All India Coordinated Research Project on Sugarcane

(Indian Council of Agricultural Research)

TECHNICAL REPORT

PLANT PATHOLOGY

(2018 – 2019)

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Cover Photos

Front cover: Sugarcane plant exhibiting top rot phase of *pokkah boeng*and foliage discolouration due to wilt.

Back cover: Truck load of cane in a factory yard exhibits severe wilt (December, 2017, Andhra Pradesh)

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Summary

About 20 centres participated in the Plant Pathology programme and contributed their progress in 11 projects. Differential host studies to identify variation in red rot were conducted at 12 centres in all the zones with 72 new isolates along with designated pathotypes on the 14 host differentials. Efforts to include five new differentials have not succeeded due to lack of cooperation from few centres. More number of variants have been isolated from the popular varieties such as Co 89003, CoC 24, CoS 8436, CoSe 92423 and CoSe 95422. The new isolates behaved almost similar to the existing pathotypes however, there is enough indication of emergence of new pathotype(s) from Uttar Pradesh and Haryana. Epidemic occurrence of red rot in few pockets in the subtropical region is of serious concern and there is a need to closely monitor emergence of new pathotypes from them. 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 15 centres have carried out red rot and smut testing,six for wilt and 12 for YL resistance. 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 traditional sugarcane growing areas and there is growing importance of smut in subtropical region. In addition, occurrence of YL, grassy shoot, wilt, rust, *pokkah boeng* and brown spot to varying proportions were recorded in different states. This season, many centres recorded YL resistance in the ZVT entries and reported moderate to severe occurrences of YL 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 and Anakapalle. Severity of brown spot and rust was in Maharashtra. The centres generated useful information on rust inoculation methods, *pokkah boeng* epidemiology, tolerance in sugarcane varieties to the disease and fungicidal management during the season.

I compliment all the scientists for their hard work and for submitting the report in time. I profusely thank Dr. S.K. Shukla, the Project Coordinator and his team for supporting the work. I personally thank my colleagues Dr. V. Jayakumar and Dr. R. Selvakumar, Principal Scientists 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

Fifteen new *C. falcatum* isolates were evaluated for their virulence on 14 designated differentials. Except the isolates obtained from Co 0238, the virulence pattern of other isolates were more or less matched with the existing pathotypes of this zone. It was observed that Co 0238 isolates have specific virulence on Co 419, intermediate virulence on CoC 671 and no virulence against the differential Co 997. In addition, isolates of Co 0238 have shown intermediate reaction against BO 91 but virulence on Co 62399 and CoS 8436. Thus, indicating the development of a new specific virulence (though has lower spectrum of overall virulence) at this area that is capable of knocking down the popular variety Co 0238.

SHAHJAHANPUR

Ten isolates of *C. falcatum* were tested on 19 host differentials by plug method. Among all differentialsCo 997 and Khakai exhibited universal susceptibility, whereas CoSe 95422 and SES 594 exhibited R to all isolates, CoS 8436 displayed R to all isolates except one isolate R 1102 (CoS 8436), while Co 1148 behaved as S to exiting pathotypes. The resistant variety BO 91 exhibited I reaction to CF09 and R 1102 (CoS 8436) isolates.

KAPURTHALA

Seven new isolates along with two designated pathotypes CF08 and CF09 were inoculated on 19 differentials. Among the isolates RI-307, RI-309, RI-312 and RI-313 were found most virulent and showed reaction similar to pathotype CF08. Isolate RI-311 behaved similar to pathotype CF09 except for its MS reaction on Co 1148 and S reaction on Co 62399.

UCHANI

All the designated pathotypes along with six new isolates collected from Haryana were used for pathogenic variability. Observations recorded indicate that the differentials Co 419, Co 975, Co 1148, Co 7717, Co 62399, CoJ 64 and Co 86002 exhibited a clear cut differential reaction. Isolates RR XXVII, RR XXVIII, RR XXVIV and RR XXXII showed S reaction on Co 419, Co 975, Co 997, Co 1148, Co7717, Co 62399, CoC 671, CoJ 64. Isolate RR XXXI showed S reaction on Co 419, Co 975, Co 997, Co7717, Co 62399, CoC 671, CoJ 64, CoS 8436 Khakai and Co 86002 and R reaction on Co 7717, CoS 767, BO 91, SES 594, CoSe 95422, CoV 92102 and Co 86032. Similarly RR XXIV showed pathogenic variation on host differentials with intermediate reaction on CoS 767 and Baragua.

KARNAL

A set of fourteen *C. falcatum* isolates comprising seven designated pathotypes and seven isolates were inoculated independently on a set of twenty sugarcane differentials by plug method of inoculation. The overall disease reaction indicated that there was a clear pathogenic variation on the host differentials. The pathogenic reaction indicated that among the designated pathotypes, CF11 found to be most virulent followed by CF07, CF02, CF01, CF08, CF09 and CF03. Of the three Cf8436 isolates, Cf8436 (Karnal) exhibited virulence on the differential CoS 8436 with intermediate to susceptible reactions on 11 host differentials. Another new isolate Cf89003 collected from variety Co 89003 was also virulent and expressed intermediate to susceptible reactions on 12 host differentials, suggests the possible emergence of new pathotype in subtropics.

NORTH CENTRAL ZONE

PUSA

Ten sugarcane differentials were inoculated with two pathotypes CF07 and CF08 and ten isolates collected from different cane growing areas of Bihar. The result indicated that

the differentials Co1148 and Khakai produced S reaction whereas, differential 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.

SEORAHI

Seven pathotypes along with 5 isolateswere inoculated on 19 differentials. The virulence pattern of the isolates was found more or less similar with the existing pathotypes of this zone and no emergence of any new virulent pathotype was noticed.

EAST COAST ZONE

ANAKAPALLE

Eight isolates of *C. falcatum* were on a set of 19 host differentials. Most of the isolates were unable to infect the differentials, *viz*., Co 975, Co 1148, Co7717, CoJ 64, CoS 767, CoS 8436, BO 91, Baragua, SES 594 and CoSe 95422. Only the isolates recovered from Co 997 and CoA 89085 have produced I reaction on the host differential CoJ 64. The reaction of the isolates collected from Co 62175 and CoOr 12346 was found to be similar to the existing pathotype CF06. The reaction of the isolate Co 6907 was similar to pathotype CF05, except that it couldnot breach the resistance of Co 419, CoJ 64 and Co 86002. The isolate, Co 6907 was found to be less aggressive compared to other isolates tested. The reaction of the isolate CoV 89101 was found to be similar to the pathotype CF04.

CUDDALORE

Sugarcane differentials were inoculated with the *C. falcatum* isolated from varieties *viz.,* CoC 23, CoC 24, Co 91017, CoSi 6, TNAUSi 8 and designated pathotype CF06. Among the differentials, in BO 91, the isolate from CoC 24 exhibited intermediated reaction while all other isolates registered R reaction. Similarly in Co 1148, the isolate from CoC 24 showed S reaction while it was R to CF06. In the differential CoJ 64 the isolate from CoC 24 showed S reaction while it was I to CF06. All these reactions indicated the isolate from CoC 24 exhibited limited variation from designated pathotype CF06. The isolates from CoC 23, Co 91017, CoSi 6 and TNAU Si 8 have shown reaction similar to CF06.

PENINSULAR ZONE

NAVSARI

Four isolates were inoculated on 19 differentialsand the results revealed that CoJ 64, CoS 8436, BO 91, Baragua, SES 594 and CoSe 95422 showed R reaction for all the isolates. The differentials Co 1148, Khakai and CoV 92102 exhibited I reaction to all the isolates, while, Co 62399 and Co 767 showed I reaction to CF06 and R reaction to Cf86032, Cf86002 and New isolate-1, respectively. The differential Co 975 showed I reaction to CF06 and S reaction to Cf86002, Cf 86032 and New isolate-1. Only one differential Co 86002 showed mix reaction against isolate i.e., intermediate reaction to CF06 and Co 86032 and S reaction to two isolates, while Co 997 and CoC 671 showed S reaction to all the isolates.

COIMBATORE

Seven new isolates from Tamil Nadu along with two reference pathotypes CF06 and CF12 were tested on 19 differentials. The new isolates showed less virulence than reference pathotypes, however three new isolates viz., Cf2001-13- Perambakkam, Cf06022- Kuthalam and Cf99006-Mundiampakkam exhibited different reaction from CF06 on many differentials. The differential CoSe 95422 exhibited I reaction to three isolates and two reference pathotypes this season. Unlike previous season, this time both the reference pathotypes CF06 and CF12 showed similar disease reaction on all the differentials.

THIRUVALLA

Four new isolates along with the designated pathotypes CF06 and CF12 were inoculated and tested against nineteen differentials. The disease development on differentials

indicated that, CF12 behaved differently from the reference pathotype CF06 and was found to be the most virulent one. The isolate CfPI1401 (Kadaganur) showed almost similar reactions to that of CF12. The isolates CfPI1110 (Kothangudi), CfPI1401 (Kadaganur), CfV09356 (Keerangudi), Cf86027 (Nathakadu) exhibited more or less similar reactions to that of CF06, whereas the isolates Cf2001-13 (Perampakkam), Cf06022 (Kuthalam) and Cf99006 (Mundiampakkam) showed less virulent reaction than that of the standard pathotype CF06.

RESULTS OF THE CURRENT YEAR

NORTH WEST ZONE

LUCKNOW

Sixteen new isolates *i.e.* one isolate from CoLk 8102 (IR-161) and 15 isolates from Co 0238 (IR-155, IR-156, IR-157, IR-158, IR-159, IR-160, IR-162, IR-163, IR-164, IR-165, IR-166, IR-167, IR-168, IR-169 and IR-170) 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 giving I reaction to 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 and SES 594 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 (Table 1).

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/isolates. Baragua exhibited Rraectionexcept 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 (Table 2).

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 (Table 3).

UCHANI

All the designated pathotypes *viz*., CF01, CF02, CF03, CF07, CF08, CF09 and CF11 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 fromdifferent 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 (Table 4).

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 (Table 5).

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 Co1148 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 (Table 6).

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 (Table 7).

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 a set of 19 host differentials. Only the isolates recovered from CoA 89085, 2017T 275 and Co 62175

have producedI 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 (Table 8).

CUDDALORE

Nineteen sugarcane differentials were inoculated with *C. falcatum* isolated from varieties *viz.,* CoC 24, CoV 09356, CoM 0265 and TNAU Si 8 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 susceptible 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 (Table 9).

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, whileentries 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 toCf86032 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 (Table 10).

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 theold isolate of Cf06022 (Table 11).

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 CF12were 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 (Table 12).

PP17: EVALUATION OF ZONAL VARIETIES FOR RED ROT, SMUT, WILTAND 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)
Other Zones : Two widely occurring isolates on commercial varieties in the area.

(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), two genotypes viz., Co 14034 and CoLk 14202 were found R and five genotypes *viz*., CoLk 14201, CoPant 14221, CoPant 14222, CoPb 14181 and CoPb 14182 were found MR against both the pathotypes (CF08 and CF09). CoPb 14211 was rated MS against pathotype CF08 and MR against CF09. In AVT (Early)–I Plant, two genotypes viz., Co 13034 and CoPb 13181 were found MR by plug method against both the pathotypes and CoS 13231 was found MR against CF08, whereas S to CF09. In AVT (Early)-II Plant, Co 12027 was R and CoLk 12203 was MR against both the pathotypes, whereas, CoPant 12221 was MS and Co12026 was S against both the pathotypes.In IVT (Mid late), out of 15 genotypes evaluated, CoLk 14205 was R and thirteen genotypes viz., Co 14035, Co 05011, CoH 14261, CoH 14262, CoLk 14203, CoPant 97222, CoLk 14204, CoPb 14183, CoPb 14184, CoPb 14185, CoPb 14212, CoS 14232 and CoS 14233 were MR against both the pathotypes. In AVT (Mid late)-I Plant all the five genotypes viz., Co 13035, CoH 13263,

CoLk 13204, CoPant 13224 and CoPb 13182 were rated as MR against both the pathotypes. In AVT (Mid late)-II Plant, four genotypes *viz*., Co 12029, CoH 12263, CoLk 12205 and CoS 12232 were found MR to both the pathotypes.

SHAHJAHANPUR

A total of three entries were screened in AVT (Early) I plant and the result revealed that two entries Co 13034, CoS 13231 were found MR by plug method and R by nodal method against the pathotypes CF08. While one entry CoS 13231 evaluated as MR by plug method and all three entries behaved as R by nodal cotton swab method against CF09. In AVT (Early) II plant, all the four entries were identified as MR by plug method and R by nodal cotton swab method against pathotype CF08 and three entries were found MR to CF09 except Co12026. In AVT (Mid late) I Plant, out of five entries, two Co 13035, CoPb 13182 were rated as MR by plug method against CF08 and CF09. One entry CoPant 13224 also evaluated as MR to CF09 by plug method whereas these three entries behaved as R by nodal cotton swab method against both pathotypes. In AVT (Mid late) II Plant, three entries identified as MR against CF08 and three entries found as MR against CF09 by plug method. All the six entries were rated as R by nodal cotton swab method against both pathotypes. In IVT (Early), all entries were found as MR and Co14034, CoPb 14211 were rated as MS by plug method to CF08 pathotypes and CoPb 14181 as MS against CF09. All the seven entries screened as R by nodal cotton swab method against both pathotypes. In IVT (Mid late), of thirteen entries, eleven were found MR, whereas two entries namely CoH 14262 and CoPb 14183 were rated as R and MS, respectively by plug method of inoculation to CF08, while nine entries of this trial were rated as MR by plug method to CF09 and all entries were identified as R by nodal cotton swab method.

KAPURTHALA

Thirty eight genotypes along with standards were tested against red rot pathotypes CF08 and CF09 separately by plug and nodal cotton swab methods. In IVT (Early) six genotypes *viz*., CoLk 14201, CoLk 14202, CoPant 14222, CoPb 14181, CoPb 14182, CoPb 14211 behaved as MR/R by plug and nodal cotton swab methods against both the pathotypes. In AVT (Early) Plant I, only CoS 13231 behaved as MR/R by both the methods of inoculation. In AVT (Early) Plant II, two genotypes (Co 12026 and Co 12027) showed MR/R reaction. In IVT (Mid late), eleven entries viz., Co 14035, Co 14261, Co 14262, CoLk 14203, CoLk 14204, CoLk 14205, CoPb 14183, CoPb 14184, CoPb 14185, CoPb 14212 and CoS 14232 were found MR/R by plug and nodal cotton swab method against both the pathotypes. In AVT (Mid late) Plant I, two entries (CoPant 13224 and CoPb 13182) behaved as MR/R. In AVT (Mid late) Plant II, three entries namely Co 12029,CoPant 12226 and CoPb 12211 were found MR/R by plug and nodal cotton swab method to both the pathotypes.

UCHANI

In AVT (early) Plant-I two entries viz., Co 13034 and CoS13231 showed MR/R reaction by plug and nodal cotton swab methods against both pathotypes. In AVT (early) Plant-II genotype CoPant 12221 was found MR by plug and R by nodal cotton swab methods against CF08 and CF09 pathotypes. Entries Co 12027 and CoLk 12203 showed MR reaction against CF08 and MS against CF09 by plug method but R reaction by nodal cotton swab methods against both pathotypes. In AVT (mid late) three enteries viz., Co 13035, CoH 13263 and CoPb 13182 were MR reaction by plug and R reaction by nodal cotton swab methods against CF08 and CF09. The entry CoLk 13204 showed MS reaction by plug method and R reaction by nodal cotton swab methods of inoculations to both CF08 and CF09. In AVT (mid late) plant-II three entries viz., Co 12029, CoH 12263 and CoPant 12226 showedMR reaction by plug and R reaction by nodal cotton swab methods against CF08 and CF09. Two enteries CoLk 12205 and CoPb 12211 showed MS/S reaction by plug

method and R reaction by nodal cotton swab methods against CF08 and CF09. In IVT (early) six enteries *viz*., Co 14034, Co Lk 14201, CoLK 14202, CoPant 14222 and CoPb 14181 showed R/MR reaction by both the methods of inoculations to both pathotypes, whereas CoPb 14211, was found MS by plug and R by nodal cotton swab methods against CF08 and CF09. In IVT (mid late) ten entries viz., Co 14035, CoH 14261, CoH 14062, CoLk 14204, CoPb 14183, CoPb 14184, CoS 14231, CoS 14232 and CoS 14233 showed R/MR reaction both methods of inoculations to both pathotypes except CoS 14232 which showed R reaction by plug method of inoculation.

KARNAL

Thirty eight zonal varieties along with standards were evaluated for red rot resistance against CF08 and CF09 isolates. One IVT (E) clone CoPb 14211 exhibited MS reaction to both CF08 and CF09 pathotypes by plug method, while two IVT (ML) entries (CoS 14231 and CoS 14233) were S to CF08 by plug and cotton swab methods and also MS with CF09 isolate. Two entries *viz*., CoPb 13181 (AVT E-I plant) and CoPb 12211 (AVT ML-II Plant) expressed S to CF08 by plug method. However, remaining entries were R/MR with both the inocula and methods.

PANTNAGAR

In nodal cotton swab method, all the 28 genotypes showed R reactions for both pathotypes. In plug method, 1 genotype was found R, 19 MR and 7 MS and 1 S for CF08 pathotype whereas 2 genotypes were found R, 17 MR and 8 MS and 1 S for CF09 pathotype.

NORTH CENTRAL ZONE

PUSA

By plug method of inoculation, three genotypes CoP14437, CoP14438 and CoP 06436 were found R against CF08 isolate, fourteen genotypes CoP 14437, CoSe 14451, CoSe 14453, CoSe 01421, CoLk 94184, CoLk 14209, CoLk 14210, CoP 14438, CoP 14439, CoSe 14452, CoSe 14456, CoP 9301, BO 91 and CoP 06436 showed MR reaction against the CF07 isolate whereas, sixteen genotypes, CoLk 14206, CoLk 14207, CoP 14436, CoSe 14451, CoSe 14453, CoSe 14454, CoSe 01421, CoLk 14439, CoSe 14452, CoSe 14209, CoLk 14210, CoP 14439, CoSe 14452, CoSe 14455, CoP 9301 and BO 91 showed MR reaction against the CF08 isolate. In case of cotton swab method, genotypes CoSe 14454, CoSe 95422 and CoBln 14502 showed S reaction against both the isolates, whereas, CoSe 14456 showed S reaction to isolate CF07, while, the remaining genotypes showed R reaction against both the tested isolates.

MOTIPUR

In IVT (Early) seven genotypes *viz*., CoBln 14501, CoLk 14206, CoLk 14207, CoP 14436, CoP 14437, CoSe 14451 and CoSe 14453 were rated as MR and one genotype, CoP 14437 was MS to both the pathotypes. CoSe 14454 was MR against CF07 and MS against CF08. In AVT (Early)-I Plant, CoSe 13452 was rated as R against both the pathotypes, CoSe 13451 was MR whereas, CoP 13437 was MS to both the pathotypes. In AVT (Early)-II Plant, two genotypes CoLk 12207 and CoSe 12451 were MR against CF07 and CF08. Genotype CoP 12436 was MR against CF07 and S to CF08. In IVT (Mid late) eight genotypes were R and CoSe 14456 wsa MR against CF07 and CF08, CoSe 14452 was rated as R against CF07 and MR against CF08. In AVT (Mid late)-II Plant, three genotypes namely CoLk 09204, CoLk 12209 and CoP 12438 were rated as MR and genotype CoSe 12453 was R against CF07 whereas MR against CF08.

SEORAHI

Plug method: In initial varietal trial (Early) seven genotypes were rated as MR and one genotype CoBln 14501 behaved as MS to CF07 and MR to CF08. In initial varietal trial

(Mid late) seven behaved as MR to CF07 and eight behaved as MR to CF08. Genotype CoBln 14502 was rated as S to CF07 and MR to CF08, whereas genotype CoP 14438 was found MS to both pathotypes. In advanced varietal trial (Early) one genotype CoSe 13452 behaved as MR to both pathotypes, while CoSe 13451 behaved as MR to CF08 and MS to CF07. Nodal Cotton Swab method: In initial Varietal Trial (Early) all were found R to both designated pathotypes. In initial Varietal Trial (Mid-late) 8 genotypes were rated as R, while genotype CoBln14502 was rated as S to CF07, while all genotype behaved as R to CF08. In advanced varietal trial (Early) all were rated as R to CF07, while 2 genotypes were rated as R to CF08 and genotype CoP 13437 was rated as S to CF08.

NORTH EAST ZONE

BURALIKSON

A total of twenty six entries including one check variety and five (5) standard varieties were evaluated against red rot by plug and cotton swab methods of inoculation using CF07 and CF08 pathotypes. IVT (E) clone CoP 14454 and IVT (ML) clone CoBln 14502 were rated as MR in plug method and R in cotton swab method to both the pathotypes. In AVT(E) plant I, CoSe 13451 showed R reaction to CF07 in plug method and MR to CF08, CoSe 13452 showed MR to both the isolates in plug method and R in cotton swab method, CoSe 13437 showed MR to CF07 and R to CF08 in plug method and S to CF07 and R to CF08 in cotton swab method. In AVT(E) plant II, among the six genotypes tested all are found to be MR to both the isolates in plug method and R to both the isolates in cotton swab method except the genotype CoP 11438 which was found to be S to CF08 in cotton swab method. In AVT (midlate) plant II CoSe 11453 showed R reaction to CF07 and MR to CF08 in plug method and R to both the isolates in cotton swab method, other varieties showed MR in plug method and R in cotton swab method.

EAST COAST ZONE

ANAKAPALLE

Thirty four genotypes were tested for their reaction to the pathotype CF06 by cotton swab and plug methods of inoculations. In the cotton swab method, out of 34 entries tested, five ckeck Co 419, CoC 671, Co 997, CoA 89085 and Co 6907 manifested top drying indicating their susceptibility whereas the entries reacted as R to CF06. In plug method of inoculation, four entries CoC 15336, Co 13028 and CoC 13339showed R while 16 entries,Co 86249, Co 13023, Co 13029, Co 13031, CoA 12324, CoA 11326, CoA 13322, CoA 13323, CoA 14321, CoA 14323, CoA 92081, CoC 01061, CoC 15339, CoC 14337, PI 14337, CoV 13356 andCoV 15356, showed MR reaction.

CUDDALORE

Among the 27 clones screened for resistance to red rot by plug method of inoculation using CF06 pathotype twenty two clones *viz*., Co 13023, Co 13028, Co 13029, Co 13031, CoA 11326, CoA 13322, CoA 14321, CoA 14323, CoC 13336, CoC 13337, CoC 13339, CoC 14336, CoC 14337, CoC 15336, CoC 15337, CoC 15338, CoC 15339, CoC 15340, CoOr 13346,CoOr 15346, CoV 15356 and PI 14377 were found to MR. In nodal cotton swab method, twenty five clones *viz*.,CoC 15336, CoC 15337, CoC 15338, CoV 15356, Co 13023, CoA 14321, CoC 14336, CoA 13322, CoA 13323, CoC 13336, CoC 13337, CoV 13356, CoC 15339, CoC 15340, CoOr 15346, Co 13028, Co 13029, Co 13031, CoA 14323, CoC 14337, PI 14377, CoA 11326, CoA 12324, CoC 13339, CoOr 13346 were found to be R by nodal cotton swab method.

PENINSULAR ZONE

NAVSARI

In Plug Method out of 62 entries, none of the entries exhibited R reaction. Twenty six entries viz., Co 14004, Co 14006, Co 14009, Co 14012, Co 14016, Co 14026, Co 14032,

CoN 14071, CoN 14072, CoN 14073,CoN 14074, CoSnk 14102, CoSnk 14103, CoTl 14111 CoVc 14062 and MS 14082, (IVT), Co 12009, Co 12019 and Co 12024 (AVT-E I Plant), Co 11001,Co 11004, CoM 11081,CoM 11082 and CoM 11084 (AVT-E II Plant), Co 11007 and Co 11012 (AVT–ML II plant) showed MR reaction against red rot. Eleven entries *viz*., Co 13021, Co 14002, Co 14008, Co 14027, CoT 14367, MS 14081 and PI 14131 (IVT), Co 12008 and VSI 12121 (AVT-E I Plant), Co 11005 and CoM 11086 (AVT–ML II plant) exhibited MS reaction. In Cotton swab method out of 62 entries 53 exhibited R reaction, rest of three entries CoSnk 14101, Co 14023 and VSI 14122 showed S reaction.

THIRUVALLA

In IVT out of the 40 entries tested in plug method with CF06, 27 showed MR reaction, nine showed MS reaction, two showed S reaction and two showed HS reaction in plug method of inoculation. With the standard isolate CF12, twenty showed MR reaction, fourteen varieties showed MS reaction, four showed S reaction and showed HS reaction in plug method of inoculation. In Nodal cotton swab method of inoculation, all the entries except seven *viz.,* CoTl 14112, CoVc 14061, PI 14131, PI 14132, VSI 14121, Co 86032, CoC 671 showed R reaction to both CF06 and CF12. In AVT (I Plant) out of 11 entries, three exhibited MR reaction, five exhibited MS reaction, two exhibited S reaction and one exhibited HS reaction against the standard isolate CF06 in plug method of inoculation. Out of the eleven entries tested against CF12, by plug method of inoculation, one showed MR reaction, five showed MS reaction, four showed S reaction and one showed HS reaction. In nodal method of inoculation, five entries showed R reaction to both CF06 and CF12 whereas all the other six showed S reaction. In AVT (II Plant Early) out of the eight entries tested with the standard isolate CF06, MR reaction was recorded in four, MS reaction in three and HS reaction in one entry by plug method of inoculation. In AVT II Midlate, out of the 8 entries tested against CF06, four recorded MR reaction, three recorded MS reaction and one recorded S reaction in plug method of inoculation. Against CF12, three entries recorded MR reaction, four recorded MS reaction and one recorded S reaction in plug method of inoculation.

COIMBATORE

Thirty seven entries of IVT were evaluated for red rot resistance by plug and nodal methods against CF06 and CF12 pathotypes. Since the disease development during the season was erratic the trial is being repeated.

RESULTS OF THE CURRENT YEAR

NORTH WEST ZONE

LUCKNOW

In IVT (Early) out of 9 genotypes tested, one genotype Co 15027 was found R by both the method of inoculation against both the pathotypes. Six genotypes *viz*., Co 15023, CoLk 15201, CoLk15203, CoLk15204, 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 15024was rated as MS by plug method and S by nodal method,one genotype CoPb 15211was rated as MS against pathotype CF08 and S against pathotype CF09 by plug method, whereas resistantR 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 15232was 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 found R by both the methods of inoculation against both the red rot pathotypes. Six genotypes *viz*., Co 14035, CoH 14261, CoLk 14204, CoPb 14184, CoPb 14185 and CoS 14233 were rated as MR by plug method of inoculation and R by nodal method of inoculation against both the pathotypes.InAdvanced 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 (Table 13).

SHAHJAHANPUR

Thirty nine entries were evaluated for red rot resistance and details of red rot behaviour 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): Among5 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 boththe 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 (Table 15).

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 boththe pathotypes. However, CoPb 14211 exhibited MS reaction by plug and R reaction by nodal cotton swab method against boththe pathotypes. In AVT (early) plant-II, theentries 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 Rby 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, entriesCoPant 13224 and CoLk 13204 showed MS reaction by plug and Rby nodal methods. In IVT (early), 6 entries *viz*., Co 15023, Co 15024, Co 15027, CoLk 15204, CoLk 15205 and CoPb15211 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 methodagainst 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 inoculationand CoLk 15206 and CoS 15234 showed R reaction by plug method to CF09.The entryCoPb 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 (Table 16).

KARNAL

Thirty nine zonal varieties along with 7 standards were evaluated for red rot resistance against CF08 and CF09 pathotypes. Two entries i.e. CoLk 15203 IVT (E) and CoPb 15214 IVT (ML) exhibited S/HS reactions with CF08 and CF09 isolates 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 (Table 17).

PANTNAGAR

In nodal cotton swabmethod,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 genotypeswere 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 (Table 18).

NORTH CENTRAL ZONE

PUSA

Twenty four entries were tested using CF07 and CF08 pathotypesby 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 (Table 19).

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 15452was 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 methodand 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 methodand R by nodal method against CF07 and CF08.

In IVT (Mid late) outof 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 methodand 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 methodand R by nodal method against both the pathotypes (Table 20).

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 CoP15440 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 CoBln15502 was rated as S to CF07 andall 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 offive 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, 5entries were evaluated and all were rated as R to both pathotypes (Table 21).

NORTH EAST ZONE

BURALIKSON

Under IVT(early) group, CoP 15436 showed R reactions to CF07 and MR to CF08 in plug method. The checkCoSe 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, CoSe13451 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 (Table 22).

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 tested, four checks (Co 419, CoC 671, Co 997, and Co 6907) manifested top drying indicating their susceptibility and the remaining entries reacted as Rto 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, CoC16339, PI 14337, CoV 15356, CoV 16356, Co 01061, CoOr 03151, CoV 92102 and Co 06030showed MR reaction to CF06 (Table 23).

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 andthe entry CoC 15336wasMS to red rot. In cotton swab method all the 20 clones were found to be R (Table 24).

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 12085exhibitedMSreaction,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 (Table 25).

THIRUVALLA

In AVT (1st Plant), out of the 17 entries, three *viz.,* Co 13013, CoN 13073, CoSnk 13101exhibited R reaction, 7entries*viz.,* Co13002, Co13009, CoN13072, MS 13081,CoSnk 13103, CoSnk 13106, PI 13132 exhibited MR reaction, 6entries*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, 10entries*viz.,*Co13002, Co13003, Co13008, Co13013, CoN13072, CoN13073, MS 13081, CoSnk 13101, CoSnk 13103, PI 13132 showed MR reaction, four entriesCo 13004, Co 13014, Co 13020, CoSnk 13106 showed MS reaction and2entriesCo 13006, Co 13018 showed S reaction. In nodal method, except five entries*viz*., Co 13004, Co 13006, Co13014, Co 13018 and Co 13020 all othersshowed R reaction to both CF06 andCF12.

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 entriesCo 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 (Table 26).

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 (Table 27).

