

**ANNUAL REPORT OF EXPERIMENT CONDUCTED UNDER ALL INDIA
COORDINATED RESEARCH PROJECT ON SUGARCANE (2015-16)
ENTOMOLOGY DIVISION**

**G.S. Sugarcane Breeding and Research Institute,
Seorahi – Kushinagar. U.P.-India**

Project No. E-4.1

Title:-Evaluation of zonal genotype 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.

AVT (Mid-late) 1st plant

Under AVT 1st plant (Mid-late) total four varieties were evaluated viz., BO 155, CoSe 11453, CoSe 11454 and CoSe 11455 along with three standards (checks) BO91, CoP 9301 and CoSe 92423 against shoot, top, stalk and root borer.

Based on cumulative incidence of shoot borer all the varieties including standards showed less susceptible reaction to shoot borer. It ranged from 5.66% in CoSe 11454 to 11.11% in BO 155. At harvest, all the varieties including standard showed less susceptible to top borer. Maximum incidence (7.20%) was recorded in CoP 9301 (standard) while it was minimum (4.95%) in CoSe 11453 and CoSe 92423 (standard) respectively. Regarding the stalk borer infestation, the infestation index was recorded very low. It ranged from 0.05 in CoSe 11453 to 0.13 in CoSe 11455. All the genotypes including standards showed less susceptible behaviour to stalk borer. Similarly the root borer incidence was also recorded low, which showed less susceptible to root borer (Table 1 a, b, c).

AVT (Early) 1st plant

Under AVT (Early) 1st plant Four varieties were evaluated viz. CoP11436, CoP 11437, CoP 11438 and CoSe 11451 along with two standard varieties BO130 and CoSe 95422 against shoot, top, stalk and root borer.

Based on cumulative incidence of shoot borer all the varieties including standard showed less susceptible reaction to shoot borer. The minimum (7.77%) incidence was observed in CoP 11436 and maximum (9.80%) in CoSe 95422 (standard). At harvest, all the varieties including standard showed less susceptible reaction to top borer. It ranged from 6.25% in CoP 11436 to 9.60% in BO130 (standard). Regarding the stalk borer infestation, all the genotypes including standard showed less susceptible reaction. Its infestation index was recorded minimum 0.10 in CoSe 11451 to 0.18 in CoP 11436. Similarly all the varieties showed less susceptible behaviour to root borer also. The minimum and maximum incidence was found 2.36% in CoP 11438 and 4.21% in BO 130 (standard). All the genotypes including standards showed less susceptible behaviour to stalk borer. (Table 1 d, e, f).

AVT (Mid-late) 2nd plant

Under AVT (Mid-late) 2nd plant three varieties were evaluated viz., CoSe 10451, CoSe 10452, CoSe 10453 along with three standard varieties BO91, CoP 9301 and CoSe 92423 against shoot, top, root and stalk borer.

Based on cumulative incidence of shoot borer all the varieties including standard showed less susceptible reaction to shoot borer. It's incidence was recorded minimum (6.81%) in CoP9301 (standard) and maximum (9.02%) in CoSe 10452 cultivar. At harvest, all the varieties including standard showed less susceptible reaction to top borer. It ranged from 4.72% in CoSe 10453 to 6.66% in BO 91 (standard). Regarding the stalk borer infestation all the varieties

including standard showed less susceptible reaction to stalk borer. Its infestation index ranged from 0.08 in CoSe 10453 to 0.15 in CoSe 10452 and CoP 9301 (standard). All the genotypes including standards showed less susceptible behavior to stalk borer. Similarly the root borer incidence was also recorded low, which showed less susceptible to root borer (Table 1g, h, i).

Project No. E-28

Title: - Survey and Surveillance of sugarcane insect-pests.

