

## Two new species of *Agabus* LEACH from East Russia and North China, with notes on other species of the *Agabus affinis* species group (Coleoptera: Dytiscidae)

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### Abstract

*Agabus kholini* sp.n. and *Agabus laferi* sp.n. are described from South Primorye in Russia and Heilungkiang Province in China. Together with *A. sikhotealinensis* (LAFER, 1988) they are assigned to the *A. affinis* group. The key of NILSSON & LARSON (1990) is revised. New distributional records are presented for *A. affinis* (PAYKULL, 1798), *A. sikhotealinensis*, and *A. yakutiae* NILSSON & LARSSON, 1990.

Key words: Dytiscidae, taxonomy, *Agabus affinis* group, new species, Russia, China

Within the large Holarctic genus *Agabus* LEACH, the *A. affinis* group was recently reviewed by NILSSON & LARSON (1990), who assigned two Nearctic and four Palearctic species to this group. Two additional Palearctic species of this group were recently found in material from South Primorye. Moreover, *A. sikhotealinensis* (LAFER), overlooked in the above-mentioned review, should also be included in the *A. affinis* group. I will here describe the two new species and present some interesting east Palearctic records of three other species.

All abbreviations as in NILSSON & LARSON (1990).

### *Agabus kholini* sp.n.

TYPE LOCALITY: Russia, Primorye, 22 km N of Vladivostok, Sputnik station.

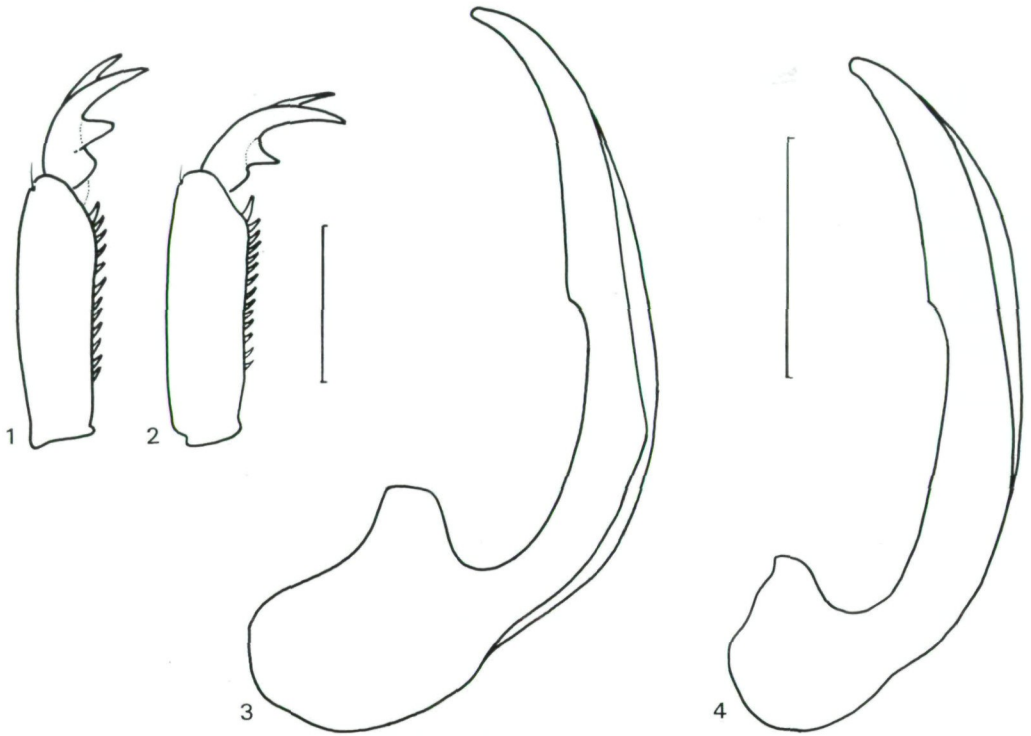
**Holotype** ♂ labelled "Russia, Primorye, V-vostok, Sputnik 13-28.vi.93 Leg. S.Kholin/A.Nilsson" and with my holotype label. Deposited in the Zoological Institute, St. Petersburg.

**Paratypes** 1 ♂, 3 ♀♀ with same locality labels and with my paratype labels. Deposited in Swedish Museum of Natural History, Stockholm, Institute of Biology and Pedology, Vladivostok, and in coll. Nilsson, Umeå.

