



**SUGARCANE BREEDING INSTITUTE
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ANNUAL REPORT 2015-16 (Entomology)

During 2015-16, entomological work of AICRP(S) was carried out under the following projects at ICAR-SBI, Coimbatore, as per the technical program. As the Center joined the project for entomology work late in the season in the current year, no separate planting could be taken up for entomological observations. Also, early stage observations could not be recorded.

Project details:

- 1. E 4.1: Evaluation of zonal varieties/genotypes for their reaction against major insect pests**
- 2. E.28 : Survey and surveillance of sugarcane insect pests**
- 3. E.30 : Monitoring of insect pests and bioagents in sugarcane agro-ecosystem**

Detailed report:

- 1. E 4.1: Evaluation of zonal varieties/genotypes for their reaction against major insect pests**

Shoot borer incidence was recorded on 120th day after planting in breeder's trial plots as no separate trial was laid out this year for screening genotypes to major pests. Total number of shoots and shoots with deadhearts were counted in the entire plot and the percent incidence was calculated.

All the 15 entries under IVT (Early) were rated as LS to shoot borer with deadheart incidence of less than 15%. Minimum deadheart incidence of the borer was in the genotype Co 12001 and the maximum was in the genotype CoM 12081 which recorded 741 and 5278 bored plants/ha, respectively (Table 1).

Table 1. Shoot borer incidence in IVT (Early) 2015-16

S. No.	Genotype	% Incidence of ESB					No. of bored plants/ha (On the basis of cumulative % incidence)	Infestation Grade
		30 DAP	60 DAP	90 DAP	120 DAP	Cumulative % incidence		
1	Co 12001				1.71	1.71	741	LS
2	Co 12003				3.88	3.88	2034	LS
3	Co 12006				4.69	4.69	2963	LS
4	Co12007				4.49	4.49	2222	LS
5	Co 12008				2.99	2.99	1852	LS
6	CoM 12081				9.00	9.00	5278	LS
7	CoM 12082				3.29	3.29	2034	LS
8	CoM 12083				8.30	8.30	4167	LS
9	CoN 12071				6.07	6.07	2500	LS
10	CoN 12072				5.79	5.79	3333	LS
11	CoT 12366				2.58	2.58	1667	LS
12	CoT 12367				3.78	3.78	1852	LS
13	CoC 671				2.02	2.02	926	LS
14	Co 94008				3.85	3.85	1574	LS
15	Co 85004				3.45	3.45	2593	LS

In AVT (Early)-I Plant, all the entries were least susceptible to shoot borer. Overall incidence ranged between 2.26% in Co 10004 and 12.0% in Co 94008, and total number of bored plants varied between 2314 and 11806 in these two entries (Table 2).

Table 2. Shoot borer incidence in AVT (Early) – I Plant 2015-16

S. No.	Genotype	% Incidence of ESB					No. of bored plants/ha (On the basis of cumulative % incidence)	Infestation Grade
		30 DAP	60 DAP	90 DAP	120 DAP	Cumulative % incidence		
1	Co 10004				2.26	2.26	2314	LS
2	Co 10005				7.69	7.69	7983	LS
3	Co 10006				7.77	7.77	8488	LS
4	Co 10024				4.32	4.32	6248	LS
5	Co 10026				4.29	4.29	4861	LS
6	Co 10027				5.44	5.44	6132	LS
7	CoT 10367				8.58	8.58	9718	LS
8	CoT 10366				7.28	7.28	5322	LS
9	CoC 671				3.94	3.94	3355	LS
10	Co 85004				3.69	3.69	4165	LS
11	Co 94008				12.00	12.00	11806	LS

Under IVT-Midlate category, all the 18 entries showed LS reaction to shoot borer. The overall incidence of the borer was very low varying from 1.43% in Co

12014 to a maximum of 6.11% in the entry VSI 12121, which also recorded the maximum number of bored plants/ha (Table 3).

