SYSTEMATICS AND DISTRIBUTION OF THE TRIBE MESOSINI (CERAMBYCIDAE: LAMIINAE) IN SARAWAK

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Systematics and Distribution of the Tribe Mesosini (Cerambycidae: Lamiinae) in Sarawak

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ABSTRACT

This study records and discusses the entomological collection in Sarawak, with reference to voucher specimens of the tribe Mesosini (Coleoptera: Cerambycidae: Lamiinae) in Sarawak Museum, Sarawak Forestry Research Centre, and UNIMAS Insect Reference Collection. A total of 378 specimens, comprising 26 species from 14 genera were evaluated. Of 68 species found in Borneo, only 24 exist as voucher specimen in three of the repositories in Sarawak, which represents 35% of known Bornean fauna. The genus *Cacia* dominated other genera in composition of species with 19.23% domination, followed by *Choeromorpha* (15.38%), *Mesosa* (11.54%), *Planodes* (11.54%) and *Anancylus* (7.69%). In this study, *Choeromorpha wallacei* (17.46% of the total individuals) and *Choeromorpha polynesa* (11.11% of the total individuals) were the most abundant and common species while *Cacia bispinosa, Mesosa bituberosa*, and *Planodes deterrens* were assumed as rare species due to their presence of singletons. Cluster analysis reflects that taxonomic status of *P. deterrens* needs to be reviewed. Species of the tribe Mesosini were distributed throughout Sarawak, with some unique distribution pattern where some species were confined to the coastal western part of the state. Genus best represented was *Pseudochoeromorpha*, due to the widely distributed localities in Sarawak. Systematic accounts of every species and distribution maps of the species examined are presented.

Keyword: Systematics, Mesosini, Lamiinae, Sarawak.

ABSTRAK

Penyelidikan ini merekod dan membincangkan koleksi entomologi di Sarawak, dengan merujuk kepada specimen Tribe Mesosini (Coleoptera: Cerambycidae: Lamiinae) di Muzium Sarawak, Pusat Penyelidikan Perhutanan Sarawak, dan UNIMAS Insect Reference Collection. Sejumlah 378 spesimen yang terdiri daripada 26 spesies dan 14 genera telah dicatat. Daripada 68 spesies yang pernah direkod di Borneo, hanya 24 (35%) wujud sebagai specimen baucer di pusat koleksi Sarawak. Genus Cacia mempunyai komposisi spesies yang paling dominan, iaitu sebanyak 19.23%, ini diikuti Choeromorpha (15.38%), Mesosa (11.54%), Planodes (11.54%) dan Anancylus (7.69%). Dalam kajian ini, Choeromorpha wallacei (17.46% daripada jumlah individu) dan Choeromorpha polynesa (11.11% daripada jumlah individu) merupakan spesies yang paling tinggi kelimpahan manakala. Cacia bispinosa, Mesosa bituberosa, dan Planodes deterrens merupakan spesies yang paling jarang ditemui di Sarawak. Analisis Kluster menunjukkan bahawa status taksonomi P. deterrens perlu disemak semula. Spesies daripada kumpulan Mesosini ditemui di seluruh Sarawak, dengan sesetengah corak taburan unik yang tertumpu di kawasan perairan Barat. Pseudochoeromorpha sp. merupakan genus yang paling baik diwakili kerana boleh didapati di merata Sarawak. Akaun sistematik untuk setiap spesies dan pemetaan taburan spesies untuk spesies yang dikaji turut dibincangkan.

***Kata kunci**: Sistematik, Mesosini, Lamiinae, Sarawak.*

1.0 INTRODUCTION

Cerambycidae, or commonly known as the long-horned beetles, together with Chrysomelidae are classified under the superfamily Chrysomeloidea. Cerambycidae is divided into several subfamilies, namely Parandrinae, Prioninae, Nepturinae, Necydalinae, Spondylidinae, Apatophyceinae, Cerambycinae, and Lamiinae (Lawrence and Britton, 1994).

