REVISED TARGETS AND TOOLS IN IPM FOR INSECT PESTS OF COTTON IN INDIA

In India, adoption of Bt cotton to contain bollworm menace has seen dramatic increase from 0.038 to >113 mha just in 15 years. Being largest grower of Bt cotton hybrids expressing CryIAc+CryIAb toxins, striking benefits of bollworm suppression (>95%), insecticide usage reduction (60-100%) against bollworms and yield advantage (>50%) have been harnessed.

The reduction of synthetic pyrethroids and organophosphate insecticides after introduction of BG-II Bt cotton hybrids has led enhanced infestation of non-target insect pest species in India and elsewhere. The target pests of bollworm complex and sucking pests viz., thrips, leafhoppers, aphids and whiteflies before introduction of Bt cottons. The present day key target pests are mealybugs (Phenococcus solenopsis, Paracoccus marginatus), mirid bug (Creontiades biserratense), and flower bud maggot (Dasineura gossypii). These pests affect fruiting structures and cause >60% loss urging for insecticide application atleast twice. Other major problem is neonicotinoid resistance in sucking pests particularly in leafhoppers. Imidacloprid resistance is widespread and upto 2000 folds. Survival of pink bollworm (PBW) in Bt cottons is also causing an issue. Thus cotton pest management has new targets now which need revised tools in integrated pest management (IPM) for sustained profit. The ideal approach include: avoiding seed dressing with neonicotinoids; new chemistry for sucking resistance management (flonicamid, pymetrazine); high efficacy bio-molecules and insect pathogens are essential for effective management of leafhoppers, thrips, whiteflies. Location specific management of mites, shoot weevil is also essential. Development of pheromones based and colour traps, biotech tools viz., RNAi and host plant resistance are tools to avoid insecticides being used against minidbugs, flower bud maggots and mealybugs. Parasitoids and sterile insects also have logical place in revised IPM.