

Revisional Notes on the Family Lymexylonidae (Coleoptera) in Eastern and Southeastern Asia

By

Yoshihiko KUROSAWA

Department of Zoology, National Science Museum, Tokyo

Abstract The beetles of the family Lymexylonidae occurring in eastern and southeastern Asia are discussed. The genus *Atractocerus* PALISOT DE BEAUVOIS, 1801, is split into five genera, *Atractocerus* s. str., *Raractocetus* nov., *Fusicornis* PHILIPPI, 1866, *Hymaloxylon* nov. and *Arractocetus* nov., chiefly by the cephalic structure. *Atractocerus mirabilis* MIWA, 1935, and *Hylecoetus formosanus* MIWA, 1935, both described from Formosa, are synonymized with *Raractocetus emarginatus* (CASTELNAU, 1836) from tropical Asia and *H. flavellicornis* (SCHNEIDER, 1791), from the Palearctic Region respectively. *Lymexylon oculare* NAKANE, 1963, from Japan is transferred to the genus *Melittomma* MURRAY, 1867. *Neohylecoetus* Y. KUROSAWA, 1956, is regarded as a synonym of *Melittomma*; *N. javanicus* Y. KUROSAWA, 1956, from Java and *N. philippensis* Y. KUROSAWA, 1956, from the Philippines are both synonymous with *M. javanicum* (CHEVROLAT, 1829). *Lymexylon amamianum* sp. nov. from the Ryukyu Archipelago and Formosa and *Arractocetus monticola* sp. nov. from Formosa are described. The beetle recorded under the name of *Atractocerus niger* STROHMEYER, 1910, from Formosa is divided into two species, and together with true *niger* STROHMEYER and *morio* PASCOE, the four allied species are shown in a key. Problems on the behaviour of some species concerning with the size of the eyes and on the mimicry are discussed.

The classification of the family Lymexylonidae in eastern and southeastern Asia has not been settled because of the establishment of some new taxa. In the present paper, the author attempted to clarify such confusion caused by several authors including the present author himself, though he was unable to go into the problem if the family can be divided into two distinctive families or not.

Before going further, the author must express his gratitude to many entomologists who offered him useful materials for this study. His cordial thanks are also expressed to Miss C. M. F. HAYEK and Mr. M. BACCHUS of the Department of Entomology, British Museum (Natural History), for the loan of the material preserved in the museum, and also to Mr. Kimio MASUMOTO for kindly taking it from London to Tokyo.

Atractocerus auct.

The so-called genus *Atractocerus* is rather heterogeneous and must be split at least into five genera proposed in the following key.

Key to the Brachelytrous Genera in the Family Lymexylonidae

1. Eyes larger, occupying almost all parts of frons, strongly approximating to each other, and only leaving an extremely narrow striate parts between them (female) or completely osculate (male); head without ocellar pore on vertex or frons; hindwings short but broad, exposing apical two or three dorsal segments of abdomen behind them 2
 - Eyes smaller, broadly separated from each other, leaving a broad space between them 3
2. Head smaller, somewhat horizontally produced and distinctly narrower than the width of pronotum; antennae shorter, robuster, with the segments from the third to terminal fusiform; scutellum broader, wider than long and occupying the most parts of elytral base *Atractocerus* PALISOT DE BEAUVOIS, 1810
 - Head larger, rather vertical, as broad as or broader than the anterior margin of pronotum; antennae slenderer, with the segments from third to terminal somewhat fusiform; scutellum narrower, longer than wide, and occupying about two-thirds the width of elytral base *Raractocetus* Y. KUROSAWA, nov.
3. Pronotum subconical, with the anterior margin strongly produced and not separated from the lateral margins 4
 - Pronotum subquadrate, with the anterior margin distinctly separated from the lateral margins; eyes oblique, converging below, with the interocular part about as wide as the width of an eye anteriorly and about twice as wide as that posteriorly *Arractocetus* Y. KUROSAWA, nov.
4. Eyes larger, rounded, swollen and produced, with the interocular part narrower than the width of an eye *Fusicornis* PHILIPPI, 1866
 - Eyes smaller, subparallel, neither produced nor swollen, with the interocular part about twice as wide as the width of an eye *Hymaloxylon* Y. KUROSAWA, nov.