The beetles in this family have long antennae that are almost always more than two-third of body length, and are directed backward over the body. These elongate and subcylindrical beetles have lateral tubercles or spines on the prothorax. The mesonotum is usually with stridulatory file. The legs bear tibial spurs and simple tarsal claws (Lawrence and Britton, 1994). The usually very long antennae, absence of a beak, and characteristic tarsi serve to separate this very large family from other beetles (Arnett, 1968).

All the long-horned beetles are xylophagous and phytophagous. Members of Lyctidae, Anobiidae and Cerambycidae are among the families that are of considerable importance in forestry (Davies, 1988). Their important roles in the ecological functions are like pollination and nutrient cycling in forest ecosystems.

The Cerambycidae of Borneo is closely related to the fauna of Peninsular Malaysia, Sumatra and Java, with a distinct overlap of species and a strong commonality of tribes and genera (Heffern, 2005). Nearly all tribes and many genera within this family that occur in Southeast Asia could be found in Borneo. This is because Borneo, Sumatra and Java, along with many smaller islands, have been irregularly connected by a land bridge to continental Southeast

Asia in recent geological time due to fluctuation of sea levels during postglacial periods. Mindanao and Sulawesi have never been really connected to Borneo through land bridge, yet the distance between them is short enough to permit movement of some species. Consequently, they do share numerous genera but limited number of common species between the islands. As for the Philippine islands, since only Palawan was part of the Sunda Shelf, generally, they have endemic cerambycid fauna (Heffern, 2005). Wallace's Line is the boundary separating the Indo-Malayan and Australasian biogeographical areas. Surprisingly, there are cases showing tribes and genera of Cerambycidae occuring on one side of the line and not the other.

Systematic studies, in particular the insects on Borneo are very much lacking. Thus, this study is conducted to recognize the importance of the field as it also contributes significantly to other branches of biology.

1.1 OBJECTIVES

The ojectives of this stidy were threefold. The primary objective was to study the taxonomy of the Mesosini in Sarawak based on morphological characteristics. Secondly, it was aimed at studying the phylogenetic relationship of members of the species in Sarawak based on morphological characteristics by building a phylogenetic tree. Thirdly, the objective was to map the geographical distribution of members of the tribe Meosini in Sarawak based on locality information on the collecting labels of the voucher specimens studied.

2.0 LITERATURE REVIEW

The Cerambycidae was first introduced to science in the eighteenth century. However, the Cerambycid fauna of Borneo and Malaya were first studied by Thomson M. J. and Pascoe, F. P. in addition to many following senior authors in and since the 1860's era. These were chiefly based on the famous rich collection of more than 1000 species of Mr. Wallace A. R. from the then "Malay Archipelago" (Hayashi, 1975).

In the early nineteenth century, study of insects started to become a hot topic among the western entomologists, where the collection, documentation and description of species became more familiarized (Abang and Juat, 2005). Ironically, the early entomological works of Sarawak after 1915 did not contribute much to the museum collection, since the majority of them were sent overseas (Rothschild, 1963). These early collections were mostly stored at the British Museum (Natural History) or other similar institutions in Britain, Europe and the United States of America (Abang and Juat, 2005).

Cerambycids from South-East Asia have been studied, mainly by Japanese researchers, but not much is being done for Borneo Island as a whole. On contrary, the Cerambycidae fauna of North America is now well-understood due to the joint efforts of several contemporary entomologists, notable among whom are Knull J. N., Dillon L. S., Linsley E. G., and Chemsak J. (Arnett, 1968). In Puerto Rico, 49 species of Cerambycidae were recorded, representing over half of the previously reported species (Lingafelter and Micheli, 2004). Among these, 25 individuals were from subfamily Lamiinae, including one new species (*Styloleptus taino*) and one firstly recorded species.

The cerambycid fauna of Borneo is closely related to the fauna of the Peninsular Malaysia, Sumatra and Java, with a distinct overlap of species and a strong commonality of tribes and genera (Heffern, 2005). Nearly all tribes and many genera that occur in Southeast Asia are found in Borneo. Some Cerambycidae have dispersed from island to island by flight, and many traveled as larvae in floating wood. The possibility is there since Borneo, Sumatra, Java and other smaller islands have been periodically connected by a land bridge to continental Southeast Asia in recent geological time due to fluctuation of sea levels during glacial periods. The cerambycid of Borneo is also closely related to the Philippine island of Palawan, since it was part of the Sunda Shelf around 160,000 years ago when sea levels were at their lowest, permitting ancestral fauna dispersion to that island via a land bridge (Heffern, 2005).

