

Linzer biol. Beitr.	26/2	991-998	30.12.1994
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## Two new species of the genera *Allopachria* and *Agabus* from Taiwan (Coleoptera, Dytiscidae)

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**Abstract:** *Allopachria wangi* sp. n. and *Agabus taiwanensis* sp. n. are both described from the island of Taiwan. The genus *Allopachria* ZIMMERMANN 1924, is used in a broad sense, with *Nipponhydrus* GUIGNOT 1954, as a junior synonym. *A. wangi* is most similar to the Japanese species *A. flavomaculata* (KAMIYA). *Agabus taiwanensis* is placed in its own species-group, viewed as an early offshoot from the *Agabus* clade including the *A. guttatus*-group.

During the preparation of a review of the species of Dytiscidae known from Taiwan (= Formosa) in cooperation with Mr L.-J. Wang (Taipei) and M. Sato (Nagoya) two previously undescribed species were found. Taiwan is an island 150 km east of mainland China, 320 km north of the Philippines, and the Tropic of Cancer divides it into tropical and semitropical regions. About 50 % of it is mountainous with over 100 mountains higher than 3000 m. The dytiscid fauna is relatively poorly known with about 50 species known from the island (Nilsson, Wewalka, Wang & Sato, in manuscript).

We here provide descriptions of the two new species from Taiwan, assigned to the genera *Allopachria* ZIMMERMANN (Hydrophorinae, Hyphdrini) and *Agabus* LEACH (Colymbetinae, Agabini).

### Descriptions

#### *Allopachria wangi* WEWALKA & NILSSON sp. n.

**Type locality:** Taiwan, Taipei, Gongliao Nanya.

**Type material:** Holotype ♂ labelled: „Taiwan, Taipei, Gongliao, 3.7.1992, leg. L.J. Wang“ and our holotype label. - **Paratypes:** 8♂♂ 8♀♀; 1♀ Taiwan, Keelung City, 10.8.1990, (72), leg. M.L. Jeng; 2♂♂ Taiwan, Taipei, Gongliao 6.5.1993, and 6♂♂ 7♀♀ 13.5.1993 leg. L.J. Wang. Holotype and one paratype deposited in Naturhistorisches Museum, Vienna. Other paratypes deposited in: The Natural History Museum, London, National Museum of Natural History, Washington D.C., National Taiwan University, Taipei, OÖ. Landesmuseum, Linz, coll. A.N. Nilsson, Umeå, and coll. G. Wewalka, Vienna.

**Diagnosis:** The new species is closely related to *Allopachria flavomaculata* (KAMIYA 1938), with which it shares habitus, size, elytral markings and general structure of male genitalia. *Allopachria wangi* can be distinguished from *A. flavomaculata* by the predominantly dark brown head, and the distinct reticulation of pronotum, elytra and ventral surface.

**Size and shape:** Total body length 2.7-2.9 mm; maximum width 1.8-2.1 mm. Habitus oval, moderately convex (Fig. 1).

**Colour:** Head dark brown, anterior margin and area posterior to eyes yellowish. Antenna testaceous. Pronotum dark brown, lateral margin yellowish near base. Elytron dark brown with big yellowish basal spot and postmedian transverse yellowish spot not reaching lateral margin (Fig. 1). Epipleuron dark brown. Ventral surface dark brown to reddish-brown. Fore- and midlegs yellowish, hindlegs somewhat darker.

**Sculpture and setation:** Head dorsally with punctation very fine and sparse; provided with a series of minute punctures along internal margin of each eye; reticulation quite strong and regular. Pronotum with punctation not very strong, simple; sparse on disc, more dense along the anterior and posterior margin; reticulation quite strong. Elytron with punctation not very strong, regular and simple; reticulation quite strong with meshes somewhat wider than on pronotum. Prosternal process rugose, mat. Metasternum and metacoxae with punctation strong; less strong on abdominal sterna 1-2; very fine and sparse on other sterna. Reticulation relatively strong on metacoxae and abdominal sterna; reduced on metasternum.

**Structural features:** Head with shallow oblique dimples laterally behind anterior margin; clypeal margin without raised bead. Pronotum with sides slightly rounded; anterior margin with very fine bead; lateral bead distinct. Elytron with lateral margin slightly dilated near base and here visible from above with outline subsinuate. Pronotal-elytral angle obtuse in lateral view. Prosternal process relatively broad, more or less flat, with distinct lateral bead.

**Male:** Antenna slightly dilated. Pro- and mesotarsomere 1 enlarged. Protibia slightly broadened distally with shallow ventroapical excavation distad of two small spines (Fig. 2). Penis with three distal processes (Figs 3-4); paramere relatively slender without distal setae (Figs 5-6).

