

**ALL INDIA COORDINATED RESEARCH PROJECT  
ON SUGARCANE  
YEAR 2014-15  
ENTOMOLOGY**

**UP COUNCIL OF SUGARCANE RESEARCH, SHAHJAHNAPUR**

PROJECT	E. 4-1
TITLE	EVALUATION OF VARIETIES FOR THEIR REACTION AGAINST MAJOR INSECT PESTS.
OBJECTIVE	TO GRADE THE VARIETIES IN ZONAL VARIETAL TRIALS FOR THEIR BEHAVIOUR TOWARDS DAMAGES BY KEY PESTS IN THE AREA.
YEAR OF COMMENCEMENT	REGULAR FEATURE
LOCATION	SHAHJAHANPUR

**AVT (MIDLATE) I PLANT**

Under AVT (midlate) I plant, total 5 varieties were evaluated viz., CoPb10181, CoPb 10182, CoH 10262, CoPant 10221 and Co 10036 alongwith three standards (checks) CoS 767, CoS 8436 and CoPant 97222 against major insect pests of the area.

Based on cumulative incidence of shoot borer the varieties viz., CoPb 10181 (19.56%), CoPb 10182 (17.45%) and CoPant 10221 (17.02%) were recorded moderate susceptible reaction to shoot borer while rest of the varieties including standard showed less susceptible reaction. At harvest the varieties CoPb 10182 (10.67%), CoH 10262 (13.33%) and Co 10036 (12.00%) including standard CoS 8436 (13.33%) and CoPant 97222 (14.67%) showed moderate susceptible reaction while rest of the varieties including standard CoS 767 (8.00%) showed less susceptible reaction to top borer. Regarding the stalk borer infestation, the varieties CoPb 10182 (5.05), CoH 10262 (5.38) and Co 10036 (5.42) including standard CoS 8436 (5.63) and CoPant 97222 (7.68) showed highly susceptible reaction to stalk borer while rest of the varieties CoPb 10181 (3.57), CoPant 10221 (2.57) including standard showed moderate susceptible to stalk borer (Table 1a,b).

**AVT (MIDLATE) II PLANT**

Under AVT (midlate) II plant, total 5 varieties viz., CoS 09232, CoPb 09214 CoLk 09204, CoH 09264 and Co 09022 alongwith three standards (checks) CoS 767, CoS 8436 and CoPant 97222 were evaluated against major insect pests of the area.

Based on cumulative incidence of shoot borer the varieties CoPb 09214 (20.09%) and CoLk 09204 (16.67%) showed moderate susceptible reaction while rest of the varieties including standard showed less susceptible reaction to shoot borer. It ranged from 9.58% in CoS 8436 (standard) to 20.09% in CoPb 09214. At harvest, the varieties CoPb 09214 (13.33%), Co 09022 (14.67%) including standard CoS 8436 (10.67%) showed moderate susceptible reaction while rest of the varieties including standard showed less susceptible reaction to top borer. Regarding the stalk borer infestation, the varieties CoH 09264 (4.62), Co 09022 (4.34) including standard CoS 767 (2.39) and CoS 8436 (3.48) showed moderate susceptible reaction to stalk borer while rest of

the varieties CoS 09232 (7.82), CoPb 09214 (5.57), CoLk 09204 (8.34) including standard CoPant 97222 (5.57) showed highly susceptible to stalk borer (Table 1e,d).

#### **AVT (EARLY) I PLANT**

Under AVT (early) I plant, total 3 varieties viz., CoS 10231, CoH 10261 and Co 10035 alongwith standards (checks) CoPant 84211 and CoJ 64 were evaluated against major insect pests of the area.

Based on cumulative incidence of shoot borer the varieties CoH 10261 (17.23%) and Co 10035 (20.78%) were recorded moderate susceptible reaction to shoot borer while rest of the varieties including standard showed less susceptible reaction. At harvest, only the variety Co 10035 (9.33%) showed less susceptible reaction to top borer while rest of the varieties CoS 10231 (12.00%), CoH 10261 (13.33%) including standard CoPant 84211 (10.67%) and CoJ 64 (16.00%) showed moderate susceptible reaction to top borer. Regarding the stalk borer infestation, all the varieties including standard were recorded moderate susceptible to stalk borer. It's infestation index ranged from 2.63 in CoPant 84211 (standard) to 4.18 in CoS 10231 (Table 1e,f).

#### **AVT (EARLY) II PLANT**

Under AVT (early) II plant 5 varieties viz., CoS 09246, CoLk 09202, CoPb 09181, CoH 09262 and CoH 09263 alongwith two standards CoPant 84211 and CoJ 64 were evaluated against major insect pests of the area.

Based on cumulative incidence of shoot borer the varieties CoLk 09202 (10.65%), CoH 09262 (13.90%) and standards CoPant 84211 (14.55%), CoJ 64 (12.41%) showed less susceptible reaction while the varieties CoS 09246 (19.40%), CoPb 09181 (21.16%) and CoH 09263 (18.72%) showed moderate susceptible reaction to shoot borer.

