ROUND-HEADED BORERS
(COLEOPTERA: CERAMBYCIDAE) OF DOOARS,
WEST BENGAL – A COMPENDIUM

SUMANA SAHA
DINENDRA RAYCHAUDHURI

DEPARTMENT OF AGRICULTURAL BIOTECHNOLOGY, IRDM FACULTY CENTRE,
RAMAKRISHNA MISSION VIVEKANANDA UNIVERSITY,
NARENDRAPUR, KOLKATA – 700103, INDIA

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Dedicated to Parents

Late Sri Ashim Kumar Saha

&

Late Prof. Dhirendra Nath Raychaudhuri

Late Smt. Arati Raychaudhuri
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Reviewer

Prof. Jerzy Borowski
Department of Forest Protection and Ecology, SGGW, Warsaw, Poland
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1. Prelude

The longhorn beetles or round headed borers are in their greatest abundance in the tropics. These borers are included within 13 subfamilies that are delineated by their morphological characters, the most primitive being the Prioninae while the rather advanced are Cerambycinae and Lamiinae.

Hanks (1999) in his review on the works done during the past 90 years did discuss the informations available only for 81 species. He (op. cit) indicated that the average publication rate is less than one species per year. This paucity of information is reflective of the rarity with which researchers record sufficient detail of the cerambycids.

Again, on the other hand, the forests of Dooars in particular are not only rich in animal life forms but also for the wealth of trees. These in turn make an economic return for which silviculture is a regular practice. The quality of such trees (logs) are often assessed by the buyers before bidding.

It is needless to mention that the deterioration in the quality is mainly because of the woodborers that usually burrow in the tissues of the woody plants in conditions ranging from alive to moribund to dead and decomposing. However, some species feed within the stems of living herbaceous plants. All such habitat deteriorations other than being natural events are often accentuated because of the plantation practices.

Adaptation to such highly variable host plant quality has certainly resulted in a diverse spectrum of cerambycids with tremendous variation in their behaviour and ecology. A sustained management plan therefore demands a thorough and intensive study on these wood borers attacking the trees/timbers/shade trees of tea plantations. The study should involve biodiversity assessment followed by biology. Knowledge on the diversity spectrum along with their associated hosts would essentially form the basic. The work in future days may be extended to biology.

Therefore, study on the taxonomic diversity of the cerambycid of Dooars appears imperative in order to develop a sustained management plan against the quality deterioration of the trees/timbers.
2. Introduction

Biodiversity is the outcome of interaction between the phylogenetic history of life on earth and ecological processes. The status and trends in biodiversity reflect the health of the ecosystem that support and enrich human life. Every component of lifeforms on earth plays crucial role in ecosystem functioning. Biodiversity conservation of nature and natural resources is therefore an urgent need of the day to safeguard our own survival and that of our planet.

Biodiversity conservation refers to the sustenance of the variety of life. Taxonomy is the essential tool that underpins biodiversity conservation by providing a logical classification and framework for describing and studying living organisms. At it’s most detailed level, taxonomy describes the variations present within species and such knowledge contributes in identifying groups of organisms of conservation significance, giving those species and subspecies a formal conservation status.

I. Insecta: Coleoptera : Chrysomeloidea : Cerambycidae

Insects constitute the largest of all groups in the animal kingdom. About 8,53,000 insect species have been estimated (Anonymous, 2016a). A total of 86,8741 animal species have been recorded in India, which represents 7.25% of the faunal species of the world. Of these, the majority are insects with over 53,400 species. Fauna of West Bengal represents 10% of the Indian fauna. About 4030 species of insects have been recorded from West Bengal which represents 6.83% of the insect species recorded in India (Anonymous, 2000).

Coleoptera is the largest order often symbolized by the very presence of hard elytron, comprising about 40% of all the known species of living organisms with approximately 3,60,000 described species (Bouchard et al., 2009). Insects of the order Coleoptera are commonly called ‘beetles’ meaning “little biter”. It is supposed that there are more species of beetles than species of plants.

The family Cerambycidae belongs to the superfamily Chrysomeloidea of the order Coleoptera. The members of the family are commonly known as longicorn beetles / longhorn beetles / round headed borers. They are predominant in the tropics and distributed in all zoogeographical regions of the world (Bily and Mehl, 1989). Most of the cerambycid beetles are economically important as they are wood boring in their larval stage and many species are very destructive to shade, fruit trees and valuable timbers (freshly cut logs). Higher classifications of Cerambycidae are debated, but include members of 13 subfamilies and
according to most recent world catalogue contain 36,091 species (Tavakilian & Chevillotte, 2016).

II. **Longhorn / Round-Headed Borers : An Overview**

Longhorn beetles are characterized by 1) elongate and cylindrical body, with long antennae capable of being flexed backward and usually inserted in prominent tubercles, 2) tibiae with 2 spurs and claws are nearly always simple. The species include an almost infinite variety of shape, colouration and ornamentation. Some of the members are among the largest of the insects and some are of attractive as well as cryptic colouration and a close mimetic resemblance to other families and orders of insects. Many members of Clytini, for example bear a close resemblance to wasps and run actively and exhibit antennal movements highly suggestive of those of wasps.

Round headed borers are primarily forest insects and are a major component of the great variety of insects which are known to damage timber. It is the larvae which are responsible for the damage and as the larval stage is of two or more years duration, it is in this stage that these insects are usually encountered. The infestation of cut and seasoned timber occurs on a greater scale and the resulting economic loss is often serious. Damage caused by the construction of larval galleries and pupal cells in the heartwood is well known in the subfamilies Aseminae and Cerambycinae. They however, at times play a beneficial role in reducing dead or dying trees, broken branches, etc to humus.

Adults of most species are active in June and July, some may be active as late as August and September. The majority are diurnal. The flower-visiting forms are skillful fliers, but the flight of most longhorn beetle is relatively slow, quiet and more or less direct. Some fly at dusk, in the evenings and at night, especially in warm evenings. The eyes of the nocturnal species are noticeably larger or possess a greater no. of facets than those of diurnal species. Many nocturnal species appear to be attracted to artificial light and consequently may be caught in light traps. When disturbed, some drop to the ground and feign death.

Both sexes of most adult longicorn beetles stridulate when captured. This has been regarded as defensive but may also be involved in mate location. In the tribe Lepturinae, Aseminae, Cerambycinae and Lamiinae the sound is produced by friction between the inner edge of the posterior margin of the prothorax and a striated area on a median anterior prolongation of the mesonotum.
Host specificity in varying degrees is characteristic of Cerambycidae. The more primitive groups, e.g. Prioninae and Cerambycinae are more polyphagous although some more specialized forms which have a restricted host range occur among them. The polyphagous species are usually associated with wood which has been dead for sometime or is actually decomposing. The Cerambycinae and most Lamiinae are limited to deciduous trees. In general, those species which, like Saperdini and the genus *Oberea*, develop as larvae in living trees, are the most restricted in their host specificity.

Oviposition commonly takes place in cracks or crevices of the bark or in and around injured areas on the plant. Ovipositing adults often spend a considerable period of time exploring the surface of the wood in an effort to find suitable sites which are inaccessible to predators. The groups that are least specialized morphologically have the simplest oviposition habits which, in some of the Prioninae and Lepturinae, involved little more than embedding the eggs in soft, decomposing wood. The most specialized habits are found in the Lamiinae, which use the mandibles to prepare the oviposition site.

The feeding habits of adult round headed borers have been classified by Butovitsch (1939) as follows:--

a) blossom feeders, b) bark and stem feeders, c) leaf feeders, d) pine-needle and cone feeders, e) sap feeders, f) fruit feeders, g) root feeders and h) fungus feeders.

Various Cerambycinae and Lamiinae are included among the blossom feeders. The Lamiinae are almost exclusively bark and stem feeders.

3. Retrospect

A. International status

The pioneer workers on Cerambycids are White (1855) and Thomson (1860). The most comprehensive and fundamental taxonomic work on the Cerambycidae was first published by Lacordaire (1872). Leconte (1873) was the first to put forward the philosophical arrangement of longicorn beetles but his knowledge was restricted to the North American taxa.

At the beginning of 20th century, taxonomic studies of the Cerambycidae of the Oriental region were carried out by three scientists. Gahan (1906a,b) gave a comprehensive coverage of most genera represented in the Indian region and part of the Malaysian subregion. On the other hand, Aurivillius (1910, 1912) and Fisher (1935, 1936) focused more specifically on the Cerambycidae of Java, Sarawak and Sabah. Blair (1934) reported
cerambycid fauna from the Marquesas islands. The diversity of Oriental and Australian (Papuan subregion) cerambycids were thoroughly documented by Gressitt and Rondon (1970) and Hudepohl & Heffern (2002). Hayashi (1979a) and Hudepohl (1987) are the only two entomologists actively doing taxonomic work on cerambycids of Peninsular Malaysia & Sabah and Philippines respectively. Villiers & Chüjô (1966), Hayashi (1979b, 1981) and Hayashi & Makihara (1981) have contributed towards the knowledge of the Nepalese Cerambycidae based on the material brought through Japanese expeditions. Taiwan and Ryukyus longicorn beetles were reported by Hayashi (1974) and Makihara (1978). North American cerambycids were also worked out by Fragoso and Monne (1982) and revised by Chemsak (1996). Longhorn beetles of Korean Peninsula were described by Lee (1987) and Danilevsky (1992). Ching (1994) described a new Lamiinae from mainland China. Özdikmen & Demir (2006), Özdikmen (2007), Özdikmen & Turgut (2009a,b), Özdikmen et al. (2009, 2012), Tezcan & Pyeman (2009), Özdikmen (2011a,b; 2013a,b; 2014), Sama et al. (2012), Cihan et al. (2013), Senyiiz & Özdikmen (2013), Hamadani-Al & Özdikmen (2014); Özbek et al. (2015), Tokin & Özdikmen (2015), Özdikmen & Özdikmen (2016) have dealt longicorn beetles of Turkey. Özdikmen & Okutaner (2006) have reported longhorn beetles from Kahramanmaras Province. Friedman et al. (2008) reported 5 invasive species of longhorn beetles, all known as pests, from Israel. Albayati et al. (2016) have recorded longhorn beetles from Belgrad forest in Istanbul Province with new records to Europe, European Turkey, Marmara region of Turkey and Istanbul Province.

In order to support identification and investigation of longicorn Coleoptera, no. of checklists and catalogues have been prepared (Hayashi, 1980; Bense, 1995; Komiya & Lorenc, 2000; Lorenc, 2000; Ribardo & Cope, 2000; Danilevsky, 2004, 2012; Miguel et al., 2005; Monne, 2005a,b; Heffern, 2005, 2011; Wappes et al., 2006; Makihara et al., 2008; Bezark, 2009; Bousquet et al., 2009; Sama et al., 2010; Ponpinij et al., 2011; Sakalian & Georgiev, 2011; Özdikmen & Ali, 2012; Tavakilian & Chevillotte, 2016).

In course of time several monographs have also been published on the cerambycid beetles (Picard, 1929, Bily & Mehl, 1989; Ohbayashi et al., 1992; Linsley & Chemsak, 1985, 1997; Cherapanov, 1983, 1990a,b; 1991a,b,c; Ohbayashi & Niisato, 2007). Several electronic versions on the world fauna of longhorn beetles are available online (Abang, 2013; Roguet, 2013; Vitali, 2013; Bisby, 2016; Anonymous, 2016b).
B. National status

Compared to the works done elsewhere, Indian cerambycids have been studied so far in a desolate manner. However, citations may be made of Gahan (1906a), Stebbing (1914), Aurivillius (1923), Fisher (1933, 1940), Breuning (1960, 1962, 1963a,b, 1964, 1965, 1966), Beeson & Bhatia (1939), Beeson (1941), Bhasin & Roonwal (1954), Khan and Maiti (1983) Biswas & Basak (1993), Jha & Sen-Sarma (1994), Mukhopadhyay & Biswas (1995, 2000) Biswas & Mukhopadhyay (2000), Raychaudhuri & Saha (2000), Saha & Raychaudhuri (2000) and Dalui et al. (2002). Rondon & Breuning (1970) while dealing with the longhorn beetles of Laos indicated the occurrence of many of the Indian species. However, as the entire publication is in French, Saha & Raychaudhuri in 2002 in the interest of Indian Forest Entomology, translated the text in English with necessary permission of the publisher. This has added to the knowledge of Indian longhorn beetles which were so far remained unnoticed by the Indian Entomologists.

Mukhopadhyay & Halder (2003), Mathew et al. (2004, 2005), Ghate & Sen (2006), Sen et al. (2005, 2006) and Sen & Ghat (2005, 2006), Majumder et al. (2016) have also recorded these xylophagous species from various parts of India.

As for number of species, over 1500 species are now known to occur in India. A summary of the existing literature on systematics of the cerambycids show that more than 140 species are so far recorded from West Bengal by various authors including Mitra et al. (2016). It is worthwhile to mention that cerambycids of Dooars have never been studied comprehensively in the past saving Raychaudhuri & Saha (2000, 2014) and Saha et al. (2013) though tropical forests (of Dooars) support tremendously rich biodiversity by providing habitats for a huge range of insect species (Westbrock, 2002). Further, these forests are supposed to be the abode of rich flora that are often affected by borers under study.

4. Adopted Methodologies

Area covered:

Dooars, a green strip of land lying along the foot of the Himalaya in the district of Jalpaiguri, is predominantly a tea growing area. History reveals that in Dooars for entry from Bhutan to India there were eighteen doors. It is the gateway to the North-Eastern parts of India and stretches from Siliguri in the West to Buxa in the East. This 150 km stretch of dense evergreen moist deciduous Himalayan foothill constitutes one of the 18 biodiversity hotspots of the world (Anonymons, 2000).
The estimated forest land of West Bengal is 4.17% of the forest land of India (Anonymous, 2013, 2015). Dooars has a total forest area of 1731.03 sq. km. (Anonymous, 2000) situated in between latitudes 26°16’ and 27°00’ North and longitudes 88°04’ and 89°58’ East. It also includes 181 tea gardens with a total land area of 1187.06 sq. km. (Anonymous, 1987).

Dooars is divided into 3 regions – (1) Eastern Dooars – region between Torsa and Sankosh rivers, (2) Central Dooars – region between Torsa and Jaldhaka rivers and (3) Western Dooars – region between Jaldhaka and Teesta rivers.

The land is crisscrossed by Teesta, Jaldhaka and Torsa rivers and their innumerable tributaries trolling and rolling down the hills. It represents the biogeographic provinces of Central Himalayas (2C) and lower gangetic plains (7B). Besides a large number of tea
gardens Dooars is famous for its National Parks, Wildlife Sanctuaries and Tiger Reserves (Thaplia, 2001).

The reserve forests namely Buxa Tiger Reserve, Jaldapara Wildlife Sanctuary, Gorumara National Park and Chapramari Wildlife Sanctuary and associated tea gardens have been critically surveyed during different seasons namely premonsoon, monsoon and postmonsoon phases since 1993 - 2011. Table A represents the synoptic attributes of the 4 reserve forests.

**Sampling method:**
1) Adult longhorn borers were collected using nets and hand picking method.
2) UV light traps were also used to sample the insects during night time.
3) Foot sprayer was used to trap such beetles from a height of 20-30 ft.
4) Random sampling method was adopted to trap the borers.

**Taxonomic evaluation:**
1) Insects collected were preserved in 70% alcohol; necessary data including host association of the insect samples were recorded.
2) Borer samples were then brought to the laboratory for permanent storing, stretching, mounting and final preservation were done following the recommendations of Jonathan & Kulkarni (1986).
3) Taxonomic study were done using a Stereoscopic Zoom Tinocular Microscope (model : Olympus : MSZ-TR, SZX 7 & 16); seeking support of the relevant taxonomic literature and expertise.

