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On the Collections of Ceramb Ycid Beetles from Manipur, NE India, Infesting the Timber Plants

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Abstract: *Six species of Cerambycid beetles belonging to the family Cerambycidae were collected for the first time from the valley region of Manipur, NE, India. The diagnostic features, biology, host plant association, economic importance and the damage caused by them are briefly discussed along with certain known control measures.*

Keywords: *Cerambycid beetle, Cerambycinae, Lamiinae, Indo-Myanmar hot spot, pest.*

INTRODUCTION

Cerambycid beetles occur in diverse habitats ranging from tropical rain forest to high altitude pine forest to scrubland and they are ecologically essential forms that help in recycling moribund and dead plants [1]. The larval cerambycids feed on tissues of woody plants that are healthy, moribund or dead or even at various stages of decomposition. A good number of long horned cerambycids are known to be pests of forest timber plants, plantation as well as street trees.

The United States Department of Agriculture (USDA) has estimated that the exotic Asian long-horned beetle and other Chinese wood boring beetles would cause damage to the tune of $ 100 billion to the US economy [2] and owing to such great economic importance; this group of beetle receives serious attention now. Although appreciable level of research work related to cerambycids of Indian subcontinent has been carried out by a number of researchers [3-7], that pertaining to Indo- Myanmar hot spot sector in general and Manipur in particular has not been attempted so far. Considering this view in mind, survey of cerambycids of Manipur has been taken up and the biology, habitat of occurrence association with plant hosts and damage potential are discussed in this article along with a brief account to diagnose the species concerned.

MATERIALS AND METHODS

Survey work was carried out in all the nine districts of Manipur state (23°7´-25°4´N latitude and 93°5´ – 94°5´ longitude) from 2012 to 2014 especially during May to October. As their incidence was too low from November to April, field collection was not attempted during this period. Since cerambycids are comparatively bigger insects measuring minimum of about 1cm and maximum of about 6cm in body length, it is possible to collect by conventional handpicking and also sweeping with traditional insect net besides shaking the tree branches and collecting the fallen insects with inverted umbrella [8]. After collection, the dead specimens were preserved in 70% alcohol and were brought to the laboratory for stretching, pinning and labeling [9; 10]. The data on plant hosts, seasonal occurrence, daily activity rhythm and damage potential were also gathered during the period of survey.

RESULTS AND DISCUSSION

Chlorophorus Annularis (Fabricius, 1787)

(Ceram by cinae : Clytini)

Diagnostic features

Body black; elytra brown black and elongated; yellow white pubescence in the head and pronotum; yellow white pubescence form bands and spots on elytra; antennae 11-segmented shorter than half of

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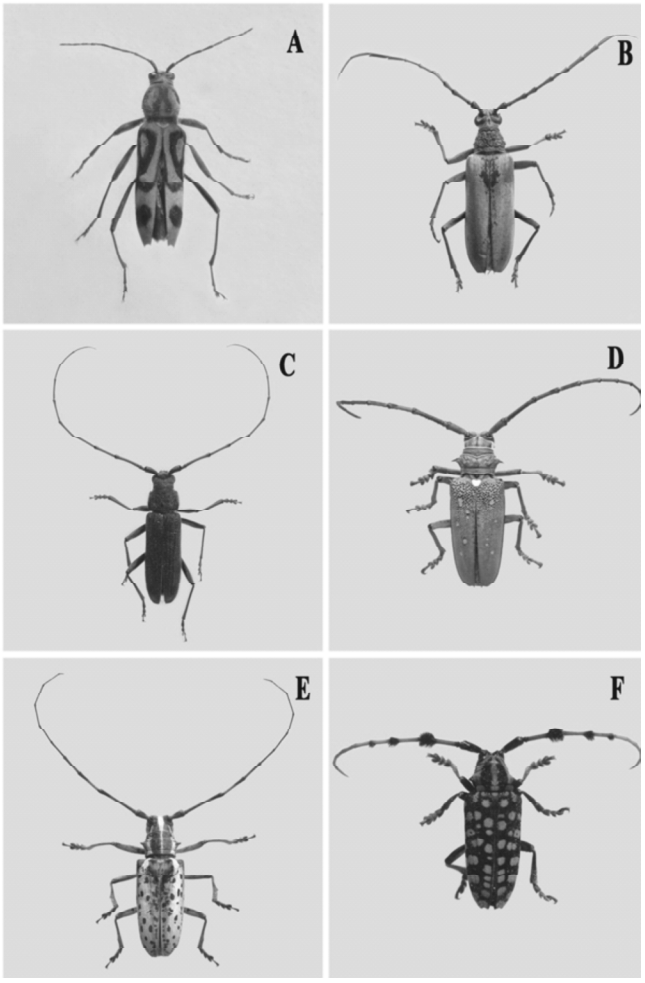

