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Project E. 4.1		
Title of Project	**:**	Evaluation of zonal varieties/genotypes for their reaction against major insect pests.
Objective	**:**	To grade the entries in the zonal varietal trials for their behaviour towards damage by key pests in the area.
Year of Start	**:**	1985-86 (Continuing)
Duration	**:**	Long term
Location	**:**	As hereunder
North Western Zone	**:**	Kapurthala (Ludhiana), Uchani, Karnal (SBI), Shahjahanpur and Lucknow
North Central Zone and Eastern Zone	**:**	Pusa and Seorahi
Peninsular Zone	**:**	Akola, Kolhapur, Padegaon, Pune, Powarkheda, Navsari, Mandya, Coimbatore
East Coast Zone	**:**	Anakapalle, Vuyyuru (Voluntary centre since 2013-14)
No. of replication	**:**	03 (Three)
Plot size	**:**	A minimum of 3 (three), six metre row/variety per replication

I. NORTH WESTERN ZONE

1. Regional Research Station, PAU., Kapurthala (Punjab)

Forty two genotypes consisting of seventeen under early maturing group (nine under IVT E, four under AVT E I plant and four under AVT E II plant) and twenty five under mid-late maturing group (thirteen under IVT ML, six under AVT ML I plant and six under AVT ML II plant) with respective group standards were evaluated against early shoot borer, top borer and stalk borer of sugarcane at Punjab Agricultural University, Regional Research Station, Kapurthala [Table-4.1.1].

Salient Findings:

The lowest incidence of early shoot borer was recorded in CoPb 13181 (4.15%) under IVT E category whereas it was highest in CoS 13232 (16.51%) under IVT ML category. The rest of all genotypes showed intermediate incidence against early shoot borer. Thus, all genotypes showed less to moderately susceptible reaction against early shoot borer. The cumulative incidence of top borer ranged from 5.81 per cent in CoPb 13181 (IVT E) to

18.64 per cent in Co 238 (AVT E II P) and exhibited low to moderately susceptible reaction against top borer. The infestation index of stalk borer ranged from 0.04 per cent in CoH 13263 to 0.25 per cent in CoPb 13183 under IVT ML and showed less susceptible reaction to stalk borer in all tested genotypes.

2. Regional Research Station, Uchani Dist- Karnal (Haryana)

Forty two genotypes comprising of seventeen under early maturing category (nine under IVT E, four under AVT E I plant and four under AVT E II plant) and twenty five under mid-late maturing group (thirteen under IVT ML, six under AVT ML I plant and six under AVT ML II plant) with respective group standards were tested against early shoot borer, top borer, stalk borer, root borer, pyrilla, whitefly, black bug and webbing mite of sugarcane at Regional Research Station, Uchani Dist- Karnal [Table-4.1.2(a) to 4.1.2(b)].

Salient Findings:

The incidence of early shoot borer was recorded as low (2.6 %) in genotype CoPb 11214 under AVT ML II P and high (15.9%) in genotype CoS 8436 (IVT ML and IVT ML I P). The genotype tested under different maturity groups are graded as less to moderately susceptible reaction against early shoot borer. The incidence of top borer was recorded as low to moderate and varied from 1.60 per cent in genotype CoS 12232 (AVT ML I P) to 6.50 per cent in genotype CoH 11262 (AVT E II P). Thus, all screened genotypes showed less susceptible reaction against top borer. The stalk borer infestation index was varied from 0.3 per cent in CoLk 13203 (IVT E) to 2.4 per cent in CoPant 13224 (IVT ML) and showed less to moderately susceptible reaction. The incidence of root borer was found minimum (15.60%) in genotype CoPb 13181 (IVT E) and maximum (34.8%) in genotype CoPant 13221 and thus graded as moderately to highly susceptible genotypes.

3. ICAR-SBI Coimbatore Regional Centre, Karnal (Haryana)

Thirty four genotypes consisting of twelve under AVT E I P, twelve under AVT E II P and ten under ratoon with respective group standard check were screened for their reaction against shoot borer, top borer, root borer and stalk borer of sugarcane at Karnal centre [Table- 4.1.3].

Salient Findings:

The per cent incidence of early shoot borer ranged from zero per cent in CoS 10231 (Ratoon) to 5.40 per cent in Co 12026 (AVT E I P). Thus, all the tested genotypes showed less susceptible reaction to early shoot borer. Whereas, the per cent incidence of top borer was ranged from 0.00 per cent in AVT E I P (Co 0238, Co 12027, Co 12026, CoLk

12203, Co 05011, CoH 12263, CoPb 12211) and AVT E II P (CoH 11262, CoLk 11201, Co 0238, Co 11027, CoH 11263, CoPb 11214) to 3.20 per cent in CoH 10262 (Ratoon). Thus, all genotypes exhibited less susceptible reaction to top borer. The lowest per cent incidence of root borer was observed in CoPb 11214 (9.7%) under AVT E II P and highest in CoH 10261 (66.20%) under ratoon category. Thus, all the tested genotypes showed less to highly susceptible reaction to root borer. The infestation of stalk borer was ranged from 0.10 per cent in Co 0238 (Ratoon) to 5.40 per cent in Co 0238 (AVT E II P). Thus, all the tested genotypes showed less to moderately susceptible reaction to stalk borer.

4. U.P. Council of Sugarcane Research, Shahjahanpur (U.P.)

Thirty entries comprising of four under AVT E I P, four under AVT E II P, four under AVT E R, six under AVT ML I P, six under AVT ML II P and six under AVT ML R with respective group standard check were investigated for their reaction against early shoot borer, top borer and stalk borer of sugarcane at Shahjahanpur centre [Table- 4.1.4].

Salient Findings:

The incidence of early shoot borer was recorded as low (8.08%) in CoS 767 (AVT ML I P) to high (23.94%) in Co 0238 (AVT E R), thus it showed less to moderately susceptible reaction to early shoot borer. The incidence of top shoot borer at harvest was minimum (5.33%) in CoS 767 (AVT ML I P) and Co 11027, CoH 11263, CoLk 12206 (AVT ML II P) to maximum (21.33%) in CoLk 12205 (AVT ML I P) and Co Pant 97222 (AVT ML R). Thus, all the tested genotypes showed less to highly susceptible reaction to top borer. The stalk borer infestation index was ranged from 0.84 per cent in CoH 11263 (AVT ML II P) to 4.91 per cent in Co 0238 (AVT E R) and grouped as less to moderately susceptible reaction to stalk borer.

5. Division of Crop Protection, ICAR-IISR, Lucknow (U.P.)

Eighteen genotypes consisting of seven under AVT E and eleven under AVT ML with respective group standard check were screened for their reaction against top borer, stalk borer and internode borer of sugarcane at Lucknow centre [Table- 4.1.5].

Salient Findings:

The top borer incidence (IV brood) was recorded as minimum (0.00%) in CoS12232 (AVT ML) to maximum (15.74%) in CoS767 (AVT ML), thus all genotypes exhibited less to moderately susceptible reaction. The infestation index of stalk borer ranged from 0.01 per cent in CoPant 12226 (AVT ML) to 0.39 per cent in Co 0238 (AVT E) and registered less susceptible reaction. The incidence of internode borer was low (10.00%) in

CoJ64 (AVT E) to high (42.79%) in CoH 11263 (AVT ML) and showed less to highly susceptible reaction.

II. NORTH CENTRAL ZONE AND EASTERN ZONE

6. SRI, RAU, Pusa (Bihar)

Twenty three genotypes comprising of four under IVT E, three under AVT E I P, four under IVT ML, four under AVT ML I P, four under AVT ML II P and four under AVT E II P along with standard check were evaluated against early shoot borer, top borer, stalk borer and root borer at SRI, Pusa [Table- 4.1.6].

Salient Findings:

The cumulative incidence of early shoot borer was recorded as lowest (6.75 %) in genotype CoLK 12207 under AVT E I P and highest (16.58%) in genotype CoSe 11454 under AVT ML II P. The genotypes tested under different maturity groups graded as less to moderately susceptible reaction against early shoot borer. While, incidence of top borer was found minimum (7.30%) in genotype CoP 13438 (IVT ML) and maximum (11.30%) in genotype CoP 13436 (IVT E) and graded as less to moderately susceptible reaction. The stalk borer infestation index was varied from zero per cent in IVT E (CoP 13436, CoSe 13451, CoSe 95422); AVT E I P (CoLK 12207, BO 130); AVT ML I P (CoLK 09204, BO 91); AVT ML II P (CoSe 11454, CoSe 11455, BO 91) and AVT E II P (CoP 11436, CoP 11437, CoP 11438) to 0.63 per cent in Co0238 (AVT E) and showed less susceptible reaction for all tested genotype. The incidence of root borer was varied from 6.99 per cent in genotype CoP 13436 (IVT E) to 10.25 per cent in genotype CoSe 11454 (IVT M) and all the tested genotypes exhibited less susceptible reaction to root borer.

7. G.S. Sugarcane Breeding and Research Station, Seorahi (U.P.)

Eleven genotypes consisting of three under AVT E I P, four under AVT ML I P and four under AVT ML II P with respective group standard check were evaluated for their reaction against early shoot borer, top borer, root borer and stalk borer of sugarcane at Seorahi centre [Table- 4.1.7].

Salient Findings:

The incidence of early shoot borer ranged from 10.62 per cent (CoSe92423- AVT ML II P) to 17.04 per cent (CoLk12209- AVT ML I P) and implies that all genotypes grouped into less to moderately susceptible reaction. The incidence of top shoot borer (at harvest) was low (7.01%) in CoSe 12453 (AVT ML I P) to high (13.15%) in CoP 12436 (AVT E I P) and all tested genotypes showed less to moderately susceptible reaction. The root borer incidence

was minimum (0.10%) in BO130 (AVT E I P) to high (3.77%) in CoP 12438 (AVT ML I P) and all tested genotypes grouped as less susceptible. The stalk borer infestation index was varied from 0.08 per cent (CoSe 12453- AVT ML I P) to 4.27 per cent (CoP 12436- AVT E I P) and registered as less to moderately susceptible group.

III. PENINSULAR ZONE

8. SRS, Dr. PDKV, Akola (M.S.)

Fifty nine genotypes comprising of five under AVT E I P, eight under AVT E II P, six under AVT ML I P, twelve under AVT ML II P, nine under IVT E I P and twenty under IVT ML along with respective group standard check were evaluated for their reaction against early shoot borer, scale insect and pyrilla of sugarcane at Akola centre [Table- 4.1.8].

Salient Findings:

The early shoot borer incidence was minimum (1.52%) in Co10005 (AVT E II P), while it was maximum (13.68%) in CoSnk13102 (IVT E I P). Thus, all the tested genotypes showed less susceptible reaction. The scale insect incidence was found to be low (22.0%) in Co86032 (AVT ML II P) to 46.00 per cent in Co09009 (AVT ML II P) and registered as moderately to highly susceptible reaction. The pyrilla incidence was lowest (0.43%) in CoN13071, CoN13072 (IVT E I P) to highest (1.78%) in CoVC10061 (AVT ML II P). Thus, all the tested genotypes exhibited less susceptible reaction.

9. CSRS, MPKV, Padegaon (M.S.)

Seventy seven genotypes consisting of eight under IVT E, twenty under IVT ML, five under AVT E I P, eight under AVT E II P, six under AVT ML I P, eleven under AVT ML II P, eleven under AVT ML R and eight under AVT E R with respective group standard check were screened for their reaction against early shoot borer, internode borer, mealy bug and scale insect of sugarcane at Padegaon centre [Table- 4.1.9].

Salient Findings:

The early shoot borer per cent incidence (cumulative) was ranged from 4.10 per cent in CoC 671 (AVT E R) to 50.36 per cent in Co 94008 (AVT E II P) and all tested genotypes grouped as less to highly susceptible reaction. The incidence of internode borer was recorded as low (20.00%) in Co 10031 (AVT ML II P) and Co 86032 (AVT ML II P) to high (70.00%) in Co 94008 (IVT E) and thus data showed less to highly susceptible reaction in all evaluated genotypes. The incidence of top shoot borer was found to be nil in all the tested genotypes under six groups. The mealy bug incidence was minimum (43.33%) in MS 13081 (IVT E) to cent per cent in IVT ML (Co 13011), AVT ML II P (Co 10017, Co 10031,

CoM 10083, CoT 10368, CoT 10369, Co 99004, Co 10017). Thus, all the screened genotypes showed highly susceptible reaction. Scale insect incidence was found to be nil (CoN 13072, CoSnk 13101, MS 13081, Co 94008, CoC 671- IVT E; Co 13005, Co 13006, Co 13011, Co 13013, Co 13014, Co 13016, Co 13020, CoN 13074, CoSnk 13103, CoSnk 13104, CoSnk 13105, CoSnk 13106, CoT 13366, PI 13131, PI 13132, Co 86032, Co 99004- IVT ML; Co 11001, Co 11004, CoM 11081, CoM 11082, CoM 11084, Co 85004, Co 94008, CoC 671- AVT E I P; Co 10004, Co 10005, Co 10006, Co 10024, Co 10026, Co 10027, CoT 10366, CoT 10367, Co 85004, Co 94008, CoC 671- AVT E II P; Co 11005, Co 11007, Co 11012, Co 11019, CoM 11085, CoM 11086, Co 86032, Co 99004- AVT ML I P; PI 10132- AVT ML II P; PI 10132- AVT ML II P). The mealy bug incidence was highest (85.0%) in Co 10017 (AVT ML R). All the evaluated genotypes against mealy bug exhibited less to highly susceptible reaction.

10. Vasantdada Sugar Institute (VSI), Pune (M.S.)

Seventy seven genotypes consisting of eight under IVT E, twenty under IVT ML, five under AVT E I P, eight under AVT E II P, six under AVT ML I P, eight under AVT E R, eleven under AVT ML II P and eleven under AVT ML R with respective group standard check were tested for their reaction against early shoot borer, internode borer, mealy bug and scale insect of sugarcane at Pune centre [Table- 4.1.10(a) to 4.1.10(b)].

Salient Findings:

The cumulative incidence of early shoot borer was found to be lowest (1.39%) in Co 10005 (AVT E R) to highest (58.47%) in Co 10006 (AVT E II P), thus all the tested genotypes grouped as less to highly susceptible. The incidence of internode borer was maximum (24.0%) in Co 10026 (AVT E II P) and minimum (0.00%) in Co 85004 (IVT E). Thus, all evaluated genotypes showed less susceptible reaction. The incidence of mealy bug was found to be nil in Co 13011, Co 13013, Co N 13073, Co Snk 13103, Co Snk 13104, Co Snk 13105, CoT 13366, Co 99004 under IVT ML; Co 11004, CoM 11081, CoM 11082, CoM 11084 under AVT E I P; Co 10006, Co 10024, Co 10026, Co 10027, Co 94008 under AVT E II P; Co 10017, Co 10031, CoVc 10061, PI 10131, PI 10132, Co 86032, Co 99004 under AVT ML II P and Co 10031 under AVT ML R. However, it was maximum (28.0%) in Co 85004 (AVT E R). Thus, all the screened genotypes categorised as less to moderately susceptible reaction to mealy bug. The incidence of scale insect was recorded as nil in all the tested genotypes except Co 85004 (13.33%) under AVT E I P; Co 10026 (8.00%) under AVT E II P; Co 11007 (1.33%) and Co 86032 (12.00) under AVT ML I P, and Co 10033 (8.00%)

and PI 10132 (2.00%) under AVT ML I P. All the evaluated genotypes against scale insect exhibited less susceptible reaction.

11. ZARS, JNKVV, Powarkheda (M.P.)

Fifty one genotypes comprising of eight under IVT E, five under AVT E I P, eight under AVT E II P, nineteen under IVT ML and eleven under AVT ML I P along with respective group standard check were evaluated for their reaction against early shoot borer and pyrilla at Powarkheda centre [Table- 4.1.11].

Salient Findings:

The early shoot borer incidence was found to be low (3.00%) in Co 10031 (AVT ML II P) to high (21.33%) in Co 10026 (AVT E II P). Thus, all the screened genotypes grouped as less to moderately susceptible. The pyrilla population was maximum (9.82 pyrilla/leaf) in Co 10026 (AVT E II P) and it was minimum (2.72 pyrilla/leaf) in Co 11082 (AVT E I P) Therefore, all tested genotypes showed less to moderately susceptible reaction.

12. MSRS, NAU., Navsari (Gujarat)

Fifty eight genotypes consisting of eight under IVT E, five under AVT E I P, eight under AVT E II P, twenty under IVT ML, six under AVT ML I P and eleven under AVT ML II P with respective group standard check were screened for their reaction against early shoot borer, top borer, stalk borer, scale insect, mealy bug and root borer of sugarcane at Navsari centre [Table- 4.1.12(a) to 4.1.12(b)].

Salient Findings:

The cumulative incidence of early shoot borer was found to be low (1.32%) in CoM 11081 (AVT E I P) to high (16.22%) in CoSnk 13104 (IVT ML). Thus, all the screened genotypes showed less to moderately susceptible reaction. The incidence of top borer (at harvest) was ranged from 1.87 per cent in CoN 13071 (IVT E) to 10.41 per cent in CoSnk 13104 (IVT ML), thus all screened genotypes exhibited less susceptible reaction. The scale insect incidence was recorded as nil in IVT E (Co 13002, Co 13003, Co 13004, CoN 13071, CoN 13072, CoSnk 13101, CoSnk 13102, MS 13081); AVT E I P (Co 11001, CoM 11081) to high in 20.0 per cent in Co 11004 (AVT E I P). Thus, all genotypes exhibited less susceptible reaction. The mealy bug incidence was found to be nil in IVT E (Co 13002, Co 13003, CoSnk 13101, CoSnk 13102, MS 13081); AVT E I P (Co 11001, CoM 11081, CoM 11084); AVT E II P (Co 10026, Co 10027, CoT 10366, CoT 10367); IVT ML (Co 13005, Co 13006, Co 13008, Co 13011, CoM 13082, CoSnk 13103, PI 13131, PI 13132); AVT ML I P (Co 11005, Co 11007, CoM 11085, CoM 11086) and AVT ML II P (Co 10015, Co 10017, Co

10031, Co 10033, PI 10132) and implies that all evaluated genotypes showed less to moderately susceptible reaction. The root borer incidence was registered as low (8.00%) in IVT E (Co 13003, Co 13004, CoN 13071, CoSnk 13101); AVT E I P (Co 11001, CoM 11082), AVT E II P (Co 10004, Co 10005, Co 10024); IVT ML (Co 13008, Co 13013, Co 13014, Co 13016, Co 13020, CoM 13082, CoSnk 13103, CoSnk 13104, CoSnk 13105, CoT 13366, PI 13131); AVT ML I P (Co 11005, Co 11012, Co 11019) and AVT ML II P (Co 09009, Co 10017, Co 10031, Co 10033, CoM 10083, CoT 10368, CoT 10369, CoVC 10061, PI 10132) while it was high (20.00%) in AVT E II P (Co 94008) and AVT ML II P (Co 99004). Thus, all tested genotypes showed less to moderately susceptible reaction.

13. ZARS, UAS, Mandya (Karnataka)

Fifty eight genotypes comprising of twenty under IVT ML, eight under IVT E, six under AVT ML I P, five under AVT E I P, eleven under AVT ML II P and eight under AVT E II P with respective group standard check were tested for their reaction against early shoot borer, top borer and internode borer of sugarcane at Mandya centre [Table- 4.1.13].

Salient Findings:

The incidence of early shoot borer was ranged from 4.75 per cent (Co 13071- IVT E) to 21.33 per cent (Co 10024- AVT E II P) and all tested genotypes categorized as less to moderately susceptible group. The top shoot borer incidence was recorded as low (4.25%) in Co 86032 (IVT ML) to high (23.00%) in CoN 13072 (IVT E), Thus all tested genotypes exhibited less to highly susceptible reaction. The internode borer incidence was found to be minimum (5.33%) in Co 13008 (IVT ML) to maximum (44.33%) in Co 94008 (AVT E II P) and all the tested genotypes showed less to highly susceptible reaction.

14. Regional Sugarcane & Jaggery Research Station, Kolhapur (M.S.)

Report is not submitted by concern centre.

15. ICAR-SBI, Coimbatore (T.N.)

Fifty eight genotypes consisting of eight under IVT E, five under AVT E I P, twenty under IVT ML, six under AVT ML I P, eleven under AVT ML II P and eight under AVT E II P with respective group standard check were evaluated for their reaction against early shoot borer, internode borer, root borer and top shoot borer of sugarcane at Coimbatore centre [Table- 4.1.14].

Salient Findings:

The early shoot borer incidence was recorded as minimum (19.59%) in Co 13016 (IVT ML) to maximum (77.11%) in Co 85004 (IVT E), thus all genotypes exhibited

moderately to highly susceptible reaction. The incidence of internode borer was low (32.00%) in CoC 671 (AVT E I P) to high (82.00%) in Co 13011 (IVT ML) and showed moderately to highly susceptible reaction. The root borer incidence was nil in all tested genotypes. The top shoot borer incidence was recorded as nil in CoSnk 13105 (IVT ML) and Co 85004 (AVT E II P) to high (2.32%) in CoM 10083 (AVT ML II P), Thus all tested genotypes exhibited less susceptible reaction.

IV. EAST COAST ZONE

16. RARS, ANGRAU, Anakapalle (A.P.)

Twenty seven genotypes comprising of three under IVT E, two under IVT ML, five under AVT E I P, two under AVT ML I P, eight under AVT E II P, four under IVT E R and three under IVT ML R with respective group standard check were tested for their reaction against early shoot borer and internode borer of sugarcane at Anakapalle centre [Table-4.1.15].

Salient Findings:

The early shoot borer (cumulative incidence) was found to be low (1.95%) in Co A 12 322 under AVT E II P to high (16.53%) in Co A 99082 (93A 145) under IVT ML Ratoon. Thus, all the genotype tested showed less to moderately susceptible reaction. The incidence of internode borer was ranged from 16.7 per cent in Co A 12 321 under AVT E II P to 88.89 per cent in Co A 92081 (87A 298) under IVT ML R. Thus, all the genotype under different groups exhibited less to highly susceptible reaction.

17. Sugarcane Research Station, Vuyyuru (A.P.) – Voluntary centre

Twenty nine genotypes were evaluated for their reaction against early shoot borer, internode borer and scale insect of sugarcane at Vuyyuru centre (Table- 4.1.16).

Salient Findings:

All the tested genotypes exhibited less susceptible reaction to early shoot borer while it was showed highly susceptible reaction to internode borer and scale insect at Vuyyuru centre.

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Project E. 28		
Title of Project	:	Survey and surveillance of sugarcane insect pests
Objective	:	To identify key insect pests of sugarcane in the area
Year of Start	:	2003-04
Duration	:	Long term
Location	:	All centres where entomologist are available

1. Regional Research Station, PAU., Kapurthala (Punjab)

Sugarcane fields nearby sugar factories of Punjab were surveyed for insect pests in the area. The incidence of termite ranged between 1-2 per cent in popular varieties of sugarcane *viz.*, CoH 89003, CoJ 64 and Co 238 around sugar factories at Mukerian, Dasuya, Gurdaspur and Fazilka. The incidence of early shoot borer, top borer, stalk borer and root borer ranged between 4-5, 3-4, 6-7 and 4-5 per cent, respectively in different varieties of sugarcane *viz.*, Co 238, CoJ 85, Co 89003 and CoJ 88 at different cane growing areas of Punjab. The incidence of pyrilla, mite and black bug were found 7-8, 5-6 and 7-8 per cent, respectively on different varieties *viz*., CoJ 85, Co 238, Co 89003, CoJ 64 and CoJ 88 in cane growing area of Dasuya, Mukerian, Phagwara, Batala, Gurdaspur, Ajnala, Nakodar, Dhuri, Amloh, Fazilka, Mukatsar, Faridkot, Budhewal, Ludhiana and Morinda. The incidence of whitefly was found to traces to low [Table-28.1].

2. Regional Research Station, Uchani Dist- Karnal (Haryana)

A roving survey of Mills zones of Cooperative sugar factories *viz*., Karnal, Yamuna Nagar, Shahabad, Rohtak, Assandh, Panipat, Sonipat and Jind was carried out for insect- pests of sugarcane crop. Survey of insect-pests during pre-monsoon season revealed that in Sugar Mill Zone Karnal, a low to moderate incidence of termites (4.5-12.4%) in plant crop in varieties Co 89003, Co 0238, Co 0118, Co 05011 and CoH 160 was observed in sandy soils. The low to moderate incidence of pink stem borer, *Sesamia inferens* was observed during month of March to first fortnight of April. A moderate incidence of thrips (6-11%), low to moderate incidence of early shoot borer (2.8-12.4 %) and low incidence of top borer (2-3 %) was observed in plant and ratoon crop in varieties CoJ 85, Co 89003, Co 0238, Co 0118, Co 05011, CoS 8436, CoP84212 and CoH 160. The low to moderate incidence of black bug (4-12 bugs/whorl) was observed in ratoon crop. During monsoon season in Karnal sugar mill zone, top borer incidence was observed as low to moderate and stalk borer had moderate incidence in Co 0238, Co 89003, Co 05011, CoS 8436, CoP 84212 and CoH 160 varieties of

sugarcane. However, black bug population was recorded low to high (8-36 bugs/whorl) in plant and ratoon crop. The moderate to high incidence (10-74 % leaves infested) of webbing mite was reported in Karnal sugar mill zone during month of July. The incidence of root borer was low to moderate (8-17%) and low to moderate (1-4 grub/m^2) incidence of white grub in sandy soils. During post monsoon season, low to moderate incidence of stalk borer (8.5-27.4 %), medium to high incidence of root borer (7.2-20.4%), low to high incidence of whitefly (0-14.6 nymphs and puparia/2.5 cm^2), medium to high incidence of black bug (16-43 bugs/whorl), moderate to high incidence of white grub (3-7 grubs/m^2), low incidence of top borer and low incidence of *Pyrilla* was observed in Co 89003, Co 0238,CoH 119, Co 05011, CoH 160, CoP 84212 Co J 85 and Co 0118. However, parasitization of *Pyrilla* was reported to be very less and only 0.5 to 0.8 cocoons/leaf of *Epiricania melanoleuca* (nymphal-adult parasitoid) were observed [Table-28.2].

3. ICAR-SBI Coimbatore Regional Centre, Karnal (Haryana)

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 *viz*., 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 per cent, respectively in Haryana. 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 listed as major insect pests of sugarcane in Haryana. 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 [Table-28.3].

4. U.P. Council of Sugarcane Research, Shahjahanpur (U.P.)

Sugarcane fields around sugar factory *viz*; Nawabganj (Bareilly), Hargaon (Sitapur), Kumbhi (Kheri), Rosa (Shahjahanpur), Khambarkhera (Kheri), Maqsudapur (Shahjahanpur), Tilhar (Shahjahanpur) and Sultanpur 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 4.50 per cent (Rosa factory zone) to 9.00 per cent (Tilhar factory zone). The per cent incidence of top borer was recorded low to moderate in all surveyed sugar factory zones. The minimum (5.00%) incidence of top borer was recorded around Kumbhi sugar factory zone while maximum (11.00%) around Tilhar factory zone. The infestation of stalk borer was recorded low in all surveyed factory zone. It ranged from 10.50 per cent on cane basis 2.85 per cent intensity around Hargaon factory zone to 17.50 per cent on cane basis with 5.04 per cent intensity around Rosa factory zone. The minimum population of pyrilla was 7.50 (nymph + adult)/leaf observed around Hargaon factory zone while maximum as 11.00 pyrilla (Nymph + adult)/leaf was observed around Tilhar factory zones during 3rd week of April. The occurrence of *Epiricania melanoleuca* was traces in most of the fields [Table-28.4].

5. Division of Entomology, ICAR-IISR, Lucknow (UP)

During the year 2016-17, insect survey was conducted in command areas of USDM, Ltd. Shamli, DSCL Sugar-Hariawan and Loni, The Simbhaoli Sugar Ltd., Chilwaria in U.P. The incidence of top borer (II brood), ESB, web mite, white grub were observed as 2-8%, 2-3%, 3-6% , 10-20% and 1-4%, respectively in variety Co 0238 in different villages of USDM, Shamli. White grub (8-10%) was observed in varieties Co 89003, Co 05011 and Co 95422 in DSCL-Hariawan and Loni. The incidence of root borer was increasing and was around 5 per cent in Chilwaria areas with one location of heavy patch of root borer incidence (20%). The low incidence of top borer and stalk borer in Shahjahanpur area was noticed at maturity stage of the crop. **Note- Only text was submitted instead tabular format.**

6. SRI, RAU, Pusa (Bihar)

A survey was conducted on the insect pests of sugarcane under different village of reserved area of Hasanpur sugar factory during cropping season of 2016-17. The per cent incidence of early shoot borer (5.5 to 11.5%), root borer (3 to 6%), top borer (10.5 to 17.5%), stalk borer (below 5%), army worm (6.5 to 15.5%) and pyrilla (6.5 to 19) per leaf were observed as the key pests of sugar factory reserved area of sugarcane. The incidence of other pests *viz*., plassey borer, mealy bug, termite, grass hopper, scale insect, whitefly, 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 2.0 to 9.0%, 2.0 to8.0% and 5.0 to 16.0%, and 1.0 to 7.0%, respectively. Pyrilla population was observed as 5-14/leaf at Pusa Farm [Table-28.5].

7. G.S. Sugarcane Breeding and Research Station, Seorahi (U.P.)

Survey was made in eleven different sugar factory zones *viz*., Seorahi, Manakapur, Balrampur, Babhanan, Mausudha, Dhadha, Ramkola, Sultanpur, Utrola, Khadda, and Siswabajar for key insect–pests of sugarcane. During hot weather, the incidence of early shoot borer was low and ranged from 3.50% in Balrampur factory zone to 6.00% in Seorahi factory zone. The per cent incidence of top borer was recorded low in all surveyed factory zone. The minimum (7.00%) incidence of top borer was recorded in Ramkola factory zone while maximum (11.50%) around Khadda factory zone. The infestation of stalk borer was observed low in all surveyed factory zone. It ranged from (7.00%) around Manakapur and (17.50%) on cane basis in Ramkola factory zone. The incidence of root borer was observed low and ranged from 4.00 per cent in Seorahi factory zone to 12.50 per cent in Ramkola factory zone [Table-28.6].

8. SRS, Dr. PDKV, Akola (M.S.)

Survey was made in vidharbha region of Maharashtra in various districts/blocks *viz*., Wardha, Yavatmal, Telhara, Nagpur and Bhandara for key insect pests of sugarcane. During the survey programme, the incidence of internode borer was 12.00-16.0 per cent in Wardha, Yavatmal and Telhara area. The per cent incidence of pyrilla was recorded as low to moderate in all surveyed area (12.0%). The incidence of early shoot borer was 20.34 per cent in above areas. The incidence of internode borer was 8.00-16.0 per cent in Nagpur and Bhandara area. The incidence of pyrilla was observed low and ranged from 8.00 to 12.00 per cent in Nagpur and Bhandara area [Table-28.7(a) to 28.7(c)].

9. CSRS, MPKV, Padegaon (M.S.)

The early shoot borer was key pest of this area and per cent insect infestation was highest in *suru* planting than *adsali* and *preseasonal.* The incidence of early shoot borer ranged 8.00 to 31.20 per cent (Av. 11.00%). The per cent incidence of internode borer ranged from12.60 to 22.00 and intensity ranged from 1.80 to 5.20 per cent. The incidence of mealy bug was ranged from 10.20 to 22.60 per cent, whereas intensity ranged from 1.60 to 4.0 per cent. The incidence of top shoot borer, root borer, sugarcane woolly aphid, pyrilla, whitefly, thrips, scale insects, white grub and termites were traces to low level [Table-28.8].

10. Vasantdada Sugar Institute (VSI), Pune (M.S.)

The data presented in Table- 28.9 revealed that per cent incidence of early shoot borer was ranged from 0.00 to 36.36 per cent, while it was maximum 36.36 per cent in variety VSI 08005. The per cent incidence of internode borer was ranged from zero to 40.00 per cent,

while it was maximum 40 per cent in variety CoM 10001. The per cent incidence of mealy bug was ranged from 0.00 to 20.00 per cent, while it was maximum 20.00 in Co 86032.

11. ZARS, JNKVV, Powarkheda (M.P.)

The pyrilla and early shoot borer were key insect pests, while the top shoot borer, root borer, pink stem borer, whitefly, mealy bug and scale insect were minor insect pests of sugarcane. Among the areas surveyed, the highest infestation of early shoot borer as well as pyrilla recorded at Bankhedi sugar factory area [Table-28.10]. .

12. MSRS, NAU., Navsari (Gujarat)

The incidence of early shoot borer and top borer was ranged from 5.0 to 10.0 per cent in Co 86032, Co 97009 (MC 707), Co 86032, Co 86002 and CoM 0265, respectively. Whitefly incidence varied from 8.0 to 60.0 per cent in plant sugarcane and in ratoon it was about 90.0 per cent. The incidence of root borer was increased in the area and varied from 5.0 to 18.0 per cent. The rodent damage was ranged from 5.0-10.0 per cent [Table-28.11].

13. ZARS, UAS, Mandya (Karnataka)

The internode borer and woolly aphid registered highest level of incidence. Overall insect pest activity was moderate to high during the year [Table-28.12].

14. ICAR-SBI, Coimbatore (T.N.)

The incidence of internode borer was ranged from 15.0 to 20.0 per cent (Av. 17.5%) (M/s Amravathi Sugars, Udumalpet factory zone) in Co 86032. The per cent incidence of mealy bug was recorded as 10.0 to 20.0 per cent (Av. 15.0%). The incidence of other pest *viz*., top borer, pyrilla and root borer were noticed as low to moderate in various sugar factory area [Table-28.13].

15. RARS, ANGRAU, Anakapalle (A.P.)

During 2016-17, survey and surveillance of sugarcane insect pests was done in Chodavaram, Thandava, Etikoppaka sugar factory areas in Visakhapatnam district, Navabharath sugars and Chelluru sugar factory area in East Godavari district. The early shoot borer and internode borer were the major problems in all commercial varieties which were grown in different areas. The incidence of early shoot borer was ranged between 4.0- 47.0% in different sugarcane growing areas due to high day temperatures coupled with low relative humidity during the months of March and April. Later the incidence was declined due to well distributed rainfall during the months of June-August. The incidence of internode borer was relatively low to moderate (5-50%). The moderate to severe incidence of whitefly (10-39N and P/2.5cm^2) was observed in many ratoon planted crops in Chodavaram division of

Visakhapatnam district. The incidence of red mite was ranged between 5-36% and termite incidence was 12-40% in different sugarcane growing areas. In East Godavari district, Chelluru was low to moderate incidence of *Pyrilla* (2-16AandN/leaf) was observed during August month [Table-28.14].

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Project E. 30		
Title of Project	**:**	Monitoring of insect pests and bioagents in sugarcane agro-ecosystem
Objective	**:**	To monitor the key insect pests and natural enemies in the area.
Year of Start	**:**	2006-07
Duration	**:**	Long term
Location	**:**	Kapurthala, Uchani, Karnal (SBI), Shahajahanpur, Lucknow, Pusa, Seorahi, Akola, Padegaon, Pune, Powarkheda, Navsari, Mandya, Kolhapur, Coimbatore and Anakapalle
Plot Size	**:**	Planting of sugarcane variety recommended for the region in 0.2 ha area

Detailed Report:

1. Regional Research Station, PAU., Kapurthala (Punjab)

Sugarcane variety CoJ 88 was planted in 0.2 ha area and the incidence of insect pests and their natural enemies were recorded. The early shoot borer incidence started from 2nd week of April and reached its peak level (12.6%) in 2nd week of May which thereafter, declined to 1.8 per cent in the 2nd week of July. The parasitoid *viz.*, *Trichogramma sp*. and *Stenobracon sp*. were recorded as 2.0 and 3.6 per cent, respectively in the month of April and 4.0 and 4.9 per cent, respectively in the month of May. The top borer incidence started from month of May and reached to its peak level of 13.0 per cent in 2nd week of July. Thereafter, top borer incidence decreased to 1.0 per cent in the 1st fortnight of September. The bio-agents *viz.*, *Rhaconotus sp*., *Isotima javensis* and *Stenobracon sp*. were recorded as 3.6, 3.1 and 5.0 per cent in the month of June, respectively; 5.5, 4.2 and 6.0 per cent in the month of July, respectively and 2.0, 2.1 and 3.1 per cent in the month of August, respectively. The stalk borer incidence started from 2nd week of September and reached to its peak level of 11.0 per cent in the month of November and thereafter stalk borer incidence declined. The parasitization by bio-agents *viz*., *Sturmiopsis inference* and *Cotesia flavipes* were observed as 2.0 and 1.0 per cent in the month of September, respectively and again *Sturmiopsis inference* and *Cotesia flavipes* were observed as 3.5 and 2.0 per cent in the month of October and 5.0 and 3.5 per cent in the month of November, respectively. The activity of pyrilla on sugarcane

initiated from 2nd week of July and continued up to first fortnight of October. The activity of bio-agent *viz., Epiricania melanoleuca* was 4.8 per cent parasitization observed in the month of August, 6.0 per cent was observed in the month of September, and 3.5 per cent observed in month of October [Table- 30.1].

2. Regional Research Station, Uchani Dist- Karnal (Haryana)

The pink stem borer, *Sesamia inferens* was the major pest in March planted sugarcane variety Co 0238. Damage to crop by this pest started just after germination of crop and remained up to mid April. The infestation by pink stem borer pest ranged from 1.2 to 7.9 per cent during March to April, 2016. During formative phase of crop (April-June), early shoot borer, *Chilo infuscatellus* was the major pest sugarcane variety Co 0238 during pre-monsoon period. The damage occurrence of shoot borer was started in first fortnight of April, its incidence being relatively low in end April (1.4%). During month of May, shoot borer incidence increased to a maximum of 5.6 per cent. During month of June, shoot borer incidence reached to a maximum of 7.8 per cent. The incidence of shoot borer species was noticed to decline subsequently and was recorded 6.8 per cent (cumulative incidence). Thereafter incidence of early shoot borer was not noticed. Top borer infestation was observed to begin in mid May with an infestation level reaching 6.3 per cent in end October. The infestation was raised with second brood as 4.7 per cent in end July and it increased (5.4%) by end August (third brood) and 6.2 per cent in last week of September (fourth brood). The infestation of this borer species in variety Co 0238 was 6.2 per cent during September when the pest reached the fifth brood. The damage of stalk borer started during month of July with low incidence in end July (0.6 infestation index). During month of September, stalk borer incidence started increasing and reached to a maximum of 1.8 infestation index during months of February-March. The incidence of root borer was noticed during month of July (12.8 %) and in August its population reached to 13.6 per cent and thereafter population increased gradually and reached to a maximum of 24.5 per cent during month of March.

The black bug, *Cavelerius sweeti* infestation in the crop was first recorded during May (1.7 nymph/adults per whorl). It increased during June and found to inhabit a mean of 5.4 nymphs and adults/ whorl and 9.4 nymphs and adults/whorl during month of August. The number was decreased to a mean of 2.3/ shoot in the month of November. It declined (0.6 bugs/whorl) in the subsequent month, but the pest infestation continued in the crop till end December. Leaf hopper, *Pyrilla perpusilla* was noticed to begin in July and remained in the

crop till December. It was naturally controlled by the egg and nymphal- adult parasitoid. Whitefly appeared in end July and its population was recorded as 0.3 nymphs and puparia/2.5 sq. cm^2 and reached to a maximum of 2.6 nymphs and puparia/2.5 sq. cm^2 during August, 2016 and thereafter its population decreased and remained up to December. Similarly, webbing mite also appeared during end June with incidence (0.8 % infested leaves). It increased slowly to a mean per cent webbing leaves of 5.9 during month of August and subsequently declined to 0.2 per cent webbed leaves by December.

A natural parasitism of top borer and stalk borer eggs by egg parasitoid, *Trichogramma chilonis* was observed. The parasitism of top and stalk borer eggs by egg parasitoid was recorded as 2.1 and 2.4 per cent, respectively. The parasitism by *Isotima javensis, Cotesia flavipes and Beauveria bassiana* of top borer larvae was 5.2, 5.6 and 7.4 per cent, respectively. In case of stalk borer, parasitism by *Sturmiopsis inferens, Cotesia flavipes* and *Beauveria bassiana* was 5.8, 6.2 and 5.8 per cent, respectively during post monsoon season. The larvae of root borer collected from field showed parasitism to the extent of 4.8 per cent by *Beauveria bassiana* during month of September. A natural parasitism (4.6%) of whitefly nymphs by *Encarsia sp*. was also observed [Table-30.2(a) to 30.2(c)].

3. ICAR-SBI Coimbatore Regional Centre, Karnal (Haryana)

The incidence of early shoot borer and top borer was below ETL (<15.0 and <10%, respectively). The root borer and termite incidence was 27.0 and 12.0%, respectively. The population of pyrilla was recorded as 7.0/leaf. Pink borer emerged as a major insect pest of sugarcane. The cumulative incidence of pink borer was seen from shoot stage to harvest of the crop (80.0%). It was also observed that black bug; an insect pest of sugarcane ratoon, infest the sugarcane crop during May to October. 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, respectively. *Cotesia flavipes* identified as a parasitoid of stalk borer with 12.3 per cent stalk borer larvae during the month of February to April [Table- 30.3].

4. U.P. Council of Sugarcane Research, Shahjahanpur (U.P.)

An experiment was conducted on sugarcane crop planted in 0.2 ha area with CoS 08272 cultivars at Shahjahanpur to monitor the key insect pests and their bio-agents. The incidence of early shoot borer was recorded as maximum 8.50 per cent during 24th SMW followed by 7.62 per cent, 5.10 per cent and 4.15 per cent during 20th, 16th and 29th SMW, respectively. The incidence of top borer was recorded as maximum 7.30 per cent during 35th SMW followed by 5.80 per cent, 4.85 per cent, 3.60 per cent and 2.00 per cent during 31st , 26th, 22nd and 38th SMW, respectively. The per cent incidence of stalk borer (on cane basis) was observed to be maximum 26.50 per cent during 43rd followed by 18.20% during 38th SMW, respectively.

The bio-agents *viz.*, *Telenomus beneficiens, Isotima javensis, Rhaconotus scirpophagae* and *Stenbracon deesae* were recorded as major parasitoids of top borer. *Cotesia flavipes*, a larval parasitoid of stalk borer was also recorded from fields. The peak activity of egg-parasitoid, *T. beneficiens* was observed to be 14.30 per cent during 31st SMW and declined up to 6.15 per cent during 35th SMW. A parasitisation of larvae by *Isotima javensis* was observed from 22nd SMW (2.00%) and increases up to 10.35 per cent during 35th SMW thereafter decreases up to 5.35 per cent during 38th SMW. The parasitisation of top borer by *Rhaconotus scirpophagae* was recorded minimum (2.65%) during 26th SMW which increased up to 7.00 per cent during 35th SMW thereafter decreases up to 3.50 per cent during 38th SMW. The parasitisation of *Stenobracon deesae* was ranged from 3.62 per cent during 31st SMW to 6.35 per cent during 38th SMW. The parasitisation of stalk borer larvae by *Cotesia flavipes* was recorded maximum 13.20 per cent during 43rd SMW [Table- 30.4].

5. Division of Crop Protection, IISR, Lucknow (U.P.)

An experiment was planted with a susceptible sugarcane variety, CoLk 8102. The incidence of termite was in traces. The incidence of top borer II, III and IV brood was 0.16 - 1.33, 1.11 - 16.67 and 6.09 - 12.00 per cent, respectively. The incidence of root borer was 26.67 to 58.82 per cent in July and in the month of September with 50.00 to 88.89 per cent. The incidence of internode borer was 14.11 to 40.00 per cent. The incidence of stalk borer was 0.0-5.00%. The incidence of *Pyrilla perpusilla* was low and its parasitoid *Fulgoraesia* (*Epiricania) melanoleuca* was active in nature. The incidence of mealy bug was 100 per cent. No incidence of whitefly was seen in the field. The population of black bug varied from 2-17/cane. The parasitisation (in parentheses) by *Telenomus beneficiens* 25.58-63.88 (Av.

39.03% on egg mass basis), *Stenobracon sp*. (1.66-5.00%), *Rhaconotus sp*. (28.33-1.6%), *Isotima javensis* (10.00-12.5%) was observed. The cocoons of *Epiricania melanoleuca* on per leaf basis varied from 1-5 in the month of August and 5-10 in the month of October. Predatory fauna comprising of Coccinellids, spiders and ants were noticed in the field at different stages of the crop [Table- 30.5(a) to 30.5(d)].

6. SRI, RAU, Pusa (Bihar)

Sugarcane variety BO 153 was planted in 0.2 hectare area at Pusa farm, Sugarcane Research Institute, Pusa. The population of root borer, shoot borer, top borer, stalk borer, pyrilla, and their natural enemies were recorded at monthly interval during cropping season of 2016-17. The data on monitoring of insect pests and their bio-agents revealed that the mean per cent incidence of root borer, shoot borer, top borer and stalk borer were varied from 1.8 to 10.2%, 2.0 to 14.3%, 1.0 to 16.7% and 2.0 to 5.3% respectively. The incidence of sugarcane pyrilla was varied from 1.0 to 17.9/leaf.

The bio-agents of root and early shoot borer were not observed during cropping season. The parasitization of bio-agents such as, *Apantelis flavipes, Rhanconotus scirpophagae and Stenobracon deesae* were recorded against top borer. The data further revealed that population of *S. deesae* varied from 5 to 11.5 per cent during May to November and its peak (11.5%) was noticed in September month. The population of *Apantelis flavipes* was ranged in between 2.5 to 12.7 per cent during May to November with its highest population (12.7%) was recorded in month of September. The activity of *R. scirpophagae* was recorded from July to November with its peak (8.2%) in month of September. The parasitization of *T. pyrillae* and *E. melanoleuca* were recorded from July to November and May to November, respectively. Their peaks were noticed in the month of November (70.2%) and September (29.2%), respectively. In case of stalk borer, the parasitization of *Apantalis flavipes* was recorded from 5.8 to 15.3% during August to November [Table 30.6(a) to 30.6(b)].

7. G.S. Sugarcane Breeding and Research Station, Seorahi (U.P.)

An experiment was conducted on 0.2 ha area with CoS 08272 cultivar at Seorahi for monitoring the key insect-pests and their natural enemies. The incidence of shoot borer was recorded maximum 9.08 per cent during 24th SMW followed by 8.35, 4.50 and 2.30 per cent during 20th, 16th and 29th SMW, respectively. The incidence of top borer was recorded maximum (7.89%) during 31st SMW followed by 4.70, 3.44, 2.67 and 1.62 per cent during

35th, 26th, 22nd and 38th SMW, respectively. The per cent incidence of stalk borer (on cane basis) was observed to be maximum (15.25%) during 43rd SMW followed by 10.40 per cent during 38th SMW, respectively. The bio-agents *viz., Isotima javensis, Stenobracon sp., Elasmus zehnteri* and *Rhaconotus scirpophagae* were recorded as major parasitoid of top borer and *Cotesia flavipes*, a larval parasitoid of stalk borer was also recorded from the field. A parasitisation of larvae by *Isotima javensis* was recorded minimum (2.22%) during 22th SMW and increased up to 18.18 per cent during 35th SMW there after decreased up to 4.41 per cent during 38th SMW. The parasitisation of *Stenobracon sp.* was observed with minimum (3.22%) during 22nd SMW and increased up to 14.28 per cent during 35th SMW there after decreased up to 5.00 per cent during 38th SMW. The parasitisation of top borer by *Elasmus zehnteri* was observed with 4.44 per cent during 26th SMW and increased up to 12.00 per cent during 35th SMW there after decreased up to 5.00 per cent during 38th SMW. *Rhaconotus scirpophagae* was observed minimum (3.33%) during 26th SMW and increased up to 10.71 per cent during 35th SMW thereafter decreased up to 5.00 per cent during 38th SMW. The parasitization by *Cotesia flavipes* was maximum (10.50%) on stalk borer larvae during 43th SMW followed by 6.20 parasitizes during 38th SMW [Table- 30.7(a) to 30.7(c)].

8. SRS, Dr. PDKV, Akola (M.S.)

The insect pests recorded on sugarcane variety Co-86032 during 2016-17 were early shoot borer, scales, pyrilla, whitefly and aphids. However, the incidence of aphids, whitefly and pyrilla was in a patch and very meager. The seasonal incidence data revealed that the damage due to early shoot borer was initiated during the 7th SMW (12.96% dead hearts) and it was continued up to 30th SMW. The maximum damage due to early shoot borer was observed during 7th SMW (12.96% dead hearts) during which meteorological parameters were ranged from 15.9 to 33.9^{0}C temperature, 21 to 51% RH and 0.0 mm rainfall. The incidence of scales insect was initiated during 37th SMW (40% incidence and 4.96% intensity) and it was continued up to 52nd SMW. The per cent incidence and per cent intensity increased at 37th SMW and then per cent intensity decreased but the per cent incidence of scales increased during last meteorological week and was the maximum on 52nd SMW (44%). The incidence of pyrilla was initiated during 30th SMW (0.90/ leaf) and it was continued up to 42nd SMW. The maximum pyrilla per leaf was observed on 33rd SMW (1.60/leaf). The meager population of aphid was noticed. The incidence started from 27th SMW and it was continued up to 47th SMW the maximum incidence was noticed on 33rd SMW (28 aphids/ 3

leaves). The meager population of whitefly was noticed. The incidence started from 27th SMW and it was continued up to 45th SMW with maximum incidence was noticed on 41st SMW (10 whiteflies/3 leaves). The bio-agents such as ladybird beetles, spiders and *Apanteles* spp. were in traces against early shoot borer and *Epiricania* was also seen against pyrilla. Spiders were also observed to feeding on nymphs of pyrilla during 7th SMW and continued up to 52nd SMW [Table-30.8].