At harvest, all the varieties including standards showed moderate susceptible reaction to top borer. It ranges from 10.67% in standard CoPant 84211 to 18.67% in CoJ 64. Regarding the stalk borer infestation only the variety CoPb 09181 (7.80) showed highly susceptible reaction while all the varieties including the standard showed moderate susceptible to stalk borer infestation (Table 1g,h).

#### **AVT (Early) Ratoon**

Under AVT (early) ratoon, 5 varieties viz., CoS 09246, CoLk 09202, CoPb 09181, CoH 09262 and CoH 06263 alongwith two standards CoPant 84211 and CoJ 64 were evaluated against major insect pests of the area.

Based on cumulative incidence of shoot borer the varieties CoS 09246 (11.50%), CoLk 0922 (8.44%), CoH 09262 (8.98%), CoPb 09181 (14.02%), and standards Co 84211 (12.21%), CoJ 64 (11.23%) showed less susceptible reaction while the variety CoH 09263 (16.72%) showed moderate susceptible reaction to shoot borer.

At harvest, the varieties CoH 09263 (8.00%), CoPb 09181 (9.33%) and standard CoPant 84211 (9.33%) showed less susceptible reaction to top borer while the varieties CoS 09246 (10.67%), CoLk 0922 (12.00%), CoH 09262 (13.33%) and standard CoJ 64 (14.67%) showed moderate susceptible reaction to top borer. Regarding the stalk borer infestation only the variety CoPb 09181 (5.63%) showed highly susceptible reaction while all the varieties including the standard showed moderate susceptible to stalk borer infestation (Table 1ij).

#### **AVT (Midlate) Ratoon**

Under AVT (midlate) ratoon total 5 varieties viz., CoS 09232, CoPb 09214, CoLk 09204, CoH 09264 and Co 09022 alongwith three standards (checks) CoS 767, CoS 8436 and CoPant 97222 were evaluated against major insect pests of the area.

Based on cumulative incidence of shoot borer the only variety Co 09022 (15.98%) showed moderately susceptible reaction while all the varieties alongwith standards showed less susceptible reaction to shoot borer.

At harvest, the varieties CoH 09264 (6.67%), CoLk 09204 (5.33%), Co 09232 (9.33%) and standards CoS 767 (8.00%), CoPant 97222 (6.67%) showed less susceptible reaction while the varieties Co 09022 (10.67%), CoPb 09214 (10.67%) and standard CoS 8436 (12.00%) showed

moderate susceptible reaction to top borer. Regarding the stalk borer infestation the variety CoLk 09204 (5.17) showed highly susceptible reaction while rest all the varieties including standard showed less susceptible to stalk borer (Table 1kl).

#### **Project E-28: Survey and surveillance of sugarcane insect-pests**

Sugarcane fields around sugar factory area were surveyed to know the major insect pests of the area. During hot weather, the incidence of early shoot borer was low and ranged from 4.18% (Tilhar factory zone) to 8.65% (Rupapur factory zone). The per cent incidence of top borer was recorded moderate in all surveyed factory zone. The minimum (12.75%) incidence of top borer was recorded around Azabapur factory zone while maximum (15.65%) around Baheri factory zone. The infestation of stalk borer was recorded low to moderate in all surveyed factory zone. It ranges from 22.00% on cane basis with 8.38% intensity around Tilhar factory zone to 35.00 on cane basis with 9.89% intensity around Rupapur factory zone. The sporadic occurrence of mealy bug and army worm was recorded on CoS 97264 (Ratoon) around Nigohi factory zone. Sporadic occurrence of white grub and gurdaspur borer was also recorded on CoP 84212 (plant), CoSe 92423 (Ratoon) and CoSe 01434 (Ratoon) around Baheri factory zone (Table 2).

