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LONGICORN BEETLES AND THEIR DIET BREADTH FROM FORESTS OF KOLHAPUR DISTRICT, NORTHERN WESTERN GHATS, MAHARASHTRA

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ABSTRACT
Signs of wood and bark boring activity and Cerambycidae larvae in living and felled forest trees were discovered during Spetember- October 2010 in the forests of Kolhapur district, Northern Western Ghats Maharashtra with a new host plant record. Prompted by this result, we conducted a field study to determine the complex assemblage of bark and wood boring longhorn beetles and their breadth of diet with distribution in the forests of Kolhapur district. Adult specimens were collected by caging infested bole samples under the laboratory conditions as well as by applying light trap near the selected sampling sites in the forests of Kolhapur district. A total of 26 species were recorded during the study period under 23 genera distributed in 4 subfamilies of family Cermabycidae viz. Prioninae, Lepturinae, Cerambycinae and Lamiinae from the forest area of Kolhapur district, Maharashtra, India. The beetles of economic importance are *Aeolesthes holosericea, Xystocera globosa, Olenocamptus bilobus, Coptops aedificator, Batocera rufomaculata, Diorthus simplex, Plocaederus obesus, Celosterna scabrator, Stromatium barbatum* and *Xylotrechus subscutellatu*. These species were recorded as major wood borer species in the forests of Kolhapur district. *Cleonaria bicolor* is being reported for the first time from this region of Western Ghats Maharashtra.

INTRODUCTION

Cerambycidae are a group of beetles belonging to the most conspicuous taxa for entomologists all over the world. The beetles of the family Cerambycidae are generally called as Longicorn or Long-horned Beetles. It includes a large assemblage of phytophagous insects. The individuals of this family are borers of all kinds of wood from a live tree to finished timber product. Cerambycidae is one of the largest families of Coleoptera and represents more than 35,000 species under 4,000 genera distributed in 11 subfamilies (Lawrence, 1982). As far as concerned to the georgraphic distribution, it has worldwide distribution but the higher numbers of species were recorded in the tropical region. The number of cerambycid species described from India is 1500 (Beeson, 1941; Breuning 1960-62, 1963a, 1963b, 1964, 1965, 1966; Mukhopadhyay and Biswas, 2002). In the recent past several new species were described from India and also new records in the Indian Territory (Sen *et al.*, 2006; Ghate, *et al.* 2006, 2011; Ghate *et al.*, 2012; Agarwala and Bhattacharjee, 2012).

Our earlier studies on the wood boring beetles revealed that these long horn beetles have adapted to feed on the wide range of food plants. In the absence of primary food plants, beetles switch over to new food plants (Mamlayya *et al.*, 2009; Bhawane and Mamlayya, 2013). Prompted by these findings, we conducted a field study with the following objectives: 1) to determine the cerambycid wood borer species attacking living and felled forest trees in the Kolhapur district; 2) to determine the species' diet breadth and distribution in the forest area of Kolhapur district.

MATERIALS AND METHODS

Materials used during the study includes a collecting net, forceps, vials containing 70% alcohol and 4% formalin as preserving media, plastic containers for temporary storage and transportation. Polythene bags for storing plant material, rearing material, or other samples. Extensive surveys were carried to find out the beetles and their larval host range in the natural stands in three consecutive years 2010 to 2012.

Usually most of the longhorn beetles emerge beetles emerge after first shower of monsoon; the light traps were applied from 6. 00 pm to 10.00 pm in the each sampling site Collected beetles were brought to the laboratory for further studies. The immature stages were brought to the laboratory with the same piece of wood found during the sampling. They were kept under laboratory conditions up to the emergence of adult. The collection of beetles and larvae was followed according to Leather *et al.* (2005) and Alfred and Ramakrishna (2004). The identification of the specimens was done by Dr. H. V. Ghate, Department of Zoology and Modern College Pune. The identification was also with help of experts from the

International Institute of Entomology, Queens gate London. Few specimens were observed with the help of available literature Gahan (1906).

