Notes on Notonectidae (Hemiptera: Heteroptera) from southeastern Asia, mostly from Brunei and the Philippines

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Introduction

Taxonomically, the backswimmers (Notonectidae) of the Oriental Region are fairly well known. There are several keys to genera (e.g., NIESER 1998, CHEN et al. 2005), and to species of certain countries, e.g., Thailand (NIESER et al. 2008), West Malaysia and Singapore (NIESER 2004). Besides, the revision of *Enithares* Spinola, 1837 by LANSBURY (1968) remains a very important tool for species identification. For the taxonomically difficult genus *Anisops* Spinola, 1837, the key by NIESER et al. (2008) is very useful, although it treats only a limited set of species, but allows identification of both males and females.

We bring to attention some interesting records of backswimmers from southeastern Asia, based on the results of three projects, two of them focusing on the aquatic Heteroptera fauna of Brunei Darussalam (by H. Zettel and D. J. W. Lane) and the Philippines (by H. Zettel and co-researchers; see GAPUD & ZETTEL 1999, ZETTEL & GAPUD 2003), while the third research project, AQUA Palawana (by H. Freitag), although limited to the Greater Palawan group of islands, has a broader taxonomic approach. We also include further interesting material from the southeastern Asian mainland. In addition to ten first country records and uncounted first regional records from various provinces and Philippine islands, a few morphological aspects are treated as well. We describe for the first time the female of the enigmatic *Enithares intha* Paiva, 1918, hitherto known only from types of two males from Shan State, Myanmar. We review again the species-specific differences between *Enithares freyi* Brooks, 1948 and *E. quadrispinosa* Lansbury, 1967, and confirm the full species status of the latter.

Material and methods

Specimens examined are deposited in the following collections:

HFDG  Hendrik Freitag private collection, Dresden, Germany;
HZWA  Herbert & Salvacion V. Zettel private collection, Vienna, Austria;
HNHM  Hungarian Natural History Museum, Budapest, Hungary;
NHMW  Natural History Museum Vienna, Austria;
NMPC  National Museum, Prague, Czech Republic;
PCSD  Palawan Council for Sustainable Development, Philippines;
UBDB  Biology Department Collection, Universiti Brunei Darussalam, Brunei Darussalam;
UPLB  Museum of Natural History, University of the Philippines, Los Baños, Laguna, Philippines;
USCP  Biological Collections, University of San Carlos, Cebu City, Philippines;
ZMAS  Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia;
ZRCS  Zoological Reference Collection, National University of Singapore, Singapore.

Material examined sections do not include specimens already published in earlier studies (NIESER & ZETTEL 1999, ZETTEL 2003).

Stacked digital images were taken with a Leica DFC camera attached to a Leica MZ16 binocular microscope and processed with the help of Leica Application Suite. They were then stacked with ZereneStacker 64-bit and processed with Adobe Photoshop 7.0.
Species account

*Anisops breddini* Kirkaldy, 1901

(Fig. 1)

*Anisops breddini* Kirkaldy, 1901: 5; *Nieser* (2004: 85); *Chen* et al. (2005: 421); *Nieser* et al. (2008: 254).


**Distribution.** *Anisops breddini* is widespread from Sri Lanka and India to New Guinea (*Nieser* 2004, *Chen* et al. 2005) and very common on the Malay Peninsula and in Thailand (*Nieser* et al. 2008). Specimens from Brunei represent the first record from Borneo. Specimens from the Philippines are the first specified records from that country. In the checklist by *Chen* et al. (2005) ‘PH’ (for ‘remaining Philippine Islands’ excluding the biogeographical regions of Greater Luzon, Greater Mindanao, and Greater Palawan) refers to some of the Cebu specimens mentioned above which were identified by Nico Nieser, Tiel. Listed are first records from Cebu and Bohol.

*Anisops kuroiwae* Matsumura, 1915

(Fig. 2)


**Distribution.** Common and widely distributed from India through southeastern Asia to Hainan, Taiwan, Iriomote, and the Philippines (*Nieser & Chen* 1999). In the Philippines previously recorded from the islands of Luzon (Laguna), Panay, Negros, Catanduanes, Samar, Leyte, Mindanao (Surigao del Sur), and Palawan (*Yano* et al. 1981, *Zettel* 2003); first records from Burias, Bohol and Siargao Islands, Cagayan Province in northern Luzon, and Surigao del Norte Province in northern Mindanao.
Anisops nasutus Fieber, 1851

(Fig. 3)

*Anisops nasuta* Fieber, 1851: 60; *Brooks* (1951: 416).


