THE RAFFLES BULLETIN OF ZOOLOGY 2001 **49**(2): 259-267

NEW SPECIES OF THE GENUS *WAKARUMBIA* FROM SULAWESI (COLEOPTERA: LYCIDAE)

Ladislav Bocak

Department of Zoology, Palacký University, tř. Svobody 26, CZ-771 46 Olomouc, Czech Republic. Email: ladislav.bocak@upol.cz

ABSTRACT. – The following new species are described: *Wakarumbia amporiwensis*, new species, *W. equalis*, new species, *W. fasciata*, new species, *W. grisea*, new species, *W. kalamensis*, new species, *W. mamasensis*, new species, *W. montana*, new species, *W. orobuensis*, new species and *W. petri*, new species. The important diagnostic characters are illustrated and all known species of *Wakarumbia* Bocak, 1999, are keyed. Relationships between species and ecological data are briefly discussed.

KEY WORDS. – Taxonomy, Coleoptera, Lycidae, Metriorrhynchini, *Wakarumbia,* new species, Sulawesi.

INTRODUCTION

Wakarumbia has recently been proposed for one species collected from Buton island, near the south east coast of Sulawesi (Bocak, 1999). Later additional species were described from the material collected in Bumonga-Bone National Park in Northern Sulawesi during the Wallace Project organised in 1985 by the Royal Entomological Society of London and one species was transferred from the genus *Protaphes* Kleine, 1926 (Bocak, 2000). Additional two species described by Pic (1922) were transferred from *Xylobanus* Waterhouse, 1879 (Bocak & Bocakova, 2000). Several additional new species were found in the material from Sulawesi and are described here. A key is here provided for identification of all known species of the genus *Wakarumbia*.

Although the material collected by the British expedition was relatively restricted, it showed potentially high radiation within *Wakarumbia*. Altogether 11 species were found in the material of 27 specimens, three of them represented only in females and therefore not yet formally described (Bocak, 2000). The genus *Wakarumbia* formed only small fragment in the Lycid material of the British expedition and I expected that members of *Wakarumbia* occur rarely in the area. The closely related *Hemiconderis* Kleine, 1926, occurring on New Guinea, formed only 0.30% of Lycidae collected by American expeditions (Bocak & Bocakova, 1990) and it seems that *Wakarumbia* is also a rare group. The new material collected in southern Sulawesi in July 1999 did not confirm this presumption. Over 50% of lycids collected in the mountains of southern Sulawesi belonged to *Wakarumbia* and altogether over 160 specimens were collected on three localities on southern slope of the Gunung Gandadiwata massive and on Gunung Lompobatang. Only one species was collected in the central part of Sulawesi, near Poso Lake. All 9 species represented in this material are new and they are described here.

MATERIAL AND METHODS

All morphological measures were made using the ocular grid of an Olympus SZX-12 binocular microscope at the magnification 20 times for body length and 90 times for remaining body parts. Data given in the paragraph 'Measures' refer to the holotype, when only one size is given, the spans express the variability of available specimens, when a series was available. Eye diameter was measured in lateral view and when the eye outline was not circular the diameter was measured at the widest point. The interocular distance was taken from a dorsal view at the point of minimum eye distance. Line illustrations were derived from microphotographs produced by an Olympus DP-10 or Olympus Camedia 3000 digital camera.

Depositories. – BMNH - Natural History Museum, London, UK; KMTC - Kyioshi Matsuda collection, Takarazuka, Hyogo Pref., Japan; LMBC - author's collection, Department of Zoology, Faculty of Sciences UP, Olomouc, Czech Republic; SMNS - Natural History Museum, Stuttgart, Germany; ZRC - Zoological Reference Collection, National University of Singapore, Singapore.

Received 24 Aug 2000 Accepted 6 Nov 2000

TAXONOMY

Wakarumbia Bocak, 1999

Wakarumbia Bocak, 1999: 166.

Type species – *Wakarumbia gracilis* Bocak, 1999, by monotypy.

Differential diagnosis. – *Wakarumbia* is characterised by the combination of the following characters: the pronotum poses single rhomboidal median areola connected laterally by the transverse costae with the lateral margins of the pronotum (Fig. 1), the fully developed primary elytra costae and the absence of secondary costae, characteristic shape of phallus with unique complex thorn-like structure in the basal part (Figs. 2 - 12), and the spermaduct attached to the characteristic pocket in the apical part of vagina. The absence of secondary costae reminds of *Xylobanus* Waterhouse, 1879, but other characters do not support their close relationship. *Xylobanus* is characterised by the different arrangement of costae on pronotum and different type of male genitalia. The related genus *Hemiconderis* differs externally in having secondary elytral costae, two independent basal thorns in male genitalia, and the simple, sack-like vagina (Bocak & Bocakova, 1990).

Redescription. – Body small, slender (Fig. 1), head small, partly concealed by pronotum, antennae shorter than body, 11-segmented, segments 3 - 7 emarginate at base of apex, mouth parts tiny but fully developed, maxillary palpi 4-segmented, labial palpi 3-segmented, margin of last segment with projections. Sexual dimorphism in size of eyes. Pronotum with five areolae, median areola narrow, rhomboidal, costae straight, sharp and narrow (Fig. 1). Elytra with four primary costae, connected by transverse costae, primary costa 2 and 4 weaker, secondary costae absent. Male genitalia without paramerae, phallobase annuliform without any sclerotization of membrane, phallus simple with complex thorn-like structure at the base of internal sac (Figs. 2 - 12). For full description of *Wakarumbia* see Bocak (1999).

