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Contributions to the knowledge of water bugs in Mindoro Island, Philippines, with a species checklist of Nepomorpha and Gerromorpha (Insecta, Hemiptera, Heteroptera)

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Academic editor: Laurence Livermore

Received: 24 Jul 2020 | Accepted: 27 Oct 2020 | Published: 04 Nov 2020

Citation: Pelingen AL, Zettel H, Pangantihon CV, Aldaba KMD, Fatallo EK, de Leon JM, Freitag H (2020)

Contributions to the knowledge of water bugs in Mindoro Island, Philippines, with a species checklist of Nepomorpha and Gerromorpha (Insecta, Hemiptera, Heteroptera). Biodiversity Data Journal 8: e56883.

<https://doi.org/10.3897/BDJ.8.e56883>

Abstract

Background

This survey aims to provide an updated species checklist of aquatic and semi-aquatic bugs in the intra-Philippine biogeographic Region of Mindoro. An assessment survey of water bugs (Hemiptera, Heteroptera) was conducted mostly by manual collection in selected areas of Oriental Mindoro from 2017 to 2018, in which some of the collecting activities were undertaken by graduate students of Ateneo de Manila University.

New information

Twenty-nine aquatic and semi-aquatic heteropteran species were documented and some are known island-endemic species or subspecies, including *Enithares martini mindoroensis*

Nieser & Zettel, 1999, *Hydrotrepes stereoides mindoroensis* Zettel, 2003, *Aphelocheirus freitagii* Zettel & Pangantihon, 2010, *Rhagovelia mindoroensis* Zettel, 1994, *Rhagovelia raddai* Zettel, 1994, *Rhagovelia potamophila* Zettel, 1996 and *Strongylovelia mindoroensis* Lansbury & Zettel, 1997, which were found in new areas in the Region. In addition, there are also new records for the Island that have already been documented in other parts of the Philippines, such as the Philippine-endemic *Ochterus magnus* Gapud & San Valentin, 1977 and *Hebrus philippinus* Zettel, 2006 and the widely-distributed backswimmers *Anisops nigrolineatus* Lundblad, 1933 and *Anisops rhomboides* Nieser & Chen, 1999. Several undescribed specimens and potentially new species are also discussed in this paper. Further surveys in the other parts of Mindoro and in the other regions of the Philippines, are encouraged to produce a comprehensive baseline data of heteropteran species richness in the country.

Keywords

biodiversity, distribution, endemism, freshwater, macroinvertebrates

Introduction

The order Hemiptera constitutes a large part of the insect fauna, both in terrestrial and aquatic ecosystems in the Philippines (Gapud 1986). The majority of the aquatic forms belong to Nepomorpha and Gerromorpha (water bugs) under the suborder Heteroptera (true bugs or typical bugs). These water bugs have been relatively well-studied compared to other aquatic macroinvertebrate taxa, mainly due to the comprehensive Philippine Water Bug Inventory Project (Gapud and Zettel 1999). Most of the represented species are Philippine-endemic, many of which are island-endemics. More than 200 species are known from the country, although numerous undescribed, or even undiscovered species still await their formal description. Despite their abundance, Heteroptera were subject to only a few studies in Mindoro. In Lake Naujan, Mindoro, 12 heteropteran species, along with 49 coleopteran species, were documented (Freitag and Pangantihon 2010), while in Lake Manguao Catchment, Palawan, 21 heteropteran species were recorded (Freitag and Zettel 2012). Zettel (2014) documented 85 gerromorphan species from the Island of Luzon, while Pangantihon and Freitag (2016) recorded 31 new island records of coastal and marine-associated heteropteran species from central Visayas and Mindoro. In total, 43 species were recorded from Mindoro in these previous studies. Since then, no published papers dealt with similar faunistic surveys on aquatic and semi-aquatic Heteroptera in any region of the Philippines. Thus, this study aims to update the species list of Gerromorpha and Nepomorpha of Mindoro. The majority of the survey efforts were accomplished within the scope of a graduate course activity by the junior authors in selected areas of the Island for which a Gratuitous Permit was issued by the Philippine Bureau of Fisheries and Aquatic Resources (BFAR).