9. CSRS, MPKV, Padegaon (M.S.)

During this year (2016-17), the incidence of early shoot borer ranged from 0.44 to14.73 per cent. The peak incidence of early shoot borer was observed in 17th SMW (14.73%). The parasitism of *T. chilonis* was observed as 13th to 23rd SMW. The incidence of pyrilla per leaf was ranged from 1 to 3 per cent. The parasitoids, *T. pyrillae* and *E. melanoleuca* were also observed. The first incidence of woolly aphid was observed in 31st SMW with 0.11 woolly aphids per leaf. However, the peak incidence was observed in 49th SMW (34.78 woolly aphids/ leaf) and it was continued up to 5th SMW. The parasitoid, *Encarsia flavoscutellum* was ranged from 7 to 133 per 150 leaves and peak was observed in 48 SMW. The predator, *Micromus igorotus* was ranged from 5 to 63 per 150 leaves and peak was observed in 43rd SMW. The peak predation of *D. aphidivora* on woolly aphid was observed in 43rd and 48th SMW (39 larvae of *Dipha/* 150 leaves). The predator, *Syrphids* was observed since 43rd SMW with a peak activity recorded in 50th and 52nd SMW. The Chrysoperla were also observed in traces. The mealy bug incidence was ranged from 1 to 2 per cent and incidence was observed since 37 to 42 SMW [Table- 30.9(a) to 30.9(d)].

10. Vasantdada Sugar Institute (VSI), Pune (M.S.)

The per cent incidence of early shoot borer was maximum (7.59%) in April 2016, while in May 2016 it was minimum 1.98 per cent. The per cent incidence of internode bore was maximum (14.0%) in November 2016. The per cent intensity and infestation index of internode borer was maximum 1.51and 0.20 per cent, respectively in August 2016. The incidence of mealy bug was maximum (13%) in August 2016 and November 2016. Intensity of mealy bug was observed as maximum (2.49%) in June 2016 [Table-30.10].

11. ZARS, JNKVV, Powarkheda (M.P.)

The infestation of early shoot borer initiated (0.2%/week) at 5th SMW (1st week of Feb.). Thereafter, it increased gradually and reached to the seasonal peak activity (>2.5%/week) at 13th to 15th SMW (last week of March to 2nd week of April). Afterwards,

ESB observed decline trend and its activity declined after 22nd SMW (last week of May). The maximum temperature of 40 to 42^{0}C, minimum of 20^{0}C, morning and evening RH of 93% and 61 %, respectively found to be conductive to induce the peak activity of ESB.

The 1st phase of pyrilla activity initiated at 12th SMW (2nd last week of March), the peak activity of more than 3 pyrilla individuals/leaf observed during 17th to 19th SMW (Last week of April to 2nd week of May) and pest remain active up to 23rd SMW i.e, 1st week of June. The second phase observed to initiate from the 26th SMW (last week of June), reached to the peak infestation (>4 pyrilla individuals/leaf) during 31st to 33rd SMW (1st fortnight of August). Maximum Epiricania parasitism (28.0%) observed after a week, while, maximum Epiricania egg masses/ cocoon and *T. pyrillae* (65%) observed at 36th SMW i.e. after 2 weeks of pyrilla peak activity. The maximum and minimum temperature of 30-32^{0}C and 22-23^{0}C and morning and evening RH of 92 to 99% and 77 to 98% seems to be favorable for peak pest activity in rainy season [Table-30.11(a) to 30.11(b)].

12. MSRS, NAU., Navsari (Gujarat)

The incidence of early shoot bore in 7th, 11th and 16th SMW was 2.34, 1.43 and 0.98 respectively. During period of study only *T. chilonis* was found to parasitized early shoot borer. Parasitism ranged from 2.43 to 9.73 per cent.

The incidence of top shoot bore in 20th, 28th and 50th SMW was 1.68, 1.42 and 2.53 per cent, respectively. During period of study per cent parasitism by *T. japonicum* was 5.69, 3.25 and 1.63, respectively. Whereas *T. chilonis* found to be parasitizing at the rate of 1.48, 2.42 and 1.19 per cent, Parasitism done by *Apanteles flavipes* was ranged from 1.25 to 2.34 per cent. Fungus parasitism ranged from 1.18 to 1.32 % caused by *B. bassiana* [Table-30.12].

13. ZARS, UAS, Mandya (Karnataka)

The cumulative incidence of ESB in Co 86032 sugarcane variety was 17.46 per cent in the first four months after planting. Thereafter, at seven months after planting the incidence of TSB was 21.42 per cent and the incidence of INB was 24.67 per cent. Aphid, whitefly and pyrilla appeared in very small numbers though failed to establish and spread. Encarsia (3-7 adults/leaf) kept the woolly aphid under control. More rainfall during the months of August to October resulted in the higher incidence of woolly aphid and INB in Mandya area [Table-30.13].

13. Regional Sugarcane & Jaggery Research Station (MPKV), Kolhapur (M.S.)

The annual report was not submitted by concern centre.

14. ICAR-SBI, Coimbatore (T.N.)

The maximum incidence of early shoot borer was 82.2 per cent during May month. The other pests peak incidence *viz.*, top borer (0.44%) in July, internode borer (82.51%) in September, woolly aphid (1.77/leaf) in November, mealy bug (1.79%), whitefly (0.77%), termite (traces) were reported during the present investigation. *Encarsia flavoscutellum* and *Micromus* were reported to feed on sugarcane woolly aphid in the area during November month [Table-30.14].

15. RARS, ANGRAU, Anakapalle (A.P.)

During 2016-17, the major insect pests and their bio-agents in sugarcane variety 93 A 145 (Co A 99082) were monitored. The incidence of early shoot borer (ESB) was ranged between 1.6 to 21.0 per cent with peak incidence during the month of May (21.0%). The parasitisation of *Trichogramma chilonis* (0.2-3.8%), *Sturmiopsis inferens* (1-2%) were observed on early shoot borer during the present investigation. The internode borer incidence was ranged between 6.0 to 32.0 per cent with maximum incidence (32.0%) during the month of October and parasitisation of *T. chilonis* (0.2-4.0%), *S. inferens* (1-2%), *Cotasia flavipes* (0.4-2.2%). Red mite incidence (6.0-28.0%) was noticed during the months of May-August with maximum incidence during the month of June (28.0%). Mealy bug incidence was very meager and predatory coccinellids *viz*., *C. septempunctata* and *C. sexmaculata* were also observed on mealy bugs. The incidence of scale insect was also very less and it was ranged between 5.0 to 40.0 per cent with a peak incidence in December month (40.0%).

The peak population of *Pyrilla* (10-18/leaf) was observed during the month of October. The parasitisation of *Epiricania melanoleuca* on *Pyrilla* nymphs and adults was ranged between 2.0 to 9.0 per cent with maximum parasitisation during November month (9.0%). The parasitisation by *Tetrastichus pyrillae* on *Pyrilla* eggs was also observed (1.0-4.0%). The prevalence of effective parasitoids of major insect pests of sugarcane was identified *viz., Trichogramma chilonis, Sturmiopsis inferens, Cotesia flavipes* parasitizing on early shoot borer and internode borer eggs, larvae and *Tetrastichus pyrillae, Epiricania melanoleuca* parasitizing on *Pyrilla* eggs and nymphs, adults, respectively. A new insect pest, spittle bug, *Poophilus costalis* (Walker) incidence was traces during the months of August to November, 2016 on sugarcane leaves [Table-30.15(a) to 30.15(c)].

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Project E. 34		
Title of Project	**:**	Standardization of simple and cost effective techniques for mass multiplication of sugarcane bio-agent.
Objective	**:**	To develop simple and cost effective mass-multiplication techniques of promising bio-agents of the area.
Year of Start	**:**	2012-2013
Modified year	**:**	2015-16 [In 31st Biennial Workshop of AICRP on Sugarcane held at VSI, Pune (MS) on November 16-17, 2016]
Duration	**:**	Three years
Location	**:**	Locations and bio-agents to be multiplied.
Anakapalle	**:**	*Beauveria bassiana*
Uchani	**:**	*Trichogramma* spp.*, Epiricania melanoleuca*
Lucknow	**:**	*Metarhizium anisopliae, Beauveria bassiana, Chrysoperla carnae* and *E. melanoleuca*
Padegaon	**:**	*Chrysoperla zastrowi sillemi*
Coimbatore		*Cotesia flavipes*
Pune	**:**	*Trichogramma sp*.

Detailed Report

1. Regional Research Station, Uchani Dist- Karnal (Haryana)

An experiment was carried at Bio-control laboratory, CCSHAU, RRS, Uchani on mass multiplication of egg parasitoid, *Trichogramma sp. viz*., *Trichogramma chilonis* and *Trichigramma japonicum* on eggs of *Corcyra cephalonica*. Corcyra larvae diet was prepared from coarsely milled maize grains. The bio-control laboratory produced and supplied 782 Trichocards of *Trichogramma japonicum* to the 81 cane growers for top borer and *Trichogramma chilonis* for stalk borer management.

Nymphal and adult parasitoid, *Epiricania melanoleuca* of sugarcane leaf hopper, *Pyrilla perpusilla* was also mass multiplied in laboratory and supplied to cane growers for release in sugarcane fields. The culture was initially started in glass jars (15x 20cm) and mass multiplied in wooden cages as per technology developed and designed by Radadia *et al.* The

bio-control laboratory produced and supplied 418 egg masses and 4766 cocoons of nymphal and adult parasitoid, *Epiricania melanoleuca* to 69 cane growers for pyrilla management [Table-34.1].

2. Division of Crop Protection, ICAR-IISR, Lucknow (U.P.)

Biology and rearing of *Eumicrosoma sp*. was developed at IISR, Lucknow. Nucleus culture of the parasitoid was collected from the sugarcane fields. *Eumicrosoma sp*. was a black shiny Sceilionid wasp. Eggs of black bug, *D. gibbus* were used as laboratory host. Fresh eggs (one day old) were offered to the gravid female in homoeopathic vials for parasitization. Parasitized eggs became blackish in colour from one end and in few days and turned completely black to shiny black just before hatching. Parasitization ranged from 21.48 to 72.50 per cent at 75% RH. The parasitization of single gravid female ranged from 5-22 eggs with an average of 15.67 eggs.

[Note- Allotted bioagents *viz*., *Metarhizium anisopliae, Beauveria bassiana, Chrysoperla carnae* and *E. melanoleuca* to the centre and centre had submitted data about *Eumicrosoma sp.* parasitoid. Furthermore, tabular data was also not submitted by Lucknow centre].

3. CSRS, MPKV, Padegaon (M.S.)

The allotted bio-agent for multiplication was *Chrysoperla zastrowi sillemi.* This bio-agent was tried to multiply on sugarcane woolly aphid in field. An experiment was planted on 10.02.2016 with regular variety Co 86032. During the year 2016-17, the incidence of woolly aphid was occurred in 31st SMW i.e. July 30-Aug 05 of 2016 (0.11 woolly aphid/leaf). However, it was continued up to 5th SMW of 2017. The green shade net (50.0%) of 5 m x 5m x 5m was erected for mass multiplication of *Chrysoperla zastrowi sillemi.* The inundative (repeated) releases of woolly aphids were done since 32nd to 35th SMW for more development of woolly aphid culture in shade net. The honey and water solution in Petri-plates were also kept in shade net. The caster flowers were also kept for alternate days to enhance the fecundity of *Chrysoperla.* The average 1-7 neonate larvae were observed per stool since 45th SMW of 2016 to 2nd SMW of 2017. However, the bio agents, *viz.*, *Micromus igorotus, Dipha aphidivora* and *Encarsia flavoscutellum* were also observed in shade net.

[Note- Tabular data was not submitted by Padegaon centre]

4. Vasantdada Sugar Institute (VSI), Pune (M.S.)

The data revealed that centre had produced 1758.30 cc (351.66 lac) eggs of Corcyra with a monthly average of 146.52 cc eggs (29.30 lac). Further, centre had also

produced 1464 Trichocards (292.80 lac parasites) of *Trichogramma chilonis* with a monthly average of 122 cards (24.40 lac parasites) and supplied 505.5 Trichocards for the management of borers on 33.70 ha area and 5.00 cc *Corcyra* eggs as a nucleus culture [Table-34.2(a) to 34.2(b)].

5. ICAR-SBI, Coimbatore

The parasitoid, *Cotesia flavipes* was multiplied by group-exposure method. Parasitoid adults emerged in the early hours from cocoon masses held in glass tubes. Adutls were confined based on antennal length. The generally female-biased parasitoid adults were transferred from the glass tubes to glass chimneys with wider end on one side and narrow end on the other side at 50-60 per chimney (≈1 lit) and provided with honey: water (50:50) solution impregnated on a cotton swab. After 2 hours of mating period, third to fourth instar larvae of internode borer or sorghum borer were placed in the chimney at 1:1 host larvae: parasitoid female ratio. A few shoots of the host were provisioned and both the ends of the chimney were secured with a double layer of white muslin and black coarse cloth. The chimneys were placed in plastic trays and covered with black cloth. The larvae were collected 24 hours later and transferred to small rearing boxes lined with filter paper and provisioned with shoot bits which were changed every other day. Cocoon masses of the parasitoid generally emerged on around 12^{th} day and these were collected from the boxes at changing and held in glass tubes for release in the field or continuation of laboratory culture.

[Note- Tabular data was not submitted by Coimbatore centre]

6. RARS, ANGRAU, Anakapalle (A.P.)

The treatment of par boiled rice was found significant with highest spore count of 21.10 X 10^8 per ml with less biomass (0.38g/100g) and exhibited suitable media for mass culturing of *Beauveria bassiana* followed by rice (20.8 X 10^8/ml). PDA medium produced 24.30X10^8/ml spores per ml with a biomass of 0.41g/100g. Based on cost incurred for the production of spores, par boiled rice (Rs. 0.38) and rice (Rs. 0.39) and sorghum (Rs.0.39) were the best and low cost substrates for 1 X 10^8 spore production compared to PDA medium (Rs. 0.52). Around 200 kg of rice based *B. bassiana* culture was produced and supplied to farmers for the management of root grub in sugarcane cultivation area through sugar factories on cost basis [Table-34.3].

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Project E. 36		
Title of Project	**:**	Management of borer complex of sugarcane through lures
Objective	**:**	To manage sugarcane borers (early shoot borer, top borer, internode borer and stalk borer) through pheromone traps.
Year of Start	**:**	2012-13
Concluded year	**:**	2015-16 [In 31st Biennial Workshop of AICRP on Sugarcane held at VSI, Pune (MS) on November 16-17, 2016]
Variety	**:**	Recommended variety of the location
Location		As hereunder
1. Peninsular Zone	**:**	Mandya, Akola, Pune, Navsari, Powarkheda and Padegaon
2. East Coast Zone	**:**	Anakapalle
3. North West Zone	**:**	Kapurthala, Uchani, Shahjahanpur and Lucknow
4. North Central Zone	**:**	Seorahi and Pusa
Treatments	**:**	Pheromone lures of sugarcane early shoot borer, top borer and stalk borer
Plot Size	**:**	Two blocks, each of minimum 1 Acre. In first block, trap @ 11/ha should be installed and the second be kept one acre sugarcane crop should be taken to avoid the pheromone effect (control). [Refer the revised methodology as per proceeding of group meeting held during 2013].

Detailed Report:

1. Regional Research Station, PAU., Kapurthala (Punjab)

The activity of early shoot borer started from last week of April to third week of August. The highest numbers of early shoot borer were trapped in third week of May. The incidence of early shoot borer in treated and control plots was 7.45 and 12.33 per cent, respectively with reduction of 39.58 per cent. The activity of top borer was started from third week of May to last week of September. The highest numbers of top borer were trapped in

second week of July. The incidence of top borer in treated and control plots was 8.84 and 13.75 per cent, respectively with reduction of 35.70 per cent. The activity of stalk borer started from second week of September to last week of January. The highest numbers of stalk were trapped in last week of November. The incidence of stalk borer in treated and control plots was 5.78 and 9.67 per cent, respectively with reduction of 40.22 per cent [Table-36.1(a) to 36.1(c)].

2. Regional Research Station, Uchani Dist- Karnal (Haryana)

To evaluate the management of borer complex of sugarcane (shoot, top and stalk borer) through pheromone trap, a field experiment was conducted in 0.4 ha of sugarcane field of variety CoH 160. Moths trapped were recorded at weekly interval. Pheromone lures were changed at monthly intervals. The present investigations revealed that shoot borer moth were captured (2.5 moths/trap) in 15th SMW. The number of captures increased speedily up to 23th SMW and reached to 9.6 moths per trap. Thereafter, moth capture decreased gradually during the next six weeks and no moths of shoot borer were trapped after 29th SMW, 2016. The infestation by shoot borer ranged from 1.8 to 2.2 per cent in trap installed field as compared to 2.1 to 6.8 per cent in without trap installed field. Top borer moths were trapped during 19th SMW, 2016 onwards. The first top borer moth catches were observed during 19th SMW, 2016 (Av. 1.2 moths/trap). Thereafter, captures increased gradually and reached to a maximum of 7.1 moths per trap during 29th SMW. Thereafter, a gradual decrease was observed up to 36th SMW where moth trapping was observed 0.7 moth per trap. After 36th SMW, no top borer adult moth was trapped. The infestation by top borer ranged from 1.2 to 3.5 per cent in trap installed field as compared to without trap installed field. The activity of stalk borer fluctuated widely between mid July i.e. 28th SMW, 2016 to first week of January as 1st SMW. The trapping of stalk borer was observed during 28th SMW (Av. 1.6 moths/trap). Thereafter, captures increased gradually and reached to a maximum of 9.8 moths/trap during 37th SMW. Thereafter, a gradual decrease was observed up to 1st SMW, 2017 where moth trapping was observed 0.6 moths/trap. The infestation by stalk borer ranged from 0.2 to 1.1 infestation index in trap installed field as compared to 0.6 to 2.8 infestation index in without trap installed field [Table-36.2(a) to 36.2(c)].

3. U.P. Council of Sugarcane Research, Shahjahanpur (U.P.)

An experiment was conducted with CoS 08272 cultivar 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 (6.33 moths/trap) was recorded during 19th SMW followed by 18th SMW (5.67 moths/trap). Top borer moth catches were recorded maximum (6.67 moths /trap) during 28th SMW followed by 19th SMW (5.33 moths/trap), 18th SMW (4.67 moths/trap) and 27th SMW (3.33 moths/trap). The highest moth catches (4.67 moths/trap) of stalk borer was observed during 36th SMW followed by 24th SMW (3.33 moths/trap). Moth catches of shoot borer was positively correlated with maximum (r=0.5228) and minimum temperature (r=0.2066) while negatively correlated with morning (r=-0.4580) and evening humidity (r= -0.2758). Top borer moth catches were found to be positively correlated with maximum (r=0.1595), minimum temperature (r=0.1487) and evening humidity (r=0.0150) while negatively correlated with morning humidity (r=-0.0315). The moth catches of stalk borer was observed positively correlated with minimum temperature (r=0.2707) and with morning (r=0.1341) and evening humidity (r= 0.1644) while negatively correlated with maximum temperature (r=-0.2707). The per cent incidence of shoot borer (11.20%), top borer 2nd brood (4.10%), 3rd brood (7.32%) and at harvest (12.00%) and infestation index of stalk borer was recorded 1.32 in treated plot while the corresponding parameters were 15.61, 6.28, 9.42, 15.69 per cent and 2.20 infestation index in untreated plots, respectively [Table-36.3(a) to 36.3(c)].

4. Division of Crop Protection, ICAR-IISR, Lucknow (U.P.)

To evaluate the effect of sex pheromones on incidence of borer pests of sugarcane, a field experiment was conducted in one acre of sugarcane field. Planting was done on February 19, 2016. In half of the area, 6 sex pheromone traps at the distance of 20 meter apart were placed when the top borer moth was reported in the field. Moth catches were recorded daily. Trapped moths were removed from the trap after recording their number. No sex pheromones for other borers were available. The sex pheromone traps were installed @ 6 traps per 0.5 acre sugarcane field and half of the acre field was kept without traps for comparison. Sex pheromone lures for top borer were procured from PCI, Bangalore (India). Moth catches were recorded daily. Water and mobile oil were changed daily when moth catches were recorded. Trapped moths were removed from the trap after recording their number. In second and third brood catches were observed while in fourth brood low catches were observed.

The total number of male moths of top borer (II brood) caught in traps was 98 (16.33 moths/trap), total catch of top borer moth (III brood) was 134 (22.33 moths /trap) and of IV brood was only 43(1.17/trap). The incidence of top borer (II brood) in plot with traps

ranged from 3.33 to 6.67 % (Av. 5.00%) as against 4.39-7.67 % (Av. 6.74%) in without traps. The incidence of top borer (III brood) in plots with traps and without traps were 2.00 - 3.57 per cent (Av. 2.55 %) and 1.11-16.67 % (Av. 5.6 %), respectively. The incidence of IV brood in plots with traps was 2.50-12.346 (Av. 6.77%). The incidence in plot without trap was 9-11.42 per cent (Av. 9.42 %) [Table-36.4(a) to 36.4(b)].

5. SRI, RAU, Pusa (Bihar)

The experiment was conducted with variety BO 153 at Pusa Farm, Sugarcane Research Institute, DRPCAU, Pusa to study the management of borer complex of sugarcane (ESB, TB and SB) through lures. The data revealed that the activity of ESB started from 2nd fortnight of March to 1st fortnight of July and the maximum (7.33) moths per trap were catch in 1stfortnight of May. The incidence of ESB in treated plot and untreated plots were 9.73 and 14.25 per cent, respectively. The activity of TB started from 2ndfortnight of March to 2nd fortnight of August with a maximum (7.33) moths/trap catch in 1st fortnight of June. However, their incidences in treated and untreated plot were 14.20 and 17.30 per cent, respectively. The activity of stalk borer started from 2ndfortnight of July to 1stfortnight of November with a maximum (3.33) moths/trap catch in 2nd fortnight of August. The incidence of stalk borer in treated and untreated plots were 3.85 and 5.95 per cent, respectively. The temperature exhibited a positive correlation with the activities of early short borer, top borer and stalk borer in sugarcane while RH and rainfall showed a negative correlation with the borer complex in sugarcane [Table-36.5(a) to 36.5(c)].

6. G.S. Sugarcane Breeding and Research Station, Seorahi (U.P.)

The experiment was conducted on 0.4 ha area with Co 0238 cultivar at Seorahi 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 parameter on moth catches. The present investigation revealed that highest number of shoot borer (10.66 moths/ trap) was recorded during 17th SMW followed by 16th and 23th SMW (7.66 moths/ trap and 7.33 moths/ trap) and 22nd SMW (4.33moths/trap). The top borer moth catches were recorded maximum (10.33 moths /trap) during 11th SMW followed (6.66 moths /trap) during 19th SMW and 6.33moths/trap during 27th SMW. The stalk borer moth catches were observed (7.00 moths /trap) during 25th SMW followed by (6.33 moths /trap), (6.00 moths /trap), (5.00 moths /trap) during 19th, 24th and 31st SMW, respectively.

The moth catches of shoot borer was positively associated with maximum (r= 0.695) and minimum temperature (r=0.231) while negatively correlated with morning and

evening humidity (r= -0.452, r= 0.332) and rain fall (r= -0.169). Top borer moth catches were found to be negatively correlated with maximum (r= -0.186) and minimum temperature (r=-0.043), morning and evening humidity (r= -0.405, r= -0.303) and rain fall (r= -0.211). The moth catches of stalk borer was positively correlated with maximum temperature (r= 0.194), morning humidity (r=+0.034) and rain fall (r=+0.071) and negative correlated with maximum temp. (r=-2.025) and with morning humidity (r=-0.026). The per cent incidence was also observed in treated (application of pheromone trap) and untreated plot (without pheromone trap).The per cent incidence of shoot borer was recorded as 4.70 per cent. Top borer 2nd brood was 1.73 per cent and at harvest it was 5.12 per cent. The infestation of stalk borer on cane basis was observed (6.12%) in treated plot. While the corresponding parameters were 9.50%, 3.55%, 8.15%, 8.02% and 9.08% in untreated plots, respectively [Table-36.6(a) to 36.6(c)].

Note: The concern centre had presented the results of Project E. 36 and given all the project details including results as per concluded Project E. 32 since last two years.

7. SRS, Dr. PDKV, Akola (M.S.)

The results of experiment were not submitted by concern centre.

8. CSRS, MPKV, Padegaon (M.S.)

The highest number of moth catches in case of early shoot borer (8 numbers/ 3 traps in 20 SMW), internode borer (5 numbers per 3 traps in 34 and 37 SMW) and top shoot borer (2 numbers/3 traps in 25, 27 and 30 SMW) were trapped, respectively. The installation of pheromone traps @ 15 per ha reduced the incidence of 50.12 and 47.96 per cent of early shoot borer and internode borer, respectively and increased 6.65 per cent sugarcane yield over untreated control [Table-36.7(a) to 36.7(c)].

9. Vasantdada Sugar Institute (VSI), Pune (M.S.)

In pheromone traps, negligible adults of early shoot borer were reported. The internode borer and top shoot borer were captured. The per cent incidence of ESB was maximum 10.59 per cent in May 2016 in treated plot. The per cent incidence of internode borer was noticed as maximum 16.0 per cent in November 2016 in treated plot, while it was 24.0 per cent in August 2016 in control plot. Both treated and control plots were free from top borer infestation [Table-36.8(a) to 36.8(b)].

10. ZARS, JNKVV, Powarkheda (M.P.)

During the season, early shoot borer (ESB dead hearts) and EBS moth captures at pheromone traps observed from 4th and 5th standard meteorological week (SMW), respectively (last week of January and 1st week of February). The maximum ESB infestation

in control block (3.2%/week) and lure managed block (2.8%/week) recorded at 14th SMW (2nd week of April) while maximum moth captures at pheromone trap (0.67 moths/trap/day) was recorded after a week 15th SMW (3rd week of April). The cumulative ESB infestation in the control block remained 25.00 per cent, while it was 20.00 per cent in lure managed block i.e. 20.00 per cent lower as compared to control block [Table-36.9].

11. RSRS, NAU., Navsari (Gujarat)

The maximum (4.0) moths of early shoot borer were collected in 48th SMW. The data revealed that ESB had significantly negative correlation with minimum temperature (r=-0.2744), rain fall (r=-0.2343) and number of rainy days (r=-0.2610), negative highly significant relation with relative humidity per cent at morning (r=-0.3503) and evening (r=-0.3250), whereas it showed positive significant correlation with maximum temperature (r=0.2409) and sunshine hours (r=0.3170). The maximum moths (5.0) of top borer were catches during 44th, 48th and 52nd SMW. The data revealed that TSB had significant negative correlation with minimum temperature (r=-0.2316), non-significant negative relation with number of rainy days and rainfall and the negative highly significant relation with minimum morning relative humidity (r=-0.2266). The data showed positive significant correlation with sunshine hours (r=0.2480). The maximum numbers of moth (20) were trapped during 46th SMW. The results further stated that there was positive non-significant correlation between internode borer moth catches and maximum temperature (r=0.0497) and sunshine hours (r=0.1723). However, it showed negative significant correlation with minimum temperature (r=-0.2456) and morning (r=-0.3119) and evening (r=-0.2728) relative humidity per cent. The rainfall (r=-0.1065) and rainy days (r=-0.2028) were exhibited negative non-significant correlation with internode borer incidence [Table-36.10(a) to 36.10(b)].

12. ZARS, UAS, Mandya (Karnataka)

The early shoot borer and top shoot borer were active throughout the year. The top shoot borer activity was moderate because of heavy rainfall received from August to October 2014 (234.7mm, 10 rainy days) and 69.4 mm of rainfall during the month of November with 3 rainy days. The moth activity of internode borer was low throughout the season. During the season, early and top shoot borer incidence was moderate. The cumulative ESB incidence in the control block remained at 16.47 per cent while it was 11.50 per cent in the lure managed block. The top shoot borer incidence was 9.50 per cent in lure managed block and it remained at 15.25 per cent in the control block. The incidence of internode borer was 18.50 per cent in lure managed block whereas it was 29.50 per cent in control plot. The peak activity of ESB

(3.0 moths/trap/week), TSB (4.00moths/trap/week) and INB (2.00moths/trap/week) was observed during 23nd, 32th and 24 and 37th SMW, respectively.

The correlation studies on pheromone trap catch of ESB and meteorological variables revealed a positive and non significant relationship between maximum temperature (r= 0.28) and mean temperature (r= 0.047). However, morning relative humidity (r= -0.274) revealed non significant negative relationship. The results of pheromone trap catches of TSB and meteorological variables revealed a negative and non significant relationship with maximum temperature (r= -0.158) and sunshine (r= -0.222) and positive significant relationship with minimum temperature (0.596).The internode borer showed a positive and non significant relationship with number of rainy days (0.435) and rainfall (r=0.474) [Table-36.11(a) to 36.11(b)].

13. RARS, ANGRAU, Anakapalle (A.P.)

The maximum number of early shoot borer moths was captured during 23rd SMW (31 moths/ trap/week) where maximum and minimum temperatures were 31.9^{0}C and 27^{0}C and morning and evening RH were 71 and 89 per cent, respectively. The maximum internode borer moth catches (23 moths/ trap/week) were recorded in 36 SMW where maximum, minimum temperatures were 30.8^{0}C and 26.3^{0}C and morning and evening RH were 90 and 77 per cent, respectively.

The correlation studies of pheromone trap catches with weather parameters indicated that evaporation has exerted significant positive correlation (r=0.50) with ESB moth catches in pheromone traps whereas maximum temperature (r=0.55) and evening relative humidity (r=0.67) showed significant positive correlation with INB moth catches in pheromone traps. The plot with pheromone traps @ 25 traps/ha reduced the incidence of early shoot borer to an extent of 44.83 per cent and internode borer to an extent of 50.79 per cent over control and recorded high per cent sucrose (21.0%) and cane yield (82.0 t/ha) compared to control plot [Table-36.12(a) to 36.12(d)].

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Project E. 37		
Title of Project	**:**	Bio-efficacy of new insecticides for the control of sugarcane early shoot borer.
Objective	**:**	To find out effective strategy for the management of sugarcane early shoot borer
Year of Start	**:**	2013-14
Concluded year	**:**	2015-16 [In 31st Biennial Workshop of AICRP on Sugarcane held at VSI, Pune (MS) on November 16-17, 2016]
Location	**:**	Kapurthala, Shahajahanpur, Seorahi, Padegaon, Pune, Powarkheda, Mandya, Navsari and Anakapalle
Design	**:**	RBD (Randomized Block Design)
Number of treatments	**:**	08 (Eight)
Number of repetition	**:**	03 (Three)
Plot size	**:**	Gross: 6.0 x 6.3 m Net: 6.0 x 5.4 m
List of treatments	**:**	As per mentioned hereunder

Treat. No.	Details of treatments
T_1	Soil application of Fipronil 0.3 G @ 25 kg a.i./ha at the time of planting and 60 DAP
T_2	Soil application of Chlorantraniliprole 0.4 G @ 22.5 kg/ha at the time of planting and 60 DAP
T_3	Spraying of Chlorantraniliprole 18.5 SC 375 ml/ha at 30 and 60 DAP
T_4	Spraying of Spinosad 45 SC @ 90 ml/ha at 30 and 60 DAP
T_5	Spraying of Flubendiamide @ 250 ml/ ha at 30 and 60 DAP
T_6	Soil application of Phorate 10 G @ 15 kg /ha at the time of planting and 60 DAP
T_7	Soil application of Carbofuran 3 G @ 33 kg /ha at the time of planting and 60 DAP
T_8	Untreated control

Detailed report:

1. Regional Research Station, PAU., Kapurthala (Punjab)

The efficacy of different insecticidal treatments tested against sugarcane early shoot borer revealed that cumulative per cent incidence of early shoot borer observed at 30, 60, 90 and 120 days after planting was least for the treatment of chlorantraniliprole 18.5 SC

@ 375 ml/ha thereby increase in other economic parameters like cane yield (89.52 t/ha), total cane height (283.17 cm), sucrose (17.51% in juice) and CCS (12.23%) which was at par with chlorantraniliprole 0.4G @ 22.5 kg exhibited 88.68 t/ha cane yield. The next best treatments were flubendiamide 39.35 SC @ 125 ml/ha, spinosad 45 SC @ 90 ml/ha, fipronil 0.3 G@ 25 kg, carbofuron 3 G @ 33 kg/ha and phorate 10 G @ 15 kg/ha as compared to control for management of early shoot borer in sugarcane [Table- 37.1].

2. U.P. Council of Sugarcane Research, Shahajahanpur (U.P.)

Spraying of chlorantraniliprole 18.5 SC @ 375 ml/ha at 30 and 60 DAP recorded least cumulative incidence of ESP (3.74%) followed by soil application of chlorantraniliprole 0.4G @ 22.5 kg/ha at the time of planting and 60 DAP (4.20%) as compared to untreated control (5.91%). The maximum cane yield was recorded in spraying of chlorantraniliprole 18.5 SC @ 90 ml/ha (154 t/ha) which was at par with soil application of phorate 10 G @ 15 kg/ha at the time of planting and 60 DAP (145 t/ha) and soil application of fipronil 0.3G @ 25 kg/ha at the time of planting and 60 DAP (143 t/ha) [Table- 37.2].

3. SRI, RAU, Pusa (Bihar)

The data presented in Table-37.3 revealed that chlorantraniliprole 18.5 SC @ 375 ml/ha was superior when it was sprayed at 30 DAP and 60 DAP as recorded least cumulative incidence of ESB (5.00%) with highest cane yield (86.20 t/ha) which was at par with chlorantraniliprole 0.4 G (5.95%) and fipronil 0.3 G (6.35%) with cane yield 85.0 and 81.90 t/ha, respectively.

4. G.S. Sugarcane Breeding and Research Station, Seorahi (U.P.)

Among the tested insecticides, spraying of flubendiamide @ 250 ml/ha at 30 and 60 DAP recorded least cumulative incidence of ESB (9.35%) followed by spraying of chlorantraniliprole 18.5 SC @ 375 ml/ha at 30 and 60 DAP (9.40%) as compared to untreated control (14.70%). The maximum cane yield was recorded in spraying of chlorantraniliprole 18.5 SC @ 375 ml/ha at 30 and 60 DAP (85.50 t/ha) followed by soil application of carbofuran 3G @ 33 kg//ha at the time of planting and 60 DAP (84.77 t/ha), spraying of spinosad 45SC @ 90 ml/ha at 30 and 60 DAP (79.62 t/ha) and soil application of fipronil 0.3 G @ 25 kg//ha at the time of planting and 60 DAP (79.01 t/ha) [Table- 37.2].

5. CSRS, MPKV, Padegaon (M.S.)

Bio-efficacy of newer insecticide for the management of sugarcane early shoot borer was tested with different treatments. Among them, soil application of chlorantraniliprole 0.4 G @ 22.5 kg / ha at the time of planting and 60 DAP was found most

effective against early shoot borer on sugarcane with least cumulative incidence (7.47%) and recorded highest millable canes (82.31 thousand/ha) as well as highest cane yield (95.83 t/ha) which was at par with chlorantraniliprole 18.5 SC 375 ml/ha in corresponding parameters as 10.25 per cent incidence, 79.54 thousand/ha millable cane and 91.67 t/ha cane yield over rest of the treatments [Table-37.5].

6. Vasantdada Sugar Institute (VSI), Pune (M.S.)

The trial was vitiated at Vasantdada Sugar Institute (VSI), Pune.

7. ZARS, JNKVV, Powarkheda (M.P.)

The efficacy of different insecticidal treatments tested against sugarcane early shoot borer revealed that cumulative per cent incidence of early shoot borer observed at 30, 60, 90 and 120 days after planting was least for the treatment of fipronil 0.3 G @ 25 kg /ha (3.22%) which was at par with chlorantraniliprole 0.4G @ 22.5 kg (3.03%). The maximum millable cane was recorded in spraying of chlorantraniliprole 0.4G @ 22.5 kg (79.63 thousand/ha) which was at par with fipronil 0.3 G @ 25 kg /ha (78.24 thousand/ha). The highest cane yield was observed in chlorantraniliprole 0.4G @ 22.5 kg (89.35 t/ha) and it was at par with fipronil 0.3 G @ 25 kg /ha (88.27 t/ha) when applied at the time of planting and 60 DAP [Table- 37.6].

8. MSRS, NAU., Navsari (Gujarat)

The treatment of soil application of chlorantraniliprole 0.4 G @ 22.5 kg/ha at the time of planting and 60 DAP recorded minimum cumulative per cent incidence (13.94%) whereas the maximum cumulative per cent incidence (34.85%) was recorded in untreated control. The highest millable cane yield of sugarcane was recorded in chlorantraniliprole 0.4 G @ 22.5 kg/ha (132.21 t/ha) and it was at par with chlorantraniliprole 18.5 SC 375 ml/ha (128.61t/ha).The significant lowest yield was found in untreated control (80.06 t/ha). The quality parameters *viz*., brix per cent, sucrose per cent, purity per cent and C.C.S per cent were found non- significant. All the tested treatment did not showed any significant difference in quality parameter [Table-37.7].

9. ZARS, UAS, Mandya (Karnataka)

Among the different tested insecticides against sugarcane early shoot borer, soil application of chlorantraniliprole 0.4G @ 22.5kg/ha at the time of planting and 60 DAP was found to be affective with least ESB incidence (2.79%). The maximum cane yield was

recorded with chlorantraniliprole 0.4G @ 22.5kg/ha (87.51 t/ha) and it was at par with fipronil 0.3 G @ 25 kg /ha (77.45 t/ha) [Table- 37.8].

10. RARS, ANGRAU, Anakapalle (A.P.)

The soil application of chlorantraniliprole 0.4 G @ 22.5 kg / ha at the time of planting and 60 DAP was registered as effective against early shoot borer with least cumulative incidence (5.80%) with highest cane yield (114.94 t/ha) and it was at par with fipronil 0.3 G @ 25 kg /ha (113.88 t/ha) and chlorantraniliprole 18.5 SC 375 ml/ha (110.57t/ha) as compared to other the treatments [Table-37.9].

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Table-4.1.1: Reaction of zonal varieties/genotypes against borer pests of sugarcane at Kapurthala (Punjab) (2016-17)

Sr. No.	Varieties/ Genotypes	Early shoot borer (%)		Top borer incidence (%)				Stalk borer			
		Cumulative per cent incidence	Reaction	III Brood	IV Brood	Cumulative	Reaction	Incidence (%)	Intensity (%)	Infestation index	Reaction
	IVT Varietal Trial (Early)										
1	Co 13033	12.59	LS	5.26	4.85	10.12	MS	10.67	1.22	0.13	LS
2	Co 13034	7.44	LS	3.67	4.71	8.38	LS	8.00	0.98	0.08	LS
3	CoLk 13201	11.78	LS	4.35	3.26	7.61	LS	13.33	1.19	0.16	LS
4	CoLk 13202	15.36	MS	8.75	2.35	11.10	MS	14.67	1.42	0.21	LS
5	CoLk 13203	10.06	LS	9.64	1.20	10.84	MS	10.67	1.33	0.14	LS
6	CoPant 13221	11.22	LS	4.44	5.26	9.71	LS	9.33	1.42	0.13	LS
7	CoPant 13222	20.35	MS	8.64	5.49	14.14	MS	14.67	1.50	0.22	LS
8	CoPb 13181	**4.15**	**LS**	5.81	0.00	**5.81**	**LS**	6.67	1.42	0.09	LS
9	CoS 13231	9.80	LS	4.94	2.47	7.41	LS	9.33	1.17	0.11	LS
CK	Co 64	11.84	LS	6.25	5.43	11.68	MS	13.33	1.42	0.19	LS
	CoPant 84211	9.79	LS	6.12	1.05	7.18	LS	12.00	1.25	0.15	LS
	Co 238	10.58	LS	9.47	8.42	17.89	MS	10.67	1.17	0.12	LS
	AVT Varietal Trial (Early I Plant)										
1	Co 12026	9.87	LS	4.88	4.49	9.37	LS	13.33	1.17	0.16	LS
2	Co 12027	5.90	LS	5.13	3.70	8.83	LS	10.67	0.83	0.09	LS
3	CoLk 12203	10.06	LS	7.50	3.95	11.45	MS	14.67	1.08	0.16	LS
4	CoPant 12221	8.10	LS	6.25	3.37	9.62	LS	16.00	1.08	0.17	LS
CK	CoJ 64	11.30	LS	4.90	4.12	9.03	LS	12.00	1.33	0.16	LS
	CoPant 84211	10.73	LS	4.88	6.10	10.98	MS	10.67	1.33	0.14	LS
	Co 238	9.42	LS	10.34	5.26	15.61	MS	12.00	1.17	0.14	LS
	AVT Varietal Trial (Early II Plant)										
1	CoH 11262	10.33	LS	4.44	5.56	10.00	LS	14.67	1.42	0.21	LS
2	CoLk 11201	11.42	LS	5.75	3.45	9.20	LS	13.33	1.17	0.16	LS
3	CoLk 11202	9.76	LS	10.00	2.38	12.38	MS	12.00	1.17	0.14	LS

Sr. No.	Varieties/ Genotypes	Early shoot borer (%)		Top borer incidence (%)				Stalk borer			
		Cumulative per cent incidence	Reaction	III Brood	IV Brood	Cumulative	Reaction	Incidence (%)	Intensity (%)	Infestation index	Reaction
4	CoLk 11203	8.05	LS	6.67	2.38	9.05	LS	13.33	0.92	0.12	LS
CK	CoJ 64	10.67	LS	4.60	4.44	9.04	LS	16.00	1.33	0.21	LS
	CoPant 84211	10.75	LS	5.75	5.00	10.75	MS	12.00	1.00	0.12	LS
	Co 238	11.29	LS	10.00	8.64	**18.64**	**MS**	13.33	1.17	0.16	LS
	IVT Varietal Trial (Mid Late)										
1	Co 13035	10.07	LS	6.90	2.33	9.22	LS	10.67	1.08	0.12	LS
2	Co 13036	11.19	LS	3.61	1.20	4.82	LS	14.67	0.92	0.13	LS
3	CoH 13261	15.19	MS	5.06	3.37	8.43	LS	17.33	1.33	0.23	LS
4	CoH 13262	10.03	LS	5.26	4.71	9.97	LS	9.33	0.75	0.07	LS
5	CoH 13263	5.94	LS	5.41	2.78	8.18	LS	6.67	0.58	**0.04**	**LS**
6	CoLk 13204	7.89	LS	3.41	3.66	7.07	LS	9.33	0.75	0.07	LS
7	CoLk 13205	12.63	LS	5.88	4.26	10.14	MS	16.00	1.17	0.19	LS
8	CoPant 13223	10.41	LS	6.02	6.02	12.05	MS	13.33	0.92	0.12	LS
9	CoPant 13224	9.58	LS	7.78	3.33	11.11	MS	12.00	1.25	0.15	LS
10	CoPb 13182	9.09	LS	5.26	3.16	8.42	LS	8.00	1.42	0.11	LS
11	CoPb 13183	13.10	LS	5.88	3.41	9.29	LS	17.33	1.42	**0.25**	**LS**
12	CoS 13232	**16.51**	**MS**	8.33	1.05	9.39	LS	17.33	1.17	0.20	LS
13	CoS 13233	15.26	MS	5.75	6.12	11.87	MS	17.33	1.25	0.22	LS
CK	CoS 767	10.24	LS	3.66	6.85	10.51	MS	13.33	1.17	0.16	LS
	CoS 8436	9.84	LS	6.38	3.57	9.95	LS	12.00	0.92	0.11	LS
	CoPant 97222	10.36	LS	5.21	5.21	10.42	MS	12.00	1.00	0.12	LS
	AVT Varietal Trial (Mid Late I Plant)										
1	Co 12029	7.28	LS	4.26	3.57	7.83	LS	10.67	0.75	0.08	LS
2	CoH 12263	10.03	LS	5.68	2.38	8.06	LS	17.33	1.25	0.22	LS
3	CoLk 12205	9.40	LS	5.19	1.19	6.39	LS	13.33	0.58	0.08	LS
4	CoPant 12226	10.97	LS	6.67	3.57	10.24	MS	6.67	0.67	**0.04**	**LS**

Sr. No.	Varieties/ Genotypes	Early shoot borer (%)		Top borer incidence (%)				Stalk borer			
		Cumulative per cent incidence	Reaction	III Brood	IV Brood	Cumulative	Reaction	Incidence (%)	Intensity (%)	Infestation index	Reaction
5	CoPb 12211	13.25	LS	4.44	3.57	8.02	LS	14.67	1.08	0.16	LS
6	CoS 12232	15.31	MS	4.76	5.95	10.71	MS	17.33	0.92	0.16	LS
CK	CoS 767	9.46	LS	4.26	5.06	9.32	LS	12.00	1.17	0.14	LS
	CoS 8436	8.67	LS	5.21	3.53	8.74	LS	12.00	1.00	0.12	LS
	CoPant 97222	9.15	LS	7.07	2.17	9.24	LS	10.67	1.08	0.12	LS
	AVT Varietal Trial (Mid Late II Plant)										
1	Co 11027	15.46	MS	4.55	1.14	**5.68**	**LS**	10.67	1.33	0.14	LS
2	CoH 11263	12.17	LS	7.79	3.33	11.13	MS	13.33	1.25	0.17	LS
3	CoLk 11204	12.26	LS	6.86	3.23	10.09	MS	9.33	1.17	0.11	LS
4	CoLk 11206	9.58	LS	5.68	4.55	10.23	MS	8.00	1.17	0.05	LS
5	CoPb 11214	7.50	LS	5.19	2.60	7.79	LS	6.67	0.83	0.06	LS
6	CoS 11232	4.78	LS	5.19	2.60	7.79	LS	9.33	0.92	0.09	LS
CK	CoS 767	9.83	LS	4.90	3.70	8.61	LS	12.00	1.00	0.12	LS
	CoS 8436	8.92	LS	5.68	3.49	9.17	LS	16.00	0.83	0.13	LS
	CoPant 97222	7.97	LS	5.19	4.82	10.01	MS	13.33	1.25	0.17	LS

Table-4.1.2(a): Reaction of zonal varieties/genotypes against insect pests of sugarcane at Uchani (2016-17)

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
	IVT E								
1	Co 13033	5.4	4.4	0.8	16.4	LS	LS	LS	MS
2	Co 13034	4.9	2.4	1.0	31.6	LS	LS	LS	HS
3	CoLk 13201	7.4	5.9	1.2	33.7	LS	LS	LS	HS
4	CoLk13202	12.6	4.7	0.7	17.4	LS	LS	LS	MS
5	CoLk 13203	6.2	3.8	**0.3**	16.9	**LS**	LS	LS	MS
6	CoPant 13221	3.8	4.5	1.1	**34.8**	**LS**	LS	LS	HS
7	CoPant 13222	1.7	4.9	2.3	20.5	LS	LS	MS	MS
8	CoPb 13181	4.6	4.1	1.3	**15.6**	**LS**	LS	LS	MS
9	CoS 13231	5.9	4.8	1.2	32.4	LS	LS	LS	HS
CK	CoJ 64	4.3	3.4	1.6	27.6	LS	LS	LS	MS
	Co 0238	3.8	5.7	0.9	22.6	LS	LS	LS	MS
	AVT E I P								
1	Co 12026	6.4	5.7	1.6	23.2	LS	LS	LS	MS
2	Co 12027	5.4	4.3	2.2	29.4	LS	LS	MS	MS
3	CoLk 12203	3.9	6.4	0.6	28.6	LS	LS	LS	MS
4	CoPant 12221	7.1	2.2	1.8	23.5	LS	LS	LS	MS
CK	CoJ 64	4.3	3.4	1.6	27.6	LS	LS	LS	MS
	Co 0238	3.8	5.7	0.9	22.6	LS	LS	LS	MS
	AVT E II P								
1	CoH 11262	8.4	**6.5**	1.9	17.4	**LS**	LS	LS	MS
2	CoLk 11201	8.2	5.6	1.7	16.2	LS	LS	LS	MS
3	CoLk 11202	7.8	3.4	0.9	19.7	LS	LS	LS	MS
4	CoLk 11203	3.6	2.8	1.3	17.8	LS	LS	LS	MS
CK	CoJ 64	4.3	3.4	1.6	27.6	LS	LS	LS	MS
	CoPant 84211	4.8	6.4	1.2	28.7	LS	LS	LS	MS
	IVT ML								

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 13035	4.6	2.7	1.2	18.4	LS	LS	LS	MS
2	Co 13036	6.4	4.6	1.8	32.8	LS	LS	LS	HS
3	CoH 13261	6.8	4.2	1.7	17.2	LS	LS	LS	MS
4	CoH 13262	8.6	3.8	1.5	19.6	LS	LS	LS	MS
5	CoH 13263	8.7	3.7	1.6	19.4	LS	LS	LS	MS
6	CoLk 13204	4.1	3.8	1.4	22.3	LS	LS	LS	MS
7	CoLk 13205	3.6	3.6	1.5	34.7	LS	LS	LS	HS
8	CoPant 13223	4.8	3.2	1.4	16.9	LS	LS	LS	MS
9	CoPant 13224	4.7	3.9	**2.4**	31.8	**LS**	LS	MS	HS
10	CoPb 13182	4.7	3.9	1.5	18.5	LS	LS	LS	MS
11	CoPb 13183	6.8	2.9	1.2	32.4	LS	LS	LS	HS
12	CoS 13232	7.4	4.5	1.7	31.2	LS	LS	LS	HS
13	CoS 13233	4.5	2.9	1.5	26.4	LS	LS	LS	MS
CK	CoS 767	5.7	1.8	0.4	22.5	LS	LS	LS	MS
	CoS 8436	**15.9**	3.7	1.8	29.6	**MS**	LS	LS	MS
	CoPant 97222	4.5	2.4	1.2	20.8	LS	LS	LS	MS
	AVT ML I P								
1	Co 12029	8.4	1.8	1.2	27.4	LS	LS	LS	MS
2	CoH 12263	6.7	2.8	1.3	16.7	LS	LS	LS	MS
3	CoLk 12205	5.5	2.5	1.9	27.3	LS	LS	LS	MS
4	CoPant 12226	6.6	3.8	1.3	23.8	LS	LS	LS	MS
5	CoPb 12211	5.2	2.6	2.2	24.4	LS	LS	MS	MS
6	CoS 12232	4.3	**1.6**	0.6	23.8	**LS**	LS	LS	MS
CK	CoS 767	5.7	1.8	0.4	22.5	LS	LS	LS	MS
	CoS 8436	**15.9**	3.7	1.8	29.6	**MS**	LS	LS	MS
	CoPant 97222	4.5	2.4	1.2	20.8	LS	LS	LS	MS
	AVT ML II P								
1	Co 11027	5.8	4.8	1.5	23.2	LS	LS	LS	MS

