

Chapter VI

Discussion

Faunal Study

Eight tribes of Scolytidae were found and Tribe Xyleborini is the most common with the most species rich (11 species) in genus *Cyclorhipidion* whereas two tribes of Platypodidae were found and Tribe Platypodini is the most common. The high number of species in Tribe Xyleborini and Platypodini are similar to that found in a tropical forest plantation in Papua New Guinea (Gray, 1974b,a). Most of scolytid species are polygamous and xylomycetophagous except some monogamous species in Scolytoplatypodini, Dryocoetini, Cryphalini and Corthylini. Scolytids in MEF exhibit more xylomycetophagy and phloeophagy whereas scolytids in DDF exhibit fewer examples of both feeding types but exhibit more in two types 1) phloeophagy and spermatophagy 2) phloeophagy and xylophagy. Differences in forest type might explain the differences in feeding strategies found among the species. MEF is likely to have more favorable conditions than DDF, 'disturbed area'. However, both types of forest shared several species except some species occurred in specific forest types. For example, *Eccoptopterus* sp., most *Hypothenemus* spp. and *Genyocerus* sp. were found only in DDF. Prior studies showed that those three genera occurred in lowland, disturbed and dried areas (Browne, 1961; Robert, 1993) whereas *Acanthotomicus* sp., *Ambrosiodmus* sp., *Ozopemon* sp., *Dryocoetiops* sp. and *Euwallacea* sp. were found only in MEF which might be explained by environment constraints (higher humidity and lower temperature). Presumably, species in the same genera should be constrained by the same environmental factors, however, related species showed varied tolerance to different environmental factors. For example, *Xyleborus affinis* and *Arixyleborus* aff. *scabripennis* were found only in DDF whereas other species in same genera were found in MEF. *Xyleborus perforans*, which was the dominant species in DDF, occurred in small numbers in MEF.

For MEF, species that were found in high species number from trapping methods and/or found from infested logs might be representatives of that forest type whereas the DDF, fauna could be identified by the presence of *Hypothenemus* spp. and *Genyocerus*. These species may indicate a dry forest given that *Hypothenemus* show a greater tolerance of climatic variation, particularly of dry conditions (Browne, 1961) while *Genyocerus* may indicate a Dipterocarp forest (Roberts, 1993). Browne (1961) also reported a few *Genyocerus* species attacking living trees after drought in Malaysia. However, these species can not be representatives of MEF and DDF but they were samples of one area of MEF and DDF, due to all trapping method being marked and done at the same place. Interestingly, *Gnatharus tibetensis* which had been recorded only from Tibet (Wood & Yin, 1986) was found in both forest types.

Diversity indices and similarity index

Species diversity and similarity between MEF and DDF were varied. Fisher's alpha gave higher value for MEF whereas Simpson's gave higher value for DDF. However, results showed no statistical difference ($P > 0.05$). Sorensen's similarity index between MEF and DDF showed less values in Scolytidae. This might be effected by altitudes. Altitude determines the type of forest (Maxwell and Elliot, 2001) and type of forest might have an effect on more species of Scolytidae than Platypodidae.

Multivariate analysis

In this study, two physical factors (temperature and relative humidity) and time were used for cluster analysis. For physical factors, results showed that species of both families in both types of forest can be arranged into four groups based on the following factor(s); temperature, relative humidity, both factors, and independence to these factors. The occurrence of Scolytidae in MEF is dependent on both factors, whereas the species in DDF are dependent on at least one factor. The occurrence of Platypodidae is dependent on high temperature. But when using time as the factor, species were arranged by frequency of occurrence (infrequent and frequent), almost all scolytid and platypodid species (in MEF) and scolytids (in DDF) are infrequently

found whereas platypodids in DDF shared equal numbers in both frequencies (aggregate and scattered occurrence).

Infested logs

Most infested logs belonged to the species in Fagaceae (*Castanopsis diversifolia*, *Castanopsis acuminatissima*, *Quercus* sp.), Pinaceae (*Pinus kesiya*) and Moraceae (*Artocarpus* sp.). They are dominant plant species in MEF. Twenty-nine species in eighteen genera were collected. Scolytids and platypodids likely preferred new fallen trees rather than healthy trees because infestation in healthy trees was not observed. Bark beetles find their hosts based on use of semiochemicals (locate such trees by orienting over several meters to volatile chemicals usually released by damaged or diseased trees) and in most species on aggregation behaviour which results from their pheromones that cause a rapid increase of the number of attacks on the host trees (Sauvard, 2004). Some scolytids seem to have host specificity with some plants. For example, *Cryphalus kesiya*, *Cyrtogenius brevior* and *Polygraphus major* were found only in pine (*Pinus kesiya*). Some dominant species of Scolytidae and Platypodidae occurred all year round; e.g. *Peroplatypus fagacearum* in Fagaceae and *Polygraphus major* in Pinaceae. This might be because of favorable physical factors (e.g. suitable temperature and relative humidity). Other species were found in certain periods of the year which might be explained by the seasonal change.

Differences among trapping methods

The number of species collected were significantly different among the trapping methods ($P < 0.05$) (Table 7) due to several factors. Position, size and number of traps might play important roles. The ethanol trap attracted more species and individuals of both families as compared to the other methods. For a number of scolytids, especially the bark beetles, vertically oriented traps elicit stronger responses than horizontally oriented or non-tree-shaped traps (Flechtmann *et al.*, 2000). Graham (1968) reported that volatile attractants have been demonstrated to develop from anaerobic treatment of fresh sapwood for periods of from 4 to 40 hours at room temperature. Moeck (1970) had extracted volatiles from wood and bark of several pine species and found that ethanol at high concentration was at first strongly

attractive to the beetles. Many, and probably all Scolytidae and Platypodidae, are attracted to white objects during their periods of flight (Browne, 1961). There is usually a positive correlation between ethanol release rate and response of ambrosia beetles (Flechtmann *et al.*, 2000). But when ethylene glycol was added and left longer (3 weeks), fewer species and individuals were collected. This might be explained by an interference of the release rate of ethanol because the ethylene glycol covered the surface of the ethanol. There is little doubt that odor is the principal factor that attracted beetles to the traps (Browne, 1961). Flight Intercept trap is based on similar principles to the window trap. Only insects that drop upon contact with the window (black fabric mesh) are collected when they fall into the preserving fluid. Several other studies on collected scolytids and platypodids used window flight traps. For example, Löyttyneimi *et al.* (1984 & 1985), caught many of beetles in both families. But in this study, it is likely that the low catch of species and individuals might be due to 'competition' among the traps (Ethanol & FIT Trap) and the short flight period among species, thus decreasing the opportunity for individuals to blunder into the trap.

Accumulation curves showed 50 to 74 species found in both forest types. If number of collection increases, species number might be higher than this.

One interesting observation is that the same species was usually found in the same trap and same genus was usually found in same type of trap. Results of beetles species are varied due to different altitude and trapping methods since the line transects were done at only one place in MEF and DDF, therefore species found were representative of that place only, not representatives of each type of forest. To obtain diversity of species in MEF and DDF, line transects should be randomly distributed. Expansion of study area with increasing the number of traps and extension of time, effects not only the number of species, which might include new species and new records, but also cause positive effect on species accumulation curves.



Taxonomy

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่

Copyright © by Chiang Mai University

All rights reserved

FAMILY SCOLYTIDAE

(Based on Browne 1961, Wood 1986, Maiti & Saha2004)

Subfamily Hylesininae

Most recent classification has recognized the Hylesininae as a major division of Scolytidae. The most consistent and reliable character available for the recognition of this subfamily is the procurved basal margins of the elytra that are armed by a row of crenulations, and the scutellar notch between them.

Tribe Hyorrhynchini

Genus *Sueus* - Frons sexually dimorphic, male slightly to strongly impressed, female convex; eye completely divided; antennal funicle 5-segmented, club rather weakly compressed; male dwarfed, rare, flightless; xylomycetophagous species.

Distribution: Sri Lanka and New Guinea to Japan

Collected species: *Sueus niisimai* (Eggers), body length (b.l.) : 2 mm

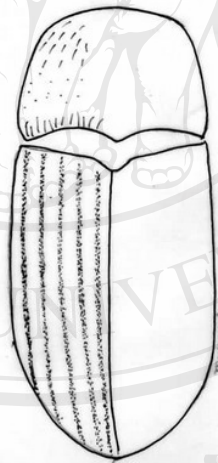


Figure 34 Dorsal view of *Sueus niisimai*, Female.

Tribe Polygraphini

Genus *Polygraphus* – Frons dimorphic, male variously impressed and sparsely pubescent, female concave to convex and usually ornamented by conspicuous setae; eye completely divided by a deep emargination (some Asian and African species only emarginated); antennal club rather strongly flattened, symmetrical, devoid of sutures; scutellum not visible; phloeophagous species.

Distribution: North America, Asia, Europe, Africa

Collected species: *Polygraphus major* Stebbing, b.l. : 2.7 mm

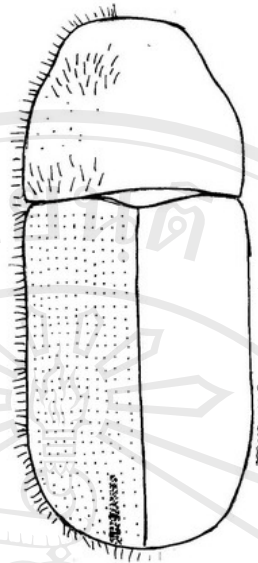


Figure 35 Dorsal view of *Polygraphus major*, Female.

Subfamily Scolytinae

Member of this subfamily have the bases of the elytra simple, forming a straight, transverse line across the body. A large, flat, scutellum is usually visible. The elytra bases are weakly subcostate in some Scolytini, Ctenophorini, and Cryphalini. The body tends to be more elongate, with specialization directed toward cylindrical compaction and the xylomycetophagous habit. A broadly oval outline is usually confined to primitive, phloeophagous genera.

Tribe Scolytoplatypodini

Genus *Scolytoplatypus* - Frons dimorphic, male concave, female convex; posterior face of head truncate; eye oval, entire; scape elongate, funicle 6-segmented, club flattened, without sutures; pronotum unarmed, usually constricted on posterior half, female with median mycetangium; scutellum not visible. All are monogamous and xylomycetophagous.

Distribution: Africa, Madagascar, Asia to Indonesia, New Guinea, and the Philippines.

Collected species: *Scolytoplatypus minimus* Hagedorn, b.l. : 1.8 mm

Scolytoplatypus pubescens Hagedorn, b.l. : 3.8 mm

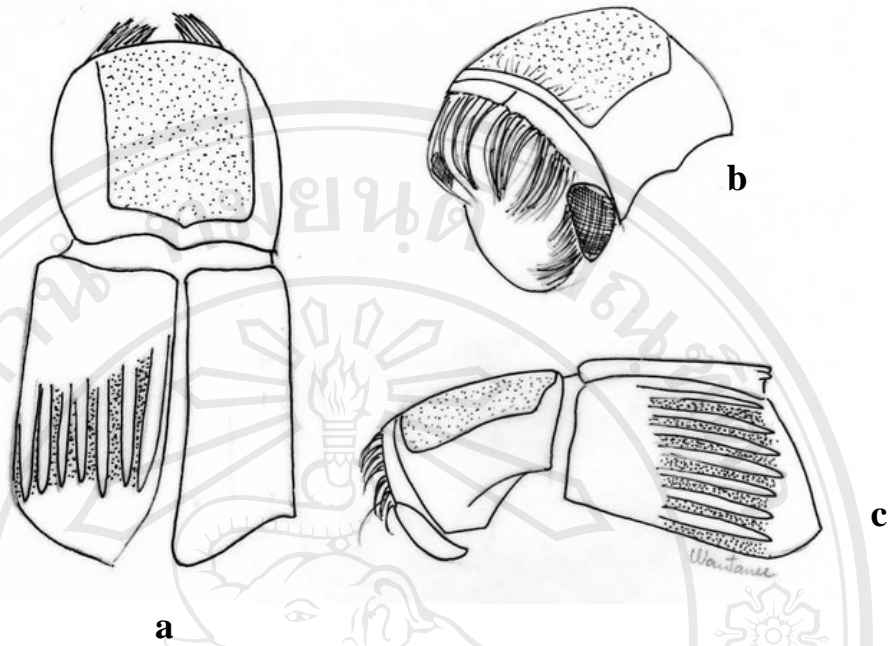


Figure 36 *Scolytoplatypus minimus*, Male, **a**, Pronotum and elytra in dorsal view; **b**, frons; **c**, pronotum and elytra in lateral view.

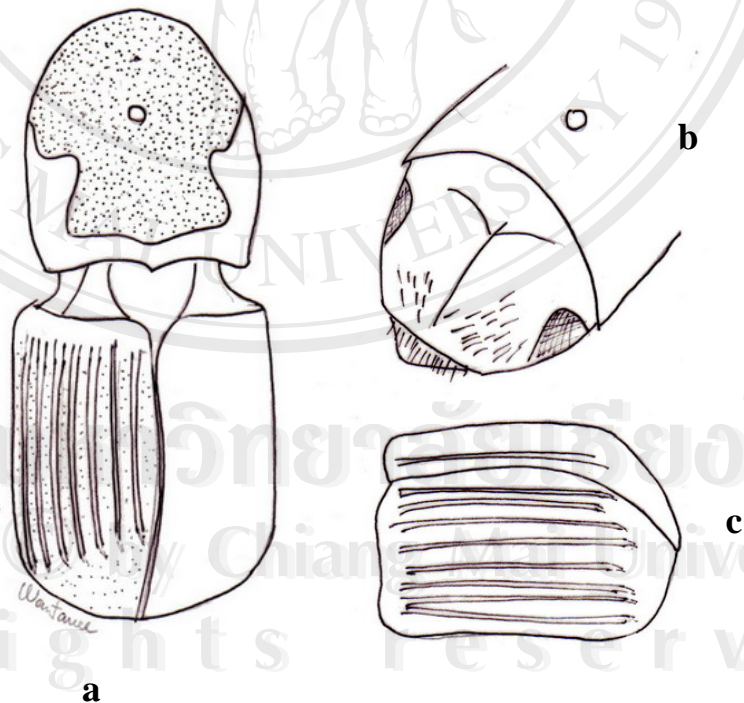


Figure 37 *Scolytoplatypus minimus*, Female, **a**, Pronotum and elytra in dorsal view; **b**, frons; **c**, elytra in lateral view.



Figure 38 *Scolytoplatypus pubescens* : **a**, Male, dorsal and lateral view; **b**, Female, dorsal and lateral view; **c**, Frons of male; **d**, Frons of female.

Tribe Ipinini

Genus *Acanthotomicus* – Frons usually dimorphic, male convex, female variously excavated, protuberant, or ornamented by setae; eye large, very coarsely faceted sinuate, lower half usually much narrower than above; antennal scape slender, elongate, funicle 5-segmented; scutellum visible; all are phloeophagous.

Distribution: Mexico to South America, South Asia to Australia, Africa.

Collected species: *Acanthotomicus* sp., b.l. : 2.4 mm

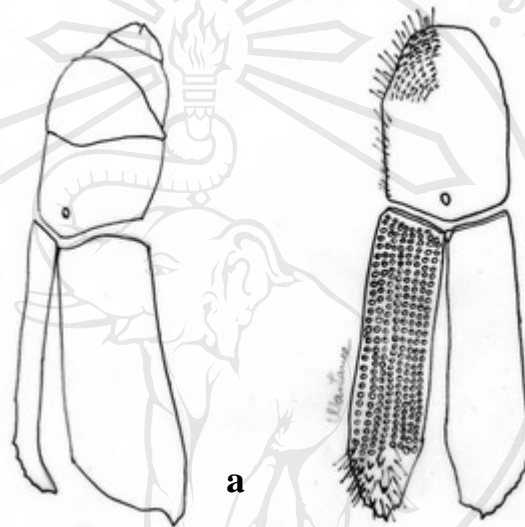


Figure 39 *Acanthotomicus* sp.; pronotum and elytra in: **a**, lateral view; **b**, dorsal view.

Tribe Dryocoetini

Description: Frons usually sexually dimorphic, male convex to variously impressed, female convex to flattened or with elevations, variously ornamented by setae in many species; eye distinctly emarginated to divided; antennal scape slender, elongate, funicle 4- to 6-segmented, club obliquely truncate to strongly flattened; scutellum visible; elytra declivity usually convex.

Genus *Cyrtogenius* – Antennal club with suture 1 weakly to profoundly procurved, rarely with sutures absent and pubescent to base; commonly with ventrolateral margin of declivity slightly elevated or armed; All phloeophagous and hetrosanguineously polygynous.

Distribution: Africa, India, Japan to Australia and Micronesia.

Collected species: *Cyrtogenius* sp., b.l. : 3mm

Cyrtogenius brevior (Eggers), b.l. : 2.4 mm

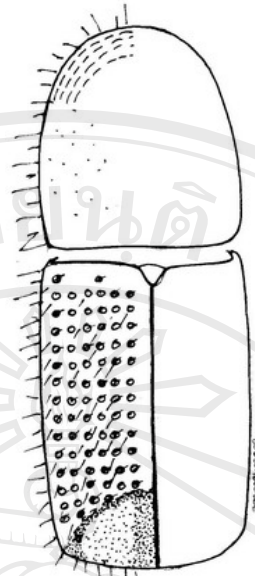


Figure 40 Dorsal view of *Cyrtogenius* sp.

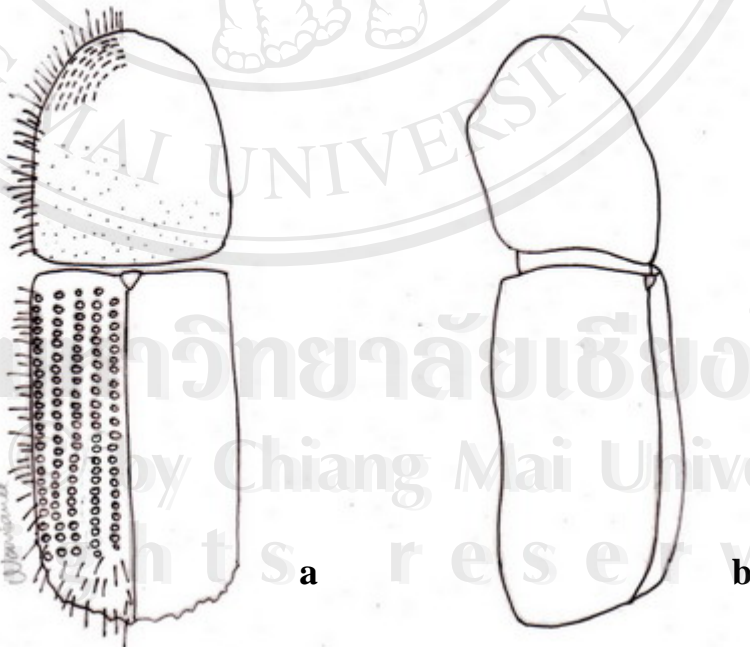


Figure 41 *Cyrtogenius brevior*, Female, pronotum and elytra in: **a**, dorsal view; **b**, lateral view.

Genus *Dryocoetiops* – Procoxae narrowly to moderately separated; anterior margin of pronotum usually armed by serrations; pronotum usually more coarsely aspirate in anterior areas, its summit more definite and near middle. All are myelophagous

Distribution: SE Asia, Sri Lanka, Indonesia, and New Guinea.

