

## Studies on the Negastrinae: New and Little-Known Species of the Genus *Hemirrhaphes* Candèze, 1878 (Insecta: Coleoptera: Elateridae) from Southeast Asia

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**Rainer Schimmel and Dariusz Tarnawski (2011)** Studies on the Negastrinae: new and little-known species of the genus *Hemirrhaphes* Candèze, 1878 (Insecta: Coleoptera: Elateridae) from Southeast Asia. *Zoological Studies* 50(6): 804-808. Two new species of the genus *Hemirrhaphes* Candèze, 1878, *H. johorensis* sp. nov., and *H. laoticus* sp. nov., are described and illustrated, and new data on *H. ferrugineus* Candèze, 1896, and *H. notabilis* Candèze, 1878 are provided. In total, we consider 6 species as members of the genus *Hemirrhaphes*: *H. apicalis* Schwarz, 1900, *H. bivittatus* Fleutiaux, 1905, *H. ferrugineus* Candèze, 1896, *H. johorensis* sp. nov., *H. laoticus* sp. nov., and *H. notabilis* Candèze, 1878. It is argued that species of *Hemirrhaphes* are phylogenetically closer to species of the genus *Zorochros* than to those of the genus *Arhaphes*, in which they were repeatedly placed by various earlier authors. <http://zoolstud.sinica.edu.tw/Journals/50.6/804.pdf>

**Key words:** Coleoptera, Negastrinae, *Hemirrhaphes*, New species, New records.

The genus *Hemirrhaphes* was established by Candèze (1878) with the type species *H. notabilis* Candèze, 1878 from Myanmar (Burma). Since that time, and because species of the genera *Hemirrhaphes* and *Arhaphes* have similar body appearances, the name *Hemirrhaphes* was regarded as a synonym of *Arhaphes* Candèze, 1860, by subsequent authors (refer to Schwarz 1902, Schenkling 1925: 217-218). Finally Stibick (1971) separated the 2 genera and established them as 2 valid species-groups. However, considering the species which belong to the genus *Arhaphes*, only 4 species of the genus *Hemirrhaphes* are known so far from Southeast Asia: *H. apicalis* Schwarz, 1900 (from Sumatra), *H. bivittatus* Fleutiaux 1905 (from southwestern India), *H. ferrugineus* Candèze, 1896 (from Java), and *H. notabilis* Candèze, 1878 (from Myanmar).

Through colleagues and friends, we recently received newly collected materials of the subfamily Negastrinae from Indonesia, Laos, Malaysia, and Thailand. Among these materials, we found 2 new species of the genus *Hemirrhaphes* which we describe and illustrate below. Also, new records of 2 already known species of this genus are given.

### MATERIALS AND METHODS

The following abbreviations are used in this study: CSV, Coll. Schimmel, Vinningen, Germany; CRG, Coll. Riese, Genova, Italy; and CTW, Coll. Tarnawski, Wrocław, Poland. The material was examined under a Zeiss Stemi 2000-C stereo-microscope (Jena, Germany) with a micron insert. Photographs were taken with a Nikon E4500

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camera (Tokyo, Japan) with a TV2/3" C 0.63x adaptor to the binocular. The body length of specimens was measured from the apical margin of the frons to the apex of the elytra, and body width along the base angles of the pronotum using the micron insert. The examined specimens were fixed on white pasteboard. Male genitalia were pulled out of the abdomen, cleaned, and fixed beside the body of the specimen using water-soluble transparent glue.

## TAXONOMY

### Genus *Hemirrhaphes* Candèze, 1878

(Figs. 1-3)

*Hemirrhaphes* Candèze, 1878: 32.

*Type species: Hemirrhaphes notabilis* Candèze, 1878: 32.

*Distribution:* India, Indonesia, Laos, Malaysia, Thailand.

### *Hemirrhaphes ferrugineus* Candèze, 1896

*Hemirrhaphes ferrugineus* Candèze, 1896: 54.  
*Arrhaphes ferrugineus* [sic] Schenkling, 1927: 218.

*Type locality:* Java.

