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**ALL INDIA CO-ORDINATED RESEARCH PROJECT  
ON SUGARCANE, KOLHAPUR.**

**ANNUAL REPORT  
2013- 2014**

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**PLANT PATHOLOGY**

**REGIONAL SUGARCANE AND JAGGERY RESEARCH STATION,**

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**( MAHARASHTRA)**

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(i)

## **Weather Condition during Crop Period (February, 2012 to February, 2014)**

The Regional Sugarcane and Jaggery Research Station, Kolhapur is geographically situated at an elevation of 574 meter above the sea level on 16°.43' North latitude and 74°.13' East longitude. It comes under the Sub-Montane Zone of Maharashtra. The weather parameters during the seasonal crop growth period from December, 2012 to February, 2014 are presented in Table 1 and 2.

The planting of seasonal sugarcane was completed in second fortnight of December 2012 to January 2013. During germination phase of sugarcane the maximum and minimum temperature were 31.14°C and 14.97°C, respectively with average morning humidity of 80.83%. This was favorable condition for good germination. The tillering phase was completed in the month of February 2013 to April 2013. The average maximum temperature 35.82°C and average minimum 18.33 °C with average morning humidity 75.78 % which was solicited for tillering phase.

There was even distribution of rains during the monsoon season. During early growth and grand growth of crop the total rainfall received was 322 and 626 mm respectively. There was flood situation w.e.f. 23.7.13 to 4.8.13 (for 12 days) during grand growth stage. The water level rose to 6' due to flood in plots near river bank.

The maturity phase of crop was started from 45 MW to 48 MW of 2013. The average maximum temperature 30.56<sup>0</sup> C and minimum temperature 17.8<sup>0</sup> C with 82.8 % humidity were observed.

The incidence of early shoot borer was observed in late planted crop (after 15<sup>th</sup> February ) and late ratoon, hence, required to undertake plant protection measures for control of early shoot borer during tillering phase of sugarcane. In grand growth period, the incidence of White Wooly Aphid was noticed more in some part of submontane zone (Chandgad, Gadhinglaj and Ajara), whereas, lower incidence of white fly was noticed as compared to previous years. The incidence of white grub (*Leucopholis* and *Holotricha spp.*) is increasing day by day in the region.

Rust and Ring spot, these fungal diseases have been occurred every year with high intensity during monsoon period. Besides this, the outbreak of brown spot with high intensity in the region since last three years is a threat to sugarcane crop particularly CoM 0265 variety. Another viral disease yellow leaf is increased from grand growth period on Co 86032. Therefore it is necessary to procure and multiply pure seed material by following thermotherapy method.

The total rainfall of 1038.8 mm in 76 rainy days was received during entire crop period.

**Table 1. Week wise weather data recorded at Zonal Agricultural Research Station, Shenda Park farm, Kolhapur for the year 2012-13-14.**

M W	Period	Rain mm.	RD	Mean Temp °C		Wind Speed kmph	BSS Hrs	Relative Humidity		Evap. mm.
				Max.	Min.			M	E	
	<b>December 12</b>									
49	03/12 – 09/12	00.0	0	31.1	16.3	Faulty	08.0	84	42	07.8
50	10/12 – 16/12	00.0	0	30.7	16.5	Faulty	08.2	79	44	06.4
51	17/12 – 23/11	00.0	0	29.3	13.8	Faulty	07.7	78	35	04.2
52	24/12 – 31/12	00.0	0	30.9	14.0	Faulty	07.6	72	28	04.0
	<b>January 13</b>									
01.	01/01-07/01	00.0	0	31.6	15.9	NA	6.5	88	41	4.5
02.	08/01-14/01	00.0	0	31.0	14.5	NA	7.2	79	31	4.2
03.	15/01-21/01	00.0	0	32.0	13.7	NA	8.5	84	29	4.3
04.	22/01-28/01	00.0	0	32.4	14.5	NA	7.2	86	29	4.1
05.	29/01-04/02	00.0	0	31.9	15.3	NA	7.3	80	32	4.2
	<b>February 13</b>									
06.	05/02-11/02	00.0	0	32.5	15.2	1.4	7.7	88	34	4.2
07.	12/02-18/02	00.8	0	32.1	17.4	2.3	8.0	78	34	3.9
08.	19/02-25/02	00.0	0	33.7	15.8	1.4	9.3	78	27	4.2
09.	26/02-04/03	00.0	0	34.3	17.6	2.7	9.1	69	24	5.6
	<b>March, 13</b>									
10.	05/03 – 11/03	00.0	0	35.8	19.4	2.8	8.5	67	27	6.1
11.	12/03 – 18/03	00.6	0	35.7	18.7	2.1	7.3	79	31	5.5
12.	19/03 – 25/03	00.0	0	35.7	18.1	1.9	7.8	63	24	6.2
13.	26/03 – 01/04	00.0	0	37.1	19.0	2.2	8.3	73	28	6.3
	<b>April, 13</b>									
14.	02/04 – 08/04	00.0	0	38.6	18.6	2.2	9.3	66	22	6.3
15.	09/04 – 15/04	00.0	0	39.2	20.8	2.3	8.3	65	26	7.6
16.	16/04 – 22/04	00.0	0	35.6	17.5	2.7	9.5	83	31	7.0
17.	23/04 – 29/04	00.0	0	38.4	20.6	3.0	8.8	84	31	6.8
18.	30/04 – 06/05	02.6	0	39.4	20.9	2.8	8.9	80	29	6.4
	<b>May, 13</b>									
19.	07/05 – 13/05	02.0	0	38.9	21.4	3.1	8.1	83	31	7.5
20.	14/05 – 20/05	00.0	0	37.2	22.2	3.1	6.2	83	42	6.4
21.	21/05 – 27/05	06.8	1	34.6	21.6	4.1	7.8	85	44	5.5
22.	28/05 – 03/06	34.8	2	34.6	21.6	3.2	6.7	83	55	4.7
	<b>June 13</b>									
23.	04/06 – 10/06	78.0	4	30.2	21.7	1.8	3.9	96	71	1.4
24.	11/06 – 17/06	78.6	5	27.8	21.4	3.0	0.7	95	88	0.8
25.	18/06 – 24/06	49.5	6	28.2	21.2	1.8	2.0	98	85	0.7
26.	25/06 – 01/07	72.3	5	27.2	21.5	2.3	2.6	97	85	0.7