**Female:** Antenna and legs normal. Spermatheca not sclerotized.

**Distribution:** North Taiwan.

**Biology:** This species was collected in a temporary riverside pool. As some specimens were taken with a light-trap, *A. wangi* is not flight-less.

**Etymology:** The species epithet is a noun in the genitive case derived from the name of Dr L.-J. Wang, National Taiwan University, who collected the holotype.

***Agabus taiwanensis* NILSSON & WEWALKA sp. n.**

**Type locality:** Taiwan, Nantou, Hsien, Patungkuan.

**Type material:** Holotype ♂, labelled: "Taiwan 16.8.1989 Nantou Hsien Patungkuan 7, leg. C.F.Lee" and our holotype label. - **Paratypes:** 17♂♂ 35♀♀: 1♀ with same original label as holotype; 1♂ Taiwan 29.4.1988 Pingtung Hisen Kenting leg. Chao-Shang Tseng 2; 2♀♀ Taiwan, Nantou, Patungkuan, leg. L.-J. Wang 25.7.90; 4♂♂ 2♀♀ 26.12.1992 and 8♂♂ 28♀♀ 26.12.1993, Taiwan, Nantou, Mt. Hohuan C.L. Li & Hsu leg.; 4♂♂ 2♀♀ Taiwan, Kaoshung, Jinjing Bridge 15.5.1993 L.M. Jeng leg. Holotype in Naturhistorisches Museum, Vienna, and paratypes in: The Natural History Museum, London, National Museum of Natural History, Washington D.C., National Taiwan University, Taipei, coll. A.N. Nilsson, Umeå, and coll. G. Wewalka, Vienna.

**Diagnosis:** A relatively small and flattened black *Agabus* with the following combination of characters: (1) clypeal marginal bead continuous, (2) pronotum with anterior row of punctures continuous and posterior row with sublateral gap, (3) dorsal sculpture sexually dimorphic, (4) elytron with two yellow spots, (5) metasternal wing narrow, (6) legs slender with prolonged pro- and mesotarsomere 5, (7) male pro- and mesotarsomeres 1-3 with ventral adhesive scales, (8) penis simple with narrow dorsal groove, and (9) paramere stylate.

**Size and shape:** Total body length  $7.4 \pm 0.2$  mm (length without head  $6.7 \pm 0.2$  mm), maximum width  $3.8 \pm 0.1$  mm; length to width ratio  $1.94 \pm 0.04$  (N= 16). Body elongate with sides weakly curved (Fig. 7); dorsal surface only slightly convex.

**Colour:** Head black with anterior margin and paired interocular spots rufous. Antenna and palpi rufous, without infuscation. Pronotum black with lateral margins narrowly rufous. Elytron black with sublateral and subapical yellow spots. Legs dark rufous. Ventral surface black; epipleuron, metacoxal processes and posterior térgal margins rufous.

**Sculpture and setation:** Dorsal surface shiny in male, opaque in female. Head with meshes of unequal shape and size; frequently with central micropunctures. Frons with single additional sensillar puncture. Pronotum with meshes larger than on head; many meshes longitudinally stretched on female. Anterior transverse row of punctures continuous; posterior row with short sublateral gap. Elytron with meshes smaller than on pronotum; lines of reticulation very shallowly impressed in male (Fig. 11), and very deeply so in female. Meshes smaller and more longitudinally stretched in female. In male many meshes with fine central micropunctures. Serial rows of punctures distinct in male, obsolete in female. Prosternal process micropunctate. Metasternum medially smooth, sublaterally somewhat rugose. Metacoxal plate with relatively large, oblong meshes; striate towards posterior margin. Abdominal sterna 1-3 with fine oblique longitudinal striation; sternum 6 medially with transversely stretched fine reticulation and some coarse punctures. Metafemur posteroapically with dense row of about six long stout setae. Metatibia with disc impunctate and with  $11 \pm 3$  (N= 16) anteroventral punctures in entire but not continuous row. Metatarsus without additional anterodorsal or posteroventral spiniform punctures.

**Structural features:** Clypeus with anterior bead more or less continuous. Pronotum with anterior bead present only laterally; lateral bead distinct. Prosternal process relatively broad, more or less flat with lateral bead only slightly dilated posterior of procoxae. Metasternum with anteromedial emargination not fully reaching posterior margin of mesocoxae. Metasternal wing narrow, WC/WS  $3.89 \pm 0.22$  (N= 14). Hind wing about 1.2 x as long as clytron. Metacoxal lines reaching metasternum. Metacoxal processes broad. Pro- and mesotarsi long; length ratio tarsomere 5 to tarsomere 3 in male 3.7 and 4.3, respectively. Metatarsal claws of equal length. Hind leg slender with metatarsomere 1 evidently longer than long tibial spur.

