Project No. E.4.1. Evaluation of zonal varieties/genotypes for their reaction against major insect pests of sugarcane.

Objective: To grade the entries in the zonal varietal trials for their behavior towards damage by key pests in the area.

Location: SBI-RC, Karnal

Year of Start: 2008 (Continuing project)

AVT Ratoon: A total of ten genotypes along with two check varieties were evaluated against major insect pests namely; black bug (BB), early shoot borer (ESB), top borer (TB) root borer (RB) and stalk borer (SB). All the 8 genotypes; CoPb 10181, CoPb 10182, CoPant 10221, CoH 10262, Co 10036, CoS 10231, CoH 10261 and Co 10035 showed least susceptible (LS) reaction to BB (<25.0 individual/20 leaves), ESB (<15.0%) and top borer (<10.0%). Four genotypes; CoPb 10181, CoPant 10221, CoH 10262 and Co 10036 were moderately susceptible (15.1 to 30 %) and 4 genotypes; CoPb 10182, CoS 10231, CoH 10261 and Co 10035 were showed highly susceptible (HS) reaction to root borer (>30%).

Table1. Reaction of sugarcane genotypes against major insect pests in ratoon

Sl. No.	Variety/ Genotypes	Popn./ 20 leaves	% Incidence			Stalk borer		
		Black Bug	ESB	Top borer	Root borer	Incidence (%)	Intensity (%)	Infestation Index
1	CoS 8436	18.0	2.6	2.3	32.5	22.1	8.3	1.8
2	CoPb 10182	17.0	1.3	1.6	37.0	6.9	6.2	0.4
3	CoPb10181	11.0	3.3	3.2	28.7	7.7	7.4	0.6
4	CoPant 10221	13.0	1.3	1.3	16.1	5.0	5.8	0.3
5	CoH 10262	9.0	1.0	3.2	28.5	6.2	6.2	0.4
6	Co 10036	12.0	2.3	1.6	28.6	6.0	6.7	0.4
7	CoS 10231	17.0	0.0	3.1	46.2	5.6	14.7	0.8
8	CoH 10261	11.0	1.6	2.5	66.2	3.5	5.0	0.2
9	Co 0238	11.0	2.3	1.6	31.9	2.8	3.7	0.1
10	Co 10035	16.0	1.6	1.2	44.3	3.9	7.2	0.3

In case of stalk borer, 8 genotypes; CoPb 10182, CoPb10181, CoPant 10221, CoH 10262, Co 10036, CoS 10231, CoH 10261 and Co 10035 were least susceptible to stalk borer (infestation index < 2.0).

AVT 1st plant: A total of ten genotypes along with two check varieties were evaluated against early shoot borer (ESB), top borer (TB) root borer (RB) and stalk borer (SB). All the 10 genotypes; CoPant 12221, Co 12027, Co 12026, CoLk 12203, CoS 12232, Co 12029, CoH 12263, CoLk12205, CoPant 12226 and CoPb 12211 showed least susceptible reaction to early shoot borer (<15.0%) and top borer (<10.0%). In case of root borer, 4 genotypes ; CoS 12232, CoH 12263, CoPb 12211 and Co 12026 were least susceptible (<15%); 5 genotypes; CoPant 12221, Co 12027, CoLk 12203, Co 12029 and CoLk 12205 were moderately susceptible (15.1-30%) and 1 genotype; CoPant 12226 showed highly susceptible (HS) reaction (>30%).

Table2. Reaction of sugarcane genotypes against major insect pests in AVT 1st Plant

Sl. No.	Variety/Genotypes	Incidence (%)			Stalk borer		
		Early shoot borer	Top borer	Root borer	Incidence (%)	Intensity (%)	Infestation Index
1	Co 0238	3.1	0.0	18.2	44.0	6.4	2.8
2	CoPant 12221	2.1	0.7	18.3	42.7	8.1	3.5
3	Co 12027	4.1	0.0	24.1	48.9	7.9	3.9
4	Co 12026	5.4	0.0	12.9	40.5	6.5	2.6
5	CoLk 12203	2.9	0.0	21.7	59.7	6.9	4.1
6	CoS 12232	2.3	0.4	12.1	35.6	7.1	2.5
7	Co 05011	2.2	0.0	20.1	39.1	6.6	2.6
8	Co 12029	2.0	0.3	15.7	44.4	6.8	3.0
9	CoH 12263	2.3	0.0	13.9	46.5	6.9	3.2
10	CoLk12205	2.1	0.5	26.9	35.4	6.9	2.4
11	CoPant12226	2.8	0.3	35.6	16.4	9.5	1.6
12	CoPb 12211	3.2	0.0	14.1	44.7	9.7	4.3

