Evaluation of IPM for the management of insect pests of Okra

Rudra N Borkakati and DK Saikia

Abstract

Experiment for evaluation of IPM package of okra was carried out in 2015-16 and 2016-17 at Allengmora, Jorhat. The results revealed that the population development of sucking pests (Amrasca biguttula biguttula (Ishida) and Bemisia tabaci (Gennadius)) of IPM package and farmer’s practice (Chemical control) were statistically at par. The number of A. biguttula biguttula and B. tabaci population/plant were 0.98 and 0.76 in IPM package whereas they were 1.03 and 0.74 was recorded in farmers’ practice respectively, after third spray. Pertinent to fruit damage, the minimum fruit damage of 8.17% was obtained in chemical control plots as against 9.06% in IPM plot, although they were on par with each other. Regarding yield, maximum yield (102.2q/ha) was registered in IPM package followed by farmer’s practice with 98.57 q/ha and they were statistically significant with each other. Similarly, the highest Cost: Benefit ratio (1: 8.46) was observed in case of IPM plot followed by farmers’ practice (1: 7.98).

Keywords: Evaluation of IPM, pests of Okra, Amrasca biguttula biguttula (Ishida), Bemisia tabaci (Gennadius), per cent fruit damage, farmers practice

Introduction

Okra (Abelmoschus esculentus L.) belongs to the family Malvaceae, commonly known as Lady’s finger is one of the predominant vegetables cultivated in throughout India. Okra constitutes various vitamin like A, B, C and is it also rich source of protein, carbohydrates, fats, iron and iodine etc, which are important components of human diet [1]. Okra seeds are a potential source of oil, with concentrations varying from 20% to 40%, which consists of linoleic acid up to 47.4%. Okra seed oil is also a rich source of linoleic acid, a polyunsaturated fatty acid essential for human nutrition [2]. As a nutritious vegetable, okra is a superb food to address doubling farmer’s income as well as the problem of malnutrition. Like other crops, Okra is also attacked by a number of biotic and abiotic factors, including insect pests and diseases [3]. However, insect pests and diseases are major constraints to the reduction of fruit yield of okra. It is ravaged by numerous insect pests, amongst all okra shoot and fruit borer, Earias vitellae Fab, is the major threat to okra production, causes a yield reduction up to 50 – 70%[4]. In addition to this, different insects viz., aphid, jassids, whitefly, thrip, spotted bollworms, whitefly are the most important pest of okra crop right from sowing till harvesting. These pests attacks the crop either directly by sucking the sap or indirectly by transmitting a large number of viral diseases as vector [5, 6, 7, 8]. However, jassid is a very destructive sucking insect pest of many crops in the majority areas of the growing countries of the world and has been found damaging many crops in the world. Due to sap sucking by adult and nymph of jassids, the colour turns grayish and leaves may fall down due to the injection of toxic saliva into the plant tissues of okra crops [9]. Unfortunately, farmers are depends on the use of synthetic chemical pesticides, thereby endangering the human health as well as pollutes environment [10]. The neem products with half the dose of conventional insecticide has resulted in more efficient control than insecticide alone [11]. Therefore, to overcome this problem of insect pests and diseases adoption of IPM module is the need of the hour. A number of IPM trials have been implemented in different parts of the globe, showed that integration of different control tactics along with the right dose of pesticides after pest attaining the ETL reduces their problem to a great extent [12]. However, Begam et al., [13] reporte that conservation of natural enemies are very much important, which is achieved only chemical free agriculture. From another experiment conducted by Borkakat et al., [14], found that the a number of natural enemies were present in any kind of agri-horti ecosystem.
Fortunately, integration of biopesticides with pest management technology is also gaining momentum in last few years [15, 16]. Future transgenic of vegetables may also be an important part of IPM [17].

Materials and Methods
Field experiment on evaluation of IPM package of okra was compared with farmers’ practice (chemical control) and untreated check covering an area of 210 m², 210 m² and 30 m², respectively at Allegmora, Jorhat with a variety Arka Anamika. The IPM package comprised with the installation of yellow sticky traps (YST) @ 1 / 50 sq.m was done at 15 days after sowing of okra against B. tabaci and A. biguttula biguttula; three releases of Trichogramma chilonis @ 50,000/ha/week against fruit borer at bud initiation stage; installation of light trap @ 1/ 500 sq.m was done at 15 days after sowing of okra against adult lepidopteran pests; removal & destruction of infested fruits/shoots, roughing of YMV infested plants and need based application of insecticides i.e. two sprays of malathion 50 EC @ 2ml/lit of water. The entire plant from random selection 10 plants from each replication. Yield of fruits at each harvest was recorded. In farmer’s practice, six sprays of Deltamethrin (Decis 2.8 EC) @ .0.5 ml/lit was sprayed against Earias vitella, A. biguttula biguttula and B. tabaci.