M W	Period	Rain mm.	RD	Mean Temp °C		Wind Speed kmph	BSS Hrs	RH		Evap. mm.
				Max.	Min.			M	E	
	<b>July 2013</b>									
27.	02/07 – 08/07	44.3	5	26.9	21.4	1.8	0.0	96	84	1.8
28.	09/07 - 15/07	81.9	5	25.9	20.9	1.3	0.2	98	93	1.6
29.	16/07 – 22/07	146.2	6	24.7	20.7	1.9	0.0	99	96	2.3
30.	23/07 – 29/07	110.2	7	24.8	20.7	3.6	0.7	96	90	2.0
31.	30/07 – 05/08	73.4	7	25.9	20.8	3.7	0.7	99	88	1.4
	<b>August 2013</b>									
32.	06/08 – 12/08	12.9	2	27.4	21.2	1.6	2.5	98	85	1.9
33.	13/08 – 19/08	30.5	3	26.5	21.2	1.3	1.5	98	84	2.1
34.	20/08 – 26/08	24.8	3	28.4	20.7	1.8	3.4	96	74	2.9
35.	27/08 – 02/09	5.8	1	29.7	20.5	0.8	5.4	98	71	3.6
	<b>Sept 2013</b>									
36.	03/09 - 09/09	08.4	1	30.6	20.5	0.5	4.3	97	67	3.3
37.	10/09 - 16/09	50.6	4	29.7	21.2	0.3	3.6	98	74	3.3
38.	17/09 - 23/09	24.7	2	28.1	20.9	1.0	2.2	98	85	2.3
39.	24/09- 30/09	12.3	1	29.2	20.6	1.1	4.7	99	73	4.0
	<b>Oct 2013</b>									
40.	01/10 - 07/10	02.9	0	29.6	21.1	0.9	4.4	98	67	2.6
41.	08/10 – 14/10	00.0	0	30.9	20.5	0.7	7.2	98	65	3.8
42.	15/10 – 21/10	09.6	1	33.3	20.4	0.7	6.3	87	54	4.3
43.	22/10 – 28/10	53.3	3	31.3	21.2	0.9	4.4	91	50	3.5
	<b>Nov 2013</b>									
44.	29/10 – 04/11	00.0	0	30.9	19.6	0.7	7.5	90	56	5.2
45.	05/11 – 11/11	00.0	0	30.8	18.6	1.2	7.6	88	57	3.5
46.	12/11 – 18/11	00.0	0	29.9	15.8	1.7	8.0	70	45	3.5
47.	19/11 – 25/11	00.0	0	31.2	17.1	1.0	8.0	82	42	4.7
48.	26/11 – 2/12	15.8	1	30.0	17.9	0.8	5.5	84	63	3.2
	<b>Dec 2013</b>									
49.	3/12 – 9/12	00.0	0	29.8	15.7	1.5	8.3	87	34	3.6
50.	10/12 – 16/12	00.0	0	30.4	13.6	1.1	6.6	73	31	4.0
51.	17/12- 23/12	00.0	0	29.7	12.2	0.3	8.3	82	34	3.1
52.	24/12-31/12	00.0	0	29.4	13.7	0.7	7.6	89	49	4.0
	<b>January 14</b>									
01.	01/01-07/01	00.0	0	29.9	13.8	0.7	6.6	88	43	5.0
02.	08/01-14/01	00.0	0	31.6	14.4	0.0	7.4	91	32	3.5
03.	15/01-21/01	00.0	0	31.2	15.5	0.2	7.7	91	38	3.4
04.	22/01-28/01	00.0	0	29.7	16.7	1.1	3.8	80	40	3.5
05.	29/01-04/02	00.0	0	30.4	14.2	0.4	6.2	73	36	3.3
	<b>February 14</b>									
06.	05/02-11/02	00.0	0	33.4	15.2	0.0	8.4	80	25	4.4
07.	12/02-18/02	00.0	0	30.3	14.4	0.3	9.3	84	38	5.1
08.	19/02-25/02	00.0	0	32.5	17.2	0.5	6.9	85	39	4.2
09.	26/02-04/03	05.2	1	32.1	16.6	0.4	6.8	87	48	3.8