Genus *Atractocerus* PALISOT DE BEAUVOIS, 1801

(Fig. 1)

Atractocerus PALISOT DE BEAUVOIS, 1801, Mem. Nouv. Gen. Ins.: 3.

Necydalis LINNÉ, 1766, Syst. Nat., ed. 12, 1 (2): 643 (pars).

Cantharis GMELIN, 1788, Syst. Nat., ed. 13, 1 (4): 1881, 1900 (pars).

Macrogaster THUNBERG, 1805, Gött. Gel. Anz., 29: 281 (type species: *Lymexylon abbreviatus* FABRICIUS, 1787).

Type species: *Atractocerus necydaloides* PALISOT DE BEAUVOIS, 1801 (= *Necydalis brevicornis* LINNÉ, 1766) (Africa).

Atractocerus reversus WALKER, 1858, from Ceylon, and *A. brasiliensis* LEPINEUX et SERVILLE, 1825, from Central and South Americas may belong to this genus in a strict sense.

Genus *Raractocetus* Y. KUROSAWA, nov.

Atractocerus auct.

Type species: *Atractocerus emarginatus* CASTELNAU, 1836.

Stands next by the genus *Atractocerus* PALISOT DE BEAUVOIS, 1801, and distinguished from it by the following points: 1) Head rather vertical, larger, as broad as or broader than the width of the anterior margin of pronotum; 2) eyes very large, strongly swollen and laterally produced, and sparsely scattered with a few inconspicuous short erect hairs; 3) antennae slenderer, with the segments from the third to terminal somewhat fusiform; 4) scutellum narrower, longer than wide and occupying about two-thirds the width of elytra.

Other than *R. emarginatus* (CASTELNAU, 1836), the type species of the genus, Australian *kreuselerae* PASCOE, 1864, may belong to this genus. No American species presumably belonging to this genus is known.

Raractocetus emarginatus (CASTELNAU, 1836)

(Fig. 2)

Atractocerus emarginatus CASTELNAU, 1836, in SILBERMAN, Rev. Ent., **4**: 59.

Atractocerus debilis WALKER, 1858, Ann. Mag. nat. Hist., (3), **2**: 185.

Atractocerus celebensis GESTRO, 1874, Ann. Mus. civ. Stor. nat. Genova, **6**: 545.

Atractocerus luteolus FAIRMAIRE, 1882, Notes Leyden Mus., **4**: 217.

Atractocerus fissicollis FAIRMAIRE, 1885, Ann. Soc. ent. Belg., **29**: 108.

Atractocerus Horni BOURGEOIS, 1905, Ann. Soc. ent. Fr., **74**: 133.

Atractocerus mirabilis MIWA, 1935, Trans. nat. Hist. Soc. Formosa, **25**: 457, fig. (syn. nov.).

Atractocerus mirabilis MIWA, 1935, described from Formosa is nothing but a synonym of *emarginatus* CASTELNAU, 1836, widespread in tropical Asia.

This species having a pale amber-coloured body is nocturnal and comes flying to light. The posture of repose holding its abdomen up between the half-open hindwings reminds us of certain ichneumon flies belonging to the genus *Ophion* and its allies. When taking on wings, it may show a mimicry to certain nocturnal vespid wasps of the genus *Provespa*.

Genus *Fusicornis* PHILIPPI, 1866

(Fig. 3)

Fusicornis PHILIPPI, 1866, Stettin. ent. Ztg., **27**: 115.

Fusicornis HEYNE, 1908, in TASCHENBERG, Exot. Käfer: 191 (err.).

Type species: *Fusicornis valdivianus* PHILIPPI, 1866.

Based upon his new species, *valdivianus* from Chile, R. A. PHILIPPI established a new genus, *Fusicornis*, in 1866. Though it has currently been regarded as a synonym of *Atractocerus* PALISOT DE BEAUVOIS, 1801, it is evidently discriminated from true *Atractocerus* by the structure of head. It may take place between *Raractocetus* nov. and *Arractocetus* nov. in view of the structure of head and also stands closely by

Hymaloxylon nov. in the shape of pronotum.

Judging from the structure of eyes and the colour of body, the species of this genus may be seminoturnal.

Genus *Hymaloxylon* Y. KUROSAWA, nov.

(Fig. 4)

Atractocerus auct.

Type species: *Atractocerus quercus* GARDNER, 1935.

