Higher Sett Rate of Sugarcane at Planting as a Cultural Technique for the Management of Chilo infuscatellus Snell

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ABSTRACT

The experiment was conducted at the Sugarcane Research Station, Cuddalore for assessing the efficacy of adoption of higher sett rate at planting to manage shoot borer damage. The cumulative incidence of shoot borer reduced progressively in the plots planted with a higher number of setts. The mean shoot borer incidence was found to decrease in all the higher sett rate plantings. The same trend was also observed during the I, II and III year trials. Among the different sett rates economic advantage in terms of yield and benefit was more conspicuous when 30% hike in sett rate over the conventional rate was followed. The mean reduction of shoot borer varied from 3.80 to the highest of 39.16% among the different sett rates tested as against the conventional rate. The gross benefit ratio was 2.165 under 30% increased sett rate. This technique being a cultural and eco-friendly one could be specifically advocated to late season planted sugarcane (March to June) and shoot borer endemic locations.

Key words: Sugarcane, Chilo infuscatellus, higher sett rate, cultural control

The magnitude of pest problem in sugarcane crop is more complex and compounded when it gets added with disease incidence. Among the economically important pests of sugarcane, borers with particular reference to early shoot borer assume more prominence in the coastal districts of Tamil Nadu in terms of yield loss and economic loss (David et al., 1986). Shoot borer management through cultural practices like early season planting, trash mulching, intercropping with pulses like so, are some of the effective eco-friendly technologies advocated (Rajendran, 2002). In view of the considerable area around 30-35% is brought under late season planting wherein the problem by shoot borer is a recurring menace in Tamil Nadu, farmers still prefer chemical control mode for effectively managing this pest. Management through trash mulching and intercropping in sugarcane also is not preferred by farmers in some localities based on their local situations and sentiments. Under this circumstances an easy cultivation practice of adopting higher sett rate at planting itself to ward off the infestation of shoot borer during late season crop is thought to be a more judicious and pragmatic approach as this type of cultural technique is widely followed to stave off shoot fly menace in sorghum crop. With this background, three season experiments from 2002 to 2005 were conducted at the Sugarcane Research Station (SRS), Cuddalore for assessing the efficacy of adoption of higher sett rate at planting to manage shoot borer menace.

Three season trials were conducted during 2002-2005 at SRS farm, Cuddalore, Tamil Nadu. The field experiments were conducted in a randomized block design with four replications to test the different higher sett rates of 10, 20, 30, 40 and 50% over and above the conventional sett rate of 75000/ha to assess the reduction of shoot borer incidence in sugarcane. The variety tested was CoSi 95071. The trials were raised in late season during summer (March second fortnight to April) at the Sugarcane Research Station, Cuddalore farm so as to get the maximum incidence of shoot borer. Shoot borer incidence was observed on the I, II and III months after planting and the cumulative infestation was worked out. Similarly, the incidence of internode borer was also recorded. There was no other pest incidence in these three trials. At harvest the cane yield and combined cane sugar per cent (CCS) was assessed for analysis.

The first year experiment (2002-2003) indicated that the higher sett rate adopted plots recorded proportionately reduced incidence of shoot borer with higher yields. Because of the severe incidence of shoot borer during the summer season of 2002 (April - June 2002) in Sugarcane Research Station farm, the cumulative incidence of shoot borer was even up to 82.65% in the sett rate of 82500/ha. As the sett rate was increased proportionately, the incidence level reduced to the lowest of 42.5% in 1,12,500 setts/ha and the cane yield obtained was the highest of 53.63 t/ha in this treatment. The mean incidence of shoot borer in the conventional sett rate of 75000/ha was 72.95% and the yield obtained was 17.98 t/ha (Table 1).

During the second season (2003-2004), it was inferred that the cumulative incidence of shoot borer was found to reduce progressively in the plots planted with a higher number of setts.
Table 1: Different sett rates of sugarcane at planting on the shoot borer incidence and yield (2002-2003)

<table>
<thead>
<tr>
<th>Treatments (setts rate/ha)</th>
<th>Cumulative incidence of shoot borer (%)</th>
<th>Cane yield (t/ha)</th>
<th>CCS (%)</th>
<th>Per cent increase in yield over control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional sett rate 75000</td>
<td>72.95</td>
<td>17.98</td>
<td>12.38</td>
<td>-</td>
</tr>
<tr>
<td>10% higher - 82500</td>
<td>82.65</td>
<td>18.58</td>
<td>12.46</td>
<td>3.34</td>
</tr>
<tr>
<td>20% higher - 90000</td>
<td>73.38</td>
<td>24.68</td>
<td>12.70</td>
<td>37.26</td>
</tr>
<tr>
<td>30% higher - 97500</td>
<td>59.73</td>
<td>30.28</td>
<td>12.50</td>
<td>68.41</td>
</tr>
<tr>
<td>40% higher - 105500</td>
<td>55.36</td>
<td>43.76</td>
<td>12.01</td>
<td>143.38</td>
</tr>
<tr>
<td>50% higher - 112500</td>
<td>42.52</td>
<td>53.63</td>
<td>11.90</td>
<td>198.27</td>
</tr>
<tr>
<td>CD (0.05%)</td>
<td>10.617</td>
<td>12.616</td>
<td>1.435</td>
<td></td>
</tr>
</tbody>
</table>

Though the 10% increased sett rate behaved similar with the conventional sett rate by recording 32.17 and 32.79% shoot borer incidence, enhanced sett rate at 20%, 30%, 40% and 50% over the conventional rate reduced the shoot borer to 27.74, 24.47, 22.99 and 21.57%, respectively. The yield increase ranged from 14.07 to the highest of 28.43% among the different sett rates adopted (Table 2).