**Material examined.** **BRUNEI: BRUNEI-MUARA DISTRICT:** west of Bandar Seri Begawan, south of Jerudong, large artificial lake, 5 m a.s.l., 04°55′03.0″N 114°49′54.3″E (GPS), 3.xii.2008, leg. H. Zettel & D. J. W. Lane (# 36), 1♀ 3♂ (UBDB, NHMW). **PHILIPPINES:** **Bohol:** northern Bohol, southwest of Talibon, Zamora Dam, 25 m a.s.l., pond, 9.xi.2007, leg. H. Zettel (474b), 5♂♂ (NHMW, UPLB, HFDG), leg. C. V. Pangantihon (PC474b), 4♀♀ (HZWA).

**Distribution.** *Anisops nasutus* is widely distributed from India to Australia (*Chen et al.* 2005). However, listed materials represent the first record from Brunei and the entire island of Borneo. Regarding the Philippines, an unspecific record by *Nieser & Chen* (1999) was cited by *Zettel* (2003), but not repeated by *Chen et al.* (2005), and was specified ‘Mindanao’ by *Nieser et al.* (2008). The examined specimens represent the first record from Bohol Island.

Anisops nigrolineatus Lundblad, 1933


**Distribution.** *Anisops nigrolineatus* is widely distributed from India to Java (*Nieser & Chen* 1999, *Chen et al.* 2005) and very common in southeastern Asia, especially Thailand (*Nieser et al.* 2008). However, listed materials represent the first record from Bohol Island and the entire island of Borneo.

Anisops occipitalis Breddin, 1905

(Figs. 4–7)


**Material examined.** **JAPAN:** **RYUKYUS:** Ishigaki Island, collected at light, 16.x.1999, leg. S. Belokobylskij, 2♀♀ (ZMSP, NHMW). **PHILIPPINES:** **Bohol:** northern Bohol, southwest of Talibon, Zamora Dam, 25 m a.s.l., pond, 9.xi.2007, leg. H. Zettel (474b), 9♀♀ 6♀♀ (NHMW, UPLB), leg. C. V. Pangantihon (PC474b), 8♀♀ 9♀♀ (HZWA, USCP). **INDONESIA:** **SULAWESI TENGGARA PROVINCE:** Kolaka, 20 km south of Pomalea, 2.iii.1989, leg. N. Nieser (N8927), det. N. Nieser, 1♂ 1♀ (NHMW). **CERAM:** near Wahal, 12.ii.1989, leg. M. A. Jäch, det. N. Nieser, 1♂ 1♀ (NHMW).

**Distribution and notes.** *Anisops occipitalis* is widely distributed from West Malaysia to Australia and New Caledonia (*Chen et al.* 2005). In addition to its southern distribution recorded by Nico Nieser in several papers (*Nieser 2004, Chen et al. 2005, Nieser et al. 2008*), there are more northern records from southeastern China, Taiwan, and Japan by *Lansbury* (1961) and *Polhemus* (1995). In his morphological analysis of *A. occipitalis*, *Lansbury* (1965) did not include
the Taiwanese material studied some years earlier (in LANSBURY 1961). Examined specimens from the Ryukyus in southern Japan belong to the same morph as the Philippine material. These samples differ from the typical A. occipitalis (e.g., from Sulawesi and Ceram) chiefly in a wide head which is hardly narrower than the pronotum, a characteristic that has been also described for eastern populations of A. occipitalis (Russell Island, New Guinea; LANSBURY 1965: figs. 7C, 7D) and in A. leucothea Esaki, 1926 from Samoa, which is suspected to be possibly conspecific with A. occipitalis (see LANSBURY 1965). Under such circumstances the Philippine population is tentatively identified as A. occipitalis. A male from Bohol is illustrated in Figs. 4–7.

