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BIOLOGY OF INVASIVE PEST FALL ARMY WORM

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Introduction

Invasive pests are non-native or exotic organism which are present outside their natural and dispersal potential. Invasive species have been identified as second greatest threat to biodiversity after habitat loss. There are many causes for risk of invasive pests such as increased transboundary movement of agricultural commodities, anthropogenic activities, climate change etc. led to introduction of new species. The more recent invasive pest that have been reported from India is the fall army worm*, Spodoptera frugiperda* (JE Smith); Noctuidae: Lepidoptera. It was first reported at College of Agriculture, Shivamogga, Karnataka in May 2018 (Chormule et al., 2019). After that it was also noticed in maize fields in parts of Andhra Pradesh, Telangana, Maharashtra, Tamil Nadu and Gujarat. This highly destructive and invasive pest has been seen in the America several decades. But its prevalence and outbreaks for the first time in West and Central Africa were recorded in early 2016. Based on the reports of International Maize and Wheat Improvement Centre (CIMMYT), Mexico, FAW caused damaged to more than 1.5 million hectares of maize crop in Africa's within two years after invasion. FAW mainly cause damage to maize crop and it is also known to attack more than 100 crops like rice, sorghum, sugarcane, cabbage, beet, tomato, onion, cotton, pasture grasses etc. In India the Recent studies suggest that, FAW infestation in maize crop causes damages upto 2 to 35%. Fall army worm are potential threat to major agricultural production. FAW are highly migratory in nature mostly the femal adult moths are The adult moths of FAW are highly migratory in nature, in a single season female moth can travel upto 500 km for oviposition sites. They have the capacity to fly over 100 km per night and is one of the major reason for rapid spreading of this pest.

Life cycle of fall army worm

The FAW can complete their life cycle within 30 days at mean temperature of -28^{0}C during summer months, but takes upto 60 days in spring and autumn and may extend up to 80-90 days during winter. FAW is lacking the ability to diapause. FAW infestation can occurs throughout the year in endemic areas. However in non-endemic areas, the migratory FAW arrive only when environment is favourable and after completing one generation they become locally extinct.

Egg

The female moth lays total 1500-2000 eggs in their entire life cycle in single or multiple clusters (100-200 eggs in each cluster). They lay eggs in the underside of leaves or inside whorls or rarely on stem of the host plants. The FAW egg is dome shaped with flattened base and they are pale yellowish or creamish in colour at the time of oviposition. The egg masses are covered by greyish scales from the female abdomen. During warm periods, egg will hatch in 2-3 days.

Larva

FAW has total 6 instars with total larval period 14-30 days (depending on the temperature). First instar is greenish in colour with black head, and head will turn to orangish in second instar. The third instar is brownish in colour and lateral lines begins to form. Fourth to sixth instar have brownish body with three white dorsal line and a light lateral line. On the dorsal part of the body,

dark elevated spots are seen which bear spines. White inverted 'Y' marking is seen on the head region. High degree of cannibalism is often shown by Caterpillar.

Pupa

The pupation of FAW normally takes place in soil at the depth of 2-8 cm. They prefer making cocoons made up of soil and silk for the purpose. In presence of hard soil larva web together with the leaf debris and other materials to form pupa in the soil surface. Pupation period mainly depends upon the environmental condition mostly temperature and persist for 8-9 days during summer and 20-30 days in winter. The pupa is mostly shiny brown in colour.

Adult

Adult moths show slight sexual dimorphism. Adult longevity is usually 7-9 days, but may extend up to 21 days. The mail moth has shaded grey to brown colour forewings with presence of white triangular spots at the centre and tip of the wings. However, in female moth, the forewings are less distinctly marked and are greyish brown to fine mottling of grey and brown. The hindwings are straw colour with a narrow dark brown border in both sexes. Adult moths are active during warm and humid evenings but are mostly nocturnal in nature. The female moth lays most of her eggs within first 4 to 5 days, after 3-4 days of preoviposition period. Female moths are strong flier and they are migratory in nature.

Conclusion

Fall army worm is destructive invasive pest known to cause damage to economically important cultivated crops like maize, sorghum, sugarcane, cotton and also vegetable crops. All larval instars of FAW cause damage to crop. Early detection of the pest is very much essential to avoid huge loss of the crop. And there is also urgent need to increase awareness among the farmers about the life stages of the pest and stage of the crop where pest will cause economical damage, so that one can take up right management practices for the control of the pest.

References

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