

Bio-suppression of Coconut Scale Insects - Success Story

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Coconut scale insect (*Aspidiotus destructor* Sign.) is a sporadic pest on coconut. This pest assumes significance in the wake of climate dynamics, which has become all the more realistic in Kerala with extreme weather modulation of scorching summer (>40°C), acute winter (<14°C), skewed monsoon showers congregating in severe proportions for a few days period (250 mm per day) resulting in landslips. Such varied weather factors and extremities could upset biodiversity, thereafter minor pests turn major in a short time period, for which ecological well-being and understanding of natural enemies are very critical.

Earlier in August 2012, ICAR-CPCRI had reported an upsurge of coconut scale insect, *A. destructor* from Chingoli panchayat, near Kayamkulam, Kerala wherein rise in temperature coupled with reduction in precipitation and relative humidity were attributed as reasons for this flare up. Very recently, a similar outbreak of *A. destructor* was observed in Vettiar, near Mavelikara, Kerala during May 2019, where one isolated coconut garden was found seriously infested by the pest. The infestation was restricted mainly on juvenile coconut palms of Dwarf varieties such as Chowghat Green Dwarf, Chowghat Orange Dwarf and the common West Coast Tall.

Coconut scale, *A. destructor* is a cosmopolitan

pest recorded from 60 plant families in tropical and subtropical regions of the world. Native to South Asia and described by Signoret in 1869, *A. destructor* has been a major pest on coconut in Fiji Island in 1920 and for its suppression, classical biological control by importing predators from Java was attempted during those period to a limited success. It is also reported as a pest on banana, avocado, bread fruit, mango, guava, papaya, cocoa, cardamom, black pepper, oil palm, rubber, sugarcane, tea and several ornamental plants.

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Damage symptoms

In the affected coconut garden in Vettiar, the scale insect was confined to the under surface of palm leaflets. The infested palm leaflets were explicit by the characteristic chlorotic lesions on the upper surface. By the sucking feeding habit of the nymphs and injection of toxic saliva, typical yellowing of palm leaflets could be observed at a distance. Under severe conditions, necrotic lesions emerge and random drying of leaflets was recorded. In addition, petioles, inflorescence and buttons were also found infested and in certain extreme cases, the buttons were shrivelled and immature nut drop was realized. In general, juvenile palms of dwarf genotypes were found to be more susceptible.