The cumulative incidence of shoot borer was found to reduce progressively in the plots planted with higher number of setts during 2004-2005. The mean shoot borer incidence was found to decrease in all the higher sett rate plantings with the lowest incidence of 23.15% in 50% increased sett rate as against the highest incidence of 40.49% in the conventional sett rate of 75000/ha. The cane yield obtained was ranged from 21.7 in the conventional sett rate to the highest of 47.2 t/ha in 40% increased sett rate (Table 3).

The cumulative mean shoot borer incidence recorded in the three season trials was 48.54, 48.72, 43.59, 38.39, 34.60 and 29.08% in the conventional, 10, 20, 30, 40 and 50% sett rates.

Table 2: Different sett rates of sugarcane at planting on the shoot borer incidence and yield (2003-2004)

<table>
<thead>
<tr>
<th>Treatments (sett rates/ha)</th>
<th>Cumulative incidence of shoot borer (%)</th>
<th>Cane yield (t/ha)</th>
<th>CCS (%)</th>
<th>Per cent increase in yield over control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional sett rate 75000</td>
<td>32.17</td>
<td>53.53</td>
<td>12.11</td>
<td>-</td>
</tr>
<tr>
<td>10% higher - 82500</td>
<td>32.70</td>
<td>61.06</td>
<td>13.79</td>
<td>14.07</td>
</tr>
<tr>
<td>20% higher - 90000</td>
<td>27.74</td>
<td>65.48</td>
<td>12.65</td>
<td>22.32</td>
</tr>
<tr>
<td>30% higher - 97500</td>
<td>24.47</td>
<td>68.75</td>
<td>13.13</td>
<td>28.43</td>
</tr>
<tr>
<td>40% higher - 105500</td>
<td>22.99</td>
<td>68.07</td>
<td>12.01</td>
<td>27.16</td>
</tr>
<tr>
<td>50% higher - 112500</td>
<td>21.57</td>
<td>67.29</td>
<td>11.00</td>
<td>25.71</td>
</tr>
<tr>
<td>CD (0.05%)</td>
<td>1.470</td>
<td>3.175</td>
<td>1.580</td>
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</table>

The reduction of shoot borer in the increased sett rate over the conventional rate was 3.28, 13.31, 21.86, 29.93 and 39.16% respectively (Fig. 1 and Table 4). Similar results of reduction of shoot borer by increasing the seed rate on a monocot crop like sorghum was earlier reported by Dhaliwal and Sandhu (1981). Singh and Mishra (1997) also reported on the usage of cultural technique of higher seed rate for reducing the damage caused by stem borer *Chilo partellus* in sorghum crop.

The cumulative cane sugar per cent was found to vary between treatments, but exhibited a moderate decline at 40% (12.01%) and 50% (11.45%) increased sett rate treatments. The overall analysis of gross benefit ratio in the different increased sett rate was the highest, 2.165 and 2.175 in the 30 and 40% hiked sett rates while the 10, 20 and 50% sett rates turned out a ratio of 1.175, 1.308 and 1.921, respectively (Table 4). Increased cost benefit ratio in sugarcane through adoption of cultural practices like trash mulching, intercropping against shoot borer was already reported by this author (Rajendran, 1999). Hence from the three season experiments carried out on the effect of increased sett rates at planting of sugarcane on

Table 3: Different sett rates of sugarcane at planting on the shoot borer incidence and yield (2004-2005)

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Conventional sett rate 75000</td>
<td>40.49</td>
<td>21.7</td>
<td>12.88</td>
<td>-</td>
</tr>
<tr>
<td>10% higher - 82500</td>
<td>30.71</td>
<td>25.5</td>
<td>12.55</td>
<td>17.51</td>
</tr>
<tr>
<td>20% higher - 90000</td>
<td>29.66</td>
<td>28.4</td>
<td>12.80</td>
<td>30.87</td>
</tr>
<tr>
<td>30% higher - 97500</td>
<td>30.97</td>
<td>47.0</td>
<td>12.50</td>
<td>116.59</td>
</tr>
<tr>
<td>40% higher - 105500</td>
<td>25.45</td>
<td>47.2</td>
<td>11.90</td>
<td>117.51</td>
</tr>
<tr>
<td>50% higher - 112500</td>
<td>23.15</td>
<td>41.7</td>
<td>12.15</td>
<td>92.16</td>
</tr>
<tr>
<td>CD (0.05%)</td>
<td>5.193</td>
<td>9.802</td>
<td>1.162</td>
<td>-</td>
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</table>