Along with field collection from the easily-accessible municipalities of Puerto Galera and Baco, special attention is given to the Baroc River basin in Roxas, which belongs partly to

the Key Biodiversity Area (KBA) “69 Hinunduang Mt.” with extremely high critical conservation priority (“EHc”) and high socioeconomic pressure (Ong et al. 2002). This study aims to address the lack of biodiversity data from Mindoro Island. The comprehensive assessment project of the Baroc River basin by the Ateneo Biodiversity Laboratory has led already to the discovery of several interesting aquatic arthropod species (Freitag 2013, Mey and Freitag 2013, Komarek and Freitag 2014, Vidal et al. 2017, Garces et al. 2018, Komarek and Freitag 2020, Pelingen and Freitag 2020). These papers also provide more details on some of the collecting sites.

Materials and methods

Abbreviations and acronyms

ap apterous

asl. above the sea level (elevation)

bra brachypterous

ma macropterous

N nymph

NN nymphs

s.l. sensu lato

s.str. sensu stricto

sp. species

ssp. subspecies

Field Collection

A large proportion of the aquatic and semi-aquatic heteropteran material studied here was collected in rivers and streams of Oriental Mindoro from June 2017 to August 2018. The sampling sites (all from the Province of Oriental Mindoro, Philippines) are summarised in Table 1.

Table 1.

Acronym codes of sampling sites in the Province of Oriental Mindoro as used in the result section.

Code	Municipality/ Barangay	River/Creek/ Tributary	Description	Latitude, Longitude	Elevation (m asl)
301	Puerto Galera	Tagbinai Munti River	hill creek in coconut plantation	13°29'00"N, 120°57'12"E	10

Code	Municipality/ Barangay	River/Creek/ Tributary	Description	Latitude, Longitude	Elevation (m asl)
302	Puerto Galera	downstream of Tamaraw Falls	creek in secondary vegetation	13°27'03"N, 120°59'27"E	80
303	Puerto Galera, Calsapa	Tukunan River ("Hidden Paradise") (Fig. 1C)	medium-sized river in secondary vegetation	13°26'00"N, 120°58'23"E	80
304	Puerto Galera	downstream of Aninuan Falls	creek in secondary vegetation	13°29'10"N, 120°54'18"E	10
305	Puerto Galera	Tagbinai Malaki River (Fig. 1B)	small river in secondary vegetation	13°28'57"N, 120°57'34"E	30
310	Baco, Dulangan	Lantuyan River	torrent mountain river in secondary vegetation	13°16'08"N, 121°04'56"E	55
312	Baco, Dulangan	Lantuyan River	torrent tributary of Lantuyan River in secondary forest	13°18'02"N, 121°02'44"E	400
353	Baco	Baco, Rural Road Side	residual pools of small intermittent river in secondary vegetation	13°21'49"N, 121°05'30"E	26
356	Baco, Dulangan	lower Dulangan River (Fig. 1D)	torrent river in rural open land	13°21'22"N, 121°07'10"E	8
396	Puerto Galera, Poblacion	lowland Creek (Fig. 1A)	small lowland creek in secondary vegetation	13°30'07"N, 120°56'46"E	2
BR2	Roxas, San Mariano	middle Baroc River	disturbed warm water river in farmland	12°37'40"N, 121°26'29"E	10
BR3	Roxas, Wasig	lower Baroc River (Fig. 2A)	disturbed warm water river in farmland	12°35'51"N, 121°28'11"E	2
HBC	Roxas, San Vicente	Quirao Buhay Creek	creek in secondary vegetation	12°36'10"N, 121°23'00"E	142
HBT	Roxas, San Vicente	Tagugoy Creek	small Quirao Buhay tributary in secondary forest	12°36'30"N, 121°22'38"E	200
HTC	Roxas, San Vicente	Tinggiwang Creek	creek in secondary forest	12°35'48"N, 121°22'01"E	162
HQC	Roxas, San Vicente	Quirao na Balete Creek	mountain creek fringed by secondary forest	12°35'38"N, 121°23'34"E	230
HR1	Roxas, San Vicente, Quirao	Hinundungan River	slightly disturbed lowland river in rural extensive farmland and secondary vegetation	12°36'23"N, 121°23'29"E	118
HR2	Roxas, San Vicente	Hinundungan River downstream of Hinagdanan Falls (Fig. 2B)	clean mountain river in secondary forest	12°35'23"N, 121°21'52"E	200
HR3	Roxas, San Vicente	Hinundungan River upstream of Hinagdanan Falls	clean mountain river in secondary forest	12°35'10"N, 121°21'36"E	280
TAC	Roxas, San Vicente	Sapang Alupa	torrent creek in old secondary forest	12°37'48"N, 121°20'52"E	340