Study area: Kolhapur district (MS) India

The Kolhapur district is situated between 15º43′ to 17º17′ NL and 73º40′ to 74º42′ EL 500msl. It has been divided into 12 talukas and 4 sections for managerial reason. The forest areas of Kolhapur division lie between NL 15º43′ to 17º10′ and EL 73º40′ to 74º42′ east. The division has eight forest ranges viz. Chandgad, Ajara, Gargoti, Radhanagari, Gaganbawada, Karveer, Panhala and Malkapur. For the present four representative forest areas were selected for the sampling *viz.* Chandgad Forest area, Panhala Forest area, Karveer Forest area and Amba Forest area.

RESULTS AND DISCUSSION

A total of 27 species were recorded during the study period under 23 genera distributed in 4 subfamilies of family Cermabycidae viz. Prioninae, Lepturinae, Cerambycinae and Lamiinae from the forest area of Kolhapur district, Maharashtra,India. Table 1 presents the host plants of the immature stages of species encountered during the study. The host plant records and localities in which specimens were collected are included and arranged chronologically. The longhorn beetles collected during the investigation are shown in plate I and plate II. Among 27 species of cerambycid beetles, 10 species were found pestiferous in nature *viz. Aeolesthes holosericea, Xystocera globosa, Olenocamptus bilobus, Coptops aedificator, Batocera rufomaculata, Diorthus simplex, Plocaederus obesus, Celosterna scabrator, Stromatium barbatum* and *Xylotrechus subscutellatus*.

Diet Breadth of the species collected during the study

Subfamily Prioninae

Subfamily Prioninae represented 2 species from the present study region. The members of this are large in size, easily attracted to light. Mostly these breed in a rotten wood (Beeson, 1941).

***Priotyrannus mordax* White**

The beetle is phototactic in nature. The species was collected at Patgaon forest area, Amba forest area, and Chandgad forest area. Earlier it was recorded from the Southern India, Nilgiri hills, Annamalais, Kanara and Travancore (Fletcher, 1914). Gahan (1906) noted Southern India as a distributional range of *Priotyrannus mordax*. The species is active during the months August and September. The available information on this species throws a light on the taxonomic description and geographic distribution. No information is available on the life history and diet breadth of *P. mordax*.

***Acanthophorus serraticornis* Olivier**

The beetle comes freely to the light and is on the wings during April to September. It feed on the decaying roots of large trees. The earlier recorded food plants are *Bombyx malabaricum, Mangifera indica, Morus alba and Shorea robusta* (Beeson, 1941). The species was collected at Chandgad forest area in the month of September on light trap. Butani (1979) reported *A. serraticornis* as a pest of *Mangifera indica*.

Subfamily Lepturinae

The members of the subfamily Lepturinae can be easily recofnized by their peculiar form; the head of Lepturinae prolonged behind into a 'neck' (Pascoe, 1869).

***Apiocephalus licheneus* Gahan**

Apiocephalus licheneus was described by Gahan (1906) and was reported from Dehra Dun. During the present study, *A. licheneus* was collected on light trap at Karveer, Kolhapur district. As this group of long horn beetles are very rare and scanty information is available on the ecological requirements of the species. No host plants were known from the present study region. Beeson (1941) reported larvae of *A. licheneus* feed on the inner surface of the bark of *Buchnania latifolia*. It is on wings in the months September-October and January-February.

Subfamily Cerambycinae

***Xystocera globosa* Olivier**

X. globosa was found a serious pest of *Albizzia lebbeck, Samanea saman* in the present study region. These are major roadside and avenue trees in Kolhapur district. The species was found active in Sepetember- November. Beeson (1941) reported that it is a serious pest of roadside and avenue trees especially of the genus *Albizzia X. globosa* is well distributed in Ethiopian, Oriental and Australasian region (Gahan, 1906). The earlier recorded food plants are *Acacia catechu, Albizzia lebbeck, Albizzia lucida, Albizzia moluccana, Albizzia odoratissima, Albizzia procera, Albizzia stipulate, Bauhinia accuminata, Bombax malabaricum, Grewia tilaefolia* and *Xylia dolabriformis* (Beeson, 1941).