**DIAGNOSIS:** Within the *Agabus affinis* group recognized on the combination of medium size, narrow body shape and narrow metasternal wing. Elytral reticulation with meshes relatively large and of irregular shape. Penis narrow with medioventral projection, and basal apodeme large. Male stridulatory file consists of many narrow ridges.

**SIZE and SHAPE:** Measurements of holotype and paratypes are (mean  $\pm$  SD): TL 7.0  $\pm$  0.2 mm, MW 3.6  $\pm$  0.1 mm, TL/MW 1.93  $\pm$  0.03. Body subparallel with lateral outline more or less continuous.

**COLOUR:** Head black with anterior margin and two posteromedial spots rufous. Antenna rufotestaceous with antennomere 11 brown in distal half. Each palpus rufous with apex brown. Pronotum black with lateral bead and narrow area inside of bead rufous. Elytron black, with weak mediolateral and subapical yellow spots. Ventral surface black. Legs dark rufopiceous with protibia and each tarsus rufous.



Figs 1 - 4: *Agabus*, male protarsomere 5 in anterior view (1-2), and penis in lateral view (3-4). 1, 3. *A. kholini* sp.n. 2, 4. *A. laferi* sp.n. Different scale bars for 1-2 (left, 0.2 mm), and 3-4 (right, 0.5 mm).

**SCULPTURE and SETATION:** Dorsal reticulation simple; meshes of variable shape and size; on elytron size of meshes intermediate between *A. affinis* and *A. biguttulus* THOMSON. Pronotum with anterior and posterior submarginal transverse rows of rather coarse punctures; posterior row with wide medial gap. Elytron with series of punctures relatively large; each puncture larger than most cells of reticulation; additional punctures present on areas between serial punctures, denser posteriorly. Metacoxal plate coarsely reticulate with irregular transverse striae. Abdominal sternum 6 with coarse transversely stretched reticulation and mediosubapical deep punctation. Metatibia with ventral face impunctate in distal  $2/3$ ; anteroventral row of 6 - 7 coarse spiniferous punctures not confluent. Metatarsomere 1 with 2 - 3 posteroventral spines.

**STRUCTURAL FEATURES:** Clypeus with anterior bead more or less continuous. Pronotum with lateral bead gradually narrowed anteriorly and obsolete near front angle; hind angle slightly obtuse. Prosternum with process tectiform; process short with apex bluntly pointed. Metasternum with anteromedial emargination short, not extended to level of hind margin of mesocoxa. Metasternal wing narrow, WC/WS  $3.20 \pm 0.11$ . Metafemur with distinct lamina at posteroapical angle. Metatarsomere 1 of same length as longer apical tibial spur.

**MALE:** Abdominal sternum 3 with mediolateral file composed of 27 ridges with an average width of 0.02 mm. Anterior protarsal claw with subbasal tooth (Fig. 1). Protarsomere 1 about 2.5 x as broad as tarsomere 5 medially. Penis narrow, with medioventral projection (Fig. 3).

**DISTRIBUTION** (Fig. 6): Known only from the type locality close to Vladivostok in South Primorye in the Far East of Russia.

**BIOLOGY:** Four specimens were collected in *Sphagnum* moss at the margin of a small *Typha* fen.

The fifth specimen was collected at the margin of a peat pool, about 2 x 7 in size and with a maximum water depth of 0.2 m. Both habitats belong to fragments of a formerly extensive wetland area that now is cultivated.

ETYMOLOGY: The species epithet is a noun in the genitive case derived from the name of Dr. Sergej Kholin, Vladivostok, who helped me to collect the type material during joint field-work.

***Agabus laferi* sp.n.**

*Agabus affinis* (PAYKULL, 1798): BALFOUR-BROWNE 1947:443 (misident.).

TYPE LOCALITY: Cheng-Ching, Lesser Khingan Mountains, in northernmost Heilungkiang Province in China.

**Holotype** ♂ labelled "Cheng-Ching, Lesser Khingan, Manchukuo", "23.VI.38 M. Weymarn", "H.B. Leech Collection", "Agabus ? biguttulus Thoms. det. H.B. Leech 10-iv.1939" and with my holotype label. Deposited in California Academy of Sciences, San Francisco.

**Paratypes** 2 ♀♀ labelled "Russia: Primorskij Kr. Anisomovka Stn. pond 20/7-92 AN Nilsson" and "Russia: Primorskij Kr. 22 km N Vladivostok Sputnik Stn. ponds 25/7-92 AN Nilsson", and with my paratype labels. Deposited in Zoological Institute, St. Petersburg, and in coll. Nilsson, Umeå.