Code	Municipality/ Barangay	River/Creek/ Tributary	Description	Latitude, Longitude	Elevation (m asl)
TDR1	Roxas, San Vicente, Taugad Diit	lower Taugad Daka River	clean mountain river in extensive farmland and secondary forest	12°37'33"N, 121°21'18"E	180
TDR4	Roxas, San Vicente	upper Taugad Daka River (Fig. 2C)	clean mountain creek in secondary forest	12°38'00"N, 121°19'15"E	700
THC	Roxas, San Vicente	Hiyong Creek	perennial creek in extensive farmland and secondary vegetation	12°37'27"N, 121°22'48"E	147
THF	Roxas, San Vicente	Hiyong Fall	small fall of perennial creek in extensive farmland and secondary vegetation	12°37'32"N, 121°22'47"E	150
TIR1	Roxas, San Vicente, Taugad Diit	lower Taugad Diit River	slightly disturbed river in extensive farmland and secondary vegetation	12°37'32"N, 121°22'17"E	180
TR1	Roxas, San Vicente Proper	Taugad River	slightly disturbed lowland river in extensive farmland and secondary vegetation	12°37'07"N, 121°23'37"E	95
TR2	Roxas, San Vicente	upper Taugad River	mountain river in secondary vegetation and forest	12°37'18"N, 121°22'58"E	140
TUC	Roxas, San Vicente	"unnamed" creek (Fig. 2D)	small intermittent creek in secondary forest	12°37'38"N, 121°22'38"E	154
TWC	Roxas, San Vicente Proper	"community water source" creek"	perennial mountain creek in secondary forest	12°37'01"N, 121°23'18"E	150

The main sampling method used was handpicking with the use of a hand-held net to collect the aquatic bugs. Some of the specimens had also been collected using a black light trap (L) or in emergence traps (E) as described by Freitag (2004).

In the label data of the material, the codes mentioned before for the collecting sites are followed by a single minor letter for the microhabitats (Fig. 3) listed and encoded in Table 2.

Table 2.

Microhabitat codes for samples as used in the result section.

Microhabitat code	Description
a	littoral sand/gravel in running sections of the stream/river
b	mud/sand/fine gravel in littoral pool sections with stagnant or very slow-moving water connected to the stream/river (Fig. 3B)
c	stream bottom gravel in running sections of the stream/river (Fig. 3C)
d	leaf packs in running and riffle sections of the stream/river (Fig. 3D)
e	leaf litter/CPOM in isolated side pools or residual pool (separated from stream)

Microhabitat code	Description
f	submerged wood in running and riffle sections of the stream/river
g	solid rock surfaces in riffle and running sections of the stream/river (Fig. 3F)
h	root packs/grass bunches in running sections of the stream/river (Fig. 3G)
j	hygropetric rocks
k	CPOM/leaf litter in small side rivulets connected to the mainstream (Fig. 3E)
m	gravel/sand in shallow, sun-exposed side pools or residual pool (separated from stream)
t	littoral gravel/sand/mud deposits of side pools or residual pool (separated from stream) (Fig. 3A)
u	water plants inside pools or residual pool (separated from stream)
y	water surface (neustic) of calm water sections (pool)
z	water surface (neustic) of running and riffle water sections (Fig. 3H)



Figure 1. [doi](#)

Sampling sites at northern Mindoro (Baco, Puerto Galera). **A.** the first author sampling at site 396; **B.** Tagbinai Malaki River (305); **C.** Tukuran River at "Hidden Paradise" (303); **D.** lower Dulangan River (356).



Figure 2. [doi](#)

Sampling sites at the Baroc River basin (Roxas, southern Mindoro). **A.** lower Baroc River (BR3); **B.** Hinundungan River from Hinagdanan Falls (HR2); **C.** upper Taugad Daka River (TDR4); **D.** small tributary of the Taugad River (TUC).

