

# Turncoat Cotton

**Posing a striking opposition to genetically modified cotton, Sreeram Chellappa presents an antithesis – organic cotton, and discusses the procedures essential to its cultivation**

Cotton plays a dominant role in the agrarian and industrial economy of India. It is the backbone of the country's textile industry, accounting for 70 per cent of the total fiber consumption in the textile sector, and 38 per cent of the country's export, fetching over Rs 42,000 crore. The area under cotton cultivation in India (8.9 million ha) is the highest in the world, that is, 25 per cent of the total world area and employs almost 7 million people.

But besides the above statistics, cotton productivity in India is quite low as compared to the world standards. The modern cotton production technology relies heavily on the use of fertilisers and chemicals to control insects, pests, diseases and weeds. Use of chemicals at such scale cause a lot of hazards, such as environmental pollution, soil health, and agro-ecology and poor profitability in cotton farming. This has basically prompted the demand of organically cultivated, eco-friendly or "green" cotton.

The various steps to be followed in the organic cultivation of cotton are listed below.

## SELECTION OF SITE

Fields with high degree of soil erosion and heavily infested with perennial weeds should not be put under organic farming. Organic farming is not a farming of neglect or armchair cultivation and so, fertility levels of less fertile soils should be improved through organic means before opting for this type of cultivation.

## VARIETAL SELECTION

High yielding varieties, which respond well to chemical inputs, may not always be suitable for organic farming. Varieties, which are jassid-tolerant, can be preferred over susceptible ones. Early maturing varieties are less exhaustive and also help the crop to escape heavy bollworm damage.

## SEED RATE AND SOWING

Acid-delinted seeds cannot be used, according to international norms such as the International Federation for Organic Agriculture Movement, for the purpose of certification of the fiber. However, farmers who pursue organic farming for reducing the cost of cultivation and to increase the profitability can use acid-delinted seeds in order to avoid seed borne pathogenic infections and to achieve optimum plant stand. If fuzzy seeds are used, higher seed rate is to be used in order to achieve the same goal. About 25 kg/ha of seeds at 75x15 cm spacing ensures a final plant population of 85-90 thousand plants/ha.

## MANURING PRACTICES

Improvement and maintenance of organic matter of the soil is important in organic cotton production, as this would increase the physical parameters of soil, improve soil structure and enhance nutrient supply. Since huge amounts of Farm Yard Manuring (FYM), to meet the nutrient requirement of the cotton crop are not generally available, a combination of sources with different biological properties should be preferably used.

Organic manures (FYM, compost, vermicompost), in situ green manuring, cowpea and biofertilisers along with fertility restoring crop rotations form the components for maintaining soil fertility.

### SELECTION OF ROTATIONS

Crop rotations play a very important role in restoring soil fertility and minimising damage due to insect pests and weeds. High nutrient-exhaustive rotations must be avoided and instead rotations with a legume that is recommended for the locality may be adopted.

### INTEGRATED PEST MANAGEMENT STRATEGIES

Avoidance of pesticide application by introducing biocontrol agents, either by natural augmentation processes or by artificial releases increases the

commercial Bt formulation at the rate of 1.5 l/ha

- ◆ Release of *Habrobracon hebetor* is also useful for controlling growing bollworm larvae and other caterpillars damaging leaves and flowers
- ◆ Placement of bird perches at the rate of 5-6/ha would help in increasing the predatory bird visit in the cotton fields
- ◆ Monitoring of bollworm using the pheromone traps would give a clue regarding their first occurrence in a season in order to initiate adequate and suitable crop protection measures
- ◆ One of the important practices that are desirable is to deport the crop that has grown beyond 80 days. This would reduce the egg laying activity of *Heliothis Armigera*.

From the studies conducted at the Central institute for Cotton Research, Nagpur on the technology generation for sustainable organic cotton production and its comparison to conventional farming with use of chemicals (fertilisers and insecticides), the following facts have emerged for careful consideration.

- ◆ In a span of 3-4 years, there was gradual build up in soil productivity and the seed cotton yield in organic farming was at par with non-organic farming
- ◆ In the initial year, the yield realisation through organic system was about 40 per cent of that of conventional (non-organic) system, with comparable or slightly higher (7-10 per cent) production costs. This situation improves in subsequent years
- ◆ There was also a gradual improvement in soil fertility parameters such as organic carbon content. The organic carbon content stabilised at 0.50-0.55 per cent after 4-5 years
- ◆ One interesting observation was that even jassid susceptible cultivator such as LRA. 5166 showed good tolerance to jassid infestation under organic environment.

There was a good build up of natural enemies, such as egg, larval and pupal parasitoids, and also of various predators of cotton pests. Under continuous cultivation of cotton in organic environment, its stability situation for better performance was achieved over a period of time. Capability of cotton plant to withstand pest infestation was also found to be high. 🌱

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**IMPROVEMENT AND MAINTENANCE OF ORGANIC MATTER OF THE SOIL IS IMPORTANT IN ORGANIC COTTON PRODUCTION, AS THIS INCREASES THE PHYSICAL PARAMETERS OF THE SOIL, IMPROVES ITS STRUCTURE, AND ENHANCES NUTRIENT SUPPLY**

stability of cotton cultivation. The basic concept of conserving natural mortality agents of pests can be achieved in organic cotton cultivation, primarily by reducing insecticide application. These toxicants destroy both, pests and their natural enemies, and so, are not desirable for common use. To sum up, the following pest suppression strategies are recommended for organic cotton cultivation:

- ◆ Select a reasonably jassid tolerant cultivator
- ◆ Release of *Chrysoperla spp* at 500-1000/ha according to the intensity of jassid damage between 20-25 days of crop growth once. For jassid susceptible cultivator, this may be released after 35 days
- ◆ Release *trichocards* at 5/ha once in 45-50 days and then after 10-12 days, twice more in order to kill bollworm eggs
- ◆ Spray H-NPV at the rate of 250 larval equivalent (LE). This could be repeated after every 15 days for retaining good inoculums of the pathogen. This could be alternated with any com-