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ALL INDIA CO-ORDINATED RESEARCH PROJECT

ON

SUGARCANE

(INDIAN COUNCIL OF AGRICULTURE RESEARCH)

TECHNICAL REPORT

OF

SUGARCANE ENTOMOLOGY

(2015-16)

CENTRE: PUSA (BIHAR)



**SUGARCANE RESEARCH INSTITUTE
RAJENDRA AGRICULTURAL UNIVERSITY
BIHAR, PUSA (SAMASTIPUR)-848125**

**Annual Report of All India Co-ordinated Research Project on Entomology
Department of Entomology, Sugarcane Research Institute
Rajendra Agricultural University, Bihar, Pusa-848125
(2015-16)**

Project No. E. 4.1

- (i) Project Title : Evaluation of zonal varieties/genotypes for their reaction against major insect pests of sugarcane.
- (ii) Objective : To grade entries in the zonal varietal trials for their behaviour towards damage by key pests in the areas.
- (iii) Period under report : 2015-16
- (iv) Year of Start : 1985-86
- (v) Location : Sugarcane Research Institute, Pusa, Bihar
- (vi) Technical Programme : 2015-16
- (vii) Replication : 03
- (viii) Plot Size : 06 Meter long.
- (ix) Row to row : 90 cm (Spacing)

Technical Summary

Thirty eight (38) varieties/genotypes comprising of 7 IVT E, 6 AVT E I P, 9 IVT M, 10 IVT M I P and 6AVT M including standard check were evaluated against root borer, shoot borer, top borer and stalk borer at SRI, Pusa (Table 1a-e).

The cumulative incidence of early shoot borer was recorded as lowest (9.52 %) in variety CoP 11439 AVT M IP and highest (16.50%) in variety CoSe 95422(Std.) IVT E. The genotype tested under different maturity groups are graded under less to moderately susceptible reaction against early shoot borer. While, incidence of root borer was found minimum (7.15%) in variety CoP 12437 IVT E and maximum (10.74%) in variety CoSe 92423(std.) graded as less susceptible reaction. The incidence of top borer was recorded as low to moderate which varied 6.85% in variety BO 155 IVT MIP and 9.44% in variety Colk 12209 .IVT M against 3rd brood, while 8.36% in variety CoSe 10451 AVT E 1Pand 11.35% in variety Colk 12209.IVT M against 4th brood of top borer. All the genotypes evaluated under different maturity groups exhibited less to moderately susceptible reaction against top borer based on 4th brood incidence. The stalk borer infestation index was varied from untraceable to 0.63per cent and showed less susceptible reaction for all tested genotype.

Table 1a. E. 4.1. Evaluation of Zonal variety/genotype of reaction against borer pest of sugarcane.

S.N.	Varieties/ genotypes	Early shoot borer (% incidence)						Top borer (% incidence)			Stalk borer				Root borer % incidence	Reaction
		30 DAP	60 DAP	90 DAP	120 DAP	Cumm .	Reaction	III Brood	IV Brood	*Reactio n	% incidence	% intensity	Infestation index	Reaction		
								5 th month	7 th month							
IVT (Early) 5+2																
1	Colk 1207	0.00	13.88	7.14	3.33	10.76	LS	8.70	9.14	LS	4.00		0.19	LS	7.46	LS
2	Colk 1208	0.00	13.09	8.08	3.93	13.66	LS	8.94	10.63	MS	0.00	0.00	0.00	LS	7.98	LS
3	CoP 12436	0.00	7.73	6.36	3.77	10.52	LS	8.13	9.47	LS	5.33	0.41	0.20	LS	7.45	LS
4	CoP 12437	11.20	8.11	6.51	5.06	13.79	LS	8.02	8.84	LS	0.00	0.00	0.00	LS	7.15	LS
5	CoSe 12451	7.72	8.37	8.95	4.87	15.52	MS	8.42	9.14	LS	2.66	0.00	0.13	LS	8.35	LS
6	BO 130(Std.)	5.73	6.50	5.35	4.76	14.21	LS	6.64	8.56	LS	0.00	0.00	0.00	LS	8.18	LS
7	CoSe 95422 (Std.)	6.56	7.85	8.70	5.65	16.50	MS	8.46	10.24	MS	0.00	0.00	0.00	LS	8.89	LS
	SEm ±	0.402	0.880	0.543	0.439	-	-	0.471	0.418						0.634	
	CD at 5%	1.239	2.712	1.674	1.355	-	-	1.451	1.289						1.954	
	CV %	15.61 6	16.031	12.45	16.45	-	-	9.961	7.683						13.862	

***Reaction based on 4th brood percent incidence**

Table 1b. E. 4.1. Evaluation of Zonal variety/genotype of reaction against borer pest of sugarcane.

