy leaching of nutrients, leaf rotting and top rotting of cane was observed.

THIRUVALLA

The leaf spot diseases like eye spot, brown spot, banded sclerotial disease and rust were found in mild form. Proper field sanitation and detrashing for 2-3 times controlled the foliar diseases. The other diseases observed were Pokkah Boeng, leaf scald, mosaic and YL. But none of the diseases were in a severe stage to cause any drastic yield decline.

COIMBATORE

In different districts, incidences of YL and grassy shoot were more common across the varieties. Wilt was observed in different varieties including in the new variety Co 0212. Red rot was observed in the cv Co 86027. Severe incidences of Pokkah boeng was found in the cvs Co 06022 and PI 1110. In Karnataka, severe occurrence of brown spot was recorded in the cv CoM 0265 in Uttara Kannada and Hubli Districts and affecting the crop growth significantly. Epidemic scale disease outbreak restricted the varietal spread in the region and other popular varieties *viz.,* Co 86032 and Co 92005 were free from the disease.

PP 23: ASSESSMENT OF ELITE AND ISH GENOTYPES FOR RESISTANCE TO RED ROT

Objective: To gather information on *Saccharum* sp. and elite genotypes for resistance to red rot, so that the resistant genotypes could be used in breeding programme as possible donor for resistance.
Locations: Kapurthala, Uchani, Karnal, Shahjahanpur, Lucknow, Pusa, Seorahi, Anakapalle, Cuddalore, and Navsari
Plot Size: One, six metre row of at least 10 clumps.
No. of isolates: As indicated in PP 17 experiment.
Method of inoculation: Plug method only.
Inoculum: As per details given under PP 17 (Pathotypes to be inoculated individually only).
Method of evaluation: As per details in PP 17.

RESULTS OF PREVIOUS YEAR
NORTH WEST ZONE
LUCKNOW

Out of 26 ISH genotypes tested, 7 genotypes namely AS 04-635, BA 1003143, BM 1010168, GU 07-2276, GU 07-3849, SA 04-454 and SA 98-13 were rated as R against both the pathotypes (CF08 and CF09) by both plug and nodal the methods of inoculation. Two genotypes BM 1009-163 and PG 9869137 were rated S to both the pathotypes (CF08 and CF09) by both methods. Two genotypes AS 04-245 and GU 073-774 were rated HS against both the pathotypes by plug method and S by nodal method. Four genotypes BM 1022-173, AS 04-1687, CYM-07986 and MA5/51 were rated as MS against both the pathotypes by plug method whereas R by nodal method whereas the other 11 genotypes were rated as MR to both the pathotypes by plug method and R by nodal method.

KAPURTHALA

Twenty-seven ISH genotypes were inoculated by plug method using red rot pathotypes CF08 and CF09. Of the 27 genotypes, none behaved as R against any of the pathotypes and 13 genotypes were found MR against CF08 and eight against CF09. Three genotypes *viz*., BM 10-22173, SA 04-409 and SA 04-472 and were found MS to both the pathotypes. Genotypes AS 04-635, BM 1003143, MA 5/37 and SA 98-13 behaved as MR to CF08 and MS to CF09 whereas genotypes AS 04-2097, BM 1010168, BM 1009163, MA 5/5 and PG 9869137 and behaved as MS to CF08 and S against CF09. Three genotypes (AS 04-245, CYM 07-986 and SA 04-458) were HS to both the pathotypes. Eight genotypes namely, AS 04-1689, BM 1005149, GU 07-2276, MA 5/51, MA 5/99, SA 04-390, SA 04-454 and SA 04-496 were found MR against both the pathotypes.

UCHANI

Twenty five ISH clones/genotypes were evaluated for resistance to red rot by plug method using pathotype CF08. Thirteen clones namely, BM-100-3143, BM-1005-149, BM-1022-173, CUM-07-986, GV-07-3849, GV-07-2276, MA-5-22, MA-5-99, SA-04-390, SA-04-409, SA-98-13, SA 04-472 and SA 04-496 and were found resistant/moderately resistant whereas, eleven clones viz., AS-04-245, AS-04-635, AS -04-1687, AS -04-1689, AS -04-2097, BM-1009-163, BM-1010-168, GV-07-3734-212, MA-5-5, MA-5-37 and MA-5-51, showed MS/S reaction against red rot pathotype CF08.

SHAHJAHANPUR

A total of 23 ISH genotypes were tested for red rot resistance against CF08 and CF09 by plug method of inoculation. Of 23 genotypes, five genotypes namely AS 04-390,

BM 1010168, MA 5/99, SA 04-454 and SA 04-496 were identified as MR while SA 98-13 was found R against CF08 and CF09. Two genotypes *viz*, BM 1005149 and GU 07-2276 were behaved as MS to CF08 and MR to CF09. The genotypes AS 04/1687, AS 04/2097, BM 1003143, CYM 07-986, GU 07-3849, MA 5/51 and SA 04-472 behaved as MS to both the pathotypes. Four genotypes AS 04-635, AS 04-1689, PG 9869137 and SA 04-409 and were rated as MR to CF08 and MS to CF09. Two genotypes such as AS 04-245 and GU 07-3774 were behaved as HS against CF08 and CF09 and MA 5/5 as S to CF08. One genotype MA 4/22 was found as MS to CF08 and S to CF09.

KARNAL

Twenty seven ISH clones were inoculated with CF08 and CF09 isolates by plug method of inoculation for red rot resistance. Among the test clones, 15 showed R/MR reaction, two MS and ten S/HS reactions with CF08 isolate, while nine were MR, seven MS and eleven S/HS with CF09 isolate by plug method of inoculation.

NORTH CENTRAL ZONE

PUSA

Twenty seven elite and ISH clones were evaluated artificially for resistance to red rot with pathotypes CF07 and CF08 by plug method of inoculation. Out of 27 clones none of the clones were found resistant while, 10 clones (AS 04-390, AS 04-454, AS 04-496, AS 04-1687, AS 04-1689, AS 04-2097, AS 04-98/13, BM-1010168, GU 07/2276 and MB-1005149) were found to be MR. Six clones (AS 04-635, BM 1009163, CYMO 7986, MA 5/22, MB 1022173 and SA 04/ 472) were found as MS to CF07 pathotype. However, three clones AS 04-635, AS 04/ 472 and MB 1022173 were observed MS to the pathotype CF08, whereas, 11 clones were found S against CF07 and 14 were S to the pathotype CF08.

SEORAHI

Twenty seven ISH genotypes were evaluated against red rot pathotypes CF07 and CF08. Of these, 6 genotypes were rated as MR, 8 genotypes as MS, 5 genotypes as S and 6 genotypes as HS to CF07, while 7 genotypes were rated as MR, 7 genotypes as MS, 4 genotypes as S and 7 genotypes as HS to CF08.

EAST COAST ZONE

ANAKAPALLE

Out of 27 ISH genotypes tested by plug method of inoculation, one entry (PG 9869137) showed R reaction while 6 entries, AS 04-2097, GU 07-2276, MA 5/51, MA 5/37, MA 5/99, SA 04-496 and SA 04-454 and showed MR reaction to the pathotype CF06 and remaining were MS to HS.

CUDDALORE

Twenty seven elite and ISH clones screened for resistance to red rot by plug method of inoculation using CF06 pathotype. Among the clones, GU 07-2276 recorded resistant reaction. Twelve genotypes *viz*., AS 04-2097, BM 1005149, BM 1010168, GU 07-3849, MA 5/22, MA 5/37, MA 5/99, PG 9869137, SA 04-390, SA 04-409, SA 04-454 and SA 98-13 were MR to red rot. Six genotypes *viz*., AS 04-635, AS 04-1687, AS 04-1689, CYM 07-986, SA 04-472 and SA 04-496 were MS. Three genotypes *viz.,* AS 04-245, BM 1003143 and MA 5/5 showed S reaction and the genotypes BM 1022173, BM 1009163, GU 07-3774, MA 5/51 and SA 04-458, and were found to be HS to red rot.

PENINSULAR ZONE

NAVSARI

Of the 30 elite and ISH genotypes, SES 594 and BM 10 1068 gave R reaction. Fifteen genotypes, *viz*., AS 04-1687, CYM 07 986, GU 07-2276, ISH 58, ISH 100, ISH 111, ISH 114, ISH 115, ISH 117, ISH 118, ISH 147, ISH 267, MA 5/99, MA 5/22 and SA 04-454 showed MR reaction. Six genotypes viz., AS 04-2097, ISH 12, ISH 50, ISH 175, ISH 229

and ISH 287 and showed MS reaction. Four genotypes *viz*., ISH 41, ISH 69, MA 5/5 and MA 5/51 exhibited S reaction. Whereas, three genotypes *viz*., ISH 9 and ISH 43 and ISH 176 showed HS reaction by plug method.

COIMBATORE

First set of materials were evaluated and new set of materials will be tested in the coming season.

RESULTS OF CURRENT YEAR

NORTH WEST ZONE

LUCKNOW

Out of 26 ISH genotypes tested, 5 namely SA04-454, BA 1003143, BM1010168, SA98-13 and AS04-635 were rated as R against both the pathotypes (CF08 and CF09) by plug and nodal both the method of inoculation. Three genotypes BM 1009-163, MA5/51 and PG 9869137 were rated S to both the pathotypes and genotypes AS04-245 and GU073-774 were rated HS against both the pathotypes (CF08 and CF09) by both methods. Three genotypes viz., BM1022-173, AS04-1687 and CYM-07986 were rated as MS) against both the pathotypes (CF08 and CF09) by plug method of inoculation whereas R by nodal method of inoculation. Other 13 genotypes *viz*., SA04-454, SA04-472, GU07-3849, MA/5/22, MA/5/37, SA04-390, SA04-496, AS04-2097, BM-1009149, MA5/5, SA04-409, MA5/99 and AS04-1689 were rated as MR to both the pathotypes by plug method of inoculation and R by nodal method of inoculation (Table 29).

KAPURTHALA

Twenty seven ISH genotypes were screened and of that none behaved as R, 11 genotypes were found MR against CF08 and eight against CF09. Seven genotypes *viz*., AS 04-635, MA 5/5, MA 5/22, SA 98-13, SA 04-409, SA 04-472 and BM 10-22173 were found MS to both the pathotypes. Genotypes AS 04-1687, BM 1003143 and MA 5/37 behaved as MR to CF08 and MS to CF09, whereas genotypes PG 9869137 and BM 1009163 behaved as MS to CF08 and S against CF09. Four genotypes (AS 04-245, CYM 07-986, GU 07-3774 and SA 04-458) were HS to both the pathotypes by plug method of inoculation. Eight genotypes namely, BM 1005149, GU 07-2276, MA 5/51, MA 5/99, SA 04-390, SA 04-454, SA 04-496 and AS 04-1689 were found MR against both the pathotypes (Table 30).

UCHANI

Twenty five ISH clones/genotypes were evaluated for resistance to red rot by plug method using pathotype CF08 and CF09. Six clones *viz*., SA04-472, SA-98-13, MA-5-99, GV-07-3849, GV-07-2276, SA-04-390 were found R/MR against CF08 and CF09 by plug method. Seven clones namely, MA-5-37, SA04-496, MA-5-22, BM-1022-173, AS -04-1687, BM-100-3143 and BM-1010-168 exhibited MR/MS reaction against CF08 and CF09. Twelve clones *viz*., AS-04-635, AS-04-245, Bm-1009-163, MA-5-5, AS -04-1689, BM-1005-149, AS -04-2097, GV-07-2276, GV-07-3774, MA-5-51, CUM-07-986, PG-9869137 and BM-1010-168 showed MS/S reaction against CF08 and CF09 (Table 31).

KARNAL

Twenty seven ISH clones were inoculated with CF08 and CF09 pathotypes and in that 12 clones were rated as MR, six were MS and nine were S/HS to CF08, while ten clones showed MR, eight were MS and nine were S/HS to CF09 pathotypes (Table 32).

SHAHJAHANPUR

Twenty three ISH genotypes were tested for red rot resistance against CF08 and CF09. Of 23 genotypes, nine genotypes namely AS 04-1689, BM 1010168, GU 07-2276, GU 07-3849, MA 5/99, SA 04-390, SA 04-454, SA 04-496 and SA 98-13 showed MR reaction to both the pathotypes. Two genotypes AS 04-245 and GU 07-3774 behaved as HS against

CF08 and CF09. The genotype MA 5/5 was rated as S to CF 08 and MA 5/22, PG 9869137 as S to CF09. Two genotypes BM 1003143 and BM 1005149 behaved as MS to CF08 and MR to CF09. Four genotypes such as AS 04/1687, CYM 07-986, MA 5/51 and SA 04-472 exhibited MS reaction to both the pathotypes (Table 33).

NORTH CENTRAL ZONE

PUSA

Twenty seven elite and ISH sugarcane clones were artificially evaluated for resistance to red rot with CF07 and CF08 isolates by plug method of inoculation. Out of which, six clones (IGH 829, ISH 513, IGH 554, IGH 833, ISH 502 and ISH 545) were found R, four clones (IGH 834, ISH 594, ISH 585 and ISH 590) were found MR, two clones (IGH 816 & ISH 519) were MS and remaining fifteen clones were S to CF07 isolate. Whereas, seven clones (IGH 829, ISH 513, IGH 834, ISH 554, ISH 594, IGH 833 and ISH 502) were found as R, three clones (ISH 585, ISH 590 and ISH 545) were found MR, two clones (ISH 512 and ISH 519) were found MS and rest 15 clones were S to isolate CF08 (Table 34).

SEORAHI

Twenty seven ISH genotypes were evaluated against red rot. Of these, one genotype BM 1010168 was rated as R, 4 genotypes were rated as MR, 10 genotypes as MS, 10 genotypes were rated as S to CF07, while one genotype MA 5/99 was rated as R, 5 genotypes were rated as MR, 9 genotypes as MS, 10 genotypes were rated as S to CF08 (Table 35).

EAST COAST ZONE

CUDDALORE

Twenty-seven elite and ISH clones screened for resistance and among these the clone GU 07-2276 was recorded as R. Twelve genotypes *viz*., AS 04-2097, BM 1005149, BM 1010168, GU 07-3849, MA 5/37, MA 5/99, MA 5/22, PG 9869137, SA 98-13, SA 04-454, SA 04-390, and SA 04-409 were MR to red rot. The genotypes *viz*., AS 04-1689, AS 04-635, AS 04-1687, CYM 07-986 SA 04-472 and SA 04-496 were MS. The genotypes BM 1022173, GU 07-3774, MA 5/51 and SA 04-458, and were HS to red rot (Table 36).

ANAKAPALLE

Out of 27 ISH genotypes tested by plug method of inoculation, one entry (PG9869137) showed R, while 6 entries, SA 04-454, SA 04-496, AS 04-2097, MA 5/51, MA 5/37, MA 5/99 and GU 07-2276 showed MR reaction to the pathotype CF06 and remaining were MS to HS to red rot disease (Table 37).

PENINSULAR ZONE

NAVSARI

Thirty elite and ISH Clones were evaluated for resistance to red rot by plug method using CF06 and CF12 pathotypes. Among them only one clone SES 594 was found R against both the pathotypes and 12 clones were rated as MR against both the pathotypes. Five clones *viz.,* ISH 50, ISH 175, ISH 229, ISH 287 and AS 04 1687 showed MS against both the pathotypes, 2 clones *viz.,* ISH 69 and MA 5/5 exhibited S against both the pathotypes, 3 clones *viz*., ISH 9, ISH 43 and ISH 176 were rated as HS to both pathotypes. Clone GU 07 2276 was rated as R to CF06 while MR to CF12, clones ISH 12, MA 5/22 and SA 04 454 were found MS to CF06, while MR to CF12. The clone CyM 07 986 showed S to CF06 and MS to CF06. Clone ISH 41 found HS to CF06 and S to CF06 whereas MA 5/51 showed S to CF06 and HS to CF06 (Table 38).

COIMBATORE

The first batch of ISH clones was evaluated and the trial concluded. A new set of materials will be tested in the 2020-21.

PP 31: SCREENING, EPIDEMIOLOGY AND MANAGEMENT OF POKKAH BOENG IN SUGARCANE

Objectives: To study the development of pokkah boeng disease in relation to weather parameters and its management in sugarcane crop.
Location: Kapurthala, Uchani, Shahjahanpur, PUSA, Seorahi, Anakapalle, Pune and Akola
Year of Start: 2011-2012
Observations to be recorded: Screening the desirable varieties for the incidence of pokkah boeng, correlation of climatic factors in relation to disease development and management of pokkah boeng under field conditions if the disease reaches acute phases.
(i) Screening:
Symptoms to be observed:
Mild -Green plants with pokkah boeng (curling/twisting of spindle leaves, twisting of leaves, whitish/chlorotic streaks on the leaves) at varying intensities.
Moderate -Yellowing of 3rd/4th leaf followed by complete yellowing of foliage and expression of top rot symptom
Severe -Yellowing of leaves + Discoloration (Light colored) of silk + wilting symptom in opened stalks
Observe for the presence of above symptoms and grade it as given below

Varieties	% infected Plants				Disease reaction
	Mild	Moderate	Severe	Total incidence	
VI					
V2					
V3					

* No restriction on number of varieties to be studied
Disease Reaction:
0-5% - Resistant; >5-10% - Moderately Susceptible; 10-20% - Susceptible;
20% - Highly Susceptible
(ii) Epidemiology
Record temperature, relative humidity and rainfall from May to September and establish correlation with disease incidence
(iii) Management – (To be taken up during second year of the Project)
Varieties: Two susceptible varieties
Treatments:
T-1 Sett treatment – Overnight soaking with Carbendazim – 0.1% a.i.
T-2 Foliar spray – Carbendazim – 0.05% a.i. (3 sprays at 15 days interval from May 15th)
T-3 – Sett treatment (T1) +Foliar spray with carbendazim (T2)
T-4 Control
Replications: 4
Observations: Record disease incidence of pokkah boeng displaying symptoms of top rot or wilt or both and present the date in a tabular form.

RESULTS OF PREVIOUS YEAR

I. SCREENING FOR POKKAH BOENG RESISTANCE

KAPURTHALA

Out of 39 entries screened, 12 were MS and 4 were S and remaining showed resistance to PB. However, both the check varieties Co 0238 and CoJ 85 behaved as HS.

UCHANI

Sixty eight clones of sugarcane were screened against PB disease under natural conditions. Ten genotypes namely, Co 13034, CoLk 13204, CoLk 15027, CoLk 15208, CoPant 13224, CoS 13231, CoS 15233, CoS 15234 and MA-5-99 showed MS reaction to PB. Six genotypes *viz*., Co 05009, Co 15026, CoJ 64, CoS 8436, MA-5-5 and MA-5-37 exhibited S reaction (10.52-19.56%) to PB. However, five genotypes *viz*., BM-1022-173, Co 0238, CoS 15231, SA 04-472 and SA 04-496 showed HS reaction (20.93-47.3%) against PB.

SHAHJAHANPUR

Eight out of 18 genotypes/varieties behaved as R whereas, six genotypes/varieties were MS. Four genotypes/varieties *viz*; 4619/07, Co 0238, CoS 8436 and CoSe 15455 and were susceptible to PB.

PUSA

Out of 24 varieties, 13 (BO 91, BO 153, CoP 151, CoP 153, CoP 155, CoP 2061, CoP 9301, CoP 11438, CoP 12436, CoP 12438, CoP 13439, CoP 16437 and CoSe 13452) showed R reactions, whereas 10 varieties (BO 139, BO 156, CoBln 14502, CoLk 12207, CoP 154, CoP 11437, CoSe 12451, CoP 13437, CoSe 13453 and CoP 16440 and the check (CoSe 95422) showed MS reaction against PB.

SEORAHI

Out of 18 varieties, 11 showed resistant (R), 5 moderately susceptible (MS) and two showed susceptible (S) behavior to PB.

ANAKAPALLE

Out of 33 genotypes screened against top rot disease under natural conditions, only one genotype CoC 14336 was rated as resistant. Six genotypes (Co 01061, CoA 92081, CoA 14321, CoC 16338, CoC 16339 and CoV 16357) recorded MS reaction. The remaining entries were found to be susceptible to highly susceptible.

PUNE

Out of the 14 genotypes, CoVSI 03102 was observed free from the disease, while remaining 13 varieties *viz.,* 14-22, 59-20, 191-3, Co 419, Co 86032, Co 94012, CoC 671, CoM 0265, CoM 9057, CoVSI 9805, MS 10001, VSI 434, and VSI 08005 were found S. Maximum disease incidence was noted in CoVSI 9805 (24.33%) and Co 94012 (18.89%).