Diversity and Ecology. – Altogether 23 *Wakarumbia* species are already known from Sulawesi and Buton island (21 formally described, additional two undescribed species are known only in females, the specimens are deposited in the Wallace Project collection in the Natural History Museum, London). One species is known from Buton island, another two from the south-western tip of Sulawesi, all remaining, sooner described species occur in the North Sulawesi Province (Bocak, 2000; Bocak & Bocakova, 2000). Additional 9 species are described here from central and southern Sulawesi. Available data show high vicariance and the faunas of southern and northern parts of Sulawesi are completely different at specific level. Almost all newly collected specimens were found in mountain areas 900 - 1750 m above sea level, where *Wakarumbia* species were dominant within Lycidae. Only one specimen was collected in lower elevation of central Sulawesi. Two sooner described species occurring in lower elevations of southern Sulawesi, *W. celebensis* (Kleine, 1933) and *W. lateniger* (Pic, 1922), were not found in the studied material. The adults were usually sitting during day on the bottom side of leaves of shrubs or lower tree stratum. Bending of branches did not disturb them and at most they tried to change their position on leaf. Only seldom, they fly or fell down when more intensively disturbed by shaking of branches. Over half of collected specimens was found in aggregations on single tree or on a group of several trees.

The members of *Wakarumbia* are often engaged in mimicry complexes. Most species collected in higher elevation are uniformly black and occurs together with several habitually very similar species of the specious *Xylobanus* Waterhouse, 1879 and less common *Plateros* Bourgeois, 1879 (see Bocakova, 2001 for the generic status of *Plateros*). Species of these genera occur syntopically and several times specimens of several genera were collected in aggregations. This case was observed on the Gunung Lompobatang, where *W. montana*, new species, and *W. petri*, new species, were found in quite high number of specimen together with unidentified *Xylobanus* and *Plateros*.

Wakarumbia grisea, new species, *W. orobuensis*, new species, and *W. kalamensis*, new species, were collected together with one unidentified species of *Plateros* and several *Xylobanus* in the Mamasa area. All species from this area are dark brown to black with lighter pubescence giving them greyish appearance. Several species of syntopically occurring *Xylobanus* had lighter pubescence restricted to the pronotum, but they resembled the species of *Wakarumbia* in size and shape of body. Another species found in this area, *W. equalis*, new species, was dark brown to black without light pubescence, very similar to the species found in the Gunung Lompobatang area. The species resembled another unidentified black *Xylobanus* species from the same place.

The second mimicry complex in the Mamasa area involved two species of black *Xylobanus* with yellow transverse band in the middle of elytra, one unidentified species of the family Cantharidae and two species of *Wakarumbia*: *W. fasciata*, new species, and *W. mamasensis*, new species. The generic classification of these animals is impossible without microscope, because the degree of external similarity is very high.

The mimicry complexes are very common in Lycidae and they involve very often several families of Coleoptera and even other orders. Lycidae are untasteful (Moore & Brown, 1981) and they are considered models in these complexes. We do not know predators foraging for such small beetles. The pattern of black dorsum with yellow band is presumably aposematic, but the uniform black colouration with greyish pubescence can hardly be considered such. Despite this facts, gaps between individual complexes are very apparent and any variability within them considerably suppressed. The high specific diversity in *Wakarumbia* could be enhanced not only by the insular history of some parts of Sulawesi but also by the coevolution in isolated mimicry complexes.

KEY TO MALES OF *WAKARUMBIA*[1]

1. Whole elytra dark brown to black, at most with slightly lighter costae 2
– Elytra otherwise coloured, pale yellow, light brown or dark brown with yellow humeri, or black with yellow transverse band in middle part of elytra 12

2. Head, thorax, and most of femora light brown, pronotum brown, phallus symmetrical ..... *W. gracilis* Bocak
– Whole body dark brown to black, only trochanters light brown or eventually elytral costae a bit lighter than bottom of elytral cells 3

3. Eye diameter smaller than interocular distance or their diameter equals their frontal distance 6
– Eye diameter at least 1.10 times longer than interocular distance 4

4. Pronotum and elytra covered with greyish pubescence 5
– Pronotum and elytra covered with dark pubescence, male eye diameter at least 1.2 times longer than minimal interocular distance, phallus slender, symmetrical ..... *W. oculata* Bocak

5. Eye diameter 1.17 - 1.27 times longer than interocular distance, apical part of phallus symmetrical (Fig. 5) ..... *W. grisea*, new species
– Eye diameter at least 1.50 times longer than interocular distance, phallus slightly curved (Fig. 11) ..... *W. kalamensis*, new species

6. Pronotum and elytra covered with greyish pubescence, phallus slender, tubular part short, forming one sixth of phallus length, apical part apparently rotated (Fig. 12), male eyes very small, interocular distance 1.36 times longer than their maximum diameter ..... *W. orobuensis*, new species
– Pronotum and elytra covered with dark pubescence, interocular distance at most 1.30 times longer than their maximum diameter 7

7. Apical part of phallus considerably rotated (Fig. 9) 8
– Apical part of phallus symmetrical or very slightly rotated (Fig. 8) 9

8. Tubular part forms 30 per cent of phallus length, interocular distance 1.15 times longer than eye diameter, body large, around 7 mm, very narrow margin of pronotum brown . ..... *W. grandis* Bocak
– Tubular part forms 15 per cent of phallus length (Fig.9), interocular distance 1.08 times longer than eye diameter, entire pronotum black ..... *W. petri*, new species

9. Elytral costae lighter than bottom of elytral cells, phallus widest in basal third ..... *W. similis* Bocak
– Elytra costae of same colour as bottom of elytral cells 10

10. Eye diameter 1.00 - 1.09 times longer than interocular distance, tubular part of phallus forms less than 10 per cent of phallus length, apical part rotated by 60° (Fig. 10) ..... *W. equalis*, new species
– Eyes smaller than eye diameter, tubular part of phallus longer than 10 per cent of phallus length (Fig. 8), apical part symmetrical or rotated by less than 30° 11

11. Basal part of phallus slender, widest in basal third, tubular part longer, forming 20 per cent of phallus length (Fig. 8) ... . *W. montana*, new species
– Basal part of phallus robust, widest in basal quarter, tubular part longer, forming 12 per cent of phallus length..... ..... *W. nigra* Bocak

12. Elytra black with yellow transverse band in middle part, sometimes yellow part can be diminished and forms more or less independent patches on each elytron 13
– Elytra otherwise coloured 14

