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SUGARCANE SECTION
CCS HARYANA AGRICULTURAL UNIVERSITY, HISAR
RRS, UCHANI, KARNAL

ANNUAL REPORT ENTOMOLOGY FOR 2014-15, RRS, UCHANI, KARNAL

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

Thirty eight entries/genotypes comprising seven under IVT (Early), three under AVT E-1P and five under AVT E -1 P, thirteen under IVT ML, five AVT ML -1P and 5 AVT ML-11P with respective group standard and standard checks were evaluated for their reaction against major moth borers (top Borer, stalk borer and root borer) and sucking pests (whitefly, webbing mite and black bug) at RRS, Uchani, Karnal (Table). All the evaluated genotypes showed susceptibility to the three borer species and sucking pests to varying extent.

Table 1.1a: Reaction of sugarcane genotypes in Initial Varietal Trial (Early) to borers

Sr No.	Variety/Genotype	Borer (% infestation)				Grade of infestation			
		Shoot Borer	Top Borer	Stalk borer*	Root borer	Shoot Borer	Top Borer	Stalk borer*	Root borer
1	CoH 11261	3.1	8.8	0.6	20	LS	LS	HS	MS
2	CoH 11262	5.2	10.3	2.2	4	LS	MS	MS	LS
3	CoLk 11201	5.0	5.1	1.3	33	LS	LS	HS	HS
4	CoLk 11202,	2.3	5.8	2.5	22	LS	LS	MS	MS
5	CoLk 11203,	3.1	7.1	2.7	37	LS	LS	MS	HS
6	CoPb 11211	1.3	6.8	2.4	30	LS	LS	MS	MS
7	CoPb 11212	5.4	10.1	1.2	55	LS	MS	HS	HS
CK	CoJ 64	2.9	9.3	6.5	28	LS	LS	HS	MS
	CoPant 84211	2.4	6.9	1.7	28	LS	LS	LS	MS

*Infestation Index

Under the IVT early, (Table 1.1a) seven entries were evaluated against the standards CoJ 64 and CoPant 84211. Shoot borer incidence ranged from 1.3 to 5.4 per cent in different genotypes and all the genotype were categorised under least susceptible. Incidence of top borer ranged from 5.1 to 10.3 per cent in tested genotypes. Genotypes CoH 11262 and CoPb 11212 were shown a reaction of moderately susceptible against top borer. In case of stalk borer infestation index ranged from 0.6 to 6.5 in all genotypes. Out of which, three were in highly and four categorised under moderately susceptible. Root borer incidence ranged from 4 per cent to 55 per cent. The highest infestation was recorded in CoPb 11212.

Table 1.1b: Reaction of sugarcane genotypes in Initial Varietal Trial (Early) to sucking pests

Sr No.	Variety/Genotype	Sucking pests (% infestation)			Grade of infestation		
		Whitefly*	Webbing mite	Black bug	Whitefly	Webbing mite	Balck bug
1	CoH 11261	0.6	1.9	4.8	LS	LS	LS
2	CoH 11262	0.8	1.9	11.0	LS	LS	LS
3	CoLk 11201	1.4	1.3	11.4	LS	LS	LS
4	CoLk 11202,	1.6	4.5	7.5	LS	LS	LS

5	CoLk 11203,	0.7	7.1	7.0	LS	LS	LS
6	CoPb 11211	0.9	2.5	7.2	LS	LS	LS
7	CoPb 11212	8.3	1.5	8.6	HS	LS	LS
CK	CoJ 64	0.6	3.6	13.2	LS	LS	LS
	CoPant 84211	2.7	8.0	9.5	MS	LS	LS

*Whitefly population (nymph & puparia) / 2.5 sq.cm

All the tested genotypes (table 1.1b) against whitefly exhibited less to moderate susceptible reaction and infestation ranged from 0.6 to 8.3 nymph & puparia/2.5 sq.cm. The incidence of webbing mite was found at lower side in all the tested genotypes. In the tested entries, the reaction against black bug varied from 4.8 to 13.2 black bug/central whorl of sugarcane plant and graded as least susceptible.

