A revision of Palaearctic and Oriental Rugilus. V. Two new species from China and additional records (Coleoptera: Staphylinidae: Paederinae)

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Abstract: Two species of Rugilus Leach, 1819 from China are described and illustrated: R. (Rugilus) emeiensis nov.sp. (Sichuan: Emei Shan), the third endemic Rugilus species from the Emei Shan, and R. (R.) rugosissimus nov.sp. (Guizhou: Fanjing Shan), the first record of Rugilus sensu strictu from Guizhou. Additional records of 15 previously described species are reported from the Palaearctic and Oriental regions, among them the first record of R. dabaiicus Assing, 2012 from the Qinling Shan (Shaanxi). Two probably undescribed species from Yunnan and Guizhou, which are currently represented only by females, remain unnamed. Including the new species, Rugilus is now represented in the Palaearctic and Oriental regions by 100 species and one subspecies.

Keywords: Coleoptera, Staphylinidae, Paederinae, Rugilus, Palaearctic region, Oriental region, China, new species, new records, distribution

Introduction

The paederine genus Rugilus Leach, 1819 was previously represented in the Palaearctic and Oriental regions by 98 species and one subspecies in two subgenera, the Palaearctic or Holarctic nominate subgenus (78 species) and the probably circumtropical subgenus Eurystilicus Fagel, 1953 (17 species). Three species are of uncertain subgeneric affiliations (Assing 2014; Rougemont 2014). As many as 30 species have been reported from China, 23 of the subgenus Rugilus, all of them with more or less restricted distributions, except for the Middle Asian R. capitalis (Gemminger & Harold, 1868), and seven species of Eurystilicus, five of them widespread, one confined to Sichuan, and one doubtfully recorded from China. The provinces with the greatest diversity of species of the nominate subgenus are Yunnan (thirteen species, twelve of them exclusive) and Sichuan (six species, four exclusive), followed by Hubei (three species, two exclusive), Shaanxi (three species), Jiangxi (one exclusive species), Gansu, Henan, and Xinjiang (one species each). Two endemic species were previously known from the Emei Shan in Sichuan and no species of Rugilus sensu strictu had been recorded from Guizhou (Assing 2012a, 2012b, 2013).

The present paper is based on material that has become available since the latest supplement to the revision (Assing 2014). An examination of this material yielded not
only additional records of 15 previously described species, but also four undescribed taxa. Two of these species, both belonging to the nominate subgenus, are described. They were discovered in the Emei Shan (Sichuan) and in the Fanjing Shan (Guizhou). The remaining two species (from Yunnan and Guizhou) are represented only by females and consequently not named. Thus, the genus is now represented in the Palaearctic and Oriental regions by 100 named species.

Material and methods

The material treated in this paper is deposited in the following collections:
CAS ................ Chinese Academy of Sciences, Beijing
MNHUB .......... Museum für Naturkunde der Humboldt-Universität Berlin (J. Frisch, J. Willers)
NME .......... Naturkundemuseum Erfurt (M. Hartmann)
cAss .......... author’s private collection
cSch .......... private collection Michael Schülke, Berlin
cSme ........ private collection Aleš Smetana, Ottawa

The morphological studies were conducted using a Sterni SV 11 microscope (Zeiss Germany) and a Jenalab compound microscope (Carl Zeiss Jena). The images of external characters were created using a photographing device constructed by Arved Lompe (Nienburg) and CombineZ software. A digital camera (Nikon Coolpix 995) was used for the remaining photographs.

Body length was measured from the anterior margin of the mandibles (in resting position) to the abdominal apex, the length of the forebody from the anterior margin of the mandibles to the posterior margin of the elytra, head length from the anterior margin of the frons to the posterior margin of the head, elytral length at the suture from the apex of the scutellum to the posterior margin of the elytra, and the length of the aedeagus from the apex of the ventral process to the base of the aedeagal capsule. The "parameral" side (i.e., the side where the sperm duct enters) is referred to as the ventral, the opposite side as the dorsal aspect.

Species descriptions and additional records

**Rugilus** (Rugilus) *frischi* Assing, 2011

*Material examined:* 2 exs., Gilan province, S Astara, W Lomir, 38°13’N, 48°53’E, 100 m, 10.X.2011, leg. Frisch (MNHUB, cAss); 1 ex., Gilan province, S Hashtpar, Asalem, 37°42’N, 48°53’E, 110 m, 9.X.2011, leg. Frisch (MNHUB).

*Comment:* The distribution of *R. frischi* is confined to North Iran.