**Male:** Protarsal claws elongate; 3.3 x as long as tarsomere 3. Pro- and mesotarsomeres 1-3 dilated; ventrally clothed with oblong adhesive scales. Metatarsomeres 1-3 provided with ventral setal fringe. Penis simple and narrow with dorsal groove more or less closed and apex rounded (Figs 8-9). Paramere sclerotized in basal half and with narrow apical appendage (Fig. 10); setal fringe long and dense.

**Female:** Dorsal surface opaque from coarse microreticulation. Metatibia and -tarsus without ventral setal fringe. Ovipositor rounded, without lateral ridge.

**Distribution:** Known from Central and South Taiwan.

**Biology:** This species has been collected in headwaters and pools with cold and clean water at high altitude (2400-3100 m a.s.l.). At Mt. Hohuan, specimens were found from decayed wood surrounding a dried-out pond. The male from Kenting was seemingly mislabelled as the altitude of this locality is only 500 m (Wang, in litt.).

**Etymology:** The species epithet is an adjective derived from the geographical name Taiwan.

## Discussion

An ongoing generic revision of *Allopachria* ZIMMERMANN 1924 (type-species: *Allopachria quadripustulata* ZIMMERMANN 1924), and allied genera by the junior author in cooperation with Dr. O. Biström, Helsinki, probably will show that *Nipponhydrus* GUIGNOT 1954, must be regarded as a junior synonym of *Allopachria*. It will be part of further investigations to decide whether the genus *Allopachria* should be divided into subgenera.

The new *Agabus* species shares its habitus and many characters with the Palearctic *guttatus*-group. However, the continuous anterior row of punctures on pronotum, and the presence of adhesive scales on male mesotarsomere 3 indicate that *A. taiwanensis* is not a member of this group (cf. NILSSON 1992).

Like *A. paludosus* (FABRICIUS 1801), *A. faldermanni* ZAITZEV 1927, and *A. alinae* (LAFER 1988), the new species is seemingly an early offshoot from the *Agabus* clade including the *guttatus*-group. As these four species show few derived characters, it is

difficult to find synapomorphies that can define relationships between them. In this situation we suggest that *A. taiwanensis* should be placed in its own monobasic group.

The prolonged distal pro- and mesotarsomeres of *A. taiwanensis* are shared with *A. adpressus* AUBÉ 1838, and *A. udege* NILSSON 1994. A closer relationship with these two species is rejected chiefly because of the sublaterally continuous posterior row of punctures on pronotum, the lack of yellow elytral spots, and the straplike parameres of *A. adpressus* and *A. udege*.

### Acknowledgement

We thank Dr L.-J. Wang, Taiwan National University, for providing us with material of the two new species for description, and with the SEM-photo.

