

**All India Coordinated Research Project on Sugarcane**  
(Indian Council of Agricultural Research)

**TECHNICAL REPORT**  
**PLANT PATHOLOGY**  
(2017 – 2018)

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## 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** (14 + 5): 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*). Five new differentials – 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 to be completed in 2 days by last week of August.

**Observation:** One observation at 60<sup>th</sup> 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 (X) 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.

X: 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**

Nineteen new isolates were evaluated on 14 differentials by plug method of inoculation. Except Co 0238 isolates, the virulence patterns of other isolates more or less matched with the existing pathotypes of this zone. It was observed that Co 0238 isolates giving intermediate reaction on BO 91; susceptible reaction on Co 62399, CoS 767, Khakai, Co 419 and CoJ 64 and resistance to SES 594, Baragua, Co 997, Co 975 and CoC 671. The results indicate the existence of gained virulence for BO 91 and loss of virulence for Co 997 and CoC 671.

#### **SHAHJAHANPUR**

Four *C. falcatum* isolates were tested for variability along with the existing pathotypes on 19 host differentials. The observations of disease behaviour revealed that two isolates R 1501 (CoJ 88) and R 1502 (UP 9530) exhibited reactions parallel to CF09 and CF08 pathotypes, respectively. Other two isolates R 1102 (CoS 8436) and R 1304 (CoS 07250) were found to be new emerging pathotypes on the basis of their reaction on 19 host differentials.

#### **KAPURTHALA**

Nineteen differentials were inoculated with 7 designated pathotypes and 6 isolates collected from Punjab state. The data revealed that all the pathotypes and tested isolates were avirulent on CoS 767, CoS 8436, BO 91, SES 594, Baragua, CoV 92102 and CoSe 95422 except pathotypes CF09 and CF11. Among the pathotypes, CF08 from CoJ 84 was found most virulent than others by showing S reaction on 10 differentials. In recent year the isolate RI-304 from CoJ 85 was found most virulent than other isolates and pathotypes because it showed S reaction on 11 differentials. New isolates RI 303 and RI 305 were found as virulent as pathotype CF08.

#### **UCHANI**

Pathogenic variability was studied on 18 differentials with all the designated pathotypes along with six new isolates collected from Haryana. The observations indicated that all the pathotypes/isolates exhibited S reaction on Co 997, CoC 671 and Khakai, whereas R reaction on SES 594, Baragua, CoSe 95422 and CoV 92102. The observations also indicated that the clones Co 7717, Co 1148, Co 975, Co 419, Co 62399, Co 86002 and Co 86032 exhibited a clear cut differential reaction. The isolates RR XXI, RR XXII and RR XXVI were more virulent as CF08 and showed similarity with CF08. The isolates RR XX and RR XXIV showed pathogenic variation on host differentials.

#### **KARNAL**

Seven pathotypes along with 13 isolates collected were inoculated independently on a set of 19 sugarcane differentials by plug method of inoculation. The disease reaction indicated that there was a clear pathogenic variation on the host differentials. None of the pathotype/isolate resembled another pathotype/isolate in pathogenic behaviour. A new isolate Cf89003 collected from variety Co 89003 exhibited more virulence with intermediate to susceptible reactions on 14 host differentials, suggests the possible emergence of new pathotype in the subtropics.

### **NORTH CENTRAL ZONE**

#### **PUSA**

Seventeen sugarcane differentials were inoculated with two pathotypes and eight isolates collected from different areas of Bihar. It is clear from the data that pathotype CF07 and isolates RR<sub>1</sub>, RR<sub>3</sub>, RR<sub>4</sub>, RR<sub>5</sub> and RR<sub>7</sub> produced R reaction on differentials the Co 419,

CoS 767, Co 7717, Co 975, CoV 92102 and Co 86032 and I reaction on CoSe 8436 and Co 62399. The pathotype CF07 and the isolates RR<sub>1</sub>, RR<sub>3</sub>, RR<sub>4</sub>, RR<sub>5</sub> and RR<sub>7</sub> showed similar pathological reaction on differentials. Similarly, pathotype CF08 and isolates RR<sub>2</sub>, RR<sub>6</sub> and RR<sub>8</sub> produced I reaction on Co 419, CoS 767, Co 7717, Co 975, CoV 92102, Co 86032 and CoSe 95422 and S reaction on CoS 8436 and Co 92399.

#### **SEORAH**

Seven pathotypes along with 2 isolates, isolate-1 (CoLk 8102) and isolate-2 (CoSe 92423) were inoculated on 18 differentials. The reaction of isolate-1 resembled with CF07 and isolate-2 resembled with CF08.

#### **EAST COAST ZONE**

##### **ANAKAPALLE**

Testing of eight isolates obtained from Co 419, CoC 671, Co 997, CoA 89085, Co 62175, 81 V 48, CoOr 12346 and CoA 09321 on 19 host differentials revealed no variation/deviation in reaction.

##### **CUDDALORE**

Nineteen sugarcane differentials were inoculated with new *C. falcatum* isolates and designated pathotype CF06. Among the differentials BO 91 showed I reaction for the isolate collected from CoC 24 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. With regard to reaction in CoS 767, the isolate from CoC 24 showed I reaction which indicated its variation from the designated pathotype.

#### **PENINSULAR ZONE**

##### **NAVSARI**

The results revealed that CoJ 64, CoS 8436, BO 91, Baragua and SES 594 showed R reaction for all the isolates. Entries Co 7717 and Khakai and CoV 92102 exhibited I reaction to all the isolates. While entries Co 1148 and Co 62399 showed R reaction on Cf 86032 but I reaction on CF06 and Cf 86002 and also entries CoS 767 and CoSe 95422 showed R reaction on CF06 and Cf 86002 but I reaction on Cf86032. Only one entry Co 7805 showed R reaction for Cf86002 and I reaction on CF06 and Cf86032. Entries Co 975 and Co 86032 showed I reaction for Cf86002 and S reaction for CF06 and Cf 86032. Entries Co 975 showed I reaction for Cf86032 and Co 86002 showed I reaction for CF06.

#### **COIMBATORE**

Two new isolates along with five old isolates and 2 standard isolates were inoculated by plug method on 19 sugarcane differentials. The red rot development on differential hosts indicated that all the isolates except CF12 exhibited more or less similar reactions of the designated pathotype CF06 and among the tested isolates, CF12 exhibited more virulence followed by CfPI1401- Kadaganur and CfV09356-Keerangudi.

#### **THIRUVALLA**

Eight isolates along with 2 designated pathotypes were inoculated by plug method. The disease development on different differentials indicated that the isolates Cf92012 (Kanjapur), CfPI 1110 (Mathakadi) and CfPI1110 (Kothangudi) exhibited a variable reaction from the standard isolate CF06 with respect to Co7805, CoS 767 and Co 7717, respectively. These isolates were found to be more virulent than the reference pathotype CF06, during the current year. Other isolates *viz.*, CfPI1401, CfV09356, Cf0323, Cf91017 and CoTl 88322 (New isolate) exhibited more or less similar reaction to reference pathotype.

## **RESULTS OF THE CURRENT YEAR**

### **NORTH WEST ZONE**

#### **LUCKNOW**

Fifteen new *C. falcatum* isolates *viz.*, two isolates from CoS 8436 (IR-145 and IR-146); three isolates from CoSe 95422 (IR-147, IR-148 and IR-152); two isolates from CoS 767 (IR-153 and IR-154); six isolates from Co 0238 (IR-140, IR-141, IR-143, IR-149 IR-150 and IR-151); and one isolate each from CoS 92423 (IR-144) and CoLk 8102 (IR-142) 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 (Table 1).

#### **SHAHJAHANPUR**

Ten isolates pathotypes of *C. falcatum* were tested on 19 host differentials by plug method. Seven existing pathotypes and three local isolates R 1102 (CoS 8436), R 1304 (CoS 07250) and R 1602 (Co 0238) exhibited pathogenic variability on host differentials. Among all differentials Co 997 and Khakai exhibited universal susceptibility, whereas CoSe 95422 and SES 594 exhibited resistance to all isolates. CoS 8436 displayed resistance to all isolates except one isolate R 1102 (CoS 8436) while Co 1148 behaved as susceptible to existing pathotypes. The resistant variety BO 91 did not exhibit susceptible reaction, it exhibited intermediate reaction to CF09 and R 1102 (CoS 8436) isolates. The varieties Co 419, Co 975, Co 7717, Co 62399, CoJ 64, CoS 767, Co 86002, CoV 92102, CoS 95422, Khakai and SES 594 mostly behaved as isolates R 1102 (CoS 8436) and R 1602 (Co 0238) whereas R 1304 (CoS 07250) behaved differently from these isolates (Table 2).

#### **KAPURTHALA**

Seven new isolates *viz.*, RI-307 from CoJ 64, RI-308 from CoJ 88, RI-309 from CoJ 85, RI-310 from CoPb 91, RI-311 from Co 89003, RI-312 from Co 89003 and RI-313 from Sel. K 2/3 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. Two new isolates RI-308 and RI 310 were also found as virulent as pathotype CF08 except intermediate reaction of RI-308 on Co 419 and of RI-310 on Co 1148. Isolate RI-311 behaved quite similar to pathotype CF09 except its intermediate reaction on Co 1148 and S reaction on Co 62399 (Table 3).

#### **UCHANI**

All the designated pathotypes along with six new isolates RR XXVII (CoJ 64), RR XXVIII (CoJ 85), RR XXIV (CoJ 64) and RR XXX (CoS 89003) and RR XXXI CoS (CoS 8436), RR XXXII (CoJ 85) 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 (S/R/I). Isolates RR XXVII, RR XXVIII, RR XXIV and RR XXXII showed S reaction on Co 419, Co975, 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 (Table 4).



## **KARNAL**

A set of fourteen *C. falcatum* isolates comprising seven designated pathotypes and seven isolates collected from CoS 8436 (3), BO 138 (1), CoSe 95422 (1), CoBln 05521(1) and Co 89903 (1) 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. Further, three isolates viz. CfBLN 05521, CfBO138 and CfSe 95422 exhibited intermediate reaction to some of the host differentials, whereas differential SES 594 showed complete resistance to all the test isolates (Table 5).

## **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. Twenty five canes of each differential were inoculated and disease progress was assessed. The result indicated that the differentials Co1148 and Khakai produced susceptible reaction whereas, differential BO 91 and SES 594 showed resistant reaction while, differentials Co 419, CoS 8436, Co 62399, Co 975, CoV 92102 and CoSe 95422 showed differential reaction against all the test isolates (Table 6).

### **SEORAH**

Seven pathotypes viz. CF01, CF02, CF03, CF07, CF08, CF09 and CF11 along with 5 isolates, R1101Seo (CoLk 8102), R1201Seo (CoS 8436), R1301Seo (CoS 07250), R1601Seo (CoSe 92423) and R1602Seo (UP 9530) were inoculated in 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 (Table 7).

## **EAST COAST ZONE**

### **ANAKAPALLE**

Eight isolates of *C. falcatum* collected from sugarcane cultivars, Co 419, Co 997, CoC 671, CoA 89085, CoOr 12346, Co 62175, CoV 89101 and Co 6907 were tested for their pathogenic variability 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 an intermediate 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 couldn't 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 (Table 8).

### **CUDDALORE**

Sugarcane differentials were inoculated with the *C. falcatum* isolated from varieties viz., CoC 23, CoC 24, Co 91017, CoSi 6, TNAU Si 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 (Table 9).

## **PENINSULAR ZONE**

### **NAVSARI**

Four isolates collected from CoC 671 (CF06), Co 86032(Cf86032), Co 86002 (Cf86002) and CoC 671 (New isolate-1) were inoculated on 19 differentials and 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 (Cf 86002 and new isolate-1), while Co 997 and CoC 671 showed S reaction to all the isolates (Table 10).

### **COIMBATORE**

Seven new isolates from Tamil Nadu *viz.* CfPI1110 Kothangudi, CfPI1401 Kadaganur, CfV09356 Keerangudi, Cf86027 Nathakadu, Cf2001-13 Perambakkam, Cf06022-Kuthalam and Cf99006 Mundiampakkam 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. Pathogenic reactions of the isolates indicated some changes induced by the environmental factors prevailed during the period (Table 11).

### **THIRUVALLA**

Four new isolates *viz.*, Cf 86027 (Nathakadu), Cf 2001-13 (Perampakkam), Cf 06022 (Kuthalam), Cf 99006 (Mundiampakkam) and three old isolates *viz.*, CfPI1110 (Kothangudi), CfPI 1401 (Kadaganur), CfV 09356 (Keerangudi) along with the designated pathotypes CF06 and CF12 were inoculated and tested against nineteen differentials. The disease development on different differentials indicated that, among the isolates, 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), Cf 86027 (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 (Table 12).

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

### PP 17A: EVALUATION OF ZONAL VARIETIES FOR RED ROT

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

**Locations:**

North West Zone : Lucknow, Kapurthala, Uchani, Shahjahanpur, Karnal, Pantnagar

North Central Zone : Pusa, Motipur, Seorahi and Bethuadahari

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

Five entries in IVT (Early) viz., CoLk 13201, CoLk 13202, CoLk 13203, CoPant 13221 and CoPb 13181 were MR by plug and nodal method against both the pathotypes. Two entries in AVT (Early)-I Plant viz., Co 12027 and CoLk 12203 were MR by plug and nodal method against both the pathotypes. In AVT (Early)-II Plant, two genotypes viz., CoLk 11201, CoLk 11202 and CoLk 11203 were MR by both the methods. In IVT (Mid late), out of thirteen entries tested, seven viz., Co 13035, CoH 13262, CoH 13263, CoLk 13204, CoLk 13205, CoPant 13224 and CoS 13232 were MR whereas CoPb 13182 was R by plug and nodal method against both the pathotypes. The entry CoH 13261 was R against the pathotype Cf 08 and MR against Cf 09 by both the method. In AVT (Mid late)-I Plant, 3 entries viz., Co 12029, CoLk 12205 and CoS 12232 were MR against both the pathotypes. In AVT (Mid late)-II Plant, 2 entries viz., CoLk 11206 and CoS 11232 were MR whereas, CoH 11263 was R by plug and nodal method against both the pathotypes.

## **SHAHJAHANPUR**

In AVT (E) I Plant two entries viz., Co 12027, CoLk 12203 and in AVT (E) II Plant two entries viz., CoLk 11201, CoLk 11202 showed R/MR reaction against CF08 and CF09 pathotypes. In AVT (ML) I Plant four entries viz., Co 12029, CoLk 12205, CoPant 12226, CoS 12232 and in AVT (ML) II plant five entries viz., Co 11027, CoH 11263, CoLk 11206, CoLk 11214, CoS 11232 showed R/MR reaction against both the pathotypes. In IVT (E) five entries viz., Co 13033, Co 13034, CoLk 13202, CoPant 13221, CoS 13231 and in IVT (ML) eight entries viz., Co 13035, Co 13036, CoH 13262, CoLk 13204, CoPant 13223, CoPant 13224, CoPb 13182, CoS 13232 showed R/MR reaction against both the pathotypes.

## **KAPURTHALA**

Forty-two genotypes were screened with pathotypes CF08 and CF09 separately by plug and cotton swab methods. In AVT (Early) Plant I, three entries viz., Co 12026, Co 12027 and CoPant 12221 behaved as MR/ R by plug and cotton swab methods against both the pathotypes. In AVT (Early) Plant II, only one genotype CoLk 11202 behaved as MR/ R by both the methods. In AVT (Mid late) Plant I, four entries viz., Co 12029, CoH 12263, CoPant 12226 and CoPb 12211 behaved as MR/R by plug and cotton swab methods. In AVT (Mid late) Plant II, all the genotypes were found MR/R by both the methods. In IVT (Early), four genotypes viz, Co 13033, CoLk 13202, CoPant 13221 and CoS 13231 were found MR/R to both the pathotypes and in IVT (Mid late), five genotypes viz., Co 13036, CoH 13262, CoPant 13223, CoPant 13224 and CoPb 13182 behaved as MR/R by plug and cotton swab method.

## **UCHANI**

Four entries of AVT (early) Plant-I viz., Co 12026, CoLk 12203 and CoPant 12221 and Co 0238 showed MR reaction by plug and R by cotton swab methods, whereas Co 12027 exhibited MS reaction by plug and R by cotton swab methods. In AVT (E) Plant-II the genotypes viz., CoH 11262 and CoLk 11202 were found MR by plug and R by cotton swab method against both the pathotypes. In AVT (ML) Plant-I the entries Co 12029, CoH 12263 and CoS 8436 showed R/MR reaction by plug method and R reaction by cotton swab methods, in AVT (ML) Plant-II five entries viz., Co 11027, CoH 11263, CoLk 11204, CoPb 11214 and CoS 11232 showed R/ MR reaction by plug and R reaction by cotton swab methods against CF08 and CF09. In IVT (E) the entries Co 13033, Co 13034, CoLk 13202, CoPant 13221 and CoS 13231 showed MR reaction by plug and R reaction by cotton swab methods to both the pathotypes, in IVT (ML) the entries Co 13035, Co 13036, CoH 13261, CoH 13062, CoH 13063, CoLk 13204, CoPant 13223, CoPant 13224, CoPb 13182 and CoS 8436 showed R/MR reaction by plug and R reaction by cotton swab method.

## **KARNAL**

Forty two entries were evaluated for red rot resistance against CF08 and CF09 pathotypes. Three entries viz., CoPant 13222 IVT(E), CoPb 13183 IVT (ML) and CoH 11262 AVT- E (II plant) exhibited susceptible reaction by plug and cotton swab methods, while two entries namely CoLk 13203 (IVT-E) and CoPb 12111 (AVT- ML-I Plant) showed susceptibility to CF08 and CF09 isolates by plug method only. Six entries were rated as MS and remaining were R /MR with both the inocula and methods.

## **PANTNAGAR**

In cotton swab method, all the genotypes showed R reactions for both the pathotypes except Co 12027 and CoS 13232 which showed S reaction for both the pathotypes. In plug method, 14 genotypes were found R, 22 MR, 4 MS and 1 S. Identical reactions were recorded for both the pathotypes.

## **NORTH CENTRAL ZONE**

### **PUSA**

In case of plug method, the entries CoP 11437, CoP 11438, CoP 11451, CoLk 09204, BO 155, BO 130, CoP 13437, CoP 13438, CoSe 13451, CoSe 13452, CoSe 13453 and CoSe 13454 showed MR reaction against both the isolates whereas, entries BO 91, CoP 9301 and CoP 13439 showed R reaction. In case of cotton swab method, check varieties CoSe 92423 and CoSe 95422 showed S reaction against both the pathotypes, and e rest of the genotypes showed R reaction against both the pathotypes.

### **MOTIPUR**

In IVT (Early), all the entries except CoP 13437 were MR by plug and nodal methods. In AVT (Early)-I Plant, all the entries except CoSe 12451 were MR by both methods and in AVT (Early)-II Plant, all the entries were MR against both the pathotypes. In IVT (Mid late), 2 entries *viz.*, CoP 13439 and CoSe 13454 were MR by both methods. In AVT (Mid late)-I Plant, all the entries except CoP 12438 were MR and in AVT (Mid late)-II Plant, all the entries except CoSe 11455 were MR by plug and nodal methods against both the pathotypes.

### **SEORAH**

In pug method 13 were rated as MR to both pathotype, 3 were rated as MR to CF08 and MS to CF07, 1 was MR to CF07 and MS to CF08, 3 genotypes were rated as MS to both pathotype, 2 genotypes were MS to CF08 and S to CF07, while 1 genotype was rated as S to both pathotypes. In cotton swab method, 22 entries were rated as R to both pathotypes, while 1 was rated as R to CF07 and S to CF08.

## **NORTH EAST ZONE**

### **BURALIKSON**

Two IVT (Early) clones, CoP 13436, CoP 13437 and one (1) IVT (Midlate) clone CoP 13438 were rated as MR to both the pathotypes. In AVT (Early)-I Plant, CoLk 12207 was found to be R in plug method to CF07 and MR to CF08. Other entries were MR in plug method and R in cotton swab method to both the pathotypes. In AVT (Early)-II plant all four entries *viz.*, CoP 11436, CoP 11437, CoP 11438, CoSe 11451 were rated as MR to both the pathotypes in plug method and R in cotton swab method. In AVT (Midlate)-I plant among the four entries, CoLk 12209 was rated as R to CF07 and MR to CF08 pathotype in plug method and R in cotton swab method. In AVT (Midlate)-II plant all the four entries *viz.*, BO 155, CoSe 11453, CoSe 11454, CoSe 11455 were found to be MR in plug method and R cotton swab method to both the pathotypes.

## **EAST COAST ZONE**

### **ANAKAPALLE**

In plug method, five entries *viz.*, CoA 11321, CoA 13325, CoA 12321, CoA 12322 and CoA 92081 showed R reaction, while 5 entries *viz.*, CoA 13321, CoA 13322, CoA 11326, CoA 13328 and CoV 13356 showed MR reaction to all the pathotypes. In cotton swab method, out of 32 entries 9 entries *viz.*, Co 419, CoC 671, Co 997, Co 6907, Co 13032, CoA 14322, CoA 14324, CoV 14356, and PI 14376 showed S reaction to all the three pathotypes.

### **CUDDALORE**

Among the 33 entries screened, 21 clones registered MR reaction by plug method for both CF06 and CF04 pathotypes. In cotton swab method, 27 entries were found to be R for both pathotypes.

## **PENINSULAR ZONE**

### **NAVSARI**

Out of 58 entries evaluated by plug method, none of the entries exhibited R reaction, whereas 41 entries showed MR reaction, 10 entries exhibited MS reaction, rest of the entries

displayed S to HS reaction by plug method. In cotton swab method, 56 entries exhibited R reaction, one entry *viz.*, CoM 11081 (AVT-E I Plant) was found MS and one entry Co 10017 (AVT-ML II Plant) was found S.

#### **THIRUVALLA**

In IVT (Early) out of 11 entries 3 showed R reaction and 6 showed MR to plug method of inoculation and in cotton swab method all the entries showed R reaction, with CF12 in plug method, one entry showed R and eight entries showed MR reaction. In cotton swab method all the entries except CoSnk 13102 showed R reaction. In the IVT (midlate) trial with plug method and isolate CFO6, 3 entries showed R and 15 showed MR reaction. In cotton swab method except Co 13006 and CoSnk 13103 all other entries showed R reaction. In IVT (midlate) trial with CF12, 10 entries showed R reaction, 9 entries showed MR reaction by plug method and in cotton swab method all entries except Co 13016 showed R reaction. In AVT (Early I Plant) with CF06, 5 entries showed MR by plug method and in cotton swab method all entries showed R reaction. With isolate CF12, three entries showed MR reaction by plug method and all entries except CoM 11084 and CoC 671 showed R reaction. In AVT (Early II Plant) with CF06, three entries showed R reaction, 7 entries exhibited MR reaction in plug method and in cotton swab method all entries except CoC 671 showed R reaction. With CF12 pathotype 9 entries showed MR in plug method while all the entries except Co10026 and CoC 671 showed R reaction in cotton swab method. In the AVT midlate I Plant with CF06, one entry showed R reaction, 6 exhibited MR in plug method and all entries exhibited R reaction in cotton swab method. With CF12, six entries exhibited MR reaction in plug method and all entries exhibited R reaction in cotton swab method. In the AVT midlate II Plant with CF06, two entries showed R reaction, ten entries exhibited MR reaction in plug method and all entries exhibited R reaction in cotton swab method. With CF12, two entries showed R reaction, 6 entries exhibited MR reaction in plug method and all entries except Co 10017 exhibited R reaction in cotton swab method.

#### **COIMBATORE**

Thirty three entries were evaluated for red rot resistance by plug and nodal methods against CF06 and CF12 pathotypes. About 22 IVT entries were identified as R to CF06 as against four for CF12 in plug method to red rot. In nodal method, 30 and 15 were R to both the pathotypes, respectively.

### **RESULTS OF THE CURRENT 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 (Table 13).

#### **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 (Table 14).

#### **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 found MR/R by plug and nodal cotton swab method with both the pathotypes (Table 15).

#### **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 entries 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 showed MR reaction by plug and R reaction by nodal cotton swab methods against CF08 and CF09. Two entries 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 entries viz., Co 14034, Co Lk 14201, CoLK 14202, CoPant14222 and Co Pb14181 showed R/MR reaction by both the methods of inoculations to both pathotypes, whereas CoPb14211, 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, CoH14062, 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 (Table 16).

#### **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 (Table 17).

#### **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 (Table 18).

#### **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 CF0, while, the remaining genotypes showed R reaction against both the tested isolates (Table 19).

##### **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 was 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 (Table 20).

##### **SEORAH**

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 (Table 21).

#### **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 (Table 22).

##### **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 ckeckCo 419, CoC 671, Co 997, CoA 89085 and Co 6907 manifested top drying indicating their susceptibility whereas the entries reacted as Rto CF06. In plug method of inoculation, four entries CoC 15336, Co 13028 and CoC 13339 showed 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 and CoV 15356, showed MR reaction (Table 23).

##### **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 (Table 24).

##### **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 (Table 25).

#### **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 the eleven 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 cotton swab 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. Against the isolate CF12, three recorded MR reaction, four recorded MS reaction and one recorded HS reaction in plug method of inoculation. In Nodal cotton swab method of inoculation, except CoC 671 all entries showed R reaction to both the isolates. In AVT II Midlate, out of the eight 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. In Nodal cotton swab method of inoculation, except Co 86032 all entries showed R reaction to both the isolates (Table 26).

#### **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.

## SUMMARY

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

### **NORTH WEST ZONE (Table 13 to 18)**

#### **LUCKNOW- plug and nodal cotton swab**

- IVT (Early) : Co 14034, CoLk 14201, CoLk 14202, CoPant 14221, CoPant 14222, CoPb 14181 and CoPb 14182
- IVT (Midlate) : Co 14035, Co 05011, CoH 14261, CoH 14262, CoLk 14203, CoLk 14204, CoLk 14205, CoPant 97222, CoPb 14183, CoPb 14184, CoPb 14185, CoPb 14212, CoS 14232 and CoS 14233
- AVT (Early)-I : Co 13034 and CoPb 13181
- AVT (Early)-II : Co 12027 and CoLk 12203
- AVT (Midlate)-I : Co 13035, CoH 13263, CoLk 13204, CoPant 13224 and CoPb 13182
- AVT (Midlate)-II : Co 12029, CoH 12263, CoLk 12205, and CoS 12232

#### **SHAHJAHANPUR-Plug & Nodal cotton swab method**

- AVT (Early) Plant I : CoS 13231
- AVT (Early) Plant II : Co 12027, CoLk 12203, CoPant 12221
- AVT (Midlate) Plant I : Co 13035, CoPb 13182
- AVT (Midlate) Plant II : Co 12029, CoS 12232
- IVT (E) : CoLk 14201, CoLk 14202, CoPant 14222, CoPb 14182
- IVT (Midlate) : Co 14035, CoH 14261, CoH 14262, CoLk 14203, CoLk 14204, CoPb 14184, CoPb 14185, CoS 14232

#### **KAPURTHALA – Plug method & Nodal cotton swab**

- AVT (Early) Plant I : CoS 13231
- AVT (Early) Plant II : Co 12026 and Co 12027
- AVT (Midlate) Plant I : CoPant 13224 and CoPb 13182
- AVT (Midlate) Plant II : Co 12029, CoPant 12226 and CoPb 12211
- IVT (Early) : CoLk 14201, CoLk 14202, CoPant 14222, CoPb 14181, CoPb 14182, CoPb 14211
- IVT (Midlate) : Co 14035, CoH 14261, CoH 14262, CoLk 14203, CoLk 14204, CoLk 14205, CoPb 14183, CoPb 14184, CoPb 14185, CoPb 14212 and CoS 14232

#### **UCHANI – Plug & Nodal cotton swab method**

- AVT (E) Plant I : Co 13034 and CoS13231
- AVT (E) Plant II : CoPant 12221
- AVT (Midlate) Plant I : Co 13035, CoH 13263 and CoPb 13182
- AVT (Midlate) Plant II : Co 12029, CoH 12263 and CoPant 12226
- IVT (Early) : Co 14034, Co Lk 14201, CoLk 14202, CoPant 14222 and CoPb14181
- IVT (Midlate) : Co 14035, CoH 14261, CoH14062, CoLk 14204, CoPb 14183, CoPb 14184, CoS 14231, CoS 14232 and CoS 14233

#### **KARNAL – Plug & nodal cotton swab method**

- IVT (Early) : Co 14034, CoLk 14201, CoLk 14202, CoPant 14222, CoPb 14181, CoPb 14182
- IVT (Midlate) : Co 14035, CoH 14261, CoH 14262, CoH 14263, CoH 14264, 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)	:	Co 14034, CoLk 14201
IVT (Midlate)	:	CoLk 14203, CoLk 14204, CoS 14232, CoS 14233
AVT (E) Plant I	:	CoS 13221
AVT (E) Plant II	:	Co 12026, CoLk 12203, CoPant 12221
AVT (Midlate) Plant I	:	CoH 13263, CoLk 13204, CoPb 13182
AVT (Midlate) Plant II	:	CoH 12263, CoLk 12205, CoPb 12211, CoS 12232

**NORTH CENTRAL ZONE(Table 14 to 21)****PUSA- Plug & Cotton swab method**

IVT (Early)	:	CoP14437, CoSe14451, CoSe14453, CoSe 01421, CoLk 94184
IVT (Midlate)	:	CoLk14209, CoLk14210, CoP14438, CoP14439, CoSe14452

**MOTIPUR - Plug and cotton swab method**

IVT (Early)	:	CoBln 14501, CoLk 14206, CoLk 14207, CoP 14436, CoP 14437, CoSe 14451 and CoSe 14453
IVT (Mid late)	:	CoBln 14502, CoLk 14208, CoLk 14209, CoLk 14210, CoP 14438, CoP 14439, CoSe 14452, CoSe14455 and CoSe 14456
AVT (Early) I Plant	:	CoSe 13451, CoSe 13452
AVT (Early) II Plant	:	CoLk 12207 and CoSe 12451
AVT (Mid late)-II Plant	:	CoLk 09204, CoLk 12209 and CoP 12438

**SEORAHI – Plug and nodal cotton swab method**

IVT (Early)	:	CoLk 14206, CoLk 14207, CoP 14436, CoSe 14451, CoSe 14453, CoSe 14454
IVT (Mid late)	:	CoLk 14208, CoLk 14209, CoLk 14210, CoP 14439, CoSe 14452, CoSe 14455, CoSe 14456
AVT (Early) I Plant	:	CoSe 13452

**NORTH EAST ZONE (Table 22)****BURALIKSON – Plug & nodal cotton swab method**

IVT (Early)	:	CoP 14454
IVT (Midlate)	:	CoBln 14502
AVT (Early)- I Plant	:	CoSe 13451, CoSe 13452
AVT (Early)- II Plant	:	CoSe 12451, CoP 12436, CoLk12207, CoP 11436, CoP 11437
AVT (Midlate)- II Plant	:	CoLk 12209, CoLk 09204, CoP 11451, CoP 12438, CoSe 11453, CoSe 11454, CoSe 11455, BO 155

**EAST COAST ZONE(Table 23 to 24)****ANAKAPALLE**

IVT Early	:	CoC 15336, CoV 15356
IVT Midlate	:	CoC 15339
AVT (Early)- I Plant	:	Co 13023, CoA 14321
AVT I (Midlate)	:	Co 13028, Co 13029, Co 13031, CoA 14323, CoC 14337, PI 14337
AVT II (Early)	:	CoA 13322, CoA 13323, CoV 13356
AVT (Midlate)- II Plant	:	CoA 11326, CoA 12324, CoC 13339

**CUDDALORE- Plug and nodal cotton swab method**

IVT (Early)	:	CoC 15336, CoC 15337, CoC 15338, CoV 15356
IVT (Midlate)	:	CoC 15339, CoC 15340, CoOr 15346
AVT- Early (I Plant)	:	Co 13023, CoA 14321, CoC 14336
AVT- Early (II Plant)	:	CoA 13322, CoC 13336, CoC 13337
AVT-Mid late (I Plant)	:	Co 13028, Co 13029, Co 13031, CoA 14323, CoC 14337, PI 14377

AVT-Mid late (II : CoA 11326, CoC 13339, CoOr 13346  
Plant)

**PENINSULAR ZONE(Table 25 to 26)**

**NAVSARI – Plug method**

IVT (Early) : 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, CoSnk 14111, CoVc 14062, MS 14082

AVT (Early) Plant I : Co 12009, Co 12019, Co 12024

AVT (Early) Plant II : Co 11001, Co 11004, CoM 11081, CoM 11082, CoM 11084

AVT (Midlate) Plant II : Co 11007, Co 11012

**THIRUVALLA – Plug & nodal cotton swab method**

IVT (Early) : Co 13021, Co 13022, Co 14003, Co 14004, Co 14006, Co 14008, Co 14009, Co 14012, Co 14016, Co 14023, Co 14026, Co 14027, Co 14030, Co 14031, Co 14032, CoN 14071, CoN 14073, CoN 14074, CoSnk 14102, CoSnk 14103, CoT 14366, CoT 14367, CoTl 14111, MS 14081, MS 14082, CoVC 14062 and CoSnk 05103

AVT (Early) Plant I : Co 12008, Co 12019, CoSnk 05103

AVT (Early) Plant II : Co 11004, CoM 11084, Co 85004, Co 94008

AVT (Midlate) Plant II : Co 11007, Co 11012, CoM 11086, Co 99004

## 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, Powarkheda, Thiruvalla, Padegaon, Navsari, Kolhapur, Sankeshwar 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 forty two entries tested, eighteen viz., Co 13034, CoLk 13203, CoS 13231, Co 12026, Co 12203, CoPant 12221, CoLk 11202, Co 13035, CoPb 13182, CoS 13232, CoPb 13183, Co 12029, CoH 12263, CoLk 12205, CoPb 12211, Co 11027, CoH 11263 and CoLk 11204 were S and remaining 24 were tolerant to smut.