Closely allied to the preceding genus *Fusicornis* PHILIPPI, 1866, but differs from it by the smaller and subparallel eyes having the interocular part about twice as wide as the width of an eye. The genus is also somewhat allied to the next genus, *Ar-ractocetus* Y. KUROSAWA, nov., but differs from it in the following points: 1) Hairs on the eyes scarce, inconspicuous and distinctly shorter; 2) pronotum bell-shaped, with the anterior margin strongly produced at the middle; 3) scutellum narrower, and furcate at the apex.

From *Atractocerus* and *Raractocetus*, it differs in the structure of eyes, which are extremely large and more or less osculate in these two genera.

The type species of this genus, *quercus* GARDNER, 1935, was originally described by a male preserved at present in the British Museum (Natural History) and labelled as follows: Mundali 8408, Chakrata, U.P., 28. v. 1934, Ex. *Quercus dilatata*. The author also examined the following specimen: 1 ♂, Basantpur, East Nepal, 10. v. 1972, H. SHIMA lgt. No other species have been known to be included in this genus.

Genus *Ar-ractocetus* Y. KUROSAWA, nov.

Atractocerus auct.

Closely allied to the genus *Raractocetus* Y. KUROSAWA, nov. from tropical Asia, but this diurnal group is distinguished from it by the following points: 1) Head including eyes densely clothed with long erect dark-coloured hairs; 2) eyes smaller, obliquely converging below and leaving a broad space between them, but never osculate; 3) clypeus and genae broader, not covered by eyes; 4) pronotum with the distinct and rather deep median longitudinal groove; 5) elytra sinuate exteriorly, never emarginate interiorly just behind scutellum and approximate to or sometimes osculate with each other just behind scutellum; 6) hindwing longer, slenderer, exposing at least one dorsal segment of abdomen behind them.

The genus is also different from the genus *Atractocerus* PALISOT DE BEAUVOIS, 1801, in the following points: 1) Head larger, rather vertical, as wide as or wider than the anterior margin of pronotum, sometimes with a small ocellar pore at the centre of vertex; 2) eyes smaller, broadly separated from each other, never osculate, and rather densely clothed with rather long erect dark-coloured hairs; 3) longitudinal median groove of pronotum more distinct and deeper; 4) elytra longer, about 3 times as long as wide, with the exterior and interior margins more or less sinuate; 5) hindwings longer

and slenderer, exposing one dorsal segment of abdomen behind them.

Type species: *Atractocerus nipponicus* NAKANE, 1985, from Japan, the Ryukyu Archipelago and Formosa.

Atractocerus morio PASCOE, 1860, from the Moluccas, etc., *A. niger* STROHMEYER, 1910, from South India, *A. blairi* GARDNER, 1936, from Assam and *A. bruijni* GESTRO, 1874, from Celebes, the Philippines and the Malay Peninsula, doubtlessly belong to this new genus.

***Arractocetus niger* (STROHMEYER, 1910)**

Atractocerus niger STROHMEYER, 1910, Ent. Rundsch., 27: 6.

Though this species was originally described from Anamalai Hills, South India, and was later recorded from Formosa by S. SCHENKLING, 1916, specimens from Formosa include two species of which one agrees with *nipponicus* NAKANE, 1985, recently described from Southwest Japan, and the other represents a new species. No specimen identical with Indian *niger* STROHMEYER, 1910, has been found in Formosa.

Specimen examined: 1 ♀, Anamalais (syntype) (in coll. British Museum).

Distribution: S. India.

***Arractocetus nipponicus* (NAKANE, 1985)**

Atractocerus nipponicus NAKANE, 1985, Yakushima no Shizen: 596, figs.

Atractocerus niger: Y. KUROSAWA, 1956, Bull. natn. Sci. Mus., Tokyo, (39): 82 (nec STROHMEYER, 1910).

Closely similar to *A. morio* PASCOE, 1860, described from the Moluccas, but different from it in the following points: 1) Hairs on head and pronotum blackish, sparser and inconspicuous, while in *morio*, they are dark brownish and denser; 2) elytra blackish, partially and basally pale-coloured and rather evenly sculptured, no partially and basally reddish brown and not subcostate as in *morio*.

Length: 11.8–27.6 mm; width: 1.0–3.7 mm.

