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ORIGINAL PAPER

Major Insect Pest of Mustard and their Integrated Management

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Insect pest infestation is the major production constraints in sustainable mustard cultivation and continues to be the important limiting factor in achieving higher productivity, profitability and area expansion. Various insect pest and diseases attack mustard crop from the early stages of crop growth till maturity and the extent of damage varies from 10 to 90 % depending on location, severity of infestation and level of protection.

IMPORTANT INSECT PESTS OF MUSTARD

About 43 insect species have been recorded infesting this crop (Khan *et al*., 2013) and among these aphids (*Lipaphis erysimi),* saw fly (*Athalialugens proxima*), painted bug (*Bagrada cruciferarum*), leaf miner (*Chromatomyia horticola*), flea beetle (*Phyllotreta cruciferae*), cabbage webber and pod borer (*Crocidolomia binotalis*) and cabbage butterfly (*Pieris brassicae*) are the important insect pests. Besides, insect pests like Bihar hairy caterpillar, *Spilosoma obliqua* Walker (Lepidoptera : Arctiidae), Cabbage head borer: *Hellula undalis* Fabricius (Lepidoptera: Crambidae) and Diamondback moth: *Plutella xylostella* L. (Lepidoptera: Plutellidae) also infest the crop sporadically. Recently tobacco caterpillar (*Spodoptera litura*) has been reported as the major insect pests of mustard in different locations of Odisha. However, with increase in cropping intensity and the changing cropping patterns under different agro climatic conditions, the pest complex of the crop has changed (Divya *et al*., 2015). The damage symptom, incidence and infestation level of some of the important insect pests are discussed briefly below.

1. Mustard Aphid:

Aphids are the most devastating insect pest that contributes towards the yield loss ranging from 9 to 96% (Singh and Sharma 2002) and 15% oil reduction (Verma and Singh 1987) in India. Though three species of aphids i.e. cabbage aphid *Brevicoryne brassicae* L.,

mustard aphid, *Lipaphis erysimi* Kalt. and green peach aphid, *Myzus persicae* Sulz.) infest the crop, *Lipaphis erysimi* is the dominant one. Both the nymphs and adults suck sap from leaves, twigs, buds, inflorescence, developing pods and causes damage by poor plant growth, curling of leaves, delayed flowering, flower abortion, reduced pod formation and poor seed setting. They may also excrete honey dew, which encourage the growth of black sooty mould that hampers photosynthesis and decreases plant vigour. This pest has higher rate of reproduction as within a period of 2-3 weeks after insecticide treatment, its population reaches around the same number as recorded before treatment(Amer *et al*., 2009). A variety of field and laboratory studies indicate that aphid abundance increases with rising temperature and under delayed sowing after rice harvest the aphid infestation increases and cause heavy economic loss. Similarly, excessive application of nitrogenous fertilizers by the farmer aggravates the aphid incidence and maximizes the yield loss in mustard. Economic threshold level (ETL) of this pest is when pest population reaches 20-25 aphids/plant and when 30 per cent plants are infested.

2. Cabbage webber:

Cabbage webber is an emerging pest of mustard in the changing climatic scenario and is causing yield loss of 13.2 to 81.8 per cent (Reddy and Ali, 1977).The newly hatched larvae feed gregariously by scrapping the chlorophyll of young leaves and later feed on the older leaves, flowers and siliqua. The caterpillars form silken web around the leaves, flowers and pods and under severe infestation the plants are defoliated, the pods and seeds are eaten away. The leaf webber started infesting the crop after 3rd to 4th week of after sowing i.e. around 2nd to 3rd week of December . The pest population increased thereafter and reached a peak level after 7th to 8th week of sowing (1st to 2nd week of January). Thereafter, the pest population decreased slowly and disappeared at the time of harvesting.

