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Bio-Ecology and Management of Jassid, *Amrasca devastans* (Dist.) in Bhendi

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Abstract

Bhendi (*Abelmoschus esculentus*), is an important vegetable crop grown throughout the year in India. The edible fruits has good source of vitamins A and B, proteins and minerals. Several abiotic and biotic factors are limiting factor on the yield of the crop to attain the maximum potential yield. Among the biotic factors, insect pests are one of the major problem resulted in considerable economic loss. The crop is attacked by several types of insect pests *viz*., sucking insects, chewing insects and soil insects. Among them, the sucking pest jassid, *Amrasca devastans* (Dist.) is most serious, causing substantial reduction in crop growth and development. It occurs throughout the year and resulted in significant yield loss. Critical analysis on its identification, biology, bio-ecology, damage symptoms and alternate hosts will facilitate developing better management strategies against the insect pest.

Introduction

Bhendi, *Abelmoschus esculentus* (L.) Moench is predominantly a crop of tropics and subtropics. In India, bhendi is cultivated in almost all the states and its largest producers are Bihar, Orissa, West Bengal, Assam, Andhra Pradesh and Karnataka. It occupies fifth position, next to tomato, in area under vegetables in India. In South India, the conditions favour for the crop to cultivate throughout the year since frost and severe winters are absent. In north India, two crops are usually raised in a year. The summer crop is sown during February-March and harvested between April-June. The rainy season crop is sown during June-July with the onset of rains and harvested in August-October. The crop is cultivated for its young tender fruits, used in curry and soups. Bhendi is ravaged by many insect pests right from germination of seeds to harvest of fruits. It is attacked by several types of insect pest *viz*., defoliators, sap feeders, borers and soil inhabiting insects. Among them, Jassid, *Amrasca devastans* (Cicadellidae; Hemiptera) is a major and dreaded insect pest that attacks the crop from sowing to till harvesting. It is a sucking insect and obtains the plant sap during feeding, injects toxins into leaves resulting in marginal discoloration on leaves, chlorosis as well as reddening (Meena *et al.,* 2010). Jassid population is severe during hot and humid conditions, which is favourable for their growth and development.

Jassids are serious and most destructive pest on all the vegetables as well as other ornamental plants. The pest usually settles under side of the leaves during day time. Farmers rely solely on the chemical insecticides for the management of pests because of easy adaptability, immediate and spectacular knockdown effects of pesticides on insects. Despite these credentials, continuous use of chemical insecticides has been found to be ecologically unsafe and indiscriminate use

of insecticides has resulted in development of resistance by jassid to insecticides. Bio-rational insecticides could be used as eco-friendly management strategy and can be incorporated in developing IPM programme (Akramuzzaman *et al*., 2018). With the view, this paper envisages distribution, host plants, biology, ecology, damage symptoms, significance on yield and integrated management strategies of bhendi jassid.

Distribution and Host Range

Jassid, *Amrasca devastans* is a common and widely distributed insect. It has been recorded in India, China, Pakistan, Iran, Syria, Greece, Spain, Argentina, Brazil and USA. It is distributed widely throughout Eastern, Western, Southern, Central Africa and Australia. Apart from feeding on bhendi, jassid have a very wide range of the host plants, including herbaceous cultivated plants and weeds. It attacks the various family of plants *viz*., Malvaceae, Leguminaceae and Solanaceae. Jassid is polyphagous insect infesting bhendi, cotton, brinjal, tomato, beans, soybean, black gram, green gram, chick pea, pea, peanut, pigeon pea, maize, buck wheat, castor, sunflower, alfalfa, carrot, beetroot, potato, corn, cucurbits, apple, grape *etc*.

Identification Characters

Egg

Eggs are curved, elongated and yellowish white in colour and deeply embedded in the midribs of large veins on the undersurface of the leaves.

Nymph

Nymphs are flattened, pale yellowish green with characteristic way of moving diagonally in relation to their body, and remain confined to the lower surface of leaves during daytime (Figure 1).

Figure 1: Jassid Nymph

Adult

Adults are about 3.5 mm in length. They are elongate and wedge shaped with pale green body. Forewings and vertex have black spots. Adults are very active with sideway movements but quick to hop (hence referred as leafhoppers) and fly when disturbed (Figure 2).

Figure 2: Matured adult

Biology

The female inserts about 15 eggs inside leaf veins. The incubation period ranges from 4-11 days. The nymphal period occupies 7-21 days depending upon weather conditions. Eleven generations have been estimated to occur in a year. Nymphs moult five times. Average number of eggs laid by female is about 15 with a maximum of 29. Adults are about 3.5 mm length, body is elongate and wedge shaped with pale green colour. On transformation into winged adults, they live for 5-7 weeks, feeding constantly on the plant juice.

Bio-Ecology

The different environmental factors such as temperature, relative humidity as well as rainfall are considered as an important reason for fluctuation in population. Environmental factors are effectual on the existence, growth and development as well as reproductive capacity of jassid. Temperature is the most important environmental factor. The diverse environmental parameters affect the development, life cycle, spread, and jassid outbreaks. Generally, the nymphal population build up occur from the second week of seedling emergence (Figure 3).

