




Cotton bollworm

Helicoverpa armigera

	Prevention	Monitoring	Direct Control	Direct Control	Restrictions
 <p>Adult <i>H. armigera</i> (ICRISAT)</p>	<ul style="list-style-type: none"> • If bollworm population is low in area, plant before and/or during crop growth one/two rows of maize around crop field as a trap for pest when it is at larval stage • Reduce planting density of tomato • Provide habitats for natural enemies (e.g. flowering plants) such as: <i>Trichogramma</i> spp. (egg parasitoids), wasps, flies (larva parasitoids), ants, lacewings, ladybugs, assassin bugs, minute pirate bugs and birds • Rotating with non-host crops can prevent the population from building up but rotation must be used together with other prevention/control practices as the bollworm can attack and harbour on over 200 species of plants • Avoid crop rotation with other plant hosts incl. eggplants, okra, soybeans, cotton, corn, beans, chickpea, flax, wheat, barley, oats and sorghum • Remove and destroy crop residues immediately after harvest. Feed to livestock • It is not recommended to apply insecticides as a preventative measure as the pest is often resistant to these • Plough the soil to expose the pupae to direct sunlight and natural enemies 	<ul style="list-style-type: none"> • Monitor the pest and symptoms 1-2 times/week from emergence until harvest • Use light traps (2/acre) to detect adults. Adults: forewings are yellow/brown and hindwings are white. • Look for small yellow/white to reddish-brown caterpillars with light stripe on each side of the body on leaves below highest open flowers and on fruit base. • Look for small, darkened entry holes at the base of the tomato, near the stem and under base leaves of the old flower. Open the fruit to confirm infestation • Large caterpillars: up to 35-40 mm long. Vary in colour: yellow/green/brown/red with greyish-black stripes along the body when fully grown. Large caterpillars hide inside the fruits • Note the number of eggs, small and large caterpillars, and % defoliation of plant • It is necessary to open the fruits and flowers of plants because the caterpillars are hidden within plant organs • Consider taking actions when the first few caterpillars are detected 	<ul style="list-style-type: none"> • For small plots, hand pick and destroy the eggs and young caterpillars from flower bud tips and fruit bases • Apply neem products on small caterpillars (e.g. neem oil 40ml/20L water) maximum 3 times. Start 15 days after transplanting. Ensure thorough coverage of fruits and plants. • Remove any fallen fruit or infested plant parts and destroy or feed to livestock 	<ul style="list-style-type: none"> • Apply when eggs hatch so that larvae are killed. Only the young <1 cm long larvae outside the fruits can be controlled. Larvae inside fruits are protected from sprays with contact pesticides. • There are many WHO class II pesticides registered against bollworm but less toxic alternatives can control the pest. • Lambda-cyhalothrin 50g/L • Cypermethrin 50g/L • <i>Bacillus thuringiensis</i> against small larvae • Azadirachtin 1% based products (neem) 	<ul style="list-style-type: none"> • WHO class II. Moderately hazardous. MRL: 0.1mg/Kg, PHI: 3 days. REI-when spray dries. • WHO class II- moderately hazardous. Apply only when larvae are <1 cm as corrective spray. Do not apply before 75% petal drop. No more than 2 applications per growing season (7-10 days intervals) due to resistance to pyrethroids. PHI 4 days, REI 1 day. If ineffective, use a different chemical group. Toxic to bees • WHO class III (slightly hazardous); biological multisite stomach poison for insects, must be eaten by insect PHI. 1 days, REI 1 days, min retreatment 7 days, max 2 sprays per season. Dosage 15-20g/15 litre knapsack • WHO class U. Product unlikely to present hazard under normal use conditions. Larvae moulting disruptor; inhibits egg laying, antifeedant effects; PHI 3 days; REI 1 day. No more than 1 spray when flowering. Toxic to bees + aquatic organisms.
 <p>Bollworm and damage to tomato (PM Kodwaran, Kenya)</p>					
 <p>Larva in tomato fruit (A.B.S. King)</p>					

Ghana

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