#### **Project E-30: Monitoring of insect pests and bioagents in sugarcane agro-ecosystem.**

An experiment was conducted on sugarcane crop planted in 0.2 ha area with CoS 07250 cultivars at Shahjahanpur to monitor the key insect pests and their bio-agents. The incidence of early shoot borer was recorded maximum 23.08% during 24<sup>th</sup> SMW followed by 18.25%, 14.76% and 6.54% during 29<sup>th</sup>, 20<sup>th</sup> and 16<sup>th</sup> SMW respectively. The incidence of top borer was recorded maximum 5.20% during 35<sup>th</sup> SMW followed by 5.00%, 4.25%, 2.15% and 1.90% during 31<sup>st</sup>, 26<sup>th</sup>, 22<sup>nd</sup> and 38<sup>th</sup> SMW, respectively. The per cent incidence of stalk borer (on cane basis) was observed to be maximum 45.20% during 47<sup>th</sup> SMW followed by 39.50% during 43<sup>rd</sup> SMW and 30.35% during 38<sup>th</sup> SMW, respectively. The *bio-agents* viz., *Isotima javensis*, *Telenomus beneficiens*, *Rhaconotus scirpophagae* and *Stenobracon deesae* were recorded as major parasitoids on top borer. *Cotesia flavipes*, a larval parasitoid of stalk borer was also recorded from the field. A parasitisation of larvae by *Isotima javensis* was observed from 22<sup>nd</sup> SMW (1.60%) and increases upto 11.35% during 35<sup>th</sup> SMW thereafter decreases upto 5.20% during 38<sup>th</sup> SMW. The peak activity of egg-parasitoid *T. beneficiens* was observed to be 14.65% during 31<sup>st</sup> SMW and reduced (6.28%) during 35<sup>th</sup> SMW. The parasitisation of top borer by *Rhaconotus scirpophagae* was recorded minimum (2.10%) during 26<sup>th</sup> SMW which increased upto 9.50% during 35<sup>th</sup> SMW. The parasitisation of *Stenobracon deesae* was ranged from 3.20% during 31<sup>st</sup> SMW to 6.00% during 38<sup>th</sup> SMW. The parasitisation of stalk borer larvae by *Cotesia flavipes* was recorded maximum 25.50% during 38<sup>th</sup> SMW thereafter it decreased upto 6.33% during 47<sup>th</sup> SMW (Table 3a,b).

#### **Project E-36: Management of borer complex of sugarcane through lures.**

An experiment was conducted with CoS 07250 cultivar at Shahjahanpur to study the management of borer complex of sugarcane (early shoot, top and stalk borer) through pheromone trap and to know the influence of weather parameters on moth catches.

The present investigation revealed that highest number of shoot borer (4.66 moths/trap) was recorded during 17<sup>th</sup> SMW followed by 23<sup>rd</sup> SMW (4.33 moth/trap) and 21<sup>st</sup>, 22<sup>nd</sup> and 25<sup>th</sup> SMW (3.33 moths/trap). Top borer moth catches were recorded maximum (3.66 moths/trap) during 27<sup>th</sup> SMW followed by 28<sup>th</sup> and 20<sup>th</sup> SMW (3.33 moths/trap). The highest moth catches (4.00 moths/trap) of stalk borer was observed during 37<sup>th</sup> SMW followed by 38<sup>th</sup> SMW (3.33 moths/trap) and 39<sup>th</sup> SMW (3.00 moths/trap).

Moth catches of shoot borer was positively associated with maximum ( $r = 0.6863$ ) and minimum temperature (0.3043) while negatively correlated with morning and evening humidity ( $r = - 0.6338$ ;  $r = 0.4686$ ). Top borer moth catches were found to be positively correlated with maximum ( $r = 0.1752$ ) and minimum temperature ( $r = 0.1845$ ) while negatively correlated with

morning and evening humidity ( $r = - 0.2694$ ,  $r = - 0.2777$ ). The moth catches of stalk borer was observed positively correlated with weather parameters viz., maximum temperature ( $r = 0.2256$ ), minimum temperature ( $r = 0.2920$ ) and relative humidity ( $r = 0.1235$ ,  $r = 0.1636$ ).

Per cent incidence was also observed in treated (application of pheromone trap) and untreated plots (without pheromone trap). The per cent incidence of shoot borer (18.20%) top borer 2<sup>nd</sup> brood (2.15%), 3<sup>rd</sup> brood (4.60%) and at harvest (12.55%) and infestation index of stalk borer was recorded 3.90 in treated plot. While the corresponding parameters were 21.50, 3.50, 6.35, 14.60 per cent and 4.70 infestation index in untreated plots respectively (Table 4).

**Project E-37: Bio-efficacy of new insecticides for the control of sugarcane early shoot borer.**

Among the tested insecticides, spraying of Flubendiamide @ 250 ml/ha at 30 and 60 DAP recorded least cumulative incidence of ESP (9.56%) followed by spraying of Chlorantraniprole 18.5 SC @ 375 ml/ha at 30 and 60 DAP (9.60%) as compared to untreated control (15.98%). Cane girth was highest in carbofuran 3G @ 33 kg/ha (20.30 mm/cane) at the time of planting and 60 DAP. Spraying of Spinosad 45 SC @ 90 ml/ha (20.30 mm/cane) at 30 and 60 DAP followed by Phorate 10G @ 15kg/ha (20.27 mm/cane) at the time of planting and 60 DAP and spraying of Chlorantraniliprole 18.5 SC @ 375 ml/ha (20.27 mm/cane) at 30 and 60 DAP. The cane height was maximum in Spinosad 45 SC @ 90 ml (205.97 cm/cane) followed by Chlorantraniliprole 0.4 @ 22.5 kg (193.34 cm/cane) and fipronil 0.3G @ 25kg (188.47 cm/cane) and chlorantraniliprole 18.5 SC @ 375ml/ha (188.33 cm/cane). The maximum cane yield was recorded in Chlorantraniliprole 18.5 SC @ 375 ml/ha (102.78 MT/ha) followed by Carbofuran 3G @ 33 kg/ha (98.15 MT/ha), Spinosad 45 SC @ 90 ml (86.11 MT/ha) and Fipronil 0.3G @ 25 kg/ha (85.18 MT/ha) (Table 5a,b).