Specimens examined: 1 ♀, Mikura-jima, Izu Is., 12. vii. 1982, K. SAKAI lgt.; 1 ♂, Kuroson, Kôchi Pref., Shikoku, 19. vii. 1953, S. HISAMATSU lgt.; 3 ♂♂ 7 ♀♀, Shiratani, Yakushima, 10–13, vii. 1973, H. IRIÉ lgt.; 1 ♂, Hatsuno, Amami-Oshima, 14. vi. 1962, M. SATÔ lgt.; 2 ♂♂ 1 ♀, Mt. Omoto-dake, Ishigaki-jima, 17. v. 1974, H. IRIÉ lgt.; Chokakurai, Daibu, Formosa, 26. vii. 1936, S. ASAHINA lgt.; 1 ♂, Baikei, C Formosa, 28. vii. 1925, T. KANO lgt.; 1 ♂, Chipon, SE Formosa, 2. iv. 1927, T. KANO lgt.; 1 ♂ 1 ♀, Shirakku, Formosa, T. KANO lgt.; 1 ♀, Sankuang, Taoyuan Hsien, N Formosa, 10. v. 1978, T. SHIMOMURA lgt.

Distribution: Japan (Izu Is., Shikoku, Yakushima), Ryukyu Is. (Amami-Oshima, Ishigaki-jima), Formosa.

Though the colour of abdomen lacking in metallic blue tinge was regarded by NAKANE as the difference between *nipponicus* and *morio*, it varies with individuals, no decided difference having been found among many examined specimens of these two species.

Arractocetus morio (PASCOE, 1860)

Atractocerus morio PASCOE, 1860, J. Ent., 1: 117, pl. 6, fig. 5.

Specimen examined: 1 ♀, Bachian, Moluccas, WALLACE (syntype) (in coll. British Museum).

Distribution: Celebes, Moluccas, New Guinea.

Arractocetus monticola sp. nov.

(Fig. 5)

Closely related to *nipponicus* NAKANE, 1985, from Japan, the Ryukyus and Formosa, but different from it in the dark-coloured coxae, at least the posterior ones, subparallel and straight sides of pronotum, and the subrectangular and slightly produced posterior angles of pronotum. Also different from *morio* PASCOE, 1860, from the Moluccas, etc., in the blackish and inconspicuous hairs on the head and pronotum and the colour of elytra which is blackish, partially pale-coloured at the base.

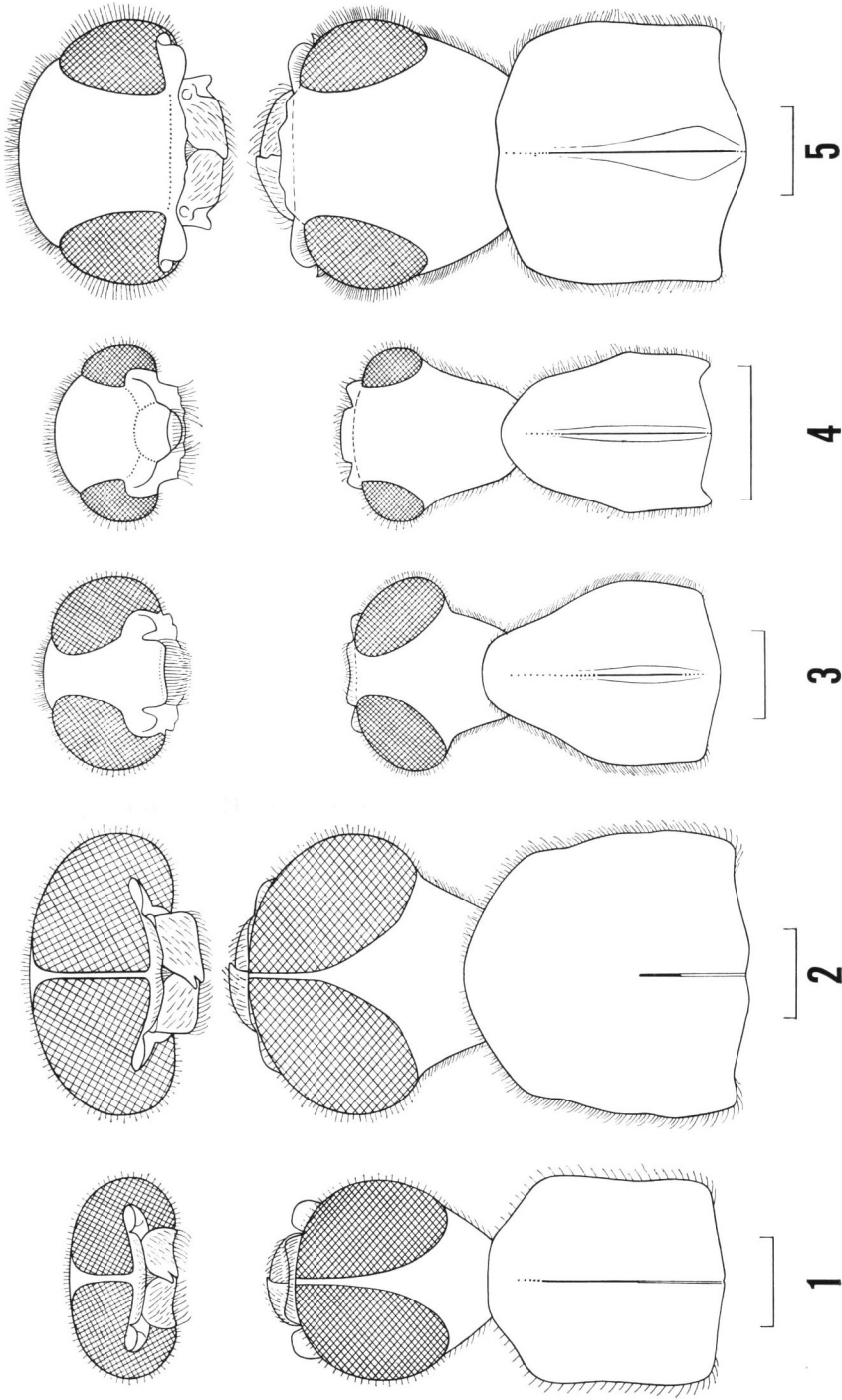
Length: 9–29 mm; width: 0.9–3.2 mm.