3. Mustard saw fly

The pest is active during seedling stage of the crop i.e. November to December and initially the larva nibbles leaves, which later feeds from the margins towards the midrib. The grubs cause numerous small holes and even riddled the entire leaves by voracious feeding. In case of severe infestation resowing of the crop is required. Larvae feed on leaves

during mornings and evenings hours, remaining hidden during the day time in the soil (Patel *et al*., 2018). The yield losses up to 5 to 18 % is reported in many parts of the country.

4. Painted Bug:

Painted bug lays its eggs in clusters on leaves or on the soil underneath host plants. The nymph pass through five stages changing colour from bright orange to red with dark markings, gradually acquiring the colouration of the adult. Both the adults and nymphs suck sap from all parts of the plant. While, the young plants wilt and wither as a result of the attack, the older plants have less flowers and fruits. Adult bugs excrete a resinous substance which spoils the pods. Quality and quantity (31% losses) of yield is affected when grown up plants are infected. The pest incidence is normally initiated during 2nd week after sowing and remained active throughout crop period. The pest population increased gradually and reached the peak infestation stage during the 6th week after sowing, normally coinciding with second and third week of January. Thereafter, population declined and reached the minimum at the time of harvest.

5. Mustard leaf miner:

Leaf miner is rapidly becoming a major pest in many crops including mustard. The adults emerge at the beginning of December and start laying eggs singly in leaf tissues. The maggots upon hatching feed between the lower and upper epidermis by making zig-zag tunnels. Maggot after 5 days pupates within the galleries. The pest passes through several broods from December to April-May. The large number of tunnels made by the maggots interferes with photosynthesis leading to stunted growth of plants. Damage is more severe if the infestation is high in the early stages of crop growth.

6. Tobacco caterpillar

Though, tobacco caterpillar, *Spodoptera litura* Fabricius is a highly polyphagous insect infesting more than one hundred fifty plant species belonging to 44 families including field crops, vegetables, ornamental plants and weeds (Kranthi et al., 2002), it was never reported as a regular pest of mustard crop. However, due to the prevalence of favourable climatic condition i.e. wide fluctuation in maximum temperature, high humidity and cloudiness in the morning hours , it has been infesting mustard crop in many parts of the state of Odisha. The larvae defoliate the plants and damage the flower and pods. The late sown in particular is heavily infested by this pest and the extent of damage is as high as 86 percent. The seasonal incidence study indicated that the peak incidence of the pest occurred during the second fortnight of February coinciding with the flowering and

fruiting of late sown crop. Among the various environmental parameters temperature gradient exhibited a strong positive influence on the population build up and infestation level of this emerging pest of mustard.

Application of chemical insecticides is still regarded as the most preferred pest management strategies among the farmers and indiscriminate application of insecticides have serious adverse effect on human health and surrounding environment. Chemical insecticides have been found to toxic to a number of natural enemies like green lace wings (*Chrysoperla carnea*), Coccinellids and syrphid flies (*Syrphus confrater and Syrphus balteatus*) and pollinators like honey bees, bumble bees and carpenter bees. Some of the insecticides like dimethoate, methyl o demeton, are not yielding the desired level protection against aphids due to the development of insecticide resistance. However, most of the farmers are not aware about the ill effect of the chemical pesticides and still rely on the highly poisonous insecticides to control this insect pest. Keeping in view the ill effects of pesticides, emphasis should be on some alternative means of control that are less toxic, safe, low in cost, local in production and also environmentally friendly (Mohammad *et al*., 2010).

INTEGRTAED INSCECT PEST MANAGEMENT IN MUSTARD

Integrated pest management (IPM) is the judicious combination of all the available pest control strategies in a compatible manner to bring the pest population below the economic threshold level without any adverse effect on environment and human health. IPM is a continuous process from sowing till the harvesting of the crop which not only includes some of the recommended cultural practices like timely sowing, integrated nutrient management but also emphasizes on the use of biopesticides and botanicals, conservation and augmentation of natural enemies and need based application of safer insecticides. Periodic monitoring of the pest and natural enemy population in the crop ecosystem is the foundation on which the entire pest management system rests. Some of the recommended IPM strategies for rapeseed and mustard crop is discussed below.