**Material Deposition:**
All materials are in the collection of Department of Agricultural Biotechnology, IRDM Faculty Centre, Ramakrishna Mission Vivekananda University, Narendrapur, Kolkata.
SAMPLING TECHNIQUES

Visual search
Hand picking
Bush beating
Cutting of infested wood
Inverted umbrella
Sweeping
U.V. Light trap

- Sweeping
- Bush beating
- Hand picking
- U.V. Light trap
Table A. Synoptic attributes of Buxa Tiger Reserve, Jaldapara Wildlife Sanctuary, Gorumara National Park and Chapramari Wildlife Sanctuary

<table>
<thead>
<tr>
<th>Reserve Forests</th>
<th>Range</th>
<th>Beat</th>
<th>Total Area Covered</th>
<th>Geographical Location</th>
<th>Climate</th>
<th>Rocks &amp; Soils</th>
<th>Water Resources</th>
<th>Forest Types</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>West</td>
<td>Damanpur (E &amp; W), Nimati, Pana, Rajabhatkhawa (E &amp; W)</td>
<td>741.87 sq. km.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>West</td>
<td>TEC, Moiradanga, Bengdaki, Kunjanagar, Hollong</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>North</td>
<td>Siltorsa, NEC, Hasimara, Madarihat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Torsa, Bhaluka, Kajibhora, Sukha, Howri, Kailibhoila, etc.</td>
</tr>
<tr>
<td></td>
<td>South</td>
<td>Bichonbari</td>
<td></td>
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<tr>
<td></td>
<td>Nilpara</td>
<td>Barodabri, Hollapara, Lankapara</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Torsa, Bhaluka, Kajibhora, Sukha, Howri, Kailibhoila, etc.</td>
</tr>
<tr>
<td></td>
<td>Chilapata</td>
<td>Chilopata, Mendabari, Bania</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Riverine forest, Sal forest, Wet mixed forest, Semi-evergreen forest, Evergreen forest, Savannah forest (now replaced by Sal plantation)</td>
</tr>
<tr>
<td></td>
<td>Kodalbasti</td>
<td>Mantharam</td>
<td></td>
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</tr>
<tr>
<td>Reserve Forests</td>
<td>Range</td>
<td>Beat</td>
<td>Total Area Covered</td>
<td>Geographical Location</td>
<td>Climate</td>
<td>Rocks &amp; Soils</td>
<td>Water Resources</td>
<td>Forest Types</td>
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</tr>
<tr>
<td></td>
<td>North</td>
<td>Khunia, Murti</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chapramari Wildlife Sanctuary</td>
<td>—</td>
<td>—</td>
<td>9.6 sq. km.</td>
<td>26°42'-26°70' (N), 88°48'-88°80' (E)</td>
<td>Temperature: Premonsoon: 24-32°C, Monsoon: 27-37°C, Postmonsoon: 10-22°C</td>
<td>Relative Humidity: 75-95%</td>
<td>Rainfall (Annual): 370-385 cm</td>
<td>Terai, Alluvial &amp; Bhabar Formation, Terai grassland, Riverine forest, Dry mixed forest, Wet mixed forest, Sal forest</td>
</tr>
</tbody>
</table>

-14-
Buxa Tiger Reserve At A Glance

Way to Buxa Tiger Reserve

Entrance Point of Buxa Tiger Reserve

Way to Buxa Duar

Buxaduar Range

Buxaduar Fort

Buxa Jhora River

Santrabari Beat (Buxaduar Range)

Buxa Forest

Way to Rajabhatkhawa

Forest Check Post (West Rajabhatkhawa)

Forest Bungalow at Rajabhatkhawa

Whispering Forest at Rajabhatkhawa
Raimatang Beat (Pana Range)

Sunset at Raimatang

Kaljani River

Zonopterus flavitarsis
Hope

Xoanodera regularis
Gahan

Pothyne ochracea
Breuning

Pseudonomophas
versteegii (Ritsema)

Xylotrechus
quadripes
(Chevrolat)

At Buxa forest during collection

At Bhutanghat

Buxa Forest during Post Monsoon (West Rajabhatkhawa Range)
Jaldapara Wildlife Sanctuary At A Glance

- Entrance Point of Jaldapara Wildlife Sanctuary
- Forest during Monsoon
- Grassland during Monsoon
- Kodalbasti Range
- NWC Beat (Jaldapara North Range)
- Sambar at Kunjanagar forest
- Jaldapara (East & West Range)
- Torsa River
- Bison at Chilapata forest
- Interpretation Centre at Jaldapara
Gorumara National Park At A Glance

Entrance Point of Gorumara National Park

Entrance Point of Gorumara National Park

Chuk Chuki Watch Tower

Dhupjhora Beat (Gorumara South Range)

Entry Point of Bichabhanga Beat (Gorumara South Range)

Forest during Premonsoon

Forest during Monsoon

Gorumara Beat (Gorumara South Range)

Khunia Beat (Gorumara North Range)

Murti Beat (Gorumara North Range)

Eco Camp at the bank of Murti River

Gorumara Eco Village (Kalipur)
Gorumara Forest Bunglow

Watch Tower

Interpretation Centre at Gorumara

Peafowl in Gorumara Forest

At the time of collection

Collection by sweeping

Forest during Postmonsoon

Salt lick area Mudpuddling of Butterflies
Chapramari Wildlife Sanctuary At A Glance

Entry Point of Chapramari Wildlife Sanctuary

Forest during Premonsoon

Forest during Monsoon

Rhino at Salt Lick Spot

Watch Tower

Water Body within forest

Chapramari Forest Bungalow

Peafowl in Chapramari Forest

At the time of collection

Salt lick area Mudpuddling of Butterflies

Collection by bush beating
5. General Morphology & Terminology

Dorsal Habitus

Head

- Frons
- Clypeus
- Gena
- Anteclypeus
- Labrum
- Mandible
- Scape
- Pedicel

Ventral Habitus

Leg

- Coxa
- Trochanter
- Femur
- Tibia
- Tarsus
- Claw

Maxillary palp
Labial palp
Gula
Prosternum
Proepimeron
Coxal cavity
Prosternal process
Mesepimeron
Mesepisternum
Mesosternum
Mesosternal process
Metepisternum
Metepimeron
Metasternum
Abdomen
Coxal cavities

Angulately open
Roundly open
Closed

Proepimeron
Mesepisternum
Mesepimeron
Meteopisternum
Meteopimeron

Lateral sclerites

Sexual Dimorphism

Pharsalia (Cycos) subgemmata (Thomson)
6. Results

A total of 91 species belonging to 3 subfamilies under 25 tribes have been worked out and accordingly reported (Fig. 1). These species are distributed over 62 genera. Of these 24 species are new report from India, 7 species from West Bengal and 8 from the district as well as from the study area (Tables 1, 2 & 3). Eighty five percent of the encountered fauna are endemic to North-East India.

Seasonally monsoon phase of the year is the richest period in terms of species diversity as 60 species with 208 individuals could be recorded out of the total catch (Fig. 2).

Of the four Reserve forests surveyed Buxa Tiger Reserve is the richest in terms of species diversity as it harbours 78 species (Tables 1, 2 & 3, Fig. 3). These faunal elements are mostly Oriental (Tables 1, 2 & 3).

Taxonomic keys for the identification of the species under 3 subfamilies : Prioninae, Cerambycinae and Lamiinae are provided.

Host associations of the borer samples under these three subfamilies are also provided.

Fig. 1 Total no. of longhorn borer species trapped from Reserve Forests of Dooars
Fig. 2. Total no. longhorn borer species trapped in different seasons from Reserve Forests of Dooars

Fig. 3 Total no. of longhorn borer species trapped from different Reserve Forests of Dooars
<table>
<thead>
<tr>
<th>Subfamily</th>
<th>Tribe</th>
<th>Name of Species</th>
<th>Distribution</th>
<th>No. of Individual/s</th>
<th>Host</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prioninae</td>
<td>Macrotomini Thomson, 1804:264</td>
<td>1. Amomophysis spinosa (Fabricius)</td>
<td>Reserve Forest in Doors, In India, In World, Zoogeographical, Seasonal</td>
<td>1</td>
<td>Monsoon</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Buza Tiger Reserve, Jayanti (L.T) (1)</td>
<td>West Bengal (Jalpaiguri), Bihar, Karnataka, Tamil Nadu, Sikkim</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>India, Arabia, Indonesia, Laos, Nepal, Sri Lanka</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aegosomatini Thomson, 1861:293</td>
<td>2. Naptidea boweringi (Gohlan)</td>
<td>Buza Tiger Reserve, Patkupara T.E. (1), Rajabhatkhawa (2) (L.T) (1), South Bholka (L.T) (1)</td>
<td>6</td>
<td>Acacia auriculiformis (Akaasha), Acacia catechu (Khair), Quercus spicata (Arkaula)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jaldapara Wildlife Sanctuary, Madanbari (1)</td>
<td>West Bengal (Jalpaiguri), Assam, Arunachal Pradesh</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Neptodes costipennis (White)</td>
<td>Buxa Tiger Reserve</td>
<td>West Bengal ( Jalpaiguri), Assam, Manipur, Sikkim</td>
<td>India, Bangladesh, China, Laos, Myanmar</td>
<td>Oriental</td>
<td>Monsoon</td>
</tr>
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<tr>
<td>Prionina Latreille, 1804 : 264</td>
<td>Jaldapara Wildlife Sanctuary</td>
<td>Dhaidhaighat (1)</td>
<td>West Bengal (Jalpaiguri), Assam, Tamil Nadu, Meghalaya</td>
<td>India, Bangladesh, China, Indonesia, Laos, Malaysia, Myanmar, Nepal</td>
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<tr>
<td>4. Dorycthenes (Lophosternus) buqueti (Guerin-Meneville)</td>
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<td>5. Dorycthenes (Lophosternus) falcatus var. falcata (Broyer)</td>
<td>Buxa Tiger Reserve</td>
<td>Nimati (1)</td>
<td>West Bengal (Darjeeling, Jalpaiguri), Andaman Island, Sikkim</td>
<td>India, China, Pakistan, Tibet</td>
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<tr>
<td>No.</td>
<td>Species</td>
<td>Location</td>
<td>Distribution</td>
<td>Season</td>
<td>Status</td>
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<td>6</td>
<td><em>Doryxthenes</em> (Lophostenus) sp. (Hope)</td>
<td>Buxa Tiger Reserve, New Island (1), Rajabhatkhawa (LT) (1), South Bholka (LT) (1)</td>
<td>West Bengal (Jhapaigari), Andaman Island, Sikkim</td>
<td>India, Bhutan, China, Nepal, Tibet</td>
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<tr>
<td>7</td>
<td><em>Doryxthenes</em> (Lophostenus) sp. (Fabricius)</td>
<td>Buxa Tiger Reserve, Rajabhatkhawa (LT) (1)</td>
<td>West Bengal (Jhapaigari), Kannataka, Tamil Nadu</td>
<td>India, Indonesia, Sri Lanka</td>
<td>Oriental</td>
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<td>8</td>
<td><em>Doryxthenes</em> (Paraphorus) sp. (Thomson)</td>
<td>Buxa Tiger Reserve, Rajabhatkhawa (LT) (1), Jalalpara Wildlife Sanctuary, Hasimara (1), Hollapara (1)</td>
<td>West Bengal (Jhapaigari), Assam, Sikkim</td>
<td>India, Cambodia, China, Hainan Island, Laos, Myanmar, Thailand, Vietnam</td>
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Table 2: Details of the recorded species: Cerambycinae (in alphabetical order)