Table 1.2a: Reaction of sugarcane genotypes in Advance Varietal Trial (Early 1 plant) to borers

Sr No.	Variety/Genotype	Borer (% infestation)				Grade of infestation			
		Shoot Borer	Top Borer	Stalk borer*	Root borer	Shoot Borer	Top Borer	Stalk borer*	Root borer
1	Co 10035	5.4	11.1	0.3	17	LS	MS	LS	MS
2	CoH 10261	4.7	13.0	1.2	20	LS	MS	LS	MS
3	CoS 10231	3.6	10.4	1.3	18	LS	MS	LS	MS
CK	CoS 8436	4.1	6.1	15.4	32	LS	LS	HS	HS
	CoPant 97222	4.8	2.7	4.2	36	LS	LS	MS	HS

*Infestation Index

Shoot borer infestation in AVT early 1Plant tested genotypes ranged from 3.6 to 5.4 and all entries are categorised under least susceptible (Table1.2a). The top borer incidence was found to be low (2.7 %) in CoPant 97222 to moderate (13.0 %) in CoH 10261. Thus, all the tested genotypes and checks showed less to moderate susceptible reaction against top borer (Table 1.2a). The incidence of stalk borer was registered as low as 0.3 Infestation index in Co 10035 and all other screened genotypes exhibited least (1.2, 1.3 Ii), moderate (4.2 Ii) to high (15.4 Ii) susceptible reaction. All tested genotypes exhibited moderately susceptible characters as checks remained high susceptible against root borer.

Table 1.2b: Reaction of sugarcane genotypes in Advance Varietal Trial (Early 1 plant) to sucking pests

Sr No.	Variety/Genotype	Sucking pests (% infestation)			Grade of infestation		
		Whitefly*	Webbing mite	Black bug	Whitefly	Webbing mite	Black bug
1	Co 10035	1.5	2.5	6.0	LS	LS	LS
2	CoH 10261	5.4	7.7	13.6	HS	LS	LS
3	CoS 10231	2.7	4.9	11.9	MS	LS	LS
CK	CoS 8436	1.6	3.6	14.3	LS	LS	LS
	CoPant 97222	2.4	7.3	13.5	MS	LS	LS

*Whitefly population (nymph & puparia) / 2.5 sq.cm

All the evaluated genotypes (Table 1.2b) showed less (Co 10035, check CoS 8436), moderate (CoS 10231, check CoPant 97222) to high (CoH 10261) susceptible reaction against whitefly incidence, whereas, least susceptible to webbing mite. The infestation of

black bug in this category varied from 6.0 to 14.3 including standard check as least susceptible of class in tested entries against black bug infestation.

Table 1.3a: Reaction of sugarcane genotypes in Advance Varietal Trial (Early II Plant) to borers

Sr No.	Variety/Genotype	Borer (% infestation)				Grade of infestation			
		Shoot Borer	Top Borer	Stalk borer*	Root borer	Shoot Borer	Top Borer	Stalk borer*	Root borer
1	CoH 09262	4.3	5.9	0.3	13	LS	LS	LS	LS
2	CoH 09263	2.6	8.6	6.8	32	LS	LS	HS	HS
3	CoLk 09202	5.4	8.8	4.7	11	LS	LS	MS	LS
4	CoPb 09181	2.5	9.4	0.3	38	LS	LS	LS	HS
5	CoS 09246	3.7	5.0	6.9	30	LS	LS	HS	MS
CK	CoS 8436	4.1	6.1	15.4	32	LS	LS	HS	HS
	CoPant 97222	4.8	2.7	4.2	36	LS	LS	MS	HS

*Infestation Index

All the tested genotypes in AVT Early II plant on the basis of shoot and top borer infestation categorised under least susceptible. All the screened genotypes (Table 3a) against stalk borer showed a range of infestation from 0.3 to 15.4 infestation index, while check entries showed moderate to high susceptible reaction. All the entries were recorded in a range of least susceptible 13 per cent (CoLk 09202) to highly 38 per cent in (CoPb 09181) susceptible against the root borer.