**Rugilus** (Rugilus) *smetanai* Rougemont, 1998

*Material examined:* Nepal: 2♀, Kaski, Bachhar Kharka, NE Sikles, 28°23’N, 84°08’E, 2200-2400 m, 15.IX.2013, leg. Hagge & Schmidt (NME, cAss).

*Comment:* This macropterous species is endemic to the Annapurna and Manaslu ranges (Assing 2012a, 2013).
Rugilus (Rugilus) rectus ASSING, 2013

Material examined: Nepal: 4♂♂, 4♀♀ [partly slightly teneral], Kaski, Lamjung Himal, Bichhar Kharka to Kori, 28°24′N, 84°09′E, 3000 m, 16.IX.2013, leg. Schmidt (NME, cAss).

Comment: The original description is based on three specimens collected in the southeastern Annapurna range (ASSING 2013).

Rugilus (Rugilus) curvatus ASSING, 2013

Material examined: Nepal: 1♂, 3♀♀ [partly slightly teneral], Kaski, Madi Khola valley, above Sikles, 28°23′N, 84°04′E, 3200 m, 13.IX.2013, leg. Hagge & Schmidt (NME, cAss).

Comment: The original description is based on two males from two localities in the southern Annapurna range, close to where the above material was collected.

Rugilus (Rugilus) reticulatus ASSING, 2012

Material examined: China: Shaanxi: 6♂♂, 27♀♀, Qining Shan, 34°01′N, 107°52′E, 1700-2200 m, sifted, 17.V.2011, leg. Grebennikov (CAS, cSme, cAss); 1♂, 5♀♀, Qining Shan, 33°52′N, 108°59′E, 2000-2600 m, sifted, 15.V.2011, leg. Grebennikov (CAS, cSme, cAss).

Comment: The known distribution of R. reticulatus is confined to the Qinling Shan in Shaanxi and the Funiu Shan in Henan province, where it had been recorded at altitudes of 1650-2000 m (ASSING 2012a). In all, 70 specimens of this wing-dimorphic species have been studied so far, 16 (23 %) of which are males. In one of the above localities, R. reticulatus was collected together with R. dabaicus.

Rugilus (Rugilus) dabaicus ASSING, 2012

Material examined: China: Shaanxi: 8♂♂, 10♀♀, Qining Shan, 33°52′N, 108°59′E, 2000-2600 m, sifted, 15.V.2011, leg. Grebennikov (CAS, cSme, cAss).

Comment: Rugilus dabaicus was previously known only from the Daba Shan in western Hubei (ASSING 2012a, 2012b). The aedeagi of the above males are distinguished from those of the three type males recorded from the Daba Shan by a slightly differently shaped ventral process, but these differences are interpreted as intraspecific rather than interspecific variation. Differences in the external and male secondary structures were not found and some variation of the shape of the ventral process has been observed also in several other species of the subgenus recorded from China (ASSING 2012a). The above material was collected together with R. reticulatus.

Rugilus (Rugilus) gonggaicus ASSING, 2012

Material examined: China: Sichuan: 1♂, 24♀♀, Gongga Shan, 29°48′N, 102°04′E, 2765 m, sifted, 20.VI.2011, leg. Grebennikov (CAS, cSme, cAss); 11♀♀, same data, 6.VI.2011 (CAS, cSme, cAss); 6♀♀, Gongga Shan, 29°48′N, 102°04′E, 2680 m, sifted, 14.V.2011, leg. Grebennikov (CAS, cSme, cAss).

Comment: The known distribution of R. gonggaicus is confined to the Gongga Shan. Only ten (10.2 %) in a total of 98 specimens studied thus far are males (ASSING 2012a).
Rugilus (Rugilus) emeiensis ASSING, 2012

Material examined: China: Sichuan: 3♂♂, Emei Shan, 29°33'N, 103°20'E, 2340 m, sifted, 29.V.2011, leg. Grebennikov (CAS, cSm, cAss).

Comment: This species is endemic to the Emei Shan. Only two in a total of 45 specimens studied are males (Assing 2012a, 2012b, 2014).

Rugilus (Rugilus) emeimontis nov.sp. (Figs 1-5)

Type material: Holotype ♀: “P.R. CHINA, Sichuan, Emei Shan, N28°33'04” E103°21'19”, 25.v.2011, 1729 m, sift05, V. Grebennikov / Holotypus ♀ Rugilus emeimontis sp. n., det. V. Assing 2014” (CAS).

Etymology: The specific epithet is a noun composed of the name of the mountain where the species was discovered and the genitive of the Latin noun mons (mountain).