### Zusammenfassung

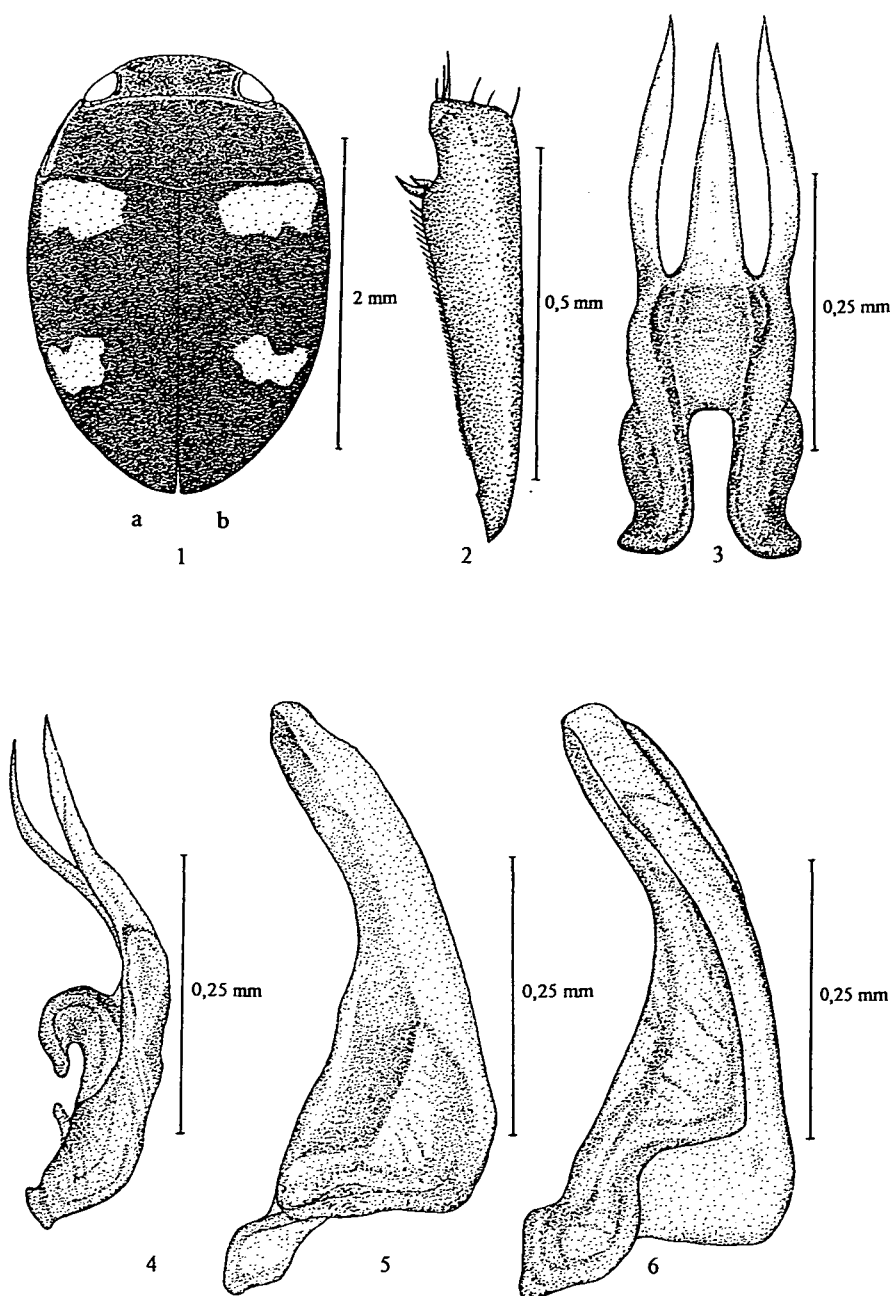
*Allopachria wangi* sp. n. und *Agabus taiwanensis* sp. n. werden von der Insel Taiwan beschrieben. *A. wangi* ist sehr nahe mit *Nipponhydrus flavomaculatus* (KAMIYA) aus Japan verwandt. Das Genus *Allopachria* ZIMMERMANN 1924 wird im weiteren Sinn verwendet und *Nipponhydrus* GUIGNOT 1954 wird als jüngeres Synonym betrachtet. *Agabus taiwanensis* wird in eine eigene Speciesgruppe gestellt.