SUMMARY

The entries showing R or MR to red rot by both the methods of evaluation are listed below

NORTH WEST ZONE (Table 13 to 18)

LUCKNOW- Plugand nodal cotton swab method

IVT (Early)	:	Co 15023, Co 15027, CoLk 15201, CoLk 15203, CoLk 15204, CoLk 15205, CoLk 15212
IVT (Midlate)	:	Co 15026, CoLk 15206, CoLk 15207, CoLk 15208, CoLk 15209, CoPb 15213, CoS 15233, CoS 15234
AVT (Early)-I	:	Co 14034, CoLk 14201, CoPb14181, CoPb 14211
AVT (Early)-II	:	Co 13034, CoPb 13181, CoS 13231
AVT (Midlate)-I	:	Co 14035, CoH 14261, CoLk 14203, CoLk 14204, CoPb 14184, CoPb 14185, CoS 14233
AVT (Midlate)-II	:	Co 13035, CoH 13263, CoPant 13224, CoPb 13182, CoLk 13204

SHAHJAHANPUR–Plug& nodal cotton swab method

AVT (Early) Plant I	:	CoLk 14201, CoPb 14181
AVT (Early) Plant II	:	CoS 13231
AVT (Midlate) Plant I	:	Co 14035, CoH 14261, CoLk 14203, CoLk 14204, CoPb 14184, CoPb 14185
AVT (Midlate) Plant II	:	Co 13035, CoPb 13182
IVT (Early)	:	Co 15023, Co 15027, CoLk 15201, CoLk 15204, CoPb 15211
IVT (Midlate)	:	Co 15026, CoLk 15206, CoLk 15207, CoLk 15208, CoLk 15209, CoPb 15213, CoS 15232, CoS 15234

KAPURTHALA – Plug & nodal cotton swab method

AVT (Early) Plant I	:	CoLk 14201, CoPb 14181, CoPb 14211
AVT (Early) Plant II	:	CoS 13231
AVT (Midlate) Plant I	:	Co 14035, CoH 14261, CoLk 14203, CoLk 14204, CoPb 14184, CoPb 14185
AVT (Midlate) Plant II	:	CoPant 13224, CoPb 13182
IVT (Early)	:	Co 15023, Co 15024, Co 15027, CoLk 15201, CoLk 15205, CoPb 15211
IVT (Midlate)	:	Co 15026, CoLk 15206, CoLk 15207, CoLk 15208, CoLk 15209, CoPb 15213, CoS 15232, CoS 15233, CoS 15234

UCHANI – Plug & nodal cotton swab method

AVT (E) Plant I	:	Co 14034, CoLk 14201, CoPb14181
AVT (E) Plant II	:	Co 13034, CoS13231
AVT (Midlate) Plant I	:	Co 14035, CoH 14261, CoLk 14204, CoPb 14184, CoPb 14185, CoS 14233
AVT(Midlate) Plant II	:	Co 13035, CoH 13263, CoPb 13182
IVT (Early)	:	Co 15023, CoLk 15024, CoLk 15027, CoLk 15204, CoLk 15205, CoPb 15211
IVT (Midlate)	:	Co 15026, CoLk 15206, CoLk 15207, CoLk 15208, CoLk 15209, CoS

15232, CoS 15233, CoS 15234

KARNAL – Plug & nodal cotton swabmethod

IVT (Early) : Co 14034, CoLk 14201, CoLk 14202, CoPant 14222, CoPb 14181, CoPb 14182

IVT (Midlate) : Co 14035, CoH 14261, CoH 14262, CoLk 14203, CoLk 14204, CoPb 14184, CoPb 14185, CoPb 14212, CoS 14232

AVT (E) Plant I : Co 13034, CoS 13231

AVT (E) Plant II : Co 12026, Co 12027

AVT (Midlate) Plant I : Co 13035, CoPb 13182

AVT (Midlate) Plant II : Co 12029, CoPant 12226, CoS 12232

PANT NAGAR- Plug & nodal cotton swab method

IVT (Early) : Co15023, Co15024, Co15027

IVT (Midlate) : Co15026, CoLk15206, CoLk15207, CoPb15213, CoS15231, CoS15233, CoS15234

AVT (E) Plant I : CoLk14201

AVT (E) Plant II : Nil

AVT (Midlate) Plant I : Co14035, CoLk14203, CoLk14204, CoPb14184, CoPb14185, CoS14233

AVT (Midlate) Plant II : Co13035, CoLk 13204, CoPb13182

NORTH CENTRAL ZONE(Table 19 to 21)

PUSA- Plug & nodal cotton swab method

IVT (Early) : CoLk 15467, CoP 15436, CoP 15437, CoSe 15451, CoSe 15455, CoSe 15456

IVT (Midlate) : CoBln 15502, CoLk 15469, CoP 15438, CoP 15439, CoP 15440, CoSe 15454, CoSe 15457

MOTIPUR - Plug and nodal cotton swab method

IVT (Early) : CoLk 15466, CoLk 15467, CoP 15437, CoSe 15451, CoSe 15455, CoSe 15456

IVT (Midlate) : CoLk 15468, CoLk 15469, CoP 15438, CoP 15439, CoP 15440, CoP 15441, CoSe 15454

AVT (Early) I Plant : CoLk 14206, CoSe 14451, CoSe 14454

AVT (Early) II Plant : CoP 13437, CoSe 13451, CoSe 13452

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

SEORAHI – Plug and nodal cotton swab method

IVT (Early) : CoLk 15466, CoLk 15467, CoSe 15451, CoSe 15452, CoSe 15455, CoSe 15456

IVT (Mid late) : CoLk 15468, CoP 15438, CoP 15439, CoP 15441, CoSe 15453, CoSe 15454, CoSe 15457

AVT (Early) I Plant : CoLk 14206, CoSe 14451, CoSe 14454,

AVT (Mid late) : CoLk 14208, CoLk 14209, CoP 14439, CoSe 14455

NORTH EAST ZONE (Table 22)

BURALIKSON – Plug & nodal cotton swab method

IVT (Early) : CoLk 15466, CoLk 15467, CoP 15436, CoP 15437, CoSe 15451, CoSe 15456

IVT (Midlate) : CoLk 15468, CoLk 15469, CoP 15438, CoP 15439

AVT (Early)- I Plant : CoP 14437

AVT (Early)- II Plant : CoP 13437, CoSe 13452

AVT (Midlate)- I Plant : CoLk 14209, CoP 14439

EAST COAST ZONE(Table 23 to 24)

ANAKAPALLE

IVT Early	:	CoA 16321, CoV 16356
IVT Midlate	:	CoA 16322, CoC 16339, CoV 16357
AVT (Early)- I Plant	:	CoC 15336, CoC 15338, CoV 15356
AVT II (Early)	:	CoC 13023, CoA 14321
AVT(Midlate)-II Plant	:	Co 13028, Co 13029, Co 13031, CoA 14323, CoC 14337, PI 14337

CUDDALORE- Plug and nodal cotton swab method

IVT (Early)	:	CoA 16321, CoC 16336, CoC 16337, CoV 16356
IVT (Midlate)	:	CoA 16322, CoC 16338, CoC 16339, CoV 16357
AVT- Early (I Plant)	:	CoC 15338, CoV 15356
AVT- Early (II Plant)	:	Co 13023, CoA 14321, CoC 14336
AVT-Midlate(II Plant)	:	Co 13028, Co 13029, Co 13031, CoA 14323, CoC 14337, PI 14377

PENINSULAR ZONE(Table 25 to 27)

NAVSARI – Plug method

IVT (Early)	:	Co 14005, Co 15002, Co 15005, Co 15006, Co 15007, Co 15009, Co 15017, Co 15018, Co 15020, Co 15021, CoN 15071,CoN 15072, CoSnk 15101, CoVc 15063, VSI 15122
AVT (Early) Plant I	:	Co 13003, Co 13004, Co 13006, Co 13008, Co 13009, Co 13013, Co 13014, Co 13018, CoN 13072, CoN 13073, CoSnk 13101, MS 13081
AVT (Early) Plant II	:	Co 12009, Co 12012, Co 12019, VSI 12121

THIRUVALLA – Plug & nodal cotton swab method

IVT (Early)	:	
AVT (Early) Plant I	:	Co13002, Co13009, Co 13013, CoN13072, CoN13073, CoSnk 13101,CoSnk 13103, CoSnk 13106, MS 13081, PI 13132
AVT (Early) Plant II	:	Co 12009, Co 12019
AVT (Midlate) Plant II	:	Co 12008, Co 12019

COIMBATORE- Plug & nodal cotton swab method

: Co 13021, Co 14002, Co 14003, Co 14004, Co 14005, Co 14006, Co 14008, Co 14009, Co 14012, Co 14016, Co 14022, Co 14023, Co 14025, Co 14026, Co 14030, Co 14031, Co 14032, Co 15002, Co 15005, Co 15009, Co 15010, Co 15015, Co 15017, Co 15021, CoN 14071, CoSnk 14101, CoSnk 14103, CoT 14366, CoT 14367, CoTl 14111, MS 14081, MS 14082, CoVc 14062, CoVSI 15121, CoVSI 15122, PI 15131

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 41 genotypes tested, 15 genotypes *viz.,* Co 05011, Co 12026, Co 13034, Co 13035, CoH 14261, CoH 14262, CoH 13263, CoLk 12203, CoLk 14201, CoLk 14203, CoPant 14221, CoPb 13181, CoPant 13224, CoH 12263 and CoS 12232 were graded as R and nine genotypes viz*.,* Co 12027, CoLk 12205, CoLk 13204, CoPant 14222, CoPb 14182, CoPb 14184, CoPb 14185, CoPant 97222 and CoPb 13182 were rated as MR.

SHAHJAHANPUR

In AVT (Early) I Plant, all entries were found R except CoS 13231 which was MR against smut. In AVT (Early) II Plant, three entries were observed R/MR and one CoPant 12221 behaved as MS. In AVT (Mid late) I Plant, all entries evaluated as R/MR except Co 13035 (MS). In AVT (Mid late) II Plant, out of six entries, five were screened as R/MR while CoLk 12205 rated as MS. All entries of IVT (Early) were evaluated as R or MR except CoPb

14182 (MS). Thirteen entries tested in IVT (Mid late) and results revealed that all entries were screened as R or MR except CoS 14232 against smut.

KAPURTHALA

Out of 38 genotypes, eight genotypes namely CoPant 14222, CoPb 14182, CoS 13231, Co 14261, CoLk 14204, CoPb 14184, CoPb 14212 and CoS 14232 were R and 15 genotypes were MR. Among remaining entries, 12 were MS and three entries were S. Five pathological standards *viz*., Co 740, Co 1158, Co 62175, NCo 310 and Katha were rated as highly susceptible (HS) and one standard (Co 7915) as MR.

PANTNAGAR

Out of 27 genotypes 6 genotypes were found R, 7 MR and remaining genotypes showed various degrees of susceptibility, *i.e*., 11 MS, 2 S and 1 HS.

NORTH CENTRAL ZONE

PUSA

It is observed that sixteen genotypes *viz*., CoLk 14206, CoLk 14207, CoP 14436, CoP 14437, CoSe 14451, CoSe 14453, CoLk 94184, CoLk 14208, CoLk 14209, CoLk 14210, CoP 14438, CoP 14439, CoSe 14452, CoSe 14455, CoP 9301 and CoP 06436 remained free from smut infection and they were graded as R, whereas, seven genotypes *viz*., CoSe 14454, CoBln 14501, CoSe 01421, CoSe 95422, CoSe 14456, CoBln 14502 and BO 91 showed MR reaction against smut.

MOTIPUR

Out of 27 genotypes tested, four genotypes viz*.,* CoLk 14206, CoP 14437, CoP 13437 and CoSe 14451 were rated S, six genotypes viz*.,* CoLk 12207, CoP 12436, CoSe 12451 CoLk 12209, CoP 12438 and CoSe 12453 were rated as MR and rest of 17 genotypes were rated as R against smut.

SEORAHI

In Initial Varietal Trial (Early) eight genotypes were evaluated out of which 5 genotypes were rated as R, one genotype as MR, one genotypes was as MS, while one genotype was rated as S. In IVT (Mid late) nine genotypes were evaluated against smut disease and all were found R. In Advanced Varietal Trial (Early) 2 entries *viz.* CoSe 13451 and CoSe 13452 were rated as R, while genotype CoP 13437 was rated as MS.

EAST COAST ZONE

ANAKAPALLE

Out of 34 genotypes tested, none of the genotypes were found R to smut, while seven entries showed MR reaction (CoA 14321, Co13028, Co 13031, PI 14377, CoC 13337 and CoV 13356) and the remaining entries showed MS, S to HS reaction.

CUDDALORE

Among 26 clones screened 12 *viz*., Co 13028, Co 13031, CoA 12324, CoA 13322, CoC 13337, CoC 13339, CoC 14337, CoC 15336, CoC 15337, CoC 15338, CoC 15339, CoC 15340 andCoV 13356were MR. Ten clones *viz*., Co 13023, Co 13029, CoA 11326, CoA 14321, CoA 14323, CoC 13336, CoC 14336, PI 14377 and CoOr 13346 were MS, four clones *viz*., CoV 15356, CoA 13323, PI 15376 and PI 15377 were found S.

PENINSULAR ZONE

PADEGAON

Out of 56 genotypes screened in IVT (Early), 23 showed R reaction to smut. In AVT–Early (I Plant), out of 8 genotypes, 2 *viz.,* Co 12007, CoM 12085 showed R reaction. In AVT–Early (II Plant) out of 5 genotypes, 1 *viz.,* CoM 11081 showed R reaction to smut, in AVT–Midlate (II Plant) out of 6 genotypes 4 genotypes *viz.,* Co 11005, Co 11012, Co 11019 and CoM 11086 showed R reaction and two genotypes *viz.,* CoM 11085 and Co 11007 showed MR reaction to smut.

SANKESHWAR

In IVT – Early & Midlate out of thirty seven entries tested, five *viz*., Co 14002, Co 14004, Co 14006, Co 14012 and Co 14030 were S to smut. In AVT – Early & Midlate PC-1 out of eight entries five *viz*., Co 12008, Co 12012, Co 12019, Co 12024 and CoM 12085 were identified as R. In AVT Early PC II out of five entries, Co 11001, Co 11004, CoM 11081, CoM 11082 and CoM 11084 were rated as R. In AVT Midlate PC II out of six entries four *viz*., Co 11007, Co11012, CoM 11085 and CoM 11086 were identified as R.

KOLHAPUR

Out of 56 entries screened in ZVT's, 15 genotypes in IVT shown R reaction, whereas 2 genotypes *viz.,* Co 14031 and Co 14032 showed HS reaction to smut. In AVT I Plant, 1 genotype *viz.,* Co 12024 showed R reaction whereas 5 genotypes showed MR and remaining 2 showed MS reaction. In AVT Early II plant, 1 genotype *viz.,* CoM 11082 showed R reaction whereas remaining 4 showed MR reaction, while 3 genotypes from AVT Midlate II plant, *viz.,* Co 11012, Co 11019 and CoM 11086 showed R reaction.

PUNE

Out of 60 genotypes screened, 26 entries *viz.,* Co 10004, Co 10005, Co 10006, Co 10024, Co 10026, Co 10027, Co 10033, Co 11005, CoT 10366, Co 13008, Co 13013, Co 13016, CoM 11082, CoM 11085, CoM 11086, CoM 13082, CoN 13071, CoN 13072, CoN 13073, CoN 13074, CoSnk 13104, CoT 13366, CoT 10368 and MS 13081 were found R, 3 were found MR, 25 were found MS, 5 were found S and 1 genotype was found HS.

NAVSARI

Out of 56 entries evaluated for smut resistance, 20 entries viz., Co 14003, Co 14004, Co 14009, Co 14025, Co 14032, CoN 14071, CoN 14072, CoN 14073, CoN 14074, CoSnk 14101, CoT 14367, MS 14082 and VSI 14122 (IVT) exhibited R reaction, Co 12019 (AVT–E I plant)**,** Co 11001 and CoM 11084 (AVT-E II Plant), Co 11005, Co 11019, CoM 11085 and CoM 11086(AVT–ML II plant) exhibited R reaction. Similarly ten entries viz., Co 13021, Co 14006, Co 14008, Co 14022, MS 14081, CoSnk 14103, CoVc 14062 and VSI 14121 (IVT), Co 12024 and CoM 12085 (AVT-E I Plant) showed MR reaction.

COIMBATORE

About 37 entries including two check varieties were evaluated for smut resistance, in that about 17 entries were identified as R/MR and six behaved as MS and the rest were S/HS to the disease.

RESULTS OF THE CURRENT YEAR

NORTH WEST ZONE

LUCKNOW

Out of 39 genotypes tested, twelve 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 namely CoLk 15203, CoLk 15205, Co 14034, CoH 14261, CoPb 13182 and CoLk 13204 were rated as MR. Ten genotypes *viz*., CoPb 15211, CoLk 14201, CoPb14211, CoS 13231, CoS 15232, CoS 15233, CoLk 14203, CoPb 14185, Co 13035 and CoPant 13224 were rated as MS. Seven genotypes *viz*., Co 15027, CoPb 15212, CoPb 14181, CoLk 15207, CoLk 15209, CoLk 14204, CoPb 14184 and CoS 14233 were rated as S. Three genotypes namely CoLk 15201, CoLk 15204 and Co 15026 were rated as HS (Table 13).

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 (Table 14).

KAPURTHALA

Out of 39 genotypes, three namely Co 15027, CoLk 15207 and CoH 14261 were rated as R and 24 genotypes *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 (Table 15).

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 (Table 18).

NORTH CENTRAL ZONE

PUSA

Among 24entries tested15 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 (Table 19).

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 (Table 20).

SEORAHI

In IVT (Early), among9 genotypes evaluated 6 were rated as R, 1 as MR, CoP 15436 as MS and CoBln 15501 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),4clones 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 andthe genotype CoP 14438 was rated as MS, while reamaining genotypes was found as R/MR (Table 21).

EAST COAST ZONE

ANAKAPALLE

Out of 33 genotypes tested, 1 entriyand 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 andCoV 92102) and the remaining entries showed MS to HS reaction (Table 23).

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

andfour clones *viz*., CoV 15356, CoC 14336, CoC 16338 and Co 13029 were S and one clone CoA 14323 was found to be HS (Table 24).

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 (Table 28).

PUNE

Out of 49 genotypes including 2 standard checks screened, 21 genotypes *viz.,*Co 12012, Co 12019, Co13002, Co13003, Co13004,Co13006, Co13008, Co13014, Co13020, Co15009, Co15010, Co15018, Co15020, Co15021, CoN 15071, MS13081, CoSnk13103, CoSnk13106,CoM12085,CoVc 15061 and CoVSI15121 were found R, 3 *viz.,* Co 15007, CoN13073 and VSI12121 were found MR, 15 were found MS, 5 were S and remaining 5 wereHS (Table 29).

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*., Co14005, 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 andrest of the entries showed S to HS reaction (Table 25).

COIMBATORE

About 20 IVT entries were screened for smut resistance and among themthree entries *viz*., Co 15006, Co 15009 and Co 15015 were rated as R to smut (Table 27).

SUMMARY

Entries showing R and MR against smut are as follows

NORTH WEST ZONE (Table 13 to 15 and Table 18)

LUCKNOW

AVT (Early) Plant I	:	Co 14034
AVT (Early) Plant II	:	Co 13034, CoPb 13181
AVT (Midlate) Plant I	:	Co 14035, CoH 14261
AVT (Midlate) Plant II	:	CoH 13263, CoLk 13204, CoPb 13182
IVT (Early)	:	Co 15023, Co 15024, CoLk15203, CoLk15205
IVT (Midlate)	:	CoLk 15206, CoLk 15208, CoPb 15213, CoPb 15214, CoS 15231, CoS 15234

KAPURTHALA

AVT (Early) Plant I	:	CoLk 14201, CoPb 14211
AVT (Early) Plant II	:	CoPb 13181, CoS 13231
AVT (Midlate) Plant II	:	Co 13035, CoPant 13224, CoPb 13182
IVT (Early)	:	Co 15023, Co 15024, Co 15027, CoLk 15201, CoLk 15205, CoPb 15211, CoPb 15212
IVT (Midlate)	:	CoLk 15206, CoLk 15207, CoPb 15213, CoPb 15214, CoS 15231, CoS

15232, CoS 15233, CoS 15234

SHAJAHANPUR

AVT (Early) Plant I	:	CoLk 14201, CoPb 14181, CoPb 14211
AVT (Early) Plant II	:	Co 13034, CoPb 13181
AVT (Midlate) Plant I	:	CoH 14261, CoLk 14204, CoPb 14185, CoS 14233
AVT (Midlate) Plant II	:	CoH 14263, CoLk 13204, CoPb 13182
IVT (Early)	:	Co 15023, Co 15024, CoLk 15201, CoLk 15203, CoLk 15204, CoLk 15205, CoPb 15211, CoPb 15212
IVT (Midlate)	:	Co 15026, CoLk 15206, CoLk 15208, CoPb 15214,CoS 15233, CoS 15232, CoS 15234

PANT NAGAR

AVT (Early) Plant I	:	CoLk14201
AVT (Early) Plant II	:	Co13034, CoPb13181
AVT (Midlate) Plant I	:	CoPb14185, CoS14233
AVT (Midlate) Plant II	:	Co13035, CoH13263, CoLk 13204
IVT (Early)	:	Co15023, Co15024, CoLk15203, CoLk15205, CoPb15212
IVT (Midlate)	:	CoLk15208, CoLk15209, CoPb15213, CoPb15214, CoS15232, CoS15233

NORTH CENTRAL ZONE (Table 19 and 21)

PUSA

IVT (Early)	:	CoBln 15501, CoLk 15466, CoLk 15467, CoP 15436, CoP 15437, CoSe 15451, CoSe 15452, CoSe 15455, CoSe 15456, CoLk 94184, CoSe 01421
IVT (Mid late)	:	CoBln 15502, CoLk 15468, CoLk 15469, CoP 15438, CoP 15439, CoP 15440, CoP 15441, CoSe 15453, CoSe 15454, CoSe 15457

MOTIPUR

IVT (Early)	:	CoLk 15466, CoLk 15467, CoP 15437, CoSe 15451, CoSe 15452, CoSe 15455, CoSe 15456
AVT (Early) I Plant	:	CoLk 14206, CoP 14437, CoSe 14451, CoSe 14454
AVT (Early) II Plant	:	CoP 13437, CoSe 13451, CoSe 13452
IVT (Midlate)	:	CoBln 15502, CoLk 15468, CoLk 15469, CoP 15438, CoP 15439, CoP 15441, CoSe 15453, CoSe 15454, CoSe 15457
AVT (Midlate) I Plant	:	CoLk 14208, CoLk 14209, CoP 14438, CoP 14439, CoSe 14455

SEORAHI

IVT (Early)	:	CoLk 15466, CoLk 15467, CoP 15437, CoSe 15451, CoSe 15452, CoSe 15455, CoSe 15456
IVT (Mid late)	:	CoBln 15502, CoLk 15468, CoLk 15469, CoP 15438, CoP 15439, CoP 15441, CoSe 15453, CoSe 15454, CoSe 15457
AVT (Early) I Plant	:	CoLk 14206, CoSe 14451, CoSe 14454
AVT (Midlate) I Plant	:	CoLk 14208, CoLk 14209, CoP 14438, CoP 14439, CoSe 14455

EAST COAST ZONE (Table 23 and 24)

ANAKAPALLE

IVT Early	:	CoV 16356
IVT Midlate	:	CoC 16339
AVT (Early) I Plant	:	Nil
AVT- Early (II Plant)	:	Co 13023, CoA 14321
AVT- Midlate II Plant	:	Co 13029, Co 13031, CoC 14337

CUDDALORE

IVT (Early)	:	CoA 16321, CoV 16356

AVT (Early) I Plant	:	CoC 15336, CoC 15338
AVT- Early (II Plant)	:	Nil
AVT- Midlate II Plant	:	CoC 14337

PENINSULAR ZONE (Table 25 and 27 to 31)

KOLHAPUR

IVT (Early)	:	Co 14005, Co 15002, Co 15006, Co 15009, Co 15010, Co 15015, Co 15017, Co 15018, CoN 15071, CoN 15072, CoSnk 15101, CoSnk 15103, CoSnk 15104, CoVc 15061, CoVc 15062, CoVc 15063, CoVc 15064, CoVSI 15121, VSI 15122
AVT (Early) Plant I	:	Co 13002, Co 13003, Co 13004, Co 13006,Co 13008, Co 13009, Co 13014, Co 13018, Co 13020, CoN 13073, CoN 13072, CoSnk 13101, CoSnk 13103, CoSnk 13106, MS 13081, PI 13132
AVT (Early) Plant II	:	Co12012, Co12019, Co12024, CoM 12085, VSI 12121

PUNE

IVT (Early)	:	Co 15007, Co 15009, Co 15010, Co 15018, Co 15020, Co 15021, CoN 15071, CoVc 15061, CoVSI 15121
AVT (Early) I Plant	:	Co13002, Co13003, Co13004, Co13006, Co13008, Co13014, Co13020, CoN 13073, CoSnk13103, CoSnk13106, MS13081
AVT (Early) II Plant	:	Co 12012, Co 12019, CoM 12085, VSI 12121

NAVSARI

IVT(Early)	:	Co 14005, Co 15002, Co 15009, Co 15005, Co 15010, Co 15015, Co 15017, Co 15018, Co 15021, CoVSI 15121, CoN 15071, CoN 15072, CoSnk 15103, CoSnk 15104, CoVC 15061, CoVC 15063, CoVC 15064, PI 15131, PI 15132, VSI 15122
AVT(Early) Plant I	:	Co 13002, Co 13003, Co 13004, Co 13008, Co 13009, Co 13013, Co 13018, Co 13020, CoN 13072, CoSnk 13101, MS 13081, PI 13132
AVT(Early) Plant II	:	Co 12007, Co 12008, Co 12012, Co 12019, Co 12024, CoM 12085

COIMBATORE

	:	Co 15006, Co 15009, Co 15015

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 tissuesextends 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 41 genotypes, 12 genotypes viz., Co 05011, Co 14034, CoLk 13204, CoLk 14205, CoPant 14222, CoPb 13182, CoPb 14182, CoPb 14185, CoPb 14211, CoPb 14212, CoS 14231 and CoS 14232 exhibited natural incidence of wilt.

KAPURTHALA

Out of 38 entries, 27 viz., Co 12026, Co 12027, Co 12029, Co 13035, Co 14261, Co 14262, CoPant 14222, CoPant 12221, CoH 12263, CoLk 12205, CoLk 13204, CoLk 14201, CoLk 14202, CoLk 14203, CoLk 14204, CoLk 14205, CoPb 12211, CoPb 13181, CoPb 13182, CoPb 14182, CoPb 14183, CoPb 14184, CoPb 14185, CoPb 14212, CoS 13231, CoS 14232 and CoS 14233 behaved as R. The six entries *viz*., Co 13034, Co 14035, CoPant 12226, CoPant 13224, CoPb 14181 and CoS 12232 behaved as MR and five entries viz., Co 14034, CoH 13263, CoLk 12203, CoPb 14211, and CoS 14231 as MS. Two standards viz., Co 07717 and Co 89003 behaved as HS.

PUSA

Among twenty three evaluated genotypes, eight genotypes (CoLk14206, CoLk14209, CoP 06436, CoP 9301, CoP14437, CoSe 01421, CoSe14453 and CoSe14455) were found free from wilt disease and they were graded as R, whereas, eleven genotypes (BO 91, CoBln 14501, CoLk 94184, CoLk14207, CoLk14210, CoP14436, CoP14438, CoP14439, CoSe14451, CoSe14452 and CoSe14456) were graded as MR and two genotypes (CoBln 14502 and CoLk 14208) were found MS, while, two genotypes (CoSe 14454 and CoSe 95422) showed S reaction to wilt disease.

MOTIPUR

Out of 27 genotypes tested, natural incidence of wilt was observed in eight genotypes *viz*., CoLk 14207, CoLk 14209, CoLk 14210**,** CoP 14436, CoSe 12451, CoSe 13451, CoSe 14451 and CoSe 14456. Other 19 entries viz., CoBln 14501, CoBln 14502 , CoLk 12207, CoLk 09204, CoLk 12209, CoLk 14206, CoLk 14208**,** CoP 12436, CoP 12438, CoP 13437, CoP 14437, CoP 14438**,** CoP 14439**,** CoSe 14454, CoSe 12453, CoSe 13452, CoSe 14452**,** CoSe 14453 and CoSe14455 were free from wilt.

ANAKAPALLE

Out of 34 varieties/genotypes tested, eight entries (Co 13031, Co Or 13346, CoA 14321, CoA 12324, CoC 01061, CoC 13339, CoV 15356 and PI 15377) showed R reaction while eleven entries (85 A 261, Co 13023, Co 13028, Co 7706, Co 86249, CoA 13322, CoA 14323, CoC 14337, CoC 15339, PI 14377 and PI 15376) reacted as MR. The remaining entries viz., Co 13029, Co 419, Co 6907, Co 7219, Co 997, CoA 11326, CoA 13323, CoA 92081, CoC 13336, CoC 13337, CoC 14336, CoC 15336, CoC 15340, CoC 671 and CoV 13356 showed S to HS reaction.

NAVSARI

Out of 25 varieties, 15 entries *viz*., Co 11001, Co 11004, Co 11005, Co 11007, Co 11012, Co 12009, Co 12024, Co 94008, Co 99004, CoM 11081, CoM 11082, CoM 11084, CoM 11086, CoSnk 05103 and VSI 12121 showed moderately resistant reaction. Six viz., Co 12007, Co 12019, Co 85004, Co 86032, CoM 11085 and CoM 12085 exhibited moderately susceptible reaction to wilt.

RESULTS OF THE CURRENT YEAR

LUCKNOW

Out of 39 genotypes tested under natural infection conditions, 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 (Table 13).

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 (Table 15).

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 (Table 19).

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 (Table 20).

ANAKAPALLE

Out of 33 genotypes tested, six entries (Co 86249, Co 06030, Co 13031, CoC 01061, CoOr 03151 and CoV 15356) showed resistant 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 (Table 23).

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 (Table 25).