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

Survey was made in eight different sugar factory zones viz., Seorahi, Manakapur, Balrampur, Babhanan, Sathiaon, Dhadha, Ramkola and Goshi for key insect-pests of sugarcane. During hot weather, the incidence of early Shoot borer was low and ranged from 2.00% in Ramkola factory zone to 9.00% in Seorahi factory zone. The percent incidence of top borer was recorded low in all surveyed factory zone. The minimum (4.00%) incidence of top borer was recorded around Mankapur and Ramkola factory zone while maximum (10.00%) around Babhanan factory zone. The infestation of Stalk borer was observed low in all surveyed factory zone. It ranged from (4.50%) around Sathiaon, and (8.00%) on cane basis in Babhanan factory zone. The incidence of root borer was observed low and ranged from 3.50% in Sathiaon factory zone to 7.00% in Dhadha factory zone. Pyrilla population was recorded high during April 2015. The maximum 32.50 (nymph + adult)/leaf was recorded around Dhadha factory zone and minimum 12.50 (nymph + adult)/leaf was observed around Balrampur factory zone. No incidence of pyrilla was observed at Balrampur, Goshi and Sathiaon factory zone. Negligible occurrence of *E. melanoleuca* was observed in all surveyed factory zone (Table 2).

Project No. E-30

Title: - Monitoring of insect-pests and bio-agents in agro-ecosystem.

Objective: - To monitor the key insect-pests and natural enemies in the area.

The Experiment was conducted on 0.2 ha area with CoSe 01434 cultivars at Seorahi for monitoring the key insect-pests and their natural enemies. The incidence of Shoot borer was recorded maximum 9.75% during 24th SMW followed by 9.21%, 8.75% and 5.26% during 20th, 29th and 16th SMW respectively. The incidence of Top borer was recorded maximum 5.07% during 31st SMW followed by 4.53%, 3.75%, 2.63% and 1.25% during 35th, 26th, 22nd and 38th SMW, respectively. The percent incidence of stalk borer (on cane basis) was observed to be maximum 8.72% during 43rd SMW followed by 7.55% during 38th. The bio-agents viz. *Isotima javensis*, *Stenobracon sp.*, *Elasmus zehnteri* and *Rhaconotus scirpophagae* were recorded 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 2.50% during 22th SMW and increases up to 16.00% during 35th SMW there after decreases up to 5.00% during 38th SMW. The parasitisation of *Stenobracon sp* was observed with minimum 2.85% during 22nd SMW and increases up to 16.00% during 35th SMW there after decreases up to 3.33% during 38th SMW. The parasitisation of Top borer by *Elasmus zehnteri* was observed with 4.16% during 26th SMW and increases up to 13.63% during 35th SMW there after decreases up to 3.33% during 38th SMW. *Rhaconotus scirpophagae* was observed minimum 3.33% during 26th SMW and increases up to 12.50% during 35th SMW there after decreases up to 4.44% during 38th SMW. *Cotesia flavipes* parasitizes maximum 13.63% stalk borer larvae during 38rd SMW and also decreases up to 6.33% during 47th SMW. (Table 3).

Project No. E-32

Title:-Population dynamics of sugarcane borers (early Shoot borer, Top borer and Stalk borer) through pheromone trap.

Objective:-To study the population dynamics of sugarcane borers (early Shoot borer, Top borer and Stalk borer) through pheromone trap and influence of weather parameters on moth catches.

The experiment was conducted on 0.4 ha area with Co 0238 cultivar at Seorahi for the study. Three pheromone traps for each pest were installed in 2nd fortnight of February up to harvest of the crop. Moth trapped was recorded at weekly intervals and pheromone lure was changed at monthly intervals.

The present investigation revealed that highest number of Shoot borer (9.66 moths/ trap) was recorded during 17th SMW followed by (6.66 moths/ trap) during 16th and 23th SMW and (3.66 moths/trap) during 22th SMW .

Top borer moth catches were recorded (8.33 moths /trap) during 12th SMW followed by (7.33moths /trap) during 19th SMW followed by 6.00 moths/trap during 27th SMW.

The **Stalk borer** moth catches were observed (10.00 moths /trap) during 25th SMW followed by (7.33 moths /trap), (7.00 moths /trap) (6.00 moths /trap) during 19th, 24th and 31st SMW respectively.

The moth catches of Shoot borer was positively associated with maximum ($r= 0.257$) and minimum temperature ($r=0.062$) while negatively correlated with morning and evening humidity ($r= -0.400$, $r= 0.252$) and rain fall ($r= -0.054$). Top borer moth catches were found to be negatively correlated with maximum ($r= -0.156$) and minimum temperature ($r=-0.196$) with morning and evening humidity ($r= -0.003$, $r= 0.157$) and positively with rain fall ($r= +0.104$). The moth catches of Stalk borer was positively correlated with weather parameter viz., maximum temperature ($r= 0.253$) and minimum temperature ($r=0.292$) while negatively correlated with morning and evening humidity ($r= -0.185$, $r= 0.103$) and rain fall ($r= -0.192$).