*Material examined:* Indonesia: Sumatra, Gunung Kerinci, 1800-2000 m, 6-7 Mar. 1991, 10

specimens, leg. Bocak et Bocakova; Malaysia: Pahang, Banjaran Benom Mts., 20 km south of Kampong Ulu Dong, 17-23.IV.1997, 1 specimen, leg. P. Cechovsky; Kelantan, 60 km northeast of Tanah Rata, Tana Kerajaan, 1700 m, 12-30.IV.2007, 2 specimens, leg. P. Cechovsky; Perak, Ipoh, 900 m, Banjaran Titi Wangsa, Ringlet, 29.III.-15.IV.2004, 1 specimen, leg. P. Cechovsky.

*Remarks:* The above-mentioned data are the 1st records of this species outside Java.

*Distribution:* Malaysia: Pahang, Kelantan, Perak; Indonesia: Sumatra, Java (type locality).

### *Hemirrhaphes johorensis* sp. nov.

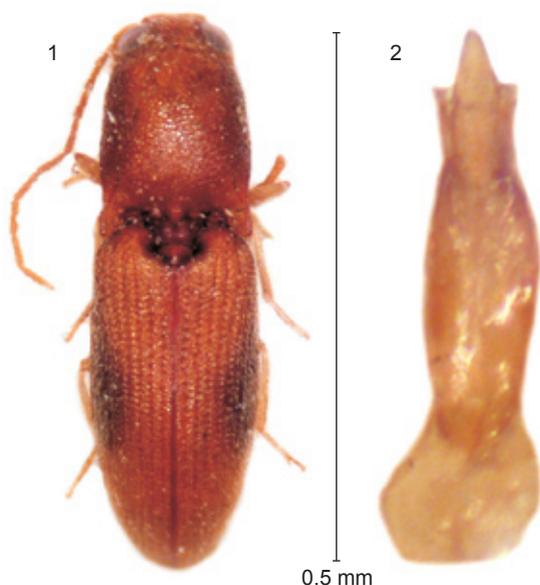
(Figs. 1, 2)

*Type locality:* Malaysia: Johor.

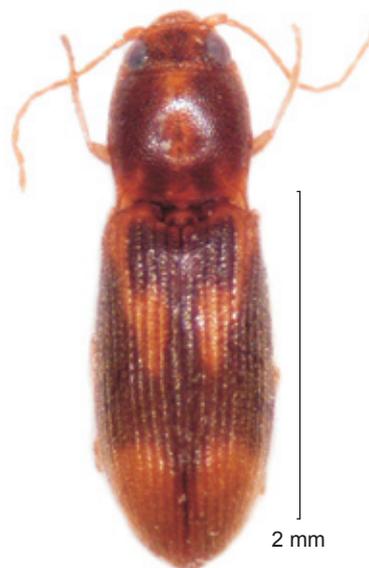
*Material examined:* Holotype ♂ (CSV): Malaysia: Johor, 600 m, 20 km north of Kota Tinggi, Muntakah Hills, Lombong, 28.I.-8.II.2000, leg. P. Cechovsky.

*Etymology:* The name of the new species refers to the type locality.

*Diagnosis:* Holotype ♂: Sub-parallel, slightly vaulted body, matted and pileous; yellowish-brown, legs and antennae yellow, scutellum apically brownish, elytra laterally with black tint on both sides; integument rugose, pronotum with wrinkled interstices of punctures, elytra micro-punctured; pubescence yellowish; 3.91 mm long, 1.11 mm wide.



**Figs. 1-2.** *H. johorensis* sp. nov. 1. Habitus. 2. Aedeagus.



**Fig. 3.** Habitus of *H. laoticus* sp. nov.

**Description:** Head: With very dense, circular, umbilicate punctures, interstices reduced to small shiny wrinkles; pubescence fine, short, and directed from base to apex and to lateral sides; eyes semi-spherical, slightly prominent; frons semicircular, declivous from center to apex, with complete and prominent, conspicuously shiny boundary carina; antennae elongate, moniliform from 3rd antennomere on, exceeding posterior angles of pronotum by length of last 3 antennomeres; 2nd antennomere sub-cylindrical, slightly longer than wide apically, 3rd antennomere twice as long as wide apically, following antennomere of almost same length, last antennomere oblong-elliptic, sub-apically beveled.