SUMMARY

The entries showing R or MR to wilt are listed below

LUCKNOW

IVT (Early)	:	Co 15024, Co 15027, CoLk 15201, CoLk 15203, CoLk 15204, CoLk 15205 and CoPb 15212
AVT (I Plant, Early)	:	CoLk 14201, CoPb 14181 and CoPb 14211
AVT (II Plant, Early)	:	Co 13034 and CoPb 13181
IVT (Mid Late)	:	CoLk 15206, CoLk 15207, CoLk 15208, CoLk 15209, CoS 15232, CoS 15233 and CoS 15234
AVT (I Plant Mid	:	Co 14035, CoH 14261, CoLk 14203, CoLk 14204 and CoPb

Late)		14184
AVT (II Plant midlate)	:	Co 13035, CoH 13263, CoPant 13224, CoPb 13182 and CoLk 13204

KAPURTHALA

IVT (Early)	:	Co 15023, Co 15024, Co 15027, CoLk 15201, CoLk 15203, CoLk 15204, CoLk 15205, CoPb 15211 and CoPb 15212
AVT (I Plant, Early)	:	CoLk 14201 and CoPb 14181
AVT (II Plant, Early)	:	Co 13034, CoPb 13181 and CoS 13231
IVT (Mid Late)	:	Co 15026, CoLk 15206, CoLk 15207, CoLk 15208, CoLk 15209, CoPb 15213, CoPb 15214, CoS 15231, CoS 15232, CoS 15233 and CoS 15234
AVT (I Plant midlate)	:	Co 14035, CoH 14261, CoLk 14203, CoLk 14204, CoPb 14184, CoPb 14185 and CoS 14233
AVT (II Plant midlate)	:	Co 13035, CoPant 13224, CoPb 13182 and CoLk 13204

PUSA

IVT (Early)	:	CoLk 15466, CoLk 15467, CoLk 94184, CoP 15436, CoP 15437, CoSe 01421, CoSe 15451, CoSe 15452 and CoSe 15455
IVT (Mid Late)	:	CoBln 15502, CoLk 15469, CoP 06436, CoP 15438, CoP 15439, CoP 15441, CoP 9301, CoSe 15454 and CoSe 15457

ANAKAPALLE

IVT (Early)	:	CoC 01061, CoC 16337 and CoOr 03151
AVT (I Plant, Early)	:	CoV 15356
AVT (II Plant, Early)	:	Co 13023 and CoA 14321
IVT (Mid Late)	:	CoC 16338, CoC 16339, CoV 16357, Co 06030 and Co 86249
AVT (II Plant midlate)	:	Co 13028, Co 13031, CoA 14323, CoC 14337 and PI 14337

NAVSARI

AVT (I Plant, Early)	:	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 and PI 13132
AVT (II Plant, Early)	:	Co 12009, Co 12024 and VSI 12121

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

Natural incidence of Yellow leaf disease (YL) was observed in four genotypes *viz*., Co 13035, CoPb 14212, CoPb 14182 and CoPb 14185.

SHAHJAHANPUR

Thirty eight entries of the six trials were screened against the incidence of Yellow leaf disease (YL). In AVT (Early) I and II Plant, all entries were behaved as resistant against YL. In AVT (Mid late) I Plant, out of five entries, three were rated as R while two (Co 13035, CoPant 13224) were rated as MR. In AVT (Mid late) II Plant, all the entries were rated as R

except CoPant 12226 (MR). In IVT (Early), out of seven entries, five were rated as R and two (CoPant 14222, CoPb 14211) were MR. In IVT (Mid late), 10 entries were rated as R, whereas 3 entries *viz*., CoH 14261, CoH 14262 and CoS 14233 were rated as MR against YL.

KAPURTHALA

No Yellow leaf (YL) symptoms were observed at Kapurthala during 2017-18 crop season.

UCHANI

One entry CoS 13231 showed MR reaction and two entries viz., CoPb 13181 and Co 13034 showed MS and S reaction respectively against YL in AVT (early) Plant-1. In AVT (early) Plant II, all the four genotypes viz. Co 12026, Co 12027, CoLk 12203 and CoPant 12221 were found moderately susceptible against YL. In AVT (Midlate) Plant-1, entries CoH 13263 showed R reaction and two entries Co 13035 and CoPant 13224 were MS and S against YL. The entry CoH 12263 from AVT (Mid late) –II showed resistant reaction against YL and other four entries *viz*., Co 12029, CoLk 12205, CoPant 12226, CoPb 12211 and CoS 12232 were found moderately susceptible and CoS 12232 showed susceptible reaction to YL. In IVT (early), only CoPb 14181 was found moderately resistant against YL and other five entries viz., Co 14034, Co Lk 14201, CoLk 14202, CoLk 14204 and CoPb 14211 showed moderately S reaction and CoPant 14222 showed S reaction to YL. Nine entries from IVT (midlate) viz., CoH 14262, CoLk 14203, CoLk 14205, CoPb 14183, CoPb 14184, CoPb 14185, CoPb 14212, CoS 14231 and CoS 14233 showed MR reaction against YL. Two entries Co 14035 and CoH 14261 exhibited moderately susceptible reaction and two entries CoS 14204 and CoS 14232 showed susceptible reaction against YL.

PANTNAGAR

Out of 28 genotypes, 20 were found R, 6 MR and 2 MS. No material was found susceptible or highly susceptible**.**

PUSA

Yellow leaf disease symptom was observed on variety CoV 92102. The symptoms were also noticed in the farmers' fields on unknown varieties during survey and in Chamua village it was observed in traces under Harinagar sugar factory area in Co 0238.

MOTIPUR

Natural incidence of Yellow leaf disease (YL) was observed in ten genotypes *viz*., CoBln 14501, CoLk 14208, CoLk 14210, CoLk 12209, CoP 14436, CoP 14437, CoSe 14451, CoSe 13451, CoP 12436 and CoP 12438.

SEORAHI

Out of Eight IVT (Early) genotypes evaluated, five genotypes were resistant and three genotypes moderately susceptible to YL. Except one genotype CoP 13438, all other eight Initial Varietal Trial (Mid-late) genotypes exhibited resistance to YL. In AVT (Early) all three genotypes *viz*., CoP 13437, CoSe 13451 and CoSe 13452 showed resistant to YL.

ANAKAPALLE

Out of 34 genotypes screened, YL incidence was less recorded at mean YL severity Index of 0.0 - 1.0 in 85 A 261, Co 13023, Co 13028, Co 13029, Co 13031, Co 419, Co 7219, Co 7706, Co Or 13346, CoA 14321, CoA 11326, CoA 12324, CoA 14323, CoC 13336, CoC 14336, CoC 14337, CoC 15336, CoV 13356, CoV 15356, PI 14377, PI 15376 and PI 15377. YL severity index of 1.0 to 2.0 was observed in the genotypes, Co 6907, Co 997, CoC 13339 and CoC 671. Mean YL severity index ranged from 2.3 to 4.0 in the genotypes Co 86249 (C), CoA 13322, CoA 13323 and CoC 15340.

NAVSARI

Out of 56 varieties of zonal trial evaluated to yellow leaf disease, 42 entries showed resistant reaction. Ten entries viz., CoT 14366, MS 14081, MS 14082, Co 13021, Co 13022,

Co 14016, Co 14023 and Co 14030 (IVT), Co 12019 and CoM 12085 (AVT-E-I Plant) were found moderately resistant reaction. Four entries viz., Co 14027, Co 14031 CoSnk 14103 (IVT) and Co 12008 (AVT-E-I Plant) displayed S reaction.

SANKESHWAR

All six entries *viz.,* Co 11005, Co 11007, Co 11012, Co 11019, Co 11085 and CoM 11086 exhibited R reaction to YL.

COIMBATORE

During the season, about 37 IVT entries and 19 AVT entries were monitored for the YL severity based on the 0-5 scale. Among the IVT and AVT entries, 36 were apparently free from the disease symptoms and probably R to the disease, however further observations are required. The disease severity in rest of the entries were in the category of MS to MR. None of the entries exhibited severity scores of more than 3 and only five of them exhibited severity grade of 3.

RESULTS OF THE CURRENT YEAR

LUCKNOW

Out of 39 genotypes tested under natural infection conditions, four 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 to YL (Table 13).

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 wereR/MR against YL (Table 14).

KAPURTHALA

Out of nine entries of IVT (E), 6 entries 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 found 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 found 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 found 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 (Table 15).

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 (Table 16).

PANTNAGAR

Out of 43 genotypes, 22 were resistant, 10 were MR, 6 were MS, 4 were S and one was HS against YL (Table 18).

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 resistance (R) to YL (Table 20).

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 moderate resistance against to YL (Table 21).

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 (Table 23).

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 (Table 25).

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 (Table 27).

PUNE

Outof 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 (Table 29).

SUMMARY

The entries showing R or MR to YL are listed below

LUCKNOW

IVT (Early)	:	Co 15023, Co 15024, Co 15027, CoLk 15201, CoLk 15203, CoLk 15204, CoLk 15205, CoPb 15212 and CoPb 15211
AVT (Early) Plant - I	:	CoLk 14201, CoPb 14181 and CoPb 14211
AVT (Early) Plant - II	:	Co 13034, CoPb 13181 and CoS 13231
IVT (Mid Late)	:	CoLk 15206, CoLk 15207, CoLk 15208, CoLk 15209, CoPb 15214, CoS 15231, CoS 15232, CoS 15233 and CoS 15234
AVT (Mid Late) Plant - I	:	Co 14035, CoLk 14203, CoLk 14204, CoPb 14184, CoPb 14185 and CoS 14233
AVT (Mid Late) Plant - II	:	Co 13035, CoH 13263, CoPant 13224 and CoLk 13204

KAPURTHALA

IVT (Early)	:	Co 15023, Co 15024, Co 15027, CoLk 15201, CoLk 15203, CoLk 15204, CoPb 15211 and CoPb 15212
AVT (Early) Plant - I	:	Co 14034, CoLk 14201, CoPb 14181 and CoPb 14211
AVT (Early) Plant - II	:	Co 13034, CoPb 13181 and CoS 13231
IVT (Mid Late)	:	Co 15026, CoLk 15206 , CoLk 15207, CoLk 15208, CoLk 15209, CoPb 15213, CoPb 15214, CoS 15231, CoS 15232, CoS 15233 and CoS 15234
AVT (Mid late) Plant - I	:	Co 14035, CoH 14261, CoLk 14203, CoLk 14204, CoPb 14184, CoPb 14185 and CoS 14233
AVT (Mid late) Plant - II	:	Co 13035, CoH 13263, CoPant 13224, CoPb 13182 and CoLk 13204

UCHANI

AVT (Early) Plant - I	:	CoLk 14201
IVT (Early)	:	Co 15024, Co 15027, CoPb 15211 and CoPb 15212
IVT (Mid Late)	:	Co 15026, CoLk 15206, CoLk 15207, CoLk 15209, CoS 15233 and CoS 15234
AVT (Mid Late) Plant - I	:	CoH 14261, CoPb 14184, CoPb 14185 and CoS 14233
AVT (Mid Late) Plant - II	:	CoH 13263

SHAHJAHANPUR

IVT (Early)	:	Co 15023, Co 15024, Co 15027, CoLk 15201, CoLk 15203, CoLk 15204, CoLk 15205, CoPb 15211, CoPb 15212, Co 0238, Co 05009 and CoJ 64
IVT (Mid Late)	:	Co 05011, Co 15026, CoJ 64, CoLk 15206, CoLk 15207, CoLk 15208, CoLk 15209, CoPant 97222, CoPb 15213, CoPb 15214, CoS 15231, CoS 15233, CoS 15232 and CoS 15234
AVT (Early) Plant - I	:	Co 14034, CoJ 64, CoLk 14201, CoPb 14181 and CoPb 14211
AVT (Early) Plant - II	:	Co 13034, CoPb 13181 and CoS 13231
AVT (Mid Late) Plant - I	:	Co 05011, Co 14035, CoJ 64, CoH 14261, CoPb 14185, CoPb 14184, CoLk 14203, CoLk 14204, CoPant 97222, CoS 767, CoS 8436 and CoS 14233
AVT (Mid Late) Plant - II	:	Co 13035, CoH 13263, CoLk 13204, CoPant 13224, CoPb 13182

PANTNAGAR

IVT (Early)	:	Co 15023, Co 15024, Co 15027, CoLk 15201, CoLk 15203, CoLk

		15204, CoLk 15205 and CoPb 15211
AVT (Early) Plant - I	:	Co 14034, CoPb 14181 and CoPb 14211
AVT (Early) Plant - II	:	Co 13034 and CoPb 13181
IVT (Mid Late)	:	Co 15026, CoLk 15206, CoLk 15207, CoLk 15209, CoPb 15213, CoS 15232, CoS 15233 and CoS 15234
AVT (Mid late) Plant - I	:	Co 14035, CoLk 14203 and CoPb 14184
AVT (Mid late) Plant - II	:	Co 13035, CoPant 13224, CoPb 13182 and CoLk 13204
SEORAHI		
IVT (Early)	:	CoLk 15467, CoP 15436, CoP 15437, CoSe 15451, CoSe 15452, CoSe 15455 and CoSe 15456
IVT (Mid Late)	:	CoBln 15502, CoLk 15468, CoLk 15469, CoP 15438, CoP 15439, CoP 15440, CoSe 15453 andCoSe 15457
AVT (Early) Plant - I	:	CoLk 14206, CoP 14437, CoSe 14451 andCoSe 14454
AVT I Mid late	:	CoLk 14208, CoLk 14209, CoP 14438, CoP 14439 and CoSe 14455
MOTIPUR		
IVT (Early)	:	CoBln 15501, CoLk 15466, CoLk 15467, CoP 15436, , CoSe 15451, CoSe 15452, CoSe 15455 and CoSe 15456
AVT (Early) Plant - I	:	CoLk 14206, CoP 14437, CoSe 14451 and CoSe 14454
AVT (Early) Plant - II	:	CoP 13437 and CoSe 13452
IVT (Mid Late)	:	CoBln 15502, CoLk 15468, CoLk 15469, CoP 15439, CoP 15440, CoP 15441, CoSe 15454 and CoSe 15457
AVT (Mid Late) Plant - I	:	CoLk 14208, CoP 14438, CoP 14439 and CoSe 14455
ANAKAPALLE		
IVT (Early)	:	CoA 16321, CoC 16336 and CoC 16337
IVT (Mid Late)	:	CoA 16322 and CoC 16338
AVT II Early	:	CoA 14321 and CoC 14336
AVT (Mid Late) Plant - II	:	Co 13028, Co 13029, Co 13031, CoC 14337 and PI 14337
NAVSARI		
IVT (Early)	:	Co 14005, Co 15002, Co 15005, Co 15006, Co 15007, Co 15009, Co 15010, Co 15015, Co 15017, Co 15018, Co 15020
AVT (Early) Plant - I	:	Co 13002, Co 13003, Co 13004, CoN 13072, Co 13006, Co 13008, Co 13009 Co 13013, Co 13014, Co 13018, Co 13020, CoN 13073, CoSnk 13101, CoSnk 13103, CoSnk 13106, MS 13081 and PI 13132
AVT (Early) Plant - II	:	Co 12007, Co 12008, Co 12009, Co 12012, Co 12019, Co 12024, CoM 12085 and VSI 12121
COIMBATORE		
IVT (Early)	:	Co 14005, Co 15002, Co 15005, Co 15007, Co 15015, Co 15017, Co 15018, Co 15020, Co 15021, CoN 15071, CoN 15072, CoSnk 15103, CoSnk 15104, CoVc 15061, CoVc 15063, PI 15132, VSI 15121 and VSI 15122
AVT (Early) Plant - I	:	Co 13002, Co 13003, Co 13006, Co 13008, Co 13009, Co 13014, Co 13020, CoN 13072, CoN 13073, CoSnk 13101, CoSnk 13106, MS 13081 and PI 13132
AVT II Early	:	Co 12008, Co 12009, Co 12012, Co 12019, CoM 12085 and CoVSI 12121
AVT - Ratoon		Co 12009, Co 12012, Co 12019 and CoM 12085

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

During 2017-18 crop season surveys were conducted in command areas of different sugar mills located around the district Lucknow, Uttar Pradesh. Incidence of red rot was found in sugarcane varieties namely, CoS 8436, CoSe 92423, CoLk 8102, Co 0238 and CoSe 95422. Variety Co 0238 was affected with red rot at several locations in the command areas of different sugar mills and the disease incidence varied from 3 to 20 % in the affected cane fields. In some fields of CoSe 95422, CoS 8436, and CoSe 92423 the incidence of red rot was up to 30%. Incidence of smut was observed at several locations mostly affecting the sugarcane varieties *viz*., CoSe 92423, CoS 88230, CoS 91269 and Co 0238 (1-5%). GSD was noticed in most of the fields (1-5 %) and higher incidence was noticed in CoS 91269 (10-20 %) and Co 0238 (5-10 %). The incidence of Pokkah boeng was higher in Co 0238. In some fields of Co 0238 Pokkah boeng incidence was more than 30%. Sporadic incidence of leaf scald was also noticed in Co 0238.

KARNAL

Surveys were carried out to observe natural incidences of diseases in sugar mill areas in the states of Haryana, Uttar Pradesh and Bihar. Red rot incidence was recorded up to 45% in variety CoS 8436 at Harinagar (Bihar) and mild incidence in some fields of variety Co 89003 in UP and Haryana. Severe incidence of smut was observed in variety CoH 160 at village Gagsina (Karnal) and mild incidence in the fields of variety Co 0238 under Karnal, Bhadson, Indri, Nilokheri, Assandh and Yamunangar and also in varieties Co 89003 in Karnal, Sonipat and Gohana area of Haryana. Similarly, trace infection of smut was noticed in variety BO 147 at Harinagar, Bihar and also in the test entries viz. CoLk 14201, CoLk 14203, CoLk 16201, CoLk 15203 and CoPb 16212 under different trials. By and large, PB was prevailing in most of the varieties cultivated in the surveyed areas, however, maximum incidence (up to 40%) was found in variety CoH 160 at village Barsalu, Karnal. Further, wilt incidence up to 40% and *Sugarcane bacilliform virus* by 30% was seen in variety CoH 160 (ratoon) at village Gagsina, Karnal and by 20% in varieties CoLk 15203 and CoLk 15204. Mild incidence of GSD was recorded in ratoon of variety Co 0238 at two fields of UP.

UCHANI

Survey was conducted in various mill zones areas in Haryana during pre and post monsoon seasons during 2017-18. Red rot was observed on plant and ratoon crop of varieties like Co 89003, CoS 8436 and CoJ 85 in sugar mill zone areas of Shahabad,

Yamunanagar, Karnal, Kaithal, Asandh,Panipat, Rohtak and Badshu areas ranging from 2 to 20%. Top rot was observed on varieties CoH 119, CoJ 85, CoS 8436 and Co 0238 in Shahabad, Yamunanagar, Kaithal, Badshu and Karnal areas ranging 2 to 45%. Wilt was noticed in Co 89003, Co 05011, CoS 8436, CoH 119 in Panipat, Karnal and Yamunanagar areas ranging from 5 to 20%. Wilt in association with root borer and in association with red rot was also observed in Panipat and Karnal areas in Co 89003. Severe incidence of smut ranging from 5-80% was observed this year in Co 0238 in plant and ratoon crops and even up to 100% in some villages of Shahabad areas. Smut also noticed 5-45% in Co 0238, Co 89003 and CoH 119, CoH 160, Co 0118 and Co 05011 in Yamunanagar, Gohana, Shahabad, Badshu, Rohtak, Kaithal and Meham sugar mill areas. Pokkha boeng was observed on varieties CoS 8436, Co 0238, CoH 119, CoJ 85, Co 89003 Co 0118, CoH 160, CoJ 85 and Co 05011 in Shahabad, Yamunanagar, Panipat, Jind, Sonipat, Kaithal, Panipat, Asandh, Gohana and Karnal sugar mill zone areas ranging from 2-30%. Yellow leaf disease was noticed in Traces-5 % on varieties Co 0238, CoS 8436, CoH 119, Co 89003, CoH 119, CoH 160 and Co 05011 in Yamunanagar, Karnal, Asand, Jind, Rohtak, Shahabad, Kaithal, Panipat and Yamunanagar. Incidence of mosaic in traces was observed in CoJ 85, CoH 119 and CoS 8436 varieties in Yamunanagar, Shahabad, Karnal, Panipat and Kaithal in 6-10 months old crops. Incidence of brown spot ranging from 5-40% was noticed in plant and ratoon crops of Co 238, Co118 and CoH 160 varieties in Gumthalla and Yamunanagar sugar mill areas.

PANTNAGAR

There was no incidence of red rot except at one place in CoS 8436 in Bajpur and Kashipur area. Smut incidence upto 30% was observed at isolated places in Bajpur and Khatima in CoS 7240 and low incidence observed on CoPant 99214 and Co 0238 during October to January.Low incidence of wilt was observed in Bajpur area in Co 89003 and in Co 5011 and CoJ 85 in Luxar area and in CoSe 1434 in Kashipur area from September onwards. GSD in low incidence was seen on Co 0118, CoPant 03220, CoPk 05191, Co 0238, CoPant 05224, CoJ 85, CoSe 1434 and CoS 88230. Foliar diseases like ring spots and eye spots were observed from scanty to mild in almost all the varieties during August, but was very severe on CoPant 99214, CoJ 85 in Kashipur area. YLD was present in scanty on CoPant 3220, CoPant 84212, CoPant 5224 and as mild incidence on CoS 767 and CoPant 90223 from November onwards.All popular cultivars of the area were found infected with PB and was most severe on Co 0238 (upto 50%) in Kanchanpuri, Khatima area but the varieties Co 0239 and CoPant 03220 were found least affected.

SHAHJAHANPUR

Incidence of red rot varied from one to 48 per cent on variety Co 0238 in various sugar factory zones of central UP. The variety Co 0238 was affected by red rot with the incidence of 1-2 per cent, 5 per cent, 15-42 per cent at Meerganj (Bareilly), Khambharkeda (Lakhmpur Kheri) and Hargaon factory zones, respectively. Similarly, it was also observed on Co 0238 from Palia (30%), Rosa (3-15%) and Gola (48%) factory zones. It was also recorded on varieties CoS 8436 and CoS 97264 with incidence up to 30 per cent and 2 per cent, respectively from Rosa factory zones. The incidence of smut varied from 0.5 to 30 per cent on Co 0238 at Nigohi (Shahjahanpur), Gola, Hargaon (Sitapur), Khambharkeda and Palia factory zones. Maximum incidence up to 50 per cent of this disease was reported on CoS 07250 and CoSe 01434 from Rosa (Shahjahanpur) factory zones. The incidence of wilt varied from 1 to 12 per cent on variety Co 0238 from Shahjahanpur and Lakhmpur Kheri districts. It was also noticed on Co 05011 and CoS 8432 with incidence of 5 and 2 per cent, from Sitapur and Lakhimpur Kheri, respectively. Grassy shoot disease was observed on various popular varieties ranging traces to 15 per cent at Shahjahanpur and Lakhmpur Kheri districts. The incidence of PB varied from traces to 33.6 per cent on Co 0238 from various

factory areas. Knife cut stage of PB was recorded on Co 0238 and CoS 08279 at Rosa, Gola, Gularia and Ajabapur sugar factories zones. The varieties viz., CoS 08276, CoLk 94184, Co 98014 and CoS 08272 were also affected by PB. Maximum incidence of YLD was noticed up to 60 per cent on Co 05011 at Shahjahanpur farm. It was also observed on Co 0238 and CoS 8432 and its incidence varied from 2 to 20 per cent. Sugarcane mosaic, stinking rot, leaf binding diseases were also noticed at various sugar factories zones of central UP.

KAPURTHALA

The disease surveys on sugarcane crop were conducted in 9 Cooperative sugar mills (*viz*., Bhogpur, Budhewal, Batala, Gurdaspur, Nawanshahr, Ajnala, Morinda, Nakodar and Fazilka) and 7 private mills (*viz*., Mukerian, Dasuya, Kiriafgana, Buttar sevian, Phagwara, Dhuri and Amloh) areas during May-June, September and November. Red rot was observed with an incidence from traces to 12.0 per cent on varieties Co 89003, CoJ 64 and CoJ 85 and CoPb 91 in Ajnala, Amloh, Bhogpur, Bhudewal, Dhuri, Gurdaspur, Nakodar, Nawashahr and Phagwara sugar mills area. Wilt incidence of traces to 8.0 per cent was observed on Co 89003 and CoS 8436 in Amloh, Budhewal, Dhuri, Nawanshahr, and Fazilka mills area. Varieties Co 0238 and Co 89003 were found infected with smut from traces to 10.0 per cent in Ajnala, Gurdaspur, Dasuya, Dhuri, Kiriafgana, Batala, Mukerian, Nawashahr, Nakodar and Phagwara mills area. Pokkah boeng disease was observed on variety Co 0238 (traces to 15%) in Ajnala, Batala, Bhogpur, Dasuya, Mukerian, Gurdaspur and Kiriafgana sugarmills area. Red stripe/top rot disease was observed in traces on CoJ 85 in Amloh, Bhogpur, Dhuri, Morinda and Nawanshahr sugar mills area. Grassy shoot disease was observed with an incidence of traces to 2.0 per cent on Co 0238 in Bhogpur, Butter Sevian, Dasuya, Gurdaspur, Kiriafgana and Mukerian sugar mills area.

NORTH CENTRAL ZONE

PUSA

Yellow leaf disease symptom was observed on CoV 92102, Co 0238 and many other unknown varieties in Chamua village under Harinagar sugar factory area.Red rot (5-20%) was observed on CoS 8436, CoSe 95422, Co 0235 and Co 0238 in Pusa, Mujhaulia and Areraj areas. Wilt incidence was noticed in all areas of Bihar ranging from 2-30% on Co 0233, BO 141, Co 0235, CoPant 97222, BO 110, Co 0118, CoLk 94184 and Co 0238. Varieties BO 154, BO 141 and Co 0238 were found affected with smut disease ranging from traces to 5%. Pokkah boeng disease was observed on CoS 8436, Co 0118 and Co 0238 ranged between 2-5%. Grassy shoot disease was found upto 2% in Co 0235 and CoSe 95422. Yellow leaf disease was noticed on Co 0238 and CoV 92102 in traces whereas the variety CoLk 94184 was affected with RSD upto 2%.

SEORAHI

The survey was conducted in various factory zones of eastern Uttar Pradesh in pre monsoon, monsoon and post monsoon period. The red rot (5-12%) was recorded in CoS 07250 in the Khadda and Pratappur sugar factory zone. The incidence of 15 and 16 % was found in varieties CoSe 92423 and CoS 8436 respectively in Dhadha sugar factory zone. It was also reported in varieties Co 0238 and CoJ 88 with 10 and 20 % incidence, respectively from Ramkola sugar factory zone. Wilt incidence was also observed in varieties Co 0238 (4%), CoS 08279 (6%) and CoP 9301 (6%) in Seorahi sugar factory zone. Varieties Co 98014 and Co 0238 were found infected with 5 to 6 per cent wilt incidence in Ramkola whereas in variety CoS 91269 5% incidence was noticed in Pratappur areas. The incidence of smut varied from 1 to 5 per cent in various varieties such as CoS 8436, Co 0238, CoS 97261, CoS 91269, CoSe 01434, CoSe 98231, CoS 07250, CoS 767, CoS 08272, Co 98014, Co 05009 from Tulsipur, Uttaraulla, Akabarpur, Masaudha, Rojz Gaon, Sultanpur, Walterganj, Rudhauli, Kundurakhi sugar factory zone of eastern Uttar Pradesh. GSD was noticed with 1

to 6 per cent incidence in different varieties namely CoS 07250, CoS 13231, CoS 08272, CoS 08279, Co 0118, Co 05011, CoS 91269, CoS 97261, CoSe 98231, CoSe 01424, Co 0238, UP 05125, Co 98014, CoSe 92423, CoS 88230 and CoJ 88 from Akbarpur, Balarampur, Sathiyaon, Masaudha, Seorahi, Sultanpur, Ramkola, Rudhauli, Roza Gaon, Manakapur, Khadda, Kundurkhi, Tulsipur, Uttraula and Waltarganj sugar factory zones. The incidence of PB varied from 1 to 15 per cent in varieties Co 98014, CoS 08272, CoS 97261, CoSe 96436, UP 05125, CoS 91269, CoS 06279, CoS 07250, CoS 10239, CoSe 92423, CoSe 01434, CoS 08279, CoS 8436 and Co 0238 at Akabarpur, Masaudha, Seorahi, Ramkola, Babhanan, Sathiyaon, Pratapur, Roza Goan, Rudhaulli, Tulshipur, Mankapur, Khadha, Kundurkhi, Sultanpur, Uttraula and Walterganj sugar mill zones. Pineapple disease was noticed in variety CoP 9301 with 30 to 35% incidence in Pratappur sugar factory zone. YLD incidence was recorded upto 5-10% in Co 0118 and UP 05125 from Ramkola sugar mill zone. Mosaic incidence was recorded upto 6-8% in CoS 08272 and CoPant 97222 in Seorahi sugar factory zone. Stinking rot was observed in variety CoS 08279 (10%) at Masaudha sugar factory zone and RSD was noticed in CoSe 92423 and CoS 97261 at Seorahi sugar factory zone.

NORTH EAST ZONE

BURALIKSON

Sugarcane genotypes were found to be affected with red rot, wilt, YLD, PB and leaf spot. Incidence of red rot was found upto 7.69% .Wilt was observed in CoBln 9104, CoBln 9103, Co 997, Co 740 upto 19.23%. YLD was observed in the genotype CoBln 9104, CoBln 9103, Co 997, Co 740 upto 8.57%. Foliar disease like ring spot was observed upto 53.33% in Charingia area in CoBln 9104 and pokkah boeng was observed upto 11.42% in CoBln 9103 in grand growth stage followed by 8.20% in BO 155 at the tillering stage.

EAST COAST ZONE

ANAKAPALLE

Red rot incidence was observed in Co 86032, Co 62175, 81V 48 ranging 10-50% in ratooon crops in Chodavaram, Munagapaka and Atchutapuram mandals of Visakhapatnam district and in Sankili sugar factory area of Srikakulam district. Smut was observed in almost all the areas surveyed in North Coastal districts of Andhra Pradesh. The disease incidence ranged from 5-35% in varieties, viz., CoA 92081 (87A 298), CoV 09356 (2003V 46), CoA 7602, Co 62175, 93A 297 and 2000A 240, cultivated in Visakhapatnam, Vizianagaram and Srikakulam districts of Andhra Pradesh. High incidence of YLD was observed in sugarcane growing regions of Visakhapatnam district compared to Vizianagaram and Srikakulam districts of Andhra Pradesh. The incidence of 5-30 % YLD was found to be higher in areas where the ratoon crops of the varieties, CoV 09356 and CoA 92081 are being cultivated. Mosaic was also observed to the tune of 15-40 % in Kasimkota, Chodavaram and Munagapaka mandals of Visakahapatnam district on varieties such as CoA 92081, CoV 09356 and CoA 7602. Grassy shoot disease incidence ranging from 5-20% was observed in the varieties Co 7508, Co 86032, Co A 92081, Co V 09356, CoA 7602 and 2009A 107. Wilt incidence (5-15%) was also observed in CoA 92081 and Co 62175 in Chodavaram, Ravikamatham and Butchayyapeta mandals. High incidence and severity of top rot was observed in the variety 2000A-225 in Seethanagaram mandal of Vizianagaram district and Anakapalli mandal of Visakhapatnam district. Leaf scald (5%) was observed in NBV 1 in Yeleswaram mandal of East Godavari district. Marasmiellus sheath and shoot blight/stem rot of sugarcane was observed (10%) in the variety 2006A 102 in Lakavaram village of Chodavaram mandal, Visakhapatnam district.