**Anisops rhomboides** Nieser & Chen, 1999


**Material examined.** **BRUNEI:** Belait District: Peat-swampy area draining to Sungai Ingei, 6.vi.2010, leg. D. J. W. Lane (15), 1 ♀ (UBDB).

**PHILIPPINES:** **LEYTE:** Leyte Province, Mahaplag, Hilusig River, 6.iii.2001, leg. F. E. Bendanillo, 1 ♀ (USCP).

**Distribution.** *Anisops rhomboides* is a West Malesian species so far recorded from Borneo, Sulawesi, and the Philippines (NIESER & CHEN 1999, CHEN et al. 2005). This species is the only notonectid species previously recorded from Brunei (from km 29.5 on Labi road [in Belait District], NIESER & CHEN 1999). Philippine records are only from the south: Mindanao (South Cotabato) (NIESER & CHEN 1999), Tawi Tawi (LANSBURY 1967, as A. tahitiensis), and Palawan (ZETTEL 2003). This first record from Leyte (Leyte Province) represents the species’ northernmost occurrence.

**Anisops stali** Kirkaldy, 1904


**Material examined.** **PHILIPPINES:** **LUZON:** Mountain Province, Sagada, Underground River, downstream cave, 1450 m a.s.l., 17°05′N 120°54′E, 14.iii.1995, leg. H. Freitag (5), 2 ♀♀ (NHMW). **NEGROS:** Negros Oriental Province, Bais Forest, 500 m a.s.l., 21.v.1981, leg. Fr. Schoenig, 1 ♀ (USCP). **CEBU:** Cebu City, Buhisan, 11.ix.1979, leg. A. Creus, 1 ♀ (USCP); Minglanilla, Camp 7, 29.ix.1979, leg. Egula, 1 ♀ (USCP).

**Distributinal notes.** *Anisops stali* is distributed from Java in Indonesia and the Philippines eastwards to Australia (CHEN et al. 2005). Despite this wide distribution it has been rarely reported from the Philippines, namely from Mindanao (BROOKS 1951) and Mindoro (ZETTEL 2003). We present first records from Luzon (Mountain Province), Negros Oriental, and Cebu.

**Aphelonecta philippina** Zettel, 1995

(Fig. 8)


**Material examined.** **BRUNEI:** Temburong District: Sungai Tunkul Libut (tributary to Sg. Temburong), 30 m a.s.l., 04°34′N 115°07′E (GPS), 1.xii.2008, leg. H. Zettel (35), 1 ♀ (UBDB).
Notes. Although the specimen from Brunei has an atypical colour pattern (Fig. 8), it agrees well with studied specimens from Palawan and Sabah in structural characteristics including genitalia.

Distribution. *Aphelonecta philippina* was originally described from Palawan Island, the Philippines, and later recorded from Sabah, Borneo (ZETTEL et al. 1998). We present the first record from Brunei.

*Enithares bakeri* Brooks, 1948


Distribution. *Enithares bakeri* is known from the Philippines, Indonesia (Sulawesi, Nusa Tengara), and East Malaysia (CHEN et al. 2005). Extrapolating from the limited collections and distributional data, *E. bakeri* can be expected all over the Philippine Islands. It has been previously recorded from Mindoro, Marinduque, Negros, Siquijor, Biliran, Poro, and Mindanao (NIESER & ZETTEL 1999, ZETTEL 2003). Here we present first records from the islands of Luzon (Cagayan Province), Burias and Bohol.

*Enithares freyi* Brooks, 1948

(Figs. 9, 14)


Notes. NIESER & ZETTEL (1999: fig. 16) have illustrated the genitalia of the male; in this figure the characteristic lateral arm of the basal plate of the aedeagus is partly covered by the posterior lobe of the genital capsule. Figure 14 shows its complete outline. See also notes for *E. quadririspina*.

Hitherto, *Enithares freyi* has been very rarely collected, but in the municipality of Santa Fe, Caballos Mountains, it commonly inhabits suitable places at elevations from 600 to 1200 m a.s.l. Deep, shaded bays along the edges of the streams are the main requirement of this species.