Table 1.3b: Reaction of sugarcane genotypes in Advance Varietal Trial (Early II Plant) to sucking pests

Sr No.	Variety/Genotype	Sucking pests (% infestation)			Grade of infestation		
		Whitefly*	Webbing mite	Black bug	Whitefly	Webbing mite	Black bug
1	CoH 09262	1.6	1.8	8.7	LS	LS	LS
2	CoH 09263	2.9	3.7	10.7	MS	LS	LS
3	CoLk 09202	1.7	1.8	15.7	LS	LS	LS
4	CoPb 09181	1.6	4.9	11.4	LS	LS	LS
5	CoS 09246	3.7	5.8	16.7	MS	LS	LS
CK	CoS 8436	1.6	3.6	14.2	LS	LS	LS
	CoPant 97222	2.4	7.3	13.5	MS	LS	LS

*Whitefly population (nymph & puparia) / 2.5 sq.cm

The evaluated entries CoH 09262, CoLk 09202, CoPb 09181 exhibited least susceptible reaction alongwith check CoS 8436, while, remaining listed moderately susceptible against whitefly. All the tested entries found least susceptible against webbing mite (Table 1.3b). Black bug invasion in group evaluation of sugarcane genotypes varied from 8.7 in CoH 09262 to 16.7 (in CoS 09246) black bug/central whorls of genotypes and classed as least.

Table 1.4a: Reaction of sugarcane genotypes in Initial Varietal Trial (Midlate) to borers

Sr No.	Variety/Genotype	Borer (% infestation)				Grade of infestation			
		Shoot Borer	Top Borer	Stalk borer*	Root borer	Shoot Borer	Top Borer	Stalk borer*	Root borer

1	Co 11026	7.5	7.9	0.8	37	LS	LS	LS	HS
2	Co 11027	11.9	9.2	5.8	3	LS	LS	HS	LS
3	CoH 11263	3.9	6.4	2.6	30	LS	LS	MS	MS
4	CoH 11264	4.4	9.7	1.4	11	LS	LS	LS	LS
5	CoLk 11204	7.8	9.4	4.5	27	LS	LS	MS	MS
6	CoLk 11205	6.3	13.3	2.6	37	LS	MS	MS	HS
7	CoLk 11206	9.2	8.9	7.5	9	LS	LS	HS	LS
8	CoPb 11181	3.5	5.5	2.6	3	LS	LS	MS	LS
9	CoPb 11182	4.5	7.1	0.5	55	LS	LS	LS	HS
10	CoPb 11213	8.7	12.8	0.7	33	LS	MS	LS	HS
11	CoPb 11214	3.8	11.9	3.5	37	LS	MS	MS	HS
12	CoS 11231	2.9	7.7	1.6	36	LS	LS	LS	HS
13	CoS 11232	6.4	4.4	4.0	31	LS	LS	MS	HS
CK	CoJ 64	2.9	9.3	6.3	28	LS	LS	MS	MS
	CoPant 84211	2.4	6.9	1.7	28	LS	LS	LS	MS

*Infestation Index

All the entries tested under IVI midlate (Table 1.4a) against shoot borer infestation were found to be least susceptible ranging from 2.4(check CoPant 84211) to 11.9 (Co 11027) per cent. Against top borer, entries COLk 11205, CoPb 11213 and CoPb 11214 have shown moderately susceptible reaction while others were categorised as least. Stalk Borer infestation ranged from 0.5 (CoPb 11182) to 6.3 (check CoJ 64) infestation index. Root borer incidence ranged from 3 (Co 11027, CoPb 11181) to 37 per cent (Co11026, CoPb11214).