Table 3. Shoot borer incidence in IVT (Midlate) 2015-16

S. No.	Genotype	% Incidence of ESB					No. of bored plants/ha (On the basis of cumulative % incidence)	Infestation Grade
		30 DAP	60 DAP	90 DAP	120 DAP	Cumulative % incidence		
1	Co 12009				4.76	4.76	3549	LS
2	Co 12012				2.87	2.87	3703	LS
3	Co 12014				1.43	1.43	1234	LS
4	Co 12016				3.78	3.78	3549	LS
5	Co 12017				4.99	4.99	3858	LS
6	Co 12019				5.10	5.10	3703	LS
7	Co 12021				3.94	3.94	3549	LS
8	Co 12024				2.82	2.82	2160	LS
9	CoM 12084				3.37	3.37	3175	LS
10	CoM 12085				2.54	2.54	2006	LS
11	CoM 12086				5.64	5.64	3858	LS
12	CoN 12073				4.66	4.66	3858	LS
13	CoN 12074				3.07	3.07	2160	LS
14	CoT 12368				5.74	5.74	4783	LS
15	VSI 12121				6.11	6.11	5555	LS
16	Co 99004				3.67	3.67	3395	LS
17	Co 86032				3.58	3.58	4166	LS
18	Co 0212				4.90	4.90	4321	LS

In AVT (Midlate)-I Plant, all the 13 entries showed LS reaction to shoot borer whose incidence varied from 0.93 (Co 10017) to 6.23% (Co 86032). Total number of bored plants/ha was minimum in the entry Co 10017 (926) and maximum in the entry CoM 10083 (6482), though the later recorded comparatively low percent incidence (Table 4).

Table 4. Shoot borer incidence in AVT (Midlate)-I Plant 2015-16

S. No.	Genotype	% Incidence of ESB					No. of bored plants/ha (On the basis of cumulative % incidence)	Infestation Grade
		30 DAP	60 DAP	90 DAP	120 DAP	Cumulative % incidence		
1	Co 09009				2.60	2.60	2778	LS
2	Co 10015				2.07	2.07	2315	LS
3	Co 10017				0.93	0.93	926	LS
4	Co 10031				2.81	2.81	3241	LS
5	Co 10033				5.20	5.20	5093	LS
6	CoM 10083				5.25	5.25	6482	LS
7	CoT 10368				2.84	2.84	2315	LS
8	CoT 10369				4.13	4.13	3936	LS
9	CoVc 10061				1.91	1.91	1852	LS
10	PI 10131				3.85	3.85	3819	LS
11	PI 10132				5.67	5.67	4399	LS
12	Co 86032				6.23	6.23	5788	LS
13	Co 99004				5.14	5.14	3704	LS

Internode borer (INB) incidence was recorded from 25 randomly selected canes at harvest in all the trials to assess the reaction of the entries to the borer. Total number of internodes and infested internodes were counted and percent incidence, percent intensity and infestation index were worked out as per the technical programme. Out of the 17 entries in IVT-Midlate, eight entries each recorded HS and MS while Co 12024 alone recorded LS. The borer incidence varied between 20% in Co 12024 and 64% in CoM 12086 and the later recorded the highest intensity of the pest (4.57%) (Table 5).

Table 5. IVT - Midlate: INB Incidence at Harvest

S.No	Genotype	% Incidence	% Intensity	Infestation Index	Infestation Grade
1	Co 12009	44.00	2.79	1.23	HS
2	Co 12012	32.00	1.53	0.49	MS
3	Co 12014	48.00	4.00	1.92	HS
4	Co 12016	44.00	2.38	1.05	HS
5	Co 12017	44.00	2.83	1.25	HS
6	Co 12019	60.00	3.33	2.00	HS
7	Co 12021	44.00	3.21	1.41	HS
8	Co 12024	20.00	0.86	0.17	LS
9	CoM 12084	32.00	2.30	0.74	MS
10	CoM 12085	28.00	1.61	0.45	MS
11	CoM 12086	64.00	4.57	2.92	HS
12	CoN 12073	36.00	1.71	0.62	MS

13	CoN 12074	32.00	1.42	0.45	MS
14	CoT 12368	32.00	2.50	0.80	MS
15	VSI 12121	28.00	1.79	0.50	MS
16	Co 99004	28.00	1.89	0.53	MS
17	Co 86032	44.00	2.05	0.90	HS

Under IVT-Early category, out of the 15 entries three entries recorded HS and the rest including three standards recorded MS reaction. The lowest incidence under this category was in Co 12003 (24%) and the entry Co 12006 recorded the highest incidence of 50%. However, the highest intensity was recorded in the entry CoM 12083 and the lowest was in Co 12003, which also has recorded the lowest infestation index (0.24) (Table 6).