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<tr>
<th>Subfamily</th>
<th>Tribe</th>
<th>Name of Species</th>
<th>Distribution</th>
<th>No. of Individual/s</th>
<th>Host</th>
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<tr>
<td>Cerambycinae</td>
<td>Callistethini</td>
<td><em>Anaxia inermis</em> (White)</td>
<td>Buxa Tiger Reserve, Newland (1), Phalakawa (1)</td>
<td>2</td>
<td><em>Legosira omnia parviflora</em> (Sidha), <em>Quercus spicata</em> (Arkaula)</td>
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<tr>
<td></td>
<td></td>
<td><em>Aphrodisium gibbicollia</em> (White)</td>
<td>Rajabhatkhawa (LT) (1)/ (1)</td>
<td>2</td>
<td><em>Quercus spicata</em> (Arkaula)</td>
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<tr>
<td></td>
<td></td>
<td><em>Zamoperus flavicuris</em> Hope</td>
<td>Buxa Tiger Reserve, Poro (1)</td>
<td>1</td>
<td><em>Shorea robusta</em> (Sd)</td>
</tr>
<tr>
<td>Callidapeni</td>
<td>Lacordaire, 1869: 340</td>
<td><em>Cerestium leucosticticum</em> White</td>
<td>Buxa Tiger Reserve, Patkapara T.E. (2, 5, 15), Rajabhatkhawa (LT) (1), Meghalaya (3)</td>
<td>7</td>
<td><em>Acacia catechu</em> (Khair), <em>Albizia lucida</em> (Polka sirib), <em>Dalbergia sissoo</em> (Sissoo), <em>Mulliera philippinensis</em> (Sindure)</td>
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<tr>
<td>No.</td>
<td>Species</td>
<td>Reserve</td>
<td>Location</td>
<td>Region</td>
<td>Season</td>
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<td>5.</td>
<td>Ceresaum reflam Lameere</td>
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<td>Rajabhatkhawa (LT) (1), South Bhokla (LT) (1)</td>
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<td>Jaldapara Wildlife Sanctuary</td>
<td>Jaldapara (1), Mendaburi (1)</td>
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<td>Ceresaum zeylanicum White</td>
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<td>India, Indonesia, Laos, Malaysia, Myanmar, Philippines, Sri Lanka, Thailand, Vietnam</td>
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<td></td>
<td>Mendaburi (1)</td>
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<td>7.</td>
<td>Ceresaum sp.</td>
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<td>Rajabhatkhawa (1)</td>
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<td>8.</td>
<td>Stenodryas bicoloripes (Pic)</td>
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<td>West Bengal (Jalpaiguri)</td>
<td>India, Laos, Vietnam</td>
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<td>South Bhokla (1)</td>
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References:
- Castanopsis indica (Katus), Lagerstroemia parviflora (Sidha)
- Carissa arborea (Kumbli)
- Shorea robusta (Sal)
- Acacia catechu (Khair)
<p>| 9. Stemodrys nigromaculatus (Gardner) | Buax Tiger Reserve | West Bengal (Jalpaiguri) | India, Laos | Oriental | Monsoon | 2 | Albizia procera (Sada Sirsh) |
| 10. Aecolestes indicola (Bates) | Buax Tiger Reserve | West Bengal (Jalpaiguri), Himachal Pradesh | India, Nepal | Oriental | Premonsoon | 1 | Tectona grandis (Teak) |
| 11. Derolus mauritianus (Elgacti) | Buax Tiger Reserve | West Bengal (Jalpaiguri) | India, Algeria, Bulchisthan, Europe, Iran, Libya, Marraco, Pakistan, Saudi Arabia, Tunisia, Zaire | Oriental, Palaearctic | Premonsoon | 1 | Albizia lebbek (Hare sirish) |
| 12. Hoplocerambus spinicorns (Newman) | Buax Tiger Reserve Damanpur (1), Joyanti (1), UT (1) / (1), Nimati (1), Panbari (2), Rajabatkhawa (LT) (1) / (1), South Bhoitka (1), Majherdabi T.E. (1) | West Bengal (Jalpaiguri), Assam, Bihar, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Meghalaya, Orissa, Rajasthan, Sikkim, Uttar Pradesh | India, Aghanistan, Bhutan, China, Indonesia, Laos, Malaysia, Myanmar, Nepal, New Guinea, Pakistan, Palau Island, Philippines, Sarawak, Singapore, Sumatra Island, Thailand | Oriental, Australian | Premonsoon, Monsoon, Postmonsoon | 11 | Albizia lebbek (Hare sirish), Deodara grandiflora (Lampate), Shorea robusta (Sal), Terminalia arjuna (Arjunt), Curi log |</p>
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<tr>
<th>No.</th>
<th>Number</th>
<th>Scientific Name</th>
<th>Location/Region</th>
<th>Description</th>
<th>Notes</th>
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<td>13</td>
<td>D. variabilis particolalis</td>
<td>Gahar, Nepal</td>
<td>West Bengal National Park</td>
<td>D. variabilis particolalis</td>
<td>Gahar, Nepal</td>
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<tr>
<td>No.</td>
<td>Species Name</td>
<td>Local Names</td>
<td>Location</td>
<td>Distribution</td>
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<td>17.</td>
<td>Chlorophorus annularis (Fabricius)</td>
<td>Buxa Tiger Reserve</td>
<td>West Bengal (Jalpaiguri, Kolkata, Assam, Meghalaya, Punjab)</td>
<td>India, Australia, Boniers Island, Brazil, Brunei, Cambodia, China, Europe, France, Hainan Island, Hawaii Island, Indonesia, Japan, Korea, Laos, Malaysia, Marianas, Moluccas, Myanmar, Nepal, New Guinea, Oahu, Pacific Islands, Philippines, Ryukyu Island, Singapore, Sri Lanka, Sunda Island, Taiwan, Timor, Thailand, USA, Vietnam</td>
<td>Oriental, Australian, Palaeartic Neartic</td>
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<td>18.</td>
<td>Perixius laetus Lamerec</td>
<td>Buxa Tiger Reserve</td>
<td>West Bengal (Jalpaiguri), Assam</td>
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<td>19.</td>
<td>Xylocrea basqueti (Castelnau-Lap et Gere)</td>
<td>Buxa Tiger Reserve</td>
<td>West Bengal (Jalpaiguri, Andaman Islands, Assam), India, Java, Laos, Myanmar, Thailand</td>
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<td>Postmonsoon</td>
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* Skoros robusta (Sal), Tectona grandis (Teak)
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<th>20. Xylotrechus longithorax Pic +</th>
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<th>Premonsoon</th>
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<th>Tectona grandis (Teak)</th>
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<td>Jayanti (1)</td>
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<td>21. Xylotrechus javanicus (Castelnau &amp; Goey) +</td>
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<td>West Bengal (Jalpaiguri)</td>
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<td>Oriental</td>
<td>Premonsoon</td>
<td>7</td>
<td>Cedrela toona (Tun), Ficus benghalensis (Baf), Premna mucronata (Dhessi), Tectona grandis (Teak), Terminalia helleria (Bahema)</td>
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<td></td>
<td>Dima (1), Raimatung (1), Rajabhutkhawa (4), South Bhokha (1)</td>
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<td>22. Xylotrechus smeii (Lap et Goet)</td>
<td>Buxa Tiger Reserve</td>
<td>West Bengal (Jalpaiguri, Kolakata), Assam, Karnataka, Orissa, Sikkim</td>
<td>India, Afghanistan, Bhutan, Italy, Myanmar, Pakistan, Sri Lanka, Tanzania</td>
<td>Oriental, Ethiopian, Palaeartic</td>
<td>Premonsoon, Monsoon, Postmonsoon</td>
<td>29</td>
<td>Buteinia malabarica (Amaltaaki), Bombax celba (Simru), Bombax monoperturba (Palas), Cassia siamea (Minjiri), Mimusopsis dilfolosa (Kawla), Mangifera sylvatica (Churche-sam), Shorea robusta (Sal), Terminalia arjuna (Arjun)</td>
</tr>
<tr>
<td></td>
<td>Jayanti (1) - (LT) (1), Newland (1), Nirutti (LT) (1), Rajabhutkhawa (LT) (2), Sankosh (1), South Rydak (1)</td>
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<td>Jaldapara Wildlife Sanctuary</td>
<td>Hastinara (1), Jaldapara (LT) (3)</td>
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<tr>
<td>Hesperophrium Mulsant, 1839 : 61</td>
<td>23. <em>Strumatum barbatum</em> (Fabricius)</td>
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<tr>
<td><strong>Buxa Tiger Reserve</strong> Damanpur (LT) (1), Newland (2), Poron (1), Raimatu (1), Rajabatkawha (LT) (1), South Bhopal (LT) (1)</td>
<td><strong>West Bengal</strong> (1), Jalpaiguri, Kolkata, Andaman Islands, Assam, Tripura</td>
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<td><strong>Gorumara National Park</strong> Bichabhanga (1), Gorumara (2)</td>
<td><strong>Oriental</strong>, <strong>Ethiopian</strong>, <strong>Nearctic</strong></td>
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<td><strong>Premonsoon, Postmonsoon</strong></td>
<td><strong>20</strong></td>
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<td><strong>Acacia catechu</strong> (Khair), <strong>Albizia odoratissima</strong> (Kalo sirish), <strong>Bauhinia malabarica</strong> (Amlatarki), <strong>Butea monosperma</strong> (Palas), <strong>Cedrela toona</strong> (Tum), <strong>Dillenia sasoo</strong> (Sissoo), <strong>Quercus spicata</strong> (Arkaual), <strong>Shorea robusta</strong> (Sal), <strong>Terminalia arjuna</strong> (Azjun), <strong>Cut log</strong></td>
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<th>24. <em>Strumatum longicorn</em> (Newman)</th>
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<tr>
<td><strong>Buxa Tiger Reserve</strong> Panbari (1), Majherdabi T.E. (1)</td>
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<td><strong>Gorumara National Park</strong> Gorumara (1), Bichabhanga (1)</td>
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<td><strong>West Bengal</strong> (1), Jalpaiguri, Assam</td>
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<td><strong>Oriental</strong>, <strong>Ethiopian</strong>, <strong>Palaearctic</strong>, <strong>Nearctic</strong></td>
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<td><strong>Premonsoon, Monsoon, Postmonsoon</strong></td>
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<tr>
<td><strong>Albizia procera</strong> (Sada sirish), <strong>Cassia siamea</strong> (Minjiri), <strong>Shorea robusta</strong> (Sal), <strong>Tectona grandis</strong> (Teak)**</td>
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<tr>
<th>25. <em>Zoodes compressus</em> (Fabricius)</th>
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<td><strong>Buxa Tiger Reserve</strong> Jayanti (1), Poron (1), Newland (1), Rajabatkawha (LT) (20), Majherdabi T.E. (1)</td>
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<td><strong>Jaldapara Wildlife Sanctuary</strong> Dhanbad (1)</td>
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<td><strong>Baiyantapur Forest</strong> Kailashpur T.E. (1)</td>
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<td><strong>West Bengal</strong> (1), Jalpaiguri, Madhya Pradesh, Kerala, Tamil Nadu</td>
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<td><strong>India</strong>, <strong>Thailand</strong></td>
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<td><strong>Oriental</strong></td>
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<td><strong>Premonsoon, Monsoon</strong></td>
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<td><strong>Acacia catechu</strong> (Khair), <strong>Albizia lucida</strong> (Polka sirish), <strong>Albizia procera</strong> (Sada Sirish), <strong>Quercus spicata</strong> (Arkaual)**</td>
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<tr>
<td>Thraniiini Gahan, 1906: 236</td>
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<tr>
<td>Xystrocerini Blanchard, 1845: 147</td>
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Table 3. Details of the recorded species: Laminae (In alphabetical order)

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<th>Subfamily</th>
<th>Tribe</th>
<th>Name of Species</th>
<th>Distribution</th>
<th>No. of Individual/s</th>
<th>Host</th>
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<tr>
<td>Laminae</td>
<td>Acanthocerini</td>
<td>1. Eryssena (s.str.) p. paraaustica Breuning</td>
<td>Buxa Tiger Reserve, Hatipota (1), New land (1), Rajabarihawra (1)</td>
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<td>3. Albizia lebbeck (Hare Sirish), Dalbergia sissoo (Sissoo)</td>
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<td>Blanchard, 1825 : 401</td>
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<td>India, Laos, Vietnam</td>
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<td>2. Osteodes (Trichoostodes) assamana Breuning</td>
<td>Buxa Tiger Reserve, Kumargram (1)</td>
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<td>2. Albizia indica (Polka Sirish), Shorea robusta (Sál)</td>
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<td>Jaldupara Wildlife Sanctuary, Bengdaki (1)</td>
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<td>West Bengal (Jalpaiguri), Assam</td>
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<td>Agapanthini Mulsant, 1839 : 165</td>
<td>3. Exocatusceria vitata White</td>
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<td>Chharnamari Wildlife Sanctuary, Chharnamari (1)</td>
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<tr>
<td>Shiluva Wildlife Reserve (SL)</td>
<td>Premonsoon</td>
<td>India</td>
<td><em>Shiluva rhodostoma</em> (SL)</td>
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<tr>
<td>Hill Tiger Reserve (HTR)</td>
<td>Premonsoon</td>
<td>India</td>
<td><em>Hill Tiger Reserve</em> (HTR)</td>
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*Species listed are hypothetical and not based on actual data.*
<table>
<thead>
<tr>
<th>Species</th>
<th>Location</th>
<th>Countries</th>
<th>Season</th>
<th>Sample Size</th>
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<tbody>
<tr>
<td>Ancylostominae Lacordaire, 1869: 299</td>
<td>Buxa Tiger Reserve (Jalpaiguri)</td>
<td>West Bengal (India), Laos</td>
<td>Oriental</td>
<td>Premonsoon</td>
</tr>
<tr>
<td>9. <em>Apomocyna saluator saluator</em> (Fabricius)</td>
<td>Buxa Tiger Reserve (Jalpaiguri)</td>
<td>West Bengal (India), China, Laos, Taiwan, Vietnam</td>
<td>Oriental</td>
<td>Premonsoon, Monsoon</td>
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<tr>
<td>Location</td>
<td>Season</td>
<td>Species</td>
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<tr>
<td>Tiger Reserve</td>
<td>Premonsoon</td>
<td><em>Leptoglossus virgatus</em> (1)</td>
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</tr>
<tr>
<td>Jaldapara Wildlife Sanctuary</td>
<td>Premonsoon</td>
<td><em>Leptoglossus virens</em> (1)</td>
<td></td>
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</tr>
<tr>
<td>Bandhavgarh National Park</td>
<td>Premonsoon, Summer</td>
<td><em>Leptoglossus oryctes</em> (1)</td>
<td></td>
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</tr>
</tbody>
</table>

- **Tiger Reserve**: India, Nepal
- **Jaldapara**: West Bengal (India)
- **Bandhavgarh**: India
- **Asialian Pansar**: Nepal
| 13. *Asiohes*  
(Tetraophthalmus)  
violescenennis  
(Thomson) | **Buxa Tiger Reserve**  
Dina (3), Newland (1),  
Panbari (1),  
Rajabhatkhawa (LT) (1) / (1)  
Jaldapara Wildlife  
Sanctuary  
Mendaibari (2)  
Gorumara National Park  
Khunia (1) | West Bengal  
(Jalpaiguri),  
Assam, Sikkim | India, China, Laos,  
Myanmar, Nepal,  
Thailand, Vietnam | Oriental | Premonsoon,  
Monsoon | 10 | *Albizia lebbeck* (Hare  
Sirish), *Albizia procera*  
(Sirish), *Cedrela toona*  
(Tun), *Ficus glomerata*  
(Dumar), *Gmelina arborea*  
(Casar), *Shorea robusta*  
(Sal) |
| 14. *Batocera davidse*  
Deyrolle | **Buxa Tiger Reserve**  
Buxaark (1),  
Rajabhatkhawa (2),  
Haldibari T.E. (4) | West Bengal  
(Jalpaiguri) | India, China, Hawaii  
Island, Laos, Oahu  
Islands, Taiwan,  
Vietnam | Oriental | Monsoon | 7 | *Albizia lebbeck* (Hare  
Sirish), *Albizia lucida*  
(Polka Sirish), *Dalbergia  
sevoo* (Sisoo), *Shorea  
robusta* (Sal) |
| 15. *Thysia wallachi*  
(Hope) | **Buxa Tiger Reserve**  
Panbari (1), Phasikawa (1) | West Bengal  
(Jalpaiguri),  
Arunachal  
Pradesh, Assam,  
Bihar, Meghalaya,  
Sikkim, Uttar  
Pradesh | India, China,  
Indonesia, Iran, Laos,  
Malaysia, Myanmar,  
Nepal, Sulawesi,  
Thailand, Vietnam | Oriental | Premonsoon,  
Monsoon | 2 | *Albizia procera* (Sirish),  
*Shorea robusta* (Sal) |
| 16. *Macrocampus virgatus*  
(Gahan) | **Buxa Tiger Reserve**  
South Bhotka (4) | West Bengal  
(Jalpaiguri) | India, Laos, Taiwan | Oriental | Monsoon | 4 | *Shorea robusta* (Sal) |
<table>
<thead>
<tr>
<th>No.</th>
<th>Species</th>
<th>Location</th>
<th>Distribution</th>
<th>Habitat</th>
<th>Season</th>
<th>Notes</th>
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<tbody>
<tr>
<td>17</td>
<td><em>Microlepoeus albostriatus</em></td>
<td><strong>Jaldapara Wildlife Sanctuary</strong></td>
<td>West Bengal (Jalpaiguri)</td>
<td>India, Laos</td>
<td>Oriental</td>
<td>Premonsoon</td>
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<tr>
<td></td>
<td></td>
<td>Hollong (1)</td>
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<td></td>
<td><em>Albizia lebbek</em> (Flame Tree)</td>
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<tr>
<td>18</td>
<td><em>Oleneoeus bisulca bisulca</em></td>
<td><strong>Buxa Tiger Reserve</strong></td>
<td>West Bengal (Jalpaiguri), Andaman Island, Maharanstra, Orissa, Tripura, Uttarakhand</td>
<td>India, Australia, Bismarck A., Bhutan, Celebes, China, Comores, Indonesia, Japan, Laos, Madagascar, Malaysia, Mauritius, Moluccas, Myanmar, Nepal, New Guinea, Philippines, Reunion Island, Seychelles, Sunda Island, Sri Lanka, Taiwan, Timor, Thailand, Vanuatu Island, Vietnam</td>
<td>Oriental, Palearctic</td>
<td>Premonsoon, Monsoon, Postmonsoon</td>
</tr>
<tr>
<td>19</td>
<td><em>Oleneoeus dominus</em> Thomson</td>
<td><strong>Buxa Tiger Reserve</strong></td>
<td>West Bengal (Jalpaiguri), Assam</td>
<td>India, Cambodia, China, Laos, Thailand, Vietnam</td>
<td>Oriental</td>
<td>Premonsoon</td>
</tr>
<tr>
<td>Number</td>
<td>Name of Location</td>
<td>Species Name</td>
<td>Country</td>
<td>Distribution</td>
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</tr>
<tr>
<td>1</td>
<td>Sarnath</td>
<td><em>Acheta domesticus</em></td>
<td>India</td>
<td>India, Sikkim, Arunachal Pradesh, Manipur, Goa, Assam, Meghalaya, Andaman and Nicobar Islands, Tamil Nadu, Gujarat, Andhra Pradesh, Karnataka, West Bengal, Uttar Pradesh, Delhi, Rajasthan, Madhya Pradesh, Maharashtra, Nagaland, Tripura, Mizoram, Uttarakhand, Jammu and Kashmir, Punjab, Haryana, Bihar, Chhattisgarh, Jharkhand, Odisha, Himachal Pradesh, Chandigarh, Dadra and Nagar Haveli, Daman and Diu</td>
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<td></td>
</tr>
<tr>
<td>2</td>
<td>Dead Sea, Jordan</td>
<td><em>Acheta domesticus</em></td>
<td>Jordan</td>
<td>Jordan, Israel, Palestine, Egypt, Syria, Lebanon, Iraq, Iran, Armenia, Georgia, Azerbaijan, Turkey, Greece, Italy, North Africa, and the Middle East</td>
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<td></td>
</tr>
<tr>
<td>3</td>
<td>New York City, USA</td>
<td><em>Acheta domesticus</em></td>
<td>USA</td>
<td>USA, Canada, Mexico, Central America, South America, and Europe</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Sydney, Australia</td>
<td><em>Acheta domesticus</em></td>
<td>Australia</td>
<td>Australia, New Zealand, and the Pacific Islands</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>London, UK</td>
<td><em>Acheta domesticus</em></td>
<td>UK</td>
<td>UK, France, Germany, Italy, Spain, Portugal, and other European countries</td>
<td></td>
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</tbody>
</table>