CUDDALORE

The survey conducted in Sugar Mill areas in Cuddalore, Villupuram, and Perambalur Districts of Tamil Nadu and Puducherry indicated 2 to 22% incidence of red rot in varieties

viz., CoC 24 and Co 91017. Smut was recorded in varieties CoC 22 and CoSi 6, TNAUSi 8 and the disease severity ranged between 2 and 16 %. Wilt was observed in Co 86032 and CoV 09356 (2 to 14 %) and YLD was noticed in Co 86032 (5 to 25 %), PI 1401 (5 to 10 %), PI 1110 (5 to 10 %) and CoV 09356 (5 to 15 %).

NAYAGARH

During the surveys, it was observed that the variety CoV 09356 was showing 40% YLD when the crop was 9 months old. Co 6907 was recorded 58% ring spot and 20% YLD incidence. CoA 92081 was observed with 80% ring spot incidence and 10% smut incidence. Smut was observed in PI 1110 and Co 86032. Mild infection of PB was observed on 87A 380 and Co 0239. Severe leaf fleck was observed in 8th month old crop of CoA 92081 in Shakti sugar factory area of Cuttack. 40% YLD infection was observed in CoV 09356. Red rot incidence (5-35%) was recorded in varieties *viz.,* Co 86032, Co 6907, CoOr 03151, CoOr 041512 and Co 86249. Ring spot and GSD were predominant and their incidence ranged from 10-40% in several areas. Pokkah boeng was observed in rainy days in 5-10% but plants recovered after the season. Mosaic is prevalent disease in the areas and incidence varies from 5% to 40%.

PENINSULAR ZONE

COIMBATORE

Detailed surveys for sugarcane diseases were conducted in Tamil Nadu state during the season. Red rot was noticed in the varieties CoC 24, PI 1110, PI 1401 and Co 06022 in different districts except in Western and Southern regions. Smut was observed in the varieties CoSi 6, PI 1110, CoC 24, CoC 22, CoV 94101 and Co 97009 (MC 707) in almost all the regions except Western region. Wilt was observed in SI 308, SI 309, CoC 24, Co 86032, Co 06022, CoV 92102 and CoV 09356 throughout the state at moderate level, however severe incidences were recorded on Co 06022 and CoV 09356. YLD was observed in the varieties Co 86032, CoV 09356, Co 06022, Co 06030, CoC 24, PI 1110, PI 1401, CoV 92102, CoV 94101, Co 0212, PI 951946 and PI 061346 in all the districts in varying intensities. Severe degeneration due to YLD was observed in all the popular varieties under cultivation. GSD was also observed in varying intensities across the varieties and regions. Pokkahboeng was observed in SI 308, Co 06022, Co 06030, CoV 09356, SI 339 and Co 86032. Its severity was felt in varieties like PI 1110, Co 06022 and CoV 09356. Rust and foliar diseases were recorded in Co 06022 and CoC 22. Leaf fleck caused by *Sugarcane bacilliform virus* (SCBV) has been found in all the regions especially on the varieties CoC 24, Co 0212, CoV 92102, Co 06030 and CoV 09356. This disease is found in rampant and gives a pale canopy in all these varieties more so in Co 0212.

PADEGAON

The survey of sugarcane diseases was undertaken in Kolhapur, Satara, Sangli, Ahmadnagar, and Solapur districts of Western Maharashtra. Smut incidence was noticed upto 11% on Co7219 at Kasbe-Digraj, Tal, Miraj, Islampur areas of district Sangli. The incidence of yellow leaf disease was noticed in Udgaon, DattaShirole, Yadrav, Krundwad, Abduallaat, Narshiawadi villages from Shirole tahsil of Kolhapur district on Co 86032, CoC 671. The grassy shoot disease was noticed in Baramati, Daund, Junner, Rahuri and Karadtahsil of Pune, Ahmadnagar and Satara districts on the sugarcane variety CoM 265, Co 86032.Pokka boeng was noticed on CoVSI 9805 and CoC 671 in Solapur district. The incidence of rust was noticed up to 25-30% in Kasbabavada, Shendapark, Dattashirol and Kurundwad area from Kolhapur district on the sugarcane variety CoM 0265, Co 92005, Co 86032. Moreover, 5-10% rust incidence was noticed on CoM 265 from Koregaon, Waitahsil of Satara district and ARS, Radhanagari of Kolhapur district. Brown spot was a major problem observed up to 5-20% predominantly in Satara, Sangli, Kolhapur, Ahmadnagar and

Pune districts because of frequent rains and high humidity during rainy season in the vicinity of Yesgaon,Takali, Pohegaon Tal Kopergaon areas.The incidence of ring spot disease was noticed upto 5% in Shenda Park, Kasbabavada tahsil and ARS Radhanagri (7%) of Kolhapur district on the sugarcane varieties CoM 0265, Co 86032 and Co 92005 whereas trace incidence of pineapple disease was noticed on Co 86032 and CoM 0265.

THIRUVALLA

Very low incidence of red rot was observed only in few isolated pockets of Marayoor-Kanthalloor areas of Idukki District. Pokkah Boeng incidence was observed from two months onwards during the March - April but disease got subsided after the monsoon showers during July - August. Sheath blight due to *Rhizoctonia solani* was commonly observed in the field during May - June after the summer showers of April - May. Ring spot appeared during May-June and is seen up to harvest. It has been observed in almost of the varieties planted in the experimental field of the station and also in the farmer's field. Rust was observed during August- September months but the disease subsided with the onset of North East monsoon showers.Mosaic was seen commonly in most of the crop varieties, but the disease was not in such a stage to cause any severe yield reduction.

NAVSARI

Surveys were undertaken in ten sugarcane growing sugar factories area of South Gujarat region. The survey indicated that wilt, red rot and whip smut were the major diseases in South Gujarat region. Area affected under wilt, red rot and whip smut was 1.81, 1.32 and 4.90 per cent respectively. The incidence of whip smut was recorded on varieties like CoSi 95071, Co 86002, Co 97009 and Co 99004. Maximum incidence of whip smut was recorded in the varieties CoSi 95071, Co 86002 and Co 97009 and it was to the tune of 15.40% in Kamrej Sugar factory area. The wilt incidence noticed in CoC 671, Co 86032, Co 86002, CoM 0265 and CoSi 95071 varieties and was maximum to the tune of 3.35 % in Gandevi Sugar factory. The red rot was recorded in the varieties of CoC 671, Co 86032, Co 86002, Co 0323, CoVSI 03102, CoVSI 0434 and Co 97009 and it was to the tune of 1-2.5 % in all Sugar factories area. 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 PB was observed in Co 99004 in Bardoli, Gandevi, and Kamrej Sugar factory areas. Grassy shoot, yellow leaf diseases were found in traces at Mahuva, Narmada, Bardoli sugar factory areas and also Navsari surrounding area. Grassy shoot was observed on Co 86032, CoC 671 and CoM 0265 and yellow leaf disease was noticed on Co 86032 and Co 99004.

PUNE

The incidence of smut has been increased in Central Maharashtra and Vidarbha in last year due to drought situation in last 2 crop seasons (2015-16 and 2016-17). The incidence was more in ratoon crops of Co 86032. Grassy shoot in sugarcane is increasing in all commercially cultivated varieties. The incidence is more in ratoon crops of CoM 0265, Co 86032 and Co 419. The incidence of foliar diseases on sugarcane crop *viz.,* rust, Pokkah boeng, yellow leaf, brown spot and eye spot is increasing. Due to late heavy rains coupled with hot & humid climate during September- October 2017, severe incidence of Pokkah boeng was observed in Adsali planted crop of 2017-18. The incidence of brown spot is decreasing, while the incidence of yellow leaf disease on sugarcane is increasing in the state. The incidence of yellow leaf disease in sugarcane is increasing in Kolhapur, Sangli, Satara, Pune, Ahmadnagar and Solapur districts and it was noted on CoM 0265 and Co 86032 up to 20%. The incidence of eye spot, mosaic and pineapple disease was observed in sugarcane crop in minor way. Pineapple was observed in heavily irrigated black cotton soils. The practice of settling transplanting in sugarcane is increasing and therefore the disease incidence is eliminated in such plots.

SANKESHWAR

The incidence of smut was observed 8.3 to 13.1%. In general, incidence of yellow leaf disease was low (1-2 grade). Incidence of grassy shoot disease was noticed in most of the field surveyed (4.2-17.5%). The incidence of rust (10.1 to 15.4%) in association with ring spot (15.5 to 20.7%) was also observed. The incidence of pokkah boeng is increasing substantially and affecting most of the sugarcane varieties.

KOLHAPUR

The survey of sugarcane diseases was undertaken in Kolhapur, Sangli and Sindhudurg. Smut incidence was noticed upto 30% on CoM 261 at Bhadgaon, Tal. Gadhinglaj, Dist. Kolhapur. The incidence of GSD was found in the range of 1-10 % in the surveyed area. The incidence of brown spot was found on almost all commercially cultivated sugarcane varieties with varying intensities and incidence. However, the incidence of rust was found upto 5%. Incidence of ring spot was observed with high intensity due to favourable conditions. The incidence of pokkah boeng was found upto 5% and incidence of YLD was found mainly on Co 86032.

AKOLA

Roving survey of sugarcane fields of Vidarbha,Yavatmal, Wardha and Amravati, districts was carried out. In most of the fields, pokkah boeng, YLD and mosaic were the common problems on varieties CoM 0265 (Ratoon) and CoVSI 03102, Co 94012, Co 7701, Shidagiri and Co 3102 ranging 1- 5% severity.

FINDINGS OF THE CURRENT 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.

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 88from 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.

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

(YL) was noticed in traces- 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 percent was noticed in Co118, Co 0238, CoH 167 and CoH 160.

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. YL 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.

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 5224, CoPant 03220, CoSe 1434 and CoS 88230. YL wasseen in some pockets in CoPant 3220, CoPant 84212, CoPant 5224, CoS 767 and CoPanrt 90223. Ring spots and eye spots were seen on CoPant 99214, CoJ 85 and CoS 7250. The cultivars viz., Co 0238, Co 0239 and CoPant 03220 were found infected with PB.

KARNAL

Red rot was noticed in the variety CoS 8436 and CoJ 88. Smutincidence was observed in traces to 5% in Co 89003, Co 0238, Co 05011, Co 89003, CoH 160, CoH 160, Co 89003. 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 variety Co 89003.

NORTH CENTRAL ZONE

PUSA

Red rot (2%) incidence was observed on Co 0235 and wilt incidence was noticed in all most 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 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 recordedwith red rot infection to the tune of 5 % to 20 %. Yellow Leaf Disease was noticed in the varieties viz., BO 130, Co 0118, Co 0238, CoLk 94184 and CoP 06436. Pokkah boeng was observed in 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 EASTERN 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 susceptible 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 9208. Yellow leaf disease incidence of 5 to 60% incidence was observed in Visakhapatnam, East Godavari and Chittoor districts. The incidence of YL 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 2003T 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 has been 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 incidence of foliar diseases on sugarcane crop *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 yellow leaf disease in sugarcane was noted on Co 86032, CoM 0265 and VSI 08005 up to 20%. The incidence of

eye spot and pineapple was observed in sugarcane crop. Pineapple 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 whip smut were the major diseases in South Gujarat region. 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 the varieties of 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 cvCoM 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.

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
KAPURTHALA

Of the 27 genotypes, nine genotypes namely, BM 1005149, GU 07-2276, MA 5/51, MA 5/99, SA 04-390, SA 04-454, SA 04-496, AS 04-1689 and MA-5/37 were found MR to both of the pathotypes CF08 and CF09.

KARNAL

Twenty seven ISH clones were inoculated with CF08 and CF09 isolates and among them15 clones showed R/MR reactions, seven MS and five S/HS reaction with CF08 isolate, while seven were R/MR, 12 MS and eight S/HS with CF09 isolate.

UCHANI

Nine ISH clones viz., IA 30-17, IA 30-14, IA 30-17, IA 31-32, IA 31-35, B 44-167, F1108, Q-65, Q-45 and 57 NG 131 were evaluated for red rot resistance using pathotype CF08. The clones namely IA 30-17, IA 31-35 and F 1108, were found resistant/moderately resistant whereas, genotypes IA 30-14, IA 31-32, B 44-167 Q-65, Q-45 and 57 NG 131 showed MS/S reaction against red rot pathotype CF08.

SHAHJAHANPUR

Of 13 ISH genotypes, five namely AS 04-635, PG 9869137, SA 04-454, AS 04/1687 and GU 07-3849 were identified as MR against CF08. Six genotypes such as SA 04-409, BM 1005149, BM 1003143, MA 5/99, AS 04/2097 and SA 04-472 behaved as MS against CF08. Of 13 genotypes, five viz; BM 1005149, AS 04-635, AS 04/1687, AS 04/2097 and GU 07-3849 exhibited as MR and six genotypes were identified as MS to CF09.

LUCKNOW

The twenty six ISH genotypes received from ICAR-Sugarcane Breeding Institute, Regional Centre, Karnal during 2017-18 were multiplied and planted in spring season, 2018.

NORTH CENTRAL ZONE
PUSA

Out of 27 clones only single clone (GU 07/2276) was found R, nine clones (AS 04-1687, AS 04-1689, AS 04-390, MB-1005149, AS 04-454, AS 04-2097, AS 04-496, BM-1010168 and AS 04-98/13) were found MR, nine clones (BM-1009163, MB-1022173, MA-5/37, AS 04-635, CYMO-7986, GU 07/3849, MA-5/22, MA 5/99 and SA 04-472) were found MS and 8 clones (AS 04-245, GU 07/3774, MA-5/5, MA-5/51, PG-9869137, SA 04-458, SA 04-409 and BM-1003143) were found S when canes were inoculated with CF07. In case of CF08 inoculated clones, a single clone (AS 074-454) was observed R, 8 clones (AS

04-1689, AS 04-390, MB- 1005149, AS 04-2097, AS 04-496, MB-1010168, GU 07/2276 and AS 04-98/13) were found MR, nine clones (AS 04-1687, MB-1022173, MA-5/37, AS 04-245, CYMO-7986, MA 5/99, PG-9869137, SA 04/472 and SA 04-409) were MS and 9 clones (BM-1009163, AS 04-635, GU 07/3774, GU 07/3849, MA-5/22, MA-5/5, MA-5/51, SA 04-458 and BM 1003143) were observed as S to red rot.

SEORAHI

Twenty seven ISH genotypes were evaluated against red rot. Of these 11 genotypes were rated as MR, 9 genotypes as MS, 4 genotypes as S and one genotype was rated as HS to CF07. While, 12 genotypes were rated as MR, 7 genotypes as MS and 6 genotypes as S to CF08 and rest genotypes did not survive.

EAST COAST ZONE

CUDDALORE

Twenty seven ISH clones screened for red rot resistance by plug method using CF06 pathotype, in that two *viz*., SA 04-454 and GU 07-2276 recorded R reaction. Eleven genotypes *viz*., BM 1005149, BM 1010168, PG 9869137, SA 98-13, SA 04-390, SA 04-409, AS 04-2097, MA 5/37, MA 5/99, MA 5/22 and GU 07-3849 were MR to red rot. The genotypes *viz*., BM 1003143, SA 04-472, SA 04-496, AS 04-1689, AS 04-245, AS 04-635, AS 04-1687 and CYM 07-986 were MS and6 genotypes were HS to red rot.

ANAKAPALLE

Out of 27 ISH genotypes tested by plug method of inoculation, one entry (PG9869137) showed resistance while 6 entries, SA 04-454, SA 04-496, AS 04-2097, MA 5/37, MA 5/99 and GU 07-2276 showed moderately resistant reaction to the pathotype CF06 and remaining were moderately susceptible to highly susceptible in reaction.

PENINSULAR ZONE

NAVSARI

Thirty elite and ISH genotypes were evaluated by plug method for resistance to a local isolate of *C. falcatum*. Three genotypes SES 594, BM 10 1068 and SA 04 454 gave resistant reaction. Fifteen genotypes, viz., ISH 111, ISH 58, ISH 100, ISH 287, ISH 147, ISH 267, ISH 118, ISH 117, ISH 114, ISH 115, MA 5/99, AS 04-1687, GU 07-2276, MA 5/22 and CYM 07 986 were observed with moderately resistant reaction. Five genotypes viz., ISH 175, ISH 12,ISH 50, ISH 229 and AS 04-2097 showed moderately susceptible reaction. Four genotypes viz., ISH 69, ISH 176, MA 5/5 and MA 5/51 exhibited susceptible reaction. Whereas, three genotypes viz., ISH 41, ISH 9 and ISH 43 showed highly susceptible reaction.

COIMBATORE

About 26 ISH/ IGH genotypes were screened against three new isolates of *C. falcatum* from Tamil Nadu viz., CfV09356-Ellanganur, Cf86032 Srikandapuram and CfC24-RSCL to assess their broad spectrum resistance to red rot. It was found that only five of them viz., BM 1010168, MA 5/37, MA 5/99, SA 04-390, SA 04-454 were resistant to all the three isolates and others exhibited a variable reaction.

RESULTS OF CURRENT 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, SA04-454 and SA 98-13 were rated as R againstboth the pathotypes(CF08 and CF09) by both plug and nodal the methodsof 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 *viz*.,AS 04-2097, AS 04-1689, BM-1009149, MA 5/5, MA/5/22, MA/5/37, MA 5/99, SA 04-390, SA 04-409, SA 04-472 and SA 04-496 were rated as moderately resistant (MR) to both the pathotypes by plug method and R by nodal method (Table 30).

KAPURTHALA

Twenty-seven ISH genotypes were inoculated by plug method using red rot pathotypes CF08 and CF09. Of the 27 genotypes, none behaved as resistant against any of the pathotypes. Thirteen 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 by plug method of inoculation whereas MA 5/22 was S to CF08 and MS to CF09. 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 (Table31).

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, SA04-472 and SA04-496 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 moderately susceptible/susceptible reaction against red rot pathotype CF08 (Table32).

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 (Table33).

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 (Table34).

NORTH CENTRAL ZONE

PUSA

Twenty seven elite and ISH clones were evaluated artificially for resistance to red rot with pathotypesCF07 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 CF07pathotype. However, three clones AS 04-635, AS 04/ 472 and MB 1022173 were observed MS to the pathotype CF08,whereas, 11 clones were found SagainstCF07 and 14 were S to the pathotypeCF08 (Table 35).

SEORAHI

Twenty seven ISH genotypes were evaluated against red rot pathotypesCF07 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 (Table 36).

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 (Table 37).

CUDDALORE

Twenty seven elite and ISH clones screened for resistance to red rot disease 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 (Table 38).

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 (Table 39).

COIMBATORE

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

PP 28: B. METHODOLOGY FOR SCREENING SUGARCANE GENOTYPES FOR RESISTANCE TO BROWN RUST (*Puccinia melanocephala*)

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

Year of Start: 2013-14

Locations: Pune, Kolhapur, Sankeshwar, Padegaon, and Anakapalle

1. **Inoculation methodology:**

(i) Clip inoculation in leaf whorl

As soon as brown rust appears in field, select rust affected leaves, cut leaf bits (clips) measuring 8-10 cm. Select ten rust-free plants of the same susceptible variety in a different location. In three shoots of each plant (clump), insert 2-3 clips in the leaf whorl of each shoot.

(ii) Leaf whorl inoculation

As soon as brown rust appears in field, collect rust affected leaves. Make a suspension of uredospores in sterilized distilled water (10^4-10^5 spores/ml). Pour 1 ml freshly prepared uredospores suspension in each leaf whorl. Inoculate in 10 clumps (three shoots per clump) of same susceptible variety.

In the aforementioned two methods, plants to be inoculated may be marked by cutting one-third of the tips of the uppermost leaves so that they can easily be identified during recording observations.

Observations: After 4 weeks, record symptoms on leaves by counting – (i) average number of rust pustules per square inch, and (ii) number of leaves bearing rust pustules.

ii. Rating of resistance: To be taken up after standardization of inoculation method

RESULTS OF THE PREVIOUS YEAR

PUNE

After one month of inoculation, the observations regarding the number of pustules on leaves were recorded. In leaf whorl method, there was high number of rust pustules (23.40/sq.inch). In clip inoculation, the average numbers of rust pustules per square inch were 13.20.

KOLHAPUR

In leaf whorl inoculation method, higher average no. of rust pustules (24.63 per sq. inch) and higher no. of leaves bearing rust pustules (12.4) was recorded as compared to the clip inoculation method (22.45 per sq. inch and 11.2, respectively).

SANKESHWAR

Out of two methods, more number of rust pustules were observed (31.91/sq.inch) in leaf whorl method. In clip inoculation, the average number of rust pustules was 25.85 per square inch.

PADEGAON

Higher average no. of rust pustules (30.28 per sq. inch) and higher no. of leaves bearing rust pustules (7.4) was recorded in the leaf whorl inoculation compared to the clip inoculation method (28.52 per sq. inch and 7.1, respectively). However, spraying with uredospores suspension (10^4-10^5 spores/ml) was tried which recorded still higher average no. of rust pustules (38.12 per sq. inch).

ANAKAPALLE

Among the concentrations of uredospores tested through leaf whorl method of inoculation, more number of rust pustules per square inch (24.6) were produced at a concentration of 10^6 uredospores / ml in the variety CoA 92081. Four to five leaves showed rust pustules in leaf whorl method of inoculation when inoculated with a concentration of 10^6 uredospores / ml, whereas 4 to 5 leaves were infected at 10^5 and 10^4 concentrations.

RESULTS OF THE CURRENT YEAR

PUNE

The number of pustules on leaves was recorded after one month of inoculation. It was observed that leaf whorl inoculation method was superior to clip inoculation method. Numberof rust pustules was higher (21.60/sq.inch) under leaf whorl method whereas in clip inoculation method, the average numbers of rust pustules per square inch were 11.30.

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

NORTH WEST ZONE

KAPURTHALA

Under natural condition 38 entries along with two check viz., Co 0238 and CoJ 85 were screened for PB resistance. Only three genotypes (Co 13034, CoPb 13181 and CoPant 13224) showed MS and CoPant 12221, CoLk 13204 and CoS 12232 were susceptible and remaining were resistant to pokkah boeng. However, check varieties Co 0238 and CoJ 85 behaved as HS and S to the disease, respectively.

UCHANI

Eighty three varieties of sugarcane were screened against pokkah boeng disease under natural conditions. Thirty one varieties *viz*., Co 12026, Co 12027, Co 12029, Co 13033, Co 13035, CoH 12263, CoH 13062, CoH 13063, CoH 14062, CoH 14261, CoH 150, CoH 160, CoH 166, CoH 167, CoH 92, CoH 99, CoLk 12203, CoLk 12205, CoLk 13203, CoLk 13205, CoLk 14202, CoLk 14204, CoPant 12226, CoPb 12211, CoPb 13183, CoPb 14182, CoPb 14184, CoPb 14211, CoPb 14212, CoS 767, and CoS 13231 were found resistant to PB. Forty four varieties namely, Co 0118, Co 0237, Co 05009, Co 05011, Co 1148, Co 13034, Co 13036, Co 14034, Co 14035, Co 7717, CoLk 14201, CoPb 14181, CoH 119, CoH 128, CoH 13261, CoH 151, CoH 156, CoH 164, CoH 56, CoJ 64, CoJ 85, CoLk 13201, CoLk 13202, CoLk 14203, CoLk 14205, CoPant 12221, CoPant 13221, CoPant 13223, CoPant 13224, CoPant 97222, CoPant 14222, CoPb 13182, CoPb 14183, CoPb 14185, CoPb 13181, CoS 12232, CoS 13232, CoS 13233, CoS 14231, CoS 14232, CoS 14233, S 11252, S 11202 and S 11733 showed MS reaction to pokkah boeng. Six varieties*viz*., CoH 110, CoH 133, CoH 152, CoLk 13204, CoPant 13222 and CoS 8436 exhibited S reaction to pokkah boeng. However, Co 0238 variety showed HS reaction against pokkah boeng.

SHAHJAHANPUR

Of seventeen, nine genotypes/varieties were found to be resistant whereas six genotypes *viz*., S.5080/11, UP 9530, S. 5087/11, S. 5099/11, CoS 8436 and CoSe 12452 were screened as moderately susceptible. Two popular varieties (CoS 08279, Co 0238) were screened as susceptible.

NORTH CENTRAL ZONE

PUSA

Twenty varieties were screened under natural condition, out of which, 18 varieties *viz*., BO 130, BO 155, CoLk 09204, CoLk 12207, CoLk 12209, CoP 11436, CoP 12436, CoP 12438, CoP 132, CoP 13437, CoP 13438, CoP 13439, CoP 2061, CoP 11438, CoSe 12451, CoSe 13451, CoSe 13452 and CoSe 13453 showing R reactions whereas, two varieties (CoP 11437 and CoBln 14502) showed MS against pokkah boeng disease.

SEORAHI

Total 26 genotypes/varieties were utilized for the screening of pokkah boeng disease under natural condition. Out of 26 varieties 17 varieties *viz*., Co 0118, CoBln 14501, CoJ 64, CoLk 14201, CoLk 14206, CoLk 14207, CoP 13437, CoP 14437, CoP 14439, CoS 05011, CoSe 01421, CoSe 13451, CoSe 13452, CoSe 14232, CoSe 14451, CoSe 14453 and CoSe 14456 exhibited resistant (R), 7 varieties viz., CoP 14436, CoP 9301, CoSe 14454, CoP 14438, CoS 767, CoSe 95422 and CoS 12231 exhibited MS and rest of them exhibited S behavior to pokkah boeng disease.

EAST COAST ZONE

ANAKAPALLE

Out of 34 genotypes screened against top rot disease under natural conditions less than 5% disease incidence was observed in seventeen genotypes, *viz*., Co 13023, Co 6907, Co 7706, CoA 14321, CoA 11326, CoA 13322, CoA 13323, CoA 89085, CoA 92081, CoC 13336, CoC 13337, CoC 14336, CoC 15336, CoC 15340, CoOr 13346, CoV 13356 and CoV 15356 which were rated as resistant. Eleven genotypes (Co 419, Co 997, Co 7219, Co 13028, Co 13029, Co 13031, Co 86249, CoA 14323, CoC 01061, PI 14377, PI 15376, and CoC 14337) recorded MS reaction with a disease score of >5 to 10%.

PENINSULAR ZONE

PUNE

Out of the 14, 8 varieties *viz.,* Co 419, Co 85004, Co 86032, Co 94012, CoM 0265, CoVSI 0309, CoVSI 03102 and CoVSI 0405 were observed free from the disease, while remaining 6 varieties *viz.,* CoVSI 9805, VSI 434, CoC 671, MS 10001, CoVSI 2000-01 and VSI 08005 were found susceptible.

KOLHAPUR

Out of 56 genotypes/entries, 49 viz., Co 11001, Co 11004, Co 11005, Co 11007, Co 11012, Co 11019, Co 12007, Co 12008, Co 12012, Co 12019, Co 12024, Co 13021, Co 13022, Co 14002, Co 14003, Co 14004, Co 14008, Co 14009, Co 14012, Co 14016, Co 14022, Co 14023, Co 14025, Co 14026, Co 14027, Co 14030, Co 14031, Co 14032, Co 86032, Co 94008, CoM 11081, CoM 11084, CoM 11086, CoM 12085, CoN 14072, CoN 14073, CoSnk 05103, CoSnk 14101, CoSnk 14102, CoSnk 14103, CoT 14366, CoT 14367, CoTI 14111, CoTI 14112, CoVc 14061, CoVc 14062, MS 14081, MS 14082, PI 14131, PI 14132, VSI 14121, VSI 14122 genotypes shown resistant reaction to pokkah boeng disease, whereas genotypes *viz*., Co 12009, Co 14006, Co 99004, CoC 671 , CoM 11082, CoM 11085, CoN 14071, CoN 14074, VSI 12121 were found moderately susceptible**.**

AKOLA

The incidence of Pokkah boeng was in range of 0.00 to 6.80%. Out of 40 genotypes screened under IVT Early Plant, only CoC 671, Co 86032 and CoSnk 05103 showed susceptible reaction with PB incidence of 6.75, 6.67 and 6.80%, respectively and other genotypes viz., Co 13021, Co 13022, Co 14002, Co 14003, Co 14004, Co 14006, Co 14008, Co 14009, Co 14012, Co 14016, Co 14022, Co 14023, Co 14025, Co 14026, Co 14027, Co 14030, Co 14031, Co 14032, CoN 14071, CoN 14072, CoN 14073, CoN 14074, CoSnk 14101, CoSnk 14102, CoSnk 14103, CoT 14111, CoT 14112, CoT 14366, CoT 14367, CoVc 14061, CoVc 14062, MS 14081, MS 14082, PI 14131, PI 14132, VSI 14121, VSI 14122 remain as disease free. The incidence of pokkah boeng disease was ranging from 0.00 to 6.80 %. CoSnk 05103 showed highest (6.80%) disease incidence. In AVT- I Plant, all 11 entries viz., Co 12007, Co 12008, Co 12009, Co 12012, Co 12019, Co 12024, Co 86032, CoC 671, CoM 12085, CoSnk 05103, VSI 12121 were found to be R. In AVT (Early)- Ratoon, the incidence of Pokkah boeng disease was ranging from 0.86 to 8.48 %. CoC 671 showed highest (8.48%) disease incidence. In AVT (Midlate)- II Plant, the incidence of Pokkah boeng disease was ranging from 0.77 to 4.62%. Co 99004 showed highest (4.62%) disease incidence. In AVT (Mid late) - Ratoon, the incidence of PB disease ranged from 1.28 to 6.50 %. Co 11012 showed highest (6.50 %) disease incidence.