Table 6. IVT - Early : INB Incidence at Harvest

S.No	Genotype	% Incidence	% Intensity	Infestation Index	Infestation Grade
1	Co 12001	40.00	1.85	0.74	MS
2	Co 12003	24.00	1.01	0.24	MS
3	Co 12006	52.00	2.92	1.52	HS
4	Co 12007	26.00	1.27	0.33	MS
5	Co 12008	50.00	2.61	1.31	HS
6	CoM 12081	36.00	1.46	0.53	MS
7	CoM 12082	30.00	1.63	0.49	MS
8	CoM 12083	46.00	3.28	1.51	HS
9	CoN 12071	38.00	2.05	0.78	MS
10	CoN 12072	28.00	1.10	0.31	MS
11	CoT 12366	38.00	2.22	0.84	MS
12	CoT 12367	40.00	2.21	0.88	MS
13	CoC 671	40.00	1.94	0.78	MS
14	Co 85004	30.00	1.35	0.41	MS
15	Co 94008	36.00	2.13	0.77	MS

In AVT-Early category, the incidence percent was in the narrow range of 34.67 - 52%. Under this category, three entries recorded MS reaction while the rest were highly susceptible (HS). The intensity of attack was highest in the entry Co 10027 (3.64%) and the lowest (1.93%) in the entry CoT 10366 (Table 7).

S.No	Genotype	% Incidence	% Intensity	Infestation Index	Infestation Grade
1	Co 10004	48.00	2.94	1.41	HS
2	Co 10005	46.67	2.61	1.22	HS
3	Co 10006	45.33	2.62	1.19	HS
4	Co 10024	52.00	3.60	1.87	HS
5	Co 10026	50.67	2.67	1.35	HS
6	Co 10027	41.33	3.64	1.50	HS
7	CoT 10366	36.00	1.93	0.69	MS
8	CoT 10367	46.67	2.67	1.25	HS
9	CoC 671	36.00	1.98	0.71	MS
10	Co 85004	34.67	1.99	0.69	MS
11	Co 94008	49.33	2.90	1.43	HS

Out of the 13 entries under AVT-Midlate (I Plant), seven entries were moderately susceptible while the rest were highly susceptible. Lowest incidence was recorded in the entry CoVc 10061 (22%) and the highest incidence was in the entry CoT 10368 which also has recorded the highest intensity of attack and infestation index. The lowest intensity of attack (1.02) and infestation index (0.22) were recorded for CoVc 10061 (Table 8).

Table 8. AVT - Midlate (I Plant) : INB Incidence at Harvest

S.No	Genotype	% Incidence	% Intensity	Infestation Index	Infestation Grade
1	Co 09009	50.00	1.33	0.67	HS
2	Co 10015	44.00	1.93	0.85	HS
3	Co 10017	36.00	1.43	0.51	MS
4	Co 10031	34.00	1.62	0.55	MS
5	Co 10033	30.00	1.47	0.44	MS
6	CoT 10368	54.00	3.27	1.76	HS
7	CoT 10369	50.00	2.03	1.02	HS
8	CoM 10083	46.00	1.93	0.89	HS
9	PI 10131	44.00	1.90	0.84	HS
10	PI 10132	30.00	1.60	0.48	MS
11	CoVc 10061	22.00	1.02	0.22	MS
12	Co 86032	30.00	1.34	0.40	MS
13	Co 99004	32.00	1.66	0.53	MS

In AVT-Early (II Plant), the entry CoN 09072 has recorded the lowest incidence (20%), lowest intensity (1.18%) and the least infestation index (0.24).

Under this category, percent incidence varied widely between 20% in CoN 09072 and 73.21% in Co 94008 (Table 9).

Table 9. AVT - Early (II Plant) : INB Incidence at Harvest

S.No	Genotype	% Incidence	% Intensity	Infestation Index	Infestation Grade
1	Co 09004	38.67	2.11	0.82	MS
2	Co 09007	26.67	1.42	0.38	MS
3	CoN 09072	20.00	1.18	0.24	LS
4	CoC 671	30.67	1.51	0.46	MS
5	Co 94008	73.21	2.95	2.16	HS
6	Co 85004	25.33	1.68	0.43	MS

The root borer incidence was recoded in IVT-Midlate category after the harvest of the crop. Twenty five randomly selected clumps per replication were split open and verified for the borer injury and percent incidence worked out. The incidence of the borer varied from nil in entries CoM 12084, Co 12121, Co 86032 and Co 0212, to 29.6% in Co 12024 (Table 10).