Holotype: ♀, Tattaka, C Formosa, 10. vi. 1965, T. SHIRÔZU lgt.; allotype: ♂, Mt. Shinbajin, near Mt. Nanhu-ta-shan, N Formosa, 16. vi. 1961, S. UÉNO lgt.; paratypes: 1 ♂ 1 ♀, Lu-shan, C Formosa, 6. v. 1973, K. MATSUDA lgt.; 1 ♂, do., 8. v. 1975, K. AKIYAMA lgt.; 1 ♀, do., 25. v. 1976, K. AKIYAMA lgt.; 1 ♀, Rimogan, C Formosa, 10. vii. 1961, T. SHIRÔZU lgt.; 1 ♀, Suisharyo, C Formosa, 10. vii. 1961, S. UÉNO lgt.; 1 ♀, Hotso, Nantou Hsien, C Formosa, 26–29. vi. 1973, M. OWADA lgt.; 1 ♀, Tattaka, C Formosa, 12–14. vi. 1974, H. YOKOYAMA lgt.; 1 ♀, Sankuang, Taoyuan Hsien, N Formosa, 10. v. 1978, T. SHIMOMURA lgt.; 1 ♀, Tapan, Taichung Hsien, N Formosa, 25. vii. 1978, T. SHIMOMURA lgt.

Distribution: Formosa.

A key to the four blackish species is given in the following lines.

1. Hairs on head and pronotum silvery grey or white; pronotum with the sides slightly but rather straightly and obliquely converging posteriorly, anterior margin slightly produced in arc, anterior angles subrectangular, posterior angles also subrectangular, slightly produced posteriorly; elytra brownish black, uniformly covered with dark brownish, short, semirecumbent hairs, but without costa; coxae blackish *niger* STROHMEYER, 1910
- Hairs on head and pronotum blackish, or dark brownish, or sometimes black with silvery reflection in certain aspects; pronotum with anterior margin produced in strong arc, anterior angles produced and abased 2
2. Hairs on head and pronotum dark brownish; elytra slightly costate with the base of costa reddish brown; costae dark-coloured; posterior angles of pronotum subrectangular and slightly produced backwards *morio* PASCOE, 1860
- Hairs on head and pronotum blackish and inconspicuous; elytra not costate, partially pale-coloured, but without reddish brown part 3
3. Coxae, at least posterior ones, dark-coloured; pronotum with the sides subparallel



Figs. 1-5. The frontal (upper) and dorsal (lower) views of the head and pronotum of brachelytrous Lymexylonidae. — 1. *Atractocerus brevicornis* (LINNÉ, 1766); 2. *Raractocerus emarginatus* (CASTELNAU, 1836); 3. *Fusicornis valdivianus* PHILIPPI, 1866; 4. *Hymaloxylon quercus* (GARDNER, 1935); 5. *Arractocetus monticola* Y. KUROSAWA, sp. nov. Scale bars represent 1 mm.