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
2	CoH 11263	5.1	3.6	1.4	27.6	LS	LS	LS	MS
3	CoLk 11204	2.1	1.8	1.7	15.8	LS	LS	LS	MS
4	CoLk 11206	6.6	2.1	1.1	20.8	LS	LS	LS	MS
5	CoPb 11214	**2.6**	2.9	1.3	30.6	**LS**	LS	LS	HS
6	CoS 11232	4.8	3.5	1.9	22.4	LS	LS	LS	MS
CK	CoS 767	5.7	1.8	0.4	22.5	LS	LS	LS	MS
	CoS 8436	**15.9**	3.7	1.8	29.6	MS	LS	LS	MS
	CoPant 97222	4.5	2.4	1.2	20.8	**LS**	LS	LS	MS

*** Infestation index**

Table-4.1.2(b): Reaction of zonal varieties/genotypes against insect pests of sugarcane at Uchani (2016-17)

Sr. No.	Variety/Genotype	Sucking pests infestation				Grade of infestation			
		Pyrilla	Whitefly	Black bug	Webbing mite	Pyrilla	Whitefly	Black bug	Webbing mite
	IVT E								
1	Co 13033	3.3	**0.7**	3.8	17.6	LS	LS	LS	MS
2	Co 13034	1.8	2.9	3.5	**2.4**	LS	MS	LS	LS
3	CoLk 13201	2.0	0.8	3.3	8.4	LS	LS	LS	LS
4	CoLk13202	1.5	1.2	3.8	6.9	LS	LS	LS	LS
5	CoLk 13203	2.3	2.8	3.5	12.4	LS	MS	LS	MS
6	CoPant 13221	1.5	1.4	3.5	3.1	LS	LS	LS	LS
7	CoPant 13222	**0.8**	0.8	**2.3**	5.9	LS	LS	LS	LS
8	CoPb 13181	2.6	1.6	3.4	8.4	LS	LS	LS	LS
9	CoS 13231	1.8	1.5	2.8	5.4	LS	LS	LS	LS
CK	CoJ 64	1.8	2.1	2.5	9.8	LS	MS	LS	LS
	Co 0238	4.7	1.9	**8.6**	5.6	LS	LS	LS	LS
	AVT E I P								
1	Co 12026	1.8	1.8	3.3	2.6	LS	LS	LS	LS
2	Co 12027	3.3	3.3	5.0	6.4	LS	MS	LS	LS
3	CoLk 12203	1.8	1.2	4.4	3.6	LS	LS	LS	LS
4	CoPant 12221	2.5	1.1	3.8	8.0	LS	LS	LS	LS
CK	CoJ 64	1.8	2.1	2.5	9.8	LS	MS	LS	LS
	Co 0238	4.7	1.9	8.6	5.6	LS	LS	LS	LS
	AVT E II P								
1	CoH 11262	1.8	2.1	2.5	8.1	LS	MS	LS	LS
2	CoLk 11201	2.5	1.7	3.5	6.9	LS	LS	LS	LS
3	CoLk 11202	2.3	2.1	4.3	7.4	LS	MS	LS	LS
4	CoLk 11203	3.4	1.1	3.6	7.4	LS	LS	LS	LS
CK	CoJ 64	1.8	2.1	2.5	9.8	LS	MS	LS	LS
	CoPant 84211	3.6	2.4	8.3	6.7	LS	MS	LS	LS
	IVT ML								

Sr. No.	Variety/Genotype	Sucking pests infestation				Grade of infestation			
		Pyrilla	Whitefly	Black bug	Webbing mite	Pyrilla	Whitefly	Black bug	Webbing mite
1	Co 13035	2.4	1.7	4.6	8.4	LS	LS	LS	LS
2	Co 13036	3.8	1.8	2.4	3.5	LS	LS	LS	LS
3	CoH 13261	2.6	1.7	4.5	9.5	LS	LS	LS	LS
4	CoH 13262	2.8	1.2	4.6	5.8	LS	LS	LS	LS
5	CoH 13263	2.6	1.6	2.9	10.2	LS	LS	LS	MS
6	CoLk 13204	2.2	2.1	3.9	6.6	LS	MS	LS	LS
7	CoLk 13205	2.6	1.7	6.2	8.7	LS	LS	LS	LS
8	CoPant 13223	2.5	1.5	4.4	3.9	LS	LS	LS	LS
9	CoPant 13224	3.9	1.5	4.9	5.7	LS	LS	LS	LS
10	CoPb 13182	2.7	1.6	4.2	5.4	LS	LS	LS	LS
11	CoPb 13183	2.4	2.1	3.4	9.2	LS	MS	LS	LS
12	CoS 13232	2.6	2.5	3.8	6.6	LS	MS	LS	LS
13	CoS 13233	2.9	1.7	6.4	8.4	LS	LS	LS	LS
CK	CoS 767	1.3	1.9	3.3	12.5	LS	LS	LS	MS
	CoS 8436	1.8	1.8	3.3	7.6	LS	LS	LS	LS
	CoPant 97222	2.3	2.4	4.0	5.6	LS	MS	LS	LS
	AVT ML I P								
1	Co 12029	2.5	**0.7**	5.0	10.4	LS	LS	LS	MS
2	CoH 12263	2.8	2.2	2.5	2.5	LS	MS	LS	LS
3	CoLk 12205	2.0	2.7	3.5	6.9	LS	MS	LS	LS
4	CoPant 12226	2.5	1.4	3.5	7.5	LS	LS	LS	LS
5	CoPb 12211	2.3	2.1	3.0	9.6	LS	MS	LS	LS
6	CoS 12232	2.0	2.3	3.3	5.6	LS	MS	LS	LS
CK	CoS 767	1.3	1.9	3.3	12.5	LS	LS	LS	MS
	CoS 8436	1.8	1.8	3.3	7.6	LS	LS	LS	LS
	CoPant 97222	2.3	2.4	4.0	5.6	LS	MS	LS	LS
	AVT ML II P								
1	Co 11027	1.8	1.1	**2.3**	9.4	LS	LS	LS	LS

Sr. No.	Variety/Genotype	Sucking pests infestation				Grade of infestation			
		Pyrilla	Whitefly	Black bug	Webbing mite	Pyrilla	Whitefly	Black bug	Webbing mite
2	CoH 11263	3.6	1.4	3.5	8.1	LS	LS	LS	LS
3	CoLk 11204	**4.8**	**3.7**	3.3	7.9	LS	MS	LS	LS
4	CoLk 11206	1.8	2.0	5.5	5.6	LS	LS	LS	LS
5	CoPb 11214	3.2	4.5	4.0	5.5	LS	MS	LS	LS
6	CoS 11232	4.3	4.9	4.3	3.5	LS	MS	LS	LS
CK	CoS 767	1.3	1.9	3.3	12.5	LS	LS	LS	MS
	CoS 8436	1.8	1.8	3.3	7.6	LS	LS	LS	LS
	CoPant 97222	2.3	2.4	4.0	5.6	LS	MS	LS	LS

Table-4.1.3: Reaction of zonal varieties/genotypes against insect pests of sugarcane at SBI-Karnal (2016-17)

Sr. No.	Genotypes	Shoot Borer incidence (%)	Reaction	Top Borer incidence (%)	Reaction	Root borer incidence (%)	Reaction	Stalk borer intensity (%)	Stalk borer infestation index	Reaction
	AVT E I P									
1	Co 0238	3.1	LS	**0.0**	**LS**	18.2	MS	6.4	2.8	MS
2	CoPant 12221	2.1	LS	0.7	LS	18.3	MS	8.1	3.5	MS
3	Co 12027	4.1	LS	**0.0**	**LS**	24.1	MS	7.9	3.9	MS
4	Co 12026	**5.4**	**LS**	**0.0**	**LS**	12.9	MS	6.5	2.6	MS
5	CoLk 12203	2.9	LS	**0.0**	**LS**	21.7	MS	6.9	4.1	MS
6	CoS 12232	2.3	LS	0.4	LS	12.1	MS	7.1	2.5	MS
7	Co 05011	2.2	LS	**0.0**	**LS**	20.1	MS	6.6	2.6	MS
8	Co 12029	2.0	LS	0.3	LS	15.7	MS	6.8	3.0	MS
9	CoH 12263	2.3	LS	**0.0**	**LS**	13.9	LS	6.9	3.2	MS
10	CoLk12205	2.1	LS	0.5	LS	26.9	MS	6.9	2.4	MS
11	CoPant12226	2.8	LS	0.3	LS	35.6	HS	9.5	1.6	LS
12	CoPb 12211	3.2	LS	**0.0**	**LS**	14.1	LS	9.7	4.3	MS
	AVT E II P									
1	CoH 11262	0.3	LS	**0.0**	LS	19.8	MS	9.1	4.3	MS
2	CoLk 11201	1.9	LS	**0.0**	LS	26.1	MS	6.4	3.1	MS
3	CoLk 11202	1.2	LS	0.5	LS	10.7	LS	8.2	3.2	MS
4	CoLk 11203	0.6	LS	0.9	LS	28.0	MS	7.9	3.3	MS
5	Co 0238	2.1	LS	**0.0**	LS	33.8	HS	9.4	**5.4**	**MS**
6	Co 11027	3.4	LS	**0.0**	LS	23.3	MS	8.7	1.8	LS
7	CoH 11263	1.6	LS	**0.0**	LS	30.7	HS	6.2	1.5	LS
8	CoLk 11204	1.2	LS	0.3	LS	22.0	MS	7.2	1.5	LS
9	CoLk 11206	2.8	LS	0.3	LS	17.5	MS	8.8	4.9	MS
10	CoPb 11214	2.4	LS	**0.0**	**LS**	**9.7**	**LS**	9.2	3.2	MS
11	CoS 11232	2.2	LS	0.5	LS	20.6	MS	11.5	1.7	LS
12	Co 05011	3.2	LS	0.3	LS	16.4	MS	9.0	3.5	MS

Sr. No.	Genotypes	Shoot Borer incidence (%)	Reaction	Top Borer incidence (%)	Reaction	Root borer incidence (%)	Reaction	Stalk borer intensity (%)	Stalk borer infestation index	Reaction
	Ratoon									
1	CoS 8436	2.6	LS	2.3	LS	32.5	HS	8.3	1.8	LS
2	CoPb 10182	1.3	LS	1.6	LS	37.0	HS	6.2	0.4	LS
3	CoPb10181	3.3	LS	3.2	LS	28.7	MS	7.4	0.6	LS
4	CoPant 10221	1.3	LS	1.3	LS	16.1	MS	5.8	0.3	LS
5	CoH 10262	1.0	LS	**3.2**	**LS**	28.5	MS	6.2	0.4	LS
6	Co 10036	2.3	LS	1.6	LS	28.6	MS	6.7	0.4	LS
7	CoS 10231	**0.0**	**LS**	3.1	LS	46.2	HS	14.7	0.8	LS
8	CoH 10261	1.6	LS	2.5	LS	**66.2**	**HS**	5.0	0.2	LS
9	Co 0238	2.3	LS	1.6	LS	31.9	HS	3.7	**0.1**	**LS**
10	Co 10035	1.6	LS	1.2	LS	44.3	HS	7.2	0.3	LS

Note: Above entries/genotypes are not as per approved Technical programme of Entomology (2016-17)

Table-4.1.4: Reaction of zonal varieties/genotypes against insect pests of sugarcane at Shahjahanpur (2016-17)

Sr. No.	Varieties/ Genotype	Early shoot borer (% incidence)		Top borer (% incidence)		Stalk borer	
		Cumulative	Reaction	At harvest	Reaction	Infestation index	Reaction
	AVT E I P						
1	CoPant 12221	9.59	LS	10.67	MS	1.76	LS
2	Co 12026	14.04	LS	13.33	MS	4.74	MS
3	Co 12027	12.10	LS	12.00	MS	2.28	MS
4	CoLk 12203	11.82	LS	8.00	LS	2.68	MS
CK	CoJ 64	5.81	LS	6.67	LS	3.81	MS
	Co 0238	14.83	LS	16.00	MS	3.95	MS
	AVT E II P						
1	CoLk 11201	18.40	MS	9.00	LS	3.47	MS
2	CoLk 11202	22.40	MS	9.33	LS	1.36	LS
3	CoLk 11203	18.36	MS	16.00	MS	1.97	LS
4	CoH 11262	19.25	MS	8.00	LS	2.83	MS
CK	CoJ 64	18.47	MS	10.67	MS	1.60	LS
	Co 0238	19.89	MS	12.00	MS	4.14	MS
	AVT E R						
1	CoLk 11201	20.97	MS	8.00	LS	3.93	MS
2	CoLk 11202	22.80	MS	8.00	LS	1.67	LS
3	CoLk 11203	19.06	MS	18.00	MS	2.23	MS
4	CoH 11262	19.98	MS	9.33	LS	3.37	MS
CK	CoJ 64	21.90	MS	12.00	MS	2.06	MS
	Co 0238	**23.94**	**MS**	14.00	MS	**4.91**	**MS**
	AVT ML I P						
1	CoS 12232	9.94	LS	6.67	LS	2.15	MS
2	CoPb 12211	18.18	MS	10.67	MS	0.88	LS
3	CoPant 12226	15.41	MS	17.33	MS	3.03	MS
4	CoLk 12205	11.61	LS	**21.33**	**HS**	3.24	MS
5	CoH 12263	15.98	MS	14.67	MS	2.99	MS

Sr. No.	Varieties/ Genotype	Early shoot borer (% incidence)		Top borer (% incidence)		Stalk borer	
		Cumulative	Reaction	At harvest	Reaction	Infestation index	Reaction
6	Co 12029	13.72	LS	13.33	MS	2.85	MS
CK	CoS 767	**8.08**	**LS**	**5.33**	**LS**	2.76	MS
	CoS 8436	8.44	LS	9.33	LS	4.33	MS
	CoPant 97222	20.47	MS	10.67	MS	4.38	MS
	AVT ML II P						
1	CoS 11232	13.44	LS	6.67	LS	1.40	LS
2	Co 11027	14.10	LS	**5.33**	**LS**	1.94	LS
3	CoH 11263	12.92	LS	**5.33**	**LS**	**0.84**	**LS**
4	CoLk 12204	16.44	MS	8.00	LS	2.95	MS
5	CoLk 12206	21.50	MS	**5.33**	**LS**	3.03	MS
6	CoPb 11214	17.28	LS	10.67	MS	1.80	LS
CK	CoS 8436	14.01	LS	6.67	LS	3.52	MS
	CoS 767	13.76	LS	9.33	LS	1.22	LS
	CoPant 97222	14.68	LS	13.33	MS	2.98	MS
	AVT ML R						
1	CoS 11232	13.27	LS	9.33	LS	1.64	LS
2	Co 11027	13.97	LS	6.67	LS	2.20	MS
3	CoH 11263	12.76	LS	10.67	MS	1.19	LS
4	CoLk 12204	18.30	MS	8.00	LS	3.09	MS
5	CoLk 12206	15.90	MS	8.00	LS	2.98	MS
6	CoPb 11214	13.85	LS	14.67	MS	1.65	LS
CK	CoS 8436	13.10	LS	6.67	LS	3.13	MS
	CoS 767	15.28	MS	9.33	LS	1.27	LS
	Co Pant 97222	11.67	LS	**21.33**	**HS**	2.87	MS

Table-4.1.5: Reaction of zonal varieties/genotypes against insect pests of sugarcane at Lucknow (2016-17)

S.N	Genotypes	Top borer			Stalk borer				Internode Borer			
		III Brood incidence	IV Brood incidence	Reaction*	Incidence (%)	Intensity (%)	Infestation index	Reaction	Incidence (%)	Intensity (%)	Infestation index	Reaction
	AVT E											
1	Co12027	1.71	6.5	LS	5.36	0.76	0.04	LS	17.15	2.17	0.37	LS
2	CoH1126 2	3.86	3.67	LS	2.57	1.56	0.04	LS	15.56	2.41	0.37	LS
3	CoLk11201	0.00	2.79	LS	3.76	1.12	0.04	LS	15.58	1.86	0.28	LS
4	CoLk11202	1.98	3.05	LS	2.32	1.24	0.02	LS	21.09	2.34	0.49	MS
5	CoLk11203	11.23	3.90	LS	2.90	0.93	0.03	LS	16.28	1.56	0.25	LS
6	CoLk12203	1.70	2.82	LS	2.68	1.06	0.03	LS	17.08	2.18	0.37	LS
7	CoPant12221	1.61	4.30	LS	2.30	1.03	0.02	LS	15.22	2.90	0.44	LS
CK	Co0238	13.95	14.02	LS	12.14	3.21	**0.39**	**LS**	33.21	4.28	1.42	MS
	CoJ64	12.63	13.73	LS	7.77	1.65	0.13	LS	**10.00**	1.56	0.16	**LS**
	AVT ML											
1	Co11027	1.67	3.93	LS	3.45	0.90	0.03	LS	17.15	1.25	0.21	LS
2	Co12029	1.19	5.81	LS	2.90	1.56	0.04	LS	21.95	1.94	0.42	MS
3	CoH11263	1.81	3.96	LS	6.39	1.02	0.06	LS	**42.79**	2.97	1.27	**HS**
4	CoH12263	1.38	2.5	LS	1.31	1.55	0.02	LS	29.73	3.02	0.87	MS
5	CoLk11204	0.85	1.12	LS	2.13	1.62	0.03	LS	19.67	2.08	0.41	LS
6	CoLk11206	2.53	6.85	LS	3.41	1.30	0.04	LS	24.10	3.17	0.76	MS
7	CoLk12205	0.85	5.27	LS	3.08	1.80	0.05	LS	32.33	3.13	1.01	MS
8	CoPb11214	0.00	3.75	LS	3.19	1.23	0.03	LS	17.44	4.06	0.71	LS
9	CoPb12211	3.53	3.64	LS	3.38	1.18	0.04	LS	16.61	2.21	0.37	LS
10	CoPant12226	2.17	11.33	LS	2.13	0.68	**0.01**	**LS**	30.05	2.07	0.62	MS
11	CoS12232	2.78	**0.00**	**LS**	3.18	0.61	0.02	LS	22.84	2.87	0.65	MS
CK	CoS767	11.01	**15.74**	**MS**	6.28	1.93	0.12	LS	23.15	1.51	0.35	MS
	CoPant97222	11.12	12.38	LS	2.67	0.96	0.02	LS	25.57	2.21	0.56	MS

Figures in parentheses are arcsine transformed values while those outside are original values ***Reaction based on IV brood incidence.**

Note: Above entries/genotypes are not as per approved Technical programme of Entomology (2016-17) in IVT/AVT.

Table-4.1.6: Reaction of zonal varieties/genotypes against insect pests of sugarcane at Pusa (2016-17)

Sr. No	Varieties/ genotypes	Early shoot borer (% incidence)						Top borer (% incidence)			Stalk borer				Root borer	
		30 DAP	60 DAP	90 DAP	120 DAP	Cum	Reaction*	III Brood	IV Brood	Reaction **	% incidence	% intensity	Infestation index	Reaction	% incidence	Reaction
	IVT E															
1	CoP 13436	0.00	12.6	9.32	4.60	11.71	LS	8.64	**11.30**	**MS**	0.00	0.00	**0.00**	**LS**	**6.99**	**LS**
2	CoP 13437	0.00	8.50	5.32	4.10	9.76	LS	9.02	9.73	LS	4.32	2.33	0.10	LS	7.35	LS
3	CoSe 13451	12.20	9.15	5.50	6.07	14.5	LS	8.32	7.90	LS	0.10	0.75	**0.00**	**LS**	6.89	LS
4	CoSe 13452	6.70	9.10	7.85	3.95	15.30	MS	8.15	9.30	LS	1.96	1.22	0.02	LS	8.60	LS
CK	BO 130	6.20	7.30	4.90	4.20	14.36	LS	5.94	8.10	LS	0.05	0.55	0.03	LS	8.08	LS
	CoSe 95422	6.35	7.50	7.20	6.35	15.72	MS	7.96	10.03	MS	0.10	0.85	**0.00**	**LS**	8.35	LS
	AVT E I P															
1	CoLK 12207	0.00	6.78	6.50	2.00	**6.75**	**LS**	6.90	8.20	LS	0.00	0.00	**0.00**	**LS**	7.50	LS
2	CoP 12436	5.10	7.15	6.35	4.38	15.86	MS	7.36	10.10	MS	2.56	2.15	0.05	LS	8.35	LS
3	CoSe 12451	0.00	7.85	6.98	1.90	8.67	LS	7.30	9.40	LS	0.80	3.15	0.02	LS	8.20	LS
CK	BO 130	0.00	9.20	8.32	3.10	14.36	LS	7.38	8.30	LS	0.15	4.25	**0.00**	**LS**	9.10	LS
	CoSe 95422	12.10	13.30	6.98	2.90	15.72	MS	8.30	9.40	LS	4.98	7.75	0.09	LS	9.76	LS
	IVT ML															
1	CoP 13438	11.00	9.10	7.95	2.50	13.45	LS	6.80	**7.30**	**LS**	0.80	1.25	0.01	LS	7.35	LS
2	CoP 13439	9.65	7.00	7.10	3.85	10.75	LS	8.30	10.10	MS	0.75	1.50	0.01	LS	8.20	LS
3	CoSe 13453	2.65	11.20	7.56	1.80	9.30	LS	8.75	9.85	LS	5.60	6.70	0.37	LS	7.56	LS
4	CoSe 13454	3.95	10.78	5.30	3.00	11.25	LS	8.35	9.50	LS	3.20	1.30	0.04	LS	7.98	LS

Sr. No	Varieties/ genotypes	Early shoot borer (% incidence)						Top borer (% incidence)			Stalk borer				Root borer	
		30 DAP	60 DAP	90 DAP	120 DAP	Cum	Reaction*	III Brood	IV Brood	Reaction **	% incidence	% intensity	Infestation index	Reaction	% incidence	Reaction
CK	BO 191	1.08	9.30	7.35	2.89	12.65	LS	7.30	10.00	LS	1.95	2.53	0.05	LS	9.30	LS
	CoP 9301	10.30	7.80	6.98	4.00	14.30	LS	7.50	10.05	MS	3.80	2.65	0.10	LS	9.50	LS
	AVT ML I P															
1	CoLK 09204	6.72	9.25	6.30	1.95	12.09	LS	7.35	9.00	LS	0.50	1.35	**0.00**	**LS**	7.35	LS
2	CoP 12438	8.30	7.53	6.30	1.98	11.10	LS	8.10	9.95	LS	1.32	1.75	0.02	LS	9.00	LS
3	CoLK 12209	8.50	5.30	7.00	3.20	10.24	LS	7.30	10.10	MS	0.80	2.01	0.02	LS	8.50	LS
4	Cose 12453	11.90	13.95	10.25	5.60	14.80	LS	8.75	10.25	MS	1.00	1.45	0.01	LS	9.35	LS
CK	BO 91	1.08	9.30	7.35	2.85	12.65	LS	6.90	9.50	LS	0.30	1.50	**0.00**	**LS**	8.95	LS
	CoP 9301	1030	7.80	6.98	4.00	14.30	LS	8.05	9.30	LS	3.80	1.02	0.04	LS	9.30	LS
	AVT ML II P															
1	BO 155	6.25	6.20	5.90	1.90	10.83	LS	7.30	9.85	LS	2.60	5.40	0.40	LS	9.80	LS
2	CoSe 11453	7.50	8.10	6.50	1.90	9.17	LS	8.30	10.90	MS	2.66	0.75	0.02	LS	10.10	LS
3	CoSe 11454	11.00	9.90	8.80	3.35	**16.58**	**MS**	8.75	9.25	LS	0.10	1.05	**0.00**	**LS**	**10.25**	**LS**
4	CoSe 11455	0.00	7.60	7.00	2.40	8.62	LS	8.90	10.30	MS	0.15	0.75	**0.00**	**LS**	9.98	LS
CK	BO 91	1.08	9.30	7.35	2.85	12.65	LS	7.35	9.20	LS	0.20	0.10	**0.00**	**LS**	9.70	LS
	CoP 9301	10.30	7.80	6.98	4.00	14.30	LS	6.75	9.50	LS	3.00	4.00	0.12	LS	9.80	LS
	CoSe 92423	13.60	14.90	8.10	4.10	16.31	MS	8.10	11.03	MS	5.30	9.10	**0.48**	**LS**	10.10	LS
	AVT E II P															
1	CoP 11436	1.05	8.70	6.70	5.45	10.05	LS	6.80	8.70	LS	0.10	1.05	**0.00**	**LS**	7.48	LS

Sr. No	Varieties/ genotypes	Early shoot borer (% incidence)						Top borer (% incidence)			Stalk borer				Root borer	
		30 DAP	60 DAP	90 DAP	120 DAP	Cum	Reaction*	III Brood	IV Brood	Reaction **	% incidence	% intensity	Infestation index	Reaction	% incidence	Reaction
2	CoP 11437	2.01	9.70	7.25	6.15	12.25	LS	7.70	8.20	LS	1.20	0.75	**0.00**	**LS**	8.35	LS
3	CoP 11438	3.35	8.70	8.00	7.50	14.08	LS	8.95	10.35	MS	0.00	0.50	**0.00**	**LS**	8.20	LS
4	CoP 11451	12.66	10.01	6.70	8.75	15.80	MS	8.30	9.25	LS	4.35	1.25	0.05	LS	9.05	LS
CK	BO 130	6.20	7.30	4.90	4.20	14.36	LS	8.50	9.00	LS	3.20	4.25	0.14	LS	8.20	LS
	CoSe 95422	6.35	7.50	7.20	6.35	15.72	MS	8.20	9.20	LS	2.80	1.75	0.05	LS	8.90	LS

*** Reaction based on cumulative per cent incidence; ** Reaction based on IV brood**

Table-4.1.7: Reaction of zonal varieties/genotypes against insect pests of sugarcane at Seorahi (2016-17)

Sr. No.	Varieties/ Genotype	Early shoot borer (% Incidence)		Top borer (% Incidence)		Root borer		Stalk borer	
		Cumulative	Reaction	At harvest	Reaction	Per cent incidence	Reaction	Infestation index	Reaction
1	2	3	4	5	6	7	8	9	10
	AVT E I P								
1	CoLk 12207	13.49	LS	11.30	MS	0.11	LS	4.23	MS
2	CoP 12436	13.43	LS	**13.15**	**MS**	0.14	LS	**4.27**	**MS**
3	CoSe 12451	12.71	LS	10.00	LS	0.11	LS	3.73	MS
4	BO130	15.09	MS	10.40	MS	**0.10**	**LS**	3.82	MS
CK	CoSe 95422	14.81	LS	11.25	MS	0.15	LS	3.82	MS
	AVT ML I P								
1	CoLk 09204	13.71	LS	10.00	LS	2.62`	LS	0.15	LS
2	CoLk12209	**17.04**	**MS**	8.91	LS	3.30	LS	0.20	LS
3	CoP 12438	15.20	MS	8.27	LS	**3.77**	**LS**	0.10	LS
4	CoSe 12453	11.49	LS	**7.01**	**LS**	2.28	LS	**0.08**	**LS**
CK	BO91	12.00	LS	9.38	LS	2.43	LS	0.11	LS
	CoP9301	14.91	LS	9.97	LS	3.42	LS	0.15	LS
	AVT ML II P								
1	BO155	15.70	MS	8.15	LS	2.96	LS	0.09	LS
2	CoSe11453	13.75	LS	9.00	LS	2.40	LS	0.10	LS
3	CoSe11454	12.29	LS	7.79	LS	2.64	LS	0.10	LS
4	CoSe11455	12.29	LS	9-22	LS	2.14	LS	0.15	LS
CK	BO91	13.29	LS	8.40	LS	2.51	LS	0.09	LS
	CoP9301	15.53	MS	10-00	MS	2.84	LS	0.15	LS
	CoSe92423	**10.62**	**LS**	9.56	LS	2.36	LS	0.09	LS

Table-4.1.8: Reaction of zonal varieties/genotypes against insect pests of sugarcane at Akola (2016-17)

Sr. No.	Varieties/ Genotype	Early shoot borer		Scale insect			Pyrilla	
		Per cent incidence (At 120 DAP)	Reaction	Per cent incidence (At harvest)	Per cent intensity (At harvest)	Reaction	Per cent incidence	Reaction
1	2	3	4	5	6	7	8	9
	AVT E I P							
1	Co11001	6.03	LS	36.00	5.05	HS	1.15	LS
2	CoM11081	11.61	LS	32.00	5.57	MS	1.08	LS
3	CoM11084	3.75	LS	37.33	6.38	HS	0.93	LS
4	Co11004	5.67	LS	34.67	7.21	MS	0.87	LS
5	CoM11082	5.55	LS	34.67	6.59	HS	0.88	LS
CK	Co85004	7.82	LS	26.67	4.34	MS	1.07	LS
	Co94008	7.90	LS	32.00	6.23	MS	0.97	LS
	CoC671	2.00	LS	25.33	4.47	MS	0.85	LS
	AVT E II P							
1	Co10004	3.54	LS	40.00	6.56	HS	0.80	LS
2	Co10005	**1.52**	**LS**	26.00	3.69	MS	0.92	LS
3	Co10006	7.18	LS	34.00	5.00	MS	0.70	LS
4	Co10024	5.84	LS	44.00	6.65	HS	0.85	LS
5	Co10026	4.69	LS	38.00	5.39	HS	0.75	LS
6	Co10027	2.29	LS	32.00	5.23	MS	1.00	LS
7	CoT10366	5.76	LS	28.00	6.85	MS	0.45	LS
8	CoT10367	3.15	LS	32.00	6.16	MS	1.10	LS
CK	Co 85004	1.61	LS	30.00	4.38	MS	0.65	LS
	Co 94008	2.52	LS	32.00	6.28	MS	0.90	LS
	CoC 671	2.58	LS	36.00	7.73	HS	0.45	LS
	AVT ML I P							
1	Co11005	6.77	LS	29.33	4.85	MS	0.92	LS
2	Co11007	7.31	LS	36.00	6.96	HS	0.73	LS

Sr. No.	Varieties/ Genotype	Early shoot borer		Scale insect			Pyrilla	
		Per cent incidence (At 120 DAP)	Reaction	Per cent incidence (At harvest)	Per cent intensity (At harvest)	Reaction	Per cent incidence	Reaction
3	Co86032	4.31	LS	22.67	2.93	MS	0.58	LS
4	Co11019	4.26	LS	30.67	5.32	MS	0.78	LS
5	CoM11085	5.07	LS	33.33	5.84	MS	0.92	LS
6	CoM11086	5.02	LS	38.67	7.39	HS	0.97	LS
CK	Co11012	8.94	LS	36.00	5.45	HS	0.83	LS
	Co99004	8.22	LS	28.00	3.70	MS	0.92	LS
	AVT ML II P							
1	Co09009	2.45	LS	**46.00**	7.74	**HS**	0.75	LS
2	Co10015	2.87	LS	38.00	8.20	HS	1.25	LS
3	Co10017	6.04	LS	42.00	17.32	HS	0.83	LS
4	Co10031	3.63	LS	34.00	6.26	MS	1.30	LS
5	Co10033	4.75	LS	34.00	5.79	MS	0.98	LS
6	CoM10083	3.36	LS	30.00	3.94	MS	1.38	LS
7	CoT10368	2.90	LS	40.00	5.78	HS	1.50	LS
8	CoT10369	6.37	LS	30.00	4.36	MS	1.55	LS
9	CoVC10061	4.77	LS	32.00	5.23	MS	**1.78**	**LS**
10	PI 10131	2.65	LS	30.00	3.46	MS	1.33	LS
11	PI 10132	4.37	LS	28.00	4.66	MS	1.50	LS
CK	Co86032	3.09	LS	**22.00**	3.34	**MS**	0.90	LS
	Co99004	4.01	LS	26.00	2.80	MS	0.68	LS
	IVT E I P							
1	Co13002	6.34	LS	34.00	5.79	MS	0.80	LS
2	Co13003	8.86	LS	26.00	4.28	MS	0.70	LS
3	Co85004	5.74	LS	36.00	6.24	HS	0.70	LS
4	CoN13071	4.90	LS	26.00	4.72	MS	**0.43**	**LS**
5	CoN13072	5.41	LS	30.00	4.06	MS	**0.43**	**LS**

Sr. No.	Varieties/ Genotype	Early shoot borer		Scale insect			Pyrilla	
		Per cent incidence (At 120 DAP)	Reaction	Per cent incidence (At harvest)	Per cent intensity (At harvest)	Reaction	Per cent incidence	Reaction
6	CoC671	5.41	LS	26.00	3.08	MS	0.48	LS
7	CoSnk13102	**13.68**	**LS**	40.00	7.54	HS	0.52	LS
8	MS13081	8.78	LS	42.00	5.41	HS	0.75	LS
9	Co13004	7.43	LS	36.00	4.37	HS	0.68	LS
CK	Co94008	6.29	LS	26.00	4.57	MS	0.58	LS
	CoSnk13101	12.13	LS	34.00	5.34	MS	0.38	LS
	IVT ML							
1	Co13005	3.33	LS	26.00	3.71	MS	0.88	LS
2	Co13006	3.03	LS	36.00	5.81	HS	1.10	LS
3	Co13008	2.58	LS	38.00	5.95	HS	1.20	LS
4	Co13009	3.88	LS	36.00	7.42	HS	1.15	LS
5	Co13011	2.80	LS	28.00	3.70	MS	1.08	LS
6	Co13013	1.85	LS	32.00	6.38	MS	1.35	LS
7	Co13014	3.23	LS	30.00	4.83	MS	1.13	LS
8	Co13016	3.09	LS	34.00	6.22	MS	0.98	LS
9	Co13018	3.69	LS	28.00	4.43	MS	0.95	LS
10	Co13020	2.48	LS	36.00	10.70	HS	1.03	LS
11	CoM13082	2.92	LS	40.00	8.20	HS	1.15	LS
CK	Co86032	3.25	LS	28.00	5.18	MS	0.63	LS
12	CoN13073	1.94	LS	32.00	6.16	MS	0.95	LS
13	CoN13074	3.61	LS	36.00	7.85	HS	1.18	LS
CK	Co99004	8.82	LS	26.00	5.89	MS	1.35	LS
14	CoSnk13103	5.73	LS	36.00	6.58	HS	1.35	LS
15	CoSnk13104	2.99	LS	38.00	7.66	HS	1.13	LS
16	CoSnk13105	6.60	LS	38.00	6.69	HS	1.25	LS
17	CoSnk13106	3.65	LS	30.00	6.06	MS	1.08	LS

Sr. No.	Varieties/ Genotype	Early shoot borer		Scale insect			Pyrilla	
		Per cent incidence (At 120 DAP)	Reaction	Per cent incidence (At harvest)	Per cent intensity (At harvest)	Reaction	Per cent incidence	Reaction
18	CoT13366	6.20	LS	32.00	7.08	MS	1.38	LS
19	PI13131	6.56	LS	32.00	5.55	MS	1.35	LS
20	PI13132	5.11	LS	28.00	4.80	MS	1.35	LS

Table-4.1.9: Reaction of zonal varieties/genotypes against insect pests of sugarcane at Padegaon (2016-17)

Sr. No.	Genotypes/ Varieties	Early shoot borer		Internode borer				Mealy bug			Scale insect		
		Cumulative incidence	Reaction	% Incidence	% Intensity	% Infestation index	Reaction	% Incidence	% Intensity	Reaction	% Incidence	% Intensity	Reaction
	IVT E												
1	Co 13002	24.17	MS	56.67 (48.93)	4.40	2.49	HS	66.67 (55.08)	6.63	HS	13.33 (13.08)	1.38	MS
2	Co 13003	25.25	MS	50.00 (45.00)	4.05	2.02	HS	43.33 (41.08)	3.14	HS	13.33 (13.08)	1.60	MS
3	Co 13004	17.04	MS	43.33 (41.15)	2.58	1.12	HS	60.00 (50.85)	5.41	HS	56.67 (49.14)	9.55	HS
4	CoN 13071	23.10	MS	46.67 (42.99)	3.34	1.56	HS	56.67 (48.93)	5.23	HS	23.33 (24.15)	2.99	MS
5	CoN 13072	23.71	MS	46.67 (43.78)	2.69	1.25	HS	60.00 (50.85)	5.72	HS	**00.00** (00.00)	0.00	**LS**
6	CoSnk 13101	29.65	MS	50.00 (45.08)	3.61	1.80	HS	73.33 (58.96)	8.30	HS	**00.00** (00.00)	0.00	**LS**
7	CoSnk 13102	35.65	HS	80.00 (68.07)	7.90	6.32	HS	46.67 (43.08)	4.31	HS	36.67 (32.22)	4.41	HS
8	MS 13081	38.42	HS	63.33 (53.07)	4.43	2.80	HS	**43.33** (41.07)	2.94	**HS**	**00.00** (00.00)	0.00	**LS**
CK	Co 85004	29.49	MS	36.67 (36.15)	2.18	0.80	MS	80.00 (68.85)	10.67	HS	16.67 (15.00)	1.47	MS
	Co 94008	36.80	HS	**70.00** (62.00)	6.14	4.30	**HS**	56.67 (48.93)	4.31	HS	**00.00** (00.00)	0.00	**LS**
	CoC 671	36.23	HS	43.33 (41.15)	3.15	1.36	HS	70.00 (57.78)	6.90	HS	**00.00** (00.00)	0.00	**LS**
	IVT ML												
1	Co 13005	15.63	MS	50.00 (45.00)	2.94	1.47	HS	60.00 (50.89)	6.02	HS	**0.00** (0.00)	0.00	**LS**
2	Co 13006	17.01	MS	75.00 (61.16)	5.18	3.88	HS	55.00 (47.88)	4.21	HS	**0.00** (0.00)	0.00	**LS**
3	Co 13008	14.67	LS	65.00 (53.78)	5.38	3.49	HS	70.00 (64.61)	5.38	HS	35.00 (36.22)	4.87	MS
4	Co 13009	29.23	MS	40.00 (39.10)	3.62	1.45	MS	95.00 (80.78)	12.43	HS	45.00 (42.11)	4.89	HS
5	Co 13011	14.29	LS	60.00	2.67	1.60	HS	**100.00**	10.86	**HS**	**0.00**	0.00	**LS**

Sr. No.	Genotypes/ Varieties	Early shoot borer		Internode borer				Mealy bug			Scale insect		
		Cumulative incidence	Reaction	% Incidence	% Intensity	% Infestation index	Reaction	% Incidence	% Intensity	Reaction	% Incidence	% Intensity	Reaction
				(51.33)				(90.00)			(0.00)		
6	Co 13013	11.60	LS	40.00 (38.66)	2.04	0.81	MS	80.00 (64.17)	6.61	HS	**0.00** (0.00)	0.00	**LS**
7	Co 13014	10.42	LS	40.00 (39.10)	2.45	0.98	MS	85.00 (73.39)	7.67	HS	**0.00** (0.00)	0.00	**LS**
8	Co 13016	10.92	LS	45.00 (42.11)	2.71	1.22	HS	65.00 (53.78)	5.17	HS	**0.00** (0.00)	0.00	**LS**
9	Co 13018	7.32	LS	60.00 (50.89)	4.08	2.44	HS	80.00 (64.17)	8.07	HS	20.00 (33.21)	4.47	MS
10	Co 13020	30.10	HS	50.00 (45.00)	2.91	1.45	HS	70.00 (57.10)	5.82	HS	**0.00** (0.00)	0.00	**LS**
11	CoM 13082	10.65	LS	40.00 (39.23)	1.86	0.74	MS	60.00 (51.33)	3.56	HS	40.00 (39.23)	3.93	HS
12	CoN 13073	20.78	MS	45.00 (42.11)	2.67	1.20	HS	75.00 (60.11)	5.61	HS	20.00 (19.61)	1.51	MS
13	CoN 13074	15.79	MS	40.00 (39.10)	2.63	1.05	MS	85.00 (73.39)	9.70	HS	**0.00** (0.00)	0.00	**LS**
14	CoSnk 13103	19.21	MS	50.00 (45.00)	5.03	2.51	HS	85.00 (67.50)	9.06	HS	**0.00** (0.00)	0.00	**LS**
15	CoSnk 13104	22.29	MS	50.00 (45.00)	3.83	1.91	HS	75.00 (60.11)	5.97	HS	**0.00** (0.00)	0.00	**LS**
16	CoSnk 13105	28.48	MS	45.00 (41.67)	4.01	1.80	HS	65.00 (55.39)	4.73	HS	**0.00** (0.00)	0.00	**LS**
17	CoSnk 13106	20.33	MS	70.00 (57.10)	5.16	3.61	HS	70.00 (64.61)	10.41	HS	**0.00** (0.00)	0.00	**LS**
18	CoT 13366	24.74	MS	55.00 (48.01)	3.45	1.90	HS	60.00 (50.89)	4.17	HS	**0.00** (0.00)	0.00	**LS**
19	PI 13131	27.27	MS	35.00 (36.22)	2.36	0.82	MS	80.00 (63.44)	6.75	HS	**0.00** (0.00)	0.00	**LS**
20	PI 13132	34.10	HS	70.00 (56.79)	4.98	3.48	HS	80.00 (63.44)	6.14	HS	**0.00** (0.00)	0.00	**LS**
CK	Co 86032	35.00	HS	30.00 (32.89)	1.49	0.44	MS	80.00 (64.17)	6.95	HS	**0.00** (0.00)	0.00	**LS**
	Co 99004	24.82	MS	55.00	3.15	1.70	HS	80.00	7.45	HS	**0.00**	0.00	**LS**

Sr. No.	Genotypes/ Varieties	Early shoot borer		Internode borer				Mealy bug			Scale insect		
		Cumulative incidence	Reaction	% Incidence	% Intensity	% Infestation index	Reaction	% Incidence	% Intensity	Reaction	% Incidence	% Intensity	Reaction
				(47.88)				(64.17)			(0.00)		
	AVT E I P												
1	Co 11001	37.42	HS	40.00 (39.15)	2.73	1.09	MS	80.00 (62.71)	5.44	HS	**0.00** (0.00)	0.00	**LS**
2	Co 11004	61.07	HS	26.67 (30.99)	1.61	0.43	MS	76.67 (61.22)	7.51	HS	**0.00** (0.00)	0.00	**LS**
3	CoM 11081	39.66	HS	53.33 (47.01)	4.02	2.14	HS	80.00 (63.93)	6.11	HS	**0.00** (0.00)	0.00	**LS**
4	CoM 11082	16.51	MS	53.33 (47.00)	3.13	1.67	HS	86.67 (76.92)	9.28	HS	**0.00** (0.00)	0.00	**LS**
5	CoM 11084	27.82	MS	46.67 (43.08)	3.04	1.42	HS	83.33 (70.78)	7.63	HS	**0.00** (0.00)	0.00	**LS**
CK	Co 85004	36.08	HS	33.33 (35.22)	2.52	0.84	MS	70.00 (57.78)	9.96	HS	**0.00** (0.00)	0.00	**LS**
	Co 94008	43.85	HS	36.67 (37.22)	1.89	0.69	MS	63.33 (53.85)	6.06	HS	**0.00** (0.00)	0.00	**LS**
	CoC 671	26.51	MS	36.67 (36.93)	2.48	0.91	MS	66.67 (55.08)	7.38	HS	**0.00** (0.00)	0.00	**LS**
	AVT E II P												
1	Co 10004	25.10	MS	56.67 (49.22)	4.53	2.57	HS	80.00 (68.85)	10.45	HS	**0.00** (0.00)	0.00	**LS**
2	Co 10005	26.01	MS	50.00 (44.92)	3.36	1.68	HS	80.00 (67.86)	7.75	HS	**0.00** (0.00)	0.00	**LS**
3	Co 10006	50.00	HS	53.33 (47.01)	3.67	1.96	HS	83.33 (66.15)	8.99	HS	**0.00** (0.00)	0.00	**LS**
4	Co 10024	29.94	MS	63.33 (53.07)	3.50	2.22	HS	50.00 (45.08)	3.19	HS	**0.00** (0.00)	0.00	**LS**
5	Co 10026	29.38	MS	56.67 (48.85)	3.44	1.95	HS	50.00 (45.00)	3.20	HS	**0.00** (0.00)	0.00	**LS**
6	Co 10027	43.02	HS	23.33 (23.85)	2.01	0.47	MS	93.33 (77.71)	12.05	HS	**0.00** (0.00)	0.00	**LS**
7	CoT 10366	28.29	MS	46.67 (43.08)	3.44	1.60	HS	70.00 (57.00)	7.71	HS	**0.00** (0.00)	0.00	**LS**
8	CoT 10367	32.42	HS	23.33	1.66	0.39	MS	90.00	9.11	HS	**0.00**	0.00	**LS**

Sr. No.	Genotypes/ Varieties	Early shoot borer		Internode borer				Mealy bug			Scale insect		
		Cumulative incidence	Reaction	% Incidence	% Intensity	% Infestation index	Reaction	% Incidence	% Intensity	Reaction	% Incidence	% Intensity	Reaction
				(28.78)				(75.00)			(0.00)		
CK	Co 85004	29.96	MS	16.67 (19.22)	0.89	0.15	LS	93.33 (75.71)	18.29	HS	**0.00** (0.00)	0.00	**LS**
	Co 94008	**50.36**	**HS**	30.00 (32.71)	2.20	0.66	MS	63.33 (53.85)	4.33	HS	**0.00** (0.00)	0.00	**LS**
	CoC 671	32.03	HS	30.00 (33.33)	1.94	0.58	MS	86.67 (72.78)	8.69	HS	**0.00** (0.00)	0.00	**LS**
	AVT ML I P												
1	Co 11005	15.72	MS	46.67 (43.08)	2.73	1.27	HS	93.33 (81.15)	9.91	HS	**0.00** (0.00)	0.00	**LS**
2	Co 11007	14.91	LS	43.33 (41.15)	2.33	1.01	HS	93.33 (81.15)	14.34	HS	**0.00** (0.00)	0.00	**LS**
3	Co 11012	12.61	LS	33.33 (34.92)	1.94	0.65	MS	93.33 (81.15)	18.57	HS	**0.00** (0.00)	0.00	**LS**
4	Co 11019	15.54	MS	40.00 (39.15)	2.60	1.04	MS	86.67 (72.78)	7.92	HS	**0.00** (0.00)	0.00	**LS**
5	CoM 11085	11.66	LS	30.00 (33.00)	1.55	0.46	MS	90.00 (75.00)	14.80	HS	**0.00** (0.00)	0.00	**LS**
6	CoM 11086	11.48	LS	26.67 (30.29)	1.87	0.50	MS	66.67 (60.00)	8.15	HS	**0.00** (0.00)	0.00	**LS**
CK	Co 86032	23.82	MS	23.33 (28.08)	1.67	0.39	MS	80.00 (63.93)	11.33	HS	**0.00** (0.00)	0.00	**LS**
	Co 99004	16.73	MS	60.00 (51.15)	3.44	2.06	HS	66.67 (54.98)	6.76	HS	**0.00** (0.00)	0.00	**LS**
	AVT ML II P												
1	Co 09009	25.00	MS	43.33 (41.07)	2.88	1.25	HS	90.00 (68.93)	7.89	HS	30.00 (28.08	3.29	MS
2	Co 10015	33.22	HS	30.00 (33.21)	1.71	0.51	MS	93.33 (77.71)	8.24	HS	20.00 (21.93	2.88	MS
3	Co 10017	38.95	HS	26.67 (30.29)	1.45	0.39	MS	**100.00** (90.00)	13.56	**HS**	20.00 (22.14)	1.69	MS
4	Co 10031	18.55	MS	**20.00** (26.07)	1.03	0.21	**LS**	**100.00** (90.00)	12.84	**HS**	26.67 (26.15)	3.18	MS
5	Co 10033	18.15	MS	26.67	1.32	0.35	MS	93.33	7.69	HS	13.33	1.28	MS