13. Male genitalia as in Fig. 7 ..... *W. fasciata*, new species
– Male genitalia as in Fig. 6..... *W. mamasensis*, new species

14. Whole elytra brown, light brown to pale yellow or at most apical one tenth of elytra slightly infuscated 15
– Humeral part of elytra lighter than rest, infuscated part always larger than light one 18

15. Apical part of phallus rotated at least by 90° 16
– Apical part of phallus almost symmetrical, middle part with triangular process ..... *W. amporiwensis*, new species

16. Meso- and metathorax light brown to yellow, phallus slender, basal part of opening apparently asymmetrical, apical part rotated by 90° ..... *W. pallescens* Bocak
– Meso- and metathorax brown to dark brown, phallus with basal part of opening symmetrical, apical part not rotated... 17

17. Basal tubular part of phallus bulb-like, tubular part forming less that 5 per cent of phallus length..... ..... *W. brunnescens* Bocak
– Basal tubular part of phallus, slender, parallel-sided, tubular part forming third of phallus length .... *W. brendelli* Bocak

18. At least one quarter of elytra eyllow 19
– Only very short transverse part of humeri lighter than the rest of elytra 20

19. Light coloured costae and darker bottom of elytral cells in more than humeral third of elytra, male eyes 1.67 times interocular distance, phallus without any constriction in apical part (Bocak, 2000, Fig. 27) .... *W. flavohumeralis* Bocak
– Colouration of elytral costae and bottom of elytral cells similar in whole elytra, male eyes 1.35 times interocular distance, phallus with considerably constricted subapical part (Fig. 4) ..... *W. angustior* (Pic)

20. Disc of pronotum infuscated, elytral cells apparently transverse, eyes in male as large as interocular distance .... *W. celebensis* (Kleine)
– Disc of pronotum yellow, without any patches, elytral cells slightly transverse ..... *W. lateniger* (Pic)

1 Note. The species of the genus *Wakarumbia* differ mostly in the size on eyes in male (they are almost uniform in females) and shape of male genitalia. The differences in colouration are insufficient in many cases for certain identification. The characters available in both sexes were used in the key as far as possible, but some theses had to be based on characters available for males only.

Wakarumbia amporiwensis, new species

(Figs. 2, 3)

Material examined. – Holotype – male, Indonesia, C Sulawesi, 17 km E Pendolo, nr. Amporiwo, 120.45.49E, 2.06.33S, coll. Bolm, 4-9 Jul.1999 (LMBC).

Etymology. – The specific name refers to the type locality of the holotype.

Differential diagnosis. – *Wakarumbia amporivensis*, new species, belongs to the group of uniformly yellow or testaceous species. It differs from externally similar *W. pallescens* in the light yellow apex of elytra and the symmetrical apical half of phallus, from *W. brunnescens* in lighter colouration, more robust transverse bridge in basal part of phallus and the bent left margin in the middle part of phallus.

Description. – Male. Body slender, yellow; antennae, abdomen, tarsi, and apical parts of femora and tibiae dark brown. Head small, with distinct antennal tubercles, frons shining, covered with sparse long pubescence. Maxillary palpi with broad robust apical segment, labial palpi very short, with apical segment of similar shape. Eyes large, hemispherically prominent, eye diameter 1.29 times longer than interocular distance. Antennae slender, considerably compressed, surpassing elytral three quarters. Pronotum trapezoidal, broadest at base, 1.26 times wider than long, disc with one median areola, shining. Scutellum flat, concave at apex. Elytra parallel-sided, with four primary costae, primary costae 2 and 4 considerably stronger in apical two thirds of elytral length, elytral cells slightly transverse. Phallus slender, tubular part very short, weakly bulbous, left margin with triangular process, apical part almost symmetrical (Figs. 2, 3). Female unknown.

Measures. – Male. Length of body 6.0 mm, width at humeri 1.23 mm, length of pronotum 0.86 mm, width of pronotum 1.08 mm, holotype: interocular distance 0.37 mm, maximum diameter of eyes 0.48 mm.

Distribution. – Central Sulawesi.