Table 1.4b: Reaction of sugarcane genotypes in Initial Varietal Trial (Midlate) to sucking pests

Sr No.	Variety/Genotype	Sucking pests (% infestation)			Grade of infestation		
		Whitefly*	Webbing mite	Black bug	Whitefly	Webbing mite	Black bug
1	Co 11026	4.2	5.8	10.1	MS	LS	LS
2	Co 11027	2.4	6.5	14.2	MS	LS	LS
3	CoH 11263	3.6	3.7	9.3	MS	LS	LS
4	CoH 11264	2.2	4.7	12.6	MS	LS	LS
5	CoLk 11204	4.6	8.8	10.5	MS	LS	LS
6	CoLk 11205	2.3	4.1	13.6	MS	LS	LS
7	CoLk 11206	4.1	13.7	8.3	MS	MS	LS
8	CoPb 11181	2.9	11.5	12.6	MS	MS	LS
9	CoPb 11182	2.1	9.6	13.3	MS	LS	LS
10	CoPb 11213	1.9	14.3	10.1	LS	MS	LS
11	CoPb 11214	2.3	7.7	10.7	MS	LS	LS
12	CoS 11231	5.6	5.2	6.0	HS	LS	LS
13	CoS 11232	3.9	7.7	12.0	MS	LS	LS
CK	CoJ 64	0.6	3.6	13.2	LS	LS	LS
	CoPant 84211	2.7	8.0	9.5	MS	LS	LS

*Whitefly population (nymph & puparia) / 2.5 sq.cm

Entries evaluated under IVT midlate (Table 1.4b) against sucking pests, two entries CoPb 11213 and CoJ 64 (check) were found to be least susceptible and entry CoS 11231 categorised as highly susceptible, while all others fall in moderately susceptible class against whitefly infestation. In case of webbing mite invasion, entries CoLk 11206, CoPb 11181 and CoPb 11213 were found under class of moderately susceptible, while all others remaining

classified as least including check. The infestation of black bug in this class ranged from 6.0 (CoS 11231) to 14.2 (Co 11027) black bug/ central whorl and categorised as least including standard check.

Table 1.5a: Reaction of sugarcane genotypes in Advanced Varietal Trial (Midlate 1Plant) to borers

Sr No.	Variety/Genotype	Borer (% infestation)				Grade of infestation			
		Shoot Borer	Top Borer	Stalk borer*	Root borer	Shoot Borer	Top Borer	Stalk borer*	Root borer
1	Co 10036	2.2	14.9	2.4	15	LS	MS	MS	LS
2	CoH 10262	4.7	14.3	2.9	12	LS	MS	MS	LS
3	CoPant 10221	1.9	5.8	0.7	9	LS	LS	LS	LS
4	CoPb 10181	6.5	11.0	5.8	28	LS	MS	HS	MS
5	CoPb 10182	8.7	3.8	6.3	8	LS	LS	HS	LS
CK	CoS 8436	4.1	6.1	15.4	32	LS	LS	HS	HS
	CoPant 97222	4.8	2.7	4.2	36	LS	LS	MS	HS

*Infestation Index

All the entries tested in AVT midlate 1plant (Table 1.5a) against shoot borer ranged from 1.9 to 8.7 per cent and classified as least susceptible. Out of five entries tested, one categorised as highly, 3 moderately and one least susceptible including checks against top borer. Stalk borer ranged from 0.7 to 15.4 infestation index including checks, while against root borer incidence tested entries were evaluated as least to moderately susceptible while checks were in highly susceptible class.

Table 1.5b: Reaction of sugarcane genotypes in Advanced Varietal Trial (Midlate 1Plant) to sucking pests

Sr No.	Variety/Genotype	Sucking pests (% infestation)			Grade of infestation		
		Whitefly*	Webbing mite	Black bug	Whitefly	Webbing mite	Black bug
1	Co 10036	3.3	1.5	19.2	MS	LS	LS
2	CoH 10262	1.6	14.3	8.1	LS	MS	LS
3	CoPant 10221	3.6	11.7	15.3	MS	MS	LS
4	CoPb 10181	2.1	8.8	10.6	MS	LS	LS
5	CoPb 10182	1.5	15.1	12.3	LS	MS	LS
CK	CoS 8436	1.6	3.6	14.3	LS	LS	LS
	CoPant 97222	2.4	7.3	13.5	MS	LS	LS

*Whitefly population (nymph & puparia) / 2.5 sq.cm

Entries tested against sucking pests *i.e.*, whitefly and webbing mites were categorised under least to moderately susceptible including checks (Table 1.5b) in AVT midlate 1Plant. The evaluated entries against black bug ranged from 8.1 in CoH 10262 to 19.2 in Co 10036 per central whorl in AVT-midlate group and found to be in class of least susceptible.