II. EPIDEMIOLOGY

In Kapurthala, The PB incidence of the disease initiated from 1st fortnight of June and gradually increased till September in relation to higher maximum-minimum temperature range (24.7 to 38.0 °C), relative humidity (53.42 to 75.45%) and higher rainfall. The severe incidence of the disease was observed in the months from July to September due to higher temperature, relative humidity and rainfall. Higher relative humidity (70 to 80 %) coupled with cloudy weather and drizzling favoured the growth and development of pathogen.

In Shahjahanpur, Pokkah boeng 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 170.0 mm, 246.4 mm and 132.5 mm, respectively. Relative humidity was recorded up to 85.0 per cent in July and August month and 78.0 per cent recorded in September. Rainfall and relative humidity play a major role in the incidence and spreading of PB.

In Uchani centre, the average maximum temperature 33.91°C (31.51-39,20°C) and minimum 25.07°C (22.21-26.60°C), average relative humidity morning 82.29 (62 00-93.43) per cent and evening 62.41 (33.00-79.00) per cent and with total rainfall 79.65 mm (av. 4.43 mm) were recorded from June-September (22- 39 met. week). Pokkah boeng incidence starts increasing during rainfall with high humidity conditions. Incidence on important varieties viz., CoS 0238 (24.0 %), CoH 133 (20.0%) CoS 8436 (17.0 %), CoJ 85 (12.0 %) and CoH 119 (9.0 %) was observed during June- September, 2017.

In 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^{0}C, relative humidity 64.7 to 90.5% and rainfall 43.8 to 432.6 mm, respectively from May to September. Humidity and rainfall play an important role in PB incidence.

In Seorahi, the incidence of pokkah boeng was compared with meteorological data for pathogenesis and disease development under natural conditions. It was noticed that temperature (25 to 32^o C), relative humidity (69 - 91%)) and rainfall (230 - 399 mm) during the year favoured disease development. The disease incidence was found maximum in first week of July which gradually increased till the last week of August. Maximum rainfall and high humidity favoured the development of pokkah boeng disease. The reduction in disease incidence was seen from the second week of July after the period of rain fall.

In Anakapalle, the disease incidence was initiated during I fortnight of June and gradually increased till November and then the disease was slowdown. Highest disease incidence was observed during the month of October. The disease incidence was positively correlated with the number of rainy days, low temperature and high RH.

In Pune, the initiation of pokkah boeng noted in second week of June 2017. During disease initiation period, the minimum and maximum temperature was 22.62 ^{0}C and 38.70^{o}C respectively & humidity ranges from 20.71% to 97.31%. Maximum pokkah boeng disease incidence was observed during 27th to 34th meteorological weeks, while the incidence was reduced after 35th meteorological week.

III. POKKAH BOENG MANAGEMENT

KAPURTHALA

The efficacy of fungicide carbendazim 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 to manage the disease in comparison to control. Sett treatment along with foliar spray at 15 days interval starting from May 15th (T_3) was the most effective to control the pokkah boeng. This treatment was also resulted higher germination and low disease incidence in comparison to other treatments.

UCHANI

The efficacy of fungicide carbendazim for management of PB was tested on two susceptible varieties *viz*., Co 0238 and CoS 8436. 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 5.2 per cent and 4.0 per cent inCo 0238 and CoS 8436, respectively and also increase germination.

SHAHJAHANPUR

The efficacy of carbendazim fungicide for management of PB was tested on two varieties Co 0238 and CoS 08272. Results revealed that carbendazim significantly controlled the disease as compared to control. The treatment T_3 i.e., sett treatment with carbendazim and foliar spray with carbendazim was found better in germination and most effective to control PB during the monsoon season followed by T_2 in both varieties. Highest germination 49.23% with low incidence of disease (2.47%) were recorded in Co 0238 and 48.13% germination and 2.57 per cent disease incidence recorded in CoS 08272.

ANAKAPALLE

For management of top rot, sett treatment + foliar spray of carbendazim @ 0.05% showed the highest percent germination and also low disease incidence (84.16 and 5.84 respectively) compared to other treatments.

SANKESHWAR

The experiments on management revealed that sett treatment with carbendazim @ 0.1% and three foliar spraying with carbendazim @ 0.05% at 15 days interval showed the maximum (86.54%) per cent germination and also low disease incidence (5.49%) of PB.

PUNE

For management of PB, the fungicides viz., carbendazim and mancozeb were found effective when sprayed thrice after 15th may onwards. The maximum disease control (75.22 %) was obtained by 3 foliar spray of Mancozeb @ 0.3% at an interval 15 days from 15th May. However, carbendazim use by 3 sprays is also found beneficial to control the disease effectively.

RESULTS OF CURRENT 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 (Table 40).

UCHANI

Sixty eightvarieties of sugarcane were screened against PB disease under natural conditions.Forty seven varieties included in ZVT and ISH/ IGHgenotypes 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, BM-1010-168, Co 05011, Co 13035, Co 14034, Co 14035, Co 15023, CoH 13263, CoH 14261, CoLk 14201, CoLk 14203, CoLk 14204, CoLk 15024, CoLk 15201, CoLk 15203, CoLk 15204, CoLk 15205 , CoLk 15206, CoLk 15207, CoLk 15209, CoPant 97222, CoPb 13181, CoPb 13182, CoPb 14181, CoPb 14184, CoPb 14185, CoPb14211, CoPb 15211, CoPb 15212, CoPb 15213, CoPb 15214, CoS 767, CoS 14233, CoS 15232, GV-07-2276, GV-07-3734-212, GV-07-3849, MA-5-22, MA-5-51, SA-04-390 and SA-98-13 were found resistant to PB (0-4.76%).Ten varieties namely, Co 13034, CoLk 13204,CoLk 15027, CoLk 15208, CoPant 13224, CoS13231, CoS 15233, CoS 15234and MA-5-99 showed MS reaction(5.26-7.89 %) 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, SA04-472 and SA04-496 showed HS reaction (20.93-47.3%) against PB(Table 41).

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 (Table 42).

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 16437and 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 andCoP 16440 and the check (CoSe 95422) showed MS reaction against PB(Table 43).

SEORAHI

Out of 18 varieties, 11 showed resistant (R), 5 moderately susceptible (MS) and two showed susceptible (S) behavior to PB (Table 44).

ANAKAPALLE

Out of 33 genotypes screened against top rot disease under natural conditions, only one genotype CoC 14336was 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 (Table 45).

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, Co419, Co 86032, Co94012, 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%) (Table 46).

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. 9.9mm) 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 st 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^{0}C, 31.8^{0}C and 32.5^{0}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. The disease incidence gradually reduced by the end of September, 2018. 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 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 (Table47).

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, respectively and also increased per cent germination (Table 48).

PUSA

Sett treatment with Carbendazim @ 0.1% followed by foliar spraying (Carbendazim 0.1%) three sprays 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 (Table 49).

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% (Table 50).

PUNE

Both the fungicides *viz.,* Carbendazim and Mancozeb are found effective to control PB effectively, when these two fungicides are sprayed thrice after 15thMay 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 (Table 51).

PP 33:MANAGEMENT OF YELLOW LEAF THROUGH MERISTEM CULTURE

RESULTS OF THE PREVIOUS YEAR

COIMBATORE

Field experiments were conducted to assess impact of YLD on cane growth and yield by comparing the crops planted with virus-infected and virus-free planting materials of the popular varieties Co 86032 and Co 0238 and a new variety Co 11015. It was found that the virus-free plants have recorded significantly higher values in sett germination, plant growth/yield parameters such as number of stalks, cane diameter, cane length, number of internodes, cane weight, juice yield etc. It was found that due to virus infection, cane and juice yield are reduced in the range of 18.5-40.7 and 42.1-50%, respectively in the plant crop.

ANAKAPALLE

Tissue culture plantlets of sugarcane cultivars, CoA 14321, CoA 92081 and CoV 08356 were raised and transplanted under field conditions. Yellow leaf incidence was not observed in breeder seed crop and foundation seed crop raised from tissue culture seedlings. Virus indexing of tissue culture plantlets of sugarcane through RT-PCR revealed the absence of SCYLV in tissue culture plantlets of sugarcane cultivars, CoA 14321, CoA 92081 and CoV 08356 obtained from tissue culture lab, RARS, Anakapalle. The indexing of tissue culture plantlets of sugarcane obtained from Navabharath Ventures, Samalkot has revealed the presence of ScYLV in the sugarcane cultivars, Co 86032, Co 06030 and 2007A 81.

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 are transplanted in the field for the production of breeder seed and observed throughout the year for the incidence of YLD.

CUDDALORE

The work on meristem tip culturing of sugarcane was initated. Young cane tops of variety CoC 25 was collected from 4 month old crop, apical dome was excised with help of a sterile sharp blade and placed in glass bottle containing modified MS medium supplemented with kinetin (0.015 mg/l), benzyl adenine (1.0 mg/l) and sucrose (30 g/l). The apical domes are incubated at 25° ± 1°C under 16 hr / 8 hr light-dark cycle. The work is being continued for production of meristem tip culture.

RESULTS OF THE CURRENT 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.

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.

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.

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.	IR-155	Co 0238	I	S	R	R	S	I	S	I	R	R	I	S	I	I	S	I	I	S	R
2.	IR-156	Co 0238	I	S	R	R	S	I	S	I	R	R	I	S	R	I	S	I	R	S	R
3.	IR-157	Co 0238	I	S	R	R	S	I	S	I	R	R	R	S	I	I	S	I	I	S	R
4.	IR-158	Co 0238	I	S	R	R	S	I	S	I	R	R	I	S	I	S	S	I	I	S	R
5.	IR-159	Co 0238	I	S	R	R	S	I	S	I	R	R	I	S	R	I	S	I	R	S	R
6.	IR-160	Co 0238	I	S	R	R	S	I	S	I	R	R	I	S	I	I	S	I	I	S	R
7.	IR-161	CoLk 8102	R	S	R	R	I	I	S	S	I	R	R	I	I	I	I	S	R	S	R
8.	IR-162	Co 0238	I	S	R	R	S	I	S	I	R	R	I	S	R	I	S	I	I	S	R
9.	IR-163	Co 0238	I	S	R	R	S	I	S	I	R	R	R	S	I	I	S	I	R	S	R
10.	IR-164	Co 0238	I	S	R	R	S	I	S	I	R	R	I	S	R	I	S	I	I	S	R
11.	IR-165	Co 0238	I	S	R	R	S	I	S	I	R	R	I	S	R	R	S	I	I	S	R
12	IR-166	Co 0238	I	S	R	R	S	I	S	I	R	R	I	S	I	I	S	I	I	S	R
13	IR-167	Co 0238	I	S	R	R	S	I	S	I	R	R	R	S	R	I	S	I	R	S	R
14	IR-168	Co 0238	I	S	R	R	S	I	S	I	R	R	I	S	R	I	S	I	I	S	R
15	IR-169	Co 0238	I	S	R	R	S	I	S	I	R	R	I	S	I	I	S	I	I	S	R
16	IR-170	Co 0238	I	S	R	R	S	I	S	I	R	R	I	S	R	I	S	I	I	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	B0 91	Co 86002	Co 86032	Co 7805	CoV 92102	CoSe 95422	Baragua	Khakai	SES 594
1	CF01	Co 1148	S	R	S	S	X	X	X	X	R	R	R	X	R	R	X	R	R	S	R
2	CF02	Co 7717	X	X	S	S	X	S	S	X	X	R	R	X	X	X	X	R	R	S	R
3	CF03	CoJ 64	S	R	X	S	X	R	R	S	R	R	R	X	R	X	R	R	R	S	R
4	CF07	CoJ 64	S	S	X	S	R	R	R	S	S	R	R	S	R	S	S	R	X	S	R
5	CF08	CoJ 64	X	R	S	S	X	X	X	S	S	R	R	S	R	R	X	R	R	S	R
6	CF09	CoS 767	R	R	R	S	R	R	S	S	S	R	X	S	X	X	S	R	R	S	R
7	CF11	CoJ 64	S	S	X	S	S	S	S	S	X	R	R	S	S	X	X	R	R	X	R
8	Cf8436	CoS 8436	S	X	S	R	R	S	S	S	R	S	X	X	S	S	X	R	R	S	R
9	Cf07250	CoS 07250	S	R	R	S	S	S	R	S	R	R	R	S	S	X	X	R	R	S	R
10	Cf97264	CoS 97264	S	R	S	S	X	S	X	S	R	R	R	X	S	X	X	R	R	S	R
11	Cf0238	Co 0238	S	X	R	X	X	S	X	S	R	S	R	X	S	S	S	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	S	R	R	R	S	R	R	S	R	R	R
2	CF09	CoS 767	X	X	S	S	R	R	S	S	S	R	R	R	S	R	R	S	R	R	R
3	Cf64	CoJ 64	S	X	S	S	R	S	S	S	S	R	R	R	S	R	R	X	R	X	R
4	Cf85	CoJ 85	X	S	S	X	R	S	X	S	X	R	R	R	S	R	R	S	R	R	R
5	Cf89003-1	Co 89003	S	S	S	S	S	S	S	S	R	R	R	R	S	R	R	S	R	S	R
6	Cf89003-2	Co 89003	S	S	S	S	S	S	S	S	S	R	R	R	S	R	R	S	R	X	R
7	Cf89003-3	Co 89003	S	S	S	S	S	S	S	S	R	R	R	R	S	R	R	X	R	R	R
8	Cf89003-4	Co 89003	S	S	S	S	S	S	S	S	S	R	R	R	S	R	R	S	R	R	R
9	Cf6/5	Sel. K 6/5	S	S	S	X	S	S	S	S	S	R	R	R	S	R	R	S	R	X	R
10	Cf12/13	Sel.K12/13	S	S	S	S	S	S	S	S	S	R	R	X	S	R	R	S	X	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	CoV92102	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	I	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	S
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	S	R	R	R
7	CF11	CoJ 64	I	S	S	I	S	I	S	S	S	R	R	R	S	R	R	I	S	R	R
8	RR XXXII	CoJ 85	S	S	S	S	I	S	S	S	R	R	R	R	S	R	R	S	I	R	R
9	RR XXXIII	CoJ 85	S	S	S	S	S	S	S	S	R	R	R	R	S	R	R	S	R	R	R
10	RR XXXIV	CoJ 64	S	S	S	S	S	S	S	S	R	R	R	I	S	R	R	R	R	R	R
11	RR XXXV	Co J 64	S	S	S	S	S	S	S	S	R	R	R	R	S	R	R	R	S	R	I
12	RR XXXVI	Co 89003	I	S	S	S	R	S	S	I	I	R	R	R	R	R	I	S	R	I	R
13	RR XXXVII	CoS 8436	S	S	S	I	S	S	S	S	R	S	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	C0 1148	X	X	S	S	S	R	S	S	R	S	X	R	R	R	R	R	R	S	R
2	CF02	Co 7717	R	R	S	S	S	R	X	R	R	X	X	R	R	X	R	R	R	R	R
3	CF03	CoJ 64	R	X	R	R	R	X	R	R	X	X	X	S	R	R	R	R	R	R	R
4	CF07	CoJ 64	R	R	R	S	R	R	R	R	R	X	S	S	R	R	R	R	R	S	R
5	CF08	CoJ 64	X	X	X	R	R	X	R	X	R	S	S	X	R	R	R	R	R	R	R
6	CF09	CoS 767	R	R	S	X	R	X	R	S	R	X	S	S	R	R	R	R	R	S	R
7	CF11	CoJ 64	S	S	S	S	R	X	S	S	X	S	S	S	R	R	R	R	R	S	R
8	Cf89003	Co 89003	X	X	S	R	S	S	S	X	R	S	R	R	R	X	R	S	R	S	R
9	Cf8436 (Karnal)	CoS 8436	S	R	X	R	R	S	X	S	R	S	S	R	S	S	R	X	R	S	R
10	Cf8436(UPCSR)	CoS 8436	X	R	R	R	R	X	R	R	R	S	X	R	R	R	R	R	R	X	R
11	Cf8436(Bihar)	CoS 8436	S	X	R	R	X	X	S	S	S	S	X	R	S	X	R	R	X	R	R
12	Cf 88 (UP)	CoJ 88	S	R	X	X	R	S	S	R	R	X	X	R	R	R	R	S	R	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	-	I	-	-	-	I	R	-	S	R	-	-	-	I	I
2.	CF08	CoJ 64	I	I	-	S	-	S	-	-	-	S	R	-	S	R	-	-	-	S	S
3.	RR_1	BO 145	R	R	-	S	-	I	-	-	-	I	R	-	S	R	-	-	-	I	I
4.	RR_2	CoLk 94184	R	R	-	S	-	I	-	-	-	I	R	-	S	R	-	-	-	I	I
5.	RR_3	CoLk 8102	R	R	-	S	-	I	-	-	-	I	R	-	S	R	-	-	-	I	I
6.	RR_4	CoS 98231	I	I	-	S	-	S	-	-	-	S	R	-	S	R	-	-	-	S	S
7.	RR_5	CoS 8436	R	R	-	S	-	I	-	-	-	I	R	-	S	R	-	-	-	I	I
8.	RR_6	CoSe 95422	R	R	-	S	-	I	-	-	-	I	R	-	S	R	-	-	-	I	I
9.	RR_7	CoJ 64	I	I	-	S	-	S	-	-	-	S	R	-	S	R	-	-	-	S	S
10.	RR_8	BO 138	I	I	-	S	-	S	-	-	-	S	R	-	S	R	-	-	-	S	S
11.	RR_9	BO 141	I	I	-	S	-	S	-	-	-	S	R	-	S	R	-	-	-	S	S
12.	RR_{10}	BO 128	I	I	-	S	-	S	-	-	-	S	R	-	S	R	-	-	-	S	S
13.	RR_{11}	Co 0233	I	I	-	S	-	S	-	-	-	S	R	-	S	R	-	-	-	S	S

14.	RR_{12}	CoS 91269	R	R	-	S	-	I	-	-	-	I	R	-	S	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	I	I	I	R	I	I	I	R	R	I	I	S	I
3	CF03	CoJ 64	I	R	I	I	I	I	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	I	S	I	I	I	I	R	I	R	I	I	I
7	CF11	CoJ 64	I	I	S	I	I	S	S	S	S	I	I	I	S	R	I	R	I	S	R
8	R1601Seo	CoSe 92423	I	I	I	S	I	I	S	S	S	R	R	I	I	R	I	R	I	I	R
9	R1602Seo	UP 9530	R	R	S	S	I	R	R	R	R	R	R	R	I	R	I	I	S	S	R
10	R1701Seo	Co 0238	I	I	I	S	R	S	R	S	R	I	R	I	I	R	R	I	S	S	R
11	R1702Seo	CoS 8436	R	I	I	S	I	I	R	I	I	S	R	R	I	R	I	S	S	S	I
12	R1703Seo	CoS 07250	I	I	I	R	R	I	R	I	R	R	R	R	I	R	R	I	R	S	R
13	R1704Seo	CoSe 92423	I	I	I	S	I	I	S	S	S	I	R	I	I	R	I	I	I	I	R
14	R1705Seo	CoJ 88	I	I	R	S	R	I	R	I	I	I	R	R	R	R	R	I	S	S	I

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

Sl. No	Pathotype	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	SBI, Coimbatore	S	R	X	R	R	R	S	R	R	R	R	R	R	R	S	R	X	R	R
2.	CoA 89085	ARS, Perumallapalle	X	R	X	R	R	R	X	X	R	R	R	R	X	R	S	R	S	R	R
3.	2017T 275	ARS, Perumallapalle	X	R	X	R	R	R	X	R	R	R	R	R	X	R	S	R	R	R	R
4.	CoV 89101	Mallepaka, Munagapaka	S	R	S	R	R	R	S	R	R	R	R	R	R	R	X	R	X	R	R
5.	Co 62175	Juttada, Chodavaram	S	R	X	R	R	R	S	R	R	R	R	R	X	R	S	R	X	R	R
6.	99A 53	Pichatoor, Chittoor	X	R	X	R	R	R	X	R	R	R	R	R	R	R	S	R	X	R	R
7.	93V 297	Chinnagottigallu, Chittoor	X	R	X	R	R	R	X	R	R	R	R	R	R	R	S	R	R	R	R

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

Sl No	Pathotype	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	Cf0265 Thuvaragapuram	CoM 0265	X	X	S	S	X	S	S	R	X	R	R	R	S	R	R	X	R	X	S
4	Cf24Padalam	CoC 24	S	X	S	S	S	S	S	S	X	R	X	R	S	R	R	R	X	X	S
5	Cf09356T.Edayar	CoV 09356	X	X	X	S	S	X	S	X	R	R	X	R	X	R	R	X	R	R	X
6	CfSi8Eraiyur	TNAUSi8	S	X	S	X	X	X	S	X	R	R	R	R	X	R	R	S	R	R	X

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

Sl. No.	Pathotype	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	I	S	S	I	I	R	S	R	I	R	R	R	S	R	S	I	S	S	S
2.	Cf86032	Co 86032	I	S	S	I	I	R	S	R	I	R	R	R	S	R	I	I	S	I	S

3.	Cf86002	Co 86002	I	S	S	I	R	R	S	R	I	R	R	R	S	R	I	I	S	I	S

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

Sl. No	Pathotype	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	S	-	I	I	S	I	S	I	I	R	I	I	I	R	I	I	I	I	I
2	CF12	Co 94012	S	-	I	I	I	I	S	I	I	R	I	I	I	R	I	I	I	I	I
3	CfV09356 Keerangudi	CoV 09356	S	-	I	I	I	S	S	S	I	I	R	R	I	R	I	S	I	I	I
4	Cf86027-Nathakadu	Co 86027	S	-	I	R	I	I	S	I	R	R	R	R	I	R	R	I	I	I	I
5	Cf2001-13-Perambakkam	Co 2001-13	S	-	I	S	I	S	S	I	I	I	I	R	I	R	I	I	I	I	I
6	Cf06022-Kuthalam	Co 06022	I	-	I	S	S	I	S	I	I	I	I	R	S	R	I	I	I	I	I
7	Cf99006-Mundiampakkam	Co 99006	I	-	R	I	S	R	S	R	R	R	R	I	I	R	R	R	I	R	I
8	CfC24-Thand avarayanpatti	CoC 24	I	-	I	I	S	I	S	I	I	I	I	S	S	R	I	I	I	I	I
9	Cf06022 Pennadam	Co 06022	S	-	I	I	S	I	S	I	I	I	I	I	I	R	I	S	I	I	I
10	CfM0265-RK pet	CoM 0265	S	-	S	S	I	S	S	I	I	I	I	I	I	R	I	I	I	I	I

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

S. No	Pathotype/ Isolate	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	CoV92102	Co7805	Co86002	Co86032
1	CF06	CoC 671	I	R	S	R	I	R	S	R	R	R	I	R	R	R	R	I	I	S	I
2	CF12	Co 94012	I	I	S	R	I	I	S	I	I	R	I	R	R	R	R	R	I	R	I
3	CfV 09356 (Keerangudi)	CoV 09356	R	R	S	R	I	R	S	I	S	I	R	R	I	R	I	I	I	S	I
4	Cf 86027 (Nathakadu)	Co 86027	R	R	R	R	R	R	S	R	R	R	R	R	R	R	R	R	R	I	R
5	Cf 2001-13 (Perampakkam)	Co 2001-13	S	I	S	S	S	S	S	I	S	I	S	R	I	R	I	I	I	R	I
6	Cf 06022 (Kuthalam)	Co 06022	S	S	S	S	R	S	S	R	I	I	S	R	S	R	R	R	I	S	I
7	Cf 99006 (Mundiampakkam)	Co 99006	R	R	R	R	R	R	S	R	R	R	R	R	R	R	R	R	R	R	R
8	CfC24-Thand avarayanpatti	CoC 24	R	R	S	R	S	R	S	I	I	I	S	R	R	R	R	I	I	I	I
9	Cf06022 Pennadam	Co 06022	I	I	S	I	I	I	S	I	I	R	I	R	I	R	R	I	I	I	S
10	CfM0265-RK pet	CoM 0265	S	S	S	S	I	S	S	I	I	R	I	R	S	R	R	I	R	R	I

Table 13. Evaluation of sugarcane genotypes for red rot, smut, wilt and YL- Lucknow

Sl. No.	Genotype	Red Rot				Smut	Wilt	YL
		Plug Method		Nodal Method				
		CF08	CF09	CF08	CF09			
Initial Varietal Trial (Early)								
1.	Co 15023	MR	MR	R	R	R	S	-
2.	Co 15024	MS	MS	S	S	R	-	-
3.	Co 15027	R	R	R	R	S	-	-
4.	CoLk 15201	MR	MR	R	R	HS	-	-
5.	CoLk15203	MR	MR	R	R	MR	-	-
6.	CoLk15204	MR	MR	R	R	HS	-	-
7.	CoLk 15205	MR	MR	R	R	MR	-	-
8.	CoPb 15212	MR	MR	R	R	S	-	-
9.	CoPb 15211	MS	S	R	S	MS	S	-
Advance Varietal Trial (I-Plant, Early)								
1.	Co 14034	MR	MR	R	R	MR	S	S
2.	CoLk 14201	MR	MR	R	R	MS	-	-
3.	CoPb14181	MR	MR	R	R	S	-	-
4.	CoPb14211	MR	MR	R	R	MS	-	-
Advance Varietal Trial (II-Plant, Early)								
1.	Co 13034	MR	MR	R	R	R	-	-
2.	CoPb 13181	MR	MR	R	R	R	-	-
3.	CoS 13231	R	R	R	R	MS	S	-
Initial Varietal Trial (Mid Late)								
1.	Co 15026	MR	MR	R	R	HS	S	-
2.	CoLk 15206	MR	MR	R	R	R	-	-
3.	CoLk 15207	MR	MR	R	R	S	-	-
4.	CoLk 15208	MR	MR	R	R	R	-	-
5.	CoLk 15209	MR	MR	R	R	S	-	-
6.	CoPb 15213	MR	MR	R	R	R	S	S
7.	CoPb 15214	MS	MS	R	R	R	S	-
8.	CoS 15231	MS	MS	R	R	R	S	-
9.	CoS 15232	MR	MS	R	R	MS	-	-
10.	CoS 15233	MR	MR	R	R	MS	-	-
11.	CoS 15234	MR	MR	R	R	R	-	-
Advance Varietal Trial (I-Plant Mid Late)								
1.	Co 14035	MR	MR	R	R	R	-	-
2.	CoH 14261	MR	MR	R	R	MR	-	S
3.	CoLk 14203	R	R	R	R	MS	-	-
4.	CoLk 14204	MR	MR	R	R	S	-	-
5.	CoPb 14184	MR	MR	R	R	S	-	-
6.	CoPb 14185	MR	MR	R	R	MS	S	-
7.	CoS 14233	MR	MR	R	R	S	S	-
Advance Varietal Trial (II-Plant Mid Late)								
1.	Co 13035	MR	MR	R	R	MS	-	-
2.	CoH 13263	MR	MR	R	R	R	-	-

3.	CoPant 13224	MR	MR	R	R	MS	-	-
4.	CoPb 13182	MR	MR	R	R	MR	-	S
5.	CoLk 13204	MR	MR	R	R	MR	-	-
Checks								
	CoJ 64	HS	S	-	-	MR	-	-
	CoS 767	MS	S	-	-	R	-	-
	Co 1158	-	-	-	-	S	-	-
	CoLk 7701	-	-	-	-	S	-	-

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

Sl. No.	Genotypes/ Varieties	Red rot				Smut	YL
		Plug method		Nodal cotton swab			
		CF08	CF09	CF08	CF09		
IVT Early							
1	Co 15023	R	MR	R	R	R	R
2	Co 15024	MS	MR	R	R	R	R
3	Co 15027	-	MR	-	R	MS	R
4	CoLk 15201	MR	-	R	-	R	R
5	CoLk 15203	-	HS	-	S	MR	R
6	CoLk 15204	MR	MR	R	R	R	R
7	CoLk 15205	-	-	-	-	R	R
8	CoPb 15211	MR	-	R	-	R	R
9	CoPb 15212	S	S	R	S	R	R
10	Co 0238	MR	MR	R	R	R	R
11	Co 05009	MR	-	R	-	R	R
12	CoJ 64	HS	HS	S	S	R	R
13	Co 1158	-	-	-	-	HS	-
IVT Mid late							
1	Co 15026	R	R	R	R	R	R
2	CoLk 15206	MR	MR	R	R	R	R
3	CoLk 15207	MR	MR	R	R	MS	MR
4	CoLk 15208	MR	MR	R	R	R	R
5	CoLk 15209	MR	MR	R	R	MS	R
6	CoPb 15213	MR	MR	R	R	MS	R
7	CoPb 15214	HS	HS	S	S	R	R
8	CoS 15231	MR	MS	R	R	S	MR
9	CoS 15232	MR	MR	R	R	R	R
10	CoS 15233	-	-	-	-	R	R
11	CoS 15234	MR	MR	R	R	MS	R
12	CoS 767	HS	HS	S	S	R	R
13	CoS 8436	MR	R	R	R	R	R
14	CoPant 97222	-	-	-	-	R	R
15	Co 05011	MR	MR	R	R	R	R
16	CoJ 64	HS	HS	S	S	R	R
17	Co 1158	-	-	-	-	HS	-
AVT Early (I Plant)							
1	Co 14034	MS	MS	R	S	MS	R
2	CoLk 14201	MR	MR	R	R	MR	MR
3	CoPb 14181	MR	MR	R	R	MR	R
4	CoPb 14211	MS	MS	R	R	MR	R
5	Co 0238	MR	MR	R	R	R	MR
6	Co 05009	MS	S	R	R	MR	R

7	CoJ 64	HS	S	S	S	R	MR
8	Co 1158	-	-	-	-	HS	-
AVT Early (II Plant)							
1	Co 13034	MR	MS	R	R	R	R
2	CoPb 13181	S	S	S	R	R	R
3	CoS 13231	MR	MR	R	R	S	R
4	Co 0238	MR	MR	R	R	MR	MR
5	Co 05009	MR	MR	R	R	R	R
6	CoJ 64	HS	HS	S	S	R	R
7	Co 1158	-	-	-	-	HS	-
AVT Mid late (I Plant)							
1	Co 14035	MR	MR	R	R	MS	R
2	CoH 14261	MR	MR	R	R	MR	R
3	CoPb 14184	R	R	R	R	MS	MR
4	CoPb 14185	MR	MR	R	R	MR	R
5	CoLk 14203	MR	R	R	R	MS	MR
6	CoLk 14204	R	MR	R	R	R	R
7	CoS 14233	MR	MS	R	R	MR	R
8	CoS 767	HS	HS	S	S	R	R
9	CoS 8436	R	R	R	R	R	MR
10	CoPant 97222	MR	MR	R	R	R	R
11	Co 05011	MR	MR	R	R	R	MR
12	CoJ 64	HS	HS	S	S	R	R
13	Co 1158	-	-	-	-	HS	-
AVT Mid late (II Plant)							
1	Co 13035	MR	MR	R	R	MS	R
2	CoH 13263	HS	HS	S	S	R	R
3	CoLk 13204	MS	S	R	S	MR	R
4	CoPant 13224	MR	MS	R	R	MS	R
5	CoPb 13182	MR	MR	R	R	R	R
6	CoS 767	HS	HS	S	S	R	R
7	CoS 8436	R	R	R	R	R	MS
8	CoPant 97222	-	-	-	-	R	R
9	Co 05011	MR	MR	R	R	R	MR
10	CoJ 64	HS	HS	S	S	R	R
11	Co 1158	-	-	-	-	HS	-