Table 10. Root borer incidence in IVT - Midlate

S.No	Clone	Root borer incidence (%)	Infestation Grade
1	Co 12012	4.00	LS
2	Co 12014	4.00	LS
3	Co 12016	1.90	LS
4	Co 12017	4.00	LS
5	Co 12019	16.00	MS
6	Co 12024	29.60	MS
7	Co 12074	12.00	LS
8	Co 12121	0.00	LS
9	CoM 12084	0.00	LS
10	CoM 12085	16.00	MS
11	CoM 12086	11.54	LS
12	CoN 12073	4.17	LS
13	VSI 12121	3.85	LS
14	Co 86032	0.00	LS
15	Co 0212	0.00	LS
16	Co 99004	8.33	LS

In AVT-Early (II Plant) too, the incidence level was very low and all the entries recorded the least susceptible reaction to the pest (Table 11).

Table 11. AVT – Early (II Plant) Top borer incidence				
S.No	Genotype	% Incidence at		Infestation Grade
		6 th Month	At harvest	
1	Co 09004	0.00	0.74	LS
5	Co 09007	0.00	1.36	LS
2	CoN 09072	0.58	1.25	LS
3	CoC 671	0.81	0.81	LS
4	Co 94008	0.00	0.72	LS
6	Co 85004	0.00	1.91	LS

Out of the 11 entries under AVT-Early (I Plant), only one entry CoT 10366 recorded MS reaction whereas the rest of the entries showed least susceptible reaction. Overall, the incidence of the borer varied from nil to a maximum of 10.42% (Table 12).

Table 12. AVT – Early (I Plant) Top borer incidence				
S.No	Genotype	6 th Month	At harvest	Infestation Grade
1	Co 10004	0.00	0.00	LS
2	Co 10005	0.00	0.00	LS
3	Co 10006	0.57	0.62	LS
4	Co 10024	0.00	0.46	LS
5	Co 10026	3.33	4.44	LS
6	Co 10027	0.78	1.08	LS
7	CoT 10366	5.09	10.42	MS
8	CoT 10367	0.00	2.90	LS
9	Co 85004	0.51	1.71	LS
10	Co 94008	0.00	0.81	LS
11	CoC 671	0.00	0.00	LS

In AVT-Midlate (I Plant), all the entries except Co 10017 showed least susceptible reaction to the borer. The entry Co 10017 at 6th month and at harvest showed MS reaction despite very low incidence of the pest in all the other entries (Table 13).

Table 13. AVT – Midlate (I Plant): Top borer incidence

S.No	Genotype	% Incidence at		Infestation Grade
		6 th Month	At harvest	
1	Co 09009	0.00	1.40	LS
2	Co 10015	0.00	0.85	LS
3	Co 10017	10.42	15.07	MS
4	Co 10031	0.00	0.00	LS
5	Co 10033	0.96	2.68	LS
6	CoM 10083	1.72	1.79	LS
7	CoT 10368	0.00	1.98	LS
8	CoT 10369	0.00	0.77	LS
9	PI 10131	0.00	1.22	LS
10	PI 10132	0.00	2.33	LS
11	CoVc 10061	1.65	5.41	LS
12	Co 86032	0.00	1.54	LS
13	Co 99004	0.00	0.00	LS

In IVT-Early too, the incidence of the borer was very low varying from nil to a maximum of 8.78%. Among all the entries, CoM 12081 alone showed the maximum incidence of the borer both at 6th month and at harvest. However, all the entries showed least susceptible reaction to the pest (Table 14).

Table 14. IVT – Early : Top borer incidence

S. No.	Genotype	% Incidence at		Infestation Grade
		6 th Month	At harvest	
1	Co 12001	0.00	1.07	LS
2	Co 12003	0.00	0.56	LS
3	Co 12006	0.00	0.66	LS
4	Co 12007	0.91	2.40	LS
5	Co 12008	0.00	0.85	LS
6	CoM 12081	1.69	8.78	LS
7	CoM 12082	0.00	0.76	LS
8	CoM 12083	0.00	0.00	LS
9	CoN 12071	0.00	2.63	LS
10	CoN 12072	0.00	2.94	LS
11	CoT 12366	0.00	0.00	LS
12	CoT 12367	0.00	0.96	LS
13	Co 85004	0.00	0.00	LS
14	Co 94008	0.00	4.59	LS
15	CoC 671	0.00	0.00	LS

Under IVT-Midlate category, all the entries except Co 12012 showed least susceptible reaction to the borer. The entry Co 12012 consistently showed higher incidence of the pest both at 6th month and at harvest in spite of low borer incidence probably indicating inherent susceptible nature of the genotype (Table 15).