**Table 1a: Evaluation of zonal varieties/genotypes for their reaction against major insect pests of sugarcane**

AVT (Mid late) I Plant (2014-15)

SN	Varieties/genotypes	Early shoot borer (% incidence)					No. of borer plants/ha
		30 DAP	60 DAP	90 DAP	120 DAP	Cummu.	
01	CoPb 10181	8.17	11.36	13.61	3.10	19.56	12757
02	CoPb 10182	8.05	11.75	13.21	2.12	17.45	11523
03	CoH 10262	6.30	8.85	10.53	2.36	13.65	9465
04	CoPant 10221	6.85	11.32	13.01	3.30	17.02	11523
05	Co 10036	5.89	10.91	12.95	2.50	12.58	8025
Ck	CoS 767	6.54	8.49	10.83	2.73	12.93	9259
	CoS 8436	5.26	6.95	12.47	3.24	14.17	7202
	Co Pant 97222	9.14	12.21	13.27	2.57	14.21	10494

**Table 1b: Evaluation of zonal varieties/genotypes for their reaction against major insect pests of sugarcane**

AVT (Mid late) I Plant (2014-15)

SN	Varieties/genotypes	Top borer (% incidence)			Stalk borer		
		III <sup>rd</sup> brood	IV <sup>th</sup> brood	At harvest	% incidence	% intensity	Infestation index
		5 <sup>th</sup> month	7 <sup>th</sup> month				
01	CoPb-10181	1.09	0.44	6.67	44.00	8.11	3.57
02	CoPb-10182	2.03	1.02	10.67	54.67	9.23	5.05
03	CoH 10262	3.22	1.07	13.33	46.67	11.53	5.38
04	CoPant- 10221	1.23	0.82	9.33	32.00	8.03	2.57
05	Co-10036	3.38	1.13	12.00	57.33	9.45	5.42
Ck	CoS 767	1.60	0.46	8.00	34.67	8.17	2.83
	CoS 8436	3.69	1.38	13.33	45.33	12.42	5.63
	Co Pant 97222	3.21	1.20	14.67	64.00	12.00	7.68

**Table 1c: Evaluation of zonal varieties/genotypes for their reaction against major insect pests of sugarcane**

AVT (Mid late) II Plant (2014-15)

S.No.	Varieties/genotypes	Early shoot borer (% incidence)					No. of borer plants/ha
		30 DAP	60 DAP	90 DAP	120 DAP	Cummu.	
01	CoS 09232	8.69	10.85	6.08	2.63	13.83	7202
02	CoPb 09214	22.41	22.25	10.71	6.50	20.09	18930
03	CoLk 09204	11.39	16.27	13.56	1.97	16.67	10082
04	CoH 09264	14.03	11.77	7.29	2.73	12.95	9671
05	Co 09022	10.78	10.92	8.79	1.90	12.78	9259
Ck	CoS 767	4.75	8.01	9.73	2.50	10.22	7613
	CoS 8436	4.65	7.26	8.94	2.60	9.58	4133
	Co Pant 97222	12.90	8.83	10.36	2.12	11.61	7407

**Table 1d: Evaluation of zonal varieties/genotypes for their reaction against major insect pests of sugarcane**

AVT (Mid late) II Plant (2014-15)

SN	Varieties/genotypes	Top borer (% incidence)			Stalk borer		
		III <sup>rd</sup> brood	IV <sup>th</sup> brood	At harvest	% incidence	% intensity	Infestation index
		5 <sup>th</sup> month	7 <sup>th</sup> month				
01	CoS 09232	2.45	1.16	8.00	73.33	10.67	7.82
02	CoPb 09214	1.61	0.96	13.33	60.00	9.28	5.57
03	CoLk 09204	4.84	1.84	6.67	65.33	12.77	8.34
04	CoH 09264	4.56	2.40	5.33	53.33	8.67	4.62
05	Co 09022	3.00	1.93	14.67	53.33	8.13	4.34
Ck	CoS 767	4.13	1.56	9.33	33.33	7.16	2.39
	CoS 8436	2.79	1.96	10.67	41.33	8.42	3.48
	Co Pant 97222	3.72	1.99	9.33	56.00	9.95	5.57

**Table 1e: Evaluation of zonal varieties/genotypes for their reaction against major insect pests of sugarcane**

AVT (Early) I Plant (2014-15)

S.No.	Varieties/genotypes	Early shoot borer (% incidence)					No. of borer plants/ha
		30 DAP	60 DAP	90 DAP	120 DAP	Cummu.	
01	CoS 10231	26.19	11.32	11.77	3.20	14.09	10494
02	CoH 10261	23.21	18.48	19.01	2.65	17.22	12551
03	Co 10035	29.37	22.18	19.38	6.88	20.78	11490
Ck	Co Pant 84211	15.85	15.09	13.00	1.97	14.29	10288
	CoJ 64	19.90	17.28	17.23	2.32	13.81	11111

