Entomological survey on cotton whitefly in district Bahawalpur

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Abstract

An entomological survey on pest scouting of whitefly in standing cotton was conducted to evaluate month-wise comparison of spots of Above and Below Economic Injury Level (AEIL and BEIL) in District Bahawalpur during 2012-2013. Spot-wise population of whitefly was recorded 3.15%, 0.00% as above EIL with 80.75% and 88.96% below EIL during May in both the years respectively. However 15.76% and 5.04% spots were recorded above EIL and 77.97%, 86.69% below EIL during June in both the years. During July gradually increased spots were recorded 18.65%, 8.92% of above EIL and 81.35% and 91.08% below EIL. During August above EIL of spots were recorded 17.51%; 11.46% with below EIL was 81.49% and 88.54%. However in September 23.13%, 19.68% spots infested were AEIL with 76.87% and 80.48% were recorded BEIL. During October maximum 34.45% spots were recorded above EIL but 65.55% spots were recorded BEIL during 2013. However during 2012, the spot-wise population of whitefly trend decreased as 16.67% above EIL but 83.33% spots were below EIL. Spot-wise comparison showed significant result (P<0.05) in above economic injury level (AEIL) of whitefly i.e. 59 and 25 spots in September during both years. However during October 44 and 31 above EIL spots showed non significant effect (P>0.05) with each other but highly significant (P<0.05) result with all rest of the months. Maximum spots were recorded below EIL i.e. 147; 146; 126; 115 and 112 were statistically non significant (P>0.05) to each other during 2013. However highest spots recorded below EIL i.e. 147; 146 were showed non significant (P>0.05) result with each other but showed significant result (P<0.05) with all rest of the treatments during 2012. At the end it was concluded that population of whitefly was increasing above EIL gradually with the passage of time up to October. However the cotton growers should be vigilant during June-October. However the farmers were advised to do regular pest scouting in their fields with the consultation of plant doctors in crucial time to avoid high infestation of whitefly.

Keywords: Pest Scouting, Survey, Cotton, Whitefly, Bahawalpur, Punjab-Pakistan

Introduction

Cotton (\textit{Gossypium hirsutum} L.) is cash crop popularly known as silver fiber, back bone of Pakistan; considered the forth largest producer and third largest consumer throughout the world (Zeeshan et al. 2010). Cotton having a share of 1.4% in GDP, 6.7% in agriculture value addition and an important source of raw material to the textile industry. During July-March 2013-14, textile industry fetched foreign exchange earnings of US$ 10.385 billion. The crop was cultivated on an area of 2806 thousand hectares, 2.5% less than last year’s area of 2879 thousand hectares. The production stand over 12.8 million bales during this period against the target of 14.1 million bales, showing decline of 9.2% against the target and
Homoptera: Aleyrodidae) 2013.

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1914).Whiteflies are polyphagous insect that feed on a

different parts of plant. Insect pests are major limiting factors in producing cotton and hundreds of species of insect pests found in a cotton field, but 10-15 of those species are capable of producing economical damage (Greene, 2012). Whiteflies (Homoptera: Aleyrodidae) are small insects that feed on nymphs and adults on plant sap with piercing-sucking mouthparts (Stewart, 1914). Heavy infestations weaken plants and cause wilting and yellowing of leaves. Honeydew excretions from feeding nymphs accumulate on plants, giving them a sticky but shiny appearance. Sooty mold developed on honeydew can cover leaves and stain the lint. This is generally not a serious problem in the Mid-South because rain will often “wash” the lint. However, the accumulation of honeydew and sooty mold is an indication of heavy infestations that may need to be treated with insecticides (Stewart, 1914). Whiteflies are polyphagous insect that feed on a large number of host plants fruit trees, vegetables, ornamentals, weeds and field crops. However, the magnitude of infestation and the nature and extent of injury vary with plant species, seasons and localities. That can be attributed to the presence of biotypes (A and B) in this species, especially the ‘B’ biotype which is a very voracious feeder (Tayyib et al. 2014). Adults and larvae of B. tabaci feed by sucking the phloem and are attracted by yellow color. In relation to its host plant, B. tabaci is affected by the external physical characteristics of the leaf, e.g., hairiness vs. glabrousness, sticky glandular trichomes, leaf shape (okra/ super okra) foliage density; and the internal chemical characteristics of leaf, e.g., pH of leaf sap as sources of mechanisms of resistance in cotton (Berlinger, 1986). A serious outbreak of cotton whitefly (Bemisiatabaci) was occurred in August, 1974 and completely destroyed the crop in parts of Lahore, Sahiwal, Faisalabad, Jhang, Sargodha and RahimYarKhan Districts where majority of the farmers had to plough up their cotton fields (Yunus et al. 1980). The continuous and indiscriminate use of synthetic pesticides led to adoption of IPM approaches which are very useful potential means of ameliorating commodity losses to pests, thereby enhancing the long term sustainability of agro-ecosystem. Under Integrated Pest Management (IPM) the host plant resistance is internationally recognized approach. The varietal resistance can play an important role in compatible with different pest control tactics of IPM (Ali and Ahmad, 1982; Jin et al. 1999 and Khan et al. 2003). However entomological survey was carried out on cotton whitefly infestation in the area of District Bahawalpur to evaluate spot wise comparison of whitefly during 2012-2013.