**Distribution.** Endemic in northern and central Luzon in the Philippines: Mountain Province, Benguet (BROOKS 1948, NIESER & ZETTEL 1999), Laguna (ZETTEL 2003); first records for Ilocos Norte and Nueva Viscaya.
Enithares intha Paiva, 1918
(Figs. 10, 16, 18)


Distribution and notes. Until recently, Enithares intha was only known from the type series, two males, from Inle Lake, also in Shan State, Myanmar. While the identity of this species was unknown to Ivor Lansbury when preparing his revision of Enithares (LANSBURY 1968), he redescribed the types later (LANSBURY 1973). THIRUMALAI (2007) recorded E. intha from Meghalaya, northeastern India, based on a personal note by J.T. Polhemus. NIESER et al. (2008) included E. intha in a key to species from Thailand and adjacent areas, referring to LANSBURY’s (1973) redescription, without having seen further specimens. Material in NHMW consists only of females. The shape of the metaxiphus agrees well with the illustration provided by LANSBURY (1973) for males and allows identification. The females strongly resemble E. sinica (comp. Fig. 12) except for slightly smaller body size, for a distinct spur on the mesotrochanter (Fig. 16), which is absent in E. sinica females (Fig. 17) and for the shape of the metaxiphus (Fig. 18), which is not expanded and has less highly elevated margins than in E. sinica (Fig. 19). The small spur on the mesotrochanter distinguishes females from all species in the region.
Description of female. Body length 8.38–8.95 mm, head width 2.38–2.58 mm, median head length (in exact dorsal aspect of specimen) 1.24–1.30 mm, anterior width of vertex 1.05–1.09 mm, synthlipsis 0.48–0.51 mm, pronotum width 2.95–3.19 mm, median pronotum length 1.03–1.19 mm. Colour see Fig. 10, extension of dark colour on mesoscutellum and hemelytra slightly varying. Head large. Vertex anteriorly convex, clearly surpassing anterior eye margin. Medial margin of pronotal foveae directed slightly laterally. Metaxiphus (Fig. 18), relatively narrow, with distinctly, but not very strongly elevated sides and short apex. Mesotrochanter (Fig. 16) with distinct spur similar to that of male. Metafemur without tooth.

**Enithares mandalayensis** Distant, 1910

*Enithares mandalayensis* Distant, 1910: 331; LANSBURY (1968: 380); NIESER (2004: 93); CHEN et al. (2005: 423); NIESER et al. (2008: 280).


**Distribution.** *Enithares mandalayensis* is widespread in Myanmar, Vietnam, West Malaysia, and Singapore (NIESER 2004); it has been frequently recorded from Thailand (NIESER et al. 2008 and this study). Here we present the first records from China.

**Enithares martini martini** Kirkaldy, 1898

*Enithares martini* Kirkaldy, 1898: 151; LANSBURY (1968: 432); CHEN et al. (2005: 423). 


**Distribution.** The nominotypical subspecies occurs probably throughout the Philippine Islands except in the Palawan Region and in Mindoro. It has been recorded from numerous islands and provinces (NIESER & ZETTEL 1999, ZETTEL 2003). Here are first records from the islands of Poro (Camotes group), Bohol and Siiquior; and from the provinces Ilocos Norte, Ilocos Sur, La Union, Nueva Viscaya, Cavite (all on Luzon island), and Southern Leyte.

*Enithares quadrispinosa* Lansbury, 1967

(Figs. 11, 15)