In case of stalk borer 1 genotype; CoPant 12226 was least susceptible (infestation index < 2.0) and nine genotypes; CoPant 12221, Co 12027, Co 12026, CoLk 12203, CoS 12232, Co 12029, CoH 12263, CoLk 12205 and CoPb 12211 were showed moderately susceptible reaction (infestation index 2.1 to 5.0).

AVT 2ndPlant: A total of ten genotypes along with two check varieties were evaluated against early shoot borer (ESB), top borer (TB) root borer (RB) and stalk borer (SB). All the eight genotypes; CoH 11262, CoLk 11201, CoLk 11202, CoLk 11203, Co 11027, CoH 11263, CoLk 11204, CoLk 11206, CoPb 11214 and CoS 11232 were least susceptible to early shoot borer (<15.0%) and top borer (<10.0%). Two genotypes; CoLk 11202 and CoPb 11214 were least susceptible (<15.0 %), 7 genotypes; CoH 11262, CoLk 11201, CoLk 11203, Co 11027, CoLk 11204, CoLk 11206 and CoS 11232 exhibited moderately susceptible reaction (15.1-30%) to root borer and one genotypes viz., CoH 11263 was highly susceptible (>30%).

Table2. Reaction of sugarcane genotypes against major insect pests in AVT 2nd Plant

Sl. No.	Variety/Genotypes	Incidence (%)			Stalk borer		
		Early shoot borer	Top borer	Root borer	% Incidence	Intensity (%)	Infestation Index
1	CoH 11262	0.3	0.0	19.8	47.7	9.1	4.3
2	CoLk 11201	1.9	0.0	26.1	48.5	6.4	3.1
3	CoLk 11202	1.2	0.5	10.7	38.5	8.2	3.2
4	CoLk 11203	0.6	0.9	28.0	41.7	7.9	3.3
5	Co0238	2.1	0.0	33.8	57.5	9.4	5.4
6	Co 11027	3.4	0.0	23.3	21.1	8.7	1.8
7	CoH 11263	1.6	0.0	30.7	23.7	6.2	1.5
8	CoLk 11204	1.2	0.3	22.0	21.1	7.2	1.5
9	CoLk 11206	2.8	0.3	17.5	55.7	8.8	4.9
10	CoPb 11214	2.4	0.0	9.7	34.3	9.2	3.2
11	CoS 11232	2.2	0.5	20.6	14.9	11.5	1.7
12	Co 05011	3.2	0.3	16.4	38.9	9.0	3.5

In case of stalk borer, 4 genotypes; Co 11027, CoH 11263, CoLk 11204 and CoS 11232 were least susceptible (infestation index < 2.0) and six genotypes; CoH 11262, CoLk 11201, CoLk 11202, CoLk

11203, CoLk 11206 and CoPb 11214 showed moderately susceptible reaction (infestation index 2.1 to 5.0).

Project No. E.28. Survey and surveillance of sugarcane insect- pests.

Objective: To identify the key insect- pests in the area.

Location: SBI-RC, Karnal
Year of Start: 2008 (Continuing project)

Results

To identify the major Insect pests' of sugarcane under North Western Zone, insect pests' survey was carried out under the reserved areas of 12 sugar mills of Haryana namely; Karnal, Shahabad, Panipat, Gohana, Rohtak, Sonipat, Palwal, Jind, Rohtak, Meham, Asandh and Yamuna nagar, 03 sugar mills of Uttar Pradesh viz., Mawana sugar works Mawana, Triveni engineering works, Deoband, district Saharanpur and Triveni engineering works, Sabitgarh, Bulandshahar and RBNS Sugar mill, Laksar, Uttarakhand. Pink borer and Internode borer were identified as new pest of sugarcane in Haryana, Uttarakhand and western Uttar Pradesh. The incidence of these two pests found increasing severely where pink borer and internode borer incidence was 60.0 and 10.0% respectively in Haryana.