II. EPIDEMIOLOGY

KAPURTHALA

The incidence of the disease initiated from 1st fortnight of June and gradually increased till September. The average maximum temperature of 34.94°C (32.83-38.23°C), average minimum temperature 25.95°C (22.53-27.13°C), average relative humidity 70.08 per cent (54.6-77.64%) and higher total rainfall of 424 mm, respectively were recorded from June to September. The severe incidence of the disease was observed in the months from July to September due to high rainfall, relative humidity and temperature. Higher relative humidity and rainfall favoured the growth and development of pathogen.

UCHANI

Pokkah boeng incidence was found highest in February - March sowing. The average maximum temperature 33.6 °C (29.6-38.9°C) and minimum 25.3 °C (21.6-26.9°C), average relative humidity morning 85.4 per cent (58.0-95.6) and evening 64.9 per cent (30.1-83.3) and with total rainfall 178.9 mm (av. 9.9 mm) were recorded from June-September (22- 39

met. week). Pokkah boeng incidence starts increasing during rainfall with high humidity conditions. Popular varieties viz., CoS 0238 (27.8%), CoS 8436 (19.7%), CoJ 64 (19.6%) and CoH 119 (8.0%) exhibited b severe disease incidences during June- September, 2018.

SHAHJAHANPUR

Pokkah boeng incidence appeared during I fortnight of June and gradually increased till July to September due to high rainfall and humidity. Rainfall in July, August and September were recorded 612.8 mm, 324.4 mm and 102.6 mm, respectively. Similarly maximum relative humidity was recorded up to 83%, 87% and 81% and maximum temperature also recorded as 33.2°C, 31.8°C and 32.5°C in aforesaid months, respectively. Temperature, rainfall and relative humidity played a major role in the incidence and spreading of Pokkah boeng disease.

PUSA

The disease appeared in the last week of May and remains till 1st week of September. The maximum incidence was observed during 2nd week of June to last week of July and gradually decreased. The minimum and maximum temperature ranged between 23.9 to 34.7°C, relative humidity 64.7 to 90.5% and rainfall 43.8 to 432.6 mm, respectively were recorded from May to September. Humidity and rainfall play an important role in PB incidence.

SEORAHI

It was noticed that temperature (26 to 31°C), relative humidity (70 - 90%) and rainfall (240- 398 mm) during the year favored disease development. The disease incidence was found maximum in first week of July which gradually increased till last week of August. Maximum rainfall and high humidity favored the development of PB. The reduction in disease incidence was observed from the second week of July.

ANAKAPALLE

Pokkah boeng disease was initiated in sugarcane cultivar, 2003A 255 Simhadri during the second fortnight of May and high incidence was recorded in the months of June, July and August and incidence gradually reduced by the end of September, 2018. The disease incidence was highly influenced by minimum temperature followed by number of rainy days. As the minimum temperature reduced from the first fortnight of October, the disease also reduced. It was observed that PB incidence started from 65 days after planting and persisted upto 200 days. However, high incidence of the disease was observed from first fortnight of June to second fortnight of July which was found to be influenced by minimum temperatures and number of rainy days.

III. POKKAH BOENG MANAGEMENT

KAPURTHALA

The efficacy of Carbendazim fungicide for management of PB was tested on two susceptible varieties *viz*., Co 0238 and CoJ 85. The results revealed that fungicide Carbendazim was significantly better than control. Overnight soaking along with foliar spray at 15 days interval starting from May 15th was the most effective in checking the disease which gave higher germination and low disease incidence of 10.0 and 8.75 per cent in Co 0238 and CoJ 85 in comparison to other treatments.

UCHANI

Overnight cane soaking with Carbendazim 0.1% and foliar sprays with Carbendazim was found most effective in checking the the PB which gave lowest disease incidence of 6.4 per cent and 4.8 per cent in Co 0238 and CoS 8436.

PUSA

Sett treatment with Carbendazim @ 0.1% followed by 3 foliar sprays (Carbendazim 0.1%) at 15 days interval resulted in low disease of 5.0% compared to 20.3% PB in control. Sett treatment with Carbendazim @ 0.1% alone resulted in 11.3% PB disease incidence.

ANAKAPALLE

Sett treatment with Carbendazim @ 0.1% followed by foliar spraying of Carbendazim -0.05% recorded low (9.71%) top rot incidence compared to control which was on par with foliar spray with Carbendazim @ 0.05%.

PUNE

Both the fungicides *viz.,* Carbendazim and Mancozeb were found effective to control PB, when these two fungicides are sprayed thrice after 15th May onwards. However, Mancozeb found more effective than the Carbendazim. The maximum disease control (77.05 %) was obtained by 3 foliar sprays of Mancozeb @ 0.3% at an interval 15 days from 15th May onward. However, sett treatment with Carbendazim @ 0.1% and foliar spraying (Carbendazim 0.1%) three sprays at 15 days interval was also effective.

RESULTS OF CURRENT YEAR

KAPURTHALA

Forty entries were screened for PB incidence under natural condition. Among 40 entries, 15 namely Co 15024, Co 15025, Co 15027, Co 16030, CoLk 14203, CoLk 15209, CoLk 16202, CoPb 14211, CoPb 16181, CoLk 15205, CoLk 16204, CoPb 16212, CoS 16231, CoS 16233 and CoS 15233 were MS, four entries (CoPant 16222, CoLk 15201, CoPb 15212 and CoLk 15206) were S and remaining were R to pokkah boeng (Table 39).

UCHANI

Seventy genotypes were screened against PB under natural conditions in that 37 entries *viz.*, AS-04-1687, AS-04-1689, AS -04-2097, AS-04-245, AS-04-635, BM-100-3143, BM-1005-149, BM-1009-163, Co 16029, CoH 14261, CoLk 14204, CoLk 15201, CoLk 15205, CoLk 15206, CoLk 15207, CoLk 15209, CoLk 16203, CoLk 16204, CoLk 16202, CoPant 16221, CoPb 15212, CoPb 16181, CoPb 16212, CoPb14211, CoS 14233, CoS 15232, CoS 16231, CoS 16233, GV-07-2276, GV-073734-212, GV-07-3849, MA-5-22, MA-5-51, PG 9869137**,** SA-04-390, SA-04-409 and SA-98-13 were found R (0-4.93%). Eighteen varieties namely, BM-1010-168, Co 14034, Co 14035, Co 15023, Co 16025, CoLk 14201, CoLk 16201, CoPb 16211, CoLk 14203, CoLk 15027, CoPant 97222, CoPb 14185, CoPb 15213, CoPb 14181, CoS 767, CoS 16232, CUM-07-986 and MA-5-99 showed MS reaction (5.34-9.95%) to pokkah boeng. Ten entries *viz.*, Co 15026, Co 16030, CoJ 64, CoLk 15024, CoPant 16222, CoPant 16223, CoPb 14184, CoS 15233, MA5-5 and MA5-37 exhibited S reaction (10.53-19.25%) however, 4 clones *viz*,. BM-1022-173, Co 0238, SA04-472 and SA04-496 showed HS reaction (28.15-48.15%) against pokkah boeng (Table 40).

SHAHJAHANPUR

Twenty two genotypes were evaluated naturally against PB. Six out of 21 genotypes *viz.*, CoJ 64, CoS 16233, CoS 17233, CoSe 16451, CoSe 16453 and 5347/12 behaved as R, whereas six screened as MS. Nine genotypes were observed as S/HS and susceptible check Co 0238 exhibited HS to PB (Table 41).

PUSA

Twenty sugarcane varieties were screened under natural condition out of which, twelve entries (BO 91, BO 139, BO 153, BO 155, CoP 151, CoP 2061, CoP 14436, CoP 14437, CoP 14438, CoP 15436 CoP 16437and CoP 15438) were observed as R, six entries (CoP 16440, CoLk 14208, BO 130, CoP 155, BO 156 and CoP 154) showed MS and two entries CoSe 95422 and CoSe 14453 showed S reaction to Pokkah boeng (Table 42).

SEORAHI

Total of 33 genotypes were screened for PB and out of these, 21 exhibited R, 7 exhibited MS and rest of them exhibited S behavior to pokkah boeng disease (Table 43).

ANAKAPALLE

Out of 35 genotypes, less than 5% disease incidence was observed in eight genotypes, *viz.*, Co 6907, CoA 17321, CoA 17323, CoA 17324, CoA 92081, CoC 16338, CoOr 17346 and CoV 16357 and rated as R and the remaining entries were found to be either MS or S to HS with a disease score of >5% (Table 44).

PUNE

Out of fourteen entries 14-22, 191-3, Co 419, CoVSI 03102, CoM 0265 and CoM 9057 were free from the disease, while the remaining 8 *viz.,* Co 86032, Co 94012, CoC 671, CoVSI 9805, MS 10001, VSI 434, and VSI 08005 were found to be S. Maximum disease incidence was noted in CoVSI 9805 (26.75%) and VSI 08005 (19.33%) (Table 45).

II. EPIDEMIOLOGY

KAPURTHALA

During the present study, the overall disease severity was moderate to high and disease progressed readily when environmental conditions were favourable. The progress of disease started picking up from the last week of May and gradually increased till September. The severe incidence of the disease was observed in the months of July and August. Weather parameters *viz.*, maximum temperature, relative humidity (morning and evening) and rainfall were found to be positively correlated; therefore it is evident that disease severity progressed significantly with rise in temperature, relative humidity and high rainfall. Higher relative humidity coupled with cloudy weather and drizzling favoured the growth and development of pathogen. Coefficient of determination between disease severity and weather parameters revealed that all the weather parameters together governed 74% towards disease severity.

UCHANI

The progress of disease started picking up from the second week of June and gradually increased till August. The severe incidence of the disease was observed in the months of June and July. There was a significant positive correlation between disease severity and rainfall (r=0.55), minimum temperature (r=0.57) relative humidity morning (r=0.49) and evening (r=0.90). The correlation coefficients of disease severity with evaporation (r=-0.45) and sunshine (r=-0.48) was negatively significant. There was negative correlation between disease severity and maximum temperature (r=-0.33) but not significant.

SHAHJAHANPUR

Pokkah boeng incidence appeared during Ist fortnight of June and gradually increased till July to September due to high rainfall and humidity. Rainfall in July, August and September were recorded 484.6 mm, 140.6 mm and 167.2 mm, respectively. Likewise, utmost relative humidity was recorded up to 82%, 81% and 84% in same months, respectively. Higher relative humidity % coupled with cloudy weather and showery favoured the growth of pathogen. Maximum temperature also recorded as 33.5^{0}C, 33.5^{0}C and 32.3^{0}C in aforesaid months, respectively. Temperature, rainfall and relative humidity collectively played a key role in the severe incidence and spreading of PB.

PUSA

The maximum disease incidence of PB was observed during 2nd and 1st fortnight of August (18.5% and 16.6%) respectively. The minimum and maximum temperature ranged between 26.7^{0}C to 34.6^{0}C, relative humidity 73.0 to 91.0% and rainfall 8.2 mm to 161.3 mm respectively, during the maximum development of the disease. The correlation analysis between weather factors and disease incidence indicate that minimum temperature showed highly significant positive correlation with disease incidence (R=0.66**), whereas, RH of 07

hrs and 14 hrs (r=0.19, 0.44) showed +ve correlation but not significant and rainfall (0.51*) showed significant positive correlation. The multiple linear regression were also worked out by taking disease incidence as dependent variable and weather factors as independent variables. The data showed that all the weather factors together governed 76% towards disease incidence (R_2 = 0.76) and the minimum temperature and rainfall were the favourable weather factors for PB in Bihar.

SEORAHI

It was noticed that temperature (22.07 to 32.6° C), relative humidity (68.51 – 89.97%) and rainfall (231 - 342 mm) during the year favored disease development. The disease incidence was found maximum in first week of July which gradually increased till last week of August. Maximum rainfall and high humidity favored the development of PB. The reduction in disease incidence was observed from the second week of July after the period of rain fall.

ANAKAPALLE

The disease incidence was initiated during the first fortnight of June and high incidence was recorded in the month of August. The disease incidence gradually reduced by second fortnight of September, 2019. The disease incidence was found to be highly influenced by minimum temperature followed by number of rainy days. As the minimum temperature reduced from the second fortnight of October, the disease also reduced. It was observed that PB incidence started from first fortnight of June (about 65 days after planting) and considerable disease incidence was noticed till second fortnight of September (175 days after planting). However, high incidence of the disease was observed from second week of August to first week of September which was found to be influenced by minimum temperature (25.3 to 26.1^{0}C) and number of rainy days.

III. POKKAH BOENG MANAGEMENT

SHAHJAHANPUR

The efficacy of carbendazim fungicide for the management of PB was assessed with two susceptible varieties Co 0238 and CoS 08279. Study revealed that carbendazim managed the disease severity as compared to control. The treatment T_3 (Sett treatment with carbendazim + foliar spray with carbendazim) was found better in germination and most effective to manage PB during the monsoon season followed by T_2 in both the varieties. Highest germination of 40% with low incidence of PB (11.63%) was recorded in Co 0238 and 48.75% germination and 11.92% PB incidence recorded in CoS 08279 (Table 46).

KAPURTHALA

The efficacy of carbendazim fungicide for management of pokkah boeng was tested on two susceptible varieties *viz*., Co 0238 and CoJ 85 under four treatment combinations *viz*., T_1: sett treatment-overnight soaking with Carbendazim (0.1% a.i.), T_2: Foliar spray of Carbendazim (0.05% a.i.-3 sprays at 15 days interval from May 15th), T_3: Sett treatment (T_1) + Foliar spray with carbendazim (T_2) and Control (T_4). The results revealed that fungicide carbendazim was significantly better in increasing germination and to manage the disease in comparison to control. Overnight soaking along with foliar spray at 15 days interval starting from May 15th (T_3) was the most effective in checking the disease which gave higher germination and low disease incidence of 9.25% and 9.75 %, respectively in Co 0238 and CoJ 85 in comparison to other treatments (Table 47).

UCHANI

For management of PB, experiment was conducted by following three treatments *viz*., T_1 Sett treatment (overnight soaking with carbendazim 0.1%), T_2 Foliar spray with carbendazim 0.05% - 3 sprays at 15 days interval and T_3 (T_1 + T_2) and control with four replications on varieties Co 0238 and CoS 8436. Overnight soaking with carbendazim 0.1%

and foliar sprays with carbendazim was found most effective in checking the the PB which gave lowest disease incidence of 6.7% and 5.8% in Co 0238 and CoS 8436, respectively and also increase **%** germination (Table 48).

PUSA

To manage the PB, sett treatment with carbendazim @ 0.1% and three foliar sprays with carbendazim at 15 days intervals showed highest germination and maximum disease control in all the treated varieties. Highest germination 36.4% with low disease incidence (7.2%) was observed in BO 154 and lowest germination 22.3% and 13.2% disease incidence was recorded in variety CoBln 15501 (Table 49).

ANAKAPALLE

Sett treatment + foliar spray of carbendazim -0.05% recorded low (5.33%) top rot incidence compared to control which was on par with foliar spray with carbendazim @ 0.05% a.i (5.55%) (Table 50).

PP 33: MANAGEMENT OF YELLOW LEAF THROUGH MERISTEM CULTURE

RESULTS OF THE PREVIOUS YEAR

ANAKAPALLE

Tissue culture plantlets of sugarcane cultivars, CoA 92081 and CoV 09356 were raised and transplanted under field conditions in the months of April and June, 2018. Yellow leaf incidence was not observed in breeder seed crop of CoA 92081. However, 1-5% incidence of YL was recorded in the foundation seed crop of the variety, CoV 09356 planted in June, 2018 which was adjacent to the field with 50 per cent YL incidence. This may be attributed to the high amount of ScYLV inoculum adjacent to the transplanted field and prevalence of viruliferous aphids in the early stages of crop growth. Virus indexing of tissue culture plantlets of sugarcane through RT-PCR revealed the absence of ScYLV in tissue culture plantlets of sugarcane cultivars, CoA 92081 and CoV 09356 obtained from tissue culture lab, RARS, Anakapalle.

PUNE

The tissue culture plantlets of Co 86032 and VSI 08005 were produced and properly hardened TC plantlets were transplanted in the field for the production of breeder seed and observed throughout the year for the incidence of YL. During the production of breeder seed, the crop remained free from YL. The sugarcane setts obtained from breeder seed plot were planted for production of foundation seed in the field. The ratoon of the breeder crop was also maintained and is under inspection for the disease occurrence.

COIMBATORE

A field trial was conducted with healthy and disease-affected planting materials of three popular cvs Co 86032, Co 0238 and Co 11015 and assessed impact of YLD on cane growth and yield under field conditions. In all the three varieties virus-infected materials exhibited a poor crop stand. The diseased crops were found to have poor vigour and lacked uniform crop stand as that of virus-free plants. In all the three varieties, virus-infected canes recorded significantly lesser cane and juice yield than the healthy ones.

RESULTS OF THE CURRENT YEAR

ANAKAPALLE

Seedlings of CoA 92081 (2221 No.s) raised through meristem tip culture were transplanted in the field and YL incidence was recorded in CoA 92081 and CoV 09356. Yellow leaf incidence was not observed in breeder seed crop of CoA 92081. However, 1-2% incidence of YL was recorded in the ratoon crop of the variety, CoA 92081 and 5% disease incidence in CoV 09356. This may be attributed to the horizontal spread of ScYLV from infected plants to the fields transplanted with tissue culture seedlings through viruliferous aphids.

CUDDALORE

The mother culture of variety Co 86032 was collected from Sugarcane Breeding Institute, Coimbatore. The culture were used for shoot multiplication, rooting and 3500 hardened seedlings were transplanted in the fields and observed for the yellow leaf disease incidence. There was no YL in breeder as well as foundation seed crop. The growth character of the tissue culture plants (Co 86032) was compared with the plants raised from two budded setts. The observation on the plant character revealed that the sugarcane raised from the tissue culture seedlings was superior to conventional two budded sett planting in all

the plant growth characters observed. The tissue culture based sugarcane was free from yellow leaf disease incidence whereas the plants from the two budded setts has higher incidence of yellow leaf disease.

PUNE

The tissue culture plantlets of 2 varieties *viz.,* Co 86032 and VSI 08005 were produced as per the standard procedure being followed at VSI, Pune. Properly hardened TC plantlets were transplanted in the field for the production of breeder seed and observed throughout the year for the natural incidence of YL. During the production of breeder seed, the crop remained free from YL. The sugarcane setts obtained from breeder seed plot were planted for production of foundation seed. The foundation seed crop was also found free from YL. However, the ratoon crop of breeder seed exhibited the symptoms of YL.

COIMBATORE

A field trial was conducted with healthy and disease-affected planting materials of three popular cvs Co 86032, Co 0238 and Co 11015 and assessed impact of YL on cane growth and yield under field conditions. Overall, in all the three varieties virus-infected materials exhibited a poor crop stand and lacked uniform crop stand as that of virus-free plants. The diseased plots recorded significantly reduced flowering especially in the cv Co 86032. Further, it was also observed that in the diseased plants, either flowering was delayed or the arrows along with short blade dried without complete emergence. Among the three varieties, the virus-free plants of cv Co 11015 picked up the disease and recorded severe YL as in the case of virus-infected plots. Virus-free plots recorded PDI of 48% as compared to 63% in virus-infected plots. However, in other two varieties healthy plots exhibited less than 3.0% disease as compared to 15.6% (Co 0238) and 52.1% (Co 86032) in the diseased plots. In the plots YL severity grades were recorded and till December, upto severity grade 4 was recorded. In case of Co 86032, only 0.11% canes in the healthy plots were observed with grade 1 symptom and no further severe grades were observed. Whereas in the diseased plots 3.5, 4.2, 7.01 and 3.7% plants exhibited YL grades -1, -2, -3 and -4, respectively. In the cv Co 0238 the severity grades 1-2 were observed in limited number of plants. However, in case of Co 11015, 12.5% plants of healthy and 16.8% plants of the diseased plots expressed YL grade 3 and the respective figures for the grade 4 were 32.5 and 35.06. In the cv Co 86032, YL affected plots recorded 17.1% and 29.6% reductions in cane and juice yield, respectively at the time of harvest. Similarly, the cvs Co 0238 and Co 11015 recorded a loss of 29.5% and 14.2% in cane yield, respectively at the time of harvest. The cv Co 11015 recorded a loss of 26.4% in juice yield due to YL at the time of harvest, however, the cv Co 0238 did not such severe loss in juice yield (Table 51).