Collected species: *Dryocoetiops coffeae* (Eggers), b.l. : 2.9 mm

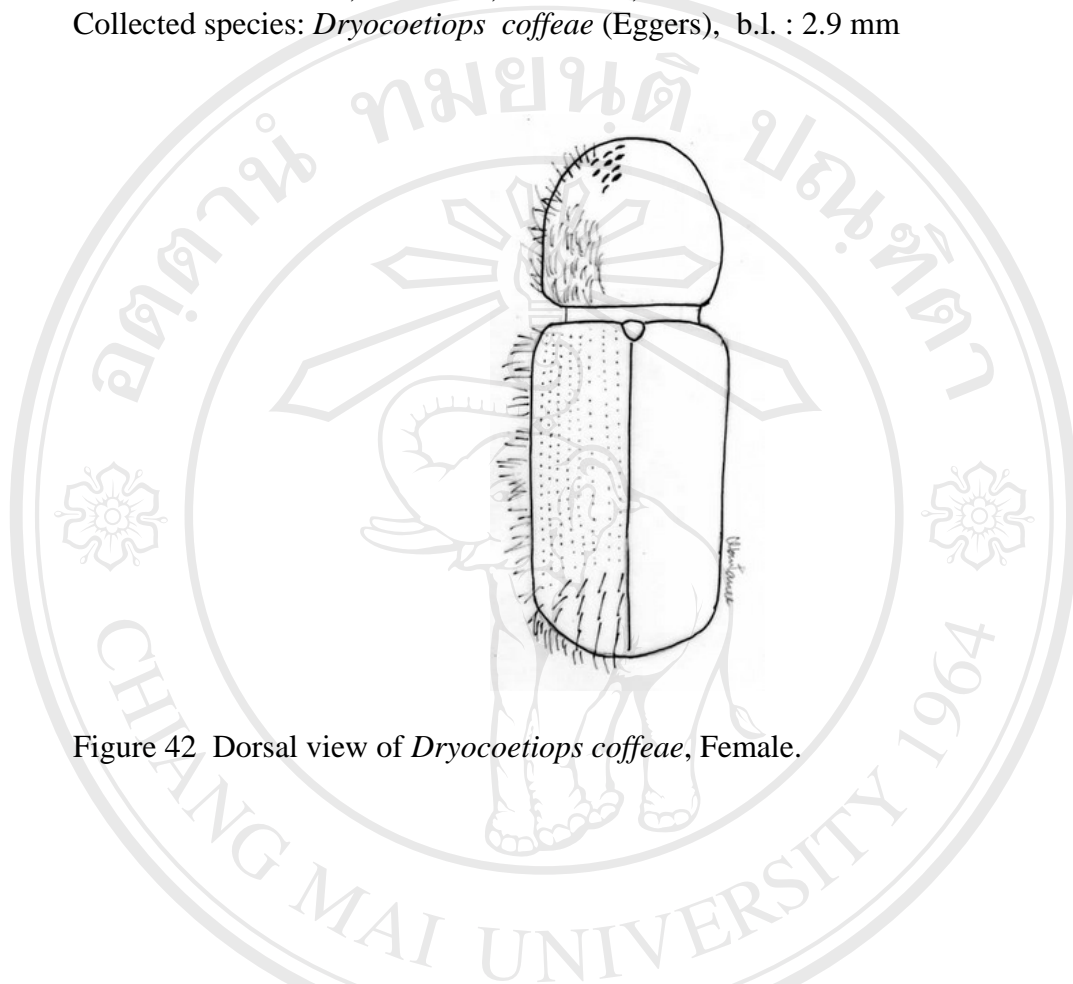


Figure 42 Dorsal view of *Dryocoetiops coffeae*, Female.

Genus *Ozopemon* - Lateral margins of pronotum obscurely to subacutely elevated only near base; anterior half of pronotum always strongly declivous and aspirate; elytral declivity either moderately impressed on central half and with interstitial tubercles or discal punctures strongly confused. All are consanguineously polygynous and phloeophagous.

Distribution: SE Asia and Indonesia to Fiji.

Collected species: *Ozopemon* sp., b.l. : 3.7 mm

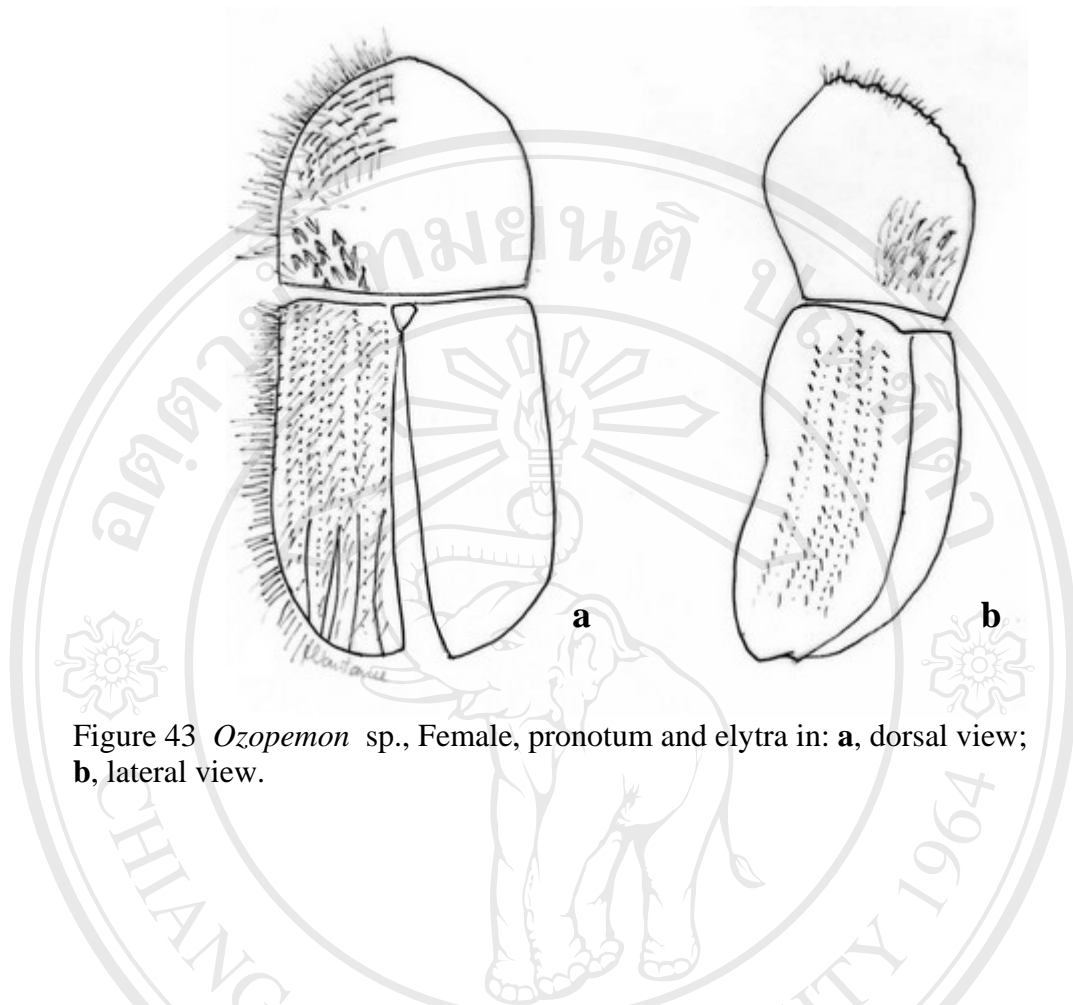


Figure 43 *Ozopemon* sp., Female, pronotum and elytra in: **a**, dorsal view; **b**, lateral view.

Genus *Coccotrypes* - Lateral margins of pronotum subacutely elevated on more than basal half; frons commonly convergently aciculate; elytral declivity usually convex, rarely impressed, granules absent or inconspicuous; punctures on elytral disc almost always in rows. All are consanguineously polygynous and phloeophagous or spermophagous.

Distribution: Mostly from Africa, South Asia and adjacent areas.

Collected species: *Coccotrypes* sp.1, b.l. : 2.8 mm

Coccotrypes advena Blandford, b.l. : 2.2 mm

Coccotrypes ?cinnamomi (Eggers) , b.l. : 2 mm

Coccotrypes carpophagus Hornung, b.l. : 2 mm

Coccotrypes longior (Eggers), b.l. : 1.8 mm

Coccotrypes papuanus (Eggers), b.l. : 2.5 mm

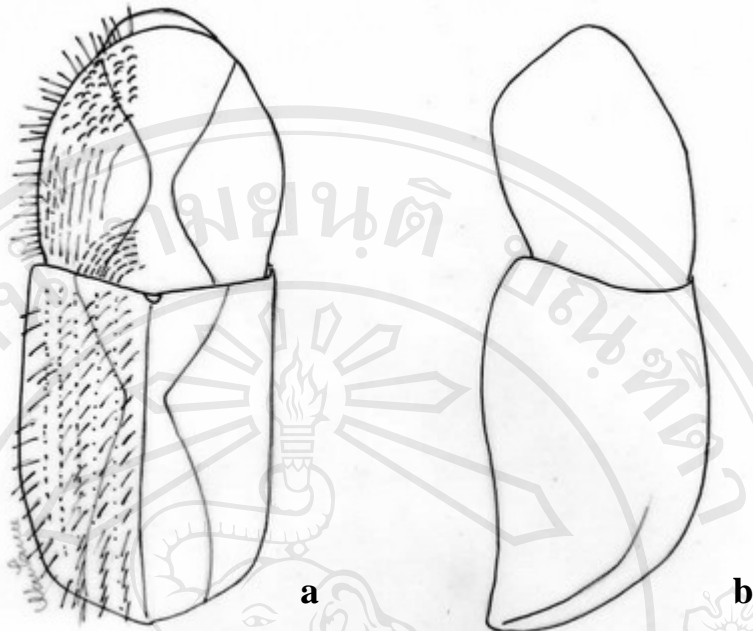


Figure 44 *Coccotrypes* sp.1, Female, pronotum and elytra in: **a**, dorsal view; **b**, lateral view.

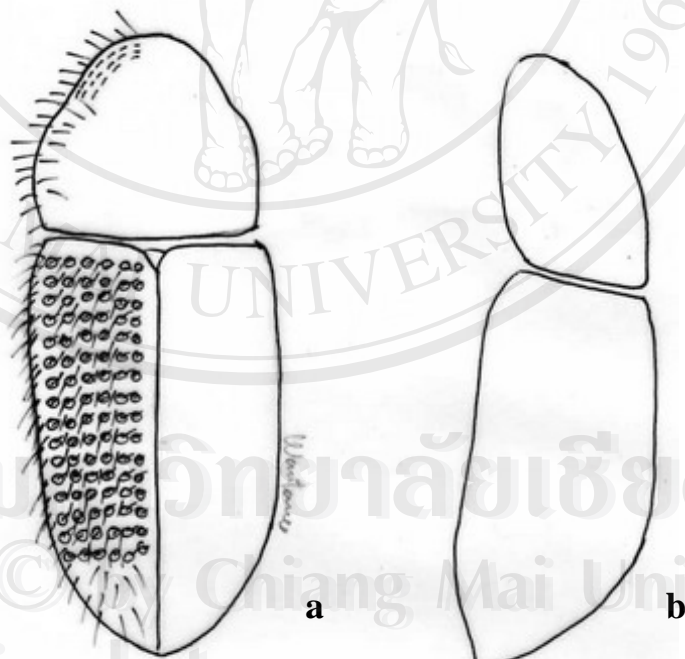


Figure 45 *Coccotrypes advena*, Female, pronotum and elytra in: **a**, dorsal view; **b**, lateral view.

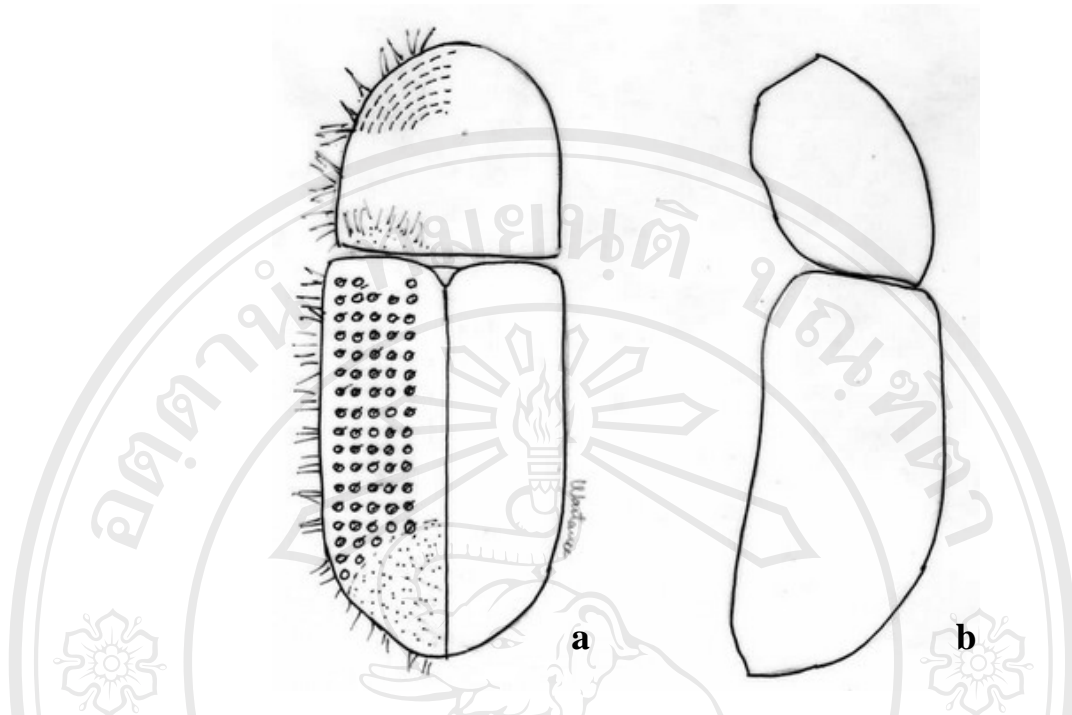


Figure 46 *Coccotrypes ? cinnamomi*, Female, pronotum and elytra in: **a**, dorsal view; **b**, lateral view.

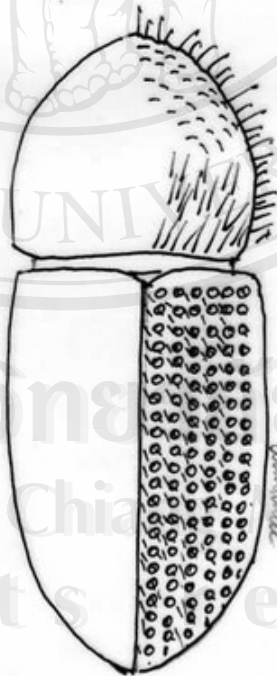


Figure 47 *Coccotrypes carpophagus*, Female, pronotum and elytra in dorsal view.

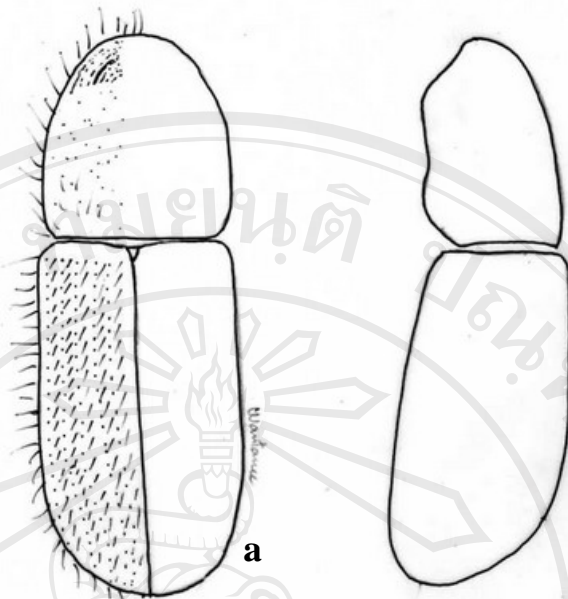


Figure 48 *Coccotrypes longior*, Female, pronotum and elytra in: **a**, dorsal view; **b**, lateral view.

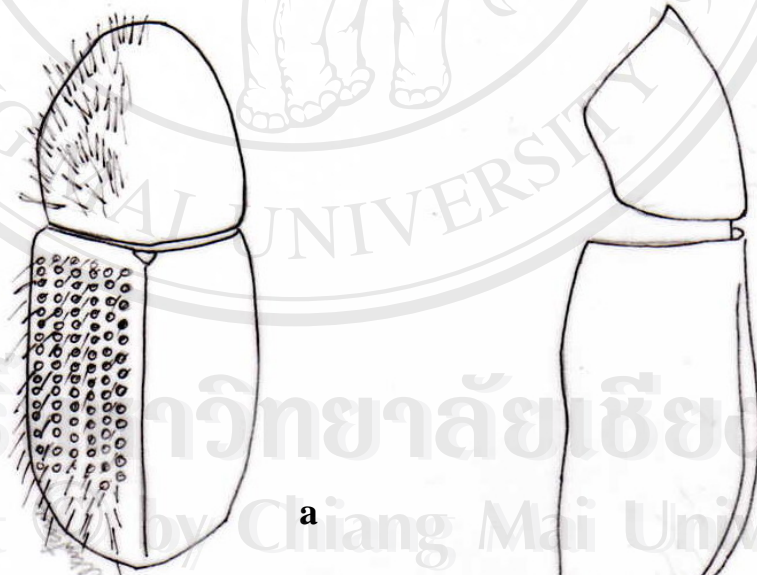


Figure 49 *Coccotrypes papuanus*, Female, pronotum and elytra in: **a**, dorsal view; **b**, lateral view.

.....

Tribe Xyleborini

Description: Body dimorphic, male dwarfed, deformed, flightless, eye reduced in size, often aberrant in shape; frons convex, unadorned; eye emarginated to divided in a few oriental forms; antennal scape elongate; club obliquely truncate except basal corneous area reduced or absent in some genera; pronotum asperate on anterior slope; scutellum varying from large and flat to modified to absent. All are consanguineous polygynous and xylomycetophagous.

Distribution: Worldwide circumtropical distribution, with a few species occurring in temperate areas.

Genus *Arixyleborus* – Protibia with posterior face inflated and armed by numerous fine tubercles; scutellum shiny and subround or tongue-shape; elytral declivity and at least part of disc with interstriae carinate, striae spaces between carinae usually granular or dull, with punctures usually obsolete.

Distribution: SE Asia to Australia.

Collected species: *Arixyleborus malayensis* (Schedl), b.l. : 2.7 mm

Arixyleborus sp. aff. *scabripennis* (Blandford), b.l. : 2.5 mm

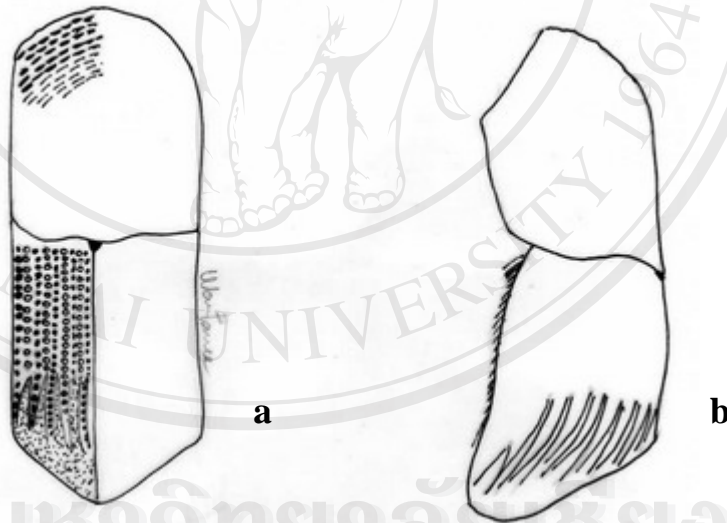


Figure 50 *Arixyleborus malayensis*, Female, pronotum and elytra in: **a**, dorsal view; **b**, lateral view.