Materials and Methods

An entomological survey on pest scouting of whitefly in standing cotton was conducted to evaluate month-wise comparison of spots of Above and Below Economic Injury Level (AEIL and BEIL) in District Bahawalpur during 2012-2013. The success of entomological survey was done by interviewing the farmers of each spot. The entire District was divided into small pockets and pest scouting was done by Mario Method, however pest scouting was done at morning and evening time. The EIL of both nymph and adult of whitefly was 4-5/leaf during the whole season. The attack was recorded from three upper, middle and lower portions of leaves from randomly selected plant then taken its average. The survey showed that maximum farmers were used Pyriproxifen @ 1000 ml/ha followed by acetameprid @ 375g/ml/ha and buprofezin @ 1500g/ha for controlling whitefly of cotton. When bolls were mature and opened at the end of September and later on 2-3 picking was applied in the field. The data collected were statistically analyzed by analysis of variance technique at 5% level of probability (Steel and Torrie, 1980).

Results and Discussion

Fig. 1 showed that Spot-wise population of whitefly was recorded 3.15%, 0.00% as above EIL with 80.75% and 88.96% below EIL during May, 2012-2013. However 15.76% and 5.04% spots were recorded above EIL and 77.97%, 86.69% below EIL.
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![Figure 1 showing month-wise comparison of percentage spots of above-economic injury level (AEIL) and below-economic injury level (BEIL)](image)

Table 1 revealed that Spot-wise comparison showed significant result (P<0.05) in above economic injury level (AEIL) of whitefly i.e. 59 and 25 spots in September during both years. However during October 44 and 31 above EIL spots showed non significant effect (P>0.05) with each other but highly significant (P<0.05) result with all rest of the months. Maximum spots were recorded below EIL i.e. 147; 146; 126; 115 and 112 were statistically non significant (P>0.05) to each other during 2013. However highest spots recorded below EIL i.e. 147; 146 were showed non significant (P>0.05) result with each other but showed significant result (P<0.05) with all rest of the treatments during 2012. Studies showed that the cotton whitefly, *Bemisia tabaci* had been recorded feeding on 540 host plants belonging to 77 families (Basu, 1995). They also suggested that Movento and Imidacloprid were proved to be highly effective against sucking pests of cotton. *B. tabaci* laid less number of eggs on sparsely hairy cotton variety and most of the eggs were laid on velvet hairy variety (Butter and Vir, 1991).

Table 1 showing Spot-wise comparison of above economic injury level (AEIL) and below economic injury level (BEIL) during 2012-13

<table>
<thead>
<tr>
<th>Month</th>
<th>Spots 2013</th>
<th>Spots 2012</th>
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<td>May</td>
<td>31b</td>
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<td>June</td>
<td>34b</td>
<td>143c</td>
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<td>July</td>
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<td>64b</td>
<td>71c</td>
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<td>August</td>
<td>23b</td>
<td>7c</td>
<td>115a</td>
<td>121b</td>
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<tr>
<td>September</td>
<td>59a</td>
<td>25ab</td>
<td>126a</td>
<td>112b</td>
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<tr>
<td>October</td>
<td>44ab</td>
<td>31a</td>
<td>112a</td>
<td>127b</td>
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Conclusion

At the end it was concluded that population trend of whitefly increased above EIL gradually with the passage of time. However the cotton growers should be vigilant to implement following actions. 1) Field and water channel should be free from all types of weeds. 2) Whitefly should be controlled in alternate hosts like in vegetables. 3) Seed should be treated with Imidachloprid @ 5g/kg of seed or suitable available insecticides to provide initial control measures against this pest. 4) Regular pest scouting or Integrated Pest Management (IPM) should be implemented with the consultation of plant doctors in crucial time to avoid high infestation of whitefly.

References