**Table 1f :Evaluation of zonal varieties/genotypes for their reaction against major insect pests of sugarcane**

AVT (Early) I Plant (2014-15)

S.No.	Varieties/genotypes	Top borer (% incidence)			Stalk borer		
		III <sup>rd</sup> brood	IV <sup>th</sup> brood	At harvest	% incidence	% intensity	Infestation index
		5 <sup>th</sup> month	7 <sup>th</sup> month				
01	CoS 10231	2.03	0.74	12.00	44.00	9.49	4.18
02	CoH 10261	3.68	1.08	13.33	38.67	9.38	3.63
03	Co 10035	1.23	0.70	9.33	41.33	8.26	3.41
Ck	Co Pant 84211	2.00	1.11	10.67	29.33	8.98	2.63
	CoJ 64	4.09	1.36	16.00	41.33	8.86	3.66

**Table 1g: Evaluation of zonal varieties/genotypes for their reaction against major insect pests of sugarcane**

**AVT (Early) II Plant (2014-15)**

SN	Varieties/genotypes	Early shoot borer (% incidence)					No. of borer plants/ha
		30 DAP	60 DAP	90 DAP	120 DAP	Cummu.	
01	CoS 09246	20.11	18.27	17.53	1.61	19.40	11934
02	CoLk 09202	4.90	7.13	5.15	1.70	10.65	5761
03	CoPb 09181	24.51	18.72	12.43	1.66	21.16	12757
04	CoH 09262	10.53	12.06	10.15	2.01	13.90	6379
05	CoH 09263	31.32	13.93	10.78	1.88	18.72	14403
Ck	Co Pant 84211	18.32	17.32	13.18	2.49	14.55	9671
	CoJ 64	16.48	12.70	7.67	2.06	12.41	6790

**Table 1h: Evaluation of zonal varieties/genotypes for their reaction against major insect pests of sugarcane**

**AVT (Early) II Plant (2014-15)**

SN	Varieties/genotypes	Top borer (% incidence)			Stalk borer		
		III <sup>rd</sup> brood	IV <sup>th</sup> brood	At harvest	% incidence	% intensity	Infestation index
		5 <sup>th</sup> month	7 <sup>th</sup> month				
01	CoS 09246	1.55	1.10	13.33	65.33	6.85	4.48
02	CoLk 09202	3.26	1.92	14.67	42.67	8.44	3.60
03	CoPb 09181	2.34	1.82	12.00	86.67	9.00	7.80
04	CoH 09262	3.59	1.80	16.00	36.00	9.59	3.45
05	CoH 09263	2.86	1.84	12.00	50.67	7.98	4.04
Ck	Co Pant 84211	1.55	1.11	10.67	58.67	7.76	4.55
	CoJ 64	4.51	3.01	18.67	29.33	7.98	2.34

**Table 1i: Evaluation of zonal varieties /genotypes for their reaction against major insect pests of sugarcane**

**AVT (Early) Ratoon (2014-15)**

SN	Varieties/genotypes	Early shoot borer (% incidence)					No. of borer plants/ha
		30 DAP	60 DAP	90 DAP	120 DAP	Cummu.	
1	CoS 09246	14.79	11.58	9.49	2.12	11.50	13580
2	CoLk 09202	6.83	5.55	5.33	2.43	8.44	9877
3	CoPb 09181	19.10	14.63	8.93	2.90	14.02	16872
4	CoH 09262	8.75	5.92	6.32	2.40	8.98	9053
5	CoH 09263	23.41	14.70	10.00	3.17	16.72	21399
Ck	CoPant 84211	13.64	10.90	8.00	2.89	12.21	12963
	CoJ 64	14.58	9.04	6.18	2.58	11.23	12757

**Table 1j: Evaluation of zonal varieties /genotypes for their reaction against major insect pests of sugarcane**

**AVT (Early) Ratoon (2014-15)**

SN	Varieties/genotypes	Top borer (% incidence)			Stalk borer		
		3 <sup>rd</sup> brood	4 <sup>th</sup> brood	At harvest	% incidence	% intensity	Infestation index
		5 <sup>th</sup> month	7 <sup>th</sup> month				
1	CoS 09246	1.35	1.16	10.67	56	7.24	4.05
2	CoLk 09202	2.61	1.15	12.00	37.33	7.58	2.83
3	CoPb 09181	1.54	0.77	9.33	74.67	7.54	5.63
4	CoH 09262	4.37	2.19	13.33	28	10.80	3.02
5	CoH 09263	1.31	1.12	8.00	42.47	8.06	3.44
Ck	CoPant 84211	1.93	1.07	9.33	48	7.46	3.58
	CoJ 64	3.58	1.98	14.67	26.67	8.22	2.19

