Popular Article

Popular Kheti

Volume -2, Issue-2 (April-June), 2014

Available online at www.popularkheti.info

ISSN: 2321-0001

Eco-friendly Management of Leaf Webber and Capsule Borer (*Antigastra catalaunalis* Duponchel) Menace in Sesame

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Sesame leaf webber and capsule borer (*Antigastra catalaunalis*) is one of the divesting pests of sesame in India. It starts to attack the crop from seeding stage continues till maturity of pod and almost damages all the plant parts (shoot, leaf, flower and pod). Under severe attacks at early stage of crop may cause complete failure of crop especially in rain fed areas. Mostly the pest is managed through application of synthetic chemicals. Sole reliance on synthetic chemicals will results in high cost of production, effects on non-targets and health hazards. In this paper, some of the eco-friendly strategies are recommended which could help to prevent and manage this pest successfully rather than control.

Introduction

Sesame (*Sesamum indicum* Lin.) known as the 'queen of oil seeds' is one of oldest oilseed crops grown in India. India ranks first in area under cultivation representing 30% of the world production and Rajasthan, Maharashtra, Gujarat, Madhya Pradesh, Andhra Pradesh, Karnataka, Uttar Pradesh, West Bengal, Orissa, Punjab and Tamil Nadu are the major states of sesame cultivation (Singhal, 1999). It also grown in Assam, Bihar, Haryana, Jammu and Kashmir, Kerala, Himachal Pradesh, North Eastern hill states and Pondicherry (Viswanath and Lal, 1995). Among the various production constrains insect pests are prime important. Pests such as leaf webber and capsule borer (*Antigastra catalaunalis*), gall midge (*Asphondylia sesami*), sphingid moth (*Acherontia styx*), leaf hopper (*Orosius albicinctus*) and white fly (*Bemisia tabaci*) are the most important pests throughout India. Off these, sesame leaf webber and capsule borer, *Antigastra catalaunalis* (Lepidoptera: Pyralidae) is the notorious pest of sesame and causes up to 90% losses (Ahuja and Bakhetia, 1995).

Biology

Adult moths are small in size with orange brown forewings and pale yellow transparent hind wings. A female lay about 15-300 greenish minute eggs on the under surface of the apex of the tender leaves or on flowers. Egg stage lasted for 2 to 7 days depending upon the weather and

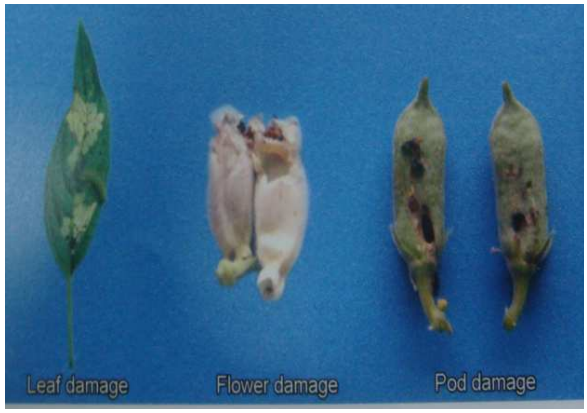
larvae become fully grown in 10 to 11 days under going 5 instars. Pupation takes place within the webbing, under fallen leaves or in soil cervices in a thin transparent cocoon. The pupal period lasted for 4 to19 days depending upon the weather. Adult longevity was 6 to8 days. The total cycle was completed in 67 days during winter and 23 days in summer.

Nature and Extent of Damage

The leaf webber and pod borer attacks all parts of sesame plant except root and it feeds on the tender foliage by webbing top leaves and also bores into the shoots and capsule. Singh (1983) recorded 10 to 71% plant infestation and 10 to 43.5% capsule infestation, resulting in 8.9 to 71.5% yield loss; 66.31% seed loss per capsule (Kumar and Goel, 1994).

The larvae roll the leaves of the host plant, feeds on the tender shoots and the leaves in a sort of nest made by webbing of the leaves together. It also bring into the green pods of the plant, thus wholly or partly destroying the seeds. Pest attacks both the summer and *Kharif* crops right from the beginning of the growth and if the infestation occurs at very early stage, the plants dies without producing any branch or shoot and a single caterpillar could destroy two to three plants in a week. If infestation occurred at a later stage, the infested shoot remains without further growth.

A. catalaunalis damage during early stage



A. catalaunalis damage in various part

At flowering stage the production of flowers ceased beyond the point of infestation and during the pod formation the larval bored into green pods destroying the pod content partly and wholly. Severity of damage found to be varies with the cultivar and plant with higher number of leaf trichomes preferred more by adult moth for egg laying (Karuppaiah and Nadarajan, 2013) and intensity of locule damage also found to be high in susceptible varieties (Karuppaiah and Nadarajan, 2011).

Management Strategies

Cultural control

Sowing the crop during June and July will escape from leaf webber damage and delayed sowing resulted in a significantly higher level of damage to leaves, flowers and pods and poor yield (Patra, 2001). Pest load found to be less in *Kharif* crop as compared to late sown.

Intercropping with pigeon pea (Nath et al., 2002) and black gram, green gram, cluster bean, sorghum and pearl millet (Ahirwar et al., 2009; Ahuja et al., 2009) found to be significantly reduced the leaf webber damage.

Mechanical control

Collection and destruction of infested parts of plants further minimize the damage of caterpillar. If possible manual collection and destruction of larvae will reduce the population build up.

Biological control

Conservation of existing natural enemies (spiders, coccinellid beetles, predatory stink bugs, preying mantids, black ant) and parasitoids (Braconids and Ichneumonids) through ETL based (2 webbed leaves/sq. m or 10% damage) application of botanical insecticides and safer chemicals. Augmented release of parasitoids *viz*., *Trathala flavoorbitalis* (Behera, 2011) and *Apanteles* sp and the predators like *Chrysoperla carnea* also would reduce the population build up

Application of bio-pesticides

Spray of neem oil 1% or Neem Seed Kernel Extract 5% at the early stage of infestation. Application of bio-inoculants (*Azospirillum*) induces the insect resistance among the treated plants and recorded the minimum leaf damage (Anandh *et al*., 2010) by increasing levels of phosphorus and potassium level in the plants (Selvanarayanan, 2013).

Chemical control

Spray of carbaryl 0.1% or dusting carbary l 5% reduces the damage. Two sprays of quinalphos 0.05% at 30 and 45 days after sowing will control the pest effectively.

Integrated Pest Management Module

Module comprising sesame intercropped with green gram and spray of 9 ppm Azadirachtin at flowering stage reduce the *A. catatlaunalis* infestation from 24.79 to 13.04 (Ahuja et al., 2009).

Conclusion

The leaf webber and capsule borer is capable of causing significant yield loss as it damages all the stages of the crop. Therefore, the single control strategy may not give satisfactory control and integrated strategies can give better control and it would be more economical and ecologically sustainable. Periodical monitoring of field and ETL based application of recommended botanicals and synthetic chemical at right time at right dose would be more appropriate for successful management of this potential pest.

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