Description: Body length 5.7 mm; length of forebody 3.4 mm. Coloration: head, pronotum, and abdomen blackish; elytra blackish with distinct bronze hue; legs dark-yellowish; antennae yellowish-red.

Head (Fig. 2) weakly transverse, 1.03 times as broad as long, broadest across eyes; margins behind eyes smoothly and weakly curving towards posterior constriction in dorsal view, posterior angles obsolete; punctation coarse, largely longitudinally confluent (particularly in lateral dorsal portions). Eyes large and strongly convex, approximately as long as distance from posterior margin of eye to posterior constriction. Anterior margin of labrum with two short teeth on either side of the shallow median incision.

Pronotum (Fig. 2) 1.17 times as long as broad and 0.75 times as wide as head; midline with pronounced broad impunctate glossy band in the middle, extending to neither anterior nor posterior margins; punctation similar to that of head.

Elytra (Fig. 1) probably sexually dimorphic, with dense, coarse, and defined punctuation; interstices glossy. Metatarsomere I nearly as long as the combined length of II and III.

Abdomen without microsculpture; anterior impressions of tergites III-VI with coarse and dense punctuation; punctuation of remaining tergal surfaces fine and dense; interstices without microsculpture; posterior margin of tergite VII with palisade fringe.

♂: sternite VII (Fig. 3) moderately strongly transverse, approximately 1.55 times as broad as long, with shallow postero-median impression, posterior margin weakly concave; sternite VIII (Fig. 4) approximately 1.1 times as broad as long, posterior excision V-shaped and approximately one-fourth as deep as length of sternite; aedeagus with slender ventral process, 0.75 mm long, and shaped as in Fig. 5.

♀: unknown.

Comparative notes: Based on the similar external and male sexual characters, R. emeimontis is probably allied to R. gansuensis ROUGEMONT, 1998 (Gansu, Shaanxi: Qinling Shan, Daba Shan, Maiji Shan) and R. daxuensis ASSING, 2012 (West Sichuan: Daxue Shan). It is distinguished from these species particularly by the differently shaped aedeagus and by the differently shaped posterior excision of the male sternite VIII (less deep than in R. gansuensis and deeper than in R. daxuensis).
**Rugilus emeimontis** nov.sp.: (1) forebody; (2) head and pronotum; (3) male sternite VII; (4) male sternite VIII; (5) aedeagus in lateral view. Scale bars: 1-2: 1.0 mm; 3-5: 0.5 mm.

**Distribution and natural history:** *Rugilus emeimontis* is the third (probably) endemic *Rugilus* species to be recorded from the Emei Shan in West Sichuan. The holotype was sifted at an altitude of approximately 1730 m, together with a specimen of *R. aquilinus*. Although females are unknown, it can be assumed that, like other closely allied species known from China, *R. emeimontis* is subject to a sexual wing-dimorphism (males macropterous, females micropterous).

**Rugilus (Rugilus) schuelkei** Assing, 2012

**Material examined:** China: Yunnan: 10♀, Haba Shan, 27°22′N, 100°06′E, 3350 m, sifted, 23.VI.2012, leg. Grebennikov (CAS, cAsm, cAss); 1♀, Haba Shan, 27°21′N, 100°06′E, 4120 m, sifted, 26.VI.2012, leg. Grebennikov (CAS).
The known distribution is confined to several localities in the environs of Zhongdian (ASSING 2012a, 2012b). The sex ratio in the material studied up to today is 0.32 (10 males : 31 females). The altitudes range from 2870 to 4120 m.

Rugilus (Rugilus) aquilinus ASSING, 2012

Material examined: China: Sichuan: 16♂♀, 22♀, Emei Shan, 29°34N, 103°21E, 1850 m, sifted, 23.V.2011, leg. Grebennikov (CAS, cSme, cAss); 1♀, Emei Shan, 29°34N, 103°21E, 1780 m, sifted, 23.V.2011, leg. Grebennikov (CAS, cAss); 8♂♂, 22♀♀, Emei Shan, 29°34N, 103°21E, 1830 m, sifted, 26.V.2011, leg. Grebennikov (CAS, cSme, cAss); 1♀, Emei Shan, 29°33N, 103°21E, 1730 m, sifted, 25.V.2011, leg. Grebennikov (cAss).

Comment: Rugilus aquilinus is endemic to the Emei Shan (ASSING 2012b, 2013). The sex ratio in the material studied so far is 0.57 (29 males : 51 females).

Rugilus (Rugilus) rugosissimus nov.sp. (Figs 6-10)


Etymology: The specific epithet is the superlative of the Latin adjective rugosus and alludes to the conspicuously rugosely confluent punctuation of the head and pronotum.