**Table 1k: Evaluation of zonal varieties /genotypes for their reaction against major insect pests of sugarcane**

**AVT (Midlate) Ratoon (2014-15)**

SN	Varieties/genotypes	Early shoot borer (% incidence)					No. of borer plants/ha
		30 DAP	60 DAP	90 DAP	120 DAP	Cummu.	
1	CoS 09232	7.64	10.09	8.72	2.36	10.01	16049
2	CoLk 09214	17.14	17.88	11.60	3.81	14.24	26749
3	CoPb 09204	7.94	12.03	4.91	2.64	7.59	12140
4	CoH 09264	6.09	8.93	9.82	3.52	11.94	19342
5	Co 09022	8.55	7.80	14.47	5.96	15.98	23251
Ck	CoS 767	7.09	7.58	7.02	3.26	10.26	16049
	CoS 8436	7.21	6.11	4.18	2.77	6.35	10082
	CoPant 97222	11.39	8.77	8.75	3.67	9.81	17901

**Table 1l: Evaluation of zonal varieties /genotypes for their reaction against major insect pests of sugarcane**

**AVT (Midlate) Ratoon (2014-15)**

SN	Varieties/genotypes	Top borer (% incidence)			Stalk borer		
		3 <sup>rd</sup> brood	4 <sup>th</sup> brood	At harvest	% incidence	% intensity	Infestation index
		5 <sup>th</sup> month	7 <sup>th</sup> month				
1	CoS 09232	1.70	1.22	9.33	66.67	8.78	5.85
2	CoLk 09214	1.03	0.62	10.67	46.67	9.14	4.27
3	CoPb 09204	2.74	1.60	5.33	50.67	10.21	5.17
4	CoH 09264	2.41	1.32	6.67	42.67	8.12	3.46
5	Co 09022	2.15	1.67	10.67	40	8.54	3.42
Ck	CoS 767	0.74	0.93	8.00	28	7.54	2.11
	CoS 8436	1.23	1.02	12.00	33.33	7.95	2.65
	CoPant 97222	2.03	0.81	6.67	41.33	9.65	3.99



**Table 2: Survey and surveillance of sugarcane insect pests in the area (2014-15)**

SN	Varieties	Location	Name of pest	% incidence/population			Remark
				Minimum	Maximum	Average	
1	Co 0238, CoS 8436, CoSe 98231, CoS 767	Rupapur (Hardoi)	Early shoot borer (% incidence) Top shoot borer (% incidence) Stalk borer (% incidence) (% Intensity)	7.5 12.30 30 8.31	9.80 18.40 40 11.47	8.65 15.35 35.00 9.89	
2	CoS 8436, Co 0238, CoSe 92423, CoS 01434 and CoS 767	Hargaon (Sitapur)	Early shoot borer (% incidence) Top shoot borer (% incidence) Stalk borer (% incidence) (% Intensity)	4.28 11.70 28 10.93	6.50 16.20 32 9.21	5.39 13.95 30.00 10.07	
3	CoSe 01434, CoSe 92423, Co 0238 and CoS 8436	Tilhar (Shahjahanpur)	Early shoot borer (% incidence) Top shoot borer (% incidence) Stalk borer (% incidence) (% Intensity)	2.75 10.50 18 7.67	5.60 15.37 25 9.08	4.18 12.94 22.00 8.38	
4	CoS 97261, CoS 767, CoS 97264, CoS 8436, CoLk 94184, CoP 9301, Co 0238, CoSe 92423	Nigohi (Shahjahanpur)	Early shoot borer (% incidence) Top shoot borer (% incidence) Stalk borer (% incidence) (% Intensity) Mealy bug Army worm	5.20 13.65 25 9.00	7.80 16.55 37 11.02	6.50 15.10 31.00 10.01	CoS 97264 (Ratoon)
				Sporadic incidence			

5	CoS 8436, CoSe 92423, Co 0238, CoP 84212	Baheri (Bareilly)	Early shoot borer (% incidence)	6.40 14.10 29	8.82 17.20 36	7.61 15.65 32.5	CoP 84212 CoSe 92423 (R) and CoSe 01434 (R)
			Top shoot borer (% incidence)	8.66	8.47	8.57	
			Stalk borer (% incidence) (% Intensity) White grub Gurdaspur borer	Sporadic incidence			
6	Co 0238, Co 0118, Co 98014, CoSe 01434, CoSe 92423	Ajabapur (Kheri)	Early shoot borer (% incidence) Top shoot borer (% incidence) Stalk borer (% incidence) (% Intensity)	3.15 11.30 23 12.77	7.45 14.20 35 9.18	5.30 12.75 29 10.73	