Percent incidence was also observed in treated (application of pheromone trap) and untreated plot (without pheromone trap).The percent incidence of Shoot borer (5.65%).Top borer 2nd brood (2.00%), 3rd brood (3.75%) and at harvest (4.15%). The infestation of Stalk borer on cane basis was observed (5.00%) in treated plot. While the corresponding parameters were 8.95%, 3.76%, 5.07%, 7.15% and 8.45% in untreated plots respectively (Table 4).

Project E. 4-1

Evaluation of zonal varieties/genotypes for their reaction against major insect pests.

Table 1a. AVT (Mid-late) 1st Plant

| Sr. No. | Genotype | % incidence of ESB | | | | | No. of bored plants/ha (on the basis of Cumulative % incidence) |
|---------|-----------|--------------------|--------|--------|---------|------------------------|---|
| | | 30 DAP | 60 DAP | 90 DAP | 120 DAP | Cumulative % incidence | |
| 1 | BO155 | 0.00 | 4.76 | 7.69 | 2.56 | 11.11 | 4691.35 |
| 2 | CoSe11453 | 0.00 | 3.77 | 3.73 | 2.83 | 8.66 | 3209.87 |
| 3 | CoSe11454 | 0.00 | 3.19 | 3.14 | 1.31 | 5.66 | 3619.84 |
| 4 | CoSe11455 | 0.00 | 2.43 | 4.06 | 2.64 | 6.91 | 2716.04 |
| 5 | BO91 | 0.00 | 3.06 | 4.42 | 2.81 | 8.60 | 3209.87 |
| 6 | CoP9301 | 0.00 | 4.21 | 4.13 | 2.17 | 8.16 | 2962.96 |
| 7 | CoSe92423 | 0.00 | 3.33 | 3.63 | 2.38 | 7.51 | 2469.91 |
| | SE | - | 0.734 | 0.75 | 0.53 | - | - |
| | CD | - | 2.262 | 2.30 | 1.63 | - | - |

Table 1b. AVT (Mid-late) 1st Plant

| Sr. No. | Genotype | % incidence of top borer | | |
|---------|-----------|---------------------------------|--------------------------------|------------|
| | | III brood/5 th month | IV brood/7 th month | At harvest |
| 1 | BO155 | 3.28 | 3.82 | 6.08 |
| 2 | CoSe11453 | 3.01 | 3.37 | 4.95 |
| 3 | CoSe11454 | 4.05 | 3.77 | 6.71 |
| 4 | CoSe11455 | 3.37 | 2.99 | 6.25 |
| 5 | BO91 | 3.63 | 4.16 | 5.63 |
| 6 | CoP9301 | 3.82 | 4.32 | 7.20 |
| 7 | CoSe92423 | 3.75 | 2.92 | 4.95 |
| | SE | 0.40 | 0.41 | 0.88 |
| | CD | 1.24 | 1.26 | 2.71 |

Table 1c. AVT (Mid-late) 1st Plant

| Sr. No. | Genotype | Stalk borer | | | Root borer |
|---------|-----------|-------------|-------------|-------------------|-------------|
| | | % incidence | % intensity | Infestation index | % incidence |
| 1 | BO155 | 9.33 | 0.99 | 0.09 | 3.79 |
| 2 | CoSe11453 | 6.66 | 0.70 | 0.05 | 2.50 |
| 3 | CoSe11454 | 9.33 | 0.94 | 0.08 | 3.49 |
| 4 | CoSe11455 | 12.00 | 1.12 | 0.13 | 2.37 |
| 5 | BO91 | 8.00 | 0.91 | 0.07 | 2.91 |
| 6 | CoP9301 | 10.66 | 1.13 | 0.12 | 3.23 |
| 7 | CoSe92423 | 9.33 | 0.90 | 0.08 | 2.50 |
| | SE | 1.72 | 0.10 | 0.022 | 0.75 |
| | CD | 5.30 | 0.32 | 0.069 | 2.32 |

