meeting the phosphorus requirement of new growth in perennial fruit crops like *Citrus*.

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NEW RECORD OF *HETEROPSYLLA CUBANA* CRAWFORD (PSYLLIDAE: HOMOPTERA) ON SUBABUL, *LEUCAENA LEUCOCEPHALA* (LAM) DE WIT IN INDIA

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LEUCAENA LEUCOCEPHALA (Lam) de Wit commonly known as subabul in India and Ipil-Ipil or Koahaeri in western countries is one of the fastest growing tree species and is capable of producing large biomass per unit area in a short time. This plant has multiple uses as fodder, green leaf manure, fuel and timber. Because of its high protein content, *L. leucocephala* is excellent as animal feed for all classes of animals. Its wood is useful in paper manufacture and the gum obtained from seeds is used as a thickener for ice-cream and also as a fixative in the manufacture of certain cosmetics. In view of its many uses, its extreme tolerance to drought, and the absence of pests and diseases, the Government of India and many State Governments in the country included this plant in agro-forestry and social forestry programmes.

Recently the psyllid (Homoptera), *Heteropsylla cubana* Crawford was noticed attacking tender shoots of *L. leucocephala* in different parts of Tamil Nadu, namely Livestock Research Station, Kattupakkam (Chengalpattu district), National Pulses Research Centre, Vamban and Anna Farm, Kudumianmalai (Pudukkottai district), farmers' holdings in Kulithalai (Trichy district), Thanjavur, and in Tamil Nadu Agricultural University Campus, Coimbatore.

The incidence of the psyllid was high in that large numbers of nymphs and adults (more than 300/ young shoot of 15 cm height) damaged the young shoots by sucking the sap and caused wilting and death of the tender shoots. Honey-dew excretion was also noticed on the upper surface of lower leaves. The expanded leaves showed chlorotic spots due to feeding but damage was not seen on dark-green older leaves. Pruned plants showed heavy attack compared to old trees which were not pruned (figure 1). Incidence was also recorded in the nursery and on self-sown plants under old trees. Irrigated plants growing in shade had large numbers of the pest.

The adult psyllids are pale green and measure 1.5 mm in length and 0.5 mm in width. The nymphs are yellow and dorso-ventrally flattened with prominent wing buds typical of psyllids.

This is the first report of the occurrence of the psyllid on subabul. The pest has been reported as

Figure 1. Branch of an old plant that was not pruned (left) and branch from a pruned plant showing damage caused by *H. cubana* (right).

the reason for complete devastation of subabul plantations in Hawaii[1], Solomon Islands[2] and Pacific countries[3]. It has caused extensive damage to subabul plantations in the Philippines, Indonesia, Thailand, Malaysia, Singapore and other countries[4].

We observed different species of *Leucaena* in the university farm and noted that the incidence was heavy only on *L. leucocephala*. Low incidence was recorded on *L. collinsii* (Britton & Rose), *L. pulverulenta* (Schlecht) Benth, *L. tricodes* (Jacq.) Benth., *L. lanceolata* (S. Watson.) and *L. diversifolia* (Schlecht) Benth. *Mimosa pudica* Linn., *Desmanthus virgatus* Willd. and *Medicago sativa* Linn. did not show any incidence.

Many species of natural enemies were also recorded feeding on the psyllids at Coimbatore. *Menochilus sexmaculatus* (F.), *Scymnus gracilis* Motsch. (Coccinellidae) and unidentified preying mantids, reduviids, mirids and chyrsopids fed on the nymphs and adults of the psyllid. The staphylinid beetle, *Paederus fuscipes* Curt., a predator on rice brown planthopper, green leafhopper, etc. readily fed on the eggs, nymphs and adults of the psyllid and can be effective biocontrol agents against the psyllid.

Several attempts have been made in the Philippines, Taiwan and continental South-East Asia to identify effective biocontrol agents to check the spread of the psyllid. Banpot Napompeth[5] observed the coccinellids *Menochilus sexmaculatus* and *Micraspis discolor* (F.), the red ant *Oecophylla smaragdina* (F.), the spiders *Araneus inustatus* (L. Koch), *Neosona theisi* (Walckenaer) and *Oxyopes javanus* Thorell, and an unidentified mantispid on different stages of the psyllid in Thailand. The coccinellid *Curinus coeruleus* Mulsant introduced from Mexico to control the coconut mealy-bug, *Nipaecoccus nipae* (Maskell) in Hawaii[6] was found to be effective for the control of *H. cubana* in Hawaii. The natural enemies of *H. cubana* recorded in Australia included the reduviid *Scipinia arenacea*; the coccinellids *Coccinello transversalis* (= *C. repanda*), *Coelophora inaequalis*, *Cryptolaemus montrouzieri*, *Harmonia conformis*, *Harmonia octomaculata*, *Micrapis lineata* and *Oenopia guttata*; the melyrids *Carphurus* sp. 1 and *Carphurus* sp. 2; the *Syrphids baccha* sp., and *Ischiodon scutellaris*; and the formacid *Oecophylla smaragdina*[7].

A nymphal encyrtid parasite, *Phyllaephagus* sp. nr. *rotundiformis* (Howord) was found to control the psyllid effectively in Hawaii and the same was introduced into Thailand[8].

Among insect pathogens, *Beauveria bassiana* was found to give 64–100% control in 7–35 days after application. Chemical insecticides like carbosulfan and monocrotophos when injected into the stem were effective seven days later and continued to be effective up to 30 days[9]. In the Philippines the fungi *Entomophthora* sp., *Hirsutella thompsonii* and *Paecilomyces farinosus* are known to infect the psyllid[10].

Of the ten species of fungi isolated from diseased psyllids in Taiwan, *Conidiobolus coronatus*, unidentified *Conidiobolus* species and *Paeciolomyces* sp. were considered to be the species most useful as biological control agents[10].

Observations on the use of light traps indicated that the adult psyllids are not attracted by light traps. Motorised suction traps developed by the Tamil Nadu Agricultural University could suck and trap the insects for mechanical destruction.

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