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
Copyright © by Chiang Mai University
All rights reserved

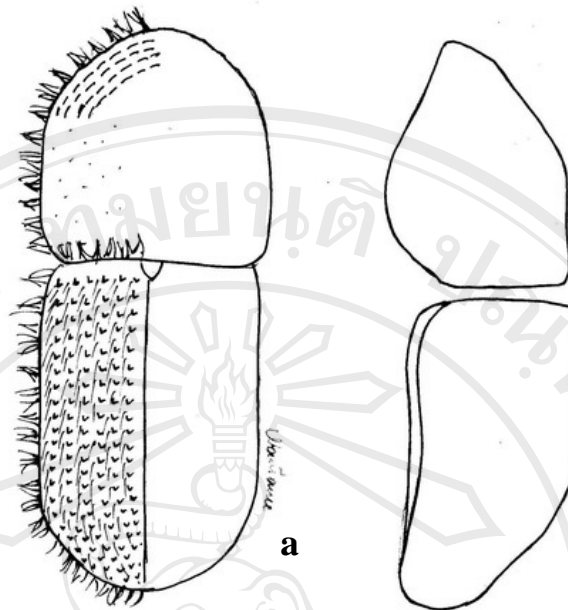


Figure 51 *Arixyleborus* aff. *scabripennis*, Female, pronotum and elytra in: **a**, dorsal view; **b**, lateral view.

Genus *Ambrosiodmus* – Pronotal asperities extending to base, including most of discal area; anterior margin of pronotum never armed by a definite row of serrations; scutellum somewhat tongue-shaped lateral margin of protibia armed by 7 to 8 socketed denticles, metatibia by 8 to 11 denticles.

Distribution: North, Central and South America, with numerous species in Asia and Africa.

Collected species: *Ambrosiodmus* sp.1, b.l. : 4.2 mm

Ambrosiodmus sp.2, b.l. : 2.2 mm

Ambrosiodmus sp.3, b.l. : 2.5 mm

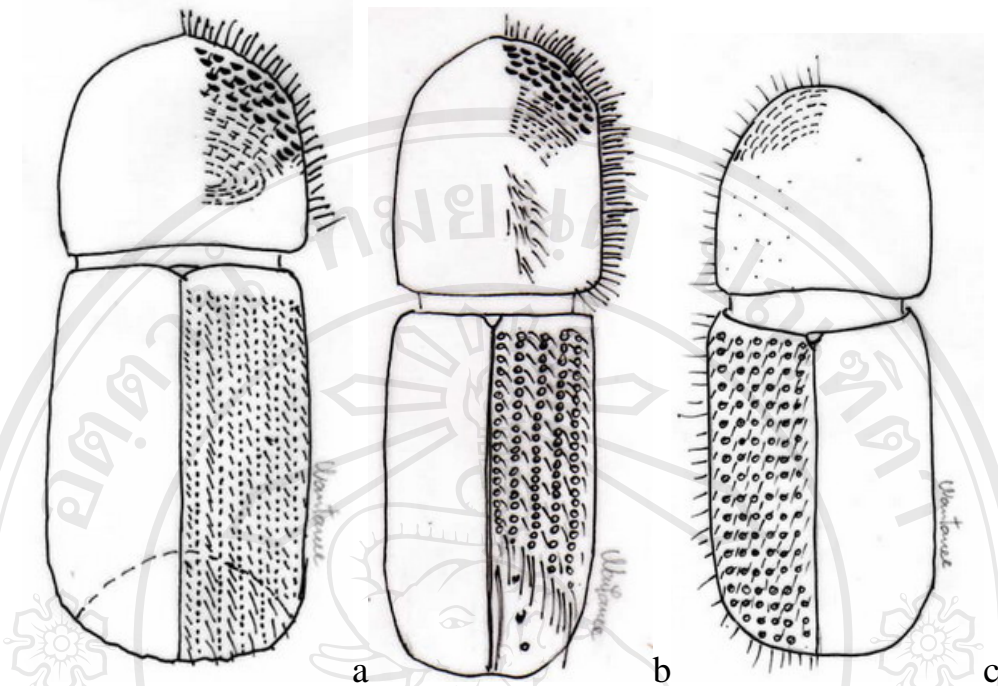


Figure 52 *Ambrosiodmus* sp., Female : Pronotum and elytra in dorsal view.
a, *Ambrosiodmus* sp.1; **b**, *Ambrosiodmus* sp.2; **c**, *Ambrosiodmus* sp.3

Genus *Euwallacea* - Head generally globose, frons plano-convex; pronotum commonly subquadrate, its anterior margin almost always unarmed; scutellum smooth, shiny and glabrous, and subround to triangular in shape; striae and interstitial punctures usually in rows, elytral vestiture comparatively sparse, confined to striae and interstitial rows. All are consanguineously polygynous and xylomycetophagous.

Distribution: Africa to SE Asia and Australia.

Collected species: *Euwallacea destruens* (Blandford), b.l. : 5.6 mm

Euwallacea fornicatus (Eichhoff), b.l. : 2.4 mm

All rights reserved

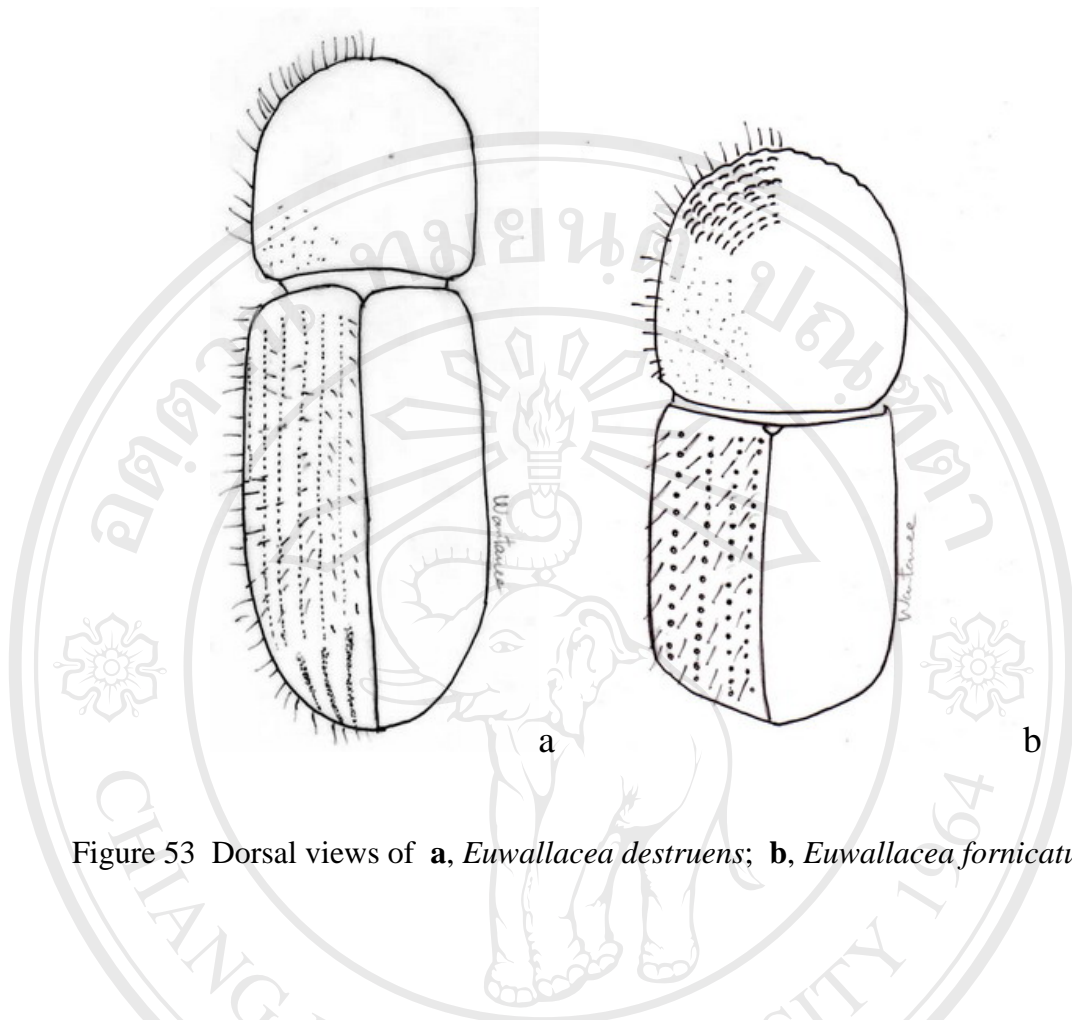


Figure 53 Dorsal views of **a**, *Euwallacea destruens*; **b**, *Euwallacea fornicatus*.

Genus *Cyclorhipidion* – Pronotum almost never quadrate, its anterior margin usually procurved and armed by a definite row of serrations; posterolateral margin of declivity rounded; elytral punctures often confused, vestiture usually much more abundant. All are consanguineously polygynous and xylomycetophagous.

Distribution: Africa to SE Asia and Australia.

Collected species: *Cyclorhipidion* sp.1- sp.10, b.l. : 1.8 - 3 mm

Cyclorhipidion perpilosellum (Schedl), b.l. : 2.8 mm

Cyclorhipidion aff. *punctatopilosum* (Schedl), b.l. : 2.9 mm

Cyclorhipidion aff. *punctatopilosus* (Schedl), b.l. : 3.4 mm

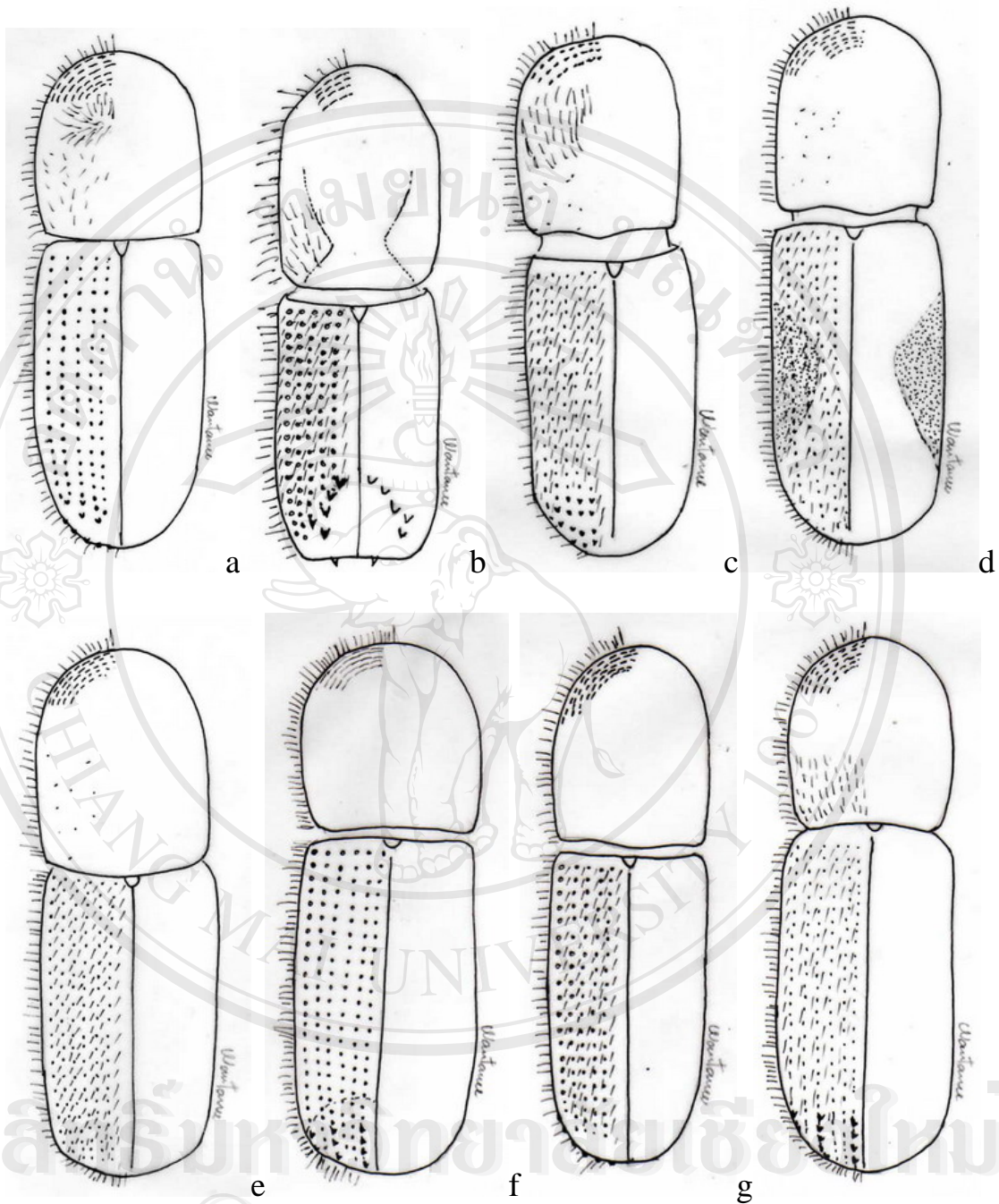


Figure 54 Dorsal views of *Cyclorhipidion* sp., Female, **a**, *Cyclorhipidion* sp.1; **b**, *Cyclorhipidion* sp.2; **c**, *Cyclorhipidion* sp.3; **d**, *Cyclorhipidion* sp.4; **e**, *Cyclorhipidion* sp.5; **f**, *Cyclorhipidion* sp.6; **g**, *Cyclorhipidion* sp.7; **h**, *Cyclorhipidion* sp.8

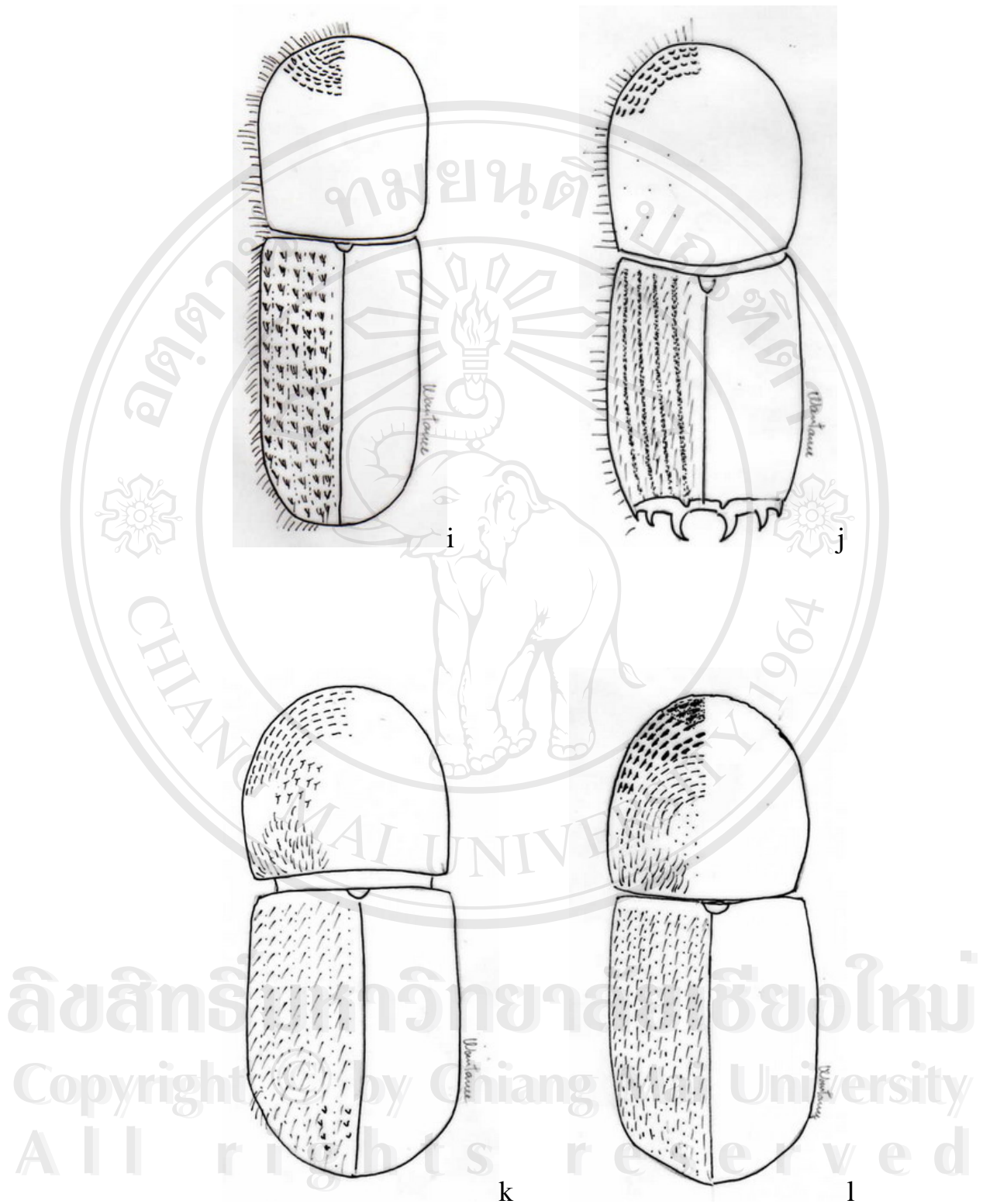


Figure 55 Dorsal views of ; **i**, *Cyclohipidion* sp.9; **j**, *Cyclohipidion* sp.10; **k**, *Cyclohipidion* aff. *perpilosellum*; **l**, *Cyclohipidion* aff. *punctatopilosus*.

Genus *Xyleborus* – Procoxae contiguous; body usually more slender, mostly more than 2.0 times as long as wide; its posterior element inflated occasionally dentate. All are consanguineously polygynous and xylomycetophagous.

Distribution: Worldwide.

Collected species: *Xyleborus perforans* (Wollaston), b.l. : 2.5 mm

Xyleborus similis Ferrari, b.l. : 2.5 mm

Xyleborus hirtus (Hagedorn), b.l. : 3.0 mm

Xyleborus affinis Eichhoff, b.l. : 2.5 mm

Xyleborus sp., b.l. : 1.7 mm.