#### SHAHJAHANPUR

Among the screened entries 32 viz., Co 12027, Co 12029, CoLk 12203, CoPant 12221, CoLk 11201, CoLk 11202, CoH 12263, CoPant 12226, CoS 12232, CoH 11263, CoLk 11204, CoLk 11206, CoLk 11214, CoS 11232, Co 13034, CoLk 13201, CoLk 13202, CoLk 13203, CoPb 13181, CoS13231, Co 13035, Co 13036, CoH 13261, CoH 13262, CoH

13263, CoLk 13204, CoPant 13223, CoPant 13224, CoPb 13182, CoPb 13183, CoS 13232 and CoS 13233 were rated as R/MR.

#### **KAPURTHALA**

Out of 42 entries five namely, CoH 13262, CoLk 13201, CoPant 13221, CoPant 13223 and CoS 13231 were rated as R and 14 entries *viz.*, Co 12026, Co 13033, CoH 11262, CoH 11263, CoH 12263, CoH 13261, CoLk 13203, CoPant 12226, CoPant 13224, CoPb 12211, CoPb 11214, CoPb 13181, CoPb 13183 and CoS 13232 were rated as MR.

#### **PANTNAGAR**

Out of 41 genotypes 23 genotypes were found R, 3 were MR and remaining entries showed various degrees of susceptibility with 10 MS and 5 S reactions.

#### **NORTH CENTRAL ZONE**

##### **PUSA**

Eighteen sugarcane genotypes including one check were tested for smut resistance. It is observed that seven entries *viz.*, CoP 11438, CoP 11451, CoLk 09204, BO 155, BO 91, CoP 9301 and CoP 13439 remained free from smut and graded as R. Whereas, 10 entries *viz.*, CoP 11437, BO 130, CoSe 92423, CoP 13436, CoP 13437, CoSe 13451, CoSe 13452, CoP 13438, CoSe 13453 and CoSe 13454 were graded as MR against smut.

##### **MOTIPUR**

Out of 23 entries tested, five *viz.*, CoP 13436, CoP 13439, CoSe 13452, CoSe 13454 and CoLk 12207 were S and remaining 16 were tolerant to smut.

##### **SEORAH**

Of 23 entries, 18 were rated as R and 1 was rated as MS, while 4 were rated as HS against smut.

#### **EAST COAST ZONE**

##### **ANAKAPALLE**

Out of 32 entries evaluated against smut nine entries *viz.*, Co 13023, Co 13024, CoC 14336, Co 13025, Co 13028, Co 13030, Co 13031, Co 13032 and CoA 14323 exhibited MR reaction.

##### **CUDDALORE**

Among the 33 entries screened, four clones *viz.*, Co 13032, CoC 14337, CoV 13356 and CoA 12324 recorded R and twenty clones *viz.*, Co 07013, Co 13023, Co 13024, CoA 14321, CoC 14336, CoV 14356, Co 13025, Co 13028, Co 13029, Co 13030, Co 13031, PI 14376, PI 14377, CoC 13337, CoA 12322, CoOr 12346, CoV 12356, CoA 11326, CoC 13339 and CoOr 13346 were MR, six clones were MS, two clones were S and one was HS to smut disease.

#### **PENINSULAR ZONE**

##### **PADEGAON**

Out of 58 clones, 2 *viz.*, CoN 13071 and MS 13081 from IVT Early, 3 clones *viz.*, CoM 11081, CoM 11082, and CoM 11084 from AVT–Early (I Plant), 5 entries *viz.*, Co 10004, Co 10024, Co 10026, CoT 10366 and CoT 10366 from AVT–Early (II Plant), 14 entries *viz.*, Co 13008, Co 13014, Co 13016, Co 13018, Co 13020, CoM 13082, CoN 13073, CoN 13074, CoSnk 13104, CoSnk 13105, CoSnk 13106, CoT 13366, PI 13131 and PI 13132 from IVT-Midlate, 2 entries *viz.*, Co 11007 and CoM 11086 from IVT-Midlate (I Plant) and 3 entries *viz.*, CoM 10083, CoT 10368 and CoT 10369 from AVT-Midlate (II Plant) showed R reaction to smut disease.

##### **SANKESHWAR**

In IVT (E) among eight entries 4 *viz.*, Co 13003, CoN 13072, CoSnk 13101 and CoSnk 13102 were graded as R. In IVT (ML) 14 entries namely Co 13008, Co 13009, Co 13011, Co 13014, Co 13016, CoM 13082, Co 13073, CoN 13074, CoSnk 13014, CoSnk



13015, CoSnk 13016, CoT 13366, PI 13131, PI 13132 were rated as R. In AVT Early (PC I) all 8 entries recorded R reaction, whereas in AVT Midlate (PC I) out of 6 entries, 4 viz., Co 11005, Co 11007, Co 11012 and Co 11019 showed R reaction. In AVT Early (PC II) out of 8 entries tested, four viz., Co10004, Co 10024, Co 10026 and CoT 10366 were R to smut. In AVT Midlate (PC II) out of 11 entries tested, Co 10015, Co 10017, Co 10031, Co 10033, CoM 10083, CoVc 10061 and PI 10131 were rated as R.

### **POWERKHEDA**

Among AVT– II (early) entries three viz., Co 10027, CoT 10366, CoT 10367 and in AVT – I (early) two viz., Co 11004 and CoM 11081 were found to be R and five entries i.e. Co 11001, Co 10004, Co 10024, Co 10026, and CoM 11084 showed MR reaction. In the mid late group, three entries viz., CoT 10368, CoT 10369 and CoVv 10061 in AVT – II and two entries, i.e., Co 11005 and Co 11007 in AVT – I were found to be R where as seven entries i.e. Co 11012, Co 10031, CoM 10083, PI 10131, PI 10132, CoM 11085 and CoM 11086 exhibited MR reaction. In IVT (early), six entries namely Co 12001, Co 12006, CoM 12083, CoN 12072, CoT 12366 and CoT 12367 were found to be R while remaining entries showed MR to S reaction. Among IVT (Mid late), five entries namely Co 12014, Co 12016, Co 12019, Co 12021 and CoN 12073 were found to be R and remaining genotypes exhibited MR to MS reaction to smut disease.

### **KOLHAPUR**

Out of 58 entries, 4 viz., Co 13002, Co 13004, CoN 13071 and MS 13081 from IVT Early, 4 viz., Co 11004, CoM 11081, CoM 11082 and CoM 11084 from AVT Early (I Plant), 6 viz., Co 10004, Co 10005, Co 10024, Co 10026, CoT 10366 and CoT 10367 from AVT Early (II Plant), 15 viz., Co 13008, Co 13009, Co 13014, Co 13016, Co 13018, Co 13020, CoM 13082, CoN 13073, CoN 13074, CoSnk 13104, CoSnk 13105, CoSnk 13106, CoT 13366, PI 13131 and PI 13132 from IVT Midlate, 3 viz., Co 11007, Co 11012 and CoM 11086 from AVT Midlate (I Plant), 3 viz., CoM 10083, CoT 10368 and CoT 10369 from AVT Midlate (II Plant) shown R reaction to smut.

### **PUNE**

Out of 51 entries screened, 34 viz., Co 12001, Co 12003, CoM 12081, CoM 12082, CoM 12083, CoT 12366, CoN 12072, CoT 12367, Co 10004, Co 10006, Co 10024, Co 10026, Co 10027, CoT 10367, Co 09004, Co 09007, Co 12012, Co 12016, Co 12017, Co 12019, Co 12021, CoM12084, CoM 12085, CoN 12073, CoT 12368, VSI 12121, Co 09009, Co 10015, Co 10031, CoM 10083, CoT 10368, CoT 10369, PI 10131 and PI 10132 were found R, 2 were found MR, 7 were found MS, 5 were found S and remaining 3 were HS.

### **NAVSARI**

Out of 58 entries evaluated, thirty entries viz., Co 13002, Co 13004, CoN 13071, CoSnk 13102 and MS 13081 (IVT-E), Co 13006, Co 13008, Co 13009, Co 13011, Co 13014, Co 13016, Co 13018, CoM 13082, CoN 13073, CoN 13074, CoSnk 13105 and CoT 13366 (IVT-ML), Co 11001 and CoM 11084 (AVT–E I plant), Co 10005, Co 10006 and CoT 10366 (AVT-E II Plant), Co 11005, Co 11019, CoM 11085 and CoM 11086 (AVT–ML I plant), CoT 10369, CoVc 10061 and PI 10132 (AVT–ML II plant) exhibited R reaction. Eight entries viz., Co 13003 and CoN 13072 (IVT-E), CoSnk 13104 (IVT-ML), Co 10004 and CoT 10367 (AVT-E II Plant), Co 09009, CoM 10083 and PI 10131 (AVT ML II Plant) showed MR reaction.

### **COIMBATORE**

Totally 28 IVT entries were evaluated for smut resistance, among them 10 entries were identified as R/MR, eight behaved as MS and the rest were S/HS to the disease.

## **RESULTS OF THE CURRENT 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 (Table 13).

#### **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 (Table 14).

#### **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 (Table 15).

#### **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 (Table 18).

### **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 (Table 19).

#### **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 (Table 20).

#### **SEORAH**

In Initial Varietal Trial (Early) eight genotypes were evaluated out of which 5 genotypes were rated as R, one genotype as MR, one genotype as MS, while one genotype was rated as S. In Initial Varietal Trial (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 (Table 21).

## **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 (Table 23).

### **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 and CoV 13356 were 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 (Table 24).

## **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.*, CoM11081 showed R reaction to smut, in AVT–Midlate (II Plant) out of 6 genotypes 4 genotypes *viz.*, Co 11005, Co 11012, Co 11019 and CoM11086 showed R reaction and two genotypes *viz.*, CoM11085 and Co 11007 showed MR reaction to smut (Table 27).

### **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, Co 11085 and CoM 11086 were identified as R (Table 28).

### **POWERKHEDA**

Report not given.

### **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 (Table 29).

### **PUNE**

Out of 60 genotypes screened against smut, 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 (Table 30).

### **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 (Table 25).

### **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 (Table 31).

### **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 13034, CoPb 13181  
AVT (Early) Plant II : Co 12026, Co 12027, CoLk 12203  
AVT (Midlate) Plant I : Co 13035, CoH 13263, CoLk 13204, CoPant 13224, CoPb 13182  
AVT (Midlate) Plant II : CoH 12263, CoLk 12205, CoS 12232  
IVT (Early) : CoLk 14201, CoPant 14221, CoPant 14222, CoPb 14181  
IVT (Midlate) : Co 05011, CoH 14261, CoH 14262, CoLk 14203, CoPb 14184, CoPb 14185, CoPant 97222

##### **KAPURTHALA**

AVT (Early) Plant I : CoPb 13181, CoS 13231  
AVT (Early) Plant II : Co 12026  
AVT (Midlate) Plant I : CoH 13263, CoPant 13224  
IVT (Early) : Co 14034, CoLk 14201, CoLk 14202, CoPant 14222, CoPb 14182, CoPb 14211  
IVT (Midlate) : Co 14035, CoH 14261, CoH 14262, CoLk 14204, CoPb 14184, CoPb 14185, CoPb 14212, CoS 14232, CoS 14233

##### **SHAJAHANPUR**

AVT (Early) Plant I : Co 13034, CoPb 13181, CoS 13231  
AVT (Early) Plant II : Co 12026, Co 12027, CoLk 12203  
AVT (Midlate) Plant I : CoH 13263, CoPant 13224, CoPb 13182, CoLk 13204  
AVT (Midlate) Plant II : Co 12029, CoH 12263, CoPant 12226, CoPb 12211, CoS 12232  
IVT (Early) : Co14034, CoLk 14201, CoLk 14202, CoPant 14222, CoPb 14181, CoPb 14211  
IVT (Midlate) : Co 14035, CoH 14261, CoH 14262, CoLk 14203, CoLk 14204, CoLk 14205, CoPb14183, CoPb 14184, CoPb 14185, CoPb 14212, CoS 14231, CoS 14233

##### **PANT NAGAR**

AVT (Early) Plant I : CoPb 13181, CoS 13231  
AVT (Early) Plant II : CoLk 12203  
AVT (Midlate) Plant I : CoLk 13204, CoPant 13224, CoPb 13182  
AVT (Midlate) Plant II : CoH 12263, CoPant 12226, CoS 12232  
IVT (Early) : CoPb 14181, CoLk 14201  
IVT (Midlate) : CoLk 14204, CoPb 14212

#### **NORTH CENTRAL ZONE (Table 19 and 21)**

##### **PUSA**

IVT (Early) : CoLk 14206, CoLk 14207, CoP 14436, CoP 14437, CoSe 14451, CoSe 14453, CoSe 14454, CoBln 14501, CoSe 01421, CoLk 94184

IVT (Mid late) : CoLk 14208, CoLk 14209, CoLk 14210, CoP 14438, CoP 14439, CoSe 14452, CoSe 14455, CoSe 14456, CoBln 14502, CoP 06436

### **SEORAH**

IVT (Early) : CoBln 14501, CoLk 14207, CoP 14436, CoSe 14451, CoSe 14453, CoSe 14454

IVT (Mid late) : CoBln 14502, CoLk 14208, CoLk 14209, CoLk 14210, CoP 14438, CoP 14439, CoSe 14452, CoSe 14455, CoSe 14456

AVT (Early) I Plant : CoSe 13451, CoSe 13452

### **EAST COAST ZONE (Table 23 and 24)**

#### **ANAKAPALLE**

IVT Early : Nil

IVT Midlate : Nil

AVT (Early) I Plant : Co 13023, CoA 14321

AVT- Early (II Plant) : CoC 13337, CoV 13356

AVT- Midlate I Plant : Co 13028, Co 13031, PI 14377

AVT- Midlate II Plant : Nil

#### **CUDDALORE**

IVT (Early) : CoC 15336, CoC 15337, CoC 15338

IVT (Mid late) : CoC 15339, CoC 15340

AVT (Early) I Plant : Nil

AVT- Early (II Plant) : CoC 13337, CoV 13356

AVT- Midlate I Plant : Co 13028, Co 13031, CoC 14337

AVT- Midlate II Plant : CoA 12324, CoC 13339

### **PENINSULAR ZONE (Table 25 and 27 to 31)**

#### **PADEGAON**

IVT (Early) : Co 13021, Co 13022, Co 14003, Co 14004, Co 14006, Co 14008, Co 14009, Co 14012, Co 14016, Co 14026, Co 14027, Co 14030, Co 14101, CoN 14071, CoN 14072, CoN 14073, CoN 14074, CoSnk 14102, CoSnk 14103, CoT 14366, CoT 14111, CoT 14112, CoVc 14061, CoVc 14062, MS 14081, MS 14082, PI 14131, PI 14132, VSI 14121, VSI 14122

AVT(Early) Plant I : Co 12007, Co 12009, Co 12012, Co 12019, CoM 12085, VSI 12121

AVT(Early) Plant II : Co 11001, CoM 11081, CoM 11084

AVT (Midlate) II Plant : Co 11005, Co 11007, Co 11012, Co 11019, CoM 11085, CoM 11086

#### **KOLHAPUR**

IVT (Early) : Co 13021, Co 13022, Co 14003, Co 14004, Co 14006, Co 14008, Co 14009, Co 14012, Co 14016, Co 14026, Co 14027, Co 14030, CoN 14071, CoN 14072, CoN 14073, CoN 14074, CoSnk 14101, CoSnk 14102, CoSnk 14103, CoT 14111, CoT 14112, CoT 14367, CoVC 14061, MS 14081, MS 14082, PI 14131, PI 14132, VSI 14121, VSI 14122

AVT (Early) Plant I : Co12007, Co 12012, Co 12019, Co12024, CoM 12085, VSI 12121

AVT (Early) Plant II : Co 11001, Co 11004, CoM 11081, CoM 11082, CoM 11084

AVT (Midlate) II Plant : Co 11005, Co 11007, Co 11012, Co 11019, CoM 11085, CoM 11086

#### **SANKESWHAR**

IVT (Early) : Co 14003, Co 14008, Co 14016, Co 14022, Co 14025, Co 14026, Co 14027, Co 14031, Co 14032, Co 14074, CoN 14071, CoN 14073, CoSnk 14101, CoSnk 14103, CoT 14112, CoT 14366, CoVc 14061, MS 14081, PI 14131, PI 14132, VSI 14121

AVT (Early) Plant I : Co 12008, Co 12012, Co 12019, Co 12024, CoM 12085  
 AVT (Early) Plant II : Co 11001, Co 11004, CoM 11081, CoM 11082, CoM 11084  
 AVT (Midlate) Plant II : Co 11007, Co 11012, Co 11085, CoM 11086  
**PUNE**  
 IVT (Early) : CoN 13071, CoN 13072, CoSnk13101, MS13081  
 AVT (Early) I Plant : CoM 11082  
 AVT (Early) II Plant : Co 10004, Co 10005, Co 10006, Co 10024, Co 10026, Co 10027, CoT 10366  
 AVT (Midlate) : Co 13008, Co 13013, Co 13016, CoM 13082, CoN 13073, CoN 13074, CoSnk 13104, CoT 13366, PI 13131  
 AVT Midlate I Plant : Co 11005, CoM 11085, CoM 11086  
 AVT Midlate II Plant : Co 09009, Co 10015, Co 10017, Co 10033, CoT 10368  
**NAVSARI**  
 IVT(Early) : Co 13021, Co 14003, Co 14004, Co 14006, Co 14008, Co 14009, Co 14022, Co 14025, Co 14032, CoN 14071, CoN 14072, CoN 14073, CoN 14074, CoSnk 14101, CoSnk 14103, CoT 14367, VSI 14122, MS 14081, CoVC 14062, MS 14082, VSI 14121  
 AVT(Early) Plant I : Co 12019, Co 12024, CoM 12085  
 AVT(Early) Plant II : Co 11001, CoM 11084  
 AVT (Midlate) Plant II : Co 11005, Co 11019, CoM 11085, CoM 11086  
**COIMBATORE**  
 : Co 14002, Co 14003, Co 14006, Co 14009, Co 14022, Co 14025, Co 14026, Co 14030, Co 14032, CoN 14071, CoN 14072, CoN 14073, CoSnk 14102, CoSnk 14103, CoT 14367, MS 14082, VSI 14121

## 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 5 m length planted under wilt sick soils

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

**Observations:** 1. Germination count at 45 days of planting

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

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

**Evaluation** : 0-4 Scale of wilt severity index

**Grade Symptoms**

- |   |   |
|---|---|
| 0 | Healthy canes and roots with no external or internal symptoms of wilt.  |
| 1 | No wilting or drying of leaves, no stunting or shrinking of the stalk or rind, slight pith formation with yellow discolouration of the internal tissues in one or two lower internodes only. No cavity formation or fungal growth seen. Apparently normal and healthy roots.  |
| 2 | Mild yellowing of top leaves and drying of lower leaves, mild stunting and shrinking of the stalk and rind. Yellowish discolouration of the internal tissues extend 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 =  $\frac{\text{Sum of wilt indices of individual stalks}}{\text{Number of stalks sampled}}$

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

## **RESULTS OF THE PREVIOUS YEAR**

### **LUCKNOW**

Incidence of wilt was observed in 5 genotypes *viz.*, Co 13036, CoH 11262, CoPant 13222, CoS 13231, CoPant 12226.

### **KAPURTHALA**

Out of 42 entries 27 behaved as R, 11 namely Co 13034, Co 13036, CoH 11263, CoLk 11201, CoLk 11203, CoLk 13201, CoLk 13203, CoPant 12226, CoPant 13224, CoS 11232 and CoS 11263 behaved as MR and four *viz.*, Co 13033, CoH 11262, CoH 13263 and CoLk 12203 behaved as MS.

### **PUSA**

Out of 18 genotypes, nine entries BO 155, BO 130, CoP 13436, CoP 13437, CoP 13438, CoSe 13451, CoSe 13452, CoSe 13453 and CoSe 13454 were graded as R, whereas, seven entries *viz.*, CoLk 09204, CoP 11437, CoP 11438, CoSe 11451, BO 91, CoP 9301 and CoP 13439 were graded as MR.

### **MOTIPUR**

Natural incidence of wilt was observed in 4 genotypes *viz.*, CoP 12438, CoP 13438, CoSe 13452 and CoSe 13453 and the remaining entries showed no disease.

### **ANAKAPALLE**

Out of 32 entries tested, 3 entries *viz.*, Co 13031, CoA 14323, and CoC 14337 exhibited R reaction and the remaining entries showed MR, MS and HS reactions.

### **NAVSARI**

Out of 34 entries none showed R reaction, whereas 21 entries *viz.*, Co 13006, Co 13009 and CoN 13073 (IVT-ML), Co 11001, Co 11004, CoM 11082 and CoM 11084 (AVT-E I Plant), Co 10005, Co 10006, Co 10027, CoT 10366 and CoT 10367 (AVT-E II Plant), Co 11005, Co 11007, Co 11012, CoM 11085 and CoM 11086 (AVT-ML I Plant), Co 10015, Co 10031, CoT 10368 and PI 10132 (AVT-ML II Plant) showed MR reaction. Eight entries exhibited MS reaction and remaining entries showed S reaction to wilt.

## **RESULTS OF THE CURRENT 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 (Table 13).

### **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 (Table 15).

### **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 (Table 19).

### **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 (Table 20).

### **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 (Table 23).

### **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 (Table 25).

### **SUMMARY**

The entries showing R or MR to wilt are listed below

#### **NORTH WESTERN ZONE**

##### **LUCKNOW**

IVT (Early) : Co 14034, CoLk 14201, CoLk 14202, CoPant 14221 and CoPb 14181  
AVT (Early) Plant - I : Co 13034, CoPb 13181 and CoS 13231  
AVT (Early) Plant - II : Co 12026, Co 12027, CoLk 12203 and CoPant 12221  
IVT (Mid Late) : Co 14035, CoH 14261, CoH 14262, CoLk 14203, CoLk 14204, CoPb 14183, CoPb 14184, CoS 14233 and CoPant 97222  
AVT (Midlate) Plant - I : Co 13035, CoH 13263 and CoPant 13224  
AVT (Midlate) Plant - II : Co 12029, CoH 12263, CoLk 12205, CoPant 12226, CoPb 12211 and CoS 12232

##### **KAPURTHALA**

IVT (Early) : CoLk 14201, CoLk 14202, CoPant 14222, CoPb 14181 and CoPb 14182  
AVT (Early) Plant - I : Co 13034, CoPb 13181 and CoS 13231  
AVT (Early) Plant - II : Co 12026, Co 12027 and CoPant 12221  
IVT (Mid Late) : Co 14035, Co 14261, Co 14262, CoLk 14203, CoLk 14204, CoLk 14205, CoPb 14183, CoPb 14184, CoPb 14185, CoPb 14212, CoS 14232 and CoS 14233  
AVT (Mid Late) Plant - I : Co 13035, CoPant 13224, CoPb 13182 and CoLk 13204  
AVT (Midlate) Plant - II : Co 12029, CoH 12263, CoLk 12205, CoPant 12226, CoPb 12211 and CoS 12232

## **NORTH CENTRAL ZONE**

### **PUSA**

- IVT (Early) : CoLk 14206, CoLk 14207, CoP 14436, CoP 14437, CoSe 14451, CoSe 14453, CoBln 14501, CoSe 01421 and CoLk 94184
- IVT (Mid Late) : CoLk 14208, CoLk 14209, CoLk 14210, CoP 14438, CoP 14439, CoSe 14452, CoSe 14455, CoSe 14456, BO 91 and CoP 06436

### **MOTIPUR**

- IVT (Early) : CoBln 14501, CoLk 14206, CoP 14437, CoSe 14453 and CoSe 14454
- AVT (Early) Plant - I : CoP 13437 and CoSe 13452
- AVT (Early) Plant - II : CoLk 12207 and CoP 12436
- IVT (Mid Late) : CoBln 14502, CoLk 14208, CoP 14438, CoP 14439, CoSe 14452 and CoSe 14455
- AVT (Midlate) Plant- II : CoLk 09204, CoLk 12209, CoP 12438, CoSe 12453

## **EAST COAST ZONE**

### **ANAKAPALLE**

- IVT (Early) : CoV 15356
- AVT (Early) Plant - I : Co 13023 and CoA 14321
- AVT (Early) Plant - II : CoA 13322
- IVT (Mid Late) : CoC 15339, PI 15376 and PI 15377
- AVT (Mid Late) Plant - I : Co 13028, Co 13031, CoA 14323, CoC 14337 and PI 14377
- AVT (Mid Late) Plant - II : CoA 12324, CoC 13339 and Co Or 13346

## **PENINSULAR ZONE**

### **NAVSARI**

- AVT (Early) Plant - I : Co 12007, Co 12009, Co 12024 and VSI 12121
- AVT (Early) Plant - II : Co 11001, Co 11004, CoM 11081, CoM 11082 and CoM 11084
- AVT (Midlate) Plant - II : Co 11005, Co 11007, Co 11012 and CoM 11086

## 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<sup>th</sup>, 10<sup>th</sup> and 12<sup>th</sup> 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	Description
Score	Disease reaction
0.0 - 1.0	Resistant
>1.0 – 2.0	Moderately resistant
>2.0 – 3.0	Moderately susceptible
>3.0 – 4.0	Susceptible
>4.0 – 5.0	Highly susceptible

## RESULTS OF THE PREVIOUS YEAR

### LUCKNOW

YL incidence was observed in eight genotypes *viz.*, Co 12027, CoH 12263, CoH 13263, CoLk 13201, CoPb 11214, CoPb 13181, CoPb 13182 and CoS 12232.

### KAPURTHALA

No disease symptoms were observed during the year 2016-17.

### UCHANI

In AVT (E) Plant-1, out of 4 entries only Co 12026 showed YL resistance and entries *viz.*, Co 12027, CoLk 12203 and CoPant 12221 were MS. In AVT (E) Plant II trial, CoLk 11202 was YL resistant. The entries CoH 11262 and CoLk 11201 were MS and CoLk

11203 was found to be S. Entries CoH 12263, CoLk 12205 in AVT (ML) Plant-1, showed MR and three entries namely, Co 12029, CoS 8436 and CoPb 12211 were MS. The entries viz., CoPant 12226 and CoS 12232 and standards CoS 767 and Co Pant 97222 were S to YL. Out of six entries in AVT (ML) –II, CoH 11263 and CoPb 11214 showed resistant reaction and CoLk 11204 and CoS 8436 were MS. The entries Co 11027 and CoLk 11232 were YL susceptible and three entries/ standards, CoLk 11206, CoPant 97222 and CoS 767 were HS. Out of 9 entries in IVT (E), four entries viz., CoLk 13201, CoLk 13202, CoLk 13203 and CoPant 13221 were MR and Co 13033, Co 13034, CoPant 13222 and CoPb 13181 were MR to YL. Of the 15 evaluated under IVT (ML), only CoS 13233 showed resistance and four entries viz., CoH 13261, CoH 13262, CoH 13263 and CoS 13232 showed MR reaction against YL. Eight entries Co 13035, Co 13036, CoLk 13204, CoLk 13205, CoPant 13223, CoPant 13224, CoPb 13182 and CoPb 13183 exhibited MS to YL.

### **SHAHJAHANPUR**

Forty two genotypes were evaluated for YL resistance in six trials. In AVT (Early I plant), all 4 entries Co 12026, Co 12027, CoLk 12203 and CoPant 12221 were found to be R. Two genotypes CoLk 11201 and CoLk 11202 were found to be R and CoLk 11203 was MR in AVT (E, II plant). In AVT (M, I plant), all 6 genotypes Co 12029, CoH 12263, CoLk 12205, CoPant 12226, CoPb 12211 and CoS 12232 were rated as R. In AVT (M, II plant), the genotypes CoH 11263, CoLk 11204, CoS 11232 and CoS 767 were R and Co 11027 and CoLk 11214 were MR. Two genotypes CoPant 13222 and CoS 13231 were found to be R and the genotypes CoLk 13201, CoLk 13202, CoPant 13221 and CoPb 13181 were rated as MR in IVT (E). There were 8 genotypes viz., CoH 13263, CoLk 13204, CoLk 13205, CoPant 13223, CoPant 13224, CoPant 97222, CoS 767 and CoS 8436 found as R and 4 genotypes such as CoPb 13182, CoPb 13183, CoS 13232 and CoS 13233 were MR in IVT (M).

### **PANTNAGAR**

Under natural condition, YL was assessed on 41 genotypes. Out of these, 25 were recorded as R, 9 as MR, 6 as MS and only one was recorded as S.

### **PUSA**

YL was not observed in any experimental plots.

### **ANAKAPALLE**

Out of 64 genotypes, three entries namely 2006 A 64, Co 13029 and Co 7602 showed resistance against YL under natural conditions, while five genotypes viz., Co 7219, CoA 12322, CoA 14323, CoC 13336 and PI 15376 showed MR reaction and remaining genotypes were S under natural conditions.

### **SEORAH**

Of 23 genotypes screened, 17 genotypes were YL resistant, 2 were MR and 4 genotypes were MS to YL. In IVT (E) trial, CoP 13436, CoSe 13451 and CoSe 13452 were found as resistant, while CoP 13437 was MR to YL. Among IVT (ML) genotypes, CoP 13438, CoSe 13453 and CoSe 13454 were resistant to YL, while CoP 13439 was MS to YL. The entries CoP 12436 and CoSe 12451 were found as resistant, while CoLk 12207 was S to YL in AVT (E) I Plant trial. In AVT (E) II Plant trial, genotypes viz., CoP 11437, CoP 11438 and CoSe 11451 were found as resistant, while CoP 11436 was found to be MS to YL. Among Advanced Varietal Trial (ML) I Plant genotypes, CoLk 09204 and CoLk 12209 were YL resistant and CoP 12438 was MR to YL while CoSe 12453 was MS to YL. In AVT (ML) II Plant trial, all four genotypes viz., BO 155, CoSe 11453, CoSe 11454 and CoSe 11455 were found to be YL resistant.