A study carried out in Bukit Soeharto of East Kalimantan showed that a total of 2241 cerambycid beetles representing 190 species were caught in nine Malaise traps between January and October 1998 (Makihara *et al*, 2000). Among these, more than 550 species were found in a restricted area of the study site in 1998 (Makihara, 1999). This number is more than half of the total number of cerambycid species in all of North America (Linsley and Chemsak, 1997). Out of these, 0.02% is unidentified. These could possibly be new records or new species.

Beetles in the subfamily Lamiinae possess the following characteristics: fore tibia with internal and mid tibia with external oblique groove densely lined with setae, apical segment of maxillary palp fusiform, narrowed apically, and almost always strongly deflexed and hyponagthous (Lawrence and Britton, 1994). Few studies had been reported about this particular subfamily.

Hüdepohl and Smetana (1992) collected a series of the Lamiinae long-horned beetles in 1987 and 1988 while sifting for terricolous fauna in the peak region (around 4000m) and in the montane forest (around 3200m) of Mount Kinabalu, Sabah. From this study, a new apterous Lamiinae, *Rucentra smetanai* sp. n., from the Kinabalu National Park had been described. It was the first one known from Borneo, which differed from *R. celebensis* Breuning, 1943 by the rounded apices of the elytra (Hüdepohl and Smetana, 1992).

In 1975, Hayashi studied the long-horned beetles from Sabah and Sarawak in Borneo and the Central and Northern districts of Malaya, and came out with 14 new descriptions and several new distribution records. From this study, seven species of long-horned beetles from the tribe Mesosini of the Lamiinae were recorded. Among them, five species were distributed in Borneo, namely *Pseudozelata capito*, *P. mima*, *Choeromorpha polynesa*, *C. amica*, and *Mutatocoptops bituberosa*. *C. amica* was the only species that could only be found in Borneo. This was based on material examined from Matang Road, Sarawak.

Based on the systematic and distribution studies done by Abang (2004), the Cerambycidae of Sarawak could be classified into four subfamilies, namely Prioninae (6%), Cerambycinae (25%), Lamiinae (68%), and Lepturinae (1%). Lamiinae is the largest subfamily and many species are of considerable economic importance.

In a recent study focusing on post-Wallace entomological collections of Lamiinae in Sarawak, the specimens of the Sarawak Museum were revised. Abang and Juat (2005) recorded a total of 1,909 specimens of Lamiinae, comprising 261 species from 18 tribes: Saperdini was the largest tribe (37.16%) followed by Agniini (16.86%) and Mesosini (10.73%).

3.0 MATERIALS AND METHODS

This study was based on voucher specimens deposited at three repositories in Sarawak, namely Sarawak Museum, Sarawak Forestry Research Centre and UNIMAS Insect Reference Collection of Universiti Malaysia Sarawak. Classifying of organisms has always been based on the comparison of specimens and voucher materials from collections that represent populations and species (Abang, 2000). From these voucher specimens, morphological characters were examined using microscope and magnifier. The morphological characteristics of each species were described based on the observation. Representative for each species was photographed using Nikon D100. Other data recorded were sex, locality, collecting date (day/ month/ year), and collector's name. These records provided useful information in analyzing the abundance, range and distribution pattern of long-horned beetles in Borneo. Ten individuals were examined to measure their average body length using 15cm ruler.

The Sarawak Museum Old Building was built in 1891 and was extended to its present form in 1911 (Anonymous, 2000). Regarded as one of the best museum in South-East Asia, it stores many fine collections of Borneon archaeological and ethnological artifacts, as well as valuable fauna specimens. The Sarawak Museum insect collection was built up during the years 1890-1915 by its respective curators, Haviland C. D. (1893-1895), Shelford R. W. C. (1897-1905), Hewitt J. (1905-1908), and Moulton J. C. (1908-1915) (Abang and Juat, 2005). The specimens used mostly range from year 1850 till 1950.