Sr. No.	Genotypes/ Varieties	Early shoot borer		Internode borer				Mealy bug			Scale insect		
		Cumulative incidence	Reaction	% Incidence	% Intensity	% Infestation index	Reaction	% Incidence	% Intensity	Reaction	% Incidence	% Intensity	Reaction
				(30.99)				(81.15)			(13.08)		
6	CoM 10083	34.41	HS	43.33 (41.07)	2.94	1.27	HS	**100.00** (90.00)	13.97	**HS**	0.00 (0.00)	0.00	LS
7	CoT 10368	15.35	MS	43.33 (41.07)	3.17	1.37	HS	**100.00** (90.00)	33.03	**HS**	43.33 (41.15)	5.57	HS
8	CoT 10369	21.24	MS	16.67 (23.36)	0.94	0.16	LS	**100.00** (90.00)	20.23	**HS**	23.33 (24.15)	2.14	MS
9	CoVC10061	10.62	LS	36.67 (36.15)	2.18	0.80	MS	96.67 (83.85)	13.44	HS	6.67 (8.85)	0.84	LS
10	PI 10131	23.63	MS	46.67 (42.70)	3.33	1.55	HS	86.67 (72.29)	7.40	HS	10.00 (11.07)	1.48	LS
11	PI 10132	26.92	MS	53.33 (46.92)	3.55	1.89	HS	96.67 (83.85)	14.59	HS	**0.00** (0.00)	0.00	**LS**
CK	Co 86032	23.62	MS	**20.00** (26.07)	1.25	0.25	**LS**	96.67 (83.85)	11.44	HS	13.33 (13.08)	1.19	MS
	Co 99004	13.48	LS	43.33 (40.86)	2.80	1.21	HS	**100.00** (90.00)	9.14	HS	40.00 (33.93)	3.34	HS
	AVT ML R												
1	Co 09009	27.95	MS	30.00 (33.21)	2.34	0.70	MS	80.00 (58.28)	5.87	HS	65.00 (54.22)	8.51	HS
2	Co 10015	23.06	MS	20.00 (26.56)	1.21	0.26	LS	55.00 (47.88)	5.08	HS	30.00 (32.89)	3.04	MS
3	Co 10017	15.73	MS	20.00 (25.85)	1.75	0.35	LS	**100.00** (90.00)	11.11	**HS**	**85.00** (67.50)	15.80	**HS**
4	Co 10031	18.59	MS	25.00 (29.88)	1.36	0.34	MS	65.00 (55.39)	4.25	HS	55.00 (48.22)	5.72	HS
5	Co 10033	13.47	LS	25.00 (29.88)	1.69	0.42	MS	80.00 (63.44)	7.08	HS	40.00 (39.10)	5.09	HS
6	CoM 10083	17.81	MS	30.00 (32.89)	1.94	0.58	MS	85.00 (73.39)	12.53	HS	70.00 (58.28)	11.56	HS
7	CoT 10368	20.33	MS	**20.00** (26.56)	1.18	0.23	**LS**	95.00 (80.78)	16.94	HS	65.00 (53.78)	6.78	HS
8	CoT 10369	27.66	MS	30.00 (32.89)	1.78	0.53	MS	95.00 (80.78)	13.77	HS	45.00 (42.11)	6.76	HS

Sr. No.	Genotypes/ Varieties	Early shoot borer		Internode borer				Mealy bug			Scale insect		
		Cumulative incidence	Reaction	% Incidence	% Intensity	% Infestation index	Reaction	% Incidence	% Intensity	Reaction	% Incidence	% Intensity	Reaction
9	CoVC10061	19.08	MS	**20.00** (26.56)	1.19	0.23	**LS**	85.00 (67.50)	14.11	HS	45.00 (42.11)	6.93	HS
10	PI 10131	23.43	MS	30.00 (32.89)	2.62	0.78	MS	70.00 (56.79)	6.69	HS	65.00 (55.39)	8.76	HS
11	PI 10132	11.43	LS	25.00 (29.88)	1.39	0.35	MS	90.00 (76.72)	12.28	HS	70.00 (56.79)	7.81	HS
CK	Co 86032	17.62	MS	25.00 (29.88)	1.69	0.42	MS	80.00 (63.44)	7.58	HS	45.00 (42.11)	4.77	HS
	Co 99004	16.99	MS	15.00 (22.50)	1.28	0.19	LS	90.00 (76.72)	11.73	HS	35.00 (36.22)	3.43	MS
	AVT E R												
1	Co 10004	10.51	LS	26.67 (30.78)	1.70	0.42	MS	93.33 (81.15)	13.06	HS	73.33 (60.00)	10.43	HS
2	Co 10005	15.84	MS	23.33 (28.78)	1.47	0.34	MS	96.67 (83.85)	12.27	HS	80.00 (63.93)	10.93	HS
3	Co 10006	20.87	MS	23.33 (28.78)	1.48	0.34	MS	96.67 (83.85)	13.93	HS	56.67 (49.22)	8.54	HS
4	Co 10024	13.43	LS	30.00 (32.71)	2.16	0.65	MS	86.67 (68.85)	9.31	HS	40.00 (39.15)	3.91	HS
5	Co 10026	14.41	LS	43.33 (41.07)	2.45	1.06	HS	90.00 (75.00)	8.91	HS	60.00 (51.15)	6.28	HS
6	Co 10027	13.36	LS	33.33 (35.01)	2.52	0.84	MS	86.67 (72.78)	11.79	HS	83.33 (66.64)	11.43	HS
7	CoT 10366	9.70	LS	40.00 (39.23)	2.76	1.10	MS	96.67 (83.85)	12.51	HS	66.67 (55.08)	10.01	HS
8	CoT 10367	9.54	LS	16.67 (23.85)	0.87	0.14	LS	93.33 (77.71)	17.31	HS	60.00 (51.15)	7.35	HS
9	Co 85004	15.26	MS	36.67 (36.93)	2.21	0.81	MS	100 (90.00)	25.57	HS	63.33 (53.15)	12.30	HS
10	Co 94008	17.39	MS	33.33 (35.01)	2.36	0.79	MS	93.33 (81.15)	9.49	HS	60.00 (51.93)	6.72	HS
11	CoC 671	**4.10**	**LS**	46.67 (43.08)	2.71	1.26	HS	96.67 (83.85)	14.92	HS	60.00 (51.15)	7.11	HS

Figures in parentheses are arcsine transformed values while those outside are original values

Table-4.1.10 (a): Reaction of zonal varieties/genotypes against insect pests of sugarcane at Pune (2016-17)

Sr. No	Varieties/ genotype	Early shoot borer (% incidence)							Internode borer				Mealy bug		
		30 DAP	60 DAP	90 DAP	120 DAP	Cum	No. of bored plants/ha	Reaction*	% incidence	% intensity	Infestation index	Reaction	% incidence	% intensity	Reaction
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	IVT E														
1	Co13002	0.00	3.03	16.81	9.09	18.54 (23.40)	30556	MS	5.33 (2.39)	0.38	0.02	LS	8.00 (2.86)	1.32	MS
2	Co13003	0.00	1.52	20.56	11.43	26.61 (30.88)	32407	MS	1.33 (1.18)	0.09	0.001	LS	10.67 (3.24)	1.70	MS
3	Co13004	0.00	5.56	21.88	14.68	30.30 (33.05)	37963	HS	5.33 (2.39)	0.38	0.02	LS	9.33 (3.03)	1.42	MS
4	CoN 13071	0.00	5.88	37.65	19.59	43.30 (41.08)	50000	HS	2.67 (1.65)	0.19	0.01	LS	17.33 (4.22)	3.29	MS
5	CoN 13072	0.00	9.33	26.36	15.20	30.30 (32.80)	50926	HS	6.67 (2.59)	0.75	0.07	LS	6.67 (2.39)	0.84	MS
6	CoSnk 13101	0.00	10.14	32.53	16.98	37.31 (37.60)	48148	HS	9.33 (3.06)	1.00	0.11	LS	8.00 (2.77)	1.77	MS
7	CoSnk 13102	0.00	7.32	30.77	37.36	49.00 (44.43)	49074	HS	13.33 (3.19)	1.04	0.25	LS	12.00 (3.50)	2.17	MS
8	MS 13081	0.00	11.76	42.86	14.05	41.42 (39.99)	69444	HS	6.67 (2.65)	0.39	0.03	LS	13.33 (3.57)	2.18	MS
CK	Co 85004	0.00	13.46	14.29	18.81	32.75 (34.17)	36111	HS	**0.00** (0.71)	0.00	0.00	**LS**	8.00 (2.45)	0.88	MS
	Co 94008	0.00	29.55	35.21	37.50	59.25 (50.37)	60185	HS	5.33 (2.18)	0.42	0.03	LS	8.00 (2.86)	1.38	MS
	CoC 671	0.00	12.82	27.78	32.53	44.62 (41.94)	43519	HS	1.33 (1.18)	0.14	0.01	LS	16.67 (4.04)	2.95	MS
	IVT ML														
1	Co 13005	0	3.13	7.14	1.69	6.82 (12.86)	8333	LS	8.00 (2.38)	0.55	0.09	LS	2.00 (1.41)	0.22	LS
2	Co 13006	0	20.83	4.00	6.10	14.82 (20.98)	16667	LS	10.00 (3.23)	0.73	0.08	LS	4.00 (1.81)	0.73	LS

Sr. No	Varieties/ genotype	Early shoot borer (% incidence)							Internode borer				Mealy bug		
		30 DAP	60 DAP	90 DAP	120 DAP	Cum	No. of bored plants/ha	Reaction*	% incidence	% intensity	Infestation index	Reaction	% incidence	% intensity	Reaction
3	Co 13008	0	5.71	6.25	3.13	10.25 (17.29)	9722	LS	6.00 (2.52)	0.37	0.03	LS	4.00 (1.81)	0.36	LS
4	Co 13009	0	38.71	15.79	18.46	38.76 (38.49)	45833	HS	2.00 (1.41)	0.15	0.01	LS	4.00 (1.81)	0.46	LS
5	Co 13011	0	12.82	19.72	2.56	21.45 (27.32)	29167	MS	8.00 (2.91)	0.67	0.06	LS	**0.00** (0.71)	0.00	**LS**
6	Co 13013	0	2.94	6.56	16.67	18.37 (22.62)	26389	MS	0.00 (0.71)	0.00	0.00	LS	**0.00** (0.71)	0.00	**LS**
7	Co 13014	0	12.50	5.13	8.11	21.74 (23.98)	15278	MS	6.00 (2.52)	0.41	0.03	LS	2.00 (1.41)	0.39	LS
8	Co 13016	0	16.67	20.00	20.00	30.16 (33.03)	41667	HS	4.00 (1.81)	0.35	0.03	LS	6.00 (2.12)	0.92	MS
9	Co 13018	0	13.33	8.82	11.54	22.92 (28.39)	29167	MS	2.00 (1.41)	0.17	0.01	LS	2.00 (1.41)	0.34	LS
10	Co 13020	0	28.13	7.81	4.42	14.89 (22.69)	26389	LS	2.00 (1.41)	0.15	0.01	LS	8.00 (2.38)	1.39	MS
11	Co M 13082	0	1.45	0.00	6.19	7.97 (15.70)	9722	LS	12.00 (3.49)	1.16	0.15	LS	4.00 (1.81)	0.36	LS
12	Co N 13073	0	25.00	5.08	2.13	10.16 (18.37)	15278	LS	8.00 (2.83)	0.47	0.05	LS	**0.00** (0.71)	0.00	**LS**
13	Co N 13074	0	32.26	14.55	11.76	26.63 (30.99)	38889	MS	4.00 (2.12)	0.57	0.02	LS	2.00 (1.41)	0.14	LS
14	Co Snk 13103	0	6.90	8.77	11.58	17.89 (24.99)	25000	MS	10.00 (3.23)	0.72	0.08	LS	**0.00** (0.71)	0.00	**LS**
15	Co Snk 13104	0	4.76	3.57	8.33	11.00 (18.57)	16667	LS	6.00 (2.12)	0.49	0.06	LS	**0.00** (0.71)	0.00	**LS**
16	Co Snk 13105	0	8.00	7.69	8.82	15.05 (22.18)	23611	MS	2.00 (1.14)	0.16	0.01	LS	**0.00** (0.71)	0.00	**LS**
17	Co Snk 13106	0	24.44	11.29	20.73	35.61 (36.61)	48611	HS	4.00 (1.81)	0.43	0.03	LS	10.00 (3.23)	0.91	MS
18	CoT 13366	0	0	6.67	8.33	11.89	11111	LS	2.00	0.28	0.01	LS	**0.00**	0.00	**LS**

Sr. No	Varieties/ genotype	Early shoot borer (% incidence)							Internode borer				Mealy bug		
		30 DAP	60 DAP	90 DAP	120 DAP	Cum	No. of bored plants/ha	Reaction*	% incidence	% intensity	Infestation index	Reaction	% incidence	% intensity	Reaction
						(19.22)			(1.41)				(0.71)		
19	PI 13131	0	5	5.88	12.20	17.5 (24.22)	11111	MS	8.00 (2.38)	0.65	0.11	LS	8.00 (2.38)	1.29	MS
20	PI 13132	0	16.67	22.03	21.69	36.27 (37.02)	51389	HS	0.00 (0.71)	0.00	0.00	LS	4.00 (1.81)	0.33	LS
CK	Co 86032	0	22.92	7.14	6.25	23.61 (28.83)	29167	MS	4.00 (1.81)	0.30	0.03	LS	6.00 (2.12)	0.91	MS
	Co 99004	0	8	15.38	4.62	14.25 (2.06)	15278	LS	10.00 (3.23)	0.64	0.07	LS	**0.00** (0.71)	0.00	**LS**
	AVT E I P														
1	Co 11001	3.33	2.38	15.24	13.10	22.65 (28.14)	30159	MS	14.00 (3.80)	0.96	0.14	LS	4.00 (1.91)	0.34	LS
2	Co 11004	0.00	0.00	25.00	16.35	26.96 (30.49)	26190	MS	2.67 (1.44)	0.26	0.02	LS	**0.00** (0.71)	0.00	**LS**
3	CoM 11081	0.00	16.95	11.61	13.08	25.68 (30.36)	31746	MS	13.33 (3.57)	0.95	0.14	LS	**0.00** (0.71)	0.00	**LS**
4	CoM 11082	0.00	2.63	8.05	2.00	9.41 (17.07)	7937	LS	9.33 (3.12)	0.52	0.05	LS	**0.00** (0.71)	0.00	**LS**
5	CoM 11084	0.00	5.13	18.42	10.83	26.10 (30.71)	30159	MS	8.00 (2.86)	0.44	0.04	LS	**0.00** (0.71)	0.00	**LS**
CK	Co 85004	0.00	5.26	9.17	4.62	13.57 (20.17)	15873	LS	6.67 (2.59)	0.52	0.05	LS	6.67 (2.30)	0.42	MS
	Co 94008	0.00	13.04	37.65	22.43	43.25 (41.10)	49206	HS	4.00 (1.91)	0.33	0.02	LS	1.33 (1.18)	0.08	LS
	CoC 671	0.00	7.32	18.57	7.07	19.55 (25.99)	18254	MS	12.00 (3.50)	0.69	0.09	LS	2.67 (1.44)	0.15	LS
	AVT E II P														
1	Co 10004	0.00	2.08	9.18	4.92	11.81 (19.89)	19048	LS	6.00 (2.52)	0.36	0.03	LS	2.00 (1.41)	0.23	LS
2	Co 10005	0.00	0.00	5.00	4.40	8.67 (16.79)	10714	LS	6.00 (2.12)	0.32	0.04	LS	0.00 (0.71)	0.00	LS

Sr. No	Varieties/ genotype	Early shoot borer (% incidence)							Internode borer				Mealy bug		
		30 DAP	60 DAP	90 DAP	120 DAP	Cum	No. of bored plants/ha	Reaction*	% incidence	% intensity	Infestation index	Reaction	% incidence	% intensity	Reaction
3	Co 10006	0.00	15.38	49.09	41.03	**58.47** (49.97)	77381	**HS**	12.00 (3.49)	0.87	0.12	LS	**0.00** (0.71)	0.00	**LS**
4	Co 10024	0.00	5.88	14.58	8.51	27.27 (28.66)	30952	MS	10.00 (3.10)	0.69	0.10	LS	**0.00** (0.71)	0.00	**LS**
5	Co 10026	0.00	16.67	2.63	2.13	10.91 (19.20)	13095	LS	**24.00** (4.88)	1.44	0.37	**MS**	**0.00** (0.71)	0.00	**LS**
6	Co 10027	0.00	1.96	15.71	4.40	15.57 (23.07)	19048	MS	14.00 (3.80)	0.98	0.14	LS	**0.00** (0.71)	0.00	**LS**
7	CoT 10366	0.00	0.00	4.76	10.53	13.59 (21.63)	9524	LS	20.00 (4.53)	1.36	0.27	LS	6.00 (2.12)	0.48	MS
8	CoT 10367	0.00	4.55	26.42	6.15	24.81 (29.87)	23810	MS	6.00 (2.52)	0.47	0.04	LS	4.00 (1.81)	0.60	LS
CK	Co 85004	0.00	6.25	10.14	5.17	12.21 (20.43)	17857	LS	4.00 (1.81)	0.28	0.02	LS	6.00 (2.52)	0.74	MS
	Co 94008	0.00	9.68	54.05	15.63	38.17 (38.08)	39286	HS	16.00 (4.06)	0.90	0.15	LS	**0.00** (0.71)	0.00	**LS**
	CoC 671	0.00	3.23	1.96	8.93	13.36 (20.59)	8333	LS	10.00 (3.23)	0.82	0.08	LS	2.00 (1.41)	0.13	LS
	AVT ML I P														
1	Co11005	0.00	0.91	5.37	6.47	11.41 (19.37)	15873	LS	4.00 (1.91)	0.32	0.02	LS	4.00 (2.12)	0.48	LS
2	Co 11007	0.00	17.19	14.85	5.61	23.69 (29.09)	25397	MS	8.00 (2.86)	0.48	0.05	LS	2.67 (1.65)	0.32	LS
3	Co 11012	0.00	1.49	19.84	10.45	22.30 (26.89)	31746	MS	13.33 (3.66)	0.88	0.13	LS	6.67 (2.30)	0.54	MS
4	Co 11019	0.00	0.00	2.56	6.87	8.63 (16.94)	8730	LS	6.67 (2.65)	0.55	0.04	LS	9.33 (3.06)	0.89	MS
5	CoM 11085	0.00	0.00	5.65	7.63	11.73 (19.92)	13492	LS	6.67 (2.39)	0.44	0.04	LS	6.67 (2.39)	0.68	MS
6	CoM 11086	0.00	0.00	20.87	4.35	19.16 (25.48)	23016	MS	8.00 (2.91)	0.59	0.05	LS	5.33 (2.18)	0.36	MS

Sr. No	Varieties/ genotype	Early shoot borer (% incidence)							Internode borer				Mealy bug		
		30 DAP	60 DAP	90 DAP	120 DAP	Cum	No. of bored plants/ha	Reaction*	% incidence	% intensity	Infestation index	Reaction	% incidence	% intensity	Reaction
CK	Co 86032	0.00	5.56	10.00	8.78	17.02 (24.08)	22222	MS	4.00 (1.91)	0.24	0.02	LS	6.67 (2.65)	0.54	MS
	Co 99004	0.00	5.00	6.17	9.78	15.99 (23.56)	12698	MS	10.67 (3.33)	0.66	0.07	LS	8.00 (2.56)	0.82	MS
	AVT E R														
1	Co 10004	0	2.86	0.00	0.00	1.43 (6.90)	1389	LS	4.00 (1.81)	0.26	0.02	LS	10.00 (2.62)	1.16	MS
2	Co 10005	0	0.00	0.00	1.35	**1.39** (6.83)	1389	**LS**	10.00 (3.09)	0.64	0.09	LS	12.00 (3.32)	1.25	MS
3	Co 10006	1.32	3.23	0.00	8.24	14.61 (21.23)	13889	LS	14.00 (.3.54)	0.95	0.20	LS	20.00 (4.53)	2.89	MS
4	Co 10024	0	1.45	2.08	3.64	4.48 (10.74)	8333	LS	8.00 (2.83)	0.54	0.05	LS	10.00 (3.23)	1.35	MS
5	Co 10026	0	0.00	6.67	4.82	7.61 (13.51)	9722	LS	18.00 (4.24)	1.88	0.35	LS	4.00 (2.12)	0.54	LS
6	Co 10027	0	9.09	3.17	2.91	9.23 (15.89)	13889	LS	2.00 (1.41)	0.15	0.01	LS	12.00 (3.49)	2.08	MS
7	CoT 10366	0	0.00	1.67	0.00	1.52 (7.04)	1389	LS	8.00 (2.91)	0.43	0.04	LS	18.00 (4.24)	2.01	MS
8	CoT 10367	0	11.11	3.51	1.37	9.51 (16.92)	12500	LS	14.00 (3.80)	1.03	0.15	LS	12.00 (3.32)	2.00	MS
CK	Co 85004	0.00	0.00	0.00	3.64	3.43 (10.49)	5556	LS	6.00 (2.12)	0.43	0.05	LS	**28.00** (5.10)	4.41	**MS**
	Co94008	0	2.17	2.13	8.93	11.09 (18.39)	9722	LS	8.00 (2.91)	0.65	0.05	LS	4.00 (2.12)	0.91	LS
	CoC 671	0	6.67	0.00	1.16	4.85 (12.11)	5556	LS	18.00 (4.24)	1.85	0.16	LS	14.00 (3.72)	2.22	MS
	AVT ML II P														
1	Co 09009	0	5.66	25.00	14.77	30.56 (32.76)	39286	HS	8.00 (2.91)	0.34	0.05	LS	2.00 (1.41)	0.13	LS
2	Co 10015	0	8.11	22.03	4.60	18.98	23810	MS	8.00	0.46	0.04	LS	2.00	0.12	LS

Sr. No	Varieties/ genotype	Early shoot borer (% incidence)							Internode borer				Mealy bug		
		30 DAP	60 DAP	90 DAP	120 DAP	Cum	No. of bored plants/ha	Reaction*	% incidence	% intensity	Infestation index	Reaction	% incidence	% intensity	Reaction
						(25.74)			(2.91)				(1.41)		
3	Co 10017	0	4.55	12.24	11.84	20.34 (26.78)	20238	MS	4.00 (1.81)	0.20	0.02	LS	**0.00** (0.71)	0.00	**LS**
4	Co 10031	0	1.92	14.04	6.17	14.23 (21.79)	16667	LS	16.00 (4.06)	1.20	0.19	LS	**0.00** (0.71)	0.00	**LS**
5	Co 10033	0	7.69	17.02	3.61	14.89 (21.13)	16667	LS	8.00 (2.91)	0.68	0.05	LS	2.00 (1.41)	0.11	LS
6	CoM 10083	0	8.82	8.77	8.00	19.55 (25.12)	16667	MS	14.00 (3.80)	0.91	0.13	LS	6.00 (2.12)	0.92	MS
7	CoT 10368	0	3.77	27.66	13.00	24.31 (29.54)	33333	MS	14.00 (3.72)	0.95	0.16	LS	6.00 (2.12)	0.49	MS
8	CoT 10369	0	2.44	11.54	6.12	14.76 (22.58)	19048	LS	0.00 (0.71)	0.00	0.00	LS	2.00 (1.41)	0.34	LS
9	Co Vc 10061	0	0.00	7.14	2.83	5.45 (13.49)	7143	LS	4.00 (2.12)	0.26	0.01	LS	**0.00** (0.71)	0.00	**LS**
10	PI 10131	0	0.00	30.91	7.14	22.33 (28.06)	27381	MS	12.00 (3.49)	0.85	0.11	LS	**0.00** (0.71)	0.00	**LS**
11	PI 10132	0	4.88	15.56	16.67	29.77 (32.29)	21429	MS	12.00 (3.32)	0.89	0.14	LS	**0.00** (0.71)	0.00	**LS**
CK	Co 86032	0	15.79	30.00	17.28	34.27 (35.82)	41667	HS	10.00 (3.23)	0.57	0.06	LS	**0.00** (0.71)	0.00	**LS**
	Co 99004	0	0	3.12	6.76	8.68 (16.97)	7143	LS	6.00 (2.52)	0.37	0.03	LS	**0.00** (0.71)	0.00	**LS**
	AVT ML R														
1	Co 09009	0	0.00	2.59	2.50	5.25 (12.88)	8333	LS	14.00 (3.54)	0.91	0.20	LS	4.00 (1.81)	0.72	LS
2	Co 10015	2.19	9.72	3.16	1.46	9.61 (17.74)	20833	LS	6.00 (2.52)	0.40	0.01	LS	10.00 (3.09)	1.17	MS
3	Co 10017	0	6.06	1.96	3.13	8.33 (16.24)	18056	LS	10.00 (3.23)	0.82	0.09	LS	10.00 (3.09)	1.44	MS
4	Co 10031	0	1.85	0.00	3.49	5.05	5556	LS	10.00	0.84	0.09	LS	**0.00**	0.00	LS

Sr. No	Varieties/ genotype	Early shoot borer (% incidence)							Internode borer				Mealy bug		
		30 DAP	60 DAP	90 DAP	120 DAP	Cum	No. of bored plants/ha	Reaction*	% incidence	% intensity	Infestation index	Reaction	% incidence	% intensity	Reaction
						(12.34)			(3.23)				(0.71)		
5	Co 10033	0	1.54	1.56	1.08	3.25 (10.18)	4167	LS	2.00 (1.41)	0.12	0.01	LS	4.00 (1.81)	0.06	LS
6	CoM 10083	0	6.25	6.90	2.11	10.49 (18.45)	15278	LS	6.00 (2.52)	0.32	0.02	LS	20.00 (4.31)	2.92	MS
7	CoT 10368	1.28	3.28	1.15	5.26	10.16 (18.59)	11111	LS	10.00 (3.23)	0.68	0.07	LS	12.00 (3.49)	1.08	MS
8	CoT 10369	0	0.00	0.00	3.65	3.62 (10.96)	6944	LS	12.00 (2.83)	0.68	0.17	LS	12.00 (3.32)	2.14	MS
9	Co Vc 10061	1.05	2.33	1.11	0.99	3.70 (10.82)	5556	LS	10.00 (3.23)	0.63	0.07	LS	8.00 (2.91)	0.88	MS
10	PI 10131	0.98	2.78	2.63	2.52	6.60 (14.74)	12500	LS	2.00 (1.41)	0.14	0.01	LS	12.00 (3.32)	2.37	MS
11	PI 10132	0	0.00	1.72	8.22	10.84 (17.44)	9722	LS	4.00 (2.12)	0.54	0.02	LS	16.00 (4.06)	1.34	MS
CK	Co 86032	0	1.64	1.41	2.02	3.45 (9.64)	5556	LS	12.00 (3.54)	0.88	0.11	LS	26.00 (5.05)	3.59	MS
	Co 99004	0	6.90	0.00	4.84	7.87 (16.19)	6944	LS	8.00 (2.91)	0.77	0.06	LS	8.00 (2.83)	0.76	MS

Figures in parenthesis are arcsine transformed values while those outside are original values. *Reaction based on cumulative per cent incidence.

Table-4.1.10 (b): Reaction of zonal varieties/genotypes against insect pests of sugarcane at Pune (2016-17)

Sr. No.	Varieties/ Genotype	Scale Insect [AVT E I P]			Varieties/ Genotype	Scale Insect [AVT E II P]			Varieties/ Genotype	Scale Insect [AVT ML I P]			Varieties/ Genotype	Scale Insect [AVT ML II P]		
		% incidence	% intensity	Reaction *		% incidence	% intensity	Reaction *		% incidence	% intensity	Reaction*		% incidence	% intensity	Reaction *
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Co 11001	**0.00 (0.71)**	0.00	**LS**	Co 10004	**0.00 (0.71)**	0.00	**LS**	Co11005	**0.00 (0.71)**	0.00	**LS**	Co 09009	**0.00 (0.71)**	0.00	**LS**
2	Co 11004	**0.00 (0.71)**	0.00	**LS**	Co 10005	**0.00 (0.71)**	0.00	**LS**	Co 11007	1.33 (1.18)	1.02	LS	Co 10015	**0.00 (0.71)**	0.00	**LS**
3	CoM 11081	**0.00 (0.71)**	0.00	**LS**	Co 10006	**0.00 (0.71)**	0.00	**LS**	Co 11012	**0.00 (0.71)**	0.00	**LS**	Co 10017	**0.00 (0.71)**	0.00	**LS**
4	CoM 11082	**0.00 (0.71)**	0.00	**LS**	Co 10024	**0.00 (0.71)**	0.00	**LS**	Co 11019	**0.00 (0.71)**	0.00	**LS**	Co 10031	**0.00 (0.71)**	0.00	**LS**
5	CoM 11084	**0.00 (0.71)**	0.00	**LS**	Co 10026	8.00 (2.91)	1.92	LS	CoM 11085	**0.00 (0.71)**	0.00	**LS**	Co 10033	8.00 (2.83)	2.40	LS
6	Co 85004 **(CK)**	**13.33 (2.59)**	7.76	MS	Co 10027	**0.00 (0.71)**	0.00	**LS**	CoM 11086	**0.00 (0.71)**	0.00	**LS**	CoM 10083	**0.00 (0.71)**	0.00	**LS**
7	Co 94008 **(CK)**	**0.00 (0.71)**	0.00	**LS**	CoT 10366	**0.00 (0.71)**	0.00	**LS**	Co 86032 **(CK)**	12.00 (2.48)	7.81	MS	CoT 10368	**0.00 (0.71)**	0.00	**LS**
8	CoC 671 **(CK)**	**0.00 (0.71)**	0.00	**LS**	CoT 10367	**0.00 (0.71)**	0.00	**LS**	Co 99004 **(CK)**	**0.00 (0.71)**	0.00	**LS**	CoT 10369	**0.00 (0.71)**	0.00	**LS**
9	--	--	--	--	Co 85004 **(CK)**	**0.00 (0.71)**	0.00	**LS**	--	--	--	--	Co Vc 10061	**0.00 (0.71)**	0.00	**LS**
10	--	--	--	--	Co 94008 **(CK)**	**0.00 (0.71)**	0.00	**LS**	--	--	--	--	PI 10131	**0.00 (0.71)**	0.00	**LS**
11	--	--	--	--	CoC 671 **(CK)**	**0.00 (0.71)**	0.00	**LS**	--	--	--	--	PI 10132	2.00 (1.41)	0.32	LS
12	--	--	--	--	--	--	--	--	--	--	--	--	Co 86032 **(CK)**	**0.00 (0.71)**	0.00	**LS**
13	--	--	--	--	--	--	--	--	--	--	--	--	Co 99004 **(CK)**	**0.00 (0.71)**	0.00	**LS**

Figures in parenthesis are arcsine transformed values while those outside are original values.

Table-4.1.11(a): Reaction of zonal varieties/genotypes against insect pests of sugarcane at Powarkheda (2016-17)

Sr. No.	Genotypes/varieties	ESB (% Infestation)	Reaction	Pyrilla/leaf	Reaction	*Epiricania*/ plant
	AVT E					
1	Co 13002	18.67	MS	8.75	MS	6.03
2	Co 13003	4.67	LS	3.67	LS	4.90
3	Co 13004	5.33	LS	4.93	LS	5.03
4	CoN 13071	6.00	LS	5.88	MS	5.37
5	CoN 13072	12.67	LS	7.17	MS	5.83
6	Co SNK 13101	10.67	LS	6.53	MS	5.93
7	Co SNK 13102	6.33	LS	5.08	MS	5.43
8	MS 13081	14.00	LS	8.03	MS	6.10
	AVT E I P					
1	Co 11001	5.33	LS	4.00	LS	5.03
2	Co 11004	4.33	LS	4.80	LS	5.30
3	Co 11081	7.67	LS	7.47	MS	5.90
4	Co 11082	3.00	LS	**2.72**	**LS**	**4.60**
5	Co 11084	7.67	LS	4.68	LS	5.30
	AVT E II P					
1	Co 10004	20.67	MS	7.25	MS	5.97
2	Co 10005	16.00	MS	8.33	MS	6.23
3	Co 10006	18.00	MS	5.47	MS	5.57
4	Co 10024	7.33	LS	7.63	MS	5.97
5	Co 10026	**21.33**	**MS**	**9.82**	**MS**	6.73
6	Co 10027	18.67	MS	7.88	MS	6.07
7	Co 10366	6.33	LS	6.30	MS	5.67
8	Co 10367	4.67	LS	3.23	LS	4.93
CK	Co 85004	12.00	LS	7.70	MS	6.00
	Co 94008	7.67	LS	5.57	MS	5.47
	CoC 671	18.00	MS	7.28	MS	5.93

Table-4.1.11 (b): Reaction of zonal varieties/genotypes against insect pests of sugarcane at Powarkheda (2016-17)

Sr. No.	Genotypes/varieties	ESB (% Infestation)	Reaction	Pyrilla/leaf	Reaction	*Epiricania*/ plant
	IVT ML [PI 13132 – Genotype missing in report]					
1	Co 13005	5.00	LS	5.82	MS	6.03
2	Co 13006	10.00	LS	8.87	MS	6.73
3	Co 13008	5.00	LS	4.82	LS	5.17
4	Co 13009	13.67	LS	7.93	MS	6.10
5	Co 13011	6.33	LS	4.57	LS	5.03
6	Co 13013	10.00	LS	7.42	MS	5.90
7	Co 13014	15.67	MS	7.97	MS	6.10
8	Co 13016	6.00	LS	8.57	MS	6.67
9	Co 13018	5.33	LS	5.70	MS	5.47
10	Co 13020	15.33	MS	7.73	MS	6.03
11	CoM 13082	17.67	MS	8.73	MS	6.63
12	CoN 13073	14.33	LS	8.80	MS	6.70
13	CoN 13074	6.33	LS	4.70	LS	5.30
14	CoSNK 13103	7.33	LS	4.87	LS	5.33
15	CoSNK 13104	11.67	LS	7.05	MS	5.80
16	CoSNK 13105	13.33	LS	9.62	MS	6.70
17	CoSNK 13106	7.33	LS	4.93	LS	5.10
18	CoT 13366	12.00	LS	8.27	MS	6.93
19	PI 13131	18.67	MS	7.43	MS	5.93
	AVT ML I P					
1	Co 11005	13.67	LS	5.23	MS	5.53
2	Co 11007	4.67	LS	6.75	MS	5.60
3	Co 11012	7.33	LS	6.80	MS	5.63
4	Co 11019	11.00	LS	8.45	MS	6.97
5	CoM 11085	6.67	LS	6.37	MS	5.73
6	CoM 11086	13.00	LS	7.43	MS	6.03

Sr. No.	Genotypes/varieties	ESB (% Infestation)	Reaction	Pyrilla/leaf	Reaction	*Epiricania*/ plant
	AVT ML II P					
1	Co 09009	6.00	LS	6.90	MS	6.00
2	Co 10015	4.67	LS	3.97	LS	5.03
3	Co 10017	11.00	LS	7.03	MS	6.70
4	Co 10031	**3.00**	**LS**	2.70	LS	4.87
5	Co 10033	9.00	LS	5.72	MS	5.37
6	Co 10083	13.00	LS	7.55	MS	6.17
7	Co 10368	12.33	LS	7.43	MS	6.17
8	Co 10369	6.67	LS	4.73	LS	5.10
9	Co 10061	4.67	LS	6.75	MS	5.70
10	Co 10131	7.33	LS	8.80	MS	6.37
11	Co 10132	7.00	LS	8.07	MS	6.80
CK	Co 86032	8.00	LS	7.05	MS	5.93
	Co 99004	7.67	LS	5.10	MS	5.33

Table-4.1.12(a): Reaction of zonal varieties/genotypes against insect pests of sugarcane at Navsari (2016-17)

Sr. No.	Varieties/ Genotype	Early shoot borer (% Incidence)						Reaction	Top borer (% Incidence)			Reaction*
		30 DAP	60 DAP	90 DAP	120 DAP	Cum	No. of bored plants/ha		5th month	7th month	At harvest	
1	2	3	4	5	6	7	8	9	10	11	12	13
	IVT E											
1	Co 13002	0.00	2.20 (8.53)	3.81 (11.26)	2.08 (8.29)	2.74	13333	LS	3.09 (10.12)	3.13 (10.19)	3.09 (10.13)	LS
2	Co 13003	0.00	2.20 (8.53)	3.45 (10.70)	0.91 (5.47)	1.53	8333	LS	3.77 (11.20)	3.74 (11.15)	2.73 (9.51)	LS
3	Co 13004	0.00	8.57 (17.02)	6.56 (14.84)	0.88 (5.38)	5.29	30000	LS	2.65 (9.37)	1.77 (7.65)	2.63 (9.34)	LS
4	CoN 13071	0.00	2.20 (8.53)	4.50 (12.25)	1.03 (5.82)	1.97	10000	LS	1.83 (7.77)	1.92 (7.96)	**1.87** (7.86)	LS
5	CoN 13072	0.00	2.20 (8.53)	5.45 (13.51)	0.86 (5.32)	2.06	11667	LS	3.88 (11.36)	3.96 (11.48)	2.88 (9.78)	LS
6	CoSnk 13101	0.00	2.75 (9.55)	2.38 (8.88)	0.84 (5.26)	1.98	11667	LS	4.27 (11.93)	3.45 (10.70)	2.54 (9.17)	LS
7	CoSnk 13102	0.00	2.20 (8.53)	12.96 (21.10)	0.97 (5.65)	4.97	25000	LS	2.91 (9.82)	2.94 (9.87)	2.88 (9.78)	LS
8	MS 13081	0.00	2.20 (8.53)	3.97 (11.49)	0.93 (5.53)	1.79	10000	LS	7.44 (15.83)	4.35 (12.04)	5.08 (13.03)	LS
CK	Co 85004	0.00	15.45 (23.15)	15.24 (22.98)	3.96 (11.48)	7.01	36667	LS	6.19 (14.41)	2.78 (9.60)	5.45 (13.51)	LS
	Co 94008	0.00	16.34 (23.84)	15.73 (23.37)	4.76 (12.60)	10.39	40000	LS	7.89 (16.31)	7.59 (15.99)	7.69 (16.10)	LS
	Co C 671	0.00	8.99 (17.45)	11.93 (20.20)	3.64 (11.00)	8.12	41667	LS	10.86 (19.24)	10.94 (19.31)	10.80 (19.19)	LS
	AVT E I P											
1	Co 11001	0.00	15.27 (23.00)	15.83 (23.45)	14.75 (22.59)	15.28	95000	MS	2.68 (9.42)	2.65 (9.37)	2.40 (8.91)	LS
2	Co 11004	0.00	7.83 (16.25)	9.17 (17.63)	1.67 (7.42)	6.10	35000	LS	2.94 (9.87)	3.00 (9.97)	2.83 (9.68)	LS
3	CoM 11081	0.00	1.56	0.83	1.53	**1.32**	8333	**LS**	1.79	3.54	1.63	LS

Sr. No.	Varieties/ Genotype	Early shoot borer (% Incidence)						Reaction	Top borer (% Incidence)			Reaction*
		30 DAP	60 DAP	90 DAP	120 DAP	Cum	No. of bored plants/ha		5th month	7th month	At harvest	
			(7.18)	(5.22)	(7.10)				(7.69)	(10.84)	(7.34)	
4	CoM 11082	0.00	4.21 (11.84)	5.50 (13.57)	1.85 (7.82)	3.85	20000	LS	1.94 (8.01)	3.92 (11.42)	3.09 (10.12)	LS
5	CoM 11084	0.00	15.63 (23.28)	15.11 (22.87)	15.97 (23.55)	15.54	100000	MS	2.29 (8.70)	2.33 (8.78)	1.63 (7.34)	LS
CK	Co 85004	0.00	10.89 (19.27)	9.80 (18.25)	7.00 (15.34)	9.24	46667	LS	4.46 (12.19)	5.77 (13.90)	5.77 (13.90)	LS
	Co 94008	0.00	15.22 (22.96)	15.31 (23.03)	15.84 (23.45)	15.46	75000	MS	5.38 (13.41)	8.06 (16.49)	7.45 (15.84)	LS
	CoC 671	0.00	15.56 (23.23)	15.83 (23.45)	14.43 (22.33)	15.36	71667	MS	10.56 (18.96)	11.41 (19.74)	10.33 (18.75)	MS
	AVT E II P											
1	Co 10004	0.00	16.67 (24.09)	15.91 (23.51)	13.19 (21.29)	15.06	60000	MS	6.10 (14.30)	3.66 (11.03)	2.67 (9.40)	LS
2	Co 10005	0.00	6.56 (14.84)	9.71 (18.15)	1.00 (5.74)	5.68	25000	LS	4.55 (12.32)	4.44 (12.16)	2.22 (8.57)	LS
3	Co 10006	0.00	2.08 (8.30)	4.30 (11.97)	1.00 (5.74)	2.49	10000	LS	2.47 (9.04)	3.49 (10.77)	4.05 (11.61)	LS
4	Co 10024	0.00	0.90 (5.45)	7.29 (15.67)	0.81 (5.15)	2.72	15000	LS	3.39 (10.61)	3.51 (10.80)	2.36 (8.84)	LS
5	Co 10026	0.00	7.45 (15.84)	3.23 (10.35)	0.90 (5.45)	3.65	20000	LS	2.73 (9.51)	2.83 (9.68)	2.80 (9.63)	LS
6	Co 10027	0.00	1.03 (5.83)	3.85 (11.31)	2.38 (8.88)	2.55	15000	LS	4.07 (11.64)	2.56 (9.21)	1.96 (8.05)	LS
7	CoT 10366	0.00	1.30 (6.54)	2.75 (9.55)	1.05 (5.89)	1.78	8333	LS	2.25 (8.63)	2.27 (8.67)	4.44 (12.16)	LS
8	CoT 10367	0.00	0.00 (0.00)	2.25 (8.62)	3.57 (10.89)	1.98	8333	LS	5.49 (13.55)	4.35 (12.04)	4.26 (11.91)	LS
CK	Co 85004	0.00	5.26 (13.26)	9.18 (17.64)	0.96 (5.63)	5.05	25000	LS	4.46 (12.19)	5.77 (13.90)	5.77 (13.90)	LS
	Co 94008	0.00	16.35	15.24	15.15	15.58	80000	MS	5.38	8.06	7.45	LS

Sr. No.	Varieties/ Genotype	Early shoot borer (% Incidence)						Reaction	Top borer (% Incidence)			Reaction*
		30 DAP	60 DAP	90 DAP	120 DAP	Cum	No. of bored plants/ha		5th month	7th month	At harvest	
			(23.85)	(22.98)	(22.91)				(13.41)	(16.49)	(15.84)	
	CoC 671	0.00	15.53 (23.21)	15.89 (23.49)	15.60 (23.26)	15.67	83333	MS	10.56 (18.96)	11.41 (19.74)	10.33 (18.75)	MS
	IVT ML											
1	Co 13005	0.00	15.79 (23.41)	15.53 (23.21)	16.51 (23.97)	15.97	76667	MS	10.25 (18.67)	10.25 (18.67)	10.05 (18.48)	MS
2	Co 13006	0.00	4.60 (12.38)	8.82 (17.28)	3.23 (10.35)	5.24	21667	LS	3.67 (11.04)	2.80 (9.63)	3.60 (10.94)	LS
3	Co 13008	0.00	2.04 (8.21)	6.31 (14.54)	1.87 (7.86)	3.48	18333	LS	3.25 (10.39)	4.17 (11.78)	4.10 (11.68)	LS
4	Co 13009	0.00	10.11 (18.54)	1.89 (7.90)	2.02 (8.17)	4.42	21667	LS	2.54 (9.17)	4.42 (12.14)	3.42 (10.66)	LS
5	Co 13011	0.00	0.93 (5.55)	6.92 (15.26)	1.57 (7.20)	3.30	20000	LS	2.48 (9.06)	2.56 (9.21)	2.50 (9.10)	LS
6	Co 13013	0.00	2.06 (8.26)	5.30 (13.31)	0.79 (5.10)	2.81	16667	LS	3.25 (10.39)	2.56 (9.21)	3.23 (10.35)	LS
7	Co 13014	0.00	3.90 (11.38)	5.04 (12.98)	1.83 (7.77)	3.61	18333	LS	4.21 (11.84)	4.17 (11.78)	4.30 (11.97)	LS
8	Co 13016	0.00	1.09 (5.98)	5.00 (12.92)	1.98 (8.09)	2.88	15000	LS	2.52 (9.13)	2.65 (9.37)	3.45 (10.70)	LS
9	Co 13018	0.00	15.53 (23.21)	15.38 (23.09)	15.97 (23.55)	15.63	91667	MS	2.38 (8.87)	3.33 (10.51)	2.42 (8.95)	LS
10	Co 13020	0.00	5.08 (13.03)	3.65 (11.01)	1.54 (7.13)	3.38	21667	LS	3.03 (10.02)	3.15 (10.22)	3.08 (10.11)	LS
11	CoM 13082	0.00	13.00 (21.13)	1.85 (7.82)	1.92 (7.96)	5.45	28333	LS	2.63 (9.33)	4.46 (12.19)	2.61 (9.30)	LS
12	CoN 13073	0.00	2.90 (9.80)	9.41 (17.87)	2.33 (8.78)	5.00	20000	LS	2.27 (8.67)	2.41 (8.93)	2.33 (8.78)	LS
13	CoN 13074	0.00	15.96 (23.54)	15.15 (22.91)	15.32 (23.04)	15.43	90000	MS	5.17 (13.14)	4.46 (12.19)	5.22 (13.21)	LS
14	CoSnk 13103	0.00	0.98	3.45	2.31	2.39	15000	LS	4.80	3.31	4.07	LS

Sr. No.	Varieties/ Genotype	Early shoot borer (% Incidence)						Reaction	Top borer (% Incidence)			Reaction*
		30 DAP	60 DAP	90 DAP	120 DAP	Cum	No. of bored plants/ha		5th month	7th month	At harvest	
			(5.68)	(10.70)	(8.74)				(12.66)	(10.48)	(11.64)	
15	CoSnk 13104	0.00	15.96 (23.54)	16.67 (24.09)	15.97 (23.55)	**16.22**	91667	**MS**	10.46 (18.87)	10.34 (18.76)	**10.41** (18.82)	**MS**
16	CoSnk 13105	0.00	2.78 (9.59)	2.99 (9.95)	1.60 (7.27)	2.45	15000	LS	3.82 (11.27)	3.20 (10.30)	3.08 (10.11	LS
17	CoSnk 13106	0.00	3.28 (10.43)	2.07 (8.27)	1.43 (6.87)	2.21	15000	LS	3.73 (11.14)	2.33 (8.78)	3.76 (11.18)	LS
18	CoT 13366	0.00	15.28 (23.01)	16.22 (23.75)	16.35 (23.85)	16.00	66667	MS	10.42 (18.83)	10.53 (18.94)	10.35 (18.77)	LS
19	PI 13131	0.00	16.42 (23.90)	15.56 (23.23)	17.05 (24.39)	16.33	66667	MS	6.74 (15.05)	5.62 (13.71)	6.67 (14.97)	LS
20	PI 13132	0.00	3.53 (10.83)	5.00 (12.92)	2.08 (8.29)	3.56	16667	LS	6.06 (14.25)	5.15 (13.12)	7.00 (15.34)	LS
CK	Co 99004	0.00	9.59 (18.04)	2.22 (8.57)	2.25 (8.63)	4.37	18333	LS	11.08 (19.44)	10.92 (19.30)	10.06 (18.49)	MS
	Co 86032	0.00	15.63 (23.28)	16.67 (24.09)	17.20 (24.50)	16.49	78333	MS	6.67 (14.97)	5.26 (13.26)	6.42 (14.68)	LS
	AVT ML I P											
1	Co 11005	0.00	2.75 (9.55)	2.88 (9.77)	3.13 (10.19)	2.93	18333	LS	3.03 (10.02)	3.17 (10.26)	2.36 (8.84)	LS
2	Co 11007	0.00	5.00 (12.92)	5.95 (14.12)	4.29 (11.95)	5.14	18333	LS	3.66 (11.03)	3.66 (11.03)	3.70 (11.09)	LS
3	Co 11012	0.00	4.17 (11.78)	6.58 (14.86)	2.82 (9.67)	4.62	15000	LS	5.33 (13.35)	9.09 (17.55)	8.00 (16.43)	LS
4	Co 11019	0.00	3.70 (11.09)	8.18 (16.62)	4.12 (11.71)	5.56	26667	LS	2.94 (9.87)	4.04 (11.60)	5.10 (13.05)	LS
5	CoM 11085	0.00	5.06 (13.00)	6.36 (14.61)	8.24 (16.68)	6.57	30000	LS	2.91 (9.82)	3.92 (11.42)	3.54 (10.84)	LS
6	CoM 11086	0.00	4.76 (12.60)	6.42 (14.68)	7.69 (16.10)	6.34	30000	LS	3.88 (11.36)	4.00 (11.54)	3.77 (11.20)	LS
CK	Co 99004	0.00	3.45	6.25	7.07	5.70	28333	LS	10.14	10.19	10.24	MS

Sr. No.	Varieties/ Genotype	Early shoot borer (% Incidence)						Reaction	Top borer (% Incidence)			Reaction*
		30 DAP	60 DAP	90 DAP	120 DAP	Cum	No. of bored plants/ha		5th month	7th month	At harvest	
			(10.70)	(14.48)	(15.42)				(18.57)	(18.62)	(18.66)	
	Co 86032	0.00	10.17 (18.60)	10.32 (18.74)	11.11 (19.47)	10.51	61667	LS	4.17 (11.78)	4.35 (12.04)	3.94 (11.45)	LS
	AVT ML II P											
1	Co 09009	0.00	4.96 (12.87)	2.82 (9.67)	3.08 (10.11)	3.56	23333	LS	3.03 (10.02)	3.15 (10.22)	3.05 (10.06)	LS
2	Co 10015	0.00	2.74 (9.53)	6.54 (14.82)	6.41 (14.67)	5.43	23333	LS	1.92 (7.96)	2.80 (9.63)	1.69 (7.47)	LS
3	Co 10017	0.00	3.23 (10.35)	8.89 (17.35)	8.70 (17.15)	7.24	26667	LS	3.70 (11.09)	3.74 (11.15)	3.60 (10.94)	LS
4	Co 10031	0.00	6.31 (14.55)	2.11 (8.35)	2.27 (8.67)	3.38	21667	LS	2.29 (8.70)	3.13 (10.19)	2.40 (8.91)	LS
5	Co 10033	0.00	7.53 (15.93)	3.25 (10.39)	8.51 (16.96)	6.13	31667	LS	2.65 (9.37)	4.39 (12.09)	3.23 (10.35)	LS
6	CoM 10083	0.00	3.08 (10.11)	2.08 (8.29)	2.53 (9.15)	2.50	10000	LS	4.44 (12.16)	3.30 (10.47)	3.33 (10.51)	LS
7	CoT 10368	0.00	4.08 (11.65)	2.52 (9.13)	3.92 (11.42)	3.45	18333	LS	1.74 (7.58)	3.60 (10.94)	2.54 (9.17)	LS
8	CoT 10369	0.00	2.75 (9.55)	3.45 (10.70)	3.57 (10.89)	3.26	18333	LS	3.20 (10.30)	3.17 (10.26)	3.25 (10.39)	LS
9	CoVC 10061	0.00	4.35 (12.04)	1.95 (8.03)	3.77 (11.20)	3.04	16667	LS	2.21 (8.55)	3.08 (10.11)	2.22 (8.57)	LS
10	PI 10131	0.00	6.06 (14.25)	3.13 (10.19)	4.94 (12.84)	4.53	18333	LS	3.41 (10.64)	4.65 (12.45)	3.30 (10.47)	LS
11	PI 10132	0.00	4.49 (12.23)	3.17 (10.26)	4.44 (12.16)	3.93	20000	LS	4.17 (11.78)	3.45 (10.70)	2.92 (9.84)	LS
CK	Co 99004	0.00	3.45 (10.70)	6.25 (14.48)	7.07 (15.42)	5.70	28333	LS	10.14 (18.57)	10.19 (18.62)	10.24 (18.66)	LS
	Co 86032	0.00	10.17 (18.60)	10.32 (18.74)	11.11 (19.47)	10.51	61667	LS	4.17 (11.78)	4.35 (12.04)	3.94 (11.45)	LS
Figures in parentheses are arcsine transformed values while those outside are original values * Reaction based on at harvest												