Description: Body length 7.2 mm; length of forebody 4.1 mm. Coloration: head, pronotum, and abdomen blackish-brown; elytra dark-brown with slight bronze hue; forelegs reddish; mid- and hindlegs dark-yellowish, with the femoral apices indistinctly infuscate; antennae with blackish-brown base, apically gradually becoming paler brown.

Head (Fig. 7) distinctly tranverse, 1.17 times as broad as long, broadest across eyes; margins behind eyes smoothly and weakly curving towards posterior constriction in dorsal view, posterior angles weakly marked; punctuation coarse, largely longitudinally confluent, less confluent and noticeably umbilicate only on frons. Eyes large and moderately convex, approximately 0.7 times as long as distance from posterior margin of eyes to posterior constriction. Anterior margin of labrum with two pronounced, basally fused teeth on either side of the narrow median incision.

Pronotum (Fig. 7) 1.13 times as long as broad and 0.7 times as wide as head; midline without impunctate, glossy band; punctuation similar to that of head.

Elytra (Fig. 6) 0.75 times as long as pronotum; punctuation dense, coarse, and defined; interstices glossy. Hind wings apparently reduced. Metatarsomere I nearly as long as the combined length of II and III.

Abdomen approximately as broad as elytra; tergites III-VI with shallow impressions anteriorly, these impressions with coarse and dense punctuation; punctuation of remaining tergal surfaces fine and dense; interstices without distinct microsculpture; posterior margin of tergite VII without palisade fringe.

♂: sternite VII (Fig. 8) strongly transverse, approximately 1.55 times as broad as long, with shallow median impression, posterior margin with pronounced, nearly semi-circular excision; sternite VIII (Fig. 9) approximately 1.15 times as broad as long, posterior excision convex anteriorly and 0.2 times as deep as length of sternite; aedeagus small in relation to body size, 0.66 mm long, and of robust shape (Fig. 10).
Comparative notes: Based on the similarly derived modifications of the male sternite VII (with large and nearly semi-circular posterior excision), the similarly derived morphology of the aedeagus (small, but robust; ventral process short and forming an angle with the basal portion; internal sac with large black sclerites), as well as the similar external characters, *R. rugosissimus* is undoubtedly most closely related to *R. wuyicus* Assing, 2012 from Jiangxi, *R. desectus* Assing, 2012 from Yunnan, *R. aquilineus* Assing, 2012 from Sichuan, and *R. malaisei* (Schéppeltz, 1965) from Burma. It is distinguished from all of them by the conspicuous longitudinal rugae on the head and pronotum and by the slightly different shape of the aedeagus. In addition it differs from them as follows:

Figs 6-10. *Rugilus rugosissimus* nov.sp.: (6) forebody; (7) head and pronotum; (8) male sternite VII; (9) male sternite VIII; (10) aedeagus in lateral view. Scale bars: 6-7: 1.0 mm; 8-10: 0.5 mm.
from *R. wuyicus* by the larger and more transverse head with relatively smaller eyes, broader elytra, the slightly deeper and less broad posterior excision of the male sternite VII, the deeper posterior excision of the male sternite VIII, by the more pronounced ventral projection at the base of the ventral process of the aedeagus (lateral view), and by the slightly different shape of the apex of the ventral process (lateral view);

from *R. malaisei* by the larger and more transverse head, the more slender and more oblong pronotum (*R. malaisei*: approximately as broad as long), the smaller posterior excision of the male sternite VII, the narrower posterior excision of the male sternite VIII, and by the apically less acute and more truncate ventral process of the aedeagus;

from *R. desectus* by the relatively larger and more transverse head with completely obsolete posterior angles, the more slender and more oblong pronotum, much shorter and narrower elytra, the distinctly smaller and sub-circular posterior excision of the male sternite VII, the less distinctly V-shaped posterior excision of the male sternite VIII, and by the much smaller aedeagus with a much more slender ventral process (lateral view);

from *R. aquilinus* by the relatively larger and more transverse head with completely obsolete posterior angles and a longer postocular region in relation to the eyes, the distinctly more massive antennae, the shorter male elytra, and the somewhat less strongly curved ventral process of the aedeagus (lateral view).

For illustrations of the external and male sexual characters of *R. wuyicus*, *R. desectus*, and *R. malaisei* see ASSING (2012a, 2012b).

**Distribution and natural history**: The type locality is situated in the Fanjing Shan, a somewhat isolated mountain range in the northeast of Guizhou, South China. The holotype was collected at an altitude between 1400 and 1700 m. Additional data are not available.