Sarawak Forestry is a private company, wholly owned by the Sarawak State Government and is the principal management company of the Sarawak Forest Conservation Statutory Body.

Established in 1976, the Sarawak Forest Research Centre Insect Collections houses the largest collection reported for Sarawak, which is a total of 350,811 specimens from 13 orders of insects (Abang, 2000). The specimens range from 1981 till 2001.

The UNIMAS Insect Reference Collection was established eleven years ago in 1995, with the mission of collecting, documenting and storing retrievable specimens from all species of insects occurring in Sarawak and neighboring areas in Borneo (Abang, 2000). A total of 47, 785 processed specimens comprising of 16 orders are recorded at this centre (Abang, 2000). The specimens range from 1995 till 2003.

Information on diagnostic characters (for identification) and habitat distribution for all species were mainly based on literature data and available identification keys. Numerous identification keys were studied in this study, but many do not include species for Borneo. However, they still serve as important references in identifying specimens to tribe or genus level. Descriptions on family, tribe and genus were based on Gressitt (1940), Gressitt (1956) and Hayashi (1975) while information on synonyms was based on Heffern (2005). The general format used in this report is as follows:

[*Genus***]** [Author], [year]

[*Genus*] [Author], [year]. [Source of reference] [page number of description]

(type species: Genus species Author)

[*Genus*] [*species*] [*subspecies*] [Author], [year]

(Figure of species) (Figure of distribution map)

[*Genus*] [*species*] [*subspecies*] [Author], [year]. [Source of reference] [page number of description]

[*synonym*] [Author], [year]

[*synonym*] [Author], [year]. [Source of reference] [page number of description]

The valid genus-group names were in italicized type and listed in taxonomic order according to their phylogenetic relationships based on the UPGMA tree produced, while the valid species-group names were also italicized and listed taxonomically after the genus. Synonyms were italicized and listed from the most senior to junior names.

GARMIN MapSource WorldMap Version 3.01 was used to produce the distribution map of species of the tribe Mesosini. Cluster analysis is the name of a group of multivariate techniques whose primary purpose is to identify similar entities from the characteristics they posses (Hair *et al.*, 1992). Data analysis was done using the Multivariate Statistical Package (MVSP) Version 3.13 to build a UPGMA tree based on 86 variables. Measures of similarity based on binary data are adequate for some classification purposes (Krebs, 1989).

4.0 RESULTS

4.1 Species Diversity

A total of 378 specimens comprising 14 genera and 26 species of long-horned beetles from the tribe Meosini (subfamily Lamiinae) were examined in this study. Among these, 220 were deposited in the Sarawak Museum, 149 specimens in the Sarawak Forestry Centre and nine individuals in the UNIMAS Museum. The genus *Cacia* dominated other genera in composition of species with 19.23% domination, followed by *Choeromorpha* (15.38%), *Mesosa* (11.54%), *Planodes* (11.54%) and *Anancylus* (7.69%). Other genera like *Agelasta*, *Coptops*, *Elelea*, *Ereis*, *Golsinda*, *Pseudochoeromorpha*, *Sorbia*, *Syrrhopoeus* and *Zelota* were represented by single species. The genus *Choeromorpha*, represented by 148 specimens in the collection, could be assumed as the most commonly found genus. *Choeromorpha wallacei* and *Choeromorpha polynesa* were the most common species, represented by 66 specimens (17.46%) and 42 specimens (11.11%) in the collection respectively. Meanwhile, *Cacia bispinosa*, *Mesosa bituberosa* and *Planodes deterrens* could be considered as the rarest, as indicated by the repeated singletons in the collections. There were six specimens not identified in the present study, given names as 'Meso 1', 'Meso 2', 'Meso 3', 'Meso 4', 'Meso 5' and 'Meso 6'.

The list of long-horned beetles of Borneo by Heffern (2005) is perhaps the most complete available list of the Cerambycidae of Borneo. This list was used as the main reference of the present study (Table 1). However, instead of the exact locality, the list only states Borneo as the location of the species found.