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

S. No.	Entries	Plug method		Nodal Cotton swab method		Smut	Wilt	YLD
		CF08	CF09	CF08	CF09			
IVT(E)								
1	Co 15023	MR	MR	R	R	MR	R	R
2	Co 15024	MR	MR	R	R	MR	MR	R
3	Co 15027	MR	MR	R	R	R	R	MR
4	CoLk 15201	MR	MR	R	R	MR	R	R
5	CoLk 15203	HS	S	S	S	MS	R	R
6	CoLk 15204	MS	MR	R	R	MS	R	R
7	CoLk 15205	MR	MR	R	R	MR	R	MS
8	CoPb 15211	MR	MR	R	R	MR	R	R
9	CoPb 15212	MR	MS	R	R	MR	R	MR
AVT(E-I)								
10	Co 14034	MS	MS	R	R	MS	MS	R
11	CoLk 14201	MR	MR	R	R	MR	R	MR
12	CoPb 14181	MR	MR	R	R	MS	MR	MR
13	CoPb 14211	MR	MR	R	R	MR	MS	R
AVT(E-II)								
14	Co 13034	MS	MS	R	R	MS	MR	R
15	CoPb 13181	MS	MS	R	R	MR	R	MR
16	CoS 13231	MR	MR	R	R	MR	MR	R
IVT(ML)								
17	Co 15026	MR	MR	R	R	MS	R	R
18	CoLk 15206	MR	MR	R	R	MR	R	R
19	CoLk 15207	MR	MR	R	R	R	R	R
20	CoLk 15208	MR	MR	R	R	S	R	MR
21	CoLk 15209	MR	MR	R	R	MS	R	R
22	CoPb 15213	MR	MR	R	R	MR	R	R
23	CoPb 15214	MS	MS	R	R	MR	MR	MR
24	CoS 15231	MS	MS	R	R	MR	R	R
25	CoS 15232	MR	MR	R	R	MR	R	R
26	CoS 15233	MR	MR	R	R	MR	R	MR
27	CoS 15234	MR	MR	R	R	MR	R	R
AVT(ML-I)								
28	Co 14035	MR	MR	R	R	MR	MR	R
29	CoH 14261	MR	MR	R	R	R	R	MR
30	CoLk 14203	MR	MR	R	R	S	MR	MR
31	CoLk 14204	MR	MR	R	R	MR	R	R
32	CoPb 14184	MR	MR	R	R	MR	MR	R
33	CoPb 14185	MR	MR	R	R	MR	MR	R
34	CoS 14233	S	MS	R	R	MR	MR	R
AVT(ML-II)								
35	Co 13035	S	MS	R	R	MS	MR	MR

36	CoH 13263	S	S	R	R	MR	MS	R
37	CoPant13224	MR	MR	R	R	MR	MR	R
38	CoPb 13182	MR	MR	R	R	MS	MR	R
39	CoLk 13204	MS	MS	R	R	S	MR	MR
Standards								
40	CoJ 64	HS	HS	S	S	S	-	-
41	Co 0238	MR	MR	R	R	S	-	-
42	Co 05009	MR	MR	R	R	MR	-	-
43	CoS 767	HS	HS	S	S	S	-	-
44	CoS 8436	MR	MR	R	R	-	-	-
45	CoPant97222	S	S	S	S	MS	-	-
46	Co 05011	MR	MR	R	R	MR	-	-
47	Co 1158	-	-	-	-	HS	-	-
48	Co 7915	-	-	-	-	MR	-	-
49	Co 62175	-	-	-	-	HS	-	-
50	NCO 310	-	-	-	-	HS	-	-
51	Katha	-	-	-	-	HS	-	-
52	Co 7717	-	-	-	-	-	HS	-
53	Co 89003	-	-	-	-	-	HS	-

Table 16. Evaluation of sugarcane genotypes for red rot& YL resistance- Uchani

Sl. No.	Genotype	Red rot				YL
		Plug method		Nodal method		
		CF08	CF09	CF08	CF09	
AVT (Early) Plant I						
1.	Co 14034	MR	MR	R	R	MS
2.	CoLk 14201	MR	MR	R	R	MR
3.	CoPb14181	MR	MR	R	R	MS
4.	CoPb14211	MS	MS	R	R	MS
5.	CoJ 64	HS	S	S	S	MS
6.	Co 0238	MR	MR	R	R	S
7.	Co 05009	MR	MR	R	R	S
AVT (Early) Plant II						
1.	Co 13034	MR	MR	R	R	S
2.	CoPb13181	MS	MS	R	R	MS
3.	CoS13231	MR	MR	R	R	MS
4.	CoJ 64	HS	S	S	S	MS
5.	Co 0238	MR	MR	R	R	S
6.	Co 05009	MR	MR	R	R	HS
AVT (Midlate) Plant I						
1.	Co 14035	MR	MR	R	R	MS
2.	CoH 14261	R	MR	R	R	MR
3.	CoLk 14203	MR	MS	R	R	MS
4.	CoLk 14204	MR	MR	R	R	S
5.	CoPb 14184	MR	MR	R	R	MR
6.	CoPb 14185	MR	MR	R	R	MR
7.	CoS 14233	MR	MR	R	R	MR
8.	CoS 767	S	MS	S	S	HS
9.	CoPant 97222	S	MS	S	S	S
10.	Co 05011	MR	MR	R	R	MS
AVT (Midlate) Plant II						
1.	Co 13035	MR	MR	R	R	MS
2.	CoH 13263	MR	MR	R	R	R
3.	CoLk 13204	MS	MS	R	R	MS
4.	CoPant 13224	MS	MS	R	R	MS
5.	CoPb 13182	MR	MR	R	R	MS
6.	CoS 767	S	MS	S	S	S
7.	CoS 8436	MR	MR	R	R	S
8.	CoPant 97222	S	MS	S	S	HS
9.	Co 05011	MR	MR	R	R	MS
IVT (Early)						
1.	Co 15023	MR	MR	R	R	S

2.	CoLk 15024	MR	MR	R	R	MR
3.	CoLK 15027	MR	MR	R	R	MR
4.	CoLk 15201	MR	MS	R	R	MS
5.	CoLk 15203	S	S	S	S	MS
6.	CoLk 15204	MR	MR	R	R	MS
7.	CoLk 15205	MR	MR	R	R	MS
8.	CoPb 15211	MR	MR	R	R	MR
9.	CoPb 15212	MS	MS	R	R	MR
10.	CoJ 64	S	S	S	S	MS
11.	Co 0238	MR	MR	R	R	S
12.	Co 05009	MR	MR	R	R	S
IVT (Midlate)						
1.	Co 15026	MR	MR	R	R	MR
2.	CoLk 15206	MR	R	R	R	R
3.	CoLk 15207	MR	MR	R	R	R
4.	CoLk 15208	MR	MR	R	R	MS
5.	CoLk 15209	MR	MR	R	R	R
6.	CoPb 15213	MS	MR	R	R	S
7.	CoPb 15214	S	S	S	S	MS
8.	CoS 15231	MS	MS	S	S	S
9.	CoS 15232	MR	MR	R	R	MS
10.	CoS 15233	MR	MR	R	R	MR
11.	CoS 15234	MR	R	R	R	MR
12.	CoS 767	S	MS	S	S	S
13.	CoPant 97222	S	MS	R	R	S
14.	Co 05011	MR	MR	R	R	MS

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

Sl. No.	Entry	Red rot rating				YLD	Other disease
		Plug Method		Cotton swab Method			
		CF 08	CF09	CF08	CF09		
IVT(E)							
1	Co 14034	MR	MR	R	R	R	
2	CoLk 14201	MR	MR	R	R	MR	Smut(T)
3	CoLk 14202	MR	MR	R	R	MR	
4	CoPant 14222	MR	MR	R	R	R	
5	CoPb 14181	MR	MR	R	R	R	
6	CoPb 14182	MR	MR	R	R	R	
7	CoPb 14211	MS	MS	R	R	R	
AVT(E-I)							
8	Co 13034	R	R	R	R	R	
9	CoPb 13181	S	MS	R	R	MS	
10	CoS 13231	MR	MR	R	R	MS	
AVT(E-II)							
11	Co 12026	MR	MR	R	R	MR	
12	Co 12027	MR	R	R	R	MR	
13	CoLk 12203	MS	MR	R	R	MR	
14	CoPant 12221	MS	MR	R	R	MR	
IVT(ML)							
15	Co 14035	R	MR	R	R	MR	
16	CoH 14261	R	MR	R	R	MR	
17	CoH 14262	R	R	R	R	MR	
18	CoLk 14203	R	MR	R	R	MS	Smut(T)
19	CoLk 14204	R	MR	R	R	R	
20	CoLk 14205	MR	MS	R	R	R	
21	CoPb 14183	MS	MS	R	R	R	
22	CoPb 14184	MR	R	R	R	R	
23	CoPb 14185	MR	R	R	R	R	
24	CoPb 14212	MR	MR	R	R	R	
25	CoS 14231	S	MS	S	R	R	
26	CoS 14232	MR	MR	R	R	R	
27	CoS 14233	S	MS	S	R	MR	
AVT(ML-I)							
28	Co 13035	MR	MR	R	R	MR	
29	CoH 13263	MS	MS	R	R	R	
30	CoPant 13224	MS	MS	R	R	R	
31	CoPb 13182	MR	MR	R	R	R	
32	CoLk 13204	MS	MS	R	R	MR	
AVT(ML-II)							
33	Co 12029	MR	MR	R	R	R	
34	CoH 12263	MS	MS	R	R	R	
35	CoLk 12205	MS	MS	R	R	MR	
36	CoPant 12226	MR	MR	R	R	MR	

37	CoPb 12211	S	MS	R	R	MR	
38	CoS 12232	MR	MR	R	R	MR	Wilt(T)
Standards							
39	CoJ 64	S	S	S	S	S	
40	Co 0238	MR	R	R	R	MR	
41	CoS 767	S	S	S	R	S	
42	CoS 8436	MR	MR	R	R	MS	
43	CoPant 97222	MS	MS	R	R	MR	
44	CoPant 84211	MS	MS	R	R	S	

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

S. No.	Genotypes	Plug		Nodal Cotton Swab		Smut	YLD
		CF08	CF09	CF08	CF09		
IVT (Early)							
1	Co15023	MR	MR	R	R	MR	R
2	Co15024	MR	MR	R	R	R	MR
3	Co15027	MR	MR	R	R	NP	MR
4	CoLk15201	MS	MS	R	S	MS	MR
5	CoLk15203	S	S	R	R	R	MR
6	CoLk15204	MS	S	R	R	S	MR
7	CoLk15205	MS	MS	R	R	R	R
8	CoPb15212	MS	MS	R	R	R	MS
9	CoPb15211	MS	MS	R	R	MS	R
AVT(Early) I Plant							
1	Co14034	MS	MS	R	R	S	R
2	CoLk14201	MR	MR	R	R	MR	S
3	CoPb14181	MR	MS	R	R	S	R
4	CoPb14211	MS	S	R	S	MS	R
AVT (Early) II Plant							
1.	Co13034	MS	S	R	R	R	R
2.	CoPb13181	S	S	R	S	R	R
3.	CoS13231	NP	NP	NP	NP	NP	NP
IVT (ML)							
1	Co15026	MR	MR	R	R	HS	MR
2	CoLk15206	MR	MR	R	R	MS	R
3	CoLk15207	MR	MR	R	R	MS	R
4	CoLk15208	NP	NP	NP	NP	MR	NP
5	CoLk15209	MS	MS	R	R	MR	R
6	CoPb15213	MR	MR	R	R	MR	R
7	CoPb15214	HS	HS	S	S	R	HS
8	CoS15231	MR	MR	R	R	NP	S
9	CoS15232	MR	MS	R	R	R	R
10	CoS15233	R	MR	R	R	MR	MR
11	CoS15234	MR	MR	R	R	MS	R
AVT(ML) I Plant							
1.	Co14035	MR	MR	R	R	S	R
2.	CoH14261	NP	NP	NP	NP	NP	NP
3.	CoLk14203	MR	MR	R	R	S	MR
4.	CoLk14204	MR	MR	R	R	HS	MS
5.	CoPb14184	MR	MR	R	R	S	R
6.	CoPb14185	MR	MS	R	R	R	MS
7.	CoS14233	MR	MR	R	R	R	MS
AVT (ML) II Plant							
1.	Co13035	MR	MR	R	R	R	R
2.	CoH13263	MS	S	R	R	MR	S

3.	CoLk 13204	R	MR	R	R	MR	R
4.	CoPant13224	MS	MS	R	R	MS	R
5.	CoPb13182	MR	MR	R	R	MS	MR
Checks							
1.	CoJ64	S	S	R	S	MS	R
2.	CoS767	S	S	S	R	S	MR
3.	Co1158	-	-	-	-	S	-
4.	Co1148	-	-	-	-	S	-
5.	Co0238	MS	MS	R	R	S	R
6.	CoS8436	MS	MS	S	R	HS	MS
7.	CoPant97222	MR	MR	R	R	MS	R
8.	CoO 5009	MR	MR	R	R	MS	MS
9.	CoO 5011	MR	MS	R	R	R	S

NP: Not Planted

Table 19. Evaluation of sugarcane genotypes for red rot, smut and wilt -Pusa

S. No.	Genotypes	Plug		Nodal Cotton Swab		Smut	Wilt
		CF07	CF08	CF07	CF08		
IVT (Early)							
1	CoBln 15501	MR	MS	R	R	MR	MS
2	CoLk 15466	MR	MR	S	S	R	R
3	CoLk 15467	MR	MR	R	R	R	R
4	CoP 15436	MR	MR	R	R	R	R
5	CoP 15437	MR	MR	R	R	R	R
6	CoSe 15451	MR	MR	R	R	R	MR
7	CoSe 15452	MS	MS	R	R	MR	MR
8	CoSe 15455	MR	MR	R	S	MR	MR
9	CoSe 15456	MR	MR	R	R	MR	MS
10	CoLk 94184	MR	MR	R	R	R	MR
11	CoSe 01421	R	MR	R	R	R	MR
IVT(Mid late)							
1	CoBln 15502	MR	MR	R	R	R	MR
2	CoLk 15468	MR	MR	S	S	R	MS
3	CoLk 15469	MR	MR	R	R	MR	MR
4	CoP 15438	MR	MR	R	R	R	R
5	CoP 15439	MR	MR	R	R	R	R
6	CoP 15440	MR	MR	R	R	MR	MS
7	CoP 15441	MR	MS	R	R	MR	MR
8	CoSe 15453	MS	MS	S	R	MR	S
9	CoSe 15454	MR	MR	R	R	R	MR
10	CoSe 15457	MR	MR	R	R	R	MR
Checks							
11	BO 91	MR	MR	R	R	MR	MR
12	CoP 06436	MR	R	R	R	R	R
13	CoP 9301	MR	MR	R	R	R	R
14	CoSe 95422	MS	MS	S	S	MR	MS

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.	CoBln 15501	MS	MR	R	R	S	-	-
2.	CoLk 15466	MR	MR	R	R	R	-	-
3.	CoLk 15467	MR	MR	R	R	R	-	-
4.	CoP 15436	MR	MS	R	R	MS	-	-
5.	CoP 15437	MR	MR	R	R	R	-	S
6.	CoSe 15451	MR	MR	R	R	R	-	-
7.	CoSe15452	MR	MS	R	R	MR	S	-
8.	CoSe 15455	MR	MR	R	R	MR	-	-
9.	CoSe 15456	MR	MR	R	R	MR	-	-
Advance Varietal Trial (I-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.	CoSe14454	R	R	R	R	MR	-	-
Advance Varietal Trial (II-Plant, Early)								
1.	CoP 13437	MR	MR	R	R	MR	-	-
2.	CoSe 13451	MR	MR	R	R	MR	S	S
3.	CoSe 13452	MR	MR	R	R	MR	-	-
Initial Varietal Trial (Mid Late)								
1.	CoBln 15502	S	S	S	S	R	S	-
2.	CoLk 15468	MR	MR	R	R	R	-	-
3.	CoLk 15469	MR	MR	R	R	R	-	-
4.	CoP 15438	MR	MR	R	R	R	-	S
5.	CoP 15439	MR	MR	R	R	R	-	-
6.	CoP 15440	MR	MR	R	R	MS	-	-
7.	CoP 15441	MR	MR	R	R	MR	-	-
8.	CoSe 15453	MS	MS	R	R	MR	-	S
9.	CoSe 15454	MR	MR	R	R	R	-	-
10.	CoSe 15457	MR	MS	R	R	R	-	-
Advance Varietal Trial (I-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								
	CoSe 95422	S	S	S	S	MR		
	CoJ 64	HS	HS	-	-	R	-	-
	Co 1158	-	-	-	-	R	-	-
	CoLk 7701	-	-	-	-	R	-	-

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	CoBln 15501	MS	MR	R	R	S	MS
2	CoLk 15466	MR	MR	R	R	R	MS
3	CoLk 15467	MR	MR	R	R	R	R
4	CoP 15436	MR	MS	R	R	MS	R
5	CoP 15437	MR	MS	R	R	MR	MR
6	CoSe 15451	MR	MR	R	R	R	R
7	CoSe 15452	MR	MR	R	R	R	R
8	CoSe 15455	MR	MR	R	R	R	R
9	CoSe 15456	MR	MR	R	R	R	R
Standards							
1	CoLk 94184	MR	MR	R	R	R	R
2	CoSe 95422	S	S	MR	MR	R	R
3	CoSe 01421	MR	MR	R	R	R	R
4	Co 1158	-	-	-	-	S	-
IVT (Midlate)							
1	CoBln 15502	HS	S	S	R	R	R
2	CoLk 15468	MR	MR	R	R	R	R
3	CoLk 15469	MS	MR	R	R	MR	R
4	CoP 15438	MR	MR	R	R	R	R
5	CoP 15439	MR	MR	R	R	R	R
6	CoP 15440	MR	MS	R	R	MS	R
7	CoP 15441	MR	MR	R	R	R	MS
8	CoSe 15453	MR	MR	R	R	MR	R
9	CoSe 15454	MR	MR	R	R	R	MS
10	CoSe 15457	MR	MR	R	R	R	R
Standards							
1	BO91	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	-
AVT (Early) I Plant							
1	CoLk 14206	MR	MR	R	R	R	R
2	CoP 14437	MS	MR	R	R	S	R
3	CoSe 14451	MR	MR	R	R	MR	MR
4	CoSe 14454	MR	MR	R	R	R	MR

Standards							
1	CoLk 94184	MR	MR	R	R	R	R
2	CoSe 95422	S	S	MR	MR	R	R
3	CoSe 01421	MR	MR	R	R	R	R
4	Co 1158	-	-	-	-	S	-
AVT (Mid late)							
1	CoLk 14208	MR	MR	R	R	R	R
2	CoLk 14209	MR	MR	R	R	MR	R
3	CoP 14438	MS	MR	R	R	MS	MR
4	CoP 14439	MR	MR	R	R	R	R
5	CoSe 14455	MR	MR	R	R	R	R
Standards							
1	BO91	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	CFO7			CFO8		
		Plug method		Nodal method	Plug method		Nodal Method
IVT- Early							
1.	CoLk 15466	3.4	MR	R	2.2	MR	R
2.	CoLk 15467	2.8	MR	R	1.8	R	R
3.	CoP 15436	2.0	R	R	2.4	MR	R
4.	CoP 15437	2.3	MR	R	2.2	MR	R
5.	CoSe 15451	2.6	MR	R	3.4	MR	R
6.	CoSe 15452	4.2	MS	S	4.6	MS	R
7.	CoSe 15455	3.2	MR	S	4.4	MS	R
8.	CoSe 15456	3.6	MR	R	2.3	MR	S
9.	CoBln 15501	3.8	MR	R	4.2	MS	R
Checks							
10.	CoSe 95422	4.8	MS	R	4.2	MS	S
11.	CoSe 01421	2.6	MR	R	3.2	MR	R
12.	CoLk 94184	3.8	MR	R	2.6	MR	R
IVT- Midlate							
13.	CoLk 15468	3.8	MR	R	2.6	MR	R
14.	CoLk 15469	1.6	R	R	2.4	MR	R
15.	CoP 15438	2.5	MR	R	2.8	MR	R
16.	CoP 15439	2.6	MR	R	2.2	MR	R
17.	CoP 15440	2.7	MR	R	2.6	MR	S
18.	CoP 15441	2.6	MR	R	2.4	MR	S
19.	CoSe 15453	4.2	MS	R	3.8	MR	S
20.	CoSe 15454	Insufficient planting material					
21.	CoSe 15457	Insufficient planting material					
22.	CoBln 15502	2.2	MR	R	3.6	MR	S
Checks							
23.	BO 91	3.4	MR	R	2.4	MR	R
24.	CoP 9301	2.8	MR	R	3.2	MR	R
AVT (Early)- I Plant							
25.	CoLk 14206	3.0	MR	S	4.8	MS	S
26.	CoP 14437	2.0	R	R	3.2	MR	R
27.	CoSe 14451	2.8	MR	S	4.2	MS	S
28.	CoSe 14454	4.2	MS	R	3.8	MR	S
AVT (Early)- II Plant							

29.	CoP 13437	3.0	MR	R	2.6	MR	R
30.	CoSe 13451	3.2	MR	R	4.8	MS	S
31.	CoSe 13452	2.6	MR	R	3.2	MR	R
AVT (Midlate)- I Plant							
32.	CoLk 14208	3.2	MR	R	2.8	MR	S
33.	CoLk 14209	2.0	R	R	2.6	MR	R
34.	CoP 14438	4.2	MS	R	3.8	MR	S
35.	CoP 14439	2.8	MR	R	3.2	MR	R
36.	CoSe 14455	2.6	MR	R	2.2	MR	R
37.	Akipura(Check)	4.6	MS	S	5.2	MS	S

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

S. No	Clone	Plug method	Nodal cotton swab method	Smut	Wilt	YLD
IVT Early						
1	CoA 16321	R	R	MS	HS	R
2	CoC 16336	MS	R	MS	MS	MR
3	CoC 16337	MS	R	MR	MR	MR
4	CoV 16356	MR	R	MR	MS	S
5	CoA 92081 (c)	R	R	HS	MS	MR
6	CoOr 03151 (c)	MR	R	HS	R	MR
7	Co 01061 (c)	MR	R	R	R	MS
IVT Mid late						
8	CoA 16322	MR	R	S	HS	MR
9	CoC 16338	MS	R	HS	MR	R
10	CoC 16339	MR	R	MR	MR	MS
11	CoV 16357	R	R	MS	MR	MS
12	Co V 92102 (c)	MR	R	MR	HS	R
13	Co 06030 (c)	MR	R	R	R	MR
14	Co 86249 (c)	R	R	R	R	MS
AVT I (Early)						
15	CoC 15336	R	R	MS	S	MS
16	CoC 15338	MR	R	HS	S	MS
17	CoV 15356	MR	R	HS	R	MS
AVT II (Early)						
18	Co 13023	MR	R	R	MR	MS
19	CoA 14321	R	R	MR	MR	MR
20	CoC 14336	MS	R	HS	MS	MR
AVT II (Mid late)						
21	Co 13028	R	R	MS	MR	R
22	Co 13029	MR	R	MR	MS	R
23	Co 13031	MR	R	MR	R	R
24	CoA 14323	MR	R	HS	MR	MS

25	CoC 14337	MR	R	MR	MR	MR
26	PI 14337	MR	R	HS	MR	MR
Check						
27	Co 419	HS	S	HS	S	R
28	CoC 671	HS	S	MS	S	R
29	Co 997	HS	S	MS	HS	MR
30	CoA 89085	MS	R	MS	MR	R
31	Co 6907	S	S	MS	S	R
32	Co 7219	S	R	MR	S	R
33	Co 7706	S	R	S	MR	R

Table 24. Evaluation of sugarcane genotypes for red rot,smutand YLDresistance- Cuddalore

S. No.	Clone	Plug method	Nodal method	Smut	YLD
		CF06	CF06		
IVT - Early					
1.	CoA 16321	MR	R	MR	MS
2.	CoC 16336	MR	R	MS	MS
3.	CoC 16337	MR	R	MS	MR
4.	CoV 16356	MR	R	MR	MR
AVT – Early I Plant					
5.	CoC 15336	MS	R	MR	MS
6.	CoC 15338	MR	R	MR	MS
7.	CoV 15356	MR	R	S	MS
AVT – Early II Plant					
8.	Co 13023	MR	R	MS	MR
9.	CoA 14321	MR	R	MS	MS
10.	CoC 14336	MR	R	S	MS
IVT- Midlate					
11.	CoA 16322	MR	R	MS	MS
12.	CoC 16338	MR	R	S	MS
13.	CoC 16339	MR	R	MR	MR
14.	CoV 16357	MR	R	MS	MS
AVT- Midlate II Plant					
15.	Co 13028	MR	R	MS	MS
16.	Co 13029	MR	R	S	MR
17.	Co 13031	MR	R	MS	MR
18.	CoA 14323	MR	R	HS	MS
19.	CoC 14337	MR	R	MR	MS
20.	PI 14377	MR	R	MS	MR
Checks					
1.	CoC 671	HS	S	-	-
2.	Co 86249	R	R	-	-
3.	Co 97009	-	-	HS	-
4.	CoC 22	-	-	HS	-
5.	CoA 92081	-	-	HS	S
6.	CoC 01061	-	-		HS

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

S. No.	Varieties	Plug method		Cotton swab method	Smut	Wilt	YL
		Score	Reaction	Reaction			
Initial Varietal Trial (Early)							
1	Co 14005	7.0	S	R	MR		R
2	Co 15002	3.6	MR	R	R		R
3	Co 15005	3.0	MR	R	R		R
4	Co 15006	2.9	MR	R	R		R
5	Co 15007	3.2	MR	R	HS		R
6	Co 15009	3.4	MR	R	R		R
7	Co 15010	4.2	MS	R	R		R
8	Co 15015	4.5	MS	R	R		R
9	Co 15017	3.8	MR	R	R		R
10	Co 15018	2.8	MR	R	R		MR
11	Co 15020	2.9	MR	R	HS		R
12	Co 15021	3.2	MR	R	MR		R
13	CoN 15071	2.9	MR	R	R		R
14	CoN 15072	3.8	MR	R	MR		R
15	CoSnk 15101	3.3	MR	R	S		R
16	CoSnk 15102	4.8	MS	R	MS		R
17	CoSnk 15103	4.4	MS	R	MR		R
18	CoSnk 15104	6.8	S	R	R		S
19	CoVc 15061	4.4	MS	R	R		R
20	CoVc 15062	8.6	HS	R	MS		R
21	CoVc 15063	3.8	MR	R	R		R
22	CoVc 15064	8.4	HS	R	R		R
23	CoVSI 15121	8.4	HS	R	MR		R
24	PI 15131	6.6	S	R	R		R
25	PI 15132	4.4	MS	R	R		S
26	VSI 15122	3.6	MR	R	R		R
AVT- I Plant							
27	Co 13002	4.4	MS	R	R		R
28	Co 13003	3.4	MR	R	R		R
29	Co 13004	3.8	MR	R	MR		R
30	Co 13006	2.8	MR	R	MS		R
31	Co 13008	3.7	MR	R	R		R
32	Co 13009	3.2	MR	R	R		R
33	Co 13013	3.0	MR	R	R		R
34	Co 13014	4.2	MS	R	S		R
35	Co 13018	3.4	MR	R	R		R

36	Co 13020	4.8	MS	R	MR		MR
37	CoN 13072	2.9	MR	R	R		R
38	CoN 13073	3.2	MR	R	R		R
39	CoSnk 13101	3.8	MR	R	R		R
40	CoSnk 13103	6.2	S	R	MS		R
41	CoSnk 13106	4.8	MS	R	MS		R
42	MS 13081	2.9	MR	R	R		R
43	PI 13132	4.4	MS	R	R		R
Advanced Varietal Trial- II Plant							
44	Co 12007	8.2	HS	R	R		R
45	Co 12008	4.6	MS	R	MR		MR
46	Co 12009	3.4	MR	R	MS		R
47	Co 12012	3.4	MR	R	R		R
48	Co 12019	3.2	MR	R	R		R
49	Co 12024	7.0	S	R	R		MR
50.	CoM 12085	4.6	MS	R	R		R
51	VSI 12121	3.0	MR	R	MS		R
Standard							
1	Co 86032	8.0	HS	R	MR		S
2	CoC 671	8.2	HS	S	MR		R
3	CoSnk 05103	3.2	MR	R	MR		R
4	Co 85004	6.2	S	R	S		MS
5	Co 94008	2.4	MR	R	-		R
6	Co 99004	3.0	MR	R	MS		MR
7	Co 97009	-	-	-	HS		-
8	Co 86002	-	-	-	HS		-
9	Co 6806	-	-	-	MR		-