**DIAGNOSIS:** Within the *Agabus affinis* group recognized on the combination of large size, broad body shape and broad metasternal wing. Elytral reticulation with meshes relatively large and of irregular shape. Penis relatively broad with medioventral projection, and basal apodeme small.

**SIZE and SHAPE:** Measurements of holotype and paratypes are: TL 7.2 - 7.6 mm, MW 3.8 - 3.9 mm, TL/MW 1.87 - 1.94. Body elongate oval with lateral outline more or less continuous (Fig. 5); dorsal surface relatively strongly convex in lateral view.

**COLOUR:** Head black with anterior margin and two posteromedial spots rufous. Antenna rufotestaceous with antennomeres 9 - 11 brown in distal half. Each palpus rufous with apex brown. Pronotum black with lateral bead rufous. Elytron black, with weak mediolateral and subapical yellow spots. Ventral surface black. Legs dark rufopiceous with protibia and each tarsus rufous.

**SCULPTURE and SETATION:** Dorsal reticulation simple; meshes of variable shape and size; on elytron size of meshes intermediate between *A. affinis* and *A. biguttulus*, and slightly smaller and less deeply impressed than in *A. kholini* sp.n. Pronotum with anterior and posterior submarginal transverse rows of rather coarse punctures; posterior row with wide medial gap. Elytron with series of punctures relatively large; each puncture larger than most cells of reticulation; additional punctures present on areas between serial punctures, denser posteriorly. Metacoxal plate coarsely reticulate with irregular transverse striae. Abdominal sternum 6 with coarse transversely stretched

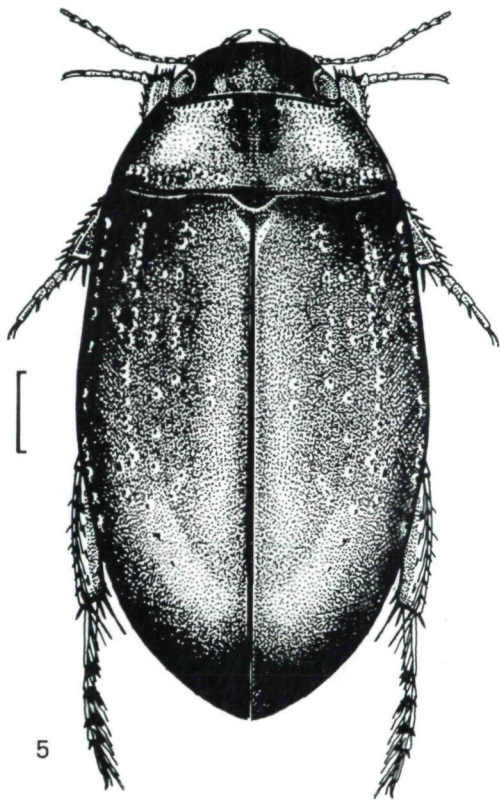


Fig. 5: *Agabus laferi* sp.n., habitus of paratype. Scale bar 1 mm. Drawn by G. Marklund.

reticulation and mediosubapical coarse punctation. Metatibia with ventral face impunctate in distal  $2/3$ ; anteroventral row of coarse spiniferous punctures not confluent. Metatarsomeres 1 and 2 with 5 - 6 and 2 - 3 posteroventral spines, respectively.

**STRUCTURAL FEATURES:** Clypeus with anterior bead more or less continuous. Pronotum with lateral bead gradually narrowed anteriorly and obsolete near front angle; hind angle slightly obtuse. Prosternum with process tectiform; process short with apex bluntly pointed. Metasternum with anteromedial emargination short, not extended to level of hind margin of mesocoxa. Metasternal wing broad, WC/WS 1.82 - 1.87. Metafemur with distinct lamina at posteroapical angle. Metatarsomere 1 of same length as longer apical tibial spur.

**MALE:** Abdominal sternum 3 with mediolateral file composed of 17 ridges with an average width of 0.04 mm. Anterior protarsal claw with subbasal tooth (Fig. 2). Protarsomere 1 about twice as broad as tarsomere 5 medially. Penis relatively broad, with medioventral projection (Fig. 4).