**Table 3a: Monitoring of insect pest and natural enemies of sugarcane (0.2 ha area) 2014-15**

Period of observation Dates + SMW	% incidence early shoot borer	% Parasitism (ESB), if any			% incidence early stalk borer	% Parasitism (stalk borer)				
		<i>T. chilonis</i>	<i>E. annulipes</i>	<i>S. inferens</i>		<i>Cotesia flavipes</i>	<i>Apanteles pyralophagus</i>	<i>S. inferens</i>	<i>Nosema sp.</i>	<i>B. bassiana</i>
1	2	3	4	5	6	7	8	9	10	11
16-04-14 16 <sup>th</sup> SMW	6.54	-	-	-	-	-	-	-	-	-
18-05-14 20 <sup>th</sup> SMW	14.76	-	-	-	-	-	-	-	-	-
17-06-14 24 <sup>th</sup> SMW	23.08	-	-	-	-	-	-	-	-	-
20-07-14 29 <sup>th</sup> SMW	18.25	-	-	-	-	-	-	-	-	-
20-08-14 34 <sup>th</sup> SMW	-	-	-	-	-	-	-	-	-	-
22-09-14 38 <sup>th</sup> SMW	-	-	-	-	30.35	25.50	-	-	-	-
25-10-14 43 <sup>rd</sup> SMW	-	-	-	-	39.50	17.25	-	-	-	-
19-11-14 47 <sup>th</sup> SMW	-	-	-	-	45.20	6.33	-	-	-	-



**Table 4 : Management of borer complex of sugarcane through lures (2014-15)**

Met. Week	Date	Shoot borer	Top borer	Stalk borer	Temperature <sup>0</sup> C		R.H.%		Rain Fall (mm)/Days
					Max.	Min.	F.N.	A.N.	
9	26-4 March2012	0.00	0.33	0.00	24.90	12.75	90.14	66.18	18/3
10	5-11	0.00	0.66	0.33	23.32	12.81	75.28	45.14	-
11	12-18	0.33	2.00	1.33	29.51	15.84	76.71	46.71	1.2/1
12	19-25	1.00	1.33	2.00	30.82	16.64	65.85	43.57	-
13	26-01 April	0.66	0.00	1.00	33.45	18.31	60.71	47.28	-
14	2-8	0.33	0.00	1.00	35.00	19.05	58.57	42.71	-
15	9-15	2.66	0.66	0.66	35.10	18.31	59.00	57.57	-
16	16-22	3.00	0.33	0.00	32.45	18.84	62.00	58.14	7.4/1
17	23-29	4.66	1.66	0.00	38.48	22.74	45.42	23.00	-
18	30-06 May	1.00	2.33	1.00	36.65	22.30	55.00	38.14	8.0/1
19	7-13	2.00	3.00	1.33	37.82	24.17	50.71	31.85	1.2/1
20	14-20	2.66	3.33	0.66	38.00	24.40	47.42	27.00	-
21	21-27	3.33	0.66	0.00	39.11	25.20	43.85	31.28	-
22	28-03 June	3.33	0.33	2.33	39.35	24.10	60.57	44.85	
23	04-10	4.33	0.00	2.66	43.11	26.10	53.28	33.14	
24	11-17	2.66	2.00	2.33	37.84	26.41	63.00	43.00	
25	18-24	3.33	1.33	2.00	39.01	26.92	70.42	63.57	
26	25-01 July	2.33	1.66	1.00	38.42	24.90	64.28	56.71	22/3
27	2-8	0.66	3.66	1.33	34.25	25.60	76.85	64.00	55.6/3
28	9-15	1.00	3.33	1.66	34.38	27.38	84.42	77.28	1.4/1
29	16-22	1.66	0.33	0.66	32.60	26.35	88.85	84.42	50.4/6
30	23-29	2.00	0.00	0.33	33.52	25.94	87.28	73.71	8.8/6
31	30-05 August	0.66	0.66	0.00	34.84	26.24	74.42	63.14	7.2/3
32	06-12	1.00	1.00	0.00	33.97	24.30	85.85	63.28	2.6/2
33	13-19	1.00	2.00	0.66	34.18	26.32	84.85	73.85	31.2/2
34	20-26	0.33	1.33	1.00	36.54	26.72	76.42	64.71	-
35	27-02 September	0.00	0.66	1.66	34.88	25.22	78.85	60.52	11.0/2
36	03-09	0.00	0.33	2.00	33.72	25.68	83.71	81.57	23.2/4
37	10-16	-	0.00	4.00	32.05	24.01	92.28	81.42	46.2/2
38	17-23	-	0.66	3.33	34.32	24.90	85.57	65.00	-
39	24-30	-	0.00	3.00	34.50	23.28	79.14	66.00	-
40	01-07 October	-	-	1.00	33.67	23.01	86.71	68.42	-
41	08-14	-	-	1.33	31.88	19.95	84.0	56.71	26.4/1
42	15-21	-	-	1.00	31.94	16.10	87.57	60.71	4.6/1
43	22-28	-	-	0.00	31.51	16.78	91.14	59.71	-

**Correlation Coefficient:**

	<b>Shoot Borer</b>	<b>Top Borer</b>	<b>Stalk Borer</b>
<b>Max. Temp.</b>	0.6863	0.1752	0.2256
<b>Min. Tem.</b>	0.3043	0.1845	0.2920
<b>R.H.% FN</b>	-0.6338	-0.2694	0.1235
<b>R.H.% AN</b>	-0.4686	-0.2777	0.1636