### **NAVSARI**

Of 58 zonal varieties/ entries from IVT (E), IVT (ML), AVT (E I & II Plant), AVT (ML I & II Plant), along with 5 checks (CoC 671, Co 94008, Co 85004, Co 86032 and Co

99004) were evaluated for YL resistance. 52 entries showed resistant reaction. Five entries viz., MS 13081 (IVT-E), Co 13005, CoT 13366, PI 13131 and PI 13132 (IVT-ML) were found as MR. Only one entry viz., Co 10368 (AVT-ML II Plant) was recorded as MS. Out of five checks, CoC 671 and Co 94008 (IVT-E) were found resistant and only Co 99004 (IVT-ML) was found MR to YL. The check Co 85004 (IVT-E) exhibited MS reaction and Co 86032 (IVT-ML) was observed as YL susceptible.

### **COIMBATORE**

During the season, about 28 IVT entries and 31 AVT entries were monitored for the YL severity based on the 0-5 scale. Among the IVT and AVT entries, 10 each was apparently free from the disease symptoms and had shown R reaction. The disease severity in rest of the entries were in the category of MS to MR. Three IVT mid late entries viz., Co 13016, CoT 13366 and PI 13131 and one AVT (ML II plant) entry Co 10031 were found to be susceptible to YL. Similarly, the ratoon fields of AVT (E I plant) and AVT (ML I plant) were monitored throughout the season where two entries such as, Co 10006 and Co 10027 in AVT (E I plant) ratoon were found apparently free from the disease symptoms. In AVT (ML I plant) ratoon, the entry Co 10031 had shown YL score more than 3 with severe stunting symptoms and none of the entries in that were found to be free from the disease.

### **POWARKHEDA**

A total of 30 AVT genotypes were observed for their resistance to YL. In the early group, 10 genotypes i.e., Co 10006, Co 10024, Co 10026, Co 10027, CoT 10366, CoT 10367, Co 11001, CoM 11081, CoM 11082 and CoM 11084 were found to be R whereas others exhibited MR to MS reaction. Among the mid late group, 13 genotypes viz., Co 09009, Co 10015, Co 10017, Co 10033, Co 11005, Co 11007, Co 11012, Co 11019, CoM 10083, CoM 11085, CoM 11086, CoT 10368, CoVC 10061 exhibited YL resistance whereas remaining four entries were found to be MR.

### **SANKESHWAR**

In IVT (E), seven entries viz., Co 13003, CoN 13004, CoN 13071, CoN 13072, CoSnk 13101, CoSnk 13102 and MS 13081 showed R reaction and Co 13002 exhibited MR reaction. In IVT (ML), out of 20 entries, 19 entries showed R reaction and only PI 131312 recorded MR. In AVT- E (PC I), all entries viz., Co 11001, Co 11004, CoM 11081, CoM 11082 and CoM 11084 were R. In AVT- ML (PC I), all six entries viz., Co 11005, Co 11007, Co 11012, Co 11019, CoM 11085 and CoM 11086 were R. In AVT - E (PC II), out of 8 entries, 7 entries viz., Co 10004, Co 10005, Co 10006, Co 10026, Co 10027, Co 13086 and CoT 10367 showed R reaction, only Co 10024 displayed MR reaction. In AVT-ML (PC II), all entries viz., Co 09009, Co 10015, Co 10017, Co 10031, Co 10033, CoM 10083, CoT 10368, CoT 10369, CoVC 10061, PI 10131 and PI 10132 were found to be R.

## **RESULTS OF THE CURRENT YEAR**

### **LUCKNOW**

Natural incidence of Yellow leaf disease (YL) was observed in four genotypes viz., Co 13035, CoPb 14212, CoPb 14182 and CoPb 14185 (Table 13).

### **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), ten entries were evaluated as

R whereas three entries namely CoH 14261, CoH 14262 and CoS 14233 were rated as MR against YL (Table 14).

#### **KAPURTHALA**

No Yellow leaf (YL) symptoms were observed at Kapurthala during 2017-18 crop season (Table 15).

#### **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 (Table 16).

#### **PANTNAGAR**

Out of 28 genotypes, 20 were found resistant, 6 moderately resistant and 2 moderately susceptible. No material was found susceptible or highly susceptible (Table 18).

#### **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 (Table 19).

#### **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 (Table 20).

#### **SEORAH**

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 Advanced Varietal Trial (Early) all three genotypes viz. CoP 13437, CoSe 13451 and CoSe 13452 showed resistant to YL (Table 21).

#### **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 (Table 23).

#### **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 susceptible reaction (Table 25).

#### **SANKESHWAR**

All six entries Co 11005, Co 11007, Co 11012, Co 11019, Co 11085 and CoM 11086 exhibited R reaction to YL (Table 28).

#### **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 (Table 31).

#### **SUMMARY**

The entries showing R or MR to YL are listed below

#### **NORTH WEST ZONE**

##### **LUCKNOW**

- IVT (Early) : CoLk 14202, CoPant 14221, CoPant 14222, CoPb 14181 and CoPb 14211
- AVT (Early) Plant - I : Co 13034, CoPb 13181 and CoS 13231
- AVT (Early) Plant - II : Co 12026, Co 12027, CoLk 12203 and CoPant 12221
- IVT (Mid Late) : Co 14035, CoH 14261, CoH 14262, CoLk 14203, CoLk 14204, CoLk 14205, CoPb 14183, CoPb 14184, CoS 14231, CoS 14232, CoS 14233, CoPant 97222 and Co 05011
- AVT (Mid Late) Plant - I : CoH 13263, CoLk 13204, CoPant 13224 and CoPb 13182
- AVT (Mid Late) Plant - II : Co 12029, CoH 12263, CoLk 12205, CoPant 12226, CoPb 12211 and CoS 12232
- AVT (Mid Late) Plant - II : CoLk 09204 and CoSe 12453

##### **UCHANI**

- AVT (Early) Plant - I : CoH 13263
- AVT (Early) Plant - II : CoH 12263
- IVT (Early) : CoPb 14182
- IVT (Mid Late) : CoH 14262, CoLk 14203, CoLk 14205, CoPb 14183, CoPb 14184, CoPb 14185, CoPb 14212, CoS 14231 and CoS 14233

##### **SHAHJAHANPUR**

- IVT (Early) : Co 14034, CoLk 14201, CoLk 14202, CoPant 14222, CoPb 14181, CoPb 14182, CoPb 14211, Co 0238, CoJ 64 and Co 05009
- IVT (Mid Late) : Co 14035, CoH 14261, CoH 14262, CoLk 14203, CoLk 14204, CoLk 14205, CoPb 14183, CoPb 14184, CoPb 14185, CoPb 14212, CoS 14231, CoS 14232, CoS 14233, CoS 767, CoS 8436 and CoPant 97222

##### **PANTNAGAR**

- IVT (Early) : CoLk 14201, CoPb 14182, CoPb 14181 and Co 14034
- AVT (Early) Plant - I : CoS 13221, CoS 13034
- AVT (Early) Plant - II : CoPant 12221, Co 12026 and CoLk 12203
- IVT (Mid Late) : CoPb 14212, CoPb 14183, CoLk 14203, CoLk 14204, CoS

14233, CoPb 14184 and CoS 14232  
 AVT (Early) Plant - I : Co 13035, CoPb 13182, CoH 13263 and CoPant 13224  
 AVT (Early) Plant - II : CoPant 12226, CoS 12232, CoPb 12211, CoLk 12205, CoH  
 12263 and Co 12029

**NORTH CENTRAL ZONE**

**MOTIPUR**

IVT (Early) : CoLk 14206, CoLk 14207, CoSe 14453 and CoSe 14454  
 AVT (Early) Plant - I : CoP 13437 and CoSe 13452  
 AVT (Early) Plant - II : CoLk 12207 and CoSe 12451  
 IVT (Mid Late) : CoBln 14502, CoLk 14209, CoP 14438, CoP 14439, CoSe 14452,  
 CoSe 14455 and CoSe 14456

**SEORAH**

IVT (Early) : CoBln 14501, CoLk 14206, CoLk 14207,  
 CoP 14436 and CoP 14437  
 IVT (Mid Late) : CoBln 14502, CoLk 14208, CoLk 14209, CoLk 14210, CoP  
 14439, CoSe 14452, CoSe 14455 and CoSe 14456  
 AVT (Early) : CoP 13437, CoSe 13451 and CoSe 13452

**EAST COAST ZONE**

**ANAKAPALLE**

IVT (Early) : CoC 15336 and CoV 15356  
 IVT (Mid Late) : PI 15376 and PI 15377  
 AVT (Early) Plant : Co 13023, CoA 14321 and CoC 14336  
 AVT I Mid late : Co 13028, Co 13029, Co 13031, CoA 14323, CoC 14337 and PI  
 14377  
 AVT II Early : CoC 13336 and CoV 13356  
 AVT (Mid Late) Plant - II : CoA 11326, CoA 12324, CoC 13339 and CoOr 13346

**PENINSULAR ZONE**

**NAVSARI**

IVT (Early) : Co 14002, Co 14003, Co 14004, Co 14006, CoN 14071, CoN  
 14072, CoSnk 14101, CoSnk 14102, CoT 14366, CoT 14367, MS  
 14081, MS 14082, Co 13021, Co 13022, Co 14008, Co 14009, Co  
 14012, Co 14016, Co 14022, Co 14023, Co 14025, Co 14026, Co  
 14030, Co 14032, CoN 14073, CoN 14074, CoTl 14111, CoTl  
 14112, CoVC 14061, CoVC 14062, PI 14131, PI 14132, VSI  
 14121 and VSI 14122  
 AVT (Early) Plant - I : Co 12007, Co 12009, Co 12012, Co 12019, Co 12024, CoM  
 12085 and VSI 12121  
 AVT (Early) Plant - II : Co 11001, Co 11004, CoM 11081, CoM 11082 and CoM 11084  
 AVT (Mid Late) Plant - II : Co 11005, Co 11007, Co 11012, Co 11019, CoM 11085 and CoM  
 11086



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

**Objectives:** To gather information on the diseases naturally occurring in the area on varieties to compile all India status report yearly.

**Location:** Lucknow, Karnal (SBI), Uchani, Pantnagar, Shahjahanpur, Kapurthala, Pusa, Seorahi, Buralikson, Anakapalle, Cuddalore, Nayagarh, Coimbatore, Padegaon, Tiruvalla, Navsari, Pune, Sankeshwar, Kolhapur and Akola.

**Year of Start:** 1989-1990

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

### **FINDINGS OF THE PREVIOUS YEAR**

#### **NORTH WEST ZONE**

##### **LUCKNOW**

Incidence of red rot was noticed in Co 0238, CoS 8436, CoS 92423, CoLk 08102, CoS 91269 and CoSe 95422. Localized incidence (3-8%) of red rot was also noticed in Co 0238 at several locations of Uttar Pradesh. However, in some fields of CoLk 8102, CoSe 95422 and CoS 8436, there was 25% incidence. Incidence of smut was also observed in CoSe 92423 and Co 0238. Incidence of GSD was noticed in most of the field surveyed (1-3%) to (10-20%) in CoS 91269. The incidence of pokkah boeng is increasing substantially and the incidence of leaf scald was also noticed in Co 0238.

##### **KARNAL**

Severe red rot incidence (> 40%) was recorded in Co 89003; upto 20% in CoPant 84212 and trace to 1% on variety Co 89003. Similarly up to 10% incidence was recorded in two fields of mix varieties at Laksar (UK). Severe incidence (1- 20%) was noted in ratoon of variety Co 89003 at Panipat followed by CoH 150 (1- 8%, Shahabad) and CoH 152 (trace- 3.0%, Palwal). None of the field of variety CoH 150 was free from smut in Shahabad. Further, trace incidence observed in the variety Co 0238 at Sobitgarh (UP). GSD was recorded up to 5% in Co 89003 (ratoon) at Sonipat, 1- 3% in CoH 150 (Shahabad) and trace to 2.0% in other varieties i.e. Co 0238, CoS8436, CoJ 88, CoH 160, CoH 152 and CoH 119 in Haryana. Trace to 3.0% incidence was also observed on Co 0238, Co 98014 and CoS 8436 at Mawana. Pokkah boeng incidence was ranging from trace to 3% in varieties viz. CoH 150, CoH 119, CoS 8436, Co 0238, Co 89003, CoJ 85 and CoJ 88 in Haryana, whereas in UP, disease was prevailing in the varieties Co 0238, Co 98014 and CoS 8436. However, in one field of variety Co 0238 in village Jaisinghpur, Mawana (UP) incidence of 10-12% was observed. Further, very severe incidence of top rot (40%) was recorded in CoJ 85 at Meham, 5% in CoH 150 (Shahabad), 1- 2 % in CoS 8436 (Karnal & Rohtak), up to 2% in CoJ 85 (Rohtak) and trace in varieties CoH 119 and CoH 152 at Palwal and Kaithal (Haryana). Disease was recorded by 2.0 – 3.0 % in CoJ 88 under Deoband, Laksar and Sobitgarh areas. Mild to severe incidence of wilt (up to 30.0%) was seen in variety Co 89003 at many fields of Haryana and UP.

##### **UCHANI**

Red rot was observed on plant and ratoon crop of CoS 8436, CoJ 85 and Co 89003 varieties ranging from 2 to 25%. Wilt was noticed in varieties namely Co 89003, Co 05011, CoS 8436, CoH 119, Co 767 and Co 1148 ranging from 5 to 25%. The incidence of wilt in

association with red rot was also observed in Co 89003. The incidence of wilt in association with red rot and root borer was also observed in Karnal, Panipat and Rohtak sugar mill zone areas. Smut incidence in the range of 2- 15% was observed on the varieties Co 0238, Co 89003, CoH 99, CoH 160, Co 0118, CoH 119 and Co 05011 . Top rot was observed on the varieties viz., CoJ 85, Co 0238, CoH 152 and CoH 119 ranging from 2 to 60%. GSD was observed in traces to 15% on Co89003, CoJ 85, Co 0238, CoS 8436, CoH 119, CoH 160 and CoH152. Pokkah boeng (traces to 35%) appeared on varieties viz., Co89003, CoJ 85, Co 0238, CoS 8436, CoH 119, CoH 160, CoH 152 and Co 05011. YLD was noticed in traces to 5% on the varieties Co 0238, CoS 8436, CoH 119, CoH 152, Co 89003, CoH 119, CoH 160 and Co 05011. Incidence of mosaic in traces was observed in CoH 119 and CoS 8436.

### **PANTNAGAR**

During the survey, red rot was not recorded on any of the varieties in the field. Smut was observed in traces in few cultivars during October to January. Wilt was observed on CoS 767 in Liberhedi, and on CoS 88230, CoS 767 in Doiwala. Foliar disease (ring spots and eye spots) were observed in scanty level to mild in almost all the varieties. Most severe on CoPant 99214, CoS 88230, Co 0118, CoS 767, CoS 96268, CoPant 92423 in Khanpur, Laksar and Iqbalpur area. YLD was seen as a minor disease in some pockets in CoPant 84212, CoPant 03220, CoPant 05224 mild incidence in CoPant 90223 and CoS 767. PB was present at low level in some varieties, more in Co 0238 at most of the places.

### **SHAHJAHANPUR**

Red rot was observed on the variety Co 0238 with incidence of 5-15%, 1-2%, 2-10%, 40% from Nigohi, Rosa, Hargaon and Gola, respectively. The varieties CoJ 85 and CoJ 88 were affected with 10 to 20% from Mankapur and Nigohi, respectively. Incidence of smut up to 3% was noticed on varieties Co 0238, Co 1158, CoS 98231, CoS 767, CoSe 92423 and CoLk 94184 at Hardoi, Gajraula, Palia and Shahjahanpur. Wilt (5%) was reported on the varieties Co 05011, Co 0238, CoS 08279, CoS 08272, CoS 08276 and CoS 08452. This disease also observed on Co 05011 with the incidence of trace to 25%. GSD was reported in almost all the popular sugarcane cultivars and its incidence varied from 2 to 25% in Shahjahanpur and Bareilly. Pokkah boeng disease was reported in Co 0238 with incidence of 15-30%. It was also reported up to incidence of 5% from Shahjahanpur, Sitapur, Gajraula, Palia and Gola. The popular cultivars viz; Co 0238, Co 0118, Co 05011, CoS 08279, CoS 08272, CoS 8436, CoSe 01434 and UP 05125 were affected by YLD.

### **KAPURTHALA**

The disease survey on sugarcane crop was conducted three times during May-June, September and November. Red rot was observed from traces to 6.0 % on Co 89003, CoJ 64 and CoJ 85 and CoPb 91 in Ajnala, Amloh, Bhogpur, Bhudewal, Nawashahr and Phagwara sugar mills areas. Wilt incidence of 6-7% was observed on Co 89003 and CoS 8436 in Dhuri, Nawanshahr, Amloh, Budhewal and Fazilka mills area. The varieties Co 0238 and Co 89003 were found infected with smut from traces to 5.0% in Kiriafgana, Batala, Mukerian, Dasuya Nakodar and Phagwara and Ajnala mills area. Pokkah boeng disease was observed on variety Co 0238 (traces to 2%) in Mukerian, Dasuya, Gurdaspur, Kiriafgana, Batala, Ajnala and Bhogpur sugarmills area. Red stripe/top rot disease was observed traces on CoJ 85 in Bhogpur, Budhewal Dhuri, Amloh and Morinda sugar mills area. GSD was observed with an incidence of 1-2% on Co 0238 in Butter Sevan, Kiriafgana, Mukerian, Dasuya and Gurdaspur Dasuya and Gurdaspur sugarmills area.

### **NORTH CENTRAL ZONE**

#### **PUSA**

During survey, incidence of wilt was noticed in varieties CoLk 94184, CoSe 98231, Co 0118 and Co 0233. Smut was observed in BO 141 and BO 136. Variety Co 05011 was

found affected with Pokkah Boeng and mosaic diseases. The varieties CoSe 92423, CoS 8436 and CoSe 95422 were found affected with red rot. Red rot and GSD was observed in variety Co 0235. While YLD was noticed in ratoon crop of varieties CoSe 95422 and CoSe 8436 in two clumps only in the farmer field during 2nd week of August, 2016.

### **SEORAH**

Red rot was reported with 15- 20% incidence on cultivars CoSe 92423 and UP 9530 in Ramkola sugar mill at the farmer fields. The wilt was observed on varieties CoS 08279 (2%) and Co 0238 (10%) incidence in Seorahi and variety Co 98014 was observed to have 15-20% incidence in the Ramkola sugar mill at farmer's field. Traces to 1% incidence of smut was reported in the plant and ratoon crops of CoSe 11453, UP 05125, CoSe 01434, CoS 08279, CoSe 92423, Co 0238, CoS 8432, Co 0118, Co 05011 and CoP 9301 and incidence range from 2 to 8 %from Seorahi, Ramola, Dhara, Khada, Manakapur, Balarampur, Babhanan, Uttaraula sugar mill zone areas in eastern UP. GSD was noticed in the varieties namely Co 05011, Co 0118, Co 0238, Co 98014, CoS 88230, CoS 91269, CoS 97261, CoS 13231, CoS 08272, CoS 08279, CoSe 92423, CoSe 01424, UP 5125 and CoJ 88 were from Babhanan, Balarampur, Chhatiyawn, Manakapur, Uttaraula, Ramkola, Seorahi and Sultanpur sugar mill zone areas in the farmers field and its incidence varied from 2 to 6%. The PB was also recorded on cultivars CoS 08279, CoS 08272, UP 9530, UP 05125, CoSe 96436, CoSe 92423, CoSe 01434, CoS 06279, CoS 91269 Co 05011, Co 98014, Co 0118 and Co 0238 @ 1 to 10%. YLD was also recorded on Co 05011 and UP 05125 @ 15% and 10% and the mosaic incidence was recorded in the variety CoPant 97222. Further YLD, mosaic and stinking rot were noticed in traces on the varieties Co 0118, CoS 08272 and CoS 08279.

### **MOTIPUR**

In Bihar, CoP 9301, Co 0238, CoSe 95422, Co 0118, CoLk 94184, Co 0239, BO 130 were the varieties found in cultivation. Red rot was recorded in varieties CoSe 95422, Co 0238 and BO 130 to the tune of 3-7%. Whereas PB was observed in the variety Co 0238 (5-20%) and YLD was noticed in the varieties viz., CoLk 94184, Co 0118, BO 130 and Co 0238.

### **NORTH EAST ZONE**

#### **BURALIKSON**

Sugarcane genotypes were found to be affected with red rot, wilt, YLD, pokkahboeng and leaf spot in Golaghat District of Assam. Red rot, wilt and YLD were observed in Co 740, Co 997, CoBln 09104. Red rot incidence varied from trace to 8.82%. Wilt was observed in ratoon crop of Khanikor upto 18.51%. Trace to 5.66% YLD incidence was noticed in Co 997. Foliar disease, ring spot was recorded in CoBln 09103, BO 130 and CoSe 12453 upto 24%. Pokkahboeng was also observed in CoSe 11454, CoLk 09204, CoP 13436, BO 130 in tillering stage. But these genotypes regained from disease condition except the genotype CoSe 11451 where top rot phase was observed. Banded sclerotial disease was also observed in BO 155 in traces.

### **EAST COAST ZONE**

#### **ANAKAPALLE**

Red rot of 10-40 % was observed on Co 62175, 81 A 99, 93 V 297, S-12 and 81 V 48 in Visakhapatnam, Chittor and Srikakulam districts. Smut incidence was noticed in almost all sugarcane growing areas of Andhra Pradesh ranging from 10-45 % mostly on ratoon crop of CoA 92081, CoV 09356 (2003V46), 91 V 83 and 97 R 83. Wilt incidence also was observed 10-30 % in Coastal areas of Andhra Pradesh on Co 86032, 87 A 380, Co 7219, 91 V 83, Co A 92081, Co 62175 and 81 A 99. YLD is increasing year after year in all sugarcane growing areas of Andhra Pradesh in all the varieties and recorded 10-70%. Top rot, rust, ring

spot and GSD are predominant diseases recorded during the period 2016-17 on sugarcane. Rust and ring spot diseases were observed in some areas even after 2-3 months after planting. Though leaf scald disease once appeared in traces, is again seen emerging on a economically significant note especially during 2016 and 2017.

### **CUDDALORE**

The survey conducted in Cuddalore, Villupuram, Kanchipuram and Thiruvannamalai Districts of Tamil Nadu and Puducherry state indicated that 2 to 54 % incidence of red rot on CoC 24, CoC 23 and Co 91017. Smut was recorded in variety CoC 22 and CoSi 6 with 2 and 8 % severity. Wilt was observed in Co 86032 (2 to 12 %) and YLD was noticed on Co 86032 (5 to 15 %) and CoV 09356 (5 to 10 %).

### **NAYAGARH**

Incidence of red rot was recorded 5-30% in the varieties *viz.* Co 86032, Co 6907, CoOr 03151 and Co 86249. Ring spot and GSD were predominant diseases in sugarcane and their incidence in the range of 10-40%. Pokkah boeng was observed during rainy days in the range of 5-10% but plants recovered after the season. Mosaic was prevalent in the areas and incidence varied from 5% to 40%.

### **PENINSULAR ZONE**

#### **COIMBATORE**

Detailed surveys for smut, wilt and YLD were conducted in Karnataka and Tamil Nadu. Occurrence of red rot in Co 86027 and TNAU Si8 was found in Namakkal and Tiruvannamalai dt, respectively. Trace incidence of red rot was found in a ratoon crop of Co 06022 in Nagapattinam Dt. Sudden outbreak of smut in Co 86032 was found in Villupuram and Tiruvannamalai districts. Continuation of the old varieties such as Co 97009 and PI-96-843 with severe smut was found to be the reason for the sudden outbreak of the disease. Further severe wilt outbreak was found in both the states. The varieties Co 62175, Co 86032 and Co 0323 were affected in the Karnataka state and in many varieties in Tamil Nadu. Severe rust occurrence of brown rust was found in Co 0323 in Karnataka. Degeneration in the cultivars Co 86032, CoA 92081 and CoV 94101 was found due to YLD and mosaic. Occurrence of GSD was found in many districts where healthy seed nursery programme is not followed.

#### **PADEGAON**

The incidence of diseases like smut, GSD, pokkah boeng, rust, YLD, brown spot, pineapple and ring spot was observed in different areas. Smut incidence was noticed up to 8% on Co 7219 at Kasbe-Digraj in Sangli district. The incidence of YLD was noticed in villages from Kolhapur district on Co 86032, CoC 671. GSD was noticed in Pune, Ahmednager and Satara districts on the sugarcane varieties *viz.*, CoM 265 and Co 86032 (ratoon). Pokkah boeng was noticed on CoVSI 9805 and CoC 671 in Solapur district. The incidence of rust up to 25-30% was noticed in Kolhapur district on CoM 0265, Co 92005 and Co 86032. Moreover, 5-10% rust incidence was noticed on CoM 0265 from Satara district. Brown spot was a major problem observed up to 5-20% predominantly in Satara, Sangli and Pune districts because of frequent rains and high humidity. The incidence of ring spot disease was noticed up to 5% in Kolhapur district on CoM 0265, Co 86032 and Co 92005, whereas trace incidence of pineapple disease was noticed on Co 86032 and CoM 0265.

#### **THIRUVALLA**

Ring spot, sheath blight, rust, mosaic and pokkah boeng were recorded but none of the diseases were in a severe stage to cause any drastic yield decline. Sheath blight due to *Rhizoctonia solani* was observed in the entire experimental field in the station during May – June. Ring spot was the most common and predominant foliar disease observed even from

two months age up to harvest. Rust disease was observed during August – September months. Mosaic was seen commonly in most of the crop varieties.

### **NAVSARI**

Area affected under wilt, red rot and whip smut was 2.02, 1.63 and 4.92% respectively. The incidence of smut was recorded on varieties like CoSi 95071, Co 86002, Co 97009 and Co 99004. Maximum incidence of smut was recorded on CoSi 95071, Co 86002 and Co 97009 and it was to the tune of 9.70 % in Bardoli 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 6.54 % in Gandevi Sugar factory. The red rot was recorded on CoC 671, Co 86032, Co 86002, Co 0323, CoVSI 03102, CoVSI 0434 and Co 97009 and it was to the tune of 1-2 % in all Sugar factory areas. 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 pokkah boeng disease was observed in Co 99004 in Bardoli, Gandevi, Chalthan and Kamrej Sugar factory areas. Grassy shoot, YLD were found in traces at Chalthan, Mahuva, Narmada, Bardoli sugar factory areas and also Navsari surrounding area. Grassy shoot was observed on Co 86032, CoC 671 and CoM 0265 and YLD was noticed on Co 86032 and Co 99004.

### **POWARKHEDA**

Survey of different sugarcane growing areas were undertaken to record the incidence of major diseases like red rot, wilt, smut, GSD, YLD and pokkah boeng. Red rot was recorded on CoLk 8001/Unknown at Narsingpur with incidence of up to 20%. Only 2-3 plots were infected with red rot. Smut was found to be major diseases and observed from all the locations i.e. Hoshangabad, Bankhedi, Kareli, Gadarwara and Narsingpur sugarcane growing area. Mainly, the disease was recorded on Co 7219, Co 86032, Co 99004, Co 06027, Co 94012, Co 8014, CoM 0265, CoJ 64, Co 0238 and CoS 88230. The highest incidence was noticed on Co J 64 up to 12%. Wilt was observed from Kareli, Gadarwara and Narsingpur sugarcane growing areas on Co 94012 with incidence of up to 40%. GSD was observed on Co 86032 and Co J 64 from Kareli sugarcane growing area with the incidence of up to 7%. YLD from Hoshangabad and Kareli locations on Co JN 86572, Co 09007, Co 85004 Co 99004, Co 86032, CoVSI 434 and CoS 88230 with the incidence of up to 15%. Pokkah boeng was observed in traces.

### **PUNE**

The GSD incidence in Maharashtra was up to 15% on CoC 671, Co 86032, CoM0265, Co 419, CoVSI9805 and Co 92005. Smut incidence was up to 5% in Khandesh and Vidarbha region on Co 86032 and Co 419. Pineapple disease was observed in ill-drained soils up to 5% affecting germination. Due to drought and low humidity for last 2 crop seasons, the incidence of the pokkah boeng was low to 10% throughout Maharashtra. The rust disease up to 15% was observed starting September after the monsoon period and present throughout the year. The eye spot incidence was noted in Southern Maharashtra on CoC671, Co92005 and Co86032 up to 7 %. The mosaic was minor and observed in traces. The incidence of brown spot was noted on CoM0265 up to 5%. The incidence of YLD is increasing on CoC 671, CoM0265, Co 86032, Co 419, VSI434 throughout Maharashtra.

### **SANKESHWAR**

Smut, rust, brown spot and grassy shoot were the major diseases in region. Maximum incidence of smut was observed on Co 86032 and Co 8011, CoC 671 and Co 91010 and it was to the tune of 11.4%. 10-17% rust incidence was observed in some areas after 2-3 months of planting. Brown spot was a major problem observed predominantly in Dharwad and Belgaum districts because of frequent rains and high humidity during rainy

season. The pokkah boeng disease was noticed on all sugarcane varieties after receiving pre monsoon shower in May. YLD was observed in some varieties in severe form.

### **KOLHAPUR**

The survey of sugarcane diseases was carried out before onset of south-west monsoon and after over monsoon in the region. The incidence GSD is increased due to use of unhealthy seed material. Smut was not much observed in the zone except on Co 7527 upto 2% in Kagal tehsil. Among the foliar diseases, rust and ring spot fungal diseases are predominant in the region. The intensity was noticed in the range of 5-25% (rust) and 2-10% (ring Spot). The pokkah boeng was noticed on all sugarcane varieties in the range of 2-5%. The brown spot caused by *Cercospora longipes* is noticed every year on CoM 0265 sugarcane variety with intensity in the range of 15-20%. The intensity of YLD is more in 8 to 12 months crop on the variety Co 86032.

### **AKOLA**

Surveys in Wardha, Yavatmal and Telhara areas indicated that Pokkah Boeng (up to 5% incidence), YLD (upto 2%), mosaic (traces – 1%) were found in low intensity on Co 265 (Ratoon), Co 86032 and Local variety Paturda. In Nagpur and Bhandara regions, Pokkah boeng was recorded upto 6% on variety Co 03102 and NR 9805. The other varieties Co 86032, CoM 0265, Co 03102, Co 92005 and NR-9805 were also affected by PB. YLD and mosaic diseases were also observed on all these varieties. In Wardha regions, Pokkah Boeng, YLD and mosaic were observed on Co 86032, CoVSI 8005, CoM 0265 and the incidence was very low upto 5% only.

## **FINDINGS OF THE CURRENT YEAR**

### **NORTH WEST ZONE**

#### **LUCKNOW**

During 2017-18 sugarcane 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 percent was observed this year in Co 0238 in plant and ratoon crops and even up to 100 per cent in some villages of Shahabad areas. Smut also noticed 5-45 percent 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 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 (YLD) was noticed in Traces-5 % on varieties viz., Co 0238, CoS 8436, CoH 119, Co 89003, CoH 119, CoH 160 and Co 05011 in Yamunanagar, Karnal, Asandh, 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 percent 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 3220, CoPk 5191, 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 sevan, 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 (GSD) was observed with an incidence of traces to 2.0 per cent on Co 0238 in Bhogpur, Butter Sevan, 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, Mujhailia 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%.

#### **SEORAH**

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, Uttaraula, 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 per cent incidence in Pratappur sugar factory zone. YLD incidence was recorded up to 5 -10 per cent in Co 0118 and UP 05125 from Ramkola sugar mill zone. Mosaic incidence was recorded up to 6 - 8 per cent in varieties 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 also 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 in grand growth stage. 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 incidence 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 001110 (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 8<sup>th</sup> 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 (YLD) was noticed in Udgaon, DattaShirole, Yadrav, Krundwad, Abdullaat, Narshiwadi villages from Shirole tahsil of Kolhapur district on Co 86032, CoC 671. The grassy shoot disease (GSD) was noticed in Baramati, Daund, Junner, Rahuri and Karadtahsil of Pune, Ahmadnagar and Satara districts on the sugarcane variety CoM 265, Co 86032 (ratoon). 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 (1-2grade). 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%. The incidence of YLD was found mainly on Co 86032.