Figure 1: A. Chlorophorus Annularis
B. Hoplocerambyx spinicornis
C: Stromatium barbatum
D: Batocera Rufomaculata
E. Epepeotes Uncinatus
F. Aristobia Approximator

the body, pronotum globose with 3 black spots; scutellum broadly 'U' shaped; legs long, tibia elongated.

Host plants and damage

C. annularis infests on bamboo, citrus, cotton, sugarcane, teak, Sal, grapes and maize, of which, the cut dry bamboo is known to be invariably preferred. Presence of visible frass and circular- oval emergence hole of 2 - 3 cm diameter on the bamboo stems are the typical symptoms of this invader.

Biology

The female oviposits on the external surface of the cracks and cavities of the bark. Eggs may be laid singly or in small groups and they emerge mainly in June and they are univoltine species. The emergence of the beetle may take place at any time between May and September or may be delayed according to the dryness of the bamboo. In consequence the development of this beetle may continue after the bamboo has been made up into furniture, tent-poles, umbrella handles etc.

Control measure

Bamboo canes infested with *C. annularis* could be controlled with either hot or cold treatment. Immersing the cane in hot water (56°C) for 30 minutes or 38°C to 55°C for 48 hours or exposing the cane to –20°C for 7 days and finally soaking in crude petroleum (Rangoon oil) for 2 days will kill the pest [11]. Manual removal and destruction of infested material could also minimize the infestation by *C. annularis*.

Hoplocerambyx Spinicornis (Newman, 1842)

(Cerambycinae: Cerambycini)

Diagnostic features

Head strongly exserted, wrinkled basally; eyes deeply emarginated; antennae 11-segmented, 3rd segment onwards spinose, 8th segment onwards gradually shortened; pronotum little longer than broad, pronotum transversely irregularly wrinkled with broken ridges; scutellum pitch brown, small and broadly triangular in shape; elytra with a spine at sutural apex; legs moderately long and stout, femora slightly compressed, hind tibia long and slender.

Host plants and damage

H. spinicornis attack *Shorea robusta* (Gaertn.), the Sal tree. The larvae of *H. spinicornis* feed on the bark and bore gradually towards the inner core of sapwood. The borer affects the entire Sal tree by excavating small and large galleries in all direction, destroying initially the bast (fibre from inner bark of the tree) and the sapwood and latter riddling the heartwood with large tunnels. Production and ejection of wood dust and frass serve as an indication of infection and also betrays the presence of live larval stages inside the wood. Thus, the wood is completely made unsuitable for any purpose.

Biology

The individuals of the female lay 100- 300 eggs during the entire life span of three to four weeks. The normal

incubation period varies from 3 to 7 days. The larvae that hatch from the eggs feed under the bark and eventually bore into the heartwood and pupate inside the wood. The adult emerges after 2-6 weeks of pupation which coincides with the onset of south west monsoon. Mating occurs soon after emergence and maximum life span of male was found to be 49 days and that of female being 38 days.

Control measure

The field density of this beetle can be reduced by routine monitoring their density, enumeration of attacked trees, regulating the time of felling, removal of forest refuge from the forests, etc. [12].

Stromatium Barbatum

(Fabricius, 1775) (Cerambycinae : Hesperophanini)

Diagnostic features

Body colour varies from brownish black to reddish brown; head produced narrower than pronotum; prothorax very densely covered with strong coarse punctures, the disc with five slightly raised tubercles, less distinct in male; antennae 11-segmented about $1/3^{rd}$ longer than body; scutellum broadly 'U' shaped; elytra parallel sided, narrowed and truncate at apex; legs moderately long, femora compressed.