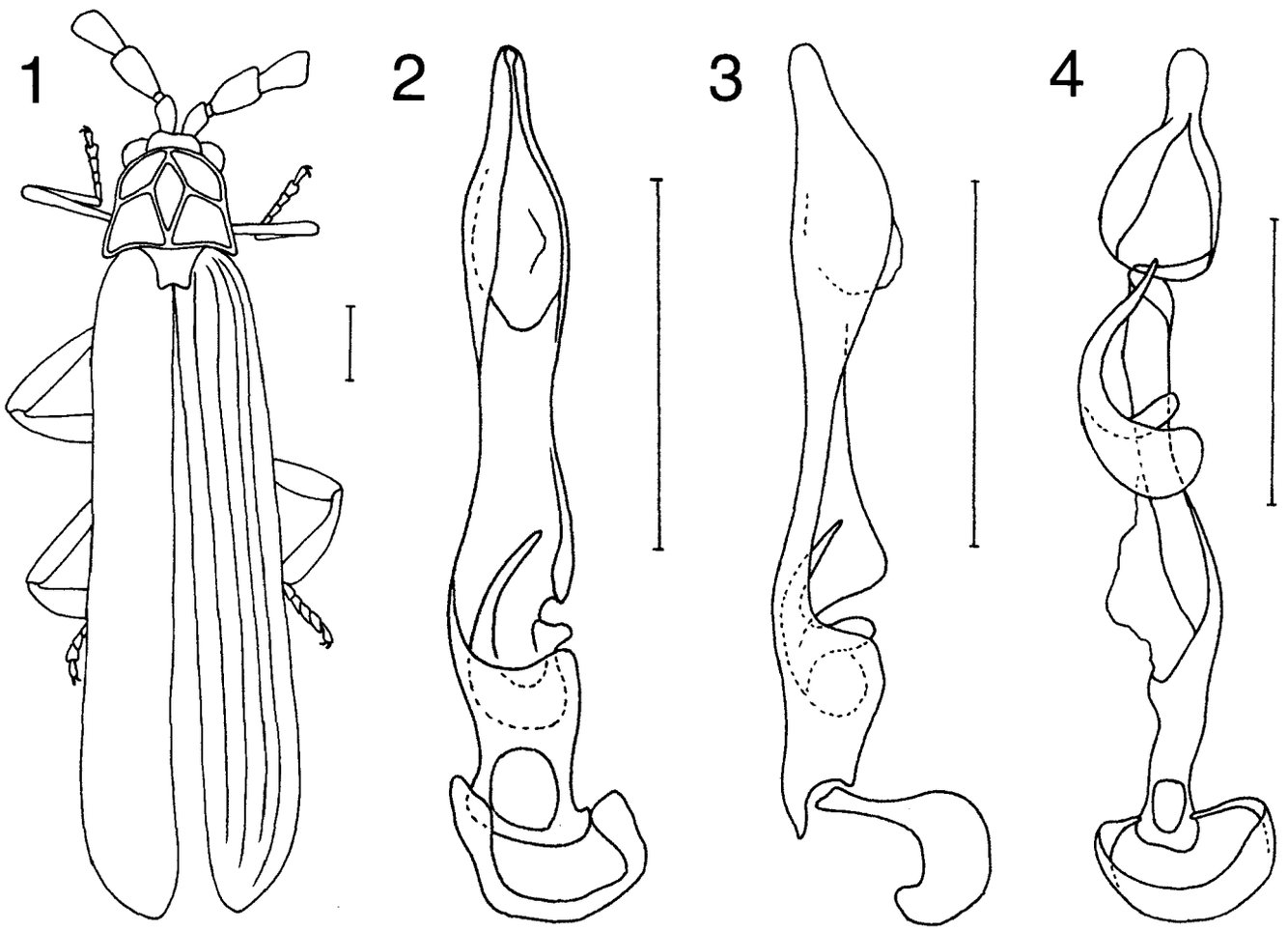
Remark. – *Wakarumbia amporiwensis*, new species, *W. pallescens* and W. *brunnescens* seem to be closely related species on the basis of similar shape of male genitalia and similar size of eyes. The first two species were collected in lower elevations where *Wakarumbia* is generally rare.

Wakarumbia equalis, new species
(Fig. 10)

Material examined. – Holotype – male, Indonesia, S Sulawesi, 25 km E Mamasa, 1100 m, 119.28.39E, 3.02.10S, coll. Bolm, 22-24 Jul.1999 (LMBC).

Paratypes – 3 males, 6 females, same locality data, 2 females, Indonesia, S Sulawesi, 8 km W Mamasa, 950 m, 119.20.32E, 2.56.13S, coll. Bolm, 18-21 Jul.1999 (LMBC, ZRC).

Etymology. – The specific name refers to the approximately equal frontal distance of male eyes and eye diameter.



Figs. 1-4. 1 - General appearance of *Wakarumbia grandis* Bocak. Male genitalia: 2, 3 - *Wakarumbia amporiwensis*, new species; 4 - *W. angustior* (Pic). Scales 0.5 mm.

Differential diagnosis. – *Wakarumbia equalis*, new species, belongs to the group of uniformly black species. It differs from externally similar species in the short tubular base of the phallus, in relatively larger eyes, and in slightly rotated apex of phallus (Fig. 10, compare with similar phallus of *W. nigra*, whose apical part is symmetrical).

Description. – Male. Body slender, dark brown to black, mouth parts and trochanters light brown. Head small, with distinct antennal tubercles, frons shining, covered with sparse long pubescence. Maxillary palpi with broad robust apical segment, labial palpi very short, with apical segment of similar shape. Eyes relatively large, hemispherically prominent, eye diameter 1.00 - 1.09 times longer than interocular distance. Antennae slender, considerably compressed, surpassing elytral two thirds. Pronotum trapezoidal, broadest at base, 1.23 times wider than long, disc with one median areola, shining. Scutellum flat, concave at apex. Elytra parallel-sided, with four primary costae, primary costae 2 and 4 considerably stronger in apical two thirds of elytral length, elytral cells slightly transverse. Phallus slender, tubular part very short, apical part slightly rotated (Fig. 10). Female. Interocular distance of eyes 1.17 - 1.31 times longer than maximum eye diameter.

Measures. – Male. Length of body 5.25 - 6.40 mm, width at humeri 1.03 - 1.22 mm, length of pronotum 0.77 mm, width of pronotum 0.95 mm, holotype: interocular distance 0.36 mm, maximum diameter of eyes 0.35 mm.