**Material examined.** PHILIPPINES: PALAWAN: El Nido, barangay Villa Libertad, 50 m a.s.l., 11°12′N 119°26′E, small creek, 15.x.1994, leg. H. Freitag (113bM), 1 ♂ (HFDDG); Taytay, one-third of way to Lake Manguao, Manguao stream tributary, in primary forest, 35 m a.s.l., 10°47′N 119°31′E, 29.iv.1995, leg. H. Freitag (13bM), 1 ♂ 1 ♀ (NHWMA); Taytay, Poblacion, southern Manguao stream tributary, 30 m a.s.l., 10°46′00″N 119°30′43″E, 14.ii.2007, leg. H. Freitag (63aM), 2 ♂♂ 1 ♀ (HFDDG); Taytay, Poblacion, Manguao southwestern bay, Malibongbong Creek, 20 m a.s.l., 10°44′29″N 119°31′25″E, 7.v.2008, leg. H. Freitag (72aM/E), 2 ♂♂ (PCSD); Taytay, Manguao tributary east of Sinanaglait Creek, 20 m a.s.l., 10°46′58″N 119°31′25″E, 3.xi.2008, leg. H. Freitag (73aM), 1 ♀ (USCP); Taytay, Lake Manguao, northeastern tributary, Pakoh Creek, 10°46′56″N 119°32′01″E 100 m a.s.l., residual pool, 7.v.2008, leg. H. Freitag (74aM), 1 ♂ 1 ♀ (PCSD); Taytay, barangay Abongan, Ibanglay, Abongan River tributary, km 177.9 on Northern Highway, 10°37′23″N 119°23′17″E, 3.xi.2007, leg. H. Freitag (118M), 1 ♀ (UFDDG); Taytay, Poblacion, Manguao, temporary tributary at northern coast, Mechico Creek, 10°46′37″N 119°33′14″E, 20 m a.s.l., in degraded primary forest, 4.xi.2007 and 29.viii.2008, leg. H. Freitag (119M), 1 ♂ 3 ♀♀ (NHWMA); Taytay, Poblacion, Manguao, Malard Creek, 20 m a.s.l., 10°46′22″N 119°33′36″E, 4.xi.2008, leg. H. Freitag (120M), 1 ♂ 1 ♀ (USCP); Taytay, Poblacion, Manguao, Enolbong Creek, 20 m a.s.l., 10°46′40″N 119°32′19″E, 5.xi.2008, leg. H. Freitag (121bM), 1 ♂ (HFDDG); Taytay, Poblacion, Manguao, Meadadium Creek, 30 m a.s.l., 10°45′45″N 119°34′00″E, 29.viii.2008, leg. H. Freitag (146M), 1 ♂ (HFDDG); Taytay, barangay Poblacion, 4 km southeast of town proper,
Notes. The taxon was originally described as a subspecies of *E. freyi*, but raised to species rank by Nieser & Zettel (1999). erroneously, it was listed again as a subspecies by Chen et al. (2005) and Young (2010). *Enithares freyi* and *E. quadrispinosa* differ in a good number of characters including body size, colour and genitalia of males. In their key, Nieser & Zettel (1999) give a body length of 11.4–11.7 mm for *E. freyi* and ‘up to 10.6 mm’ for a set of species including *E. quadrispinosa*. Measuring more specimens, the range of body lengths is 11.3–12.7 mm (n = 27) in *E. freyi*, and 8.6–9.9 mm (n = 45) in *E. quadrispinosa*. The body shape is slightly more elongated but less acuminated in *E. freyi* than in *E. quadrispinosa* (comp. Figs. 9 and 11). Both species show wide variations in body colour. In *E. freyi* dark forms are dominant; the mesoscutellum is mostly black (Fig. 9), and we have seen only a single specimen with yellow spot covering an area slightly exceeding 50 % of the entire visible surface. In contrast, most specimens of *E. quadrispinosa* are pale, the yellow area covering 75 to (usually) 100 % of the mesoscutellum (Fig. 11). Chaetotaxy of the first mesotarsomere of the male differs considerably: Whereas *E. freyi* possesses four setae in a row, as in the female, *E. quadrispinosa* has two pairs of short, stout setae at the segment’s basal half. The distal part of the paramere is slender-triangular in *E. freyi* and narrow-digitiform in *E. quadrispinosa* (Nieser & Zettel 1999). However, the most distinctive character in males is the very different shape of the lateral arms of the basal plate (comp. Figs. 14 and 15). From an ecological viewpoint, both species inhabit similar microhabitats, i.e. pools and quiet bays.
in streams, but *E. freyi* is a mountain species (ca. 600−1200 m a.s.l.) and *E. quadrispinosa* occurs in lowlands (ca. 20−150 m a.s.l.).

From LANSBURY’s (1968) description of the pale type specimens, YOUNG (2010) concluded that he described the flightless morph, and the ‘normal morph’ is unknown. However, the situation is more complicated. As a preliminary study, we have dissected 37 specimens with varying colour pattern and only 6 pale specimen of both sexes had reduced indirect flight muscles. Among the 31 specimens with well-developed flight muscles, some are completely pale, too. All examined specimens had completely developed hind wings. Despite the small number of examined specimens, the high frequency of individuals with flight abilities corresponds well with the rather unstable conditions of the species’ microhabitats.