Table-4.1.12(b): Reaction of zonal varieties/genotypes against insect pests of sugarcane at Navsari (2016-17)

Sr. No.	Varieties/ Genotype	Scale insect			Mealy bug			Root borer	
		Per cent incidence	Per cent intensity	Reaction	Per cent incidence	Per cent intensity	Reaction	Per cent incidence	Reaction
1	2	3	4	5	6	7	8	9	10
	IVT E								
1	Co 13002	**0.00 (0.00)**	0.00 (0.00)	**LS**	**0.00 (0.00)**	0.00 (0.00)	**LS**	16.00 (23.58)	MS
2	Co 13003	**0.00 (0.00)**	0.00 (0.00)	**LS**	**0.00 (0.00)**	0.00 (0.00)	**LS**	**8.00** (16.43)	**LS**
3	Co 13004	**0.00 (0.00)**	0.00 (0.00)	**LS**	13.33 (21.41)	5.83 (13.97)	MS	**8.00** (16.43)	**LS**
4	CoN 13071	**0.00 (0.00)**	0.00 (0.00)	**LS**	6.67 (14.97)	1.68 (7.45)	MS	**8.00** (16.43)	**LS**
5	CoN 13072	**0.00 (0.00)**	0.00 (0.00)	**LS**	6.67 (14.97)	1.60 (7.27)	MS	16.00 (23.58)	MS
6	CoSnk 13101	**0.00 (0.00)**	0.00 (0.00)	**LS**	**0.00 (0.00)**	0.00 (0.00)	**LS**	**8.00** (16.43)	LS
7	CoSnk 13102	**0.00 (0.00)**	0.00 (0.00)	**LS**	**0.00 (0.00)**	0.00 (0.00)	**LS**	16.00 (23.58)	MS
8	MS 13081	**0.00 (0.00)**	0.00 (0.00)	**LS**	**0.00 (0.00)**	0.00 (0.00)	**LS**	20.00 (26.57)	MS
CK	Co 85004	13.33 (21.41)	4.24 (11.88)	LS	20.00 (26.57)	12.71 (20.89)	MS	16.00 (23.58)	MS
	Co 94008	6.67 (14.97)	2.48 (9.06)	LS	4.00 (11.54)	2.09 (8.31)	MS	20.00 (26.57)	MS
	CoC 671	14.67 (22.52)	4.46 (12.19)	LS	20.00 (26.57)	4.46 (12.19)	MS	16.00 (23.58)	MS
	AVT E I P								
1	Co 11001	**0.00 (0.00)**	0.00 (0.00)	**LS**	**0.00 (0.00)**	0.00 (0.00)	**LS**	**8.00** (16.43)	**LS**
2	Co 11004	**20.00** (0.00)	4.55 (12.32)	**LS**	13.33 (21.41)	10.91 (19.29)	MS	20.00 (26.57)	MS
3	CoM 11081	**0.00**	0.00	**LS**	**0.00**	0.00	**LS**	12.00	LS

Sr. No.	Varieties/ Genotype	Scale insect			Mealy bug			Root borer	
		Per cent incidence	Per cent intensity	Reaction	Per cent incidence	Per cent intensity	Reaction	Per cent incidence	Reaction
		(0.00)	(0.00)		**(0.00)**	(0.00)		(20.27)	
4	CoM 11082	0.00 (0.00)	0.00 (0.00)	LS	22.67 (28.43)	7.87 (16.29)	MS	**8.00** (16.43)	LS
5	CoM 11084	0.00 (0.00)	0.00 (0.00)	LS	**0.00 (0.00)**	0.00 (0.00)	**LS**	12.00 (20.27)	LS
CK	Co 85004	13.33 (21.41)	4.24 (11.88)	LS	20.00 (26.57)	12.71 (20.89)	MS	16.00 (23.58)	MS
	Co 94008	6.67 (14.97)	2.48 (9.06)	LS	4.00 (11.54)	2.09 (8.31)	LS	20.00 (26.57)	MS
	CoC 671	14.67 (22.52)	4.46 (12.19)	LS	4.00 (11.54)	1.79 (7.69)	LS	16.00 (23.58)	MS
	AVT E II P								
1	Co 10004	6.67 (14.97)	0.87 (5.35)	LS	4.00 (11.54)	0.87 (5.35)	LS	**8.00** (16.43)	LS
2	Co 10005	5.33 (13.35)	0.82 (5.20)	LS	5.33 (13.35)	8.00 (16.43)	MS	**8.00** (16.43)	**LS**
3	Co 10006	4.00 (11.540	0.80 (5.13)	LS	2.67 (9.40)	0.90 (5.44)	LS	16.00 (23.58)	MS
4	Co 10024	6.67 (14.97)	0.82 (5.20)	LS	2.67 (9.40)	0.89 (5.41)	LS	**8.00** (16.43)	**LS**
5	Co 10026	6.67 (14.97)	0.80 (5.13)	LS	**0.00 (0.00)**	0.00 (0.00)	**LS**	12.00 (20.27)	LS
6	Co 10027	2.67 (9.40)	0.80 (5.13)	LS	**0.00 (0.00)**	0.00 (0.00)	**LS**	16.00 (23.58)	MS
7	CoT 10366	1.33 (6.62)	0.80 (5.13)	LS	**0.00 (0.00)**	0.00 (0.00)	**LS**	20.00 (26.57)	MS
8	CoT 10367	2.67 (9.40)	0.80 (5.13)	LS	**0.00 (0.00)**	0.00 (0.00)	**LS**	12.00 (20.27)	LS
CK	Co 85004	13.33 (21.41)	4.24 (11.88)	LS	20.00 (26.57)	12.71 (20.89)	MS	16.00 (23.58)	MS
	Co 94008	6.67 (14.97)	2.48 (9.06)	LS	4.00 (11.54)	2.09 (8.31)	LS	**20.00** (26.57)	**MS**

Sr. No.	Varieties/ Genotype	Scale insect			Mealy bug			Root borer	
		Per cent incidence	Per cent intensity	Reaction	Per cent incidence	Per cent intensity	Reaction	Per cent incidence	Reaction
	CoC 671	14.67 (22.52)	4.46 (12.19)		4.00 (11.54)	1.79 (7.69)	LS	16.00 (23.58)	MS
	IVT ML								
1	Co 13005	--	--	--	**0.00 (0.00)**	0.00 (0.00)	**LS**	16.00 (23.58)	MS
2	Co 13006	--	--	--	**0.00 (0.00)**	0.00 (0.00)	**LS**	**8.00** (16.43)	LS
3	Co 13008	--	--	--	**0.00 (0.00)**	0.00 (0.00)	**LS**	**8.00** (16.43)	**LS**
4	Co 13009	--	--	--	20.00 (26.57)	9.92 (18.36)	MS	16.00 (23.58)	MS
5	Co 13011	--	--	--	**0.00 (0.00)**	0.00 (0.00)	**LS**	20.00 (26.57)	MS
6	Co 13013	--	--	--	13.33 (21.41)	8.26 (16.70)	MS	**8.00** (16.43)	**LS**
7	Co 13014	--	--	--	20.00 (26.57)	12.98 (21.12)	MS	**8.00** (16.43)	**LS**
8	Co 13016	--	--	--	22.67 (28.43)	12.10 (20.36)	MS	**8.00** (16.43)	**LS**
9	Co 13018	--	--	--	13.33 (21.41)	9.32 (17.78)	MS	12.00 (20.27)	LS
10	Co 13020	--	--	--	22.67 (28.43)	12.00 (20.27)	MS	**8.00** (16.43)	**LS**
11	CoM 13082	--	--	--	**0.00 (0.00)**	0.00 (0.00)	**LS**	**8.00** (16.43)	**LS**
12	CoN 13073	--	--	--	13.33 (21.41)	9.15 (17.61)	MS	16.00 (23.58)	MS
13	CoN 13074	--	--	--	20.00 (26.57)	11.11 (19.47)	MS	16.00 (23.58)	MS
14	CoSnk 13103	--	--	--	**0.00 (0.00)**	0.00 (0.00)	**LS**	**8.00** (16.43)	**LS**
15	CoSnk 13104	--	--	--	26.67	12.28	MS	**8.00**	**LS**

Sr. No.	Varieties/ Genotype	Scale insect			Mealy bug			Root borer	
		Per cent incidence	Per cent intensity	Reaction	Per cent incidence	Per cent intensity	Reaction	Per cent incidence	Reaction
					(31.09)	(20.51)		(16.43)	
16	CoSnk 13105	--	--	--	28.00 (31.95)	13.27 (21.36)	MS	**8.00** (16.43)	**LS**
17	CoSnk 13106	--	--	--	29.33 (32.79)	12.90 (21.05)	MS	16.00 (23.58)	MS
18	CoT 13366	--	--	--	17.33 (24.60)	8.27 (16.71)	MS	**8.00** (16.43)	**LS**
19	PI 13131	--	--	--	**0.00 (0.00)**	0.00 (0.00)	**LS**	**8.00** (16.43)	**LS**
20	PI 13132	--	--	--	**0.00 (0.00)**	0.00 (0.00)	**LS**	16.00 (23.58)	MS
CK	Co 99004	--	--	--	4.00 (11.54)	1.59 (7.24)	LS	20.00 (26.57)	MS
	Co 86032	--	--	--	13.33 (21.41)	3.42 (10.66)	MS	16.00 (23.58)	MS
	AVT ML I P								
1	Co 11005	--	--	--	**0.00 (0.00)**	0.00 (0.00)	**LS**	**8.00** (16.43)	**LS**
2	Co 11007	--	--	--	**0.00 (0.00)**	0.00 (0.00)	**LS**	16.00 (23.58)	MS
3	Co 11012	--	--	--	20.00 (26.57)	11.63 (19.94)	MS	**8.00** (16.43)	**LS**
4	Co 11019	--	--	--	22.67 (28.43)	13.27 (21.36)	MS	**8.00** (16.43)	**LS**
5	CoM 11085	--	--	--	**0.00 (0.00)**	0.00 (0.00)	**LS**	16.00 (23.58)	MS
6	CoM 11086	--	--	--	**0.00 (0.00)**	0.00 (0.00)	**LS**	12.00 (20.27)	LS
CK	Co 99004	--	--	--	4.00 (11.54)	1.59 (7.24)	LS	20.00 (26.57)	MS
	Co 86032	--	--	--	13.33 (21.41)	3.42 (10.66)	MS	16.00 (23.58)	MS

Sr. No.	Varieties/ Genotype	Scale insect			Mealy bug			Root borer	
		Per cent incidence	Per cent intensity	Reaction	Per cent incidence	Per cent intensity	Reaction	Per cent incidence	Reaction
	AVT ML II P								
1	Co 09009	--	--	--	21.33 (27.51)	10.64 (19.04)	MS	**8.00** (16.43)	**LS**
2	Co 10015	--	--	--	**0.00 (0.00)**	0.00 (0.00)	**LS**	16.00 (23.58)	MS
3	Co 10017	--	--	--	**0.00 (0.00)**	0.00 (0.00)	**LS**	**8.00** (16.43)	**LS**
4	Co 10031	--	--	--	**0.00 (0.00)**	0.00 (0.00)	**LS**	**8.00** (16.43)	**LS**
5	Co 10033	--	--	--	**0.00 (0.00)**	0.00 (0.00)	**LS**	16.00 (23.58)	MS
6	CoM 10083	--	--	--	18.67 (25.60)	11.36 (19.70)	MS	**8.00** (16.43)	**LS**
7	CoT 10368	--	--	--	20.00 (26.57)	12.71 (20.89)	MS	**8.00** (16.43)	**LS**
8	CoT 10369	--	--	--	0.00 (0.00)	0.00 (0.00)	LS	**8.00** (16.43)	**LS**
9	CoVC 10061	--	--	--	22.67 (28.43)	10.79 (19.18)	MS	**8.00** (16.43)	**LS**
10	PI 10131	--	--	--	20.00 (26.57)	11.36 (19.70)	MS	16.00 (23.58)	MS
11	PI 10132	--	--	--	**0.00 (0.00)**	0.00 (0.00)	**LS**	**8.00** (16.43)	**LS**
CK	Co 99004	--	--	--	4.00 (11.54)	1.59 (7.24)	LS	**20.00** (26.57)	**MS**
	Co 86032	--	--	--	13.33 (21.41)	3.42 (10.66)	MS	16.00 (23.58)	MS
Figures in parentheses are arcsine transformed values while those outside are original values									

Table-4.1.13: Reaction of zonal varieties/genotypes against insect pests of sugarcane at Mandya (2016-17)

Sr. No.	Varieties/ Genotypes	Early shoot borer (% incidence)		Top shoot borer (% incidence)		Internode borer			
		Cumulative	Reaction	Cumulative	Reaction	% incidence	% intensity	Infestation index	Reaction
1	2	3	4	5	6	7	8	9	10
	IVT ML								
1	Co 13005	18.08(23.10)	MS	13.58(19.86)	MS	16.58(22.04)	1.61	0.27	LS
2	Co 13006	16.08(21.70)	MS	15.42(21.16)	MS	18.67(23.32)	1.18	0.22	LS
3	Co 13008	10.75(17.55)	LS	4.08(10.61)	LS	**5.33**(12.23)	0.58	0.03	**LS**
4	Co 13009	15.75(21.30)	MS	15.67(21.39)	MS	18.00(22.99)	2.05	0.37	LS
5	Co 13013	15.50(21.29)	MS	16.92(22.29)	MS	20.17(24.49)	0.64	0.13	MS
6	Co 13014	9.33(16.30)	LS	4.33(10.62)	LS	9.92(16.76)	2.38	0.24	LS
7	Co 13016	18.33(23.26)	MS	12.67(19.08)	MS	17.75(22.73)	2.04	0.36	LS
8	Co 13018	15.58(21.35)	MS	17.00(22.34)	MS	20.25(24.54)	1.52	0.31	MS
9	Co 13020	16.92(22.29)	MS	16.75(22.15)	MS	21.33(25.25)	1.66	0.35	MS
10	Co 13082	9.50(16.36)	LS	7.50(14.32)	LS	6.50(13.53)	1.48	0.09	LS
11	CoM 13082	19.50(24.06)	MS	16.00(21.63)	MS	19.00(23.71)	1.59	0.30	LS
12	CoN 13073	17.83(22.90)	MS	15.92(21.58)	MS	20.17(24.45)	2.18	0.41	MS
13	CoN 13074	18.42(23.33)	MS	15.00(20.82)	MS	17.83(22.91)	2.84	0.51	LS
14	CoSnk 13103	17.00(22.36)	MS	12.08(18.63)	MS	20.92(24.98)	1.63	0.34	MS
15	CoSnk13104	17.58(22.76)	MS	9.42(16.35)	LS	18.83(23.61)	1.48	0.28	LS
16	CoSnk 13105	20.75(24.89)	MS	10.50(17.29)	MS	18.33(23.26)	0.95	0.17	LS
17	CoSnk 13106	16.33(21.89)	MS	13.25(19.53)	MS	20.17(24.49)	1.37	0.27	MS
18	CoT 13366	21.00(25.04)	MS	16.25(21.79)	MS	16.57(22.02)	3.14	0.52	LS
19	PI 13131	18.58(23.45)	MS	18.67(23.51)	MS	22.50(26.00)	2.29	0.51	MS
20	PI 13132	17.25(22.53)	MS	19.00(23.71)	MS	16.25(21.81)	1.53	0.25	LS
CK	Co 86032	15.33(20.99)	MS	**4.25**(10.73)	**LS**	13.83(20.03)	1.48	0.20	LS
	Co 99004	16.33(21.90)	MS	7.67(14.57)	LS	12.33(18.67)	1.66	0.21	LS
	IVT E								
1	Co 13002	15.33(23.00)	MS	20.17(24.48)	MS	18.83(23.61)	LS	3.78	0.71

Sr. No.	Varieties/ Genotypes	Early shoot borer (% incidence)		Top shoot borer (% incidence)		Internode borer			
		Cumulative	Reaction	Cumulative	Reaction	% incidence	% intensity	Infestation index	Reaction
2	Co 13003	17.00(24.34)	MS	17.36(22.50)	LS	23.17(26.43)	MS	2.19	0.51
3	Co 13004	16.33(23.80)	MS	21.50(25.36)	HS	24.00(26.89)	MS	3.70	0.82
4	Co 13071	**4.75**(12.47)	**LS**	12.25(18.76)	MS	18.50(23.37)	LS	1.45	0.27
5	CoN 13072	15.83(23.43)	MS	**23.00**(26.30)	**HS**	22.00(25.53)	MS	2.20	0.48
6	CoSnk 13101	6.17(14.29)	LS	12.17(18.68)	MS	20.00(24.40)	MS	1.95	0.39
7	CoSnk 13102	6.67(14.82)	LS	11.67(18.33)	MS	14.67(20.66)	LS	1.42	0.21
8	MS 13081	11.33(19.61)	LS	13.17(19.54)	MS	17.33(22.58)	LS	1.38	0.24
CK	Co 85005	15.50(23.13)	MS	14.83(20.78)	MS	22.50(26.01)	MS	2.12	0.48
	Co 94008	13.00(21.10)	LS	17.67(22.82)	MS	21.50(25.26)	MS	2.00	0.43
	CoC 671	18.33(23.32)	MS	21.67(25.46)	HS	23.17(26.41)	MS	1.42	0.32
	AVT ML I P								
1	Co 11005	17.67(22.82)	MS	18.00(23.04)	MS	30.33(30.69)	MS	2.12	0.64
2	Co 11007	19.83(24.29)	MS	16.33(21.88)	MS	29.83(30.40)	MS	2.78	0.82
3	CoM 11012	19.83(24.23)	MS	19.00(23.73)	MS	29.33(30.04)	MS	1.86	0.54
4	CoM 11019	11.33(18.05)	LS	8.67(15.66)	LS	17.83(22.93)	LS	1.08	0.19
5	CoM 11085	7.67(14.72)	LS	12.67(19.12)	MS	18.00(23.04)	LS	1.38	0.25
6	CoM 1186	8.67(15.70)	LS	16.83(22.23)	MS	19.67924.18)	LS	2.00	0.39
CK	Co 86032	16.67(22.10)	MS	9.00(15.99)	LS	24.00(26.910	MS	1.54	0.36
	Co 99004	19.83(24.26)	MS	14.33(20.41)	MS	20.17(24.48)	MS	1.86	0.38
	AVT E I P								
1	Co 11001	18.00(23.02)	MS	11.67(18.24)	MS	18.62(23.47)	2.78	0.52	LS
2	Co 11004	9.67(16.62)	LS	5.33(12.23)	LS	20.67(24.78)	0.45	0.09	MS
3	CoM 11081	18.83(23.59)	MS	15.00(20.90)	MS	22.67(26.10)	2.00	0.45	MS
4	CoM 11082	8.00(15.03)	LS	7.50(14.53)	LS	14.00(20.14)	3.70	0.52	LS
5	CoM 11084	10.50(17.30)	LS	8.33(15.32)	LS	18.67(23.49)	1.10	0.21	LS
CK	Co 85004	16.33(21.87)	MS	15.00(20.86)	MS	21.67(25.46)	3.78	0.82	MS
	Co 94008	14.83(20.77)	LS	14.67(20.68)	MS	19.33(23.94)	2.00	0.39	LS
	CoC 671	14.33(20.23)	LS	19.17(23.84)	MS	20.17(24.45)	2.20	0.44	MS

Sr. No.	Varieties/ Genotypes	Early shoot borer (% incidence)		Top shoot borer (% incidence)		Internode borer			
		Cumulative	Reaction	Cumulative	Reaction	% incidence	% intensity	Infestation index	Reaction
	AVT ML II P								
1	Co 09009	13.50(21.53)	LS	14.50(22.36)	MS	25.67(30.40)	1.97	0.51	MS
2	Co 10015	16.83(24.21)	MS	14.00(21.95)	MS	28.17(32.04)	4.31	1.21	MS
3	Co 10017	18.33(25.31)	MS	15.33(23.03)	MS	24.00(29.31)	5.25	1.26	MS
4	Co 10031	16.00(23.56)	MS	20.50(26.86)	HS	21.50(27.51)	4.28	0.92	MS
5	Co 10033	12.83(20.97)	LS	16.33(23.81)	MS	19.33(26.07)	3.94	0.76	LS
6	CoM 10083	17.50(24.72)	MS	21.33(27.48)	HS	27.67(31.70)	1.72	0.48	MS
7	PI 10131	13.83(21.80)	LS	14.33(22.18)	MS	15.67(23.16)	2.02	0.32	LS
8	PI 10132	12.67(20.83)	LS	14.83(22.61)	MS	17.67(24.84)	4.17	0.74	LS
9	CoVC 10061	11.67(19.94)	LS	15.00(22.71)	MS	21.17(27.38)	1.92	0.41	MS
10	CoT 10368	20.00(26.54)	MS	18.67(25.59)	MS	30.00(33.18)	2.90	0.87	MS
11	CoT 10369	20.00(26.53)	MS	20.67(27.01)	HS	23.50(28.91)	9.40	2.21	MS
CK	Co 86032	15.50(23.17)	MS	14.67(22.50)	MS	22.00(27.93)	5.50	1.21	MS
	Co 99004	14.83(22.63)	LS	13.33(21.41)	MS	23.67(29.09)	5.38	1.27	MS
	AVT E II P								
1	Co 10004	18.00(25.09)	MS	10.00(18.30)	LS	24.67(29.76)	1.64	0.41	MS
2	Co 10005	7.33(15.67)	LS	6.33(14.42)	LS	19.50(26.19)	1.13	0.22	LS
3	Co 10006	17.33(24.59)	MS	20.83(27.12)	HS	24.00(29.31)	1.92	0.46	MS
4	Co 10024	**21.33**(27.49)	**MS**	13.83(21.78)	MS	31.50(34.13)	1.69	0.53	MS
5	Co 10026	7.50(15.81)	LS	8.67(17.07)	LS	18.33(25.33)	2.96	0.54	LS
6	Co 10027	9.33(17.72)	LS	9.67(18.10)	LS	18.67(25.56)	1.16	0.22	LS
7	CoT 10366	18.50(25.46)	MS	21.33(27.49)	HS	29.00(32.57)	2.02	0.59	MS
8	CoT 10367	11.17(19.51)	MS	6.00(14.08)	LS	18.83(25.69)	4.60	0.87	LS
CK	Co 85004	14.67(22.47)	MS	8.33(16.77)	LS	42.83(40.87)	2.91	1.25	HS
	Co 94008	10.33(18.74)	LS	10.67(19.05)	MS	**44.33** (41.73)	4.28	1.89	**HS**
	CoC 671	16.50(23.94)	MS	16.00(23.56)	MS	28.00 (31.93)	3.97	1.11	MS

Figures in parentheses are arc sine transformed values whereas outside parentheses are original values

Table-4.1.14: Reaction of zonal varieties/genotypes against insect pests of sugarcane at Coimbatore (2016-17)

Sr. No	Varieties/ genotype	Early shoot borer		Internode borer				Root borer		Top shoot borer		
		Cumulative % incidence	Reaction	% Incidence	% Intensity	Infestation Index	Reaction	Root borer incidence (%)	Reaction	7th Month	At harvest	Reaction*
	IVT E											
1	Co 13002	43.86	HS	--	--	--	--	--	--	0.50	0.50	LS
2	Co 13003	50.57	HS	--	--	--	--	--	--	0.10	0.10	LS
3	Co 13004	55.72	HS	--	--	--	--	--	--	0.33	0.33	LS
4	CoN 13071	38.68	HS	--	--	--	--	--	--	0.72	0.72	LS
5	CoN 13072	29.36	MS	--	--	--	--	--	--	0.60	0.60	LS
6	CoSnk 13101	58.45	HS	--	--	--	--	--	--	0.32	0.32	LS
7	CoSnk 13102	76.77	HS	--	--	--	--	--	--	1.11	1.11	LS
8	MS 13081	58.47	HS	--	--	--	--	--	--	1.61	1.61	LS
CK	CoC 671	77.02	HS	--	--	--	--	--	--	0.95	0.95	LS
	Co 85004	**77.11**	**HS**	--	--	--	--	--	--	0.34	0.34	LS
	AVT E I P											
1	Co 11001	28.23	MS	68.00	3.92	2.66	HS	--	--	0.48	0.48	LS
2	Co 11004	45.40	HS	44.00	2.89	1.27	HS	--	--	1.31	1.31	LS
3	CoM 11081	65.56	HS	68.00	5.46	3.71	HS	--	--	0.51	0.51	LS
4	CoM 11082	61.39	HS	60.00	3.68	2.21	HS	--	--	1.73	1.73	LS
5	CoM 11084	71.91	HS	76.00	5.21	3.95	HS	--	--	0.64	0.64	LS
CK	CoC 671	--	--	**32.00**	2.20	0.70	**MS**	--	--	0.85	0.85	LS
	Co	--	--	36.00	1.62	0.58	MS	--	--	0.36	0.36	LS

Sr. No	Varieties/ genotype	Early shoot borer		Internode borer				Root borer		Top shoot borer		
		Cumulative % incidence	Reaction	% Incidence	% Intensity	Infestation Index	Reaction	Root borer incidence (%)	Reaction	7th Month	At harvest	Reaction*
	85004											
	Co 94008	--	--	68.00	5.78	3.93	HS	--	--	0.85	0.85	LS
	IVT ML											
1	Co 13005	34.79	HS	72.00	5.23	3.77	HS	--	--	1.20	1.20	LS
2	Co 13006	25.97	MS	60.00	7.11	4.27	HS	--	--	0.51	0.51	LS
3	Co 13008	35.76	HS	64.00	5.47	3.50	HS	--	--	0.97	0.97	LS
4	Co 13009	53.33	HS	46.00	3.06	1.40	HS	--	--	0.47	0.47	LS
5	Co 13011	44.58	HS	**82.00**	5.33	4.37	**HS**	--	--	0.16	0.16	LS
6	Co 13013	44.10	HS	40.00	2.76	1.10	MS	--	--	0.54	0.54	LS
7	Co 13014	36.71	HS	74.00	6.38	4.72	HS	--	--	0.65	0.65	LS
8	Co 13016	**19.59**	**MS**	80.00	5.18	4.14	HS	--	--	0.68	0.68	LS
9	Co 13018	20.91	MS	52.00	2.04	1.06	HS	--	--	0.22	0.22	LS
10	Co 13020	51.97	HS	70.00	3.82	2.67	HS	--	--	0.84	0.84	LS
11	CoM 13082	40.30	HS	76.00	5.60	4.26	HS	--	--	0.60	0.60	LS
12	CoN 13073	58.40	HS	52.00	4.15	2.16	HS	--	--	0.16	0.16	LS
13	CoN 13074	55.59	HS	80.00	4.70	3.76	HS	--	--	0.16	0.16	LS
14	CoSnk 13103	50.18	HS	44.00	2.33	1.03	HS	--	--	0.47	0.47	LS
15	CoSnk 13104	47.41	HS	68.00	5.03	3.42	HS	--	--	0.16	0.16	LS
16	CoSnk 13105	40.84	HS	70.00	6.55	4.59	HS	--	--	0.00	**0.00**	**LS**
17	CoSnk 13106	33.84	HS	60.00	3.74	2.24	HS	--	--	0.17	0.17	LS
18	CoT	50.00	HS	78.00	4.40	3.43	HS	--	--	0.31	0.31	LS

Sr. No	Varieties/ genotype	Early shoot borer		Internode borer				Root borer		Top shoot borer		
		Cumulative % incidence	Reaction	% Incidence	% Intensity	Infestation Index	Reaction	Root borer incidence (%)	Reaction	7th Month	At harvest	Reaction*
	13366											
19	PI 13131	27.53	MS	50.00	3.03	1.52	HS	--	--	0.50	0.50	LS
20	PI 13132	50.75	HS	52.00	3.28	1.71	HS	--	--	0.25	0.25	LS
CK	Co 86032	--	--	70.00	4.72	3.30	HS	--	--	0.47	0.47	LS
	Co 99004	--	--	54.00	3.67	1.98	HS	--	--	0.45	0.45	LS
	AVT ML I P											
1	Co 11005	65.02	HS	52.00	3.86	2.01	HS	--	--	0.74	0.74	LS
2	Co 11007	71.76	HS	44.00	2.85	1.25	HS	--	--	0.96	0.96	LS
3	Co 11012	66.98	HS	40.00	3.65	1.46	MS	--	--	1.34	1.34	LS
4	Co 11019	61.04	HS	44.00	3.14	1.38	HS	--	--	1.82	1.82	LS
5	CoM 11085	68.72	HS	56.00	2.05	1.15	HS	--	--	1.10	1.10	LS
6	CoM 11086	76.17	HS	56.00	3.16	1.77	HS	--	--	1.04	1.04	LS
CK	Co 99004	--	--	48.00	2.21	1.06	HS	--	--	1.76	1.76	LS
	Co 86032	--	--	46.00	3.72	1.71	HS	--	--	1.09	1.09	LS
	AVT ML II P											
1	Co 09009	36.64	HS	74.00	4.54	3.36	HS	--	--	0.14	0.14	LS
2	Co 10015	34.47	HS	46.00	2.65	1.22	HS	--	--	0.26	0.26	LS
3	Co 10017	49.66	HS	48.00	2.03	0.97	HS	--	--	0.00	0.00	LS
4	Co 10031	33.18	HS	56.00	3.17	1.78	HS	--	--	0.85	0.85	LS
5	Co 10033	34.72	HS	44.00	1.35	0.59	HS	--	--	1.83	1.83	LS
6	CoM 10083	46.15	HS	82.00	4.50	3.69	HS	--	--	2.32	**2.32**	**LS**
7	CoT 10368	34.23	HS	62.00	4.33	2.68	HS	--	--	1.78	1.78	LS
8	CoT 10369	57.99	HS	64.00	4.08	2.61	HS	--	--	0.63	0.63	LS
9	CoVc	28.27	MS	58.00	2.34	1.36	HS	--	--	0.13	0.13	LS

Sr. No	Varieties/ genotype	Early shoot borer		Internode borer				Root borer		Top shoot borer		
		Cumulative % incidence	Reaction	% Incidence	% Intensity	Infestation Index	Reaction	Root borer incidence (%)	Reaction	7th Month	At harvest	Reaction*
	10061											
10	PI 10131	-	-	58.00	2.43	1.41	HS	--	--	0.81	0.81	LS
11	PI 10132	32.25	HS	68.00	4.50	3.06	HS	--	--	0.37	0.37	LS
CK	Co 99004	43.77	HS	58.00	3.65	2.12	HS	--	--	0.88	0.88	LS
	Co 86032	--	--	58.00	4.55	2.64	HS	--	--	--	--	--
	AVT E II P											
1	Co 10004	32.76	HS	--	--	--	--	--	--	0.18	0.18	LS
2	Co 10005	23.78	MS	--	--	--	--	--	--	0.22	0.22	LS
3	Co 10006	36.44	HS	--	--	--	--	--	--	0.90	0.90	LS
4	Co 10024	42.79	HS	--	--	--	--	--	--	0.29	0.29	LS
5	Co 10026	26.04	MS	--	--	--	--	--	--	1.03	1.03	LS
6	Co 10027	46.50	HS	--	--	--	--	--	--	0.00	0.00	LS
7	CoT 10366	36.99	HS	--	--	--	--	--	--	1.46	1.46	LS
8	CoT 10367	19.81	MS	--	--	--	--	--	--	0.58	0.58	LS
9	Co 94008	33.47	HS	--	--	--	--	--	--	0.54	0.54	LS
10	Co 671	--	--	--	--	--	--	--	--	0.47	0.47	LS
11	Co 85004	--	--	--	--	--	--	--	--	0.00	**0.00**	LS

*** Reaction is based on at harvest**

Table-4.1.15: Reaction of zonal varieties/genotypes against insect pests of sugarcane at Anakapalle (2016-17)

Sr. No.	Varieties/ Genotype	Early shoot borer (% Incidence)							Internode borer			
		30 DAP	60 DAP	90 DAP	120 DAP	Cum	No. of bored plants/ ha	Reaction	Per cent incidence	Per cent intensity	Infestation index	Reaction
1	2	3	4	5	6	7	8	9	10	11	12	13
	IVT E [Co 07013, Co 13024, Co 13023, CoV 14356 not included]											
1	Co A 14 321	6.73	0.00	1.98	0	4.32	11993	LS	43.1	3.5	1.51	HS
2	Co A 14 322	5.51	2.04	2.80	0	5.48	15230	LS	45.8	2.7	1.24	HS
3	Co C 14 336	5.77	2.16	1.31	0	5.42	15045	LS	48.4	3.8	1.84	HS
	IVT ML											
1	Co A 14 323	3.94	1.03	1.55	0	4.65	12912	LS	42.4	3.1	1.31	HS
2	Co A 14 324	6.19	2.01	2.31	0	6.29	17460	LS	25.8	1.5	0.39	MS
	AVT E I P											
1	Co A 13 322	7.30	0.00	1.15	0	5.92	16443	LS	44.4	3.9	1.73	HS
2	Co A 13 323	7.14	4.20	2.95	0.36	10.51	29192	LS	48.48	4.76	2.31	HS
3	Co C 13 336	5.58	1.15	0.89	0	3.28	9105	LS	26.1	1.8	0.47	MS
4	Co C 13 337	9.80	2.09	1.51	0	6.06	16833	LS	49.4	3.5	1.73	HS
5	Co V 13 356	5.95	1.06	1.45	0	4.75	13197	LS	33.3	2.5	0.83	MS
	AVT ML I P											
1	Co C 13 339	1.57	0.76	3.59	0.61	6.70	18620	LS	50.0	2.7	1.35	HS
2	Co Or 13 346	3.42	0.45	2.19	0	4.55	12652	LS	16.1	1.0	0.16	LS
3	**AVT E II P**											
4	Co A 12 321	4.82	2.86	1.98	0	4.50	12492	LS	**16.7**	0.9	0.15	**LS**
5	Co A 12 322	2.57	0.00	1.02	0	**1.95**	5416	**LS**	33.3	2.5	0.83	MS
6	Co A 12 323	4.24	0.38	0.35	0	2.86	7937	LS	51.2	3.4	1.74	HS
7	Co C 12 336	5.42	1.73	1.15	0	6.14	17049	LS	51.8	3.5	0.18	HS
8	Co Or 12 346	4.99	0.58	1.86	0.52	3.76	10452	LS	55.6	3.7	2.06	HS
CK	Co A 99082 (93A 145)	15.30	3.60	2.08	0	15.96	44322	MS	55.8	3.2	1.79	HS
	Co A 92081 (87A 298)	15.04	4.10	2.23	0	12.14	33719	LS	61.9	5.8	3.59	HS

Sr. No.	Varieties/ Genotype	Early shoot borer (% Incidence)							Internode borer			
		30 DAP	60 DAP	90 DAP	120 DAP	Cum	No. of bored plants/ ha	Reaction	Per cent incidence	Per cent intensity	Infestation index	Reaction
	IVT E Ratoon											
1	Co A 13321	0.41	6.15	2.26	0.42	5.07	14084	LS	83.22	6.34	5.28	HS
2	Co A 13322	10.35	2.52	9.08	0.42	15.96	44334	MS	85.21	11.93	10.17	HS
3	Co A 13323	7.14	4.20	2.95	0.36	10.51	29192	LS	48.48	4.76	2.31	HS
4	Co A 13324	1.85	2.31	3.10	0.60	5.07	14088	LS	76.69	9.90	7.59	HS
	IVT ML Ratoon											
1	Co A 13 326	7.51	6.24	2.23	0.76	10.49	29147	LS	58.70	6.17	3.62	HS
2	Co A 13 327	0.75	2.18	1.73	0.17	3.51	9742	LS	60.77	4.69	2.85	HS
3	Co A 13 328	2.78	2.61	1.33	0.41	5.54	15394	LS	53.33	4.17	2.22	HS
CK	Co A 92081 (87A 298)	1.12	3.70	2.56	0.28	9.41	26150	LS	**88.89**	8.49	7.55	**HS**
	Co A 99082 (93A 145)	1.89	1.84	6.00	0.00	**16.53**	45912	**MS**	71.82	6.26	4.49	HS

Note: Above entries/genotypes are not as per approved Technical programme of Entomology (2016-17)

Table-4.1.16: Reaction of zonal varieties/genotypes against insect pests of sugarcane at Vuyyuru (A.P.) (2016-17)

Sr. No	Varieties/ genotype	Early shoot borer (% incidence)						Internode borer				Scale insect		
		45 DAP	60 DAP	90 DAP	120 DAP	Total*	Reaction#	% incidence	% intensity	Infestation index	Reaction	% incidence	% intensity	Reaction
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Co 13 – 028	3.51	0.79	2.33	2.03	8.66	LS	55	4.02	2.21	HS	**100**	73.01	**HS**
2	Co A 14 – 322	4.20	1.13	1.55	1.81	8.69	LS	85	7.49	6.37	HS	**100**	33.51	**HS**
3	Co 13 – 031	4.12	1.49	1.49	1.74	8.84	LS	75	5.74	4.31	HS	95	75.46	HS
4	Co 13 – 029	2.33	1.08	1.95	1.81	7.17	LS	75	2.48	1.86	HS	**100**	47.03	**HS**
5	PI 14 – 337	3.22	1.48	1.48	1.65	7.83	LS	70	7.02	4.94	HS	**100**	38.36	**HS**
6	Co A 14 - 321	3.09	1.31	1.90	1.91	8.41	LS	60	4.49	2.69	HS	**100**	51.48	**HS**
7	Co 13 – 012	4.27	1.39	2.46	1.95	10.07	LS	65	4.96	3.22	HS	**100**	37.12	**HS**
8	Co 13 – 024	3.39	1.59	1.61	1.63	8.22	LS	80	7.47	5.98	HS	**100**	78.90	**HS**
9	Co A 14 – 324	2.78	1.34	1.41	1.32	6.85	LS	70	4.68	3.26	HS	80	32.06	HS
10	Co 07- 013	2.76	1.44	1.86	1.49	7.55	LS	75	6.31	4.73	HS	60	14.86	HS
11	Co 13- 03	4.07	1.12	1.32	2.04	8.55	LS	75	6.13	4.59	HS	**100**	33.25	**HS**
12	Co 13 – 025	1.53	1.61	1.63	1.39	6.16	LS	60	5.00	3.00	HS	95	48.59	HS
13	Co 13 – 023	2.42	1,32	1.41	1.63	6.78	LS	75	5.49	4.12	HS	**100**	48.54	**HS**
14	Co C 14 – 336	1.89	1.23	1.24	1.29	**5.65**	**LS**	85	8.31	7.06	HS	**100**	20.12	**HS**
15	Co C 14 – 337	1.94	1.79	1.84	1.21	6.78	LS	**40**	2.80	1.12	**HS**	90	22.44	HS
16	Co A 14- 323	0.91	0.89	2.20	2.13	6.13	LS	55	8.31	4.57	HS	**100**	65.19	**HS**
17	Co 13- 032	1.82	1.48	2.68	2.38	7.60	LS	**95**	9.61	9.13	**HS**	90	44.10	HS
18	Co C 13-337	2.31	1.43	1.89	1.62	7.25	LS	65	4.25	2.76	HS	90	50.74	HS

Sr. No	Varieties/ genotype	Early shoot borer (% incidence)						Internode borer				Scale insect		
		45 DAP	60 DAP	90 DAP	120 DAP	Total*	Reaction#	% incidence	% intensity	Infestation index	Reaction	% incidence	% intensity	Reaction
19	Co A 92081	3.89	0.90	1.99	1.64	8.42	LS	80	7.69	6.15	HS	**100**	47.77	**HS**
20	Co A 13-322	4.84	1.48	2.16	1.44	9.92	LS	95	6.76	6.42	HS	**100**	65.83	**HS**
21	Co A 13-336	5.85	1.55	1.77	1.77	**10.94**	**LS**	90	9.05	8.14	HS	**100**	44.89	**HS**
22	Co 13 – 339	1.07	1.22	2.09	1.23	5.61	LS	85	7.05	5.99	HS	**100**	54.42	**HS**
23	Co A 13 – 323	2.51	1.42	2.98	1.73	8.64	LS	85	6.92	5.88	HS	**100**	67.57	**HS**
24	Co V 13-356	1.51	1.31	1.95	1.89	6.66	LS	65	5.12	3.32	HS	**100**	51.14	**HS**
25	Co A 12 – 324	1.55	1.68	1.86	1.91	7.00	LS	80	16.89	13.68	HS	**100**	44.89	**HS**
26	Co C 01- 061	2.89	1.18	1.74	1,39	7.20	LS	55	3.67	2.02	HS	**100**	47.13	**HS**
27	Co Or 13 – 346	1.19	1.59	1.83	1.22	5.83	LS	80	8.70	6.96	HS	90	13.40	HS
28	Co V 92012	1.44	1.41	1.77	1.45	6.07	LS	70	5.09	3.56	HS	**100**	32.69	**HS**
29	Co 86249	2.62	1.16	1.86	1.39	7.03	LS	85	7.16	6.09	HS	**100**	38.01	**HS**

***Note: Concern centre submitted data in the form of total cumulative per cent incidence. #Reaction is based on per cent incidence at 120 DAP.**

Table-28.1: Survey and surveillance of insect pests of sugarcane at Kapurthala (Punjab) (2016-17)

S. No.	Varieties	Location	Name of Pest	Per cent incidence	Remark
1.	Co 89003 CoJ 64 Co 238	Mukerian Dasuya Gurdaspur Fazilka	Termite (*Odontotermes obesus*)	1-2	In sandy soil termite attack was more
2.	Co 238 CoJ 85 Co 89003 CoJ 88	Faridkot Phagwara Bhogpur Dasuya Dhuri Fazilka	Early shoot borer (*Chilo infuscatellus)*	4-5	-
3.	Co 238 CoJ 85 Co 89003	Budhewal Gurdaspur Nakodar Batala Amloh Nawanshahar	Top borer (*Scirpophaga excerptalis*)	3-4	-
4.	CoJ 85 Co 238	Dasuya Mukerian Phagwara Batala Gurdaspur Ajnala Nakodar	Pyrilla (*Pyrilla perpusilla*)	3-4/leaf (7-8%)	-

5.	CoJ 85 Co 238	Morinda Dhuri	Whitefly (*Aleurolobus barodensis*)	Traces	-
6.	Co 238 Co 89003 CoJ 64	Dhuri Amloh Fazilka Mukatsar Faridkot	Mite (*Oligonychus indicus*)	5-6/cm square (5-6%)	-
7.	Co 238 CoJ 85 CoJ 88 Co 89003	Budhewal Ludhiana Phagwara Ajnala Dhuri Morinda	Black bug (*Cavelerious excavatus*)	3-4/Plant (7-8%)	Black bug incidence more in sugarcane ratoon crop
8	Co 238 CoJ 88 CoJ 85	Mukerian Dasuya Dhuri Kapurthala Gurdaspur Batala	Root borer (*Emmalocera depressella*)	4-5	-
9.	Co 238 CoJ 85 CoJ 64 Co 89003	Ajnala Budhewal Nawanshahar Gurdaspur Amloh Nakodar Morinda Phagwara	Stalk borer (*Chilo auricilius*)	6-7	-

Table-28.2: Survey and surveillance of insect pests of sugarcane at Uchani (2016-17)

Sugar Mills Zone	Season	Varieties	Insect-pests	Per cent incidence (%)	Remarks
Karnal	Pre-monsoon	Co J 85, Co 89003, Co 0118 CoH 160,Co 0238, Co 05011, CoS 8436 & CoP 84212	Termite	4.5 -12.4	Termite damage more in sandy soils
			Pink stem borer	2.0-8.0	More damage during March.
			Thrips	6-11	Infestation under drought conditions
			Shoot borer	2.8-12.4	--
			Black bug	4-12 bugs/whorl	Infestation in ratoon crop.
			Top borer	2-3	-
	Monsoon	Co 0238,Co 89003,CoH160, Co05011,CoS8436, & CoP 84212	Top borer	3-8	More infestation in Co 0238
			Stalk borer	12.5-22.3	-
			Black bug	8-36 bugs/whorl	Infestation in plant & ratoon crop.
			Webbing mite	10-74% leaves infested	-
			Root borer	8-17	-
			White grub	1-4 grub/m^2	Grub damage more in sandy soils

	Post monsoon	Co 89003, Co 0238,CoH 160, Co 05011, CoP 84212 Co J 85, CoH 119 & Co 0118	Stalk borer Root borer Whitefly White grub Pyrilla *Epiricania melanoleuca* Black bug Top borer	8.5-27.4 7.2-20.4 0-14.6 nymphs & puparia/2.5 cm^2 3-7 grubs/m^2 0.1-1.0 nymphs/ adults/leaf 0.5-0.8 cocoons/leaf 16-43 bugs/whorl 2-5	More infestation in mismanaged fields - More infestation on water lodged fields. Grub damage more in sandy soils - - Infestation in plant & ratoon crop. -
Yamuna Nagar	Monsoon	Co 89003, Co 0238& Co 05011	Webbing mite Whitefly Black bug Top borer	14-52 leaves infested 2-5 nymphs & puparia/2.5 cm^2 12-39 bugs/whorl	- In water logged fields Infestation in plant & ratoon crop.
Shahbad	Monsoon	Co 89003, Co 0238 & CoH 160	Webbing mite Black bug Top borer	6-32% leaves infested 8-32 bugs/whorl 26.-12.5	- Infestation in plant & ratoon crop. -

	Post-monsoon	Co 0238 & Co 89003	Stalk borer Top borer Pyrilla *Epiricania melanoleuca*	3.4-8.7 2-4 1-4 nymphs & adults/leaf 2-6 cocoons/ leaf	- - -
Rohtak	Pre-monsoon	Co 89003, Co 0118,CoH 160 ,CoH 119 & Co 0238	Thrips Shoot borer Black bug	4-16 4.8-20.6 6-16 bugs/whorl	Infestation under drought conditions Infestation under drought conditions Infestation in ratoon crop.
Assandh	Monsoon	Co 89003, Co 0238 & CoS 88230	Webbing mite Whitefly Black bug Top borer	6.5-32 % leaves infested 1.0-2.5 nymphs & puparia/2.5 cm^2 8-27 bugs/whorl 0-8.6	- In water logged fields Infestation in ratoon crop. -
	Post monsoon	Co 89003, Co 0238 & CoS 88230	White fly Stalk borer	1-2 nymphs & puparia/2.5 cm^2 6-17	In water logged fields More in mismanaged fields
Panipat	Monsoon	Co 0238 & CoH 160	Stalk borer Top borer Root borer	2-4 2-10.2 12-20	- - -
	Post monsoon	Co 89003, Co 0238 & CoH 160	Stalk borer Top borer Pyrilla	3.5-12.0 2-4 0-1.3 nymphs &	- -

			Epiricania melanoleuca	adults/leaf 3-6 cocoons/leaf	
Sonipat	Post monsoon	Co 89003, Co 0238 & CoH 160	Stalk borer Top borer Black bug	3.5-12.0 2-4 2-8 nymphs & adults/whorl	- - Damage in month of February
Jind	Post monsoon	CoH 160,CoH 119, Co 89003 & Co 05011	Whitefly Pyrilla *Epiricania melanoleuca* Stalk borer	1-2 nymphs & puparia/2.5 cm^2 2-4 nymphs & adults/leaf 1-6 cocoons/leaf 4-10	-

Table-28.3: Survey and surveillance of insect pests of sugarcane at SBI-Karnal (2016-17)

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%)

Note: Provided Table is not as per standard format. Follow the provided table format in PPT presentation in workshop at Coimbatore.