It was also treated as main pest of plantation species viz., *Acacia mangium, Acacia auriculiformis, Paraserianthes falcataria* (Nair, 2000). Duffy (1968) recorded 25 different host plants of *X. globosa*.

***Stromatium barbatum* Fabricius**

The individuals of this were obtained from the timber depot at Kalamba, Karveer, Kolhapur district. The species is found through out the district. No evidence of attack on green trees in the forest area of Kolhapur district was recorded. It was known that *Stromatium barbatum* attracted to 350 different kinds of wood (Beeson, 1941). It is well distributed in India, Sri Lanka, Mauritius and Madagascar (Gahan, 1906; Beeson, 1941). Duffy (1968) list of 180 generic names of plantsas food plants of *S. barbatum*.

***Plocaederus obesus* Gahan**

The species was collected from the wood of *Terminalia tomentosa* at timber depot, Kalamba, Karveer, Kolhapur district. It was a serious pest *Terminalia tomentosa* wood in the timer depot. Beeson (1941) provided list of 19 host plants of *P. obesus viz. Bombax malabaricum, Buchnania latifolia, Butea monosperma, Caryota urens, Cedrela toona, Cordia myxa, Eriodendron anfranctuosum, Garuga pinnata, Gmelina arborea, Kydia talycinia, Lannia grandis, Mangifera indica, Protium seratum, Shorea robusta, Spondias Mangifera, Sterculia colorata, sterculia urens, sterculia villosa and Terminalia tomentosa.. P. obesus* is widely distributed and polyphagous species in horticultural and other forestry crops but it is first report to damage on trees of *B. lanzan (Chironji)* in

Acalolepta nivosa White

Acanthophorus serraticornis Olivier

Batocera numitor Newan

Batocera runfomaculata DeGeer

Apiocephalus licheneus Gahan

Celpsterna scabrator Fab.

Aphrodisium cantori Hope

Cleonaria Bicolor Thompon

Glenea multiguttata Guerin

Chlorophorus quadridecimmaculatus

Neocerambyx paris Hudepohl

Captops aedificator Fab.

Chlorophorus Sp.

Aeolesthes holosericea Fab

Plate 1: Longhorn Beetles From The Forests of Kolhapur District Norhtern Western Ghats Maharashtra

India (Meshram, 2009).

***Neocerambyx paris* Wied.**

During the present study, *N. paris* was collected on the leaf litter at Amba forest area, Kolhapur district. Beeson (1941) reported that *N. paris* feed and breed on the wood *Quercus* sp. The larval food plants from the present study region are not known.

***Aeolesthes holosericea* Fabricius**

The species bores the stem of *Terminalia tomentosa, Terminalia arjuna, Albizzia lebbeck*, and *Albizzia procera*. In the present study region, the major infestation was recorded on *Albizzia lebbeck*. This was common tree species, planted as roadside and avenue tree in kolhapur district.

Within the natural stands, it attack freshly felled trees and does not spread to the healthy living trees in forests. The immature stages of this beetle are known to feed on 45 different plant species (Beeson, 1941). Mamlayya *et al.*, (2009) reported the incidence of *A. holosericea* on *samanea saman* and *Albizzia lebbeck*. Mamlayya and Bhawane (2013) reported *Artocarpus hirsutus* as a new larval food plant of *A. holosericea*. As the species is highly polyphytophagus in nature, more concentrated efforts are needed to understand the existing diet breadth from the present study region.