**DISTRIBUTION** (Fig. 6): Known from South Primorye in Russia and northernmost Heilungkiang Province in China.

**BIOLOGY:** In Primorye, both specimens were collected in small ponds with dense vegetation surrounded by fields and deciduous forest. At Anisimovka the specimen was found in *Drepanocladus* moss and at Sputnik station in *Carex* debris.

**ETYMOLOGY:** The species epithet is a noun in the genitive case derived from the name of Dr. German Lafer, Vladivostok, specialist on Adephega.

#### *Agabus sikhotealinensis* (LAFER)

*Gaurodytes sikhotealinensis* LAFER, 1988: 56 (orig. descr.); LAFER 1989: 246 (key).

This species was described from a single female collected in Anuchinsky District in Primorye. Another female was seen among material from Staatliches Museum für Naturkunde, Stuttgart, collected in Khabarovsk Territory, 12 km NE of Bikin (SE Boitsovo 250 - 350 m ASL, 26.v - 4.vi.1990, leg. W. Schawaller) (Fig. 6).

This species is very similar to *A. yakutiae*, and although the male is unknown, it can without doubt be assigned to the *A. affinis* group. A comparison of females of the two species has shown that *A. sikhotealinensis* is somewhat larger and more brightly coloured than *A. yakutiae*. The size difference may be an artefact due to the low number of specimens studied. The phylogenetic position of *A. sikhotealinensis* cannot be determined in the absence of males.

#### *Agabus affinis* (PAYKULL)

*Dytiscus affinis* PAYKULL, 1798: 211 (orig. descr.).

This Transpalearctic species has long been known from Kamchatka and Primorye. As it is not known from Korea (YOON & AHN 1988) and a previous record from northern China (BALFOUR-BROWNE 1947) is erroneous, this species has seemingly its southern limit in South Primorye.

I collected 8 specimens in Primorye at ca. 43°N (Khasansky District, 3 km E of Ryazanovka 12 - 14.vii.1992). In this region, *A. affinis* seemed restricted to patches with *Sphagnum* and *Eriophorum* on open coastal bogs. Larvae in the two later instars were found on 12 July.

#### *Agabus yakutiae* NILSSON & LARSON

*Agabus yakutiae* NILSSON & LARSON, 1990: 229 (orig. descr.).

This species was up to now known only from the type series that was collected at Yakutsk in 1915. An additional male found in the collections of the Institute of Biology and Pedology, Vladivostok, was collected in the Amur Province (*Zeya* 24.vi.1976, leg. V. Kuznetsov). The new

record widens the distributional range of this rare species considerably (Fig. 6).

### Modified key of NILSSON & LARSON (1990)

Couplet 1, 2 and 4 of the key of NILSSON & LARSON (1990: 229) are here extended to allow inclusion also of *A. kholini* sp.n., *A. laferi* sp.n. and *A. sikhotealinensis*.

- 1 Small, TL = 5.1 - 5.7 mm: pronotum with lateral margin, including entire anterolateral angle, broadly red; elytron with sculpture fine, meshes small and rounded, mainly isodiametric although some irregularity in size present especially basomedially ..... 1a
- Larger, TL = 5.8 - 7.6 mm: pronotum darker, dark piceous to black or at most narrowly rufous adjacent to lateral bead and at apex of anterolateral angle; elytron with sculpture various, most specimens with evident irregularity in size and shape of meshes ..... 2
- 1a(1) Elytron uniformly piceous to black ..... *yakutiae*
- Elytron bicoloured; rufous in basal  $\frac{1}{3}$  to  $\frac{1}{2}$  and piceous to black in apical  $\frac{1}{2}$  to  $\frac{2}{3}$  ..... *sikhotealinensis*
- 2(1) Metasternal wing narrow; either apex very narrow and tongue-like (length of tongue over its basal width exceeding 1.7), or WC/WS 3.0 or more; penis with or without a medioventral projection ..... 2a
- Metasternal wing with apex broadly triangular (length of tongue over its basal width less than 1.5) and WC/WS 2.8 or less; penis with a medioventral projection ..... 3
- 2a Penis without a medioventral projection. Dorsal reticulation with relatively small meshes, especially in anterior half of pronotum and on head ..... *unguicularis*
- Penis with a medioventral projection (Fig. 2). Dorsal reticulation with relatively large meshes, also in anterior half of pronotum and on head ..... *kholini* sp.n.
- 4(3) Large, TL 7.2 - 7.6 mm. Metasternal wing broad, WC/WS 1.82 - 2.07. Penis broad in lateral view with basal apodeme small (Fig. 4) ..... *laferi* sp.n.
- Smaller, TL 7.1 mm or less. Metasternal wing frequently narrower, WC/WS 1.96 - 2.74. Penis narrow in lateral view with basal apodeme large ..... 4a

