Management of Cashew Stem and Root Borer (CSRB) – major pest of cashew

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Introduction

Cashew is prone to significant losses in raw cashew nut yield due to insect pest incidence during various stages of the crop. Moderate to severe loss of the crop yield may occur depending on crop stage as well as intensity of insect pest damage. Out of these pests, two major insect pests cause considerable yield loss in most of the cashew growing regions of our country; viz., a) Cashew Stem and Root Borers (CSRB) scientifically known as *Plocaederus ferrugineus* and *Plocaederus obesus* and b) Tea Mosquito Bug (TMB) scientifically known as *Helopeltis antonii*.

Cashew Stem and Root Borers

Cashew stem and root borers (CSRB) infest the vital bark portion of yielding cashew trees and lead to gradual death of such infested cashew trees, if timely pesticidal intervention and alternate management practices are not adopted. The pest population of CSRB builds up over the years resulting in cumulative loss of tree population. Thus, productivity in a given location gets drastically reduced over the years as high yielding trees succumb to the pest. The other major pest is the tea mosquito bug (TMB)which displays seasonal occurrence in tune with the crop phenology; the adults and nymphs of TMB constantly suck plant sap and this results in drying up of shoots and flower panicles, leading to considerable yield loss during that cropping season. However, intensity of the pest damage varies over the years.

Cashew stem and root borers (CSRB)

The pest complex comprises of three species; *Plocaederus ferrugineus* and *Plocaederus obesus* which are primary pests infesting the healthy trees and *Batocera rufomaculata* which is a secondary pest and infests already infested and weakened cashew trees. The insect damage is generally noticed by cashew farmers at later stages, during which any pest management practice will not be effective and this is one of the main reasons for inadequate

management of the pest. The larval stages feed on the bark portions of the main stem, primary branches and roots, by forming irregular tunnels which enlarge as the larvae grow in size. The pest has concealed nature of feeding i.e., it is hidden below the bark which appears deceptively normal externally. On chipping off the damaged bark portions the cashew farmers can notice presence of different age groups of CSRB larvae below the bark, while the pupae and un-emerged immature adults occur inside the heartwood or in root forks of the infested cashew trees. The adult insects belong to the "longicorn beetle" group of insects which have long antennae and are active only during the night. Hence, adult beetles are seldom noticed in the cashew plantations during day time.

Symptoms of pest damage:

During initial stages of pest attack, small quantities of slightly pinkish-brown chewed fiber occurs on the bark surface; while the presence of exuded gum and brownish frass (*i.e, chewed cashew bark fiber and excreta*) at the base of the CSRB infested tree, are seen during the progressive and moderate stages of pest attack. During severe pest incidence, the canopy of infested tree turns yellowish prematurely and start falling off. In subsequent stages of attack, the twigs and branches dry off and the bark on the trunk starts splitting. At this stage, substantial quantity of chewed fibers and gum are seen at the base of the CSRB infested tree.

Seasonality of pest incidence

Though the pest incidence is noticed all-round the year, the adult emergence (as indicated by the back dating the age groups of field collected CSRB grub) stretched between Oct. to May in different cashew growing zones. Generally different stages of the pest are noticed in infested cashew trees all-round the year. However, young and old larval stages of the pest occur during the late summer months and throughout the monsoon months while, pupal stages of the pest are noticed during post monsoon months only. During the onset of rainy season the healthy cashew trees turn dark green, whereas, the CSRB infested trees retain the yellowish canopy, which is a definite indicator of the pest infestation in those trees. The initial incidence symptoms of the pest overlaps with the nut collection period. Hence, during the nut collection period, detailed observation of the main tree trunk at collar region reveals the initial infestation symptoms; if any, which needs to be treated suitably prior to onset of monsoon.

Nature of pest damage

The adult female beetles lay ovoid eggs (which resemble rice grains) inside the crevices of the bark of stem, branches or exposed roots. Nascent grubs hatch from these eggs in 5 – 7 days and immediately start boring into the bark. The grubs feed voraciously for a period of 8 to 10 months and grow rapidly in size and fill the tunnels with chewed fiber and excreta. Their feeding method by irregular tunneling interferes with movement of sap leading to premature leaf fall, drying of branches and gradual death of the infested cashew tree. Full grown larvae make deep zig-zag tunnels in the heart wood and form a hard cocoon made of calcium secretions. The pupal stage lasts for 60 – 90 days and after transformation the pre-mature adult beetles lie quiescent and are inactive for 30 to 60 days till emergence. The emerged beetles are highly nocturnal and mate later on and continue the life cycle.

Pest management techniques

Several systemic insecticides and botanicals have been evaluated as swabbing and stem injections for their efficacy in managing the pest at various research centers, for over a few decades. Any insecticidal treatment imposed on the infested trees without removing the pest stages will not be effective in resurrecting and saving the tree.

All the pest stages of CSRB in the infested cashew trees (both in the stem region and in the root zone also) have to be carefully tracked. The pest larvae will be present in the zone where the frass is lighter in color both in the stem and in the roots; these need to be removed and destroyed by skillful chiseling of the tunnels in the infested portion. The fresh fiber in the tunnels can be traced by their light color while, older fibers will be darker. In case the larvae have entered into the heartwood for pupation, they can be killed by inserting a gear wire / any other bending metal wire and poking into the tunnel till a slushy sound is heard or white fluid flows out. After removing or destroying the larvae and other pest stages, the chiseled portion should be swabbed thoroughly with chloropyriphos (0.2%) solution and the same needs to be drenched onto the soil near the root zone. This has been proven to minimize the re-infestation by the pest.

The treated trees need to be observed regularly at 15 to 20 days interval for any fresh symptoms of pest incidence and if fresh pest infestation symptoms occur, the treatment should be repeated. It is very critical not to damage more than 50 per cent of the bark circumference, as this will lead to girdling and subsequent death of the treated cashew tree. In case, more than 50 per cent of the bark circumference has been damaged or the leaf canopy has turned yellowish, such trees need not be treated, as they do not recover. Such trees need

to be uprooted and searched for presence of pest stages in those trees both in collar and root zones and they should be destroyed. Such uprooted trees should be shifted out of the plantation and can be used as firewood. Adopting this method of plant protection is termed as "phytosantiation" which aids in minimizing the pest load in a given area. Both methods when adopted simultaneously on a community basis will surely lead to lower incidence of pest in the following years.

Prevention of the spread of pest infestation

Two aspects are to be borne in mind to prevent spread of pest infestation;

i) Reduction density of CSRB pest population in a given location and
ii) Rescuing the CSRB infested cashew trees during initial stages of infestation, itself.

To achieve these aspects, all the cashew trees need to be surveyed at regular intervals for any initial symptoms of pest incidence, the initial stages of infestation of CSRB infested trees should be taken up during the nut collection period and marked suitably. Treatment of all such initially infested trees should be done AT A TIME during post monsoon and premonsoon months as the soil will have sufficient moisture to facilitate the digging of root zone and if possible preferably on a community basis following the methods mentioned above. Also, the trees which have yellowing of the canopy and / or have more than 50 per cent of the bark circumference damaged should be uprooted and pest stages in the root zone should be destroyed. Extensive field trials have shown that on adopting this phytosanitary measure, a reduction in the number of freshly infested trees and also a significant reduction in the number of larvae occurring per infested tree could be achieved.

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