Table- 3: current status of major insect pests of sugarcane North Western Zone

Surveyed area	Key insect pests	Occasional insect pests	New pest
Uttar Pradesh (3)	ESB, TB,RB, SB, pyrilla, BB, BM, WG and termites	AW, GH,WF, MB, YM ,thrips	PB (T-10%) BM (T-91.7%)
Uttarakhand (1)	ESB, TB,RB, SB, pyrilla, BB, BM, WG and termites	AW, GH,WF, MB, YM ,thrips	PB (T-10%) BM (T-76.0%)
Haryana (12)	ESB, TB,RB, SB, pyrilla, BB,BM, WG and termites	AW,GH,WF, MB,YM, thrips	PB (T-60%) INB (T-10% (CoH 160) BM (T-22.0%)

ESB= Early shoot borer, TB =top borer, RB= root borer, SB= stalk borer, BB= black bug, BM=Blister mites, WG=white grubs, AM=Army worm, GH=grass hopper, WF=white fly, YM=Yellow mite MB=mealy bug, PB=Pink borer, BM=Blister mite, INB=Internode borer

Early shoot borer, top borer, root borer, stalk borer, pyrilla, mealy bug, mites, black bug, white grubs and termites were identified as major pests in U.P and Uttarakhand. Whereas, early shoot borer, pink borer, internode borer top borer, root borer, stalk borer, pyrilla, black bug and mites and mealy bug were in listed as major insect pests of sugarcane in Haryana. In general the incidence of leaf webbing mite was recorded as sporadic pest however leaf sheath blister mites listed as regular pest of sugarcane under the zone. Blister mite incidence was 91.7, 76.0 and 22.0 per cent in U.P, Uttarakhand and Haryana, respectively.

Project No. E.30 Monitoring of insect pests and bio agent's in sugarcane agro- ecosystem.

Objective: To monitor the key insect-pests and natural enemies in the area.
Location: SBI-RC, Karnal

Year of Start: 2008 (Continuing project)

Results

A non replicated experiment with sugarcane variety, Co 0238 was carried out and monitored the incidences of major insect pests and their bio agents of sugarcane at regular interval. The incidence of early shoot borer and top borer was below ETL (<15.0 and <10%, respectively). Root borer and termite incidence was 27.0 and 12.0%, respectively.

Prevalence of Insect pests of sugarcane and their bio- agents

S.No.	Insect-pests	Infestation / Population	Bio- agents	Parasitisation (%)
1	Early shoot borer	7.1 **%**	**-**	**-**
2	Top borer	6.6%	*Isotima javensis*	4.3 (Larvae)
			Stenobracon deesae	4.8(Larvae)
3	Stalk borer	76.3,10.0 and 7.7 (Infestation index)	*Cotesia flavipes*	12.3(Larvae)
	Root borer	27.0		
	Pink borer	80%		
4	Pyrilla	(7.0 individual/20 leaves).	*Epiricania melanoleuca*	71.2 (Nymph and adults)
			Tetrasticus pyrillae.	43.3 (eggs)
	Termite	12.0		
	Black bug	117		

The population of Pyrilla was recorded @ 7.0/leaf. Pink borer emerged as a major insect pest of sugarcane. The cumulative incidence of pink borer right from shoot stage to harvest of the crop was up to 80.0 per cent. It was also observed that black bug; an insect pest of sugarcane ratoon, infested the planted sugarcane crop also during May to October severely. The population of black bug was up to 117.0 /tiller/cane. Stalk borer incidence, intensity and infestation index were 76.3%, 10.0% and 7.7, respectively. The bio agent's viz., *Epiricania melanoleuca,* identified as an effective parasitoid of pyrilla nymphs and adult's with 71.2 per cent parasitization. *Tetrasticus pyrillae* identified as an egg parasitoid of pyrilla with 43.3 per cent parasitization of pyrilla egg masses. *Isotima javensis* and *Stenobracon deesae* were identified as top borer larval parasitoids with 4.3 and 4.8 per cent parasitism. *Cotesia flavipes* and was also identified as a parasitoid of stalk borer which parasitized 12.3% stalk borer larvae during the month of February to April in cane.