Table 1. A list of species evaluated in the present study in relation to species recorded for Borneo (Heffern, 2005)

No.	Species recorded from Borneo	Present Study (no. of specimen)		Heffern (2005)
1	*Aemocia borneana* Breuning	0		√
2	*Aesopida malasiaca* J. Thomson	0		√
3	*Agelasta (Dissosira) catenata* Pascoe	0		√
4	*Agelasta (Epagelasta) newmani* White	√	(10)	√
5	*Anancylus (Anancylus) calceatus* J. Thomson	0		√
6	*Anancylus (Paranancylus) griseatus* Pascoe	√	(13)	√
7	*Anancylus (Paranancylus) malasiacus* Breuning	0		√
8	*Anancylus (Paranancylus) socius socius* Pascoe	√	(9)	√
9	*Cacia (Cacia) anancyloides* Breuning	0		√
10	*Cacia (Cacia) confusa* Pascoe	√	(22)	√
11	*Cacia (Cacia) inculta inculta* Pascoe	√	(15)	√
12	*Cacia (Cacia) kinabaluensis* Breuning	0		√
13	*Cacia (Cacia) sarawakensis* Breuning	0		√
14	*Cacia (Acanthocacia) bispinosa* Aurivillius	√	(1)	√
15	*Cacia (Acanthocacia) collarti* Breuning	0		√
16	*Cacia (Acanthocacia) compta* Pascoe	√	(8)	√
17	*Cacia (Acanthocacia) melanopsis* Pascoe	0		√
18	*Cacia (Acanthocacia) picticornis* Pascoe	√	(16)	√
19	*Cacia (Coreothrophora) parelegans* Breuning	0		√
20	*Cacia (Ipocregyes) newmani* Pascoe	0		√
21	*Cacia (Ipocregyes) unda* Heller	0		√
22	*Choeromorpha (Choeromorpha) amica* White	√	(26)	√
23	*Choeromorpha (Choeromorpha) callizona* White	√	(13)	√
24	*Choeromorpha (Choeromorpha) mediofasciata* Breuning	0		√
25	*Choeromorpha (Choeromorpha) multivittata* Breuning	0		√
26	*Choeromorpha (Choeromorpha) polynesa* White	√	(43)	√
27	*Choeromorpha (Choeromorpha) wallacei* White	√	(66)	√
28	*Clytomedus annularis* Pascoe	0		√
29	*Clytomedus borneensis* Breuning	0		√
30	*Coptops undulata undulata* Pascoe	√	(4)	√
31	*Demodes conspersa* Aurivillius	0		√
32	*Demodes subconspersa* Breuning	0		√
33	*Elelea concinna* Pascoe	√	(12)	√
34	*Elelea multipunctata* Heller	0		√
35	*Ereis anthriboides anthriboides* Pascoe	√	(16)	√
36	*Eurymesosa ventralis* Pascoe	0		√
37	*Falsomesosella* sp.	0		√
38	*Golsinda corallina* Thomson	√	(11)	√
39	*Mesosa (Anthriboscyla) illecideosa* Breuning	0		√
40	*Mesosa (Anthriboscyla) lecideosa* Pascoe	√	(14)	√
41	*Mesosa (Anthriboscyla) mima* Thomson	0		√
42	*Mesosa (Saimia) albidorsalis* Pascoe	√	(7)	√
43	*Mesosa (Saimia) bituberosa*	√	(1)	0
44	*Mesosa (Saimia) incongrua* Pascoe	0		√
45	*Mesosa (Saimia) lineata* Breuning	0		√
46	*Mesosa (Saimia) plurimigrosignata* Breuning	0		√
47	*Mesosa (Saimia) pontianakensis* Breuning	0		√
48	*Mesosa (Saimia) postfasciata* Breuning	0		√
49	*Mesosa (Saimia) revoluta* Pascoe	0		√
50	*Metacoptops fasciculata* Aurivillius	0		√
51	*Microcacia longiscapa* Breuning	0		√
52	*Mimanancylus borneensis* Breuning	0		√
53	*Mimocacia ferrugmea* Breuning	0		√
54	*Mnemea phalerata* Pascoe	0		√
55	*Mutatocoptops (Mutatocoptops) bituberosa* Pascoe	0		√
56	*Mutatocoptops (Mutatocoptops) borneensis* Breuning	0		√
57	*Mutatocoptops (Mutatocoptops) diversa* Pascoe	0		√
58	*Planodes deterrens* Pascoe	√	(1)	√
59	*Planodes satelles Pascoe*	√	(5)	0
60	*Planodes leporinus* Pascoe	√	(1)	√
61	*Planodes variegatus* Aurivillius	0		√
62	*Pseudochoeromorpha lar sobrina* Pascoe	√	(32)	√
63	*Pseudozelata (Pseudozelata) capito* Breuning	0		√
64	*Pseudozelata (Parazelota) mima* Breuning	0		√
65	*Sorbia affinis* Breuning	0		√
66	*Sorbia tarsalis* Pascoe	√	(14)	√
67	*Syrrhopoeus agelastoides* Pascoe	√	(9)	√
68	*Trichomesosa sp.*	0		√
69	*Zelota bryanti* Breuning	0		√
70	*Zelota spathomelina* Gahan	√	(3)	√
	Total species	26	(372)	68