Table-28.4: Survey and surveillance of insect pests of sugarcane at Shahjahanpur (2016-17)

SN	Varieties	Location	Name of pest	% incidence/population			Remark
				Minimum	Maximum	Average	
1	Co 0238, Co 98014, CoSe01434 CoS 08279	Nawabganj (Bareilly)	Early shoot borer (% incidence)	4.00	7.00	5.50	
			Top shoot borer (% incidence)	5.00	8.00	6.50	
			Stalk borer (% incidence)	10.00	15.00	12.50	
			(% Intensity)	4.50	5.20	4.85	
			Pyrilla/leaf	8.00	10.00	9.00	
			Epiricania melanoleuca	-	-	-	Negligible
2	Co 0238, Co 0118, CoS 08272, CoS 8436 CoLk 94184	Hargaon (Sitapur)	Early shoot borer (% incidence)	5.00	9.00	7.00	
			Top shoot borer (% incidence)	4.00	8.00	6.00	
			Stalk borer (% incidence)	9.00	13.00	10.50	
			(% Intensity)	2.33	3.37	2.85	
			Pyrilla/leaf	6.00	9.00	7.50	
			Epiricania melanoleuca	-	-	-	2-3 cocoon/ plot
3	Co 0238 CoSe 01434 CoS 08279 Co 0118	Kumbhi (Kheri)	Early shoot borer (% incidence)	5.00	8.00	6.50	
			Top shoot borer (% incidence)	3.00	7.00	5.50	
			Stalk borer (% incidence)	11.00	16.00	13.50	
			(% Intensity)	5.15	4.37	4.76	
			Pyrilla/leaf	7.00	12.00	9.50	

			Epiricania melanoleuca	-	-	-	1-2 cocoon/ plot
4	Co 0238 Co 0118 CoS 08279 CoLk 94184, Co 98014	Rosa (Shahjahanpur)	Early shoot borer (% incidence) Top shoot borer (% incidence) Stalk borer (% incidence) (% Intensity) Pyrilla/leaf *Epiricania melanoleuca*	3.00 5.00 15.00 4.09 5.00 -	6.00 8.00 20.00 6.00 13.00 -	4.50 6.50 17.50 5.04 9.00 -	3-4 cocoon/ plot
5	Co 0238, Co 0118, Co 98014, CoLk 94184, CoS 08279	Khambarkhera (Kheri)	Early shoot borer (% incidence) Top shoot borer (% incidence) Stalk borer (% incidence) (% Intensity) Pyrilla/leaf *Epiricania melanoleuca*	6.00 6.00 12.00 3.50 6.00 -	9.00 9.00 18.00 5.20 11.00 -	7.50 7.00 15.00 4.35 8.50 -	2-3 cocoon/ plot
6	Co 0238, Co 0118, Co 98014, CoS 8436	Maqsudapur (Shahjahanpur)	Early shoot borer (% incidence) Top shoot borer (% incidence) Stalk borer (% incidence) (% Intensity) Pyrilla/leaf *Epiricania melanoleuca*	4.00 4.00 9.00 2.98 7.00 -	8.00 7.00 13.00 4.20 10.00 -	6.00 5.50 11.00 3.59 8.50 -	3-5 cocoon/ plot

7	Co 0238, Co 0118, CoS 8436 CoS 767	Tilhar (Shahjahanpur)	Early shoot borer (% incidence) Top shoot borer (% incidence) Stalk borer (% incidence) (% Intensity) Pyrilla/leaf *Epiricania melanoleuca*	7.00 8.00 16.00 4.80 9.00 -	11.00 14.00 18.00 5.12 13.00 -	9.00 11.00 17.00 4.96 11.00 -	3-4 cocoon/ plot
8	Co 0238, Co 0118, CoSe 98231 CoS 767	Sultanpur	Early shoot borer (% incidence) Top shoot borer (% incidence) Stalk borer (% incidence) (% Intensity) Pyrilla/leaf *Epiricania melanoleuca*	5.00 7.00 11.00 2.94 7.00 -	9.00 11.00 16.00 4.60 12.00 -	7.00 9.00 13.50 3.77 9.50 -	3-5 cocoon/ plot

Table-28.5: Survey and surveillance of insect pests of sugarcane at Pusa (2016-17)

Sr. No.	Variety	Location	Name of pest	% incidence		
				Min.	Max.	Average
1.	BO 130, CoSe 95422, CoP 2061, Co 238	Kalyanpur	Root borer	02	04	3.0
			Pyrilla/leaves	05	20	12.50
			Shoot borer	08	15	11.50
			Top borer	10	35	17.50
2.	CoP 9301, Co 235, BO 153	Masina	Pyrilla	08	30	19.00
			Shoot borer	05	14	9.50
			Root borer	02	10	6.00
3.	Co 239, BO 91, CoP 12436	Chhatneshwar	Pyrilla	05	25	15.00
			Army warm	05	13	9.00
4.	BO 91, Co 238, CoVS 13102, BO 130, CoP 2061, CoP 9301	SRI, Museum	Pyrilla	03	10	6.50
			Top borer	10	20	15.00
			Army warm	05	08	6.50
			Shoot borer	05	10	7.50
			Stalk borer	01	04	2.50
			Root borer	02	05	3.50
5.	BO 91,BO 130, CoVS 13102, Co 235	Jatmalpur	Army warm	11	20	15.5
			Top borer	08	16	12.0
			Shoot borer	04	11	7.50
6.	CoP 2061	Pusa farm	Pyrilla	05	14	9.5
			Root borer	02	8	5.0

			Scale insect	01	03	2.0
			Shoot borer	02	9	5.5
			Top borer	05	16	10.5
			Stalk borer	01	7	4.0

Table-28.6: Survey and surveillance of insect pests of sugarcane at Seorahi (2016-17)

Variety	Location	Name of Pest	% incidence/population			Remark
			Min.	Max.	Average	
Co0238,0118,98014 ,CoS08272, 08279, CoSe01434, 08452,92423 ,CoLk 94184	Seorahi	Early Shoot Borer at hot weather	2	10	6.00	-
		Top Borer at harvest	5	12	8.50	-
		Stalk Borer at harvest	6	16	11.00	-
		Root Borer at harvest	3	5	4.00	-
Co 0238, 0118,5011, 0239, UP 05125	Mankapur	Early Shoot Borer at hot weather	2	8	5.00	-
		Top Borer at harvest	6	12	9.00	-
		Stalk Borer at harvest	4	10	7.00	-
		Root Borer at harvest	2	8	5.00	-
Co 0238,0239,CoLk 94184, CoS.88230,767,8436,97261CoSe 01434,92423 CoJ 88	Balrampur	Early Shoot Borer at hot weather	2	5	3.50	-
		Top Borer at harvest	6	14	10.00	-
		Stalk Borer at harvest	5	14	9.50	-
		Root Borer at harvest	4	10	7.00	-
, CoS 8432, 08279, 08272 ,CoSe 01434,92423,CoLk94184,Co0238,98014,0239 CoJ88	Bhabhnan	Early Shoot Borer at hot weather	2	6	4.00	-
		Top Borer at harvest	5	10	7.50	-
		Stalk Borer at harvest	3	12	7.50	-

		Root Borer at harvest	2	9	5.50	-
CoLk 94184, Co0238, CoS97261, CoSe01434, 92423	Mausudha	Early Shoot Borer at hot weather	0	8	4.00	-
		Top Borer at harvest	6	15	10.50	-
		Stalk Borer at harvest	4	13	8.5	-
		Root Borer at harvest	5	10	7.50	-
		Any other (new pest)	-	-	-	-
CoSe 01434, CoSe 98231, Co 0238, CoSa767, CoSe 92423, CoS 88230& CoS 8432	Dhada	Early Shoot Borer at hot weather	2	6	4.00	-
		Top Borer at harvest	5	14	8.50	-
		Stalk Borer at harvest	4	11	7.50	-
		Root Borer at harvest	4	10	7.00	-
Co 0238,0118 CoP 9301, UP 9530, CoSe 92423, CoSe 01434, CoS 8432&, Colk 94184 BO 110	Ramkola	Early Shoot Borer at hot weather	2	8	4.00	-
		Top Borer at harvest	4	10	7.00	-
		Stalk Borer at harvest	15	20	17.50	-
		Root Borer at harvest	10	15	12.50	-
CoLk 94184, Co 0238, CoSe 92423, CoS 767& Co 0118 CoS07250, CoSe 01434& CoSe98231	Sultanpur	Early Shoot Borer at hot weather	2	9	5.50	-
		Top Borer at harvest	3	16	9.50	-
		Stalk Borer at harvest	4	13	8.50	-
		Root Borer at harvest	5	12	8.50	-
CoS.99259 CoSe92423, CoLk94184, Co0238,	Utrola	Early Shoot Borer at hot weather	2	12	7.00	-
		Top Borer at harvest	7	14	10.50	-

		Stalk Borer at harvest	6	15	10.50	-
		Root Borer at harvest	4	10	7.00	-
CoLk 94184, Co0238,0118,CoS8436, CoSe01434, 92423,98231	Khadda	Early Shoot Borer at hot weather	1	8	4.50	-
		Top Borer at harvest	5	18	11.50	-
		Stalk Borer at harvest	5	12	8.50	-
		Root Borer at harvest	6	12	8.00	-
CoLk 94184, Co0238,0118 CoS.08272, 08279, CoSe01434, 92423,08452 CoP9301	Siswabajar	Early Shoot Borer at hot weather	2	6	4.00	-
		Top Borer at harvest	4	11	7.50	-
		Stalk Borer at harvest	6	10	8.00	-
		Root Borer at harvest	4	8	6.00	-

Table-28.7 (a): Survey and surveillance of insect pests of sugarcane at Akola [Wardha, Yavatmal and Telhara] (2016-17)

Sr. No.	Varieties	Location	Name of the farmers	Name of Pest	Internode borer				Pyrilla per leaf
					Per cent incidence	Per cent Intensity	Infestation Index	Reaction	
1.	Co-265 (Ratoon)	Jalgaon Tal. Arvi	Sau. Sarita Manohar Sawarkar Sau.Sunita Prabhakar Nehare Viay Panjabrao Deshmukh Manohar Mahadeo Sawarkar	Internode borer Pyrilla (*Pyrilla perpusilla*)	16.00 12.00 8.00 20.00	4.24 4.50 3.58 4.71	0.68 0.54 0.29 0.94	LS LS LS LS	7.00 7.50 7.48 7.65
2.	Co-265 (Ratoon) for seed purpose	Dhanoli Tal. Karanja	Shri. Pradip Wamanrao Dive	Internode borer Pyrilla (*Pyrilla perpusilla*)	12.00	3.98	0.48	LS	4.00
3.	Co-265 (Ratoon) for seed purpose	Talegaon Farm Tal. Talegaon	Agril. Asstt. Jetendra Patil	Internode borer Pyrilla (*Pyrilla perpusilla*) Whitefly (*Aleurolobus barodensis*)	16.00	3.71	0.59	LS	4.10 3-5/ cm^2
4.	Co86032	Chikali Tal. Darvha Dist. Yavatmal	Shri. Ghive	Whitefly	4.00	2.45	0.10	LS	20-24/ cm^2
5.	Local variety Paturda	Tal. Telhara Dist . Akola	Shri. Ramkrishna More	Pyrilla Whitefly	--	--	--	--	7.00 26-28/ cm^2

6.	Local Chewing variety Paturda	Mahispur Tal. Akola Dist Akola	Balkrishna Patekhede	Early Shoot borer	20.34 % ESB infestation	--	--	--	--

Table-28.7 (b): Survey and surveillance of insect pests of sugarcane at Akola [Nagpur and Bhandara] (2016-17)

Sr. No.	Varieties	Location	Name of the farmers	Name of Pest	Internode borer				Pyrilla per leaf
					Per cent incidence	Per cent Intensity	Infestation Index	Reaction	
1.	Co86032	Sawali Tal. Kamthi Dist. Nagpur	Chandrabhan Shriram Ingole	Internode borer Pyrilla (*Pyrilla perpusilla*)	12.00	3.81	0.46	LS	13.35
2.	Co-265 (Ratoon) for seed purpose Co86032	Wadoda Tal. Kamthi Dist. Nagpur	Shri. Ramu Bhagwan Bhure Shri. Sunil Bhagwan Bhure Shri. Raju Bhagwan Bhure	Internode borer Pyrilla (*Pyrilla perpusilla*)	16.00 8.00 12.00 12.00	3.57 3.35 3.15 3.00	0.57 0.27 0.38 0.36	LS LS LS LS	15.30 13.35 13.65 13.88
3.	Co-03102 Co-92005 NR-9805 Co-86032	Devhada Tal. Tumsar Dist. Bhandara	Shri. Rameshwar Topale Nursery Incharge Manas Agro Industries Unit No.4 Sugar factory farm	Internode borer Pyrilla (*Pyrilla perpusilla*)	12.00 8.00 12.00 12.00	3.77 3.07 2.55 2.82	0.33 0.25 0.31 0.34	LS LS LS LS	3.38 2.98 2.45 4.40
4.	Co-92005	Madgi Tal. Tumsar	Shri. Deoramji T. Bodge	Internode borer Pyrilla	12.00	3.43	0.41	LS	27.90

5.	Co-92005	Sukdi Tal. Tumsar	Shri. Dharmapal T. Chaudhary	Internode borer Pyrilla	12.00	2.75	0.33	LS	29.43
6.	Co-92005	Madgi Tal. Tumsar	Shri. Jagan S. Wahile	Internode borer Pyrilla Aphids	16.00	2.99	0.48	LS	28.98 28-32/ cm^2
7.	Co-03102 NR-9805	Madgi Tal. Tumsar	Shri. Manohar Chindu Wahile	Internode borer Pyrilla	12.00 8.00	3.20 2.58	0.38 0.21	LS LS	29.23 29.18
8.	Co-86032	Tal. Sakoli Dist. Bhandara	Shri. Sharad Gobhade	Internode borer Pyrilla	12.00	3.16	0.38	LS	2.98
9.	Co-86032	Tal. Sakoli Dist. Bhandara	Shri. Gulab Chaganji Kapgate	Internode borer Pyrilla	8.00	2.80	0.22	LS	3.38

Table-28.7 (c): Survey and surveillance of insect pests of sugarcane at Akola [Wardha] (2016-17)

Sr. No.	Varieties	Location	Name of the farmers	Name of Pest	Internode borer				Pyrilla per leaf
					Per cent incidence	Per cent Intensity	Infestation Index	Reaction	
1.	Co-86032	Mahakal Tal Wardha	Shri. Pavane	Internode borer Pyrilla	12.00	2.70	0.32	LS	4.40
2.	Co-86032	Mahakal Tal. Wardha	Shri. Mahdeo Patil	Internode borer Pyrilla	12.00	3.06	0.37	LS	4.35
3.	Co-86032	Mahakal Tal. Wardha	Shri. Purshottam Tonape	Internode borer Pyrilla Aphids	12.00	2.95	0.35	LS	5.35
4.	Co-265	Mahakal Tal. Wardha	Shri. Babanrao Karmore	Internode borer Pyrilla Aphids Whitefly	12.00	3.46	0.42	LS	4.93 32-34/ cm^2 28-30/ cm^2
5.	CoVSI-8005 Co-265	Jamni Tal.. Deoli	Sugar Factory Nursery	Internode borer Pyrilla	8.00 8.00	3.16 2.78	0.25 0.22	LS LS	2.45 2.28
6.	Co-265	Jamni Shindi Tal. Deoli	Shri. Ashokrao C. Karotkar	Internode borer Pyrilla	12.00	3.81	0.46	LS	2.98
7.	Co-86032	Bhidi Tal. Deoli	Shri. Ajay Dashrathji Zade	Internode borer Pyrilla	16.00	3.57	0.57	LS	3.38

Table-28.8: Survey and surveillance of insect pests of sugarcane at Padegaon (2016-17)

Sr. No.	Variety	Location	Name of pest	% incidence/Population			Remark
				Min.	Max.	Average	
1.	Co 86032 CoM 0265 MS 10001	HOL (Baramati), Padegaon (Phaltan), Padegaon (Khandala), Katewadi (Baramati), Pimpre	Early shoot borer (% incidence)	8.00	31.20	11.00	-
			Top shoot borer (% incidence)	0	2.00	0.10	-
			Internode borer -% incidence (% intensity)	12.60 (1.80)	22.00 (5.20)	15.40 (3.60)	-
			Stalk borer (% incidence/% intensity)	--	--	--	-
			Root borer (% incidence)	1.40	5.00	2.80	Katewadi area
			Any other borer (% incidence)	--	--	--	-
			Pyrilla/ leaf	0	05	--	very rare incidence
			Epiricania melanoleuca/plant	4	15	--	-
			Whitefly (per 2.5 sq.cm.)	0	01	--	very rare incidence
			Woolly aphid (Average grade)	0	05.80	02.30	On very few stools
			Scale insect (% incidence/% intensity)	0	05.40	01.80	-
			Mealy bug - % incidence / (% intensity)	10.20 (1.60)	22.60 (4)	17.40 (3.40)	Katewadi area
			Black bug/leaf	--	--	--	-
			Spittle bug (% incidence)	--	--	--	-
			Thrips (% incidence)	--	--	--	In traces
			Mite (% incidence)	--	--	--	-
			White grub (No. of grub/ha)	0	25	05.20	Katewadi area
			Termite (% incidence) At germination/harvest	0	5	0.20	Katewadi area
			Derbid plant hopper, *Proutista moesta*	04.40	14.80	06.20	--
			Sugarcane grass hopper, *Hieroglyphus banian*	--	--	--	In traces
			Any other (New Pest)	--	--	--	--

Table-28.9: Survey and surveillance of insect pests of sugarcane at Pune (2016-17)

Sr. No	Name of the Farmer	Village	Variety	Date of planting/ ratoon	Name of the Pest						
					Early shoot borer	Mealy bug		Root borer		Internode borer	
					% Inci.	% Inci	% inten	%Inci	%inten	% inci	% inten
1	Mr.Lagad Satyavan V.	Nanvij	Co 86032	15.7.2016	-	0	0	0	0	0	0
2	Mr. Sutar	Nanvij	CoM 265	Nov.2016 Ratoon	2.64	-	-	-	-	-	-
3	Mr.Patole Vitthal Rajaram	Nanvij	Co 86032	Nov.2016	6.02	-	-	-	-	-	-
4	Mr.Patole Vitthal Rajaram	Nanvij	Co M 0265	Nov.2016	2.52	-	-	-	-	-	-
5	Mr.Patankar Popat Maruti	Nanvij	Co 86032	1.7.2016	-	0	0	0	0	10.00	0.89
6	Mr.Patankar Popat Maruti	Nanvij	Co 86032	Dec.2016 Ratoon	3.70	-	-	-	-	-	-
7	Mr.Patole Vitthal Rajaram	Nanvij	CoM 265	July.2016	-	0	0	0	0	0	0
8	Mr.More Balbhim Dasharath	Nanvij	CoM 265	1.7.2016	-	0	0	0	0	0	0
9	Mr.Salunkhe Milind Vitthal	Lingali	CoM 265	1.7.2016	-	0	0	0	0	20.00	2.10
10	Mr.Jagdale Subhash Dnyandeo	Lingali	CoM 265	27.11.2016	2.13	0	0	0	0	0	0
11	Mr.Jagdale Vikas Dnyandeo	Lingali	CoM 265	10.11.2016	3.15	0	0	0	0	0	0
12	Mr.Wani Dhanseth Ambarnath	Masanerwadi	CoM 10001	Jan.2017	12.09	0	0	0	0	0	0
13	Mr.Wani Dhanseth Ambarnath	Masanerwadi	CoM 10001	03.72016	-	0	0	0	0	40	9.52
14	Mr.Wani Kashinath Ambarnath	Masanerwadi	Co 86032	11.8.2016	-	0	0	0	0	0	0

Sr. No	Name of the Farmer	Village	Variety	Date of planting/ ratoon	Name of the Pest						
					Early shoot borer	Mealy bug		Root borer		Internode borer	
					% Inci.	% Inci	% inten	%Inci	%inten	% inci	% inten
15	Mr.Wani Kashinath Ambarnath	Masanerwadi	CoM 265	July 2016	-	0	0	0	0	0	0
16	Mr.Kale Kisan Baburao	Alegaon	VSI 08005	Oct.2016 Ratoon	3.03	-	-	-	-	-	-
17	Mr.Kale Kisan Baburao	Alegaon	Co 86032	Oct.2016 Ratoon	15.78	-	-	-	-	-	-
18	Mr.Kale Kisan Baburao	Alegaon	CoM 10001	Oct.2016 Ratoon	2.94	-	-	-	-	-	-
19	Mr.Kale Kisan Baburao	Alegaon	CoM 265	Oct.2016 Ratoon	3.70	-	-	-	-	-	
20	Mr.Gulankar Vitthal	Devulgaon raje	VSI 08005	15.10.2016	9.52	-	-	-	-	-	
21	Mr.Kadam Nandkumar Keraba	Karamwasti	VSI 08005	1.11.2016	0	-	-	-	-	-	-
22	Mr.Gaikwad Dattatray Sabaji	Devulgaon raje	Co 86032	July 2016	0	20.00	2.98	0	0	10.00	1.49
23	Mr.Girankar Balasaheb	Devulgaon raje	Co 86032	Jan 2017 Ratoon	1.05	-	-	-	-	-	-
24	Mr. Sonawane Sanjay	Devulgaon raje	CoM 265	Nov.2016 Ratoon	0	-	-	-	-	-	-
25	Mr.Waghmare	Vadgaon Darekar	CoM 265	Feb.2017	20.00	-	-	-	-	-	-
26	Mr.Waghmare Sambhaji	Vadgaon Darekar	CoM 265	Feb.2017	20.00	-	-	-	-	-	-
27	Mr.Waghmare Shahaji Zumbar	Vadgaon Darekar	VSI 08005	Feb.2017	36.36	-	-	-	-	-	-
28	Factory Nursery	Alegaon	Co 86032	15.11.2016	1.04	-	-	-	-	-	-

Table-28.10: Survey and surveillance of insect pests of sugarcane at Powarkheda (2016-17)

Sr. No.	Location	Name of pest % incidence/Population	Min.	Max.	Average
1.	Bankhedi	ESB (%)	5.20	23.20	14.20
		TSB (%)	1.15	3.20	2.18
		RB (%)	0.80	2.20	1.50
		Pyrilla /Leaf	6.43	15.35	10.89
		E. melanoleuca/Leaf	6.59	10.95	8.77
		Whitefly (per 2.5 sq.cm.)	0.15	1.01	0.59
2.	Hoshangabad	ESB (%)	5.56	11.76	8.66
		TSB (%)	0.08	0.32	0.20
		RB (%)	0.00	0.32	0.16
		Pyrilla /Leaf	2.18	6.50	4.34
		E. melanoleuca/Leaf	2.79	6.08	4.44
		Whitefly (per 2.5 sq.cm.)	0.08	0.72	0.49
3.	Kareli	ESB (%)	4.80	22.35	13.58
		TSB (%)	2.30	9.45	5.88
		RB (%)	0.85	4.50	2.68
		Pyrilla /Leaf	7.23	15.60	11.42
		E. melanoleuca/plant	4.33	9.78	7.05
		Whitefly (per 2.5 sq.cm.)	0.40	2.59	1.50
4.	Gadarwada	ESB (%)	4.00	15.60	9.80
		TSB (%)	1.40	4.10	2.75
		RB (%)	0.75	2.50	1.63
		Pyrilla /Leaf	5.70	12.45	9.08
		E. melanoleuca/Leaf	4.94	9.86	7.40
		Whitefly (per 2.5 sq.cm.)	0.26	0.75	0.51
Overall Average of *ESB (%)*……..			**4.89**	**18.23**	**11.56**
Overall Average of *TSB (%)*……..			**1.23**	**4.27**	**2.75**
Overall Average of *RB (%)*……..			**0.60**	**2.38**	**1.49**

Overall Average of *Pyrilla/Leaf……..*	**5.39**	**12.48**	**8.94**
Overall Average of *E. melanoleuca/Leaf….*	**4.66**	**9.17**	**6.92**
Overall Average of Whitefly (per 2.5 sq.cm.)	**0.22**	**1.27**	**0.75**

Table-28.11: Survey and surveillance of insect pests of sugarcane at Navsari (2016-17)

Name of pest	Varieties	Location	Per cent Incidence	Remarks
Whitefly	Co 86032 Co 86002 Co M 265 MC 707	Ganpatpara, Vebhardi, Mangrol, Karmal,Nishaliya,Alampuraand Karjan, (Vadodara sugar factory)	40 to 60 %	April-2016
	Co 86032 CoM 0265 (ratoon)		More than 90%	
	Co 86032 CoM 0265	Other villages surrounding to vadodara sugar factory	30 to 35 %	April-2016
	Co 86032 Co 86002	Valvada,Butwada and vanskui of Mahuva Sugar factory	8 to 15 %	Feb-2016
	CoM 0265 Co 86032 Co86002	Dungar, Chikhali, Ten,Movasa and Kharvasa village, Bardoli sugar factory	20 to 40 %	Aug-2016
	Co 86032 CoM 0265	Mohni,Kharvasa,Magob and surrounding villages of Chalthan Sugar factory	10 to 20 %	Jan-2016
Early shoot borer & Top borer	Co 97009 (MC-707) CoC 671 Co 86032 CoN 07072 CoM 0265	Kachholi, Gandevi, Vanzana and Surkhai. Gandevi sugar factory	5 to 10 %	Janu-2016
Root borer	CoM 0265 Co 86002	Chalthan sugar :Mohni,Niyol,Magob and surrounding villages Vihan, Rundh Vaktana, Vanz and Vav.	10 to 18 %	May-2016

	Co86032	Kamrej sugar : Kanyasi, Navi Pardi, Karjan, Ghala and Bodhan.	5 to 10 %	
White woolly aphid	Co 86032 Ratoon	Valvada,vanskui and Butwada Madhi sugar factory	2 to 3 %	-

Table-28.12: Survey and surveillance of insect pests of sugarcane at Mandya (2016-17)

Sr. No.	Variety	Location	Name of pest	Per cent incidence/Population			Remark
				Min.	Max.	Av.	
1	Co 62175 Co 86032 VCF 0517	Chamundi Sugars, K.M.Doddi Maddur	Early shoot borer *Chilo infuscatellus*	1.25	52.0	19.50	ESB & TSB incidence was moderate in all factory area
			Top shoot borer *Scirpophaga excerptalis*	1.65	38.5	13.25	
			Internode borer *Chilo sacchariphagus indicus*	22.50	56.0	28.50	INB incidence was moderate to high in all factory area
			Woolly aphid *Ceratovacuna lanigera*	7.0/cm^2	25.00/cm^2	16.00/cm^2	Appeared in patches
			Red spider mite *Oligonychus indicus*	2.0/cm^2	12.0/cm^2	8.0/cm^2	Incidence was more in Summer season in young crop
			Eriophyid leaf mite *Abacarus sacchari*	0.50/cm^2	27.00/cm^2	13.0/cm^2	Incidence was high in VCF 0517
			Root grub *Holotrichia serrata*	1/m^2	8.0/m^2	3.0/m^2	Sporadic incidence
2	Co 62175 Co 86032 VCF 0517	My Sugar Co Ltd, Mandya	Early shoot borer *Chilo infuscatellus*	3.0	45.0	16.75	--
			Top shoot borer *Scirpophaga excerptalis*	1.65	38.5	13.25	--
			Internode borer *Chilo sacchariphagus indicus*	2.50	31.0	18.50	Incidence was more in VCF 0517
			Woolly aphid *Ceratovacuna lanigera*	5.0/cm^2	29.00/cm^2	18.00/cm^2	Incidence was more in plots with 3ft row spacing
			Red spider mite *Oligonychus indicus*	0.50/cm^2	16.0/cm^2	9.0/cm^2	--
			Eriophyid leaf mite *Abacarus sacchari*	0.50/cm^2	19.00/cm^2	10.0/cm^2	--

			Root grub *Holotrichia serrata*	1/m^2	5.0/m^2	2.0/m^2	Sporadic incidence more in bore well irrigated plots
3.	Co 62175 Co 86032 VCF 0517	NSL Sugars Koppa K.R.Pet	Early shoot borer *Chilo infuscatellus*	3.25	48.0	21.50	--
			Top shoot borer *Scirpophaga excerptalis*	1.25	29.50	14.0	--
			Internode borer *Chilo sacchariphagus indicus*	8.0	37.0	23.50	Incidence was more in VCF 0517
			Woolly aphid *Ceratovacuna lanigera*	3.0/cm^2	23.0/cm^2	11.0/cm^2	Aprreared in patches of 4-5 clumps
			Red spider mite *Oligonychus indicus*	0.50/cm^2	10.0/cm^2	6.0/cm^2	--
			Eriophyid leaf mite *Abacarus sacchari*	0.5/cm^2	24.0/cm^2	15.0/cm^2	Incidence more in VCF 0517
			Root grub *Holotrichia serrata*	1.0/m^2	9.0/m^2	5.0/cm^2	Incidence was more in this factory area problem compounded by the shortage of water

Table-28.13: Survey and surveillance of insect pests of sugarcane at Coimbatore (2016-17)

S. No.	Variety	Location	Name of pest/ parasitoid	% incidence/population			Remarks
				Min	Max	Average	
1	Co 86032	Annur	Mealybug	5.0	10.0	--	--
	--	--	Rat	0.0	1-2 burrows	--	--
2	Co 86032	Telungupalayam	Top borer	0.0	5.0	2.5	--
	--	--	Woolly aphid	--	--	--	Stray incidence / patchy appearance
	--	--	Pyrilla	1egg mass/40 leaves	--	--	--
	--	--	*Cotesia flavipes*	0.0	17.0	8.5	On INB
	--	--		3.3	15.4	9.4	On SB
	--	--	*Sturmiopsis inferens*	0.0	25.0	12.5	On SB
3	Co 62175	--	*Epiricania melanoleuca*	1 cocoon /40 leaves	--	--	--
4	Co 86032	M/s Amravathi Sugars, Udumalpet	INB	15.0	20.0	17.5	--
	--	--	RB	0.0	15.0	7.5	--
5	Co 86032	M/s Bannari Amman Sugars, Sathyamangalam	INB	0.0	10.0	5.0	--
	--	--	RB	0.0	15.0	7.5	--
	--	--	Mealybug	10.0	20.0	15.0	--

Table-28.14: Survey and surveillance of insect pests of sugarcane at Anakapalle (2016-17)

S. No.	Variety	Location	Name of the pest	Per cent incidence or population			Remarks
				Min.	Max.	Aver.	
1	87 A 298, 86 V96, 2003 V 46 Co 86032	Navabharat Ventures Pvt., Ltd., Samalkot, East Godavari district	Early shoot borer (*Chilo infuscatellus*)	4.00	30.00	17.00	Incidence of early shoot borer and internode borer were high on variety, Co 86032. Moderate to high incidence of scale insect was observed on variety, 87 A 298 (Viswamitra) both on plant and ratoon crops.
			Root borer (*Emmalocera depresella*)	1.00	5.00	3.00	
			Top shoot borer (*Scirpophaga exrceptalis)*	2.00	8.00	5.00	
			Internode borer (*Chilo sacchariphagus indicus*)	5.00	40.00	22.50	
			Pyrilla perpusilla / leaf	3.00	12.00	7.50	
			Scale insect (*Melanaspis glomareta)* (incidence)	10.00	40.00	25.00	
			Mealy bug (*Saccharicoccus sacchari*) (%incidence)	8.00	12.00	10.00	
			Red Mite (*Oligonychus indicus*) (% incidence)	7.00	25.00	16.00	
			Termite *(Odontotermes obesus)* (% incidence)	5.00	15.00	10.00	
			Derbid leafhoppers (*Proutista moesta)* / leaf	2.00	8.00	5.00	
2	Co7219, 87 A 298 , Co 62175, 2001 A 63 & Co7805	Chodavaram sugar factory operational area, Visakhapatnam dt.	Early shoot borer (% incidence)	12.00	30.00	21.00	Along with early shoot borer, internode borer incidences, moderate to severe incidence of whitefly was observed in neglected ratoon crop
			Internode borer (% incidence)	10.00	50.00	30.00	
			Pyrilla/leaf	2.00	6.00	4.00	
			Whitefly (per 2.5sq.cm.)	10.00	39.00	24.50	
			Mealy bug (%incidence)	3.00	12.00	7.50	
			Woolly aphid (Average grade)	1.00	1.00	1.00	
			Scale insect (% incidence)	5.00	20.00	12.50	
			Red mite (% incidence)	2.00	40.00	21.00	
			Termite (% incidence)	15.00	40.00	27.50	

3	87 A 298, 2001 A 63, 93 A 145, Co7219, 81 V 48, Co 62175 & Co7805	Thummapala Sugar factory area, Anakapalle, Munagapaka villages of Visakhapatnam district	Early shoot borer (% incidence)	13.00	47.00	30.00	Due to high temperature during April month and late planted conditions, moderate to severe incidence of early shoot borer was observed on all popular varieties.
			Internode borer (% incidence)	10.00	40.00	22.50	
			Pyrilla/leaf	2.00	10.00	6.00	
			Whitefly	10.00	22.00	16.00	
			Termite (% incidence)	12.00	20.00	16.00	
			Derbid plant hoppers/leaf	2.00	10.00	6.00	
			Mealybug(%incidence)	4.00	10.00	7.00	
			scale insect(% incidence)	5.00	30.00	17.50	
			Red mite (% incidence)	5.00	36.00	20.50	
4	87 A 298, Co 62175, 2001 A 63 & 2003 V46 81 V48	Etikoppaka sugar factory operational areas, Visakhapatnam district	Early shoot borer (% incidence)	12.00	38.00	25.00	Early shoot borer and interndoe borer were the predominant species prevailed in the early stage of the crop period in Visakhapatnam district
			Internode borer (% incidence)	20.00	40.00	30.00	
			Pyrilla/leaf (A &N)	3.00	7.00	5.00	
			Red Mite (% incidence)	12.00	30.00	21.00	
			Whitefly(%incidence)	10.00	18.00	14.00	
			scale insect (incidence)	5.00	30.00	17.50	
			Termite (% incidence)	20.00	40.00	30.00	
			Pyrilla per leaf	2.00	12.00	7 .00	
5	87 A 298, Co 7805, 2003 V46, Co 86032, 2001 A 63	Sri Sarvaraya sugars Ltd., Chelluru, East Godavari dt.	Early shoot borer (% incidence)	5.00	28.00	16.50	Moderate to high incidences of early shoot borer and internode borer were observed in all
			Top shoot borer (% incidence)	1.00	3.00	2.00	
			Internode borer (% incidence)	20.00	40.00	30.00	
			Pyrilla/leaf (A &N)	3.00	16.00	9.50	
			Whitefly (per 2.5sq.cm.)	5.00	20.00	12.50	
			Woolly aphid (Average grade)	1	1	1	

			Scale insect (incidence)	5.00	20.00	12.50	commercial varieties *viz.*, Co 86032, 2003 V 46. & 87 A298.

Table-30.1: Monitoring of insect pests and bioagents in sugarcane agro-ecosystem at Kapurthala (2016-17)

Month	Percent incidence of early shoot borer	Percent parasitism (ESB)		Percent incidence of Top borer	Percent parasitism (TB)			Percent incidence of Stalk borer	Percent parasitism (SB)		Percent incidence of Pyrilla (Nymph/adult per leaf)	Percent parasitism on Pyrilla nymph
		Trichogramma chilonis	*Stenobracon* sp.		*Rhaconotus sp.*	*Isotima javensis*	*Stenobracon* sp.		*Sturmiopsis inference*	*Cotesia flavipes*		*Epiricania melanoleuca*
April, 2016	2.5	2.0	3.6	-	-	-	-	-	-	-	-	-
May, 2016	12.6	4.0	4.9	3.0	-	1.0	1.0	-	-	-	-	-
June, 2016	9.6	-	3.0	7.6	3.6	3.1	5.0	-	-	-	-	-
July, 2016	1.8	-	1.1	13.0	5.5	4.2	6.0	-	-	-	1.0	-
August, 2016	-	-	-	4.5	2.0	2.1	3.1	-	-	-	5.6	4.8
September, 2016	-	-	-	1.0	1.0	-	2.0	2.2	2.0	1.0	7.5	6.0
October, 2016	-	-		-	-	-	-	7.9	3.5	2.0	4.0	3.5
November, 2016	-	-	-	-	-	-	-	11.0	5.0	3.5	-	-
December, 2016	-	-	-	-	-	-	-	3.9	2.1	1.1	-	-
January, 2017	-	-	-	-	-	-	-	1.5	-	-	-	-

Table-30.2(a): Monitoring of insect pests and bioagents in sugarcane agro-ecosystem at Uchani (2016-17)

Period of observation	Mean incidence (%)					Mean number		Mean leaf incidence (%)		Mean number/ 2.5 sq.cm
	Pink stem borer	Shoot borer (cumulative)	Top borer	Stalk* borer	Root borer	Black bug/ central whorl	Pyrilla / leaf	Webbing mite	Thrips	Whitefly
March,2016	1.2	-	-	-	-	-	-	-	-	-
April, 2016	7.9	1.4	-	-	-	-	-	-	-	-
May, 2016	-	5.6	2.3	-	-	1.7	-	-	2.6	-
June, 2016	-	7.8	2.9	-	-	5.4	-	0.8	4.2	-
July, 2016	-	5.2	4.7	0.6	12.8	7.2	1.1	4.8	2.1	0.3
August, 2016	-	-	5.4	0.6	13.6	9.4	1.8	5.9	-	2.6
September, 2016	-	-	6.2	0.7	15.4	7.9	2.1	5.4	-	1.5
October,2016	-	-	6.3	0.8	17.2	5.2	2.4	2.6	-	1.9
November, 2016	-	-	-	1.0	17.8	2.3	4.4	0.4	-	0.8
December,2016	-	-	-	1.1	19.4	0.6	1.2	0.2	-	0.4
January,2017	-	-	-	1.5	20.2	-	-	-	-	-
February,2017	-	-	-	1.8	23.2	-	-	-	-	-
March,2017	-	-	-	1.8	24.5	-	-	-	-	-

Table-30.2(b): Monitoring of enemy complex of *Pyrilla perpusilla* in sugarcane agro-ecosystem at Uchani (2016-17)

Period of observation	*Cheiloneurus pyrillae*	*Tetrastichus pyrillae*	*Epiricania melanoleuca*	Total parasitism
1-15 May,2016	-	-	-	-
16-31 May, 2016	-	-	-	-
1-15 June,2016	-	-	-	-
16-30 June, 2016	-	-	-	-
1-15 July, 2016	-	-	-	-
16-31 July, 2016	-	4.8	2.4	7.2
1-7 August, 2016	-	12.6	2.2	14.8

8-15August, 2016	3.6	15.2	3.4	22.2
16-23 August, 2016	8.6	16.8	2.1	27.5
24- 31August, 2016	12.2	14.2	13.5	39.9
1-7 Sept, 2016	14.9	12.6	24.2	51.7
8-15 Sept, 2016	13.7	10.8	25.1	49.6
16-23 Sept, 2016	14.2	8.6	28.5	51.3
24-30 Sept, 2016	12.1	6.4	38.1	56.6
1-7 October, 2016	2.3	0.6	44.6	50.5
8-15 Oct, 2016	-	-	47.4	47.4
16-23 Oct, 2016	-	-	50.2	50.2
24-31 Oct, 2016	-	-	48.3	48.3
1-7 November, 2016	-	-	47.6	47.6
8-15 November, 2016	-	-	15.4	15.4
16-23 Nov, 2016	-	-	6.7	6.7
24 Nov-01 Dec,2016	-	-	-	-

Table-30.2(c): Monitoring of enemy complex of insect pests of sugarcane agro-ecosystem at Uchani (2016-17)

Insect-pest	Stage	Natural enemies	Parasitism (%)
Top borer, *Scirpophaga excerptalis*	Egg	*Trichogramma chilonis*	2.1
Stalk borer, *Chilo auricilius*	Egg	*Trichogramma chilonis*	2.4
Top borer, *Scirpophaga excerptalis*	Larva	*Isotima javensis* *Cotesia flavipes* *Beauveria bassiana*	5.2 5.6 7.4
Stalk borer, *Chilo auricilius*	Larva	*Sturmiopsis inferens* *Cotesia flavipes* *Beauveria bassiana*	5.8 6.2 5.8
Root borer, *Polychola (Emmalocera) depressella*	Larva	*Beauveria bassiana*	4.8
Whitefly, *Aleurolobus* sp.	Nymph	*Encarsia sp.*	4.6

Table-30.3: Monitoring of insect pests and bioagents in sugarcane agro-ecosystem at SBI-Karnal (2016-17)

Sr. 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)
4	Root borer	27.0	--	--
5	Pink borer	80%	--	--
6	Pyrilla	(7.0 individual/20 leaves).	*Epiricania melanoleuca*	71.2 (Nymph and adults)
			Tetrasticus pyrillae.	43.3 (eggs)
7	Termite	12.0	--	--
8	Black bug	117	--	--

Table-30.4 (a): Monitoring of insect pests and bioagents in sugarcane agro-ecosystem at Shahjahanpur (2016-17)

Period of observation Dates + SMW	% incidence early shoot borer	% Parasitism (ESB)		% incidence stalk borer	% Parasitism (stalk borer)
		T. chilonis	*E. annulipes*		*Cotesia flavipes*
1	2	3	4	5	6
16-04-16 16th SMW	5.10	-	-	-	-
18-05-16 20th SMW	7.62	-	-	-	-
17-06-16 24th SMW	8.50	-	-	-	-
20-07-16 29th SMW	4.15	-	-	-	-
20-08-16 34th SMW	-	-	-	-	-
22-09-16 38th SMW	-	-	-	18.20	9.65
25-10-16 43rd SMW	-	-	-	26.50	13.20
19-11-16 47th SMW	-	-	-	-	-

Table-30.4 (b): Monitoring of insect pests and bioagents in sugarcane agro-ecosystem at Shahjahanpur (2016-17)

Period of observation Dates & SMW	% incidence top shoot borer	% Parasitism (top shoot borer)						
		T. beneficiens	*I. javensis*	*A. flavipes*	*Rhanconotus scripophagae*	*Elasmus zehntneri*	*S. deesae*	*B. bassiana*
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
16-04-16 16th SMW	-	-	-	-	-	-	-	-
30-05-16 22nd SMW	3.60	2.00	2.50	-	-	-	-	-
28-06-16 26th SMW	4.85	5.25	3.65	-	2.65	-	-	-
30-07-16 31st SMW	5.80	14.30	7.00	-	4.55	-	3.62	-
28-08-16 35th SMW	7.30	6.15	10.35	-	7.00	-	4.50	-
20-09-16 38th SMW	2.00	-	5.35	-	3.50	-	6.35	-
25-10-16 43rd SMW	-	-	-	-	-	-	-	-

Table-30.5(a): Monitoring of top borer and its bioagents in sugarcane agro-ecosystem at Lucknow (2016-17)

Period of Observation	Incidence of top borer (%)	% parasitisation (Top borer)								
		T. japonicum	*T. chilonis*	*T. beneficiens*	*I. Javensis*	*Cotesia flavipes*	*Rhaconotus scirpophagae*	*Elasmus zehntneri*	*S. desae*	*B. bassiana*
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
II brood 10-05-16 (19th week)	0.16 -1.33	-	-	39.03% on egg mass basis	0.0	-	-	-	0.0	-
III brood 10-06-16 (23rd week)	1.11 - 16.67	-	-	-	12.5	-	30.00	-	500	-
IV brood 17-09-2016 (38th week)	6.09 - 12.00	-	-	-	10.00	-	28.33		1.67	-

Table-30.5(b): Monitoring of INB and RB and their bioagents in sugarcane agro-ecosystem at Lucknow (2016-17)

Period of Observation	Incidence of internode borer	% parasitisation				Period of Observation	Incidence of Root borer	% parasitisation		
		T. chilonis	*T. japonicum*	*Cotesia flavipes*	*B. bassiana*			*T. chilonis*	*Cotesia flavipes*	*B. bassiana*
1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**
19-08-16 (33rd week)	24.46	-	-	Traces	-	7-7-16	47.67	-	-	-
-	-	-	-	-	-	7-9-16 (I Week)	62.38	-	-	-

Table-30.5(c): Monitoring of Stalk borer and Mealy bug and their bioagents in sugarcane agro-ecosystem at Lucknow (2016-17)

Period of Observation	Incidence of stalk borer	% parasitisation				Period of Observation	Incidence of Mealy bug	% parasitisation		
		T. chilonis	*T. japonicum*	*Cotesia flavipes*	*B. bassiana*			*T. chilonis*	*Cotesia flavipes*	*B. bassiana*
1	2	3	4	5	6	1	2	3	4	5
18-08-16 (33rd week)	1.86	-	-	-	-	10-10-15	100.0 on cane basis	-	-	-

Table-30.5(d): Monitoring of pyrilla and their bioagents in sugarcane agro-ecosystem at Lucknow (2016-17)

Period of Observation	Incidence of *P. perpusilla*			% Parasitization				
	No. of adults/leaf	No. 0f nymphs/leaf	No. of egg mass/leaf	*Epiricania melanoleuca*			*Tetrastichus pyrillae*	*Lestrodryinus pyrillae*
				Cocoon	Egg mass	Adults	% parasitisation On egg mass basis	% parasitisation On egg mass basis
1	2	3	4	5	6	7	8	9
20-07-2016 (29th Week	0-1	-	-	-	-	-	-	-
22-08-2016 (34th Week)	1-3	5-6	1-2	1-2	0-1	1	-	-
10-10-16 (41Week)	traces	5-7	-	2-3	-	2	-	-

Table-30.6(a): Monitoring of borer pests and their bioagents in sugarcane agro-ecosystem at Pusa (2016-17)

Period of observation	% incidence top borer	% Parasitism (Top borer)			% incidence of shoot borer	% incidence of root borer	% Parasitism of (root and shoot borer) if any
		A. flavipes	*R. scripophagae*	*S. deesae*			
January	-	-	-	-	-	-	**Not observed**
February	-	-	-	-	-	-	
March	-	-	-	-	5.2	3.50	
April	7.5	-	-	-	11.6	6.20	
May	14.5	4.5	-	2.5	14.3	10.20	
June	16.7	8.9	-	6.5	6.7	5.40	
July	12.3	10.6	1.5	8.5	2.0	1.80	
August	8.7	10.5	4.0	10.2	-	-	
September	5.4	12.7	8.2	11.5	-	-	
October	1.2	5.6	3.5	7.8	-	-	
November	1.0	2.5	1.8	3.5	-	-	
December	Trace	-	--	-	-	-	

Table-30.6(b): Monitoring of insect pests and bioagents in sugarcane agro-ecosystem at Pusa (2016-17)

Period of observation	Pyrilla/leaf	% Parasitism (Pyrilla)		% incidence of stalk borer	% parasitism *A. flavipes*
		T. pyrillae	*E. melanoleuca*		
January	-	-	-	-	-
February	-	-	-	-	-
March	2.5	-	-	-	-
April	5.7	-	-	-	-
May	15.2	-	4.2	-	-
June	17.9	-	10.6	-	-
July	14.3	12.2	18.5	2.5	-
August	10.5	20.5	29.2	4.5	11.2
September	5.5	30.2	25.2	5.3	15.3
October	1.5	50.6	15.1	3.7	14.1
November	1.0	70.2	3.2	2.0	5.8
December	-	-	-	-	-

Table-30.7(a): Monitoring of early shoot borer and their bioagents in sugarcane agro-ecosystem at Seorahi (2016-17)

Period of observation Dates + SMW	% incidence	% parasitism (ESB)		
		T. chilonis	*E. annulipes*	*S. inferens*
16-04-2017 16th SMW	4.50	-	-	-
18-05-2017 20th SMW	8.35	-	-	-
17-06-2017 24th SMW	9.08	-	-	-
20-07-2017 29th SMW	2.30	-	-	-
20-08-2017 34th SMW	-	-	-	-
22-09-2017 38th SMW	-	-	-	-
25-10-2017 43rd SMW	-	-	-	-
19-11-201 47th SMW	-	-	-	-

Table-30.7(b): Monitoring of stalk borer and their bioagents in sugarcane agro-ecosystem at Seorahi (2016-17)

Period of observation Dates + SMW	% incidence	% Parasitism (Stalk borer)					
		Cotesia flavipes	*Apanteles flavipes*	*Apanteles pyralophagus*	*S. inference*	*Nosema sp.*	*B. bassiana*
16-04-2017 16th SMW	-	-	-	-	-	-	-
18-05-201 20th SMW	-	-	-	-	-	-	-
17-06-2017 24th SMW	-	-	-	-	-	-	-
20-07-2017 29th SMW	-	-	-	-	-	-	-
20-08-2017 34th SMW	-	-	-	-	-	-	-
22-09-2017 38th SMW	1040	6.20	-	-	-	-	-
25-10-2017 43rd SMW	15.25	10.50	-	-	-	-	-

Table-30.7(c): Monitoring of top borer and their bioagents in sugarcane agro-ecosystem at Seorahi (2016-17)

Period of observation Dates + SMW	% incidence	% Parasitism (Top shoot borer)					
		Stenobracon sp.	***I. javensis***	***Elasmus zehntneri***	***Rhaconotus scripophagae***	***T. Japonicum***	***T. chilonis***
16-04-20167 16th SMW	-	-	-	-	-	-	-
30-05-2017 22nd SMW	2.67	3.22	2.22	-	-	-	-
28-06-2017 26th SMW	3.44	4.75	3.33	4.44	3.33	-	-
30-07-2017 31th SMW	7.89	13.04	16.66	9.52	8.69	-	-
28-08-2017 35th SMW	4.70	14.28	18.18	12.00	10.71	-	-
20-09-2017 38th SMW	1.62	5.00	4.41	5.00	5.00	-	-
25-10-2017 43rd SMW	-	-	-	-	-	-	-

Table-30.8: Monitoring of insect pest and their bioagents in sugarcane agro-ecosystem at Akola (2016-17)

Sr. No	SMW	Per cent infestation of early shoot borer	Per cent incidence of scales	Per cent intensity of Scale insects	Bio agents per 3 plants		Aphids per 3 leaves	White fly per 3 leaves	Pyrilla Nymph adult per leaf	Rainfall (mm)	Temperature (0C)		RH I (%)	RH II (%)
					LBB	Spiders					Max	Min		
1	1	--	--	--	--	--	--	--	--	0.0	32.3	10.7	66	21
2	2	--	--	--	--	--	--	--	--	0.0	31.4	10.9	60	23
3	3	--	--	--	--	--	--	--	--	0.0	29.9	13.7	70	29
4	4	--	--	--	--	--	--	--	--	0.0	29.5	8.5	52	16
5	5	--	--	--	--	--	--	--	--	0.0	33.7	12.6	58	21
6	6	--	--	--	--	--	--	--	--	0.0	32.8	14.5	51	25
7	7	12.96	--	--	6	7	--	--	--	0.0	33.9	15.9	51	21
8	8	6.43	--	--	13	11	--	--	--	0.0	36.1	17.6	53	26
9	9	6.12	--	--	7	9	--	--	--	0.0	35.8	19.2	70	32
10	10	7.44	--	--	15	4	--	--	--	0.0	36.5	19.0	48	20
11	11	7.27	--	--	16	5	--	--	--	0.4	36.8	20.2	44	20
12	12	6.25	--	--	12	6	--	--	--	0.0	39.0	20.2	29	11
13	13	6.61	--	--	12	3	--	--	--	0.0	40.4	22.2	32	15
14	14	7.00	--	--	10	4	--	--	--	0.0	41.2	25.4	37	18
15	15	7.02	--	--	12	5	--	--	--	0.0	41.8	24.9	33	17
16	16	4.19	--	--	10	9	--	--	--	0.0	44.0	27.5	34	14
17	17	4.53	--	--	8	10	--	--	--	0.0	41.7	25.6	38	18
18	18	4.17	--	--	10	12	--	--	--	0.0	42.9	27.6	37	14
19	19	3.73	--	--	8	7	--	--	--	19.9	40.7	26.1	50	17
20	20	4.23	--	--	7	4	--	--	--	0.6	45.2	30.7	33	12
21	21	3.42	--	--	6	2	--	--	--	0.0	42.0	29.4	52	21
22	22	3.44	--	--	6	4	--	--	--	0.0	41.4	29.9	51	21
23	23	3.08	--	--	3	6	--	--	--	8.6	41.2	28.0	56	27
24	24	2.68	--	--	7	5	--	--	--	0.0	38.9	29.0	55	28
25	25	3.08	--	--	6	6	--	--	--	88.0	34.5	24.7	83	47
26	26	2.69	--	--	5	4	--	--	--	49.9	32.8	24.6	80	58
27	27	2.67	--	--	2	3	4	3	0.00	53.1	30.7	24.8	86	70
28	28	2.27	--	--	4	4	9	5	0.00	212.8	28.1	23.6	90	73