#### **AKOLA**

Roving survey of sugarcane fields of Vidarbha, Yavatmal in 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.

## 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 32 genotypes, none of the entries behaved as resistant, 14 genotypes were found MR against CF08 and 18 against CF09. Five genotypes ISH 108, ISH 191, ISH 224, ISH 269, and ISH 313 were found MS to CF08 whereas MR to CF09. Genotypes ISH 137 was found S to CF08 and MS to CF09. Five genotypes were HS to both the pathotypes by plug method of inoculation whereas ISH 012, ISH 148, ISH 267 and ISH 287 were HS to CF08 and MR/MS to CF09.

##### KARNAL

Twenty three ISH genotypes were inoculated with CF08 and CF09 isolates by plug method of inoculation for red rot resistance. Eleven genotypes exhibited S/HS, seven MS and five R/MR reaction to CF08 isolate. Similarly with CF09 isolate, 13 genotypes showed S/HS, two MS and eight R/MR reactions.

##### UCHANI

Nine ISH clones viz., 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 resistance to red rot by plug method using pathotype CF08. The clones namely F1108, IA 30-17, and IA 31-35 were found R/MR whereas, genotype B 44-167, IA 30-14, IA 31-32, Q-65, Q-45 and 57 NG 131 showed MS/S reaction against red rot pathotype CF08.

##### SHAHJAHANPUR

ISH genotypes were collected from SBI Coimbatore and multiplied during 2016-17.

##### LUCKNOW

Trial not conducted

#### NORTH CENTRAL ZONE

##### PUSA

Out of 27 clones, 06 clones (AS 04-1687, AS 04-1689, BM – 1003143, BM 1009163, SA 98-13 and SA 409) failed to germinate. Due to poor germination, the inoculation was not carried out in rest of clones. After multiplication of seed materials, 27 clones were planted during 2017 planting season and inoculation will be done during August, 2017.

##### SEORAH

Trial not conducted

## **PENINSULAR ZONE CUDDALORE**

Among the 27 elite and ISH clones screened for resistance to red rot against CF04 and CF06 by plug method of inoculation, two clones *viz.*, SA 04-454 and Gu 07-2276 recorded resistant reaction. Thirteen clones *viz.*, BM 1005149, BM 1010168, PG 9869137, SA 98-13, SA 04-390, SA 04-496, SA 04-409, AS 04-1689, AS 04-2097, MA 5/37, MA 5/99, MA 5/22 and GU 07-3849 were MR to both the pathotypes.

### **NAVSARI**

Out of 26 elite and ISH genotypes evaluated for red rot resistance, only one genotype SES 594 gave R reaction. Fourteen genotypes, *viz.*, ISH 111, ISH 58, ISH 100, ISH 287, ISH 12, ISH 50, ISH 147, ISH 267, ISH 118, ISH 117, ISH 114, ISH 115, AS 04-1687 and GU 07-2276 were observed with MR reaction. Five genotypes *viz.*, ISH 175, ISH 229, AS 04-2097, MA 5/5 and MA 5/51 showed MS reaction. Two genotypes *viz.*, ISH 69 and MA 5/99 displayed S reaction, 4 genotypes *viz.*, ISH 41, ISH 176, ISH 9 and ISH 43 exhibited HS reaction by plug method.

### **COIMBATORE**

Twenty seven ISH clones were evaluated for red rot with CF06 and CF12 pathotypes. About 14 clones were identified as resistant to CF06 as against eight for CF12 in plug method. In nodal method 18 and 19 were resistant to the two pathotypes, respectively.

### **ANAKAPALLE**

Trial not conducted.

## **RESULTS OF CURRENT 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 (Table 32).

#### **KARNAL**

Twenty seven ISH clones were inoculated with CF08 and CF09 isolates and among them 15 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 (Table 33).

#### **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 moderately susceptible/ susceptible 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 (Table 34).

#### **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 (Table 35).

### **SEORAH**

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 (Table 36).

## **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 and 6 genotypes were HS to red rot (Table 37).

### **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 (Table 38).

## **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 (Table 39).

### **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 (Table 40).

## 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

While comparing clip inoculation in leaf whorl and leaf whorl inoculation methods, number of rust pustules per square inch leaf was more in leaf whorl method (23.20/inch<sup>2</sup>). In clip inoculation, the average number of rust pustules per square inch was 13.00. Therefore, leaf whorl inoculation method is found superior over clip inoculation method.

#### KOLHAPUR

In clip inoculation method, brown rust development was slower than in leaf whorl method. More number of rust pustules was found in the leaf whorl inoculation (40.05/inch<sup>2</sup>) than the clip inoculation method (30.75/inch<sup>2</sup>) (Table 39). In addition sugarcane genotypes were screened to identify the resistance and the results are given below.

1) IVT (E): Among the tested 8 sugarcane genotypes, 3 genotypes *viz.*, Co 13002, CoSnk 13101 and MS 13081 were found free from rust, whereas remaining five showed rust severity in the range of 10-20% under natural condition.

2) AVT (EI) plant: Out of 5 sugarcane genotypes, Co 11004, CoM 11082 and CoM 11084 were found free from rust whereas, remaining genotypes showed the rust intensity in the range of 25-30 % under natural condition.

3) AVT (E II) plant): Among the 8 genotypes, 4 genotypes *viz.*, Co 10005, Co 10006, Co 10027 and CoT 10367 were found free from rust while remaining genotypes shown rust disease intensity in the range of 10-20% under natural condition.

4) IVT (ML): Among the tested 20 sugarcane genotypes, 6 genotypes *viz.*, Co 13008, Co 13011, Co 13016, CoM 13082, CoSnk 13103 and CoSnk 13106 were found rust free and remaining 14 genotypes showed rust intensity in the range of 5-20% under natural condition.



5) AVT (ML I) plant: Of the six sugarcane genotypes, Co 11007, Co 11019 and CoM 11085 were free from rust and remaining sugarcane genotypes recorded rust severity in the range of 20-40%.

6) AVT (ML II) plant: Out of 11 genotypes, 4 genotypes *viz.*, Co 10015, Co 10031, Co 10033 and CoM 10083 were found free from rust whereas, remaining genotypes recorded rust severity in the range of 10-25%.

7) Check varieties: Among the check varieties only Co 86032 and Co 740 were found free from rust and other varieties showed rust severity in the range of 5-35%.

#### **SANKESHWAR**

Observations indicated that, out of 2 methods, number of rust pustules (36.54 /inch<sup>2</sup>) on inoculated were higher under leaf whorl method. In clip inoculation, the average number of rust pustules per square inch was 24.31. Therefore leaf whorl inoculation method was found superior over clip inoculation.

#### **PADEGAON**

The leaf whorl inoculation method recorded higher number of rust pustules (31.91 per sq. inch) and more number of leaves were showing rust pustules (5.6). In clip inoculation method the number of rust pustules were lower (25.85) per sq. inch and less number of leaves were showing rust pustules (5.4). This indicates that the leaf whorl inoculation method is better for screening than the clip inoculation method. A third method i.e. spray inoculation with uredospores suspension ( $10^4$ - $10^5$  spores/ml) was experimented which recorded the higher number of rust pustules (33.42) per sq. inch than these methods.

#### **ANAKAPALLE**

Trial not conducted

### **RESULTS OF THE CURRENT YEAR (Table 41)**

#### **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.

**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 3<sup>rd</sup>/4<sup>th</sup> 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 15<sup>th</sup>)

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**

Out of 42 entries, nine genotypes showed MS reaction, six were S and remaining entries were found to be R. Check varieties Co 0238 and CoJ 85 behaved as HS and MS to the disease respectively.

##### **UCHANI**

Sixty nine varieties of sugarcane were screened against pokkah boeng under natural conditions. Twenty nine varieties were found resistant to pokkah boeng. Thirty one varieties showed MS reaction to pokkah boeng. Eight varieties (CoH 110, CoH 133, CoH 152, CoJ 85, CoLk 13204, CoPb 11214, CoPant 13222 and CoS 8436) exhibited S reaction.

##### **SHAHJAHANPUR**

A total of 13 varieties were planted for pokkah boeng screening and its incidence was correlated with climatic conditions. Variety Co 0238 was used as susceptible check for PB. Of 13, ten varieties displayed the behavior of resistant. Rest three varieties were rated as MS.

##### **KOLHAPUR**

In IVT (E) trial, 4 genotypes *viz.*, Co 13003, Co 13004, CoSnk 13101 and CoSnk 13102 were found R. In AVT Early (I Plant), all the five sugarcane genotypes *viz.*, Co 11001, Co 11004, CoM 11081, CoM 11082 and CoM 11084 were found R. Out of 8 genotypes under AVT Early (II plant), only 3 genotypes *viz.*, Co 10004, Co 10024 and Co 10027 showed R. Under IVT ML, 10 genotypes *viz.*, Co 13005, Co 13006, Co 13011, Co 13013, Co 13018, CoM 13082, CoSnk 13103, CoSnk 13105, PI 13131 and PI 13132 found R to pokkah boeng. In AVT ML (I plant), all 6 sugarcane genotypes *viz.*, Co 11005, Co 11007, Co 11012, Co 11019, CoM 11085 and CoM 11086 were found R to pokkah boeng. Out of 11 genotypes under AVT ML (II plant), 8 genotypes *viz.*, Co 09009, Co 10015, Co 10031, Co 10033, CoM 10083, CoT 10368, CoT 10369, CoVC 10061 shown resistant reaction to pokkah boeng and remaining 3 exhibited MS reaction.

#### **NORTH CENTRAL ZONE**

##### **PUSA**

Of 11 genotypes screened under natural condition, four genotypes showed MR reaction whereas seven genotypes were susceptible to PB. The disease appeared in the 2<sup>nd</sup> week of June and gradually increased till 1<sup>st</sup> week of August. Initial symptoms showed whitish, curling, twisting and bending of the leaves from the top portion. Yellowing of foliage and reading of spindles with small holes were also noticed at later stage. High humidity and rainfall favours the disease development.

##### **SEORAH**

A total of 30 genotypes/varieties were screened for PB under natural condition. Out of 30 genotypes, 18 were PB resistant and 5 were MS whereas remaining were S.

#### **EAST COAST ZONE**

##### **ANAKAPALLE**

Out of 32 varieties / genotypes screened against top rot under natural conditions only CoC 671 showed HS reaction while four entries (Co 13030, Co 419, Co 7219 and Co 997) exhibited S reaction to top rot and remaining entries were R.

#### **PENINSULAR ZONE**

##### **PUNE**

Out of the 14 genotypes, CoVSI03102 and Co 85004 were free from the disease, while remaining 12 genotypes *viz.*, Co 419, Co 86032, Co 94012, CoC 671, CoVSI9805,

VSI434, CoVSI0405, CoVSI0309, CoM0265, CoVSI2000-01, MS 10001 and VSI08005 were found susceptible.

### **AKOLA**

The incidence of pokkah boeng was in range of 1.40 to 9.48 %. CoM11082 showed highest (9.48%) PB incidence in AVT (E I) Plant trial. In AVT (EII) Plant trial, the incidence was ranging from 0.60 to 6.19 %. Co 10006 showed highest (6.19 %) disease incidence. In IVT ML Plant, the incidence of PB was maximum in Co99004 (4.88 %). In AVT ML I Plant, Co11012 showed highest (4.67 %) disease incidence. In AVT ML II Plant, The incidence of PB was ranging from 0.00 to 3.72 % .CoT 10368 showed highest (3.72 %) disease incidence.

## **II. EPIDEMIOLOGY**

In Kapurthala, the disease incidence appeared during 1<sup>st</sup> fortnight of June and gradually increased till August-September. Rainfall and high humidity play an important role in PB incidence.

In Shahjahanpur, the incidence of PB appeared after rain fall along with high humidity when low temperature prevails in nature. The symptoms of PB were severely affected at 32.8<sup>o</sup>C (Maximum), 26.0<sup>o</sup>C (Minimum), relative humidity up to 86.0 %and 462 mm rainfall in the month of July, 2016 followed by August month.

In Uchani centre, PB incidence was noticed in first week of June 2016. PB incidence started increasing during rainfall with high humidity conditions.

In Pusa, the minimum and maximum temperature of 23.0 to 35.2<sup>o</sup>C, 53.1 to 93.0% relative humidity and 34.6 to 319.2 mm rainfall were observed during May to October, 2016.

In Seorahi, the severity of PB was correlated with weather parameters under natural conditions. The temperature (25-31<sup>o</sup> C), relative humidity (67- 91.33%) and rainfall (255 - 390 mm) were recorded during the year. The disease was maximum in first week of July and gradually increased till the last week of August.

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

## **III. POKKAH BOENG MANAGEMENT**

### **KAPURTHALA**

The efficacy of Carbendazim fungicide for the management of pokkah boeng was tested on Co 0238 and CoJ 85 under field conditions. The results revealed that fungicide treatment viz., carbendazim significantly controlled the disease as compared to control. Sett treatment and foliar spray at 15 days interval from May 15<sup>th</sup> (T<sub>3</sub>) was found most effective to control the PB and highest germination and low disease incidence (12.75 % in Co 0238 and 10 % in CoJ 85) was recorded as compared to other treatments.

### **PUSA**

Sett treatment with Carbendazim 0.1% and three foliar spraying with Carbendazim @ 0.05% at 15 days interval showed the maximum (46.8) percent germination and also low disease incidence (5.3) of Pokkah boeng.

### **ANAKAPALLE**

For management of top rot, the sett treatment combined with foliar spraying of Carbendazim @0.05% showed the highest percent germination and also low disease incidence of toprot (83.4 and 4.1, respectively) compared to the other treatments.

## **SANKESHWAR**

The experiments on management revealed that sett treatment (Overnight soaking with carbendazim- 0.1%) + foliar spray carbendazim @ 0.05% showed the highest %germination (88.32) and also low disease incidence (6.38), respectively) compared to other treatments.

## **PUNE**

For management of PB, the fungicides *viz.*, Carbendazim and Mancozeb were tested along with control in 5 treatments. Both the fungicides were found effective to control PB effectively when they were sprayed thrice at an interval of 15 days after 15<sup>th</sup> May. However, mancozeb @ 0.3 % was found more effective than the carbendazim and the disease control was up to 74.81 %.

## **RESULTS OF CURRENT 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 (Table 42).

##### **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 moderately susceptible reaction to pokkah boeng. Six varieties *viz.*, CoH 110, CoH 133, CoH 152, CoLk 13204, CoPant 13222 and CoS 8436 exhibited susceptible reaction to pokkah boeng. However, Co 0238 variety showed highly susceptible reaction against pokkah boeng (Table 43).

##### **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 (Table 44).

#### **NORTH CENTRAL ZONE**

##### **PUSA**

Twenty varieties were screened under natural condition, out of which, eighteen 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 resistant reactions whereas, two varieties (CoP 11437 and CoBln 14502) showed moderately susceptible against pokkah boeng disease (Table 45).

#### **SEORAH**

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 moderately susceptible (MS) and rest of them exhibited S behavior to pokkah boeng disease (Table 46).

#### **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% (Table 47).

#### **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 (Table 48).

#### **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 (Table 49).

#### **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 (Table 50).

## II. EPIDEMIOLOGY

In Kapurthala, The PB incidence of the disease initiated from 1<sup>st</sup> 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<sup>st</sup> 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 1<sup>st</sup> week of September. The maximum incidence was observed during 2<sup>nd</sup> 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.

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° 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 the Ist 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 °C and 38.70°C respectively & humidity ranges from 20.71 % to 97.31 %. Maximum pokkah boeng disease incidence was observed during 27<sup>th</sup> to 34<sup>th</sup> meteorological weeks, while the incidence was reduced after 35<sup>th</sup> 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 15<sup>th</sup> (T<sub>3</sub>) 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 (Table 51).

#### **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 in Co 0238 and CoS 8436, respectively and also increase germination (Table 52).

#### **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<sub>3</sub> 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<sub>2</sub> 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 (Table 53).

#### **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 (Table 54).

#### **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 (Table 55).

#### **PUNE**

For management of PB, the fungicides *viz.*, carbendazim and mancozeb were found effective when sprayed thrice after 15<sup>th</sup> may onwards. The maximum disease control (75.22 %) was obtained by 3 foliar spray of Mancozeb @ 0.3% at an interval 15 days from 15<sup>th</sup> May. However, carbendazim use by 3 sprays is also found beneficial to control the disease effectively (Table 56).



## PP 32: MANAGEMENT OF BROWN SPOT DISEASE OF SUGARCANE

**Objective:** To find out effective method of brown spot management through chemicals.

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

**Year of Start:** 2015-16

**Treatment:**

**I. Variety :** Brown spot susceptible variety CoM 0265 (or local susceptible variety)

**II. Fungicides**

T.1	- Propiconazole	-	0.1 %
T.2	- Hexaconazole	-	0.1 %
T.3	- Triadimefon	-	0.1 %
T.4	- Mancozeb	-	0.3 %
T.5	- Carbendazim	-	0.1 %
T.6	- Control (Untreated)	-	-

**III. Time of application of fungicides:** To be applied just after appearance of brown spot lesions followed by two sprays at 15 days interval.

**Plot size :** 6 x 7 sq. m

**Design :** RBD

**Replications :** Three

**Observations:**

1. Germination %
2. Disease incidence% (No. of clumps showing disease / total no. of clumps x 100)
3. Disease severity (% leaf area covered with brown spot lesions based on observations of 10 leaves per clump; total no. of clumps to be observed at least 10)
4. Cane yield per plot and per hectare
5. Brix, Pol %, Purity and CCS %
6. Cost-benefit ratio

### RESULTS OF THE PREVIOUS YEAR

#### PADEGAON

The results on intensity of brown spot disease, growth and quality parameters as influenced by different treatments were recorded. The results on germination percentage at 45 DAP were not significant. The germination in different treatments ranged from 57.3 to 66.0%. All the fungicides had a significant influence on the brown spot intensity, cane yield and CCS yield. Among the treatments, Propiconazole 0.1% recorded the lowest disease intensity of 10.0% followed by Mancozeb 0.3 % which recorded the disease intensity of 13.0% and the %disease control of 79.8.

#### KOLHAPUR

Due to flood condition during rainy season the trial was not completed.

#### SANKESHWAR

Due to least incidence of brown spot in experimental plot, the trial was not completed.

#### PUNE

The incidence of the disease was not observed throughout crop period and hence the treatments were not imposed so far.

## **RESULTS OF THE CURRENT YEAR**

### **PADEGAON**

The intensity of brown spot, growth and quality parameters as influenced by different treatments were recorded. All the fungicides had a significant influence on the brown spot intensity, cane yield and CCS yield. Among the treatments, Propiconazole 0.1 % recorded the lowest brown spot intensity of 10.00 % and the highest per cent disease control of 84.46 %, total height 226.00 cm, No. of internode 19.87, internode length 12.77 cm, NMC/ha of 89.68, cane yield of 103.80 t/ha and CCS yield of 14.67 t/ha. It was followed by Mancozeb 0.10 % which recorded the brown spot intensity of 13.00 % and the per cent disease control of 79.79 %, total height 223.67 cm, No. of internode 19.43, internode length 12.38 cm, NMC/ha of 86.28, cane yield of 98.0 t/ha and CCS yield of 14.26 t/ha.

### **KOLHAPUR**

The experiment is vitiated due to low incidence of the disease and non feasibility of spraying of various fungicides (as per treatment) due to flood condition during rainy season.

### **SANKESHWAR**

Among the treatments, Propiconazole 0.1% recorded the lowest disease intensity of 11.0% disease control 82.43 followed by Mancozeb 0.3% which recorded the disease intensity of 14.0% disease control of 78.3%.

### **PUNE**

The sugarcane crop under this project remains free from the incidence of brown spot and therefore, the treatments are not imposed. The project was vitiated.

## **PP 33:MANAGEMENT OF YELLOW LEAF DISEASE THROUGH MERISTEM CULTURE**

### **RESULTS OF THE PREVIOUS YEAR**

#### **ANAKAPALLE**

The tissue culture seedlings derived from CoA 14321, CoA 92081 and CoV 08356 were transplanted in field at rate of 9135, 2460 and 6500 plantlets respectively. It was confirmed that YLD incidence (%) was not seen in breeder seed. However, YLD in range of 0-10% was observed foundation seed of all the three cultivars.

#### **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 variety Co 86032. It was found that the disease has significantly affected germination, plant growth/yield parameters such as number of stalks, cane diameter, cane length, number of internodes, cane weight, juice yield etc in the popular variety Co 86032. It was found that due to virus infection, cane and juice yield are reduced by ~20 and 10 per cent, respectively in the variety in the plant crop.

### **RESULTS OF THE CURRENT 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 initiated. 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.

**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	BO 91	CoS 8436	Baragua	Khakai	SES 594
1.	IR-140	Co 0238	S	R	R	I	S	I	I	I	R	I	S	R	S	R
2.	IR-141	Co 0238	S	R	R	I	S	I	I	I	R	I	S	R	S	R
3.	IR-143	Co 0238	S	R	R	I	S	I	I	I	R	I	S	R	S	R
4.	IR-149	Co 0238	S	R	R	I	S	I	I	I	R	I	S	R	S	R
5.	IR-150	Co 0238	S	R	R	I	S	I	I	I	R	I	S	R	S	R
6.	IR-151	Co 0238	S	R	R	I	S	I	I	I	R	I	S	R	S	R
7.	IR-142	CoLk 8102	S	R	R	R	R	R	S	S	R	R	S	R	S	R
8.	IR-153	CoS 767	S	I	R	R	I	I	S	S	S	R	R	R	S	R
9.	IR-154	CoS 767	S	I	R	R	I	I	S	S	S	R	R	R	S	R
10.	IR-145	CoS 8436	S	R	R	R	R	R	S	S	R	R	R	R	S	R
11.	IR-146	CoS 8436	S	R	R	R	R	R	S	S	S	R	R	R	S	R
12.	IR-144	CoSe 92423	S	R	R	R	R	S	S	S	R	R	S	R	S	R
13.	IR-147	CoSe 95422	S	R	R	R	R	S	S	S	I	R	R	R	S	R
14.	IR-148	CoSe 95422	S	R	R	R	R	S	S	S	I	R	R	R	S	R
15.	IR-152	CoSe 95422	S	R	R	R	R	S	S	S	R	R	R	R	S	R

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

Sl. No.	Pathotype/ Isolates	Source	Reaction on host differentials																		
			Co 419	Co 975	Co 997	Co 1148	Co 7717	Co 62399	CoC 671	CoJ 64	CoS 767	CoS 8436	B0 91	Co 86002	Co 86032	Co 7805	CoV 92102	CoSe 95422	Baragua	Khakai	SES 594
1	CF01	Co 1148	S	R	R	S	I	I	I	I	R	R	R	I	R	R	I	R	S	S	R
2	CF02	Co 7717	S	R	R	S	I	S	I	I	I	R	R	I	I	I	I	R	S	S	R
3	CF03	CoJ 64	R	R	R	S	R	R	R	I	R	R	R	I	R	I	R	R	R	S	R
4	CF07	CoJ 64	R	R	R	S	R	R	R	S	S	R	R	S	R	I	S	R	S	S	R
5	CF08	CoJ 64	-	R	R	S	I	I	I	S	S	R	R	S	R	R	I	R	S	S	R
6	CF09	CoS 767	R	R	R	S	R	R	S	S	S	R	I	S	I	I	S	R	S	S	R
7	CF11	CoJ 64	S	S	I	S	S	S	S	I	I	R	R	I	S	-	I	R	S	S	R
8	R 1102	CoS 8436	S	I	R	R	R	S	I	S	R	S	I	I	S	S	I	R	S	S	R
9	R 1304	CoS 07250	I	R	R	I	R	S	R	S	R	R	R	S	-	I	I	R	S	S	R
10	R 1602	Co 0238	S	I	R	I	R	S	I	S	R	R	R	I	S	S	I	R	S	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	RI-307	CoJ 64	S	S	S	S	S	S	S	S	S	R	R	R	S	R	R	S	R	R	R
4	RI-308	CoJ 88	X	S	S	S	S	S	S	S	S	R	R	R	S	R	R	S	R	R	R
5	RI-309	CoJ 85	S	S	S	S	S	S	S	S	S	R	R	R	S	R	R	S	R	R	R
6	RI-310	CoPb 91	S	S	S	X	S	S	S	S	S	R	R	R	S	R	R	S	R	R	R
7	RI-311	Co 89003	X	X	S	X	R	S	S	S	S	R	R	R	S	R	R	S	R	R	R
8	RI-312	Co 89003	S	S	S	S	S	S	S	S	S	R	R	R	S	R	R	S	R	R	R
9	RI-313	Sel. K 2/3	S	S	S	S	S	S	S	S	S	R	R	R	S	R	R	S	R	R	R

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

S. No	Pathotypes /Isolates	Reaction on host differentials																		
		Source	Co 419	Co 975	Co 997	Co 1148	Co 7717	Co 62399	CoC 671	CoJ 64	CoS 767	CoS 8436	BO 91	Baragua	Khakai	SES 594	CoSe 95422	Co 86002	CoV92102	Co 86032
1	CF01	Co 1148	R	I	S	S	I	S	S	I	R	R	R	R	S	R	R	R	R	R
2	CF02	CoJ 7717	I	R	S	R	S	I	S	R	R	R	R	R	S	R	R	R	R	R
3	CF03	CoJ 64	R	R	S	R	R	R	S	S	R	R	R	R	S	R	R	I	R	R
4	CF07	CoJ 64	I	R	S	S	R	R	S	S	R	R	R	R	S	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
6	CF09	CoS 767	R	R	S	S	R	R	S	S	S	R	R	R	S	R	R	R	R	R
7	CF11	CoJ 64	S	S	S	I	S	I	S	S	S	R	R	R	S	R	R	S	R	R
8	RR XXVII	Co J 64	S	S	S	S	S	S	S	S	R	R	R	R	S	R	R	S	R	S
9	RR XXVIII	CoJ 85	S	S	S	S	S	S	S	S	R	R	R	R	S	R	R	R	R	R
10	RR XXIV	CoJ 64	S	S	S	S	S	S	S	S	R	R	R	I	S	R	R	R	R	R
11	RR XXX	Co 89003	R	S	S	S	S	R	S	S	I	R	R	R	S	R	S	S	R	R
12	RR XXXI	CoS 8436	S	S	S	R	S	S	S	S	R	S	R	R	S	R	R	S	R	R
13	RR XXXII	CoJ 85	S	S	S	S	S	S	S	S	R	R	R	R	S	R	R	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 89003	Co 62399	Co 86002	Co 86032	CoC 671	CoJ 64	CoS 767	CoS 8436	CoV 92102	CoSe 95422	BO 91	Baragua	Khakai	SES 594
1.	CF01	Co 1148	I	R	S	S	R	R	R	I	I	R	R	S	R	R	R	R	R	R	R	R
2	CF02	Co 7717	R	I	S	S	S	I	R	R	R	I	S	R	R	R	I	R	R	R	R	R
3	CF03	CoJ 64	S	R	S	R	R	R	R	R	R	I	I	S	R	R	R	R	R	R	R	R
4	CF07	CoJ 64	S	S	S	I	R	S	R	I	R	R	S	I	R	R	R	R	R	R	R	R
5	CF08	CoJ 64	I	R	S	I	R	R	R	R	S	R	R	S	S	R	R	R	R	R	R	R
6	CF09	CoS 767	R	R	S	R	R	R	R	R	R	R	R	S	S	R	I	R	R	R	S	R
7	CF11	CoJ 64	I	S	S	S	S	I	R	S	S	S	S	S	S	R	R	R	R	R	S	R
8	Cf89003	Co 89003	S	I	S	S	R	I	S	S	R	S	S	I	I	R	S	R	R	R	R	R
9	Cf8436 (K)	CoS 8436	S	R	S	I	R	I	R	I	R	S	S	S	R	S	R	R	I	R	I	R
10	Cf8436 (UPCSR)	CoS 8436	I	R	S	R	R	R	I	S	I	S	S	S	I	R	I	R	R	R	R	R
11	Cf8436 (RI)	CoS 8436	R	R	R	R	R	I	R	R	R	I	S	R	R	R	R	R	R	R	R	R
12	CfBLN05521	CoBlN 05521	R	R	R	R	R	R	R	I	I	R	R	R	R	R	R	R	R	R	R	R
13	CfBO138	BO 138	R	R	R	R	R	R	R	R	R	R	R	I	R	R	R	R	R	R	R	R
14	CfSe95422	CoSe 95422	I	R	R	R	R	R	I	R	I	I	R	R	R	R	R	I	R	R	I	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 <sub>1</sub>	BO 145	R	R	-	S	-	I	-	-	-	I	R	-	S	R	-	-	-	I	I
4.	RR <sub>2</sub>	CoLK 94184	R	R	-	S	-	I	-	-	-	I	R	-	S	R	-	-	-	I	I
5.	RR <sub>3</sub>	CoLK 8102	R	R	-	S	-	I	-	-	-	I	R	-	S	R	-	-	-	I	I
6.	RR <sub>4</sub>	CoS 98231	I	I	-	S	-	S	-	-	-	S	R	-	S	R	-	-	-	S	S
7.	RR <sub>5</sub>	CoS 8436	R	R	-	S	-	I	-	-	-	I	R	-	S	R	-	-	-	I	I
8.	RR <sub>6</sub>	CoSe 95422	R	R	-	S	-	I	-	-	-	I	R	-	S	R	-	-	-	I	I
9.	RR <sub>7</sub>	CoJ 64	I	I	-	S	-	S	-	-	-	S	R	-	S	R	-	-	-	S	S
10.	RR <sub>8</sub>	BO 138	I	I	-	S	-	S	-	-	-	S	R	-	S	R	-	-	-	S	S
11.	RR <sub>9</sub>	BO 141	I	I	-	S	-	S	-	-	-	S	R	-	S	R	-	-	-	S	S
12.	RR <sub>10</sub>	BO 128	I	I	-	S	-	S	-	-	-	S	R	-	S	R	-	-	-	S	S

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	Co 86002	CoV 92102	Co 86032	CoSe 95422	Co 7805
1	CF01	Co 1148	I	I	R	I	I	I	I	R	I	I	I	R	I	R	I	I	S	R	I
2	CF02	Co 7717	S	I	I	R	I	I	I	I	I	R	I	I	S	R	I	I	S	R	I
3	CF03	CoJ 64	I	R	I	I	I	I	I	I	I	R	R	I	I	R	I	S	I	R	R
4	CF07	CoJ 64	I	S	I	S	I	S	S	S	S	R	R	I	I	R	S	S	S	I	R
5	CF08	CoJ 64	S	I	S	I	S	S	I	I	S	I	I	I	S	R	S	S	S	I	I
6	CF09	CoS 767	I	S	I	I	S	I	I	I	I	I	I	I	I	R	-	I	I	I	I
7	CF11	CoJ 64	I	I	S	I	I	S	S	S	S	I	I	I	S	R	-	I	S	I	R
8	R1101Seo	CoLk 8102	I	I	I	S	I	I	S	S	S	R	S	I	I	R	-	I	I	I	R
9	R1201Seo	CoS 8436	I	R	S	S	I	R	R	R	R	R	R	R	I	R	-	I	R	R	-
10	R1301Seo	CoS 07250	I	I	I	R	R	I	R	I	R	R	I	R	I	R	-	R	S	R	-
11	R1601Seo	CoSe 92423	S	I	S	I	S	S	I	I	S	I	I	I	S	R	-	I	I	I	R
12	R1602Seo	UP 9530	R	I	I	S	R	R	I	R	R	R	R	I	R	R	-	R	R	R	-