Host plants and symptoms of damage

Teak, bamboo, ficus, acacia, coffee, citrus, mango etc are the host plants of *S. barbatum*. This beetle is primarily a pest of packing cases, seasoned timbers, furniture, plywood and wood used in building. The sign and symptoms of damage done by this pest are in the form of ejected dust, noise of larval activity, exit holes, breakage etc.

Biology

S. barbatum occasionally breeds in dry woods. After emergence, the newly emerged female mates at night. Eggs are deposited in small holes, crevices or fissures in wood either singly or in groups soon after mating. The incubation period is 5-13 days, the first instar larvae easily bores into almost any kind of wood. The life span of male is 32 days and that of female is 18 days.

Control measures

Varnishing the wood, smoothening and oiling the surface of the wood will prevent the attack of this pest [12].

Batocera Rufomaculata

(DeGeer, 1775) (Lamiinae : Batocerini)

Diagnostic features

Body elongate, dark with a fine greyish vestiture; pronotum with 2 kidney shaped orange yellow spots; antenna 11-segmented; scutellum white; elytra with numerous black tubercles and several yellowish spots variable in number and shape.

Host plants and damage

B. rufomaculata attacks mango, fig, papaya, mulberry, Sal, rubber but mango and fig are the two most commonly attacked host plants. The larvae tunnel into branches and splits the barks of mango trees which wilt away in course of time and the beetles feed by gnawing the bark of living twigs or eating the green tips particularly of *Ficus* spp. Living trees such as figs, rubber may be attacked year after year at the margins of earlier borings. They often break the branches or weakened the trunks by forming numerous tunnels.

Biology

The female lays up to 200 eggs and oviposits on dead trees, branches and trunks of living trees that are not in good health and on the roots of trees exposed by erosion etc. The incubation period is one to two weeks. The larval period ranges from three to six months. It pupates inside the tunnel and the adult emerges in four to six months. They emerge from March to August. The life cycle is annual and therefore, it is said to be a univoltine species.

Control measures

Damage is prevented by enclosing the stem with stout paper coated with either coal tar or by wire gauze. The attacked material should be removed and the grubs may be killed with a stiff wire or by pouring petrol or Para-dichlorobenzene crystals into the bore holes and closing it with mud [12].

Epepeotes Uncinatus

Gahan, 1888 (Lamiinae: Lamiini)

Diagnostic features

Thorax and head black with white lines, antennae 11 segmented, pro notum spinose laterally, elytra greyish with irregular black spots.

Host plants and damage

Trees such as fig, mulberry and tamarind plants are attacked by *E. uncinatus.* The larvae bore into the tree. The prepupal tunnel and pupal chamber are constructed deeply into the wood.

Biology

Adults emerge between April and June. The beetle escapes by an imaginal tunnel from the base of the pupal chamber and completes its life cycle in one year.

Control measures

Periodical patrolling, regular felling of infested trees would minimize their incidence [12].

Aristobia Approximator

(Thomson, 1865) (Lamiinae: Lamiini)

Diagnostic features

Body black, rectangular, ornamented with yellow spots, ventrally black; head vertical; antenna 11-segmented, segment I and II black, segment III- XI yellow, segment III – V encircled with tuft of black hair at apex, pronotum square shaped, black, both ends constricted with a pair of lateral spines, narrowed at apex, yellow spots arranged throughout the elytra in a reticulate manner, scutellum small, broadly 'V' shaped, elytra parallel sided, brown black, legs long, black, tibia with a pair of spurs.

Host plants and damage symptoms

Cassia spp., teak, pear are the host plants attacked by *A. approximator*. The larva bores from the apical branch into the main trunk and excavates a long tunnel running downwards for several feet. Several ejection holes are made along the course of the tunnel and frass is expelled in the form of white pellets.

Biology

Eggs are laid on young shoots. The female deposits the eggs on the branch by biting a crescent shaped groove. The larvae bore from the side branch into the main trunk. The beetle emerges during the monsoon and completes their life cycle in one year.

Control measures

Infestations can be checked by regular pruning of the infected twigs and branches [12].

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