S.N.	Varieties/ genotypes	Early shoot borer (% incidence)						Top borer (% incidence)			Stalk borer				Root borer % incidence	Reaction
		30 DAP	60 DAP	90 DAP	120 DAP	Cumm.	Reaction	III Brood	IV Brood	*Reaction	% incid- ence	% intensity	Infestation index	Reaction		
								5 th month	7 th month							
AVT (Early)1st plant 4+2																
1	CoSe 10451	0.00	7.78	6.63	2.10	13.04	LS	7.76	8.36	LS	0.00	0.00	0.00	LS	7.71	LS
2	CoSe 10452	10.19	8.23	8.95	4.32	15.89	MS	8.80	10.24	MS	2.66	3.99	0.10	LS	8.27	LS
3	CoSe 10453	0.00	7.75	6.61	2.43	9.77	LS	8.33	9.43	LS	0.00	0.00	0.00	LS	9.44	LS
4	BO 91 Std.	0.00	9.40	8.72	3.57	12.50	LS	7.41	9.36	LS	0.00	0.00	0.00	LS	9.34	LS
5	CoP 9301 (Std.)	10.53	7.93	7.74	4.10	14.17	LS	7.69	9.88	LS	4.00	8.03	0.32	LS	9.61	LS
6	CoSe 92423(Std.)	13.68	14.80	7.56	3.31	15.78	MS	8.65	10.46	MS	5.33	9.11	0.48	LS	10.74	LS
	SEm ±	0.753	0.943	0.530	0.475	-	-	0.476	0.545	-	-	-	-	-	0.940	-
	CD at 5%	2.373	2.971	1.696	1.296	-	-	1.499	1.719	-	-	-	-	-	2.964	-
	CV %	18.315	17.524	14.103	18.845	-	-	9.639	9.973	-	-	-	-	-	18.703	-

***Reaction based on 4th brood percent incidence**

Table 1C. E. 4.1. Evaluation of Zonal variety/genotype of reaction against borer pest of sugarcane.

S.N.	Varieties/ genotypes	Early shoot borer (% incidence)						Top borer (% incidence)			Stalk borer				Root borer % incidence	Reaction
		30 DAP	60 DAP	90 DAP	120 DAP	Cumm.	*Reaction	III Brood	IV Brood	*Reaction	% incid- ence	% intensity	Infestation index	Reaction		
								5 th month	7 th month							
IVT (Midlate)																
1	Colk 09204	0.00	8.37	8.74	2.64	12.69	LS	9.09	10.46	MS	1.33	4.12	0.05	LS	8.56	LS
2	Colk 12209	14.48	8.66	8.69	3.49	15.07	MS	9.44	11.35	MS	6.66	9.57	0.63	LS	8.70	LS
3	CoP 12438	11.20	9.22	7.47	2.66	14.06	LS	7.32	8.74	LS	0.00	0.00	0.00	LS	7.75	LS
4	CoP 12439	10.06	6.15	7.21	3.90	11.62	LS	8.41	9.38	LS	0.00	0.00	0.00	LS	8.51	LS
5	CoP 12452	0.00	11.66	7.86	2.74	10.83	LS	8.59	9.48	LS	5.33	9.25	0.49	LS	7.66	LS
6	CoSe 12453	0.00	9.78	6.53	2.87	11.4	LS	8.44	9.39	LS	0.00	0.00	0.00	LS	7.62	LS
7	BO 91 (Std.)	0.00	9.40	8.72	3.57	12.50	LS	7.41	9.36	LS	0.00	0.00	0.00	LS	9.34	LS
8	CoP 9301(Std.)	10.53	7.93	7.74	4.10	14.17	LS	7.69	9.88	LS	4.00	8.03	0.32	LS	9.61	LS
9	CoSe 92423(std.)	13.68	14.80	7.56	3.31	15.78	MS	8.65	10.46	MS	5.33	9.11	0.48	LS	10.74	LS
	SEm ±	0.679	1.043	0.644	0.306	-	-	0.3.65	0.784	-	-	-	-	-	0.877	-
	CD at 5%	2.036	3.128	1.953	0.917	-	-	1.097	2.350	-	-	-	-	-	2.563	-
	CV %	17.661	18.949	14.241	17.601			7.703	13.950	-	-	-	-	-	18.440	-