Table 1. Pathogenic behavior of *C. falcatum* pathotypes on host differentials - Lucknow

Sl. No.	Pathotype	Source	Reaction on host differentials																	
			Co 419	Co 975	Co 997	Co 1148	Co 62399	Co 7717	CoC 671	CoJ 64	CoS 767	CoS 8436	BO 91	Co 86002	Co 86032	Co 7805	CoV 92102	CoSe 95422	Baragua	Khakai	SES 594
1.	CF07	CoJ 64	I	R	S	S	R	R	I	S	R	R	R	-	-	-	-	-	R	S	R
2.	CF08	CoJ 64	I	S	S	S	S	S	S	S	I	R	R	-	-	-	-	-	R	S	R
3.	CF09	CoS 767	I	R	I	S	R	R	I	S	S	R	R	-	-	-	-	-	R	S	R
4.	IR-171	Co 0238	I	S	R	R	S	I	S	I	I	R	R	S	I	I	S	I	I	I	R
5.	IR-172	Co 0238	I	S	R	R	S	I	S	I	I	R	R	S	R	I	S	I	R	I	R
6.	IR-173	Co 0238	I	S	R	R	S	I	S	I	R	R	R	S	I	I	S	I	I	I	R
7.	IR-174	Co 0238	I	S	R	R	S	I	S	I	I	R	R	S	I	S	S	I	I	I	R
8.	IR-175	Co 0238	I	S	R	R	S	I	S	I	I	R	R	S	R	I	S	I	R	I	R
9.	IR-176	Co 0238	I	S	R	R	S	I	S	I	I	R	R	S	I	I	S	I	I	I	R
10.	IR-177	Co 0238	I	S	R	R	S	I	S	I	I	R	R	S	R	I	S	I	I	I	R
11.	IR-178	Co 0238	I	S	R	R	S	I	S	I	I	R	R	S	R	I	S	I	I	I	R
12.	IR-179	Co 0238	I	S	R	R	S	I	S	I	R	R	R	S	I	I	S	I	R	I	R
13.	IR-180	Co 0238	I	S	R	R	S	I	S	I	I	R	R	S	R	I	S	I	I	S	R
14.	IR-181	Co 0238	I	S	R	R	S	I	S	I	I	R	R	S	R	R	S	I	I	I	R
15.	IR-182	Co 0238	I	S	R	R	S	I	S	I	I	R	R	S	I	I	S	I	I	I	R
16.	IR-183	CoLk 8102	R	S	R	R	I	S	S	S	R	R	I	I	I	I	I	S	R	S	R

Table 2. Pathogenic behavior of *C. falcatum* pathotypes on host differentials - Shahjahanpur

Sl. No.	Pathotype/ Isolates	Source	Reaction on host differentials																	
			Co 419	Co 975	Co 997	Co 1148	Co 7717	Co 62399	CoC 671	CoJ 64	CoS 767	CoS 8436	BO 91	Co 86002	Co 86032	Co 7805	CoV 92102	CoSe 95422	Baragua	Khakai	SES 594
1	CF01	Co 1148	S	R	S	S	R	X	X	S	R	R	R	R	R	R	X	R	R	S	R
2	CF02	Co 7717	R	R	S	S	R	R	S	S	R	R	R	R	R	R	R	R	R	X	R
3	CF03	CoJ 64	X	R	S	R	X	R	S	S	R	R	R	R	R	X	R	R	R	X	R
4	CF07	CoJ 64	R	R	S	X	R	R	X	S	S	R	R	X	R	R	R	R	R	S	R
5	CF08	CoJ 64	R	R	S	X	R	R	X	S	S	R	R	S	R	X	X	R	R	S	R
6	CF09	CoS 767	S	R	S	R	R	R	X	S	S	R	R	S	R	X	X	R	R	S	R
7	CF11	CoJ 64	S	S	S	S	S	S	S	S	S	R	R	S	S	X	S	R	R	S	R
8	Cf8436	CoS 8436	S	X	S	S	X	X	S	S	R	S	R	R	S	X	S	R	R	S	R
9	Cf07250	CoS 07250	S	R	S	S	X	S	S	S	X	R	S	X	S	S	X	X	R	S	R
10	Cf97264	CoS 97264	R	R	S	X	R	R	X	X	R	R	X	S	R	R	R	R	R	S	R
11	Cf0238-I	Co 0238	X	X	S	R	X	S	S	R	R	R	R	X	S	X	R	R	R	S	R
12	Cf0238 II	Co 0238	X	X	S	X	X	S	S	X	R	R	R	X	S	X	R	R	R	S	R
13	Cf0238-III	Co 0238	R	R	R	R	X	S	S	R	R	R	R	S	S	X	S	R	X	S	R
14	Cf0238-IV	Co 0238	S	X	X	X	R	S	S	X	R	R	R	X	S	S	R	R	X	S	R
15	Cf0238-V	Co 0238	X	X	S	X	X	S	S	R	R	R	R	S	S	X	R	R	X	S	R
16	Cf0238-VI	Co 0238	S	R	X	X	R	S	S	S	R	R	R	S	S	S	S	R	R	S	R
17	Cf0238-VII	Co 0238	R	R	S	X	R	S	S	S	R	R	R	S	S	S	X	R	X	S	R

Table 3. Pathogenic behavior of *C. falcatum* pathotypes on host differentials - Kapurthala

S. No	Pathotype/ Isolates	Source	Reaction on 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	Co 86002	Co 7805	Co 86032	CoV 92102	CoSe 95422
1	CF08	CoJ 84	S	S	S	S	S	S	S	S	X	R	R	R	S	R	R	S	R	R	R
2	CF09	CoS 767	X	X	S	S	R	R	S	S	X	R	R	R	S	R	R	S	R	R	R
3	Cf89003-2	Co 89003	S	S	S	S	S	S	S	S	X	R	R	R	S	R	R	S	R	X	R
4	Cf89003-1-Chunni Kamal	Co 89003	S	S	S	S	X	S	S	S	X	R	R	R	S	R	R	S	R	R	R
5	Cf89003-2 – Chunni Kamal	Co 89003	S	S	S	S	X	S	S	S	X	R	R	R	S	R	R	S	R	R	R
6	Cf89003-Pathankot	Co 89003	S	S	S	S	S	S	S	S	X	R	R	R	S	R	R	S	R	R	R
7	Cf89003-Nakodar	Co 89003	S	X	S	S	R	R	S	S	R	R	R	R	S	R	R	X	R	R	R
8	Cf89003-Ajnala	Co 89003	S	S	S	X	S	S	S	S	R	R	R	R	S	R	R	R	X	R	R
9	Cf85-Ajnala	CoJ 85	S	X	S	S	R	X	S	S	X	R	R	R	S	R	R	S	R	R	R
10	Cf85-Batala	CoJ 85	S	S	S	S	S	S	S	S	X	R	R	R	S	R	R	S	R	R	R
11	Cf88-Bhogpur	CoJ 88	S	S	S	S	R	S	S	S	R	R	R	R	S	R	X	S	R	R	R

Table 4. Pathogenic behavior of *C. falcatum* pathotypes on host differentials– Uchani

S. No	Pathotypes/ Isolates	Reaction on host differentials																		
		Source	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	Co 7805	Co 86002	CoV 92102	Co 86032
1	CF01	Co 1148	R	I	S	S	I	S	S	I	R	R	R	R	S	R	R	S	R	R	R
2	CF02	CoJ 7717	I	R	S	R	S	I	S	R	R	R	R	R	S	R	R	I	R	R	R
3	CF03	CoJ 64	R	R	S	R	R	R	S	S	R	R	R	R	S	R	R	R	I	R	R
4	CF07	CoJ 64	I	R	S	S	R	R	S	S	R	R	R	R	S	R	R	R	I	R	I
5	CF08	CoJ 64	S	S	S	S	S	S	S	S	R	R	R	R	S	R	R	R	R	R	R
6	CF09	CoS 767	R	R	S	S	R	R	S	S	S	R	R	R	S	R	R	I	R	R	R
7	CF11	CoJ 64	S	S	S	S	I	S	S	S	S	R	R	R	S	R	R	I	S	R	R
8	XXXVIII	CoJ 85	S	S	S	S	I	S	S	S	R	R	R	R	S	R	R	S	I	R	R
9	RR XXXVIIII	CoJ 85	S	S	S	S	S	S	S	S	R	R	R	R	S	R	R	S	R	R	R
10	RR XXXX	CoJ 64	S	S	S	S	S	S	S	S	R	R	R	I	S	R	R	R	I	R	R
11	RR XXXXI	Co 89003	I	S	S	R	S	S	S	I	I	R	R	R	R	R	I	S	R	R	R
12	RR XXXXII	Co 89003	S	I	S	R	I	S	S	R	R	S	R	I	S	R	R	S	I	R	R
13	RR XXXXIII	CoS 8436	S	S	S	R	S	S	S	S	R	S	R	R	S	R	R	S	I	R	R
14	RR XXXVII	CoS 8436	S	S	S	I	S	S	S	S	R	R	R	R	S	R	R	S	I	R	R

Table 5. Pathogenic behavior of *C. falcatum* pathotypes on host differentials- Karnal

S. No.	Pathotype /isolate	Source	Reaction on host differentials																		
			Co 419	Co 975	Co 997	Co 1148	Co 7717	Co 7805	Co 62399	Co 86002	Co 86032	CoC 671	CoJ 64	CoS 767	CoS 8436	CoV 92102	CoSe 95422	BO 91	Baragua	Khakai	SES 594
1.	CF01	Co 1148	S	S	S	R	S	S	R	R	R	R	R	R	R	R	R	R	S	R	R
2	CF02	Co 7717	R	S	S	S	S	S	R	S	R	R	R	R	X	X	R	R	S	X	R
3	CF03	CoJ 64	R	R	R	R	X	R	R	R	R	R	R	R	S	R	R	R	X	R	R
4	CF07	CoJ 64	R	S	R	R	X	S	S	R	R	R	R	R	X	R	R	R	S	R	R
5	CF08	CoJ 64	R	S	R	S	X	R	X	S	R	R	R	R	S	R	R	R	S	X	R
6	CF09	CoS 767	R	S	S	R	X	R	R	S	R	R	S	R	S	R	R	R	S	R	R
7	CF11	CoJ 64	R	S	S	S	S	R	S	R	S	R	S	R	S	R	R	X	S	S	R
8	Cf8436 (Karnal)	CoS 8436	X	S	R	S	S	R	R	R	S	R	R	S	S	R	R	S	S	X	R
9	Cf8436(Bihar)	CoS 8436	R	X	R	R	S	R	R	X	S	R	R	S	R	R	R	R	S	R	R
10	Cf89003	Co 89003	X	S	R	S	S	S	S	X	X	R	R	R	R	X	R	R	S	S	R
11	Cf88 (UP)	CoJ 88	R	S	R	S	S	R	R	R	S	R	R	R	X	R	R	S	S	S	R
12	CfLk 94184	CoLk 94184	R	R	R	X	S	R	S	R	R	R	R	R	R	R	R	S	S	S	R

Table 6. Pathogenic behavior of *C. falcatum* pathotypes on host differentials–Pusa

S. No.	Pathotype /Isolate	Source	Reaction on 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	Co 86002	Co 7805	Co 86032	CoV 92102	CoSe 95422
1.	CF07	CoJ 64	R	R	S	S	I	I	I	S	I	I	R	R	S	R	I	R	-	I	I
2.	CF08	CoJ 64	I	I	S	S	S	S	S	S	S	S	R	R	S	R	S	I	-	S	S
3.	RR_1	BO 128	I	I	S	S	S	S	S	S	S	S	R	R	S	R	S	I	-	S	S
4.	RR_2	BO 138	I	I	S	S	S	S	S	S	S	S	R	R	S	R	S	I	-	S	S
5.	RR_3	BO 141	I	I	S	S	S	S	S	S	S	S	R	R	S	R	S	I	-	S	S
6.	RR_4	BO 145	R	R	S	S	I	I	I	S	I	I	R	R	S	R	I	R	-	I	I
7.	RR_5	CoJ 64	I	I	S	S	S	S	S	S	S	S	R	R	S	R	S	I	-	S	S
8.	RR_6	CoS 8436	I	I	S	S	S	S	S	S	S	S	R	R	S	R	S	I	-	S	S
9.	RR_7	CoSe 95422	R	R	S	S	I	I	I	S	I	I	R	R	S	R	I	R	-	I	I
10.	RR_8	CoLk 94184	R	R	S	S	I	I	I	S	I	I	R	R	S	R	I	R	-	I	I
11.	RR_9	CoLk 8102	R	R	S	S	I	I	I	S	I	I	R	R	S	R	I	R	-	I	I
12.	RR_{10}	CoS 91269	R	R	S	S	I	I	I	S	I	I	R	R	S	R	I	R	-	I	I
13.	RR_{11}	CoS 98231	I	I	S	S	S	S	S	S	S	S	R	R	S	R	S	I	-	S	S
14.	RR_{12}	Co 0233	I	I	S	S	S	S	S	S	S	S	R	R	S	R	S	I	-	S	S
15.	RR_{13}	Co 0238	R	R	S	S	I	I	I	S	I	I	R	R	S	R	I	R	-	I	I

Table 7. Pathogenic behavior of *C. falcatum* pathotypes on host differentials - Seorahi

S. 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	Co 86002	CoV 92102	Co 86032	Co 7805
1	CF01	Co 1148	I	I	R	S	I	I	I	R	I	I	I	R	R	R	R	I	I	S	I
2	CF02	Co 7717	S	I	I	R	S	I	R	I	I	R	I	I	I	R	R	I	R	I	I
3	CF03	CoJ 64	I	R	I	I	I	R	I	S	I	R	R	I	I	R	R	I	S	I	R
4	CF07	CoJ 64	I	S	I	S	I	S	S	S	S	I	R	I	I	R	I	S	S	S	I
5	CF08	CoJ 64	S	I	S	I	S	S	I	I	S	I	I	I	S	R	S	S	S	S	I
6	CF09	CoS 767	I	S	I	I	S	I	I	R	S	I	I	I	I	R	I	R	I	I	I
7	CF11	CoJ 64	I	I	S	R	I	S	S	S	S	I	R	I	S	R	I	R	I	S	R
8	R1701Seo	Co 0238	I	R	I	S	R	S	R	S	R	I	R	R	I	R	R	I	S	S	R
9	R1801Seo	Co 0238	I	S	R	R	I	S	S	I	R	R	I	I	S	R	I	S	S	I	I
10	R1802Seo	Co 0238	I	S	R	R	I	S	S	I	R	R	I	I	S	R	I	S	S	I	I
11	R1803Seo	Co 0238	I	S	R	I	R	S	R	I	R	R	I	R	S	R	I	I	S	S	R
12	R1804Seo	Co 0238	I	S	R	R	I	S	S	I	R	R	I	I	S	R	I	S	S	I	I
13	R1805Seo	Co 0238	R	S	R	R	I	I	S	I	R	R	I	I	S	R	I	S	S	I	I
14	R1806Seo	Co 0238	I	S	R	R	I	S	S	I	R	R	I	I	S	R	I	S	S	I	I

Table 8. Pathogenic behavior of *C. falcatum* pathotypes on host differentials– Anakapalle

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	Kakhai	SES 594	Co 7805	Co 86002	Co 86032	CoV 92102	CoSe 95422
1.	CF06	CoC 671	S	R	X	R	R	R	S	R	R	R	R	R	X	R	S	R	X	R	R
2.	CfV89101 - Munagapaka	CoV 89101	S	R	X	R	R	R	S	R	R	R	R	R	R	R	X	R	X	R	R
3.	Cf62175 - Chodavaram	Co 62175	S	R	X	R	R	R	X	R	R	R	R	R	R	R	S	R	X	R	R
4.	CfA53 - Pichatoor	99 A 53	R	R	X	R	R	R	X	R	R	R	R	R	R	R	S	R	X	R	R
5.	CfV297 - Chinnagottigillu	93 V 297	R	R	X	R	R	R	S	R	R	R	R	R	R	R	S	R	R	R	R
6.	CfT275 - Perumallapalle	2017 T 275	X	R	X	R	R	R	X	R	R	R	R	R	X	R	S	R	X	R	R
7.	CfA89085 - Perumallapalle	CoA 89085	X	R	X	R	R	R	X	R	R	R	R	R	X	R	S	R	X	R	R

Table 9. Pathogenic behavior of *C. falcatum* pathotypes on host differentials– Cuddalore

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	Co 7805	Co 86002	CoV 92102	Co 86032
1	CF06	CoC 671	S	S	S	X	X	X	S	X	R	R	R	R	X	R	R	R	R	X	X
2	CF12	Co 94012	S	S	X	S	X	S	S	X	X	R	R	R	X	R	R	X	X	X	X
3	Cf86032 Pakkam	Co 86032	S	S	S	X	X	X	S	X	R	R	R	R	X	R	R	S	R	R	S
4	CfM0265 Thuvaragapuram	CoM 0265	X	X	S	S	X	S	S	R	X	R	R	R	X	R	R	X	R	X	S
5	CfC24 Padalam	CoC 24	S	X	S	S	S	S	S	S	X	R	X	R	S	R	R	R	X	X	S
6	CfV09356 T Edayar	CoV 09356	X	X	X	S	S	X	S	X	R	R	X	R	X	R	R	X	R	R	X

Table 10. Pathogenic behavior of *C. falcatum* pathotypes on host differentials– Navsari

Sl. No.	Pathotype /Isolates	Source	Reaction on 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	CoV 92102	Co 7805	Co 86002	CoSe 95422	Co 86032
1.	CF06	CoC 671	S	R	I	I	S	I	S	R	I	R	I	R	I	R	I	I	S	I	S
2.	CF12	Co 94012	S	I	I	I	I	I	S	R	I	R	I	R	I	R	R	I	R	I	I
3.	*Cf* 0265	CoM 0265	S	S	I	I	I	I	S	R	I	R	R	R	I	R	R	I	I	I	I
4.	*Cf* 97009 (Mahuva)	Co 97009	I	I	I	I	I	I	S	R	I	R	R	R	I	R	R	I	S	I	S
5.	*Cf* 671 (Gandevi)	CoC 671	S	I	I	I	I	I	S	R	I	R	R	R	I	R	I	I	S	I	S
6.	*Cf* 97009 (Gandevi)	Co 97009	I	I	I	I	I	I	S	R	I	R	R	R	I	R	R	I	S	I	S
7.	*Cf* 86002 (Gandevi)	Co 86002	I	I	I	I	I	R	S	R	I	R	R	R	I	R	I	I	S	I	S
8.	*Cf* 86032 (Chalthan)	Co 86032	I	I	I	I	I	R	S	R	I	R	R	R	I	R	I	I	S	I	S

Table 11. Pathogenic behavior of *C. falcatum* pathotypes on host differentials - Coimbatore

Sl. No	Pathotype/ Isolates	Source	Reaction on host differentials																	
			Co 419	Co 975	Co 997	Co 1148	Co7717	Co 62399	CoC 671	CoJ 64	CoS 767	CoS 8436	BO 91	Baragua	Khakai	SES594	CoSe 95422	Co 7805	Co 86002	CoV 92102	Co 86032
1	CF06	CoC 671	I	I	S	R	R	R	S	I	R	R	R	I	I	R	R	R	R	R	R
2	CF12	Co 94012	I	I	S	R	R	R	S	I	I	R	I	I	I	R	I	R	R	R	R
3	Cf86027 Vellalapalayam	Co 86027	I	I	I	R	R	I	S	I	R	R	R	-	R	R	I	R	R	R	R
4	Cfc24 Mandagapattu TN	CoC 24	I	I	I	I	I	R	S	I	I	R	R	-	I	R	I	I	I	I	I
5	Cf2001-13 Perambakkam	Co 2001-13	S	I	S	I	I	I	S	I	I	R	R	R	S	R	I	R	I	R	I
6	Cf06022 Kuthalam	Co 06022	I	I	S	I	I	I	S	I	I	I	I	I	I	R	I	I	R	R	I
7	Cf99006 Mundiampakkam	Co 99006	I	I	I	I	I	R	I	R	I	R	R	I	I	R	I	I	I	R	I
8	Cfc24 Thandavarayanpatti	CoC 24	I	R	S	R	R	R	S	R	I	R	R	S	I	R	I	R	R	R	R
9	Cf06022 Pennadam	Co 06022	S	I	I	I	I	R	S	I	I	R	I	R	I	R	S	I	I	I	I
10	Cf0265 RK pet	CoM 0265	S	I	I	R	R	R	S	I	I	R	R	-	I	R	I	I	I	I	I

Table 12. Pathogenic behavior of *C. falcatum* pathotypes on host differentials - Thiruvalla

S. 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	Kakhai	SES 594	CoSc 95422	CoV 92102	Co 7805	Co 86002	Co 86032
1	CF06	CoC 671	I	I	I	I	R	R	S	I	I	R	R	I	R	R	I	I	I	I	R
2	CF12	Co 94012	I	I	I	R	I	I	S	I	I	R	I	I	I	R	R	I	R	I	I
3	Cf 2001-13 (Perampakkam)	Co 2001-13	S	S	S	S	I	I	S	I	S	I	I	I	S	R	I	I	S	I	I
4	Cf06022 (Kuthalam)	Co 06022	S	S	S	S	I	I	S	R	R	I	R	I	S	R	R	I	I	I	I
5	Cf 99006 (Mundiampakkam)	Co 99006	S	S	S	S	S	S	S	I	S	I	I	I	S	R	I	I	S	S	I
6	CfC 24 (Thandavarayanpattu)	CoC 24	R	R	S	I	I	I	S	I	I	I	I	I	I	R	I	I	I	I	I
7	Cf06022 (Pennadam)	Co 06022	S	S	S	S	I	S	S	R	I	R	I	I	S	R	R	R	I	I	I
8	Cf0265 (RK Pet)	CoM 0265	S	S	S	S	I	S	S	S	I	R	I	R	S	R	I	I	I	S	R
9	Cf86027 (Vellalapalayam)	Co 86027	I	R	S	I	R	R	S	S	R	I	I	R	I	R	I	I	R	S	R
10	CfC24 (Mandagapattu)	CoC 24	S	S	S	S	S	S	S	I	S	I	I	I	S	R	I	I	I	I	I