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.	CF04	Co 419	S	R	S	R	R	R	S	R	R	R	R	R	R	R	S	S	S	S	R
2.	CF05	Co 997	S	R	S	R	R	X	S	X	R	R	R	R	S	R	S	X	S	S	R
3.	CF06	CoC 671	S	R	S	R	R	R	S	R	R	R	R	R	X	R	S	X	S	S	R
4.	CF10	CoA 89085	S	R	X	R	R	R	S	X	R	R	R	R	X	R	S	X	S	S	R
5.	Old isolate	CoOr 12346	S	R	S	R	R	R	S	R	R	R	R	R	X	R	S	X	S	X	R
6.	New isolate-1	Co 62175	S	R	S	R	R	R	S	R	R	R	R	R	X	R	S	X	S	S	R
7.	New isolate-2	CoV 89101	X	R	S	R	R	R	X	R	R	R	R	R	R	R	X	X	X	S	R
8.	New isolate-3	Co 6907	R	R	X	R	R	X	S	R	R	R	R	R	S	R	S	R	S	S	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	R	R	X	S	X	R	R	R	R	X	R	R	R	X	R	X
2	Isolate 1	CoC 23	X	X	S	X	X	S	S	X	R	R	R	R	X	R	R	R	X	X	X
3	Isolate 2	CoC 24	S	X	S	S	S	S	S	S	X	R	X	R	X	R	R	R	X	X	S
4	Isolate 3	Co 91017	S	S	X	R	R	X	S	X	R	R	R	R	X	R	R	R	R	X	X
5	Isolate 4	CoSi 6	S	S	S	X	R	X	S	X	R	R	R	R	X	R	R	R	X	R	X
6	Isolate 5	TNAU Si 8	S	S	S	R	R	X	S	X	R	R	R	R	X	R	R	R	X	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	S	I	S	I	I	I	S	R	I	R	R	R	I	R	I	R	I	R	S
2.	Cf86032	Co 86032	I	S	S	I	I	R	S	R	R	R	R	R	I	R	I	I	I	R	S
3.	Cf86002	Co 86002	I	S	S	I	I	R	S	R	R	R	R	R	I	R	I	I	S	R	I
4.	New Isolate-1	CoC 671	I	S	S	I	R	R	S	R	R	R	R	R	I	R	I	I	S	R	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	S	I	I	I	S	I	I	R	I	I	I	R	I	I	I	I	I
2	CF12	Co 94012	S	I	S	I	I	I	S	I	I	R	I	I	I	R	I	I	I	I	I
3	CfPI1110-Kothangudi	PI 1110	R	R	R	R	I	R	I	I	I	R	R	R	R	R	R	R	R	R	R
4	CfPI1401-Kadaganur	PI 1401	S	I	I	I	S	I	S	I	S	I	I	I	S	R	I	S	S	S	S
5	Cfv09356 Keerangudi	CoV 09356	S	I	S	S	I	I	S	I	I	I	I	R	I	R	I	S	I	I	S
6	Cf86027-Nathakadu	Co 86027	S	I	I	I	I	I	S	I	I	R	R	R	I	R	R	I	I	I	I
7	Cf2001-13-Perambakkam	Co 2001-13	I	R	S	S	R	S	S	I	I	I	R	R	I	R	R	I	I	I	I
8	Cf06022-Kuthalam	Co 06022	S	R	S	I	S	R	S	R	R	R	R	R	I	R	R	S	R	R	R
9	Cf99006-Mundiampakkam	Co 99006	I	I	I	R	I	I	I	I	I	R	R	R	I	R	I	S	I	R	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	R	R	S	I	I	I	S	I	I	I	I	R	I	R	R	I	I	I	I
2	CF12	Co 94012	I	S	S	I	S	I	S	I	I	R	I	R	I	I	I	I	I	S	I
3	CfPI 1110 (Kothangudi)	PI 1110	R	R	I	R	I	R	S	R	I	I	R	R	R	R	R	I	I	R	R
4	CfPI 1401 (Kadaganur)	PI 1401	R	I	I	I	S	R	S	R	I	I	R	R	R	R	I	R	I	I	R
5	CfV 09356 (Keerangudi)	CoV 09356	I	R	I	I	I	I	S	S	I	I	I	R	R	R	R	R	R	I	I
6	Cf 86027 (Nathakadu)	Co 86027	R	R	I	I	I	R	S	R	R	I	I	R	R	R	I	R	I	I	I
7	Cf 2001-13 (Perampakkam)	Co 2001-13	I	R	R	R	I	R	S	R	R	I	I	R	R	R	R	R	R	R	R
8	Cf 06022 (Kuthalam)	Co 06022	R	I	R	I	I	I	S	R	I	R	R	R	R	R	R	R	I	R	I
9	Cf 99006 (Mundiampakkam)	Co 99006	R	R	R	R	I	R	S	R	R	I	I	R	R	R	R	R	R	R	R

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			
<b>Initial Varietal Trial (Early)</b>								
1.	Co 14034	MR	MR	R	R	MS	S	R
2.	CoLk 14201	MR	MR	MR	MR	R	R	R
3.	CoLk 14202	R	R	R	R	MS	R	R
4.	CoPant 14221	MR	MR	MR	MR	R	R	R
5.	CoPant 14222	MR	MR	MR	MR	MR	S	R
6.	CoPb 14181	MR	MR	MR	MR	MS	R	R
7.	CoPb 14182	MR	MR	MR	MR	MR	S	S
8.	CoPb 14211	MS	MR	MR	MR	S	S	R
<b>Advance Varietal Trial (I-Plant, Early)</b>								
1.	Co 13034	MR	MR	R	R	R	R	R
2.	CoPb 13181	MR	MR	R	R	R	R	R
3.	CoS 13231	MR	S	MR	MS	S	R	R
<b>Advance Varietal Trial (II-Plant, Early)</b>								
1.	Co 12026	S	S	S	S	R	R	R
2.	Co 12027	R	R	R	R	MR	R	R
3.	CoLk 12203	MR	MR	MR	MR	R	R	R
4.	CoPant 12221	MS	MS	MS	MS	S	R	R
<b>Initial Varietal Trial (Mid Late)</b>								
1.	Co 14035	MR	MR	MR	MR	MS	R	R
2.	CoH 14261	MR	MR	MR	MR	R	R	R
3.	CoH 14262	MR	MR	R	R	R	R	R
4.	CoLk 14203	MR	MR	MR	MR	R	R	R
5.	CoLk 14204	MR	MR	MR	MR	MS	R	R
6.	CoLk 14205	R	R	R	R	MS	S	R
7.	CoPb 14183	MR	MR	R	R	S	R	R
8.	CoPb 14184	MR	MR	MR	MR	MR	R	R
9.	CoPb 14185	MR	MR	MR	MR	MR	S	S
10.	CoPb 14212	MR	MR	MR	MR	MS	S	S
11.	CoS 14231	S	S	MS	MS	MS	S	R
12.	CoS 14232	MR	MR	MR	MR	S	S	R
13.	CoS 14233	MR	MR	MR	MR	MS	R	R
14.	CoPant 97222	MR	MR	R	R	MR	R	R
15.	Co 05011	MR	MR	MR	MR	R	S	R
<b>Advance Varietal Trial (I-Plant Mid Late)</b>								
1.	Co 13035	MR	MR	MR	MR	R	R	S
2.	CoH 13263	MR	MR	MR	MR	R	R	R
3.	CoLk 13204	MR	MR	MR	MR	MR	S	R
4.	CoPant 13224	MR	MR	MR	MR	R	R	R
5.	CoPb 13182	MR	MR	MR	MR	MR	S	R



<b>Advance Varietal Trial (II-Plant Mid Late)</b>								
1.	Co 12029	MR	MR	MR	MR	MS	R	R
2.	CoH 12263	MR	MR	MR	MR	R	R	R
3.	CoLk 12205	MR	MR	MR	MR	MR	R	R
4.	CoPant 12226	MS	MS	MR	MR	MS	R	R
5.	CoPb 12211	MS	MS	MR	MR	MS	R	R
6.	CoS 12232	MR	MR	MR	MR	R	R	R
Check	CoJ 64*	HS	S	S	S	-	-	-
Check	CoS 767*	MS	S	MR	MS	-	-	-
Check	Co 1158**	-	-	-	-	S	-	-
Check	CoLk 7701**	-	-	-	-	S	-	-

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

Sl. No.	Genotypes/ Varieties	Reaction against Red rot				Smut	YL
		Plug method		Nodal Cotton swab			
		CF08	CF09	CF08	CF09		
<b>AVT Early (I Plant)</b>							
1	Co 13034	MR	MS	R	R	R	R
2	CoPb 13181	S	MS	S	R	R	R
3	CoS 13231	MR	MR	R	R	MR	R
4	CoJ 64	HS	HS	S	S	MR	R
5	Co 0238	MR	MS	R	R	R	R
6	Co 05009	MR	MR	R	R	R	R
<b>AVT Early (II Plant)</b>							
1	Co 12026	MR	MS	R	R	MR	R
2	Co 12027	MR	MR	R	R	MR	R
3	CoLk 12203	MR	MR	R	R	R	R
4	CoPant 12221	MR	MR	R	R	MS	R
5	Co 0238	MS	MR	R	R	MR	R
6	CoJ 64	HS	HS	S	S	R	R
<b>AVT Mid late (I Plant)</b>							
1	Co 13035	MR	MR	R	R	MS	MR
2	CoH 13263	S	HS	S	S	R	R
3	CoPant13224	MS	MS	R	R	R	MR
4	CoPb 13182	MR	MR	R	R	R	R
5	CoLk 13204	MS	S	R	S	MR	R
6	CoS 767	HS	HS	S	S	R	R
7	CoS 8436	MR	MR	R	R	R	MS
8	CoPant 97222	S	HS	R	S	R	R
9	Co 05011	MR	MR	R	R	R	MS
<b>AVT Mid late (II Plant)</b>							
1	Co 12029	MR	MR	R	R	MR	R
2	CoH 12263	MS	MS	R	R	R	R
3	CoLk 12205	MS	MR	R	R	MS	R
4	CoPant 12226	MR	MS	R	R	MR	MR
5	CoPb 12211	MS	MS	R	R	R	R
6	CoS 12232	MR	MR	R	R	R	R
7	CoS 767 (S)	HS	HS	S	S	R	MR
8	CoS 8436	MR	MR	R	R	R	MR
9	CoPant 97222	HS	HS	S	S	R	R
10	Co 1158	-	-	-	-	HS	-

<b>IVT Early</b>							
1	Co14034	MS	MS	R	R	R	R
2	CoLk 14201	MR	MR	R	R	MR	R
3	CoLk 14202	MR	MR	R	R	R	R
4	CoPant 14222	MR	MR	R	R	MR	MR
5	CoPb 14181	MR	MS	R	R	MR	R
6	CoPb 14182	MR	MR	R	R	MS	R
7	CoPb 14211	MS	MS	R	R	R	MR
8	Co 0238	MR	MR	R	R	R	R
9	CoJ 64	HS	HS	S	S	R	R
10	Co 05009	MR	MR	R	R	MR	R
11	Co 1158	-	-	-	-	HS	-
<b>IVT Mid late</b>							
1	Co 14035	MR	MR	R	R	R	R
2	CoH 14261	MR	MR	R	R	MR	MR
3	CoH 14262	R	MR	R	R	R	MR
4	CoLk 14203	MR	MR	R	R	R	R
5	CoLk 14204	MR	MR	R	R	MR	R
6	CoLk 14205	MR	MS	R	R	MR	R
7	CoPb14183	MS	MR	R	R	MR	R
8	CoPb 14184	MR	MR	R	R	R	R
9	CoPb 14185	MR	MR	R	R	MR	R
10	CoPb 14212	MR	MS	R	R	R	R
11	CoS 14231	MR	MS	R	R	R	R
12	CoS 14232	MR	MR	R	R	MS	R
13	CoS 14233	MR	MS	R	R	R	MR
14	CoS 767	HS	HS	R	S	R	R
15	CoS 8436	MR	MR	R	R	R	MR
16	CoPant 97222	-	MS		S	R	R
17	Co 05011	MR	MR	R	R	R	MS
	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
		CF08	CF09	CF08	CF09		
<b>IVT(E)</b>							
1	Co 14034	MS	MS	R	R	MR	MS
2	CoLk 14201	MR	MR	R	R	MR	R
3	CoLk 14202	MR	MR	R	R	MR	R
4	Co Pant 14222	MR	MR	R	R	R	R
5	CoPb 14181	MR	MR	R	R	MS	MR
6	CoPb 14182	MR	MR	R	R	R	R
7	CoPb 14211	MR	MR	R	R	MR	MS
<b>AVT(E-I)</b>							
8	Co 13034	MS	MR	R	R	MS	MR
9	CoPb 13181	MS	MS	R	R	MR	R
10	CoS 13231	MR	MR	R	R	R	R
<b>AVT(E-II)</b>							
11	Co 12026	MR	MR	R	R	MR	R
12	Co 12027	MR	MR	R	R	MS	R
13	CoLk 12203	MS	MS	R	R	MS	MS
14	CoPant 12221	MS	MR	R	R	MS	R
<b>IVT(ML)</b>							
15	Co 14035	MR	MR	R	R	MR	MR
16	CoH 14261	MR	MR	R	R	R	R
17	CoH 14262	MR	MR	R	R	MR	R
18	CoLk 14203	MR	MR	R	R	S	R
19	CoLk 14204	MR	MR	R	R	R	R
20	CoLk 14205	MR	MR	R	R	MS	R
21	CoPb 14183	MR	MR	R	R	MS	R
22	CoPb 14184	MR	MR	R	R	R	R
23	CoPb 14185	MR	MR	R	R	MR	R
24	CoPb 14212	MR	MR	R	R	R	R
25	CoS 14231	MS	MS	R	R	MS	MS
26	CoS 14232	MR	MR	R	R	R	R
27	CoS 14233	S	S	S	S	MR	R
<b>AVT(ML-I)</b>							
28	Co 13035	S	MS	R	R	MS	R
29	CoH 13263	MS	S	R	R	MR	MS
30	CoPant 13224	MR	MR	R	R	MR	MR
31	CoPb 13182	MR	MR	R	R	MS	R
32	CoLK 13204	MS	MS	R	R	S	R
<b>AVT(ML-II)</b>							
33	Co 12029	MR	MR	R	R	MS	R
34	CoH 12263	MS	MR	R	R	MR	R
35	CoLk 12205	MS	MS	R	R	S	R

36	CoPant 12226	MR	MR	R	R	MR	MR
37	CoPb 12211	MR	MR	R	R	MR	R
38	CoS 12232	MS	MS	R	R	MS	MR
<b>Standards</b>							
39	CoJ 64	HS	HS	S	S	S	-
40	Co 0238	MR	MR	R	R	S	-
41	Co 05009	MR	MR	R	R	MR	-
42	CoS 767	HS	HS	S	S	S	-
43	CoS 8436	MR	MR	R	R	MS	-
44	CoPnt 97222	S	S	S	S	MS	-
45	Co 05011	MR	MR	R	R	MR	-
46	Co 740	-	-	-	-	HS	-
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	
<b>AVT (Early) Plant I</b>						
1.	Co 13034	MR	MR	R	R	S
2.	CoPb13181	S	MS	R	R	MS
3.	CoS13231	MR	MR	R	R	MR
4.	CoJ 64	HS	S	S	S	MS
5.	Co 0238	MR	MR	R	R	S
6.	Co 05009	MR	MR	R	R	HS
<b>AVT (Early) Plant II</b>						
1.	Co 12026	MS	MR	R	R	MS
2.	Co 12027	MR	MS	R	R	MS
3.	CoLk 12203	MR	MS	R	R	MS
4.	CoPant 12221	MR	MR	R	R	MS
5.	CoJ 64	HS	S	S	S	MS
6.	Co 0238	MR	MR	R	R	S
<b>AVT (Midlate) Plant I</b>						
1.	Co 13035	MR	MR	R	R	MS
2.	CoH 13263	MR	MR	R	R	R
3.	CoLk 13204	MS	MS	R	R	S
4.	CoPant 13224	MR	MS	R	R	MS
5.	CoPb 13182	MR	MR	R	R	S
6.	Co S 767	MS	S	R	R	MS
7.	CoS 8436	MR	MR	R	R	MS
8.	CoPant 97222	S	MS	S	S	S
9.	Co 05011	MR	MR	R	R	MS
<b>AVT (Midlate) Plant II</b>						
1.	Co 12029	MR	MR	R	R	MS
2.	CoH 12263	MR	MR	R	R	MR
3.	CoLK 12205	MS	MS	R	R	MS
4.	CoPant 12226	MR	MR	R	R	MS
5.	CoPb 12211	S	MS	R	R	MS
6.	CoS 12232	MS	MR	R	R	S
7.	Co S 767	MS	S	R	R	S
8.	CoS 8436	MR	MR	R	R	MS
9.	CoPant 97222	S	MS	S	S	HS
<b>IVT (Early)</b>						
1.	Co 14034	MR	MR	R	R	MS
2.	Co Lk 14201	MR	MR	R	R	MS

3.	CoLk 14202	MR	MR	R	R	MS
4.	CoPant14222	MR	MR	R	R	S
5.	Co Pb14181	MR	MR	R	R	MS
6.	CoPb 14182	MR	MR	R	R	MR
7.	CoPb14211	MS	MS	R	R	MS
8.	CoJ 64	S	S	S	S	MS
9.	Co 0238	MR	MR	R	R	S
10.	Co 05009	MR	MR	R	R	MS
<b>IVT (Midlate)</b>						
1.	Co 14035	MR	MR	R	R	MS
2.	CoH 14261	R	MR	R	R	MS
3.	CoH 14262	MR	R	R	R	MR
4.	CoLk 14203	MR	MR	R	R	MR
5.	CoLk 14204	MR	MR	R	R	S
6.	CoLK 14205	MS	MR	R	R	MR
7.	CoPb 14183	MS	MS	R	R	MR
8.	CoPb 14184	MR	R	R	R	MR
9.	CoPb 14185	MR	MR	R	R	MR
10.	CoPb14212	MR	MR	R	R	MR
11.	CoS 14231	S	MS	S	R	MR
12.	CoS 14232	MR	R	R	R	S
13.	CoS 14233	MR	R	R	R	MR
14.	CoS 767	MS	S	R	R	S
15.	CoS 8436	MR	MR	R	S	MS
16.	CoPant 97222	S	MS	S	S	S
17.	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		
<b>IVT(E)</b>							
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	
<b>AVT(E-I)</b>							
8	Co 13034	R	R	R	R	R	
9	CoPb 13181	S	MS	R	R	MS	
10	CoS 13231	MR	MR	R	R	MS	
<b>AVT(E-II)</b>							
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	
<b>IVT(ML)</b>							
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	
<b>AVT(ML-I)</b>							
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	
<b>AVT(ML-II)</b>							
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(I)
<b>Standards</b>							
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	CoPnt 97222	MS	MS	R	R	MR	
44	CoPant 84211	MS	MS	R	R	S	

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

S. No.	Genotypes	Plug		Nodal Cotton Swab		Smut	YL
		CF08	CF09	CF08	CF09		
<b>IVT (Early)</b>							
1	CoLk 14201	MR	MR	R	R	R	R
2	CoPb14182	MS	MS	R	R	MS	MR
3	CoPb14181	MS	MR	R	R	MR	MR
4	Co 14034	MR	MR	R	R	MS	R
<b>AVT (Early) I</b>							
1.	Co 13034	MS	MS	R	R	MS	R
2.	CoPb 13181	S	S	R	R	R	MS
3	CoS 13231	MR	MR	R	R	R	MR
<b>AVT (Early) II</b>							
1.	Co 12026	MR	R	R	R	MS	R
2.	CoLk 12203	MR	MR	R	R	MR	R
3.	CoPant 12221	MR	MR	R	R	MS	MR
<b>IVT (ML)</b>							
1	CoLk 14203	MR	MR	R	R	MS	R
2	CoLk 14204	MR	MR	R	R	R	R
3	CoPb 14183	MR	MS	R	R	-	R
4	CoPb 14184	MS	MR	R	R	MS	R
5	CoPb 14212	MR	MS	R	R	R	R
6	CoS 14233	MR	MR	R	R	HS	R
7	CoS 14232	MR	R	R	R	MS	R
<b>AVT (ML) I</b>							
1.	Co 13035	MS	MS	R	R	S	R
2.	CoH 13263	MR	MR	R	R	MS	MR
3.	CoLk 13204	R	MR	R	R	MR	MS
4.	CoPant 13224	MS	MS	R	R	MR	MR
5.	CoPb 13182	MR	MR	R	R	MR	R
<b>AVT (ML) II</b>							
1.	Co 12029	MR	MS	R	R	MS	R
2.	CoH 12263	MR	MR	R	R	R	R
3.	CoLk 12205	MR	MR	R	R	S	R
4.	CoPant 12226	MS	MS	R	R	MR	R
5.	CoPb 12211	MR	MR	R	R	MS	R
6.	CoS 12232	MR	MR	R	R	MR	R
<b>Checks</b>							
1.	CoPant 84211	MR	MS	R	R		MS
2.	CoJ 64	S	S	S	S	MS	MR
3.	CoS 8436	MS	MS	R	R	MS	R
4.	CoPant 97222	MR	MR	R	R		R
5.	CoS 767	MS	S	R	R	MS	MR
6.	Co 1158					S	

**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		
<b>IVT (Early)</b>							
1	CoBln 14501	MS	MS	R	R	MR	MR
2	CoLk 14206	MS	MR	R	R	R	R
3	CoLk 14207	MS	MR	R	R	R	MR
4	CoP 14436	MS	MR	R	R	R	MR
5	CoP 14437	MR	R	R	R	R	R
6	CoSe 14451	MR	MR	R	R	R	MR
7	CoSe 14453	MR	MR	R	R	R	R
8	CoSe 14454	MS	MR	S	S	MR	S
9	CoSe 01421	MR	MR	R	R	MR	R
10	CoLk 94184	MR	MR	R	R	R	MR
11	CoSe 95422 (C)	MS	MS	S	S	MR	S
<b>VT(Mid late)</b>							
1.	CoBln 14502	S	S	S	S	MR	MS
2.	CoLk 14208	MS	MR	R	R	R	MS
3	CoLk 14209	MR	MR	R	R	R	R
4	CoLk 14210	MR	MR	R	R	R	MR
5	CoP 14438	MR	R	R	R	R	MR
6	CoP 14439	MR	MR	R	R	R	MR
7	CoSe 14452	MR	MR	R	R	R	MR
8	CoSe 14455	MS	MR	R	R	R	R
9	CoSe 14456	MR	MS	S	R	MR	MR
10	CoP 9301 (C)	MR	MR	R	R	R	R
11	BO 91	MR	MR	R	R	MR	MR
12	CoP 06436	MR	R	R	R	R	R

Table 20. Evaluation of sugarcane genotypes for red rot –Motipur

Sl. No.	Genotype	Red Rot				Smut	Wilt	YL
		Plug Method		Nodal Method				
		CF07	CF08	CF07	CF08			
<b>Initial Varietal Trial (Early)</b>								
1.	CoBln 14501	MR	MR	MR	MR	R	R	S
2.	CoLk 14206	MR	MR	MR	MR	S	R	R
3.	CoLk 14207	MR	MR	MR	MR	R	S	R
4.	CoP 14436	MR	MR	MR	MR	R	S	S
5.	CoP 14437	MS	MS	MR	MR	S	R	S
6.	CoSe 14451	MR	MR	MR	MR	S	S	S
7.	CoSe 14453	MR	MR	MR	MR	R	R	R
8.	CoSe 14454	MR	MS	MR	MR	R	R	R
<b>Advanced Varietal Trial (Early)-I Plant</b>								
1.	CoP 13437	MS	MS	MR	MR	S	R	R
2.	CoSe 13451	MR	MR	MR	MR	R	S	S
3.	CoSe 13452	R	R	R	R	R	R	R
<b>Advanced Varietal Trial (Early)-II Plant-</b>								
1.	CoLk 12207	MR	MR	MR	MR	MR	R	R
2.	CoP 12436	MR	S	MR	MS	MR	R	S
3.	CoSe 12451	MR	MR	MR	MR	MR	S	R
<b>Initial Varietal Trial (Midlate)</b>								
1.	CoBln 14502	MR	MR	MR	MR	R	R	R
2.	CoLk 14208	MR	MR	MR	MR	R	R	S
3.	CoLk 14209	MR	MR	MR	MR	R	S	R
4.	CoLk 14210	R	R	R	R	R	S	S
5.	CoP 14438	MR	MR	R	R	R	R	R
6.	CoP 14439	MR	MR	MR	MR	R	R	R
7.	CoSe 14452	R	MR	R	R	R	R	R
8.	CoSe14455	MR	MR	MR	MR	R	R	R
9.	CoSe 14456	MR	MR	MR	MR	R	S	R
<b>Advanced Varietal Trial (Mid late)-II Plant</b>								
1.	CoLk 09204	MR	MR	MR	MR	R	R	R
2.	CoLk 12209	MR	MR	MR	MR	MR	R	S
3.	CoP 12438	MR	MR	MR	MR	MR	R	S
4.	CoSe 12453	R	MR	R	MR	MR	R	R
<b>Standard</b>								
	CoSe 95422*	S	S	S	S	-	-	-
	BO130	MR	MR	R	R	-	-	-
	CoP 06436	MR	MR	R	R	-	-	-
	BO 91	MR	MR	R	R	-	-	-
	CoJ 64*	HS	HS	S	S	-	-	-
	Co 1158**	-	-	-	-	S	-	-
	CoLk 7701**	-	-	-	-	HS	-	-

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

Sl. No.	Genotype	Red rot				Smut	YL
		Plug Method		Nodal Cotton Swab			
		CF07	CF08	CF07	CF08		
<b>IVT (Early)</b>							
1	CoBln 14501	MS	MR	R	R	R	R
2	CoLk 14206	MR	MR	R	R	MS	R
3	CoLk 14207	MR	MR	R	R	R	R
4	CoP 14436	MR	MR	R	R	R	R
5	CoP 14437	MR	MS	R	R	S	R
6	CoSe 14451	MR	MR	R	R	MR	MS
7	CoSe 14453	MR	MR	R	R	R	MS
8	CoSe 14454	MR	MR	R	R	R	MS
<b>IVT (Midlate)</b>							
1	CoBln 14502	S	MR	S	R	R	R
2	CoLk 14208	MR	MR	R	R	R	R
3	CoLk 14209	MR	MR	R	R	R	R
4	CoLk 14210	MR	MR	R	R	R	R
5	CoP 14438	MS	MS	R	R	R	S
6	CoP 14439	MR	MR	R	R	R	R
7	CoSe 14452	MR	MR	R	R	R	R
8	CoSe 14455	MR	MR	R	R	R	R
9	CoSe 14456	MR	MR	R	R	R	R
<b>Standards</b>							
I	BO91	MR	MR	R	R	R	R
II	CoP 9301	MR	MR	R	R	R	R
III	CoP 06436	MR	MR	R	R	R	R
IV	Co 1158	-	-	-	-	HS	-
<b>AVT (Early)</b>							
1	CoP 13437	S	S	R	S	MS	R
2	CoSe 13451	MS	MR	R	R	R	R
3	CoSe 13452	MR	MR	R	R	R	R
<b>Standards</b>							
I	CoLk 94184	MR	MR	R	R	R	R
II	CoSe 95422	S	S	R	S	R	R
III	CoSe 01421	MR	MS	R	R	MS	R
IV	Co 1158	-	-	-	-	HS	-

**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	
<b>IVT- Early</b>							
1.	CoP 14454	2.1	MR	R	2.6	MR	R
<b>IVT- Midlate</b>							
2.	CoBln 14502	2.4	MR	R	2.5	MR	R
<b>AVT (Early)- I Plant</b>							
3.	CoSe 13451	2.0	R	R	2.8	MR	R
4.	CoSe 13452	2.3	MR	R	2.6	MR	R
5.	CoSe 13437	2.6	MR	S	1.6	R	R
<b>AVT (Early)- II Plant</b>							
6.	CoLk 12207	2.3	MR	R	2.4	MR	R
7.	CoP 11436	2.5	MR	R	2.3	MR	R
8.	CoP 11437	2.2	MR	R	2.8	MR	R
9.	CoP 11438	2.4	MR	R	2.7	MR	S
10.	CoP 12436	2.6	MR	R	2.4	MR	R
11.	CoSe 12451	3.0	MR	R	2.6	MR	R
<b>AVT (Midlate)- II Plant</b>							
12.	BO 155	2.3	MR	R	2.5	MR	R
13.	CoLk 12209	2.6	MR	R	2.8	MR	R
14.	CoLk 09204	2.8	MR	R	2.8	MR	R
15.	CoP 12438	2.7	MR	R	3.0	MR	R
16.	CoSe 11453	1.6	R	R	2.4	MR	R
17.	CoSe 11454	2.5	MR	R	2.6	MR	R
18.	CoSe 12453	2.6	MR	S	2.3	MR	S
19.	CoSe 11455	2.8	MR	R	3.1	MR	R
20.	CoP 11451	2.2	MR	R	2.2	MR	R
<b>STD. (Early)</b>							
21.	CoBln 7501	1.4	R	R	1.8	R	R
22.	BO 130	2.6	MR	R	2.4	MR	R
23.	CoSe 95422	2.0	R	R	2.8	MR	S
<b>STD. (Midlate)</b>							
24.	CoP 9301	2.1	MR	R	2.2	MR	R
25.	BO 91	2.2	MR	R	2.6	MR	R
<b>Check variety</b>							
26.	Akipura	5	MS	S	4.2	MS	S

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

S. No	Clone	Plug method			Cotton swab method			Smut	Wilt	YLD
		CF04	CF05	CF06	CF04	CF05	CF06			
<b>IVT Early</b>										
1	CoC 15336	R	R	R	R	R	R	HS	S	R
2	CoV 15356	MR	MR	MR	R	R	R	HS	R	R
3	CoA 92081 (c)	R	R	R	R	R	R	HS	MS	MS
4	CoC 01061 (c)	MR	MR	MR	R	R	R	S	R	MS
<b>IVT Midlate</b>										
5	CoC 15339	MR	MR	MR	R	R	R	HS	MR	MS
6	CoC 15340	S	S	S	R	R	R	HS	S	S
7	PI 15376	HS	HS	HS	R	R	R	HS	MR	R
8	PI 15377	S	S	S	R	R	R	HS	R	R
9	Co 86249 (c)	MR	MR	MR	R	R	R	MS	MR	S
<b>AVT I Early</b>										
10	Co 13023	MR	MR	MR	R	R	R	MR	MR	R
11	CoA 14321	R	R	MR	R	R	R	MR	R	R
12	CoC 14336	MS	MS	MS	R	R	R	HS	MS	R
<b>AVT I Mid late</b>										
13	Co 13028	R	R	R	R	R	R	MR	MR	R
14	Co 13029	MR	MR	MR	R	R	R	S	MS	R
15	Co 13031	MR	MR	MR	R	R	R	MR	R	R
16	CoA 14323	MR	MR	MR	R	R	R	MS	MR	R
17	CoC 14337	MR	MR	MR	R	R	R	HS	MR	R
18	PI 14337	MR	MR	MR	R	R	MR	MR	MR	R
<b>AVT II Early</b>										
19	CoA 13322	MR	MR	MR	R	R	R	MS	MR	S
20	CoA 13323	MR	MR	MR	R	R	R	MS	MS	S
21	CoC 13336	MS	MS	MS	R	R	R	HS	S	R
22	CoC 13337	S	S	S	R	R	R	MR	S	MS
23	CoV 13356	MR	MR	MR	R	R	R	MR	S	R