***Diorthus simplex* White**

Examples of species were obtained from the wood of *Albizzia lebbeck, Samanea saman* and *Pithecolabium dulce* at Karveer, Kolhapur. The species is active during September- November. Beeson (1941) reported *D. simplex* feed on 15 different kinds of wood from the forests of Indian subcontinent. Duffy (1968) also provided a list of 25 plant species.

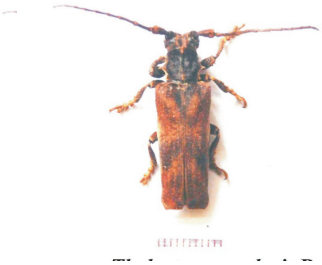
***Nyphasia apicalis* Gahan**

The species was collected on dead wood of *Memecylon umbellatum* at Amba forest area, Kolhapur district. It is commonly known as 'Sapwood borer'. Usually it prefers freshly felled trees as a breeding surface and same wood serve as a food resource for young ones. Previously, it has been recorded on *Anogeissus acuminata*, *Shorea robusta* and *Terminalia tomentosa* (Beeson, 1941).

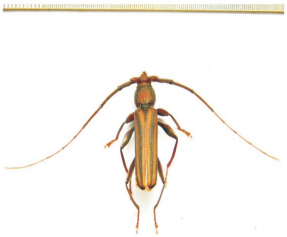
***Aphrodisium cantori* Hope**

Examples of this species collected on light trap from Chandgad

Nyphasia apicalis Gahan

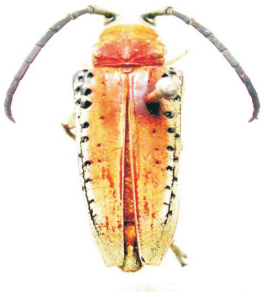


Thylactus angularis Pascoe



Xystocera globosa Olivier

Phelipara morngae



Stibara nigricornis Fabricius

Stromatium barbatum Fabricius

Pterolophia Sp.

Plerolophia Sp.

Olenecampyus bilobus Fab.

Xylotrechus Subscutellatus Chevolat

Plate II: Longhorn Beetles From The Forests of Kolhapur District Norhtern Western Ghats Maharashtra

forest area, Kolhapur district. *A. cantori* known to breed in the wood of *Buchnania latifolia, Mallotus philippinensis* and *Salix tetrasperma* (Beeson, 1941). The species is active during the September- Octomber.

***Xylotrechus subscutellatus* Chevr.**

The individuals of this species were collected from the Chandgad Forest area, Amba Forest area and Panhala Forest area from Kolhapur district. Pre-mature adults were recorded in the wood of *Terminalia tomentosa* and *Terminalia arjuna*. Beeson (1941) reported that *X. subscutellatus* feed on the wood of *Coffea arabica, Dalbergia latifolia, Kydia calycina, Pterocarpus marsupium, Tectona grandis, Vitex altissima, Vitex pinnata* in South India and Sri Lanka.

Subfamily Lamiinae

***Batocera rufomaculata* De Geer**

The adults of the species were collected on the wood of *Mangifera indica* at Amba forest area, Patgaon Forest area and Panhala Forest area from Kolhapur district. It has wide range of food plants. Its immature stages are known to feed on the 34 different kinds of plant species. *B. rufomaculata* is widely distributed in Oriental region (Beeson, 1941).

***Batocera numitor* Newman**

The adults of *Batocera numitor* were collected at Panhala Forest area and Karveer agriculture fields, Kolhapur district. There were earlier records on the occurrence of this species from this part of Northern Western Ghats, Kolhapur district. It was recorded as a pest of silvicultural plants (Nair, 2000; Nair, 2001).