Table 13. Evaluation of sugarcane genotypes for red rot, smut, wilt & YLD resistance-Lucknow

Sl. No.	Genotype	Red Rot				Smut	Wilt	YL
		Plug Method		Nodal Method				
		CF08	CF09	CF08	CF09			
Initial Varietal Trial (Early)								
1.	Co 16025	MR	MR	R	R	R	S	-
2.	Co 16029	MR	MR	R	R	R	S	S
3.	CoLk 16201	R	R	R	R	S	-	S
4.	CoLk 16202	MR	MR	R	R	MR	-	-
5.	CoPb 16211	HS	HS	S	S	S	HS	S
6.	CoPb 16181	MR	MR	R	R	MS	-	-
7.	CoPant 16221	MR	MR	R	R	R	-	-
8.	CoPant 16222	MR	MR	R	R	R	S	-
9.	CoS 16231	MR	MR	R	R	MR	-	S
Advance Varietal Trial (I-Plant, Early)								
1.	Co 15023	MR	MR	R	R	R	S	-
2.	Co 15024	MS	MS	S	S	R	HS	-
3.	Co 15027	MR	MR	R	R	MS	S	S
4.	CoLk 15201	MR	MR	R	R	R	-	-
5.	CoLk 15205	MR	MR	R	R	R	-	-
6.	CoPb 15212	MR	MR	R	R	HS	-	R
Advance Varietal Trial (II-Plant, Early)								
1.	Co 14034	MS	MS	R	R	R	S	-
2.	CoLk 14201	MR	MR	R	R	R	-	S
3.	CoPb 14181	MR	MR	R	R	MR	-	-
4.	CoPb 14211	MR	MR	R	R	R	HS	-
Initial Varietal Trial (Mid Late)								
1.	Co 16030	MS	S	S	S	R	S	-
2.	CoLk 16203	MR	MR	R	R	R	-	-
3.	CoLk 16204	MR	MR	R	R	MR	-	-
4.	CoPb 16212	S	S	S	S	MS	HS	-
5.	CoPant 16223	MR	MR	R	R	MR	S	S
6.	CoS 16232	MR	MR	R	R	MR	-	-
7.	CoS 16233	MR	MR	R	R	R	-	-
Advance Varietal Trial (I- Plant Mid Late)								
1.	Co 15026	MR	MR	R	R	MR	HS	-
2.	CoLk 15206	R	R	R	R	R	-	-
3.	CoLk 15207	MR	MR	R	R	R	-	-
4.	CoLk 15209	MR	MR	R	R	HS	-	-
5.	CoPb 15213	MR	MR	R	R	R	S	S
6.	CoS 15232	MR	MR	R	R	MS	-	-
7.	CoS 15233	MR	MR	R	R	R	S	-
Advance Varietal Trial (II Plant Mid Late)								
1.	Co 14035	MR	MR	R	R	R	S	-
2.	CoH 14261	MR	MR	R	R	MR	S	-

3.	CoLk 14203	MR	MR	R	R	R	-	S
4.	CoLk 14204	MR	MR	R	R	S	-	-
5.	CoPb 14184	MR	MR	R	R	MR	-	-
6.	CoPb 14185	MR	MR	R	R	MR	S	-
7.	CoS 14233	MS	MS	R	R	S	S	HS
Checks								
1.	CoJ 64*	HS	S	-	-	MR	-	-
2.	CoS 767*	MS	S	-	-	R	-	-
3.	Co 1158**	-	-	-	-	S	-	-
4.	CoLk 7701**	-	-	-	-	S	-	-

* Check for red rot ** Check for smut

Table 14. Evaluation of sugarcane genotypes for red rot, smut & YLD resistance-Shahjahanpur

Sl. No.	Genotypes/ Varieties	Red rot				Smut	YLD
		Plug method		Nodal cotton swab			
		CF08	CF09	CF08	CF09		
IVT Early							
1	Co 15025	MR	MR	R	R	MR	R
2	Co 16029	R	R	R	R	MR	MR
3	CoLk 16201	MR	MR	R	R	S	MS
4	CoLk 16202	MR	MR	R	R	R	MR
5	CoPb 16211	HS	S	S	S	MS	R
6	CoPb 16181	MS	MR	R	R	MR	R
7	CoPant 16221	MR	MR	R	R	MR	MS
8	CoPant 16222	MR	MR	R	R	MR	R
9	CoS 16231	MR	MR	R	R	MR	MR
IVT Mid late							
1	Co 16030	MR	MR	R	R	MR	MS
2	CoLk 16203	MR	MR	R	R	MR	R
3	CoLk 16204	R	R	R	R	S	MR
4	CoPb 16212	MR	MR	R	R	MS	MR
5	CoPant 16223	MR	MR	R	R	MR	MR
6	CoS 16232	MR	R	R	R	MR	MS
7	CoS 16233	MR	R	R	R	MS	MS
AVT Early (I Plant)							
1	Co 15023	MR	R	R	R	R	MR
2	Co 15024	MS	MR	R	R	R	MS
3	Co 15027	MR	MR	R	R	R	R

4	CoLk 15201	MR	MS	R	R	MS	R
5	CoLk 15205	MR	MR	R	R	MS	R
6	CoPb 15212	MS	MS	R	R	R	MS
AVT Early (II Plant)							
1	Co 14034	MS	MS	R	R	R	MR
2	CoLk 14201	MR	MR	R	R	R	MR
3	CoPb 14181	MR	MR	R	R	S	MR
4	CoPb 14211	MS	MR	R	R	MS	MR
AVT Mid late (I Plant)							
1	Co 15026	MR	R	R	R	MS	MR
2	CoLk 15206	MR	MR	R	R	MR	R
3	CoLk 15207	MR	R	R	R	S	MS
4	CoLk 15209	MR	MR	R	R	MS	MR
5	CoPb 15213	MR	MR	R	R	MS	MS
6	CoS 15232	MR	MR	R	R	R	MR
7	CoS 15233	MR	R	R	R	MR	MS
AVT Mid late (II Plant)							
1	Co 14035	MR	MR	R	R	R	MR
2	CoH 14261	MR	MR	R	R	MR	MR
3	CoLk 14203	MR	MR	R	R	S	MR
4	CoLk 14204	MR	R	R	R	MS	MS
5	CoPb 14184	MR	MR	R	R	MS	MR
6	CoPb 14185	MR	R	R	R	R	MS
7	CoS 14233	MR	MR	R	R	MS	MS
Checks							
1	Co 0238	MR	MR	R	R	MS	MR
2	Co 05009	MR	MR	R	R	R	S
3	CoPant 97222	MR	MR	R	R	MR	MR
4	Co 05011	MR	MR	R	R	MS	S
5	CoS 767	HS	S	S	R	R	MR
6	CoJ 64	HS	HS	S	S	MR	-
7	Co 1158	-	-	-	-	HS	-

Table 15. Evaluation of sugarcane genotypes for red rot, smut, wilt and YLD resistance-Kapurthala

S. No.	Entries	Plug method		Nodal Cotton swab method		Smut	Wilt	YLD
		CF08	CF09	CF08	CF09			
IVT(Early)								
1	Co 15025	MS	MR	R	R	R	MS	R
2	Co 16029	MR	MR	R	R	MR	MR	S
3	CoLk 16201	MR	MR	R	R	MR	R	MR
4	CoLk 16202	MR	MS	R	R	MR	MR	R
5	CoPb 16211	MS	MS	R	R	MR	MR	MR
6	CoPb 16181	MR	MR	R	R	R	R	R
7	CoPant 16221	MS	MR	R	R	MR	R	R
8	CoPant 16222	MR	MR	R	R	MR	MS	MS
9	CoS 16231	MR	MR	R	R	MR	R	R
AVT(E-I Plant)								
10	Co 15023	MR	MR	R	R	MR	MS	R
11	Co 15024	MS	MS	R	S	MR	MR	R
12	Co 15027	MR	MR	R	R	MR	R	MR
13	CoLk 15201	MR	MR	R	R	MS	R	MR
14	CoLk 15205	MR	MR	R	R	MS	R	MR
15	CoPb 15212	MR	MS	R	R	MR	R	R
AVT(E-II Plant)								
16	Co 14034	MS	MS	R	R	MS	MS	MR
17	CoLk 14201	MR	MR	R	R	MS	R	R
18	CoPb 14181	MR	MR	R	R	MS	MR	MS
19	CoPb 14211	MR	MR	R	R	MR	MS	R
IVT(ML)								
20	Co 16030	MR	MR	R	R	R	MS	R
21	CoLk 16203	MR	MR	R	R	MR	R	MS
22	CoLk 16204	MR	MR	R	R	MS	MR	MR
23	CoPb 16212	MR	MR	R	R	MR	MR	MR
24	CoPant 16223	MR	MR	R	R	MR	MR	R
25	CoS 16232	MR	MR	R	R	MR	MR	MR
26	CoS 16233	MR	MR	R	R	MS	R	R
AVT(ML-I Plant)								
27	Co 15026	MR	MR	R	R	MS	MR	MR
28	CoLk 15206	MR	MR	R	R	MR	R	MR
29	CoLk 15207	MR	MR	R	R	MR	R	R
30	CoLk 15209	MR	MR	R	R	MS	R	MR
31	CoPb 15213	MR	MR	R	R	MR	R	MS
32	CoS 15232	MR	MS	R	R	S	MS	MR
33	CoS 15233	MR	MR	R	R	MR	R	R
AVT(ML-II Plant)								
34	Co 14035	MR	MR	R	R	MS	MR	MR
35	CoH 14261	MR	MR	R	R	MR	R	MR

36	CoLk 14203	MR	MR	R	R	MS	MR	R
37	CoLk 14204	MR	MR	R	R	MR	R	MS
38	CoPb 14184	MR	MR	R	R	MR	MR	MR
39	CoPb 14185	MR	MR	R	R	MR	MR	R
40	CoS 14233	S	MS	R	R	MR	MR	MS
Standards								
41	CoJ 64	HS	HS	S	S	S	-	-
42	Co 0238	MR	MR	R	R	S	-	S
43	Co 05009	MR	MR	R	R	MR	-	-
44	CoS 767	S	S	S	S	S	-	MS
45	CoPant 97222	HS	HS	S	S	MS	-	-
46	Co 05011	MR	MR	R	R	MR	-	-
47	Co 740	-	-	-	-	HS	-	-
48	Co 1158	-	-	-	-	HS	-	-
49	Co 7915	-	-	-	-	MR	-	-
50	Co 62175	-	-	-	-	HS	-	-
51	NCO 310	-	-	-	-	HS	-	-
52	Katha	-	-	-	-	HS	-	-
53	Co 7717	-	-	-	-	-	HS	-
54	Co 89003	-	-	-	-	-	HS	-

Table 16. Evaluation of sugarcane genotypes for red rot, smut & YLD resistance- Uchani

Sl. No.	Genotype	Red rot				Smut	YLD
		Plug method		Nodal method			
		CF08	CF09	CF08	CF09		
AVT (Early) I Plant							
1.	Co 15023	MR	MR	R	R	MR	S
2.	Co 15024	MR	MR	R	R	R	MS
3.	Co 15027	MR	MS	R	R	MS	S
4.	CoLk 15201	MR	MS	R	R	MR	MS
5.	CoLk 15205	MR	MR	R	R	MR	MS
6.	CoPb 15212	MR	MS	R	R	MR	MR
AVT (Early) II Plant							
1.	Co 14034	MS	MR	R	R	MR	MR
2.	CoLk 14201	MR	MR	R	R	R	R.
3.	CoPb 14181	MR	MR	R	R	MR	R
4.	CoPb 14211	MR	MS	R	R	MS	MS
AVT (Midlate) Plant I							
1.	Co 15026	MR	MR	R	R	MS	MR
2.	CoLk 15206	MR	MR	R	R	MR	S
3.	CoLk 15207	MR	MR	R	R	MR	MR
4.	CoLk 15209	MR	MR	R	R	MS	MR
5.	CoPb 15213	MR	MR	R	R	MR	R
6.	CoS 15232	MR	MR	R	R	MS	MR
7.	CoS 15233	MR	MR	R	R	MR	R
AVT (Midlate) Plant II							
1.	Co 14035	MR	MR	R	R	MR	S
2.	CoH 14261	MR	MR	R	R	R	MR
3.	CoLk 14203	MR	MS	R	R	MR	MR
4.	CoLk 14204	MR	MR	R	R	MS	S
5.	CoPb 14184	MR	MR	R	R	MR	MR
6.	CoPb 14185	MR	MR	R	R	MR	MS
7.	CoS 14233	MR	MR	R	R	MR	S
IVT (Early)							
1.	Co 16025	MR	MR	R	R	MR	MR
2.	Co 16029	MR	MR	R	R	R	S
3.	CoLk 16201	MS	MR	R	R	MS	MS
4.	CoLk 16202	MR	MS	R	R	MR	MS
5.	CoPb 16211	S	S	S	S	MR	MS
6.	CoPb 16181	MR	MR	R	R	MR	S
7.	CoPant 16221	MR	MS	R	R	MR	MS
8.	CoPant 16222	MR	MR	R	R	R	MS

9.	CoS 16231	MR	MR	R	R	MR	R
IVT (Midlate)							
1.	Co 16030	MS	MR	R	R	R	MR
2.	CoLk 16203	MR	MR	R	R	MR	MR
3.	CoLk 16204	MR	MR	R	R	MR	MR
4.	CoPb 16212	MR	MS	R	R	MR	S
5.	CoPant 16223	MR	MS	R	R	MR	MR
6.	CoS 16232	MR	MR	R	R	MR	MS
7.	CoS 16233	MR	MR	R	R	MR	R
Checks							
1.	CoJ 64	HS	S	S	S	S	MS
2.	Co 0238	MR	MR	R	R	S	S
3.	Co 05009	MR	MR	R	R	MR	S
4.	CoS 767	S	MS	S	S	S	S
5.	CoPant 97222	S	MS	S	S	MS	S
6.	Co 05011	MR	MR	R	R	MR	MS

Table 17. Evaluation of sugarcane genotypes for red rot and YLD- Karnal

Sl. No.	Entry	Red rot rating				YLD	Other diseases
		Plug Method		Cotton swab Method			
		CF08	CF09	CF08	CF09		
IVT(E)							
1	Co 15025	MR	R	R	R	R	
2	Co 16029	MR	MR	R	R	R	
3	CoLk 16201	MR	MR	R	R	R	Smut
4	CoLk 16202	MR	MR	R	R	R	
5	CoPb 16211	HS	HS	S	S	R	
6	CoPb 16181	MS	MR	R	R	R	
7	CoPant 16221	MR	MR	R	R	R	
8	CoPant 16222	MR	MR	R	R	R	
9	CoS 16231	MR	MR	R	R	R	
AVT(E- I Plant)							
10	Co 15023	R	R	R	R	R	
11	Co 15024	MR	MR	R	R	R	
12	Co 15027	MR	MR	R	R	R	
13	CoLk 15201	MS	MS	R	R	MR	
14	CoLk 15205	MR	MR	R	R	R	
15	CoPb 15212	MR	MS	R	R	R	
AVT(E- II Plant)							
16	Co 14034	MR	MR	R	R	R	
17	CoLk 14201	MR	MR	R	R	R	Smut
18	CoPb 14181	MR	MR	R	R	MS	Smut
19	CoPb 14211	MR	MR	R	R	MS	

IVT(ML)							
20	Co 16030	R	R	R	R	R	
21	CoLk 16203	MR	MR	R	R	R	
22	CoLk 16204	MR	R	R	R	R	
23	CoLk 16212	MR	MR	R	R	R	
24	CoPant 16223	MR	MR	R	R	R	
25	CoS 16232	MR	R	R	R	R	
26	CoS 16233	MR	R	R	R	R	
AVT(ML- I Plant)							
27	Co 15026	R	R	R	R	R	
28	CoLk 15206	MR	MR	R	R	R	
29	CoLk 15207	MR	MR	R	R	R	
30	CoLk 15209	MR	MS	R	R	R	
31	CoPb 15213	MR	MR	R	R	MS	
32	CoS 15232	MR	MR	R	R	MS	
33	CoS 15233	MR	MR	R	R	MS	
AVT(ML- II Plant)							
34	Co 14035	MR	MR	R	R	R	
35	CoH 14261	MR	MR	R	R	MS	Smut
36	CoLk 14203	MR	MR	R	R	MS	Smut
37	CoLk 14204	MR	MR	R	R	S	
38	CoPb 14184	MR	MR	R	R	MS	Smut
39	CoPb 14185	MR	MR	R	R	MS	Smut
40	CoS 14233	MR	MR	R	R	MR	Smut
Standards							
41	CoJ 64	S	S	S	S	R	
42	Co 0238	MR	R	R	R	MR	
43	Co 05009	MR	MR	R	R	R	
44	CoS 767	MS	MS	R	R	MS	
45	CoPant 97222	MS	MS	R	R	R	
46	CoS 8436	MR	MR	R	R	R	
47	CoPant 84211	MR	MR	R	R	R	
48	Co 05011	R	MR	R	R	MR	

Table 18. Evaluation of sugarcane genotypes for red rot, smut & YLD- Pantnagar

S. No.	Genotypes	Red rot				Smut	YLD
		Plug		Nodal Cotton Swab			
		CF08	CF09	CF08	CF09		
IVT (Early)							
1	Co 15025	R	R	R	R	R	R
2	Co 16029	MR	MR	R	R	MR	MR
3	CoLk 16201	MS	MS	R	R	HS	MS
4	CoLk 16202	S	MS	S	S	R	R
5	CoPb 16211	HS	HS	S	S	HS	MS
6	CoPant 16221	MR	MR	R	R	MR	MR
7	CoPant 16222	MR	MR	R	R	R	MR
8	CoS 16231	MR	MR	R	R	R	MR
9	CoPb 16181	MS	MS	R	R	MR	MR
10	CoJ 64 (Check)	HS	HS	S	S	R	R
11	Co 0238 (Check)	MR	MR	R	R	R	MS
12	Co 05009 (Check)	MR	MR	R	R	R	S
AVT(Early) I Plant							
1	Co 15023	*	*	*	*	R	MR
2	Co 15024	MR	MR	R	R	R	MR
3	Co 15027	MS	MS	R	R	R	MR
4	CoLk 15201	MS	MS	R	R	MR	R
5	CoLk 15205	MR	MR	R	R	MR	MR
6	CoPb 15212	MR	MR	R	R	R	R
AVT (Early) II Plant							
1.	Co 14034	MS	MS	R	R	R	MR
2.	CoLk 14201	MR	MR	R	R	R	R
3.	CoPb 14181	MS	MR	R	R	HS	MS
4.	CoPb 14211	MS	MS	R	R	MR	MS
IVT (ML)							
1	Co 16030	MR	MR	R	R	R	R
2	CoLk 16203	MR	MR	R	R	MS	MS
3	CoLk 16204	MR	MR	R	R	MR	MR
4	CoPb 16212	MS	MS	R	R	MS	MS
5	CoPant 16223	MR	MR	R	R	R	R
6	CoS 16232	MR	MR	R	R	HS	MS
7	CoS 16233	MR	MS	R	R	R	R
8	CoS 767 (Check)	MS	S	R	R	R	MS
9	CoPant 97222 (Check)	MS	MR	R	R	MR	MR
10	Co 05011(Check)	MR	MR	R	R	MR	S
AVT(ML) I Plant							
1.	Co 15026	MR	MR	R	R	HS	MS
2.	CoLk 15206	MR	R	R	R	R	MR

3.	CoLk 15207	R	MR	R	R	MR	MR
4.	CoLk 15209	MR	MR	R	R	HS	MS
5.	CoPb 15213	MR	MR	R	R	R	R
6.	CoS 15232	MR	MS	R	R	MS	MS
7.	CoS 15233	R	MR	R	R	R	MR
AVT (ML) II Plant							
1.	Co 14035	MR	MR	R	R	R	MR
2.	CoH 14261	MR	MR	R	R	MR	MR
3.	CoLk 14203	MR	MR	R	R	S	MS
4.	CoLk 14204	MR	MR	R	R	MR	R
5.	CoPb 14184	MR	MR	R	R	R	R
6.	CoPb 14185	MR	MR	R	R	MS	MR
7.	CoS 14233	MR	MR	R	R	MR	MR