**Impact of moth catches on incidence of borer complex at Shahjahanpur (2014-15)**

Insect pest	% Incidence of Insect Pest	
	Treated (Pheromone Trap)	Untreated (Without pheromone Trap)
Shoot Borer	18.20	21.50
Top Borer (2 <sup>nd</sup> brood)	2.15	3.50
Top Borer (3 <sup>rd</sup> brood)	4.60	6.35
Top Borer (At harvest)	12.55	14.60
Stalk borer (Infestation index)	3.90	4.70

Table 5a: Bioefficacy of new insecticides for the control of sugarcane shoot borer (2014-15)

Tr. No.	Treatment detail	Early shoot borer % incidence				Cumulative incidence of early shoot borer (ESB)	Germi. %	Tillers/ha (000)	NMC/ha (000)	Cane yield (t/ha)
		45 DAP	60 DAP	90 DAP	120 DAP					
T <sub>1</sub>	Soil application of Fipronil 0.3 G @ 25 kg/ha at the time of planting and 60 DAP	1.20	1.75	4.57	5.83	11.77	35.94	165	115	85.18
T <sub>2</sub>	Soil application of Chlorantraniliprole 0.4 G @ 22.5 kg/ha at the time of planting and 60 DAP	0.97	1.88	3.60	4.51	10.07	40.73	180	102	71.30
T <sub>3</sub>	Spraying of Chlorantraniliprole 18.5 SC @ 375 ml/ha at 30 & 60 DAP	1.06	1.63	3.87	4.57	9.60	40.00	159	117	102.78
T <sub>4</sub>	Spraying of Spinosad 45 SC @ 90 ml/ha at 30 & 60 DAP	2.98	4.94	4.35	5.58	14.55	41.04	156	109	86.11
T <sub>5</sub>	Spraying of Flubendiamide @ 250 ml/ha at 30 & 60 DAP	1.04	1.88	3.83	4.53	9.56	39.48	161	113	72.68
T <sub>6</sub>	Soil application of Phorate 10 G @ 15 kg/ha at the time of planting and 60 DAP	0.86	1.14	4.55	5.85	11.66	43.02	176	116	83.33
T <sub>7</sub>	Soil application of Carbofuran 3G @ 33 kg/ha at the time of planting and 60 DAP	2.46	3.17	3.49	5.31	12.19	44.69	177	128	98.15
T <sub>8</sub>	Untreated control	3.13	4.67	5.72	6.18	15.98	33.75	142	92	65.28
	SE±	0.92	1.00	0.93	1.09	-	3.82	10.73	9.22	10.36
	CD at 5%	NS	2.14	NS	NS	-	NS	23.02	19.77	22.23
	CV(%)	64.50	47.41	26.68	24.65	-	11.75	7.98	10.13	15.27

**Table 5b: Bioefficacy of new insecticides for the control of sugarcane shoot borer (2014-15)**

Tr. No.	Treatment detail	Growth parameter				Quality parameter			
		Total cane height (cm)	Millable cane height (cm)	Number of internodes	Cane girth (mm)	Brix (%)	Sucrose (%) in juice	Purity (%)	CCS (%)
T <sub>1</sub>	Soil application of Fipronil 0.3 G @ 25 kg/ha at the time of planting and 60 DAP	284.1	188.47	21	20.06	19.93	17.32	86.84	11.88
T <sub>2</sub>	Soil application of Chlorantraniliprole 0.4 G @ 22.5 kg/ha at the time of planting and 60 DAP	281.67	193.34	20	19.85	20.61	18.22	88.40	12.60
T <sub>3</sub>	Spraying of Chlorantraniliprole 18.5 SC @ 375 ml/ha at 30 & 60 DAP	283.50	188.33	20	20.25	20.84	18.46	88.54	12.78
T <sub>4</sub>	Spraying of Spinosad 45 SC @ 90 ml/ha at 30 & 60 DAP	272.33	205.97	21	20.30	20.47	18.08	88.29	12.50
T <sub>5</sub>	Spraying of Flubendiamide @ 250 ml/ha at 30 & 60 DAP	285.00	184.20	19	19.06	20.76	18.37	88.44	12.71
T <sub>6</sub>	Soil application of Phorate 10 G @ 15 kg/ha at the time of planting and 60 DAP	260.80	182.17	20	20.27	19.90	17.31	86.93	11.88
T <sub>7</sub>	Soil application of Carbofuran 3G @ 33 kg/ha at the time of planting and 60 DAP	246.53	173.37	21	20.30	20.24	17.74	87.62	12.22
T <sub>8</sub>	Untreated control	254.07	177.97	20	19.43	19.70	17.09	86.71	11.71
	<b>SE±</b>	17.49	15.33	1.29	0.41	-	0.60	-	-
	<b>CD at 5%</b>	NS	NS	NS	NS	-	NS	-	-
	<b>CV(%)</b>	7.90	10.05	7.79	2.25	-	4.13	-	-



