

Oriental *Horaeomorphus* Schaufuss: a new species, synonymic notes and distributional synopsis (Coleoptera: Staphylinidae: Scydmaeninae)

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Abstract. For the first time the cyrtoscydmine genus *Horaeomorphus* Schaufuss is reported to occur in Laos, and *Horaeomorphus solodovnikovi*, new species, is described. Based on examination of the type material, *Stenichnus wailimae* Lhoste is transferred to *Horaeomorphus*, and the lectotype for *S. wailimae* is designated. *Horaeomorphus heissi* Franz is placed as a junior subjective synonym of *H. wailimae* (Lhoste), new combination, and *Horaeomorphus soesilae* Makhan & Ezzatpanah is transferred to *Syndicus*, resulting in *S.* (s. str.) *soesilae* (Makhan & Ezzatpanah), new combination. A distributional synopsis of all Asian species of *Horaeomorphus* is presented, with a discussion of future research problems related to the evolution and biogeography of this genus.

Key words. Scydmaeninae, Cyrtoscydmini, *Horaeomorphus*, new species, new combination, new synonym, Oriental, Laos, biogeography

INTRODUCTION

Thirty five species of the genus *Horaeomorphus* Schaufuss (Scydmaeninae: Cyrtoscydmini) have been reported so far to occur in Asia, all from the Oriental Region and areas forming a transient zone between the Oriental and the East Palearctic regions. More than 20 of them occur in the Malay Peninsula and the Sunda Islands and only a few species are distributed in the Himalayas, Vietnam, Thailand, People's Republic of China, Taiwan, Japan, the Philippines, and the Indonesian New Guinea (for complete references see Vit, 2004; Jałoszyński, 2006a, 2009a; Jałoszyński, Nomura & Idris et al., 2007; Jałoszyński & Nomura, 2008). Species that inhabit the Asian continent north of the historical Sundaland seem to be crucial for understanding the current distribution of *Horaeomorphus*, the rich radiation within the Malay sub-region in its northernmost limits and historical dispersal-vicariance events, especially those related to alternative scenarios of colonisation of Taiwan, subtropical Japanese islands, and the Philippines either by north to south dispersal from continental Asia or south to north migration from Borneo. However, this area is extremely poorly studied and therefore the distributional data on *Horaeomorphus* are still fragmentary.

In the present paper the first species of *Horaeomorphus* known to occur in Laos is described, filling the gap in the distribution of this genus between the Malay Peninsula and northern Vietnam. During the study, two cases of an incorrect taxonomic placement of previously described

species were discovered, one of them involving a necessity of synonymisation and lectotype designation. The hitherto obtained biogeographical data on the occurrence of *Horaeomorphus* in Asia are summarised in a distributional synopsis that allows for establishing guidelines for further study of this genus of Cyrtoscydmini.

MATERIAL AND METHODS

Dry-mounted specimens were relaxed in warm water and dissected; aedeagi were mounted in Canada balsam. The measurements are as follows: body length is a sum of lengths of the head, pronotum, and elytra measured separately; length of head is from the occipital constriction to anterior margin of clypeus; width of head includes eyes; length of pronotum was measured along midline; length of elytra measured along suture; width of elytra is maximum, combined; elytral index is length divided by combined width. Habitus images were taken by a Nikon Coolpix 4500 camera mounted on a Nikon Eclipse 1500 stereoscopic microscope (Nikon, Tokyo, Japan); image stacks were processed using COMBINE ZP (Hadley, 2010). In order to facilitate identification of the type material, the label data of type specimens are cited as they appear on labels, slash (/) is used to separate lines.

Studied specimens are deposited at: SDEI – Senckenberg Deutsches Entomologisches Institut, Müncheberg, Germany; and ZMUC – Zoological Museum, University of Copenhagen, Denmark.