**Distribution.** *Enithares quadrispinosa*, endemic to the Palawan region, is widespread and common on Palawan Island, and recorded from Balabac Island for the first time.

*Enithares sinica* (Stål, 1854)*

(Figs. 12, 17, 19)


**GUANGDONG**: Liuzhou Prefecture, 10 km northeast of Liuzhou City, Shamenjiang Forest Station; small stream, 200 m a.s.l., 10.xi.1993, leg. H. Schillhammer (17) [= CWBS loc. 38], 1♂ 3♀♀ (NHMW); Liuzhou Prefecture; 10 km northeast of Liuzhou City; 3 km northwest of Shamenjiang Forest Station; small stream, 150−200 m a.s.l., 11.xi.1993, leg. H. Schillhammer (18a) [= CWBS loc. 40], 1♀ (NHMW); Guilin Prefecture, Lipu County; 120 km south of Guilin, 80 km east of Liuzhou City; Siuren Village, fast flowing stream, 350 m a.s.l., 12.xi.1993, leg. H. Schillhammer (19) [= CWBS loc. 41], 1♀ (NHMW); Yulin Prefecture, Liuan Da Shan, small, steep mountain streams on the southern slope of Kui Shan Ding ( = Helmet Mountain), 600−700 m a.s.l., 17.xi.1993, leg. H. Schillhammer (21) [= CWBS loc. 43], 1♀ (NHMW).


**Hunan**: Huaihua Prefecture, Huitong County, Guangping Township, Moshao Village, 15 km west of Guangping, 5 km north of Upper Forest Research Station, rain water pools, 350 m a.s.l., 4.x.1993, leg. H. Schillhammer (10a) [= CWBS loc. 31], 1♂ 1♀ (NHMW). **Fujian**: Wuyi Mountain, Guan [Kuantan, Fukien], leg. Tschung Sen, 9.vii.1946, 2♂♂; 12.vii.1946, 1♂; 15.vii.1946, 9♂♂ 7♀♀; 22.vii.1946, 4♂♂ 10♀♀; 27.vii.1946, 2♂♂; 12.vii.1946, 2♂♂ (NMPC, NHMW); Wuyi Mountain, Guan [Kuantan, Fukien], 2300 m a.s.l., 27.40°N 117.40°E, 25.vii.1946, leg. J. Klapperich, 2♀♀ (NMPC). **Guangdong**: Zhaoping Prefecture, Zhaoping County, southeastern margin of Dinghu Nature Reserve, near Zhuhai Village, northeast of Dinghu Town, 20−40 m a.s.l., 23°11′03″N 112°33′06″E, small pools, 29.x.2001, leg. M. A. Jäch & A. Komarek (CWBS loc. 452), 2♂♂ 2♀♀ (NHMW); Zhaoping Prefecture, Dinghu Nature Reserve, 50−150 m a.s.l., at light, 30.x.2001, leg. M. A. Jäch & A. Komarek, 1♀ (NHMW); Zhaoping Prefecture, Fengkai County, 50 km east of Fengkai, 5 km west


Notes. The male of *E. sinica* possesses a large tooth on the metafemur (Fig. 12) and a spur on the mesotrochanter, both characters being absent in the female (see Fig. 17 for mesotrochanter). The shape of the metaxiphus (Fig. 19) is characteristic for both sexes. See also notes for *E. intha*.

Distribution. *Enithares sinica* is widespread in subtropical Japan, China, Taiwan, and Vietnam (LANSBURY (1968) and references therein; see also POLHEMUS (1995), CHENG et al. (2006), NIESER et al. (2008); and material listed above). NIESER (1998) lists *E. sinica* for ‘Laos and Cambodia’, NIESER et al. (2008) published a detailed record for Laos (based on specimens in NHMW listed above) and several for China (Henan, Hubei, Gunagdong, Sichuan, Yunnan). The species is still entirely unknown from Thailand. In this paper we present the first collection data from West Malaysia, which is a considerable southwards expansion of the known distribution. The species was previously unknown from the Malesian biogeographical region.