***Reaction based on 4th brood percent incidence**

Table 1d. E. 4.1. Evaluation of Zonal variety/genotype of reaction against borer pest of sugarcane.

S.N.	Varieties/ genotypes	Early shoot borer (% incidence)						Top borer (% incidence)			Stalk borer				Root borer % incidence	Reaction
		30 DAP	60 DAP	90 DAP	120 DAP	Cumm.	Reaction	III Brood	IV Brood	*Reaction	% incid- ence	% intensity	Infestation index	Reaction		
								5 th month	7 th month							
IVT (Midlate) 1st plant 7+3																
1	BO 155	6.56	9.03	6.16	2.23	12.84	LS	6.84	8.60	LS	0.0	0.00	0.00	LS	7.47	LS
2	CoP 11439	0.00	7.63	6.56	2.58	9.52	LS	7.74	9.09	LS	1.33	4.54	0.06	LS	8.61	LS
3	CoP 11440	8.37	5.23	6.21	3.19	12.35	LS	8.26	9.32	LS	0.00	0.00	0.00	LS	8.30	LS
4	CoSe 11453	0.00	10.24	8.86	2.72	12.50	LS	8.87	10.38	MS	4.00	5.67	0.22	LS	8.45	LS
5	CoSe 11454	0.00	8.88	8.18	5.08	10.76	LS	8.80	9.42	LS	0.00	0.00	0.00	LS	8.82	LS
6	CoSe 11455	0.00	10.74	8.42	3.23	11.36	LS	8.84	9.48	LS	0.00	0.00	0.00	LS	9.40	LS
7	CoSe 11456	13.66	9.73	6.68	4.76	15.06	MS	8.72	9.31	LS	0.00	0.00	0.00	LS	9.36	LS
8	BO 91(Std.)	0.00	9.40	8.72	3.57	12.50	LS	7.41	9.36	LS	0.00	0.00	0.00	LS	9.34	LS
9	CoP 9301(Std.)	10.53	7.93	7.74	4.10	14.17	LS	7.69	9.88	LS	4.00	8.03	0.32	LS	9.61	LS
10	CoSe 92423(Std.)	13.68	14.80	7.56	3.31	15.78	MS	8.65	10.46	MS	5.33	9.11	0.48	LS	10.74	
	SEm ±	0.436	0.809	0.606	0.449	-	-	0.276	0.804	-	-	--	-	-	0.768	-
	CD at 5%	1.295	2.406	1.801	1.308	-	-	0.820	2.389	-	-	-	-	-	2.282	-
	CV %	14.297	14.978	13.676	19.910			10.674	14.757	-	-	-	-	-	15.485	-

***Reaction based on 4th brood percent incidence**

Table 1e. E. 4.1. Evaluation of Zonal variety/genotype of reaction against borer pest of sugarcane.