NEW SPECIES DESCRIPTION

Horaeomorphus solodovnikovi, new species (Figs. 1A–C, 2A, B)

Material examined. Holotype. Male (Fig. 1A), three labels: "LAOS: Champasak prov.: / Bolaven Plt. [i.e., Plateau], Muang Paxong,

/ Ban Hoyayteuy, Mt. Phu Din / 14-14.vi.2008; 1,100 m., / N 15°03.171'E 106°17.397' [white, printed], "A. Solodovnikov & J. / Pedersen leg. Disturbed / primary rainforest. / ZMUC collection." [white, printed], "*HORAEOMORPHUS / solodovnikovi* m. / det. P. JAŁOSZYŃSKI, 2013 / HOLOTYPUS" [red, printed] (ZMUC).

Diagnosis. The following set of characters is unique for this species: body length below 3 mm, pigmentation brown, pronotum strongly elongate, with three small ante-basal pits located in deep groove; metatrochanters in males strongly modified, each forming very long, slightly recurved rod-like projection with rounded apex; and aedeagus with symmetrical internal armature containing long median tubular structure much longer than half length of median lobe.

Male. Body (Fig. 1A) moderately large (length 2.75 mm), slender, strongly convex, dark brown with slightly lighter legs and palps, vestiture slightly lighter than cuticle.

Head broadest at moderately large and moderately strongly convex eyes, length 0.40 mm, width 0.60 mm; tempora rounded and about as long as eye in dorsal view; vertex strongly transverse and weakly convex, with pair of small but distinct pits located near posterior margins of supraantennal tubercles; frons weakly convex; supraantennal tubercles strongly raised, well delimited from frons but confluent with vertex. Punctures on vertex and frons fine and inconspicuous; setae moderately long, sparse, suberect to erect. Antennae

slender, longer than half length of body, length 1.50 mm; relative lengths of antennomeres (shortest antennomere II as 1): 1.43 : 1.00 : 1.71 : 1.29 : 1.29 : 1.14 : 1.14 : 1.14 : 1.43 : 1.43 : 2.00.

Pronotum oval, elongate, broadest between anterior third and fourth, length 0.85 mm, width at base 0.50 mm, maximum width 0.73 mm; distal part strongly narrowing caudad to moderately sharply marked posterior constriction demarcating narrow basal collar; hind angles obtuse and blunt; posterior margin nearly straight; posterior collar delimited from disc by deep, narrow and slightly convex anteriorly transverse groove connecting three small pits: median pit as small as width of groove and lateral pits only slightly larger. Punctures on disc as fine as those on frons and vertex; vestiture composed of sparse, moderately long and suberect setae.

Elytra strongly elongate, oval, more convex than pronotum, broadest between middle and anterior third, length 1.50 mm, width 0.98 mm, elytral index 1.54. Humeral calli weakly marked, delimited from adsutural region by very short, shallow and broad basal impressions; basal elytral foveae indiscernible; median part of elytra without adsutural or circumsutural impressions; apices of elytra separately rounded. Punctures more distinct than those on pronotum, fine but sharply marked and separated by spaces 2–3× as wide as puncture diameters; vestiture similar to that on pronotum but slightly longer.

