

Pest Management in Cashew

Management of Tea Mosquito Bug

- (a) Cashew tree looks like blighted. What disease is this and how to control it?**
- (b) What is the reason for and how to control the blight disease in which the twigs of cashew dry?**
- (c) Some dried leaves are seen amidst green leaves. What is this disease?**
- (d) Why do the leaves of cashew dry off?**
- (e) One year old cashew plant flushed twice and dried completely. Why?**
- (f) Why the cashew flowers get burnt despite spraying of insecticides?**
- (g) TMB could not be controlled even after spraying twice. Why?**
- (h) Why do tender nuts blacken and dry?**
- (i) After flowering, the panicle turns black. What is the reason and how to control this?**

The blighted appearance and burnt symptoms with drying of cashew leaves is due to feeding damage by the tea mosquito bug (TMB) *Helopeltis antonii*, and is not a disease symptom. The adult and young insects (nymphs) suck the plant sap, and the toxic saliva infected by the insect leads to drying of the damaged portion. As the insect feeds on tender shoots, flower panicle as well as immature nuts, these parts get dried up. The repeated flushes are re-attacked and these also get dried up. Any spraying taken up after severe feeding damage will not be of any help and hence drying of flower panicles/twigs occur in spite of spraying.

- (a) As per our experience, cashew inflorescence dries in case there is cloudy weather for 2-3 days. Is this due to TMB damage or due to weather itself? How can we prevent the damage or at least limit the damage?**
- (b) Is there any relation between cloudy weather and TMB population build up?**

The inflorescence drying during cloudy weather has been constantly noticed, however, the sudden rise in temperature following cloudiness is suspected to lead to flower drying. The TMB population build up is also more under these conditions.

- (a) What are the non-chemical methods of TMB control?**
- (b) What are the bio-pesticides that can be used for TMB control?**
- (c) Whether neem oil can be used instead of endosulfan for plant protection in cashew??**

It is presently debated whether pesticidal usage can be reduced in TMB management. However, in trials involving different bio-pesticides (derived from neem, pongamia, dill, custard apple and others plant species), the presently recommended pesticides performed better. Use of neem oil in place of a pesticide may not provide immediate pest reduction and repellency is not long lasting.

Why twigs start drying downwards after TMB infestation?

After drying of twigs, secondary infection by fungus, *Botrydiplodia theobromae* occurs and progresses backwards, to induce die-back disease. In order to confirm the presence of pathogen, the twig should be split and if there is a discoloration it indicates the disease. In

order to check the disease outbreak, such twigs should be cut and swabbed with Bordeaux paste (10%) and sprayed with 1% Bordeaux mixture.

Some insects eat the flushes of cashew? How to control this?

Certain caterpillars do feed on cashew foliage. In case of severe attack, spraying of carbaryl (0.1%) can be taken up. Monocrotophos sprayed to control TMB will also control such pest infestation.

Are there any natural enemies of TMB? If available, could they be multiplied and released as a measure of natural control?

Three species of egg parasitoids are recorded on TMB, and *Telenomus* sp. is the commonly found parasitoid. As these parasitoids are specialized on their host TMB the efforts to multiply them in large numbers was not successful. The judicious usage of pesticides at appropriate time will enable and ensure indigenously existing parasitoids and predators to exercise natural control of TMB in cashew ecosystem.

TMB could not be controlled even after spraying twice why?

Use of insecticides against TMB needs to be done before majority of shoots get damaged and on onset of initial symptoms. If spraying is taken up after pest damage is inflicted, recovery of damaged plant portion is not achieved. Hence spraying after the drying is pronounced will not be of any help.

No insecticidal spray works when the sky is overcast. Is it advisable to spray water?

It was recorded during last few flowering season that cloudy mornings and sudden decrease in afternoon humidity resulted in drying of the flowers. In the event of recurrence of such phenomenon, it is worthwhile trying spraying of water to enhance moisture content of the air for preventing flower drying.

What is the effect on smoking on TMB incidence?

It is the experience of some farmers that smoking the cashew trees during early morning hours helps in reducing the damage due to TMB. Addition of leaves of *Vitex negundo* (neeki / notchi) reported to have repellent action is also helpful. Smoking is not very beneficial as per the studies conducted at NRCC.

Whether fish oil resin soap is effective against TMB?

Fish oil resin soap which is mainly effective in the management of sedentary insects like scale insects and mealy bugs by dissolving the waxy coating present over the body It is not so effective against TMB.

Management of Cashew Stem and Root Borer

- (a) Cashew tree dies due to trunk boring insect. What is the remedy for this?**
- (b) How can we prevent oozing of gum and consequent death of the tree?**
- (c) Why does the cashew tree die after the trunk region oozes out oil and sawdust? How to control this?**
- (d) Cashew tree dies after oozing out gum from the trunk. What is the reason?**

The cashew tree is attacked by 2 species of cashew stem and root borers (CSRB). The grubs (young ones) of this pest is like stout caterpillars and feed beneath the bark, thereby hampering nutrient translocation. The partially chewed fibres and excreta are exuded from the attacked portion, which is mixed with gum from the plant. The tree loses its leaves, twigs dry up and the tree gradually dies within a year or two. In order to control the pest and save the tree, the grubs inside an attacked tree have to be extracted carefully, causing minimum damage to the tree and avoiding girdling. The frass and gum should be scraped and removed and affected portion should be swabbed with carbaryl (0.2%) suspension.

**(a) What is the remedy for cashew stem borer?
(b) Why is cashew affected by stem borer? How to control this?**

CSRB during its life time for over 8 months feeds on thick bark and gum in the sap which are highly nutritious. To control this pest, continuous survey at monthly intervals, followed by mechanical extraction of grubs, with minimum damage to the tree, as well as phytosanitation involving uprooting of trees and destroying them are to be followed regularly. As the pest is a highly migrating type, regular checking of infestation is needed to detect fresh initial incidence by the pest.