* Plant destroyed by Jackal, No plant available for data

Table 19. Evaluation of sugarcane genotypes for red rot, smut, wilt & YLD resistance- Pusa

S. No.	Genotypes	Red rot				Smut	Wilt	YLD
		Plug		Nodal Cotton Swab				
		CF07	CF08	CF07	CF08			
1	CoBln 16501	MR	MR	R	R	R	MR	MR
2	CoBln 16502	MR	MR	R	R	R	MR	R
3	CoLk 16470	MR	MR	R	R	R	MR	R
4	CoSe 16451	MR	MR	R	S	R	R	R
5	CoSe 16452	MR	MR	R	R	MR	MR	R
6	CoSe 16453	MS	MR	R	R	MR	MS	MR
7	CoLk 16468	MR	R	R	R	R	MR	R
8	CoLk 16471	MR	MR	R	R	R	MR	MR
9	CoLk 16466	MS	MR	S	R	MR	MR	MS
10	CoLk 16467	MR	MR	S	R	MR	MS	R
11	CoLk 16469	S	MS	R	S	MR	MR	MS
12	CoP 16437	MR	MR	R	R	R	MR	R
13	CoP 16438	MR	MR	R	R	MR	MS	R
14	CoP 16440	MR	MR	R	R	MR	MR	R
15	CoP 16439	R	R	R	R	R	MR	R
16	BO 156	MR	MR	S	R	MR	MS	MR
17	CoP 16436	MR	MR	R	R	MR	MR	R
18	CoP 9301	MR	R	R	R	R	MR	R
19	BO 91	MR	MR	R	R	R	MR	R
20	CoLk 94184	MR	MR	R	R	R	MR	MR
21	CoP 2061	MR	MR	R	R	MR	MR	R
22	CoSe 01421	MR	MR	R	R	MR	MR	R
23	CoSe 95422 (Check)	S	S	S	S	MR	MS	MR

Table 20. Evaluation of sugarcane genotypes for red rot, smut, wilt & YLD- Motipur

Sl. No.	Genotype	Red Rot				Smut	Wilt	YLD
		Plug Method		Nodal Method				
		CF07	CF08	CF07	CF08			
Initial Varietal Trial (Early)								
1.	CoP 16436	MR	MR	R	R	R	-	-
2.	CoP 16437	MR	MR	R	R	R	-	-
3.	CoP 16438	MR	MS	R	S	MR	S	-
4.	CoLk 16466	MR	MR	R	R	MR	-	-
5.	CoLk 16467	MR	MR	R	R	MR	-	-
6.	CoLk 16468	MR	MR	R	R	MR	-	-
7.	CoSe 16451	MS	MS	R	S	R	-	-
8.	CoBln 16501	MR	MR	R	R	R	-	S
Advance Varietal Trial (I-Plant, Early)								
1.	CoLk 15466	MR	MR	R	R	R	-	-
2.	CoLk 15467	MR	MR	R	R	R	-	-
3.	CoP 15436	MR	MS	R	S	MS	-	-
4.	CoSe 15452	MR	MS	R	S	MR	S	-
5.	CoSe 15455	MR	MR	R	R	MR	-	-
Advance Varietal Trial (II-Plant, Early)								
1.	CoLk 14206	MR	MR	R	R	R	-	-
2.	CoP 14437	MS	MR	R	R	R	-	-
3.	CoSe 14451	MR	MR	R	R	R	-	-
4.	CoSe 14454	R	R	R	R	MR	-	-
Initial Varietal Trial (Mid Late)								
1.	CoP 16439	MR	MR	R	R	MS	-	-
2.	CoP 16440	MR	MR	R	R	MR	-	S
3.	BO 156	MR	MR	R	R	MR	-	-
4.	CoLk 16469	MR	MR	R	R	MR	-	-
5.	CoLk 16470	R	R	R	R	R	S	S
6.	CoLk 16471	MR	MR	R	R	R	-	-
7.	CoSe 16452	MR	MR	R	R	MR	S	-
8.	CoSe 16453	MS	MS	S	R	MR	-	-
9.	CoBln 16502	MR	MR	R	R	R	-	-
Advance Varietal Trial (I-Plant Mid Late)								
1.	CoLk 15468	MR	MR	R	R	R	-	-
2.	CoLk 15469	MR	MR	R	R	R	-	-
3.	CoP 15438	MR	MR	R	R	R	-	S
4.	CoP 15439	R	R	R	R	R	-	-
5.	CoP 15440	MR	MR	R	R	MS	S	-
6.	CoSe 15453	MS	MS	S	R	MR	-	S
7.	CoSe 15454	MR	MR	R	R	R	-	-
Advance Varietal Trial (II-Plant Mid Late)								
1.	CoLk 14208	MR	MR	R	R	R	-	-
2.	CoLk 14209	MR	MR	R	R	R	-	S
3.	CoP 14438	MR	MR	R	R	R	-	-

4.	CoP 14439	MR	MR	R	R	R	-	-
5.	CoSe 14455	MR	MR	R	R	R	-	-
Checks								
1.	CoSe 95422*	S	S	S	S	MR	MS	-
2.	CoJ 64*	HS	HS	-	-	R	-	-
3.	Co 1158**	-	-	-	-	HS	-	-
4.	CoLk 7701**	-	-	-	-	S	-	-

Table 21. Evaluation of sugarcane genotypes for red rot, smut & YLD resistance- Seorahi

Sl. No.	Genotype	Red rot				Smut	YLD
		Plug Method		Nodal Cotton Swab			
		CF07	CF08	CF07	CF08		
IVT (Early)							
1	CoP 16436	MR	MR	R	R	R	MR
2	CoP 16437	MR	MR	R	R	R	R
3	CoP 16438	MS	MR	R	R	R	R
4	CoLk 16466	MS	MS	R	R	S	R
5	CoLk 16467	MR	MR	R	R	R	MR
6	CoLk 16468	MR	MR	R	R	R	MR
7	CoSe 16451	MR	MR	R	R	R	R
8	CoBln 16501	S	HS	S	S	S	MS
Standards							
1	CoLk 94184	MR	MR	R	R	R	R
2	CoSe 95422	MS	S	R	R	S	R
3	CoSe 01421	MR	MR	R	R	R	R
4	Co 1158	-	-	-	-	S	-
IVT (Midlate)							
1	CoP 16439	MR	MR	R	R	MS	R
2	CoP 16440	MR	MR	R	R	R	R
3	BO 156	S	S	S	S	R	R
4	CoLk 16470	S	S	R	R	S	R
5	CoSe 16452	MR	MR	R	R	R	R
6	CoSe 16453	MR	MR	R	R	MS	R
7	CoLk 16469	S	S	S	S	MS	MS
8	CoLk 16471	MR	MR	R	R	S	MS
9	CoBln 16502	S	S	R	S	S	S
Standards							
1	Co 1158	-	-	-	-	S	-
2	CoP 9301	MR	MS	R	R	R	R
3	CoP 06436	MS	MR	R	R	R	R
4	BO 91	MR	MR	R	R	R	R
AVT (Early) I Plant							
1	CoLk 15467	MR	M S	R	R	S	R
2	CoLk 15466	MR	MR	R	R	S	R

3	CoP 15436	MR	MR	R	R	R	MR
4	CoSe 15455	MR	MR	R	R	S	R
5	CoSe 15452	MR	MR	R	R	R	MR
Standards							
1	CoLk 94184	MR	MR	R	R	R	R
2	CoSe 95422	MS	S	MR	MR	R	R
3	CoSe 01421	MR	MR	R	R	R	R
4	Co 1158	-	-	-	-	S	-
AVT (Mid late)							
1	CoLk 15468	MR	MR	R	R	MS	R
2	CoLk 15469	S	MS	R	R	S	R
3	CoP 15438	MR	MR	R	R	R	MR
4	CoP 15439	MR	MR	R	R	R	R
5	CoP 15440	MS	S	R	R	R	R
6	CoSe 15454	MR	MR	R	R	R	R
7	CoSe 15453	MR	MR	R	R	MS	R
Standards							
1	BO 91	MR	MR	R	R	R	R
2	CoP 9301	MR	MR	R	R	R	R
3	CoP 06436	MS	MR	R	R	R	R
4	Co 1158	-	-	-	-	S	-

Table 22. Evaluation of sugarcane genotypes for red rot resistance- Buralikson

Sl No	Entries/ Genotypes	Plug method		Nodal cotton swab method	
		CFO7	CFO8	CFO7	CFO8
IVT- Early					
1.	CoP 16436	MR	MR	S	R
2.	CoP 16437	MR	MR	R	R
3.	CoP 16438	MR	MR	R	R
4.	CoLk 16466	MS	MR	S	R
5.	CoLk 16467	MS	MR	R	R
6.	CoLk 16468	MR	R	R	R
7.	CoBln 16501	MR	R	R	R
Standards					
8.	CoSe 01421	MR	MR	R	R
9.	CoSe 95422	S	S	S	S
10.	CoSe 94184	MR	MR	R	R
IVT- Mid Late					
11.	CoBln 16502	MR	MR	R	R
12.	CoSe 16453	MS	MR	S	R

13.	CoSe 16452	MR	MR	R	R
14.	CoLk 16471	MR	MR	S	R
15.	CoLk 16470	MR	MR	S	R
16.	CoLk 16469	S	MS	S	S
17.	BO 156	MS	MR	R	R
18.	CoP 16440	MR	MR	R	R
19.	CoP 16439	R	R	R	R
Standards					
20.	CoP 06436	MR	MR	R	R
21.	CoP 9301	MR	R	R	R
22.	BO 91	MR	MR	R	R
AVT (Early) I					
23.	CoLk 15436	MR	MR	R	R
24.	CoLk 15452	MS	MS	S	S
25.	CoLk 15455	MR	MS	R	S
26.	CoLk 15466	MR	MR	R	R
27.	CoLk 15467	MR	R	R	R
AVT (Early) II					
28.	CoLk 14206	MR	MS	S	S
29.	CoP 14437	R	MR	R	R
30.	CoSe 14451	MR	MS	S	S
31.	CoSe 14454	MS	MR	R	S
AVT (Mid Late) I					
32.	CoLk 15468	MR	MR	R	R
33.	CoLk 15469	R	MR	R	R
34.	CoP 15438	MR	MR	R	R
35.	CoP 15439	MR	MR	R	R
36.	CoP 15440	MR	MR	R	R
AVT (Mid Late) II					
37.	CoLk 14208	MR	MR	R	S
38.	CoLk 14209	R	MR	R	R
39.	CoP 14438	MS	MR	R	S
40.	CoP 14439	MR	MR	R	R

Table 23. Evaluation of genotypes for red rot, smut, wilt & YLD resistance- Anakapalle

S. No	Clone	Red rot		Smut	Wilt	YLD
		Plug method	Nodal cotton swab method			
IVT Early						
1.	CoA 17321	R	R	MS	MS	MR
2.	CoA 17322	R	R	MS	MS	S
3.	CoA 17323	R	R	HS	MS	MR
4.	CoC 17336	R	R	S	MS	MS
5.	CoA 92081 (C)	R	R	HS	MS	MR
6.	CoC 01061 (C)	MR	R	MR	R	MS
7.	CoOr 03151 (C)	MR	R	S	R	MS
IVT Midlate						
8.	CoA 17324	R	R	MS	MS	MR
9.	CoC 17337	R	R	MR	MS	MS
10.	CoOr 17346	R	R	MR	S	MR
11.	PI 17376	MR	R	S	R	MS
12.	PI 17377	R	R	MS	R	MR
13.	CoV 92102 (C)	MR	R	MR	HS	MS
14.	Co 86249 (C)	R	R	MR	R	MR
15.	Co 06030 (C)	MR	R	R	R	MS
AVT I (Early)						
16.	CoA 16321	R	R	MS	HS	MS
17.	CoC 16336	MS	R	MR	MS	MR
18.	CoC 16337	MS	R	S	MR	MR
19.	CoV 16356	MR	-	S	HS	MR
AVT II (Early)						
20.	CoC 15336	R	R	MS	S	MS
21.	CoC 15338	MR	R	HS	S	MS
22.	CoV 15356	MR	R	HS	R	MR
AVT I (Midlate)						
23.	CoC 15339	MR	R	HS	MR	MR
24.	CoOr 15346	R	R	MR	MR	MR
25.	CoC 16338	MS	R	HS	MR	MR
26.	CoC 16339	MR	R	MR	MS	MR
27.	CoV 16357	R	R	MS	S	MS
Checks						
28.	Co 419	HS	S	HS	S	-
29.	CoC 671	HS	S	MS	S	-
30.	Co 997	HS	S	MS	HS	-
31.	85A 261	MR	R	MS	-	-
32.	Co 6907	S	S	MS	-	-
33.	Co 7219	MS	R	MS	-	-
34.	Co 7706	MS	R	S	-	-
35.	2012A 246	-	-	-	HS	-

36.	CoA 14321	-	-	-	S	-
37.	CoA 06321	-	-	-	-	S
38.	CoV 09356	-	-	-	-	S
39.	CoA 11321	-	-	-	-	S

Table 24. Evaluation of sugarcane genotypes for red rot, smut and YLD- Cuddalore

S. No.	Clone	Plug method	Nodal method	Smut	YLD
IVT - Early					
1.	CoA 17321	MR	R	S	MS
2.	CoA 17322	MR	R	MS	MR
3.	CoA 17323	MR	R	MS	MR
4.	CoC 17336	MR	R	MS	MR
AVT - Early I Plant					
5.	CoA 16321	MR	R	MR	MS
6.	CoC 16336	MS	R	MS	MS
7.	CoC 16337	MR	R	MS	MR
8.	CoV 16356	MR	R	MS	MR
AVT – Early II Plant					
9.	CoC 15336	MS	R	MS	MS
10.	CoC 15338	MR	R	MR	MS
11.	CoV 15356	MR	R	HS	MS
IVT- Midlate					
12.	CoA 17324	MR	R	MR	MR
13.	CoC 17337	MR	R	MR	MS
14.	CoOr 17346	MR	R	MS	MR
15.	PI 17376	MR	R	HS	MS
16.	PI 17377	MR	-	MS	MR
AVT- Midlate I Plant					
17.	CoC 15339	MR	R	MS	MR
18.	CoOr 15346	MR	R	MR	MR
19.	CoC 16338	MS	R	S	MS
20.	CoC 16339	MR	R	MR	MR
21.	CoV 16357	MR	R	S	MS
Checks					
1.	CoC 671	HS	S	-	-
2.	Co 86249	R	R	-	-
3.	CoC 22	-	-	HS	-
4.	Co 97009	-	-	HS	-
5.	CoC 01061	-	-	-	HS
6.	CoA 92081	-	-	-	S

Table 25. Evaluation of sugarcane genotypes for red rot, smut, wilt and YLD- Navsari

S. No.	Clones	Plug method		Cotton swab method		Smut	Wilt	YLD
		CF06	CF12	CF06	CF12			
IVT (Early)								
1	Co 11015	MS	MR	R	R	R	-	R
2	Co 16006	R	R	R	R	R	-	R
3	Co 16009	MR	MR	R	R	R	-	R
4	Co 16010	R	MR	R	R	R	-	R
5	Co 16017	R	R	R	R	R	-	R
6	Co 16018	MR	MR	R	R	R	-	R
7	CoVc 16061	MR	MR	R	R	R	-	R
8	CoVc 16062	MS	MS	R	R	R	-	MR
9	CoN 16071	R	R	R	R	R	-	R
10	CoM 16081	MR	MR	R	R	R	-	R
11	CoM 16082	R	R	R	R	S	-	R
12	CoVSI 16121	MR	MR	R	R	S	-	R
13	PI 16131	MR	MR	R	R	MS	-	MS
14	CoR 16141	MR	MR	R	R	MS	-	R
15	CoR 16142	R	R	R	R	R	-	MS
AVT- I Plant								
16	Co 14002	MR	MR	R	R	MR	MR	R
17	Co 14004	R	R	R	R	S	R	R
18	Co 14012	MR	MR	R	R	HS	MR	R
19	Co 14016	MR	MR	R	R	HS	MR	MR
20	Co 14027	MS	MR	R	R	HS	MS	MR
21	Co 14030	MR	MR	R	R	MR	MR	MS
22	Co 14032	MR	MR	R	R	R	MR	R
23	CoN 14073	MR	MR	R	R	R	MR	R
24	CoSnk 14102	MS	MS	R	R	MR	MR	R
25	CoSnk 14103	MR	MR	R	R	MR	MS	S
26	CoTI 14367	MR	MR	R	R	R	MR	R
27	CoTI 14111	MR	MR	R	R	HS	MR	R
28	CoVc 14062	MR	MR	R	R	S	MR	R
29	MS 14081	MR	MR	R	R	MR	MR	MR
30	MS 14082	MR	MR	R	R	MS	MS	MR
AVT- II Plant								
31	Co 13002	MR	MR	R	R	R	MR	R
32	Co 13003	MR	MR	R	R	R	MR	R
33	Co 13004	MR	MR	R	R	MR	MR	R
34	Co 13006	MR	MR	R	R	MS	MR	R
35	Co 13008	MS	MR	R	R	R	MR	R
36	Co 13009	MR	R	R	R	R	MR	R
37	Co 13013	MR	R	R	R	R	MR	R
38	Co 13014	MS	MS	R	R	S	MS	R
39	Co 13018	MS	MS	R	R	R	MS	R

40	Co 13020	MS	MS	R	R	MR	MR	MR
41	CoN 13072	MR	MR	R	R	R	MR	R
42	CoN 13073	MR	MR	R	R	R	MR	R
43	CoSnk 13101	MR	MR	R	R	R	MR	R
44	CoSnk 13103	MR	MR	R	R	MS	MR	R
45	CoSnk 13106	MS	MS	R	R	MS	MS	R
46	MS 13081	MR	MR	R	R	R	MR	R
47	PI 13132	MR	MR	R	R	R	MR	R
Standard								
1	CoC 671	HS	S	S	S	-	HS	R
2	CoSnk 05103	MR	MR	R	R	-	MS	-
3	Co 09004	MR	MR	R	R	MS	-	MS
4	Co 86032	HS	HS	R	R	-	-	S
5	Co 94012	HS	HS	S	S	-	-	-
6	Co 86032	-	-	-	-	MR	MS	-
7	CoC 671	-	-	-	-	MR	-	-
8	CoSnk 05103	-	-	-	-	MR	-	MR
9	Co 86002	-	-	-	-	HS	-	MR
10	Co 97009	-	-	-	-	HS	-	-
11	Co 99004	-	-	-	-	MS	-	-
12	Co 85004	-	-	-	-	S	-	-

Table 26. Evaluation of sugarcane genotypes for red rot- Thiruvalla

S. No	Genotypes	Plug		Nodal Cotton swab		S. No	Genotypes	Plug		Nodal Cotton swab	
		CF06	CF12	CF06	CF12			CF06	CF12	CF06	CF12
AVT (II plant)						**AVT (I plant)**					
1	Co 13002	MS	MS	R	R	1	Co 14002	MS	MR	R	R
2	Co 13003	MR	MS	R	R	2	Co 14004	MS	MS	S	S
3	Co 13004	MS	MS	S	S	3	Co 14012	MR	MR	R	R
4	Co 13006	S	MS	S	S	4	Co 14016	MS	MS	R	R
5	Co 13008	MS	MR	R	R	5	Co 14027	S	S	S	S
6	Co 13009	MR	MR	R	R	6	Co 14030	MS	MS	S	S
7	Co 13013	MR	MR	R	R	7	Co 14032	MS	MS	S	S
8	Co 13014	MS	MS	S	S	8	CoN 14073	MS	MS	S	S
9	Co 13018	MS	S	S	S	9	CoSnk 14102*	-	-	-	-
10	Co 13020	MR	MR	R	R	10	CoSnk 14103	MS	MS	R	R
11	CoN 13073	MR	MR	R	R	11	CoT 14367	MS	MS	R	R
12	CoN 13072	MR	MR	R	R	12	CoTl 14111	MR	MR	R	R
13	MS 13081	MR	MS	R	R	13	CoVc 14062	MS	MS	R	R
14	CoSnk 13101	MR	MR	R	R	14	MS 14081*	-	-	-	-
15	CoSnk 13103	MR	MR	R	R	15	MS 14082	MS	MS	R	R
16	CoSnk 13106	MR	MR	R	R						
17	PI 13132	MR	MR	R	R						