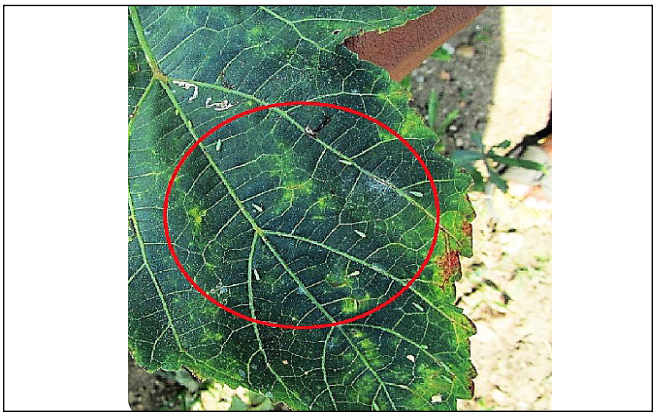

Figure 3: Aggregation of jassid nymphs

Damage Symptoms

Bhendi jassid sucks the plant cell sap resulting in reddening and yellowing of leaves and photosynthetic region reduces. Both nymphs as well as adults incurred damage by injecting its toxic saliva into plant tissues.

Step-Wise Symptoms

• Tender leaf becomes yellowish.

• Leaves margin shows curling downwards and reddening.

• During severe infestation leaves becomes browning which is typical "hopper burn" symptom.

• Leaf margins broke and crumble into pieces when crushed.

• The leaves dried up and shed down and stunted growth.

Significance and Economic Threshold Level

They can cause more than 50 percent reduction on yield (Sharma *et al*., 2001). The nymphs as well as adults can attack bhendi leaves at all stages of growing period. Particularly the older nymphs, feeding on the small veins appear to affect the functioning of the vascular system so that the leaf of edge changes color from dark to pale green, yellow and then red and brown. Nymphs and adults sfuck plant sap from under surfaces of plant leaves. The affected leaf shows hopper burn symptoms (Figure 4). The infested plants remained stunted and the heavily infested plants failed to bear fruits.

Figure 4: Symptom of damage

Integrated Ways to Manage Jassids

• Adoption of proper crop rotation and avoid growing of Malvaceae crops in sequence.

• Management of jassids during very early crop growth stage helps to minimize the population.

• Destruction of debris, crop residues, weeds & other alternate hosts.

• At the time of sowing seed treatment with imidacloprid 75 WS or Thiomethoxam 30 FS @ 5 g/kg of seed.

• Soil application of neem cake @ 250 kg/ha.

• Application of neem oil formulations 10000 ppm @ 1% neem seed kernel extract (5%).

• Set up yellow sticky traps @ 10 traps per acre.

• Release of *Chrysoperla carnea* 2 grubs/plant at weekly intervals.

• Spraying of neem seed kernel extract @ 5% or crude neem oil @ 1%.

• Spraying of the commercial myco-insecticide formulation of *Beauveria bassiana* @ 1 g/litre of water.

• Spraying of the biological derivative formulation like Spinosad @ 1 ml/litre of water or Emamectin benzoate @ 1 g/litre of water or insect growth regulator like Buprofezin @ 2 ml/litre of water.

• Spraying any one of the following insecticide only when there are high jassid injury.

✓ Azadirachtin 0.03% 2 ml/litre of water.

✓ Neem Seed Kernal Extract 5%.

✓ Imidacloprid 200 SL 0.3 ml/litre of water.

✓ Imidacloprid 17.8 SL 2 ml/ 10 litre of water.

✓ Imidacloprid 70 WG 0.7 g/ 10 litre.

✓ Malathion 50 EC 1.25 ml/litre of water

✓ Thiamethoxam 25 WG @ 1.5 g/litre of water.

Researchable Issues and Conclusion

In integrated approach for the management of jassids there is significant scope for non-chemical approaches. Varieties with resistance to jassids are an area where very limited works has been attempted. Bhendi and cotton crops belong to the family Malvaceae, in which the fibre crop cotton had various resistant varieties against jassid. Similarly, resistant varieties can be developed in bhendi against this sucking insect. Development of resistant varieties in bhendi against jassid is an approach to reduce the dependence on chemical insecticides since these are directly consuming perishable vegetables. Recent molecular approaches can be used to identify the genes responsible for resistant traits and the same can be utilized in the development of resistant varieties.

References

Akramuzzaman, M., Uddin, M., Islam, K., 2018. Biorational management of okra jassid (*Amrasca devastans*). *Progressive Agriculture* 29(3), 205-212.

Meena, N.K., Kanwat, P.M., Meena, A., Sharma, J.K., 2017. Seasonal incidence of jassids and whiteflies on okra, *Abelmoschus esculentus* (L.) Moench in Semi-Arid Region of Rajasthan. *Annals of Agri Bio Research* 15(1), 25-29.

Sharma, S.S., Kalra, V.K., Dhankhar, B.S., Kaushik, H.D., 2001. Assessment of yield losses caused by leafhopper, *Amrasca biguttula biguttula* Ishida on different varieties/ cultivars of okra. *Haryana Journal of Horticultural Sciences* 30(1&2), 128-130.