**Rugilus (Eurystilicus) ceylanensis** (KRAATZ 1859)

**Material examined**: Philippines: 1 ex., Leyte (MNHUB).

**Comment**: *Rugilus ceylanensis* is the most widespread species of the genus, its vast distribution ranging from the Himalaya to the Philippines, Australia, Hawaii, and North America (ASSING 2012a).

**Rugilus (Eurystilicus) simlaensis** (CAMERON, 1931)

**Material examined**: China: Yunnan: 13 exs., mountains W Dongchuan, Sedan Snow Mountain Scenic Resort, 2°6'N, 102°55'E, 2620 m, secondary pine forest, litter, moss, and roots of herbs sifted, 14.VIII.2014, leg. Assing (cAss); Taiwan: 1 ex., Ilan Co., "17 k. 100" Logging Road, 1650 m, flight interception trap, 2.-4.VII.2003, leg. Li (MNHUB); 1 ex., Ilan Co., "76 km, N.Crossing Highway", 1180 m, flight interception trap, 9.VII.2003, leg. Li (MNHUB); 1 ex., same data, but 2.-4.VII.2003 (MNHUB); 13 exs., Ilan Co., "17 km, 100 Logging Road", 1650 m, flight interception trap, 9.VII.2003, leg. Li (MNHUB, cAss); 21 exs., same data, but 2.-4.VII.2003 (MNHUB, cAss); 6 exs., Taichung, Anma Shan, flight interception trap, 24.-26.VII.2003, leg. Li (MNHUB, cAss); 6 exs., Taichung, "40 km., 200 Logging Road", 26.-27.VI.2002, leg. Li (MNHUB, cAss); 2 exs., Kaohsiung, Tengchih, 1400 m, 21.-23.VII.2000, leg. Sugaya (MNHUB, cAss); 2 exs., Bukenji, 23.XI.1905, leg. Sauter (MNHUB).

**Comment**: The distribution of *R. simlaensis* ranges from the Himalaya across China to Taiwan (ASSING 2012a).
Rugilus (Eurystilicus) velutinus (FAUVEL, 1895)

Material examined: China: Yunnan: 1♂, 1♀, E Kunming, Xiaobuling Forest Park, 24°56′N, 103°05′E, 2110 m, secondary pine forest, pine litter and litter at trail margin sifted, 10.VIII.2014, leg. Assing & Schülke (cAss, cSch). Taiwan: 1 ex., Taipei, 21.07.1903, leg. Lj (cAss), 1 ex., locality and date not specified, leg. Sauter (MNHUB).

Comment: Rugilus velutinus is one of the most common and widespread species of the genus in the East Palaearctic and Oriental regions (ASSING 2012a).

Rugilus (Eurystilicus) rufescens (SHARP, 1874)

Material examined: Taiwan: 2 exs., Bukmiji, 23.XI.1905, leg. Sauter (cAss); 4 exs., same data, but 8.XI.1905 (MNHUB); 4 exs., same data, but 10.XI.1905 (MNHUB, cAss).

Comment: Like the three preceding species, R. rufescens is widespread in the East Palaearctic region, its distribution extending from India to Japan and Singapore (ASSING 2012a).

Rugilus (Eurystilicus) japonicus WATANABE, 1961

Material examined: Taiwan: 12 exs., Taichung, Chipen-wenchuan, 400 m, 24.-27.IV.2001, leg. Sugaya (MNHUB, cAss); 5 exs., same data, but 6.-8.XI.2000 (MNHUB, cAss); 1 ex., Kaohsiung, Chuyunshan-lintao, 800 m, 22.IV.2001, leg. Sugaya (MNHUB).

Comment: Rugilus japonicus is widespread from Sri Lanka across most of the Oriental and South Palaearctic regions to southern Japan and the Philippines (ASSING 2012a).

Rugilus (Rugilus) sp. 1


Comment: The external characters (relatively large size, long elytra, each with a yellowish postero-lateral spot) suggest that this probably undescribed species is allied to some species recorded from the Himalaya (R. morvani (ROUGEMONT, 1987), R. smetanai ROUGEMONT, 1998).

Rugilus (Rugilus) sp. 2

Material examined: China: 1♀, Yunnan, mountains W Dongchuan, Sedan Snow Mountain Scenic Resort, 26°06′N, 102°55′E, 2620 m, secondary pine forest, litter, moss, and roots of herbs sifted, 14.VIII.2014, leg. Assing (cAss).

Comment: Based on external characters, this probably undescribed species is allied to R. malaisei and related species.

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Zusammenfassung


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