

MANAGEMENT OF RESURGING ARTHROPOD PESTS ON *Bt* COTTON IN PAKISTAN

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Abstract

Cotton is produced in 125 countries with the resulting lint used either domestically or exported as a textile raw material. Pakistan produces ~10 million bales of cotton lint and ranks 4th among cotton producing countries in the world. Cotton is widely grown in Pakistan and is an important cash crop in the country's economy. Pakistan produces cotton on about 2.9 million hectares, with the production of about 10 million bales. Primary cotton cultivars used in Pakistan include FH-Lalazar, CIM 599, CIM-602, BH-178, FH-118, and FH-142. Most of Pakistan's planted cottonseed contains transgenic gene technology for bollworms and other lepidopteran pests. Economic gains from *Bt* cotton in Pakistan was estimated to be US\$1.9 billion over a 5-year period (2010-2014) and US\$299 million for 2014 alone. Insect pests of cotton in Pakistan represent the greatest arthropod pest diversity within the entire region. The estimated lint yield losses due to insect pests to Pakistani cotton range from 20-40%. A variety of insect pests attack the cotton crop from germination through crop maturity. Recent resurging insect pests of Pakistani cotton which cause severe damage are *Bemisia tabaci*, *Amrasca biguttula*, *Thrips tabaci*, *Helicoverpa armigera*, *Earias vittella*, *Earias insulans*, and *Pectinophora gossypiella*. Some of these pests have developed resistance to our available *Bt* cotton cultivars.

Pink bollworm, *Pectinophora gossypiella*, has emerged as the most serious pest of cotton, especially at a later stage of crop growth cycle (3rd week of August to 4th week of October). There were only 129 severe infestation cases observed in 2014, but these severe cases of pink bollworm infestations increased to 1,314 in 2015. The effect of increased pink bollworm severity has resulted to significant lint yield reduction as well as poor fiber quality. Hotspots (populations exceeding ETL) were observed in Lodhran, Bahawalnagar, Vehari, TT Singh, Bhakkar, Multan, Bahawalpur and Khanewal District of Punjab (Fig. 1), whereas infestation remained below ETL throughout other cotton growing areas of Punjab. Approximately 90% of insecticides are used to manage cotton insect pests in Pakistan and only 10% of the insecticide share goes to other crops. Primary insecticides used in managing resurging pests of cotton include pyriproxyfen, nitenpyram, curacron, and lambda-cyhalothrin. The presentation highlighted our current effort in developing integrated pest management approaches for Pakistan's major cotton insect pests, particularly in light of insect resistance to *Bt* technology.

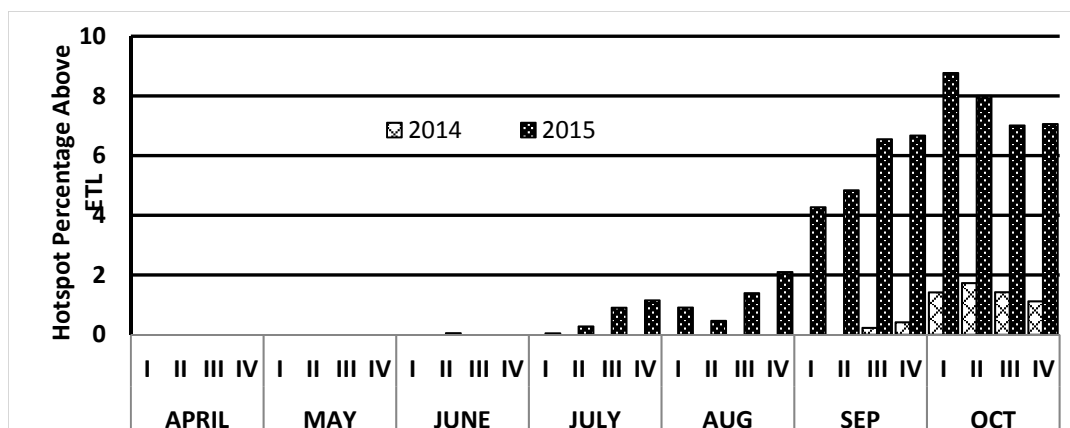


Figure 1. Weekly percentage of cotton fields exceeding pink bollworm economic threshold level in Pakistan for the years 2014 and 2015.