**Table 2: Weather conditions during the year December, 2012 to February, 14**

Growth Stages	Month	Met. Week	Temperature (°C)		Wind Speed (kmph)	BSS (hrs)	Humidity (%)		Rainfall (mm)	Rainy Days (Nos.)
			Maxi.	Mini.			Mor.	Even.		
<b>Germination</b>	Dec.,12	49-52	30.5	15.15	-	7.875	78.25	37.25	0	0
	Jan. 13	1-5	31.78	14.78	-	7.34	83.4	32.4	0	0
	<b>Average</b>	<b>--</b>	<b>31.14</b>	<b>14.97</b>	<b>-</b>	<b>7.61</b>	<b>80.83</b>	<b>34.83</b>	<b>0*</b>	<b>0*</b>
<b>Tillering</b>	Feb. 13	6-9	33.15	16.5	1.95	8.525	78.25	29.75	0.8	0
	Mar.13	10-13	36.075	18.8	2.25	7.975	70.5	27.5	0.6	0
	April13	14-18	38.24	19.68	2.6	8.96	75.6	27.8	2.6	0
	<b>Average</b>	<b>--</b>	<b>35.82</b>	<b>18.33</b>	<b>2.3</b>	<b>8.49</b>	<b>75.78</b>	<b>28.35</b>	<b>4.0*</b>	<b>0*</b>
<b>Early Growth</b>	May.13	19-22	36.325	21.7	3.375	7.2	83.5	43	43.6	3
	June,13	23-26	28.35	21.45	2.225	2.3	96.5	82.25	278.4	20
	<b>Average</b>	<b>--</b>	<b>32.34</b>	<b>21.58</b>	<b>2.8</b>	<b>4.75</b>	<b>90</b>	<b>62.63</b>	<b>322*</b>	<b>23*</b>
<b>Grand Growth</b>	July 13	27-31	25.64	20.9	2.46	0.32	97.6	90.2	456	30
	Aug.13	32-35	28	20.9	1.375	3.2	97.5	78.5	74	9
	Sept. 13	36-39	29.4	20.8	0.725	3.7	98	74.75	96	8
	<b>Average</b>	<b>--</b>	<b>27.68</b>	<b>20.87</b>	<b>1.52</b>	<b>2.41</b>	<b>97.7</b>	<b>81.15</b>	<b>626*</b>	<b>47*</b>
<b>Flowering &amp; maturity</b>	Oct. 13	40-44	31.275	20.8	0.8	5.575	93.5	59	65.8	4
	Nov. 13	45-48	30.56	17.8	1.08	7.32	82.8	52.6	15.8	1
	Dec. 13	49-52	29.825	13.8	0.9	7.7	82.75	37	0.0	0
	Jan. 14	1-5	30.56	14.92	0.48	6.34	84.6	37.8	0.0	0
	Feb. 14	6-9	32.075	15.85	0.3	7.85	84.0	37.5	5.2	1
	<b>Average</b>	<b>--</b>	<b>30.86</b>	<b>16.63</b>	<b>0.71</b>	<b>6.96</b>	<b>85.53</b>	<b>44.78</b>	<b>86.8*</b>	<b>6*</b>
<b>Total rainfall (mm) upto Feb.,14</b>									<b>1038.8</b>	<b>76*</b>