S.N.	Varieties/ genotypes	Early shoot borer (% incidence)						Top borer (% incidence)			Stalk borer				Root borer % incidence	Reaction
		30 DAP	60 DAP	90 DAP	120 DAP	Cumm.	Reaction	III Brood	IV Brood	*Reaction	% incid- ence	% intensity	Infestation index	Reaction		
								5 th month	7 th month							
AVT (Midlate)																
1	CoSe 10451	7.49	7.78	6.63	2.10	13.04	LS	8.25	9.56	MS	2.66	5.33	0.14	LS	10.50	LS
2	CoSe 10452	10.19	8.23	8.95	4.32	15.89	MS	8.05	9.22	LS	0.00	0.00	0.00	LS	10.33	LS
3	CoSe 10453	0.00	7.75	6.61	2.43	9.77	LS	8.86	10.41	LS	0.00	0.00	0.00	LS	10.67	LS
4	BO 91(Std.)	0.00	9.40	8.72	3.57	12.50	LS	7.41	9.36	LS	0.00	0.00	0.00	LS	9.34	LS
5	CoP 9301 (Std.)	10.53	7.93	7.74	4.12	14.17	LS	7.69	9.88	LS	4.00	8.03	0.32	LS	9.61	LS
6	CoSe 92423(std.)	13.68	14.80	7.56	3.32	15.78	MS	8.65	10.46	MS	5.33	9.11	0.48	LS	10.74	LS
	SEm ±	0.753	0.943	0.530	0.475	-	-	0.369	0.529	-	-	-	-	-	1.100	-
	CD at 5%	2.373	2.971	1.696	1.296	-	-	1.163	1.666	-	-	-	-	-	3.469	-
	CV %	18.315	17.524	14.103	18.845	-	-	7.741	9.335	-	-	-	-	-	18.698	-

***Reaction based on 4th brood percent incidence**

Project No. E-28

- (i) Project Title : Survey and surveillance of sugarcane insect pests.
- (ii) Objective : To identify key insect pests of sugarcane in the area.
- (iii) Period under report : 2015-16 :
- (iv) Year of start : 2003-04
- (v) Location : Sugarcane Research Institute, Pusa, Bihar
- (vi) Technical programme : 2015-16

Technical summary

A Survey was conducted on the insect pests of sugarcane under different village of reserved area of Hasanpur sugar factory during cropping season 2015-16. The percent incidence of early shoot borer (5 to 17%), root borer (3 to 8%), top borer (8 to 20%), stalk borer below 10%, army worm (3 to 25%) and pyrilla (15 to 85) per leaf were observed as the key pests of sugar factory reserved area of sugarcane. The incidence of other pest like Plassey borer, Mealy bug, Termite, Grass hopper, Scale insect, White fly, etc. were also recorded in traces. Besides, sugar mills reserved area, a roving survey was also conducted at sugarcane field in and around Pusa at monthly interval. The per cent incidence of early Shoot borer, Root borer, Top borer and stalk borer were varied from 3.2 to 17.2%, 2.5 to 11.6% and 3.2 to 17.2%, and 1.3 to 9.7%, respectively. While, Pyrilla was observed 1.3-65 per leaf at Pusa Farm.

Table 2. Survey and Surveillance of sugarcane insect pests at SRI, Pusa

Sl. No.	Variety	Location	Name of pest	% incidence		
				Min.	Max.	Average
1.	Co 238,BO 110,CoJ 85	Sawat	Pyrilla/leaves	15	60	37.5
			Shoot borer	5	17	11
			Top borer	8	20	14
2.	Co 238, Co 98014, Co 235	Narayan piper	Pyrilla	10	40	25
			Shoot borer	3	11	7
			Root borer	3	8	5.5
3.	Co 239,BO 91,CoVSi 3102	Sujanpur	Pyrilla	8	20	14
			Army warm	3	12	7.5
4.	CoJ 85 ,Co 239, CoPk 5191	Akemba	Pyrilla	35	85	60
			Top borer	5	12	6.5
5.	BO 91, Co 238,BO 110,	Ijraha	Pyrilla	15	35	25
			Army worm	15	25	20
			Shoot borer	8	17	12.5
	Co 238, Co 98014, Co 235	Bardha	Pyrilla	40	70	55
			Shoot borer	15	25	20
	Co 239, CoPk 5191, CoVSi 3102	Musepur	Pyrilla	20	45	32.5
			Army warm	12	25	17.5
	BO 91, Co 238 ,CoJ 85	Dharpur	Pyrilla	15	25	20
			Top borer	7	15	11
			Shoot borer	5	12	7.5
	BO 110, Co 238, CoPk 5191	Sakarapura	Pyrilla	30	70	50
	BO 153	Pusa farm	Pyrilla	1.3	65	33.15
			Root borer	2.5	11.9	7.2
			Shoot borer	3.2	17.2	10.2
			Top borer	1.3	17	9.15
			Stalk borer	1.3	9.7	5.5