**Pronotum:** Sub-parallel, along median line conspicuously longer than wide posteriorly (with a length-width ratio of 1.25: 1.01), slightly and regularly vaulted on entire length, nearly sub-parallel laterally, very slightly constricted sub-basally, and with precipitous slope posteriorly; posterior angles of pronotum straight, with very short carina, well-separated from lateral margin, and bent slightly mesiad after beginning of basal angles; pronotum with very short but deep fovea; punctures on entire pronotum very dense, deep, circular, and umbilicate, interstices reduced to small, shiny, costiform wrinkles; pubescence very fine, scarcely visible, declivous stellate from base to center and to apex of pronotum.

**Scutellum:** Sub-triangular, declivous anteroinferiorly, perpendicular apically, conspicuously vaulted medially; punctures dense and umbilicate, interstices conspicuously costiform; pubescence fine, scarcely visible, declivous from base to apex.

**Elytra:** Sub-parallel, just after apical 1/3 narrowing to apex; apices arcuate, without inner tooth; base of elytra slightly wider than that of pronotum and conspicuously depressed at scutellum, shoulders prominent (winged species); elytra with very dense and umbilicate punctures and fine longitudinal striae, interstices transversely rugose; pubescence fine, short and scarce, declivous from base to apex and to lateral sides.

**Pro-, meso- and metathoraxes:** With distant and fine punctures, interstices flat, semi-matted, and micro-punctured; pubescence short and declivous; pro-episternum with no punctures; shiny.

**Legs:** Elongate, moderately long and thin, tarsomeres up to claws of decreasing length, ventrally with barely visible, fine pubescence, 3rd tarsomeres short, 4th tarsomeres conspicuously lamellate, tibia covered with semi-protruding bristly

thorns.

**Aedeagus:** Oval, trilobate, median lobe widened and sub-parallel, conspicuously exceeding apices of paramere and pointed apically; parameres straight and plain apically.

**Female:** Unknown.

**Differential diagnosis:** *Hemirrhaphes johorensis* sp. nov. is similar to *H. notabilis*, but can be easily distinguished from this species by the yellowish-brown body, with black tint on the lateral sides of the elytra, very short fovea on the pronotum, and the form of the aedeagus.

**Distribution:** Malaysia: Johor.

### ***Hemirrhaphes laoticus* sp. nov.**

(Fig. 3)

**Type locality:** Laos: Vientiane, Lao Pako.

**Material examined:** Holotype ♀ (CSV): Laos: Vientiane Municipal of Vioentiane, Nam Ngum River, Lao Pako, 50 km northwest of Vientiane, 14-19.V.2007, leg. M. Pejcha.

**Paratype** ♀ (CSV): Same data as for holotype, leg. M. Pejcha.

**Etymology:** The name of the new species refers to the type locality.

**Diagnosis:** Holotype ♀: Sub-parallel, slightly vaulted body, matted and pileous; legs and antennae brownish, apices of apical angles of pronotum yellow, elytra brownish with yellow apex and longitudinal yellow strip on each side; integument rugose, pronotum with smooth interstices of punctures, elytra micro-punctured; pubescence yellowish; 3.22 mm long, 1.01 mm wide.

**Description:** Head: With very dense, circular, umbilicate punctures, interstices 1/2 their diameter and shiny; pubescence fine, short, and directed from base to apex and lateral sides; eyes semi-spherical, slightly prominent; frons semicircular, declivous from center to apex, with complete, prominent conspicuously shiny boundary carina; antennae elongate, moniliform from 3rd antennomere on, exceeding posterior angles of pronotum by length of last antennomere; 2nd antennomere sub-cylindrical, slightly longer than wide apically, 3rd antennomere twice as long as wide apically, following antennomere of almost same length, last antennomere oblong-elliptic, sub-apically beveled.