29	29	1.52	--	--	7	5	6	4	0.00	5.7	31.5	24.9	83	62
30	30	1.52	--	--	6	5	6	4	0.90	104.5	29.8	23.6	91	72
31	31	0.00	--	--	4	4	14	8	1.50	65.3	29.4	23.9	86	71
32	32	0.00	--	--	3	4	19	5	1.50	10.5	30.4	24.0	84	66
33	33	0.00	--	--	6	4	28	8	1.60	0.0	31.0	23.4	85	58
34	34	--	--	--	5	4	10	4	0.65	13.7	30.0	23.4	83	64
35	35	--	--	--	6	5	11	5	0.70	6.5	31.9	24.5	85	62
36	36	--	--	--	8	6	10	6	0.75	1.5	31.3	22.6	85	47
37	37	--	40	4.96	9	5	11	6	0.70	28.5	31.8	23.6	86	59
38	38	--	40	4.35	8	4	10	7	0.70	62.9	30.9	23.3	94	70
39	39	--	20	2.04	10	5	11	6	0.65	30.3	30.8	23.0	92	71
40	40	--	40	3.31	6	6	8	8	0.65	61.5	29.1	22.8	92	73
41	41	--	40	3.45	8	6	10	10	0.65	29.0	31.2	21.3	90	59
42	42	--	28	2.21	9	7	11	6	0.65	0.0	32.9	16.5	80	29
43	43	--	40	3.35	10	8	10	6	0.00	0.0	32.4	15.8	80	34
44	44	--	40	1.85	10	9	10	7	0.00	0.0	31.4	14.3	81	34
45	45	--	32	1.69	11	8	11	8	0.00	0.0	31.4	11.2	77	27
46	46	--	40	1.88	10	7	10	0	0.00	0.0	30.3	11.9	84	33
47	47	--	28	1.88	9	8	9	0	0.00	0.0	30.7	9.7	85	32
48	48	--	32	1.59	8	7	0	0	0.00	0.0	31.9	10.9	85	31
49	49	--	32	1.45	11	6	0	0	0.00	0.0	30.1	10.7	88	35
50	50	--	28	1.53	10	7	0	0	0.00	0.0	30.2	10.7	79	32
51	51	--	36	1.62	10	8	0	0	0.00	0.0	29.2	8.6	85	35
52	52	--	44	1.76	10	9	0	0	0.00	0.0	29.5	8.4	83	29

Table-30.9(a): Monitoring of insect pests and bioagents in sugarcane agro-ecosystem at Padegaon (2016-17)

Period of observation (2015)	% incidence early shoot borer	% Parasitism (ESB)		
		T. chilonis	*E. annulipes*	*S. inferens*
1	**2**	**3**	**4**	**5**
06 (Feb 05-11)	0.00	--	--	--
07 (Feb 12-18)	0.00	--	--	--
08 (Feb 19-25)	0.00	--	--	--
09 (Feb 26 to Mar 04)	0.00	--	--	--
10 (Mar 05-11)	0.00	--	--	--
11 (Mar 12-18)	2.20	--	--	--
12 (Mar 19-25)	2.56	--	--	--
13 (Mar 26-Apr 01)	4.49	0.20	--	--
14 (April 02-08)	9.73	1.00	--	--
15 (April 09-15)	7.86	0.80	--	--
16 (April 16-22)	14.61	1.00	--	--
17 (April 23-29)	14.73	2.00	--	--
18 (April 30- May06)	12.75	2.20	--	--
19 (May 07-13)	11.62	2.00	--	--
20 (May 14-20)	14.12	3.00	--	--
21(May 21-27)	7.10	2.40	--	--
22 (May 28-June 03)	2.18	1.80	--	--
23 (June 04-10)	0.44	1.00	--	--
24 (June 11-17)	0.00	0.00	--	--
25 (June 18-24)	0.00	--	--	--

Table-30.9(b): Monitoring of insect pests in sugarcane agro-ecosystem at Padegaon (2016-17)

Period of observation (2015)	Pyrilla / leaf	Pyrilla/leaf				
		T. pyrillae (% parasitism on eggs)	*Cheiloneurus pyrillae*	*Ooencyrtus papilionis*	*E. melanoleuca*	
					% Parasitism	*Egg mass & Cocoon*
1	**2**	**3**	**4**	**5**	**6**	**7**
29 (July 16-22)	-	-	-	-	-	-
30 (July 23-29)	0	-	-	-	-	-
31 (July 30-Aug 05)	0	-	-	-	-	-
32 (Aug 06-12)	0-1	-	-	-	-	-
33 (Aug 13-19)	0-1	-	-	-	20	1
34 (Aug 20-26)	1	10	-	-	30	0
35 (Aug 27-Sept 02)	1-2	20	-	-	20	1-2
36 (Sept 03-09)	1-2	10	-	-	20	2
37 (Sept 10-16)	2-3	20	-	-	50	2-3
38 (Sept 17-23)	2-3	40	-	-	40	2-3
39 (Sept 24-30)	1-2	30	-	-	10	1-2
40 (Oct 01-07)	1-2	20	-	-	-	2
41 (Oct 08-14)	0-1	10	-	-	-	1
42 (Oct 15-21)	0	-	-	-	-	1

Table-30.9(c): Monitoring of insect pests in sugarcane agro-ecosystem at Padegaon (2016-17)

Period of observation	woolly aphid per leaf	% Parasitism/Predator population per plant (per 150 leaves)				
		Encarsia flavoscutellum	*Micromus igorotus*	*D. aphidivora*	Syrphid fly	*Chrysoperla zastrowi sillemi*
1	**2**	**3**	**4**	**5**	**6**	**7**
28 (July 09-15) 2015	-	-	-	-	-	-
29 (July 16-22)	-	-	-	-	-	-
30 (July 23-29)	-	-	-	-	-	-
31 (July 30-Aug 05)	0.11	-	-	-	-	-
32 (Aug 06-12)	0.33	-	-	-	-	-
33 (Aug 13-19)	1.03	-	-	-	-	-
34 (Aug 20-26)	1.17	-	-	-	-	-
35 (Aug 27-Sept 02)	1.67	-	-	-	-	-
36 (Sept 03-09)	1.50	-	-	-	-	-
37 (Sept 10-16)	3.22	7	0	0	0	-
38 (Sept 17-23)	8.98	15	7	0	0	-
39 (Sept 24-30)	12.32	22	8	0	0	-
40 (Oct 01-07)	13.98	20	20	1	0	-
41 (Oct 08-14)	19.21	33	27	2	0	-
42 (Oct 15-21)	18.98	39	34	18	0	-
43 (Oct 22-28)	22.98	44	63	39	8	-
44 (Oct 29- Nov 04)	16.29	31	24	21	0	-
45 (Nov 05-11)	16.87	87	15	14	0	-
46 (Nov 12-18)	18.39	98	9	11	0	Eggs of *Chrysoperla* were observed on 4 leaves
47 (Nov 19-25)	26.45	114	9	15	12	
48 (Nov 26-Dec 02)	33.73	133	7	39	36	
49 (Dec 03-09)	34.78	72	5	35	37	
50 (Dec 10-16)	32.44	32	6	32	44	-
51 (Dec 17-23)	26.25	17	0	38	39	-
52 (Dec 24-31)	20.11	11	0	15	44	-

Period of observation	woolly aphid per leaf	% Parasitism/Predator population per plant (per 150 leaves)				
		Encarsia flavoscutellum	*Micromus igorotus*	*D. aphidivora*	Syrphid fly	*Chrysoperla zastrowi sillemi*
1	**2**	**3**	**4**	**5**	**6**	**7**
01 (Jan 01-07) 2017	14.51	14	0	25	37	-
02 (Jan 08-14)	9.36	19	0	19	25	-
03 (Jan 15-21)	5.15	15	0	7	8	-
04 (Jan 22-28)	1.91	21	0	8	6	-
05 (Jan 29-Feb 04)	0.45	10	0	0	0	-
Note : The incidence of woolly aphid was observed on 20-25 R area in the experimental field at one corner on Co 86032. The observations are based on the infested parts of the field.						

Table-30.9(d): Monitoring of insect pests in sugarcane agro-ecosystem at Padegaon (2016-17)

Period of observation (2016)	% incidence Mealy bug	% Parasitism/Predator population per plant (Mealy bug)			
		Coccinella septempunctata/ cane	*P. horni*	*Cheilomenes sexmaculata*/ cane	*C. zastrowi sillemi*
1	**2**	**3**	**4**	**5**	**6**
35 (Aug 27-Sept 02)	0	-	-	-	-
36 (Sept 03-09)	0	0	-	-	-
37 (Sept 10-16)	1.0	0	-	-	-
38 (Sept 17-23)	2.0	0	-	0	-
39 (Sept 24-30)	2.0	0	-	0	-
40 (Oct 01-07)	1.0	1	-	0	-
41 (Oct 08-14)	2.0	1-2	-	1	-
42 (Oct 15-21)	1.0	0	-	1	-
43 (Oct 22-28)	0	0	-	0	-
44 (Oct 29-Nov 04)	0	0	-	0	-

Table-30.10: Monitoring of insect pests in sugarcane agro-ecosystem at Pune (2016-17)

Sr. No	Month	Early shoot borer	Internode borer			Mealy bug	
		% incidence	% incidence	% intensity	Infestation index	% incidence	% intensity
1	March 2016	7.56	--	--	--	--	--
2	April 2016	7.59	--	--	--	--	--
3	May 2016	1.98	--	--	--	--	--
4	June 2016	--	4.00	0.90	0.04	7.00	2.49
5	July 2016	--	1.00	0.14	0.001	1.00	0.28
6	August 2016	--	13.00	1.51	0.20	13.00	2.27
7	September2016	--	5.00	0.41	0.02	7.00	0.90
8	October 2016	--	5.00	0.34	0.02	3.00	0.34
9	November 2016	--	14.00	1.23	0.17	13.00	1.83

Table-30.11(a): Monitoring of insect pests in sugarcane agro-ecosystem at Powarkheda (2016-17)

SMW	Date (2015)	Max. Temp. (^{O}C)	Min. Temp (^{O}C)	RH% Morning	RH% Evening	Rainfall (mm)	ESB infestation (%)	
							Weekly	Cumulative
1	1 to 7/1	30.00	11.11	79.00	62.00	0.00	0.0	0.0
2	8 to 14/1	29.44	10.56	83.00	77.00	0.00	0.0	0.0
3	15 to 21/1	28.33	6.11	96.00	69.00	0.00	0.0	0.0
4	22 to 28/1	28.33	6.67	82.00	57.00	0.00	0.0	0.0
5	29/1 to 4/2	31.67	8.89	91.00	67.00	0.00	0.2	0.2
6	5 to 11/2	31.67	10.00	80.00	52.00	0.00	0.2	0.4
7	12 to 18/2	34.44	11.11	73.00	67.00	0.00	0.6	1.0
8	19 to 25/2	35.56	12.78	78.00	40.00	0.00	1.0	2.0
9	26/2 to 4/3	35.56	15.00	75.00	44.00	0.00	1.4	3.4
10	5 to 11/3	37.22	16.67	72.00	53.00	0.00	1.2	4.6
11	12 to 18/3	36.67	15.56	90.60	81.10	0.00	1.8	6.4
12	19 to 25/3	38.89	15.56	68.20	60.20	0.00	2.4	8.8
13	26/3 to 1/4	40.00	20.00	93.80	61.10	0.00	2.8	11.6
14	2 to 8/4	41.67	20.56	-	-	0.00	3.0	14.6
15	9 to 15/4	42.22	20.00	-	-	0.00	2.6	17.2
16	16 to 22/4	42.78	23.33	-	-	0.00	2.0	19.2
17	23 to 29/4	41.67	23.89	-	-	0.00	2.2	21.4
18	30/4 to 6/5	42.78	23.33	-	-	0.00	1.4	22.8
19	7 to 13/5	42.78	22.22	-	-	0.00	1.0	23.8
20	14 to 20/5	46.67	27.22	-	-	0.00	0.4	24.2
21	21 to 27/5	43.33	27.22	-	-	0.00	0.2	24.4
22	28/5 to 3/6	43.33	27.22	54.00	41.00	0.00	0.2	24.6
23	4 to 10/6	43.89	23.89	35.60	29.00	0.00	0.0	24.6
24	11 to 17/6	41.11	23.33	62.00	24.80	0.00	0.0	24.6
25	18 to 24/6	44.44	23.33	92.20	79.60	105.30	0.0	24.6

Table-30.11(b): Monitoring of insect pests and bioagents in sugarcane agro-ecosystem at Powarkheda (2016-17)

SMW 2016	Max. Temp. (^{O}C)	Min. Temp (^{O}C)	RH %	RH %	Rainfall (mm)	Pyrilla (/leaf)	Pyrilla Egg Masses	*E. malanoleuca* (%)	*E. malanoleuca EM & C*	*T. pyrillae* %
10 (March)	37.22	16.67	72.00	53.00	0.00	0.00	0.28	0.00	0.06	0.00
11(March)	36.67	15.56	90.60	81.10	0.00	0.00	0.39	0.00	0.00	3.80
12 (March)	38.89	15.56	68.20	60.20	0.00	0.72	0.56	0.80	0.56	4.40
13 (March)	40.00	20.00	93.80	61.10	0.00	1.28	0.94	1.60	0.72	6.40
14 (April)	41.67	20.56	-	-	0.00	2.22	1.17	1.80	1.17	13.30
15 (April)	42.22	20.00	-	-	0.00	2.28	1.22	2.40	1.44	15.60
16 (April)	42.78	23.33	-	-	0.00	2.61	1.28	2.80	1.72	18.20
17 (April)	41.67	23.89	-	-	0.00	3.00	0.72	4.40	2.17	17.90
18 (May)	42.78	23.33	-	-	0.00	3.78	0.39	5.20	2.28	15.00
19 (May)	42.78	22.22	-	-	0.00	3.22	0.28	5.60	2.06	4.90
20 (May)	46.67	27.22	-	-	0.00	2.00	0.17	4.40	1.39	4.50
21 (May)	43.33	27.22	-	-	0.00	0.94	0.00	2.60	0.67	0.00
22 (May)	43.33	27.22	54.00	41.00	0.00	0.56	0.00	1.00	0.17	0.00
23 (June)	43.89	23.89	35.60	29.00	0.00	0.28	0.00	0.00	0.06	0.00
24 (June)	41.11	23.33	62.00	24.80	0.00	0.00	0.00	0.00	0.00	0.00
25 (June)	44.44	23.33	92.20	79.60	105.30	0.00	0.00	0.00	0.00	0.00
26 (June)	36.11	22.78	97.60	80.00	49.10	0.44	0.00	0.40	0.28	0.00
27 (July)	31.11	22.22	99.80	85.00	191.90	0.67	0.17	0.80	0.22	1.90
28 (July)	30.00	22.78	92.60	83.80	486.00	1.78	0.17	2.20	0.56	6.30
29 (July)	32.78	23.33	96.60	77.20	0.00	3.06	0.56	4.00	0.94	9.20
30 (July)	33.33	23.33	94.60	88.20	101.20	3.56	0.72	4.40	1.56	14.90
31 (Aug)	31.67	22.78	93.20	76.60	135.80	4.11	0.78	8.60	2.67	24.10

SMW 2016	**Max. Temp. (^{O}C)**	**Min. Temp (^{O}C)**	**RH %**	**RH %**	**Rainfall (mm)**	**Pyrilla (/leaf)**	**Pyrilla Egg Masses**	***E. malanoleuca* (%)**	***E. malanoleuca* EM & C**	***T. pyrillae* %**
32 (Aug)	30.56	22.78	96.40	98.20	185.20	4.67	1.06	13.20	4.72	28.90
33 (Aug)	30.00	22.22	99.80	95.60	57.00	5.33	1.17	20.00	5.28	46.10
34 (Aug)	31.11	21.11	96.20	98.40	87.70	4.33	1.11	28.00	4.72	51.90
35 (Aug)	33.33	22.78	-	-	42.60	3.11	0.67	23.00	7.39	57.70
36 (Sept)	31.11	21.11	91.80	92.20	3.20	2.72	0.61	17.60	9.17	65.30
37 (Sept)	33.33	21.67	96.40	82.80	0.00	1.06	0.56	12.00	8.50	53.00
38 (Sept)	33.33	22.22	98.80	91.40	22.40	0.72	0.50	8.20	4.06	30.00
39 (Sept)	32.78	22.78	98.80	91.40	12.40	0.83	0.33	5.00	1.50	12.20
40 (Oct)	32.22	23.33	-	-	16.00	0.28	0.06	2.60	0.50	3.10
41 (Oct)	33.33	18.33	-	-	23.30	0.17	0.00	0.60	0.33	0.00
42 (Oct)	33.33	16.67	-	-	0.00	0.00	0.00	0.40	0.22	0.00
43 (Oct)	32.78	15.56	-	-	0.00	0.00	0.00	0.00	0.00	0.00

Table-30.12(a): Monitoring of insect pests and bioagents in sugarcane agro-ecosystem at Navsari (2016-17)

Period of Observation (SMW)	% incidence of Early shoot borer	% Parasitism		
		T. chilonis	***E. annulipes***	***S. inferens***
7	2.34	9.73	-	-
11	1.43	4.25	-	-
16	0.98	2.43	-	-

Table-30.12(b): Monitoring of insect pests and bioagents in sugarcane agro-ecosystem at Navsari (2016-17)

Period of Observation (SMW)	% incidence of Top shoot borer	% Parasitism			
		T. japonicum	***T. Chilonis***	***Apanteles flavipes***	***B. bassiana***
20	1.68	5.69	1.48	1.25	1.18
28	1.42	3.25	2.42	2.34	1.26
50	2.53	1.63	1.19	1.87	1.32

Table-30.13: Monitoring of insect pests and bioagents in sugarcane agro-ecosystem at Mandya (2016-17)

Time of observation	Per cent Incidence			Woolly aphid	Mealy bug		Natural Enemies
	ESB	TSB	INB	leaf area covered	% Incidence	% Intensity	-
30 DAP	6.41	-	-	-	-	-	-
60 DAP	8.37	-	-	-	-	-	4/12egg masses were parasitized by Trichogramma parasitoid
90 DAP	1.60	-	-	-	-	-	-
120DAP	1.10	-	-	-	-	-	-
150 DAP	-	9.17	-	45%leaf area covered	-	-	*Encarsia flavoscutellum* 3adult/leaf
180 DAP	-	-	-	60%leaf area covered	-	-	*Encarsia flavoscutellum* 7adult/leaf
210 DAP	-	12.25	-	-	13.27	21.82	-
At harvest	-	-	24.67	-	-	-	-

ESB- Early shoot borer; TSB- Top shoot borer; INB- Internode borer

Table-30.14: Monitoring of insect pests and bioagents in sugarcane agro-ecosystem at Coimbatore (2016-17)

Sr. No.	Location	Insect pest	Prevalence period	Max. incidence /population	Natural enemy	Prevailence period	Max. parasitization/ population
1	Coimbatore	SB	May	82.2%	-	-	-
		-	June	17.0%	-	-	-
		-	July	18.32%	-	-	-
		TB	July	0.44%	-	-	-
		Termite	July	80.5%	-	-	-
		Asamangu-lia	July	Traces	-	-	-
		SB	September	2.05%	-	-	-
		INB	September	82.51%	-	-	-
		TB	September	0.51%	-	-	-
		Whitefly	-	0.77%	-	-	-
		Mealybug	-	1.79%	-	-	-
		Woolly aphid	November	Average rating 1.77 / leaf	*Encarsia flavoscutellum; Micromus*	November	-
		INB	March	35.0%	-	-	-

SB- Shoot borer, INB- Internode borer, TB- Top borer

Table-30.15(a): Monitoring of insect pests and bioagents in sugarcane agro-ecosystem at Anakapalle (2016-17)

Period of observation	% incidence of early shoot borer	% parasitism (ESB)			% incidence of Internode borer	% Parasitism (INB)		
		T. chilonis	*E. annulipes*	*S. inferens*		*T. chilonis*	*S. inferens*	*Cotesia flavipes*
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
April,16	2.00	0.20	5-6/clump	-	-	-	-	-
May,16	21.00	1.60	4-3/clump	-	-	-	-	-
June, 16	13.00	3.80	2-3/clump	1.00	-	-	-	-
July,16	8.00	3.00	2-3/clump	2.00	-	--	-	-
August, 16	1.60	1.40	4-6/clump	2.00	6.00	1.00	-	-
September,16	-	-	5-6/clump	-	20.00	3.00	-	-
October,16	-	-	2-3/cane	-	32.00	2.80	1.00	-
November,16	-	-	2-3/cane	-	12.00	3.10	1.60	0.40
December,16	-	-	-	-	8.00	-	2.10	1.00
January,17	-	-	-	-	--		2.80	2.20

Table-30.15(b): Monitoring of red mite, mealy bug and scale insect and bioagents in sugarcane agro-ecosystem at Anakapalle (2016-17)

Period of observation Date/MW	Red mite incidence (% incidence)	Mealy bug		Coccinellids/cane		Incidence of Scale insect (%)	Coccinellids/cane	
		% incidence	% intensity	*Coccinella septum-punctata*	*Cheilomenes sexmaculata*		*C. nigritus*	*P. horni*
29-4-16/19MW	-	-	-	-	-	-	-	-
31-5-16/24MW	11.00	--	-	-	-	-	-	-
28-6-16/27MW	28.00	-	-	-	-	-	-	-
29-7-16/32MW	12.00	-	-	-	-	-	-	-
28-8-16/36MW	6.00	1.0	0.20	2	1-2	-	-	1-2
27-9-16/40MW		2.0	0.70	1-2	1-2	-	-	1-2

30-10-16/44MW	-	4.0	1.50	1-2	1-2	5.00	2-3	1-3
27-11-16/48MW	-	1.0	0.20	1-2	1-2	10.00	2-3	1-2
29-12-16/52MW	-	-	-	1	1	40.00	1-3	1-3
5-1-17/1MW	-	--	-	-	-	10.00	1-2	1-2

Table-30.15(c): Monitoring of *Pyrilla perpusilla* and *Proutista moesta* and spittle bugs in sugarcane agro-ecosystem at Anakapalle (2016-17)

Period of observation	Incidence of *P. perpusilla*				% Parasitization (*Pyrilla*)				Incidence of Derbid hoppers (*Proutista moesta* (Adults /leaf)	Incidence of Spittle bug (no. of damaged leaves/ plant)
					Epiricania melanoleuca			*Tetristichus pyrillae*		
	No. of adults/ leaf	No. of Nymphs/ leaf	No .of egg mass/ leaf	Total	Cocoons	Adults	Total			
April,16	-	-	-	-	-	-	-	-	-	-
May,16	-	-	-	-	-	-	-	-	-	-
June, 16	-	-	-	-	-	-	-	-	-	-
July,16	1	-	1	2	-	-	-	-	-	-
August,16	2-4	3-6	2-3	7-13	-	-	-	-	-	-
September,16	2-5	6-9	1-3	9-17	1	-	1	1.0	-	3-4
October,16	2-6	6-8	2-4	10-18	2	1	3	2.0	1-2	3-6
November,16	1-3	4-5	5-6	10-14	7	2	9	4.0	2-4	3-6
December,16	1-2	2-3	1-4	4-9	3	2	5	3.0	2-4	-
January,17	1	1	-	2	2	2	4	3.0	1-2	-

Table-34.1: Mass multiplication *B. bassiana* on different growth medium at Uchani (2016-17)

Month	*T. japonicum* cards produced (no.)	No. of farmers	*T. chilonis* cards produced (no.)	No. of farmers	cocoons of *E. melanoleuca* produced(no.)	No egg masses	No. of farmers
June,2016	05	01	0	0	0	0	0
July,2016	43	05	34	05	0	0	0
August,2016	73	09	167	18	0	0	0
Sept,2016	64	07	359	31	244	85	26
Oct,2016	0	0	37	05	4285	247	32
Nov,2016	0	0	0	0	237	86	11
Dec,2016	0	0	0	0	0	0	0
Total	185	22	597	59	4766	418	69

Table-34.2 (a): Production of *C. cephalonica* eggs and *T. chilonis* parasitoids cards at Pune (2016-17)

Sr. No.	Month	*Corcyra* eggs Produced (cc)		*T. chilonis* parasitoids cards	
		Per month	Per day	Per month	Per day
1	April 2016	83.60	2.79	54	1.8
2	May 2016	58.20	1.88	39	1.26
3	June 2016	182.80	6.09	83	2.77
4	July 2016	282.60	9.12	164	5.29
5	August 2016	191.80	6.19	187	6.03
6	September 2016	245.80	8.19	213	7.1
7	October 2016	162.60	5.24	228	7.35
8	November 2016	253.20	8.44	192	6.4
9	December 2016	124.80	4.02	138	4.45
10	January 2017	55.60	1.79	60	1.93
11	February 2017	72.30	2.58	56	2.00
12	March 2017	45.0	1.45	50	1.61
	Total	1758.3	57.78	1464	47.99
	Average	146.52	4.81	122	3.99

Table-34.2 (b): Supply of *T. chilonis* parasitoids cards/Corcyra eggs during at Pune (2016-17)

Sr. No.	Name of sugar mill/other	No.of Tricho cards supplied	Amount (Rs.)	Area covered (ha)	Corcyra eggs supplied(cc)	Amount (Rs.)
1.	Dr.V.Patil SSK Dist. Ahmednagar	2	190.00	0.13	5.0	475.00
2.	Farmers	176	16720.00	11.73	-	-
3.	Shri.Datta SSK Ltd, Shirol	20	1900.00	1.33	-	-
4	Venketeshkrupa Sugar mill,Dist-Pune	20	1900.00	1.33	-	-
	Total A=	218	**20710.00**	14.53	-	-
7.	VSI Farm (Gratis) Total B=	287.5	**27312.5**	19.17	-	-
	Total C= (A+B)=	505.5	**48022.5**	33.70	-	-
				Total D=	5.00	**475.00**
	Grand Total F=(C+D)=	-	**48497.50**	-	-	-

Table-34.3: Mass multiplication *B. bassiana* on different growth medium at Anakapalle (2016-17)

Media	Spore count (X 10^{8}) per ml	Biomass (g)/ 100 g	Cost of production of 1 X 10^{8} spores (Rs)
Parboiled rice +1g Dextrose	21.10	0.38	0.38
Rice +1g Dextrose	20.80	0.40	0.39
Sorghum +1g Dextrose	20.62	0.70	0.39
Pearl millet +1g Dextrose	18.50	0.80	0.49
Ragi +1g Dextrose	20.10	1.00	0.36
Maize +1g Dextrose	20.14	1.63	0.43
Rice bran +1g Dextrose	-	-	-
Corcyra rearing waste (Maize) + 1g Dextrose	20.30	1.70	0.30
Press mud (Sugar mill) +1g Dextrose	17.70	0.20	0.46
Sugarcane bagasse+1g Dextrose	-	-	-
PDB	24.30	0.41	0.52
CD(p=0.05)	0.10	0.07	-
CV (%)	2.13	2.60	-

Table-36.1(a): Moth catches of borer complex of sugarcane through lures at Kapurthala (2016-17)

Standard Meteorological Week [SMW]	Date	Early shoot borer (Moth/trap)	Top borer (Moth/trap)	Stalk borer (Moth/trap)	Average Temperature ◦C		Average Relative Humidity %		Total Rainfall (mm)
					Max	Min	Morning	Evening	
11	14.03.16	0.0	0.0	0.0	9.9	22.3	90.9	56.1	28.0
12	21.03.16	0.0	0.0	0.0	29.9	10.4	84.4	36.0	0.0
13	28.03.16	0.0	0.0	0.0	32.0	12.1	83.9	33.9	0.0
14	04.04.16	0.0	0.0	0.0	33.6	17.0	70.0	29.7	0.0
15	11.04.16	0.0	0.0	0.0	35.4	15.9	65.4	22.4	0.0
16	18.04.16	0.0	0.0	0.0	40.4	18.7	58.6	20.6	0.0
17	25.04.16	2.0	0.0	0.0	40.0	15.3	52.1	13.4	0.0
18	02.05.16	5.0	0.0	0.0	39.7	20.1	49.0	22.6	0.0
19	09.05.16	7.0	0.0	0.0	40.6	23.3	57.0	28.3	0.0
20	16.05.16	10.0	2.0	0.0	42.3	23.4	54.1	19.9	0.0
21	23.05.16	5.0	4.0	0.0	38.9	23.7	63.6	30.9	15.0
22	30.05.16	4.0	5.0	0.0	40.0	25.9	60.6	27.9	8.0
23	06.06.16	9.0	8.0	0.0	41.3	28.3	56.0	27.7	0.0
24	13.06.16	8.0	7.0	0.0	36.6	25.0	63.9	36.9	0.5
25	20.06.16	6.0	6.0	0.0	36.3	24.7	75.0	57.4	18.0
26	27.06.16	4.0	9.0	0.0	36.6	29.4	68.6	59.7	6.0
27	04.07.16	5.0	11.0	0.0	32.7	26.6	85.6	63.7	0.0
28	11.07.16	2.0	13.0	0.0	37.4	27.4	85.0	67.3	0.0
29	18.07.16	4.0	12.0	0.0	31.7	26.4	84.1	61.4	0.0
30	25.07.16	2.0	9.0	0.0	33.7	26.3	86.4	73.6	0.0
31	01.08.16	1.0	10.0	0.0	35.4	27.7	80.6	59.0	0.0
32	08.08.16	0.0	7.0	0.0	33.7	26.4	83.3	67.4	0.0
33	15.08.16	1.0	5.0	0.0	34.7	25.0	85.6	60.3	0.0
34	22.08.16	0.0	5.0	0.0	34.3	25.7	86.6	67.3	0.0
35	29.08.16	0.0	3.0	0.0	31.9	23.9	87.9	67.4	0.0
36	05.09.16	0.0	5.0	0.0	33.7	25.4	86.7	56.1	0.0
37	12.09.16	0.0	4.0	2.0	33.6	24.0	83.7	52.6	0.0

38	19.09.16	0.0	2.0	3.0	36.0	25.9	84.7	52.7	0.0
39	26.09.16	0.0	2.0	5.0	34.3	24.0	87.9	57.7	0.0
40	03.10.16	0.0	0.0	6.0	36.0	23.7	91.3	55.1	0.0
41	10.10.16	0.0	0.0	7.0	34.6	20.1	89.3	35.3	0.0
42	17.10.16	0.0	0.0	8.0	35.1	16.4	85.1	31.0	0.0
43	24.10.16	0.0	0.0	10.0	33.7	14.1	89.0	29.6	0.0
44	31.11.16	0.0	0.0	11.0	31.3	12.4	90.4	39.3	0.0
45	07.11.16	0.0	0.0	8.0	30.7	9.9	92.3	28.7	0.0
46	14.11.16	0.0	0.0	7.0	28.9	8.7	85.7	30.4	0.0
47	21.11.16	0.0	0.0	9.0	27.9	8.7	87.6	31.1	0.0
48	28.11.16	0.0	0.0	8.0	27.6	7.7	88.1	34.7	0.0
49	05.12.16	0.0	0.0	7.0	25.1	6.6	94.6	48.1	0.0
50	12.12.16	0.0	0.0	6.0	19.7	7.3	96.6	63.1	0.0
51	19.12.16	0.0	0.0	6.0	18.7	4.3	95.3	40.9	0.0
52	26.12.16	0.0	0.0	3.0	23.1	5.0	92.6	48.0	0.0
1	02.01.17	0.0	0.0	2.0	22.7	8.3	95.1	57.1	0.0
2	09.01.17	0.0	0.0	0.0	19.1	7.7	95.1	43.9	0.0
3	16.01.17	0.0	0.0	2.0	17.1	5.9	94.1	63.7	11.0
4	23.01.17	0.0	0.0	1.0	18.6	7.0	93.1	63.7	30.5
5	30.01.17	0.0	0.0	2.0	19.7	6.3	96.3	63.9	0.0
6	06.02.17	0.0	0.0	0.0	24.4	7.7	91.7	53.3	2.5
7	13.02.17	0.0	0.0	0.0	24.9	9.3	89.9	44.3	0.0
8	20.02.17	0.0	0.0	0.0	23.8	11.2	94.0	54.0	8.0
9	27.02.17	0.0	0.0	0.0	23.8	11.2	94.0	54.0	8.0

Table-36.1(b): Correlation analysis between moth catches and weather parameters at Kapurthala (2016-17)

Correlation coefficient	Early shoot borer	Top borer	Stalk borer
Maximum Temperature	0.54	0.40	0.18
Minimum Temperature	0.52	0.74	-0.40
Relative Humidity % (Morning)	-0.72	-0.18	0.42
Relative Humidity % (Evening)	-0.24	0.46	-0.18
Rain fall	-0.08	-0.03	-0.19

Table-36.1(c): Impact of moth catches on incidence of borer complex at Kapurthala (2016-17)

Treatment	Early shoot borer (% incidence)	Top borer (% incidence)	Stalk borer (% incidence)
Pheromone (treatment)	7.45	8.84	5.78
Control	12.33	13.75	9.67
Percent reduction	39.58	35.70	40.22

Table-36.2(a): Moth catches of borer complex of sugarcane through lures at Uchani (2016-17)

Standard Meteorological Week [SMW]	Month	Mean no. of moths/ trap			Average Temperature (^{0}C)		Average Relative Humidity (%)		Total Rainfall (mm)
		ESB	Top borer	Stalk borer	Max.	Min.	Morning	Evening	
14	3-9 April	-	-	-	36.3	19.2	68.4	23.7	00.0
15	10-16	2.5	-	-	35.8	16.8	55.9	15.4	00.0
16	17-23	2.2	-	-	39.4	20.8	53.9	16.4	00.0
17	24-30	2.6	-	-	38.4	17.4	39.7	08.0	00.0
18	1-7 May	5.2	-	-	38.8	22.3	48.1	27.3	00.0
19	8-14	5.8	1.2	-	37.1	23.7	66.9	35.0	24.2
20	15-21	5.4	1.8	-	41.6	24.9	52.3	27.4	00.0
21	22-28	6.2	1.6	-	37.8	24.2	64.1	34.4	10.4
22	29-4 June	7.1	2.6	-	38.6	25.4	63.1	33.5	00.0
23	05-11	9.6	2.9	-	39.9	26.0	70.3	32.3	00.0
24	12-18	6.4	3.8	-	38.2	26.0	66.3	38.3	14.5
25	19-25	5.6	5.2	-	36.3	26.8	73.9	56.0	05.9
26	25-2July	3.1	4.9	-	37.1	27.4	82.1	56.3	19.4
27	3-9	0.4	6.2	-	33.8	25.7	89.4	70.6	85.6
28	10-16	0.0	6.8	1.6	34.4	27.7	83.9	68.9	12.0
29	17-23	0.6	7.1	2.1	32.0	26.3	89.9	73.4	10.6
30	24-30	0.0	3.6	2.4	34.0	26.4	87.9	71.6	14.2
31	31-6 August	-	3.8	2.8	32.6	26.1	86.1	71.9	00.0
32	7-13	-	2.9	3.2	31.4	25.4	95.3	85.7	126.4
33	14-20	-	0.0	4.1	32.4	25.4	90.4	70.4	73.6
34	21-27	-	2.2	4.6	33.1	25.5	87.4	70.1	63.7
35	28-3 Sept	-	0.0	3.8	32.8	24.9	88.2	70.4	28.2
36	04-10	-	0.7	8.4	31.7	24.5	92.1	70.7	19.8
37	11-17	-	-	9.8	33.3	24.5	86.3	64.7	01.8

38	18-24	-	-	7.8	34.3	24.3	88.7	56.3	00.0
39	25-1 Oct	-	-	6.7	33.3	23.0	89.1	60.0	00.0
40	2-8	-	-	6.4	34.4	24.2	92.3	62.4	00.0
41	9-15	-	-	5.4	33.8	18.2	84.3	38.4	00.0
42	16-22	-	-	5.8	33.4	15.4	83.4	29.7	00.0
43	23-29	-	-	4.2	32.2	14.8	87.6	34.7	00.0
44	30-5 Nov	-	-	4.7	29.8	12.3	94.7	35.7	00.0
45	6-12	-	-	5.2	29.3	11.6	91.3	41.3	00.0
46	13-19	-	-	3.6	27.6	09.5	87.6	31.7	00.0
47	20-26	-	-	3.1	28.8	11.4	73.9	27.4	00.0
48	27-03 Dec	-	-	1.8	24.4	09.2	98.0	57.4	00.0
49	4-10	-	-	0.0	21.2	09.9	100.0	70.6	00.0
50	11-17	-	-	0.8	22.0	07.3	95.6	49.0	00.0
51	18-24	-		0.0	21.5	06.5	93.0	55.4	00.0
52	25-31	-		0.0	22.2	08.3	99.1	62.7	08.0
1	1-7 Jan			0.6	16.2	03.4	99.6	61.3	19.0
2	8-15			0.0	17.5	05.0	98.7	63.3	03.6

Table-36.2(b): Correlation analysis between moth catches and weather parameters at Uchani (2016-17)

Correlation coefficient	Early shoot borer	Top borer	Stalk borer
Maximum temperature	0.62	0.47	0.32
Minimum temperature	0.39	0.32	0.28
Relative humidity (%) Morning	-0.74	0.24	0.18
Relative humidity (%) Evening	-0.42	0.18	0.16
Rainfall	-0.23	-0.27	-0.21

Table-36.2(c): Impact of moth catches on incidence of borer complex at Uchani (2016-17)

Period of observation	Shoot borer		Top borer		Stalk borer	
	% infestation		% infestation		infestation index	
	With pheromone trap	Without pheromone trap	With pheromone trap	Without pheromone trap	With pheromone trap	Without pheromone trap
April,2016	1.8	2.1	-	-	-	-
May, 2016	2.0	2.5	1.2	1.6	-	-
June, 2016	2.1	6.8	3.2	3.8	-	-
July, 2016	2.2	6.8	3.1	4.8	-	-
August, 2016	-	-	3.4	5.2	0.2	0.6
September, 2016	-	-	3.5	5.8	0.4	0.9
October, 2016	-	-	3.4	6.6	0.4	0.8
November, 2016	-	-	-	-	1.1	1.4
December, 2016	-	-	-	-	1.0	2.3
January,2017	-	-	-	-	1.1	2.7
February, 2017	-	-	-	-	1.1	2.8

Table-36.3(a): Moth catches of borer complex of sugarcane through lures at Shahjahanpur (2016-17)

SMW	Date	Shoot borer (Moth/trap)	Top borer (Moth/trap)	Stalk borer (Moth/trap)	Temperature ^{0}C		R.H.%		Rainfall (mm)/Days
					Max.	Min.	F.N.	A.N.	
1	2	3	4	5	6	7	8	9	10
09	26-4 March, 2016	0.00	0.33	0.00	29.84	13.70	85.63	50.13	-
10	5-11	0.00	0.67	0.33	30.28	17.01	79.86	44.16	0.1/1
11	12-18	0.00	3.00	1.67	29.99	16.13	76.99	46.49	4.2/2
12	19-25	0.33	0.67	2.33	33.23	16.20	60.57	36.29	-
13	26-01 April	0.33	0.00	1.67	34.77	18.86	64.14	29.57	-
14	2-8	0.67	0.00	1.67	37.99	21.26	62.00	25.57	-
15	9-15	1.33	0.33	1.33	38.07	22.90	39.57	17.86	-
16	16-22	2.67	1.67	0.00	39.97	24.39	49.14	19.29	-
17	23-29	4.00	2.00	0.00	39.89	21.47	41.00	14.86	-
18	30-06 May	5.67	4.67	1.33	38.53	22.46	53.71	32.57	10.6/1
19	7-13	6.33	5.33	2.67	36.46	24.54	64.86	42.00	-
20	14-20	2.33	1.00	0.67	41.10	26.16	67.14	37.57	-
21	21-27	2.00	1.33	1.33	37.49	24.17	72.29	51.29	17.00/2
22	28-03 June	1.67	1.67	2.00	38.21	25.69	72.57	47.88	9.00/02
23	04-10	1.33	0.67	1.00	37.74	27.00	67.71	52.43	-
24	11-17	1.67	2.67	3.33	38.17	27.91	70.57	54.71	-
25	18-24	2.00	1.33	1.33	34.96	27.30	81.86	70.86	50.2/3
26	25-01 July	0.33	1.00	2.00	35.73	28.03	82.57	64.14	-
27	2-8	0.33	3.33	1.67	32.80	24.31	94.43	74.57	187.6/6
28	9-15	0.67	6.67	1.33	35.11	27.66	87.14	76.00	19.6/2
29	16-22	1.67	1.67	0.67	32.27	25.51	93.43	79.57	148.00/6
30	23-29	2.33	0.00	0.00	31.17	26.11	91.71	90.43	66.2/5
31	30-05 August	1.67	0.00	0.00	33.26	26.13	83.29	76.00	67.00/4
32	06-12	1.67	0.67	1.33	33.29	26.24	87.14	83.14	57.8/4
33	13-19	0.67	2.00	2.00	33.17	26.30	89.86	74.57	79.4/4
34	20-26	0.33	0.67	2.67	33.87	25.79	82.14	68.29	-
35	27-02 September	0.33	0.33	2.67	34.60	25.56	85.29	66.71	50.2/1
36	03-09	0.00	0.00	4.67	33.14	26.01	84.43	63.43	-

37	10-16			3.00	34.23	25.17	85.29	71.00	107.6/3
38	17-23			2.67	33.80	25.16	84.71	71.43	0.6/1
39	24-30			1.67	33.39	23.80	87.86	62.43	-
40	01-07 October			1.00	34.17	25.26	88.14	70.71	28.4/2
41	08-14			1.33	33.29	21.66	80.43	48.86	-
42	15-21			0.67	32.89	17.67	86.29	46.57	-
43	22-28				32.63	16.39	75.29	38.00	-

Table-36.3(b): Correlation analysis between moth catches and weather parameters at Shahjahanpur (2016-17)

Parameter	Shoot Borer	Top Borer	Stalk Borer
Max. Temp.	0.5228	0.1595	-0.0023
Min. Tem.	0.2066	0.1487	0.2707
R.H.% FN	-0.4580	-0.0315	0.1341
R.H.% AN	-0.2758	0.0150	0.1644

Table-36.3(c): Impact of moth catches on incidence of borer complex at Shahjahanpur (2016-17)

Insect pest	% Incidence of Insect Pest	
	Treated (Pheromone Trap)	Untreated (Without pheromone Trap)
Shoot Borer	11.20	15.61
Top Borer (2nd brood)	4.10	6.28
Top Borer (3rd brood)	7.32	9.42
Top Borer (At harvest)	12.00	15.69
Stalk borer (Infestation index)	1.32	2.20

Table-36.4(a): Moth catches of borer complex of sugarcane through lures at Lucknow (2016-17)

Top borer		
II Brood (16-05-2016 to 31-05-2016)	**III Brood (16-06-2016to 16-07-2016)**	**IV Brood 19-08-2016 to 23-09-2016**
98 (16.33 moths/trap),	134 (22.33 moths /trap)	43 (7.17 moths/trap)

Table-36.4(b): Impact of moth catches of borer complex of sugarcane through lures at Lucknow (2016-17)

Treatments	**Brood-wise Incidence of top borer (%)**		
	II	**III**	**IV**
With pheromone traps	3.33 to 6.67 % (average 5.00%)	2.00 - 3.57 % (average 2.55 %)	2.50-12.346 (Average 6.77%).
Without pheromone traps	4.39-7.67 % (average 6.74%)	1.11-16.67 % (average 5.6 %),	9-11.42 % (average 9.42 %)

Table- 36.5(a): Moth Catch of borer complex of sugarcane through lures at Pusa (2016-17)

Months/year	Fortnightly Interval	Temperature (^{0}C)		Relative humidity (%)		Rainfall (mm)	No. of moth trapped/trap		
		Maximum	Minimum	Morning	Evening		ESB	TB	SB
March, 2016	I	29.1	16.9	85	47	2.0	0.33	0.00	0.00
	I I	33.7	17.1	80	34	3.6	1.66	0.33	0.00
April, 2016	I	37.2	21.2	69	30	3.2	5.33	5.00	0.00
	I I	39.3	22.2	73	28	0.0	6.66	6.33	0.00
May, 2016	I	35.2	23.4	83	50	65.2	7.33	5.00	0.00
	I I	33.8	22.7	83	56	67.6	5.33	4.66	0.00
June, 2016	I	36.2	26.2	80	55	28.4	6.00	7.33	0.00
	I I	34.2	26.2	87	67	76.7	6.00	7.00	0.00
July, 2016	I	32.9	26.4	89	73	100.6	6.33	6.66	0.00
	I I	30.9	23.9	92	84	203.5	0.66	1.33	1.00
August, 2016	I	33.4	26.3	87	68	107.4	0.00	0.00	2.33
	I I	34.0	24.2	85	65	3.4	0.00	0.00	3.33
September, 2016	I	31.9	25.8	93	79	170.4	0.00	0.00	1.00
	I I	30.8	23.2	92	78	148.8	0.00	0.00	0.66
October, 2016	I	33.1	23.9	90	67	34.6	0.00	0.00	1.33
	I I	39.1	21.8	86	48	0.0	0.00	0.00	2.33
November, 2016	I	30.9	18.2	85	39	0.0	0.00	0.00	0.66
	I I	27.2	13.6	87	49	0.0	0.00	0.00	0.00
December, 2016	I	23.2	11.3	88	63	0.0	0.00	0.00	0.00
	I I	21.3	11.2	92	67	0.0	0.00	0.00	0.00
January, 2017	I	20.8	8.2	93	60	0.0	0.00	0.00	0.00
	I I	24.1	9.1	93	65	0.0	0.00	0.00	0.00
Febuary, 2017	I	23.8	10.2	92	61	0.0	0.00	0.00	0.00
	I I	27.9	11.5	87	55	0.0	0.00	0.00	0.00

ESB- Early shoot borer, INB- Internode borer, TB- Top borer

Table- 36.5(b): Correlation analysis between moth catches and weather parameters at Pusa (2016-17)

Borer complex	Temperature ^{0}C		Relative humidity %		Rainfall (mm)
	Max.	Min.	Morning	Evening	
ESB	0.742**	0.642*	-0.329	-0.132	-0.165
TB	0.667*	0.815**	-0.210	0.070	-0.037
SB	0.668*	0.360	-0.414	-0.038	-0.248
S **Significant at 5% level (r± =0.4227) Significant at 1% level (r± = 0.5368)**					

Table- 36.5(c): Impact of moth catches of borer complex of sugarcane through lures at Pusa (2016-17)

Treatment	% incidence of borer complex		
	Early shoot borer	Top borer	Stalk borer
With pheromone traps	9.73	14.20	3.25
Without pheromone traps	14.25	17.80	5.95

Table-36.6 (a): Moth catches of borer complex of sugarcane through lures at Seorahi (2016-17)

SMW	Date	Shoot borer (moth/trap)	Top borer (moth/trap)	Stalk borer (moth/trap)	Temperature 0C		R. H. %		Rain fall(mm) /Days
					Max.	Min.	F.N.	AN.	
9	27-4 March 2016	0.00	0.66	0.00	13.6	28.6	74.42	45.28	-
10	5-11	1.33	3.00	0.66	14.0	28.1	71.71	43.57	-
11	12-18	1.00	10.33	2.33	13.71	28.45	74.85	47.0	0.8/01
12	19-25	1.66	1.66	2.00	14.71	31.97	72.42	44.25	-
13	26-01 April2016	0.33	2.66	1.33	16.85	32.14	18.79	42.14	-
14	2-8	0.66	0.00	0.00	20.51	32.8	73.71	49.14	-
15	9-15	3.00	0.00	0.00	23.91	36.14	65.85	41.28	-
16	16-22	7.66	2.33	0.00	25.71	37.22	61.71	36.42	-
17	23-29	10.66	3.33	1.66	25.4	38.8	63.0	34.42	-
18	30-06May2016	3.00	5.33	3.00	23.57	35.45	66.57	38.71	3.6/01
19	7-13	3.66	6.66	6.33	22.77	36.0	79.71	43.85	50.0/04
20	14-20	0.66	0.00	0.33	24.05	35.91	80.85	52.42	48.0/01
21	21-27	3.00	0.00	0.00	23.34	34.34	88.28	61.71	25.4/02
22	28-03 June2016	4.33	0.00	0.00	21.85	33.88	88.85	70.00	62.0/04
23	4-10	7.33	0.00	0.00	25.48	35.57	77.20	55.85	0.8/01
24	11-17	2.00	0.00	6.00	24.42	32.85	80.57	57.85	42.2/05
25	18-24	1.00	6.00	7.00	24.68	33.05	81.42	60.71	21.0/04
26	25-01 July2016	1.00	4.00	3.33	25.71	33.22	82.85	57.28	7.8/03
27	2-8	1.66	6.33	4.33	25.11	31.31	84.85	58.57	45.6/05
28	9-15	0.66	3.00	4.00	25.71	30.4	87.71	63.28	57.0/04
29	16-22	1.00	0.00	0.00	24.08	29.28	98.28	77.42	146.0/07
30	23-29	2.00	0.00	0.00	24.68	30.88	96.28	79.42	119.2/04
31	30-05 August16	1.00	0.00	5.00	25.14	32.74	94.57	66.0	33.6/04
32	6-12	0.66	1.00	1.33	25.14	31.2	91.42	66.42	48.4/05
33	13-19	0.00	1.66	2.00	25.05	32.02	87.42	61.71	17.0/03
34	20-26	0.00	1.00	1.00	25.62	33.54	85.42	57.71	7.8/01
35	27-02-Sept.2016	1.00	0.00	4.00	25.66	31.94	84.85	61.57	32.2/03

