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Biology and IPM Practices for Pod Fly in Pigeonpea

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Abstract

Pigeonpea *Cajanus cajan* (L.) Millp. is an important pulse crop, which is widely cultivated throughout India. It is also known by names like arhar, red gram or tur, grown in *Kharif* season of tropics and sub-tropics. The pod fly, *Melanagromyza obtusa* Malloch (Diptera: Agromyzidae) is small black fly, lay eggs through the wall of young pod, and is of economic importance only in the larval stages and is the major pest in medium and long duration varieties. Partially matured pods are used for egg laying than the tender or fully matured pods. Pod fly being an internal feeder, lay eggs inside the immature pod. The eggs hatch and developing maggot feeds on the developing immature seeds by making tunnels and pupate. Thus making the seeds unfit for human consumption as well as seed purpose.

Introduction

Pigeonpea *Cajanus cajan* (L.) Millp. is an important pulse crop after gram, which is widely cultivated throughout India. It is also known by names like arhar, red gram or tur, grown in *Kharif* season of tropics and sub-tropics. Pigeonpea is a multipurpose crop. It is a major source of protein and complements the protein deficient cereals diets in rural areas of India. It produces a significant amount of bio-mass. The dry shoots are invariably used as a fuel, fencing and thatching. Being a leguminous crop, symbiotic bacteria in root nodules fix atmospheric nitrogen as a result soil fertility is improved. The pod fly, *Melanagromyza obtusa* Malloch (Diptera: Agromyzidae) is small black fly, lay eggs through the wall of young pod, and is of economic importance only in the larval stages and is the major pest in medium and long duration varieties. Partially matured pods are used for egg laying than the tender or fully matured pods. All the immature stages remain within the developing pod and are very difficult to monitor without dissecting the pod.

Biology of Pod Fly

Egg

Female lay single egg per locule, often in partially matured pods rather than in very young or fully matured pods. The incubation period varies from 4.0 to 5.0 days.

Maggot (Larva)

Freshly hatched maggots are translucent, reflecting white in colour and later turn to creamy white. The body was divided into segments, which has very tenuous segmental boundaries. For the first few hours following hatching, the maggot does not bore into the seed but rather feed on the surface and then feed under the epidermis of the seeds. Later instar maggot drills deep into the seed consuming the starchy food as well as the embryo leads to form deep tunnel galleries. The full grown maggot is cylindrical in shape

and creamy white in colour which later changes to yellowish before pupation. The maggot period varies from 8.0 to 11.0 days.

Pre-Pupa and Pupa

The mature maggots after passing through the pre-pupal stage of about 0.5 to 1.0 day, transformed into a pupa inside the last instar integument in the pod. Freshly formed pupae are yellowish brown in colour but later turned into dark brown or brownish black. The pupae are cylindrical and broadly rounded at the two ends. The pupal period lasts for 8.0 to 11.0 days.

Adult

The adult fly is small, shining and metallic blue in colour. Emergence from the pupal stage takes place in the morning hours. The antenna is aristate, black palpi and the proboscis is brown at the apex. In many adults, the abdomen is glossy black with a metallic surface while in some adults the abdomen is violet colour or greenish blue in colour. Adult longevity ranges from 6.0 to 11.0 days.

Total Life Span: The total life span of pod fly varies from 28.0 to 37.0 days.

Nature of Damage

The pigeonpea is attacked by more than 300 species of insects of which pod fly is one of the most obnoxious pest causing the grain damage ranging from 10 to 80% damage (Shanower *et al.*, 1999). Pod fly being an internal feeder, lay eggs inside the immature pod. The eggs hatch and developing maggot feeds on the developing immature seeds by making tunnels and pupate. Thus making the seeds unfit for human consumption as well as seed purpose. The infested pod do not show any external symptoms of damage until the fully grown maggot chew the pod wall, leaving a thin papery membrane intact called as window through which adult exit from the pod wall (Sahoo *et al.*, 1991).

IPM Practices

- Seed treatment with Carbosulfan + *Trichoderma* spp. and Vitavax @ 3 ml + 10 g and 2 g/kg of seed, respectively.
- Sowing method broad bed and furrow.
- Intercropping Soybean + Pigeonpea 2:4, Maize + Pigeonpea 2:2, Sorghum + Pigeonpea 4:3 and Groundnut + Pigeonpea 1:2, Bt Cotton + Pigeonpea 8:2 or Sole pigeonpea.
- Installation of pheromone traps @ 10 /ha.
- Installation of bird perches @ 50 /ha.
- Spraying of *HaNPV* @ 500 LE/ha or *Bt* @ 50-62.5 g a.i./ha NSKE 5 percent spraying, respectively.
- Need based spraying of following relative ecofriendly

insecticide, I, II, III spray should invariably coincide with 25 percent flowering, early podding, milk dough stage.

- ✓ Indoxacarb 14.5 SC @ 75 g a.i./ha
- ✓ DDVP 76 WSC @ 760 g a.i./ha
- ✓ Spinosad 45 SC @ 73 g a.i./ha
- ✓ Acetamiprid 20 SP @ 20 g a.i./ha
- ✓ Emamectin benzoate 5 SG @ 11 g a.i./ha.



Figure 1: Pigeonpea pod infested with pod fly maggot and pupae



Figure 2: Pigeonpea grain damage caused by pod fly

Conclusion

Being an internal feeder, it is very difficult to notice the incidence of pod fly until the transparent window noticed on the pod since regular field visits should be done to notice the damage. Integrated management of pod fly should be practiced by combining above mentioned practices as per the availability of resources and economics of farmers.

References

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