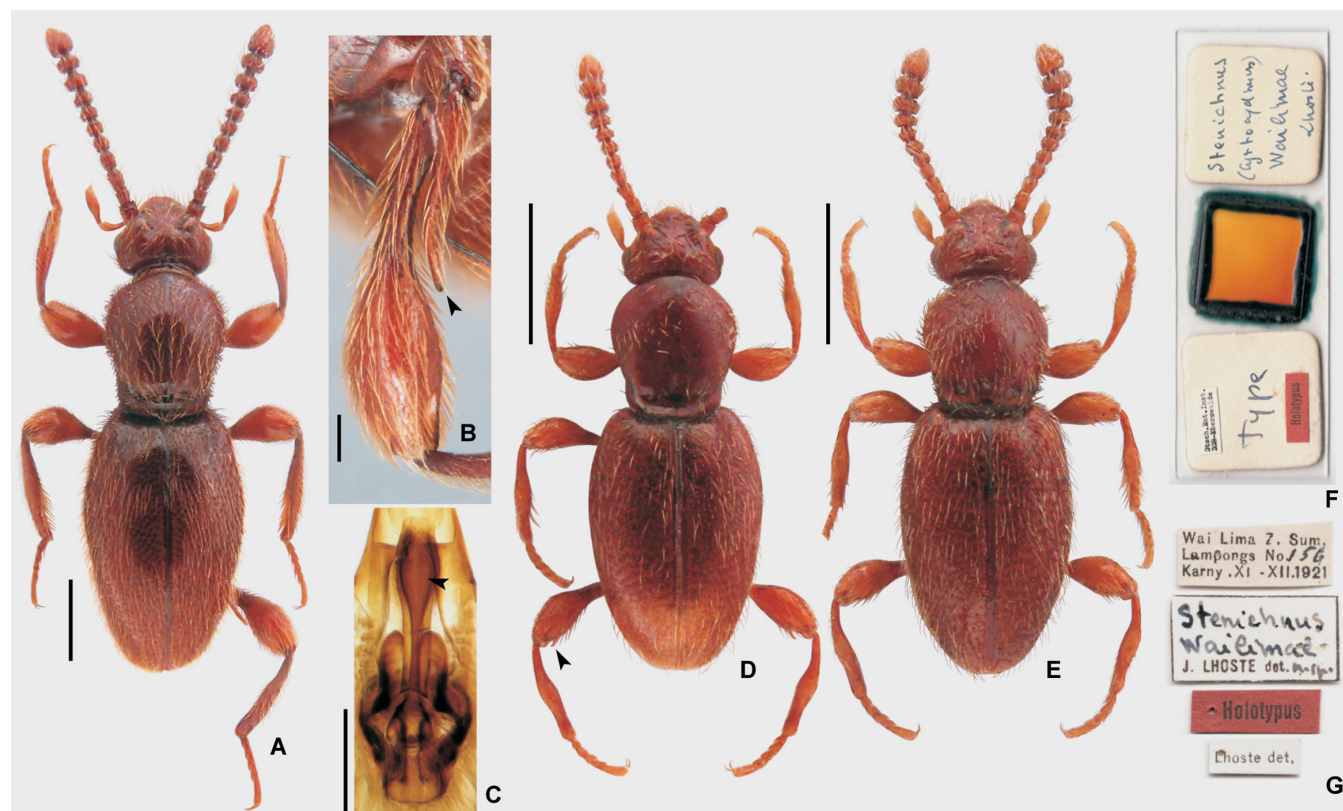


Fig. 1. *Horaemorphus solodovnikovi*, new species, (A–C); and *Horaemorphus wailimae* (Lhoste), new combination, (D–G). Dorsal habitus of holotype male (A), lectotype male (D; arrow indicates femoral projection) and paralectotype female (E); right metatrochanter and femur in ventral view (B; arrow indicates the apex of trochanteral projection); internal armature of aedeagus in ventral view (C; arrow indicates median tubular structure); genital preparation of lectotype male (F); and original set of labels of lectotype male (G). Scale bars = 0.5 mm (A, D, E), 0.1 mm (B), 0.2 mm (C).

Metatrochanters (Fig. 1B) strongly modified, developed as long and recurved rod-like projections nearly as long as half of metafemur.

Aedeagus (Figs. 1C, 2A, B) 0.73 mm in length; median lobe broadest in basal third, distal part subtriangular and rounded at apex, in lateral view slightly curved dorsally; internal armature remarkable, with large and symmetrical central complex containing strongly elongate tubular structure in middle; parameres slender, each with apical bunch of several setae of various lengths, without subapical setae.

Female. Unknown.