Xyleborus sp. *emarginatus* gr., b.l. : 3.5 mm

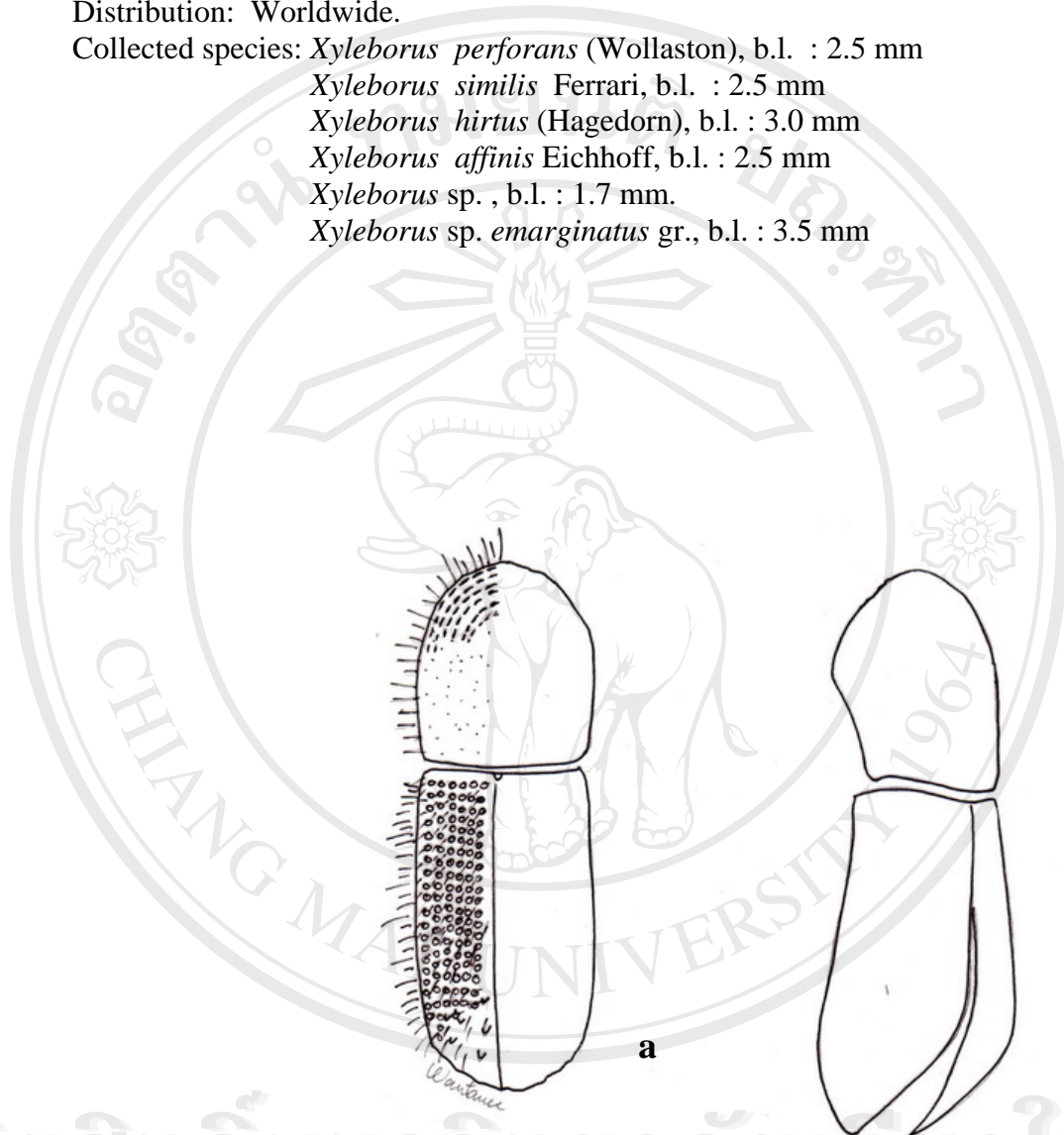


Figure 56 *Xyleborus perforans*, Female, pronotum and elytra in: **a**, dorsal view; **b**, lateral view.

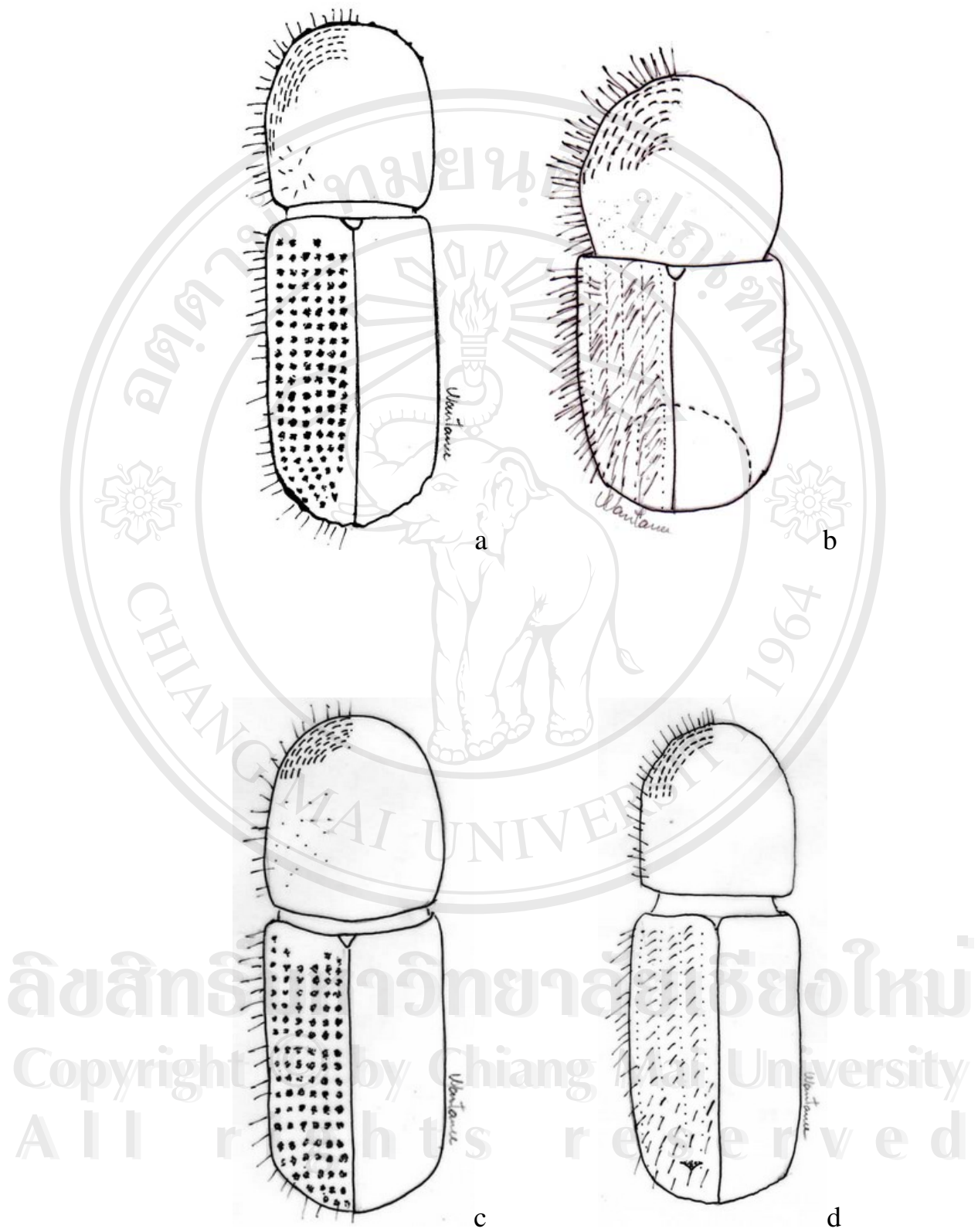


Figure 57 Dorsal views of ; **a**, *Xyleborus similis*; **b**, *Xyleborus hirtus*; **c**, *Xyleborus affinis*; **d**, *Xyleborus* sp.

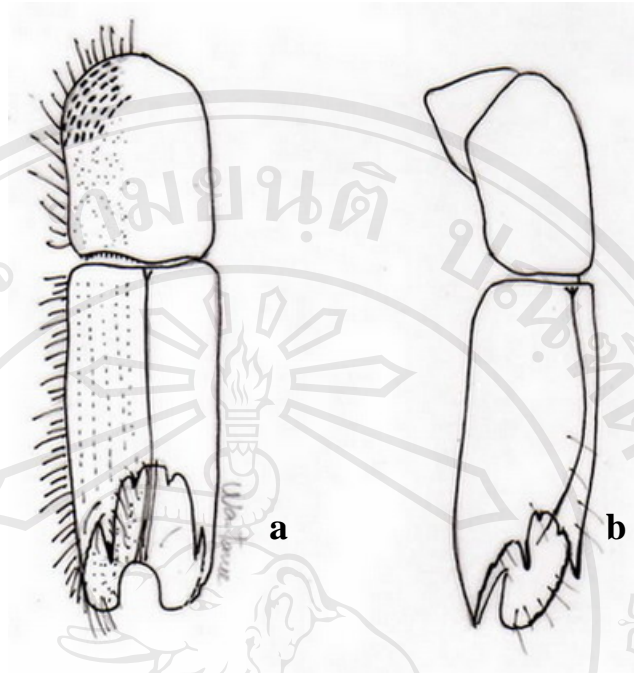


Figure 58 *Xyleborus* sp. *emarginatus* gr., Female, pronotum and elytra in: **a**, dorsal view; **b**, lateral view.

Genus *Xylosandrus* – Lateral margins of pronotum rounded; funicle 5-segmented; corneous area (in central portion) occupying basal third of antennal club; eye about one-third divided by an emargination. All are consanguineously polygynous and xylomycetophagous. Distribution: mostly in SE Asia to Australia and Africa.

Collected species: *Xylosandrus crassiusculus* (Motschulsky), b.l. : 2.7 mm

Xylosandrus aff. *compactus* Eichhoff, b.l. : 1.9 mm

Xylosandrus discolor (Blandford), b.l. : 1.8 mm

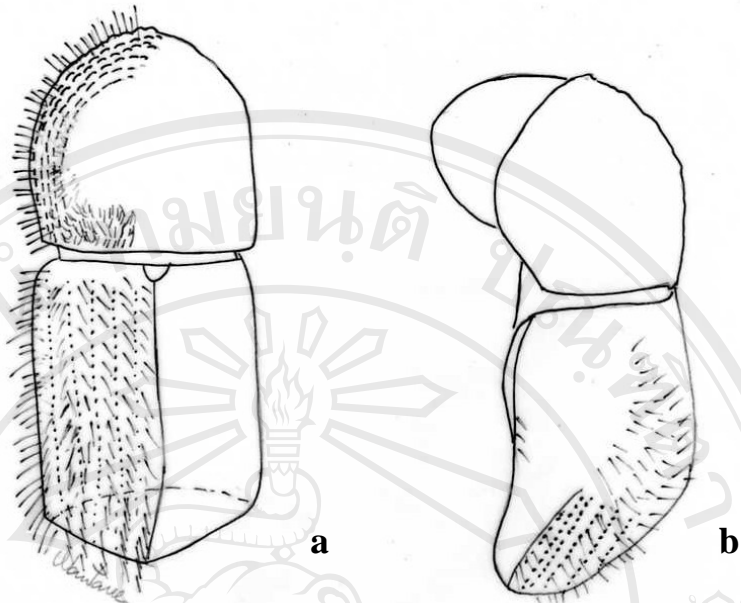


Figure 59 *Xylosandrus crassiusculus*, Female, pronotum and elytra in:
a,dorsal view; **b**, lateral view.

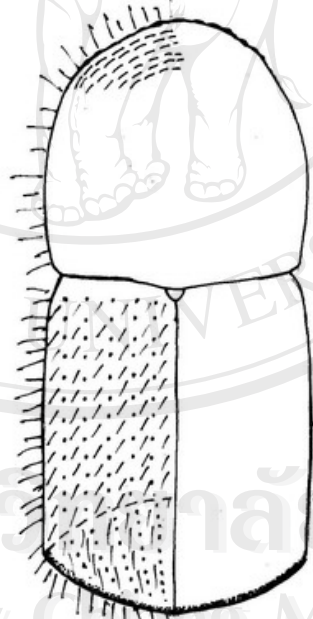


Figure 60 Dorsal view of *Xylosandrus aff. compactus*, Female.

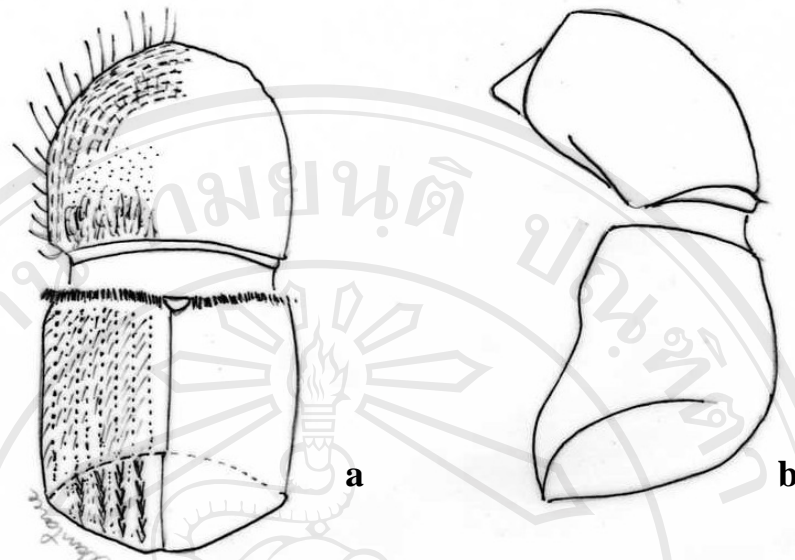


Figure 61 *Xylosandrus discolor*, Female, pronotum and elytra in: **a**, dorsal view; **b**, lateral view.

Genus *Xyleborinus* – Basal margins of elytra distinctly, shallowly emarginated in scutellar area, emargination usually filled by dense setae, scutellum displaced slightly cephalad into a visible, conical process; striae punctures in rows; declivity usually armed by tubercles or spines. All are consanguineously polygynous and xylomycetophagous.

Distribution: Mostly in SE Asia to Africa.

Collected species: *Xyleborinus andrewesi* (Blandford), b.l. : 2.2 mm

Xyleborinus exiguus (Blandford), b.l. : 1.8 mm

Xyleborinus spinipennis (Eggers), b.l. : 2.8 mm

Xyleborinus subgranulatus (Eggers), b.l. : 1.8 mm

Xyleborinus sp., b.l. : 1.9 mm

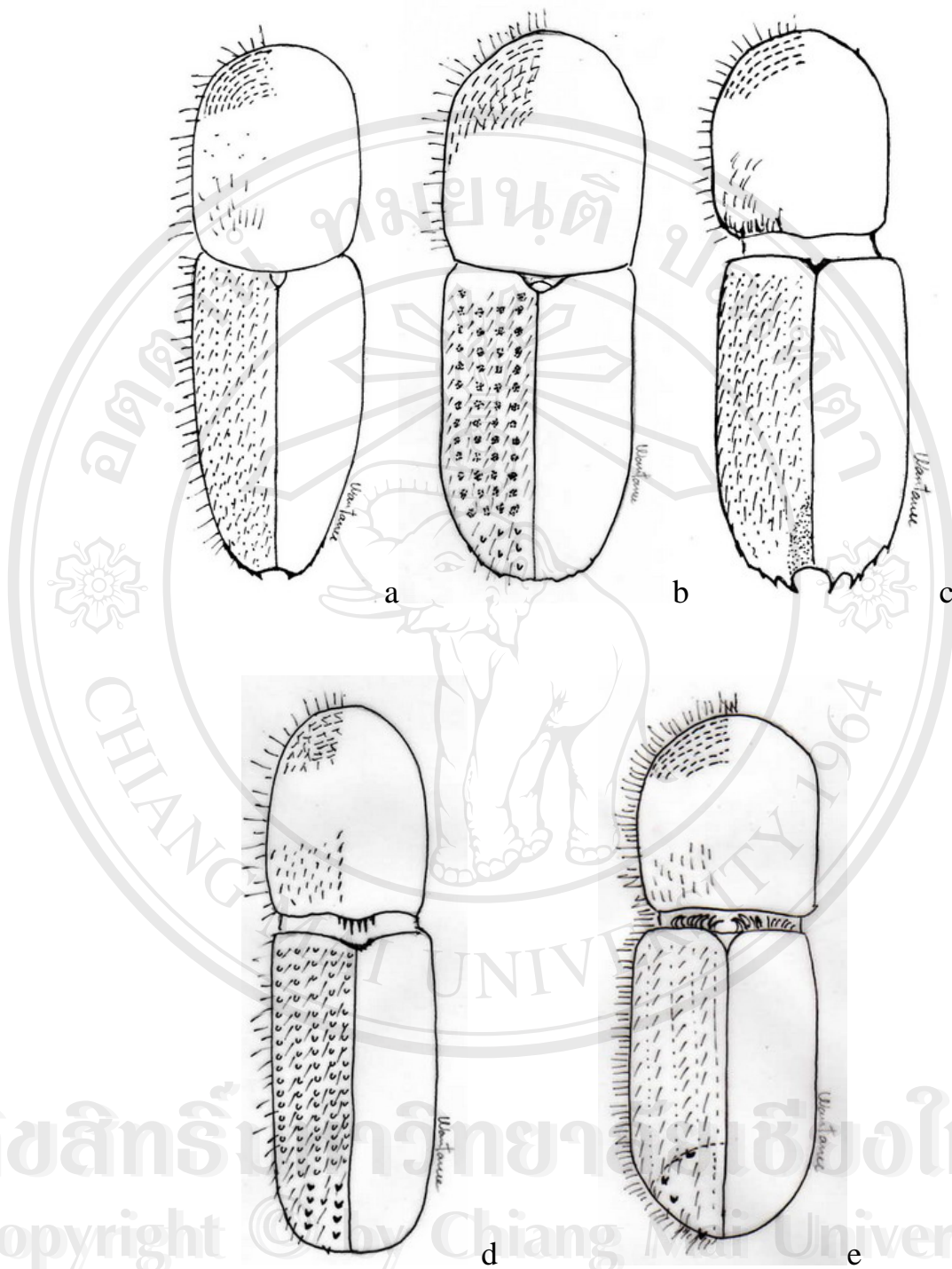


Figure 62 Dorsal views of ; **a**, *Xyleborinus andrewesi*, **b**, *Xyleborinus exiguus*, **c**, *Xyleborinus spinipennis*, **d**, *Xyleborinus subgranulatus*, **e**, *Xyleborinus* sp.

Genus *Eccoptopterus* – Metatibia abnormally large and broad, socketed denticles on lateral margin obsolete; metatarsus unusually long, very strongly compressed; declivity extending almost to base of elytra, armed by very coarse spines. All are consanguineously polygynous and xylomycetophagous.

Distribution: SE Asia to Australia and adjacent islands, and Africa.