Handling of Material Collected

Specimens collected were preserved in 96% ethanol and stored (-20°C) prior to identification. Morphological examination was done using a dissecting microscope (LEICA EZ4) and a compound microscope (OLYMPUS SZ61). The habitus images were produced using a Canon EOS 6D with macro lens and a stack rack. This stacking of images was operated using Helicon Remote and Helicon Focus. The figures were generated then processed with Adobe Photoshop.

Identification keys and other relevant literature were used for the taxa as stated in the respective taxonomic sections. In some cases, loaned type material from the Natural History Museum Vienna, Austria (NHMW) was used for comparison. The dissected parts and actual specimen were glued on to entomological papers, while some were stored in the vial with ethanol. All material is labelled and kept at the collections of the Biodiversity Laboratory, Ateneo de Manila University (ADMU), National Museum of the Philippines,

Museum of Natural History, Manila, Philippines (NMP) and the Museum für Naturkunde Berlin, Germany (ZMB).



Figure 3. [doi](#)

Microhabitats sampled with their respective label codes, as listed above. **A.** side pool with mineral deposits (“t”); **B.** littoral pool with mineral deposits (“b”); **C.** bottom gravel in running water (“c”); **D.** leaf packs trapped in riffles (“d”); **E.** leaf litter in rivulet (“k”); **F.** rock surface in riffle (“g”); **G.** root packs in running water (“h”); **H.** neustic in running water (“z”).

Taxon treatments

Ranatra sp.

Materials

- a. scientificName: *Ranatra* sp.; island: Mindoro; country: Philippines; municipality: Puerto Galera; locationRemarks: 305g; eventDate: 22.06.2017; individualCount: 2 males (ma)
- b. scientificName: *Ranatra* sp.; island: Mindoro; country: Philippines; municipality: Baco; locationRemarks: 353e; eventDate: 24.08.2017; individualCount: 1 female (ma)

Taxon discussion

This still unnamed new species (Fig. 4A) of the *Ranatra gracilis* Dallas, 1850 group (see Dallas 1850, Lansbury 1972) will be described and discussed further in an upcoming paper by Tran and Zettel (in prep.).

Habitat

Specimens were found in both flowing and calm littoral sections of shallow streams, such as in Fig. 1B. See Fig. 5 for current records.

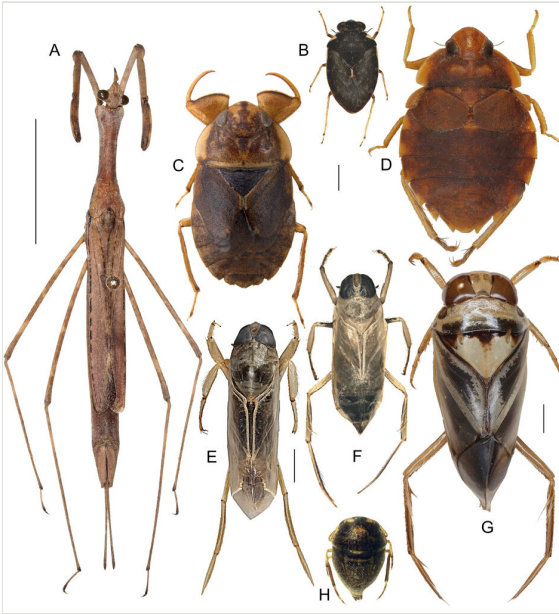


Figure 4. [doi](#)

Habitus illustrations of Nepomorpha of Mindoro **A.** *Ranatra* sp. (*R. gracilis* group); **B.** *Ochterus polhemusi*; **C.** *Asthenocoris luzonensis paradisiensis*; **D.** *Aphelocheirus* (s.str) *freitagii*; **E.** *Anisops kuroiwae*; **F.** *Anisops rhomboides*; **G.** *Enithares martini mindoroensis*; **H.** *Hydrotrepes stereoides mindoroensis*. Scale bars **A** 10 mm **B–H** 1 mm. **A & C** © NHMW Hemiptera Image Collection / photo: H. Bruckner, printed with permission.

