PEST MANAGEMENT DECISION GUIDE: GREEN AND YELLOW LIST

Cotton boll worm in chickpea

Helicoverpa armigera

Cotton boll worm caterpillar (Antoine Guyonnet, Lepidopteres Poitou-Charentes, Bugwood.org)

Adult moth (W. Billen, Pflanzenbeschaustelle, Weil am Rhein, Bugwood.org)

Prevention

- Remove crop residues from the field, because the pupal stage hibernates inside.
- Plough 2-3 times in the dry season to expose bollworm caterpillars and pupae to predators and sun.
- Soil solarisation with plastic mulch 3-4 days ahead of sowing.
- Plant at the end of rainy season (late August).
- Closely space plants (10cm * 40cm intra and inter row space instead of 20cm * 60 cm).
- Apply Di Ammonium Phosphate (DAP) at a rate 25kg/ha to reduce succulent vegetative growth attractive to bollworms.
- Remove alternative hosts and off type crops such as Abutilum indicum.
- Intercrop with repellent crops, e.g. chickpea with sorghum.
- Plant Marigold round the field 6 days after sowing of chickpea to trap boll worm moth.
- Trap crop with less important crops (cotton).
- Rotate chickpea with wheat or sorghum. Do not rotate with other leguminous crops.

Monitoring

- Inspect chickpea fields from two weeks after seedling emergence, via vegetative to flowering stage.
- Look for eggs and caterpillars on the lower blade leaves, blossoms and pods. The caterpillar has white-yellowish to reddish brown body with a dark brown to black head capsule.
- Action should be taken when 2-4 caterpillars are observed in one-meter planting row.
- Urgent action should be taken when 3 to 4 caterpillars are observed in one-meter planting row.
- Look skeletonized leaves and bored pods of chickpea, but then action is often too late.

Direct Control

- Beat bollworm caterpillars off the plant onto a below sheet using a stick or by hand. Pick and kill early onset of caterpillars, remove affected plant pods.
- Apply botanicals such as Neem seed oil (mix 0.075 litre of Neem oil with 15 litre of water), Neem seed kernel extract (0.75 litres of Neem seed kernel extract in 15 litres of water).
- Spray biopesticide Nuclear polyhydrosis virus (HaNPV products).
- Release chickens and crows to bollworm infested fields.

Direct Control / Restrictions

Direct Control	Restrictions
• Good coverage of sprays is needed because the insecticides must get into contact with the caterpillars to kill.	
• When using a pesticide or botanical, always wear protective clothing and follow the instructions on the product label, such as dosage, timing of application, pre-harvest interval, max number of sprays, restricted re-entry interval. Do not empty into drains and water sources.	
• Always consult recent list of registered pesticides of Ethopia.	
• Spray 1-2 times Spinosad (such as 5% WP). Contact pesticides	• WHO toxicity class III (Slightly acute hazardous to humans) Restricted entry interval = 4 days after spray. Pre-harvest interval PHI= 7 days Risks to pollinators and parasitoids. Thus, spray after sunset or before flowering to protect bees. Slightly hazardous to parasitoids.
• Datura stromanium botanical pesticide (called □□□□□□ □□□□leaf extract (0.75 litre Datura in 15 litre water)	• Do not use higher doses, because it's toxic to non-target organisms and even humans. Do not spray without personal protective equipment. Mix with adjuvants and stickers such as soap to increase it's efficacy
• Spray Fenitrothin (such as 50%EC) 1-2 times.	• WHO toxicity class-II (Moderately acute hazardous to humans) Extremely harmful to most beneficial organisms including bees. Thus, do not spay onto flowering chickpea or spray after sunset. REI= 24 hours, PHI= 5 days
• Spray Deltametrin (such as 2.8%EC) 1-2 times.	• WHO class-II (Moderately acute hazardous to humans) Harmless to birds, spiders and hoverflies, but harmful to bees and many other natural enemies. PHI 3 days, REI 14 days

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