*Enithares subparallela* Lansbury, 1968

(*Fig. 13*)


Material examined. PHILIPPINES: MINDANAO: Davao Province, Kidapawan, Mount Apo base camp, 200 m north of Lake Argo; mountain forest creek, 1200 m a.s.l., 07°02′0N 125°13′E, 13.iv.1995, leg. H. Freitag (33M), 2 ♀♀ (NHMW).
Notes. This is a rarely collected backswimmer that was so far only reported from the type series (eleven specimens) from Mt. Kitanglad (alternative spelling: Mt. Katanglad) in Bukidnon Province, Central Mindanao, sampled at an elevation of 1480 m a.s.l. (LANSBURY 1968). A field survey by the first author in the same mountain area at lower elevations (ca. 800–950 m a.s.l.) did not yield more specimens, but led to the discovery of another endemic species, *E. gantsophora* Nieser & Zettel, 1999. The fourth author collected *E. subparallela* for the first time in Davao Province, in the Mt. Apo area at an elevation of ca. 1200 m a.s.l. A male is illustrated in Fig. 13.

Distribution. Endemic in Mindanao, Philippines: Bukidnon (Mt. Kitanglad) (LANSBURY 1968), first record from Davao (Mt. Apo).

*Enithares uncata* Lundblad, 1933

*Enithares uncata* Lundblad, 1933: 179.


Distribution. Hitherto *Enithares uncata* was recorded from Sumatra and Java in Indonesia (LUNDBLAD 1933). The examined specimens represent the first records from the island of Borneo and the first country record for Malaysia (Sarawak).

*Enithares cf. vicintricata* Lansbury, 1968


Notes. *Enithares vicintricata* was described from two males and one female from Sarawak by Lansbury (1968) and is regarded as an endemic species of Borneo (CHEN et al. 2005). Similar, closely related species live on Java and Sumatra (*E. intricata* Breddin, 1905) and on the Andaman Islands (*E. rogersi* Distant, 1910) (see LANSBURY 1968). The specimens from Brunei differ slightly from the types of *E. vicintricata*, e.g., by smaller size (7.3–7.9 mm vs. 9.0 mm in the types); male with three stout setae on the first mesotarsomere (vs. two in the types of *E. vicintricata* and four in *E. intricata*; fide LANSBURY 1968) and basal plate of the phallus bluntly produced posteroapically (more acutely produced in all other forms). Specimens similar to those of the Brunei population are known from several locations in Sarawak (specimens in NHMW, unpublished), but it seems that there is more than one species of the *E. vicintricata* complex in western Borneo. A careful analysis on the population structure of ‘*E. vicintricata*’ will be required before drawing further taxonomic conclusions. For that reason, the identification of the Brunei material should be regarded as preliminary.
**Nychia sappho** Kirkaldy, 1901

*Nychia sappho* var. *sappho* Kirkaldy, 1901: 809.  
*Nychia sappho* var. *sappho* Kirkaldy, 1901: 809.  


Distribution. Common and widely distributed from Myanmar to Australia (see, e.g., Lansbury 1985, Zettel 2003, Nieser 2004, Chen et al. 2005, Nieser et al. 2008, Chen & Nieser 2011). The specimens from Brunei represent the first country records. In the Philippines, *N. sappho* has been recorded from Sibuyan, Masbate, Western Samar, and Leyte (Zettel 2003, as *Nychia* cf. *sappho*); here first records are provided from the islands of Mindoro, Palawan and Bohol. In addition, nymphs of *Nychia* sp. from the Loboc River in southern Bohol are deposited in USCP. So far, there are no records from northern Philippine islands.

**Discussion**

While the taxonomy of Notonectidae in southeastern Asia (including the islands of the Malay Archipelago) is relatively well known, there is still a lack of distribution data covering the area. A comprehensive list for the entire western Malesian Region was given by Chen et al. 2005.
For countries within this region, there are more detailed treatments for West Malaysia, Singapore (Niessler 2004) and the Philippines (Niessler & Zettel 1999, Zettel 2003, and this study). In Indonesia, the island of Sulawesi has been studied in details (Niessler & Chen 1991, 1999). Knowledge of the notonectid fauna on the other large Sunda Islands remains inadequate. The most recent summary on the faunas of Sumatra and Java was that by Lundblad (1933), while there is only fragmentary knowledge on the fauna of Borneo. For example, common species like Anisops breddini, A. nigrolineatus and Nychia sappho were not recorded from Borneo prior to this study.

