SUPPRESSION OF SUGARCANE PLASSEY BORER CHILO TUMIDICOSTALIS HAMPSON WITH TRICHOGRAMMA CHILONIS ISHII IN ASSAM

D K SAIKIA, A MUDOI*1 AND R N BORKAKATI

AICRP on Biocontrol, Assam Agricultural University, Jorhat
1OPIU_APART, Assam Agricultural University, Jorhat
*Email: abhilisamudoi40@gmail.com (corresponding author)

ABSTRACT

Field experiment was conducted to evaluate the efficacy of egg parasitoid, Trichogramma chilonis Ishii against sugarcane Plassey borer Chilo tumidicostalis Hampson. It was observed that the incidence of C. tumidicostalis in chemical control plot was 15.02% in comparison to 11.49% in parasitoid released plot. These revealed a significant difference between the treatments resulting in 55.77% reduction in damage. The mean % parasitism of eggs of C. tumidicostalis in parasitoid released plot was 28.13% as against 9.85% in chemical control plot. The cane yield attributed in parasitoid released plot was 74.15 t/ha as compared to 69.23 and 49.74 t/ha in chemical and untreated plots, respectively. A net return of Rs. 101221/ha was achieved in the parasitoid released plots as against Rs. 87179/ha in case of chemical control plot. Maximum cost benefit ratio was obtained with T. chilonis released plot (1:2.15) followed by chemical control (1:1.70).

Key words: chemical control plot, cost benefit ratio, incidence, incremental cost, Parasitism, parasitoid, parasitoid released plot, untreated check, yield

Sugarcane (Saccharum officinarum Linn.) is an important food-cum-cash crop grown extensively throughout India. In Assam, it occupies an area of 0.30 lakh ha, with total production of 10.76 lakh MT (Anonymous, 2014; Nath and Saikia, 2018). In Assam, the crop suffers extensive damage from borers viz., early shoot borer, Chilo infuscatus Snellen, top borer, Scirophaga excerptalis Walker and Plassey borer, Chilo tumidicostalis Hampson (Patil et al., 2006). Out of these, C. tumidicostalis is the major limiting factor in Assam. It was first observed in Assam at Jorhat in 1919 (Kumbhar and Rai, 2018). It causes a yield loss of 8.2 to 12.6% and 1.25 to 7.85% sucrose loss (Butani, 1961). The pest is more severe during its early stages of growth, i.e., the shoot stage prior to internode formation. Excessive use of pesticides to control crop pests is detrimental to human health as well as environment. Borkakati et al. (2018) reported the presence of trichogrammatids in sugarcane. Moreover, inundative release of trichogrammatids in the form of trichocard by farming community in Assam for suppression of lepidopteran pests of various crops like rice is also a positive sign towards organic agriculture (Saikia et al., 2016). The efficacy of trichogrammatids in suppressing Chilo spp. was also reported earlier by Jalali (2013). Considering the seriousness of the pest problem of sugarcane in this region, suppressive effect of a potential parasitoid, Trichogramma chilonis Ishii, was made to evaluate its efficacy against C. tumidicostastalis.

MATERIALS AND METHODS

The present investigation on evaluating the efficacy of T. chilonis against C. tumidicostalis was carried out during 2015-16, 2016-17 and 2017-18, respectively in farmers’ field at Khanikar Gaon, Golaghat district of Assam. The sugarcane variety ‘Dhansiri’ was planted in all the locations in the second week of April covering an area of one ha and the area was subdivided into eight equal subplots and each subplot was regarded as one replication. The parasitoid T. chilonis was released eleven times at 10 days interval from mid-July to first week of November @ 50000/ha. Chemical control plots were also maintained for comparisons, where 4 rounds of profenofos 50EC @ 0.05%, was sprayed at 15 days interval. Observations on mean egg parasitism and infested cane due to the attack of C. tumidicostastalis was randomly selected from 20 quadrats/replication, before and after parasitoid release. The yield after harvest were also recorded.