### Acknowledgements

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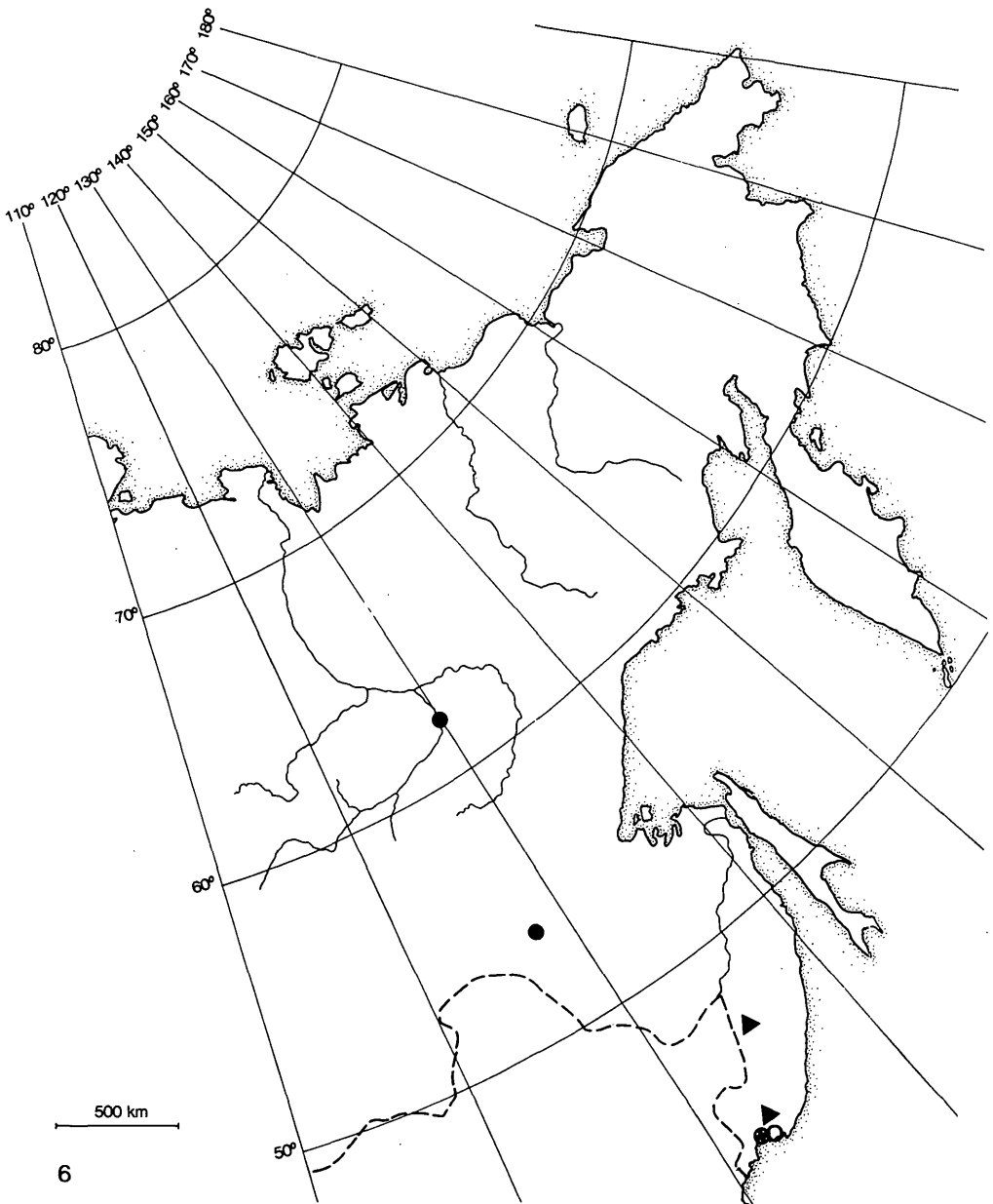


Fig. 6: Map of East Siberia showing known records of *Agabus sikhotealinensis* (triangles), *A. yakutiae* (dots), *A. kholini* sp.n. (cross), and *A. laferi* sp.n. (circles).

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