Project No. E-30

1. Project Title : Monitoring of insect pests and bio-agents in sugarcane agro-ecosystem.
2. Objective : To grade entries in the zonal varietal trials for their behaviour towards damage by key pests in the area.
3. Project No. : **E-30**
4. Period under report : 2015-16
5. Year of start : 2007-08
6. Location : Sugarcane Research Institute, Pusa, Bihar
7. Plot size : 0.2 hectare
8. Duration : Long term
9. Variety : BO 141
10. Metrological data : Recorded Monthly average

Technical Summary:-

Sugarcane variety BO 141 was planted in 0.2 hectare area. The population of Root borer, Shoot borer, Top borer, Stalk borer, Pyrilla, and their natural enemies were recorded at monthly interval during cropping season 2015-16 at Pusa Farm of Sugarcane Research Institute. The data on monitoring of insect pest and its bio-agent revealed that the mean per cent incidence of Root borer, Shoot borer, Top borer and Stalk borer were varied from 2.5 to 11.5%, 3.2% to 15.6%, 1.3 to 17.2% and 1.3 to 9.7%, respectively. Whereas, the incidence of sugarcane Pyrilla was recorded which varied from 1.3 to 65/leaf.

The bio-agents of Root and Early shoot borer were not observed during cropping season 2015-16. While, parasitization of bio-agents such as, *Apantelis flavipes*, *Rhanconotus scirpophagae* and *Stenobracon deesae* were recorded against top borer. The data presented in table 3a-b revealed that population of *S. deesae* varied from 2.7 to 13.7% during May to October. Where its peaks (13.7%) noticed in September. Population of *Apantelis flavipes* was ranged between 3.1 to 15.9% during May to November with its highest population (15.9%) was recorded in month of September. The activity of *R. scirpophagae* was recorded from July to November with its peak (7.8%) in month of September. The parasitization of *T. pyrillae* and *E. melanoleuca* were recorded from May to November and their highest parasitization per cent was recorded 42.7% and 100%, in the month of August and October, respectively. In case of Stalk borer, the parasitization of *Apantelis flavipes* was recorded from 4.1 to 18.1%.

Table: 3a. E.30 Monitoring of insect pest and natural enemies of Sugarcane (0.2 ha area)

Period of observation	% incidence top borer	% Parasitism (Top borer)			% incidence of shoot borer	% incidence of root borer	% Parssitism of (root and shoot borer) if any
		<i>A. flavipes</i>	<i>R. scripophagae</i>	<i>S. deesae</i>			
January	-	-	-	-	-	-	Not observed
February	-	-	-	-	-	-	
March	2.1	-	-	-	7.3	4.1	
April	8.9	-	-	-	12.7	7.3	
May	13.7	4.3	-	3.3	15.6	11.9	
June	17.2	8.7	-	6.9	7.4	6.3	
July	13.5	11.6	2.9	9.1	3.2	2.5	
August	9.6	13.1	4.1	11.3	-	-	
September	6.3	15.9	7.8	13.7	-	-	
October	2.9	7.5	4.4	6.8	-	-	
November	1.3	3.1	2.1	2.7	-	-	
December	Trace	-	--	-	-	-	

Table : 3b. E.30 Monitoring of insect pest and natural enemies of Sugarcane (0.2 ha area)

Period of observation	Pyrilla/leaf	% Parasitism (Pyrilla)		% incidence of stalk borer	% parasitism (stalk borer)
		<i>T. pyrrillae</i>	<i>E. melanoleuca</i>		
January	-	-	-	-	-
February	-	-	-	-	-
March	2.7	-	-	-	-
April	7.3	-	-	-	-
May	18.1	-	5.3	-	-
June	32.3	-	11.2	-	-
July	25.7	13	29.5	4.3	-
August	11.2	37	42.7	7.1	12.5
September	6.5	77	34.0	9.7	18.1
October	2.3	100	17.03	6.4	15.3
November	0.3	100	6.1	2.1	6.6
December	-	-	-	1.3	4.7