Collected species: *Eccoptopterus spinosus*(Oliver) , b.l. : 2.5 mm

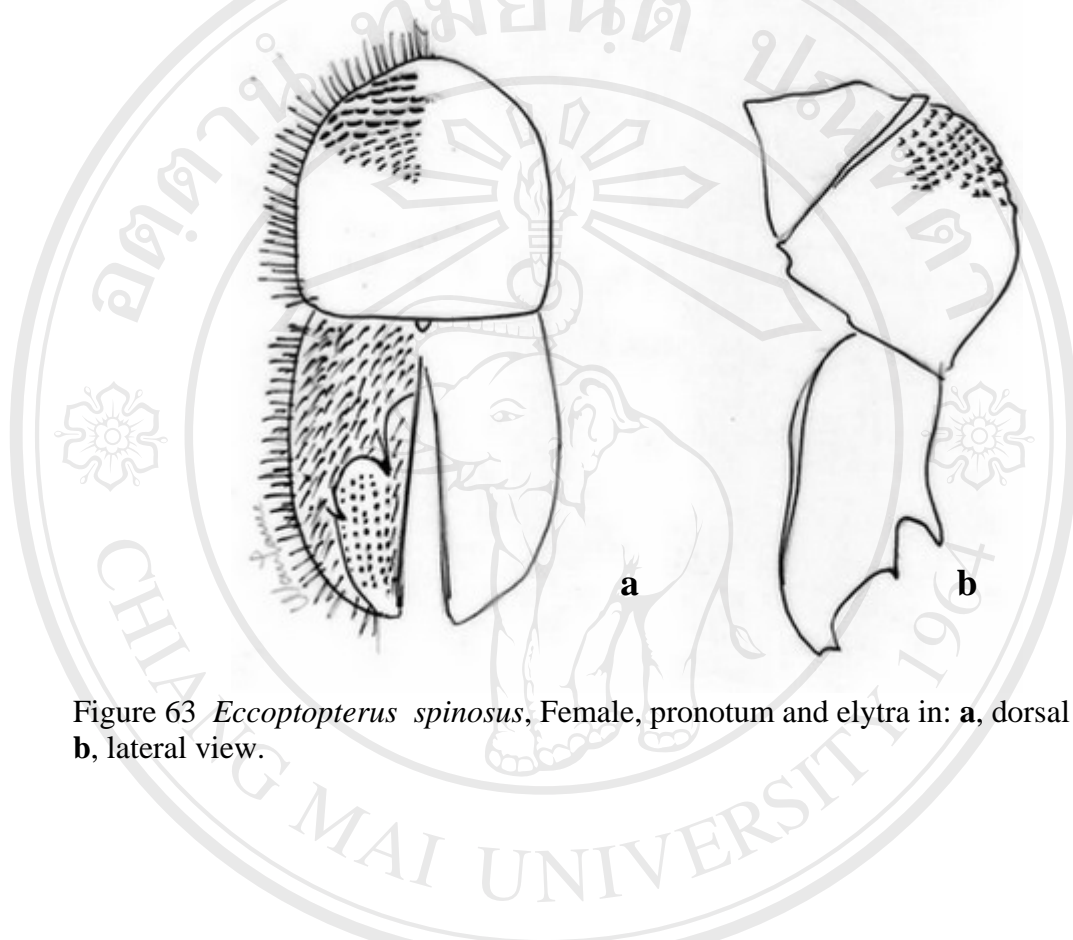


Figure 63 *Eccoptopterus spinosus*, Female, pronotum and elytra in: **a**, dorsal view; **b**, lateral view.

Genus *Coptodryas* – Strial punctures in definite rows; declivity convex, without a marginal costa, variously sculptured; elytra scales never present. All are consanguineously polygynous and xylomycetophagous.

Distribution: SE Asia to Australia and adjacent islands.

Collected species: *Coptodryas* sp. 1- 3, b.l. : 1.7 – 2.8 mm

Coptodryas alpha (Sampson), b.l. : 1.9 mm

Coptodryas elegans (Sampson), b.l. : 2.5 mm

Coptodryas fragosus (Schedl), b.l. : 2 mm

Coptodryas aff. *perparlus* (Sampson), b.l. : 1.7 mm

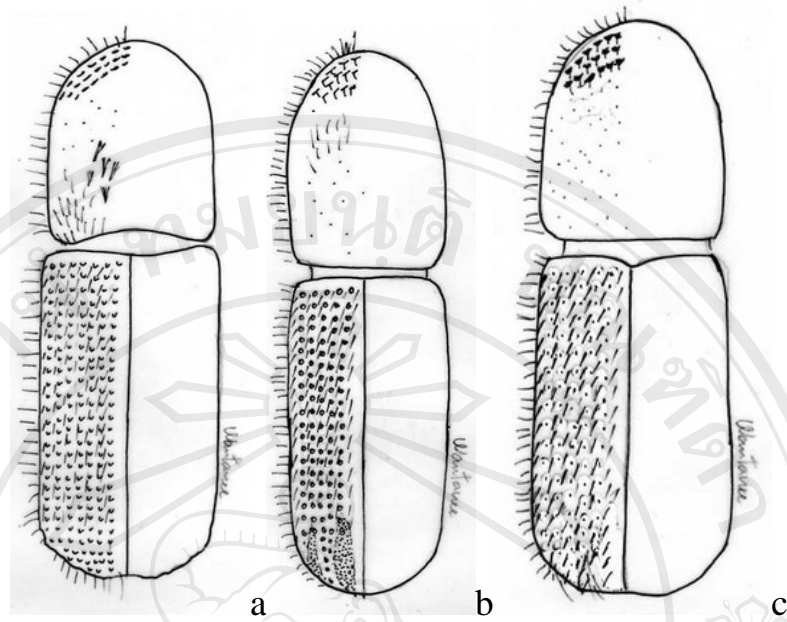


Figure 64 Dorsal views of *Coptodryas* sp., Female, **a**, *Coptodryas* sp.1
b, *Coptodryas* sp.2, **c**, *Coptodryas* sp.3

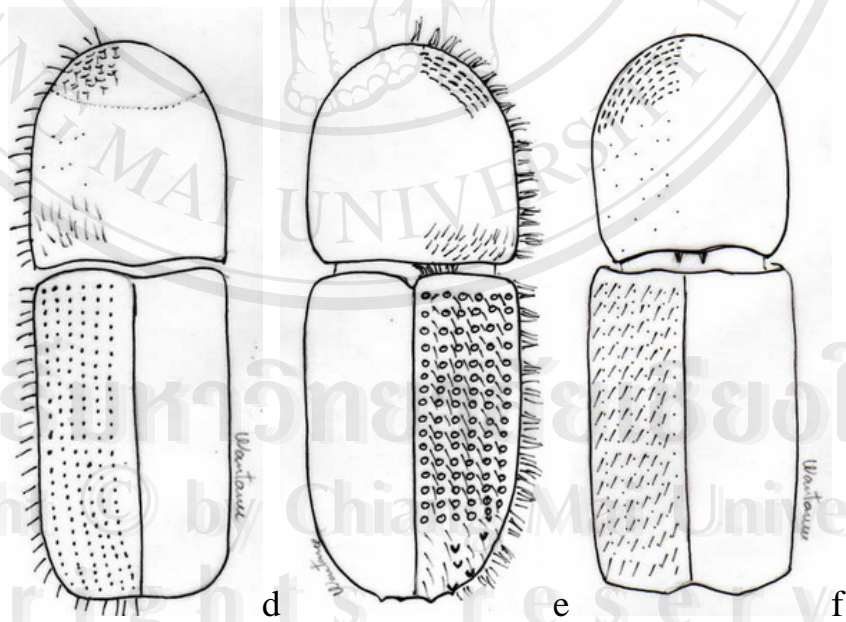


Figure 65 Dorsal views of; **d**, *Coptodryas alpha*, **e**, *Coptodryas fragosus* ,
f, *Coptodryas aff.perparlus*.

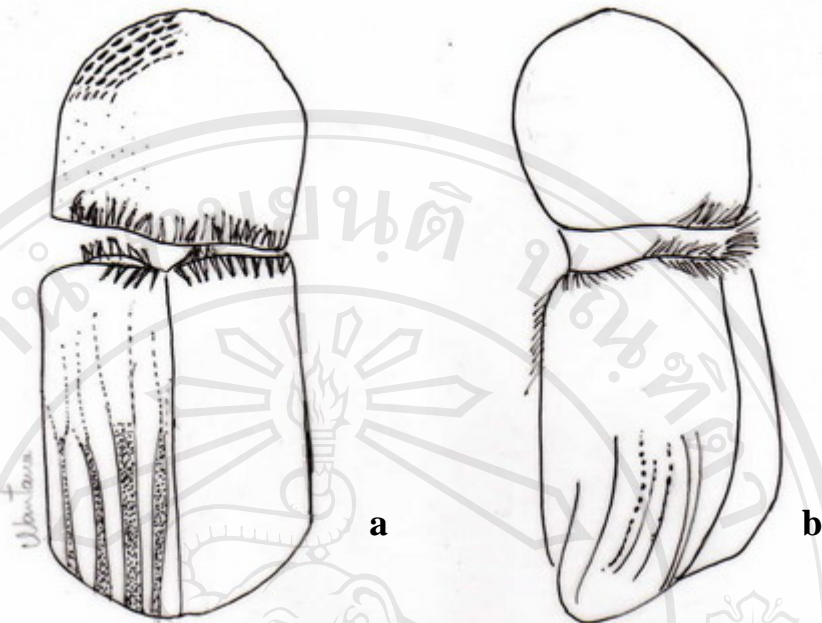


Figure 66 *Coptodryas elegans*, Female, pronotum and elytra in: **a**, dorsal view; **b**, lateral view.

Genus *Webbia* – Head globose, frons plano-convex; elytra truncate at base of declivity, never acuminate or mucronate at sutural apex; declivital margin abrupt, usually armed; body fairly long and cylindrical. All are consanguineously polygynous and xylomycetophagous.

Distribution: SE Asia to Indonesia and the Philippines.

Collected species: *Webbia cornutus* Schedl, b.l. : 2mm

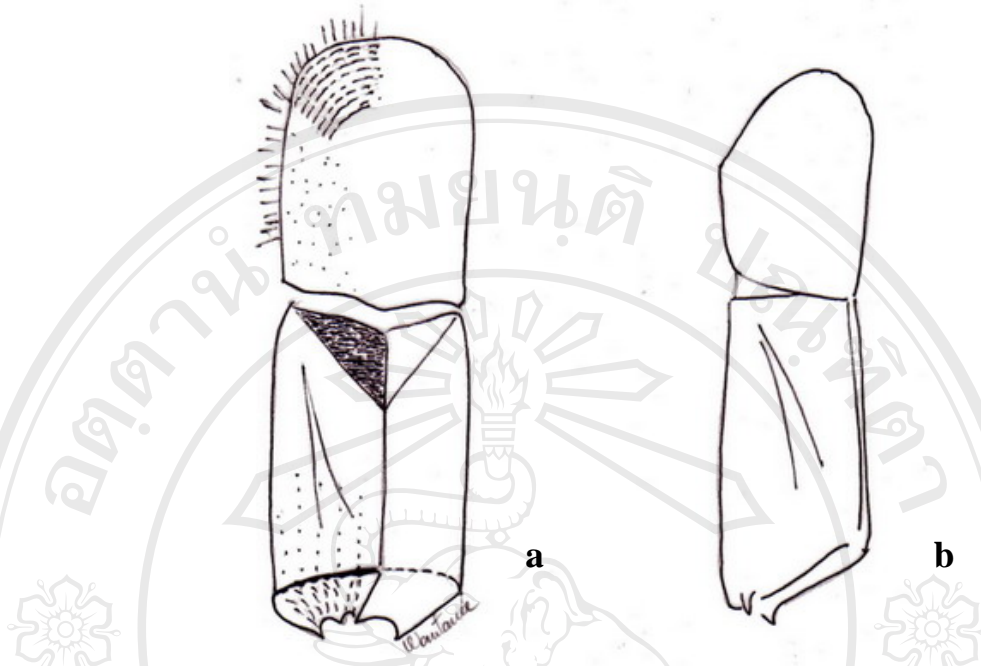


Figure 67 *Webbia cornutus*, Female, pronotum and elytra in: **a**, dorsal view; **b**, lateral view.

Tribe Cryphalini

Description: Frons rarely dimorphic usually convex, usually not adorned; eye usually entire, shallowly emarginated in a few genera; antennal scape elongate, simple, funicle 3- to 5-segmented, club moderately to strongly flattened; pronotum coarsely aspirate on anterior slope, anterior margin usually armed, lateral and basal margins usually (but not always) marked by a finely elevated line.

Genus *Cryphalus* – Antennal funicle 4-segmented, sutures on club recurved. All are monogamous and phloeophagous.

Distribution: Numerous number in Asia to Australia and adjacent islands, with a very few species in North and South America.

Collected species: *Cryphalus kesiyae* Browne, b.l. : 1.6 mm
Cryphalus sp. 1, 2

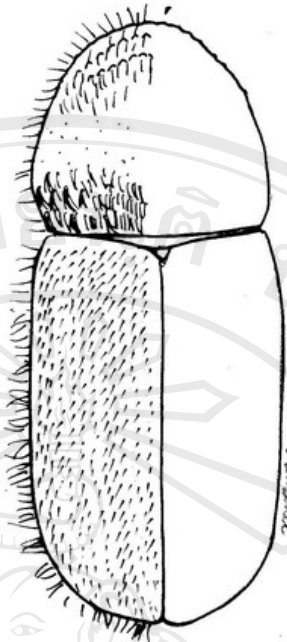


Figure 68 Dorsal view of *Cryphalus kesiyaе*

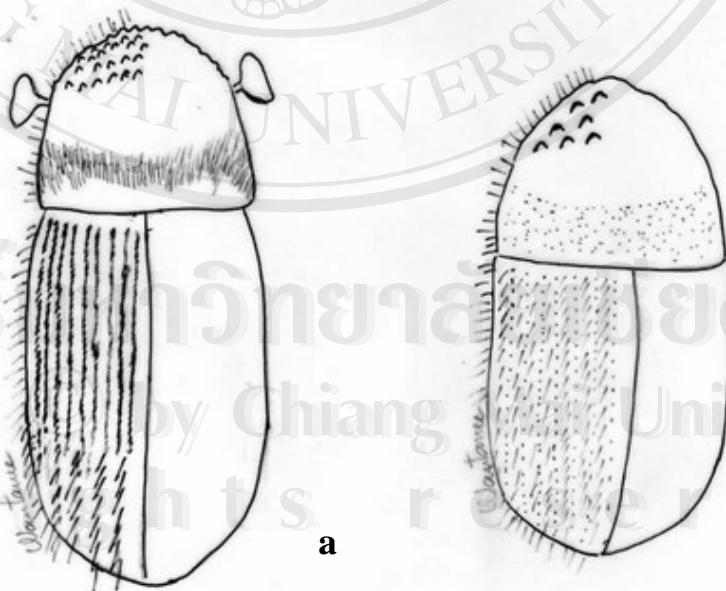


Figure 69 Dorsal views of *Cryphalus* sp., Female, **a**, *Cryphalus* sp.1; **b**, *Cryphalus* sp.2

Genus *Hypothenemus* – Anterior margin of pronotum usually armed by 1-8 serrations; antennal funicle 3- to 5-segmented; antennal club clearly marked by sutures; mature color usually darker, vestiture more abundant. All are consanguineously polygynous and myelophagous, phloeophagous, or spermophagous.

Distribution: Mostly in Tropical and subtropical areas, with some from North and Central America.

Collected species: *Hypothenemus* sp. 1 and sp.2, b.l. : 2.2 mm

Hypothenemus areccae Hornung, b.l. : 1.4 mm

Hypothenemus aulmanni (Hagedorn), b.l. : 1.9 mm

Hypothenemus birmanus (Eichhoff), b.l. : 1.9 mm

Hypothenemus eruditus Westwood, b.l. : 1.5 mm

Hypothenemus glabripennis (Hopkins), b.l. : 2.5 mm

Hypothenemus seriatus (Eichhoff), b.l. : 1 mm

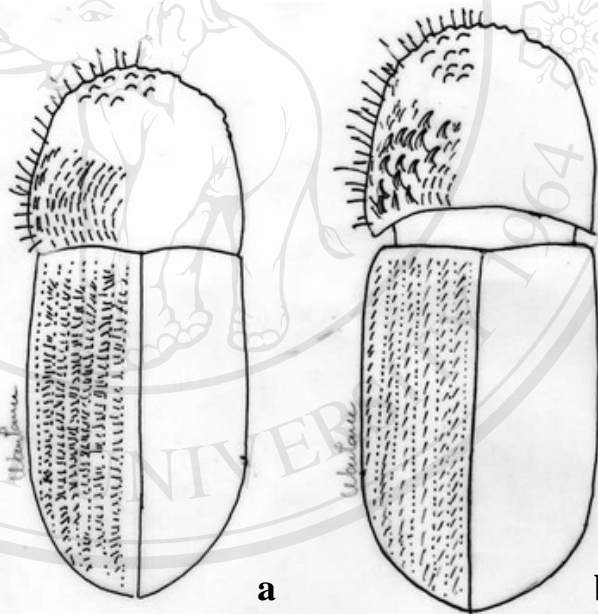


Figure 70 Dorsal views of *Hypothenemus* sp., Female, **a**, *Hypothenemus* sp.1; **b**, *Hypothenemus* sp.2

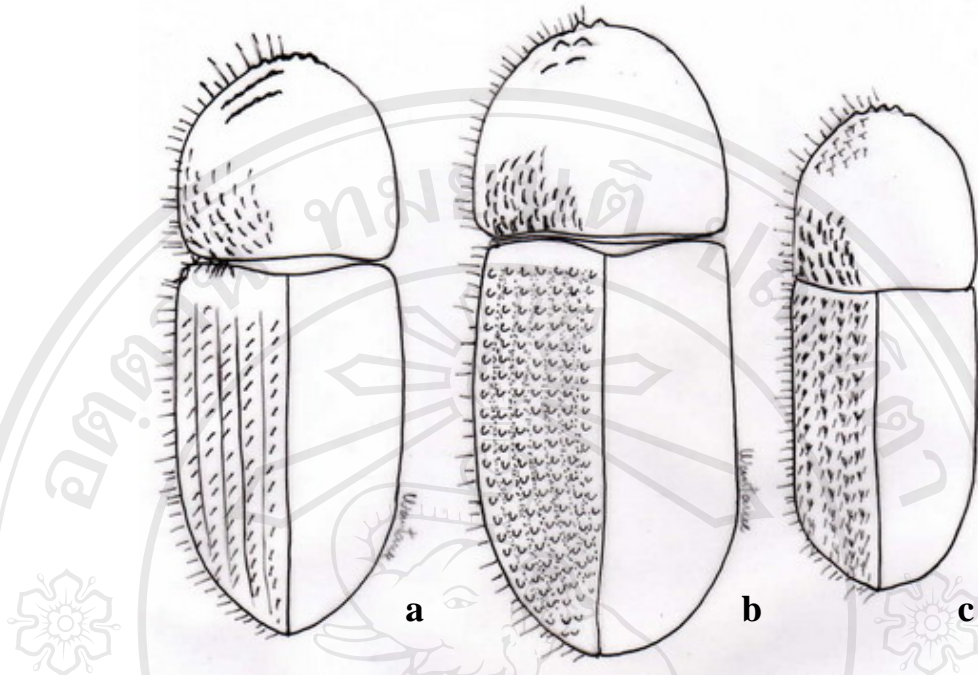


Figure 71 Dorsal views of *Hypothenemus* sp., Female; **a**, *H. seriatus*; **b**, *H. glabripennis*; **c**, *H. eruditus*.