<b>AVT II Mid late</b>										
24	CoA 11326	MR	MR	MR	R	R	R	S	MS	R
25	CoA 12324	MR	MR	MR	R	R	R	S	R	R
26	CoC 13339	MR	R	R	R	R	R	HS	R	MR
27	CoOr 13346	MS	MS	MS	R	R	R	MS	R	R
<b>Check varieties</b>										
28	Co 419	HS	HS	HS	S	S	S	HS	S	R
29	Co 997	HS	HS	HS	S	S	S	S	HS	MR
30	Co 6907	HS	S	HS	S	S	S	HS	S	MR
31	Co 7219	S	S	S	R	R	R	HS	S	R
32	Co 7706	HS	HS	HS	R	R	R	HS	MR	R
33	CoC 671	HS	HS	HS	S	S	S	HS	S	MR
34	CoA 89085	S	S	S	S	S	S	HS	MR	R



**Table 24. Evaluation of sugarcane genotypes for red rot, smut and YL resistance-  
Cuddalore**

S. No.	Clone	Plug method	Nodal Method	Smut	YL
		CF06	CF06		
<b>IVT - Early</b>					
1.	CoC 15336	MR	R	MR	MR
2.	CoC 15337	MR	R	MR	MR
3.	CoC 15338	MR	R	MR	MS
4.	CoV 15356	MR	R	S	MS
<b>AVT – Early I Plant</b>					
5.	Co 13023	MR	R	MS	MR
6.	CoA 14321	MR	R	MS	MS
7.	CoC 14336	MR	R	MS	MS
<b>AVT – Early II Plant</b>					
8.	CoA 13322	MR	R	MS	MR
9.	CoA 13323	MS	R	S	MR
10.	CoC 13336	MR	R	MS	MS
11.	CoC 13337	MR	R	MR	MR
12.	CoV 13356	MS	R	MR	MS
<b>IVT- Midlate</b>					
13.	CoC 15339	MR	R	MR	MS
14.	CoC 15340	MR	R	MR	MR
15.	CoOr 15346	MR	R	-	MR
16.	PI 15376	MS	S	S	MR
17.	PI 15377	HS	S	S	MS
<b>AVT- Midlate I Plant</b>					
18.	Co 13028	MR	R	MR	MS
19.	Co 13029	MR	R	MS	MR
20.	Co 13031	MR	R	MR	R
21.	CoA 14323	MR	R	MS	MS
22.	CoC 14337	MR	R	MR	MS
23.	PI 14377	MR	R	MS	MR
<b>AVT- Midlate II Plant</b>					
24.	CoA 11326	MR	R	MS	MR
25.	CoA 12324	MS	R	MR	MR
26.	CoC 13339	MR	R	MR	MR
27.	CoOr 13346	MR	R	MS	MS
<b>Check</b>					
1.	CoC 671	HS	S	HS	HS
2.	Co 86249	R	R	HS	MS

**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			
<b>(I) Initial Varietal Trial (Early)</b>							
1.	Co 13021	4.9	MS	R	MR	-	MR
2.	Co 13022	8.2	HS	R	MS	-	MR
3.	Co 14002	4.8	MS	R	S	-	R
4.	Co 14003	8.3	HS	R	R	-	R
5.	Co 14004	2.9	MR	R	R	-	R
6.	Co 14006	3.3	MR	R	MR	-	R
7.	Co 14008	4.3	MS	R	MR	-	R
8.	Co 14009	3.8	MR	R	R	-	R
9.	Co 14012	3.6	MR	R	HS	-	R
10.	Co 14016	3.3	MR	R	HS	-	MR
11.	Co 14022	8.6	HS	R	MR	-	R
12.	Co 14023	8.4	HS	S	S	-	MR
13.	Co 14025	8.6	HS	R	R	-	R
14.	Co 14026	3.2	MR	R	MS	-	R
15.	Co 14027	5.6	MS	R	HS	-	S
16.	Co 14030	6.8	S	R	MS	-	MR
17.	Co 14031	8.2	HS	R	HS	-	S
18.	Co 14032	3.2	MR	R	R	-	R
19.	CoN 14071	2.8	MR	R	R	-	R
20.	CoN 14072	3.0	MR	R	R	-	R
21.	CoN 14073	2.9	MR	R	R	-	R
22.	CoN 14074	3.8	MR	R	R	-	R
23.	CoSnk 14101	8.6	HS	S	R	-	R
24.	CoSnk 14102	3.1	MR	R	MS	-	R
25.	CoSnk 14103	3.7	MR	R	MR	-	S
26.	CoT 14111	3.2	MR	R	HS	-	R
27.	CoT 14112	8.4	HS	R	HS	-	R
28.	CoT 14366	7.2	S	R	HS	-	MR
29.	CoT 14367	8.6	MS	R	R	-	R
30.	CoVc 14061	8.5	HS	R	S	-	R
31.	CoVc 14062	3.3	MR	R	MR	-	R
32.	MS 14081	4.8	MS	R	MR	-	MR
33.	MS 14082	3.3	MR	R	R	-	MR
34.	PI 14131	4.4	MS	R	HS	-	R
35.	PI 14132	8.2	HS	R	HS	-	R
36.	VSI 14121	8.5	HS	R	MR	-	R
37.	VSI 14122	8.3	HS	S	R	-	R
<b>(II) Advanced Varietal Trial (Early I Plant)</b>							
38.	Co 12007	8.2	HS	R	HS	MS	R
39.	Co 12008	5.0	MS	R	HS	S	S
40.	Co 12009	3.0	MR	R	HS	MR	R

41.	Co 12012	6.2	S	R	S	S	R
42.	Co 12019	3.6	MR	R	R	MS	MR
43.	Co 12024	3.4	MR	R	MR	MR	R
44.	CoM 12085	8.2	HS	R	MR	MS	MR
45.	VSI 12121	4.2	MS	R	MS	MR	R
<b>(III) Advanced Varietal Trial- Early II Plant</b>							
46	Co 11001	3.0	MR	R	R	MR	R
47	Co 11004	2.9	MR	R	HS	MR	R
48	CoM 11081	2.8	MR	R	MS	MR	R
49.	CoM 11082	3.4	MR	R	S	MR	R
50.	CoM 11084	3.2	MR	R	R	MR	R
<b>(IV) Advanced Varietal Trial- Midlate II Plant</b>							
51.	Co 11005	4.8	MS	R	R	MR	R
52.	Co 11007	3.2	MR	R	MS	MR	R
53.	Co 11012	2.9	MR	R	S	MR	R
54.	Co 11019	8.6	HS	R	R	S	R
55.	CoM 11085	8.4	HS	R	R	MS	R
56.	CoM 11086	5.6	MS	R	R	MR	R
<b>Standard</b>							
57.	Co 94008	3.0	MR	R		MR	R
58	Co 99004	2.6	MR	R	MS	MR	MR
59	Co 85004	6.6	S	R	HS	MS	MS
60	Co 86032	8.2	HS	R	MR	MS	S
61	CoC 671	8.8	HS	S	MR	S	R
62	CoSnk 05103	2.8	MR	R	MR	MR	R
63	Co 97009	-	-	-	HS	-	-
64	Co 86002	-	-	-	HS	-	-
65	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
<b>IVT (Early)</b>							
1	Co 14002	4.3	MS	R	4.0	MR	R
2	Co 14003	3.3	MR	R	3.6	MR	R
3	Co 14004	3.3	MR	R	3.3	MR	R
4	Co 14006	2.6	MR	R	4.0	MR	R
5	Co 14008	4.0	MR	R	3.6	MR	R
6	Co 14009	4.0	MR	R	4.6	MS	R
7	Co 14012	3.0	MR	R	3.6	MR	R
8	Co 14016	4.0	MR	R	6.0	MS	R
9	Co 14022	5.3	MS	R	6.0	MS	R
10	Co 14023	4.0	MR	R	5.3	MS	R
11	Co 14025	4.3	MS	R	4.3	MS	R
12	Co 14026	4.0	MR	R	4.0	MR	R
13	Co 14027	2.6	MR	R	4.0	MR	R
14	Co 14030	3.0	MR	R	4.6	MS	R
15	Co 14031	4.0	MR	R	4.3	MS	R
16	Co 14032	3.0	MR	R	3.6	MR	R
17	Co 13021	4.0	MR	R	4.0	MR	R
18	Co 13022	4.0	MR	R	4.6	MS	R
19	CoN 14071	2.6	MR	R	3.6	MR	R
20	CoN 14072	4.6	MS	R	4.0	MR	R
21	CoN 14073	4.0	MR	R	4.0	MR	R
22	CoN 14074	3.0	MR	R	3.6	MR	R
23	CoSnk 14101	4.3	MS	R	4.5	MS	R
24	CoSnk 14102	2.6	MR	R	3.6	MR	R
25	CoSnk 14103	4.0	MR	R	5.0	MS	R
26	CoT 14366	3.3	MR	R	5.0	MS	R
27	CoT 14367	3.3	MR	R	3.6	MR	R
28	CoTl 14111	3.5	MR	R	3.3	MR	R
29	CoTl 14112	6.3	S	S	5.6	MS	S
30	MS 14081	3.6	MR	R	4.6	MS	R
31	MS 14082	2.6	MR	R	3.3	MR	R
32	CoVC 14061	8.0	S	S	8.0	S	S
33	CoVC 14062	3.6	MR	R	5.0	MS	R
34	PI 14131	5.6	MS	S	7.0	S	S

35	PI 14132	5.6	MS	S	8.0	S	S
36	VSI 14121	9.0	HS	S	8.3	HS	S
37	VSI 14122	5.0	MS	R	4.0	MR	R
38	Co 86032	6.0	MS	S	6.3	S	S
39	CoC 671	8.3	HS	S	8.3	HS	S
40	CoSnk 05103	3.3	MR	R	3.3	MR	R
<b>AVT (I Plant)</b>							
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
<b>AVT Early (II Plant)</b>							
1	Co 11001	5.0	MS	R	5.3	MS	R
2	Co 11004	3.3	MR	R	3.3	MR	R
3	CoM 11081	4.6	MS	R	4.5	MS	R
4	CoM 11082	5.0	MS	R	5.3	MS	R
5	CoM 11084	4.0	MR	R	5.3	MS	R
6	Co 85004	3.3	MR	R	3.3	MR	R
7	Co 94008	3.6	MR	R	4.0	MR	R
8	CoC 671	8.3	HS	S	8.3	HS	S
<b>AVT midlate II Plant</b>							
1	Co 11005	4.3	MS	R	4.3	MS	R
2	Co 11007	3.5	MR	R	3.6	MR	R
3	Co 11012	3.3	MR	R	4.3	MS	R
4	Co 11019	4.3	MS	R	4.5	MS	R
5	CoM 11085	5.0	MS	S	5.3	MS	S
6	CoM 11086	3.0	MR	R	3.6	MR	R
7	Co 86032	6.0	S	S	6.3	S	S
8	Co 99004	3.0	MR	R	3.5	MR	R

Table 27. Evaluation of sugarcane genotypes for smut resistance-Padegaon

S. No.	Genotype	Smut %	Reaction	S. No.	Genotype	Smut %	Reaction
<b>IVT – Early</b>							
1	Co 13021	0.00	R	23	CoSnk 14101	0.00	R
2	Co 13022	0.00	R	24	CoSnk 14102	0.00	R
3	Co 14002	36.96	HS	25	CoSnk 14103	0.00	R
4	Co 14003	1.96	MR	26	CoT 14111	0.00	R
5	Co 14004	2.27	MR	27	CoT 14112	4.92	MR
6	Co 14006	0.00	R	28	CoT 14366	0.00	R
7	Co 14008	0.00	R	29	CoT 14367	27.84	S
8	Co 14009	0.00	R	30	CoVc 14061	8.62	MR
9	Co 14012	0.00	R	31	CoVc 14062	0.00	R
10	Co 14016	0.00	R	32	MS 14081	3.57	MR
11	Co 14022	20.34	S	33	MS 14082	0.00	R
12	Co 14023	12.77	MS	34	PI 14131	0.00	R
13	Co 14025	13.21	MS	35	PI 14132	0.00	R
14	Co 14026	0.00	R	36	VSI 14121	0.00	R
15	Co 14027	0.00	R	37	VSI 14122	0.00	R
16	Co 14030	3.33	MR	<b>AVT – Early I Plant</b>			
17	Co 14031	15.15	MS	38	Co 12007	0.00	R
18	Co 14032	23.21	S	40	Co 12009	9.23	MR
19	CoN 14071	0.00	R	41	Co 12012	2.78	MR
20	CoN 14072	0.00	R	42	Co 12019	3.45	MR
21	CoN 14073	0.00	R	43	VSI 12121	0.00	R
22	CoN 14074	0.00	R	44	Co 12085	0.00	R
				45	Co 12008	17.71	MS
<b>AVT Midlate II plant</b>				<b>AVT – Early II Plant</b>			
51	Co 11005	0.00	R	46	Co 11001	5.13	MR
52	Co 11007	5.88	MR	47	Co 11004	12.31	MS
53	Co 11012	0.00	R	48	CoM 11081	0.00	R
54	Co 11019	0.00	R	49	CoM 11082	10.67	MS
55	CoM 11085	1.59	MR	50	CoM 11084	3.33	MR
56	CoM 10086	0.00	R				
<b>Checks</b>							
57	Co 86032	0.00	R	64	Co 7219	5.41	MR
58	CoC 671	0.00	R	65	Co 7527	18.33	MS
59	CoSnk 5103	0.00	R	66	MS 10001	0.00	R
60	Co 85004	0.00	R	67	Co 99004	0.00	R
61	Co 94008	0.00	R	68	CoVSI 3102	0.00	R
62	CoM 265	0.00	R				
63	Co 740	30.61	HS				

**Table 28. Evaluation of sugarcane genotypes for smut resistance-Sankeshwar**

Sl. No	Entry	Smut Reaction	YLD	Sl. No	Entry	Smut Reaction	YLD
<b>IVT (Early &amp; Midlate)</b>							
1	Co 13021	MS	R	22	CoN 14074	R	R
2	Co 13022	MS	R	23	CoSnk 14101	R	R
3	Co 14002	S	R	24	CoSnk 14102	MS	R
4	Co 14003	R	R	25	CoSnk 14103	R	R
5	Co 14004	S	R	26	CoT 14111	HS	R
6	Co 14006	S	R	27	CoT 14112	R	R
7	Co 14008	MR	R	28	CoT 14366	R	R
8	Co 14009	MS	R	29	CoT 14367	MS	R
9	Co 14012	S	R	30	CoVC 14061	R	R
10	Co 14016	R	R	31	CoVC 14062	MS	R
11	Co 14022	R	R	32	MS 14081	R	R
12	Co 14023	MS	MR	33	MS 14082	MS	R
13	Co 14025	MR	R	34	PI 14131	MR	R
14	Co 14026	R	R	35	PI 14132	R	R
15	Co 14027	R	R	36	VSI 14121	R	R
16	Co 14030	S	S	37	VSI 14122	MS	R
17	Co 14031	R	R	38	Co86032 (C) ML	R	R
18	Co 14032	R	R	39	CoC 671 (C) E	MR	R
19	CoN 14071	R	R	40	CoSnk 05103 (C) E	R	R
20	CoN 14072	R	R	41	Co 8011 (C) ML	MS	R
21	CoN 14073	R	R	42	Co 740 (C) ML	MS	R
<b>AVT (Early &amp; Midlate- PC I)</b>							
1	Co 12007	S	R	8	VSI 12121	HS	R
2	Co 12008	R	R	<b>Checks</b>			
3	Co 12009	MS	R	9	CoC 671 (C) E	R	R
4	Co 12012	R	R	10	Co 86032 (C) ML	R	R
5	Co 12019	R	R	11	CoSnk 05103 (C) E	R	R
6	Co 12024	R	R	12	Co 8011 (C) ML	MS	R
7	CoM 12085	R	R	13	Co 740 (C) ML	HS	R
<b>AVT (Early- PC II)</b>							
1	Co 11001	R	R	6	Co 85004 (C) E	R	R
2	Co 11004	R	R	7	Co 94008 (C) E	R	R
3	CoM 11081	R	R	8	Co 671 (C) E	R	R
4	CoM 11082	R	R	9	Co 8011 (C) ML	MS	R
5	CoM 11084	R	R	10	Co 740 (C) ML	S	R
<b>AVT (Midlate- PC II)</b>							
1	Co 11005	HS	R	6	CoM 11086	R	R
2	Co 11007	R	R	7	Co 86032 (C) ML	R	R
3	Co 11012	R	R	8	Co 99004 (C) E	HS	R
4	Co 11019	S	R	9	Co 8011 (C) ML	S	S
5	CoM 11085	R	R	10	Co 740 (C) ML	HS	R

**Table 29. Evaluation of sugarcane genotypes for smut resistance- Kolhapur**

S. No	Genotypes	Smut incidence (%)	Reaction	YLD
<b>IVT Early</b>				
1	Co 13021	0.0	R	MR
2	Co 13022	0.0	R	R
3	Co 14002	13.5	MS	R
4	Co 14003	0.0	R	MR
5	Co 14004	8.9	MR	R
6	Co 14006	0.0	R	R
7	Co 14008	6.9	MR	R
8	Co 14009	0.0	R	R
9	Co 14012	5.7	MR	MR
10	Co 14016	9.4	MR	R
11	Co 14022	17.4	MS	R
12	Co 14023	12.3	MS	R
13	Co 14025	13.6	MS	<b>R</b>
14	Co 14026	8.4	MR	R
15	Co 14027	11.1	MR	R
16	Co 14030	9.3	MR	<b>R</b>
17	Co 14031	42.4	HS	<b>R</b>
18	Co 14032	38.4	HS	R
19	CoN 14071	0.0	R	R
20	CoN 14072	0.0	R	R
21	CoN 14073	4.6	MR	R
22	CoN 14074	0.0	R	R
23	CoSnk 14101	0.0	R	MR
24	CoSnk 14102	0.0	R	R
25	CoSnk 14103	0.0	R	MS
26	CoT 14111	9.4	MR	R
27	CoT 14112	7.5	MR	R
28	CoT 14366	24.81	S	R
29	CoT 14367	0.0	R	R
30	CoVc 14061	0.0	R	R
31	CoVc 14062	22.9	S	R
32	MS 14081	4.3	MR	R
33	MS 14082	0.0	R	R
34	PI 14131	4.8	MR	R
35	PI 14132	3.2	MR	R
36	VSI 14121	0.0	R	R
37	VSI 14122	5.7	MR	R
<b>AVT (Early I Plant)</b>				
38	Co 12007	6.5	MR	MR
39	Co 12008	13.5	MS	MR
40	Co 12009	15.4	MS	R
41	Co 12012	3.2	MR	R



42	Co 12019	2.1	MR	R
43	Co 12024	0.0	R	S
44	CoM 12085	1.2	MR	R
45	VSI 12121	2.3	MR	R
<b>AVT (Early II Plant)</b>				
46	Co 11001	4.1	MR	MR
47	Co 11004	2.3	MR	MR
48	CoM 11081	7.9	MR	MR
49	CoM 11082	0.0	R	R
50	CoM 11084	4.1	MR	R
<b>AVT Midlate II Plant</b>				
51	Co 11005	5.3	MR	MS
52	Co 11007	2.3	MR	MR
53	Co 11012	0.0	R	MR
54	Co 11019	0.0	R	R
55	CoM 11085	1.1	MR	R
56	CoM 11086	0.0	R	R
<b>Checks</b>				
57	Co 419	32.1	HS	
58	Co 740	46.5	HS	
59	Co 7527	23.1	S	
60	Co 86032	4.3	MR	S
61	CoM 0265	0.0	R	
62	MS 10001	0.0	R	
63	Co 85004	0.0	R	
64	Co 94008	0.0	R	MR
65	CoC 671	8.7	MR	R
66	Co 99004	12.4	MS	MR
67	CoM 09057	0.0	R	
68	CoSnk 05103			MR

**Table 30. Evaluation of sugarcane genotypes for smut resistance–Pune**

S. No	Genotypes	Smut reaction	S. No	Genotypes	Smut reaction
<b>Initial Varietal Trial – early</b>			<b>AVT- Midlate</b>		
1	Co 13002	MS	1	Co 13005	MS
2	Co 13003	MS	2	Co 13006	MS
3	Co 13004	MS	3	Co 13008	R
4	Co 13072	R	4	Co 13009	MS
5	CoN 13071	R	5	Co 13011	S
6	CoSnk 13101	MR	6	Co 13013	R
7	CoSnk 13102	MS	7	Co 13014	MS
8	MS 13081	R	8	Co 13016	R
<b>AVT- Early II Plant</b>			9	Co 13018	MS
1	Co 10004	R	10	Co 13020	S
2	Co 10005	R	11	Co 13082	R
3	Co 10006	R	12	CoN 13073	R
4	Co 10024	R	13	CoN 13074	R
5	Co 10026	R	14	CoSnk 13103	MS
6	Co 10027	R	15	CoSnk 13104	R
7	CoT 10366	R	16	CoSnk 13105	MS
8	CoT 10367	MS	17	CoSnk 13106	S
<b>AVT Early I Plant</b>			18	CoT 13366	R
1	Co 11001	MS	19	PI 13131	MR
2	Co 11004	MS	20	PI 13132	MS
3	CoM 11081	MS	<b>AVT Midlate II Plant</b>		
4	CoM 11082	R	1	Co 09009	R
5	CoM 11084	MS	2	Co 10015	R
<b>AVT Midlate I Plant</b>			3	Co 10017	MR
1	Co 11005	R	4	Co 10031	S
2	Co 11007	MS	5	Co 10033	R
3	Co 11012	MS	6	CoM 10083	MS
4	Co 11019	MS	7	CoT 10368	R
5	CoM 11085	R	8	CoT 10369	MS
6	CoM 11086	R	9	CoVc 10061	HS
<b>Standard</b>			10	PI 10131	MS
	Co 740	MS	11	PI 10132	S
	Co 7219	MS			

**Table 31. Evaluation of sugarcane genotypes for smut resistance – Coimbatore**

<b>S.No</b>	<b>Genotype</b>	<b>PDI %</b>	<b>Rating</b>
1	Co 13021	11.1	MS
2	Co 13022	31.3	HS
3	Co 14002	10.5	MR
4	Co 14003	0.0	R
5	Co 14004	23.5	S
6	Co 14006	0.0	R
7	Co 14008	11.8	MS
8	Co 14009	0.0	R
9	Co 14012	36.8	HS
10	Co 14016	35.3	HS
11	Co 14022	9.5	MR
12	Co 14023	25.0	S
13	Co 14025	4.8	MR
14	Co 14026	6.3	MR
15	Co 14027	11.1	MS
16	Co 14030	5.6	MR
17	Co 14031	29.4	S
18	Co 14032	0.0	R
19	CoN 14071	0.0	R
20	CoN 14072	5.9	MR
21	CoN 14073	5.0	MR
22	CoN 14074	11.8	MS
23	CoSnk 14101	38.9	HS
24	CoSnk 14102	9.5	MR
25	CoSnk 14103	10.5	MR
26	CoT 14366	27.8	S
27	CoT 14367	0.0	R
28	CoTl 14111	50.0	HS
29	CoTl 14112	18.2	MS
30	MS 14081	38.1	HS
31	MS 14082	0.0	R
32	CoVc 14061	30.0	HS
33	CoVc 14062	23.5	S
34	PI 14131	25.0	S
35	PI 14132	16.7	MS
36	VSI 14121	5.3	MR
37	VSI 14121	30.0	HS
Standard	Co 96007 (S)	40.0	HS
Standard	Co 97009 (S)	35.3	HS
Standard	Co 6806 (R)	0.0	R

**Table 32. Assessment of elite and ISH genotypes for resistance to red rot – Kapurthala**

No.	Genotypes	Red rot reaction		No.	Genotypes	Red rot reaction	
		CF 08	CF09			CF 08	CF09
1.	AS 04-245	HS	HS	15.	MA 5/5	MS	S
2.	AS 04-635	MR	MS	16.	MA 5/22	S	MS
3.	AS 04-1687	MR	MR	17.	MA-5/37	MR	MR
4.	AS 04-1689	MR	MR	18.	MA 5/51	MR	MR
5.	AS 04-2097	MS	MS	19.	MA 5/99	MR	MR
6.	BM 1003143	MR	MS	20.	PG 9869137	MS	S
7.	BM 1005149	MR	MR	21.	SA 04-390	MR	MR
8.	BM 1009163	MS	S	22.	SA 04-409	MS	MS
9.	BM 1010168	MS	MS	23.	SA 04-454	MR	MR
10.	BM 10-22173	MS	MS	24.	SA 04-458	HS	HS
11.	CYM 07-986	S	HS	25.	SA 04-472	MS	MS
12.	GU 07-2276	MR	MR	26.	SA 04-496	MR	MR
13.	GU 07-3774	HS	S	27.	SA 98-13	MR	S
14.	GU 07-3849	MS	S				

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

No.	Genotypes	Red rot reaction		No.	Genotypes	Red rot reaction	
		CF08	CF09			CF08	CF09
1.	AS04-245	S	S	15.	MA 5/22	MS	MS
2.	AS04-635	MR	R	16.	MA 5/37	MR	MR
3.	AS04-1687	MR	MR	17.	MA 5/5	S	S
4.	AS04-1689	MR	MR	18.	MA 5/51	MR	MS
5.	AS 04-2097	MS	MS	19.	MA 5/99	MR	MR
6.	BM 100-3143	MS	MS	20.	PG 9869137	MS	MS
7.	BM 1009-163	S	S	21.	SA 04- 390	R	MR
8.	BM 1010-168	MR	MS	22.	SA 04-409	R	MS
9.	BM1005-149	R	R	23.	SA 04-454	R	MS
10.	BM1022-173	MS	S	24.	SA 04-458	HS	HS
11.	CYM 07-986	MS	S	25.	SA 04-472	MR	S
12.	GU 07-2276	R	MS	26.	SA 04-496	R	MS
13.	GU 07-3774	HS	MS	27.	SA 98-13	MR	HS
14.	GU 07-3849	MS	MS				

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

Sl. No.	Genotypes	Reaction against red rot	
		CF08	CF09
1.	AS 04/1687	MR	MR
2.	AS 04/2097	MS	MR
3.	AS 04-245	HS	HS
4.	AS 04-635	MR	MR
5.	BM 1003143	MS	S
6.	BM 1005149	MS	MR
7.	GU 07-3849	MR	MR
8.	MA 5/5	S	MS
9.	MA 5/99	MS	MS
10.	PG 9869137	MR	MS
11.	SA 04-409	MS	MS
12.	SA 04-454	MR	MS
13.	SA 04-472	MS	MS

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

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

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

No.	Genotypes	Red rot reaction		No.	Genotypes	Red rot reaction	
		CF07	CF08			CF07	CF08
1.	SA 04-1687	MS	MS	15.	MA 5/5	MS	S
2.	GU 07-2276	MR	MR	16.	PG 1869137	S	MS
3.	CYM 07-986	MS	MS	17.	MA 5/99	MR	MR
4.	BM 1003143	S	MS	18.	AS 04-1689	MR	MR
5.	BM 1005149	MS	S	19.	SA 98-13	MR	MR
6.	MA 5/37	MR	MR	20.	SA 04-390	S	S
7.	MA 5/22	MS	S	21.	GU 07-3849	MR	MR
8.	BM 1010168	MS	MS	22.	AS 04-635	MS	S
9.	SA 04-2097	S	MS	23.	MA 5/51	MR	MR
10.	SA 04-472	MR	MR	24.	BM 1009163	MS	MS
11.	SA 04-496	MR	MR	25.	AS 04-245	HS	S
12.	SA 04-454	MR	MR	26.	GU 073774	-	-
13.	BM 1022173	MS	MR	27.	SA 04-458	-	-
14.	SA 04-409	MR	MR				

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

No.	Genotypes	Disease score	Red rot reaction	No.	Genotypes	Disease score	Red rot reaction
1.	BM 1003143	5.7	MS	16.	AS 04-2097	3.8	MR
2.	BM 1005149	3.6	MR	17.	AS 04-635	5.2	MS
3.	BM 1009163	8.7	HS	18.	AS 04-1687	5.3	MS
4.	BM 1010168	2.6	MR	19.	MA 5/51	8.5	HS
5.	BM 1022173	8.3	HS	20.	MA 5/5	8.1	HS
6.	PG 9869137	3.8	MR	21.	MA 5/37	3.8	MR
7.	SA 98-13	2.9	MR	22.	MA 5/99	3.8	MR
8.	SA 04-454	1.9	R	23.	MA 5/22	2.2	MR
9.	SA 04-472	5.3	MS	24.	Gu 07-3849	3.6	MR
10.	SA 04-458	9.0	HS	25.	Gu 07-3774	9.0	HS
11.	SA 04-390	2.7	MR	26.	Gu 07-2276	1.7	R
12.	SA 04-496	5.5	MS	27.	CYM 07-986	4.4	MS
13.	SA 04-409	3.8	MR	28.	CoC 671	9.0	HS
14.	AS 04-1689	4.6	MS	29.			
15.	AS 04-245	5.7	MS	30.			