4.1 Geographical Distribution

The distribution maps depict the ranges of all species based on the specimens examined. Of the 378 voucher specimens, the majority were collected from Matang (27%), followed by Kuching (21%) and Simunjan (13%). List of localities were as follows: Simanggang, Kuching, Matang, Santubong, Samarahan, Sibu, Banting, Lingga, Belaga, Beluru, Kapit, Mukah, Sebuyau, Simunjan, Samunsam, Niah, Miri, Limbang, Baram, Lawas, Trusan, Kedurong and Julau (Appendix III, Table 3). The specimens of the repositories were also collected from localities outside Sarawak like Sabah, Peninsular Malaysia, Sumatra, Java, Philippines and Laos.

4.2 UPGMA Tree

As can be seen from the UPGMA tree, there are mainly four major groups (Figure 1). *Clorophorus moultoni* was chosen as the outgroup. *Zelota spathomelina* is the basal species, which is also the earliest evolved species in the tribe Mesosini, followed by *Golsinda corallina* and *Coptops undulata*. The second group consists of *Planodes deterrens*, *M. bituberosa*, *M. albidorsalis* and *M. lecideosa*. Group three and four are further divided into subgroups: 3a (*Planodes satelles*, *P. leporinus*, *Ereis anthriboides* and *Elelea concinna*); 3b (*Cacia bispinosa*, *C. picticornis*, *C. confusa*, *C. inculta* and *C. compta*); 4a (*Anancylus socius* and *A. griseatus*) and 4b (*Choeromorpha callizona*, *C. polynesa*, *C. wallacei*, *C. amica*, *Pseudochoeromorpha sobrina* and *Agelasta newmani*).