Etymology. This species is dedicated to Alexey Solodovnikov (ZMUC), a specialist on Staphylinidae and one of collectors of the specimen fixed here as a holotype.

Distribution. Southern Laos, Champasak Province.

Remarks. *Horaeomorphus solodovnikovi* shares the highly modified and recurved male metatrochanters with several congeners: *H. antennatus* Jałoszyński, 2006 (from Malaysia: Pahang), *H. caverniventris* Jałoszyński, 2006 (Malaysia: Pahang), *H. punctatissimus* Franz, 1992 (Malaysia: Sabah; Indonesia: Sumatra, Siberut Is.), *H. jeraianus* Jałoszyński, 2006 (Malaysia: Kedah), *H. punctifrons* Jałoszyński, 2006 (Malaysia: Pahang), *H. jaechi* Jałoszyński, 2006 (Malaysia: Sarawak), *H. tiomanensis* Jałoszyński, 2006 (Malaysia: Tioman Is.), *H. endauensis* Jałoszyński & Nomura, 2007 (Malaysia: Pahang), *H. imitator* Jałoszyński, 2009 (Philippines: Mindanao), *H. blattnyi* Jałoszyński, 2004 (Philippines: Luzon), *H. sakishimanus* Jałoszyński, 2002 (Japan: Iriomote-jima and Ishigaki-jima islands), and *H. calcarifer* (Franz, 1986) (Fiji). None of these species has the aedeagus with a long tubular median part of the internal

armature, and this character allows for an unambiguous identification of *H. solodovnikovi*.

NEW SYNONYMS AND COMBINATIONS

Horaeomorphus wailimae (Lhoste), new combination (Fig. 1D–G)

Stenichnus (*Cyrtoscydmus*) *wailimae* Lhoste, 1939: 1, figs. 1–2; Franz, 1970: 546, fig. 11.

Stenichnus waihinae Lhoste (misspelling in Franz, 1970, legend to fig. 11).

Horaeomorphus (*Pseudosyndicus*) *heissi* Franz, 1985: 124, fig. 36, new synonym.

Horaeomorphus heissi Franz; Jałoszyński, 2006: 39, figs. 1, 8, 22, 50, 83, 86–89, 124.

Material examined. Lectotype (here designated). Male, dry-mounted beetle (Fig. 1D) and genital preparation on microscope slide (Fig. 1F), card-mounted specimen with five labels (Fig. 1G): “Wai Lima Z. Sum. / Lampongs [i.e., Lampung] No 156 / Karny. XI–XII.1921” [white, printed except for handwritten number], “*Stenichnus / wailimae / J. LHOSTE det. n. sp.*” [white, handwritten and printed], “Holotypus” [red, printed], “Lhoste det.” [white, printed], “*HORAEOMORPHUS / wailimae* (Lhoste, 1939) / LECTOTYPUS / det. P. JAŁOSZYŃSKI, 2013 [white, printed] (SDEI).

Paralectotypes. 1 male and 1 female (Fig. 1E), same data except for “Paratypus” and “Paralectotypus” labels (SDEI).

Remarks. Lhoste (1939) did not specify the number of individuals included in the type series, therefore the three specimens preserved at SDEI have the status of syntypes. In order to ensure the stability of nomenclature and provide a unique name-bearing type for *Stenichnus wailimae* a lectotype is here designated.

Franz (1970) redescribed and illustrated the aedeagus of *Stenichnus wailimae* and did not express any doubts concerning the generic placement of this species. Later Franz (1985) described *Horaeomorphus heissi* from Sumatra, which was redescribed by Jałoszyński (2006a). In the latter study, which is a comprehensive revision of *Horaeomorphus* from Malaysia, Singapore, Indonesia, and Brunei, the syntypes of *Stenichnus wailimae* were not studied, as it seemed unlikely that Franz, who himself published a number of papers on *Stenichnus* and *Horaeomorphus*, might have misidentified these genera. However, examination of the type series of *Stenichnus wailimae* carried out during the present study revealed that this species not only belongs to *Horaeomorphus*, but is also conspecific with *H. heissi*.

