

Management of Fall Armyworm *Spodoptera frugiperda*

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Fall armyworm native to America is one of the important invasive polyphagous pests. It occurs in several countries such as Brazil, Argentina, USA. In 2016 and 2017, it was reported in African countries. In 2018, fall armyworm noticed in India.

Host range

It primarily attacks wild and cultivated grasses, including maize, rice, sorghum, and sugarcane. It can also damage vegetable crops, cotton, and soybeans.

Identification

Forewing of male is shaded with gray and brown, with triangular white patch at the apical region and circular spot at the center of the wing. The forewings of female are uniform grayish brown to a fine mottling of gray and brown. The hind wings are silver-white with a narrow dark boarder in both male and female. Eggs are dorso-ventrally flattened, pale green to yellowish in colour. Full grown caterpillars are brownish black and had three dorsal lines and alight lateral lines. Black tubercles are found dorsally on the body which bears spines. The frons has a white inverted 'Y' line. Pupa is light brown in colour.

Nature of damage

Fall armyworm larvae wreak havoc on maize by devouring its leaves. Young larvae act like stealthy grazers, scraping away at the leaf surface from one side, leaving a transparent, opposite epidermal layer behind. As they mature (second or third instar), they become bolder, chewing holes directly into leaves and working their way inwards from the edges. Feeding within the whorl (central cluster of leaves) often leaves a distinct signature - a row of perforations across the leaves. Older, hungrier larvae cause the most damage. They become ravenous defoliators, stripping away most of the leaf tissue, leaving only the skeletal ribs and stalks, giving the corn plants a ragged, tattered look. To top it off, some larvae become true opportunists, burrowing into the developing ears of corn to feast on the kernels.

Life cycle

Female lays eggs in clusters on under or upper surface of leaves, base of the plant and also in whorls. Eggs are covered with scales. Incubation period is 2-3 days. Each larva passes through six instars for a period of 14-19 days. Pupation takes place in soil. Pupal period is 9-12 days. Adult survives for 7-12 days. The total life cycle is completed in 32-46 days.

Management practices in maize: (Crop stagewise)

Fall armyworm management involves a multi-pronged approach called Integrated Pest Management (IPM). Here's a breakdown of the key strategies:

Before and at the time of sowing

- Deep ploughing which exposes pupae to heat and predatory birds.
- Follow clean cultivation. Destroy crop residue after harvesting of crop.
- Follow crop rotation. Do not take maize or sorghum in same field.
- Avoid staggered sowing.
- Sowing of 3-4 rows of trap crops (e.g. Napier) around maize field and spray with 5% NSKE or Azadirachtin 1500 ppm as soon as the trap crop shows symptom of FAW damage.
- Seed treatment with Cyantraniliprole 19.8 % + Thiamethoxam 19.8 % FS @ 6 ml / Kg seed

Seedling stage to early whorl stage

- Monitoring by installation of pheromone traps @ 2 / acre.
- Install pheromone traps @ 15 / acre in field for mass trapping and destruction of male moths.
- Hand collection and destruction of egg masses and early instar gregarious larvae.
- Application of Sand + lime in 9:1 ration in whorls in first thirty days of sowing soon after the observation of FAW incidence restricts larval feeding.

- Release of *Trichogramma* sp. @ 50000/acre three times at weekly interval.
- Spraying of *Metarhizium anisopliae* or *Metarhizium (Nomureya) relyi* @ 50 g or *Bacillus thuringiensis* powder 20 g/10 lit. water.
- Spray with 5% NSKE or Azadirachtin 1500 ppm @ 50 ml/10 lit water.

Medium to late whorl stage

- Hand collection and destruction of egg masses and early instar gregarious larvae.
- Spraying of 5 % NSKE or Azadirachtin 1500 ppm @ 50 ml / 10 lit. water.
- Spraying of *Metarhizium anisopliae* or *Metarhizium (Nomureya) relyi* @ 50 g or *Bacillus thuringiensis* powder 20 g/10 lit. water.

- Spraying with Emamectin benzoate 5 % SG @ 4 g or Chlorantraniliprole 9.3 % + Lambda-cyhalothrin 4.6 % ZC @ 5 ml or Chlorantraniliprole 18.5 % SC @ 4 ml or Spinetoram 11.7 % SC @ 5 ml or Thiodicarb 75 % WP @ 20 g or Emamectin benzoate 5 % + Lufenuron 40 % WG @ 1.6 g or Novaluron 5.25 % + Emamectin benzoate 0.9 % SC @ 30 ml / 10 lit. water.

- Do not spray synthetic insecticides at tassel and silk stage.
- Follow integrated approach.

Remember, a successful fall armyworm management strategy relies on combining these methods for long-term control and minimizing reliance on chemical insecticides.

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