## Cotton bollworm on cotton

*Helicoverpa armigera*

### Life cycle of cotton bollworm

- **Adult**: Reproductive stage
- **Eggs**: Laid by females on leaves
- **Pupa**: Development stage
- **Larva**: Feeding stage

### Prevention
- Remove cotton stalk, bad boll and dead cotton after harvest to reduce overwintering pupae.
- Deep tillage (5-10cm) to reduce the overwintering pupae as tillage damages pupae;
- Irrigation in winter to freeze pupae to death.
- Select later-maturing varieties to avoid the first generation of bollworm moths to lay eggs on the cotton.
- Plant maize around the cotton field to attract moths laying eggs because bollworm moths prefer to oviposit on maize.

### Monitoring
- After harvest, choose 9-10 places in the field in November, then choose five points of soil. Dig 0.01m2, 10cm deep soil to search and record the number of pupae. In March of next year, record again to assess the survived pupae over winter.
- During May, choose five points in a field to survey larvae on wheat around the cotton field every ten days.
- Examine tips of plant leaves for egg laying twice weekly for effective application of recommended pesticides. Target L1 and L2 larvae. If red eggs are found which are about to hatch, apply pesticide within three days.
- Use light traps to attract and monitor the adults.
- At 30-40 eggs/100plants or 10-15 larvae/100plants, or 5 adults/week actions might be considered.

### Direct Control
- Release the parasitic wasp (*Trichogramma* egg cards) 3 days before the peak moth captures in traps (= laying eggs). Use a dose of 30,000-50,000 eggs/µmu;
- Spray the *Helicoverpa armigera* nuclear polyhedrosis virus HaNPV (80~100g/µmu) at peak period of egg laying;
- Plant corn, sorghum around the cotton field to attract oviposition, and then kill the eggs (using the chemical pesticides see that in yellow list). Put a couple of poplar branch in the cotton field to attract adults.
- Using high frequency oscillation pest-killing lamp traps in the field to kill the adults; 2 lamps/µmu.

### Direct Control
- It is easy for cotton bollworm to develop resistance to insecticides, therefore it is essential to switch between pesticide-groups to avoid resistance development.
- When using a pesticide or botanical, always wear protective clothing and follow the instructions on the product label.
- Always consult recent list of registered pesticides [http://www.chinapesticide.gov.cn/](http://www.chinapesticide.gov.cn/)

### Restrictions
- Phenthoate
- Chlorfluazuron
- Flufenoxuron
- Spinosad

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### China

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