Horaeomorphus wailimae (= *H. heissi*) can be easily identified on the basis of a hook-like projection on the ventral surface of male metafemora (Fig. 1D, marked with an arrow), missing in females (Fig. 1E), non-modified metatrochanters in both sexes, three ante-basal pits on the pronotum, of which the middle one is anteriorly connected to a short longitudinal groove, and a remarkable and unique aedeagus (illustrated in Jałoszyński, 2006a, Figs. 86–89). The only other known species of *Horaeomorphus* with the hook-like metafemoral projection is *H. samosirensis* Jałoszyński, 2009 from the

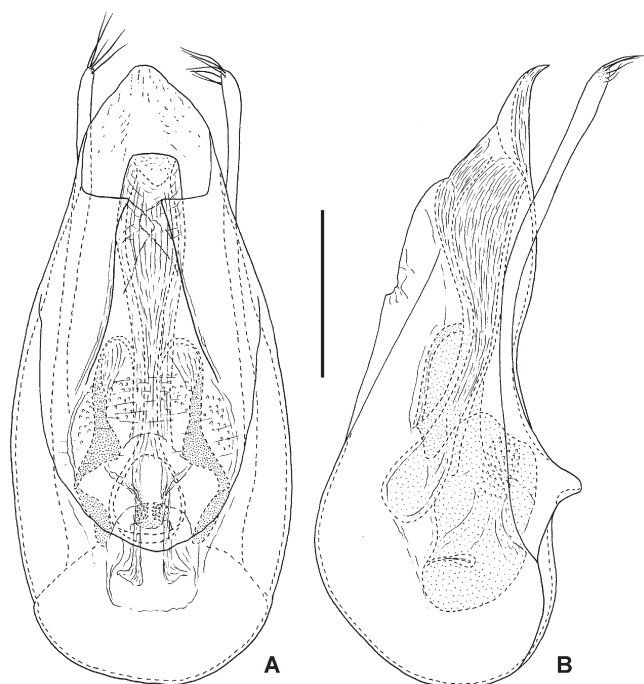


Fig. 2. *Horaeomorphus solodovnikovi* new species. Aedeagus in ventral (A) and lateral (B) views. Scale bar = 0.2 mm.

Samosir Island, North Sumatra, but it has the pronotum nearly circular and nearly as broad as elytra, and not strongly elongate and much narrower than elytra, as in *H. wailimae*.

***Syndicus (Syndicus) soesilae* (Makhan & Ezzatpanah),
new combination**

Horaemorphus soesilae Makhan & Ezzatpanah, 2011: 1, figs. 1–3.