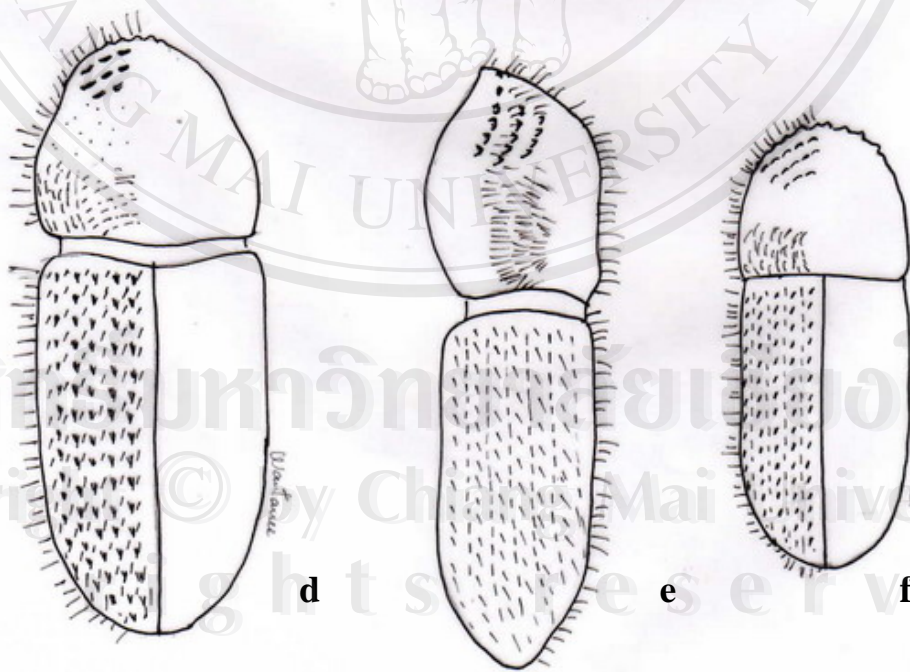


Figure 72 *Hypothenemus* sp., Female, **d**, dorsal view of *H. birmanus*; **e**, lateral view of pronotum and elytra of *H. aulmanni*; **f**, dorsal view of *H. areccae*.

Tribe Corthylini

Description: Frons usually dimorphic, either or both sexes feebly to strongly modified in sculpture and ornamentation; eye emarginated; scape usually elongate; funicle 1- to 5-segmented; club strongly flattened, suture present or obsolete; vestiture usually hairlike, scales rarely present. On a biological basis, the tribe is readily divisible into the phloeophagous Pityophthorina and the xylomycetophagous Corthylina.

Corthylini:Corthylina

Genus *Gnatharus* – Antennal funicle 4-segmented; frons with median carina; pronotum dimorphic, female with anterior slope strongly declivous, armed by numerous asperities, anterolateral angles each bearing a tuft of hair, male slope gradual, asperities greatly reduced in size and number, anterior margin a strongly formed, slightly produced continuous costa; elytral declivity divaricate from middle, truncated before apex.

Distribution: Asia (Tibet).

Collected species: *Gnatharus tibetensis* Wood and Yin, b.l. : 2.0 mm

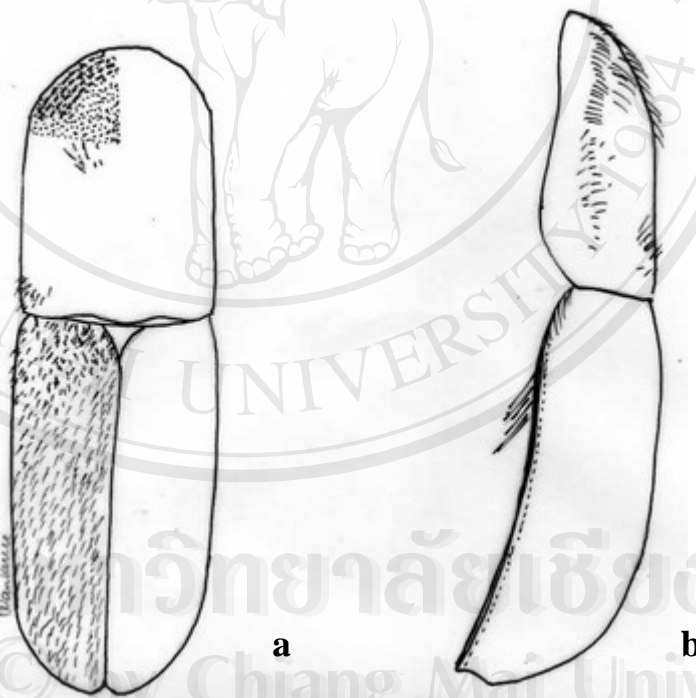


Figure 73 *Gnatharus tibetensis*, Female, pronotum and elytra in: **a**, dorsal view; **b**, lateral view.

FAMILY PLATYPODIDAE

(Based on Browne 1961 and Wood 1993)

Subfamily Tesserocerinae

Description: Posterior margin of prothorax strongly procurved in pleural area; mesepisternum large, usually inflated (concave in some Tesserocerinae); pronotum often with conspicuous grooves or pores extending into mycetangia; scutellum, if present, rising gradually, usually carinate and apically pointed; procoxae enlarged; eyes usually rounded, hemispherical; tarsal segment 1 always elongate, usually longer than segments 2-5 combined.

Genus *Diapus* – Anterior face of antennal club with a small area or line smooth, shining, often weakly elevated; base of female pronotum (occasionally also male) with a band of many mycetangia pores or grooves; scutellum smaller, narrower, often depressed; frons more sparsely pubescent in both sexes; newly emerged female usually with dehiscent mandibular appendages.

Distribution: India to Australia

Collected species: *Diapus aculeatus* Blandford, body length (b.l.) : 2.9 mm

Diapus quinquespinatus Chapuis, b.l.: male 3mm; female 3.5 mm

Diapus ? merudensus Beaver, b.l. : 3 mm

Diapus sp.n.1. male (2.2mm) + female (2.8mm)

Diapus sp.n.2. female (3.5mm)

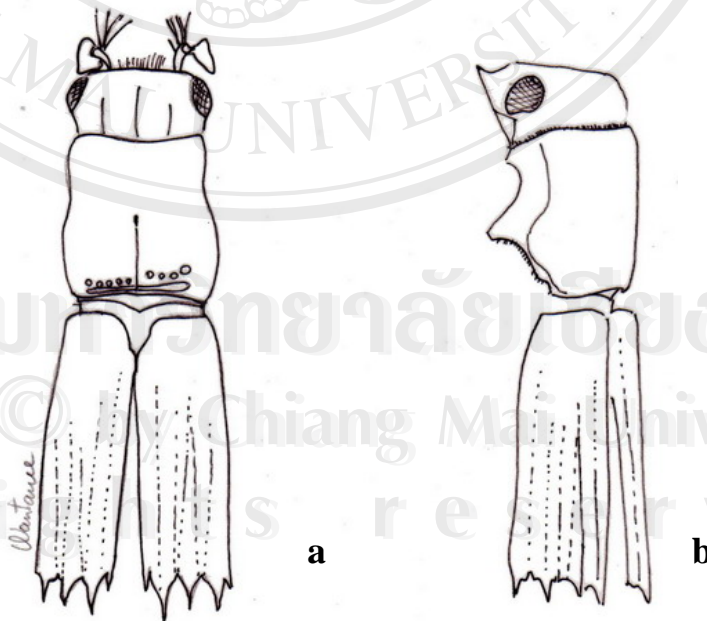


Figure 74 *Diapus quinquespinatus*, Male: **a**, dorsal view; **b**, lateral view.

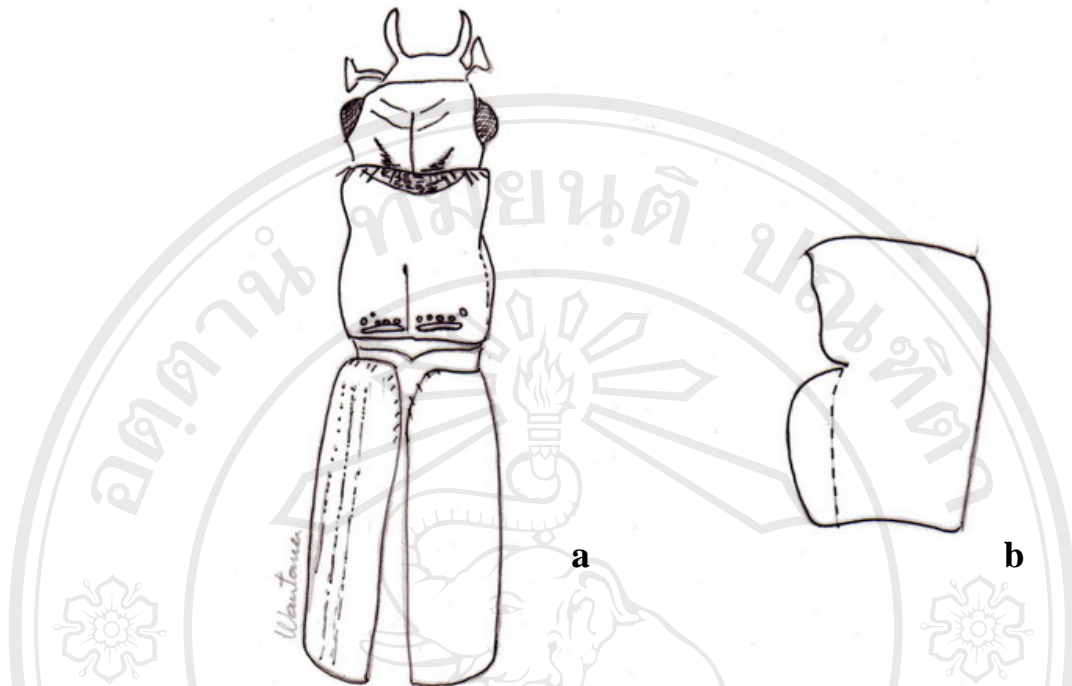


Figure 75 *Diapus quinquespinatus*, Female: **a**, dorsal view; **b**, lateral view of pronotum.

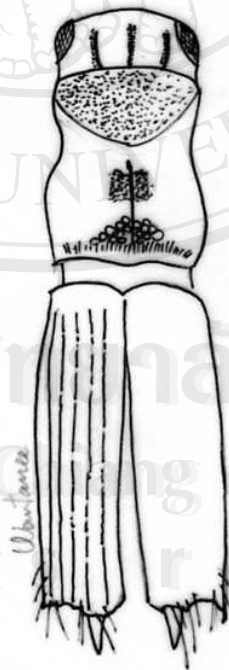


Figure 76 *Diapus aculeatus*, Male, dorsal view.

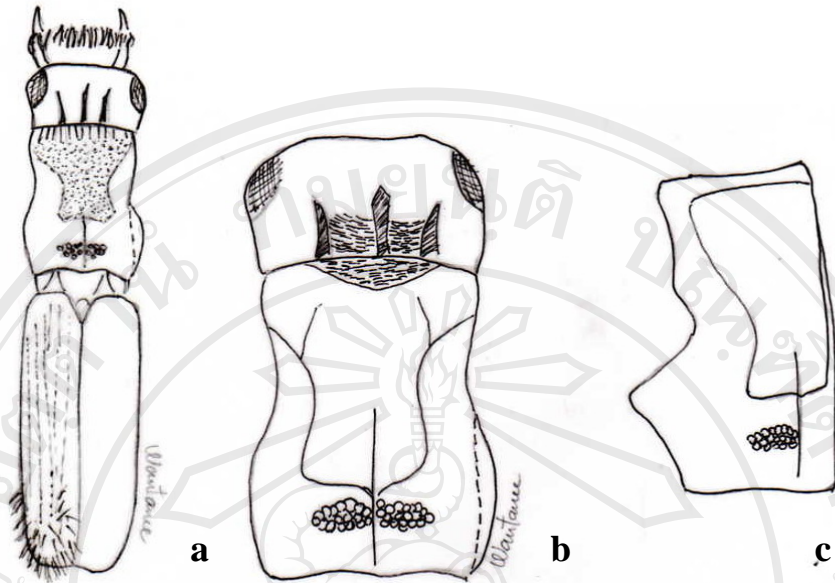


Figure 77 *Diapus* sp.n.1.,Female: **a**, dorsal view; **b**, head and pronotum; **c**, pronotum in lateral view.

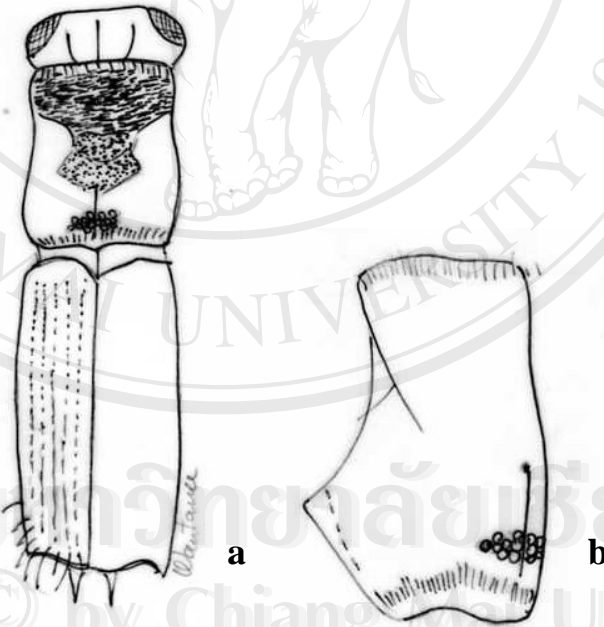


Figure 78 *Diapus* sp.n.1.,Male: **a**, dorsal view; **b**, pronotum in lateral view.

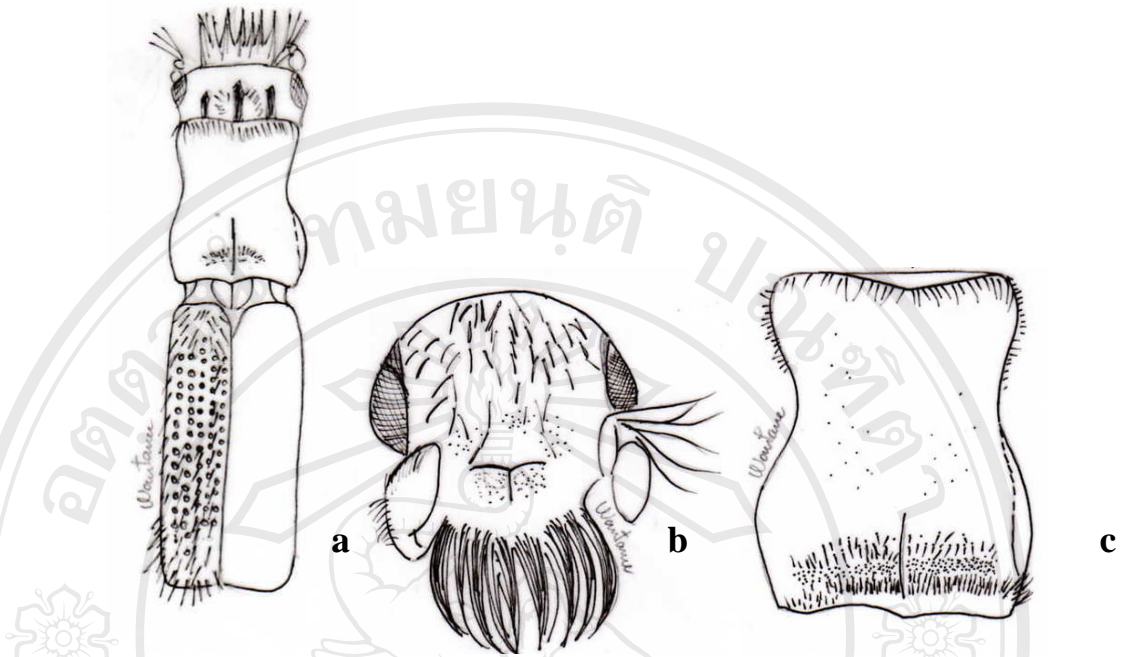


Figure 79 *Diapus* sp.n.2, Female: **a**, dorsal view; **b**, frons; **c**, pronotum in dorsal view.

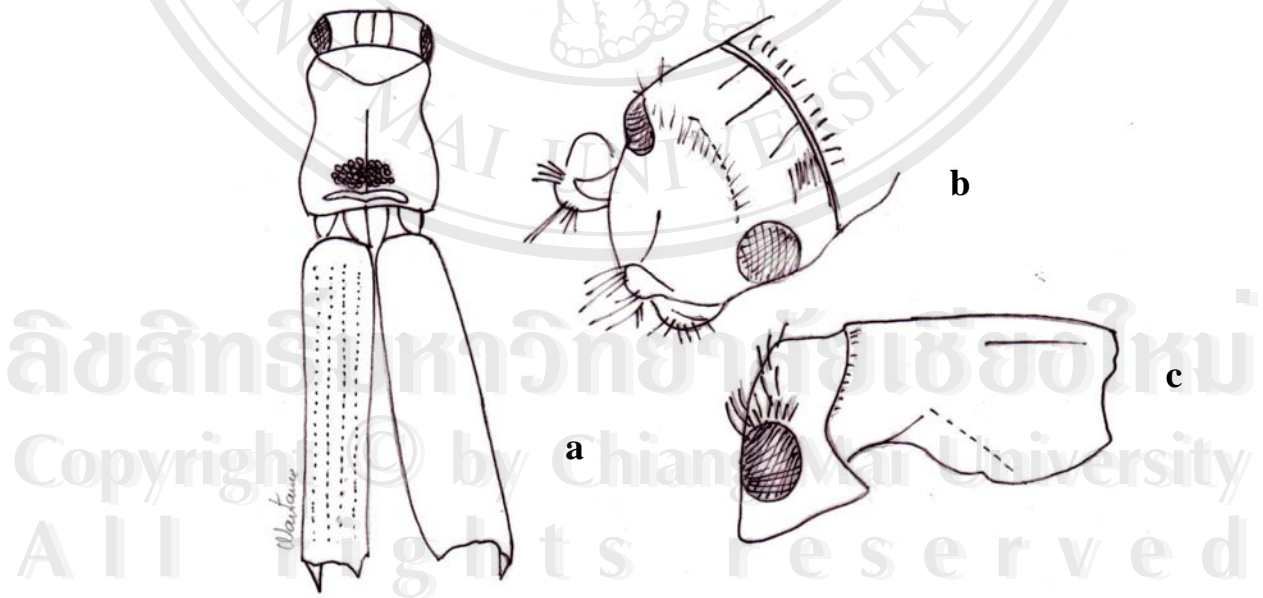


Figure 80 *Diapus* ?*merudensus*, Male: **a**, dorsal view; **b**, frons; **c**, pronotum in lateral view..

Genus *Genyocerus* – Antennal club uniformly pubescent to base; base of pronotum ornamented in median area by few coarse mycetangia pores, never with grooves; scutellum larger, broader, higher; female frons usually ornamented by tufts of very long setae; female dehiscent mandibular appendages usually absent.

Distribution: India and Sri Lanka to Philippines and New Guinea.