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

No.	Genotypes	Disease score	Red rot reaction	No.	Genotypes	Disease score	Red rot reaction
1.	83R23	2.2	MR	16.	GU 07-3774	6.7	S
2.	AS 04-245	9.0	HS	17.	GU 07-3849	4.2	MS
3.	AS 04-635	7.2	S	18.	MA 5/5	6.8	S
4.	AS 04-1687	5.3	MS	19.	MA 5/22	4.5	MS
5.	AS 04-1689	4.4	MS	20.	MA 5/37	2.5	MR
6.	AS 04-2097	3.6	MR	21.	MA 5/51	4.3	MS
7.	BM1003143	8.0	S	22.	MA 5/99	2.9	MR
8.	BM1005149	4.6	MS	23.	PG9869137	1.8	R
9.	BM1009163	9.0	HS	24.	SA 04-390	4.8	MS
10.	BM1010168	4.2	MS	25.	SA 04-409	5.6	MS
11.	BM1022173	9.0	HS	26.	SA 04-458	7.0	S
12.	Co A 06321	1.2	R	27.	SA 04-472	6.4	S
13.	CoA92081	0.6	R	28.	SA 04-496	2.8	MR
14.	CYM 07-986	7.7	S	29.	SA 98-13	4.6	MS
15.	GU 07-2276	2.2	MR	30.	SA04-454	3.2	MR

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

No.	Genotypes	Disease score	Red rot reaction	No.	Genotypes	Disease score	Red rot reaction
1.	AS 04 1687	2.9	MR	16.	ISH 115	3.6	MR
2.	AS 04-2097	4.8	MS	17.	ISH 117	2.8	MR
3.	BM 10 1068	1.7	R	18.	ISH 118	3.2	MR
4.	CYM 07 986	3.6	MR	19.	ISH 147	3.0	MR
5.	GU 07 2276	1.8	MR	20.	ISH 175	4.8	MS
6.	ISH 9	8.4	HS	21.	ISH 176	7.2	S
7.	ISH 12	4.6	MS	22.	ISH 229	4.6	MS
8.	ISH 41	8.4	HS	23.	ISH 267	3.3	MR
9.	ISH 43	8.6	HS	24.	ISH 287	3.0	MR
10.	ISH 50	4.4	MS	25.	MA 5/5	7.2	S
11.	ISH 58	3.5	MR	26.	MA 5/22	2.8	MR
12.	ISH 69	6.6	S	27.	MA 5/51	6.4	S
13.	ISH 100	3.2	MR	28.	MA 5/99	3.2	MR
14.	ISH 111	2.8	MR	29.	SA 04 454	1.6	R
15.	ISH 114	3.6	MR	30.	SES 594	0.0	R

**Table 40. Assessment of elite and ISH genotypes for resistance to red rot – Coimbatore**

No.	Genotypes	Red rot reaction			No.	Genotypes	Red rot reaction		
		CfV09356 Ellanganur	Cf86032 Srikandapuram	CfC24 RSCL			CfV09356 Ellanganur	Cf86032 Srikandapuram	CfC24 RSCL
1.	AS 04-245	MS	HS	HS	16.	MA 5/5	MS	MS	MS
2.	AS 04-635	MS	MR	MR	17.	MA 5/22	MR	MS	MS
3.	AS 04-1687	MS	MS	MS	18.	MA 5/37	R	R	R
4.	AS 04-1689	MR	MS	MR	19.	MA 5/51	S	S	HS
5.	AS 04-2097	MR	MR	MS	20.	MA 5/99	R	MR	MR
6.	BM 1003143	MR	MR	S	21.	PG 9869137	MR	MS	-
7.	BM 1005149	R	S	S	22.	SA 04-390	R	R	MR
8.	BM 1009163	MS	S	-	23.	SA 04-409	MR	MR	MS
9.	BM 1010168	MR	MR	MR	24.	SA 04-454	MR	MR	MR
10.	Co 94012	HS	HS	S	25.	SA 04-458	HS	HS	HS
11.	CoC 671	S	HS	S	26.	SA 04-472	MR	MR	S
12.	CYM 07-986	MS	MS	S	27.	SA 04-496	MS	MS	S
13.	GU 07-2276	MR	MS	MS	28.	SA 98-13	MR	MS	-
14.	GU 07-3774	HS	HS	HS					
15.	GU 07-3849	MS	MS	MR					

**Table 41. Assessing screening methods for resistance to brown rust**

Sr. No.	Inoculation Methodology	Average no. of rust pustules/inch <sup>2</sup>				
		Pune	Kolhapur	Sankeshwar	Padegaon	Anakapalle
1.	Clip Inoculation in Leaf Whorl	13.20	22.45	25.85	28.52	-
2.	Leaf Whorl Inoculation	23.40	24.63	31.91	30.28	24.6
3.	Spray Inoculation	-	-	-	38.12	-
		No. of leaves bearing rust pustules				
		Pune	Kolhapur	Sankeshwar	Padegaon	Anakapalle
1.	Clip Inoculation in Leaf Whorl	-	11.2	5.4	7.1	-
2.	Leaf Whorl Inoculation	-	12.4	5.6	7.4	4.5
3.	Spray Inoculation	-	-	-	8.1	-



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

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

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

S. No.	Genotype	Total incidence (%)	Disease reaction	S. No.	Genotype	Total incidence (%)	Disease reaction
1	Co 0118	11.0	MS	42	CoLk 13201	7.0	MS
2	Co 0237	12.0	MS	43	CoLk 13202	7.0	MS
3	Co 0238	24.0	HS	44	CoLk 13203	4.0	R
4	Co 05009	6.0	MS	45	CoLk 13204	14.0	S
5	Co 05011	9.0	MS	46	CoLk 13205	2.0	R
6	Co 1148	12.0	MS	47	CoLk 14201	6.0	MS
7	Co 12026	2.0	R	48	CoLk 14202	2.0	R
8	Co 12027	3.0	R	49	CoLk 14203	7.0	MS
9	Co 12029	5.0	R	50	CoLk 14204	2.0	R
10	Co 13033	4.0	R	51	CoLk 14205	6.0	MS
11	Co 13034	8.0	MS	52	CoPant 12221	7.0	MS
12	Co 13035	2.0	R	53	CoPant 12226	2.0	R
13	Co 13036	9.0	MS	54	CoPant 13221	6.0	MS
14	Co 14034	6.0	MS	55	CoPant 13222	12.0	S
15	Co 14035	6.0	MS	56	CoPant 13223	7.0	MS
16	Co 7717	9.0	MS	57	CoPant 13224	8.0	MS
17	CoH 110	18.0	S	58	CoPant 14222	7.0	MS
18	CoH 119	9.0	MS	59	CoPant 97222	7.0	MS
19	CoH 12263	5.0	R	60	CoPb 12211	2.0	R
20	CoH 128	9.0	MS	61	CoPb 13181	6.0	MS
21	CoH 13062	4.0	R	62	CoPb 13182	8.0	MS
22	CoH 13063	0.0	R	63	CoPb 13183	3.0	R
23	CoH 13261	5.0	MS	64	CoPb 14181	8.0	MS
24	CoH 133	20.0	S	65	CoPb 14182	4.0	R
25	CoH 14062	4.0	R	66	CoPb 14183	6.0	MS
26	CoH 14261	0.0	R	67	CoPb 14184	2.0	R
27	CoH 150	0.0	R	68	CoPb 14185	9.0	MS
28	CoH 151	9.0	MS	69	CoPb 14211	2.0	R
29	CoH 152	16.0	S	70	CoPb 14212	2.0	R
30	CoH 156	6.0	MS	71	CoS 767	0.0	R
31	CoH 160	4.0	R	72	CoS 12232	11.0	MS
32	CoH 164	6.0	MS	73	CoS 13231	6.0	R
33	CoH 166	4.0	R	74	CoS 13232	8.0	MS
34	CoH 167	4.0	R	75	CoS 13233	6.0	MS
35	CoH 56	10.0	MS	76	CoS 14231	10.0	MS
36	CoH 92	4.0	R	77	CoS 14232	6.0	MS
37	CoH 99	0.0	R	78	CoS 14233	9.0	MS
38	CoJ 64	9.0	MS	79	CoS 8436	17.0	S
39	CoJ 85	12.0	MS	80	S 11202	9.0	MS
40	CoLk 12203	0.0	R	81	S 11252	7.0	MS
41	CoLk 12205	2.0	R	82	S 11733	10.0	MS

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

Sl. No.	Varieties	Percent infected plants				Disease reaction
		Mild	Moderate	Severe	Incidence	
1.	Co 0238	11	5	0	17	S
2.	CoJ 64	1	0	0	1	R
3.	CoLk 94184	2	0	0	2	R
4.	CoS 08279	10	4	0	14	S
5.	CoS 13231	2	0	0	2	R
6.	CoS 767	1	0	0	1	R
7.	CoS 8436	5	4	0	9	MS
8.	CoSe 12451	4	1	0	5	R
9.	CoSe 12452	8	2	0	10	MS
10.	CoSe 14451	4	1	0	5	R
11.	S 5080/11	2	5	0	7	MS
12.	S 5082/11	1	0	0	1	R
13.	S 5083/11	4	0	0	4	R
14.	S 5087/11	4	2	0	6	MS
15.	S 5094/11	2	2	0	4	R
16.	S 5099/11	2	4	0	6	MS
17.	UP 9530	5	2	0	7	MS

**Table 45. Reaction of sugarcane clones for resistance to *Pokkah boeng* – Pusa**

Sl No.	Varieties	Percent infected plants			Total Incidence	Disease reaction
		Mild	Moderate	Severe		
1.	BO 130	2	1	-	3	R
2.	BO 155	3	1	-	4	R
3.	CoBln 14502	6	4	-	10	MS
4.	CoLk 09204	3	2	-	5	R
5.	CoLk 12207	3	1	-	4	R
6.	CoLk 12209	1	-	-	1	R
7.	CoP 11436	4	-	-	4	R
8.	CoP 11437	4	1	1	6	MS
9.	CoP 11438	1	-	-	1	R
10.	CoP 12436	1	1	-	2	R
11.	CoP 12438	3	1	1	5	R
12.	CoP 132	2	-	-	2	R
13.	CoP 13437	4	-	-	4	R
14.	CoP 13438	2	3	-	5	R
15.	CoP 13439	1	3	-	4	R
16.	CoP 2061	2	-	-	2	R
17.	CoSe 12451	2	1	-	3	R
18.	CoSe 13451	2	-	-	2	R
19.	CoSe 13452	2	1	-	3	R
20.	CoSe 13453	3	-	-	3	R
21.	CoSe 95422(C)	5	3	-	8	MS

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

S. N.	Varieties	Percent infected plants				Disease reaction
		Mild	Moderate	Severe	Total incidence	
1	Co 0118	2		-	-	R
2	Co 0238	9	6	-	15	S
3	CoBln 14501	1	-	-	1	R
4	CoJ 64	1	3	-	4	R
5	CoLk 14201	2	-	-	2	R
6	CoLk 14206	-	-	-	-	R
7	CoLk 14207	2	-	-	2	R
8	CoP 13437	2	1	-	3	R
9	CoP 14436	4	3	-	7	MS
10	CoP 14437	3	-	-	3	R
11	CoP 14438	6	2	-	8	MS
12	CoP 14439	2	-	-	2	R
13	CoP 9301	3	4	-	7	MS
14	CoS 05011	2	1	-	3	R
15	CoS 08279	8	8	-	16	S
16	CoS 12231	-	-	-	-	MS
17	CoS 767	5	3	-	8	MS
18	CoSe 01421	2	-	-	2	R
19	CoSe 13451	2		-	2	R
20	CoSe 13452	-	-	-	-	R
21	CoSe 14232	-	1	-	1	R
22	CoSe 14451	2		-	-	R
23	CoSe 14453	-	1	-	1	R
24	CoSe 14454	5	2	-	7	MS
25	CoSe 14456	2	-	-	2	R
26	CoSe 95422	6	2	-	8	MS

**Table 47. Reaction of sugarcane clones for resistance to Pokkah boeng - Anakapalle**

S. No.	Genotype/ Variety	Per cent infected plants				Disease reaction
		Mild	Moderate	Severe	Total incidence	
<b>IVT Early</b>						
1	CoC 15336	1	0	0	1	R
2	CoV 15356	2	0	0	2	R
3	CoA 92081 (C)	1	0	0	1	R
4	CoC 01061 (C)	4	2	0	6	MS
<b>IVT Mid late</b>						
5	CoC 15339	8	3	1	12	S
6	CoC 15340	1	1	0	2	R
7	PI 15376	5	2	0	7	MS
8	PI 15377	8	2	1	11	S
9	Co 86249 (C)	5	1	0	6	MS
<b>AVT I Early</b>						
10	Co 13023	0	0	0	0	R
11	CoA 14321	3	0	0	3	R
12	CoC 14336	0	0	0	0	R
<b>AVT I Mid late</b>						
13	Co 13028	6	2	0	8	MS
14	Co 13029	7	1	1	9	MS
15	Co 13031	5	1	0	6	MS
16	CoA 14323	6	1	0	7	MS
17	CoC 14337	8	1	0	9	MS
18	PI 14377	6	1	0	6	MS
<b>AVT II Early</b>						
19	CoA 13322	2	1	0	3	R
20	CoA 13323	1	0	0	1	R
21	CoC 13336	0	0	0	0	R
22	CoC 13337	1	0	0	1	R
23	CoV 13356	1	1	0	2	R
<b>AVT II Mid late</b>						
24	CoA 11326	1	1	0	2	R
25	CoA 12324	9	2	1	12	S
26	CoC 13339	8	3	1	12	S
27	CoOr 13346	2	0	0	2	R
<b>Check varieties</b>						
28	Co 419	6	2	1	9	MS
29	CoC 671	11	2	1	14	S
30	Co 997	6	2	0	8	MS
31	CoA 89085	0	0	0	0	R
32	Co 6907	2	1	0	3	R
33	Co 7219	5	2	0	7	MS
34	Co 7706	2	1	0	3	R

**Table 48. Reaction of sugarcane clones for resistance to *Pokkah boeng*- Pune**

S. No.	Variety	Disease Incidence (%)	S. No.	Variety	Disease Incidence (%)
1	Co 419	0 %	8	CoVSI 03102	0 %
2	Co 85004	0 %	9	CoVSI 0405	0 %
3	Co 86032	0 %	10	CoVSI 2000-01	09.40 %
4	Co 94012	0 %	11	CoVSI 9805	29.78 %
5	CoC 671	12.50 %	12	MS 10001	21.05 %
6	CoM 0265	0 %	13	VSI 08005	16.12 %
7	CoVSI 0309	0 %	14	VSI 434	20.00 %

**Table 49. Reaction of sugarcane clones for resistance to *Pokkah boeng*- Kolhapur**

Sr. No	Name of genotype	Per cent infected plants				Disease Reaction
		Mild	Moderate	Severe	Total Incidence	
	<b>IVT</b>					
1	Co 13021	1.00	1.00	0.00	2.00	R
2	Co 13022	1.00	2.00	0.00	3.00	R
3	Co 14002	0.00	2.00	0.00	2.00	R
4	Co 14003	1.00	2.00	0.00	3.00	R
5	Co 14004	2.00	1.00	1.00	4.00	R
6	Co 14006	3.00	2.00	1.00	6.00	MS
7	Co 14008	0.00	0.00	0.00	0.00	R
8	Co 14009	3.00	1.00	0.00	4.00	R
9	Co 14012	0.00	0.00	0.00	0.00	R
10	Co 14016	0.00	0.00	0.00	0.00	R
11	Co 14022	0.00	0.00	0.00	0.00	R
12	Co 14023	0.00	0.00	0.00	0.00	R
13	Co 14025	0.00	0.00	0.00	0.00	R
14	Co 14026	4.00	0.00	0.00	4.00	R
15	Co 14027	1.00	1.00	0.00	2.00	R
16	Co 14030	0.00	0.00	0.00	0.00	R
17	Co 14031	0.00	0.00	0.00	0.00	R
18	Co 14032	0.00	0.00	0.00	0.00	R
19	CoN 14071	5.00	2.00	3.00	8.00	MS
20	CoN 14072	0.00	0.00	0.00	0.00	R
21	CoN 14073	0.00	0.00	0.00	0.00	R
22	CoN 14074	4.00	4.00	2.00	10.00	MS
23	CoSnk 14101	0.00	0.00	0.00	0.00	R
24	CoSnk 14102	0.00	0.00	0.00	0.00	R
25	CoSnk 14103	0.00	0.00	0.00	0.00	R
26	CoT 14366	0.00	0.00	0.00	0.00	R
1	CoT 14367	0.00	0.00	0.00	0.00	R
2	CoTI 14111	0.00	0.00	0.00	0.00	R
3	CoTI 14112	0.00	0.00	0.00	0.00	R

4	CoVc 14061	0.00	0.00	0.00	0.00	R
5	CoVc 14062	0.00	0.00	0.00	0.00	R
6	MS 14081	0.00	0.00	0.00	0.00	R
7	MS 14082	0.00	0.00	0.00	0.00	R
8	PI 14131	0.00	0.00	0.00	0.00	R
9	PI 14132	0.00	0.00	0.00	0.00	R
10	VSI 14121	0.00	0.00	0.00	0.00	R
11	VSI 14122	0.00	0.00	0.00	0.00	R
	<b>AVT Early II Plant</b>					
38	Co 11001	0.00	0.00	0.00	0.00	R
39	Co 11004	0.00	0.00	0.00	0.00	R
40	CoM 11081	0.00	0.00	0.00	0.00	R
41	CoM 11082	3.00	4.00	3.00	10.00	MS
42	CoM 11084	0.00	0.00	0.00	0.00	R
	<b>AVT Mid late II Plant</b>					
43	Co 11005	0.00	0.00	0.00	0.00	R
44	Co 11007	0.00	0.00	0.00	0.00	R
45	Co 11012	0.00	0.00	0.00	0.00	R
46	Co 11019	1.00	0.00	0.00	1.00	R
47	CoM 11085	3.00	2.00	2.00	7.00	MS
48	CoM 11086	0.00	0.00	0.00	0.00	R
	<b>AVT I plant</b>					
49	Co 12007	0.00	0.00	0.00	0.00	R
50	Co 12008	0.00	0.00	0.00	0.00	R
51	Co 12009	4.00	4.00	2.00	10.00	MS
52	Co 12012	0.00	0.00	0.00	0.00	R
53	Co 12019	0.00	0.00	0.00	0.00	R
54	Co 12024	0.00	0.00	0.00	0.00	R
55	CoM 12085	0.00	0.00	0.00	0.00	R
56	VSI 12121	3.00	2.00	1.00	6.00	MS
	<b>Check</b>					
57	Co 86032	0.00	0.00	0.00	0.00	R
58	CoC 671	4.00	2.00	2.00	8.00	MS
59	CoSnk 05103	0.00	0.00	0.00	0.00	R
60	Co 99004	3.00	2.00	2.00	7.00	MS
61	Co 94008	0.00	0.00	0.00	0.00	R

**Table 50. Reaction of sugarcane clones for resistance to *Pokkah boeng* – Akola**

S. No.	Genotypes	% PB incidence	Grade	S. No.	Genotypes	% PB incidence	Grade
<b>IVT Early Plant</b>				<b>AVT – I Plant</b>			
1	Co 13021	0.70	R	1	Co 12007	2.66	R
2	Co 13022	8.12	R	2	Co 12008	2.01	R
3	Co 14002	0.61	R	3	Co 12009	2.10	R
4	Co 14003	0.63	R	4	Co 12012	2.22	R
5	Co 14004	0.37	R	5	Co 12019	1.35	R
6	Co 14006	3.84	R	6	Co 12024	0.52	R
7	Co 14008	1.51	R	7	Co 86032	1.56	R
8	Co 14009	0.33	R	8	CoC 671	1.78	R
9	Co 14012	4.45	R	9	CoM 12085	2.32	R
10	Co 14016	0.00	R	10	CoSnk 05103	2.03	R
11	Co 14022	0.82	R	11	VSI 12121	3.33	R
12	Co 14023	3.13	R	<b>AVT ( Early) – II Plant</b>			
13	Co 14025	6.65	R	1	Co 11001	0.69	R
14	Co 14026	1.28	R	2	Co 11004	1.06	MR
15	Co 14027	0.34	R	3	Co 85004	0.80	R
16	Co 14030	0.86	R	4	Co 94008	0.92	R
17	Co 14031	5.75	R	5	CoC 671	0.77	R
18	Co 14032	3.11	R	6	CoM 11081	0.56	R
19	Co 86032	6.67	MS	7	CoM 11082	1.39	MR
20	CoC 671	6.75	MS	8	CoM 11084	0.76	R
21	CoN 14071	4.23	R	<b>AVT (Early)– Ratoon</b>			
22	CoN 14072	1.92	R	1	Co 11001	0.86	R
23	CoN 14073	0.69	R	2	Co 11004	1.50	R
24	CoN 14074	0.30	R	3	Co 85004	3.06	R
25	CoSnk 05103	6.80	MS	4	Co 94008	6.88	MS
26	CoSnk 14101	1.22	R	5	CoC 671	8.48	MS
27	CoSnk 14102	0.00	R	6	CoM 11081	2.65	R
28	CoSnk 14103	0.82	R	7	CoM 11082	3.82	R
29	CoT 14111	1.19	R	8	CoM 11084	1.24	R
30	CoT 14112	2.56	R	<b>AVT (Midlate) – II Plant</b>			
31	CoT 14366	0.72	R	1	Co 11005	2.07	R
32	CoT 14367	4.57	R	2	Co 11007	2.17	R
33	CoVc 14061	0.51	R	3	Co 11012	3.13	R
34	CoVc 14062	2.87	R	4	Co 11019	1.18	R
35	MS 14081	0.83	R	5	Co 86032	0.77	R
36	MS 14082	0.61	R	6	Co 99004	4.62	R
37	PI 14131	0.56	R	7	CoM 11085	1.16	R
38	PI 14132	0.44	R	8	CoM 11086	1.20	R
39	VSI 14121	1.56	R				
40	VSI 14122	2.56	R				



S. No.	Genotypes	% PB incidence	Grade	S. No.	Genotypes	% PB incidence	Grade
<b>AVT (Midlate) – Ratoon</b>							
1	Co 11005	4.40	R	5	CoM 11085	1.95	R
2	Co 11007	2.43	R	6	CoM 11086	1.28	R
3	Co 11012	6.50	MS	7	Co 86032	2.42	R
4	Co 11019	2.04	R	8	Co 99004	2.72	R

**Table 51. Management of *Pokkah boeng*/top rot disease in sugarcane- Kapurthala**

Treatments		Co 0238		CoJ 85	
		Germination	Disease Incidence	Germination	Disease Incidence
T <sub>1</sub>	Sett treatment-Overnight soaking with Carbendazim (0.1% a.i.)	54.8	17.25	53.1	15.0
T <sub>2</sub>	Foliar spray-Carbendazim (0.05% a.i.-3 sprays at 15 days interval from May 15 <sup>th</sup> )	49.4	19.25	50.4	18.0
T <sub>3</sub>	Sett treatment (T <sub>1</sub> ) + Foliar spray with Carbendazim (T <sub>2</sub> )	56.3	13.5	54.0	9.5
T <sub>4</sub>	Control	49.0	27.6	49.8	22.75

**Table 52. Management of *Pokkah boeng*/top rot disease in sugarcane- Uchani**

S No.	Treatment	Per cent Germination		Per cent disease incidence	
		Co 0238	CoS 8436	Co 0238	CoS 8436
1.	T <sub>1</sub> Sett treatment (overnight soaking with carbendazim 0.1%)	46.8	47.1	13.8	10.4
2.	T <sub>2</sub> Foliar spray with carbendazim 0.05% - 3 sprays at 15 days interval	39.5	38.6	11.0	8.1
3.	T <sub>3</sub> (T <sub>1</sub> + T <sub>2</sub> ) T <sub>1</sub> Sett treatment+ T <sub>2</sub> Foliar spray with carbendazim 0.05%	47.2	46.5	5.2	4.0
4.	Control	38.8	39.0	26.0	19.0
CD at 5%		2.9	2.7	3.2	2.7

**Table 53. Management of *Pokkah boeng*/top rot disease in sugarcane- Shahjahanpur**

Treatments		Co 0238		CoS 08272	
		Germination	% Disease incidence	Germination	% Disease incidence
T <sub>1</sub>	Sett treatment - Overnight soaking with Carbendazim – 0.1% a.i.	47.43	5.73	46.33	4.20
T <sub>2</sub>	Foliar spray - Carbendazim – 0.05% a.i. (3 sprays at 15 days interval from May15th)	40.47	4.77	40.07	2.57
T <sub>3</sub>	Sett treatment (T <sub>1</sub> ) + Foliar spray with carbendazim (T <sub>2</sub> )	49.23	2.47	48.13	2.00
T <sub>4</sub>	Control	39.4	31.80	39.87	12.63
	C.D.	2.698	2.312	1.714	1.689

**Table 54. Management of *Pokkah boeng*/top rot disease in sugarcane- Anakapalle**

Treatment	Description	% disease incidence (PDI)	Yield (t/ha)
T1	Sett treatment- Overnight soaking with carbendazim- 0.1% a.i	11.93 (20.16)	79.1
T2	Foliar spray- Carbendazim -0.05% a.i (3 sprays at 15 days interval from May 15 <sup>th</sup> )	5.94 (14.84)	83.2
T3	Sett treatment (T1) + Foliar spray- Carbendazim -0.05% (T2)	4.08 (11.55)	84.7
T4	Control	30.32 (33.37)	74.6

**Table 55. Management of *Pokkah boeng*/ top rot disease in sugarcane- Sankeshwar**

Sl. No.	Treatment	Germination (%)	Disease incidence
1	Sett treatment- Overnight soaking with Carbendazim- 0.1%	80.13	9.31
2	Foliar spray- Carbendazim -0.05% (3 sprays at 15 days interval from May 15 <sup>th</sup> )	78.59	10.50
3	Sett treatment (T1) + Foliar spray- Carbendazim -0.05% (T2)	86.54	5.49

**Table 56. Management of *Pokkah boeng*/ top rot disease in sugarcane- Pune**

No	Treatment	Germination %	Yield T/Ha	CCS T/ha	Disease control of PB
T1	Sett treatment: Overnight soaking with Carbendazim @ 0.1% a.i.	60.50	141.25	20.79	55.10 (47.93)
T2	Foliar spray: Carbendazim – 0.05% a.i. (3 sprays at 15 days interval)	59.25	143.75	21.98	63.63 (52.91)
T3	Sett treatment (T1) + foliar spray with carbendazim (T2)	59.75	145.00	21.61	70.83 (57.33)
T4	Foliar spray :Mancozeb – 0.3 % a.i. (3 sprays at 15 days interval from May 15th)	59.25	155.00	23.92	75.22 (60.22)
T5	Control	57.00	139.75	19.42	0.0 (4.05)

Table 57. Reaction of ZVT entries for red rot, smut and wilt (North West Zone-I)

Sl. No.	Genotype	Red rot												Smut		Wilt		YL	
		Lucknow				Kapurthala				Uchani				Lucknow	Kapurthala	Lucknow	Kapurthala	Lucknow	
		Plug Method		Nodal Method		Plug Method		Nodal Method		Plug Method		Nodal Method							YL
		CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09						
<b>Initial Varietal Trial (Early)</b>																			
1.	Co 14034	MR	MR	R	R	MS	MS	R	R	MR	MR	R	R	MS	MS	MR	S	MS	R
2.	CoLk 14201	MR	MR	MR	MR	MR	MR	R	R	MR	MR	R	R	MS	R	MR	R	R	R
3.	CoLk 14202	R	R	R	R	MR	MR	R	R	MR	MR	R	R	MS	MS	MR	R	R	R
4.	CoPant 14221	MR	MR	MR	MR	-	-	-	-	-	-	-	-		R	-	R	-	R
5.	CoPant 14222	MR	MR	MR	MR	MR	MR	R	R	MR	MR	R	R	S	MR	R	S	R	R
6.	CoPb 14181	MR	MR	MR	MR	MR	MR	R	R	MR	MR	R	R	MS	MS	MS	R	MS	R
7.	CoPb 14182	MR	MR	MR	MR	MR	MR	R	R	MR	MR	R	R	MR	MR	R	S	R	S
8.	CoPb 14211	MS	MR	MR	MR	MR	MR	R	R	MS	MS	R	R	MS	S	MR	S	MR	R
<b>Advanced Varietal Trial (Early)-I Plant</b>																			
1.	Co 13034	MR	MR	R	R	MS	MR	R	R	MR	MR	R	R	S	R	MS	R	MR	R
2.	CoPb 13181	MR	MR	R	R	MS	MS	R	R	S	MS	R	R	MS	R	MR	R	R	R
3.	CoS 13231	MR	S	MR	MS	MR	MR	R	R	MR	MR	R	R	MR	S	R	R	R	R
<b>Advanced Varietal Trial (Early)-II Plant</b>																			
1.	Co 12026	S	S	S	S	MR	MR	R	R	MS	MR	R	R	MS	R	MR	R	R	R
2.	Co 12027	R	R	R	R	MR	MR	R	R	MR	MS	R	R	MS	MR	MS	R	R	R
3.	CoLk 12203	MR	MR	MR	MR	MS	MS	R	R	MR	MS	R	R	MS	R	MS	R	MS	R
4.	CoPant 12221	MS	MS	MS	MS	MS	MR	R	R	MR	MR	R	R	MS	S	MS	R	R	R
<b>Initial Varietal Trial (Midlate)</b>																			
1.	Co 14035	MR	MR	MR	MR	MR	MR	R	R	MR	MR	R	R	MS	MS	MR	R	MR	R
2.	CoH 14261	MR	MR	MR	MR	MR	MR	R	R	R	MR	R	R	MS	R	R	R	R	R
3.	CoH 14262	MR	MR	R	R	MR	MR	R	R	MR	R	R	R	MR	R	MR	R	R	R
4.	CoLk 14203	MR	MR	MR	MR	MR	MR	R	R	MR	MR	R	R	MR	R	S	R	R	R
5.	CoLk 14204	MR	MR	MR	MR	MR	MR	R	R	MR	MR	R	R	S	MS	R	R	R	R
6.	CoLk 14205	R	R	R	R	MR	MR	R	R	MS	MR	R	R	MR	MS	MS	S	R	R
7.	CoPb 14183	MR	MR	R	R	MR	MR	R	R	MS	MS	R	R	MR	S	MS	R	R	R
8.	CoPb 14184	MR	MR	MR	MR	MR	MR	R	R	MR	R	R	R	MR	MR	R	R	R	R

Sl. No.	Genotype	Red rot												Smut		Wilt		YL	
		Lucknow				Kapurthala				Uchani				Lucknow	Kapurthala	Lucknow	Kapurthala	YL	
		Plug Method		Nodal Method		Plug Method		Nodal Method		Plug Method		Nodal Method							YL
		CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09						
9.	CoPb 14185	MR	MR	MR	MR	MR	MR	R	R	MR	MR	R	R	MR	MR	MR	R	S	
10.	CoPb 14212	MR	MR	MR	MR	MR	MR	R	R	MR	MR	R	R	MR	MS	R	S	R	
11.	CoS 14231	S	S	MS	MS	MS	MS	R	R	S	MS	S	R	MR	MS	MS	S	MS	
12.	CoS 14232	MR	MR	MR	MR	MR	MR	R	R	MR	R	R	R	S	S	R	S	R	
13.	CoS 14233	MR	MR	MR	MR	S	S	S	S	MR	R	R	R	MR	MS	MR	R	R	
<b>Advanced Varietal Trial (Mid late)-I Plant</b>																			
1.	Co 13035	MR	MR	MR	MR	S	MS	R	R	MR	MR	R	R	MS	R	MS	R	R	
2.	CoH 13263	MR	MR	MR	MR	MS	S	R	R	MR	MR	R	R	R	R	MR	R	MS	
3.	CoLk 13204	MR	MR	MR	MR	MS	MS	R	R	MS	MS	R	R	S	MR	S	S	R	
4.	CoPant 13224	MR	MR	MR	MR	MR	MR	R	R	MR	MS	R	R	MS	R	MR	R	MR	
5.	CoPb 13182	MR	MR	MR	MR	MR	MR	R	R	MR	MR	R	R	S	MR	MS	S	R	
<b>Advanced Varietal Trial (Mid late)-II Plant</b>																			
1.	Co 12029	MR	MR	MR	MR	MR	MR	R	R	MR	MR	R	R	MS	MS	MS	R	R	
2.	CoH 12263	MR	MR	MR	MR	MS	MR	R	R	MR	MR	R	R	MR	R	MR	R	R	
3.	CoLk 12205	MR	MR	MR	MR	MS	MS	R	R	MS	MS	R	R	MS	MR	S	R	R	
4.	CoPant 12226	MS	MS	MR	MR	MR	MR	R	R	MR	MR	R	R	MS	MS	MR	R	MR	
5.	CoPb 12211	MS	MS	MR	MR	MR	MR	R	R	S	MS	R	R	MS	MS	MR	R	R	
6.	CoS 12232	MR	MR	MR	MR	MS	MS	R	R	MS	MR	R	R	S	R	MS	R	MR	
<b>Check</b>																			
1	CoJ 64*	HS	S	S	S	HS	HS	S	S	HS	S	S	S	MS	-	S	-	-	
2	CoS 767*	MS	S	MR	MS	HS	HS	S	S	MS	S	R	R	MS	-	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	MS	-	MR	-	-	
7	CoS 8436	-	-	-	-	MR	MR	R	R	MR	MR	R	R	MS	-	MS	-	-	
8	CoPnt 97222	MR	MR	R	R	S	S	S	S	S	MS	S	S	S	MR	MS	R	-	
9	Co 05011	MR	MR	MR	MR	MR	MR	R	R	MR	MR	R	R	MS	R	MR	S	-	
10	Co 740	-	-	-	-	-	-	-	-	-	-	-	-	-	-	HS	-	-	
11	Co 7915	-	-	-	-	-	-	-	-	-	-	-	-	-	-	MR	-	-	

Sl. No.	Genotype	Red rot												Smut		Wilt		YL
		Lucknow				Kapurthala				Uchani				Lucknow	Kapurthala	Lucknow	Kapurthala	YL
		Plug Method		Nodal Method		Plug Method		Nodal Method		Plug Method		Nodal Method						
		CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09	CF08	CF09					
12	Co 62175	-	-	-	-	-	-	-	-	-	-	-	-	-	HS	-	-	-
13	NCo 310	-	-	-	-	-	-	-	-	-	-	-	-	-	HS	-	-	-
14	Katha	-	-	-	-	-	-	-	-	-	-	-	-	-	HS	-	-	-
15	Co 7717	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	HS	-
16	Co 89003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	HS	-