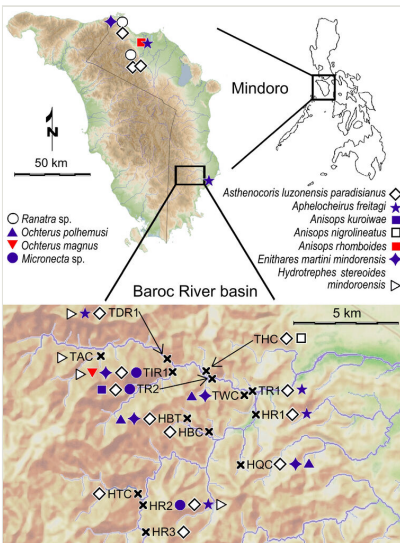


Figure 5. [doi](#)

Distribution of the collecting sites of Nepomorpha material treated in this study.

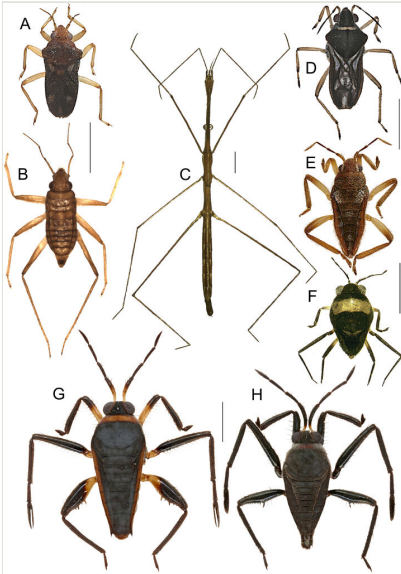


Figure 6. [doi](#)

Selected habitus illustrations of Gerromorpha of Mindoro **A.** *Hebrus* sp.; **B.** *Mesovelvia vittigera*; **C.** *Hydrometra mindoroensis*; **D.** *Microvelia douglasi*; **E.** *Pseudovelvia* cf. *curvata*; **F.** *Strongylovelia mindoroensis*; **G.** *Rhagovelia mindoroensis*; **H.** *Rhagovelia raddai*. Scale bars 1 mm.

Ochterus magnus Gapud & San Valentin, 1977

Material

- a. scientificName: *Ochterus magnus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TIRj; eventDate: 05.07.2017; individualCount: 3 males (ma)

Distribution

This is the first record of *O. magnus* Gapud & San Valentin, 1977 (see Gapud and San Valentin 1977) from Mindoro (Fig. 5). The species is Philippine-endemic, previously only known from Luzon – Mt. Makiling, Laguna; Humayao Creek, Cavite; Quezon; and in La Union (Gapud 2002).

Taxon discussion

Refer to Gapud (1986) for identification.

Habitat

The specimens were found on wet rocks.

Ochterus polhemusi Gapud, 1981

Materials

- a. scientificName: *Ochterus polhemusi*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HBT(E); eventDate: 21.09.2017; individualCount: 1 female (ma)
- b. scientificName: *Ochterus polhemusi*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HQCK; eventDate: 21.09.2017; individualCount: 3 males (ma)
- c. scientificName: *Ochterus polhemusi*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HQC(E); eventDate: 28.09.2017; individualCount: 1 female (ma)
- d. scientificName: *Ochterus polhemusi*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TWCj; eventDate: 23.09.2017; individualCount: 4 males (ma)

Distribution

This species (Fig. 4B) is widely distributed in the Philippines. See Fig. 5 for our additional records.

Taxon discussion

Refer to Gapud (1981) for identification. In Mindoro, three species of *Ochterus* Latreille, 1807 are recorded so far, *O. marginatus* (Latreille, 1804) ssp. *insularis* Rieger, 1977, *O. polhemusi* Gapud, 1981 and *O. philippinensis* Kormilev, 1971 (Kormilev 1971, Gapud 1995, Gapud 2002).

Habitat

We collected specimens in emergence traps spanned over littoral portions of small streams, on hydropetric rocks and along small rivulets. The species is generally found in banks of streams, ponds, lakes, freshwater marshlands and in association with waterfalls. It is also found in substrates that are muddy or sandy.

Micronecta sp.

Materials

- a. scientificName: *Micronecta* sp.; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HR2(L); eventDate: 31.06.2017; individualCount: 18 males (ma)
- b. scientificName: *Micronecta* sp.; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TR1(L); eventDate: 13.07.2017; individualCount: 4 males (ma)
- c. scientificName: *Micronecta* sp.; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TR2(L); eventDate: 21.06.2017; individualCount: 2 males (ma)
- d. scientificName: *Micronecta* sp.; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TR2(L); eventDate: 20.08.2018; individualCount: 1 female (ma)

Taxon discussion

The species cannot be identified yet because the examination of comparative type material is needed, which is currently inaccessible. Nieser and Chen (2003) described four species from the Philippines but the Mindoro specimens differ from those.