Table 1d. AVT (Early) 1st

| Sr. No. | Genotype | % incidence of ESB | | | | | No. of bored plants/ha (on the basis of Cumulative % incidence) |
|---------|------------|--------------------|--------|--------|---------|------------------------|---|
| | | 30 DAP | 60 DAP | 90 DAP | 120 DAP | Cumulative % incidence | |
| 1 | CoP11436 | 0.00 | 4.00 | 4.89 | 2.35 | 7.77 | 3456.79 |
| 2 | CoP11437 | 0.00 | 3.52 | 4.38 | 2.77 | 7.89 | 2962.96 |
| 3 | CoP11438 | 0.00 | 3.57 | 5.38 | 2.56 | 8.43 | 3456.67 |
| 4 | CoSe 11451 | 0.00 | 6.57 | 5.03 | 2.40 | 8.98 | 3950.61 |
| 5 | BO130 | 0.00 | 3.75 | 4.86 | 3.24 | 9.15 | 3703.37 |
| 6 | CoSe95422 | 0.00 | 5.00 | 5.30 | 3.49 | 9.80 | 3703.70 |
| | SE | - | 0.89 | 0.71 | 0.71 | - | - |
| | CD | - | 2.80 | 2.25 | 2.26 | - | - |

Table 1e. AVT (Early) 1st Plant

| Sr. No. | Genotype | % incidence of top borer | | |
|---------|------------|---------------------------------|--------------------------------|------------|
| | | III brood/5 th month | IV brood/7 th month | At harvest |
| 1 | CoP11436 | 3.84 | 4.67 | 6.25 |
| 2 | CoP11437 | 4.45 | 4.65 | 7.31 |
| 3 | CoP11438 | 4.26 | 3.97 | 8.92 |
| 4 | CoSe 11451 | 3.89 | 3.76 | 7.33 |
| 5 | BO130 | 4.00 | 5.06 | 8.41 |
| 6 | CoSe95422 | 3.72 | 4.24 | 9.60 |
| | SE | 0.36 | 0.80 | 1.75 |
| | CD | 1.16 | 2.56 | 5.54 |

Table 1f. AVT (Early) 1st Plant

| Sr. No. | Genotype | Stalk borer | | | Root borer |
|---------|------------|-------------|-------------|-------------------|-------------|
| | | % incidence | % intensity | Infestation index | % incidence |
| 1 | CoP11436 | 13.33 | 1.36 | 0.18 | 4.36 |
| 2 | CoP11437 | 12.00 | 1.45 | 0.17 | 3.67 |
| 3 | CoP11438 | 10.66 | 1.13 | 0.12 | 3.57 |
| 4 | CoSe 11451 | 9.33 | 1.11 | 0.10 | 3.57 |
| 5 | BO130 | 10.66 | 1.06 | 0.11 | 3.65 |
| 6 | CoSe95422 | 12.00 | 1.36 | 0.16 | 4.05 |
| | SE | 1.52 | 0.15 | 0.037 | 0.89 |
| | CD | 4.79 | 0.46 | 0.117 | 2.81 |

Table 1g. AVT (Mid-late) 2nd Plant

| Sr. No. | Genotype | % incidence of ESB | | | | | No. of bored plants/ha (on the basis of Cumulative % incidence) |
|---------|-----------|--------------------|--------|--------|---------|------------------------|---|
| | | 30 DAP | 60 DAP | 90 DAP | 120 DAP | Cumulative % incidence | |
| 1 | CoSe10451 | 0.00 | 3.84 | 4.37 | 2.77 | 8.49 | 3209.87 |
| 2 | CoSe10452 | 0.00 | 3.48 | 6.60 | 2.23 | 9.02 | 3209.87 |
| 3 | CoSe10453 | 0.00 | 3.33 | 4.93 | 2.80 | 8.84 | 2469.13 |
| 4 | BO91 | 0.00 | 5.00 | 4.76 | 2.54 | 8.13 | 2469.13 |
| 5 | CoP9301 | 0.00 | 5.08 | 4.04 | 1.06 | 6.81 | 2222.22 |
| 6 | CoSe92423 | 0.00 | 5.00 | 6.02 | 1.86 | 8.69 | 2469.13 |
| | SE | - | 0.67 | 1.04 | 0.46 | - | - |
| | CD | - | 2.11 | 3.27 | 1.45 | - | - |