**Pronotum:** Sub-oval, along median line conspicuously longer than wide posteriorly (with a length-width ratio of 0.85: 1.02), slightly and regularly vaulted its entire length, sub-oval laterally,

slightly constricted sub-basally, with a precipitous slope posteriorly; posterior angles of pronotum straight, with very short carina, well-separated from lateral margin, and bent slightly mesiad shortly after beginning of basal angles; pronotum with very short, smooth fovea in its center; punctures on entire pronotum dense, but smooth, circular, umbilicate, interstices 1/2 their diameter and shiny; pubescence very fine, scarcely visible, declivous stellate from base to center and to apex of pronotum.

*Scutellum*: Sub-triangular, declivous anteroinferiorly, perpendicular apically, conspicuously vaulted medially; punctures dense and umbilicate, interstices conspicuously costiform; pubescence fine, scarcely visible, declivous from base to apex.

*Elytra*: Sub-parallel, just after apical 1/3 narrowing to apex; apices arcuate, without inner tooth; base of elytra slightly wider than that of pronotum and conspicuously depressed at scutellum, shoulders prominent (winged species); elytra with very dense, umbilicate punctures and fine longitudinal striae, interstices transversely rugose; pubescence fine, short and scarce, declivous from base to apex and to lateral sides.

*Pro-, meso- and metathoraxes*: With distant and fine punctures, interstices flat, semi-matted and micro-punctured; pubescence short and declivous; pro-episternum with no punctures, shiny.

*Legs*: Elongate, moderately long and thin, tarsomeres up to claws of decreasing length, ventrally with barely visible, fine pubescence, 3rd tarsomeres short, 4th tarsomeres conspicuously lamellate, tibia covered with semi-protruding bristly thorns.

*Males*: Unknown.

*Differential diagnosis*: At present *H. laoticus* sp. nov. cannot be compared to any further species of the genus, but can be easily recognized by the body color, and by the smooth interstices of punctures on the pronotum.

*Distribution*: Laos: Vientiane.

### ***Hemirrhaphes notabilis* Candèze, 1878**

*Hemirrhaphes notabilis* Candèze, 1878: 32.

*Arrhaphes notabilis* [sic] Schenckling, 1927: 218.

*Type locality*: Myanmar Candèze (1878) mentioned that the material on which he based his description had been collected either in Burma or Silhet. In accordance with the material collected since then, Myanmar is more likely.

*Material examined*: Laos: Hua Phan Province, Fuloei National Park, Ban Sakok, 23-26.V.2003, 4 specimens, leg. D. Hauck; Thailand: Nan Prov., Phuka environs, 22-24.VI.1999, 1 specimen, leg. D. Hauck.

*Remarks*: The above-mentioned data are the 1st records of the species from Thailand and Laos.

*Distribution*: Laos; Myanmar (type locality); Thailand.

## **DISCUSSION**

Species of the genus *Hemirrhaphes* are distributed in the Himalaya (North-India), Indo-Chinese, and Malayan Sub-regions. This distribution pattern is similar to those of many other species-groups of the Elateridae in Southeast Asia, and the occurrence of these species in the Malayan Sub-region may have resulted from their dispersal during Pleistocene glaciations. Decreases in sea levels created corridors which enabled species to actively spread from the southeastern Asian continent into the Sunda Archipelago.

Based on the above-mentioned characters of the species of the genus *Hemirrhaphes*, there seems to be no close phylogenetic relationship with species of the genus *Arrhaphes*, in which members of *Hemirrhaphes* were repeatedly and erroneously placed in the past (see Schenckling 1927: 217-218). Representatives of *Hemirrhaphes* have only slightly vaulted, and sub-parallel bodies, while those of *Arrhaphes* have conspicuously vaulted, and sub-cylindrical bodies. Various other character states, such as the carina on the basal angles of pronotum, the sub-basal constriction on the pronotum, different surfaces at the base of the elytra, and different lengths of legs and antennae, clearly systematically separate the species of both groups. Also, the mentioned characters and the different body appearances point to a different mode of life and different capabilities for active dispersal.

It is very likely that the subfamily Negastrinae in its present sense constitutes an artificial conglomerate of different species-groups derived from different ancestors.

The general body appearance and the above-mentioned shared characters of species of *Hemirrhaphes* indicate that these species may be phylogenetically closer to members of *Zoroachros* than they are to the genus *Arrhaphes*.

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