Results and Discussion
The result of the experiment (Table 1) revealed that no significant differences was observed in IPM package and farmer’s practice (Chemical control) in respect of the population development of sucking pests (A. biguttula biguttula and B. tabaci). The number of A. biguttula biguttula and B. tabaci population plant/plant were 0.98 and 0.76 in IPM package whereas they were 1.03 and 0.74 was recorded in farmers’ practice respectively, after third spray. But in case of per cent fruit damage, the minimum fruit damage of 8.17 was obtained in chemical control plots as against 9.06 in IPM plot, although they were on par with each other. In case of untreated check fruit damage of 14.10 per cent was significantly different from IPM package and farmers’ practice.

Maximum yield (102.2/q/ha) was registered in IPM package followed by farmer’s practice with 98.57 q/ha, although they were statistically significant with each other. Similarly, the highest Cost: Benefit ratio (1: 8.46) was observed in IPM plot followed by farmers’ practice (1: 7.98) and untreated check (1: 4.42) (Table 2).

These results are in confirmation with the findings of Kumar et al. [18] and Ashfaqe et al. [19] who reported less incidence of jassids in IPM grown okra plots than in farmers practice and untreated control plots of okra. Mohankumar [20], reported that the IPM approach registered significantly lower populations of different insect pests coupled with yield increase in the IPM plots was 12.43-45.54 % above the farmers practice. The benefit: cost ratio was 2.53-3.23:1 in the IPM plots as compared to 1.23-1.52:1 in the farmer’s practices plots. Similarly, Zakir et al. [21] reported that IPM treatments influenced maximum mean population reduction of complex sucking pests on Okra crop. Similarly, an experiment codcete by Saikia and Borkakati [22], also observed that bio intensive IPM plot registered highest yield than chemical control plot in case of tomato. Ashis et al., (2020) [23], reported that the management module comprised with azadirachtin 300 ppm, dimethoate 30 EC, thiamethoxam 25 WG, and quinolphos 25 EC was very effective to control insect pests of Okra. From another experiment conducted by Kanimozhi et al., (2020) [24] revealed that the highest reduction of leafhopper population was recorded in dinotefuran 20 SG @ 0.30g/l (91.34 and 90.57%) followed by buprofezin 25 SC @ 2ml/l (88.36 and 87.02%).

### Table 1: Effect of IPM module on incidence of insect pests of okra (pooled data 2015-2017)

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Pre count sucking pests/leaf</th>
<th>Post count sucking pests/leaf</th>
<th>% Fruit damage</th>
<th>Fruit yield (q/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A. biguttula biguttula</td>
<td>A. biguttula biguttula</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B. tabaci</td>
<td>B. tabaci</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPM</td>
<td>4.19</td>
<td>3.09</td>
<td>2.8 a</td>
<td>2.81 a</td>
</tr>
<tr>
<td>Farmers’ practice</td>
<td>4.47</td>
<td>3.0</td>
<td>2.71 a</td>
<td>2.61 a</td>
</tr>
<tr>
<td>Untreated check</td>
<td>4.14</td>
<td>3.14</td>
<td>3.85 b</td>
<td>3.57 b</td>
</tr>
<tr>
<td>S Ed ±</td>
<td>0.24</td>
<td>0.14</td>
<td>0.15</td>
<td>0.23</td>
</tr>
<tr>
<td>CD at 5%</td>
<td>NS</td>
<td>NS</td>
<td>0.34</td>
<td>0.50</td>
</tr>
<tr>
<td>CV %</td>
<td>14.96</td>
<td>12.48</td>
<td>13.51</td>
<td>20.45</td>
</tr>
</tbody>
</table>

*Values in parenthesis are angular transform

Means in the same column by common letter are not significantly different

### Table 2: Cost benefit ratio (pooled data 2015-2017)

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Observed Yield (Kg/ha)</th>
<th>Yield gain over control (Kg/ha)</th>
<th>Gross Profit (Rs/ha)</th>
<th>Cost of production (Rs/ha)</th>
<th>Net profit (Rs/ha)</th>
<th>Cost benefit ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPM Package</td>
<td>10220</td>
<td>3310</td>
<td>102200.00</td>
<td>10803.38</td>
<td>91396.62</td>
<td>1: 8.46</td>
</tr>
<tr>
<td>Farmers’ practice</td>
<td>9850</td>
<td>2940</td>
<td>98500.00</td>
<td>10968.82</td>
<td>87531.18</td>
<td>1: 7.98</td>
</tr>
<tr>
<td>Control</td>
<td>69100</td>
<td>-</td>
<td>69100.00</td>
<td>12749.08</td>
<td>56350.92</td>
<td>1: 4.42</td>
</tr>
</tbody>
</table>

Cost of produce/kg = Rs 10.00
Conclusion
The study showed that maximum yield (q/ha) and highest benefit (Rs./ha) achieved in IPM plots as compared to farmers practice as well as untreated check. It can be concluded that IPM package proved as effective as chemical control on large scale for the management of insect pest of okra. Therefore, use of the IPM module may be an appropriate tool of wise application of synthetic chemical insecticides. Moreover, IPM may be recommended as a good substitute for the solely chemical dependent agriculture.

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References