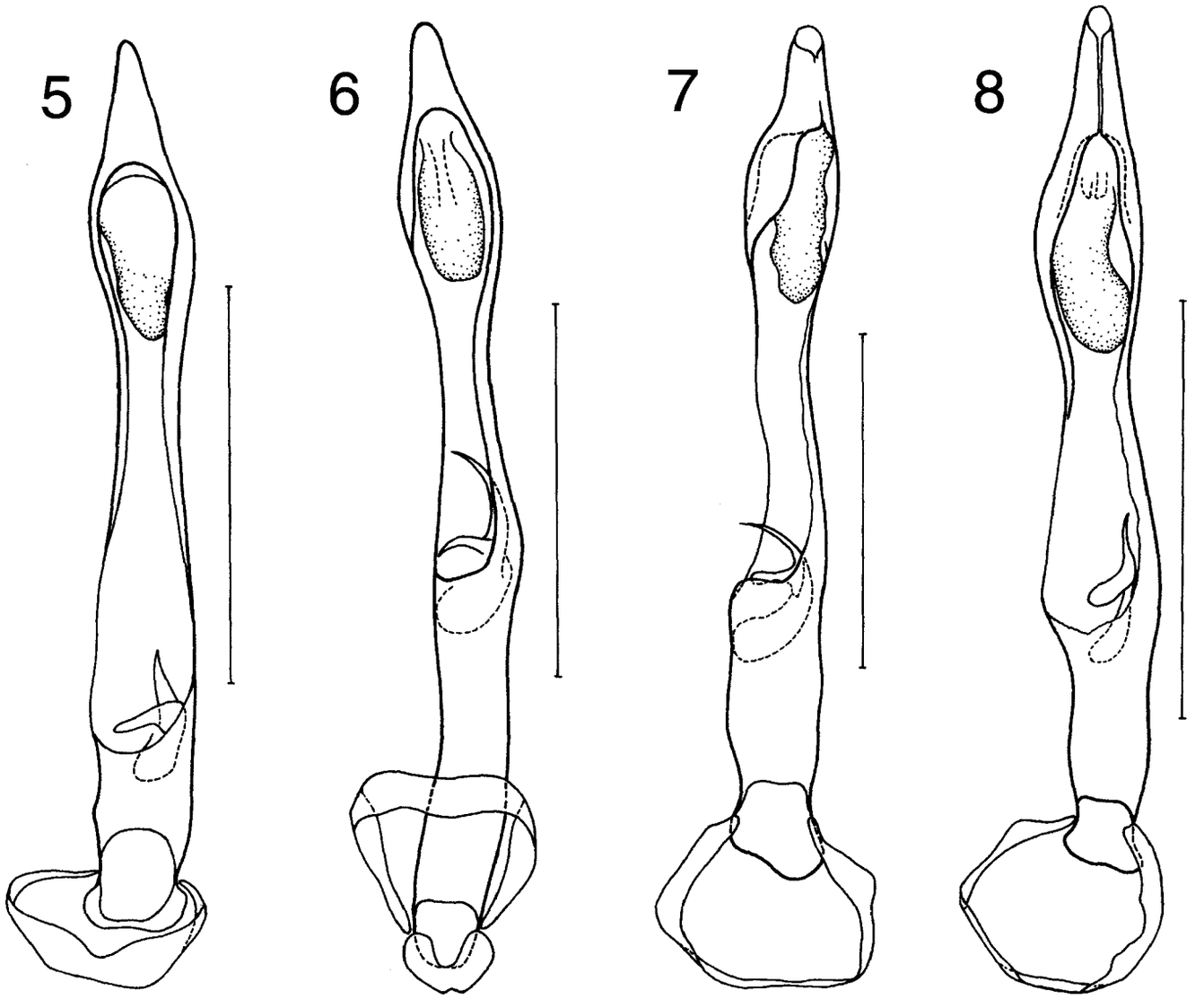
Distribution. – Southern Sulawesi.

Wakarumbia fasciata, new species
(Fig. 7)

Material examined. – Holotype – male, Indonesia, S Sulawesi, 25 km E Mamasa, 1100 m, 119.28.39E, 3.02.10S, coll. Bolm, 22-24 Jul.1999 (LMBC).

Etymology. – The specific name refers to the yellow transverse band in the middle part of elytra.

Differential diagnosis. – *Wakarumbia fasciata*, new species, reminds *W. mamasensis*, new species, but it differs in the shape of male genitalia; compare Figs. 6 and 7.



Figs. 5 - 8. Male genitalia: 5 - *Wakarumbia grisea*, new species; 6 - *W. mamasensis*, new species; 7 - *W. fasciata*, new species; 8 - *W. montana*, new species. Scales 0.5 mm.

Description. – Male. Body medium-sized, slender, dark brown to black, elytra with yellow, middle, transverse band, reaching in humeral part of elytra to humeri, mouth parts, margins of pronotum, trochanters and bases of femora light brown to yellow. Head small, with distinct antennal tubercles, frons shining, covered with sparse long pubescence. Maxillary palpi with broad robust apical segment. Labial palpi very short, with apical segment of similar shape. Eyes relatively small, hemispherically prominent, interocular distance of eyes 1.24 times longer than maximum eye diameter. Antennae slender, considerably compressed, surpassing elytral two thirds. Pronotum trapezoidal, broadest at base, 1.34 times wider than long, disc with one median areola, shining. Scutellum flat, bilobed at apex. Elytra parallel-sided, with four primary costae, primary costae 1 and 3 very weak, almost absent in some parts, elytral cells regular, quadrate to slightly transverse. Phallus slender, tubular part forming basal fourth of phallus, apical part slightly rotated (Fig. 7). Female unknown.

Measures. – Male. Length of body 7.25 mm, width at humeri 1.35 mm, length of pronotum 0.99 mm, width of pronotum 1.33 mm, holotype: interocular distance 0.51 mm, maximum diameter of eyes 0.41 mm.

Distribution. – Southern Sulawesi.

Wakarumbia grisea, new species
(Fig. 5)

Material examined. – Holotype – male, Indonesia, S Sulawesi, 8 km W Mamasa, 950 m, 119.20.32E, 2.56.13S, coll. Bolm, 18-21 Jul.1999 (LMBC).

Paratypes – 2 females, same locality data, 2 males, 5 females, Indonesia, S Sulawesi, 25 km E Mamasa, 1100 m, 119.28.39E, 3.02.10S, coll. Bolm, 22-24 Jul.1999 (LMBC).

Etymology. – The specific name refers to the colouration of the upper side of body.

Differential diagnosis. – *Wakarumbia grisea*, new species, belongs to the group of greyish pubescent species (*W. grisea*, new species, *W. kalamensis*, new species, and *W. orobuensis*, new species). *Wakarumbia grisea*, new species, has moderately bigger eyes and symmetrical phallus with very short basal tubular part (Fig. 5). These characters enable sure identification of the species.

Description. – Male. Body slender, dark brown to black, whole body, legs and antennae covered with relatively dense and long greyish pubescence, mandibles and bases of palpi light brown. Head small, with distinct antennal tubercles, frons shining, covered with dense pubescence. Maxillary palpi with broad robust apical segment. Labial palpi very short, with apical segment of similar shape. Eyes large, hemispherically prominent, maximum eye diameter 1.17 - 1.27 times longer than interocular distance. Antennae slender, considerably compressed, reaching elytral four fifths. Pronotum trapezoidal, broadest at base, 1.34 times wider than long, disc with single median areola, shining. Scutellum flat, concave at apex. Elytra parallel-sided, with four primary costae, primary costae 2 and 4 considerably stronger in apical two thirds of elytral length, elytral cells quadrate. Phallus slender, tubular part short, apical part almost symmetrical (Fig. 5). Female. Interocular distance 1.14 - 1.22 times longer than maximum eye diameter.