Remarks. Recently Makhan & Ezzatpanah (2011) described a new species of *Horaemorphus* from the island of Java, Indonesia. On the basis of errors committed in that paper it is evident that the authors have a highly fragmentary knowledge of Oriental Scydmaeninae, do not know the large literature on the subject, and did not even care to properly diagnose their new species to make it distinguishable from its congeners. Although a comprehensive revision of *Horaemorphus* of the Malay sub-region has been published (Jałoszyński, 2006a) and a number of other papers dealing with all Asian species are available (Schaufuss, 1889; Franz, 1973, 1974, 1984, 1985, 1992; Jałoszyński, 2002, 2003, 2004a, 2009a; Jałoszyński & Nomura, 2004, 2008; Vít, 2004; Jałoszyński et al., 2007), some of them containing a comprehensive discussion of diagnostic characters of *Horaemorphus*, Makhan & Ezzatpanah cited only one reference, irrelevant to the taxon they dealt with. The illustrations of *Horaemorphus soesilae* (photos of the dorsal habitus and the aedeagus) provided in the original description show clearly a representative of the unmistakable (or so it seemed) genus *Syndicus* Schauffuss. *Syndicus* is not only easily recognisable on the basis of its remarkable body shape, clearly different than that of any *Horaemorphus*, but first of all it differs from all genera of Cyrtoscydmini in having pseudo-10-segmented antennae (all other genera in this tribe, including *Horaemorphus*, have clearly 11-segmented antennae). The minute antennomere XI in *Syndicus* is highly reduced and inserted in the preceding antennomere in such a way that in the nominotypical subgenus antennomeres X and XI appear as a single antennomere, with only an indistinct septum visible between the apex of X and the base of XI. The number of antennomeres (apparently 10) can easily be counted on fig. 1 of Makhan & Ezzatpanah, and in case of any doubts the authors themselves provide the crucial data: “Antennae brown, 10-segmented” and “*Horaemorphus soesilae* Makhan & Ezzatpanah, sp. nov. is the first species with 10 antennal segments. The other species from the Oriental region have 11 antennal segments and the male genitalia are different”. It seems that Makhan & Ezzatpanah are simply not aware of the fact that the genus *Syndicus* even exists, and certainly the authors do not know (and in consequence do not cite) the large literature related to this genus (which is one of the best studied in the Oriental region), including the world revision (Jałoszyński, 2004b) and a number of later papers (Jałoszyński, 2006b, 2008, 2009b, 2011a, 2011b; Jałoszyński & Nomura, 2006). The aedeagus illustrated in figs. 2, 3 of Makhan & Ezzatpanah (2011) and the extremely short “description” without a clear diagnosis make it impossible to distinguish *Syndicus soesilae* from its numerous congeners. A further study is necessary to verify whether this is really a new species or merely a synonym.

**DISTRIBUTIONAL SYNOPSIS OF ASIAN
*HORAEOMORPHUS***

Although species of *Horaemorphus* were reported to occur not only in Asia but also in Australia, Tasmania, New Caledonia, Madagascar, Mauritius, and the Comoro Islands, a preliminary study reported previously (Jałoszyński, 2006a) revealed that at least most Australo-Pacific taxa and those from Lemuria are not congeneric with *H. eumicroides* Schauffuss, the type species of *Horaemorphus*. The only species that occurs outside the Oriental region and was confirmed to belong to this genus is *H. calcarifer* (Franz) from the Republic of Fiji (Jałoszyński, 2012).

Compared to other genera of Cyrtoscydmini, *Horaemorphus* in Asia is relatively well studied. Nearly all species were revised or described recently and are possible to identify using characters and illustrations presented in a series of taxonomic papers (Jałoszyński, 2002, 2003, 2004a, 2006a, 2009a; Jałoszyński & Nomura, 2004, 2008; Vít, 2004; Jałoszyński et al., 2007). Since the primary diagnostic characters of individual species are associated with genital structures, examination of the aedeagus is always necessary for determination.

The currently known distribution of *Horaemorphus* in Asia (Fig. 3) is predominantly south-eastern, comprising the biogeographic sub-region of Sundaland (the Malay Peninsula and Sunda Islands). Only two named species are known to occur east to the Wallace Line: *H. fakfakensis* from the Indonesian east-northern part of New Guinea and Melanesian *H. calcarifer*. While *Horaemorphus* is broadly distributed in the southern part of the Malay Peninsula and small surrounding islands (10 species known from West Malaysia and Singapore), in the Sunda Islands it is so far known only from Sumatra and the Mentawai Islands (Siberut Island; three species) and Borneo (10 species occurring in Sabah, Sarawak, Kalimantan, and Brunei). Only few species are known from more than one locality, and the distribution of two of them is disjunctive: *H. punctatissimus* Franz, 1992 occurs in Borneo, Sumatra, and Siberut Island, and *H. sarawakensis* Franz, 1992 is known from Borneo and West Malaysia. This distribution suggests either a recent dispersal or a historically broader range fragmented after the last ice age, when the Sunda Shelf broke apart into what is now the