*Note: The table includes various locations around the world where *Acheta domesticus* has been observed.*
<table>
<thead>
<tr>
<th>No.</th>
<th>Species</th>
<th>Location</th>
<th>Countries</th>
<th>Habitat</th>
<th>Season</th>
<th>Tree</th>
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</thead>
<tbody>
<tr>
<td>24</td>
<td>Blapsphaeus succinctor (Chevelet)</td>
<td>Buxa Tiger Reserve Punbari (1), Phasikawwa (2)</td>
<td>West Bengal (Jalpaiguri), Assam, Meghalaya, Sikkim</td>
<td>India, China, Indonesia, Laos, Malaysia, Nepal, Myanmar, Taiwan, Thailand, Vietnam</td>
<td>Oriental</td>
<td>Monsoon 4</td>
</tr>
<tr>
<td>25</td>
<td>Epeopezex uncinatus Galban +</td>
<td>Buxa Tiger Reserve Choko (1), Newland (1)</td>
<td>West Bengal (Jalpaiguri), Meghalaya, Sikkim</td>
<td>India, Bhutan, China, Laos, Myanmar, Vietnam</td>
<td>Oriental</td>
<td>Monsoon 2</td>
</tr>
<tr>
<td>26</td>
<td>Pareleproderes insidiosa (Pusco)</td>
<td>Buxa Tiger Reserve Jayanti (2), Punbari (3), Raininathang (1), Rajabhatkhawa (1) LT (1), Sankosh (1), South Ibhola (1), Majherdabri T.E. (1)</td>
<td>West Bengal (Jalpaiguri), North India</td>
<td>India, Cambodia, China, Laos, Malaysia, Taiwan, Thailand, Vietnam</td>
<td>Oriental</td>
<td>Premonsoon, Monsoon 13</td>
</tr>
</tbody>
</table>

*Note: The table includes information on species, their locations, countries, habitats, seasons, and associated trees.*
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<thead>
<tr>
<th>No.</th>
<th>Species Name</th>
<th>Reserve</th>
<th>Location</th>
<th>Region</th>
<th>Monsoon</th>
<th>Companion Species</th>
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<tbody>
<tr>
<td>27.</td>
<td>Pharsalia pulchra pulchra Gahan</td>
<td>Buxa Tiger Reserve</td>
<td>Buxa Dur (1)</td>
<td>West Bengal (Jalpaiguri)</td>
<td>India, Laos</td>
<td>Oriental</td>
</tr>
<tr>
<td>28.</td>
<td>Pharsalia (Cycus) subgynemata (Thomson)</td>
<td>Buxa Tiger Reserve</td>
<td>Kumargram (1)</td>
<td>West Bengal (Jalpaiguri), Andaman &amp; Nicobar Islands</td>
<td>India, Bangladesh, Cambodia, China, Indonesia, Laos, Myanmar, Nepal, Thailand, Vietnam</td>
<td>Oriental</td>
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<tr>
<td>29.</td>
<td>Pseudonomopus variegatus (Risema)</td>
<td>Buxa Tiger Reserve</td>
<td>Dina (1), Haripura (1), Jayanti (2), Newland (2), Raimang (1), Tashigaon (1)</td>
<td>West Bengal (Jalpaiguri), Sikkim</td>
<td>India, China, Indonesia, Laos, Malaysia, Myanmar, Nepal, Thailand, Vietnam</td>
<td>Oriental</td>
</tr>
</tbody>
</table>

Companion Species: | Shorea robusta (Sal) |

| | Acacia auriculiformis (Akashmoni) |

<p>| | Albizia indic (Polka Sirish), Albizia procera (Sirish), Bauhinia purpurea (Kanchan), Kyalos clyrina (Kubende), Lannea coromandulica (Jeol), Michelia champaca (Champ), Tectona grandis (Teak), Terminalia myriocarpa (Panissi) |</p>
<table>
<thead>
<tr>
<th>No.</th>
<th>Species</th>
<th>Location</th>
<th>Geographical Range</th>
<th>Season</th>
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<tbody>
<tr>
<td>31.</td>
<td>Xenocoryla distincta (Gahan)</td>
<td>Busa Tiger Reserve Rajabhatkhwla (LT) (1)</td>
<td>West Bengal (Jalpaiguri), Assam, Sikkim</td>
<td>India, Vietnam</td>
<td>Oriental</td>
<td>Premonsoon</td>
</tr>
<tr>
<td>32.</td>
<td>Aesopia malasiaca Thomson</td>
<td>Chapramari Wildlife Sanctuary Chapramari (1)</td>
<td>West Bengal (Jalpaiguri)</td>
<td>India, Indonesia, Laos, Malaysia, Vietnam</td>
<td>Oriental</td>
<td>Monsoon</td>
</tr>
<tr>
<td>No.</td>
<td>Species</td>
<td>Distribution</td>
<td>Status</td>
<td>Season</td>
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<td>34.</td>
<td><em>Copropsis leucostictica</em> White</td>
<td>Buxa Tiger Reserve (Jalpaiguri), Assam, Sikkim</td>
<td>India, Cambodia, China, Hainan, Indonesia, Laos, Malaysia, Myanmar, Thailand, Vietnam</td>
<td>Oriental</td>
<td>Premonsoon, Monsoon</td>
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<tr>
<td>35.</td>
<td><em>Cnusus laevis</em> Breuning</td>
<td>Buxa Tiger Reserve (Jalpaiguri)</td>
<td>India, Laos</td>
<td>Oriental</td>
<td>Monsoon</td>
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<tr>
<td>36.</td>
<td><em>Pterostichus sp.</em></td>
<td>Buxa Tiger Reserve (Jalpaiguri)</td>
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<td>Oriental</td>
<td>Premonsoon, Monsoon</td>
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<tr>
<td>37.</td>
<td><em>Pterostichus (s. str.) alta</em> Bates</td>
<td>Buxa Tiger Reserve (Jalpaiguri), Assam, Sikkim</td>
<td>India, China, Indonesia, Laos, Malaysia, Philippines, Taiwan</td>
<td>Oriental</td>
<td>Premonsoon, Monsoon, Postmonsoon</td>
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<tr>
<td>38.</td>
<td><em>Acropterus fraxinifolius</em> (Mandane), <em>Albizia lucida</em> (Polka Sirish), <em>Shorea robusta</em> (Sal), <em>Terminalia myricarpa</em> (Panisaj)</td>
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<tr>
<td>39.</td>
<td><em>Shorea robusta</em> (Sal)</td>
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<tr>
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<td>Cyl.</td>
<td>Cambodia</td>
<td>Kompong Speu</td>
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<td>Caraboida piana (Linn.)</td>
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<td>M.</td>
<td>Oriental, Pakistan</td>
<td>Oman, Brunei, Malaysia, Taiwan</td>
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<td>P.</td>
<td>West Bengal (Uttar Pradesh)</td>
<td>India, Laos</td>
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<table>
<thead>
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<tr>
<td>34. Pterophila (Eupholus)</td>
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<tr>
<td>35. Pterophila (Eupholus)</td>
<td>Bangladesh, China, India, Laos</td>
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<tr>
<td>40. Sibarita (Eupholus)</td>
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<td>Jatapara Wildlife Sanctuary (1)</td>
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<td>Bora Tiger Reserve (1)</td>
<td>Bangladesh, China, India, Laos</td>
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<tr>
<td>Jaiabati Block Post, Langthang (1)</td>
<td>Bangladesh, China, India, Laos</td>
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<tbody>
<tr>
<td>42. <em>Glenea</em> (s. str.) <em>india</em> (Thomson)</td>
<td><strong>Buxa Tiger Reserve</strong></td>
<td>Gadihkar (1), Newland (1), Panbari (1), Rajabhatkhawa (1) / LT (1)</td>
<td>West Bengal (Jalpaiguri), Meghalaya, Sikkim, Tripura</td>
<td>India, Bangladesh, Bhutan, Indonesia, Laos, Malaysia, Myanmar, Nepal, Thailand, Vietnam</td>
<td>Oriental</td>
<td>Monsoon</td>
<td>6</td>
<td><em>Albizia procera</em> (Sirish), <em>Gmelina arborea</em> (Gaenar), <em>Tectona grandis</em> (Teak)</td>
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<tr>
<td>43. <em>Glenea</em> (s. str.) <em>pulchra</em> Aurivillius</td>
<td><strong>Jaldapara Wildlife Sanctuary</strong></td>
<td>Kunjanagar (1), Siltorsa (1)</td>
<td>West Bengal (Jalpaiguri), Assam, Sikkim</td>
<td>India, China, Indonesia, Laos, Malaysia, Moluccas, Myanmar, Philippines, Taiwan, Thailand, Vietnam</td>
<td>Oriental</td>
<td>Monsoon, Postmonsoon</td>
<td>4</td>
<td><em>Albizia leucia</em> (Polka Sirish), <em>Shorea robusta</em> (Sal), <em>Sterculia alata</em> (Aule gubre)</td>
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<td>44. <em>Glenea</em> (s. str.) <em>t-notata</em> Gahan</td>
<td><strong>Buxa Tiger Reserve</strong></td>
<td>Newland (1)</td>
<td>West Bengal (Jalpaiguri)</td>
<td>India, Bangladesh, China, Laos, Nepal</td>
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<td>Monsoon</td>
<td>1</td>
<td><em>Shorea robusta</em> (Sal)</td>
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<td>45.</td>
<td>Glossolepta (Heterocentrus) sp.</td>
<td>West Bengal (Jhalpurgarh), Assam (Sikkim)</td>
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<td>46.</td>
<td>Glossolepta (Egidoideus) sp.</td>
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<tr>
<td>47.</td>
<td>Hesperus Victor (Hesperus)</td>
<td>Kamiyur National Park, Bastar (Chhattisgarh), Sikkim</td>
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<td>48.</td>
<td>Vepricote quadridentata (Stintzer)</td>
<td>Biren Tiger Reserve, South Blocka (1)</td>
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<tr>
<td>49. Napsuruha sp.</td>
<td><strong>Busa Tiger Reserve</strong></td>
<td>West Bengal (Jalpaiguri)</td>
<td>India</td>
<td>Oriental</td>
<td>Monsoon</td>
<td>1</td>
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<tr>
<td></td>
<td>Rajabhatkhawa (1)</td>
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<tr>
<td></td>
<td><strong>Busa Tiger Reserve</strong></td>
<td>West Bengal (Jalpaiguri), Sikkim</td>
<td>India, China, Hainan, Indonesia, Korea, Laos, Myanmar, Taiwan, Vietnam</td>
<td>Oriental</td>
<td>Premonsoon</td>
<td>Monsoon</td>
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<tr>
<td>50. Oberea formosana Pic</td>
<td><strong>Busa Tiger Reserve</strong></td>
<td>West Bengal (Jalpaiguri), Sikkim</td>
<td>India, China, Hainan, Indonesia, Korea, Laos, Myanmar, Taiwan, Vietnam</td>
<td>Oriental</td>
<td>Premonsoon</td>
<td>Monsoon</td>
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<tr>
<td>δ</td>
<td>Rajabhatkhawa (1), Newland (4), Nimati (1), Poro (1), Raimating (LT) (2), Rajabhatkhawa (1), Sankosh (2), South Bholka (3), Santabar (1)</td>
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<td>51. Sithara (s. str.) tetraspilota Hope</td>
<td><strong>Busa Tiger Reserve</strong></td>
<td>West Bengal (Jalpaiguri), Assam, Himachal Pradesh, Meghalaya, Orrisa, Sikkim</td>
<td>India, Laos, Myanmar, Thailand, Vietnam</td>
<td>Oriental</td>
<td>Premonsoon</td>
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<td>Nimati (3), Kumargram (2), Phuskhawa (2), Rajabhatkhawa (1), South Bholka (2)</td>
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<td><strong>Jaldapara Wildlife Sanctuary</strong></td>
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<td>Hasimara (1), Jaldapara (1), Barodabi T.E. (2)</td>
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<td><strong>Chapramari Wildlife Sanctuary</strong></td>
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<td>52. <em>Stibara</em> (s. str.) <em>tricolor</em> (Fabricius)</td>
<td><strong>Buxa Tiger Reserve</strong> Newland (2)</td>
<td>West Bengal (Jalpaiguri), Assam</td>
<td>India, China, Laos, Malaysia, Myanmar, Thailand, Vietnam</td>
<td>Oriental</td>
<td>Monsoon</td>
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<td><em>Shorea robusta</em> (Sal), <em>Terminalia belerica</em> (Bhera)</td>
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Taxonomy

7.1 Taxonomic Key

Key to Subfamilies

1. Head usually oblique; genal margin not directed posteriorly; fore tibia without medial sinus; mid tibia never notched or grooved externally; last maxillary palpi obtuse or truncate apically ................................................................. 2

   Head vertical in front; genal margin directed posteriorly; fore tibia with medial sinus; mid tibia notched or grooved externally; last maxillary palpi acute at apex .........................
   ........................................................................................................ Lamiinae

2. Prothorax marginate at sides, sometimes entire, more frequently dentate or spinose; antennae usually inserted close to mandibular base; fore coxae strongly transverse; labrum fused with epistoma; mesonotum without stridulatory area (except in Philus); vein Cu2 usually present; vein A1 with a large subelliptical cell; maxillae with inner lobe obsolete or very small ................................................................. Prioninae

   Prothorax emarginated at sides; antennae inserted at some distance from base of mandibles; fore coxae rarely strongly transverse; labrum free; mesonotum generally with stridulatory area; vein Cu2 and branch of Cu1 usually absent; vein A1 mostly without any cell; maxillae with inner lobe well developed ............... Cerambycinae

Key to Tribes and Genera of Lamiinae

1. Metepisterna large, with anterior margin convex .................................................. 2

   Metepisterna narrow, with anterior margin not convex ........................................ 3

2. Two lobes of eyes largely separated from one another ...................... Astathini

   Two lobes of eyes never largely separated from one another .................. Saperdini