- and straight, posterior angles subrectangular, slightly produced
 *monticola* Y. KUROSAWA, nov.
 — All coxae pale-coloured; pronotum with sinuate sides converging posteriorly,
 posterior angles obtuse, not produced *nipponicus* NAKANE, 1985

Lymexylon amamianum sp. nov.

Closely similar to *L. ruficolle* Y. KUROSAWA, 1949, from Japan, but different from the latter in the following points: 1) Body entirely brownish yellow to testaceous, with head, antennae, sides of apical parts of elytra, ventral segments of abdomen, tibiae and tarsi sometimes fuscous; 2) antennae slenderer, with the fourth segment, which is the longest, about twice as long as third, while, in *ruficolle*, the antennae are robust and compact, with the fourth segment far less than twice as long as the third; 3) pronotum slenderer, slightly but distinctly longer than wide at the base, while, in *ruficolle*, it is about as long as wide at the base; 4) hairs of body pale brown or yellowish brown, sometimes partially becoming darker, while, in *ruficolle*, they are dark-coloured or blackish, with the exception of these on female prothorax grayish; 5) no sexual dimorphism is found in the colour pattern, while, in *ruficolle*, the colour of pronotum is black in male and red in female.

Length: 6.2–13.3 mm; width: 0.8–2.0 mm.

Holotype: ♂, Hatsuno, Amami-Oshima, Ryukyus, 31. iii. 1967, H. NOMURA lgt.; allotype: ♀, Hatsuno, Amami-Oshima, 2. iv. 1964, Y. YAMAWAKI lgt.; paratopotypes: 1 ♂ 2 ♀♀, Hatsuno, Amami-Oshima, 7–12. iv. 1965, K. UEDA lgt.; 1 ♀, do., 11. iv. 1963, S. FUKUDA lgt.; 1 ♀, do., 2. iv. 1964, Y. YAMAWAKI lgt.; 2 ♀♀, do., 30–31. iii. 1967, H. NOMURA lgt.; 1 ♂ 7 ♀♀, do., 2–3. iv. 1967, H. NOMURA lgt.; 1 ♀, do., 10. iv. 1970, M. TOYAMA lgt.; 1 ♀, do., 11. iv. 1974, H. IRIE lgt.

The holotype, allotype, and several paratopotypes are preserved in the collection of the National Science Museum, Tokyo; several paratopotypes are returned to Messrs. Taichi SHIBATA's and Masao TOYAMA's cabinets.

This species is also found in Formosa. The author examined the following specimens: 1 ♂ 2 ♀♀, Tattaka, C Formosa, 1. v. 1973, H. YOKOYAMA lgt.; 1 ♂, Tattaka, 17. iv. 1967, S. FUKUDA lgt.; 1 ♂, Meifeng, C Formosa, 3. v. 1975, S. IMASAKA lgt.; 1 ♀, near Meifeng, Nantou Hsien, 24. v. 1976, T. SHIMOMURA lgt.; 2 ♀♀, Tsuifeng, Nantou Hsien, 7. vii. 1978, T. SHIMOMURA lgt.

There is no essential difference between the specimens from Amami-Oshima and those from Formosa.

Distribution: Ryukyu Is. (Amami-Oshima), Formosa.

Genus *Melittomma* MURRAY, 1867

Melittomma MURRAY, 1867, Ann. Mag. nat. Hist., (3), 20: 314.

Neohylecoetus Y. KUROSAWA, 1956, Bull. natn. Sci. Mus., Tokyo, (39): 80 (type species: *Neohylecoetus javanus* Y. KUROSAWA, 1956) (syn. nov.).

Type species: *Melittomma castaneum* MURRAY, 1867 (= *Hylecoetus africanus* THOMSON, 1858).

Neohylecoetus Y. KUROSAWA, 1956, is nothing but a synonym of this genus *Melittomma* MURRAY, 1867. All the species of this genus may be nocturnal.