Even though the tree was green, brown powder was coming out of the bark, when the soil was dug out, even the roots were found affected. Whether we should retain such trees or not?

The cashew stem and root borer is pre-dominantly a root zone borer. Even when majority of the roots are damaged, the canopy will retain its greenness, for some months. However, due to the girdling effect at the collar region, such trees will not survive and hence need to be uprooted and destroyed to avoid spreading of pest inoculum.

When do adults of stem borer starts laying eggs and how can we prevent egg laying?

The adults of CSRB starts egg laying from December and fresh incidence occurs predominantly till May, with a peak oviposition during February-April. Though mechanical barriers as mud slurry and mud slurry with pesticide and polythene sheet wrap were tried, their efficacy over long durations was not encouraging. It is always better to identify the initial damage and try for recovery of the infested tree rather than attempting prophylactic (preventive) measures for all the trees in the orchard.

It is observed that after the death of a cashew tree due to disease in the trunk, the adjacent tree also gets the same disease. How does it get transmitted? Whether the disease is transmitted through soil?

Death of cashew tree is due to infestation by cashew stem and root borer and not due to any disease. The adult beetles emerging from such trees mate and further lay eggs in nearby cashew trees and pest infestation does not spread through soil. Hence, removal of such severely infested cashew trees is necessary in order to reduce chances of survival of pest inoculum in the cashew orchard and further fresh attack of the healthy trees.

Any studies are there on pheromones or chemicals attracting CSRB adults?

Egg laying is more on the base of the tree trunk which is already attacked by CSRB. Similarly CSRB attack is more in the trees which are nearer to the attacked trees. It is an indication of existence of chemical components that attract the female beetles to lay eggs. Studies are

being undertaken at NRCC to find out the volatile present in bark or frass that attract CSRB female beetles.

Whether CSRB attack is more if cashew apple is applied around the base of the tree trunk?

Application of cashew apple around the base of the tree trunk does not attract CSRB adults and so there is no adverse effect by the application. Moreover, soil is enriched due to the addition of certain nutrients by incorporation of cashew apples in to the soil.

What are the preventive measures to be taken up before invasion of insects?

As pest (CSRB) emergence and egg laying on cashew continues for 4-6 months (December - January to April - May), an effective long duration repellent for oviposition is not presently available and repeated applications of any pesticidal swabbing will not be cost effective. Hence, treatment of the infested trees in initial stage of attack by mechanical removal of grubs followed by swabbing the treated portion with carbaryl (0.2% i.e 4g/l of water) is more beneficial. Another preventive measure of much importance is phytosanitation involving uprooting of severely infested and dead cashew trees, as well as regular inspection every month for fresh pest incidence.

Management of Minor Pests of Cashew

(a) How can we save cashew trees from termites?

(b) How can we get rid of white ants from soil?

Termites feed on dead tissues of cashew trees and are considered minor pests of cashew. They have a colony deep below the soil and feed quite far from that colony, hence eradicating termites is not feasible. However, to protect cashew trees from being damaged by termites, chlorpyrifos (0.2%) can be swabbed on the trunk region. Termites act as scavengers and convert dead plant matter into humus by feeding and are in a way beneficial to the ecosystem.

(a) How to protect cashew from wild animals in absence of a fence?

Cashew is damaged by porcupines mainly at young stage of the plant by gnawing at collar region. Hence, to avoid this, 2 split bamboo pieces may be tied onto the main stem using a wire, for 1-2 years beyond which much damage is not noticed.

(a) What are the control measures against leaf miner?

Leaf miner damage will be severe in pre-monsoon and post-monsoon flushes. The first spray taken up against TMB (monocrotophos - 0.05% or quinalphos - 0.05%) will take care of leaf miner incidence in post-monsoon flushes. Since the damage on pre-monsoon flushes is not severe, it is not necessary to take up spraying at that stage.

(a) What are the measures against hairy caterpillars?

The early instars of hairy caterpillar normally aggregate on plant parts and so manual collection and destruction is helpful in reducing the damage to a great extent. Further, carbaryl (0.1%) can be sprayed to check the build up of the pests.

(a) Some types of insects affect nut during nut formation stage. What are they and how to control them?

The nuts may be attacked by a boring insect called apple and nut borer. Such attacked fruits fall to the ground and they have frass at apple and nut joint. These fruits must be collected and buried deep in the soil to prevent further spread. No pesticidal sprays should be given at nut maturity stage.

Spraying of Cashew Orchards

(a) Whether using insecticides like endosulfan and BHC is harmful? If so, what are the alternatives for them?

(b) Whether endosulfan is highly poisonous to animals and birds? Don't we have any other safe methods for pest control?

Any insecticide used in excess or indiscriminately is harmful. The alternate chemical presently suggested for BHC and endosulfan is carbaryl which is less toxic to beneficial insects and warm-blooded animals.

(a) Is it necessary to cover drinking water source at the time of spraying?

Whenever, spraying is taken up in the orchards located near the farmhouse, covering the drinking water source helps in avoiding the contamination of water due to drifting of spray particles.

(a) Is it necessary to spray cashew orchards using power sprayer?

Cashew orchard can be sprayed by using rocker / knap sack sprayer by mixing recommended quantity of insecticide in water. Whenever power sprayer is used the concentration of insecticides should be doubled. For example whenever spraying is taken up with carbaryl, 2 g of insecticide should be mixed with one litre of water for rocker / knapsack sprayer whereas, for power sprayer the quantity of insecticide required is 4 g per litre of water.