IVT						Standards					
1	Co 11015	MS	MS	R	R	1	Co 09004	MR	MR	R	R
2	Co 16006	MS	MS	R	R	2	CoSnk 05103	MR	MR	R	R
3	Co 16009	S	MS	S	S	3	CoC 671	HS	HS	S	S
4	Co 16010	MS	MS	S	S	4	Co 86032	MS	MS	S	S
5	Co 16017	S	MS	S	S						
6	Co 16018	MS	MS	R	R						
7	CoVc 16061	S	S	S	S						
8	CoVc 16062	S	S	S	S						
9	CoN 16071	S	MS	S	S						
10	CoM 16081	MS	MS	S	S						
11	CoM 16082	MS	MS	R	R						
12	CoVSI 16121	S	MS	R	R						
13	PI 16131	MS	MS	S	R						
14	CoR 16141	MR	MR	R	R						
15	CoR 16142*	-	-	-	-						

* Inoculation not done

Table 27. Evaluation of sugarcane genotypes for red rot & smut resistance – Coimbatore

S. No.	Clones	Red rot reaction		Smut	YLD (grade)
		Plug	Nodal		
IVT					
1	Co 11015	MS	R	S	0
2	Co 16006	R	R	MS	0
3	Co 16009	MR	R	HS	0.6
4	Co 16010	R	R	S	3.0
5	Co 16017	R	R	MS	2.3
6	Co 16018	MR	R	R	0
7	CoM 16081	MR	R	R	0
8	CoM 16082	R	R	MR	0
9	CoN 16071	R	R	MS	0
10	CoR 16141	MR	R	S	0
11	CoR 16142	R	R	R	0
12	CoVc 16061	MR	R	MS	4.0
13	CoVc 16062	MS	R	R	3.0
14	CoVSI 16121	MR	R	MS	1.0
15	PI 16131	R	R	S	0
Checks					
1	CoC 671	HS	S	-	0
2	Co 94012	HS	S	-	-
3	Co 97009	-	-	HS	-

4	Co 96007	-	-	HS	-
5	Co 09004	-	-	-	0
6	Co 86032	-	-	-	1.0
S. No.	**Clones**	**YLD (grade)**	**Clones**	**YLD (grade)**	
				Plant	**Ratoon**
AVT- I Plant			**AVT- II Plant**		
1	Co 14002	0	Co 13006	2.3	2.3
2	Co 14004	0.6	Co 13018	2.1	2.6
3	Co 14012	0	CoSnk13106	1.8	1.6
4	Co 14016	0	MS 13081	1.8	-
5	Co 14027	4.2	CoSnk 13101	0	2.0
6	Co 14030	1.0	Co13013	0	1.0
7	Co 14032	2.6	PI 13132	0	0.7
8	CoM 14081	0	Co13020	0	-
9	CoM 14082	0	Co 13009	0	2.0
10	CoN 14073	0	CoSnk 13103	3.3	3.3
11	CoSnk 14102	2.2	CoN 13073	1.3	0
12	CoSnk 14103	2.6	Co 13003	2.2	1.8
13	CoVc 14062	3.3	Co 13002	0.6	1.3
14	CoT 14367	0	PI 13132	0.6	0
15	CoT 14367	0	Co 13018	1	0
16	CoTl 14111	2.5	Co 13004	0	1.5
17	-	-	CoN 13072	0	1.6
18	-	-	Co 13008	0	2.3
19	-	-	Co 13014	0	0
Checks					
1	Co 86032	2.5	Co 86032	2.6	-
2	CoC 671	0	CoC 671	1.5	-
3	CoSnk 05103	0	CoSnk 05103	0	-

Table 28. Evaluation of sugarcane genotypes for smut resistance- Pune

Sl. No	Genotypes	Smut Reaction	S. No	Genotypes	Smut Reaction
IVT Early			**AVT Early (II Plant)**		
1	Co 11015	S	1	Co 13002	R
2	Co 16006	R	2	Co 13003	R
3	Co 16009	S	3	Co 13004	R
4	Co 16010	R	4	Co 13006	R
5	Co 16017	MS	5	Co 13008	R
6	Co 16018	MS	6	Co 13009	R
7	CoVc 16061	MS	7	Co 13013	R
8	CoVc 16062	R	8	Co 13014	R
9	CoN 16071	R	9	Co 13018	R
10	CoM 16081	R	10	Co 13020	S
11	CoM 16082	R	11	CoN 13072	R
12	CoVSI 16131	R	12	CoN 13073	MR
13	PI 16131	R	13	CoSnk 13101	R
14	CoR 16141	R	14	CoSnk 13103	R
15	CoR 16142	MS	15	CoSnk 13106	R
AVT Early (I Plant)			16	MS 13081	R
16	Co 14002	R	**Standards**		
17	Co 14004	MS	1	Co 7219	S
18	Co 14012	R	2	Co 740	HS
19	Co 14016	S			
20	Co 14027	MS			
21	Co 14030	R			
22	Co 14032	R			
23	CoN 14073	R			
24	CoSnk 14102	R			
25	CoSnk 14103	R			
26	CoT 14367	R			
27	CoT 14111	R			
28	CoVc 14062	MS			
29	MS 14081	MS			
30	MS 14082	R			

Table 29. Assessment of Elite and ISH genotypes for resistance to red rot - Lucknow

Sl. No.	Genotype	Red Rot Reaction			
		Plug Method		Nodal Method	
		CF08	CF09	CF08	CF09
1.	AS04-635	R	R	R	R
2.	AS04-245	HS	HS	S	S
3.	AS04-1687	MS	MS	R	R
4.	AS04-2097	MR	MR	R	R
5.	AS04-1689	MR	MR	R	R
6.	BA 1003143	R	R	R	R
7.	BM 1009-163	S	S	S	S
8.	BM1022-173	MS	MS	R	R
9.	BM-1009149	MR	MR	R	R
10.	BM1010168	R	R	R	R
11.	CYM-07986	MS	MS	R	R
12.	GU07-2276	MR	MR	R	R
13.	GU07-3849	R	R	R	R
14.	GU073-774	HS	HS	S	S
15.	MA5/51	S	S	R	R
16.	MA5/5	MR	MR	R	R
17.	MA/5/22	MR	MR	R	R
18.	MA/5/37	MR	MR	R	R
19.	MA5/99	MR	MR	R	R
20.	PG 9869137	S	S	S	S
21.	SA04-472	MR	MR	R	R
22.	SA04-454	MR	MR	R	R
23.	SA04-390	MR	MR	R	R
24.	SA04-496	MR	MR	R	R
25.	SA98-13	R	R	R	R
26	SA04-409	MR	MR	R	R
	CoJ 64	HS	S	-	-
	CoS 767	S	S	-	-

Table 30. Assessment of elite and ISH genotypes for resistance to red rot- Kapurthala

No.	Genotypes	Red rot reaction		No.	Genotypes	Red rot reaction	
		CF08	CF09			CF08	CF09
1.	AS 04-245	HS	HS	15.	MA 5/99	MR	MR
2.	AS 04-635	MS	MS	16.	PG 9869137	MS	S
3.	AS 04-1687	MR	MS	17.	SA 98-13	MS	MS
4.	AS 04-2097	S	S	18.	SA 04-390	MR	MR
5.	BM 1003143	MR	MS	19.	SA 04-409	MS	MS
6.	BM 1005149	MR	MR	20.	SA 04-454	MR	MR
7.	BM 1010168	S	S	21.	SA 04-458	HS	HS
8.	CYM 07-986	HS	HS	22.	SA 04-472	MS	MS
9.	GU 07-2276	MR	MR	23.	SA 04-496	MR	MR
10.	GU 07-3774	HS	HS	24.	BM 10-22173	MS	MS
11.	GU 07-3849	S	HS	25.	AS 04-1689	MR	MR
12.	MA 5/5	MS	MS	26.	BM 1009163	MS	S
13.	MA 5/22	MS	MS	27.	MA-5/37	MR	MS
14.	MA 5/51	MR	MR				

Table 31. Assessment of elite and ISH genotypes for resistance to red rot- Uchani

No.	Genotypes	Red rot reaction		No.	Genotypes	Red rot reaction	
		CF08	CF09			CF08	CF09
1.	AS-04-635	MS	MS	15.	MA-5-5	MS	MS
2.	AS-04-245	S	MS	16.	MA-5-37	MS	MR
3.	AS -04-2097	MS	MS	17.	MA-5-22	MR	MS
4.	AS -04-1687	MR	MS	18.	MA-5-99	MR	MR
5.	AS -04-1689	MS	MS	19.	MA-5-51	MS	S
6.	BM-1009-163	S	MS	20.	PG-9869137	MS	S
7.	BM-1022-173	MR	MS	21.	SA04-472	MR	MR
8.	BM-1005-149	MS	MS	22.	SA-98-13	MR	MR
9.	BM-100-3143	MR	MS	23.	SA04-496	MR	MS
10.	BM-1010-168	MS	MR	24.	SA-04-390	MR	MR
11.	CUM-07-986	MS	S	25.	SA-04-409	MR	S
12.	GV-07-2276	MS	MS				
13.	GV-07-3849	M R	MR				
14.	GV-07-3774	S	MS				

Table 32. Assessment of elite and ISH genotypes for resistance to red rot- Karnal

No.	Genotypes	Red rot reaction		No.	Genotypes	Red rot reaction	
		CF08	CF09			CF08	CF09
1.	AS04- 1689	MS	MR	15.	MA 5/5	S	S
2.	AS04- 1687	S	MS	16.	MA 5/22	MR	MS
3.	AS04- 245	S	S	17.	MA 5/37	MS	MR
4.	AS04- 635	MR	MR	18.	MA 5/51	S	S
5.	BM1022-173	MS	S	19.	MA 5/99	MR	MR
6.	BM 1009-163	HS	S	20.	PG 9869137	HS	HS
7.	AS 04- 2097	MR	MS	21.	SA 98-13	MR	MS
8.	BM 100-3143	MS	MR	22.	SA 04- 390	MR	MR
9.	BM1005-149	MR	MR	23.	SA 04-409	MS	MS
10.	BM 1010-168	MR	MS	24.	SA 04-454	MR	MR
11.	CYM 07-986	S	S	25.	SA 04-458	S	S
12.	GU 07-2276	MR	MS	26.	SA 04-472	MR	MR
13.	GU 07-3774	HS	HS	27.	SA 04-476	MS	MS
14.	GU 07-3849	MR	MR				

Table 33. Assessment of elite and ISH genotypes for resistance to red rot- Shahjahanpur

Sl. No.	Genotypes	Red rot reaction		Sl. No.	Genotypes	Red rot reaction	
		CF08	CF09			CF08	CF09
1	AS 04-1687	MS	MS	13	MA 5/5	S	MS
2	AS 04-2097	MR	MS	14	MA 5/22	MS	S
3	AS 04-1689	MR	MR	15	MA 5/51	MS	MS
4	AS 04-245	HS	HS	16	MA 5/99	MR	MR
5	AS 04-635	MR	MS	17	PG 9869137	MS	S
6	BM 1003143	MS	MR	18	SA 04-390	R	MR
7	BM 1005149	MS	MR	19	SA 04-409	MR	MS
8	BM 1010168	MR	MR	20	SA 04-454	MR	MR
9	CYM 07-986	MS	MS	21	SA 04-472	MS	MS
10	GU 07-2276	MR	MR	22	SA 04-496	MR	MR
11	GU 07-3774	HS	HS	23	SA 98-13	MR	MR
12	GU 07-3849	MR	MR	24	CoJ 64 (C)	HS	HS

Table 34. Assessment of elite and ISH genotypes for resistance to red rot- Pusa

No.	Genotypes	Red rot reaction		No.	Genotypes	Red rot reaction	
		CF07	CF08			CF07	CF08
1.	ISH 823	S	S	15.	ISH 585	MR	MR
2.	ISH 526	S	S	16.	ISH 512	S	MS
3.	ISH 528	S	S	17.	ISH 535	S	S
4.	ISH 567	S	S	18.	ISH 548	S	S
5.	ISH 829	R	R	19.	ISH 519	MS	MS
6.	ISH 513	R	R	20.	ISH 587	S	S
7.	ISH 584	S	S	21.	ISH 534	S	S
8.	ISH 501	S	S	22.	ISH 590	MR	MR
9.	ISH 516	S	S	23.	ISH 833	R	R
10.	ISH 834	MR	R	24.	ISH 502	R	R
11.	ISH 816	MS	S	25.	ISH 558	S	S
12.	ISH 554	R	R	26.	ISH 524	S	S
13.	ISH 536	S	S	27.	ISH 545	R	MR
14.	ISH 594	MR	R				

Table 35. Assessment of elite and ISH genotypes for resistance to red rot - Seorahi

No.	Genotypes	Red rot reaction		No.	Genotypes	Red rot reaction	
		CF07	CF08			CF07	CF08
1.	MA 5/5	S	S	15.	CYM 07/986	S	MS
2.	AS 04-409	MS	S	16.	BM 1003143	MS	MR
3.	PG 1869137	S	S	17.	BM 1005149	MS	S
4.	SA 04-496	MS	MR	18.	MA 5/37	S	S
5.	BM 1022173	S	MS	19.	SA 04-2097	MS	S
6.	SA 98-13	MS	S	20.	MA 5/51	MR	S
7.	AS 04-1689	MR	MR	21.	SA 04-290	MS	MS
8.	MA 5/99	MR	R	22.	AS 04-635	MS	S
9.	SA 04-454	S	MS	23.	AS 04-245	S	S
10.	MA 5/22	S	MS	24.	GU 07-3849	MS	MS
11.	BM 1010168	R	MR	25.	BM 1009163	S	MS
12.	GU 07-2276	S	MS	26.	GU 07-3774	-	-
13.	SA 04-472	MS	MS	27.	SA 04-458	-	-
14.	SA 04-1687	MR	MR				

Table 36. Assessment of elite and ISH genotypes for resistance to red rot- Cuddalore

No.	Genotypes	Red rot reaction	No.	Genotypes	Red rot reaction
1.	BM 1003143	S	16.	AS 04-2097	MR
2.	BM 1005149	MR	17.	AS 04-635	MS
3.	BM 1009163	HS	18.	AS 04-1687	MS
4.	BM 1010168	MR	19.	MA 5/51	HS
5.	BM 1022173	HS	20.	MA 5/5	S
6.	PG 9869137	MR	21.	MA 5/37	MR
7.	SA 98-13	MR	22.	MA 5/99	MR
8.	SA 04-454	MR	23.	MA 5/22	MR
9.	SA 04-472	MS	24.	GU 07-3849	MR
10.	SA 04-458	HS	25.	GU 07-3774	HS
11.	SA 04-390	MR	26.	GU 07-2276	R
12.	SA 04-496	MS	27.	CYM 07-986	MS
13.	SA 04-409	MR	28.	CoC 671 (C)	HS
14.	AS 04-1689	MS			
15.	AS 04-245	S			

Table 37. Assessment of elite and ISH genotypes for resistance to red rot- Anakapalle

No.	Genotypes	Red rot reaction	No.	Genotypes	Red rot reaction
1.	BM1003143	S	16.	AS 04-2097	MR
2.	BM1005149	MS	17.	AS 04-635	S
3.	BM1009163	HS	18.	AS 04-1687	MS
4.	BM1010168	MS	19.	MA 5/51	MR
5.	BM1022173	HS	20.	MA 5/5	S
6.	PG9869137	R	21.	MA 5/37	MR
7.	SA 98-13	MS	22.	MA 5/99	MR
8.	SA04-454	MR	23.	MA 5/22	MS
9.	SA 04-472	S	24.	GU 07-3849	MS
10.	SA 04-458	S	25.	GU 07-3774	S
11.	SA 04-390	MS	26.	GU 07-2276	MR
12.	SA 04-496	MR	27.	CYM 07-986	S
13.	SA 04-409	S	28.	Co A 06321 (C)	R
14.	AS 04-1689	MS	29.	83R23 (C)	MR
15.	AS 04-245	HS	30.	CoA92081 (C)	R

Table 38. Assessment of elite and ISH genotypes for resistance to red rot - Navsari

No.	Genotypes	Red rot reaction		No.	Genotypes	Red rot reaction	
		CF06	CF12			CF06	CF12
1.	ISH 9	HS	HS	16.	ISH 176	HS	HS
2.	ISH 12	MS	MR	17.	ISH 229	MS	MS
3.	ISH 41	HS	S	18.	ISH 267	MR	MR
4.	ISH 43	HS	HS	19.	ISH 287	MS	MS
5.	ISH 50	MS	MR	20.	SES 594	R	R
6.	ISH 58	MR	MR	21.	AS 04-2097	MR	MR
7.	ISH 69	S	S	22.	MA 5/5	S	S
8.	ISH 100	MR	MR	23.	MA 5/22	MS	MR
9.	ISH 111	MR	MR	24.	MA 5/51	S	HS
10.	ISH 114	MR	MR	25.	MA 5/99	MR	MR
11.	ISH 115	MR	MR	26.	AS 04 1687	MS	MS
12.	ISH 117	MR	MR	27.	GU 07 2276	R	MR
13.	ISH 118	MR	MR	28.	CyM 07 986	S	MS
14.	ISH 147	MR	MR	29.	BM 10 1068	MR	MR
15.	ISH 175	MS	MS	30.	SA 04 454	MS	MR

Table 39. Reaction of sugarcane clones for resistance to *Pokkah boeng* - Kapurthala

No.	Genotypes	PB incidence (%)	PB reaction	No.	Genotypes	PB incidence (%)	PB reaction
1	Co 0238 (C)	26.0	HS	21	CoLk 14203	0.0	R
2	Co 12026	2.0	R	22	CoLk 14204	0.0	R
3	Co 12027	0.0	R	23	CoLk 14205	2.0	R
4	Co 12029	3.0	R	24	CoPant 12226	0.0	R
5	Co 13034	9.0	MS	25	CoPant 13224	8.0	MS
6	Co 13035	4.0	R	26	CoPb 12211	2.0	R
7	Co 14034	0.0	R	27	CoPb 13181	6.0	MS
8	Co 14035	1.0	R	28	CoPb 13182	0.0	R
9	Co 14261	1.0	R	29	CoPb 14181	1.0	R
10	Co 14262	0.0	R	30	CoPb 14182	0.0	R
11	Co Pant 14222	4.0	R	31	CoPb 14183	0.0	R
12	Co Pant 12221	12.0	S	32	CoPb 14184	0.0	R
13	CoH 12263	2.0	R	33	CoPb 14185	0.0	R
14	CoH 13263	3.0	R	34	CoPb 14211	0.0	R
15	CoJ 85 (C)	20.0	S	35	CoPb 14212	1.0	R
16	CoLk 12203	0.0	R	36	CoS 12232	13.0	S
17	CoLk 12205	0.0	R	37	CoS 13231	0.0	R
18	CoLk 13204	17.0	S	38	CoS 14231	0.0	R
19	CoLk 14201	2.0	R	39	CoS 14232	0.0	R
20	CoLk 14202	0.0	R	40	CoS 14233	0.0	R

Table 40. Reaction of sugarcane clones for resistance to *Pokkah boeng* – Uchani

S. No.	Genotype	Reaction	S. No.	Genotype	Reaction	S. No.	Genotype	Reaction
1.	Co 15023	MS	28	Co Lk 16202	R	55	BM-1022-173	HS
2.	Co 15026	S	29	Co Pb 16211	MS	56	AS -04-1687	R
3.	Co 16029	R	30	CoPb 16181	R	57	AS -04-1689	R
4.	Co 16030	S	31	CoPant 16221	R	58.	MA-5-99	MS
5	CoLk 16203	R	32	Co Pant 16222	S	59.	BM-1005-149	R
6	CoLk 16204	R	33	CoS 16231	R	60.	AS -04-2097	R
7	CoLk 15206	R	34	CoLk 15024	S	61.	BM-100-3143	R
8	CoLk 15207	R	35	CoLk 15027	MS	62.	GV-07-3849	R
9	CoLk 15209	R	36	CoLk 15201	R	63.	BM-1010-168	MS
10	CoPb16212	R	37.	CoLk 15205	R	64	GV-07-2276	R
11	CoPant 16223	S	38.	CoPb 15212	R	65.	SA-04-390	R

12	CoS 16232	MS	39.	Co 14034	MS	66.	GV-07-3734-212	R
13	CoS 16233	R	40	Co Lk 14201	MS	67.	MA-5-51	R
14	CoPb 15213	MS	41	Co Pb14181	MS	68.	CUM-07-986	MS
15	CoS 15232	R	42	CoPb14211	R	69.	SA-04-409	R
16	CoS 15233	S	43.	CoJ 64	S	70.	PG-9869137	R
17	Co 14035	MS	44	Co 0238	HS			
18	CoH 14261	R	45	Co-5009	S			
19	CoLK 14203	MS	46	AS-04-635	R			
20	CoLk 14204	R	47	AS-04-245	R			
21	CoPb 14184	S	48	Bm-1009-163	R			
22	CoPb 14185	MS	49	MA-5-5	S			
23	CoS 14233	R	50	MA-5-37	S			
24	Co S 767	MS	51	SA04-472	HS			
25	CoPant 97222	MS	52	SA-98-13	R			
26	Co 16025	MS	53	SA04-496	HS			
27	CoLk 16201	MS	54	MA-5-22	R			