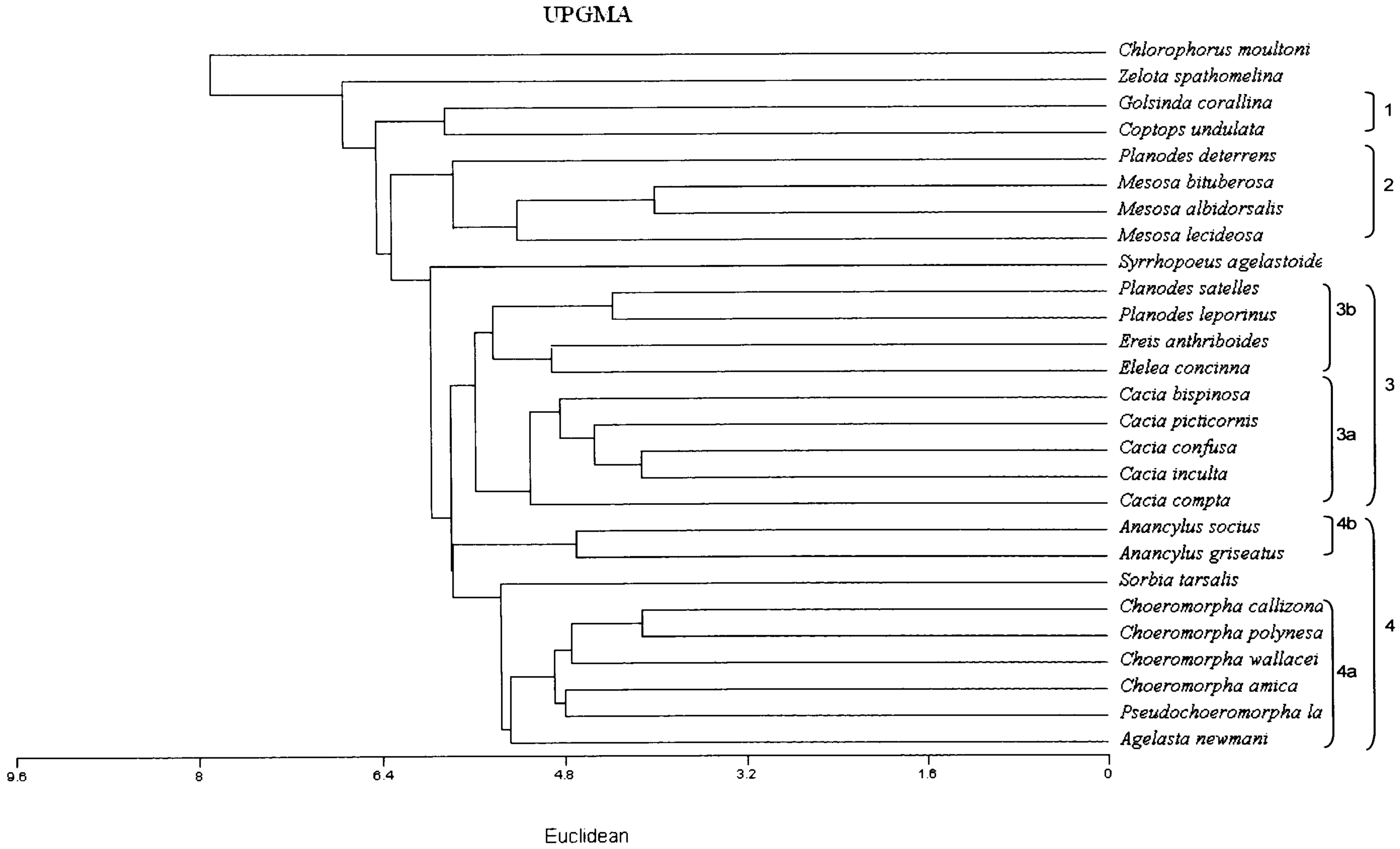

Figure 1. UPGMA tree of the tribe Mesosini

4.3 Systematics Accounts

Cerambycidae is classified under the superfamily Chrysomeloidea and is further divided into different subfamilies, of which one of them is the Lamiinae. Fourteen genera are present in this study under the Tribe Mesosini, namely *Agelasta, Pseudochoeromorpha, Choeromorpha, Sorbia, Cacia, Planodes, Elelea, Ereis, Syrrhopoeus, Anancylus, Mesosa, Coptops, Golsinda* and *Zelota*.

Chrysomeloidea Crowson, 1955

Cerambyscidea Leng, 1920; Phytophagoidea Peyerimhoff, 1933; Phytophaga LeConte and Horn, 1833; Pseudotetramera Westwood, 1839; Tetramera Leach, 1815

Cerambycidae (Leach, 1815)

Disteniidae Thomson, 1860; Hypocephalidae Imhoff, 1856; Lamiidae Latreille 1825; Lepturidae Leach, 1815; Prionidae Leach, 1815; Spondylidae LeConte, 1873; Tetropiidae *auctorum*

Shapes variable, elongate, subcylindrical, cylindrical, depressed, to somewhat flattened; size 3 to 150 mm or more in length; vestiture variable, nude, hairy, or scaly. Head usually long with smooth, punctate or rugose surface. Antennae usually eleven-segmented, rarely ten-segmented, sometimes with twelve to twenty-five or more segments; almost always more than two-thirds body length and inserted on prominences and directed backwards over the body, but some antennae may be shorter than the body. Eyes lateral, often deeply emarginated, may be divided. Labrum usually prominent; mandibles variable, usually stout, long or curve in

shape. Pronotum variable, quadrate, oval or elongate; surface variable; pleural region broad; lateral pronotal carinae absent, mesonotum with stridulatory files. Abdomen with five sternites, sometimes six. Prosternum long in front of the coxae, with broad prosternal process. Metasternum moderate or long. Tibial spurs present on all legs; tarsal claws simple, rarely appendiculate or cleft.