Regarding the fauna of Indochina (in a broad sense, including Myanmar, Thailand and southern China, see Myers et al. 2000), Thailand has been studied in more detail (Niessler et al. 2008 and references cited therein). Distribution data for Vietnam are scattered in several papers

**Tab. 2: Check-list of Notonectidae recorded from the Philippine Islands.** * Taxon endemic to the Philippines.

<table>
<thead>
<tr>
<th>Anisopinae</th>
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<tbody>
<tr>
<td>Anisops Spinola, 1837</td>
<td></td>
</tr>
<tr>
<td>* Anisops breddini Kirkaldy, 1901</td>
<td></td>
</tr>
<tr>
<td>* Anisops kuroiwae Matsumura, 1915</td>
<td></td>
</tr>
<tr>
<td>Anisops nigrolineatus Lundblad, 1933</td>
<td></td>
</tr>
<tr>
<td>* Anisops nasutus Fieber, 1851</td>
<td></td>
</tr>
<tr>
<td>Anisops nodulatus Brooks, 1951</td>
<td></td>
</tr>
<tr>
<td>Anisops occipitalis Breddin, 1905</td>
<td></td>
</tr>
<tr>
<td>* Anisops philippinensis Brooks, 1951</td>
<td></td>
</tr>
<tr>
<td>Anisops rhomboides Niessler &amp; Chen, 1999</td>
<td></td>
</tr>
<tr>
<td>* Anisops stali Kirkaldy, 1904</td>
<td></td>
</tr>
<tr>
<td>* Anisops yanoi Miyamoto, 1981</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Notonectinae</th>
<th></th>
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<tbody>
<tr>
<td>Notonectini</td>
<td></td>
</tr>
<tr>
<td>Aphelonecta Lansbury, 1965</td>
<td></td>
</tr>
<tr>
<td>* Aphelonecta philippina Zettel, 1995</td>
<td></td>
</tr>
<tr>
<td>Enithares Spinola, 1837</td>
<td></td>
</tr>
<tr>
<td>* Enithares bakeri Brooks, 1948</td>
<td></td>
</tr>
<tr>
<td>* Enithares foveata Lansbury, 1968</td>
<td></td>
</tr>
<tr>
<td>* Enithares freyi Brooks, 1948</td>
<td></td>
</tr>
<tr>
<td>* Enithares gantsophora Niessler &amp; Zettel, 1999</td>
<td></td>
</tr>
<tr>
<td>* Enithares m. martini Kirkaldy, 1898</td>
<td></td>
</tr>
<tr>
<td>* Enithares m. mindoroensis Niessler &amp; Zettel, 1999</td>
<td></td>
</tr>
<tr>
<td>* Enithares nieseri Zettel, 2003</td>
<td></td>
</tr>
<tr>
<td>* Enithares quadrisspinosa Lansbury, 1967</td>
<td></td>
</tr>
<tr>
<td>* Enithares subparallela Lansbury, 1968</td>
<td></td>
</tr>
</tbody>
</table>

| Nychini                                        |                      |
| Nychia Stål, 1859                             |                      |
| * Nychia sappho Kirkaldy, 1901                 |                      |

...
(e.g., Lansbury 1964), while knowledge of the faunas for Myanmar, Laos, and Cambodia is only fragmentary (see Nieser 1998: table on p. 12).

Prior to this study, the notonectid fauna of Brunei Darussalam was poorly known, with only one species recorded (Nieser & Chen 1999). At present seven species are known (Tab. 1), but more are expected to be found during further surveys.

The notonectid fauna of the Philippines is rich in species. Of the twenty-one species listed so far (Zettel 2003; Tab. 2), ten species are endemic. This number may increase slightly due to anticipated additional species records for Anisops, a genus which is under-represented in the material studied. There is at least one Anisops species to be added which remains unidentified and is possibly new to science.

From the Palawan region, five notonectid species in four genera are recorded. The most widely distributed species is Enithares quadrispinosa, which is a common inhabitant of side pools and lentic bays of streams. It is the only endemic backswimmer in the Palawan region.

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