1. Timely sowing is the key escape mechanism against many insect pests like aphids, cabbage webber and tobacco caterpillar. For the inland districts first fortnight of October and for the coastal districts of Odisha last week of November is the appropriate sowing time.
2. Excessive application of nitrogenous fertilizers aggravates the pest infestation. Hence, soil test based fertiliser application and adoption of integrated nutrient management strategy lowers the pest attack. Secondary and micronutrient sulphur, zinc and boron applications has been reported to have a role in induced pest resistance.
3. Conservation of aphidovorous predators like Syrphid fly, Coccinellids and Chrysopids by planting maize and castor near mustard crop.

4. Inundative release of *Chrysoperla carnea* @ 20000/ha twice at 50 and 60 DAS to promote bio-intensive pest management strategy in mustard crop

5. Installation of pheromone trap @ 5/ ha for monitoring the activit y of tobacco caterpillar and fixation of bird perches to promote avian predation against cabbage webber and tobacco caterpiller
6. Foliar spray of neem based pesticides (300 ppm azadirachitin) @ 5 ml/l and biopesticides like *Verticillium lecanii* formulations @ 2 ml/l of water or *Beauveria bassiana* formulations (Mycozal) @ 2 ml/l of water in the initial infestation stage of aphids

7. Placement o f Poison baits (10 Kg Rice bran + 1 Kg Jaggery+ 250 ml Lambada Cyhalothrin or 100 g thiodicarb) in the field and field bunds during the evening hours the to control the tobacco caterpillar**.**
8. Need based spraying of acephate 75 WP @ 750 g/ ha to control saw fly, cabbage webber and aphids at early stages of crop growth. Application thiamethoxam 25 WG @ 150 g/ ha or imidacloprid 17.8 SL @ 200 ml/ ha can be done when the aphid and painted bug population crossed the ETL and spraying of these neonicotinoids is to be done before flowering to protect the pollinators from pesticide poisoning. Some of the safer insecticides like flonicamid, pyriproxyfen and buprofezin may be applied if the aphid menace is severe during flowering and early pod development stages.
9. Foliar application of Lambada Cyhalothrin 4.9 CS @ 750 ml/ ha or (Indoxacarb + Novaluron) @ 750 ml/ ha or emamectin benzoate 5 SG @ 200 g/ ha or in the evening hours or spinetoram 11.7 SC @ 450 ml/ ha can be done to protect the crop from tobacco caterpillar.

REFERENCES

Divya, C. Kalasariyaand, R.L. and Kanara, H.G. 2015. Seasonal incidence of mustard painted bug, *Bagrada hilaris* (Burmeister) and their correlation with abiotic factors on mustard., Journal of insect science **28** (1): 92-95

Khan, M.H., Nazir, A. , Shah Rashdi, S.M.M., Ismail,M., Rauf , I. and mad Tofique, M. 2013. Studies on the compatibility of neem oil with predator, *Chrysoperla carnea* for the management of aphids (Homoptera: Aphididae) in canola (*Brassica napus* L.). *Journal of Cereals and Oilseeds,* **4 (6)**:85-88*.*

Patel, S., Yadav, S.K. and Singh, C.P. 2018. Foraging behaviour of mustard sawfly, Athalia lugens proxima Klug. on rapeseed-mustard. *J. Experim. Zool*., 21: 379-81.

Singh, Y. P. and Sharma, K. C. 2002. Integrated approach to manage the mustard aphid, Lipaphis erysimi (Kalt.) (Homoptera: Aphididae) in oil seed Brassica crops-A review. *J. Aphidology*. 16: 77-88.

Verma, S. N. and Singh, O. P. 1987. Estimation of avoidable losses to mustard by aphid, *Lipaphis erysimi* in Madhya Pradesh. *Indian J.Plant Protection*. 15: 87-89.