Measures. – Male. Length of body 5.5 - 7.0 mm, width at humeri 1.09 - 1.46 mm, length of pronotum 0.70 mm, width of pronotum 0.94 mm, holotype: interocular distance 0.33 mm, maximum diameter of eyes 0.39 mm.

Distribution. – Southern Sulawesi.

Wakarumbia kalamensis, new species
(Fig. 11)

Material examined. – Holotype – male, Indonesia, S Sulawesi, 25 km E Mamasa, 1100 m, 119.28.39E, 3.02.10S, coll. Bolm, 22-24 Jul.1999 (LMBC).

Paratype – female, same locality data (LMBC).

Etymology. – The specific name is derived from the name of the small village Kalama, in which vicinity was collected the type material.

Differential diagnosis. – *Wakarumbia kalamensis*, new species, belongs to the group with greyish upper side of body. It differs from all known *Wakarumbia* species in extremely big eyes, their maximum diameter is 1.67 times larger than the frontal interocular distance. Phallus (Fig. 11) resembles those of *W. montana*, new species, known from the Gunung Lompobatang (Fig. 8).

Description. – Male. Body slender, dark brown to black, covered with dense greyish pubescence, mouth parts, margins of pronotum, and trochanters light brown. Head small, with inconspicuous antennal tubercles, frons rugulose, covered with dense pubescence. Maxillary palpi with broad robust apical segment. Labial palpi very short, with apical segment of similar shape. Eyes very large, hemispherically prominent, maximum eye diameter 1.67 times longer than interocular distance of eyes. Antennae slender, considerably flattened, reaching elytral four fifths. Pronotum trapezoidal, broadest at base, 1.39 times wider than long, disc with single median areola, shining. Scutellum flat, bilobed at apex. Elytra parallel-sided, with four primary costae, primary costae 2 and 4 considerably stronger in apical two thirds of elytral length, elytral cells apparently transverse. Phallus very slender, tubular part long, forming one fifth of whole length, apical part slightly rotated (Fig. 11). Female. Interocular distance 1.03 times longer than maximum eye diameter.

Measures. – Male. Length of body 7.05 mm, width at humeri 1.52 mm, length of pronotum 0.94 mm, width of pronotum 1.31 mm, holotype: interocular distance 0.34 mm, maximum diameter of eyes 0.57 mm.

Distribution. – Southern Sulawesi.

Wakarumbia mamasensis, new species
(Fig. 6)

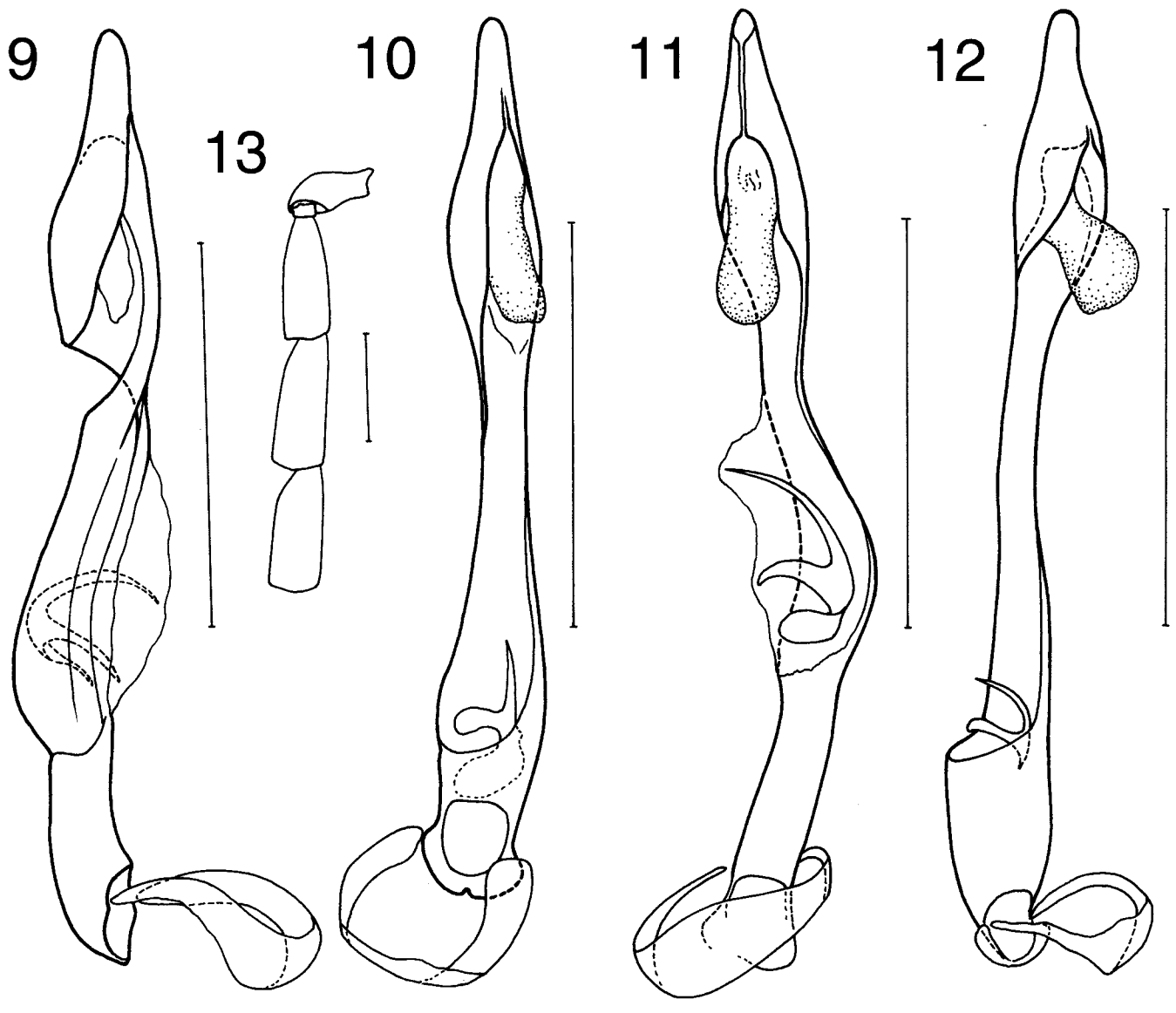
Material examined. – Holotype – male, Indonesia, S Sulawesi, 25 km E Mamasa, 1100 m, 119.28.39E, 3.02.10S, coll. Bolm, 22-24 Jul.1999 (LMBC).