***Melittomma javanicum* (CHEVROLAT, 1829)**

Hylecoetus javanicus CHEVROLAT, 1829, in GUÉRIN, Iconogr. Règne anim., 44: 57, pl. 16, figs. 9, 9a.

Melittomma javanicum: GIRARD, 1873, Les Insectes: 548, pl. 37, figs. 9, 9a.

Neohylecoetus javanus Y. KUROSAWA, 1956, Bull. natn. Sci. Mus., Tokyo, (39): 81 (syn. nov.).

Neohylecoetus philippensis Y. KUROSAWA, 1956, l.c., (39): 82 (syn. nov.).

Distribution: Sumatra, Borneo, Java, Philippines, New Guinea.

Neohylecoetus javanus and *philippensis* both described by the author himself are also synonymous with *M. javanicum* (CHEVROLAT, 1829).

***Melittomma oculare* (NAKANE, 1963)**

Lymexylon oculare NAKANE, 1963, Sci. Rept. Kyoto Pref. Univ. (Nat. Sci. & Liv. Sci.), (A), 3: 221.

Though NAKANE described this species under the genus *Lymexylon* FABRICIUS, 1775, it belongs to the genus *Melittomma* MURRAY, 1867, in view of the serrate and submoniliformed antennae, osculate eyes, subquadrate pronotum, and non-sinuate elytral sides, etc.

Specimens examined: 7 ♀♀, Mt. Ohkué, Miyazaki Pref., Kyushu, 30. vii. 1974, T. NAKANE lgt.

Distribution: Japan (Honshu, Kyushu).

Genus *Hylecoetus* LATREILLE, 1806

Hylecoetus LATREILLE, 1806, Gen. Crust. et Ins., 1: 266.

Elateroides SCHAEFFER, 1766, Elem. Ent., pl. 139 (nom. nud.).

Hylecerus JACQUELIN DU VAL, 1860, Gen. Coléopt. Eur., 3: 206 (type species: *Hylecoetus flabellicornis* SCHNEIDER, 1791).

Xylecoetus GYLLENHAL, 1827, Ins. Suec., 4: 234 (type species: *Lymexylon flabellicornis* SCHNEIDER, 1791).

Hylocoetus MELSHEIMER, 1835, Cat. Coleopt. U.S.: 86 (err.).

Hyloecetus LACORDAIRE, 1857, Gen. Coléopt., 4: 502 (err.).

Hyloecotus CHENU, 1860, Encycl. Hist. nat. Coléopt., 2: 223 (err.).

Type species: *Cantharis dermestoides* LINNÉ, 1761.

***Hylecoetus dermestoides cossis* LEWIS, 1896**

Hylecoetus cossis LEWIS, 1896, Ann. Mag. nat. Hist., (6), 17: 65.

There is no essential difference between Euro-Siberian *dermestoides* (LINNÉ, 1761) and Japanese *cossis* LEWIS, 1896, except for the colour of head, which is concolorous

with the body in *dermestoides* and is blackish, not concolorous with the body, in *coxisis*.

Hylecoetus flabellicornis (SCHNEIDER, 1791)

Lymexylon flabellicorne SCHNEIDER, 1791, *Neuest Mag.*, 1, (1): 109.

Hylecoetus flabellicornis: SCHONHERR, 1817, *Syn. Ins.*, 1 (3): 46.

Hylecoetus (Hylecerus) flabellicornis: JACQUELIN DU VAL, 1860, *Gen. Coléopt. Eur.*, 3: 206.

Hylecoetus orientalis FURSOV, 1935, *Bull. Soc. Naturalist Moscow*, 54: 92.

Hylecoetus formosanus MIWA, 1935, *Trans. nat. Hist. Soc. Formosa*, 25: 456, fig. (syn. nov.).

Hylecoetus matsushitai KÔNO, 1937, *Trans. Sapporo nat. Hist. Soc.*, 15: 199, fig.

Hylecoetus matsushitai KÔNO, 1937, described from Sakhalin is nothing but the female of this species, and *H. formosanus* MIWA, 1935, described from Formosa is also synonymous with this species. Though the Formosan specimens have the elytral costae somewhat stronger than in the nominotypical form, it does not seem sufficient to separate them as a distinct subspecies.