36	3-9	0.00	1.33	2.00	24.91	31.46	94.0	74.14	56.8/05
37	10-16	0.00	0.66	1.66	24.97	32.08	93.71	65.85	46.0/04
38	17-23	0.00	0.33	2.00	24.65	32.25	92.57	63.57	34.0/03
39	24-30	0.00	0.00	3.00	22.68	29.25	97.43	80.14	123.4/06
40	1-7 October2016	0.00	0.33	2.00	24.40	33.08	89.14	58.57	-
41	8-14	0.00	0.00	1.00	22.63	31.86	90.85	67.57	26.0/01
42	15-21	0.00	0.00	0.66	18.51	32.68	89.71	56.86	-
43	22-28	0.00	0.00	0.00	17.14	32.05	92.28	58.14	-

Table- 36.6(b): Correlation analysis between moth catches and weather parameters at Seorahi (2016-17)

Parameter	Shoot borer	Top borer	Stalk borer
Max. Temp.	+0.695	-0.186	+0.194
Min. Temp.	+0.231	-0.043	-0.025
R.H.% FN	-0.452	-0.4.05	+0.034
R.H. %AN	-0.332	-0.303	-0.026
Rainfall	-0.169	-0.211	+0.071

Table- 36.6(c): Impact of moth catches of borer complex of sugarcane through lures at Seorahi (2016-17)

Insect-pest	% Incidence of Insect-Pest	
	Treated Pheromone trap	Untreated without pheromone trap
Shoot borer	4.70	9.50
Top borer (2^{nd} brood)	1.73	3.55
Top borer (3^{rd} brood)	4.00	8.15
Top borer (At harvest)	5.12	8.02
Stalk borer (on cane basis)	6.12	9.08

Table-36.7(a): Moth catches of borer complex of sugarcane through lures at Padegaon (2016-17)

SMW	Temp		RH %		Rainfall (mm)	ESB (Moths/3 traps)	IB (Moths/3 traps)	TSB (Moths/3 traps)
	Max	Min	RH1	RH2				
01 (2016)	31.4	10.8	88.9	55.6	0.0	-	-	-
02	30.2	11.7	92.3	40.6	0.0	-	-	-
03	30.0	10.8	95.7	73.4	0.0	-	-	-
04	30.0	11.7	88.9	61.6	0.0	-	-	-
05	34.0	12.5	85.0	28.9	0.0	-	-	-
06	33.4	14.2	81.9	31.4	0.0	-	-	-
07	33.9	15.4	85.3	42.6	0.0	-	-	-
08	36.5	18.6	81.9	38.0	0.0	0	0	0
09	35.9	19.6	93.1	49.0	1.1	0	0	0
10	35.4	17.6	92.4	50.0	0.0	0	0	0
11	36.9	18.3	92.0	50.3	0.0	2	0	0
12	39.4	18.9	90.4	37.3	0.0	4	0	0
13	39.9	19.8	91.6	36.6	0.0	5	0	0
14	39.5	22.5	92.0	41.4	0.0	4	0	0
15	40.4	22.0	92.1	43.6	0.0	3	0	0
16	41.8	23.2	80.6	39.1	0.0	4	1	0
17	41.9	22.1	93.6	50.7	0.5	5	3	0
18	40.9	22.5	90.4	39.6	0.6	7	0	1
19	38.7	24.1	84.4	46.6	0.0	6	0	0
20	40.9	23.8	87.9	53.0	2.9	8	0	0
21	36.9	24.7	89.0	57.9	0.0	5	0	0
22	38.3	24.1	93.3	61.0	0.8	2	0	0
23	34.4	22.5	90.9	53.4	9.8	2	0	1
24	33.7	24.1	84.3	66.0	0.0	1	1	0
25	33.1	23.2	87.6	67.9	3.1	1	1	2
26	30.4	22.3	93.7	86.1	0.5	0	2	0
27	28.4	22.1	93.4	93.6	5.0	1	1	2
28	28.3	22.9	96.4	95.4	1.8	0	3	1

29	29.0	22.0	94.0	91.4	0.0	0	2	1
30	30.2	22.4	94.9	87.1	0.2	1	4	2
31	28.2	22.1	96.0	92.1	13.0	0	3	0
32	28.2	47.8	93.6	93.7	2.0	0	3	1
33	30.4	22.2	94.6	90.4	0.0	0	2	0
34	30.5	21.7	95.4	89.0	0.0	0	5	0
35	30.9	22.5	95.6	93.1	0.2	0	4	0
36	31.5	20.8	93.4	89.7	0.1	0	3	0
37	30.5	21.4	94.7	88.6	4.0	0	5	0
38	27.9	21.1	94.9	93.3	10.8	0	2	0
39	30.5	21.7	92.9	92.3	5.3	0	2	0
40	28.2	21.1	95.0	94.7	12.4	0	1	0
41	32.2	21.7	89.7	79.1	1.3	0	2	0
42	32.1	19.7	95.3	86.4	0.00	0	1	0
43	32.4	16.1	94.9	89.9	0.00	0	3	0
44	31.8	11.8	92.3	85.9	0.00	0	2	0
45	31.1	11.0	89.3	78.4	0.00	0	0	0
46	30.7	13.5	90.9	70.3	0.00	0	0	0
47	29.4	9.9	90.0	78.4	0.00	0	0	0
48	31.8	9.2	88.4	59.9	0.00	0	1	0
49	32.8	10.5	92.3	67.9	0.00	0	4	0
50	31.3	9.3	93.7	78.7	0.00	0	0	0
51	31.3	11.7	89.9	80.4	0.00	0	0	0
52	29.4	8.2	91.7	69.3	0.00	0	0	0
01 (2017)	29.8	7.7	91.0	66.4	0.00	0	0	0
02	28.9	8.2	84.9	55.4	0.00	0	0	0
03	28.7	10.2	89.7	58.0	0.00	0	0	0
04	31.0	12.1	92.7	72.1	0.00	0	0	0
05	31.7	11.5	89.8	66.0	0.00	0	0	0
06	33.5	11.9	93.6	75.1	0.00	0	0	0
07	33.0	11.8	90.4	68.3	0.00	0	0	0

Table- 36.7(b): Impact of moth catches of early shoot borer complex of sugarcane through lures at Padegaon (2016-17)

Treatment/s	Per cent incidence of early shoot borer					% reduction over control
	45 DAP	60 DAP	90 DAP	120 DAP	Cumulative %	
Pheromone trap @ 15 / ha (i.e. 3 per ½ acre)	4.35	5.66	2.31	0.64	**10.70**	50.12
Plot without Pheromone trap	11.67	14.35	5.36	1.36	**21.45**	--

Table- 36.7(c): Impact of moth catches of internode borer complex of sugarcane through lures at Padegaon (2016-17)

Treatment/s	Internode Borer (%)		Cane yield (t/ha)	% Increase over control (Yield)	Remarks
	Incidence (Intensity)	% reduction over control			
Pheromone trap @ 15 / ha (i.e. 3 per ½ acre)	25.33 (2.20)	47.96%	85.67	6.65 %	-
Plot without Pheromone trap	48.67 (6.67)		80.33		

Table-36.8(a): Moth catches of borer complex of sugarcane through lures at Pune (2016-17)

SMW	Mean Moths captured/week/trap		
	Early shoot borer	Internode borer	Top shoot borer
12	0	0	0
13	0.17	0	0
14	0	0	0.17
15	0.33	0	0
16	0.83	0.17	0
17	0.17	0	0
18	0.17	0	0
19	0	0	0
20	0	0	0
21	0	0	0
22	0	0	0
23	0	0	0
24	0	0	0
25	0.83	0.17	0.17
26	0.17	0	0.17
27	0	0	0
28	0.50	0.17	0
29	0	0	0
30	0	0	0
31	0	0	0
32	0	0	0
33	0	0.17	0
34	0.17	0	0
35	0	0	0
36	0	0	0
37	0	0	0
38	0	0	0
39	0	0	0

40	0	0	0
41	0.17	0	0
42	0	0	0
43	0	0	0
44	0	0	0
45	0	0	0
46	0	0	0
47	0	0.33	0
48	0	0	0

Table-36.8(b): The per cent incidence /intensity of borers in treated/control plot at Pune (2016-17)

Sr. No.	Month	Early shoot borer (% incidence)		Top shoot borer (% Incidence)		Internode borer					
						% incidence		% intensity		Infestation index	
		T	C	T	C	T	C	T	C	T	C
1	March 2016	4.83	2.24	0.00	0.00	-	-	-	-	--	-
2	April 2016	5.35	6.26	0.00	0.00	-	-	-	-	-	-
3	May 2016	10.59	6.53	0.00	0.00	-	-	-	-	-	-
4	June 2016	-	-	0.00	0.00	4.00	8.00	1.20	3.53	0.05	0.28
5	July 2016	-	-	0.00	0.00	0.00	4.00	0.00	0.53	0.00	0.02
6	August 2016	-	-	0.00	0.00	8.00	24.00	1.35	2.48	0.11	0.60
7	September 2016	-	-	-	-	12.00	16.00	0.76	1.36	0.09	0.22
8	October 2016	-	-	-	-	4.00	16.00	0.28	1.23	0.01	0.20
9	November 2016	-	-	-	-	16.00	20.00	1.63	2.30	0.26	0.46

T=Treated plot C=Control plot

Table-36.9: Moth catches of borer complex of sugarcane through lures at Powarkheda (2016-17)

2016	Meteorological Parameters						ESB (% infestation)			Moth
Date From To	SMW	Max. Temp.(C)	Min. Temp (C)	RH % Morn	RH % Even	Rainfall (mm)	Control Block	Lure Managed Block	Difference Over Control (+/-)	Captures/ day/trap
1 to 7/1	1	30.00	11.11	79.00	62.00	0.00	0.00	0.00	0.00	0.00
8 to 14/1	2	29.44	10.56	83.00	77.00	0.00	0.00	0.00	0.00	0.00
15 to 21/1	3	28.33	6.11	96.00	69.00	0.00	0.00	0.00	0.00	0.00
22 to 28/1	4	28.33	6.67	82.00	57.00	0.00	0.20	0.00	-0.20	0.00
29/1 to 4/2	5	31.67	8.89	91.00	67.00	0.00	0.20	0.20	0.00	0.10
5 to 11/2	6	31.67	10.00	80.00	52.00	0.00	0.40	0.20	-0.20	0.14
12 to 18/2	7	34.44	11.11	73.00	67.00	0.00	0.80	0.40	-0.40	0.19
19 to 25/2	8	35.56	12.78	78.00	40.00	0.00	1.40	0.80	-0.60	0.24
26/2 to 4/3	9	35.56	15.00	75.00	44.00	0.00	1.80	1.20	-0.60	0.29
5 to 11/3	10	37.22	16.67	72.00	53.00	0.00	2.20	1.60	-0.60	0.33
12 to 18/3	11	36.67	15.56	90.60	81.10	0.00	1.80	1.60	-0.20	0.48
19 to 25/3	12	38.89	15.56	68.20	60.20	0.00	2.20	2.00	-0.20	0.43
26/3 to 1/4	13	40.00	20.00	93.80	61.10	0.00	2.80	2.40	-0.40	0.52
2 to 8/4	14	41.67	20.56	--	-	0.00	3.20	2.80	-0.40	0.57
9 to 15/4	15	42.22	20.00	-	-	0.00	2.40	2.20	-0.20	0.67
16 to 22/4	16	42.78	23.33	-	-	0.00	1.80	1.80	0.00	0.57
23 to 29/4	17	41.67	23.89	-	-	0.00	1.40	1.40	0.00	0.48
30/4 to 6/5	18	42.78	23.33	-	-	0.00	1.00	0.80	-0.20	0.29
7 to 13/5	19	42.78	22.22	-	-	0.00	0.60	0.40	-0.20	0.33
14 to 20/5	20	46.67	27.22	--	-	0.00	0.40	0.20	-0.20	0.24
21 to 27/5	21	43.33	27.22	-	-	0.00	0.20	0.00	-0.20	0.19
28/5 to 3/6	22	43.33	27.22	54.00	41.00	0.00	0.20	0.00	-0.20	0.10
4 to 10/6	23	43.89	23.89	35.60	29.00	0.00	0.00	0.00	0.00	0.00
Total ……							**25.00**	**20.00**	**-5.00**	-

Table-36.10(a): Moth catches of borer complex of sugarcane through lures at Navsari (2016-17)

SMW	Date	Temperature ^{0}C		RH %		Sun shine (hrs/day)	Rain Fall (mm)	Rainy days	ESB (Moths/trap)	TB (Moths/trap)	INB (Moths/trap)
		Max ^{0}C	Min ^{0}C	Mor.	Eve.						
1	1-7	33.1	26.8	82.8	24.8	8.9	0.0	0.0	2	2	2
2	8-14	30.9	12.5	86.5	31.9	7.8	0.0	0.0	2	2	1
3	15-21	28.1	11.3	82.6	35.2	6.9	0.0	0.0	1	2	2
4	22-28	30.1	10.4	69.1	30.9	9.6	0.0	0.0	1	3	2
5	29-4	31.8	12.9	84.6	30.7	9.4	0.0	0.0	3	2	2
6	5-11	30.3	12.9	86.7	38.0	9.9	0.0	0.0	1	2	1
7	12-18	29.5	13.8	85.1	35.1	7.7	0.0	0.0	1	2	2
8	19-25	32.6	15.9	84.3	34.7	8.6	0.0	0.0	2	2	2
9	26-4	34.3	18.6	79.5	34.9	8.6	0.3	0.0	2	3	2
10	5-11	33.9	17.4	88.3	27.7	8.6	0.0	0.0	2	2	2
11	12-18	33.5	18.4	84.7	35.9	9.0	0.0	0.0	1	2	2
12	19-25	36.3	19.0	82.5	21.1	9.1	0.0	0.0	1	4	1
13	26-1	38.0	19.6	87.5	29.7	8.2	0.0	0.0	3	3	1
14	2-8	34.8	21.5	91.4	41.7	7.5	0.0	0.0	1	2	2
15	9-15	36.8	21.0	83.0	30.6	9.4	0.0	0.0	2	2	1
16	16-22	36.5	22.9	84.9	39.4	9.8	0.0	0.0	2	1	1
17	23-29	33.8	22.8	69.6	45.5	10.5	0.0	0.0	1	4	2
18	30-6	34.9	24.1	86.7	53.2	9.3	0.0	0.0	1	3	3
19	7-13	33.8	25.2	86.8	59.6	9.3	0.0	0.0	2	2	2
20	14-20	36.0	26.4	87.5	54.2	9.2	0.0	0.0	1	2	1
21	21-27	33.5	28.4	78.5	62.7	8.6	0.0	0.0	2	2	1
22	28-3	34.7	28.1	74.2	60.0	9.4	0.0	0.0	3	3	4
23	4-10	34.2	28.3	83.9	76.9	7.5	0.0	0.0	0	2	1
24	11-17	34.3	28.3	82.3	69.1	7.2	0.1	0.0	2	3	1
25	18-24	33.6	27.2	83.6	62.4	3.4	0.7	0.1	1	2	3
26	25-1	32.7	25.2	91.1	79.9	4.8	12.2	0.3	1	1	3
27	2-8	30.0	25.6	93.8	85.1	1.9	28.7	0.7	1	2	1
28	9-15	30.1	25.5	91.6	83.0	0.7	2.9	0.4	2	1	2

29	16-22	29.9	24.4	92.1	79.6	2.7	12.2	1.0	1	2	1
30	23-29	29.5	24.3	95.4	83.2	0.4	12.3	0.4	1	2	2
31	30-5	28.3	24.5	95.3	90.0	0.6	30.4	1.0	2	4	3
32	6-12	29.2	24.5	94.5	87.9	1.7	16.7	1.0	1	2	1
33	13-19	30.2	25.5	90.5	77.5	3.4	0.3	0.0	1	2	2
34	20-26	29.9	25.0	86.6	80.1	2.6	1.8	0.4	2	1	1
35	27-2	30.4	24.8	95.4	69.1	4.1	3.1	0.4	0	2	2
36	3-9	30.1	23.9	88.4	73.3	6.4	21.4	0.3	1	1	1
37	10-16	30.3	23.6	103.7	73.4	4.9	2.9	0.3	1	1	1
38	17-23	28.7	23.6	98.6	88.3	0.4	41.4	0.7	1	3	2
39	24-30	31.1	23.1	95.5	74.6	4.5	9.4	0.4	1	2	1
40	1-7	29.8	23.9	97.4	81.8	2.9	8.4	0.6	2	2	1
41	8-14	30.4	22.7	95.7	72.9	5.6	5.3	0.1	3	2	2
42	15-21	33.5	19.9	93.9	46.3	8.3	0.0	0.0	2	3	2
43	22-28	33.1	18.3	84.4	37.7	9.3	0.0	0.0	2	2	3
44	29-4	31.9	17.2	67.6	58.8	9.5	0.0	0.0	3	5	1
45	5-11	33.5	14.5	82.2	21.6	9.4	0.0	0.0	1	3	4
46	12-18	33.2	15.9	75.4	32.0	8.7	0.0	0.0	2	1	5
47	19-25	33.1	13.4	69.3	24.0	9.3	0.0	0.0	3	2	2
48	26-2	33.7	13.1	79.2	25.8	9.7	0.0	0.0	4	5	3
49	3-9	32.6	15.2	69.5	31.8	9.0	0.0	0.0	2	2	2
50	10-16	32.0	13.3	71.7	27.4	9.4	0.0	0.0	2	1	4
51	17-23	32.1	14.5	72.0	27.4	8.7	0.0	0.0	2	3	2
52	24-31	31.5	12.2	72.4	27.3	9.0	0.0	0.0	2	5	3

Table-36.10(b): Correlation analysis between moth catches and weather parameters at Navsari (2016-17)

Pests	Temperature (^{0}C)		Relative Humidity (%)		Rainfall (mm)	No. of rainy days	Sun shine hours
	Max.	Min.	Morning	Evening			
1	2	3	4	5	6	7	8
ESB	0.2409*	-0.2744*	-0.3503**	-0.3250**	-0.2343*	-0.2610*	0.3170**
TB	0.1501	-0.2316*	-0.3583**	-0.2266*	-0.0163	-0.1125	0.2480*
INB	0.0497	-0.2456*	-0.3119*	-0.2728*	-0.1065	-0.2028	0.1723
*** Significant at 0.05 (r = ± 0.2262), ** Significant at 0.01 (r = ± 0.3158)**							

ESB- Early shoot borer, TB- Top borer, INB- Internode borer

Table-36.11(a): Moth catches of borer complex of sugarcane through lures at Mandya (2016-17)

Standard Weeks	Catches/ Trap/week			Temperature (^{0}C)			No. of rainy days	Rainfall (mm)	Relative humidity (%)		Sunshine hours day^{-1}
	ESB	TSB	INB	Max.	Min.	Mean			Morning	Afternoon	
1	1.50	0.0	0.00	29.9	9.6	19.75	0	0.0	71	30	3.4
2	0.33	0.00	0.00	29.5	11.0	20.25	0	0.0	75	33	6.6
3	1.33	0.00	0.00	30.3	12.9	21.60	0	0.0	85	41	5.7
4	1.00	0.00	0.33	30.3	16.1	23.20	0	0.0	83	60	6.7
5	1.00	0.00	0.00	29.7	14.8	22.25	0	0.0	92	63	7.7
6	0.33	0.33	1.00	30.4	13.8	22.10	0	0.0	89	60	7.2
7	1.67	0.00	0.33	30.7	15.3	23.00	0	0.0	91	63	7.4
8	0.00	0.33	0.00	34.3	17.1	25.70	0	0.0	77	71	6.9
9	1.00	1.00	0.00	34.4	14.8	24.60	0	0.0	82	69	8.1
10	1.25	0.00	0.33	35.1	14.7	24.90	0	0.0	80	77	4.8
11	1.33	0.00	0.00	35.9	14.8	25.35	0	0.0	72	58	3.3
12	0.33	0.00	0.00	36.7	15.4	26.05	0	0.0	86	60	6.1
13	1.00	0.33	1.00	36.4	15.6	26.00	0	0.0	79	65	6.4
14	1.00	0.00	0.00	36.6	16.2	26.40	0	0.0	77	67	6.4
15	0.00	0.00	0.00	36.8	17.4	27.10	0	0.0	86	68	6.4
16	1.33	0.00	0.33	37.1	16.0	26.40	0	0.0	84	64	6.6
17	2.00	2.00	0.00	37.4	16.0	27.10	0	0.0	87	66	6.6
18	2.00	1.00	0.00	37.9	15.8	26.85	0	0.0	85	63	6.6
19	1.67	0.00	0.33	37.3	16.6	26.95	1	20.0	83	64	6.3
20	0.00	2.00	1.00	37.1	16.1	26.60	0	0.0	83	67	6.1
21	1.00	0.33	0.00	36.0	15.0	25.50	0	0.0	80	71	5.0
22	1.00	2.00	0.67	34.8	20.3	27.55	1	14.4	83	72	5.7
23	3.00	1.33	1.00	34.9	19.5	27.20	3	55.6	88	75	5.4

24	2.00	3.00	2.00	31.9	20.3	26.10	1	12.4	83	79	5.0
25	1.00	2.00	0.00	31.4	19.8	25.60	2	20.2	84	80	2.2
26	0.33	0.00	0.33	31.7	19.6	25.65	2	15.6	89	79	3.3
27	0.00	3.00	1.00	29.7	20.8	25.25	2	10.3	91	73	3.5
28	0.00	6.33	0.00	30.4	20.4	25.40	1	3.7	86	60	5.8
29	1.30	4.00	0.00	31.9	21.0	26.45	1	3.6	82	57	4.8
30	1.00	1.00	0.67	32.1	20.6	26.35	2	42.1	88	56	4.2
31	0.00	0.00	0.00	29.7	20.0	24.85	0	4.1	90	65	3.5
32	0.00	4.00	0.00	30.9	19.9	25.40	0	1	94	54	7.6
33	1.00	2.00	0.00	33.1	19.6	26.35	0	0	91	56	6.2
34	0.00	2.33	1.33	33.4	20.7	27.05	1	37.4	92	48	6.1
35	0.00	3.00	1.00	33.2	21.1	27.15	2	65.7	94	61	1.8
36	0.00	1.00	1.00	33.4	18.9	26.15	1	0	91	59	3.1
37	1.00	3.00	2.00	33.3	18.4	25.85	2	62.2	91	61	1.9
38	0.00	1.33	0.33	33.2	20.1	26.65	0	0	93	63	1.0
39	1.33	0.00	0.00	33.3	18.6	25.95	1	6	93	60	3.9
40	0.00	0.00	0.00	33.5	18.3	25.90	0	0	91	52	7.3
41	0.00	2.00	0.00	33.3	19.0	26.15	2	65	90	61	4.9
42	1.67	1.00	0.33	36.5	16.6	26.55	0	0	79	50	6.0
43	1.00	0.00	0.00	34.7	15.2	24.95	0	0	91	53	7.9
44	0.33	1.00	0.00	33.9	18.8	26.35	1	4.4	77	53	8.2
45	1.00	2.00	1.00	32.5	15.8	24.15	0	0	91	42	9.2
46	0.00	0.00	0.00	31.4	18.5	24.95	0	0	88	49	8.9
47	1.00	0.00	0.00	32.1	14.2	23.15	0	0	92	37	9.7
48	0.00	0.00	0.00	30.7	11.1	20.90	0	0	92	40	7.6

Table-36.11(b): Correlation analysis between moth catches and weather parameters at Mandya (2016-17)

Pest	Temperature			Relative humidity		Sunshine Hours	Rainfall (mm)
	Max.	Min.	Mean	Mor. RH	Evn. RH		
ESB	0.288	-0.200	0.047	-0.274	0.142	0.041	0.035
TSB	-0.158	0.596*	0.347	0.223	0.147	-0.222	0.336
INB	-0.004	0.309	0.226	0.200	0.227	-0.280	0.474
***Correlation is significant at the 0.05 level; ESB- Early shoot borer, TB- Top shoot borer, INB- Internode borer**							

Table-36.12(a): Moth catches of borer complex of sugarcane through lures at Anakapalle (2016-17)

SMW	Moth catches/ week/ trap		Temperature (^{0}C)		Relative humidity (%)		Evaporation (mm)	Rainy days	Rainfall	Sunshine
	ESB	INB	Max	Min	Morn	Evening				
15	-	-	21.1	37.8	84	45	0	0	2.2	7
16	-	-	27.7	35.6	84	53	0	0	3.3	6.8
17	-	-	29.2	36.8	81	54	0	0	4.1	7.5
18	-	-	27.7	36.8	79	52	16.4	1	3.2	7.4
19	-	-	27.8	35.9	78	55	39	1	1.8	5.5
20	6	-	27.2	32.9	91	43	148.8	3	3.7	5.9
21	15	-	29.2	37.9	82	51	3.4	1	1.6	5
22	26	-	28	36.3	85	61	13.2	1	1.6	5.3
23	31	-	27	31.9	89	71	70.4	1	1.6	2.6
24	4	-	28.5	37.3	81	56	21	1	2.4	5.4
25	6	1	27.5	32.4	90	65	10	2	1.1	3.8
26	6	3	26.1	29.6	91	84	89.4	5	0.8	2.4
27	4	11	27	32.3	88	66	49.2	2	1.7	3.4
28	4	14	27.8	33	80	61	1.2	0	1.3	4.6
29	4	18	27.3	32.3	87	71	11.4	1	0.7	3.9

30	5	13	26	30.2	95	79	24.8	4	0.2	3.1
31	3	23	26.3	30.8	90	77	56	4	0.4	3
32	0	10	28.3	34.4	83	53	2	0	0.3	4.4
33	0	13	27.6	34.7	80	53	5.6	1	0.5	4.9
34	0	17	27	34.2	86	59	71.2	2	0.3	4.7
35	0	10	27.1	31.8	90	73	58.8	6	0.4	3.8
36	0	21	26.8	33.6	84	59	2.8	1	0.1	3.2
37	0	17	26.7	29.5	93	73	114.6	5	0.2	2.2
38	0	13	26.5	31	94	59	93.4	4	0.2	2.7
39	0	18	25.9	28.5	97	86	135.5	6	0.2	1.4
40	0	11	26	31.5	93	81	116	4	0.1	2.6
41	0	10	25.7	32.4	87	88	50.6	1	0.1	3.4
42	0	11	23.8	32.5	79	43	0	0	0.1	3.5
43	0	8	23.1	31.9	54	47	3.2	1	0.02	3.5
44	0	5	24.7	30.6	89	67	14.2	1	0.3	3.2
45	0	9	20.5	31.5	85	38	0	0	0.2	3.6
46	0	3	21.4	31.2	85	50	0	0	0.03	3.2
47	0	3	17.9	30.7	87	34	0	0	0.03	3.6
48	0	3	18.3	31.6	89	43	0	0	0.01	3.4
49	0	1	19.5	30.9	86	40	0	0	0.02	3.4
50	0	1	21.2	30.2	80	44	0	0	0.5	3.3
51	0	1	17.2	30.4	89	41	0	0	0.05	3.4
52	0	1	17.9	30.5	91	46	0	0	0.3	2.8
1	0	1	17.1	30.8	91	46	0	0	0.1	3.2
2	3	0	16.5	30.6	91	50	0	0	0.1	3.1
3	2	0	15.9	31.1	87	31	0	0	0.5	4
4	2	0	15.4	31.4	88	38	0	0	0.5	4.2

5	6	0	18.3	31.9	96	48	0	0	1	3.6
6	9	0	17	33	96	43	0	0	0.1	4.2
7	6	0	16.2	32.7	89	38	0	0	0.2	4.6
8	2	0	21	33.9	93	51	0	0	0.2	4.3
9	1	0	17.6	34.2	93	41	0	0	0.2	4.9
10	0	0	22.3	34.4	89	59	26.6	2	1	5.3

Table-36.12(b): Impact of moth catches of borer complex of sugarcane through lures at Anakapalle (2016-17)

Treatment	Incidence of early shoot borer up to 120 DAP					Per cent reduction over untreated control
	at 30 DAP	at 60 DAP	at 90 DAP	at 120 DAP	Cumulative up to 120 DAP	
Plot with pheromone traps @ 25 traps/ha	4.47	10.58	2.71	0	17.76	44.83
Plot without pheromone traps	9.04	17.33	5.82	0	32.19	

Table-36.12(c): Impact of moth catches of borer complex of sugarcane through lures at Anakapalle (2016-17)

Treatment	Internode borer (%)			Per cent sucrose (%)	Cane yield (t/ha)	Per cent increase over control	Cost Benefit ratio
	Incidence	Intensity	Per cent reduction over untreated control				
Plot with pheromone traps @ 25traps/ha	31.00	2.60	50.79	21.00	82.00	3.82	1:1.20
Plot without pheromone traps	63.00	6.80	-	20.6 0	78.98	-	1:1.03

Table-36.12(d): Correlation analysis between moth catches and weather parameters at Anakapalle (2016-17)

Weather parameters	Correlation coefficient (r)	
	Early shoot borer moth catch	Internode borer moth catch
Rainfall	0.06	0.50
No. of rainy days	-0.04	-0.24
Max. temp (^{o}) C	0.25	0.55
Min. temp (^{o}) C	0.35	-0.11
Morning RH (%)	0.06	-0/07
Evening RH (%)	0.14	0.67
Evaporation (mm)	0.50	0.37
Sunshine hours	0.18	-0.35

Table-37.1: Bioefficacy of new insecticides for the control of sugarcane early shoot borer at Kapurthala (Punjab) (2016-17)

Treat. No.	Treatment	Cumulative percent incidence of early shoot borer (ESB)	Number of millable cane (t/ha)	Cane yield (t/ha)	Growth Parameter				Quality parameter			
					Total cane height (cm)	Millable cane height (cm)	Number of internodes	Girth of cane (cm)	Brix (%)	Sucrose (%) in Juice	Purity (%)	CCS (%)
T_1	Fipronil 0.3 G @ 25 kg	4.00cd	68.96cd	82.08c	273.60 de	245.83b	20.33d	2.14a	19.26 a	17.36abc	90.12ab	12.12 bcd
T_2	Chlorantraniliprole 0.4G @ 22.5 kg	1.00a	73.25a	88.68a	282.00 ab	253.83a	22.50ab	2.17a	19.36 a	17.48a	90.26a	12.21 ab
T_3	Chlorantraniliprole 18.5 SC @ 375 ml/ha	0.68a	73.89a	89.52a	283.17 a	254.13a	22.67a	2.18a	19.40 a	17.51a	90.26a	12.23 a
T_4	Spinosad 45SC @ 90 ml/ha	3.29bc	69.00bcd	83.34bc	276.67 cd	248.77b	21.00c	2.16a	19.32 a	17.40abc	90.06b	12.14 abcd
T_5	Flubendiamide 39.35 SC @ 125 ml/ha	2.79b	70.82b	85.71b	279.00 bc	250.45b	21.67bc	2.16a	19.36 a	17.44ab	90.10ab	12.17 abc
T_6	Phorate 10 G @ 15 kg/ha	4.54de	70.11bc	78.52d	270.73 e	237.67d	18.67e	2.11ab	19.17 b	17.26c	90.07b	12.04 d
T_7	Carbofuron 3 G @ 33 kg/ha	4.15de	68.63cd	79.26d	271.53 e	242.73c	19.33e	2.13a	19.23 ab	17.32bc	90.04b	12.08 cd
T_8	Control	12.31f	59.63e	70.16e	254.93 f	220.67e	16.33f	1.99b	18.05 c	16.16d	89.49c	11.24 e
	CD (0.05)	**0.83**	**1.84**	**2.57**	**3.82**	**3.59**	**0.94**	**0.22**	**0.20**	**0.15**	**0.18**	**0.10**

Table-37.2: Bioefficacy of new insecticides for the control of sugarcane early shoot borer at Shahjahanpur (2016-17)

Treat. No.	Treatment details	Early Shoot Borer Incidence (%)					Millable Canes (000/ha)	Average Cane Yield (t/ha)
		45 DAP	60 DAP	90 DAP	120 DAP	Cumulative incidence		
T_1	Soil application of Fipronil 0.3 G @ 25 kg /ha at the time of planting and 60 DAP (75 g ai/ha)	0.79	1.71	4.49	1.73	5.64	129a	143ab
T_2	Soil application of Chlorantraniliprole 0.4 G @ 22.5 kg/ha at the time of planting and 60 DAP (90 g ai/ha)	0.88	0.76	2.65	1.26	4.20	122a	125b
T_3	Spraying of Chlorantraniliprole 18.5 SC 375 ml/ha at 30 and 60 DAP (70 g ai/ha)	0.53	1.44	3.23	1.16	3.74	129a	154a
T_4	Spraying of Spinosad 45 SC @ 90 ml/ha at 30 and 60 DAP (40 g ai/ha)	1.37	1.61	4.37	1.58	5.68	127a	124b
T_5	Spraying of Flubendiamide 39.35 SC @ 125 ml/ ha at 30 and 60 DAP (50 g ai/ha)	0.92	1.72	3.75	1.21	4.94	134a	125b
T_6	Soil application of Phorate 10 G @ 15 kg/ha at the time of planting and 60 DAP (1500 g ai/ha)	1.41	1.48	3.99	1.45	5.56	133a	145ab
T_7	Soil application of Carbofuran 3 G @ 33 kg/ha at the time of planting and 60 DAP (1000 g ai/ha)	0.88	1.50	3.57	1.37	4.78	127a	142c
T_8	Untreated control.	1.08	1.87	3.88	1.85	5.91	97b	92
	S. E. ±	**0.56**	**0.33**	**0.53**	**0.31**	**-**	**6.11**	**12.48**
	C.D. at 5 %	**NS**	**NS**	**NS**	**NS**	**-**	**13.11**	**26.78**

Table-37.3: Bioefficacy of new insecticides for the control of sugarcane early shoot borer at Pusa (2016-17)

Treat. No.	Treatment details	Cumulative incidence of ESB (%)	Cane Yield (t/ha)
T_1	Soil application of Fipronil 0.3 G @ 25 kg /ha at the time of planting and 60 DAP (75 g ai/ha)	6.35ab	81.90a
T_2	Soil application of Chlorantraniliprole 0.4 G @ 22.5 kg/ha at the time of planting and 60 DAP (90 g ai/ha)	5.95ab	85.00a
T_3	Spraying of Chlorantraniliprole 18.5 SC 375 ml/ha at 30 and 60 DAP (70 g ai/ha)	5.00a	86.20a
T_4	Spraying of Spinosad 45 SC @ 90 ml/ha at 30 and 60 DAP (40 g ai/ha)	9.00c	77.50a
T_5	Spraying of Flubendiamide 39.35 SC @ 125 ml/ ha at 30 and 60 DAP (50 g ai/ha)	7.00b	83.20a
T_6	Soil application of Phorate 10 G @ 15 kg/ha at the time of planting and 60 DAP (1500 g ai/ha)	8.90c	78.00a
T_7	Soil application of Carbofuran 3 G @ 33 kg/ha at the time of planting and 60 DAP (1000 g ai/ha)	7.23b	80.10a
T_8	Untreated control.	18.66d	67.20b
	S. E. ±	**0.523**	**3.36**
	C.D. at 5 %	**1.59**	**10.21**
	C.V. (%)	**10.66**	**7.30**

Table-37.4: Bioefficacy of new insecticides for the control of sugarcane early shoot borer at Seorahi (2016-17)

S.N.	Treatments	%Incidence of Shoot borer				Cumu. %incidence of ESB	NMC/ha (000)	Cane Yield (t/ha)
		45DAP	60DAP	90DAP	120DAP			
T_1	Soil application of Fipronil 0.3 G @ 25 kg /ha at the time of planting and 60 DAP (75 g ai/ha)	1.22	1.86	3.80	5.37	11.34	112abc	79.01b
T_2	Soil application of Chlorantraniliprole 0.4 G @ 22.5 kg/ha at the time of planting and 60 DAP (90 g ai/ha)	1.42	1.62	3.52	4.51	9.98	112bc	77.67bc
T_3	Spraying of Chlorantraniliprole 18.5 SC 375 ml/ha at 30 and 60 DAP (70 g ai/ha)	1.06	2.01	3.00	4.39	9.40	107c	85.50a
T_4	Spraying of Spinosad 45 SC @ 90 ml/ha at 30 and 60 DAP (40 g ai/ha)	2.11	3.31	3.76	5.25	12.61	110c	79.62b
T_5	Spraying of Flubendiamide 39.35 SC @ 125 ml/ ha at 30 and 60 DAP (50 g ai/ha)	1.32	1.50	3.04	4.38	9.35	106c	75.82bc
T_6	Soil application of Phorate 10 G @ 15 kg/ha at the time of planting and 60 DAP (1500 g ai/ha)	0.89	1.08	3.79	5.22	10.03	119a	78.18bc
T_7	Soil application of Carbofuran 3 G @ 33 kg/ha at the time of planting and 60 DAP (1000 g ai/ha)	2.01	2.21	3.50	5.32	11.50	116ab	84.77a
T_8	Untreated control.	2.95	3.26	5.21	6.05	14.70	109c	74.58c
	S. E. ±	**0.13**	**0.13**	**0.21**	**0.19**	**-**	**2.60**	**1.39**
	C.D. at 5 %	**0.41**	**0.40**	**0.64**	**0.60**	**-**	**7.89**	**4.23**

Table-37.5: Bioefficacy of new insecticides for the control of sugarcane early shoot borer at Padegaon (2016-17)

Treat. No.	Treatment details	Early Shoot Borer Incidence (%)					Millable Canes (000/ha)	Average Cane Yield (t/ha)
		45 DAP	60 DAP	90 DAP	120 DAP	Cumulative incidence		
T_1	Soil application of Fipronil 0.3 G @ 25 kg /ha at the time of planting and 60 DAP (75 g ai/ha)	6.20 (14.34)	7.97 (16.29)	3.20 (10.26)	4.19 (11.81)	12.35 (20.56)b	76.02abc	87.78b
T_2	Soil application of Chlorantraniliprole 0.4 G @ 22.5 kg/ha at the time of planting and 60 DAP (90 g ai/ha)	1.04 (4.77)	3.11 (10.10)	1.95 (7.82)	3.52 (10.79)	7.47 (15.83)a	82.31a	95.83a
T_3	Spraying of Chlorantraniliprole 18.5 SC 375 ml/ha at 30 and 60 DAP (70 g ai/ha)	2.80 (9.37)	5.03 (12.69)	2.98 (9.92)	3.97 (11.46)	10.25 (18.58)ab	79.54ab	91.67ab
T_4	Spraying of Spinosad 45 SC @ 90 ml/ha at 30 and 60 DAP (40 g ai/ha)	11.46 (19.76)	19.07 (25.86)	8.03 (16.29)	6.90 (15.15)	24.24 (29.45)de	68.06d	70.28c
T_5	Spraying of Flubendiamide 39.35 SC @ 125 ml/ ha at 30 and 60 DAP (50 g ai/ha)	10.84 (19.16)	17.04 (24.36)	6.01 (14.00)	6.01 (14.14)	21.60 (27.68)cd	69.54d	72.31c
T_6	Soil application of Phorate 10 G @ 15 kg/ha at the time of planting and 60 DAP (1500 g ai/ha)	11.73 (20.01)	21.92 (27.89)	9.48 (17.84)	8.05 (16.41)	26.93 (31.24)e	65.00de	69.07c
T_7	Soil application of Carbofuran 3 G @ 33 kg/ha at the time of planting and 60 DAP (1000 g ai/ha)	8.06 (16.46)	13.97 (21.90)	5.05 (12.94)	5.11 (12.91)	19.18 (25.92)c	70.56cd	74.63c
T_8	Untreated control.	15.75 (23.36)	25.04 (30.02)	12.95 (21.02)	10.06 (18.45)	33.00 (35.02)f	61.02e	60.56d
S. E. ±		**1.33**	**1.21**	**1.18**	**0.95**	**1.04**	**1.89**	**2.07**
C.D. at 5 %		**4.02**	**3.67**	**3.56**	**2.87**	**3.16**	**5.71**	**6.26**
C.V. (%)		**14.46**	**9.92**	**14.80**	**11.80**	**7.08**	**4.57**	**4.61**
Figures inside parentheses are arcsine transformed values and those outside are original values								

Table-37.6: Bioefficacy of new insecticides for the control of sugarcane early shoot borer at Powarkheda (2016-17)

Sr. No.	Treatments	ESB (%)						Diameter (mm)	Height (cm)	NMC (000'/ha)	Cane Yield (t/ha)	% increase
		Germi. (%)	30 DAP	60 DAP	90 DAP	120 DAP	Cumu.					
T_1	Soil application of Fipronil 0.3 G @ 25 kg /ha at the time of planting and 60 DAP (75 g ai/ha)	74.74	0.72	1.75	1.45	1.48	3.22a	24.43	203.63	78.24ab	88.27a	18.67
T_2	Soil application of Chlorantraniliprole 0.4 G @ 22.5 kg/ha at the time of planting and 60 DAP (90 g ai/ha)	75.13	0.71	1.58	1.31	1.47	3.03a	24.17	202.43	79.63a	89.35a	20.13
T_3	Spraying of Chlorantraniliprole 18.5 SC 375 ml/ha at 30 and 60 DAP (70 g ai/ha)	73.96	8.59	2.18	2.15	1.71	5.57b	23.90	204.23	76.70bc	84.41bc	13.48
T_4	Spraying of Spinosad 45 SC @ 90 ml/ha at 30 and 60 DAP (40 g ai/ha)	77.61	7.94	3.86	4.66	4.70	10.26d	23.93	199.30	75.93c	80.09d	7.68
T_5	Spraying of Flubendiamide 39.35 SC @ 125 ml/ ha at 30 and 60 DAP (50 g ai/ha)	75.26	8.10	3.76	1.38	1.55	5.36b	23.97	200.00	76.54bc	85.96b	15.57
T_6	Soil application of Phorate 10 G @ 15 kg/ha at the time of planting and 60 DAP (1500 g ai/ha)	75.91	1.61	3.49	2.77	4.62	7.89c	24.03	199.53	76.39bc	82.25cd	10.58
T_7	Soil application of Carbofuran 3 G @ 33 kg/ha at the time of planting and 60 DAP (1000 g ai/ha)	74.74	2.65	5.07	5.56	5.14	10.79d	23.83	199.70	76.08bc	80.09d	7.68
T_8	Untreated control.	73.18	8.64	10.24	10.54	6.83	17.33e	23.77	199.00	73.46d	74.38e	0.00
S Em ±		**1.21**	**0.33**	**0.16**	**0.15**	**0.14**	**0.21**	**0.31**	**2.07**	**0.74**	**0.74**	-
CD @ 5 %		**NS**	**1.01**	**0.49**	**0.45**	**0.43**	**0.64**	**NS**	**NS**	**2.25**	**2.25**	-

Table-37.7: Bioefficacy of new insecticides for the control of sugarcane early shoot borer at Navsari (2016-17)

Treat No	Treatment details	Early shoot borer (% incidence)				Cumulative % incidence	Cane Yield (t/ha)
		45 DAP	60 DAP	90 DAP	120 DAP		
T_1	Soil application of Fipronil 0.3 G @ 25 kg /ha at the time of planting and 60 DAP (75 g ai/ha)	15.14 (22.90)	16.16 (23.70)	18.34 (25.36)	20.24 (26.74)	20.12	123.63bc
T_2	Soil application of Chlorantraniliprole 0.4 G @ 22.5 kg/ha at the time of planting and 60 DAP (90 g ai/ha)	12.37 (20.59)	15.56 (23.23)	17.27 (24.55)	17.72 (24.89)	13.94	132.21a
T_3	Spraying of Chlorantraniliprole 18.5 SC 375 ml/ha at 30 and 60 DAP (70 g ai/ha)	15.58 (23.25)	15.27 (23.00)	16.64 (24.08)	19.47 (26.18)	16.47	128.61ab
T_4	Spraying of Spinosad 45 SC @ 90 ml/ha at 30 and 60 DAP (40 g ai/ha)	17.20 (24.50)	16.38 (23.87)	19.06 (25.89)	21.76 (27.80)	22.26	120.36cd
T_5	Spraying of Flubendiamide 39.35 SC @ 125 ml/ ha at 30 and 60 DAP (50 g ai/ha)	16.58 (24.03)	16.11 (23.66)	17.74 (24.91)	21.19 (27.41)	21.36	121.44cd
T_6	Soil application of Phorate 10 G @ 15 kg/ha at the time of planting and 60 DAP (1500 g ai/ha)	18.05 (25.14)	17.57 (24.78)	20.91 (27.21)	22.89 (28.59)	24.41	104.87e
T_7	Soil application of Carbofuran 3 G @ 33 kg/ha at the time of planting and 60 DAP (1000 g ai/ha)	18.63 (25.57)	18.81 (25.71)	18.73 (25.64)	22.25 (28.14)	25.19	94.76f
T_8	Untreated control.	22.71 (28.46)	25.89 (30.58)	27.23 (31.45)	28.78 (32.44)	34.85	80.06g
S. Em ±		**1.72**	**0.39**	**0.44**	**0.48**	**-**	**1.82**
CD @ 5 %		**1.18**	**1.21**	**1.33**	**1.46**	**-**	**5.52**
CV (%)		**11.44**	**11.63**	**12.27**	**10.81**	**-**	**12.81**
Figures inside parentheses are original value and those outside are arcsine transformed values							

Table-37.8: Bioefficacy of new insecticides for the control of sugarcane early shoot borer at Mandya (2016-17)

Treat. No	Treatment details	Mean ESB Incidence (%)	Cane yield (t/ha)
T_1	Soil application of Fipronil 0.3 G @ 25 kg /ha at the time of planting and 60 DAP (75 g ai/ha)	6.83 (25.99)bc	77.45ab
T_2	Soil application of Chlorantraniliprole 0.4 G @ 22.5 kg/ha at the time of planting and 60 DAP (90 g ai/ha)	2.79 (16.14)a	87.51a
T_3	Spraying of Chlorantraniliprole 18.5 SC 375 ml/ha at 30 and 60 DAP (70 g ai/ha)	5.95 (24.28)b	75.62b
T_4	Spraying of Spinosad 45 SC @ 90 ml/ha at 30 and 60 DAP (40 g ai/ha)	7.78 (27.53)cd	68.77bc
T_5	Spraying of Flubendiamide 39.35 SC @ 125 ml/ ha at 30 and 60 DAP (50 g ai/ha)	6.64 (25.64)bc	74.48b
T_6	Soil application of Phorate 10 G @ 15 kg/ha at the time of planting and 60 DAP (1500 g ai/ha)	12.45 (35.10)e	62.07c
T_7	Soil application of Carbofuran 3 G @ 33 kg/ha at the time of planting and 60 DAP (1000 g ai/ha)	8.69 (29.36)d	66.17bc
T_8	Untreated control.	19.65 (44.46)f	58.67c
	C.D. @ 5%	**0.70**	**5.51**
	C.V. (%)	**2.00**	**11.58**
Figures inside parentheses are arcsine transformed values and those outside are original values			

Table-37.9: Bioefficacy of new insecticides for the control of sugarcane early shoot borer at Anakapalle (2016-17)

Treat No	Treatment details	Early shoot borer (% incidence)					Cane yield (t/ha)
		30 DAP	60 DAP	90 DAP	120 DAP	Cum	
T_1	Soil application of Fipronil 0.3 G @ 25 kg /ha at the time of planting and 60 DAP (75 g ai/ha)	6.55	2.78	0.87	0	5.87a	113.88a
T_2	Soil application of Chlorantraniliprole 0.4 G @ 22.5 kg/ha at the time of planting and 60 DAP (90 g ai/ha)	7.41	2.24	0.58	0	5.80a	114.94a
T_3	Spraying of Chlorantraniliprole 18.5 SC 375 ml/ha at 30 and 60 DAP (70 g ai/ha)	7.23	1.37	0.77	0	5.95a	110.57a
T_4	Spraying of Spinosad 45 SC @ 90 ml/ha at 30 and 60 DAP (40 g ai/ha)	12.27	4.36	0.93	0	8.47b	104.48b
T_5	Spraying of Flubendiamide 39.35 SC @ 125 ml/ ha at 30 and 60 DAP (50 g ai/ha)	10.27	0.75	0.58	0	6.65a	105.91b
T_6	Soil application of Phorate 10 G @ 15 kg/ha at the time of planting and 60 DAP (1500 g ai/ha)	9.13	2.46	0.91	0	6.69ab	101.96b
T_7	Soil application of Carbofuran 3 G @ 33 kg/ha at the time of planting and 60 DAP (1000 g ai/ha)	7.70	2.83	0.68	0	6.08a	106.34b
T_8	Untreated control.	15.36	6.74	0.77	0	20.58c	93.47c
S.Em ± (T)		**0.83**	**0.49**	**0.09**	**-**	**0.83**	**2.20**
C.D. @ 5 %		**1.79**	**1.06**	**0.19**	**-**	**1.79**	**4.72**
CV (%)		**-**	**-**	**-**	**-**	**-**	**17.69**

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