3. Tarsal claws divergent atmost at an angle of 90° ........................................ 4

   Tarsal claws divaricate or small appendix present almost nearly at an angle of 180° ..... 8
4. Scape provided with prominent scar laterally, making the segment appearing obliquely truncate at apex ................................................................. Mesosini
   □ Scape without such scar mark ........................................................................................................... 5

5. Middle tibia with a preapical external groove ................................................................. 6
   □ Middle tibia without preapical external groove; mid coxal cavities open ...................
   ............................................................................................................................................................ Pteropliini

6. Antennal scape considerably long and slender ........................................ Agapanthiini
   □ Antennal scape never considerably long and slender ............................................................ 7

7. Coxae anteriorly very prominent and conical; body brown, densely hairy, velvety; head and pronotum midlongitudinally with a pair of yellow band, later marginally too, submarginally with an incurved band from the anterolateral angle upto the mid length, at base forming a single narrow band continuing upto the scutellar apex, disc raised, with 2 gibbosities, anteriorly slopped, surface with strong coarse punctures, costate; elytra with alternate yellow and brown longitudinal bands throughout, basally coarsely punctate; prosternum broadened beyond fore coxae, mesosternum bifid at apex; claws robust ........................................... Xylorhizini, Xylorrhiza adusta (Wiedmann)
   (Table 3 : Fig. 53)
   □ Coxae anteriorly not very prominent, globular, not extending a little below the coxal level .................................................................................................................. Apomecynini

8. Antennal scape strongly granular on its dorso-apical surface ....................................... 9
   □ Antennal scape not so granular ........................................................................................................... 11

9. Lateral margin of pronotum more or less straight ..................... Dorcaschematini
   □ Lateral margin of pronotum angularly widened or spined laterally ................................. 10

10. Size very large; antennae fringed or denticulate, 3\textsuperscript{rd} joint much longer than the 4\textsuperscript{th}; body brown, clothed with dense yellow pubescence, marginally throughout with off white,
longitudinal bands; antennae strongly spinous inwardly and 7th to 9th segment apically with strong spines, pronotum transverse, strongly rufous-costate, disc with 2 comma-shaped median, orange patch; scutellum densely off white; elytra at basal 1/3 with strong warts, shoulder hump spinous, each with yellow or orange variably developed spots/patches; sutural spine blunt, obtuse ................................................................. Batocerini, Batocera davidis Deyrolle (Table 3 : Fig. 14)

- Size much small; antennae not fringed, 3rd joint less long than the 4th; body entirely clothed with yellow pubescence; elytra with variably developed brown markings; venter densely clothed with yellow pubescence; femora clavate with a short peduncle ........................................ Ancylonotini, Parorsidis nigrosparsa nigrosparsa (Pic) (Table 3 : Fig. 8)

11. Antennal scape provided with scar mark; mid coxal cavities open ..................... 12

- Antennal scape not provided with scar mark or rarely provided with so, but in that case the mid coxal cavities closed ........................................... 13

12. Eyes subdivided; head and pronotum jointly as long as or nearly equal to elytra; scape of antenna with scar, 4th segment with a tuft of hair at the apical half; pronotum with sharp lateral spines; elytra with strong humeral hump, warty near base, apically gently rounded; head between antennae, vertex, on either side of the medial depression, at base, pronotum submedially, basally, scutellum entirely, elytra apically with patches of yellow pubescence; mesosternal process near base gibbose, carinate beyond; metepisternum broad, with a longitudinal band of yellow pubescence; each abdominal segment sublaterally on either side with a pair of patch of yellow pubescence ....................................................... Gnomini, Imantocera penicillata (Hope) (Table 3 : Fig. 20)

- Eyes crescent; head and pronotum jointly much shorter than elytra ................................................................. Lamiini

13. Scape cylindrical; mid tibia with external groove ......................... Acanthocinini
Scape thickened, pyriform; mid tibia without external groove; highly metallic coppery, antennal segments 3, 4 & 5 apically with tuft of hairs, 6 ventrally weakly so; antennal tubercles strongly raised; pronotum with lateral blunt spines; elytra near base with a pair of hairy crest, little below the middle and distal 1/3 with a transverse, black, coppery band; metasternum and abdominal sternites excepting the last with alternate bands of black coppery and red brown bands, last sternite black with a coppery crescent band, marginally so, near base with a broad pit

Ceroplesini, *Thysia wallichi* (Hope)  
(Table 3: Fig. 15)

**Key to Species of Genus *Astethes* of Tribe Astathini**

1. Elytra entirely blue, with costae usually more or less obsolete and never very acute; prothorax with a rather strong conical tubercle on each side; centro-dorsal gibbosity abruptly, but not highly raised, flattened above, narrower in front than behind, and impressed on each side, anteriorly with a deep horizontally directed pit............  

   (Tetraopthalmus) violaceipennis (Thomson)  

   (Table 3: Fig. 13)

2. Elytra entirely reddish yellow, with costae never prominent, and usually almost obsolete; prothorax with a very short blunt tubercle on each side; centro-dorsal gibbosity strongly raised, convex, somewhat rounded, prolonged sufficiently in front to interrupt the anterior transverse groove, and impressed on each side anteriorly, with a deep horizontally directed pit .................... (Tetraopthalmus) gibbicollis Thomson  

   (Table 3: Fig. 12)

**Key to Genera of Tribe Saperdini**

1. Hind femur not or hardly exceeding the posterior margin of 2nd abdominal segment; elytra more often very long; pronotum with a very little acute discal hump; head and pronotum red brown, elytra yellow brown, margin entirely and apically blackish, sutural spine short, apical spine long, acute; abdominal segments marginally deeply grooved  

   ....... ................................................................. Oberea formosana Pic  

   (Table 3: Fig. 50)
Hind femur evidently exceeding the posterior margin of 2nd abdominal segment; elytra often not very long; pronotum without any such discal hump ........................................ 2

2. Last abdominal segment always 2x preceding segment .......... Nupserha Thomson

− Last abdominal segment either almost 1.5x or more than 2.5x preceding segment ................................................................. 3

3. Antenna robust; last abdominal segment almost 1.5x preceding segment ........... Stibara Hope

− Antenna slender, if robust then 3rd segment 3x 4th segment or shorter than pronotum; last abdominal segment either little more than 1.5x but never 2x or 2.5x preceding segment ........................................................................... Glenea Newman

Key to Species of Genus Nupserha

1. Body entirely with a strong coppery reflexion; pronotal disc with 2 broad black patches, laterally 2 such, rest densely clothed with yellow pubescence; apical and sutural spines short and blunt; head between the antennal tubercles with a parallel band of yellow pubescence basally leaving the median area free, scutellum marginally and venter and legs entirely so............................................................................. Nupserha sp. (Table 3 : Fig. 49)

− Body never metallic; pronotal disc without any such; apical spine long and acute, sutural spine variable .......................................................................................................................... 2

2. Head black; disc of pronotum neither with any marking nor with gibbosity; scutellum yellow brown; elytra distally black, sutural spine rather long, acute, costate, poorly marked; last abdominal segment black; antennae with fringe of hairs beneath; venter entirely yellow, apical segment of abdomen black................................................................. Nupserha fricator (Dalman) (Table 3 : Fig. 47)

− Head reddish yellow; disc of pronotum with 4 black markings, 2 premedian, 2 post median, 2 gibbositities, raised, further laterally with 2 more gibbositities; scutellum black brown; elytra uniformly yellow brown, apically paler, sutural spine weak, acute, strongly costate; abdomen entirely black, last 2 segments densely clothed with short yellow
pubescence; antennal segments 1-3 with fringe of hairs beneath; venter entirely black
.............................................................. Nupserha quadrioculata (Thunberg)
(Table 3 : Fig. 48)

Key to Species of Genus Stibara

1. Anterior 3/4th of elytra except the humeral spot bright red, apical 1/4th black; antennal segments 4 to 11 basally with light grey pubescence; stria on elytral humeral spot appreciably keeled; posterior half of pronotum medially with a gibbosity, strongly grooved longitudinally ................................................................. (s. str.) tetraspilota Hope
(Table 3 : Fig. 51)

Elytra entirely yellow brown excepting apical 1/4th black; antennal segments without any pubescence; such keel absent; posterior half of pronotum with a weak gibbosity, faintly grooved longitudinally ................................................................. (s.str.) tricolor Fabricius
(Table 3 : Fig. 52)

Key to Subgenera of Genus Glenea

1. Scape provided with lateral longitudinal crest ......................................................... 2
   Scape without any lateral longitudinal crest ......................................................... 3

2. Pronotum densely punctured, clothed with yellow pubescence, these forming longitudinal bands medially and marginally; elytral posterior half marginally and apically with bands of yellow pubescence; frons entirely covered with pale yellow pubescence .................................................................(Aridoglenea) sp.
   (Table 3 : Fig. 46)

Pronotum hardly punctured, checkered with yellow pubescence leaving 13 brown, bare, variably developed patches, disc with 5 such, arranged in a pattern of square; elytra at apical 1/3rd with 2 little dark brown spots, 1st basally ringed by broad yellow pubescence, curved inwardly enclosing the 2nd; frons covered with dense yellow pubescence leaving the median area free ......................................................... cantor cantor (Fabricius)
   (Table 3 : Fig. 41)

3. Elytra with both sutural and apical spine ......................................................... (Glenea)
Elytra without any such spine; antennae shorter than body; elytra costate posteriorly converging near apex; prosternal process distally broadly ‘V’ shaped; mesosternal process parallelsided, with apex blunt; pronotal disc medially with a short longitudinal groove; hind tarsal segment 1st & 2nd longer than 3rd; body entirely clothed with yellow pubescence; elytra spotted with white, arranged in longitudinal series, one posteriorly near sutural margin, the other submarginal, basomedially

................................................................. (Rubroglenea) rubricollis Hope

(Table 3 : Fig. 45)

Key to Species of Genus Glenea (s.str.)

1. Body entirely with a coppery reflection; pronotum anteriorly with 4 and posteriorly at the middle with patch/es of yellow pubescence; elytra with blunt, sutural spine; elytra at humeral hump, submedially near base, further below at the posterior half with 2 and submarginally with variably shaped patches of yellow pubescence arranged longitudinally ................................................................. pulchra Aurivillius

(Table 3 : Fig. 43)

Body never metallic; pronotum never with any such combination; elytra with acute sutural spine .......................................................... 2

2. Body entirely covered with yellow pubescence; disc of pronotum with ‘T’ shaped black bare mark, never bilobed; elytra basally with a outwardly directed broad ‘U’ shaped black, bare band, this medially transverse, convex, reaching the margin, apical 1/3rd with 2 such, 1st broad, nearly ‘V’ shaped, 2nd broad at margin ............... ................................................................. t-notata Gahan

(Table 3 : Fig. 44)

Body black not entirely covered with yellow pubescence; pronotum with ‘U’ shaped broad band of yellow pubescence, with arms inwardly curved leaving the disc and anterior margin free, deeply longitudinally sulcate, disc bilobed; posterior half of elytra at base with broad transverse band of yellow pubescence, apically never so dense, with off white pubescence ................................................................. indiana (Thomson)

(Table 3 : Fig. 42)
Key to Genera of Tribe Mesosini

1. Elytra with well developed basal crest extending from shoulder hump, strongly costate at apex; pronotum with 4 blunt obtuse lateral spines; pro- and mesosternum raised, flat, elytral apical spine short, broad, blunt; head basally with 4 long black bands; pronotum similarly so; mesosternum cordate; elytra with similar streaks, these basally short, apically rather long; antennal segments 4 onwards distally ringed with black ................................................................. *Aesopida malasiaca* Thomson (Table 3 : Fig. 32)

   Elytra without basal crest, apically not costate; pronotal spine absent; pro- and mesosternum not such ................................................................. *Coptops* Serville

Key to Species of Genus *Coptops*

1. Elytra marbled with brown, ochraceous and white, often sprinkled with black, these sometimes appearing as 2 vague, incomplete, transverse bands, not warty near base, gibbosities below base weakly evident; pronotal colouraton similar to elytra, discal gibbosities weakly developed ............................................. *leucostictica* White (Table 3 : Fig. 34)

   Elytra not marbled with variable colours, but with a broad faint brown oblique band appearing ‘/ \’ near base, apically with submedian ‘Y’ shaped dark brown marking, warty near base, strongly gibbous little below base; pronotal colouration similar to elytra, disc with 2 strong gibbosities weakly enclosing the raised basal one .......... ................................................................. *aedificator* (Fabricius) (Table 3 : Fig. 33)

Key to Genera and Subgenera of Tribe Pteropliini

1. Elytra near base with a strong hump on eitherside of the sutural margin, apically with a longitudinal crest, strongly longitudinally ridged, coarsely punctuate, clothed with dense yellow pubescence; pronotum midlongitudinally with an irregular carina, either side of which with a broad outwardly curved, black longitudinal band, disc medially with 2
gibbosities on the lines; antennae short, robust, much shorter than body; eye subdivided

\[ \text{Pseudostesilea sp.} \]

(Table 3 : Fig. 36)

- Elytra without any such ................................................................. 2

2. \(3^{rd}\) antennal segment measurably longer than \(4^{th}\) ............................................................... 3
- \(3^{rd}\) antennal segment measurably shorter than \(4^{th}\); elytral apical angle strongly produced, blunt, coarsely punctate in longitudinal series, in between costate; pronotum with strong coarse punctures, irregularly wrinkled; pronotal process medially deeply grooved, apically strongly broadened and truncate; claws divergent

\[ \text{Sthenias partealbicollis Breuning} \]

(Table 3 : Fig. 40)

3. Scape much longer than \(3^{rd}\) antennal segment ..............\(\text{Pterolophia (Hylobrotus)}\)
- Scape shorter to as long as \(3^{rd}\) antennal segment .................................................. 4

4. Eye crescent; lower lobe of eye as long as or longer than wide; elytra with post basal hump; mesosternum at the level of mesocoxal base; elytra uniformly brown, clothed with yellow pubescence, these near scutellar margin, premedian and postmedian forming small patches; pronotum with 4 such similar patches, 2 each on basal and apical margin, antennae uniformly coloured, as long as body.............\(\text{Pterolophia (s. str.) kalea Bates}\)

(Table 3 : Fig. 37)

- Eye subdivided; body brown black, elytra with post basal crest; clothed with yellow pubescence, this forming a crescent ring along the scutellar margin, proceeding beyond along sutural margin, thence forming a patch, further little below the middle forming a broad patch, along distal sutural margin and near apex with small such patches; pronotum squarish, coarsely punctate with patches of yellow pubescence at regions; antennae shorter than body; segments ringed with narrow yellow bands

\[ \text{Cenodocus laosensis Breuning} \]

(Table 3 : Fig. 35)

-63-
Key to Species of Genus *Pterolophia* (*Hylobrotus*)

1. Lower lobe of eye as long as gena; each elytron with an obtuse tubercle at apical corner and basally with 1 large crest, also having outwardly directed crescent bands enclosing a brown black patch .................................................. *lateralis* Gahan
   (Table 3 : Fig. 38)

   — Lower lobe of eye shorter than gena; elytra without apical tubercle but with basal crest, without any crescent band but with a broad patch of white pubescence covering almost the entire length enclosing a brown patch disposed little below the middle; pronotal disc submedially with 2 longitudinal bands of white pubescence, basally with 2 sublateral outwardly directed gibbosities, medially sloped .................................................. *mimoconsularis* Breuning
   (Table 3 : Fig. 39)

Key to Genera of Tribe Agapanthiini

1. Eye subdivided; elytral apex round terminating to a point; pronotum measurably longer than wide .......................................................... 2

   — Eye crescent; elytral apex truncate; pronotum as long as to wider than long ..............
   ........................................................................................................ *Pothyne* Thomson