Table 1h. AVT (Mid-late) 2nd Plant

| Sr. No. | Genotype | % incidence of top borer | | |
|---------|-----------|---------------------------------|--------------------------------|------------|
| | | III brood/5 th month | IV brood/7 th month | At harvest |
| 1 | CoSe10451 | 4.00 | 4.32 | 5.12 |
| 2 | CoSe10452 | 2.63 | 3.03 | 5.21 |
| 3 | CoSe10453 | 3.52 | 3.63 | 4.72 |
| 4 | BO91 | 3.37 | 3.77 | 6.66 |
| 5 | CoP9301 | 3.49 | 4.43 | 5.83 |
| 6 | CoSe92423 | 3.92 | 4.21 | 5.26 |
| | SE | 0.60 | 0.40 | 0.84 |
| | CD | 1.90 | 1.26 | 2.66 |

Table 1i. AVT (Mid-late) 2nd Plant Percent incidence of Stalk & Root borer

| Sr. No. | Genotype | Stalk borer | | | Root borer |
|---------|-----------|-------------|-------------|-------------------|-------------|
| | | % incidence | % intensity | Infestation index | % incidence |
| 1 | CoSe10451 | 10.66 | 0.97 | 0.10 | 4.36 |
| 2 | CoSe10452 | 12.00 | 1.26 | 0.15 | 3.67 |
| 3 | CoSe10453 | 9.33 | 0.93 | 0.08 | 3.57 |
| 4 | BO91 | 12.00 | 1.02 | 0.12 | 3.57 |
| 5 | CoP9301 | 13.33 | 1.14 | 0.15 | 3.65 |
| 6 | CoSe92423 | 10.66 | 1.03 | 0.10 | 4.05 |
| | SE | 1.11 | 0.11 | 0.025 | 0.89 |
| | CD | 3.51 | 0.33 | 0.078 | 2.81 |

Project No. E-28

Table-2. Survey and Surveillance of sugarcane insect-pests in the area 2015-16

| Variety | Name of Pest | % incidence/population | | | Remark |
|--|----------------------------------|------------------------|------|---------|--------|
| | | Min. | Max. | Average | |
| (1) Seorahi | | | | | |
| UP 05125, CoSe 01434, CoSe 92423, Co 0238, CoP 9301, Co 0118,CoS 8432 CoSe 98231 | Early Shoot Borer at hot weather | 8 | 10 | 9.00 | |
| | Top Borer at harvest | 3 | 9 | 6.00 | |
| | Stalk Borer at harvest | 3 | 11 | 7.00 | |
| | Root Borer at harvest | 2 | 6 | 4.00 | |
| | Pyrilla / leaf | 10 | 50 | 30 | |
| (2) Mankapur | | | | | |
| Co 0238, 0118, 0239,CoSe 01434, 98231 CoS 96275, BO110 ,UP 05125 CoLk 94184 | Early Shoot Borer at hot weather | 3 | 5 | 4.00 | |
| | Top Borer at harvest | 2 | 6 | 4.00 | |
| | Stalk Borer at harvest | 3 | 11 | 7.00 | |
| | Root Borer at harvest | 3 | 6 | 4.50 | |
| | Pyrilla /leaf | 8 | 20 | 14.00 | |
| (3) Balrampur | | | | | |
| Co 0238, CoLk 94184, CoS 97261,8432 CoSe 92423,01434 CoS 767, CoSe 98231, Bo 110& Co 0118 | Early Shoot Borer at hot weather | 2 | 5 | 3.50 | |
| | Top Borer at harvest | 3 | 10 | 6.50 | |
| | Stalk Borer at harvest | 2 | 11 | 6.50 | |
| | Root Borer at harvest | 4 | 9 | 6.50 | |
| | Pyrilla /leaf | 10 | 15 | 12.50 | |
| (4) Bhabhnan | | | | | |
| CoSe 92423, CoSe 01434, CoLk 94184, Co 0238, CoSe 98231, | Early Shoot Borer at hot weather | 3 | 5 | 4.00 | |
| | Top Borer at harvest | 8 | 12 | 10.00 | |
| | Stalk Borer at harvest | 5 | 11 | 8.00 | |
| | Root Borer at harvest | 2 | 8 | 5.00 | |
| | Pyrilla /leaf | 15 | 20 | 17.50 | |
| (5) Sathiaon | | | | | |
| CoSe 03234, CoSe 01434, | Early Shoot Borer at hot weather | 2 | 4 | 3.00 | |