RESULTS AND DISCUSSION

The parasitism of C. tumidicostalis eggs in parasitoid released plots was 28.13% which was
significantly higher than chemical control plots with mean parasitism of only 9.85% (Table 1). In absolute control plots, mean parasitism of 14.35% was observed. Similarly, damage of canes by *C. tumidicostalis* was significantly low (11.49%) in parasitoid released plots as compared to chemical control (15.02%). Overall, there was a significant reduction of cane damage (55.77%) in parasitoid released plot as compared to untreated control plot. Maximum cane yield of 74.15 t/ha was obtained with parasitoid released plots as compared to chemical control plot with 69.23 t/ha. The present results are in conformity with those of Chand et al. (2014) who observed that *T. chilonis* was an efficient parasitoid of *C. tumidicostalis*. Out of three treatments, it was observed that *T. chilonis* was the most superior causing 82.22-86% reduction in infestation. The release of the parasitoid @ 50000/ha for five times at an interval of 10 days was found to be the most effective. Moreover, an additional yield of 14410 kg/ha was observed in the parasitoid released plots. The net return was also higher (Rs 101221.00/ha) in parasitoid released plots compared to chemical control plots (Rs. 87179.00/ha). Mukunthan (2006) reported that the theoretical prevention of intensity of internode borer damage through the current recommended dose of inundative release ranged from 3.2 to 19% between the first and 6th release. These observations agree with those of Narasimha Rao et al. (2006), who revealed that the *T. chilonis* released plot recorded less incidence of early shoot borer in sugarcane. The *T. chilonis* released plot recorded a cane yield of 120.3 t/ha and 19.0 per cent juice sucrose. Maximum incremental cost benefit ratio was obtained with *T. chilonis* released plot (1: 2.15) followed by chemical control (1: 1.70) (Table 1).

### ACKNOWLEDGEMENTS

The authors thank the Director of NBAIR, Bengaluru, Agricultural University, Jorhat for their help and suggestions.

### REFERENCES


## Table 1. Evaluation of *T. chilonis* against *C. tumidicostalis* (pooled data 2015-2018)

| Treatments          | Pre treatment | Post treatment | Additional yield over control | Value of yield/ha (Rs/ha) | Cost of biocontrol/chemical treatment (Rs/ha) | Cost of cultivation (Rs/ha) | Net return (Rs/ha) | Cost : benefit
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% infested cane</td>
<td>% egg parasitism</td>
<td>% infested cane</td>
<td>% egg parasitism</td>
<td>% infestation reduction over control</td>
<td>Yield (t/ha)</td>
<td>(%)</td>
<td>(%)</td>
</tr>
<tr>
<td><em>T. chilonis</em></td>
<td>19.76</td>
<td>14.46</td>
<td>11.49</td>
<td>28.13</td>
<td>55.77</td>
<td>74.15</td>
<td>14.41</td>
<td>148300</td>
</tr>
<tr>
<td>released plot</td>
<td>(26.39)</td>
<td>(22.34)</td>
<td>(19.81)</td>
<td>(30.32)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemical control</td>
<td>19.07</td>
<td>13.46</td>
<td>15.02</td>
<td>9.85</td>
<td>42.14</td>
<td>69.23</td>
<td>9.49</td>
<td>138460</td>
</tr>
<tr>
<td>Control</td>
<td>(25.89)</td>
<td>(21.52)</td>
<td>(22.80)</td>
<td>(18.29)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>21.99</td>
<td>15.03</td>
<td>25.98</td>
<td>14.35</td>
<td>49.74</td>
<td>119480</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(27.96)</td>
<td>(22.81)</td>
<td>(30.64)</td>
<td>(22.26)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEd±</td>
<td>NS</td>
<td>NS</td>
<td>0.399</td>
<td>0.182</td>
<td>0.476</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CD</td>
<td>0.85</td>
<td>0.38</td>
<td>0.476</td>
<td>1.01</td>
<td>1.98</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CV</td>
<td>4.59</td>
<td>2.11</td>
<td>4.59</td>
<td>2.11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Data in parentheses angular transformed value; Cost of sugarcane @ Rs 200.00 q/ha
Suppression of sugarcane Plassey borer *Chilo tumidicostalis* Hampson with *Trichogramma chilonis* Ishii in Assam

D K Saikia et al.


(Manuscript Received: July, 2020; Revised: September, 2020; Accepted: October, 2020; Online Published: December, 2020)

Online published (Preview) in www.entosocindia.org Ref. No. 20248