Table 1.6a: Reaction of sugarcane genotypes in Advanced Varietal Trial (Midlate 11 Plant) to borers

Sr No.	Variety/Genotype	Borer (% infestation)				Grade of infestation			
		Shoot	Top	Stalk	Root	Shoot	Top	Stalk	Root

July, 14	-	4.9	2.6	0.9	7.5	4.7	2.2	10.6	3.6
August, 14	-	8.8	3.9	2.8	11.3	6.4	4.1	7.9	4.1
September, 14	-	10.1	9.9	9.9	8.4	13.3	7.3	3.3	6.3
October, 14	-	13.3	10.1	22.8	5.3	10.5	7.8	-	5.8
November, 14	-	15.9	8.2	39.5	8.0	6.5	6.5	-	6.7
December, 14	-	4.2	5.1	43.3	3.1	1.3	1.6	-	-
January, 15	-	-	2.2	42.6	3.3	-	-	-	-
February, 15	-	-	0.8	44.1	1.1	-	-	-	-

*Infestation Index

Sugarcane variety Co 0238 was planted in 0.2 ha area in mid March, 2013 and the incidence of insect-pests and their natural enemies were recorded (Table 2.1). Incidence of top borer was 4.9 per cent in the month of July, 14 and attained its peak (15.9 %) in month of November, 2014. Thereafter, top borer incidence decreased to 4.2 per cent in the month of December. Root borer incidence (2.6 %) was recorded in month of July and attained peak level (10.1 %) in month of October. Onwards October, there was gradual decrease (0.8 %) in month of February. In the month of July Stalk borer, incidence was 0.9 per cent which mounted to its peak (44.1 per cent) in the month of February, 2015.

Incidence of black bug, *Cavelerius sweeti* recorded maximum (mean of 11.3 nymph and adults/shoot) in the month of August, while a gradual decrease was observed during the crop season and recorded minimum (1.1 mean) in the month of February 2015. Leafhopper, *Pyrilla perpusilla* mean incidence (4.7/plant) was recorded in month of July and reached its peak level of 13.4/plant in the month of September and thereafter, infestation decreased to 1.3/plant in December. Webbing mites peak incidence was noticed (7.8 %) in the month of October, whereas, thrips (10.6%) was observed in the month of July. Whitefly mean peak population (6.7 nymph and puparia/2.5 sq cm) was recorded in the month of November.

Table 2.2: Natural enemy complex of *Pyrilla* at RRS Uchani during 2014-15

Period of observation	<i>Cheiloneurus pyrillae</i>	<i>Tetrastichus Pyrillae</i>	<i>Epiricania Melanoleuca</i>	Total parasitism
1-7 August, 14	1.1	6.3	15.1	22.5
8-15 August, 14	2.1	8.5	16.4	27.0
16-23 August, 14	13.5	14.8	17.3	45.6

24-31 August, 14	21.0	9.6	23.6	54.2
1-7 September, 14	32.1	4.2	28.6	64.9
8-15 September, 14	36.7	2.9	33.7	73.3
16-23 September, 14	29.7	2.3	41.9	73.9
24-30 September, 14	24.5	1.7	48.5	74.7
1-7 October, 14	16.2	1.4	53.9	71.5
8-15 October, 14	6.8	-	47.3	54.1
16-23 October, 14	8.8	-	46.1	54.9
24-31 October, 14	5.0	-	39.4	44.4
1-7 November, 14	1.8	-	9.7	11.5
8-15 November, 14	0.7	-	4.7	5.4

Spiders, lace wing, beetles and earwigs were the major bio-agents recorded during post monsoon period. However, the population of spiders, coccinellids, beetle and earwig remained low *i.e.*, 3.1, 2.2, 1.1 and 2.6 per plant, respectively. The population (2.2 larvae and adult/plant) of lace wing, *Chrysoperla carnea* was recorded. A relatively strong natural parasitism (54.2-74.7 %) of nymphs and adults of *Pyrilla perpusilla* was observed from 2nd fortnight of August to last of October by *Epiricania melanoleuca*, *Tetrastichus pyrillae* and *Cheiloneuru pyrillae*. The parasitism of pyrilla eggs by *Cheiloneurus pyrillae* varied from 1.1 to a maximum of 36.7 per cent in the mid of September (Table 2.2). However, parasitism of pyrilla eggs by *Tetrastichus Pyrillae* varied from 1.4 to 14.8 per cent.