Table 41. Reaction of sugarcane clones for resistance to *Pokkah boeng* – Shahjahanpur

Sl. No.	Genotype	Disease reaction	Sl. No.	Genotype	Disease reaction
1	CoS 17231	S	12	CoSe 16452	HS
2	CoS 17232	MS	13	CoSe 16453	R
3	CoS 17233	R	14	CoSe 16456	HS
4	CoS 17234	S	15	CoS 17234	MS
5	CoS 17235	S	16	S. 1206/13	S
6	CoS 17236	HS	17	S. 5154/12	MS
7	CoS 17237	MS	18	S. 4619/07	MS
8	CoS 17451	HS	19	S. 5347/12	R
9	CoSe 17452	HS	20	CoJ 64	R
10	CoS 16233	R	21	CoS 767	MS
11	CoSe 16451	R	22	Co 0238	HS

Table 42. Reaction of sugarcane clones for resistance to *Pokkah boeng* – Pusa

Sl. No.	Varieties	Disease reaction	Sl. No.	Varieties	Disease reaction
1	BO 91	R	11	CoP 151	R
2	BO 130	MS	12	CoP 154	MS
3	BO 139	R	13	CoP 155	MS
4	BO 153	R	14	CoP 14436	R
5	BO 155	R	15	CoP 14438	R
6	BO 156	MS	16	CoP 15436	R
7	CoLk 14208	MS	17	CoP 15438	R
8	CoP 16440	MS	18	CoP 16437	R
9	CoP 14437	R	19	CoSe 95422	S
10	CoP 2061	R	20	CoSe 14453	S

Table 43. Reaction of sugarcane clones for resistance to *Pokkah boeng*- Seorahi

Sl. No.	Varieties	Disease reaction	Sl. No.	Varieties	Disease reaction
1	CoSe 13452	R	18	CoP 15436	R
2	CoSe 15452	MS	19	CoLk 16470	S
3	CoSe 15453	MS	20	CoLk 15468	R
4	CoSe 15454	R	21	CoLk 15439	R
5	CoSe 15455	R	22	CoP 15438	MS
6	CoSe 15457	R	23	CoP 15469	R
7	CoSe 15456	R	24	CoP 15440	S
8	CoSe 16451	MS	25	CoP 16436	MS
9	CoSe 16452	R	26	CoP 16437	R
10	CoSe 16453	R	27	CoP 16438	R
11	CoSe 17451	R	28	CoLk 16466	R
12	CoSe 17452	R	29	CoLk 16467	R
13	CoS 17231	R	30	CoP 16439	R
14	CoS 17232	MS	31	CoP 16440	R
15	CoS 17233	R	32	Co 0238	S
16	CoLk 15467	MS	33	CoS 08279	S
17	CoLk 15466	S			

Table 44. Reaction of sugarcane clones for resistance to *Pokkah boeng* - Anakapalle

S. No.	Entry No.	Disease reaction	S. No.	Entry No.	Disease reaction
1	CoA 17321	R	19	CoV 16356	S
2	CoA 17322	S	20	CoC 15336	MS
3	CoA 17323	R	21	CoC 15338	MS
4	CoC 17336	HS	22	CoV 15356	MS
5	CoA 92081 (C)	R	23	CoC 15339	S
6	CoC 01061 (C)	MS	24	CoOr 15346	S
7	CoOr 03151 (C)	S	25	CoC 16338	R
8	CoA 17324	R	26	CoC 16339	S
9	CoC 17337	MS	27	CoV 16357	R
10	CoOr 17346	R	28	Co 419	S
11	PI 17376	S	29	CoC 671	MS
12	PI 17377	MS	30	Co 997	MS
13	CoV 92102 (C)	MS	31	CoA 89085	MS
14	Co 86249 (C)	S	32	Co 6907	R
15	Co 06030 (C)	MS	33	Co 7219	MS
16	CoA 16321	MS	34	Co 7706	S
17	CoC 16336	MS	35	CoA 14321	HS

Table 45. Reaction of sugarcane clones for resistance to *Pokkah boeng*- Pune

S. No.	Variety	Disease reaction	S. No.	Variety	Disease reaction
1	CoVSI 9805	S	8	59-20	S
2	VSI 434	S	9	CoM 9057	R
3	CoC 671	S	10	CoM 0265	R
4	Co 86032	S	11	CoVSI 03102	R
5	Co 419	R	12	191-3	R
6	Co 94012	S	13	14.22	R
7	MS 10001	S	14	VSI 08005	S

Table 46. Management of *Pokkah boeng* disease in sugarcane- Shahjahanpur

Treatments		Co 0238		CoS 08279	
		Germination	Disease incidence (%)	Germination	Disease incidence (%)
T_1	Sett treatment - Overnight soaking with Carbendazim – 0.1% a.i.	38.75	28.95	40.83	25.66
T_2	Foliar spray - Carbendazim – 0.05% a.i. (3 sprays at 15 days interval from May15th)	32.08	18.07	35.42	22.18
T_3	Sett treatment (T_1) + Foliar spray with carbendazim (T_2)	40.00	11.63	48.75	11.92
T_4	Control	32.50	43.06	32.92	29.20

Table 47. Management of *Pokkah boeng* disease in sugarcane- Kapurthala

Treatments		Co 0238		CoJ 85	
		Germination	Disease Incidence	Germination	Disease Incidence
T_1	Sett treatment-Overnight soaking with Carbendazim (0.1% a.i.)	54.8	17.25	53.1	15.0
T_2	Foliar spray-Carbendazim (0.05% a.i.-3 sprays at 15 days interval from May 15th)	49.4	19.25	50.4	18.0
T_3	Sett treatment (T_1) + Foliar spray with Carbendazim (T_2)	56.3	13.5	54.0	9.5
T_4	Control	49.0	27.6	49.8	22.75

Table 48. Management of *Pokkah boeng* disease in sugarcane- Uchani

S. No.	Treatment	Germination (%)		Disease incidence (%)	
		Co 0238	CoS 8436	Co 0238	CoS 8436
1.	T_1 Sett treatment (overnight soaking with carbendazim 0.1%	47. 4	46 .1	15.7	16.5
2.	T_2 Foliar spray with carbendazim 0.05% - 3 sprays at 15 days interval	38 .3	37.8	11.3	8.2
3.	T_3 (T_1 + T_2) T_1 Sett treatment+ T_2 Foliar spray with carbendazim 0.05%	48..5	46.4	6. 7	5.8
4.	Control	37.6	38. 2	30 .5	25.7

Table 49. Management of *Pokkah boeng* disease in sugarcane- Pusa

Treatment	CoS 8436		BO154		BO 153		CoSe 95422		CoBln 15501	
	Germination (%)	Disease incidence (%)	Germination (%)	Disease incidence (%)	Germination (%)	Disease incidence (%)	Germination (%)	Disease (%)	Germination (%)	Disease incidence (%)
T_1 sett Treatment	28.4	10.3	32.2	9..0	30.8	9.7	29.2	10.0	24.0	12.3
T_2 (foliar spray)	26.2	10.5	31.0	9.6	30.0	9.8	28.0	10.4	22.3	13.2
T_3 –T_1+ T_2	31.4	9.2	36.4	7.2	32.0	8.8	30.6	9.6	27.3	11.0
Control	22.2	15.8	29.3	11.2	26.4	12.6	24.8	13.6	20.6	16.6

Table 50. Management of *Pokkah boeng* disease in sugarcane- Anakapalle

Treatment	Description	Disease incidence (%)	Yield (t/ha)
T1	Sett treatment – Overnight soaking with carbendazim @ 0.1%	13.12 (21.17)	65.2
T2	Foliar spray – Carbendazim@0.05% (3 sprays at 15 day interval from May 15th)	5.54 (13.41)	67.1
T3	Sett treatment (T1) + Foliar spray – carbendazim @0.05% (T2)	5.33 (13.20)	68.5
T4	Control	23.20 (28.61)	62.4

Table 51. Impact of SCYLV-free planting materials on sugarcane growth and yield in popular sugarcane varieties- Coimbatore

Growth/ yield parameters	Co 86032		% reduction	Co 0238		% reduction	Co 11015		% reduction
	Healthy	Diseased		Healthy	Diseased		Healthy	Diseased	
Sett germination %	53	43	18.8	55	52	5.4	43	38	11.6
Single cane weight (Kg)	1.5	1.03	31.3	1.18	0.80	32.2	1.1	0.88	20
Expected cane yield T/Ha	158.5	131.3	17.1	151.8	107.0	29.5	107.2	92.00	14.2
Juice wt g/ kg cane	0.52	0.366	29.6	0.508	0.50	1.5	0.596	0.493	26.4
Sucrose %	20.10	19.44	3.2	20.70	18.47	10.7	21.9	20.5	6.39
Purity %	91.21	89.24	2.1	85.60	83.80	2.1	89.27	88.5	0.86
CCS %	14.10	13.50	4.2	14.10	12.40	12.0	15.2	14.2	6.58

Table 52. Reaction of ZVT entries for red rot, smut and wilt (North West Zone-I)

Sl. No.	Genotype	Red rot													Smut		Wilt		YLD	
		Lucknow				Kapurthala				Uchani										
		Plug		Nodal		Plug		Nodal		Plug		Nodal		YLD						
		CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09		Lucknow	Kapurthala	Lucknow	Kapurthala	Lucknow	Kapurthala
Initial Varietal Trial (Early)																				
1.	Co 15025	MR	MR	R	R	MS	MR	R	R	MR	MR	R	R	MR	R	R	S	MS	-	R
2.	Co 16029	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	S	R	MR	S	MR	S	S
3.	CoLk 16201	R	R	R	R	MR	MR	R	R	MS	MR	R	R	MS	S	MR	-	R	S	MR
4.	CoLk 16202	MR	MR	R	R	MR	MS	R	R	MR	MS	R	R	MS	MR	MR	-	MR	-	R
5.	CoPb 16211	HS	HS	S	S	MS	MS	R	R	S	S	S	S	MS	S	MR	HS	MR	S	MR
6.	CoPb 16181	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	S	MS	R	-	R	-	R
7.	CoPant 16221	MR	MR	R	R	MS	MR	R	R	MR	MS	R	R	MS	R	MR	-	R	-	R
8.	CoPant 16222	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	MS	R	MR	S	MS	-	MS
9.	CoS 16231	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	R	MR	MR	-	R	S	R
Advanced Varietal Trial (Early)-I Plant																				
1.	Co 15023	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	S	R	MR	S	MS	-	R
2.	Co 15024	MS	MS	S	S	MS	MS	R	S	MR	MR	R	R	MS	R	MR	HS	MR	-	R
3.	Co 15027	MR	MR	R	R	MR	MR	R	R	MR	MS	R	R	S	MS	MR	S	R	S	MR
4.	CoLk 15201	MR	MR	R	R	MR	MR	R	R	MR	MS	R	R	MS	R	MS	-	R	-	MR
5.	CoLk 15205	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	MS	R	MS	-	R	-	MR
6.	CoPb 15212	MR	MR	R	R	MR	MS	R	R	MR	MS	R	R	MR	HS	MR	-	R	R	R
Advanced Varietal Trial (Early)-II Plant																				
1.	Co 14034	MS	MS	R	R	MS	MS	R	R	MS	MR	R	R	MR	R	MS	S	MS	-	MR
2.	CoLk 14201	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	R	R	MS	-	R	S	R
3.	CoPb 14181	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	R	MR	MS	-	MR	-	MS
4.	CoPb 14211	MR	MR	R	R	MR	MR	R	R	MR	MS	R	R	MS	R	MR	HS	MS	-	R
Initial Varietal Trial (Midlate)																				
1.	Co 16030	MS	S	S	S	MR	MR	R	R	MS	MR	R	R	MR	R	R	S	MS	-	R
2.	CoLk 16203	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	MR	R	MR	-	R	-	MS

Sl. No.	Genotype	Red rot													Smut		Wilt		YLD	
		Lucknow				Kapurthala				Uchani					Lucknow	Kapurthala	Lucknow	Kapurthala	Lucknow	Kapurthala
		Plug		Nodal		Plug		Nodal		Plug		Nodal		YLD						
		CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09							
3.	CoLk 16204	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	MR	MR	MS	-	MR	-	MR
4.	CoPb 16212	S	S	S	S	MR	MR	R	R	MR	MS	R	R	S	MS	MR	HS	MR	-	MR
5.	CoPant 16223	MR	MR	R	R	MR	MR	R	R	MR	MS	R	R	MR	MR	MR	S	MR	S	R
6.	CoS 16232	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	MS	MR	MR	-	MR	-	MR
7.	CoS 16233	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	R	R	MS	-	R	-	R
Advanced Varietal Trial (Mid late)-I Plant																				
1.	Co 15026	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	MR	MR	MS	HS	MR	-	MR
2.	CoLk 15206	R	R	R	R	MR	MR	R	R	MR	MR	R	R	S	R	MR	-	R	-	MR
3.	CoLk 15207	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	MR	R	MR	-	R	-	R
4.	CoLk 15209	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	MR	HS	MS	-	R	-	MR
5.	CoPb 15213	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	R	R	MR	S	R	S	MS
6.	CoS 15232	MR	MR	R	R	MR	MS	R	R	MR	MR	R	R	MR	MS	S	-	MS	-	MR
7.	CoS 15233	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	R	R	MR	S	R	-	R
Advanced Varietal Trial (Mid late)-II Plant																				
1.	Co 14035	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	S	R	MS	S	MR	-	MR
2.	CoH 14261	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	MR	MR	MR	S	R	-	MR
3.	CoLk 14203	MR	MR	R	R	MR	MR	R	R	MR	MS	R	R	MR	R	MS	-	MR	S	R
4.	CoLk 14204	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	S	S	MR	-	R	-	MS
5.	CoPb 14184	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	MR	MR	MR	-	MR	-	MR
6.	CoPb 14185	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	MS	MR	MR	S	MR	-	R
7.	CoS 14233	MS	MS	R	R	S	MS	R	R	MR	MR	R	R	S	S	MR	S	MR	-	MS
Check																				
1	CoJ 64	HS	S	-	-	HS	HS	S	S	HS	S	S	S	MS	MR	-	-	-	-	
2	CoS 767	MS	S	-	-	S	S	S	S	S	MS	S	S	S	R	-	-	-	-	MS
3	Co 1158	-	-	-	-	-	-	-	-	-	-	-	-	-	S	HS	-	-	-	
4	CoLk 7701	-	-	-	-	-	-	-	-	-	-	-	-	-	S	-	-	-	-	
5	Co 0238	-	-	-	-	MR	MR	R	R	MR	MR	R	R	S	-	S	-	-	-	S

Sl. No.	Genotype	Red rot													Smut		Wilt		YLD	
		Lucknow				Kapurthala				Uchani					Lucknow	Kapurthala	Lucknow	Kapurthala	Lucknow	Kapurthala
		Plug		Nodal		Plug		Nodal		Plug		Nodal		YLD						
		CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09							
6	Co 05009	-	-	-	-	MR	MR	R	R	MS	MR	R	R	S	-	MR	-	-	-	-
7	CoPant 97222	-	-	-	-	HS	HS	S	S	S	MS	S	S	S	-	MS	-	-	-	-
8	Co 05011	-	-	-	-	MR	MR	R	R	MR	MR	R	R	MS	-	MR	-	-	-	-
9	Co 7915	-	-	-	-	-	-	-	-	-	-	-	-	-	-	MR	-	-	-	-
10	Co 62175	-	-	-	-	-	-	-	-	-	-	-	-	-	-	HS	-	-	-	-
11	NCO 310	-	-	-	-	-	-	-	-	-	-	-	-	-	-	HS	-	-	-	-
12	Katha	-	-	-	-	-	-	-	-	-	-	-	-	-	-	HS	-	-	-	-
13	Co 740	-	-	-	-	-	-	-	-	-	-	-	-	-	-	HS	-	-	-	-
14	Co 7717	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	HS	-	-
15	Co 89003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	HS	-	-

Table 53. Reaction of ZVT entries for red rot, smut and wilt (North West Zone-II)

Sl. No.	Genotype	Red rot													Smut		YLD	
		Shahjahanpur				Pantnagar				Karnal								
		Plug		Nodal		Plug		Nodal		Plug		Nodal						
		CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09	YLD	Shahjahanpur	Pantnagar	Shahjahanpur	Pantnagar
AVT Early (I Plant)																		
1	Co 15023	MR	R	R	R	*	*	*	*	MR	R	R	R	R	R	R	MR	MR
2	Co 15024	MS	MR	R	R	MR	MR	R	R	MR	MR	R	R	R	R	R	MS	MR
3	Co 15027	MR	MR	R	R	MS	MS	R	R	MR	MR	R	R	R	R	R	R	MR
4	CoLk 15201	MR	MS	R	R	MS	MS	R	R	MR	MR	R	R	R	MS	MR	R	R
5	CoLk 15205	MR	MR	R	R	MR	MR	R	R	HS	HS	S	S	R	MS	MR	R	MR
6	CoPb 15212	MS	MS	R	R	MR	MR	R	R	MS	MR	R	R	R	R	R	MS	R
AVT Early (II Plant)																		
1	Co 14034	MS	MS	R	R	MS	MS	R	R	MR	MR	R	R	R	R	R	MR	MR
2	CoLk 14201	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	R	R	R	MR	R
3	CoPb 14181	MR	MR	R	R	MS	MR	R	R	MR	MR	R	R	MS	S	HS	MR	MS
4	CoPb 14211	MS	MR	R	R	MS	MS	R	R	MR	MR	R	R	MS	MS	MR	MR	MS
AVT Mid late (I Plant)																		
1	Co 15026	MR	R	R	R	MR	MR	R	R	R	R	R	R	R	MS	HS	MR	MS
2	CoLk 15206	MR	MR	R	R	MR	R	R	R	MR	MR	R	R	R	MR	R	R	MR
3	CoLk 15207	MR	R	R	R	R	MR	R	R	MR	MR	R	R	R	S	MR	MS	MR
4	CoLk 15209	MR	MR	R	R	MR	MR	R	R	MR	MS	R	R	R	MS	HS	MR	MS
5	CoPb 15213	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	MS	MS	R	MS	R
6	CoS 15232	MR	MR	R	R	MR	MS	R	R	MR	MR	R	R	MS	R	MS	MR	MS
7	CoS 15233	MR	R	R	R	R	MR	R	R	MR	MR	R	R	MS	MR	R	MS	MR
AVT Mid late (II Plant)																		
1	Co 14035	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	R	R	R	MR	MR

Sl. No.	Genotype	Red rot													Smut		YLD	
		Shahjahanpur				Pantnagar				Karnal					Shahjahanpur	Pantnagar	Shahjahanpur	Pantnagar
		Plug		Nodal		Plug		Nodal		Plug		Nodal		YLD				
		CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09					
2	CoH 14261	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	MS	MR	MR	MR	MR
3	CoLk 14203	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	MS	S	S	MR	MS
4	CoLk 14204	MR	R	R	R	MR	MR	R	R	MR	MR	R	R	S	MS	MR	MS	R
5	CoPb 14184	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	MS	MS	R	MR	R
6	CoPb 14185	MR	R	R	R	MR	MR	R	R	MR	MR	R	R	MS	R	MS	MS	MR
7	CoS 14233	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	MR	MS	MR	MS	MR
IVT Early																		
1	Co 15025	MR	MR	R	R	R	R	R	R	MR	R	R	R	R	MR	R	R	R
2	Co 16029	R	R	R	R	MR	MR	R	R	MR	MR	R	R	R	MR	MR	MR	MR
3	CoLk 16201	MR	MR	R	R	MS	MS	R	R	MR	MR	R	R	R	S	HS	MS	MS
4	CoLk 16202	MR	MR	R	R	S	MS	S	S	MR	MR	R	R	R	R	R	MR	R
5	CoPb 16211	HS	S	S	S	HS	HS	S	S	HS	HS	S	S	R	MS	HS	R	MS
6	CoPb 16181	MS	MR	R	R	MS	MS	R	R	MS	MR	R	R	R	MR	MR	R	MR
7	CoPant 16221	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	R	MR	MR	MS	MR
8	CoPant 16222	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	R	MR	R	R	MR
9	CoS 16231	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	R	MR	R	MR	MR
IVT Mid late																		
1	Co 16030	MR	MR	R	R	MR	MR	R	R	R	R	R	R	R	MR	R	MS	R
2	CoLk 16203	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	R	MR	MS	R	MS
3	CoLk 16204	R	R	R	R	MR	MR	R	R	MR	R	R	R	R	S	MR	MR	MR
4	CoPb 16212	MR	MR	R	R	MS	MS	R	R	MR	MR	R	R	R	MS	MS	MR	MS
5	CoPant 16223	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	R	MR	R	MR	R
6	CoS 16232	MR	R	R	R	MR	MR	R	R	MR	R	R	R	R	MR	HS	MS	MS
7	CoS 16233	MR	R	R	R	MR	MS	R	R	MR	R	R	R	R	MS	R	MS	R