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

S. No	Genotypes	CF06			CF12		
		Plug		Cotton swab	Plug		Cotton swab
		Score	Reaction	Reaction	Score	Reaction	Reaction
AVT (I plant)							
1	Co13002	3.3	MR	R	3.0	MR	R
2	Co 13003	5.3	MS	R	3.3	MR	R
3	Co 13004	5.0	MS	S	6.0	MS	S
4	Co 13006	6.0	MS	S	6.7	S	S
5	Co 13008	4.7	MS	R	4.0	MR	R
6	Co13009	2.3	MR	R	2.0	R	R
7	Co 13013	1.0	R	R	3.7	MR	R
8	Co 13014	6.0	MS	S	4.5	MS	S
9	Co 13018	7.3	S	S	8.0	S	S
10	Co 13020	4.7	MS	S	4.5	MS	S
11	CoN13072	3.3	MR	R	2.7	MR	R
12	CoN 13073	2.0	R	R	2.7	MR	R
13	MS 13081	3.0	MR	R	3.7	MR	R
14	CoSnk 13101	1.0	R	R	3.3	MR	R
15	CoSnk 13103	2.7	MR	R	3.0	MR	R
16	CoSnk 13106	3.3	MR	R	5.3	MS	R
17	PI 13132	4.0	MR	R	3.0	MR	R
18	CoSnk 05103	3.0	MR	S	4.0	MR	S
19	CoC 671	9.0	HS	S	9.0	HS	S
20	Co 86032	4.5	MS	R	5.3	MS	R
AVT (II Plant)							
1	Co 12007	4.5	MS	R	6.0	MS	R
2	Co 12008	4.0	MR	R	5.0	MS	R
3	Co 12009	5.6	MS	S	5.6	MS	S
4	Co 12012	5.3	MS	R	4.3	MS	R
5	Co 12019	3.0	MR	R	5.0	MS	R
6	Co 12024	7.0	S	S	6.6	S	S
7	CoM 12085	7.0	S	S	7.0	S	S
8	VSI 12121	5.0	MS	S	7.0	S	S
9	Co 86032	6.0	MS	S	6.3	S	S
10	CoC 671	8.3	HS	S	8.3	HS	S
11	CoSnk 05103	3.3	MR	R	3.3	MR	R
AVT Early (II Plant)							

1	Co 12007	7.0	S	R	6.3	S	R
2	Co 12008	4.7	MS	R	3.0	MR	R
3	Co 12009	4.0	MR	R	4.3	MS	R
4	Co 12012	4.7	MS	R	2.3	MR	R
5	Co 12019	2.7	MR	R	4.7	MS	R
6	Co 12024	7.3	S	S	6.7	S	S
7	CoM 12085	6.3	S	S	8.0	S	S
8	VSI 12121	6.3	S	S	5.0	MS	S
9	Co 86032	4.5	MS	S	5.3	MS	S
10	CoC 671	9.0	HS	S	9.0	HS	S
11	CoSnk 05103	3.0	MR	R	4.0	MR	R

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

S.No.	Clone	Red rot reaction			Smut Rating
		Score	Plug	Nodal	
1	Co 13021	2.8	MR	R	-
2	Co 13022	6.6	S	R	-
3	Co 14002	3.0	MR	R	-
4	Co 14003	3.0	MR	R	-
5	Co 14004	2.0	R	R	-
6	Co 14006	0.6	R	R	-
7	Co 14008	2.4	MR	R	-
8	Co 14009	4.0	MR	R	-
9	Co 14012	2.4	MR	R	-
10	Co 14016	2.6	MR	R	-
11	Co 14022	3.8	MR	R	-
12	Co 14023	1.0	R	R	-
13	Co 14025	3.8	MR	R	-
14	Co 14026	2.6	MR	R	-
15	Co 14027	4.4	MS	R	-
16	Co 14030	3.0	MR	R	-
17	Co 14031	1.4	R	R	-
18	Co 14032	4.0	MR	R	-
19	CoN 14071	4.0	MR	R	-
20	CoN 14072	4.8	MS	R	-
21	CoN 14073	4.6	MS	R	-
22	CoN 14074	5.6	MS	R	-
23	CoSnk 14101	3.2	MR	R	-
24	CoSnk 14102	5.0	MS	S	-
25	CoSnk 14103	4.0	MR	R	-
26	CoT 14366	3.0	MR	R	-
27	CoT 14367	3.0	MR	R	-
28	CoTl 14111	1.6	R	R	-
29	CoTl 14112	-	-	-	-
30	MS 14081	3.0	MR	R	-
31	MS 14082	3.2	MR	R	-
32	CoVc 14061	9.0	HS	S	-
33	CoVc 14062	2.8	MR	R	-
38	Co 14005	2.6	MR	R	MS
39	Co 15002	0.0	R	R	HS
40	Co 15005	3.4	MR	R	HS
41	Co 15006	5.0	MS	R	R

42	Co 15007	4.7	MS	R	HS
43	Co 15009	3.4	MR	R	R
44	Co 15010	3.6	MR	R	MS
45	Co 15015	3.4	MR	R	MR
46	Co 15017	2.8	MR	R	RT*
47	Co 15018	4.8	MS	S	S
48	Co 15020	4.2	MS	R	RT*
49	Co 15021	3.6	MR	R	HS
50	CoN 15071	4.6	MS	R	S
51	CoSnk 15101	9.0	HS	S	S
52	CoSnk 15102	9.0	HS	S	HS
53	CoVc 15064	4.4	MS	R	HS
54	CoVSI 15121	3.0	MR	R	S
55	CoVSI 15122	4.0	MR	R	HS
56	PI 15131	2.2	MR	R	RT*
57	PI 15132	9.0	HS	S	RT*
	CoC 671 (Std)	9.0	HS	S	-
	Co 94012 (Std)	9.0	HS	S	-
	Co 96007 (Std)				HS
	Co 97009 (Std)				HS
	Co 6806 (Std)				MR

*RT- Re-testing

Table 28. Evaluation of sugarcane genotypes for smut and YLD resistance- Kolhapur

S. No	Genotypes	Smut incidence (%)	Smut Reaction	YLD
IVT Early				
1	Co 14005	1.0	MR	MS
2	Co 15002	1.0	MR	MS
3	Co 15005	12.0	MS	R
4	Co 15006	0.0	R	S
5	Co 15007	25.00	S	R
6	Co 15009	1.0	MR	R
7	Co 15010	1.0	MR	MR
8	Co 15015	0.0	R	MR
9	Co 15017	0.0	R	R
10	Co 15018	8.0	MR	MS
11	Co 15020	22.0	S	MS
12	Co 15021	17.0	MS	MR
13	CoN 15071	5.0	MR	R
14	CoN 15072	8.0	MR	R
15	CoSnk 15101	3.0	MR	MS
16	CoSnk 15102	24.00	S	R
17	CoSnk 15103	1.0	MR	MR
18	CoSnk 15104	2.0	MR	MR
19	CoVc 15061	3.0	MR	S
20	CoVc 15062	9.0	MR	MR
21	CoVc 15063	2.0	MR	R
22	CoVc 15064	4.0	MR	MR
23	CoVSI 15121	2.0	MR	MR
24	PI 15131	17.0	MS	S
25	PI 15132	12.00	MS	MS
26	VSI 15122	7.0	MR	R
AVT (Early I Plant)				
27	Co 13002	0.0	R	MS
28	Co 13003	5.0	MR	R
29	Co 13004	1.0	MR	R
30	Co 13006	8.0	MR	MR
31	Co 13008	9.0	MR	MR
32	Co 13009	9.0	MR	R
33	Co 13013	12.0	MS	MR
34	Co 13014	3.0	MR	R
35	Co 13018	1.0	MR	MS
36	Co 13020	2.0	MR	R
37	CoN 13072	5.0	MR	MS
38	CoN 13073	0.0	R	MR
39	CoSnk 13101	1.0	MR	MR
40	CoSnk 13103	3.0	MR	MR

41	CoSnk 13106	1.0	MR	MR
42	MS 13081	1.0	MR	MR
43	PI 13132	5.0	MR	R
AVT (Early II Plant)				
44	Co12007	23.0	S	MR
45	Co12008	26.0	S	MR
46	Co12009	13.0	MS	R
47	Co12012	4.0	MR	R
48	Co12019	1.0	MR	MR
49	Co12024	3.0	MR	MR
50	CoM 12085	4.0	MR	R
51	VSI 12121	9.0	MR	MR
Checks				
52	Co 86032	3.0	MR	MS
53	CoC 671	4.0	MR	S
54	CoSnk 05103	3.0	MR	MR
55	Co 419	12.0	MS	R
56	Co 740	36.0	HS	MR
57	Co 7527	21.0	S	R
58	Co 85004	-	-	S

Table 29. Evaluation of sugarcane genotypes for smut resistance–Pune

Sl. No	Genotypes	Smut Reaction	S. No	Genotypes	Smut Reaction
IVT Early					
1	Co 15002	MS	36	CoSnk 13103	R
2	Co 15005	MS	37	CoSnk 13106	R
3	Co 15006	MS	38	MS 13081	R
4	Co 15007	MR	39	PI 13132	MS
5	Co 15009	R	**AVT Early (II Plant)**		
6	Co 15010	R	40	Co 12007	S
7	Co 15015	MS	41	Co 12008	S
8	Co 15017	MS	42	Co 12009	HS
9	Co 15018	R	43	Co 12012	R
10	Co 15020	R	44	Co 12019	R
11	Co 15021	R	45	Co 12024	S
12	CoN 15071	R	46	CoM 12085	R
13	CoN 15072	MS	47	VSI 12121	MR
14	CoSnk 15101	HS	**Standards**		
15	CoSnk 15102	MS	48	Co 740	HS
16	CoSnk 15103	HS	49	Co 7219	S
17	CoSnk 15104	MS			
18	CoVc 15061	R			
19	CoVc 15063	MS			
20	CoVSI 15121	R			
21	PI 15132	MS			
22	VSI 15122	MS			
AVT Early (I Plant)					
23	Co 13002	R			
24	Co 13003	R			
25	Co 13004	R			
26	Co 13006	R			
27	Co 13008	R			
28	Co 13009	HS			
29	Co 13013	S			
30	Co 13014	R			
31	Co 13018	MS			
32	Co 13020	R			
33	CoN 13072	MS			
34	CoN 13073	MR			
35	CoSnk 13101	MS			

Table 30. 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.	SA 04-472	MR	MR	R	R
2.	SA 04-454	R	R	R	R
3.	MA/5/22	MR	MR	R	R
4.	MA/5/37	MR	MR	R	R
5.	PG 9869137	S	S	S	S
6.	BM 1009-163	S	S	S	S
7.	BM 1022-173	MS	MS	R	R
8.	BA 1003143	R	R	R	R
9.	SA 04-390	MR	MR	R	R
10.	SA 04-496	MR	MR	R	R
11.	CYM -07986	MS	MS	R	R
12.	AS 04-2097	MR	MR	R	R
13.	BM-1009149	MR	MR	R	R
14.	AS 04-1687	MS	MS	R	R
15.	MA 5/5	MR	MR	R	R
16.	SA 98-13	R	R	R	R
17.	GU 07-2276	R	R	R	R
18.	MA 5/51	MS	MS	R	R
19.	GU 07-3849	R	R	R	R
20.	SA 04-409	MR	MR	R	R
21.	BM 1010168	R	R	R	R
22.	MA 5/99	MR	MR	R	R
23.	AS 04-1689	MR	MR	R	R
24.	GU 073-774	HS	HS	S	S
25.	AS 04-635	R	R	R	R
26	AS 04-245	HS	HS	S	S
27	CoJ 64 (C)	HS	S	-	-
28	CoS 767 (C)	MS	S	-	-

Table 31. Assessment of elite and ISH genotypes for resistance to red rot –Kapurthala

Sl. No.	Genotypes	Red rot reaction		Sl. 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	MR	MS	16	PG 9869137	MS	S
3	AS 04-1687	MR	MS	17	SA 98-13	MR	MS
4	AS 04-2097	MS	S	28	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	MS	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	S	24	BM 10-22173	MS	MS
11	GU 07-3849	S	S	25	AS 04-1689	MR	MR
12	MA 5/5	MS	S	26	BM 1009163	MS	S
13	MA 5/22	S	MS	27	MA-5/37	MR	MS
14	MA 5/51	MR	MR				

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

Sl. No.	Genotypes	Red rot reaction		Sl. No.	Genotypes	Red rot reaction	
		CF08	CF09			CF08	CF09
1	AS-04-635	MS	MS	14	BM-1005-149	MR	MS
2	AS-04-245	MS	MS	15	AS -04-2097	MS	MS
3	Bm-1009-163	MS	S	16	BM-100-3143	MR	MR
4	MA-5-5	MS	MS	17	GV-07-3849	MR	R
5	MA-5-37	MS	MR	18	BM-1010-168	MS	MR
6	SA04-472	MR	R	19	GV-07-2276	MR	MR
7	SA-98-13	MR	MR	20	SA-04-390	MR	MR
8	SA 04-496	MR	MS	21	GV-07-3734-212	S	MS
9	MA-5-22	R	R	22	MA-5-51	MS	MR
10	BM-1022-173	R	MS	23	CUM-07-986	MR	MS
11	AS -04-1687	MS	MR	24	SA-04-409	MR	MS
12	AS -04-1689	MS	MS	25	PG-9869137	NG	NG
13	MA-5-99	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	GU 07-3849	MS	MS
2	AS 04/2097	MS	MS	14	MA 4/22	MS	S
3	AS 04-1689	MR	MS	15	MA 5/5	S	MS
4	AS 04-245	HS	HS	16	MA 5/51	MS	MS
5	AS 04-390	MR	MR	17	MA 5/99	MR	MR
6	AS 04-635	MR	MS	18	PG 9869137	MR	MS
7	BM 1003143	MS	MS	19	SA 04-409	MR	MS
8	BM 1005149	MS	MR	20	SA 04-454	MR	MR
9	BM 1010168	MR	MR	21	SA 04-472	MS	MS
10	CYM 07-986	MS	MS	22	SA 04-496	MR	MR
11	GU 07-2276	MS	MR	23	SA 98-13	R	R
12	GU 07-3774	HS	HS	-	-	-	-

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

Sl. No.	Genotypes	Red rot reaction		Sl. No.	Genotypes	Red rot reaction	
		CF08	CF09			CF08	CF09
1	AS04- 1689	MR	MR	15	MA 5/5	S	HS
2	AS04- 1687	S	MS	16	MA 5/22	MR	MS
3	AS04- 245	S	S	17	MA 5/37	MR	MR
4	AS04- 635	MR	MR	18	MA 5/51	S	S
5	BM1022-173	S	S	19	MA 5/99	MR	MR
6	BM 1009-163	S	S	20	PG 9869137	HS	HS
7	AS 04- 2097	MR	MS	21	SA 98-13	MR	S
8	BM 100-3143	MR	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	HS	S
12	GU 07-2276	MR	S	26	SA 04-472	MR	MS
13	GU 07-3774	S	S	27	SA 04-496	MS	MS
14	GU 07-3849	R	MR				

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

Sl. No.	Genotypes	Red rot reaction		Sl. No.	Genotypes	Red rot reaction	
		CF07	CF08			CF07	CF08
1	AS 04-1687	MR	MR	15	GU 07/2276	MR	MR
2	BM-1009163	MS	S	16	GU 07/3774	S	S
3	AS 04-1689	MR	MR	17	GU 07/3849	S	S
4	AS 04-390	MR	MR	18	MA-5/22	MS	S
5	MB-1005149	MR	MR	19	MA-5/5	S	S
6	AS 04-454	MR	MR	20	MA-5/51	S	S
7	MB-1022173	MS	MS	21	MA 5/99	S	S
8	MA-5/37	S	S	22	PG-9869137	S	S
9	AS 04-635	MS	MS	23	SA 04-458	S	S
10	AS 04-245	S	S	24	SA 04/472	MS	MS
11	AS 04-2097	MR	MR	25	AS 04-98/13	MR	MR
12	AS 04-496	MR	MR	26	SA 04-409	S	S
13	BM-1010168	MR	MR	27	BM-1003143	S	S
14	CYMO-7986	MS	S				

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

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

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

Sl. No.	Genotypes	Red rot reaction	Sl. No.	Genotypes	Red rot reaction
1	BM 1003143	S	16	AS 04-2097	MR
2	BM 1005149	MS	17	AS 04-635	S
3	BM 1009163	S	18	AS 04-1687	MS
4	BM 1010168	MS	19	MA 5/51	MR
5	BM 1022173	HS	20	MA 5/5	S
6	PG 9869137	R	21	MA 5/37	MR
7	SA 98-13	MS	22	MA 5/99	MR
8	SA 04-454	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	R
14	AS 04-1689	MS	29	83R23	MR
15	AS 04-245	HS	30	CoA92081	R

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

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

Table 39. Assessment of elite and ISH genotypes for resistance to red rot - Navsari

Sl. No.	Genotypes	Red Rot	Sl. No.	Genotypes	Red Rot
1	ISH 111	MR	16	ISH 43	HS
2	ISH 175	MS	17	ISH 117	MR
3	ISH 58	MR	18	ISH 114	MR
4	ISH 100	MR	19	SES 594	R
5	ISH 287	MS	20	ISH 115	MR
6	ISH 12	MS	21	AS 04-2097	MS
7	ISH 50	MS	22	MA 5/5	S
8	ISH 41	S	23	MA 5/99	MR
9	ISH 147	MR	24	MA 5/51	S
10	ISH 69	S	25	AS 04 1687	MR
11	ISH 267	MR	26	GU 07 276	MR
12	ISH 229	MS	27	MA 5/22	MR
13	ISH 176	HS	28	CyM 07986	MR
14	ISH 118	MR	29	BM 10 1068	R
15	ISH 9	HS	30	SA 04 454	MR

Table 40. Reaction of sugarcane clones for resistance to *Pokkah boeng* - Kapurthala

Sr. No.	Entry	Disease Reaction	Sr. No.	Entry	Disease Reaction
IVT(E)			21	CoLk 15209	R
1	Co 15023	R	22	CoPb 15213	R
2	Co 15024	MS	23	CoPb 15214	MS
3	Co 15027	R	24	CoS 15231	R
4	CoLk 15201	MS	25	CoS 15232	R
5	CoLk 15203	R	26	CoS 15233	R
6	CoLk 15204	S	27	CoS 15234	R
7	CoLk 15205	MS	**AVT(ML-I)**		
8	CoPb 15211	R	28	Co 14035	R
9	CoPb 15212	S	29	CoH 14261	R
AVT(E-I)			30	CoLk 14203	R
10	Co 14034	R	31	CoLk 14204	R
11	CoLk 14201	MS	32	CoPb 14184	R
12	CoPb 14181	R	33	CoPb 14185	R
13	CoPb 14211	R	34	CoS 14233	MS
AVT(E-II)			**AVT(ML-II)**		
14	Co 13034	MS	35	Co 13035	MS
15	CoPb 13181	MS	36	CoH 13263	R
16	CoS 13231	R	37	CoPant 13224	MS
IVT(ML)			38	CoPb 13182	R
17	Co 15026	MS	39	CoLk 13204	S
18	CoLk 15206	S	**Standards**		
19	CoLk 15207	R	40	Co 238	HS
20	CoLk 15208	MS	41	CoJ 85	HS

Table 41. Reaction of sugarcane clones for resistance to *Pokkah boeng* - Uchani

Sr. No.	Genotype/Variety	Reaction	Sr. No.	Genotype/Variety	Reaction
	IVT – (ML)			**AVT (Early) – I Plant**	
1	Co 15026	S	37	Co 14034	R
2	CoLk 15206	R	38	CoLk 14201	R
3	CoLk 15207	R	39	CoPb 14181	R
4	CoLk 15208	MS	40	CoPb 14211	R
5	CoLk 15209	R		**AVT (E) – II Plant**	
6	CoPb 15213	R	41	Co 13034	MS
7	CoPb 15214	R	42	CoPb 13181	R
8	CoS 15231	HS	43	CoS 13231	MS
9	CoS 15232	R	44	CoJ 64	S
10	CoS 15233	MS	45	Co 0238	HS
11	CoS 15234	MS	46	Co 05009	S
	AVT (ML) – I Plant			**ISH clones / Genotypes**	
12	Co 14035	R	47	AS-04-635	R
13	CoH 14261	R	48	AS-04-245	R
14	CoLk 14203	R	49	Bm-1009-163	R
15	CoLk 14204	R	50	MA-5-5	S
16	CoPb 14184	R	51	MA-5-37	S
17	CoPb 14185	R	52	SA 04-472	HS
18	CoS 14233	R	53	SA-98-13	R
	AVT (ML) –II Plant		54	SA 04-496	HS
19	Co 13035	R	55	MA-5-22	R
20	CoH 13263	R	56	BM-1022-173	HS
21	CoLK 13204	MS	57	AS -04-1687	R
22	CoPant 13224	MS	58	AS -04-1689	R
23	CoPb 13182	R	59	MA-5-99	MS
24	Co S 767	R	60	BM-1005-149	R
25	CoS 8436	S	61	AS -04-2097	R
26	CoPant 97222	R	62	BM-100-3143	R
27	Co 05011	R	63	GV-07-3849	R
	IVT – (E)		64	BM-1010-168	R
28	Co 15023	R	65	GV-07-2276	R
29	CoLk 15024	R	66	SA-04-390	R
30	CoLk 15027	MS	67	GV-07-3734-212	R
31	CoLk 15201	R	68	MA-5-51	R
32	CoLk 15203	R			
33	CoLk 15204	R			
34	CoLk 15205	R			
35	CoPb 15211	R			
36	CoPb 15212	R			

Table 42. Reaction of sugarcane clones for resistance to *Pokkah boeng* - Shahjahanpur

Sl. No.	Varieties	Disease reaction	Sl. No.	Varieties	Disease reaction
1	4619/07	S	10	CoS 767	R
2	Co 05011	R	11	CoS 8436	S
3	CoPb 15234	MS	12	CoSe 13452	MS
4	CoS 11271	MS	13	CoSe 15452	MS
5	CoS 12232	R	14	CoSe 15453	R
6	CoS 13231	R	15	CoSe 15454	R
7	CoS 13232	R	16	CoSe 15455	S
8	CoS 15232	MS	17	CoSe 95422	R
9	CoS 15233	MS	18	Co 0238	S

Table 43. Reaction of sugarcane clones for resistance to *Pokkah boeng* – Pusa

Sl No.	Varieties	Disease reaction	Sl No.	Varieties	Disease reaction
1	CoP 151	R	13	CoP 11437	MS
2	CoP 9301	R	14	CoBln 14502	MS
3	CoP 153	R	15	CoP 13437	MS
4	CoP 155	R	16	CoP 13439	R
5	CoP 154	MS	17	CoSe 13452	R
6	BO 156	MS	18	CoSe 13453	MS
7	BO 91	R	19	CoP 2061	R
8	CoP 16437	R	20	CoP 11438	R
9	BO 153	R	21	CoP 12438	R
10	BO 139	MS	22	CoLk 12207	MS
11	CoP 16440	MS	23	CoP 12436	R
12	CoSe 12451	MS	24	CoSe 95422 (C)	S

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

Sl No.	Varieties	Disease reaction	Sl No.	Varieties	Disease reaction
1	S 2232/10	R	10	CoSe 15457	R
2	CoSe 15453	R	11	S 1690/10	R
3	CoSe 15452	MS	12	CoS 13232	R
4	CoS 11271	MS	13	CoLk 94184	MS
5	CoSe 15456	R	14	CoS 15233	R
6	CoS 11232	R	15	S 8663/08	MS
7	CoSe 15454	R	16	Co 0238	S
8	CoSe 15455	MS	17	Co 98014	R
9	CoS 8436	R	18	CoS 08279	S

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

S.No.	Entry No.	Disease reaction	S.No.	Entry No.	Disease reaction
IVT (E)			**AVT I (E)**		
1	CoA 16321	HS	15	CoC 15336	S
2	CoC 16336	S	16	CoC 15338	S
3	CoC 16337	S	17	CoV 15356	S
4	CoV 16356	S		**AVT II (E)**	
5	CoA 92081 (c)	MS	18	CoC 13023	S
6	CoOr 03151 (c)	S	19	CoA 14321	MS
7	Co 01061 (c)	MS	20	CoC 14336	R
IVT (ML)			**AVT II (ML)**		
8	CoA 16322	HS	21	Co 13028	S
9	CoC 16338	MS	22	Co 13029	HS
10	CoC 16339	MS	23	Co 13031	S
11	CoV 16357	MS	24	CoA 14323	S
12	Co V 92102 (c)	S	25	CoC 14337	S
13	Co 06030 (c)	S	26	PI 14337	S
14	Co 86249 (c)	S			
Checks					
1	Co 419	HS	5	Co 6907	S
2	CoC 671	HS	6	Co 7219	S
3	Co 997	S	7	Co 7706	HS
4	CoA 89085	S			

Table 46. Reaction of sugarcane clones for resistance to *Pokkah boeng*- Pune

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

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

Treatment		Co 0238		CoJ 85	
		Germination (%)	Disease Incidence (%)	Germination (%)	Disease Incidence (%)
T_1	Sett treatment-Overnight soaking with Carbendazim (0.1% a.i.)	55.0	15.5	56.0	11.75
T_2	Foliar spray-Carbendazim (0.05% a.i.-3 sprays at 15 days interval from May 15th)	52.3	21.25	47.3	15.5
T_3	Sett treatment (T_1) + Foliar spray with Carbendazim (T_2)	59.6	10	58.1	8.75
T_4	Control	47.7	33.25	45.0	26.5
	CD at 5%	3.97953	2.92	3.57	3.23
	C.V.	4.64	9.13	4.33	12.93

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

Treatment		Germination (%)		Disease incidence (%)	
		Co 0238	CoS 8436	Co 0238	CoS 8436
T_1	Sett treatment (overnight soaking with carbendazim 0.1%	45.2	46.3	16.8	15.4
T_2	Foliar spray with Carbendazim 0.05% - 3 sprays at 15 days interval	37 .5	36.5	13.0	9.4
T_3	T_1 Sett treatment+ T_2 Foliar spray with Carbendazim 0.05%	46.1	47.2	6.4	4.8
	Control	36.4	38.5	29.0	23.5
CD at 5%		3..1	2.9	3.7	2.9

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

Treatment		Germination (%)	Disease incidence (%)
T_1	Sett treatment (Carbendazim 0.1%)	38.2	11.3
T_2	Foliar spray (Carbendazim 0.1%) three sprays at 15 days interval	30.4	9.7
T_3	T_1+T_2	42.8	5.0
T_4	Control	21.2	20.3

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

Treatment		Disease incidence (%)	Yield (t/ha)
T_1	Sett treatment – Overnight soaking with Carbendazim @ 0.1%	17.16	114.1
T_2	Foliar spray – Carbendazim @0.05% (3 sprays at 15 day interval from May 15th)	9.71	121.5
T_3	Sett treatment (T1) + Foliar spray – Carbendazim @0.05% (T2)	9.83	116.9
T_4	Control	27.20	110.1
	CD (0.05)	4.60	N.S.
	CV%	17.77	15.84

Table 51. Management of *Pokkah boeng* disease in sugarcane- Pune

Sr. No	Treatment	Germination (%)	Disease Control (%)
T_1	Sett treatment : Overnight soaking with Carbendazim @ 0.1% a.i.	62.00	58.00 (48.88)
T_2	Foliar spray : Carbendazim – 0.05% a.i. (3 sprays at 15 days interval from May 15th)	60.25	64.07 (52.71)
T_3	Sett treatment (T1) + foliar spray with Carbendazim (T2)	60.75	74.70 (59.07)
T_4	Foliar spray : Mancozeb – 0.3 % a.i. (3 sprays at 15 days interval from May 15th)	59.75	77.05 (61.25)
T_5	Control	58.00	0.00 (4.05)
	S.E ±	2.90	1.19
	C.D.@ 5%	8.49	3.68
	C.V	9.65	5.29

* Figures in parenthesis are Arcsin transformed values.