As was already stated, the size of eyes has a close relationship with the behaviour of respective species. Those having large osculate eyes belonging to such genera as *Atractocerus*, *Raractocetus* and *Melittomma* are nocturnal species and those having smaller separated eyes belonging to such genera as *Arractocetus*, *Hymaloxylon*, *Lymexylon* and *Hylecoetus* are diurnal ones. The long erect dark-coloured hairs on the eyes of such diurnal species as *Arractocetus* and *Lymexylon* may be the shelter to the strong summer or tropical sun beam.

The behaviour and colour pattern of these lymexylonids may be a mimicry to some vespid wasps or ichneumon flies. In particular, pale-coloured species of the genera *Atractocerus*, *Raractocetus* and *Melittomma* counterfeit their colour pattern, form and behaviour to those of nocturnal Hymenoptera belonging to such genera as *Provespa* (Vespidae), *Ophion*, *Paniscus* or their allies (Ichneumonidae). *Raractocetus emarginatus* holds its abdomen up between its half-open hindwings when it comes flying to light and response itself on the wall. Moreover, when it is caught by human hand, it bends its abdomen towards the hand like the pose when the wasps sting the human body. From these points, it is reasonable to infer that these pale-coloured species of the genera *Atractocerus*, *Raractocetus* and *Melittomma* having large osculate eyes are the mimicry to nocturnal wasps or ichneumon flies. Though such diurnal species as those belonging to the genera *Arractocetus* and *Hymaloxylon* may also be considered to be the mimicry to diurnal ichneumon flies, more ecological data must be obtained for these species to confirm the matter.

References

- FURSOV, N. I., 1935. Zwei neue Arten aus Fam. Lymexylonidae (Coleoptera) von Kaukasus und Ost-Siberien schädlich in der Forstwirtschaft. *Bull. Soc. Naturalist Moscow*, 44: 92-93.

- GARDNER, J. C. M., 1935. A new Indian species of *Atractocerus* (Col. Lymexylonidae). *Stylops, London*, **4**: 69–70, 4 figs.
- 1936. A new Indian species of *Atractocerus* (Col. Lymexylonidae). *Proc. R. ent. Soc. London*, (B), **5**: 181–182.
- KALSHOVEN, L. G. E., 1964. Observation on Lymexylonidae in Indonesia and Malaya. *Ent. Berichten*, **24**: 184–186.
- KARNY, H. H., 1922. Zur Kenntnis der Orientalischen *Atractocerus*-Arten (Col. Lymex.). *Treubia*, **3**: 6–13.
- KÔNO, H., 1937. Die Lymexyloniden, schädlich an Sachalintannen und Ezofichten in Sachalin und Hokkaido. *Trans. Sapporo nat. Hist. Soc.*, **25**: 199–201.
- KUROSAWA, Y., 1949. Description of a new Lymexylonidae of the genus *Lymexylon* FABRICIUS from Japan. *Ent. Rev. Japan*, **1**: 26–28, fig.
- 1956. A new genus and the species of the family Lymexylonidae, with the additional notes on some Japanese species (Coleoptera). *Bull. natn. Sci. Mus., Tokyo*, (39): 80–82.
- LEWIS, G., 1896. On a new species of *Hylecoetus* (Lymexylonidae) from Japan. *Ann. Mag. nat. Hist.*, (6), **17**: 65.
- MIWA, Y., 1935. Descriptions of two new species of Lymexylonidae from Formosa. *Trans. nat. Hist. Soc. Formosa*, **25**: 456–457, 2 figs.
- NAKANE, T., 1863. New or little-known Coleoptra from Japan and its adjacent regions. XXV. *Sci. Rept. Kyoto Pref. Univ. (Nat. Sci. & Liv. Sci.)*, (A), **3**: 221–226.
- 1985. On the Coleoptera occurring in Yaku-shima Island. *Yakushima no Shizen, Tokyo*: 587–631. (In Japanese, with English descriptions.)
- SCHENKLING, S., 1914. Beiträge zur Kenntnis der Lymexyloniden (Col.) I. *Ent. Mitt.*, **3**: 317–321.
- 1915. Fam. Lymexylonidae. In JUNK, W., & S. SCHENKLING (eds.), *Coleopterorum Catalogus*, pars 64 (2): 1–13. Berlin, W. Junk.
- STROHMEYER, H., 1910. Zwei neue *Atractocerus*-Arten (Lymexylonidae). *Ent. Rdsch., Stuttgart*, **27**: 6–7.