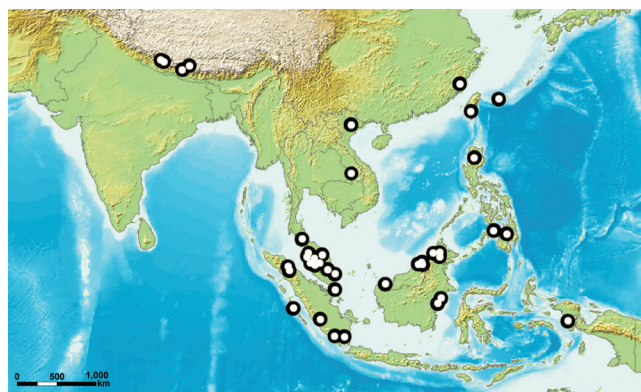


Fig. 3. Distribution of *Horaemorphus* in Asia.

Malay Peninsula, Sumatra, Borneo, Java, and a number of smaller surrounding islands (Keast & Miller, 1996; Hall & Holloway, 1998; Metcalfe et al., 2001). It seems unlikely that *Horaeomorphus* does not occur in Java and the lack of known species from this large island is rather a result of an inadequate study. Taking into account the occurrence of this genus in New Guinea it seems plausible that also the Lesser Sunda Islands and Sulawesi may be inhabited by *Horaeomorphus*, but so far this genus was not found in a relatively small material of Scydmaeninae available from various museum collections surveyed by the author.

The large islands of Philippines, historically connected with Borneo by land bridges when sea levels were low during the glacial periods (Keast & Miller, 1996; Hall & Holloway, 1998; Metcalfe et al., 2001) are also inhabited by *Horaeomorphus*, but to date only three species have been discovered, one in Luzon and two in Mindanao. However, these species were found in relatively small samples of Scydmaeninae collected during just a few expeditions, which suggests that *Horaeomorphus* in the Philippines may be more speciose and not uncommon.

The most interesting is the current distribution of *Horaeomorphus* species known to occur north of the Malay Peninsula. Their range encompasses two areas: five eastern species are known from a small number of scattered sites located in Vietnam, Laos, mainland China, Taiwan, and the subtropical islands of Japan; and four western species inhabit high altitudes in the Himalayas. The eastern and western continental areas where *Horaeomorphus* is known to occur are separated by mountain ranges running north to south along valleys of Salween, Mekong, and Yangtze rivers and forming a part of the Hengduan Mountains system. The Scydmaeninae of the entire area between the western and eastern sites where *Horaeomorphus* occurs, encompassing Bhutan, Bangladesh, Burma and south-eastern parts of Chinese Tibet, are extremely poorly studied. The gap in distribution may therefore be not a true disjunction but simply a result of the inadequate state of knowledge of Scydmaeninae fauna.

Further field work and museum surveys are necessary to properly analyse the biogeography of *Horaeomorphus* and to reconstruct historical ranges of its ancestors. An interesting research problem is whether the species that occur in Taiwan and the adjacent Japanese archipelago of Sakishima (i.e., Iriomote-jima and Ishigaki-jima) evolved from continental (i.e., Chinese) ancestors or dispersed from the Sundaland via land bridges between Borneo and the Philippines and further north to Taiwan. An analogous dilemma was recently discussed for another genus of the Scydmaeninae, *Paraneseuthia* Franz (Jałoszyński, 2011b). The species of *Horaeomorphus* that occur in the continental part of Asia (Laos, Vietnam, SE China) may be crucial for reconstructing the phylogeny and historical dispersal-vicariance events in the evolution of *Horaeomorphus*. Therefore, the discovery of the first *Horaeomorphus* from Laos reported in the present paper is highly valuable and further efforts should be concentrated on the study of Scydmaeninae in this region.

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