| | | | | | |
|---|-------------------------------------|----|----|-------|--|
| CoLk 94184, Co 0238,CO 0118&CoSe 92423 | Top Borer at harvest | 4 | 11 | 7.50 | |
| | Stalk Borer at harvest | 2 | 7 | 4.50 | |
| | Root Borer at harvest | 2 | 5 | 3.50 | |
| | Any other (new pest) | - | - | - | |
| (6) Dhada | | | | | |
| CoSe 01434, CoSe 98231, Co 0238, CoSa767, CoSe 92423, CoS 88230& CoS 8432 | Early Shoot Borer at hot weather | 3 | 4 | 3.50 | |
| | Top Borer at harvest | 6 | 10 | 8.00 | |
| | Stalk Borer at harvest | 2 | 10 | 6.00 | |
| | Root Borer at harvest | 3 | 11 | 7.00 | |
| | Pyrrilla /leaf | 25 | 40 | 32.50 | |
| (7) Ramkola | | | | | |
| Co 0238,0118 CoP 9301, UP 9530, CoSe 92423, CoSe 01434, CoS 8432&, Colk 94184 BO 110 | Early Shoot Borer at hot weather | 1 | 3 | 2.00 | |
| | Top Borer at harvest | 2 | 6 | 4.00 | |
| | Stalk Borer at harvest | 4 | 10 | 7.00 | |
| | Root Borer at harvest | 2 | 9 | 5.50 | |
| | Pyrrilla /leaf | 15 | 20 | 17.50 | |
| (8) Goshi | | | | | |
| CoLk 94184, Co 0238, CoSe 92423, CoS 767& Co 0118 CoS07250, CoSe 01434& CoSe98231 | Early Shoot Borer at hot weather | 4 | 6 | 5.00 | |
| | Top Borer at harvest | 4 | 13 | 8.50 | |
| | Stalk Borer at harvest | 3 | 12 | 7.50 | |
| | Root Borer at harvest | 3 | 8 | 5.50 | |
| | Any other (new pest) | - | - | - | |

Project No. E-30

Table-3 Monitoring of insect pest and natural enemies of Sugarcane (0.2 ha. area) 2015-16

