

Eco-Friendly Management of Mustard Aphid, *Lipaphis erysimi*: A Most Destructive Pest of Brassicaceous Crops

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Rapeseed-mustard is the second most important edible oilseed in India. Mustard aphid, *Lipaphis erysimi* is one of the most devastating biotic stresses in mustard crop. They are highly fecund and voracious feeder and therefore make insecticidal applications inevitable for cultivation of cruciferous crops. Besides higher cost, these insecticides cause undesirable side effects to the human health and thus, non-chemical control methods are now gaining importance day by day. In this article, some important eco-friendly practices have been suggested to overcome damage by this noxious pest.

Introduction

Rapeseed-mustard is the third important oilseed crop in the world. It contributes about 28.6% in the total oilseeds production in India, where it is the second most important edible oilseed after groundnut sharing 27.8% in India's oilseed economy (Shekhawat et al., 2012). Rape/Mustard has been an important crop to India for a long period of time. At an average India produces around 5 million tons of rape/mustard annually. Indian mustard, *Brassica juncea* is predominantly cultivated in Rajasthan, UP, Haryana, Madhya Pradesh, and Gujarat (Shekhawat et al., 2012). Many insect pest species are found infesting mustard crop of which saw fly (*Athalia lugens proxima*), flea beetle (*Phyllotreta cruciferae*), leaf feeders like diamond back moth (*Plutella xylostella*), pod borer (*Crocidolomia binotalis*), cabbage butterfly (*Pieris brassicae*), aphids (*Lipaphis erysimi*, *Brevicoryne brassicae* and *Myzus persicae*) are important. Aphids are most common and

destructive pests of brassicaceous crops across the World, and often cause heavy losses in yield (Shylesha et al., 2006; Azad Thakur et al., 2009). Among aphids, mustard aphid, *Lipaphis erysimi* (Hemiptera: Aphididae) is predominant and is a key pest of rapeseed and mustard causing 35-73% reduction in yield and 5-6 % reduction in oil content (Shylesha et al., 2006).



Lipaphis erysimi affected plants of mustard

Nature of Damage

Both nymph and adults suck the sap from tender leaves, buds and pods. Curling may occur for infested leaves; and at advanced stage, plants may wither and die. Plants

remain stunted, and sooty moulds grow on the honeydew excreted by the insects. The infected field looks sick and blighted in appearance. They are highly fecund and voracious feeder and therefore make insecticidal applications inevitable for cultivation of cruciferous crops. Besides higher cost, these insecticides cause undesirable side effects to the human health and thus, non-chemical control methods are now gaining importance day by day. Besides, in certain cases, judicious use of newer group of insecticides along with bio-control agents and other eco-friendly practices may be helpful to reduce the damage by this pest.

Non-chemical Management

1. Early sowing before 20th October reduces the damage significantly or normal sowing (1st week of November) also helps in reducing the risk of mustard aphid incidence.
2. Grow aphid tolerant varieties like Pusa Kalyani, Laha 101, C. 294, R.L.M. 84, RCM-198, RCM-84, RCM-202 and R.P. 09.
3. Regular surveillance of pests and defenders, especially different predators and parasitoids of aphids.
4. Conserve native natural enemies of the mustard aphid like different species of lady bird beetles (*Coccinella septempunctata* complex, *C. transversalis* complex, *Oenopia sexarata*, *Oenopia Kirby*, *Chelonemous sexmaculatus*, *Micraspis discolour* etc.) and syrphid flies (*Syrphus torvus*, *Episyrphus balteatus*, *Sphaerophoria* spp., *Sphaerophoria scripta* etc.).
5. Parasitoid, *Dietriella rapae* is abundantly present in the mustard ecosystem and naturally parasitize about 48-62% aphid population. Don't spray chemical pesticides during heavy natural parasitism.
6. Predatory spiders like Jumping spiders (*Marpissa calcuttaensis* and *Phidippus* spp), Lynx Spiders (*Argiope pulchella* and *Oxyopes rubisternum*), Wolf spiders (*Lycosa pseudoannulata*) and Orb Spinners (*Leuchge decorate*, *Larinia tabia* and *Cyrtophora carrisae*) are also commonly found throughout the season.
7. Predatory bird *Motacilla cospica* is actively feeding on aphids in February-March. Therefore, provide bird perches @ 8-10/acre.
8. Spraying of NSKE 5% or other neem formulations at recommended doses.

Chemical Management

Spraying should be done only when insect population is more than economic threshold level (ETL) and it should be undertaken during evening time to avoid damage to pollinators. Need base spraying with either Oxydemetons methyl (Metasystox) or Dimethoate (Rogor) @ 400 ml/acre, or Imidacloprid (Confidor) 17.8 SL @ 50- 60 ml/acre or Thiamethoxam @ 50-60 g/acre

Integrated Pest Management Modules against Mustard Aphid

1. Dimethoate @ 1 ml/litre followed by *Coccinella septempunctata* @ 5000 beetle/ha OR NSKE @ 5% followed by *Verticillium lecanii* @ 10⁸CS/ml OR Neem oil @ 2% followed by *Chrysoperla carnea* @ 50,000 larvae/ha

are very effective strategies for aphid control

2. Bio-control module consisting of single release of predator, *Coccinella septempunctata* @ 2000/acre + parasitoid, *Diaeretiella rapae* @ 2000 mummified aphids/acre + improvised yellow sticky traps (Figure 3) @1trap/100m²; it increased 83% yield over control.



Diaeretiella rapae Low cost yellow sticky traps

Conclusion

A single management strategy may not be so effective against *Lipaphis erysimi*; therefore IPM strategies based on economic threshold

level should be adopted to combat the damage. Chemical spraying operation should be done during evening or such a time that there is no damage to bio-control agents and pollinators.

References

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