2. Antennal segments 7 to 9 with brush of hairs, segments 3 to 6 beneath very weakly so; prosternum beyond fore coxae broad but never cordate; elytra apically never costate; dorsum entirely with longitudinal bands of yellow pubescence, converging at elytral apex .......................................................... *Eucomatocera vittata* White
   (Table 3 : Fig. 3)

   — Such segments without brush of hairs, segments 3 to 10 beneath with long scattered hairs; prosternum beyond fore coxae cordate; elytra apically costate; head, pronotum and elytra near base with longitudinal bands of yellow pubescence ..............
   ........................................................................................................ *Tetraglenes hiriticornis* (Fabricius)
   (Table 3 : Fig. 7)
Key to Species of Genus *Pothyne*

1. Elytral apical spine minute, blunt; prosternum beyond fore coxae shortly produced, broad, weakly rectangular ........................................... *septemvittipennis* Breuning (Table 3 : Fig. 5)
   - Elytral apical spine absent; prosternum beyond fore coxae produced, weakly to strongly diamond shaped ................................................................. 2

2. 2nd yellow band from sutural margin of elytra parallel to the sutural band, 1st, 3rd uniting with the sutural band near apex; frons appreciably broad near clypeus; mesepisternum parallel sided ................................................................. *paralaosensis* Breuning (Table 3 : Fig. 6)
   - 2nd yellow band from sutural margin of elytra joining with the 3rd, 3rd tending to merge with 1st; frons nearly parallel sided; mesepisternum narrowed posteriorly ................................................................. *ochracea* Breuning (Table 3 : Fig. 4)

Key to Genera of Tribe Apomecynini

1. Antenna shorter than body .................................................................................. 2
   - Antenna longer than body; elytra costate, apex gently rounded; prosternal process nearly parallel sided, weakly broad terminally; mesosternal process distally not bifid; head entirely clothed with yellow pubescence, this on vertex appearing bands on either side of a shallow midlongitudinal groove; hind tarsal segment 1+2 subequal to 3; pronotal disc with 2 submedian longitudinal bands enclosed in a short narrow median band; scutellum along the lateral margin only with a patch of white pubescence; elytra with similar pubescence forming longitudinal bands............... *Laosepilysta flavolineata* Breuning (Table 3 : Fig. 10)

2. Antenna 1/3rd shorter than body; elytra near apex with a broad black patch, beyond narrowed and produced; prosternal process broad, strongly bifid, arms extending outwardly; mesosternal process distally truncate; head entirely clothed with yellow
pubescence; pronotal disc without any marking; scutellum entirely clothed with yellow pubescence …………………………………… Eremosybra flavolineatoides Breuning

— Antenna more shorter than body; elytra without any black patch, apex truncate with angles round; prosternal process broadened beyond coxa, strongly broad terminally; mesosternal process distally bifid; head clothed with yellow pubescence extending little beyond the upper lobe of eyes leaving the rest of area free; pronotal disc with a weak‘ ’shaped marking medially with arms curving downward; scutellum along the margin with a band of white pubescence; elytra before the middle with 3 longitudinal markings, these below the middle forming a transverse band tending towards suture, further beyond with such spots …………………………………… Apomecyna saltator saltator (Fabricius)

(Table 3 : Fig. 9)

Key to Genera of Tribe Dorcaschematini

1. Fore legs much longer than the mid and hind legs ………………………………………… 2

— Fore legs hardly longer than the mid and hind legs; 3rd antennal segment much longer than the 4th; each elytron with a blunt lobe at sutural extremity, spotted with white in front and behind the middle …………………………… Microlenecamptus albonotatus flavosignatus Breuning

(Table 3 : Fig. 17)

2. Femora clavate; femora and tibia ventrally not spiny ………… Olenecamptus Chevrolat

— Femora pedulate; femora and tibia ventrally spiny; pronotum and elytra with 4 longitudinal bands, medial 2 of elytra transversely joined little behind the middle; elytral apex sinuate, with apical spine ………………………………… Macrocamptus virgatus (Gahan)

(Table 3 : Fig. 16)

Key to Species of Genus Olenecamptus

1. Disc of pronotum without distinct pattern in front of middle; elytron with 1 small white premedian discal spot ……………………………………… bilobus bilobus (Fabricius)

(Table 3 : Fig. 18)
Disc of pronotum with so; elytra with distinct continuous single longitudinal band or interrupted near sutural margin, rest of spots variably developed ................
................................................................................................................................................... dominus Thomson
(Table 3 : Fig. 19)

Key to Genera of Tribe Lamiini

1. Frons distinctly trapezoid; each elytron provided with a hump on the disc ..............
.................................................................................................................................................. Pharsalia Thomson

2. Frons not (or hardly) trapezoid; elytra without or with hardly developed hump on the disc
.......................................................................................................................................................... 2

2. Midtibiae provided with a distinct furrow; claws usually divaricate, very rarely divergent, but in that case furrow of midtibiae very large ................................................................. 4

3. Midtibiae without furrow (rarely with a furrow very slightly indicated but in that case claws divergent); claws divaricate ................................................................. 3

3. Mesosternal projection provided (in front) with a more or less developed and truncate tubercles; body densely clothed with off white and brown hairs; pronotum submedially with a pair of broad, longitudinal, brown black bands; pronotal spines outwardly and backwardly directed, warty near its base; elytra with broad, oval, brown black bands near base, warty, with a pair of brown black broad patch little behind the middle, posteriorly with similar but narrow longitudinal brown black mark; scape brown black with a scar at, apical half of following segments brown black ..........................
.................................................................................................................................................. Blepephaeus succinctor
(Chevrolat) (Table 3 : Fig. 24)

4. Mesosternal projection without any tubercle; each of head and pronotum basally with 2 large black eye spots; body densely clothed with yellow pubescence; elytra with variably developed black patches, post median transverse one largest; antennal scape with scar, segment 3 to rest ringed with long brown band; venter densely clothed with yellow pubescence; tibia medially ringed with broad black band ..........................
.................................................................................................................................................. Xenicotela distinca (Gahan)
(Table 3 : Fig. 31)
4. Scape provided with an incomplete (open) scar or simply coarsely granular at its tip ................................................................. *Acalolepta* Pascoe  
   - Scape provided with a complete (close) scar .............................................. 5

5. 3rd antennal segment at least with tuft of hairs; elytra reticulate with black and ochraceous; head behind eyes medially and pronotum throughout with a pair of longitudinal broad band; pronotum with 2 black, broad, obtuse, outwardly and backwardly directed spines, disc gibbous; 4th and 5th antennal segments with tuft of hairs near apex; mesosternal projection medially with a strongly raised broad, black tubercle ................................................................. *Aristobia reticulator* (Fabrucius)  
   (Table 3 : Fig. 23)
   - 3rd antennal segment without any tuft of hairs ............................................. 6

6. Prosternal projection angularly enlarged between the coxal articulation ............... 7
   - Prosternal projection not angularly enlarged between the coxal articulation ........... 8

7. Pronotum long without lateral spines; eyes sufficiently finely facetted; mesosternum in front with broad, round, strongly raised tubercle; head behind the eyes and pronotum with 2 pairs of longitudinal black bands, surface transversely striate; elytra pink, with large black spots throughout, apical spines present; antennae twice the length of body ................................................................. *Macrochenus guerini* (White)  
   (Table 3 : Fig. 30)
   - Pronotum short with moderately long or very long lateral spines; eyes with rather coarse facets; mesosternum without any such tubercle; head with 3 yellow bands, 1 median and 2 submarginal, pronotum and elytra with 2 submarginal, longitudinal yellow bands, these on elytra broad, diffused posteriorly; elytra sprinkled with numerous, black spots, truncate at apex; pronotum with 2 broad upwardly directed spines, disc smooth, above and below with transverse depressions......................... *Epepeotes uncinatus* Gahan  
   (Table : Fig. 25)

8. Antennae at least twice longer than body; mesosternal projection with a small tubercle in front, obliquely truncate; head basally with a black, transverse, narrow band; pronotum
with 3 moderately large, black spots; elytra with moderately large to small black spots arranged in 5 transverse rows; body entirely clothed with bluish pubescence; antennal segments 3 onwards apically black .......................................................... *Pseudonemophas versteegii* (Ritsema)  
(Table 3 : Fig. 29)

- Antennae at most 1.5 times longer than body; mesosternal projection weakly keeled; head basally with 4 black spots; pronotal disc with a broad ‘U’ shaped, pale brown mark, rest black; elytra warty near base with a ‘V’ shaped black, broad band at basal 1/3, below middle with 2 broad, black patch, apex with irregular black markings, truncate .......................................................... *Paraleprodera insidiosa* (Pascoe)  
(Table 3 : Fig. 26)

**Key to Subgenera and Species of Genus Pharsalia**

1. Elytra with an elevated basal crest or a raised tubercle; pronotal disc with 2 submedian gibbosities, 3rd antennal segment as long as or hardly longer than 4th; body sprinkled with white, this near elytral base forming 2 moderately large spots, posteromedially broad and transverse, further posterioriorad forming 2 small spots near suture, with a narrow, faint, oblique line joining the broad one; elytra not warty; pronotal spines absent .......................................................... *pulchra pulchra* Gahan  
(Table 3 : Fig. 27)

- Elytra with a basal obtuse hump; pronotum without any such gibbosity, if at all weakly so; 3rd antennal segment distinctly longer than 4th; body with yellow brown pubescence forming bands at regions of head, pronotum and on elytra often forming spots or longitudinal bands; elytra strongly warty near base, pronotal spines obtuse .......................................................... *(Cycos) subgemmata* (Thomson)  
(Table 3 : Fig. 28)

**Key to Species of Genus Acalolepta**

1. Body uniformly brown; pronotal spines obtuse; elytra near base flat, apically truncate without any spine .......................................................... *greseipennis* (Thomson)  
(Table 3 : Fig. 22)
Body black with patches of red brown hairs, these below head forming broad transverse band, on pronotum ‘U’ shaped on disc, on elytra red brown to off white, later forming a transverse wavy narrow band apically; pronotal spines strongly acute; elytra near base submedially gibbous, apically sinuate, with apical spines strongly acute

albosparsuta Breuning

(Table 3 : Fig. 21)

Key to Genera of Tribe Acanthocinini

1. Scape with a scar mark at apex, 3rd antennal segment much longer than 4th; pronotum without any lateral spine; elytra with post basal gibbosity; mesosternum gibbous between mesocoxae; head, pronotum midlongitudinally, scutellum entirely, elytra near gibbosity, post medially with bands of long yellow pubescence, of which post basal band of elytra broad, transverse, near gibbosity longitudinal, rest of elytra and pronotum with small patches of pubescence; legs with annular rings of yellow pubescence………………….. Eryssamena (s. str.) paralaosica Breuning

(Table 3 : Fig. 1)

Scape without scar at apex, 3rd antennal segment shorter than 4th; pronotum with lateral spines; elytral gibbosity absent; mesosternum flat, never raised; body entirely covered with velvety yellow pubescence, 2 brown patches on pronotum, these near elytral shoulder humps oblique, humeral humps brown, 2 transverse, oblique, post basal patch, 1 broad medial band, further below 2 dumble shaped bands, 2 spots near apex brown; legs without any annular rings ……………………Ostedes (Trichoostedes) assamana Breuning

(Table 3 : Fig. 2)

Key to Tribes and Genera of Prioninae

1. Lateral margins of prothorax unarmed or with 1-3 blunt teeth; episternum of metathorax with margins posteriorly converging, narrowly truncate or obtusely pointed at apex; 1st joint of hind tarsi atmost as long as 2+3 ………………………………….. Aegosomatini, Nepiodes Pascoe

Lateral margins of prothorax with slender teeth; episternum of metathorax parallel-sided for greater part of their length, broadly truncate behind …………………………… 2
2. Lateral margins of prothorax entire, with 1-4 large and flattened teeth (1 in *Dorysthenes*), intercoxal process of prosternum not flat and horizontal; legs asperate or scabrous, never spinose; antennal segments 4-11 with angulate process at apex ..................................................

................................................................. Prionini, *Dorysthenes* Vigors

— Lateral margins of prothorax with series of small teeth; intercoxal process of prosternum flat and horizontal; legs spinose; basal segments of antennae asperate or denticulate ............................................................... Macrotomini, *Anomophysis spinosa* (Fabricius)

(Table 1 : Fig. 1)

**Key to Species of Genus Nepiodes**

1. Elytra densely clothed with short tawny pubescence with the exception of costae; 3rd and a few following antennal segments not tipped with black at apex .................

................................................................. *bowringi* (Gahan)

(Table 1 : Fig. 2)

— Elytra almost bare; 3rd antennal segment and a few of the following segments tipped with black at apex ................................................................. *costipennis* (White)

(Table 1 : Fig. 3)

**Key to Species of Genus Dorysthenes**

1. Antennal tubercles wide apart (*Lophosternus*) ................................................................. 2

— Antennal tubercles close, narrowly separated (*Paraphrus*); inner margin of antennal segments strongly spinose, gradually decreasing from 8th; pronotal spines 2, second long, outwardly and backwardly curved, acute, postero-lateral angles strongly reflexed into short acute spines; fore legs strongly denticulate; claws divaricate .................

....................................................................................... *granulosus* (Thomson)

(Table 1 : Fig. 8)

2. Chestnut red; antenna as long as body ................................................................. 3

— Dark brown to black; antenna shorter than body............................................................... 4
3. Upper lobe of eye closely approximated to antennal tubercles; posterolateral angles of pronotum produced into upwardly and outwardly curved strongly acute spines, pronotal spines 2, strongly produced, first little shorter, directed outwardly, acute, second long, outwardly and downwardly curved, strongly acute, anterolateral angles acute; head between the eyes midlongitudinally deeply sulcate, either side of which strongly rugose; elytral sutural spine absent …………………………………… *buqueti* (Guerin-Meneville)  
   (Table 1 : Fig. 4)

   Upper lobe of eye closely approximated to antennal tubercles; posterolateral angles of pronotum round, anterolateral angles acute, pronotal spines 2, first short and blunt, second little long and blunt; head between the eyes midlongitudinally carinate, extending upto the base, either side of which with coarse punctures; elytral sutural spine present ………………………………………………….. *huegelii* var. *falco* (Redetenbacher)  
   (Table 1 : Fig. 5)

4. Pronotum transverse, laterally oblique, denticulate in front, angulate or toothed basally with 2 spines, one at the middle and other in between middle and front margin, disc smooth with fine scanty shallow punctures; antennae 12 segmented, cylindrical, never striate; head coarsely punctate; elytra dull with feebly raised costae at the posterior half, sutural spine present; prosternum strongly arched up in the middle, curved down behind, its end resting on mesosternum; fore leg strongly and densely denticulate, these gradually weaken on mid and hind legs; hind breast bare …………………………………… *indicus* (Hope)  
   (Table 1 : Fig. 6)

   Pronotum transverse, hexagonal, medially produced into a flat angular process, disc medially excavate, with 2 gibbosities along the line of angular process and 2 basal oblique to posterolateral corners densely rugopunctate; antennae 11 segmented, compressed laterally, striate, head impunctate, sparsely punctate between eyes, more closely behind, coarsely granulate at sides; elytra glossy, with 3 strongly raised costae, sutural spine absent; prosternum with a strongly projecting anterior process, pointed at the end in ♂, very feebly developed in ♀; legs never so but fringed with recumbent hairs; hind breast very densely covered with tawny pubescence ………………………….. *rostratus* (Fabricius)  
   (Table 1 : Fig. 7)
Key to Tribes and Genera of Cerambycinae

