

## DAMAGE OF A WELL-KNOWN QUARANTINE PEST “SPODOPTERA FRUGIPERDA” (FALL ARMYWORM) ON MAIZE AND ITS IPM STRATEGIES IN GLOBE

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### Abstract

The genus “*Spodoptera*” has 25 species but *S.littura*, *S.muritia*, *S.exempta* and *S.frugiperda* are economically significant species for agricultural crops. *S.frugiperda* (Fall Armyworm) is an invasive pest of many crops but most serious pest for maize. It is migratory lepidopteran insect pest with more than 100 plant species. It belongs to Family “*Noctuidae*” and Order “*Lepidoptera*”. It is occasional, polyphagous and quarantine pest for various countries. It’s also known as economic pest of corn. It is widely distributed in tropical and subtropical regions of globe. It is nocturnal pest because it is active at night for feeding and mating purposes. Previous research have been proved that it’s known as chief deflator globally. Keywords: *Spodoptera*, Fall Armyworm, *Noctuidae*, *Lepidoptera*, nocturnal pest, chief deflator

### Identification and Life History

There are two white spots present on forewings. Female lays eggs on stalks, underside the leaves and also upper side the leaves which are covered by layers of hairy scales. Its pupae are dark brown in color. A new born larva is green in color and become light tan to black. It has inverted “Y” symbol on head which differentiate it from other species. Adult moth lives up approximately 21 days and average 10 days. Female is larger than male in size and lays 1500 to 2000 eggs in her life span. Their life cycle complete in 21-40 days. Cannibalistic behavior occurs in larval stages in which larger larvae feed on smaller in case of food shortage. There are 8 no .of generations per year. They are strong flier and migrate very vastly from one area to another. They mate through releasing sex pheromones and create confliction among males. They also feed on nectar of flowers at night.

### Damage and Its Symptoms

Neonate’s larvae feed on leaf gregariously and leaf become dry, then larvae move to other leaf for feeding. At mature stages they feed on leaves severely and only midrib and veins will be standing in the field without leaves. Previous research have been proved that they are known as chief deflator. In case of cotton, at flowering and boll formation stage they feed on internal contents. They make irregular holes on the leaves. Leaves of maize plant eaten and whorl may be a mass of holes, ragged edges and larval frass. Young larvae dry up the leaf lamina. Severe feeding by larvae can kill growing points of crop plant. Larvae can also attack on cob.

### IPM Strategies

- **Prevention**
  - We should avoid planting in already infested areas
  - We should keep our field and surroundings weed free and clean
  - We should remove crop residue and alternate hosts
  - Do not move infested maize plants from one field to another
  - Intercropping with legumes, other roots, tuber crops and cucurbits etc.
  - We should adopt Crop Rotation

- **Monitoring**
  - We should monitor the fields daily for moth inspection using traps even before planting
  - We should look for light green to dark brown larvae with 3 thin yellowish white stripes down the back and distinct white inverted “Y” on the dark
  - We should look for elongated holes on the leaves and inside whorls of young plants
  - We should look for blotches of small (Window Pane) to large ragged and elongated holes in the leaves emerging from whorl with yellowish brown frass.
- **Cultural Control**
  - We should avoid late or off season planting to avoid population build up
  - We should remove crop residue and all alternate hosts
  - Plant should be at correct spacing and use of optimum fertilizers for crop
  - Don't move infested maize material from one area to another
  - Handpick and squash or drop caterpillar in hot water
  - Put a half handful of sand/ sawdust or soil in the of attacked plants to kill the larvae
  - Apply a pinch of 50gm ground hot pepper + 2Kg ash into plant funnel at knee high
  - We should use various pheromone traps to predict and identify the risk areas (high, medium and low)

#### Biological Control

- *Trichogrammapretiosum*, *T. atopovirilia* egg parasitoids (100000 per ha)
- *Telenomusremus* (2500-3000)
- **Predators**
  - Caterpillars are directly preyed on by many invertebrates and vertebrates.
  - Common predators include;
    - Birds
    - Rodents
    - Beetles
    - Earwigs *Doru* spp. (Dermaptera)
    - Bugs (Spined soldier bug)
    - *Isodontia* spp. (Hymenoptera)
    - Predatory wasp (*Pachodynerusgaudulpensis*)
- **Parasitoids**
  - Fly and wasp parasitoids target the fall armyworm include;
    - *Archytas marmoratus*
    - *Cotesia marginiventris*
    - *Chelonus texanus*
- **Genetic Control**
  - We can control insect pest especially lepidopterans through Bt varieties
    - **Bio Pesticides**
      - Nucleopolyhedroviruses (NPV) and Iridovirus
      - *Metarhiziumanisopliae* and *BeauveriaBassiana* (Fungi)
      - *Bacillus thuringiensis* (Bt) (Bacteria) (“Javelin” trade name)

- **Botanicals**
- **Neem based Antifeedent or insecticidal products;**
  - Azadirachtin main component
  - Align
  - Azatin
  - Ecozin
  - Neemazal
  - Neememusion
  - Neemix
  - Ornazin
- Tephrosia based products should apply
  
- **Recommended chemicals against fall armyworm**
  - Indoxacarb
  - Emamectin benzoate
  - Flubediamide
  - Lufenuron, Methomyl
  - Marathon Chlorpyrifos

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