| (1) Early shoot borer | | | | | | | |
|--------------------------------------|-------------|--------------------------------|---------------------------|-------------------------------|--------------------------------|---------------------|--------------------|
| Period of observation Dates + SMW | % incidence | % parasitism (ESB), if any | | | | | |
| | | <i>T. chilonis</i> | <i>E. annulipes</i> | <i>S. inferens</i> | | | |
| 16-04-2016 16 th SMW | 5.26 | - | - | - | - | - | - |
| 18-05-2016 20 th SMW | 9.21 | - | - | - | - | - | - |
| 17-06-2016 24 th SMW | 9.75 | - | - | - | - | - | - |
| 20-07-2016 29 th SMW | 8.75 | - | - | - | - | - | - |
| 20-08-2016 34 th SMW | - | - | - | - | - | - | - |
| 22-09-2016 38 th SMW | - | - | - | - | - | - | - |
| 25-10-2016 43 rd SMW | - | - | - | - | - | - | - |
| 19-11-2016 47 th SMW | - | - | - | - | - | - | - |
| (2) Stalk borer | | | | | | | |
| Period of observation Dates + SMW | % incidence | % Parasitism (Stalk borer) | | | | | |
| | | <i>Cotesia flavipes</i> | <i>Apanteles flavipes</i> | <i>Apanteles pyralophagus</i> | <i>S. inferens</i> | <i>Nosema sp.</i> | <i>B. bassiana</i> |
| 16-04-2016 16 th SMW | - | - | - | - | - | - | - |
| 18-05-2016 20 th SMW | - | - | - | - | - | - | - |
| 17-06-2016 24 th SMW | - | - | - | - | - | - | - |
| 20-07-2016 29 th SMW | - | - | - | - | - | - | - |
| 20-08-2016 34 th SMW | - | - | - | - | - | - | - |
| 22-09-2016 38 th SMW | 7.55 | 10.50 | - | - | - | - | - |
| 25-10-2016 43 rd SMW | 8.72 | 13.63 | - | - | - | - | - |
| (3) Top Borer | | | | | | | |
| Period of observation Dates + SMW | % incidence | % Parasitism (Top shoot borer) | | | | | |
| | | <i>Stenobracon sp.</i> | <i>I. javensis</i> | <i>Elasmus zehntneri</i> | <i>Rhaconotus scripophagae</i> | <i>T. Japonicum</i> | <i>T. chilonis</i> |
| 16-04-2016 16 th SMW | - | - | - | - | - | - | - |
| 30-05-2016 22 nd SMW | 2.63 | 2.85 | 2.50 | - | - | - | - |
| 28-06-2016 26 th SMW | 3.75 | 4.54 | 4.00 | 4.16 | 3.33 | - | - |
| 30-07-2016 31 th SMW | 5.07 | 13.04 | 15.00 | 9.09 | 8.00 | - | - |
| 28-08-2016 35 th SMW | 4.53 | 16.00 | 16.00 | 13.63 | 12.50 | - | - |
| 20-09-2016 38 th SMW | 1.25 | 3.33 | 5.00 | 3.33 | 4.44 | - | - |
| 25-10-2016 43 rd SMW | - | - | - | - | - | - | - |

Project No. E-32

Table-4 Population dynamics of sugarcane borers through pheromone trap at Seorahi 2015-16

