

PEST CONTROL IN ORGANIC COTTON

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Selection of varieties and time of planting

In organic cotton cultivation selection of resistant / tolerant varieties and time of planting will help the plants to tolerate the pest attack or will help to escape from harmful insect pests. LRA 5166, Surabhi and Sumangala are tolerant to sucking pests and Supriya, Kanchana and LPS 141 are resistant to whitefly. The variety Abhadita is tolerant to bollworms. Synchronized sowing in a contiguous block at proper time will reduce aggravating pest problem particularly stem weevil and pink bollworm.

Crop diversity

Trap cropping: Small plantings of a susceptible or preferred crop may be established near a major crop to act as a trap. After the pest has been attracted to the crop, the pest is destroyed or the infested plant parts or plants may be removed. Growing castor surrounding the cotton will attract *Spodoptera* for egg laying. Pigeon pea and marigold mask the odour emanated from volatile compounds of cotton and offer less preference for oviposition by *Helicoverpa* in cotton.

Intercropping: Intercropping with blackgram and chillies will reduce the intensity of bollworms infestations in cotton.

Bund cropping: Cowpea planted as a bund crop encourages predators such as coccinellids, syrphids etc. which will keep the sucking pests under check.

Ecofeast crop: Maize grown along the border provides food and shelter for number of lepidopteran parasites and thus serve as ecofeast crop. It also act as barrier crop for sucking pests. Cowpea is also a good ecofeast crop encouraging multiplication of coccinellids and other predators.

Agronomic practices:

Crop rotation: Crop rotation minimizes pest infestation to a greater extent. Cotton should be followed by crops which are not favourable or less preferred by cotton pests. Cotton followed by cereals like maize / sorghum reduce the incidence of whitefly, bollworms, soil born insects and nematodes.

Cotton free period: Cotton should be grown only once in a year. Cotton double cropping and ratooning should be avoided to prevent carry over population as they provide continuous food supply for the pest multiplication.

Cultural practices:

Proper spacing: Close spacing and dense canopy will encourage the faster rate of multiplication of bollworms and other pests of cotton. Hence optimum spacing and density are to be maintained.

Nutrition management: Proper nutrition management should be followed, apply fertilizer based on soil testing. Avoid high dose of nitrogenous fertilizers to prevent excessive vegetative growth (luxuriant green growth) which otherwise attracts more pests.

Field sanitation: Summer ploughing destroys the resting stages of insects in the soil should be followed. Removal of alternate weed hosts which harbour cotton pests. Collection and destruction of affected squares, dried flowers and grown up larvae will significantly reduce the pest intensity and buildup.

Timely harvest and stalk destruction are among the most effective method managing pink bollworm. These practices reduce the habitat and food available to the pink bollworm, *Helicoverpa* and *Spodoptera*. Efforts should be made to destroy the green bolls, cracked bolls and other plant debris left at the end of the season.

Mechanical measures

Topping: Removal of terminals of cotton crop (“Topping”) at 80-90 days of growth should be made to reduce *Helicoverpa* oviposition and also to encourage sympodial branching which bears more fruiting bodies.

Bird perches: Erection of bird perches (@ 10 / ha) encourages the predation by carnivorous birds.

Hand picking of larvae: Hand picking of grown up larvae should be done in the morning between 6.30 to 10.0 am and in the evening hours. It will eliminate the possible development of insecticide resistance. It also helps to minimize heavy build up of future population.

Scouting, monitoring and crop protection decisions

Regular field scouting / monitoring is a vital component of any pest management programme because it is the only way by which reliable information can be obtained to decide if and when pest reaches the economic threshold level. It will determine the pest density and damage levels through the use of standardized sampling techniques. Control measures should be taken in time when pest population reaches a level at which further increases would have resulted in losses beyond sustainable level.

Pheromone monitoring: A sex pheromone released by one sex only triggers off a series of behavioral patterns in the other sex of the species. It is referred to as sex attractant or sex lure. Generally females produce sex pheromone which attracts males. The sex pheromones are specific in their biological activity, the males responding only to a specific pheromone of the female of the same species. Males of the American bollworm respectively. Pheromone traps @ 5 / ha help to identify the brood emergence for synchronization of insecticide application and release of parasites.

Botanical pesticides: In view of sustainable approach and to utilize the biodiversity, it is essential to promote use of locally available neem seed as a botanical pesticide. Neem acts as antifeedant and oviposition deterrent. So NSKE 5% and neem oil 0.5% can be used to prevent the egg laying of *Helicoverpa* and also to deter the adult moths from cotton.

Method of neem kernel extract preparation

- Five kg of dried and cleaned neem seed should be taken a day before spraying, powder the seeds by grinding.

- Soak the powder overnight in 10 liters of water, Stir with wooden plank in the morning till solutions become milky white.
- Filter through double layer of muslin cloth and make volume to 100 litre by adding fresh water. Add 200 g of detergent soap and spray the solution to cover upper as well as lower foliar portions of the crop.

Bioagents: Parasitoids and predators are effective in suppressing the pest population. The parasitized eggs of *Corcyra* glued on a paper strip (Trichocard) has to be pinned and the lower surface of the cotton leaves. The emerging *Trichogramma* adult searches and parasitize the eggs of bollworms and perpetuate to some extent in nature to suppress the bollworm population. Two to three releases of egg parasitoid *Trichogramma chilonis* @1.5 lakh / ha during peak egg laying of *Helicoverpa* and other bollworms will help to reduce the bollworms infestation significantly.

Release of *Chrysoperla* sp. @ 500-1000 / ha according to the intensity of jassid damage between 20 – 25 days of crop growth will reduce the jassid population.

Insect pathogen: Entomopathogenic viruses are widely prevalent in nature and are specific to pests hence NPV effective against *H. armigera* was used. Spraying of H-NPV @ 500 LE / ha will be targeted against young larvae of *H. armigera*. Occasionally, the virus affected larvae will be seen hanging head downwards with shriveled body. This can be repeated after 15 days for retaining good inoculum of the pathogen. This may be alternated with commercial Bt formulations @ 1.51 / ha.