**Table 58. Reaction of ZVT entries for red rot, smut and wilt (North West Zone-II)**

Sl. No.	Genotype	Red rot												Smut		YL			
		Shahjahanpur				Pantnagar				Karnal				Shahjahanpur	Pantnagar	Shahjahanpur	Pantnagar		
		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						
<b>AVT Early (I Plant)</b>																			
1	Co 13034	MR	MS	R	R	MS	MS	R	R	R	R	R	R	R	R	R	MS	R	R
2	CoPb 13181	S	MS	S	R	S	S	R	R	S	MS	R	R	MS	R	R	R	R	MS
3	CoS 13231	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	MS	MR	R	R	R	MR
<b>AVT Early (II Plant)</b>																			
1	Co 12026	MR	MS	R	R	MR	R	R	R	MR	MR	R	R	MR	MR		R		
2	Co 12027	MR	MR	R	R	-	-	-	-	MR	R	R	R	MR	MR	-	R	-	
3	CoLk 12203	MR	MR	R	R	MR	MR	R	R	MS	MR	R	R	MR	R	MR	R	R	
4	CoPant 12221	MR	MR	R	R	MR	MR	R	R	MS	MR	R	R	MR	MS	MS	R	MR	
<b>AVT Mid late (I Plant)</b>																			
1	Co 13035	MR	MR	R	R	MS	MS	R	R	MR	MR	R	R	MR	MS	S	MR	R	
2	CoH 13263	S	HS	S	S	MR	MR	R	R	MS	MS	R	R	R	R	MS	R	MR	
3	CoPant13224	MS	MS	R	R	MS	MS	R	R	MS	MS	R	R	R	R	MR	MR	MR	
4	CoPb 13182	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	R	R	MR	R	R	
5	CoLk 13204	MS	S	R	S	R	MR	R	R	MS	MS	R	R	MR	MR	MR	R	MS	
<b>AVT Mid late (II Plant)</b>																			
1	Co 12029	MR	MR	R	R	MR	MS	R	R	MR	MR	R	R	R	MR	MS	R	R	
2	CoH 12263	MS	MS	R	R	MR	MR	R	R	MS	MS	R	R	R	R	R	R	R	
3	CoLk 12205	MS	MR	R	R	MR	MR	R	R	MS	MS	R	R	MR	MS	S	R	R	
4	CoPant 12226	MR	MS	R	R	MS	MS	R	R	MR	MR	R	R	MR	MR	MR	MR	R	
5	CoPb 12211	MS	MS	R	R	MR	MR	R	R	S	MS	R	R	MR	R	MS	R	R	
6	CoS 12232	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	MR	R	MR	R	R	
<b>IVT Early</b>																			
1	Co14034	MS	MS	R	R	MR	MR	R	R	MR	MR	R	R	R	R	MS	R	R	
2	CoLk 14201	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	MR	MR	R	R	R	
3	CoLk 14202	MR	MR	R	R	-	-	-	-	MR	MR	R	R	MR	R	-	R	-	
4	CoPant 14222	MR	MR	R	R	-	-	-	-	MR	MR	R	R	R	MR	-	MR	-	
5	CoPb 14181	MR	MS	R	R	MS	MR	R	R	MR	MR	R	R	R	MR	MR	R	MR	

Sl. No.	Genotype	Red rot												Smut		YL		
		Shahjahanpur				Pantnagar				Karnal				Shahjahanpur	Pantnagar	Shahjahanpur	Pantnagar	
		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 14182	MR	MR	R	R	MS	MR	R	R	MR	MR	R	R	R	MS	MS	R	MR
7	CoPb 14211	MS	MS	R	R	-	-	-	-	MS	MS	R	R	R	R	-	MR	-
<b>IVT Mid late</b>																		
1	Co 14035	MR	MR	R	R	-	-	-	-	R	MR	R	R	MR	R	-	R	-
2	CoH 14261	MR	MR	R	R	-	-	-	-	R	MR	R	R	MR	MR	-	MR	-
3	CoH 14262	R	MR	R	R	-	-	-	-	R	R	R	R	MR	R	-	MR	-
4	CoLk 14203	MR	MR	R	R	MR	MR	R	R	R	MR	R	R	MS	R	MS	R	R
5	CoLk 14204	MR	MR	R	R	MR	MR	R	R	R	MR	R	R	R	MR	R	R	R
6	CoLk 14205	MR	MS	R	R	-	-	-	-	MR	MS	R	R	R	MR	-	R	-
7	CoPb14183	MS	MR	R	R	MR	MS	R	R	MS	MS	R	R	R	MR	-	R	R
8	CoPb 14184	MR	MR	R	R	MS	MR	R	R	MR	R	R	R	R	R	MS	R	R
9	CoPb 14185	MR	MR	R	R	-	-	-	-	MR	R	R	R	R	MR	-	R	-
10	CoPb 14212	MR	MS	R	R	MR	MS	R	R	MR	MR	R	R	R	R	R	R	R
11	CoS 14231	MR	MS	R	R	-	-	-	-	S	MS	S	R	R	R	-	R	-
12	CoS 14232	MR	MR	R	R	MR	R	R	R	MR	MR	R	R	R	MS	MS	R	R
13	CoS 14233	MR	MS	R	R	MR	MR	R	R	S	MS	S	R	MR	R	HS	MR	R
<b>Check</b>																		
1	CoJ 64	HS	HS	S	S	S	S	S	S	S	S	S	S	S	MR	MS	R	MR
2	Co 0238	MR	MS	R	R	-	-	-	-	MR	R	R	R	MR	R	-	R	-
3	Co 05009	MR	MR	R	R	-	-	-	-						R	-	R	-
4	CoS 767	HS	HS	S	S	MS	S	R	R	S	S	S	R	S	R	MS	R	MR
5	CoS 8436	MR	MR	R	R	MS	MS	R	R	MR	MR	R	R	MS	R	MS	MS	R
6	CoPant 97222	S	HS	R	S	MR	MR	R	R	MS	MS	R	R	MR	R	-	R	R
7	Co 05011	MR	MR	R	R	-	-	-	-	-	-	-	-	-	R	-	MS	-
8	Co 1158	-	-	-	-	-	-	-	-	-	-	-	-	-	HS	-	S	-
9	CoPant 84211	-	-	-	-	MR	MS	R	R	MS	MS	R	R	S	-	-	-	MS



Table 59. 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				Motipur	Seorahi	Pusa	Motipur	Pusa	Motipur	Seorahi
		CF07		CF08		CF07		CF08		CF07		CF08		CF07		CF08								
		Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal							
<b>IVT (Early)</b>																								
1.	CoBln 14501	MR	MR	MR	MR	MS	R	MR	R	MS	R	MS	R	-	-	-	-	R	R	MR	R	MR	S	R
2.	CoLk 14206	MR	MR	MR	MR	MR	R	MR	R	MS	R	MR	R	-	-	-	-	S	MS	R	R	R	R	R
3.	CoLk 14207	MR	MR	MR	MR	MR	R	MR	R	MS	R	MR	R	-	-	-	-	R	R	R	S	MR	R	R
4.	CoP 14436	MR	MR	MR	MR	MR	R	MR	R	MS	R	MR	R	-	-	-	-	R	R	R	S	MR	S	R
5.	CoP 14437	MS	MR	MS	MR	MR	R	MS	R	MR	R	R	R	-	-	-	-	S	S	R	R	R	S	R
6.	CoSe 14451	MR	MR	MR	MR	MR	R	MR	R	MR	R	MR	R	-	-	-	-	S	MR	R	S	MR	S	MS
7.	CoSe 14453	MR	MR	MR	MR	MR	R	MR	R	MR	R	MR	R	-	-	-	-	R	R	R	R	R	R	MS
8.	CoSe 14454	MR	MR	MS	MR	MR	R	MR	R	MS	S	MR	S	MR	MR	R	R	R	R	MR	R	S	R	MS
<b>AVT (Early)-I Plant</b>																								
1.	CoP 13437	MS	MR	MS	MR	S	R	S	S	-	-	-	-	MR	R	S	R	S	MS	-	R	-	R	R
2.	CoSe 13451	MR	MR	MR	MR	MS	R	MR	R	-	-	-	-	R	MR	R	R	R	R	-	S	-	S	R
3.	CoSe 13452	R	R	R	R	MR	R	MR	R	-	-	-	-	MR	MR	R	R	R	R	-	R	-	R	R
<b>AVT (Early)-II Plant</b>																								
1.	CoLk 12207	MR	MR	MR	MR	-	-	-	-	-	-	-	-	MR	MR	R	R	MR	-	-	R	-	R	-
2.	CoP 12436	MR	MR	S	MS	-	-	-	-	-	-	-	-	MR	MR	R	R	MR	-	-	R	-	S	-
3.	CoSe 12451	MR	MR	MR	MR	-	-	-	-	-	-	-	-	MR	MR	R	R	MR	-	-	S	-	R	-
4.	CoP 11436	-	-	-	-	-	-	-	-	-	-	-	-	MR	MR	R	R	-	-	-	-	-	-	-
5.	CoP 11437	-	-	-	-	-	-	-	-	-	-	-	-	MR	MR	R	R	-	-	-	-	-	-	-
6.	CoP 11438	-	-	-	-	-	-	-	-	-	-	-	-	MR	MR	R	S	-	-	-	-	-	-	-
<b>IVT (Mid late)</b>																								
1.	CoBln 14502	MR	MR	MR	MR	S	S	MR	R	S	S	S	S	MR	MR	R	R	R	R	MR	R	MS	R	R
2.	CoLk 14208	MR	MR	MR	MR	MR	R	MR	R	MS	R	MR	R	-	-	-	-	R	R	R	R	MS	S	R
3.	CoLk 14209	MR	MR	MR	MR	MR	R	MR	R	MR	R	MR	R	-	-	-	-	R	R	R	S	R	R	R
4.	CoLk 14210	R	R	R	R	MR	R	MR	R	MR	R	MR	R	-	-	-	-	R	R	R	S	MR	S	R
5.	CoP 14438	MR	R	MR	R	MS	R	MS	R	MR	R	R	R	-	-	-	-	R	R	R	R	MR	R	S
6.	CoP 14439	MR	MR	MR	MR	MR	R	MR	R	MR	R	MR	R	-	-	-	-	R	R	R	R	MR	R	R

S. No	Genotypes	Red rot																Smut		Wilt		YL		
		Motipur				Seorahi				Pusa				Buralikson				Motipur	Seorahi	Pusa	Motipur	Pusa	Motipur	Seorahi
		CF07		CF08		CF07		CF08		CF07		CF08		CF07		CF08								
		Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal							
7.	CoSe 14452	R	R	MR	R	MR	R	MR	R	MR	R	MR	R	-	-	-	-	R	R	R	R	MR	R	R
8.	CoSe14455	MR	MR	MR	MR	MR	R	MR	R	MS	R	MR	R	-	-	-	-	R	R	R	R	R	R	R
9.	CoSe 14456	MR	MR	MR	MR	MR	R	MR	R	MR	S	MS	R	-	-	-	-	R	R	MR	S	MR	R	R
<b>AVT (Mid late)-II Plant</b>																								
1.	CoLk 09204	MR	MR	MR	MR	-	-	-	-	-	-	-	-	MR	MR	R	R	R	-	-	R	-	R	-
2.	CoLk 12209	MR	MR	MR	MR	-	-	-	-	-	-	-	-	MR	MR	R	R	MR	-	-	R	-	S	-
3.	CoP 12438	MR	MR	MR	MR	-	-	-	-	-	-	-	-	MR	MR	R	R	MR	-	-	R	-	S	-
4.	CoSe 12453	R	R	MR	MR	-	-	-	-	-	-	-	-	MR	MR	S	S	MR	-	-	R	-	R	-
5.	CoSe 11453	-	-	-	-	-	-	-	-	-	-	-	-	R	MR	R	R	-	-	-	-	-	-	-
6.	CoSe 11454	-	-	-	-	-	-	-	-	-	-	-	-	MR	MR	R	R	-	-	-	-	-	-	-
7.	CoSe 11455	-	-	-	-	-	-	-	-	-	-	-	-	MR	MR	R	R	-	-	-	-	-	-	-
8.	CoP 11451	-	-	-	-	-	-	-	-	-	-	-	-	MR	MR	R	R	-	-	-	-	-	-	-
<b>Checks</b>																								
1.	CoSe 95422*	S	S	S	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.	BO130	MR	R	MR	R	-	-	-	-	-	-	-	-	MR	MR	R	R	-	-	-	-	-	-	-
3.	CoP 06436	MR	R	MR	R	MR	R	MR	R	MR	R	R	R	-	-	-	-	-	R	R	-	R	-	R
4.	BO 91	MR	R	MR	R	MR	R	MR	R	MR	R	MR	R	MR	MR	R	R	-	R	MR	-	MR	-	R
5.	CoJ 64*	HS	S	HS	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6.	Co 1158**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	S	HS	-	-	-	-	-
7.	CoLk 7701**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	HS	-	-	-	-	-	-
8.	CoP 9301	-	-	-	-	MR	R	MR	R	MR	R	MR	R	MR	MR	R	R	-	R	R	-	R	-	R
9.	CoLk 94184	-	-	-	-	MR	R	MR	R	MR	R	MR	R	-	-	-	-	-	R	R	-	MR	-	R
10.	CoSe 95422	-	-	-	-	S	R	S	S	MS	S	MS	S	R	MR	R	S	-	R	MR	-	S	-	R
11.	CoSe 01421	-	-	-	-	MR	R	MS	R	MR	R	MR	R	-	-	-	-	-	MS	MR	-	R	-	R
12.	BO 155	-	-	-	-	-	-	-	-	-	-	-	-	MR	MR	R	R	-	-	-	-	-	-	-
13.	CoBln 7501	-	-	-	-	-	-	-	-	-	-	-	-	R	R	R	R	-	-	-	-	-	-	-
14.	Akipura	-	-	-	-	-	-	-	-	-	-	-	-	MS	MS	S	S	-	-	-	-	-	-	-

**Table 60. Reaction of ZVT entries for red rot, smut and wilt (East Coast Zone)**

Sl.No.	Genotypes	Anakapalle									Cuddalore						
		Red rot						Smut	Wilt	YLD	Red rot				Smut	YLD	
		CF04		CF05		CF06					CF04		CF06				
		Plug	Nodal	Plug	Nodal	Plug	Nodal				Plug	Nodal	Plug	Nodal			
<b>IVT – Early</b>																	
1.	CoC 15336	R	R	R	R	R	R	HS	S	R	-	-	MR	R	MR	MR	
2.	CoC 15337	-	-	-	-	-	-	-	-	-	-	-	MR	R	MR	MR	
3.	CoC 15338	-	-	-	-	-	-	-	-	-	-	-	MR	R	MR	MS	
4.	CoV 15356	MR	R	MR	R	MR	R	HS	R	R	-	-	MR	R	S	MS	
<b>IVT- Midlate</b>																	
1.	CoC 15339	MR	R	MR	R	MR	R	HS	MR	MS	-	-	MR	R	MR	MS	
2.	CoC 15340	S	R	S	R	S	R	HS	S	S	-	-	MR	R	MR	MR	
3.	CoOr 15346	-	-	-	-	-	-	-	-	-	-	-	MR	R	-	MR	
4.	PI 15376	HS	R	HS	R	HS	R	HS	MR	R	-	-	MS	S	S	MR	
5.	PI 15377	S	R	S	R	S	R	HS	R	R	-	-	HS	S	S	MS	
<b>AVT – Early I Plant</b>																	
1.	Co 13023	MR	R	MR	R	MR	R	MR	MR	R	-	-	MR	R	MS	MR	
2.	CoA 14321	R	R	R	R	MR	R	MR	R	R	-	-	MR	R	MS	MS	
3.	CoC 14336	MS	R	MS	R	MS	R	HS	MS	R	-	-	MR	R	MS	MS	
<b>AVT – Early II Plant</b>																	
1.	CoA 13322	MR	R	MR	R	MR	R	MS	MR	S	-	-	MR	R	MS	MR	
2.	CoA 13323	MR	R	MR	R	MR	R	MS	MS	S	-	-	MS	R	S	MR	
3.	CoC 13336	MS	R	MS	R	MS	R	HS	S	R	-	-	MR	R	MS	MS	
4.	CoC 13337	S	R	S	R	S	R	MR	S	MS	-	-	MR	R	MR	MR	
5.	CoV 13356	MR	R	MR	R	MR	R	MR	S	R	-	-	MS	R	MR	MS	
<b>AVT- Midlate I Plant</b>																	
1.	Co 13028	R	R	R	R	R	R	MR	MR	R	-	-	MR	R	MR	MS	
2.	Co 13029	MR	R	MR	R	MR	R	S	MS	R	-	-	MR	R	MS	MR	
3.	Co 13031	MR	R	MR	R	MR	R	MR	R	R	-	-	MR	R	MR	R	
4.	CoA 14323	MR	R	MR	R	MR	R	MS	MR	R	-	-	MR	R	MS	MS	
5.	CoC 14337	MR	R	MR	R	MR	R	HS	MR	R	-	-	MR	R	MR	MS	
6.	PI 14337	MR	R	MR	R	MR	MR	MR	MR	R	-	-	MR	R	MS	MR	
<b>AVT- Midlate Plant II</b>																	

Sl.No.	Genotypes	Anakapalle									Cuddalore					
		Red rot						Smut	Wilt	YLD	Red rot				Smut	YLD
		CF04		CF05		CF06					CF04		CF06			
		Plug	Nodal	Plug	Nodal	Plug	Nodal				Plug	Nodal	Plug	Nodal		
1.	CoA 11326	MR	R	MR	R	MR	R	S	MS	R	-	-	MR	R	MS	MR
2.	CoA 12324	MR	R	MR	R	MR	R	S	R	R	-	-	MS	R	MR	MR
3.	CoC 13339	MR	R	R	R	R	R	HS	R	MR	-	-	MR	R	MR	MR
4.	CoOr 13346	MS	R	MS	R	MS	R	MS	R	R	-	-	MR	R	MS	MS
<b>Checks</b>																
1	Co 419	HS	S	HS	S	HS	S	HS	S	R	-	-	-	-	-	-
2	Co 997	HS	S	HS	S	HS	S	S	HS	MR	-	-	-	-	-	-
3	Co 6907	HS	S	S	S	HS	S	HS	S	MR	-	-	-	-	-	-
4	Co 7219	S	R	S	R	S	R	HS	S	R	-	-	-	-	-	-
5	Co 7706	HS	R	HS	R	HS	R	HS	MR	R	-	-	-	-	-	-
6	CoC 671	HS	S	HS	S	HS	S	HS	S	MR	-	-	HS	S	HS	HS
7	CoA 89085	S	S	S	S	S	S	HS	MR	R	-	-	-	-	-	-
8	CoA 92081	R	R	R	R	R	R	HS	MS	MS	-	-	-	-	-	-
9	CoC 01061	MR	R	MR	R	MR	R	S	R	MS	-	-	-	-	-	-
10	Co 86249	MR	R	MR	R	MR	R	MS	MR	S	-	-	R	R	HS	MS

Table 61. Reaction of ZVT entries for red rot, smut and YLD (Peninsular Zone)

Sl No.	Genotypes	Red rot										Smut							YLD		
		Coimbatore				Thiruvalla				Navsari		Coimbatore	Navsari	Kolhapur	Padegaon	Pune	Powerkheda	Sankeswar	Navsari	Sankeswar	Kolhapur
		CF06		CF12		CF06		CF12													
		Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal												
Initial Varietal Trial – Early																					
1	Co 13021	-	-	-	-	MR	R	MR	R	MS	R	MS	MR	R	R	-	-	MS	MR	R	MR
2	Co 13022	-	-	-	-	MR	R	MS	R	HS	R	HS	MS	R	R	-	-	MS	MR	R	R
3	Co 14002	-	-	-	-	MS	R	MR	R	MS	R	MR	S	MS	HS	-	-	S	R	R	R
4	Co 14003	-	-	-	-	MR	R	MR	R	HS	R	R	R	R	MR	-	-	R	R	R	MR
5	Co 14004	-	-	-	-	MR	R	MR	R	MR	R	S	R	MR	MR	-	-	S	R	R	R
6	Co 14006	-	-	-	-	MR	R	MR	R	MR	R	R	MR	R	R	-	-	S	R	R	R
7	Co 14008	-	-	-	-	MR	R	MR	R	MS	R	MS	MR	MR	R	-	-	MR	R	R	R
8	Co 14009	-	-	-	-	MR	R	MS	R	MR	R	R	R	R	R	-	-	MS	R	R	R
9	Co 14012	-	-	-	-	MR	R	MR	R	MR	R	HS	HS	MR	R	-	-	S	R	R	MR
10	Co 14016	-	-	-	-	MR	R	MS	R	MR	R	HS	HS	MR	R	-	-	R	MR	R	R
11	Co 14022	-	-	-	-	MS	R	MS	R	HS	R	MR	MR	MS	S	-	-	R	R	R	R
12	Co 14023	-	-	-	-	MR	R	MS	R	HS	S	S	S	MS	MS	-	-	MS	MR	MR	R
13	Co 14025	-	-	-	-	MS	R	MS	R	HS	R	MR	R	MS	MS	-	-	MR	R	R	<b>R</b>
14	Co 14026	-	-	-	-	MR	R	MR	R	MR	R	MR	MS	MR	R	-	-	R	R	R	R
15	Co 14027	-	-	-	-	MR	R	MR	R	MS	R	MS	HS	MR	R	-	-	R	S	R	R
16	Co 14030	-	-	-	-	MR	R	MS	R	S	R	MR	MS	MR	MR	-	-	S	MR	S	<b>R</b>
17	Co 14031	-	-	-	-	MR	R	MS	R	HS	R	S	HS	HS	MS	-	-	R	S	R	<b>R</b>
18	Co 14032	-	-	-	-	MR	R	MR	R	MR	R	R	R	HS	S	-	-	R	R	R	R
19	CoN 14071	-	-	-	-	MR	R	MR	R	MR	R	R	R	R	R	-	-	R	R	R	R
20	CoN 14072	-	-	-	-	MS	R	MR	R	MR	R	MR	R	R	R	-	-	R	R	R	R
21	CoN 14073	-	-	-	-	MR	R	MR	R	MR	R	MR	R	MR	R	-	-	R	R	R	R
22	CoN 14074	-	-	-	-	MR	R	MR	R	MR	R	MS	R	R	R	-	-	R	R	R	R
23	CoSnk 14101	-	-	-	-	MS	R	MS	R	HS	S	HS	R	R	R	-	-	R	R	R	MR

Sl No.	Genotypes	Red rot										Smut							YLD		
		Coimbatore				Thiruvalla				Navsari		Coimbatore	Navsari	Kolhapur	Padegaon	Pune	Powerkheda	Sankeswar	Navsari	Sankeswar	Kolhapur
		CF06		CF12		CF06		CF12		Plug	Nodal										
		Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal												
24	CoSnk 14102	-	-	-	-	MR	R	MR	R	MR	R	MR	MS	R	R	-	-	MS	R	R	R
25	CoSnk 14103	-	-	-	-	MR	R	MS	R	MR	R	MR	MR	R	R	-	-	R	S	R	MS
26	CoT 14366	-	-	-	-	MR	R	MS	R	S	R	S	HS	S	R	-	-	R	MR	R	R
27	CoT 14367	-	-	-	-	MR	R	MR	R	MS	R	R	R	R	S	-	-	MS	R	R	R
28	CoTl 14111	-	-	-	-	MR	R	MR	R	MR	R	HS	HS	MR	R	-	-	HS	R	R	R
29	CoTl 14112	-	-	-	-	S	S	MS	S	HS	R	MS	HS	MR	MR	-	-	R	R	R	R
30	MS 14081	-	-	-	-	MR	R	MS	R	MS	R	HS	MR	MR	MR	-	-	R	MR	R	R
31	MS 14082	-	-	-	-	MR	R	MR	R	MR	R	R	R	R	R	-	-	MS	MR	R	R
32	CoVc 14061	-	-	-	-	S	S	S	S	HS	R	HS	S	R	MR	-	-	R	R	R	R
33	CoVc 14062	-	-	-	-	MR	R	MS	R	MR	R	S	MR	S	R	-	-	MS	R	R	R
34	PI 14131	-	-	-	-	MS	S	S	S	MS	R	S	HS	MR	R	-	-	MR	R	R	R
35	PI 14132	-	-	-	-	MS	S	S	S	HS	R	MS	HS	MR	R	-	-	R	R	R	R
36	VSI 14121	-	-	-	-	HS	S	HS	S	HS	R	MR	MR	R	R	-	-	R	R	R	R
37	VSI 14122	-	-	-	-	MS	R	MR	R	HS	S	HS	R	MR	R	-	-	MS	R	R	R
38	Co 13002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	MS	-	-	-	-	-
39	Co 13003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	MS	-	-	-	-	-
40	Co 13004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	MS	-	-	-	-	-
41	Co 13072	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-
42	CoN 13071	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-
43	CoSnk 13101	-	-	-	-	-	-	-	-	-	-	-	-	-	-	MR	-	-	-	-	-
44	CoSnk 13102	-	-	-	-	-	-	-	-	-	-	-	-	-	-	MS	-	-	-	-	-
45	MS 13081	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-
<b>AVT – Early I Plant</b>																					
1	Co 12007	-	-	-	-	MS	R	MS	R	HS	R	-	HS	MR	R	-	-	S	R	R	MR
2	Co 12008	-	-	-	-	MR	R	MS	R	MS	R	-	HS	MS	MS	-	-	R	S	R	MR

Sl No.	Genotypes	Red rot										Smut						YLD			
		Coimbatore				Thiruvalla				Navsari											
		CF06		CF12		CF06		CF12		Plug	Nodal	Coimbatore	Navsari	Kolhapur	Padegaon	Pune	Powerkheda	Sankeswar	Navsari	Sankeswar	Kolhapur
		Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal												
3	Co 12009	-	-	-	-	MS	S	MS	S	MR	R	-	HS	MS	MR	-	-	MS	R	R	R
4	Co 12012	-	-	-	-	MS	R	MS	R	S	R	-	S	MR	MR	-	-	R	R	R	R
5	Co 12019	-	-	-	-	MR	R	MS	R	MR	R	-	R	MR	MR	-	-	R	MR	R	R
6	Co 12024	-	-	-	-	S	S	S	S	MR	R	-	MR	R	-	-	-	R	R	R	S
7	CoM 12085	-	-	-	-	S	S	S	S	HS	R	-	MR	MR	R	-	-	R	MR	R	R
8	VSI 12121	-	-	-	-	MS	S	S	S	MS	R	-	MS	MR	R	-	-	HS	R	R	R
<b>AVT – Early II Plant</b>																					
1	Co 11001	-	-	-	-	MS	R	MS	R	MR	R	-	R	MR	MR	MS	-	-	R	R	MR
2	Co 11004	-	-	-	-	MR	R	MR	R	MR	R	-	HS	MR	MS	MS	-	-	R	R	MR
3	CoM 11081	-	-	-	-	MS	R	MS	R	MR	R	-	MS	MR	R	MS	-	-	R	R	MR
4	CoM 11082	-	-	-	-	MS	R	MS	R	MR	R	-	S	R	MS	R	-	-	R	R	R
5	CoM 11084	-	-	-	-	MR	R	MS	R	MR	R	-	R	MR	MR	MS	-	-	R	R	R
6	Co 10004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-
7	Co 10005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-
8	Co 10006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-
9	Co 10024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-
10	Co 10026	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-
11	Co 10027	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-
12	CoT 10366	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-
13	CoT 10367	-	-	-	-	-	-	-	-	-	-	-	-	-	-	MS	-	-	-	-	-
<b>AVT – Midlate II Plant</b>																					
1	Co 11005	-	-	-	-	MS	R	MS	R	MS	R	-	R	MR	R	R	-	HS	R	R	MS
2	Co 11007	-	-	-	-	MR	R	MR	R	MR	R	-	MS	MR	MR	MS	-	R	R	R	MR
3	Co 11012	-	-	-	-	MR	R	MS	R	MR	R	-	S	R	R	MS	-	R	R	R	MR
4	Co 11019	-	-	-	-	MS	R	MS	R	HS	R	-	R	R	R	MS	-	S	R	R	R

Sl No.	Genotypes	Red rot										Smut							YLD		
		Coimbatore				Thiruvalla				Navsari		Coimbatore	Navsari	Kolhapur	Padegaon	Pune	Powerkheda	Sankeswar	Navsari	Sankeswar	Kolhapur
		CF06		CF12		CF06		CF12		Plug	Nodal										
		Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal												
5	CoM 11085	-	-	-	-	MS	S	MS	S	HS	R	-	R	MR	MR	R	-	R	R	R	R
6	CoM 11086	-	-	-	-	MR	R	MR	R	MS	R	-	R	R	R	R	-	R	R	R	R
7	Co 09009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-
8	Co 10015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-
9	Co 10017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	MR	-	-	-	-	-
10	Co 10031	-	-	-	-	-	-	-	-	-	-	-	-	-	-	S	-	-	-	-	-
11	Co 10033	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-
12	CoM 10083	-	-	-	-	-	-	-	-	-	-	-	-	-	-	MS	-	-	-	-	-
13	CoT 10368	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-
14	CoT 10369	-	-	-	-	-	-	-	-	-	-	-	-	-	-	MS	-	-	-	-	-
15	CoVc 10061	-	-	-	-	-	-	-	-	-	-	-	-	-	-	HS	-	-	-	-	-
16	PI 10131	-	-	-	-	-	-	-	-	-	-	-	-	-	-	MS	-	-	-	-	-
17	PI 10132	-	-	-	-	-	-	-	-	-	-	-	-	-	-	S	-	-	-	-	-
<b>Checks</b>																					
1	Co 86032	-	-	-	-	MS	S	S	S	HS	R	-	MR	MR	R	-	-	R	S	R	S
2	CoC 671	-	-	-	-	HS	S	HS	S	HS	S	-	MR	MR	R	-	-	R	R	R	R
3	CoSnk 05103	-	-	-	-	MR	R	MR	R	MR	R	-	MR	-	R	-	-	R	R	R	MR
4	Co 85004	-	-	-	-	MR	R	MR	R	S	R	-	HS	R	R	-	-	R	MS	R	-
5	Co 94008	-	-	-	-	MR	R	MR	R	MR	R	-	-	R	R	-	-	R	R	R	MR
6	Co 99004	-	-	-	-	MR	R	MR	R	MR	R	-	MS	MS	R	-	-	HS	MR	R	MR
7	Co 97009	-	-	-	-	-	-	-	-	-	-	HS	HS	-	-	-	-	-	-	-	-
8	Co 86002	-	-	-	-	-	-	-	-	-	-	-	HS	-	-	-	-	-	-	-	-
9	Co 6806	-	-	-	-	-	-	-	-	-	-	R	MR	-	-	-	-	-	-	-	-
10	Co 96007	-	-	-	-	-	-	-	-	-	-	HS	-	-	-	-	-	-	-	-	-
11	Co 419	-	-	-	-	-	-	-	-	-	-	-	-	HS	-	-	-	-	-	-	-
12	Co 740	-	-	-	-	-	-	-	-	-	-	-	-	HS	R	MS	-	S	-	R	-



Sl No.	Genotypes	Red rot										Smut							YLD			
		Coimbatore				Thiruvalla				Navsari		Coimbatore	Navsari	Kolhapur	Padegaon	Pune	Powerkheda	Sankeswar	Navsari	Sankeswar	Kolhapur	
		CF06		CF12		CF06		CF12		Plug	Nodal											
		Plug	Nodal	Plug	Nodal	Plug	Nodal	Plug	Nodal													
13	Co 7527	-	-	-	-	-	-	-	-	-	-	-	-	S	R	-	-	-	-	-	-	-
14	CoM 0265	-	-	-	-	-	-	-	-	-	-	-	-	R	R	-	-	-	-	-	-	-
15	MS 10001	-	-	-	-	-	-	-	-	-	-	-	-	R	R	-	-	-	-	-	-	-
16	CoM 09057	-	-	-	-	-	-	-	-	-	-	-	-	R	-	-	-	-	-	-	-	-
17	Co 7219	-	-	-	-	-	-	-	-	-	-	-	-	-	MR	MS	-	-	-	-	-	-