Earlier, Beeson (1941) reported that this species feed on the 6 different plant species *viz. Anthocephalus cadamba, Hodgsomia heterocheta, Lannea grandis, Mangifera indica, Ochroma logopus,* and *Sterculia villosa*

***Celosterna scabrator* Fabricius**

The examples of this species were collected at Panhala forest area, Amba forest area and Chandgad forest area from Kolhapur district. The immature stages were observed in the wood of *Pithacolabium dulce and Tamrindus indica.*

C. scabrator is most notorius pest of *Acacia nilotica* but has also been recorded as serious pest in plantations of Casuriana and Teak. Other food plants are *P. spicigera, Zizyphus jujuba,*

Diptocarpus alatus, Eucalyptus sp., Morus alba, Tamarindus indica, Terminalia chebula and *Shorea robusta* (Beeson, 1941; Browne, 1968; Chatterjee and Singh, 1968; Gotoh *et al.*, 2007; Jain, 1996 and Nair, 2007).

16. *Coptops aedificator* Fabricius

It was collected at Karveer, Panahala and Chandgad forest area. The beetle is phototactic in nature. *C. aedificator* is a bark borer rather than sapwood borer of dead trees. During the present study, it was collected from the wood of *Albizzia lebbeck* and *Samanea saman*.

***Olenocamptus bilobus* Fabricius**

The examples of the species were collected from the wood of *Ficus racemosa* from Chandgad forest area, Panhala forest area and Amba forest area. Beeson (1941) reported 6 species of *Olenocamptus* feed on 30 species of plants in which O. bilobus feed on 10 different plant species of *Ficus viz. F. bengalensis, F. carica, F. elastica, F. glomerata, F. infectoria, F. locifera, F. religiosa, F. rouxburghii, F. rumphii, F. jakela*. Other food plants are *Artocarpus blumii, A. chaplasha, A. hirsute, A. intergrifolia, Bouhinia sp., Litsea polyantha, Mangifera indica, Morus indica*.

***Acalolepta nivosa* White**

The adults of this species were collected from the dead rotten wood at Panhala forest area. No earlier information is available on the host range and status as a pest view point on *Acalolepta nivosa*.

***Glenea multiguttata* Guerin- Meneville**

It was collected at Chandgad forest area, Amba forest area, kolhapur district. It has annual life cycle with emergence in April-June. The larvae feed on the wood of *Bombax malabaricum, Boswellia, Serrata, Bauhinia latifolia, Garuga pinnata, Holigarna arnotiana, Lannea grandis, Mangifera indica, Pterocarpus marsupium* and *Shorea robusta*.

***Thylactus angularis* Pascoe**

It comes freely to the light. The species was recorded at Chandgad forest area. No earlier records are available on the ecological requirements of the species and its occurrence from this region of Western India. Beeson (1941) reported that *Thylactus angularis* breeds in the wood of *Buchnania latifolia*. The species is active during August - September.

***Pterolphia* sp.**

The adults of this species were collected from the wood of *Albizzia lebbeck, Samania saman, Terminalia tomentosa* at Panhala forest area, Kolhapur district.

***Pterolphia* sp.**

The examples were collected from the wood of *Pongamia pinnata* at Amba forest area, Kolhapur district. *Pterolophia* is a large genus and widely distributed in the forests of India. Beeson (1941) reported 24 species of *Pterolophia* from the forests of India which feed on wide range of forest plants.

***Chlorophorus quadridecimmaculatus*? Add in cerambycinae**

The adult samples were collected at Panhala forest area on the wood of *Carissa carandus*. Beeson (1941) reported 7 species of *Chlorophorus* from the forest land of India. All are polyphagus in nature. The larvae of *Chlorophorus annularis* Chevrolat feed on the wood of 14 different plant species (Duffy, 1968).

Chlorophorus sp.

The specimen was collected on the wood of *Pongamia pinnata at* Panhala forest area. The damage caused by this species was observed throughout the year. The life cycle is annual.

***Cleonaria bicolor* Thomsen**

It was collected at Patgaon forest area on the wood of *Carissa carandus*, Kolhapur district. No earlier records are available on the species occurance in the forest area of Kolhapur district. The species is active during September –October.

Phelipara moringae

The species was collected at Karveer, Kolhapur district. It is phototactic in nature. The species is active during the months September- October.

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