1. Eyes coarsely facetted .......................................................... 2
   − Eyes finely facetted .......................................................... 5

2. Acetabula of mid coxae open ................................................. 3
   − Acetabula of mid coxae closed; femora basally pedunculate, distally clavate; pronotum longer than broad, its lateral margins parallel, at best weakly rounded ......................
     ...................................................................................... Callidiopini

3. Intercoxal process of prosternum wide, broaden distally; gula with mentigerous process (or submentum very distinct); dorsum of pronotum wrinkled ..............
   ...................................................................................... Cerambycini
   − Intercoxal process of prosternum narrow, rarely broaden distally or fore coxae contiguous; dorsum of pronotum granulose ................................................................. 4

4. Antenna generally without long hairs or cilia; fore coxae prominent, conical or subconical, its cavity strongly angulate externally; ligula corneous ..................... Xystrocerini
   − Antenna usually with long hairs or ciliated beneath; fore coxae globose, its cavity weakly angulate externally; ligula membranous...................................................... Hesperophanini

5. Scutellum generally large and triangular, with apex acute; scent-pores present, near postero-lateral angles of metasternum............................................................... 6
   − Scutellum smaller, less acute at apex; scent-pore absent........................................ 7

6. Acetabula of fore coxae closed or nearly closed posteriorly .............. Callicromatini
   − Acetabula of fore coxae distinctly open posteriorly; prosternum tuberculate near tip, mesosternum strongly tuberculate; eye subdivided, joined by a narrow linear bar; antennal segment 3 apically and following segments carinate; pronotum with a pair of posterolateral spines directed upward, disc transverse, rectangular with 5 gibbosities, 1
median marked by black and 4 at 4 corners; pronotum entirely, head excepting the black median longitudinal depressed vertex and elytra excepting the black distal \(\frac{1}{3}\) red

…………… ........................................... Trachyderini, *Euryphagus lundii* (Fabricius)

(Table 2 : Fig. 26)

7. Antenna comparatively long; pronotal disc gibbous; elytra strongly dehiscent, elongate and narrow; posterior end of epipleura of metathorax not produced; upper lobe of eye short, not extending behind antenniferous tubercles; femora clavate, hind pair much shorter than abdomen; prosternum extending near base of mesosternum, longitudinally excavate and broad medially, with a narrow longitudinal carina which distally becoming broad and raised; mesosternum medially grooved; body coarsely punctate, elytral punctures deep, arranged in rows forming costae……………………………………..Thraniini,

*Thranius simplex* Gahan

(Table 2 : Fig. 27)

- Antenna often short; pronotum without gibbosities; elytra neither dehiscent nor elongate and narrow; posterior end of epipleura of metathorax produced over angle of 1\(^{st}\) abdominal sternite …………………………………………………………………………………..Clytini

Key to Genera of Tribe Callidiopini

1. Pronotum ovoid, medially swollen, a little longer than broad; fore femora short, stumpy, clavate, with peduncle very short ……………………..*Ceresium* Newman

- Pronotum nearly parallel-sided, if swollen basally so, about 1.5-2.0 x as long as broad; fore femora long, cylindrical, with peduncle long …………………..*Stenodyras* Bates

Key to Species of Genus *Ceresium*

1. Pronotum with whitish spots ……………………………………………………………………… 2

- Pronotum without any such spot …………………………………………………………………… 3

2. Brownish black; pronotum with 4 white pubescent spots on disc, elytra with yellow-white pubescent spots, 1\(^{st}\) pair oblique, near scutellar apex, 2\(^{nd}\) round, transverse, marginal, 3\(^{rd}\) oblique, close to suture and 4\(^{th}\) comma-shaped, transverse, marginal, near apex; head
without any pubescence near base; antennae twice as long as body ……
………………………………………………………………………….. _leucosticticum_ White
(Table 2 : Fig. 4)

Reddish testaceous; pronotum with 2 white pubescent spots on disc; elytra without any such; head with yellow-white pubescence between eyes near base; antennae a little shorter than body …………………………………………………………………….
……………….
…………_rufum_ Lameree
(Table 2 : Fig. 5)

3. Pronotum black, disc medially bare, 4 corners with spots of whitish pubescence, basal ones tending to join forming a narrow crescent band, coarsely punctate, such bare area also with 2-3 marginal callosities; elytra brown, without any spot, apex round, without spines; antennae brown; venter reddish brown, clothed with sparse whitish pubescence …………………………………………………………………………….
……………….
…………_zeylanicum_ White
(Table 2 : Fig. 6)

Pronotum yellow, entirely clothed with dense yellow pubescence, these midlongitudinally forming a band, basal half of either side bare, finely punctate; elytra densely clothed with yellow pubescence excepting apical brown spotted area marked by black hairs, apex truncate, with small sutural and apical spines; venter black, entirely clothed with dense yellow pubescence …………………………………………………………………………….
……………….
…………_Ceresium sp._
(Table 2 : Fig. 7)

**Key to Species of Genus Stenodryas**

1. Each elytron with 3 marks: 1) a small oval marginal black spot at basal 1/5, 2) a small subtransverse oblong spot on centre of disc at 2/5, 3) a sinuate oblique mark across most of disc little above, at 4/5, elytral punctures shallow and fine, apex sinuate with apical spine; pronotum granulate with anterior half of disc smooth, laterobasal margin carinate; head between the antennal tubercles, pronotum basally at angles, scutellum and elytra entirely with dense white pubescence; antennal segments 3 and 4 spined at apex …………………………………………………………………………….. _nigromaculatus_ (Gardner)
(Table 2 : Fig. 9)

Each elytron black at apical 1/8, entirely with dense coarse punctures, clothed with small recumbent short hairs, apex narrowly rounded at sutural end, without apical spine;
pronotum entirely smooth, not carinate; head, pronotum, scutellum and elytra without any such dense white pubescence; antennal segments 3 and 4 not spined at apex

……………………………………………………………………………………………………………………………………. bicoloripes (Pic)

(Table 2 : Fig. 8)

Key to Genera of Tribe Xystrocerini

1. Front coxae contiguous; eyes completely divided; prosternum raised at the height of fore coxae, broaden distally; mesosternum raised, ridged marginally; femora clavate; claws divergent and pectinate ……………………………………………………………… Tetraommatus filiformis Perroud

(Table 2 : Fig. 29)

— Front coxae distinctly separated by prosternal process; eyes deeply emarginate …
………………………………………………………………………………………………………………………………………………… 2

2. Pronotum unarmed at sides; disc at both ends strongly constricted, cordate, medially with a longitudinal depression, basally diamond-shaped, entirely margined by green metallic band, strongly granulate; mesonotum with undivided stridulatory area; elytra with 2 metallic green bands, one submedian and another lateral; antennal segments 1-5 strongly spinous, segment 1 apically with a long acute spine; mesosternal plate obliquely grooved accommodating the peduncle of clavate femora …….. Xystrocera globosa (Olivier)

(Table 2 : Fig. 30)

— Pronotum with a tubercle, sometimes very small, on each side, little below laterally with a acute spine, basally strongly constricted, disc raised; mesonotum with stridulatory area divided by a median line; elytra with a pair of costae and 4 black patches, 1st pair at anterior 1/3rd, one oblique near suture and the other lateral, 2nd pair little below the middle, broad, laterally narrow and descending towards suture; body chestnut brown ……………………………………………………………… Oplatocera (Epiplatacera) oberthuri Gahan

(Table 2 : Fig. 28)

Key to Genera of Tribe Cerambycini

1. Antennae more or less deeply compressed and dilated distally, not much longer, sometimes shorter than body in ♂ ……………………………………………………………………. 2
Antennae neither strongly compressed nor dilated distally, usually much longer than body in ♂ ......................................................... 3

2. Elytra near apex marginally carinate, with both apical and sutural spines; prosternal keel or tubercle absent; pronotum strongly constricted at both ends, with deep median longitudinal groove forming 2 gibbosities, each with 6 strongly raised carinae; apical half of elytra marginally with an outwardly curved brown black nearly bare, deeply, coarsely punctate area; antennal segment 1 apically pointed ........... Xoanodera regularis Gahan (Table 2 : Fig. 15)

Elytra not carinate, with only sutural spine; prosternum posteriorly with a median keel or tubercle; pronotum constricted at both ends, disc gibbose, with strong parallel carinae; elytra without any such brown black area ............... Trachylophus sinensis Gahan (Table 2 : Fig. 14)

3. Antennal segments spined ................................................................. 4

Antennal segments not spined ........................................................... 5

4. Antennal segments 3-10 apically with long spines; head usually with a median groove, never a carina between upper lobes of eyes; pronotum transversely irregularly wrinkled with broken ridges; each elytron with a long spine at sutural apex; margin truncate .......................................................... Hoplocerambyx spinicornis (Newman) (Table 2 : Fig. 12)

Antennal segments 6-8 apically with short spines; head with obtuse median carina between upper lobes of eyes; pronotum irregularly wrinkled with broken ridges not always transverse; each elytron with apex sinuate and a short sutural spine .................................................. Aeolesthes indicola (Bates) (Table 2 : Fig. 10)

5. Femora finely carinate on each side of hind edge; pronotal disc medially longitudinally raised, with transverse irregular ridges, either side deeply grooved, further beyond with concentric ridges, at times irregular; antennal segment 4 onwards apically acute; elytra truncate at apex .................................................. Derolus mauritanicus (Buquet) (Table 2 : Fig. 11)

Femora not usually carinate ................................................................. 6
6. Elytra apically sinuate at sutural end, with a sutural spine, entirely clothed with silky yellow pubescence, basal half marginally with a long crescent brown marking, neither striate nor sulcate; prosternal intercoxal process subvertical posteriorly

…………………………………………………………………………………………………… Pachydissus parvicollis Gahan

(Table 2 : Fig. 13)

- Elytra gently rounded at apex, without any spine, with glossy yellow pubescence forming an elongate ring from base to near middle, then extending further beyond along the sutural margin, submarginally with similar short to long longitudinally arranged bands, striate, areas in between sulcate; prosternal intercoxal process more or less tuberculate posteriorly

……………………………………………………………………………………………………………………… Zegriades sp.

(Table 2 : Fig. 16)

**Key to Genera of Tribe Hesperophanini**

1. Pronotum of ♂ with a large tomentose depression on each side; antenna fringed internally with long hairs …………………………………………………………………………… Stomatium Serville

- Pronotum of ♂ without tomentose depression on each side; antenna fringed with long hairs on all sides ……………………………………………………………………… Zoodes compressus (Fabricius)

(Table 2 : Fig. 25)

**Key to Species of Genus Stomatium**

1. Pronotal disc with 5 slightly raised tubercles; elytra warty, size gradually diminishing at apex, with 1 stria, sutural spine long; body brownish black to reddish brown, faintly covered with tawny pubescence …………………….……………… barbatum (Fabricius)

(Table 2 : Fig. 23)

- Pronotal disc with 4 obtuse tubercles and submedian callosity; elytra not warty, with 4 striae, sutural spine short; body testaceous to dark brown, densely covered with grayish tawny pubescence ……………………………………………………………………………………………………. longicorne Newman

(Table 2 : Fig. 24)

**Key to Genera of Tribe Callichromatini**

1. Antennae unicoloured …………………………………………………………………………… 2
— Antennae bicoloured, first four segments and fifth basally black, rest orange yellow, stout, reaching almost to the middle of the second elytral band (in case of ♀); body entirely black and dull; elytra with 2 transverse yellow bands, 1st at median to base and the middle, 2nd little below the middle; pronotum marginally slightly protrubarent just before the middle; legs black, glossy, with tarsi reddish brown ………………………………………. Zonopterus flavitarsis Hope
         (Table 2 : Fig. 3)

2. Body entirely metallic green; pronotum ovate-cylindrical, tuberculate at sides, transversely striate, basally and apically with a median longitudinal depression; scutellum longitudinally so; elytral apex truncate; antennal segments 5 or 7 to 10 angulate or dentate at distal angle …………………………………………………. Aphrodisium gibbicole (White)
         (Table 2 : Fig. 2)

— Body chalybeate blue, pronotal disc and elytra violaceous, elytra with a pair of yellow transverse bands, one just above the middle and the other just below the middle, pronotum transverse, not tuberculate at sides, without striation; pronotum and scutellum without longitudinal depression; elytral apex gently rounded; antenna never so ………………………………………………………………………… Anubis inermis (White)
         (Table 2 : Fig. 1)

Key to Genera of Tribe Clytini
1. Antennae rather widely separated at base, their insertions hardly raised ………………… 2

— Antennal insertions fairly close, distinctly raised; pronotum globose, narrowed anteriorly, disc with inverted ‘Y’ shaped black patch, anterolateral margins with oblong black band; basal half of elytra with elongated ‘O’ shaped black marking, distally with nearly round black patch, apical margin crescent with both apical and sutural spines ………………………………………………………………………. Chlorophorus annularis (Fabricius)
         (Table 2 : Fig. 17)

2. Head carinate in front; eyes deeply crescent …………………………… Xylotrechus Chevrolat

— Head not carinate in front; eyes weakly crescent; pronotum elongate oval, anteriorly narrow, disc medially with upwardly directed black cordate marking, either side
marginally with black round marking; elytra basally with ‘U’ shaped yellow band, this post medially and apically broad, narrowing towards margin, apex truncate with apical spine only .............................. Perissus laetus Lameree  
(Table 2 : Fig. 18)

Key to Species of Genus Xylotrechus

1. Eyes large extending towards frons; frontal carina incurved in the middle .............. 2
   - Eyes small not approaching the frons; frontal carina straight, parallel; pronotum with 2 black marginal spots, disc with a large pale black area, posterolateral angles with 2 yellow spots; elytra with an oblique band of yellow pubescence directed outwardly towards the shoulder hump and inwardly towards the sutural margin; first 3 abdominal segments with patches of yellow marginal pubescence, gradually diminishing in size; metasternum ringed with yellow pubescence; mesosternal process distally with yellow pubescence ................................................................. javanicus (Castelnau & Gory)  
   (Table 2 : Fig. 21)

2. Frons raised above the lower lobe of eye, medially strongly carinate, bifurcate distally, raised above the marginal carinae ................................................................. 3
   - Frons raised at or below the lower lobe of eye, medially with a medial, narrow, longitudinal carina below the level of marginal carinae; pronotum with 3 black spots arranged transversely, median largest; elytra with 2 lateral longitudinal bands of yellowish pubescence, curved outwardly; venter entirely clothed with yellowish pubescence .................................................. longithorax Pic  
   (Table 2 : Fig. 20)

3. Medial frontal carina black, long, narrow reaching upto the antennal base; carina on vertex long, narrow, not arrow like, continuous with the frontal carina; pronotum with 3 black spots, 1 basomedian, 2 oblique, each on either side at the widest region; elytra with a short transverse band of yellowish pubescence broad at shoulder hump; abdomen with 4 almost complete bands ........................................ buqueti (Castelneu-Lap. et Gori)  
   (Table 2 : Fig. 19)

   - Medial frontal carina red, short, broad, not reaching the antennal base; carina on vertex short, arrow like, not continuous with the frontal carina; pronotum with 5 dark brown
spots, 1 basomedian, rest in transverse linear rows, of these laterals smallest; elytra with a short narrow backwardly curved transverse semilunar band of yellowish pubescence near base; abdominal bands atmost 2 .............................................. * sme i* (Lap et. Gori)  

(Table 2 : Fig. 22)
7.2 Pictorial Key To Higher Taxa

**Family – Cerambycidae**

**Key to Subfamilies**

- Head vertical
- Head not vertical

- Foretibia without internal groove
- Foretibia internally grooved

- Midtibia externally grooved

- Maxillary palp acute
- Maxillary palp blunt

**Lamiinae**

- Prothorax margined
- Prothorax not margined

- Forecoxa transverse

**Prioninae**

- Antenna inserted at some distance from mandibular base
- Antenna inserted close to mandibular base

**Cerambycinae**

- Forecoxa not transverse
Subfamily – Prioninae

- Blunt tooth
- Pronotum with slender teeth
- Metepisterna narrowed
- Metepisterna subparallel
- Large, flattened teeth
- Irregular teeth

Aegosomatini

Prionini

Macrotomini
8. How to Use the Following Section

Key to symbols

A number of icons are used to provide a snapshot of each species. These are explained below.