Collected species: *Genyocerus diaphanus* (Schedl) male (2.8mm); female(3mm)

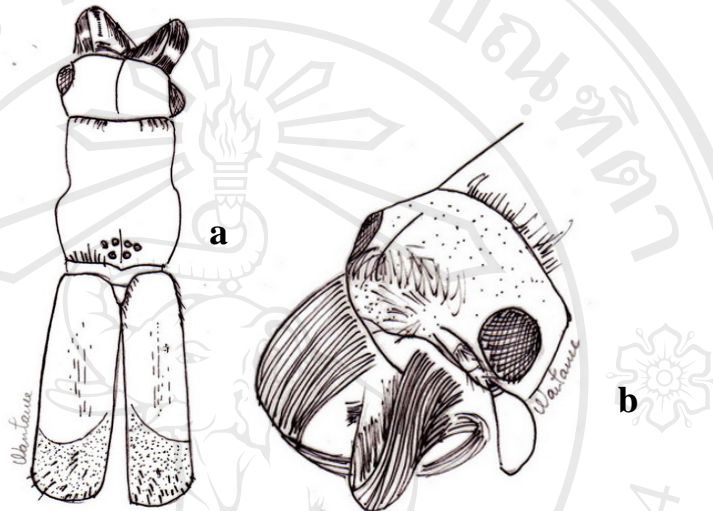


Figure 81 *Genyocerus diaphanus*, Female: **a**, dorsal view; **b**, frons.

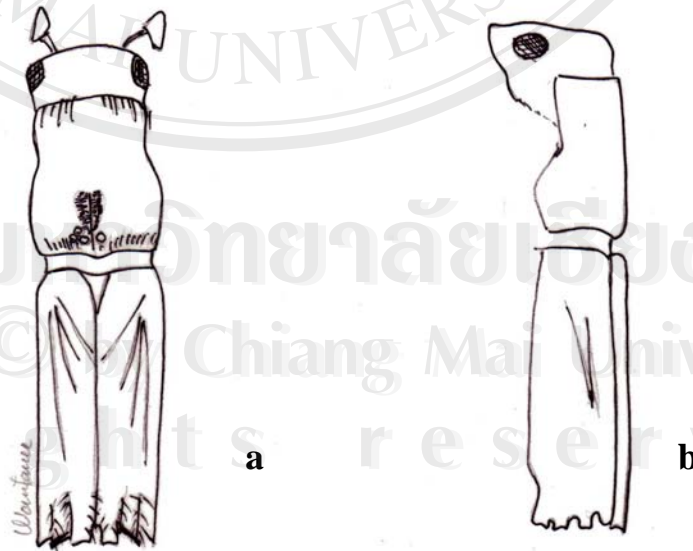


Figure 82 *Genyocerus diaphanus*, Male: **a**, dorsal view; **b**, lateral view.

Subfamily Platypodinae

Descripton: Metasternum and metepisternum near metacoxa usually weakly or not impressed for reception of femur, anterior margin of impressed area never continuously carinate or armed by a row of small spines ; protibia of male armed by about four or more coarse, transverse rugae, female either similar to male or sometimes mostly covered by small, confused granules and usually one or two weak rugae near tarsal insertion.

Genus *Platypus* - Suture at apex of male elytral declivity entire, declivity variously convex, with or without armature of tubercles and spines; if present, female mycetangia pores on pronotum numerous.

Distribution : Most tropical and subtropical areas

Collected species: *Platypus insulindicus* Schedl, b.l. : 3.4 mm

Platypus quercivorus Murayama, male (4.2mm); female (4.5mm)

Platypus aff. *pasaniae* (Schedl), b.l. : 4.2 mm

Platypus pseudospinulosi (Schedl), b.l. : 4 mm

Platypus vetulus Schedl, b.l. : 4.2 mm

Platypus sp. 1, male(5.8 mm)

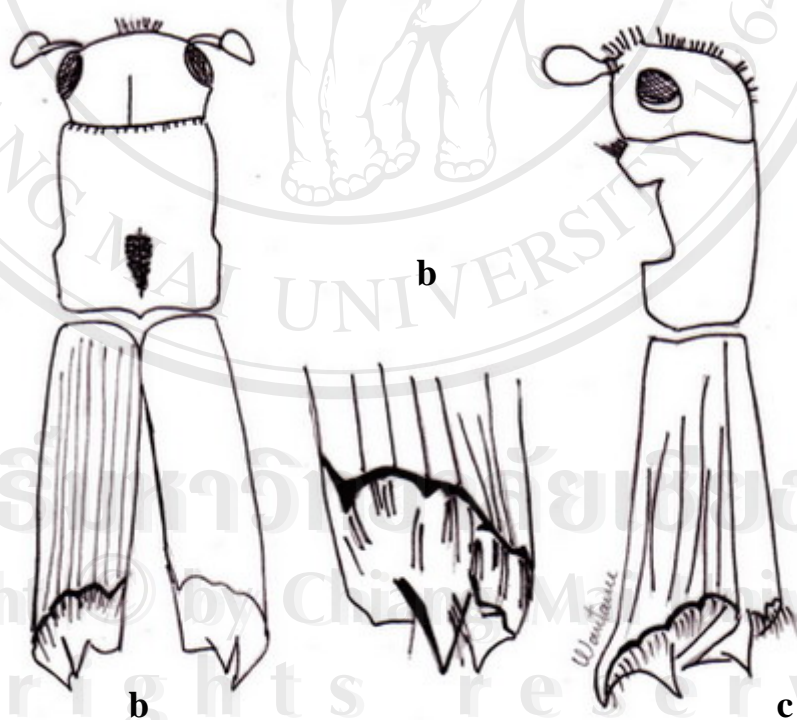


Figure 83 *Platypus insulindicus*, Male: **a**, dorsal view; **b**, apico-dorsal view of elytra; **c**, lateral view.

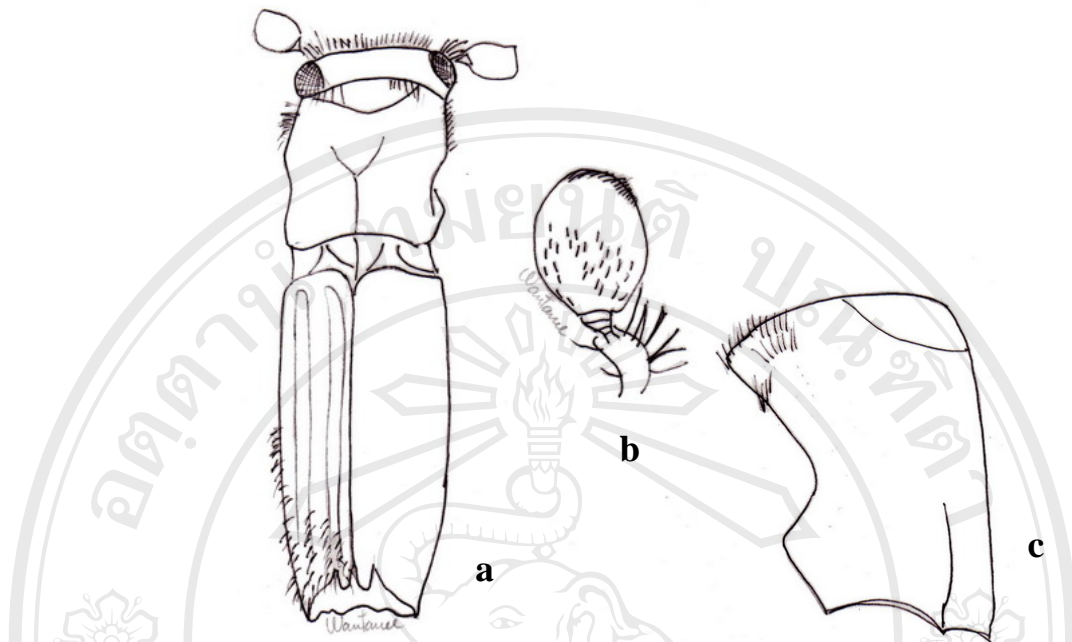


Figure 84 *Platypus quercivorus*, Male: **a**, dorsal view; **b**, antenna; **c**, lateral view of pronotum.



Figure 85 *Platypus quercivorus*, Female: **a**, dorsal view; **b**, antenna; **c**, lateral view of pronotum.



Figure 86 *Platypus pseudospinulosi*, Male: **a**, Dorsal view; **b**, apico-dorsal view of elytra; **c**, apico-lateral view of elytra.

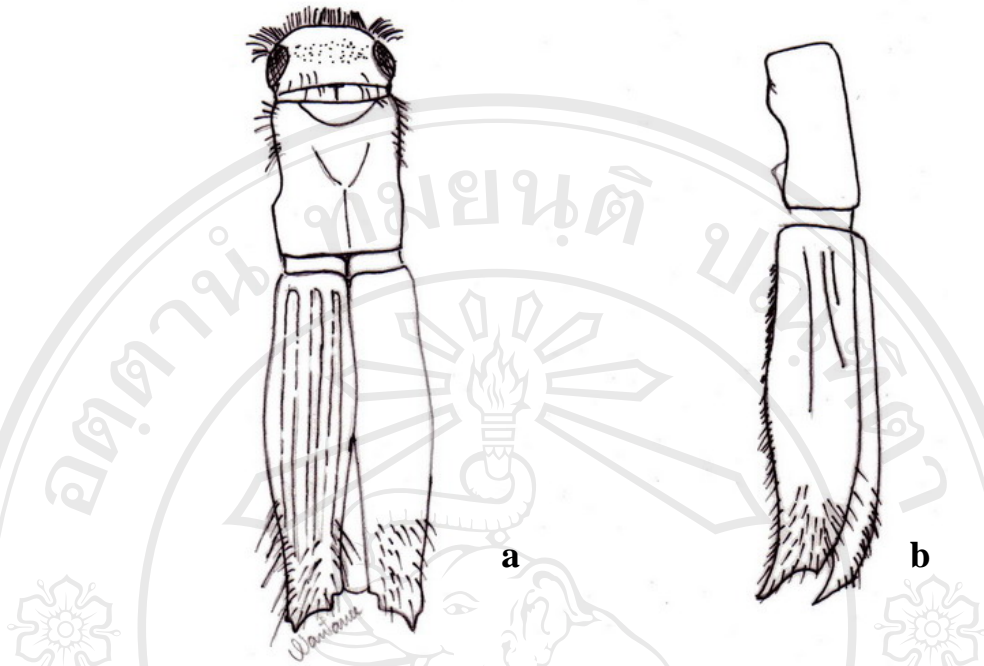


Figure 87 *Platypus* sp.1 , Male: **a**, dorsal view; **b**, pronotum and elytra in lateral view.

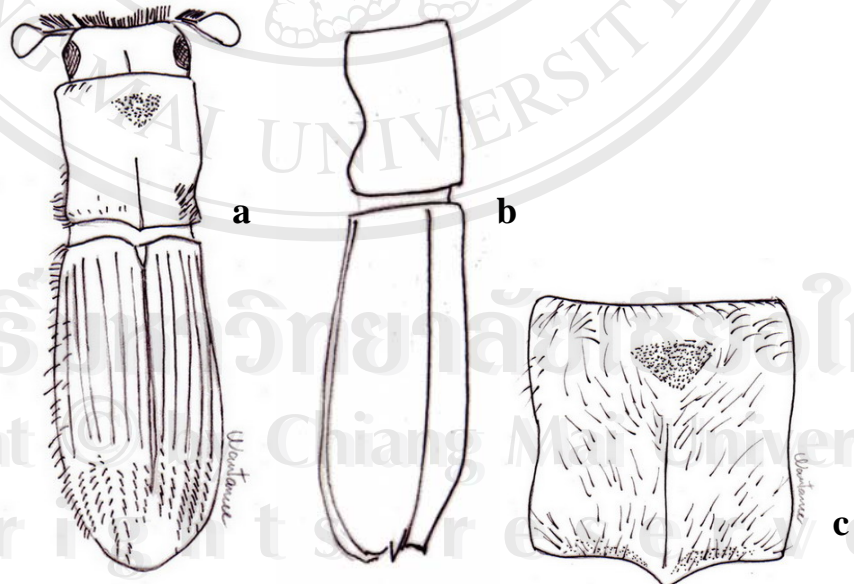


Figure 88 *Platypus vetulus*, Male: **a**, dorsal view; **b**, pronotum and elytra in lateral view; **c**, dorsal view of pronotum.

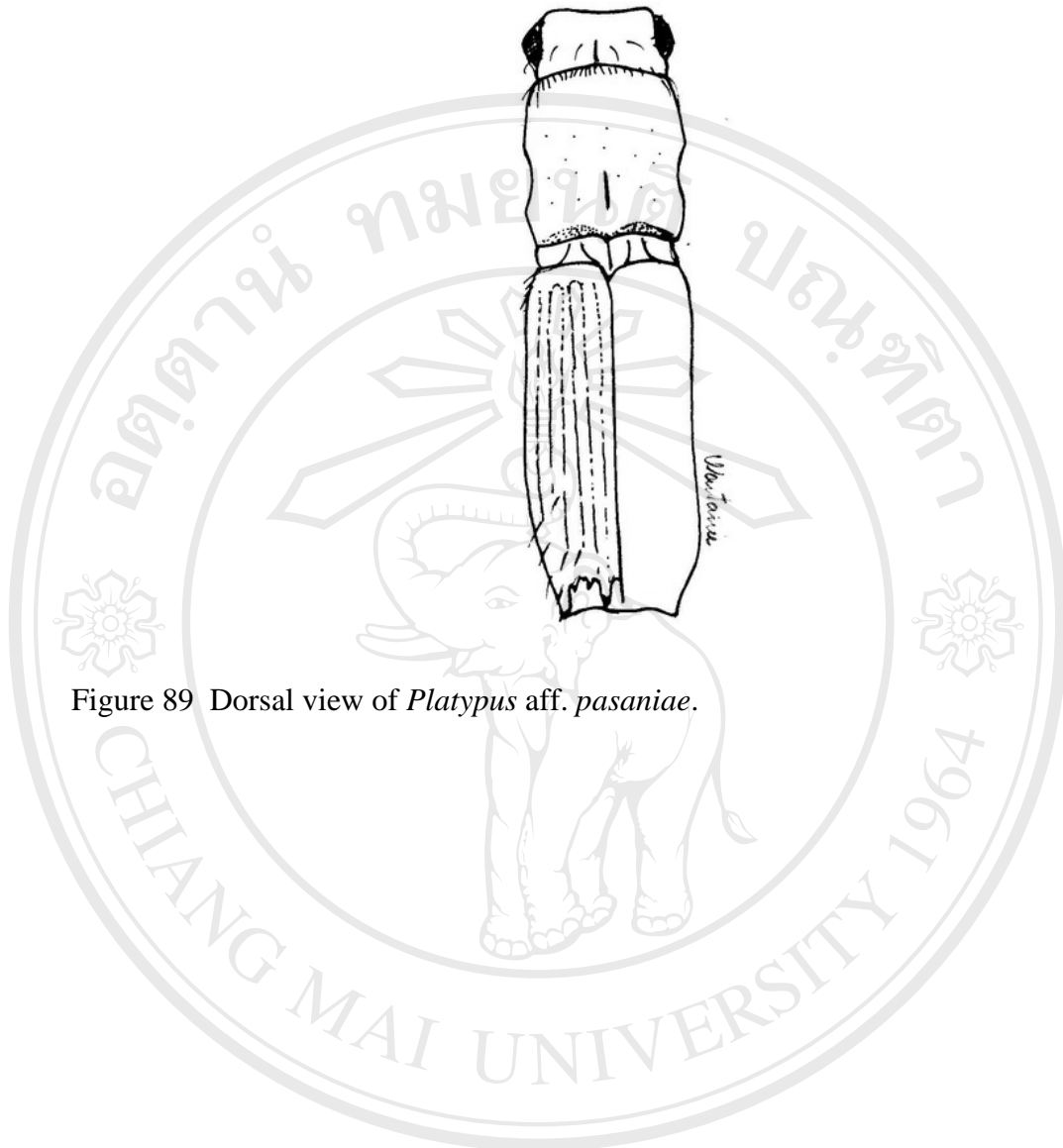


Figure 89 Dorsal view of *Platypus aff. pasaniae*.

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
Copyright © by Chiang Mai University
All rights reserved

Genus *Treptoplatypus* – Elytral apex of male moderately to exceedingly attenuate, strongly narrowed to true base of declivity, dehiscence of suture sometimes small, obscure, basal margin of declivity usually more gradual, sometimes rounded.

Distribution: India and Japan to Australia.

Collected species: *Treptoplatypus solidus* (Walker),
 b.l.: male (4.5mm); female (4.5mm)
Treptoplatypus sp. female

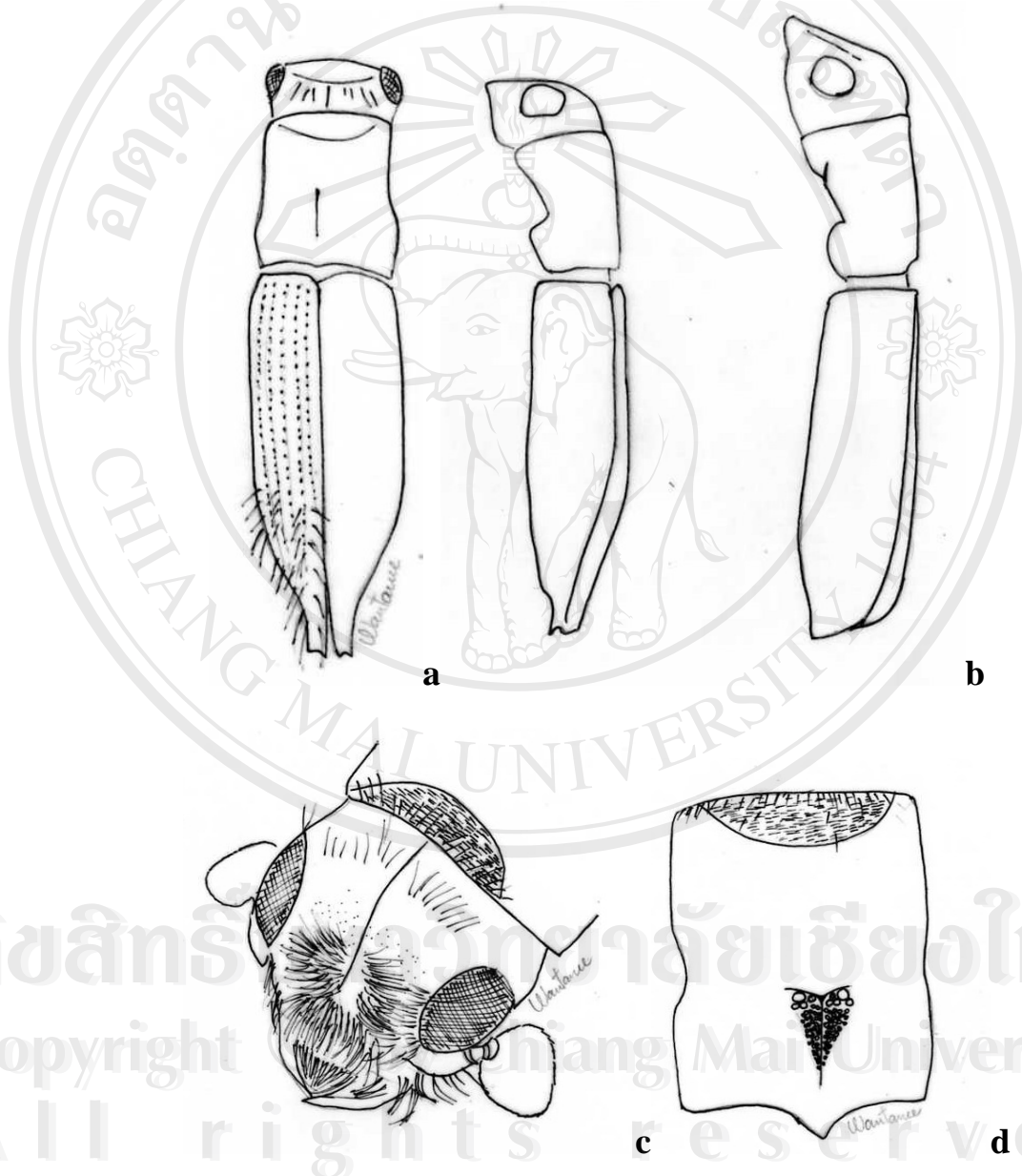


Figure 90 *Treptoplatypus solidus*: **a**, male in dorsal view; **b**, lateral view of male and female; **c**, frons; **d**, dorsal view of female's pronotum.