### References

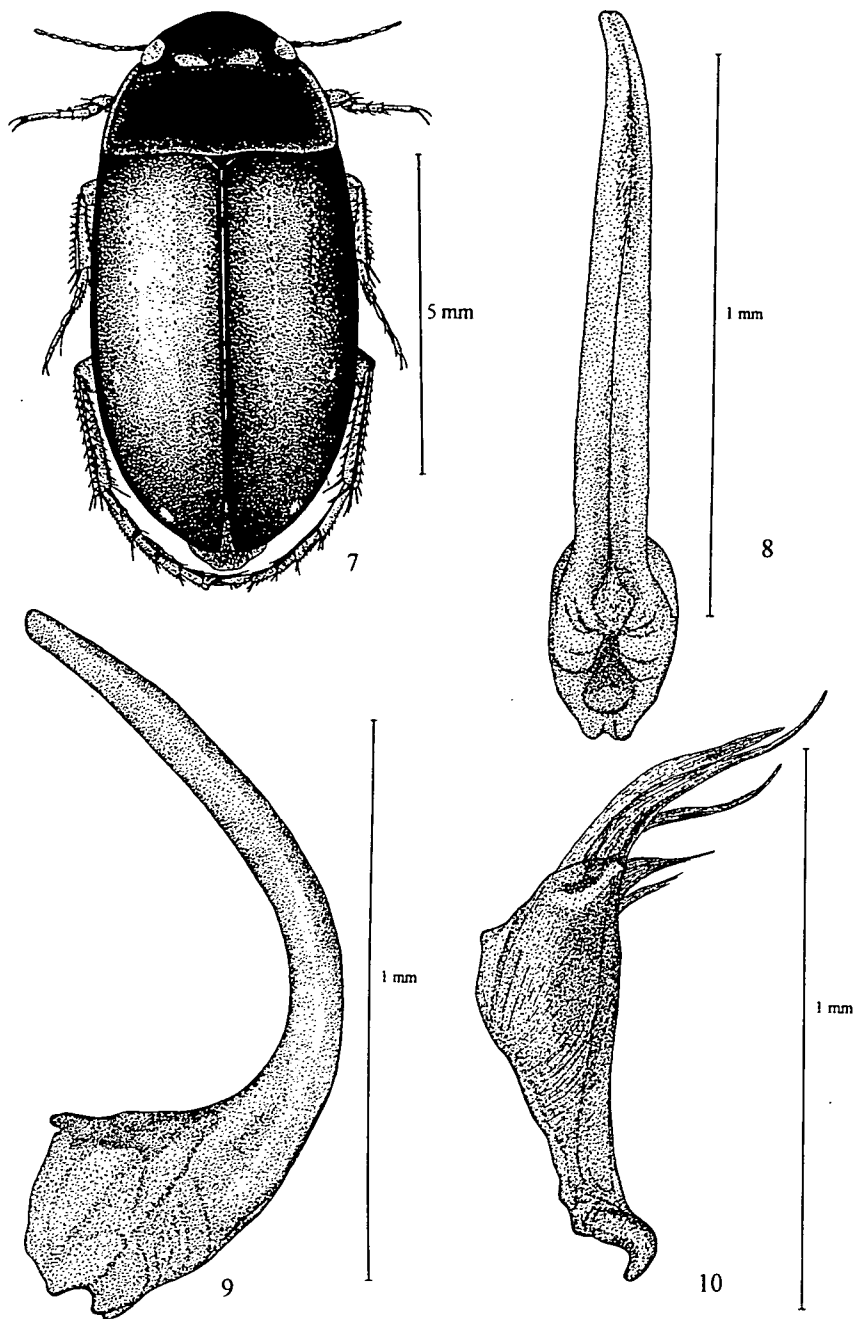
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Figs 1-6: *Allopachria wangi* sp. n., 1: Habitus and elytral markings of male holotype (a) and female paratype (b). 2: Protibia, anterior view. 3-4: Penis in dorsal (3) and lateral views (4). 5-6: Paramere in external (5) and internal views (6).



Figs 7-10: *Agabus taiwanensis* sp. n., male. 7: Habitus. 8-9: Penis in dorsal (8) and lateral views (9). 10: Paramere in external view.

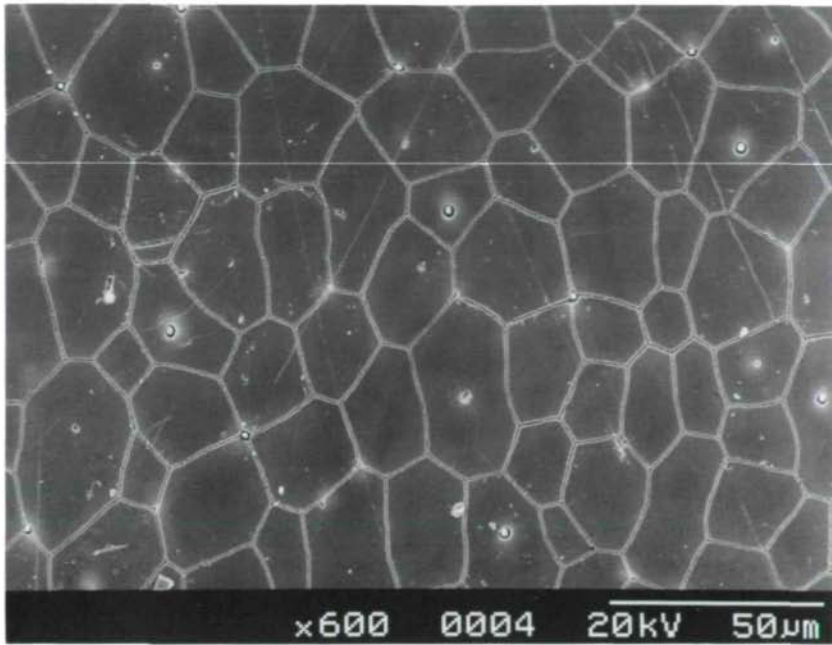


Fig. 11: *Agabus taiwanensis* sp. n., male, microsculpture of elytron, basal third.  
SEM micrograph by L.-J. Wang



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Autor(en)/Author(s): Nilsson Anders N., Wewalka Günther

Artikel/Article: [Two new species of the genera \*Allopachria\* and \*Agabus\* from Taiwan \(Coleoptera: Dytiscidae\). 991-998](#)