Sl. No.	Genotype	Red rot													Smut		YLD	
		Shahjahanpur				Pantnagar				Karnal					Shahjahanpur	Pantnagar	Shahjahanpur	Pantnagar
		Plug		Nodal		Plug		Nodal		Plug		Nodal		YLD				
		CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09					
Check																		
1	Co 0238	MR	MR	R	R	MR	MR	R	R	MR	R	R	R	MR	MS	R	MR	MS
2	Co 05009	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	R	R	R	S	S
3	CoJ 64	HS	HS	S	S	HS	HS	S	S	S	S	S	S	R	MS	R	R	R
4	CoPant 97222	MR	MR	R	R	MS	MR	R	R	MS	MS	R	R	R	MR	MR	MR	MR
5	Co 05011	MR	MR	R	R	MR	MR	R	R	R	MR	R	R	MR	MS	MR	S	S
6	CoS 767	S	MS	S	R	MS	S	R	R	MS	MS	R	R	MS	MR	R	MS	MS
7	CoS 8436	-	-	-	-	-	-	-	-	MR	MR	R	R	R	-	-	-	-
8	CoPant 84211	-	-	-	-	-	-	-	-	MR	MR	R	R	R	-	-	-	-

Table 54. Reaction of ZVT entries for red rot, smut and wilt (North Central & North East Zones)

S. No	Genotypes	Red rot																Smut			Wilt		YLD		
		Motipur				Seorahi				Pusa				Buralikson											
		CF07		CF08		CF07		CF08		CF07		CF08		CF07		CF08									
		Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Motipur	Seorahi	Pusa	Motipur	Pusa	Motipur	Pusa	Seorahi
IVT (Early)																									
1.	CoLk 16466	MR	R	MR	R	MS	R	MS	R	MS	S	MR	R	MS	S	MR	R	MR	S	MR	-	MR	-	MS	R
2.	CoLk 16467	MR	R	MR	R	MR	R	MR	R	MR	S	MR	R	MS	R	MR	R	MR	R	MR	-	MS	-	R	MR
3.	CoLk 16468	MR	R	MR	R	MR	R	MR	R	MR	R	R	R	MR	R	R	R	MR	R	R	-	MR	-	R	MR
4.	CoP 16436	MR	R	MR	R	MR	R	MR	R	MR	R	MR	R	MR	S	MR	R	R	R	MR	-	MR	-	R	MR
5.	CoP 16437	MR	R	MR	R	MR	R	MR	R	MR	R	MR	R	MR	R	MR	R	R	R	R	-	MR	-	R	R
6.	CoP 16438	MR	R	MS	S	MS	R	MR	R	MR	R	MR	R	MR	R	MR	R	MR	R	MR	S	MS	-	R	R
7.	CoSe 16451	MS	R	MS	S	MR	R	MR	R	MR	R	MR	S	-	-	-	-	R	R	R	-	R	-	R	R
8.	CoBln 16501	MR	R	MR	R	S	S	HS	S	MR	R	MR	R	MR	R	R	R	R	S	R	-	MR	S	MR	MS
AVT (Early) I Plant																									
1.	CoLk 15466	MR	R	MR	R	MR	MR	R	R	-	-	-	-	MR	R	MR	R	R	S	-	-	-	-	-	R
2.	CoLk 15467	MR	R	MR	R	MR	MS	R	R	-	-	-	-	MR	R	R	R	R	S	-	-	-	-	-	R
3.	CoP 15436	MR	R	MS	S	MR	MR	R	R	-	-	-	-	MR	MR	R	R	MS	R	-	-	-	-	-	MR
4.	CoSe 15452	MR	R	MS	S	MR	MR	R	R	-	-	-	-	MS	MS	S	S	MR	R	-	S	-	-	-	MR
5.	CoSe 15455	MR	R	MR	R	MR	MR	R	R	-	-	-	-	MR	MS	R	S	MR	S	-	-	-	-	-	R
AVT (Early) II Plant																									
1.	CoLk 14206	MR	R	MR	R	-	-	-	-	-	-	-	-	MR	MS	S	S	R	-	-	-	-	-	-	-
2.	CoP 14437	MS	R	MR	R	-	-	-	-	-	-	-	-	R	MR	R	R	R	-	-	-	-	-	-	-
3.	CoSe 14451	MR	R	MR	R	-	-	-	-	-	-	-	-	MR	MS	S	S	R	-	-	-	-	-	-	-
4.	CoSe 14454	R	R	R	R	-	-	-	-	-	-	-	-	MS	MR	R	S	MR	-	-	-	-	-	-	-
IVT (Mid late)																									
1.	CoP 16439	MR	R	MR	R	MR	R	MR	R	R	R	R	R	MR	R	MR	R	MS	MS	R	-	MR	-	R	R
2.	CoP 16440	MR	R	MR	R	MR	R	MR	R	MR	R	MR	R	R	R	R	R	MR	R	MR	-	MR	S	R	R
3.	BO 156	MR	R	MR	R	S	S	S	S	MR	S	MR	R	MS	R	MR	R	MR	R	MR	-	MS	-	MR	R

S. No	Genotypes	Red rot																Smut			Wilt		YLD		
		Motipur				Seorahi				Pusa				Buralikson											
		CF07		CF08		CF07		CF08		CF07		CF08		CF07		CF08									
		Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Motipur	Seorahi	Pusa	Motipur	Pusa	Motipur	Pusa	Seorahi
4.	CoLk 16469	MR	R	MR	R	S	S	S	S	S	R	MS	S	S	S	MS	S	MR	MS	MR	-	MR	-	MS	MS
5.	CoLk 16470	R	R	R	R	S	R	S	R	MR	R	MR	R	MR	S	MR	R	R	S	R	S	MR	S	R	R
6.	CoLk 16471	MR	R	MR	R	MR	R	MR	R	MR	R	MR	R	MR	S	MR	R	R	S	R	-	MR	-	MR	MS
7.	CoSe 16452	MR	R	MR	R	MR	R	MR	R	MR	R	MR	R	MR	R	MR	R	MR	R	MR	S	MR	-	R	R
8.	CoSe 16453	MS	S	MS	R	MR	R	MR	R	MS	R	MR	R	MS	S	MR	R	MR	MS	MR	-	MS	-	MR	R
9.	CoBln 16502	MR	R	MR	R	S	R	S	S	MR	R	MR	R	MR	R	MR	R	R	S	R	-	MR	-	R	S
AVT (I-Plant Mid Late)																									
1.	CoLk 15468	MR	R	MR	R	MR	R	MR	R	-	-	-	-	MR	MR	R	R	R	MS	-	-	-	-	-	R
2.	CoLk 15469	MR	R	MR	R	S	R	MS	R	-	-	-	-	R	MR	R	R	R	S	-	-	-	-	-	R
3.	CoP 15438	MR	R	MR	R	MR	R	MR	R	-	-	-	-	MR	MR	R	R	R	R	-	-	-	S	-	MR
4.	CoP 15439	R	R	R	R	MR	R	MR	R	-	-	-	-	MR	MR	R	R	R	R	-	-	-	-	-	R
5.	CoP 15440	MR	R	MR	R	MS	R	S	R	-	-	-	-	MR	MR	R	R	MS	R	-	S	-	-	-	R
6.	CoSe 15453	MS	S	MS	R	MR	R	MR	R	-	-	-	-	-	-	-	-	MR	MS	-	-	-	S	-	R
7.	CoSe 15454	MR	R	MR	R	MR	R	MR	R	-	-	-	-	-	-	-	-	R	R	-	-	-	-	-	R
AVT (II-Plant Mid Late)																									
1.	CoLk 14208	MR	R	MR	R	-	-	-	-	-	-	-	-	MR	MR	R	S	R	-	-	-	-	-	-	-
2.	CoLk 14209	MR	R	MR	R	-	-	-	-	-	-	-	-	R	MR	R	R	R	-	-	-	-	S	-	-
3.	CoP 14438	MR	R	MR	R	-	-	-	-	-	-	-	-	MS	MR	R	S	R	-	-	-	-	-	-	-
4.	CoP 14439	MR	R	MR	R	-	-	-	-	-	-	-	-	MR	MR	R	R	R	-	-	-	-	-	-	-
5.	CoSe 14455	MR	R	MR	R	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-	-	-
Checks																									
1.	CoSe 95422	S	S	S	S	MS	R	S	R	-	-	-	-	-	-	-	-	MR	S	-	MS	-	-	-	R
2.	CoJ 64	HS	-	HS	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-	-	-
3.	Co 1158	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	HS	S	-	-	-	-	-	-
4.	CoLk 7701	-	-	-	-	-	-	-	-									S	-	-	-	-	-	-	-
5.	CoLk 94184	-	-	-	-	MR	R	MR	R	MR	R	MR	R	MR	R	MR	R	-	R	R	-	MR	-	MR	R
6.	CoSe 95422	-	-	-	-	MS	R	S	R	S	S	S	S	S	S	S	S	-	S	MR	-	MS	-	MR	R

S. No	Genotypes	Red rot																Smut			Wilt		YLD		
		Motipur				Seorahi				Pusa				Buralikson											
		CF07		CF08		CF07		CF08		CF07		CF08		CF07		CF08									
		Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Motipur	Seorahi	Pusa	Motipur	Pusa	Motipur	Pusa	Seorahi
7.	CoSe 01421	-	-	-	-	MR	R	MR	R	MR	R	MR	R	MR	R	MR	R	-	R	MR	-	MR	-	R	R
8.	BO91	-	-	-	-	MR	R	MR	R	MR	R	MR	R	MR	R	MR	R	-	R	R	-	MR	-	R	R
9.	CoP 9301	-	-	-	-	MR	R	MS	R	MR	R	R	R	MR	R	R	R	-	R	R	-	MR	R	R	R
10.	CoP 06436	-	-	-	-	MS	R	MR	R	-	-	-	-	MR	R	MR	R	-	R	-	-	-	-	-	R
11.	CoP 2061	-	-	-	-	-	-	-	-	MR	R	R	R	-	-	-	-	-	-	MR	-	MR	-	R	-

Table 55. Reaction of ZVT entries for red rot, smut and wilt (East Coast Zone)

Sl. No.	Genotypes	Anakapalle					Cuddalore			
		Red rot (CF06)		Smut	Wilt	YLD	Red rot (CF06)		Smut	YLD
		Plug	Nodal				Plug	Nodal		
IVT – Early										
1.	CoA 17321	R	R	MS	MS	MR	MR	R	S	MS
2.	CoA 17322	R	R	MS	MS	S	MR	R	MS	MR
3.	CoA 17323	R	R	HS	MS	MR	MR	R	MS	MR
4.	CoC 17336	R	R	S	MS	MS	MR	R	MS	MR
IVT- Midlate										
1.	CoA 17324	R	R	MS	MS	MR	MR	R	MR	MR
2.	CoC 17337	R	R	MR	MS	MS	MR	R	MR	MS
3.	CoOr 17346	R	R	MR	S	MR	MR	R	MS	MR
4.	PI 17376	MR	R	S	R	MS	MR	R	HS	MS
5.	PI 17377	R	R	MS	R	MR	MR	-	MS	MR
AVT – Early I Plant										
1.	CoA 16321	R	R	MS	HS	MS	MR	R	MR	MS
2.	CoC 16336	MS	R	MR	MS	MR	MS	R	MS	MS
3.	CoC 16337	MS	R	S	MR	MR	MR	R	MS	MR
4.	CoV 16356	MR	-	S	HS	MR	MR	R	MS	MR
AVT – Early II Plant										
1.	CoC 15336	R	R	MS	S	MS	MS	R	MS	MS
2.	CoC 15338	MR	R	HS	S	MS	MR	R	MR	MS
3.	CoV 15356	MR	R	HS	R	MR	MR	R	HS	MS
AVT- Midlate Plant I										
1.	CoC 15339	MR	R	HS	MR	MR	MR	R	MS	MR
2.	CoOr 15346	R	R	MR	MR	MR	MR	R	MR	MR

3.	CoC 16338	MS	R	HS	MR	MR	MS	R	S	MS
4.	CoC 16339	MR	R	MR	MS	MR	MR	R	MR	MR
5.	CoV 16357	R	R	MS	S	MS	MR	R	S	MS
Checks										
1	Co 419	HS	S	HS	S	-				
2	Co 997	HS	S	MS	HS	-	-	-	-	-
3	CoC 671	HS	S	MS	S	-	HS	S	-	-
4	85 A 261	MR	R	MS	-	-	-	-	-	-
5	Co 6907	S	S	MS	-	-	-	-	-	-
6	Co 7219	MS	R	MS	-	-	-	-	-	-
7	Co 7706	MS	R	S	-	-	-	-	-	-
8	2012 A 246	-	-	-	HS	-	-	-	-	-
9	CoA 92081	R	R	HS	MS	MR	-	-	-	S
10	CoC 01061	MR	R	MR	R	MS	-	-	-	HS
11	CoOr 03151	MR	R	S	R	MS	-	-	-	-
12	CoV 92102	MR	R	MR	HS	MS	-	-	-	-
13	Co 86249	R	R	MR	R	MR	R	R	-	-
14	Co 06030	MR	R	R	R	MS	-	-	-	-
15	CoC 22	-	-	-	-	-	-	-	HS	-
16	Co 97009	-	-	-	-	-	-	-	HS	-

Table 56. Reaction of ZVT entries for red rot, smut and YLD (Peninsular Zone)

Sl No.	Genotypes	Red rot												Smut			YLD	
		Coimbatore				Thiruvalla				Navsari								
		CF06		CF12		CF06		CF12		CF06		CF12						
		Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Coimbatore	Navsari	Pune	Coimbatore	Navsari
IVT Early																		
1	Co 11015	MS	R	-	-	MS	R	MS	R	MS	R	MR	R	S	R	S	R	R
2	Co 16006	R	R	-	-	MS	R	MS	R	R	R	R	R	MS	R	R	R	R
3	Co 16009	MR	R	-	-	S	S	MS	S	MR	R	MR	R	HS	R	S	MR	R
4	Co 16010	R	R	-	-	MS	S	MS	S	R	R	MR	R	S	R	R	MS	R
5	Co 16017	R	R	-	-	S	S	MS	S	R	R	R	R	MS	R	MS	MS	R
6	Co 16018	MR	R	-	-	MS	R	MS	R	MR	R	MR	R	R	R	MS	R	R
7	CoM 16081	MR	R	-	-	MS	S	MS	S	MR	R	MR	R	R	R	R	R	R
8	CoM 16082	R	R	-	-	MS	R	MS	R	R	R	R	R	MR	S	R	R	R
9	CoN 16071	R	R	-	-	S	S	MS	S	R	R	R	R	MS	R	R	R	R
10	CoR 16141	MR	R	-	-	MR	R	MR	R	MR	R	MR	R	S	MS	R	R	R
11	CoR 16142	R	R	-	-	-	-	-	-	R	R	R	R	R	R	MS	R	MS
12	CoVc 16061	MR	R	-	-	S	S	S	S	MR	R	MR	R	MS	R	MS	S	R
13	CoVc 16062	MS	R	-	-	S	S	S	S	MS	R	MS	R	R	R	R	MS	MR
14	CoVSI 16121	MR	R	-	-	S	R	MS	R	MR	R	MR	R	MS	S	R	MR	R
15	PI 16131	R	R	-	-	MS	S	MS	R	MR	R	MR	R	S	MS	R	R	MS
AVT (I plant)																		
1	Co 14002	-	-	-	-	MS	R	MR	R	MR	R	MR	R	-	MR	R	R	R
2	Co 14004	-	-	-	-	MS	S	MS	S	R	R	R	R	-	S	MS	MR	R
3	Co 14012	-	-	-	-	MR	R	MR	R	MR	R	MR	R	-	HS	R	R	R
4	Co 14016	-	-	-	-	MS	R	MS	R	MR	R	MR	R	-	HS	S	R	MR
5	Co 14027	-	-	-	-	S	S	S	S	MS	R	MR	R	-	HS	MS	HS	MR
6	Co 14030	-	-	-	-	MS	S	MS	S	MR	R	MR	R	-	MR	R	MR	MS

Sl No.	Genotypes	Red rot												Smut			YLD	
		Coimbatore				Thiruvalla				Navsari								
		CF06		CF12		CF06		CF12		CF06		CF12						
		Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Coimbatore	Navsari	Pune	Coimbatore	Navsari
7	Co 14032	-	-	-	-	MS	S	MS	S	MR	R	MR	R	-	R	R	MS	R
8	CoN 14073	-	-	-	-	MS	S	MS	S	MR	R	MR	R	-	R	R	R	R
9	CoSnk 14102	-	-	-	-	-	-	-	-	MS	R	MS	R	-	MR	R	MS	R
10	CoSnk 14103	-	-	-	-	MS	R	MS	R	MR	R	MR	R	-	MR	R	MS	S
11	CoTI 14367	-	-	-	-	MS	R	MS	R	MR	R	MR	R	-	R	R	R	R
12	CoTI 14111	-	-	-	-	MR	R	MR	R	MR	R	MR	R	-	HS	R	MS	R
13	CoVc 14062	-	-	-	-	MS	R	MS	R	MR	R	MR	R	-	S	MS	S	R
14	MS 14081	-	-	-	-	-	-	-	-	MR	R	MR	R	-	MR	MS	-	MR
15	MS 14082	-	-	-	-	MS	R	MS	R	MR	R	MR	R	-	MS	R	-	MR
AVT (II plant)																		
1	Co13002	-	-	-	-	MS	R	MS	R	MR	R	MR	R	-	R	R	-	R
2	Co 13003	-	-	-	-	MR	R	MS	R	MR	R	MR	R	-	R	R	-	R
3	Co 13004	-	-	-	-	MS	S	MS	S	MR	R	MR	R	-	MR	R	-	R
4	Co 13006	-	-	-	-	S	S	MS	S	MR	R	MR	R	-	MS	R	-	R
5	Co 13008	-	-	-	-	MS	R	MR	R	MS	R	MR	R	-	R	R	-	R
6	Co 13009	-	-	-	-	MR	R	MR	R	MR	R	R	R	-	R	R	-	R
7	Co 13013	-	-	-	-	MR	R	MR	R	MR	R	R	R	-	R	R	-	R
8	Co 13014	-	-	-	-	MS	S	MS	S	MS	R	MS	R	-	S	R	-	R
9	Co 13018	-	-	-	-	MS	S	S	S	MS	R	MS	R	-	R	R	-	R
10	Co 13020	-	-	-	-	MR	R	MR	R	MS	R	MS	R	-	MR	S	-	MR
11	CoN 13073	-	-	-	-	MR	R	MR	R	MR	R	MR	R	-	R	MR	-	R
12	CoN 13072	-	-	-	-	MR	R	MR	R	MR	R	MR	R	-	R	R	-	R
13	MS 13081	-	-	-	-	MR	R	MS	R	MR	R	MR	R	-	R	R	-	R
14	CoSnk 13101	-	-	-	-	MR	R	MR	R	MR	R	MR	R	-	R	R	-	R
15	CoSnk 13103	-	-	-	-	MR	R	MR	R	MR	R	MR	R	-	MS	R	-	R

Sl No.	Genotypes	Red rot												Smut			YLD	
		Coimbatore				Thiruvalla				Navsari								
		CF06		CF12		CF06		CF12		CF06		CF12						
		Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Coimbatore	Navsari	Pune	Coimbatore	Navsari
16	CoSnk 13106	-	-	-	-	MR	R	MR	R	MS	R	MS	R	-	MS	R	-	R
17	PI 13132	-	-	-	-	MR	R	MR	R	MR	R	MR	R	-	R	-	-	R
Checks																		
1	Co 09004	-	-	-	-	MR	R	MR	R	MR	R	MR	R	-	MS	-	R	MS
2	CoSnk 05103	-	-	-	-	MR	R	MR	R	MR	R	MR	R	-	MR	-	R	MR
3	CoC 671	HS	S	-	-	HS	S	HS	S	HS	S	S	S	-	MR	-	MR	-
4	Co 86032	-	-	-	-	MS	S	MS	S	HS	R	HS	R	-	MR	-	MS	S
5	Co 94012	HS	S	-	-	-	-	-	-	HS	S	HS	S	-		-	-	-
6	Co 97009	-	-	-	-	-	-	-	-	-	-	-	-	HS	HS	-	-	-
7	Co 96007	-	-	-	-	-	-	-	-	-	-	-	-	HS		-	-	-
8	Co 7219	-	-	-	-	-	-	-	-	-	-	-	-	-	S	-	-	-
9	Co 740	-	-	-	-	-	-	-	-	-	-	-	-	-	HS	-	-	-
10	Co 99004	-	-	-	-	-	-	-	-	-	-	-	-	-	MS	-	-	-
11	Co 85004	-	-	-	-	-	-	-	-	-	-	-	-	-	S	-	-	-
12	Co 86002	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	MR