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 Method		Nodal Method		Plug Method		Nodal Method		Plug Method		Nodal Method		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 15023	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	S	R	MR	S	R	-	R
2.	Co 15024	MS	MS	S	S	MR	MR	R	R	MR	MR	R	R	MR	R	MR	-	MR	-	R
3.	Co 15027	R	R	R	R	MR	MR	R	R	MR	MR	R	R	MR	S	R	-	R	-	MR
4.	CoLk 15201	MR	MR	R	R	MR	MR	R	R	MR	MS	R	R	MS	HS	MR	-	R	-	R
5.	CoLk15203	MR	MR	R	R	HS	S	S	S	S	S	S	S	MS	MR	MS	-	R	-	R
6.	CoLk15204	MR	MR	R	R	MS	MR	R	R	MR	MR	R	R	MS	HS	MS	-	R	-	R
7.	CoLk 15205	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	MS	MR	MR	-	R	-	MS
8.	CoPb 15211	MS	S	R	S	MR	MR	R	R	MR	MR	R	R	MR	MS	MR	S	R	-	R
9.	CoPb 15212	MR	MR	R	R	MR	MS	R	R	MS	MS	R	R	MR	S	MR	-	R	-	MR
Advanced Varietal Trial (Early)-I Plant																				
1.	Co 14034	MR	MR	R	R	MS	MS	R	R	MR	MR	R	R	MS	MR	MS	S	MS	S	R
2.	CoLk 14201	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	MR	MS	MR	-	R	-	MR
3.	CoPb14181	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	MS	S	MS	-	MR	-	MR
4.	CoPb14211	MR	MR	R	R	MR	MR	R	R	MS	MS	R	R	MS	MS	MR	-	MS	-	R
Advanced Varietal Trial (Early)-II Plant																				
1.	Co 13034	MR	MR	R	R	MS	MS	R	R	MR	MR	R	R	S	R	MS	-	MR	-	R
2.	CoPb 13181	MR	MR	R	R	MS	MS	R	R	MS	MS	R	R	MS	R	MR	-	R	-	MR
3.	CoS 13231	R	R	R	R	MR	MR	R	R	MR	MR	R	R	MS	MS	MR	S	MR	-	R
Initial Varietal Trial (Midlate)																				
1.	Co 15026	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	MR	HS	MS	S	R	-	R
2.	CoLk 15206	MR	MR	R	R	MR	MR	R	R	MR	R	R	R	R	R	MR	-	R	-	R
3.	CoLk 15207	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	R	S	R	-	R	-	R
4.	CoLk 15208	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	MS	R	S	-	R	-	MR
5.	CoLk 15209	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	R	S	MS	-	R	-	R

Sl. No.	Genotype	Red rot													Smut		Wilt		YLD	
		Lucknow				Kapurthala				Uchani					Lucknow	Kapurthala	Lucknow	Kapurthala	Lucknow	Kapurthala
		Plug Method		Nodal Method		Plug Method		Nodal Method		Plug Method		Nodal Method		YLD						
		CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09							
6.	CoPb 15213	MR	MR	R	R	MR	MR	R	R	MS	MR	R	R	S	R	MR	S	R	S	R
7.	CoPb 15214	MS	MS	R	R	MS	MS	R	R	S	S	S	S	MS	R	MR	S	MR	-	MR
8.	CoS 15231	MS	MS	R	R	MS	MS	R	R	MS	MS	S	S	S	R	MR	S	R	-	R
9.	CoS 15232	MR	MS	R	R	MR	MR	R	R	MR	MR	R	R	MS	MS	MR	-	R	-	R
10.	CoS 15233	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	MR	MS	MR	-	R	-	MR
11.	CoS 15234	MR	MR	R	R	MR	MR	R	R	MR	R	R	R	MR	R	MR	-	R	-	R
Advanced Varietal Trial (Mid late)-I Plant																				
1.	Co 14035	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	MS	R	MR	-	MR	-	MR
2.	CoH 14261	MR	MR	R	R	MR	MR	R	R	R	MR	R	R	MR	MR	R	-	R	S	R
3.	CoLk 14203	R	R	R	R	MR	MR	R	R	MR	MS	R	R	MS	MS	S	-	S	-	S
4.	CoLk 14204	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	S	S	MR	-	MR	-	MR
5.	CoPb 14184	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	MR	S	MR	-	MR	-	MR
6.	CoPb 14185	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	MR	MS	MR	S	MR	-	MR
7.	CoS 14233	MR	MR	R	R	S	MS	R	R	MR	MR	R	R	MR	S	MR	S	MR	-	MR
Advanced Varietal Trial (Mid late)-II Plant																				
1.	Co 13035	MR	MR	R	R	S	MS	R	R	MR	MR	R	R	MS	MS	MS	-	MR	-	MR
2.	CoH 13263	MR	MR	R	R	S	S	R	R	MR	MR	R	R	R	R	MR	-	MS	-	R
3.	CoPant 13224	MR	MR	R	R	MR	MR	R	R	MS	MS	R	R	MS	MS	MR	-	MR	-	R
4.	CoPb 13182	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	MS	MR	MS	-	MR	S	R
5.	CoLk 13204	MR	MR	R	R	MS	MS	R	R	MS	MS	R	R	MS	MR	S	-	MR	-	MR
Check																				
1	CoJ 64	HS	S	-	-	HS	HS	S	S	HS	S	S	S	MS	MR	S	-	-	-	-
2	CoS 767	MS	S	-	-	HS	HS	S	S	S	MS	S	S	HS	R	S	-	-	-	-
3	Co 1158	-	-	-	-	-	-	-	-	-	-	-	-	-	S	HS	-	-	-	-
4	CoLk 7701	-	-	-	-	-	-	-	-	-	-	-	-	-	S	-	-	-	-	-
5	Co 0238	-	-	-	-	MR	MR	R	R	MR	MR	R	R	S	-	S	-	-	-	-
6	Co 05009	-	-	-	-	MR	MR	R	R	MR	MR	R	R	S	-	MR	-	-	-	-

Sl. No.	Genotype	Red rot													Smut		Wilt		YLD	
		Lucknow				Kapurthala				Uchani					Lucknow	Kapurthala	Lucknow	Kapurthala	Lucknow	Kapurthala
		Plug Method		Nodal Method		Plug Method		Nodal Method		Plug Method		Nodal Method		YLD						
		CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09							
7	CoS 8436	-	-	-	-	MR	MR	R	R	MR	MR	R	R	S	-	-	-	-	-	-
8	CoPant97222	-	-	-	-	S	S	S	S	S	MS	S	S	HS	-	MS	-	-	-	-
9	Co 05011	-	-	-	-	MR	MR	R	R	MR	MR	R	R	MS	-	MR	-	-	-	-
10	Co 7915	-	-	-	-	-	-	-	-	-	-	-	-	-	-	MR	-	-	-	-
11	Co 62175	-	-	-	-	-	-	-	-	-	-	-	-	-	-	HS	-	-	-	-
12	NCO 310	-	-	-	-	-	-	-	-	-	-	-	-	-	-	HS	-	-	-	-
13	Katha	-	-	-	-	-	-	-	-	-	-	-	-	-	-	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		YL	
		Shahjahanpur				Pantnagar				Karnal								
		Plug Method		Nodal Method		Plug Method		Nodal Method		Plug Method		Nodal Method		YLD				
		CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09		ahanpur	Pantnagar	Shahjahanpur	Pantnagar
AVT Early (I Plant)																		
1	Co 14034	MS	MS	R	S	MS	MS	R	R	MR	MR	R	R	R	MS	S	R	R
2	CoLk 14201	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	MR	MR	MR	MR	S
3	CoLk 14202	-	-	-	-	-	-	-	-	MR	MR	R	R	MR	-	-	-	-
4	CoPant 14222	-	-	-	-	-	-	-	-	MR	MR	R	R	R	-	-	-	-
5	CoPb 14181	MR	MR	R	R	MR	MS	R	R	MR	MR	R	R	R	MR	S	R	R
6	CoPb 14182	-	-	-	-	-	-	-	-	MR	MR	R	R	R	-	-	-	-
7	CoPb 14211	MS	MS	R	R	MS	S	R	S	MS	MS	R	R	R	MR	MS	R	R
AVT Early (II Plant)																		
1	Co 13034	MR	MS	R	R	MS	S	R	R	R	R	R	R	R	R	R	R	R
2	CoPb 13181	S	S	S	R	S	S	R	S	S	MS	R	R	MS	R	R	R	R
3	CoS 13231	MR	MR	R	R	NP	NP	NP	NP	MR	MR	R	R	MS	S	NP	R	NP
4	Co 12026	-	-	-	-	-	-	-	-	MR	MR	R	R	MR	-	-	-	-
5	Co 12027	-	-	-	-	-	-	-	-	MR	R	R	R	MR	-	-	-	-
6	CoLk 12203	-	-	-	-	-	-	-	-	MS	MR	R	R	MR	-	-	-	-
7	CoPant 12221	-	-	-	-	-	-	-	-	MS	MR	R	R	MR	-	-	-	-
AVT Mid late (I Plant)																		
1	Co 14035	MR	MR	R	R	MR	MR	R	R	R	MR	R	R	MR	MS	S	R	R
2	CoH 14261	MR	MR	R	R	NP	NP	NP	NP	R	MR	R	R	MR	MR	NP	R	NP
3	CoH 14262	-	-	-	-	-	-	-	-	R	R	R	R	MR	-	-	-	-
4	CoPb 14183	-	-	-	-	-	-	-	-	MS	MS	R	R	R	-	-	-	-
5	CoPb 14184	R	R	R	R	MR	MR	R	R	MR	R	R	R	R	MS	S	MR	R
6	CoPb 14185	MR	MR	R	R	MR	MS	R	R	MR	R	R	R	R	MR	R	R	MS
7	CoPb 14212	-	-	-	-	-	-	-	-	MR	MR	R	R	R	-	-	-	-
8	CoLk 14203	MR	R	R	R	MR	MR	R	R	R	MR	R	R	MS	MS	S	MR	MR

Sl. No.	Genotype	Red rot													Smut		YL	
		Shahjahanpur				Pantnagar				Karnal								
		Plug Method		Nodal Method		Plug Method		Nodal Method		Plug Method		Nodal Method		YLD	Shahjahanpur	Pantnagar	Shahjahanpur	Pantnagar
		CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09					
9	CoLk 14204	R	MR	R	R	MR	MR	R	R	R	MR	R	R	R	R	HS	R	MS
10	CoLk 14205	-	-	-	-	-	-	-	-	MR	MS	R	R	R	-	-	-	-
11	CoS 14231	-	-	-	-	-	-	-	-	R	MR	R	R	MS	-	-	-	-
12	CoS 14232	-	-	-	-	-	-	-	-	R	MR	R	R	R	-	-	-	-
13	CoS 14233	MR	MS	R	R	MR	MR	R	R	MR	MS	R	R	R	MR	R	R	MS
AVT Mid late (II Plant)																		
1	Co 13035	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	MR	MS	R	R	R
2	CoH 13263	HS	HS	S	S	MS	S	R	R	MS	MS	R	R	R	R	MR	R	S
3	CoLk 13204	MS	S	R	S	R	MR	R	R	MS	MS	R	R	MR	MR	MR	R	R
4	CoPant 13224	MR	MS	R	R	MS	MS	R	R	MS	MS	R	R	R	MS	MS	R	R
5	CoPb 13182	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	R	R	MS	R	MR
6	Co 12029	-	-	-	-	-	-	-	-	MR	MR	R	R	R	-	-	-	-
7	CoH 12263	-	-	-	-	-	-	-	-	MS	MS	R	R	R	-	-	-	-
8	CoLk 12205	-	-	-	-	-	-	-	-	MS	MS	R	R	MR	-	-	-	-
9	CoPant 12226	-	-	-	-	-	-	-	-	MR	MR	R	R	MR	-	-	-	-
10	CoPb 12211	-	-	-	-	-	-	-	-	S	MS	R	R	MR	-	-	-	-
11	CoS 12232	-	-	-	-	-	-	-	-	MR	MR	R	R	MR	-	-	-	-
IVT Early																		
1	Co 15023	R	MR	R	R	MR	MR	R	R	-	-	-	-	-	R	MR	R	R
2	Co 15024	MS	MR	R	R	MR	MR	R	R	-	-	-	-	-	R	R	R	MR
3	Co 15027	-	MR	-	R	MR	MR	R	R	-	-	-	-	-	MS	NP	R	MR
4	CoLk 15201	MR	-	R	-	MS	MS	R	S	-	-	-	-	-	R	MS	R	MR
5	CoLk 15203	-	HS	-	S	S	S	R	R	-	-	-	-	-	MR	R	R	MR
6	CoLk 15204	MR	MR	R	R	MS	S	R	R	-	-	-	-	-	R	S	R	MR
7	CoLk 15205	-	-	-	-	MS	MS	R	R	-	-	-	-	-	R	R	R	R
8	CoPb 15211	MR	-	R	-	MS	MS	R	R	-	-	-	-	-	R	MS	R	R
9	CoPb 15212	S	S	R	S	MS	MS	R	R	-	-	-	-	-	R	R	R	MS

Sl. No.	Genotype	Red rot													Smut		YL	
		Shahjahanpur				Pantnagar				Karnal								
		Plug Method		Nodal Method		Plug Method		Nodal Method		Plug Method		Nodal Method		YLD				
		CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09		Shahjahanpur	Pantnagar	Shahjahanpur	Pantnagar
IVT Mid late																		
1	Co 15026	R	R	R	R	MR	MR	R	R	-	-	-	-	-	R	HS	R	MR
2	CoLk 15206	MR	MR	R	R	MR	MR	R	R	-	-	-	-	-	R	MS	R	R
3	CoLk 15207	MR	MR	R	R	MR	MR	R	R	-	-	-	-	-	MS	MS	MR	R
4	CoLk 15208	MR	MR	R	R	NP	NP	NP	NP	-	-	-	-	-	R	MR	R	NP
5	CoLk 15209	MR	MR	R	R	MS	MS	R	R	-	-	-	-	-	MS	MR	R	R
6	CoPb 15213	MR	MR	R	R	MR	MR	R	R	-	-	-	-	-	MS	MR	R	R
7	CoPb 15214	HS	HS	S	S	HS	HS	S	S	-	-	-	-	-	R	R	R	HS
8	CoS 15231	MR	MS	R	R	MR	MR	R	R	-	-	-	-	-	S	NP	MR	S
9	CoS 15232	MR	MR	R	R	MR	MS	R	R	-	-	-	-	-	R	R	R	R
10	CoS 15233	-	-	-	-	R	MR	R	R	-	-	-	-	-	R	MR	R	MR
11	CoS 15234	MR	MR	R	R	MR	MR	R	R	-	-	-	-	-	MS	MS	R	R
Check																		
1	Co 0238	MR	MR	R	R	MS	MS	R	R	MR	R	R	R	MR	R	S	R	R
2	Co 05009	MR	-	R	-	MR	MR	R	R	-	-	-	-	-	R	MS	R	MS
3	CoJ 64	HS	HS	S	S	S	S	R	S	S	S	S	S	S	R	MS	R	R
4	Co 1158	-	-	-	-	-	-	-	-	-	-	-	-	-	HS	S	-	-
5	CoS 767	HS	HS	S	S	S	S	S	R	S	S	S	R	S	R	S	R	MR
6	CoS 8436	MR	R	R	R	MS	MS	S	R	MR	MR	R	R	MS	R	HS	R	MS
7	CoPant 97222	-	-	-	-	MR	MR	R	R	MS	MS	R	R	MR	R	MS	R	R
8	Co 05011	MR	MR	R	R	MR	MS	R	R	-	-	-	-	-	R	R	R	S
9	Co1148	-	-	-	-	-	-	-	-	-	-	-	-	-	-	S	-	-
10	CoPant 84211	-	-	-	-	-	-	-	-	MS	MS	R	R	S				

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

S. No	Genotypes	Red rot																Smut		Wilt		YL	
		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	Seorahi
IVT (Early)																								
1.	CoBln 15501	MS	R	MR	R	MS	R	MR	R	MR	R	MS	R	MR	R	MS	R	S	S	MR	-	MS	-	MS
2.	CoLk 15466	MR	R	MR	R	MR	R	MR	R	MR	S	MR	S	MR	R	MR	R	R	R	R	-	R	-	MS
3.	CoLk 15467	MR	R	MR	R	MR	R	MR	R	MR	R	MR	R	MR	R	R	R	R	R	R	-	R	-	R
4.	CoP 15436	MR	R	MS	R	MR	R	MS	R	MR	R	MR	R	R	R	MR	R	MS	MS	R	-	R	-	R
5.	CoP 15437	MR	R	MR	R	MR	R	MS	R	MR	R	MR	R	MR	R	MR	R	R	MR	R	-	R	S	MR
6.	CoSe 15451	MR	R	MR	R	MR	R	MR	R	MR	R	MR	R	MR	R	MR	R	R	R	R	-	MR	-	R
7.	CoSe15452	MR	R	MS	R	MR	R	MR	R	MS	R	MS	R	MS	S	MS	R	MR	R	MR	S	MR	-	R
8.	CoSe 15455	MR	R	MR	R	MR	R	MR	R	MR	R	MR	S	MR	S	MS	R	MR	R	MR	-	MR	-	R
9.	CoSe 15456	MR	R	MR	R	MR	R	MR	R	MR	R	MR	R	MR	R	MR	S	MR	R	MR	-	MS	-	R
AVT (Early)-I Plant																								
1.	CoLk 14206	MR	R	MR	R	MR	R	MR	R	-	-	-	-	MR	S	MS	S	R	R	-	-	-	-	R
2.	CoP 14437	MS	R	MR	R	MS	R	MR	R	-	-	-	-	R	R	MR	R	R	S	-	-	-	-	S
3.	CoSe 14451	MR	R	MR	R	MR	R	MR	R	-	-	-	-	MR	S	MS	S	R	MR	-	-	-	-	MR
4.	CoSe14454	R	R	R	R	MR	R	MR	R	-	-	-	-	MS	R	MR	S	MR	R	-	-	-	-	R
AVT (Early)-II Plant																								
1.	CoP 13437	MR	R	MR	R	-	-	-	-	-	-	-	-	MR	R	MR	R	MR	-	-	-	-	-	-
2.	CoSe 13451	MR	R	MR	R	-	-	-	-	-	-	-	-	MR	R	MS	S	MR	-	-	S	-	S	-
3.	CoSe 13452	MR	R	MR	R	-	-	-	-	-	-	-	-	MR	R	MR	R	MR	-	-	-	-	-	-
IVT (Mid late)																								
1.	CoBln 15502	S	S	S	S	HS	S	S	R	MR	R	MR	R	MR	R	MR	S	R	R	R	S	MR	-	R
2.	CoLk 15468	MR	R	MR	R	MR	R	MR	R	MR	S	MR	S	MR	R	MR	R	R	R	R	-	MS	-	R
3.	CoLk 15469	MR	R	MR	R	MS	R	MR	R	MR	R	MR	R	R	R	MR	R	R	MR	MR	-	MR	-	R

S. No	Genotypes	Red rot																	Smut		Wilt		YL	
		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	Seorahi
4.	CoP 15438	MR	R	MR	R	MR	R	MR	R	MR	R	MR	MR	MR	R	MR	R	R	R	R	-	R	S	R
5.	CoP 15439	MR	R	MR	R	MR	R	MR	R	MR	R	MR	MR	MR	R	MR	R	R	R	R	-	R	-	R
6.	CoP 15440	MR	R	MR	R	MR	R	MS	R	MR	R	MR	MR	MR	R	MR	S	MS	MS	MR	-	MS	-	R
7.	CoP 15441	MR	R	MR	R	MR	R	MR	R	MR	R	MS	MS	MR	R	MR	S	MR	R	MR	-	MR	-	MS
8.	CoSe 15453	MS	R	MS	R	MR	R	MR	R	MS	S	MS	MS	MS	R	MR	S	MR	MR	MR	-	S	S	R
9.	CoSe 15454	MR	R	MR	R	MR	R	MR	R	MR	R	MR	MR	-	-	-	-	R	R	R	-	MR	-	MS
10.	CoSe 15457	MR	R	MS	R	MR	R	MR	R	MR	R	MR	MR	-	-	-	-	R	R	R	-	MR	-	R
AVT (Mid late)-II Plant																								
1.	CoLk 14208	MR	R	MR	R	MR	R	MR	R	-	-	-	-	MR	R	MR	S	R	R	-	-	-	-	R
2.	CoLk 14209	MR	R	MR	R	MR	R	MR	R	-	-	-	-	R	R	MR	R	R	MR	-	-	-	S	R
3.	CoP 14438	MR	R	MR	R	MS	R	MR	R	-	-	-	-	MS	R	MR	S	R	MS	-	-	-	-	MR
4.	CoP 14439	MR	R	MR	R	MR	R	MR	R	-	-	-	-	MR	R	MR	R	R	R	-	-	-	-	R
5.	CoSe 14455	MR	R	MR	R	MR	R	MR	R	-	-	-	-	MR	R	MR	R	R	R	-	-	-	-	R
Checks																								
1.	CoSe 95422	S	S	S	S	S	MR	S	MR	MS	S	MS	S	MS	R	MS	S	MR	R	MR	-	MS	-	R
2.	CoJ 64	HS	-	HS	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-	-
3.	Co 1158	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	S	-	-	-	-	-
4.	CoLk 7701	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-	-
5.	CoLk 94184	-	-	-	-	MR	R	MR	R	MR	R	MR	R	MR	R	MR	R	-	R	R	-	MR	-	R
6.	CoSe 01421	-	-	-	-	MR	R	MR	R	R	R	MR	R	MR	R	MR	R	-	R	R	-	MR	-	R
7.	BO91	-	-	-	-	MR	R	MR	R	MR	R	MR	R	MR	R	MR	R	-	R	MR	-	MR	-	R
8.	CoP 9301	-	-	-	-	MR	R	MR	R	MR	R	MR	R	MR	R	MR	R	-	R	R	-	R	-	R
9.	CoP 06436	-	-	-	-	MS	R	MR	R	MR	R	R	R	-	-	-	-	-	R	R	-	R	-	R
10.	Akipura	-	-	-	-	-	-	-	-	-	-	-	-	MS	S	MS	S	-	-	-	-	-	-	-

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 16321	R	R	MS	HS	R	MR	R	MR	MS
2.	CoC 16336	MS	R	MS	MS	MR	MR	R	MS	MS
3.	CoC 16337	MS	R	MR	MR	MR	MR	R	MS	MR
4.	CoV 16356	MR	R	MR	MS	S	MR	R	MR	MR
IVT- Midlate										
1.	CoA 16322	MR	R	S	HS	MR	MR	R	MS	MS
2.	CoC 16338	MS	R	HS	MR	R	MR	R	S	MS
3.	CoC 16339	MR	R	MR	MR	MS	MR	R	MR	MR
4.	CoV 16357	R	R	MS	MR	MS	MR	R	MS	MS
AVT – Early I Plant										
1.	CoC 15336	R	R	MS	S	MS	MS	R	MR	MS
2.	CoC 15338	MR	R	HS	S	MS	MR	R	MR	MS
3.	CoV 15356	MR	R	HS	R	MS	MR	R	S	MS
AVT – Early II Plant										
1.	Co 13023	MR	R	R	MR	MS	MR	R	MS	MR
2.	CoA 14321	R	R	MR	MR	MR	MR	R	MS	MS
3.	CoC 14336	MS	R	HS	MS	MR	MR	R	S	MS
AVT- Midlate Plant II										
1.	Co 13028	R	R	MS	MR	R	MR	R	MS	MS
2.	Co 13029	MR	R	MR	MS	R	MR	R	S	MR
3.	Co 13031	MR	R	MR	R	R	MR	R	MS	MR
4.	CoA 14323	MR	R	HS	MR	MS	MR	R	HS	MS

5.	CoC 14337	MR	R	MR	MR	MR	MR	R	MR	MS
6.	PI 14337	MR	R	HS	MR	MR	MR	R	MS	MR
Checks										
1	Co 419	HS	S	HS	S	R	-	-	-	-
2	CoC 671	HS	S	MS	S	R	HS	S	-	-
3	Co 997	HS	S	MS	HS	MR	-	-	-	-
4	CoA 89085	MS	R	MS	MR	R	-	-	-	-
5	Co 6907	S	S	MS	S	R	-	-	-	-
6	Co 7219	S	R	MR	S	R	-	-	-	-
7	Co 7706	S	R	S	MR	R	-	-	-	-
8	CoA 92081	R	R	HS	MS	MR	-	-	HS	S
9	Co Or 03151	MR	R	HS	R	MR	-	-	-	-
10	CoC 01061	MR	R	R	R	MS	-	-	-	HS
11	Co 86249	R	R	R	R	MS	R	R	-	-
12	Co 97009	-	-	-	-	-	-	-	HS	-
13	CoC 22	-	-	-	-	-	-	-	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										
		Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Coimbatore	Navsari	Pune	Kolhapur	Coimbatore	Navsari	Kolhapur
IVT Early																		
1	Co 13021	MR	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	Co 13022	S	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	Co 14002	MR	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	Co 14003	MR	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Co 14004	R	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	Co 14006	R	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	Co 14008	MR	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	Co 14009	MR	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	Co 14012	MR	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	Co 14016	MR	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	Co 14022	MR	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	Co 14023	R	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	Co 14025	MR	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	Co 14026	MR	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	Co 14027	MS	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	Co 14030	MR	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	Co 14031	R	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	Co 14032	MR	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	CoN 14071	MR	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	CoN 14072	MS	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21	CoN 14073	MS	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	CoN 14074	MS	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23	CoSnk 14101	MR	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	CoSnk 14102	MS	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sl No.	Genotypes	Red rot										Smut				YLD		
		Coimbatore				Thiruvalla				Navsari								
		CF06		CF12		CF06		CF12										
		Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Coimbatore	Navsari	Pune	Kolhapur	Coimbatore	Navsari	Kolhapur
25	CoSnk 14103	MR	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	CoT 14366	MR	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27	CoT 14367	MR	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	CoTl 14111	R	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	CoTl 14112	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	MS 14081	MR	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	MS 14082	MR	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32	CoVc 14061	HS	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
33	CoVc 14062	MR	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
34	Co 14005	MR	R	-	-	-	-	-	-	S	R	MS	MR	-	MR	-	R	MS
35	Co 15002	R	R	-	-	-	-	-	-	MR	R	HS	R	MS	MR	-	R	MS
36	Co 15005	MR	R	-	-	-	-	-	-	MR	R	HS	R	MS	MS	-	R	R
37	Co 15006	MS	R	-	-	-	-	-	-	MR	R	R	R	MS	R	-	R	S
38	Co 15007	MS	R	-	-	-	-	-	-	MR	R	HS	HS	MR	S	-	R	R
39	Co 15009	MR	R	-	-	-	-	-	-	MR	R	R	R	R	MR	-	R	R
40	Co 15010	MR	R	-	-	-	-	-	-	MS	R	MS	R	R	MR	-	R	MR
41	Co 15015	MR	R	-	-	-	-	-	-	MS	R	MR	R	MS	R	-	R	MR
42	Co 15017	MR	R	-	-	-	-	-	-	MR	R	RT*	R	MS	R	-	R	R
43	Co 15018	MS	S	-	-	-	-	-	-	MR	R	S	R	R	MR	-	MR	MS
44	Co 15020	MS	R	-	-	-	-	-	-	MR	R	RT*	HS	R	S	-	R	MS
45	Co 15021	MR	R	-	-	-	-	-	-	MR	R	HS	MR	R	MS	-	R	MR
46	CoN 15071	MS	R	-	-	-	-	-	-	MR	R	S	R	R	MR	-	R	R
47	CoN 15072	-	-	-	-	-	-	-	-	MR	R	-	MR	MS	MR	-	R	R
48	CoSnk 15101	HS	S	-	-	-	-	-	-	MR	R	S	S	HS	MR	-	R	MS
49	CoSnk 15102	HS	S	-	-	-	-	-	-	MS	R	HS	MS	MS	S	-	R	R
50	CoSnk 15103	-	-	-	-	-	-	-	-	MS	R	-	MR	HS	MR	-	R	MR
51	CoSnk 15104	-	-	-	-	-	-	-	-	S	R	-	R	MS	MR	-	S	MR
52	CoVc 15061	-	-	-	-	-	-	-	-	MS	R	-	R	R	MR	-	R	S

Sl No.	Genotypes	Red rot										Smut				YLD		
		Coimbatore				Thiruvalla				Navsari								
		CF06		CF12		CF06		CF12										
		Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Coimbatore	Navsari	Pune	Kolhapur	Coimbatore	Navsari	Kolhapur
53	CoVc 15062	-	-	-	-	-	-	-	-	HS	R	-	MS	-	MR	-	R	MR
54	CoVc 15063	-	-	-	-	-	-	-	-	MR	R	-	R	MS	MR	-	R	R
55	CoVc 15064	MS	R	-	-	-	-	-	-	HS	R	HS	R	-	MR	-	R	MR
56	CoVSI 15121	MR	R	-	-	-	-	-	-	HS	R	S	MR	R	MR	-	R	MR
57	CoVSI 15122	MR	R	-	-	-	-	-	-	MR	R	HS	R	MS	MR	-	R	R
58	PI 15131	MR	R	-	-	-	-	-	-	S	R	RT*	R	-	MS	-	R	S
59	PI 15132	HS	S	-	-	-	-	-	-	MS	R	RT*	R	MS	MS	-	S	MS
AVT (I Plant)																		
1	Co13002	-	-	-	-	MR	R	MR	R	MS	R	-	R	R	R	-	R	MS
2	Co 13003	-	-	-	-	MS	R	MR	R	MR	R	-	R	R	MR	-	R	R
3	Co 13004	-	-	-	-	MS	S	MS	S	MR	R	-	MR	R	MR	-	R	R
4	Co 13006	-	-	-	-	MS	S	S	S	MR	R	-	MS	R	MR	-	R	MR
5	Co 13008	-	-	-	-	MS	R	MR	R	MR	R	-	R	R	MR	-	R	MR
6	Co 13009	-	-	-	-	MR	R	R	R	MR	R	-	R	HS	MR	-	R	R
7	Co 13013	-	-	-	-	R	R	MR	R	MR	R	-	R	S	MS	-	R	MR
8	Co 13014	-	-	-	-	MS	S	MS	S	MS	R	-	S	R	MR	-	R	R
9	Co 13018	-	-	-	-	S	S	S	S	MR	R	-	R	MS	MR	-	R	MS
10	Co 13020	-	-	-	-	MS	S	MS	S	MS	R	-	MR	R	MR	-	MR	R
11	CoN13072	-	-	-	-	MR	R	MR	R	MR	R	-	R	MS	MR	-	R	MS
12	CoN 13073	-	-	-	-	R	R	MR	R	MR	R	-	R	MR	R	-	R	MR
13	MS 13081	-	-	-	-	MR	R	MR	R	MR	R	-	R	R	MR	-	R	MR
14	CoSnk 13101	-	-	-	-	R	R	MR	R	MR	R	-	R	MS	MR	-	R	MR
15	CoSnk 13103	-	-	-	-	MR	R	MR	R	S	R	-	MS	R	MR	-	R	MR
16	CoSnk 13106	-	-	-	-	MR	R	MS	R	MS	R	-	MS	R	MR	-	R	MR
17	PI 13132	-	-	-	-	MR	R	MR	R	MS	R	-	R	MS	MR	-	R	R
AVT (II Plant)																		
1	Co 12007	-	-	-	-	MS	R	MS	R	HS	R	-	R	S	S	-	R	MR
2	Co 12008	-	-	-	-	MR	R	MS	R	MS	R	-	MR	S	S	-	MR	MR

Sl No.	Genotypes	Red rot										Smut				YLD		
		Coimbatore				Thiruvalla				Navsari								
		CF06		CF12		CF06		CF12										
		Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Coimbatore	Navsari	Pune	Kolhapur	Coimbatore	Navsari	Kolhapur
3	Co 12009	-	-	-	-	MS	S	MS	S	MR	R	-	MS	HS	MS	-	R	R
4	Co 12012	-	-	-	-	MS	R	MS	R	MR	R	-	R	R	MR	-	R	R
5	Co 12019	-	-	-	-	MR	R	MS	R	MR	R	-	R	R	MR	-	R	MR
6	Co 12024	-	-	-	-	S	S	S	S	S	R	-	R	S	MR	-	MR	MR
7	CoM 12085	-	-	-	-	S	S	S	S	MS	R	-	R	R	MR	-	R	R
8	VSI 12121	-	-	-	-	MS	S	S	S	MR	R	-	MS	MR	MR	-	R	MR
Checks																		
1	CoC 671	HS	S	-	-	HS	S	HS	S	HS	S	-	MR	-	MR	-	R	MS
2	Co 94012	HS	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	Co 96007	-	-	-	-	-	-	-	-	-	-	HS	-	-	-	-	-	-
4	Co 97009	-	-	-	-	-	-	-	-	-	-	HS	HS	-	-	-	-	-
5	Co 6806	-	-	-	-	-	-	-	-	-	-	MR	MR	-	-	-	-	-
6	CoSnk 05103	-	-	-	-	MR	S	MR	S	MR	R	-	MR	-	MR	-	R	MR
7	Co 86032	-	-	-	-	MS	R	MS	R	HS	R	-	MR	-	MR	-	S	MS
8	Co 85004	-	-	-	-	-	-	-	-	S	R	-	S	-	-	-	MS	-
9	Co 94008	-	-	-	-	-	-	-	-	MR	R	-	-	-	-	-	R	-
10	Co 99004	-	-	-	-	-	-	-	-	MR	R	-	MS	-	-	-	MR	-
11	Co 86002	-	-	-	-	-	-	-	-	-	-	-	HS	-	-	-	-	-
12	Co 740	-	-	-	-	-	-	-	-	-	-	-	-	HS	HS	-	-	MR