Paratypes – 2 females, same locality data (LMBC).

Etymology. – The specific name is derived from the name of the town Mamasa, the centre of western Toraja region.

Differential diagnosis. – *Wakarumbia mamasensis*, new species, externally resembles *W. fasciata*, new species, but it differs substantially in the shape of male genitalia (Figs. 6, 7). Additionally, *W. mamasensis*, new species, has smaller extent of the transverse band and the group of light hairs at the base of primary costa 2 and 3.

Description. – Male. Body slender, dark brown to black, elytra with transverse yellow band in middle part, extent of band between one tenth and one fifth of elytral length, sometimes (in case of holotype) pleurae and suture dark and middle band transformed in two independent yellow patches. Humeral part of primary costae 2 and 3 with group of yellow hairs. Mandibles, bases of palpi and trochanters light brown. Head small, with conspicuous antennal tubercles. Frons shining, covered with dense pubescence. Maxillary palpi with broad, robust apical segment. Labial palpi very short, with apical segment of similar shape. Eyes relatively small, hemispherically prominent, interocular distance 1.14 times longer than maximum eye diameter. Antennae slender, considerably compressed, reaching over elytral two thirds. Pronotum trapezoidal, broadest at base, 1.15 times wider than long, disc with one median areola, shining. Scutellum flat, concave at apex. Elytra parallel-sided, with four primary costae, primary costae 2 and 4 considerably stronger in apical two thirds of elytral length, elytral cells quadrate to slightly transverse. Phallus very slender, tubular part long, forming



Figs. 9 - 13. Male genitalia: 9 - *Wakarumbia petri*, new species; 10 - *W. equalis*, new species; 11 - *W. kalamensis*, new species; 12 - *W. orobuensis*, new species. Basal antennal segments, male: 13 - *W. petri*, new species. Scales 0.5 mm.

basal two fifth of phallus length, apical part symmetrical (Fig. 6). Female. Body slightly bigger, interocular distance 1.19 - 1.30 times longer than maximum eye diameter.

Measures. – Male. Length of body 5.35 mm, width at humeri 1.03 mm, length of pronotum 0.75 mm, width of pronotum 0.86 mm, holotype: interocular distance 0.35 mm, maximum diameter of eyes 0.31 mm.

Distribution. – Southern Sulawesi.

Wakarumbia montana, new species
(Fig. 8)

Material examined. – Holotype – male, Indonesia Sulawesi, 25 km SSE Malino, Gn. Lompobatang, 119.53.31S, 5.17.50S, coll. Bolm, 26-28 Jul.1999, 1800 m (LMBC).

Paratypes – 25 males, same locality data (LMBC, BMNH, SMNS, KMTC).

Etymology. – The specific name refers to the mountainous distribution of this species.

Differential diagnosis. – *Wakarumbia montana*, new species, resembles externally *W. petri*, new species, but both species are well characterised by the shape of male genitalia (compare Figs. 8, 9). *Wakarumbia similis* has the similar male genitalia and differs by lighter elytral costae.

Description. – Male. Body slender, dark brown to black; mandibles, basal segments of palpi and trochanters light brown. Head small, with distinct antennal tubercles, frons shining, covered with sparse long pubescence. Maxillary palpi with broad robust apical segment. Labial palpi very short, with apical segment of similar shape. Eyes relatively small, hemispherically prominent, interocular distance of eyes 1.20 times longer than maximum eye diameter. Antennae slender, considerably flattened, reaching over elytral two thirds. Pronotum trapezoidal, broadest at base, 1.26 times wider than long, disc with one median areola, shining. Scutellum flat, concave at apex. Elytra parallel-sided, with four primary costae, primary costae 2 and 4 considerably stronger in apical two thirds of elytral length, elytral cells quadrate to slightly transverse. Phallus slender, tubular part long, forming basal fifth of phallus length, apical part almost symmetrical (Fig. 4). Female. Altogether 46 females were collected together with males of *W. montana* sp. n. and *W. petri* sp. n., but I am not able to connect any female with male, because these species are indistinguishable by external characters and only males provide reliable diagnostic characters on genitalia. Females are more robust with body size 5.25 - 9.7 mm.

Measures. – Male. Length of body 5.3 - 5.75 mm, width at humeri 1.01 - 1.34 mm, length of pronotum 0.87 mm, width of pronotum 1.18 mm, holotype: interocular distance 0.46 mm, maximum diameter of eyes 0.39 mm.

Distribution. – Southern Sulawesi.

Wakarumbia orobuensis, new species
(Fig. 12)

Material examined. – Holotype – male, Indonesia, S Sulawesi, 25 km E Mamasa, 1100 m, 119.28.39E, 3.02.10S, coll. Bolm, 22-24 Jul.1999 (LMBC).

Etymology. – The specific name is derived from the name of the village Orobua, in which vicinity was collected the type material.

Differential diagnosis. – *Wakarumbia orobuensis*, new species, is a member of the mimicry complex of greyish species from Mamasa region. It differs from similar *W. kalamensis*, new species, and *W. grisea*, new species, by much smaller eyes and shape of male genitalia (Fig. 12).