Table 4. Meteorological data during crop season 2015-16

Month	Temperature		Relative humidity (%)		Rainfall (mm)
	Max.	Min.	7 hrs.	14 hrs.	
March, 2015	27.6	15.4	83.5	47.5	16.3
April, 2015	33.9	19.9	82	42.5	16.6
May, 2015	35.5	23.5	81.5	45.5	21.9
June, 2015	36.6	25.5	84	49.5	27.7
July, 2015	33.7	25.5	87.5	70.5	74.8
August, 2015	33.6	24.3	90.5	67.5	228.4
September, 2015	33.6	23.9	89	64.0	77.9
October, 2015	33.0	25.2	89	49.5	2.1
November, 2015	29.3	14.5	89	51.5	0
December, 2015	23.3	8.6	86	53.0	0
January, 2016	22.0	7.95	88.5	59.0	0
February, 2016	26.5	12.0	87.5	51.5	1.4

Project No. E-36

1. Project Title : Management of borer complex of sugarcane through lures.
2. Objective : To manage sugarcane borer (early shoot borer, top borer and stalk borer) through pheromone traps.
3. Period under report : 2015-16
5. Year of Start : 2012-13
6. Location : Sugarcane Research Institute, Pusa, Bihar
7. Plot size : 01 acre
8. Duration : Long term
9. Variety : CoP 2061

Technical Summary:-

The experiment was conducted with variety CoP 2061 at Pusa to study the management of borer complex of sugarcane (ESB, TB and SB) through lures. The data presented in table 4a revealed that the activity of ESB started from 1st fortnight of March to 1st fortnight of July and its maximum 5.66/trap of moths were catch in 2nd fortnight of May. The incidence of ESB in treated plot and untreated plots were 11.63 and 15.87 per cent, respectively. The activity of TB started from 2nd fortnight of March to 1st fortnight with maximum 7.33 moth/trap catch in 1st fortnight of June. However, their incidences in treated and untreated plot were 15.71 and 18.44 per cent, respectively. The activity of stalk borer started from 1st fortnight of July to 1st fortnight of October with maximum 1.66 moth/trap catch in 2nd fortnight of August. The incidence of stalk borer in treated and untreated plots were 5.56 and 7.23 per cent, respectively.

Table 5a: Moth Catch of borer complex of sugarcane through lures at Pusa (2015-16)

Months/year	Fortnightly Interval	Temperature (°C)		Relative humidity (%)		Rainfall (mm)	No of moth trapped		
		Maximum	Minimum	07 00 hrs.	14 00 hrs.		ESB	TB	SB
Mar, 2015	I	27.5	13.3	83	48	10.8	0.66	0.00	0.00
	II	31.7	17.6	84	47	21.8	1.00	0.00	0.00
Apr, 2015	I	33.3	19.1	80	35	0.6	2.66	0.33	0.00
	II	32.9	20.7	84	50	32.6	3.00	1.66	0.00
May, 2015	I	34.6	23.0	82	43	15.2	4.33	2.33	0.00
	II	36.4	24.1	81	48	28.6	5.66	4.66	0.00
Jun, 2015	I	38.2	25.5	83	44	19.8	2.33	7.33	0.00
	II	35.1	25.5	85	55	35.6	1.33	4.00	0.00
Jul, 2015	I	33.7	25.2	87	77	97.6	0.66	2.66	0.00
	II	33.8	24.9	88	64	52.0	0.00	1.66	1.00
Aug, 2015	I	34.1	24.4	89	60	56.4	0.00	0.66	1.66
	II	33.1	24.3	92	75	400.4	0.00	0.33	2.33
Sep,2015	I	34.3	24.5	89	65	112.2	0.00	0.33	1.66
	II	33.0	23.4	89	63	43.6	0.00	0.00	1.00
Oct, 2015	I	34.1	21.6	89	51	4.2	0.00	0.00	0.66
	II	32.0	18.8	89	48	0	0.00	0.00	0.33
Nov,2015	I	30.4	15.4	90	51	0	0.00	0.00	0.00
	II	28.3	13.7	88	52	0	0.00	0.00	0.00
Dec,2015	I	24.4	12.2	85	62	0	0.00	0.00	0.00
	II	22.3	5.1	87	44	0	0.00	0.00	0.00
Jan,2016	I	23.6	7.4	88	54	0	0.00	0.00	0.00
	II	20.4	8.5	89	60	0	0.00	0.00	0.00
Feb, 2016	I	24.7	10.0	89	52	2.6	0.00	0.00	0.00
	II	28.4	14.1	86	51	0.2	0.00	0.00	0.00