Table 2.3: Natural enemy complex of sugarcane borers at RRS Uchani during 2014-15

Insect-pest	Stage	Natural enemies	Parasitism (%)
Top borer, <i>Scirpophaga excerptalis</i>	Larva	<i>Isotima javensis</i>	7.7
		<i>Cotesia flavipes</i>	5.1
		<i>Beauveria bassiana</i>	9.9
Stalk borer, <i>Chilo auricilius</i>	Larva	<i>Sturmiopsis inferens</i>	13.6
		<i>Cotesia flavipes</i>	5.6
		<i>Beauveria bassiana</i>	6.8
Root borer, <i>Polychola (Emmilocera) depressella</i>	Larva	<i>Beauveria bassiana</i>	9.7

A natural parasitism by *Isotima javensis*, *Cotesia flavipes* and *Beauveria bassiana* of top borer larvae was 7.7, 5.1 and 9.9 per cent, respectively during post monsoon period (Table 2.3). In case of stalk borer, parasitism by *Sturmiopsis inferens*, *Cotesia flavipes* and *Beauveria bassiana* was 13.6, 5.6 and 6.8 per cent, respectively. The larvae of root borer collected from field showed parasitism to the extent of 9.7 per cent by *Beauveria bassiana*.

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

Mill zones of Cooperative sugar factories, Kaithal, Shahabad, Panipat, Gohana, Asandh, Rohtak and Karnal were surveyed for insect pests of sugarcane crop. During pre-monsoon period, thrips (10-30/shoot), black bug (7-28/shoot), pyrilla adults (3-5/leaf) and eggs, aphid (4-17/central shoot), whitefly (0.0 -11.2 nymph & puparia /2.5sq.cm), gurdas borer, mealy bug, webbing mites 12-15 per cent infestation were recorded in CoS 88230, CoJ 85, CoS 8436, Co 0238, Co 0239, CoH 119, CoH 152, CoS 767, Co 089003, Co 7717 in Shahabad, Kaithal, Gohana, Rohtak and Karnal Sugar Mill zones. Spiders, coccinellid and earwigs were recorded frequently in these area of observation. Gurdaspur borer (upto 14 per cent), root borer (upto 70 per cent), termites and internode borers were also recorded in medium to severe infestation in Panipat, Shahabad, kaithal and Rohtak mill zone area. Attack of early shoot borers was more apparent in Panipat and Shahabad mill zone. Shoot borer infestation was at higher side *i.e.*, 24.6 per cent in variety CoS 8436 in Shahbad sugar mill during June, 2014. CoH 150, CoH 160, Co 089003, CoS 8436 were liable to infest by blackbug, whitefly, webbing mites, pyrilla and top borers in Panipat, kaithal and Shahabad mill zones frequently.

During post monsoon period, Stalk borer (*Chilo auricilius*) infestation (13.4 – 29.5 %) was also observed in Karnal, Asandh, Rohtak and Gohana Sugar Mill areas. Top borer (*Scirpophaga nivella*) infestation was 8.9 to 15.2 per cent on varieties like CoS 88230, CoJ 85, Co 7717, Co 0238, CoH 119, CoH 152, CoS 767, Co 089003 in Kaithal, Gohana, Rohtak and Karnal Sugar Mill zones. A low to high incidence of root borer (upto 85.0 %) was recorded in varieties like CoH 119, Co 0238 in Gohana, Rohtak and Panipat Sugar Mill zones.