Life-stages

On examination of the under surface of palm

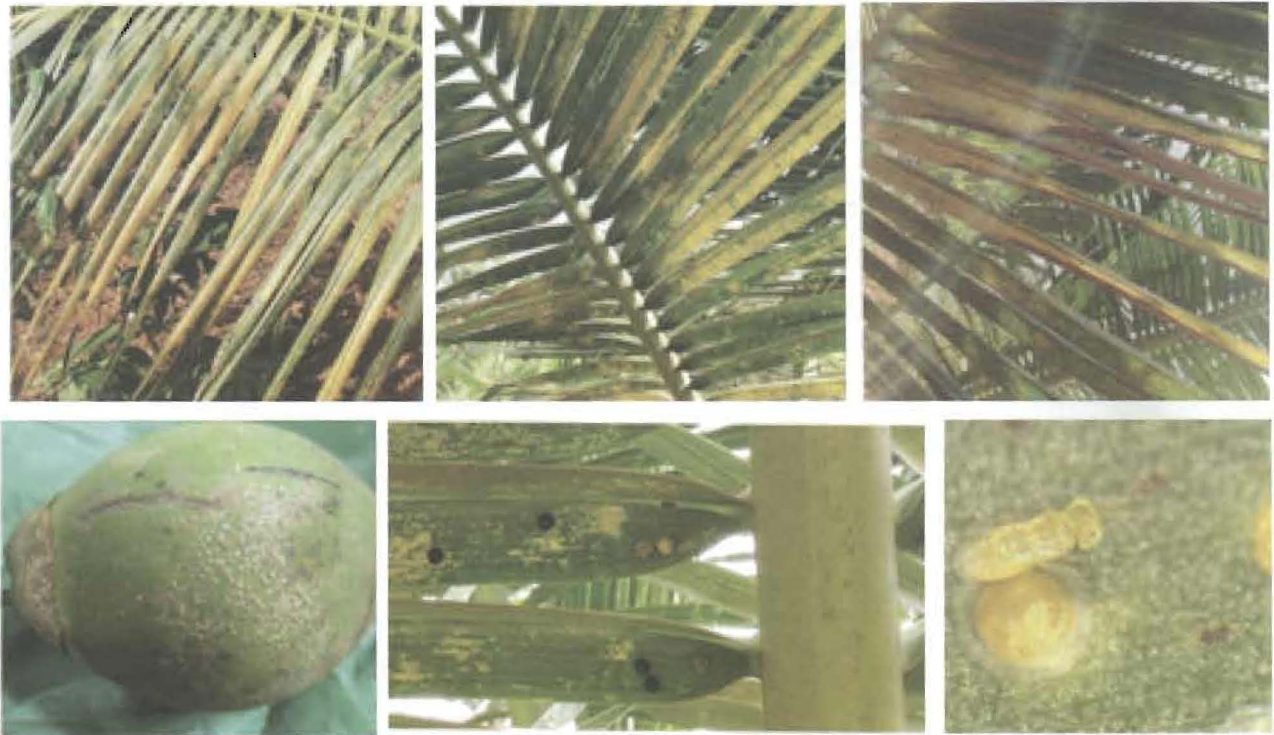


Fig 1 Coconut scale insects and their natural enemies

leaflets, closely packed adult female scale insects with fully covered waxy cover and concentric eggs internally embedded on all directions was observed which are characteristic of the species (*A. destructor*) involved. Eggs are yellow, very small and are laid underneath the scale around the body of the female. After hatching the nymphs crawl out and colonize the plant surfaces. Crawlers of both sexes and adult males are the only mobile stages of the pest. Once settled, the females remain sessile throughout their development; adult males undergo pseudo-pupation, develop a pair of wings and can disperse by flying to find mates. We found innumerable scale insects in all infested leaflets, palms in general were closely planted-about 6 x 6 m spacing and intercropped with banana, creating microclimate congenial for the proliferation of the pest.

Superfluous natural enemies

A wide array of natural enemies was located and identified on the infested palm leaflets that are abundantly prevalent. More than 50% parasitism was observed by the aphelinid parasitoid, *Aphytis sp.* A good number of the minute wasp was found in all infested leaflets either ovipositing or grooming for

mating. This marks a very successful strategy in the bio-control of coconut scale insects.

Three different species of lady beetles were also documented from the infested palm leaflets. The most commonly observed one was the black coloured lady beetle, *Chilocorus nigritus* with the spiny grub feeding on the scale insects. In addition, brown coloured lady beetles, *Sasajiscymnus sp.* were found in less numbers at random. Grubs of *Sasajiscymnus sp.* resemble mealy bugs and are very voracious feeders of the scale insects. An uncommon small black lady beetle with prominent red spots on the elytra, identified as *Pharoscyrnus horni* was also located along with its greyish black grubs that were also found devouring the scale insects. Though *P. horni* was known to feed on scale insects, its occurrence on coconut palm infested by scale insects is definitely rare and a first record to be documented. So far *P. horni* was not reported from coconut scale insects from any region but commonly observed from sugarcane scale insects.

This natural guild of defender complex (Fig 1) established very successfully in a period of two months could completely wipe out the entire colony of coconut scale insects by July 2019. The



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apprehension expressed by the farmer during May 2019 and his positive feedback after the suppression of the pest is overwhelming. ICAR-CPCRI has advocated pesticide holiday approach because of the prevalence of one effective parasitoid and three species of lady beetles on the palm infested by the pest. This is also another landmark success story in natural suppression of pests encouraged by conservation biological control, where the pest population is bio-suppressed by the natural enemy complex in a period of two months. Dispensation of agrochemicals and organic farming in coconut practiced in the region highlights more on this successful journey of “Conservation Biological Control”. ■

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CDB observes Swachhata Pakhwada



Coconut Development Board is observing Swachhata Pakhwada campaign from 16th to 31st December 2019. A mass shramadaan was conducted at the Headquarters of the Board on 20th December 2019. All employees of the Board actively participated in the cleaning of office premises.