Lamiinae

Lamiarae Latreille, Hist. Nat. Crust. Et Ins. 11 (1804) 282

Lamiidae White, Cat. Col. Brit. Mus 8 (1855) 335

Lamiitae Thomson, Classif. Cer. (1860) 1

Lamiides Lacordaire, Gen. Col.9 (1869) 238

Lamiinae Leconte and Horn, Smiths. Misc. coll. (21) 507 (1883) 313;
Aurivillius, Col. Cat. 73 (1922) 1

Head vertical anteriorly; antennal insertions generally distant from mandibles and partly surrounded by eyes; apical palpal segments acute; neck generally broad; prothorax cylindrical and often tuberculate laterally; scutellum usually rounded behind; anterior coxae more or less prominent, their acetabulae generally angulate externally; anterior tibiae obliquely grooved on inner surfaces. This division has very frequently been considered as a family and probably warrants separation more than any other major group of the longicorns except the Disteniinae.

Mesosini

Mesositae Thomson, Calssif. Cer. (1860) 35, part; Syst. Cer. (1864) 58, part

Mesosinae Pascoe, Trans. Ent. Soc. London (3) 3 (1866), 7, 94, part

Mesosides Lacordaire, Gen. Col. 9 (1869) 367

Mesosini Aurivillius, Col. Cat. 73 (1922) 135

Antennal scape with an open cicatrix; head capable of touching anterior coxae in repose; antennae ciliate beneath; rarely as much as twice as long as body; anterior coxal cavities angulate externally; middle coxal cavities open externally to epimera; middle tibiae lacking a distinct external groove.

Key to the genera of Mesosini in Sarawak

1. Eyes deeply emarginated.....11

   Eyes not deeply emarginated.....2

2. Face not parallel sided, broad at the end of gena (Figure 2a); scutellum truncate at apical; 'I' shape carinae at the middle of frons extending to antennae bases.....*Golsinda*

   Face almost parallel sided (Figure 2b); scutellum rounded at apical; frons surface almost even and smooth without any carinae.....3

3. Eyes divided into two lobes, closely distant and connected by a stout strand.....4

   Eyes divided into two distant lobes, connected by a narrow strand.....5

4. Distinct white band between antennal insertions (Figure 3); pronotum slightly wider than long; elytra with narrow longitudinal carinae ranging from apical to the end (Figure 4).....*Ereis*

White band absent between antennal insertions; pronotum distinctly wider than long; longitudinal carinae absent at elytra……..……...*Anancylus*

5. Sides of prothorax with a small but distinct tubercle before middle (Figure 5a)……..…...6

Sides of prothorax more or less rounded, bluntly swollen or nearly straight (Figure 5b)…..……...7

6. Head slightly smaller than pronotum; shoulder more round and blunt (Figure 6a); feebly flattened or feebly, narrowly depressed between antennal tubercles……...*Saimia*

Head distinctly smaller than pronotum; wider shoulder with sharp angle (Figure 6b); deeply, narrowly convex between the antennal tubercles……*Coptops*

7. Vertex distinctly concave between antennal insertions; pronotum somewhat uneven; elytra tapering apically, forming narrow sharp end (Figure 7a)……..…*Mesosa*

Vertex horizontal or feebly depressed between antennal insertions; pronotum smooth, evenly convex; elytra rounded apically with blunt end (Figure 7b)……8

8. Pronotum slightly wider than long; head and prothorax plain brown without any pattern; scutellum small and narrow……..…*Elelea*

Pronotum distinctly wider than long; longitudinal stripes of one color crossing another at the head and prothorax; scutellum tranverse late obovate and rounded at apex……..……9