Sugarcane black bug (*Cavelerius sweeti*) infestation (6.4 – 24.8 nymph & adults/shoot) was observed in ratoon crop on varieties like CoS 8436, Co 089003, Co 0118 during August to September in Kaithal, Panipat and Karnal Sugar Mill zones. Thrips (*Fulmekiola*

saccharicida) was observed 4.3 – 14.5 %) on various varieties like CoS 8436, CoH 119, CoJ 85, during August and September in Karnal and Asandh Sugar Mill zones. Sugarcane mites (*Oligonychus indicus*) infestation ranging from 3.3 to 22.8 per cent was observed on varieties CoH 119, CoS 8436, Co 0238, Co 0118 and Co 089003 in Kaithal, Karnal and Panipat Sugar Mill zones. Pyrilla (1.3-3.9 nymph & adult /leaf), whitefly (0.6-4.7 nymph & puparia /2.5 sq cm), while, grasshopper, white grub and termite were found in traces in different zones of Haryana.

Project E.34: Standardization of simple and cost effective techniques for mass multiplication of sugarcane bio-agents

The Said experiments could not be carried out due to non availability of laboratory facilities at CCS HAU, Regional Research Station, Uchani, Karnal.

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

Sugarcane genotype CoH 167, crop planted on March 30, 2014 completed its germination by mid April. Traps filled with kerosene Layered water and fitted with pheromone lures for the top and stalk borers individually were placed in the field on last week of July, 2014.

Although the infestation/pheromones trap catches of top and stalk borer started at same week in the field (Table 3.1). In case of top borer, it's peaked up twice, once in first week of September (mean 9.2 catch) and then again in first week of October (mean 11.3 trap). However in case of stalk borer, it gained it's peak in last week of September (23.3 traps) thereafter there was continuous decline in trap catches per week upto December, 2014.

Table 3.1. Weekly pheromone traps catches from July to October during 2014

Period of observation Month	Week	Mean number of moths/trap	
		Top borer	Stalk borer
July, 2014	First	-	-
	Second	-	-
	Third	-	-
	Fourth	4.3	0.8
August, 2014	First	5.3	1.1
	Second	7.2	3.3
	Third	7.3	5.6

	Fourth	8.1	7.5
September, 2014	First	9.2	16.1
	Second	5.8	17.3
	Third	4.2	10.5
	Fourth	5.5	23.3
October, 2014	First	11.3	17.8
	Second	11.2	21.6
	Third	6.0	20.4
	Fourth	6.3	18.7
November, 2014	First	7.5	14.2
	Second	8.0	8.6
	Third	7.5	7.5
	Fourth	5.2	8.5
December, 2014	First	0.6	0.5
	Second	-	0.5
	Third	-	0.3
	Fourth	-	0.1
January, 2015	First	-	-
	Second	-	-
	Third	-	-
	Fourth	-	-

Table 3.2. Weekly observation on infestation from control plot July to October, 2014

Period of observation Month	Week	Mean infestation	
		Top borer (%)	Stalk borer*
July, 2014	First	-	-
	Second	-	-
	Third	-	-
	Fourth	0.4	0.4
August, 2014	First	0.3	0.4
	Second	1.9	7.1
	Third	9.7	8.2
	Fourth	12.4	6.4
September, 2014	First	18.0	8.1
	Second	21.9	27.1
	Third	16.1	16.4

	Fourth	19.1	29.9
October, 2014	First	22.9	35.5
	Second	28.4	37.0
	Third	16.6	31.0
	Fourth	9.6	33.8
November, 2014	First	7.1	39.1
	Second	5.7	46.6
	Third	4.1	41.7
	Fourth	1.2	36.6
December, 2014	First	-	43.5
	Second	-	46.0
	Third	-	46.3
	Fourth	-	46.9
January, 2015	First	-	45.5
	Second	-	46.8
	Third	-	47.2
	Fourth	-	47.5

*Infestation Index

Top and stalk borer infestation were recorded from last week of July, 2014 (table 3.2) from control plot. Top borer gained the peak (21.9%) in second week of September, and then there was decline in infestation level that again rose to a new peak (28.4%) in the month of second week of October. Thereafter, there was continuous decline of infestation per cent in field. In case of stalk borer, it was observed that there was continuous increase in infestation level upto 47.5 infestation index upto January, 2015 with a dip (16.4) in third week of month of September, 2014.