Genus *Peroplatypus* – Male elytral declivity much more broadly truncate, declivital base almost as wide as base of elytra, basal margin abrupt, obtusely to very acutely margined, declivital face largely dull in most species; female elytra elongate, flattened; mycetangia on pronotum.

Distribution: Malaya to New Guinea.

Collected species: *Peroplatypus fagacearum*, b.l.(male: 4.5mm); (female: 6mm)

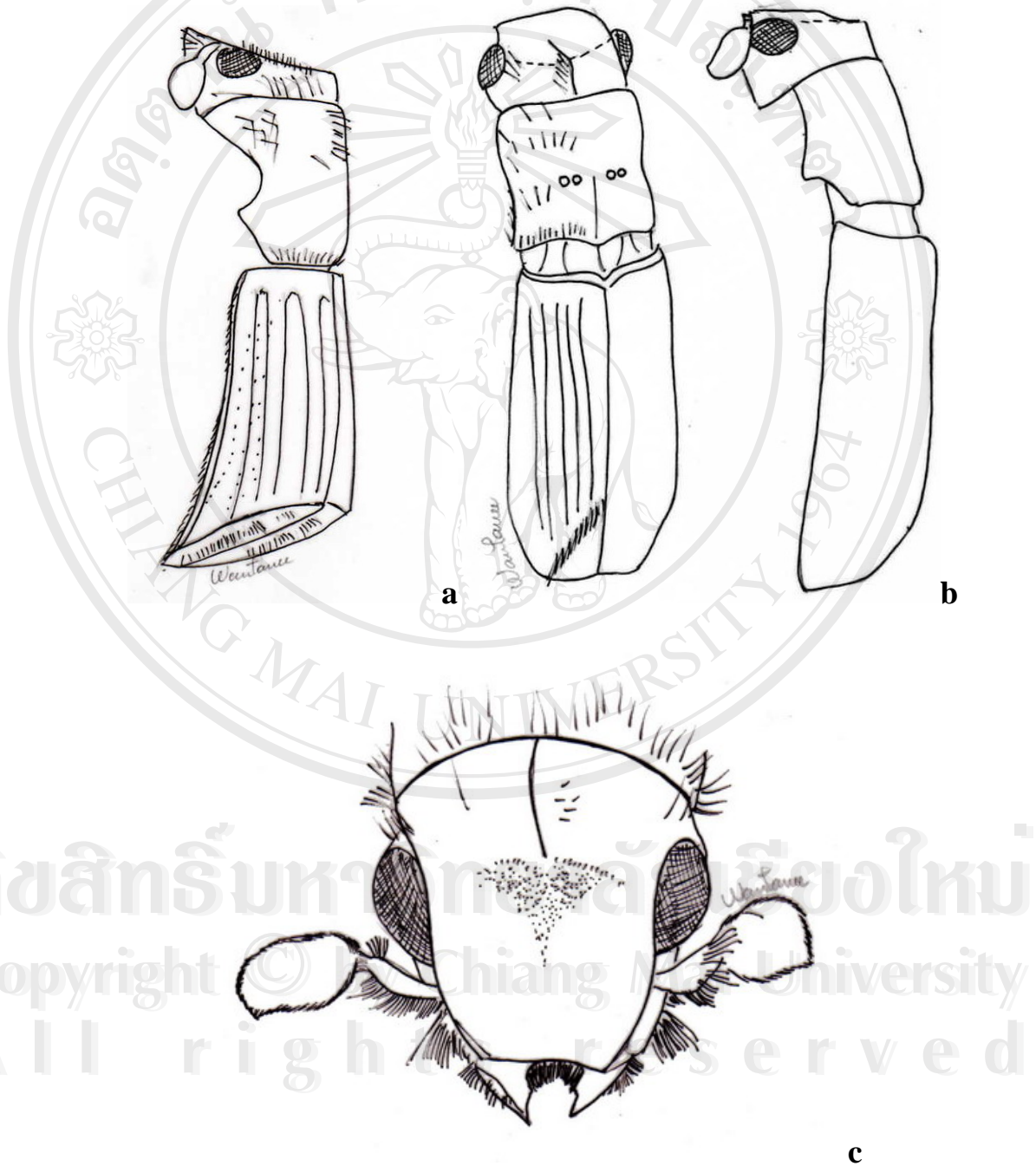


Figure 91 *Peroplatypus fagacearum* : a, Male ,lateral view; b, female in dorsal view and lateral view; c, frons of female.

Genus *Dinoplatypus* – Male sutural apex moderately to very strongly, very broadly emarginated; margin at base of male declivity moderately to strongly acute, face of declivity smooth, shining, glabrous, striae and interstriae never indicated; male declivity with a distinct constriction slightly anterior to declivital base.

Distribution: India and Japan to Australia and Micronesia.

Collected species: *Dinoplatypus brevis*, b.l. : 3.5 mm

Dinoplatypus sp.1, b.l. : 2.9 mm

Dinoplatypus sp. 2, b.l. : 4.2 mm



Figure 92 *Dinoplatypus brevis*, Male: **a**, dorsal view; **b**, lateral view.

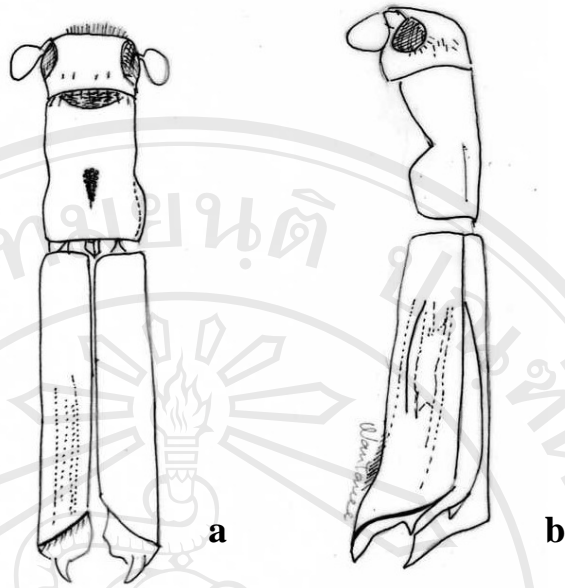


Figure 93 *Dinoplatypus* sp.1, Male: a, dorsal view; b, lateral view.



Figure 94 Dorsal view of *Dinoplatypus* sp.2, Female.

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
Copyright © by Chiang Mai University
All rights reserved

Genus *Crossotarsus* - Male declivity very short to absent, usually subvertical, a row of spines usually arms base of declivity, venter of abdomen rising abruptly to meet elytra; male metepisternum of larger species often armed near posterior end by one rounded nodule.

Distribution: India to Japan and Australia, *externedentatus* has extended its range through modern commerce to Hawaii and has been intercepted in several areas.

Collected species: *Crossotarsus externedentatus* (Fairmaire), b.l. : 3.9 mm

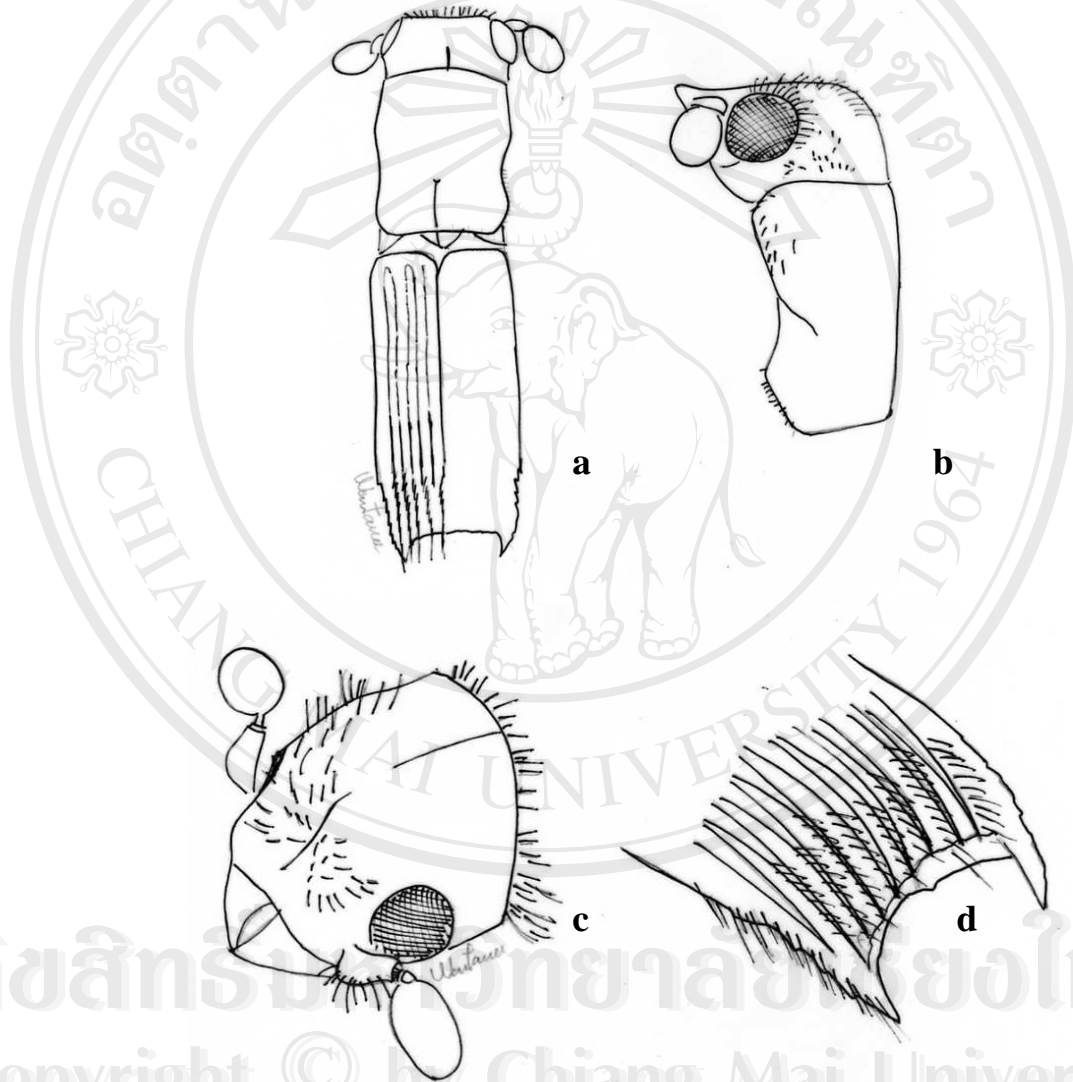


Figure 95 *Crossotarsus externedentatus*, Male: **a**, Dorsal view; **b**, lateral view of pronotum; **c**, frons; **d**, apico-dorsal view of elytra.

Genus *Euplatypus* – Male declivity with ventrolateral angles more strongly produced, usually exceeding apical margin at suture, projecting process usually more slender and often with its apex bi- or tridently armed; pronotum often with one pair of mycetangia pores in female, less common in male.

Distribution: Southern USA to Argentina, a few in Africa, Madagascar. *Euplatypus parallelus* (Fabricius) has been carried through modern commerce worldwide in tropical areas and had been intercepted in Australia and India.

Collected species: *Euplatypus parallelus* (Fabricius), b.l. : 4.5 mm

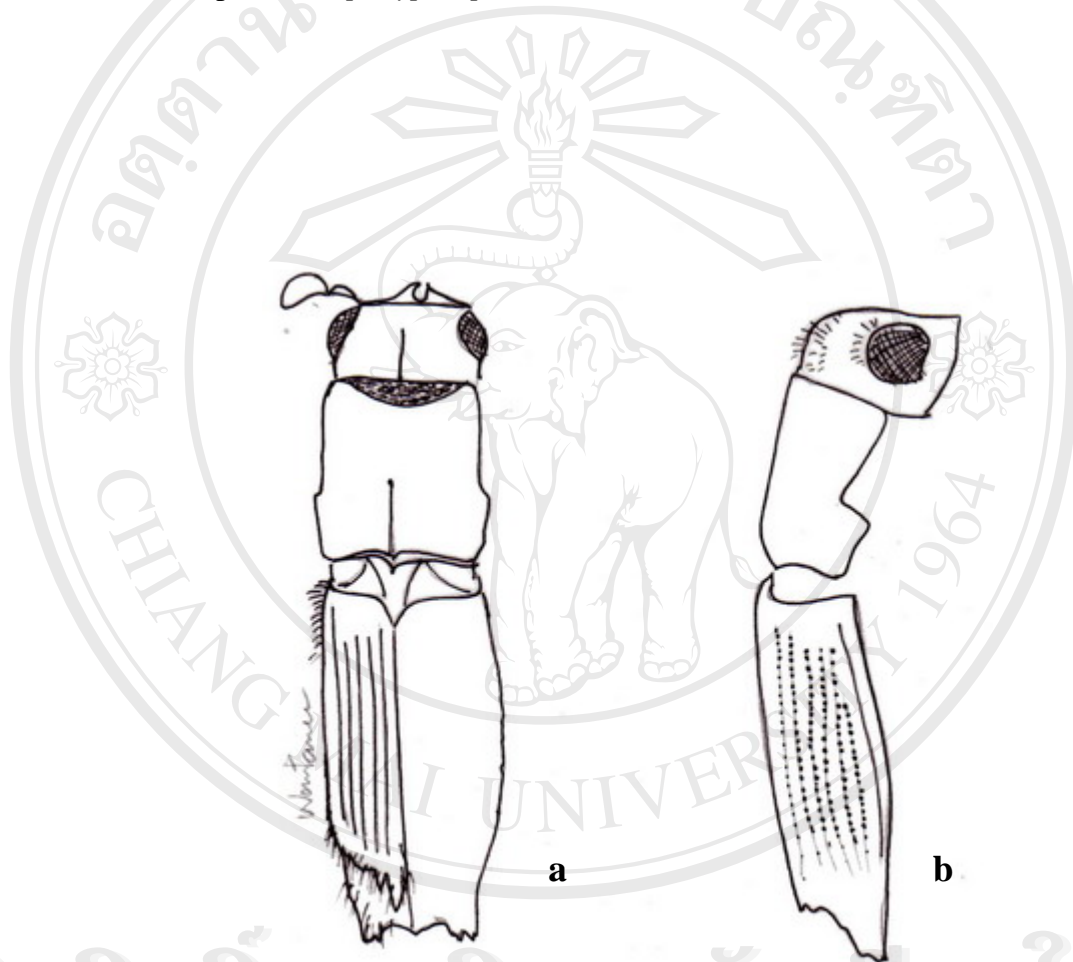


Figure 96 *Euplatypus parallelus*, Male: **a**, dorsal view; **b**, lateral view.

Genus *Biocis* – Male declivity not descending, unarmed; male abdominal sternum 5 concave; small, reticulate, very slender species. Mycetangia pores, when present on the pronotum, are numerous.

Distribution: Australia to Malaya.

Collected species: *Baiocis orientalis*, b.l. : 2.8 mm

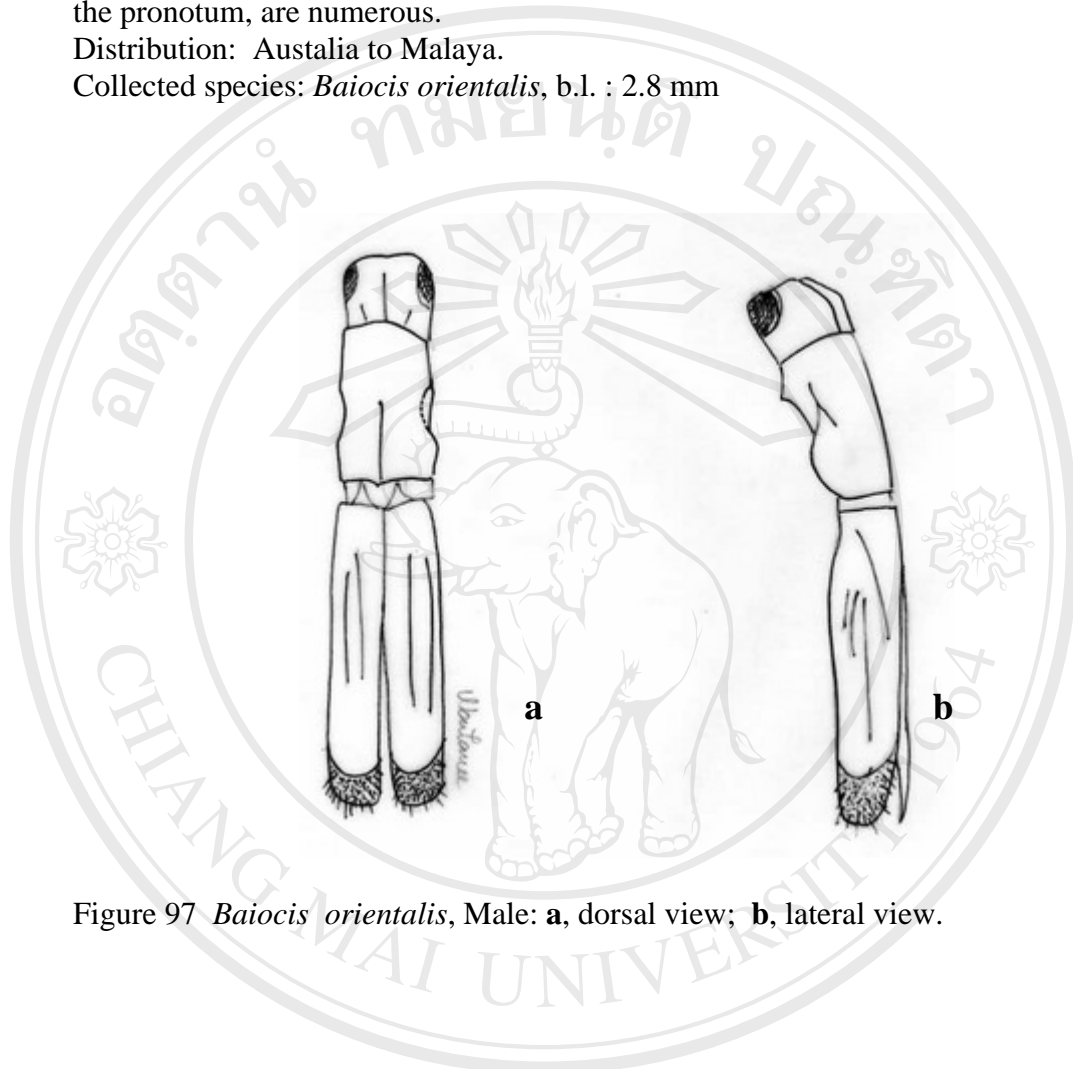


Figure 97 *Baiocis orientalis*, Male: **a**, dorsal view; **b**, lateral view.