Table 15. IVT – Midlate : Top borer incidence

S.No	Genotype	% Incidence at		Infestation Grade
		6 th Month	10 th Month	
1	Co 12009	3.57	8.40	LS
2	Co 12012	4.29	11.88	MS
3	Co 12014	0.00	0.71	LS
4	Co 12016	0.86	2.56	LS
5	Co 12017	0.94	1.09	LS
6	Co 12019	0.00	0.86	LS
7	Co 12021	0.98	1.19	LS
8	Co 12024	0.00	0.00	LS
9	CoM 12085	0.00	2.41	LS
10	CoM 12086	0.00	0.70	LS
11	CoM 12089	0.00	0.00	LS
12	CoN 12073	0.00	1.76	LS
13	CoN 12074	0.89	2.94	LS
14	CoT 12368	0.98	1.00	LS
15	VSI 12121	2.73	4.56	LS
16	Co 99004	0.00	2.93	LS
17	Co 86032	1.45	0.00	LS

Project E.28: Survey and surveillance of sugarcane insect pests

Table 16. Status of sugarcane pests and their natural enemies in and around Coimbatore, Tamil Nadu

S.No	Variety	Location	Name of pest	% incidence/population			Remarks
				Min	Max	Average	
1	Co 86032	Pooluvapatti, Coimbatore	Internode borer	5.0	10.0	7.5	
			Top borer	0.0	5.0	2.5	
			Root borer	-	-	-	
			Termite	0.0			
			<i>Epiricania melanoleuca</i>	0.0	5.0		
2	Co 86032	Thenamanallur	Mealybug	5.0	10.0		
			Rat	0.0	1-2 burrows		
3	Co 86032	Puthur	Pyrilla	0.0	5.0		
			Mealybug	5.0	40.0	27.0	
			Termite	0.0	5.0	2.5	
4	Co 86032	Telungupalayam	Top borer	0.0	5.0	2.5	
			Woolly aphid				Stray incidence / patchy appearane
			Pyrilla	legg mass/40 leaves			
			<i>Cotesia flavipes</i>	0.0	17.0	8.5	On INB
				3.3	15.4	9.4	On SB
			<i>Sturmiopsis inferens</i>	0.0	3.85	1.9	On SB
	Co 62175		<i>Epiricania melanoleuca</i>	1cocoon /40leaves			
5	Co 86032	M/s Amravathi Sugars, Udumalpet	INB	15.0	20.0	17.5	
			RB	0.0	15.0	7.5	
6	Co 86032	M/s Bannari Amman Sugars, Sathyamangalam	INB	0.0	10.0	5.0	
			RB	0.0	15.0	7.5	
7	Co 86032	M/s Rajshree Sugars, Mundiampakkam	<i>Brahmina mysoreensis</i> (New record)				
8	Co 86032	Annur, Sathyamangalam	INB	15.0	50.0	32.5	
			Mealybug	10.0	20.0	15.0	
			Rat, termite	Traces			

Project E.30: Monitoring of insect pest and natural enemies of sugarcane

Table 17. Pest and natural enemy status in monitoring plot at Coimbatore, Tamil Nadu							
S. No.	Location	Insect pest	Prevalence period	Max. incidence /population	Natural enemy	Prevalence period	Max. parasitization / population
1	Coimbatore	SB	May	5.82%			
			June	5.0%			
			July	1.32			
		TB	July	0.44			
		Termite	July	Traces			
		<i>Asamangu lia</i>	July	Traces			
		SB	September	2.05			
		INB	September	0.51			
		TB	September	0.51			
		Whitefly		0.77			
		Mealybug		1.79			
		Woolly aphid	November	Av.rating 1.77 / leaf	<i>Encarsia flavoscutellum</i> ; <i>Micromus</i>	November	
		INB	March	35.0			
		RB		47.6			