## SUGARCANE PATHOLOGY

### PART – I: ON GOING RESEARCH PROGRAMME.

#### 1) Title: Evaluation of pre-zonal/zonal varieties/I.V.T./genotypes for resistance to smut.

- |    |                             |   |  |
|----|-----------------------------|---|--|
| 1. | Title of the project        | : | Plant Protection.  |
| 2. | Name of the Scientists      | : | Prof. D.M. Veer.<br>Miss.K.B.Patil.<br>Shri.N.B.Ghodake  |
| 3. | Name of experiment          | : | Evaluation of pre-zonal/zonal varieties/I.V.T./genotypes for resistance to smut.   |
| 4. | Object                      | : | To gather information on relative resistance to smut of the entries included under crop improvement programme.   |
| 5. | Location                    | : | Regional Sugarcane and Jaggery Research Station, Kolhapur.   |
| 6. | Experimental Details        | : |  |
|    | i) Year of start            | : | 1994-95- long term experiment  |
|    | ii) Genotypes and varieties | : | Total genotypes- 62<br>Check varieties - 8   |
|    | iii) Inoculum               | : | <i>Ustilago scitaminea</i> teliospores collected from commercially cultivated susceptible varieties Co 740 and Co 7527 for artificial inoculation.                                   |
|    | iv) Inoculation             | : | The method of inoculation consists of deeping of setts for 30 minutes in spore suspension of over 90% viability and with spore load of one million spores per milliliter ( $10^6$ ). |
|    | v) Plot size and planting   | : | Plot size-3 meter row length (3x1m), Planting - Two eye budded 15 setts of each variety were planted after inoculation.  |
|    | vi) Observations            | : | Number of smut infected clumps of each genotype was recorded periodically.   |
|    | vii) Evaluation             | : | Evaluation is based on percentage clumps infected. The following grading criteria was used.  |
|    |                             | : |  |
|    | 0.0 per cent                | : | Resistant ( R )  |
|    | 0.1 - 10 per cent           | : | Moderately resistant (MR)  |
|    | 10.1- 20 percent            | : | Moderately susceptible (MS)  |
|    | 20.1- 30 per cent           | : | Susceptible (S)  |
|    | Above 30 per cent           | : | Highly susceptible (HS)  |

**Table 1: Incidence of smut on sugarcane genotypes / varieties**

<b>Sr. No</b>	<b>Name of genotype</b>	<b>Smut incidence (%)</b>	<b>Reaction</b>
<b>(I) IVT Early</b>			
1	Co 10004	0.0	R
2	Co 10005	2.73	MR
3	Co 10006	13.33	MS
4	Co 10024	10.83	MS
5	Co 10026	0.0	R
6	Co 10027	3.53	MR
7	CoM 10081	7.03	MR
8	CoM 10082	0.0	R
9	CoN 10071	11.33	MS
10	CoN 10072	6.13	MR
11	CoT 10366	0.0	R
12	CoT 10367	3.53	MR
<b>(II) AVT Early II Plant</b>			
1	Co 08001	3.87	MR
2	CoVSI 08121	0.0	R
<b>(III) IVT Midlate</b>			
1	Co 10015	23.03	S
2	Co 10017	13.43	MS
3	Co 10031	7.13	MR
4	Co 10033	5.83	MR
5	CoM 10083	0.0	R
6	CoM 10084	0.0	R
7	CoN 10073	24.03	S
8	CoT 10368	0.0	R
9	CoT 10369	5.23	MR
10	CoVC 10061	26.13	S
11	CoVSI 10121	21.63	S
12	CoVSI 10122	26.53	S
13	PI 10131	14.03	MS
14	PI 10132	0.0	R
<b>(IV) AVT Midlate II Plant</b>			
1	Co 08008	0.0	R
2	Co 08009	0.0	R
3	Co 08016	3.63	MR
4	CoSnk 08101	0.0	R
<b>(V) Checks</b>			
1	Co 85004	13.53	MS
2	Co 94008	10.83	MS
3	CoC 671	14.33	MS

4	Co 99004	0.0	R
5	Co 86032	11.03	MS
6	CoM 0265	0.0	R
7	Co 7527	23.53	S
8	Co 740	29.03	S
<b>Other genotypes</b>			
1	Co 05002	0.0	R
2	Co 99010	2.03	MR
3	CoM 10089	7.43	MR
4	Co 08007	1.83	MR
5	Co 09010	0.0	R
6	Co 09007	1.63	MR
7	CoSnk 05102	2.03	MR
8	Co 09014	0.0	R
9	Co 09009	1.13	MR
10	Co 09013	3.43	MR
11	Co 2040	0.0	R
12	Co 09012	3.83	MR
13	CoVSI 09121	5.03	MR
14	CoN 09071	1.73	MR
15	CoN 09072	3.03	MR
16	CoN 09073	0.0	R
17	CoN 09074	1.93	MR
18	Co 09005	0.0	R
19	Co 09006	0.0	R
20	Co 09002	2.53	MR
21	Co 09003	0.0	R
22	Co 09004	5.13	MR

### Results:

- 1) **IVT Early:** Out of 12 genotypes, 4 genotype *viz.* Co 10004, Co 10026, CoM 10082, CoT 10366 shown resistant reaction to smut.
- 2) **AVT Early (II Plant):** The genotype CoVSI 08121 shown resistant reaction, while Co 08001 shown moderately resistant reaction to smut disease.
- 3) **IVT Midlate:** Four genotypes out of 14 genotypes *viz.* CoM 10083, CoM 10084, CoT 10368, PI 10132 resistant reaction to smut disease. Whereas, CoN 10073, CoVC 10061, CoVSI 10121, CoVSI 10122 shown susceptible reaction to smut.
- 4) **AVT Midlate II plant:** The genotypes Co 08008, Co 08009, CoSnk 08101 shown resistant reaction to smut whereas, Co 08016 shown moderately resistant reaction to smut.
- 5) **Checks:**

**Early:** Co 85004, Co 94008 and CoC 671 shown moderately susceptible reaction to smut.

**Midlate:** Co 99004, and CoM 0265 shown resistant reaction whereas Co 86032 shown moderately susceptible reaction. Co 740 and Co 7527 were susceptible to smut.