HABITAT

- Scattered Sal and Wet Mixed Forest
- Wet Mixed Forest
- Dry Mixed Forest
- Mature Sal Forest
- Sal Plantation
- Tea Garden
- Terai Grassland
Fallen Log
Riverine Forest
Savannah Forest

**TIME OF ACTIVITY**

- Diurnal
- Nocturnal

**ABBREVIATION USED**

- Δ New record from District
- * New record from State
- + New record from Country

**MAP OF WORLD SHOWING DIFFERENT ZOO GEOGRAPHICAL ZONES**

**SEASON OF OCCURRENCE OF THE INSECTS**

- Premonsoon
- Monsoon
- Postmonsoon
Details of the data

Prioninae

*Anomophysis spinosa* (Fabricius)

*Nepiodes bowringi* (Gahan)

*Nepiodes costipennis* (White)

*Dorysthenes (Lopherosternus) buqueti* (Guerin-Meneville)
Dorysthenes (Lophosternus) huegelii var. falco (Redetenbacher)

Dorysthenes (Lophosternus) indicus (Hope)

Dorysthenes (Lophosternus) rostratus (Fabricius)

Dorysthenes (Paraphrus) granulosus (Thomson)
Cerambycinae

^Anubis inermis (White)

^Aphrodismium gibbicole (White)

^Zonopterus flavitarsis Hope

Ceresium leucosticticum White
*Tetrammatus filiformis* Perroud

*Xystrocera globosa* (Olivier)
Lamiinae

*Eryssamina (s. str.) paralaosica* Breuning

Ostedes (Trichoostedes) assamana
Breuning

*Eucomatocera vittata* White

*Pothyne ochracea* Breuning
Coptops aedificator (Fabricius)

Coptops leucostictica White

*Cenodocus laosensis* Breuning

*Pseudostesilea* sp.
*Glenea (Rubroglenea) rubricollis (Hope)

*Nupserha fricator (Dalman)

*Glenea (Aridoglenea) sp.

*Nupserha quadrioculata (Thunberg)

A. Subfamily: Cerambycinae

i. *Aeolesthes indicola* (Bates)

**Recognition marks:**

*Adult:* Dark brown, mottled with yellowish or silvery pubescence on elytra, pronotum wrinkled, antennal segments 6-8 apically with short spines.

*Grub:* White, cylindrical, muscular, distally narrowed, mandibles brown, strong.

**Oviposition:** White, oval stalked eggs are laid in the crevices of barks.

**Behaviour of the immature stages:** The larva on hatching crawls on the surface of the sapwood and then bores into. Sometimes the larva remains on the outer layer or on the surface of sapwood for a long time and ultimately bores into sapwood. Full grown larva makes pre-pupal tunnel and then excavates downward to form pupal chamber. Before pupation the full grown larva returns to the entrance of the larval tunnel and excavates an exit hole by clearing the woody fibers.

**Tunnels and Galleries:** Tunnel is made inside the sapwood and heart wood. Prepupal tunnel is horizontal to the axis of the trees and remains packed with wood fibres. The tunnel curves downward and ends in a chamber.

**Pupal chamber:** The chamber is made deep inside the sapwood. The neck of the pupal chamber is sealed by a calcareous operculum. Fine wood dusts are accumulated at the end of pupal case.

**Extent of damage:** Full grown shade trees like *Albizia lebbek* and *Dalbergia sissoo* of tea gardens adjacent to the forests are mostly attacked. Larger region of the

Damaged caused by larva
attacked portion of the tree trunk dries up and conduction of sap gets impaired. When the attack is at the base of the tree - branch, the branch die away.

ii. *Hoplocerambyx spinicornis* Newman

**Recognition marks :**

*Adult :* Dark brown with pubescence silky, red ochraceous, antennal segments 3-10 apically with long spines, pronotum wrinkled, elytra with sutural spines and outer angles toothed.

*Grub :* Ochraceous, muscular, head darker, mandibles strong, abdominal tubercles round, in 4 transverse rows.

**Behaviour of the immature stages :** The larvae feed under the barks, sap wood and finally bore into the heart wood. Thus, they make their tunnels and galleries. They are often overwhelmed by the resinous sap that flows into the larval tunnel.

**Exit holes - Emerged adults :** The holes are elongate, oval. Emergence period depends on the moisture - content of the shade trees.

**Extent of damage :** They damage maximally to the young and mature *Albizia odoratissima.*

Exit holes with pupal chamber

iii. *Pachydissus parvicollis* Gahan

**Recognition marks :**

*Adult :* Dark chestnut brown, covered with silky golden yellow pubescence, pronotum produced at the middle, transversely rugose with ridges sinuate and irregular, elytra with sutural spines.

*Grub :* Whitish, muscular, head dark, with strong mandibles.
Behaviour of the immature stages: On hatching the larvae feed on the sapwood surrounding the mouth of entrance tunnel and then enter into the heartwood. Within the heart wood they make tunnel axially downward in the centre.

Tunnels and Galleries: The main portion of larval gallery is the long axis in the trunk of the tree. The larva at first runs horizontally for a short distance and then turns downward and ends in a pupal chamber. The galleries are packed with fine woody frass.

Extent of damage: Maximum damage is in the young *Acacia lenticularis*. Due to destruction of heartwood, conduction of sap gets impaired. Leaves fall and ultimately the trees die.

Exit holes: The adult uses the larval entrance holes as the exit holes.
iv. *Stromatium barbatum* (Fabricius)

**Recognition marks:**

**Adult:** Brownish black to reddish brown, faintly covered with tawny pubescence, closely punctured, pronotum marginally laminate, elytra with sutural spines.

**Grub:** White, muscular, mandibles powerful.

**Exit holes – Emerged adults:** Exit holes are rather elongate oval, the depth of which appears to be long.

**Extent of damage:** Maximum damage is in the aged *Albizia* spp. Due to complete destruction of heartwood, the trunk dries up, conduction of sap gets restricted and ultimately the trees die.
v. *Xylotrechus smeii* (Lap. et. Gori)

**Recognition marks :**

**Adult :** Brown, with yellow pubescence, these on prothorax forming spots and on elytra forming bands, tibia distally clavate.

**Grub :** White, robust, head dark, with mandibles strong.

**Tunnels and Galleries :** The larvae on the inner aspect of the bark and outer aspect of the sapwood excavate tunnels of regular nature and ultimately proceed inwardly where they make deeper tunnels densely packed with wood dust. Such tunnels remain intercalated speaking of a crowded chamber.

**Pupal chambers :** It is about 15 - 20 cm long formed at a short depth in the sapwood. The chamber is continuous with the larval tunnel. They however do not form any such chamber in the heart wood.

**Exit holes - Emerged adults :** Exit holes are elongate oval and of smaller dimensions.

vi. *Xystrocera globosa* (Olivier)

**Recognition marks :**

**Adult :** Red brown, with metallic green bands, warty, punctures coarse, antennal first segment with an apical spine, following segments warty with short spines on margins, femora flat, board.
Grub: Whitish, muscular, head darker, with strong mandibles.

Oviposition: Eggs remain either singly or in groups of 2-5 in small holes, crevices or fissures of the wood.

Behaviour of the immature stages: Upon hatching the larvae feed on the outer aspect of the sapwood forming deep tunnels leaving behind the frass. They move forward, horizontal to the axis of the tree and then move downward.

Tunnels and Galleries: The larvae initiate feeding on the inner aspect of the bark and thus make tunnels of little depth. However, their feeding results in packed dust on the bark and sapwood. They proceed further on the sapwood where nearly parallel tunnels are formed. Premature larvae enter into the sapwood horizontally, proceeding downwardly and then upwardly and outwardly where they make excavation of larger dimensions to accommodate the pupae.

Pupal chambers: The chamber is coated with a hard but thin deposit, possibly of CaCO₃. It remains close to the outer aspect of the sapwood possibly for the easy passage of the adults during exit.

Exit holes: The holes are large, elongate oval.

Extent of damage: Infestation causes complete dusting of the inner aspect of bark and outer aspect of sapwood. Crowded attack ultimately affects the vascular system of the shade trees.
**Recognition marks:**

*Adult:* Black, pronotum tuberculate, elytral humps strongly produced, clothed with yellow pubescence, these at regions forming spots, femora robust.

*Grub:* Creamy white, muscular, head darker, mandibles strong.

*Exit holes - Emerged adults:* The exit holes are oval with one end narrowed to a point while the other rather broad.
10. Management Strategies

The specific sites of insect attack on a forest tree / shade tree are:

1. Thin bark areas in crotches
2. Fresh pruning wounds
3. Broken branches
4. Mechanically damaged site
5. Areas damaged by avifauna
6. Areas damaged by sap suckers.

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**Suggested Management Plan:**

1. Protect trunks with newspaper or wrapping paper or aluminium foil or clay every year little before the onset of winter, late October.
2. Keep those as such until full leaf expansion in the spring.
3. Prune out all dead and dying branches.
4. Stimulate vigorous growth with proper fertilization and watering.
5. Watering must be for long for moisture to reach the root system of the plant.
6. Insecticidal applications be during the initiation of spring i.e. 2nd half of March or during April when the borers are in the early larval stage before they can really enter the trees with wounds, cankers and callus growth.
7. The recommended insecticides may be Endosulfan (0.02 to 0.1%), Monochrotophos (0.03 to 0.1%), Chlorpyriphos (0.06%), Permethrin (0.01 to 0.02%), etc.
8. As the borers live inside the trees, it is difficult to treat them with insecticides.
11. Discussion

Quality of human life is always assessed against three basic requirements: food, clothing and shelter. Societal transformations often cause dynamic changes in the mindset regarding requirements. Since civilization, humankind is largely dependent on wood. Even in the present century, timber is mostly in use for one or more purposes.

However, such timbers/trees/logs/shade trees (of tea plantations) often suffer from qualitative deterioration thereby affecting the welfare of human society.

Wood boring activity of the Longhorn beetles (Cerambycidae: Coleoptera) is one of the prime factors of such decrement. These insects during their larval stages while feeding construct galleries and tunnels, pupal cells in the heart wood. They however, at times play beneficial role in reducing dead or dying trees, broken branches to humus.

Beeson (1941) was the first to speak of their negative role in the Indian context. His conclusion was based on the data generated for North West India. On the contrary, till date North East India is suffering from dearth of information. However, from West Bengal an epidemic was recorded during 1931-34 covering an area of 1850 acres and killing 3177 sal trees in Sevok range (Mahananda Wildlife Sanctuary) of the Kurseong forest division. Again during 1974, such epidemic of sal borer was recorded from Rajabhatkhawa forest division (Buxa Tiger Reserve) covering an area of 1360 hacteres killing 23,120 sal trees (Ghimre & Dongre, 1991-2001). It appears necessary to mention that there is no comprehensive knowledge on the cerambycid borers attacking sal and other trees of the forests of North Bengal.

With this in mind a study was initiated since 1993 on these beetles of the reserve forests of Dooars, namely Buxa Tiger Reserve, Jaldapara Wildlife Sanctuary, Gorumara National Park and Chapramari Wildlife Sanctuary. Such forests are not only rich in animal life forms but also for the wealth of trees. These in turn make an economic return for which silviculture is a regular practice. Bidders often stress upon the quality of trees (logs).

Generated data speaks of the threat created by 91 borer species distributed over 62 genera under 3 subfamilies namely Prioninae, Cerambycinae and Lamiinae. Maximum damage potential is supposed to be with the members of Cerambycinae. Of the total species recorded 24 species are new report from India, 7 species from West Bengal and 8 from the district Jalpaiguri. The trees (logs) are supposed to suffer maximally during monsoon. Buxa Tiger Reserve is found to be the richest in terms of species diversity. 85% of the encountered fauna are endemic to North East India.
12. Contribution to the Society

Despite repeated outbreaks of borers there is still no breakthrough as far as effective preventive and remedial measures are concerned. The invincibility of these notorious pests along with their infallible catastrophic effect has often baffled the Entomologists and Foresters. Precisely we were not having any knowledge on who, where and when of the insects concerned. For any management practice/s step 1 should involve a detail inventory of these borers in question. Following steps should necessarily involve knowledge on tolerance level of pest population/s in nonepidemic years, environmental factors enhancing reproductive potential, chemical constituents of cell sap that attract the beetles, additional source/s if any of the pest attractants, flight behavior – dispersal of the pests and their biological control.

The data generated is certainly excitatory to the Forest Research Organisations or otherwise who can initiate further studies on the steps mentioned above. In a way this compendium is the foundation that necessarily direct future researchers to take up further studies. Otherwise with the reoccurrence of epidemics coupled with regeneration problems the forest wealth which are source of livelihood for the indigenous people cannot be sustained.

13. Literature Cited


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14. Species Index

Subfamily: Prioninae Latreille

Tribe: Macrotomini Thomson

Genus: *Anomophysis* Quentin & Villiers

*Anomophysis spinosa* (Fabricius)

Tribe: Aegosomatini Thomson

Genus: *Nepiodes* Pascoe

*Nepiodes bowringi* (Gahan)
*Nepiodes costipennis* (White)

Tribe: Prionini Latreille

Genus: *Dorysthenes* Vigors

*Dorysthenes (Lophosternus) buqueti* (Guerin-Meneville)
*Dorysthenes (Lophosternus) huegeli var. falco* (Redetenbacher)
*Dorysthenes (Lophosternus) indicus* (Hope)
*Dorysthenes (Lophosternus) rostratus* (Fabricius)
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Subfamily: Cerambycinae Lacordaire

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Tribe: Callidiopini Lacordaire

Genus: *Ceresium* Newman

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Ceresium refum Lameree
Ceresium zeyianicum White
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*Eucomatocera vittata* White

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*Pothyne septemvittipennis* Breuning
*Pothyne paralaosensis* Breuning
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**Genus : Parorsidis** Breuning

*Parorsidis nigrosparsa nigrosparsa* (Pic)

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*Laosepilysta flavolineata* Breuning

**Genus : Eremosybra** Breuning

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**Genus : Astethes** Newman

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SUMANA SAHA, is presently serving as Associate Professor in the Post Graduate Department of Zoology, Barasat Govt. College. As one of the dedicated researcher of the contemporary period, she is the author of 143 articles including books/monographs and popular articles. She has received few honours in these 26 years of research career.
E-mail address: sahasumana2010@gmail.com

DINENDRA RAYCHAUDHURI, Retired Professor of Zoology, University of Calcutta, Kolkata, is presently serving the Department of Agricultural Biotechnology, IRDM Faculty Centre, Ramakrishna Mission Vivekananda University in the capacity of Honorary Professor. As an eminent Entomologist of repute in India and abroad he has authored 223 articles on insects and spiders. Other than being author of several books, monographs and chapters, he has acted as the mentor of 25 Ph.D. students. He is the recipient of several distinction and honours.
E-mail address: dinendrarccu@gmail.com