| Met Week | Date | Shoot borer | Top borer | Stalk borer | Temperature 0C | | R. H. % | | Rain fall(mm) /Days |
|----------|-----------------|-------------|-----------|-------------|----------------|-------|---------|-------|---------------------|
| | | | | | Max. | Min. | F.N. | AN. | |
| 9 | 26-4 March 2015 | 0.00 | 0.66 | 0.00 | 21.4 | 11.42 | 88.85 | 61.14 | 64.2/4 |
| 10 | 5-11 | 0.66 | 2.66 | 1.00 | 25.8 | 9.74 | 87.71 | 57.57 | |
| 11 | 12-18 | 1.00 | 4.00 | 2.66 | 26.4 | 13.17 | 80.85 | 57.42 | |
| 12 | 19-25 | 1.33 | 8.33 | 2.33 | 30.9 | 13.77 | 80.00 | 53.71 | |
| 13 | 26-01 April2015 | 0.33 | 2.00 | 1.66 | 29.6 | 16.0 | 78.71 | 63.14 | 47.0/02 |
| 14 | 2-8 | 0.66 | 0.00 | 0.00 | 30.4 | 15.2 | 83.21 | 57.4 | |
| 15 | 9-15 | 2.66 | 0.00 | 0.00 | 30.7 | 17.2 | 78.26 | 57.28 | 8.6/3 |
| 16 | 16-22 | 6.66 | 2.66 | 0.00 | 34.74 | 21.8 | 77.34 | 55.93 | 1.6/1 |
| 17 | 23-29 | 9.66 | 5.00 | 1.00 | 29.68 | 19.8 | 84.16 | 61.93 | 54.6/03 |
| 18 | 30-06May2015 | 2.66 | 6.00 | 3.33 | 33.02 | 21.48 | 76.85 | 53.57 | |
| 19 | 7-13 | 3.00 | 7.33 | 7.33 | 33.92 | 21.6 | 79.4 | 53.0 | 30.0/1 |
| 20 | 14-20 | 0.33 | 0.33 | 2.00 | 34.72 | 24.2 | 76.28 | 54.57 | 23.0/0 |
| 21 | 21-27 | 2.66 | 0.00 | 0.00 | 35.94 | 24.72 | 69.26 | 46.68 | |
| 22 | 28-03 June2015 | 3.66 | 0.00 | 0.00 | 37.25 | 25.94 | 67.0 | 43.28 | |
| 23 | 4-10 | 6.66 | 0.00 | 1.33 | 39.85 | 25.97 | 64.0 | 39.0 | |
| 24 | 11-17 | 1.66 | 0.00 | 7.00 | 35.42 | 25.02 | 71.0 | 53.14 | 28.4/2 |
| 25 | 18-24 | 1.00 | 5.33 | 10.00 | 35.85 | 26.25 | 71.14 | 54.42 | |
| 26 | 25-01 July2015 | 1.00 | 3.00 | 2.00 | 31.71 | 26.22 | 73.85 | 59.0 | 39.8/5 |
| 27 | 2-8 | 1.33 | 6.00 | 1.33 | 31.96 | 25.83 | 83.18 | 59.6 | 87.0/3 |
| 28 | 9-15 | 1.00 | 3.33 | 0.00 | 32.37 | 25.24 | 87.96 | 60.85 | 49.6/4 |
| 29 | 16-22 | 0.33 | 0.00 | 0.00 | 32.12 | 26.05 | 79.4 | 67.63 | 70.0/02 |
| 30 | 23-29 | 1.66 | 0.00 | 3.33 | 32.62 | 26.02 | 84.69 | 51.57 | 43.4/03 |
| 31 | 30-05 August15 | 1.00 | 0.00 | 6.00 | 32.68 | 26.11 | 82.57 | 57.85 | 17.0/01 |
| 32 | 6-12 | 0.66 | 1.00 | 5.00 | 32.12 | 23.82 | 84.51 | 57.14 | 21.0/01 |
| 33 | 13-19 | 0.00 | 1.66 | 1.66 | 31.4 | 24.42 | 90.4 | 64.6 | 22.4/04 |
| 34 | 20-26 | 0.00 | 1.00 | 0.66 | 32.2 | 23.14 | 92.38 | 62.14 | 145.4/6 |
| 35 | 27-02-Sept.2015 | 0.33 | 0.00 | 4.00 | 33.0 | 25.17 | 90.57 | 59.28 | 9.0/2 |
| 36 | 3-9 | 0.00 | 1.00 | 1.66 | 33.64 | 25.64 | 84.0 | 53.71 | |
| 37 | 10-16 | 0.00 | 0.66 | 2.00 | 34.08 | 25.97 | 78.71 | 49.42 | |
| 38 | 17-23 | 0.00 | 0.33 | 1.66 | 33.4 | 24.97 | 80.43 | 50.85 | 5.6/1 |
| 39 | 24-30 | 0.00 | 0.00 | 3.00 | 34.8 | 23.57 | 78.85 | 48.42 | |
| 40 | 1-7 October2015 | 0.00 | 0.33 | 2.00 | 33.77 | 22.37 | 81.14 | 53.72 | |
| 41 | 8-14 | 0.00 | 0.00 | 1.00 | 31.85 | 20.34 | 85.42 | 59.14 | 30.0/02 |
| 42 | 15-21 | 0.00 | 0.00 | 0.66 | 31.45 | 19.14 | 85.42 | 56.28 | |
| 43 | 22-28 | 0.00 | 0.00 | 0.00 | 32.14 | 16.34 | 82.57 | 52.14 | |

Co-relation coefficient

| | Shoot borer | Top borer | Stalk borer |
|------------|-------------|-----------|-------------|
| Max. Temp. | +0.257 | -0.156 | +0.253 |
| Min.Temp. | +0.062 | -0.196 | +0.292 |
| R.H.% FN | -0.400 | -0.003 | -0.185 |
| R.H. %AN | -0.252 | -0.157 | -0.103 |
| Rain fall | -0.054 | +0.104 | -0.192 |

Impact of moth catches on incidence of borer complex at Seorahi

| Insect-pest | % Incidence of Insect-Pest | |
|-----------------------------------|----------------------------|----------------------------------|
| | Treated Pheromone trap | Untreated without pheromone trap |
| Shoot borer | 5.65 | 8.95 |
| Top borer (2 nd brood) | 2.00 | 3.76 |
| Top borer (3 rd brood) | 3.75 | 5.07 |
| Top borer (At harvest) | 4.15 | 7.15 |
| Stalk borer (on cane basis) | 5.00 | 8.45 |