**2) Title: Survey of sugarcane diseases naturally occurring in the area on important sugarcane varieties.**

1. Title of the project : Plant Protection.
2. Name of the Scientists : Prof. D.M. Veer.  
Miss. K. B. Patil.  
Shri.N.B.Ghodake
3. Name of experiment : Survey of sugarcane diseases naturally occurring in the area on important sugarcane varieties.
4. Object : To gather information of diseases of sugarcane varieties grown on commercially basis.

5. **Preamble** :

Most of the cultivators are bringing the infected seed material of recommended or not recommended sugarcane varieties/genotypes in the region from adjoining states *viz.* Karnataka and Gujarat. Hence, there are chances to develop new flora of insects pest and diseases in the region and sometime it is too difficult to control their spread up in the region. It is therefore, essential to undertake the survey of sugarcane diseases. The information on occurrence and their intensity on different sugarcane varieties/genotypes to be required for preparation of disease status at national level. Therefore, the survey work was undertaken in the region and recorded the natural occurrence of diseases on commercially grown sugarcane varieties.

6. **Results** :

In Kolhapur region, the recommended sugarcane varieties belonging to early group i.e., CoC 671, Co 92005 and Co 8014 are almost under *suru* cultivation. Whereas, midlate group sugarcane varieties Co 86032 and CoM 0265 under preseasonal and Adsali season. However the area of sugarcane varieties Co 86032 and CoM 0265 are more as compare to other sugarcane varieties respectively. Co 92005 is cultivated in Submontane zone and it is suitable variety for paddy base sugarcane system. This variety introduced in some part of Konkan (Vaibhawadi Tahsil). At present, this variety is playing vital role in achieving high recovery of some sugar factories located in Submontane zone.

The survey of sugarcane diseases was carried out before onset of south-west monsoon and after over monsoon in the region. Among the cultivated sugarcane varieties, none of the variety is not found disease free. The incidence of seed borne disease *viz.*, Grassy shoot disease is increased due to use of non healthy seed material. It is, noticed that the smut disease is not much observed in

the zone except Co 7527 (Maximum 5%). The sugarcane genotype CoM 0261 which is not recommended but some farmers have planted this genotype in the zone.

Among the foliar diseases, rust and ring spot, fungal diseases are predominant in the region because of weather condition. The intensity of these diseases were noticed in the range of 25-80 % (Rust) and 10-25 % (Ring Spot). The Pokkah boeng disease was noticed in all sugarcane varieties after receiving Pre-monsoon shower in May. But, it is, disappeared after starting of South West Monsoon.

The brown spot disease has been noticed since last 3 years on CoM 0265 sugarcane variety with high intensity upto 60%. This is foliar disease which is caused by *Cercospora longipes*. It sprayed through air in Monsoon season when there is drizzling rains with more R.H.( $> 80\%$ ). The another detrimental disease is Yellow Leaf Disease which is caused by virus. The sugarcane variety Co 86032 is highly suscetible to YLD. The intensity of YLD is more on Co 86032 after attaining the age of eight to twelve months. Another viral disease mosaic was noticed in all Sugarcane varieties. Hence, the following plant protection measures were suggested for control of fungal, phytoplasmal and viral diseases.

1. To use disease free material.
2. To follow thermotherapy for control of seed borne diseases.
3. To undertake seed production by adopting three tier system.
4. To plant disease resistance varieties.
5. Seed treatment with Carbendanzim (0.1 %).
6. Field sanitation.
7. To apply proper dose of Nitrogen.
8. Drain out excess water.
9. To follow Quarantine Law within the States regarding transportation of seed material.
10. To bring awareness among the farmers for control of diseases.
11. To develop disease resistance varieties through Genetic Engineering Technology.