Table 5b: Correlation analysis between moth catches and weather parameters at Pusa (2015-16)

Borer complex	Temperature °C		Relative humidity %		Rainfall (mm)
	Max.	Min.	7hrs.	14hrs.	
ESB	0.4854**	0.3696	-0.7937	-0.4570*	-0.1098
TB	0.6070**	0.5581**	-0.4819	-0.1076	0.0146
SB	0.3249	0.4710**	0.5673	0.5900**	-0.7609
Significant at 5% level ($r_{\pm} = 0.4227$) Significant at 1% level ($r_{\pm} = 0.5368$)					

Table 5c: Impact of moth catches of borer complex of sugarcane through lures at pusa (2015-16)

Treatment	% incidence of borer complex		
	Early shoot borer	Top borer	Stalk borer
With pheromone traps	11.63	15.71	5.56
Without pheromone traps	15.87	18.44	7.23

Project No. E-37

1. Project Title : Bio-efficacy of newer insecticides for the control of sugarcane early shoot borer.
2. Objective : To find out effective strategy for the management of sugarcane early shoot borer.
3. Period under report : 2015-16
5. Year of Start : 2013-14
6. Location : Sugarcane Research Institute, Pusa, Bihar
7. Plot size : 6 x 5.4 M²
8. Design : RBD
9. Variety : CoP 2061

Technical Summary:-

Data summarized in table 6, it reveals from the table that Chlorantraniliprol 18.5 SC@375ml/ha was superior when it was sprayed at 30DAP and 60DAP as recorded maximum germination (33.7 %), least cumulative incidence of ESB (5.28%) and highest yield (85.8 t/ha) followed by Chlorantraniliprol 0.4 G and Flubendiamide being 32.3%, 6.05%, 84.5t/ha and 30.9%, 6.78% and 83.3t/ha, respectively. However, remaining treatments were significant over control.

The present study among the insecticides, the percent incidence, yield and quality parameter in order of performance were Chlorantraniliprol 18.5SC > Chlorantraniliprol 0.4G > Flubendiamide > Fipronil 0.3G > Carbofuran 3 G > Phorate 10 G > Spinosad 45SC

Table6.Bioefficacy of new insecticides for the control of sugarcane early shoot borer at Pusa (2015-16)

Treat. No.	Treatment details	Germination (%)	Cumulative % incidence of ESB	Brix %	Pol %	Purity %	CCS %	Yield (t/ha)
T ₁ -	Fipronil 0.3G@ 25kg/ha	31.1	7.54	19.15	16.82	87.83	11.60	82.2
T ₂ -	Chlorantraniliprole 0.4G @ 22.5 kg/ha	32.2	6.05	19.34	17.14	88.62	11.87	84.5
T ₃ -	Chlorantraniliprole 18.5SC @ 375ml/ha	33.7	5.28	19.50	17.37	89.07	12.06	85.8
T ₄ -	Spinosad 45SC@ 90ml/ha	29.5	9.36	18.86	16.30	86.42	11.15	77.8
T ₅ -	Flubendiamide @250ml/ha	30.9	6.78	19.23	16.92	87.98	11.68	83.3
T ₆ -	Phorate 10 G @15kg/ha	29.1	8.40	19.00	16.54	87.05	11.36	78.7
T ₇ -	Carbofuran 3 G @ 33 kg/ha	30.6	7.93	19.06	16.69	87.56	11.49	80.4
T ₈ -	Untreated Control	29.4	18.66	17.76	15.36	86.48	10.58	68.1
	SEm ±	1.82	0.40	0.341	0.367	0.568	0.631	3.24
	CD at 5%	NS	1.23	NS	NS	NS	NS	9.84
	CV %	10.35	11.76	3.106	3.808	2.120	3.674	7.63