Description. – Male. Body small, slender, dark brown to black, covered with yellowish to greyish pubescence, only mandibles and bases of trochanters light brown. Head small, with distinct antennal tubercles, frons shining, covered with dense pubescence. Maxillary palpi with broad robust apical segment. Labial palpi very short, with apical segment of similar shape. Eyes small, hemispherically prominent, interocular distance of eyes 1.36 times longer than maximum eye diameter. Antennae slender, considerably flattened, surpassing elytral two thirds. Pronotum trapezoidal, broadest at base, 1.33 times wider than long, disc with one median areola, shining. Scutellum flat, concave at apex. Elytra parallel-sided, with four primary costae, primary costae 2 and 4 considerably stronger in apical two thirds of elytral length, transverse costae irregular, elytral cells quadrate to slightly transverse. Phallus slender, tubular part rather short, forming one sixth of phallus length, apical part considerably rotated (Fig. 12). Female unknown.

Measures. – Male. Length of body 4.95 mm, width at humeri 0.98 mm, length of pronotum 0.66 mm, width of pronotum 0.88 mm, holotype: interocular distance 0.37 mm, maximum diameter of eyes 0.28 mm.

Distribution. – Southern Sulawesi.

Wakarumbia petri, new species
(Figs. 9, 13)

Material examined. – Holotype – male, Indonesia, Sulawesi, 25 km SSE Malino, Gn. Lompobatang, 119.53.31S, 5.17.50S, coll. Bolm, 26-28 Jul.1999, 1800 m (LMBC).

Paratypes – 59 males, same locality data (LMBC, BMNH, SMNS, KMTC); 3 males, Indonesia, Sulawesi, 7 km S Malino, Gn. Lompobatang, 119.43.47S, 5.17.40S, coll. Bolm, 29 Jul.1999, 950 m (LMBC).

Etymology. – *Wakarumbia petri*, new species, is named after my son Petr Bocak, an enthusiastic collector of Lycidae.

Differential diagnosis. – *Wakarumbia petri*, new species, is the only completely black species of *Wakarumbia* with considerably rotated apical part of phallus (Fig. 9). This

species is externally very similar to syntopically occurring *W. montana*, new species, but its phallus reminds those of *W. celebensis*, which is known from lower elevation of the Gunung Lompobatang massive.

Description. – Male. Body slender, dark brown to black, only bases of maxillary palpi and trochanters brown. Head small, with distinct antennal tubercles, frons shining, covered with sparse long pubescence. Maxillary palpi with broad robust apical segment. Labial palpi very short, with apical segment of similar shape. Eyes relatively small, hemispherically prominent, maximum eye diameter 1.09 times longer than interocular distance of eyes. Antennae slender, considerably flattened, surpassing elytral two thirds. Pronotum trapezoidal, broadest at base, 1.35 times wider than long, disc with one median areola, shining. Scutellum flat, concave at apex. Elytra parallel-sided, with four primary costae, primary costae 2 and 4 considerably stronger in apical two thirds of elytral length, elytral cells quadrate to slightly transverse. Phallus slender, tubular part relatively short, forming a sixth of phallus length, apical part rotated by 360 degrees (Fig. 9). Female unknown, see remark on the females of *W. montana* sp. n.

Measures. – Male. Length of body 5.6 - 7.05 mm, width at humeri 1.07 - 1.41 mm, length of pronotum 0.88 mm, width of pronotum 1.19 mm, holotype: interocular distance 0.46 mm, maximum diameter of eyes 0.39 mm.

Distribution. – Southern Sulawesi.

ACKNOWLEDGEMENTS

The study of Oriental Lycidae was partially supported by the Grant Agency of the Czech Republic, project 206/98/0539, which is gratefully acknowledged. I am very grateful to the Olympus C&S Ltd. for the generous loan of the Olympus DP-10 digital microphotographic equipment.

LITERATURE CITED

Bocak, L., 1999. New taxa of the subtribe Hemiconderinina (Coleoptera, Lycidae) from Indonesia. *Entomol. Bl.*, **95**: 166 - 170.

Bocak, L., 2000. A revision of the genus Wakarumbia (Coleoptera, Lycidae). *Eur. J. Entomol.*, **97:** 271 - 278.

Bocak, L. & M. Bocakova, 1990. Revision of the genus Hemiconderis (Coleoptera, Lycidae). *Acta Entomol. Bohemoslov.*, **87**: 209 - 220.

Bocak, L. & M. Bocakova, 2000: Nomenclatural notes on Lycidae, with description of one new species. *Acta Univ. Palacki. Olomuc. Fac. rer. nat. Biol.*, **39**: 6 - 12.

Bocakova, M., 2001: Revision and phylogenetic analysis of the subfamily Platerodinae (Coleoptera, Lycidae). *Eur. J. Entomol.*, **98**(1): 53 - 85.

Bourgeois, J., 1879. Lycides recueillis au Brésil par C. Van Volxem. *Ann. Soc. Ent. Belg. Compt. Rend.*, **22**: 15 - 19.

Kleine, R., 1926a. Protaphes, a new Lycid-genus from Sarawak. *Sarawak Mus. J.*, **3**(10): 363 - 365.

Kleine, R., 1926b. Coleoptera - Lycidae. *Nova Guinea*, **15**: 91 - 195.

Kleine, R., 1933. Neue Lyciden und Bemerkungen zum Cat. Col. Junk-Schenkling Lycidae. *Stett. Entomol. Zeit.*, **94**(1): 1 - 20.

Moore, B. P. & W. V. Brown, 1981. Identification of warning odour components, bitter principles and antifeedants in an aposematic beetle - Metriorrhynchus rhipidium (Coleoptera: Lycidae). *Insect Biochem.*, **15**: 493-499.

Pic, M., 1922. Contribution à l'étude des Lycides. *L'Échange*, **407**: 13 - 16, hors-texte.

Waterhouse, C. O., 1879. *Illustrations of the typical specimens of Coleoptera in the collection of the British Museum. Part I - Lycidae.* British Museum, London. 93 pp.