**Table-2: The survey of sugarcane diseases.**

Sr. No.	Name of Tahsil	Name of Variety	Smut (%)	GSD (%)	Brown spot (%)	Rust (%)	Ring Spot (%)	Eye Spot (%)	Pokkah boeng (%)	Yellow Leaf Disease (%)
1	Tal. Kagal Dist. Kolhapur	Co 86032	-	3	-	-	-	-	-	5
		CoM 0265	-	4	40	-	-	-	2	-
		Co 92005	-	2	-	-	10	-	2	-
		CoC 671	-	3	-	40	10	-	3	-
		Co 7527	-	2	-	60	10	-	2	-
2	Tal. Gadhingla j Dist. Kolhapur	Co 86032	-	3	-	-	10	-	-	5
		CoM 0265	-	2	50	-	-	-	-	-
		Co 92005	-	2	-	40	10	-	2	-
		CoC 671	-	2	-	60	10	-	2	-
3	Tal. Chandgad Dist. Kolhapur	Co 86032	-	3	-	-	10	2	-	3
		CoM 0265	-	2	40	-	-	-	-	-
		Co 92005	-	2	-	60	20	-	3	-
		CoC 671	-	3	-	40	10	-	5	-
		Co 7527	-	3	-	60	20	-	2	-
4	Tal. Ajara Dist. Kolhapur	Co 86032	-	2	-	-	10	-	-	3
		CoM 0265	-	1	50	-	-	-	-	-
		Co 92005	-	3	-	60	20	-	3	-
		CoC 671	-	3	-	40	20	-	3	-
5	Tal. Bhudarga d Dist. Kolhapur	Co 86032	-	2	-	-	-	-	-	5
		CoM 0265	-	2	60	-	-	-	-	-
		Co 92005	-	4	-	60	10	-	3	-
6	Tal. Radhanagari Dist. Kolhapur	Co 86032	-	3	-	-	-	-	-	5
		CoM 0265	-	2	60	-	-	-	2	-
		Co 92005	-	2	-	60	20	-	3	-
		CoC 671	-	3	-	60	20	-	5	-

Sr. No.	Name of Tahsil	Name of Variety	Smut (%)	GSD (%)	Brown spot (%)	Rust (%)	Ring Spot (%)	Eye Spot (%)	Pokkah boeng (%)	YellowLeaf Disease (%)
7	Tal. Karveer Dist. Kolhapur	Co 86032	-	3	-	-	-	-	-	5
		CoM 0265	-	4	60	-	-	-	10	-
		Co 92005	-	5	-	50	25	-	5	-
		CoC 671	-	3	-	60	25	-	15	-
8	Tal. Hatkanagale Dist. Kolhapur	Co 86032	-	5	-	-	-	-	-	10
		CoM 0265	-	7	-	60	-	-	5	-
		CoC 671	-	2	-	40	-	-	15	-
9	Tal. Walwa Dist. Sangli	Co 86032	-	5	-	-	-	-	-	10
		CoM 0265	-	5	60	-	-	-	5	-
		CoC 671	-	4	-	35	-	-	5	-
10	Tal. Karad Dist. Satara	Co 86032	-	5	-	-	-	-	-	10
		CoM 0265	-	7	60	-	-	-	-	-
		Co 92005	-	2	-	20	-	-	5	-
		CoC 671	-	4	-	30	-	-	5	-
11	Tal. Patan Dist. Satara	Co 86032	-	2	-	-	-	-	-	5
		CoM 0265	-	4	60	-	-	-	5	-
		Co 92005	-	3	-	25	25	-	5	-
		CoC 671	-	2	-	30	10	-	7	-

### 3) Title 3: Management of rust of sugarcane.

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

**Year of Start** : 2013-14

**Treatment** :

**I. Variety** : Rust susceptible variety of the area

#### II. Fungicides

T.1	- Chlorothalonil	-	0.25 %
T.2	- Propineb	-	0.20 %
T.3	- Triadimefon	-	0.10 %
T.4	- Mancozeb	-	0.30 %
T.5	- Control (Untreated)		

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

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

**Design** : RBD

**Replications** : Three

**Observations** :

1. Germination %
2. Disease severity (% leaf area covered with rust pustules based on observations of 10 leaves per clump; total no. of clumps to be observed at least 10 )
3. Cane yield per plot and per hectare
4. Brix, Pol %, Purity and CCS %
5. Cost-benefit ratio

**Note:** The experiment is vitiated due to non feasibility of spraying different fungicides during rainy season. In the month of June and July the amount of total rainfall received was 172.45 mm in 50 rainy days. However, first spray of fungicidal treatments were undertaken after appearance of rust pustules, it was observed that, each fungicide shown the effect in controlling rust. But during the later period of rainy season due to high intensity of rainfall it was not possible to undertake the spraying of fungicide.

#### **Title 4.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.

**Year of start:** 2011-2012

#### **Observations to be recorded:**

- i. Screening the desirable varieties for the incidence of pokkah boeng.
- ii. Correlation of climatic factors in relation to disease development and management of pokkah boeng under field conditions if the disease reaches acute phase.

#### **(i) Screening:**

##### **Symptoms to be observed**

**Mild** - Green plants with pokkah boeng (curling/ twisting of spindle leaves, tearing 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 + Discolouration (Light coloured) of stalks + Wilting symptom in

opened stalks

#### **(ii) Epidemiology**

Record temperature, relative humidity and rainfall from May to September and establish correlation with disease incidence

#### **INTRODUCTION :**

Pokkah Boeng is a Javanease term denoting a malformed or distorted top and it was originally described in 1896 by Wakker and went in Java. Bolle (1927) was the first to demonstrate by repeated isolation and isolation studies, that the disease is caused by Fungus, *Fusarium moniliforme* Sheldon. The occurrence of Pokkah Boeng disease has been recorded in almost countries where Sugarcane is growing commercially.

The disease is common during monsoon months in the field. Under normal studies it may not cause significant field loss but it has the potential to arrest the crop growth temporarily. The disease occurs throughout India and severe forms of the disease are recorded in Maharashtra, Gujarat, Karnataka and Kerala.

The disease manifest in two phases.viz. Pokkah Boeng and Top rot. The most common symptom is malformed on twisted top. Symptoms develop during rainy periods which coincide with grand growth period. In Maharashtra, the incidence of P.B. is recorded in all planting seasons i.e. Adsali, Preseasonal and Suru.

The earliest symptom of Pokkah Boeng is chlorotic condition towards the base of young leaves and occasionally on other parts of the blades.

Frequently the malformed or distortion of the young leaves is accompanied by pronounced wrinkling, twisting and shortening of the leaves and distortion of the stalk.

## **SYMPTOMS**

Initially, young leaves are chlorotic at their base and patchy elsewhere on the blade. Chlorosis is most obvious on the lower surface of the leaf or twisted in laminar regions. Affected leaves tend to be narrow at the base. Development of further symptoms is dependent on the susceptibility of the variety and environmental conditions conducive to the pathogen. Young leaves may become infected in the spindle, resulting in pronounced wrinkling, twisting and shortening of leaves. Sometimes leaves are shortened to few inches without lamina having malformed midrib or growth of the leaves ceased to few inches without malformation giving d-topped spindle. As the leaves mature, irregular reddish stripes and specks develop within the chlorotic areas. Infection in the spindle may reach growing point and continue into the stalk. Sometime growing point is killed leading to development of top rot. Due to death of spindle, sprouting of the lateral buds occurs. Most of the pokkah boeng infected canes generally recover from the symptoms but into top rot recovery is not there. Upon recovery we notice the normal whorl with remnants of twisted leaf portions of affected leaves still around the spindle.

## **EPIDEMIOLOGY**

The disease is favored by warm, moist growing conditions. Symptoms development begins early in the monsoon season, which normally coincides with rapid and vigorous growth of cane. The three to seven months sugarcane crops are most susceptible to the disease. Conidia are air borne and are deposited on the plants, then washed by rains into infection site.

## **TRANSMISSION**

The transmission of the disease is largely by the movement of the spores from one locality to another by air currents. Conidia which enter the spindle during dry weather are later carried down by rain to the susceptible region where they germinate. The mycelium passes through the still soft cuticle of these spindle leaves to the inner tissues. The incubation time is about one month.

## **ECONOMIC IMPORTANCE**

The pokkah boeng disease was noticed in Java country on large scale. Cane three to seven months old and growing vigorously is more susceptible to infection than older cane and infection is found in many late tillers suppressed by the older stalks. Varietal susceptibility to pakkah boeng has in some instance be increased by late applications of ammonium sulphate producing a soft succulent growth, or by heavy watering following dry weather.

**Table 3: Occurrence of Pokkah Boeng disease in varietal trials under natural conditions.**

Varieties	Per cent infected plants				Disease Reaction
	Mild	Moderate	Severe	Total Incidence	
<b>(I) Early Group</b>					
<b>(I) IVT Early</b>					
Co 10004	-	-	-	0.0	R
Co 10005	-	15.00	-	15.00	S
Co 10006	5.00	-	-	7.00	MS
Co 10024	5.00	-	-	5.00	R
Co 10026	-	-	-	0.00	R
Co 10027	-	-	-	0.00	R
CoM 10081	-	-	-	0.00	R
CoM 10082	5.00	-	-	5.00	R
CoN 10071	-	-	-	0.00	R
CoN 10072	-	15.00	-	15.00	S
CoT 10366	5.00	-	-	8.00	MS
CoT 10367	-	10.00	-	10.00	MS
<b>(II) AVT Early II Plant</b>					
Co 08001	-	-	-	0.0	R
CoVSI 08121	-	-	-	12.00	S
<b>(III) IVT Midlate</b>					
Co 10015	-	-	-	0.0	R
Co 10017	5.00	-	-	7.00	MS
Co 10031	-	10.00	-	10.00	MS
Co 10033	-	-	-	0.0	R
CoM 10083	5.00	-	-	5.00	R
CoM 10084	5.00	-	-	5.00	R
CoN 10073	-	-	-	0.0	R
CoT 10368	-	10.00	-	10.00	MS
CoT 10369	5.00	-	-	5.00	R
CoVC 10061	-	10.00	-	10.00	MS
CoVSI 10121	5.00	-	-	5.00	R
CoVSI 10122	-	15.00	-	15.00	S
PI 10131	-	10.00	-	10.00	MS
PI 10132	5.00	-	-	5.00	R
<b>(IV) AVT Midlate II Plant</b>					
Co 08008	-	5.00	-	5.00	R
Co 08009	12.00	-	-	12.00	S
Co 08016	-	-	-	0.0	R
CoSnk 08101	5.00	-	-	5.00	R
<b>(V) Checks</b>					
Co 85004	-	-	-	0.0	R
Co 94008	-	15.00	-	15.00	S
CoC 671	-	15.00	-	15.00	S

<b>Co 99004</b>	-	-	-	20.00	S
<b>Co 86032</b>	7.00	-	-	7.00	MS
<b>CoM 0265</b>	10.00	-	-	10.00	MS
<b>Co 7527</b>	10.00	-	-	10.00	MS
<b>Co 740</b>	-	-	-	0.00	R
<b>(VI) Other Genotypes</b>					
<b>Co 05002</b>	5.00	-	-	5.00	R
<b>Co 99010</b>	15.00	-	-	15.00	S
<b>Co 09010</b>	-	15.00	-	15.00	S
<b>Co 09007</b>	-	-	-	0.0	R
<b>CoSnk 05102</b>	-	15.00	-	15.00	S
<b>Co 09014</b>	5.00	-	-	5.00	R
<b>Co 09009</b>	-	-	-	0.0	R
<b>Co 09013</b>	-	-	-	0.0	R
<b>Co 2040</b>	-	-	30.00	30.00	HS
<b>Co 09012</b>	-	-	-	0.0	R
<b>CoVSI 09121</b>	-	-	25.00	25.00	HS
<b>CoN 09071</b>	7.00	-	-	7.00	MS
<b>CoN 09072</b>	-	-	-	0.0	R
<b>CoN 09073</b>	-	-	30.00	30.00	HS
<b>CoN 09074</b>	-	-	-	0.0	R
<b>Co 09005</b>	-	-	-	0.0	R
<b>Co 09006</b>	5.00	-	-	5.00	R
<b>Co 09002</b>	-	-	-	0.0	R
<b>Co 09003</b>	-	-	-	0.0	R
<b>Co 09004</b>	-	15.00	-	15.00	S

**Disease Reaction:**

0-5% - Resistant; >5-10% - Mod. Susceptible; >10-20% - Susceptible; > 20% - Highly Susceptible

**Results:**

- 1) **IVT Early:** Out of 12 genotypes, 7 genotype *viz.* Co 10004, Co 10024, Co 10026, Co 10027, CoM 10081, CoM 10082, CoT 10071 shown resistant reaction to pokkah boeng. Co 10005 and CoN 10071 were found susceptible.
- 2) **AVT Early (II Plant):** The genotype CoVSI 08121 shown susceptible reaction, while Co 08001 shown resistant reaction to pokkah boeng.
- 3) **IVT Midlate:** Eight genotypes out of 14 genotypes *viz.* Co 10015, Co 10033, CoM 10083, CoM 10084, CoN 10073, CoT 10369, CoVSI 10121 and PI 10132 resistant reaction. Whereas, CoVSI 10122 shown susceptible reaction to pokkah boeng.
- 4) **AVT Midlate II plant:** The genotypes Co 08008, Co 08016 and CoSnk 08101 shown resistant reaction whereas, Co 08009 shown susceptible reaction to smut.
- 5) **Checks:**  
**Early:** Co 85004 shown resistant reaction, whereas, Co 94008 and CoC 671 shown susceptible reaction to pokkah boeng.  
**Midlate:** Co 99004 was found susceptible, while CoM 0265 and Co 86032 shown moderately susceptible reaction. Co 740 and Co 7527 shown susceptible and moderately susceptible reaction respectively.

**OUTBREAK OF BROWN SPOT**

Causal organism – *Cercospora longipes* E.J.Butler.

Brown spot causes reddish brown to dark brown spot on sugarcane leaves. The lesions vary in the size from pin point to about 3x15 mm. The spots are oval in shape, often surrounded by a yellow halo and are equally visible on both sides of the leaf. Leaf spots are present on the older leaves and are generally well distributed over the entire surface. The percentage leaf area depends on the resistance of variety. In severe cases, the spots cover extensive area of the leaf surface; they coalesce and may be present on the younger leaves. On some varieties older leaves turn yellow and die prematurely. This produces the 'fired' appearance of affected fields, late in the season.

- Severe incidence noticed on recommended varieties - CoM 0265, CoM 0254 and Co 05002.
- Varieties free from diseases - Co 86032, Co 92005, Co 8014, CoC 671, Co 94012 and Co 7527.
- Occurrence of disease – Since July 2011 in the region.

**MANAGEMENT**

- To plant highly resistant varieties in high rainfall area.
- To drain the field after over of monsoon.
- To spray Mancozeb (0.2%) or Carbendanzim (0.01%) fungicides.

## **TECHNICAL PROGRAMME**

### **2014-2015**

1. Evaluation of zonal varieties against red rot, smut and wilt.
2. Survey of sugarcane diseases naturally occurring in the area on important sugarcane varieties.
3. Methodology for screening sugarcane genotypes for resistance to brown spot.
4. Management of rust of sugarcane
5. Epidemiology, varietal screening and management of Pokkah boeng.