Habitat

All specimens were collected using a light trap, so their habitat cannot be accurately described. However, species of *Micronecta* Kirkaldy, 1897 are usually found in stagnant or shallow, slowly flowing waters (Nieser 1999). See Fig. 5 for current records, amongst them is site HR2 (Fig. 2B).

Asthenocoris luzonensis paradisianus Zettel & Nieser, 1999

Materials

- a. scientificName: *Asthenocoris luzonensis paradisianus*; island: Mindoro; country: Philippines; municipality: Puerto Galera; locationRemarks: 303b2; eventDate: 06/07/2017; individualCount: 1 female (bra)
- b. scientificName: *Asthenocoris luzonensis paradisianus*; island: Mindoro; country: Philippines; municipality: Baco; locationRemarks: 310c; eventDate: 08/22/2017; individualCount: 1 female (bra)
- c. scientificName: *Asthenocoris luzonensis paradisianus*; island: Mindoro; country: Philippines; municipality: Baco; locationRemarks: 312f1; eventDate: 08/22/2017; individualCount: 1 female (bra)
- d. scientificName: *Asthenocoris luzonensis paradisianus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HBCa; eventDate: 06/20/2017; individualCount: 1 female (bra)
- e. scientificName: *Asthenocoris luzonensis paradisianus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HBTc; eventDate: 07/05/2017; individualCount: 1 female (bra)
- f. scientificName: *Asthenocoris luzonensis paradisianus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HQCc; eventDate: 06/16/2017; individualCount: 1 female (bra)
- g. scientificName: *Asthenocoris luzonensis paradisianus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HQCc; eventDate: 06/30/2017; individualCount: 18 males (bra), 1 female (bra)
- h. scientificName: *Asthenocoris luzonensis paradisianus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HQCh; eventDate: 09/26/2017; individualCount: 2 males (bra)
- i. scientificName: *Asthenocoris luzonensis paradisianus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HR1c; eventDate: 06/17/2017; individualCount: 3 males (bra)
- j. scientificName: *Asthenocoris luzonensis paradisianus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HR1c; eventDate: 07/08/2017; individualCount: 5 males (bra), 1 female (bra)
- k. scientificName: *Asthenocoris luzonensis paradisianus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HR2c; eventDate: 07/03/2017; individualCount: 2 males (bra)

- l. scientificName: *Asthenocoris luzonensis paradisianus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HR2d; eventDate: 12/06/2017; individualCount: 3 males (bra)
- m. scientificName: *Asthenocoris luzonensis paradisianus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HR3c; eventDate: 31.06.2017; individualCount: 1 female (bra)
- n. scientificName: *Asthenocoris luzonensis paradisianus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HR3c; eventDate: 03/31/2018; individualCount: 1 female (bra)
- o. scientificName: *Asthenocoris luzonensis paradisianus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HTCc; eventDate: 07/03/2017; individualCount: 1 female (bra)
- p. scientificName: *Asthenocoris luzonensis paradisianus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HTCf; eventDate: 12/28/2017; individualCount: 1 female (bra)
- q. scientificName: *Asthenocoris luzonensis paradisianus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TDR1c; eventDate: 06/18/2017; individualCount: 2 males (bra), 1 female (bra)
- r. scientificName: *Asthenocoris luzonensis paradisianus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TDR1f; eventDate: 07/08/2017; individualCount: 1 female (bra)
- s. scientificName: *Asthenocoris luzonensis paradisianus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TDR1f; eventDate: 06/18/2017; individualCount: 1 female (bra)
- t. scientificName: *Asthenocoris luzonensis paradisianus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TDR1f; eventDate: 09/22/2017; individualCount: 1 female (bra)
- u. scientificName: *Asthenocoris luzonensis paradisianus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TDR1c; eventDate: 04/04/2018; individualCount: 1 female (bra)
- v. scientificName: *Asthenocoris luzonensis paradisianus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: THCf; eventDate: 06/23/2017; individualCount: 1 female (bra)
- w. scientificName: *Asthenocoris luzonensis paradisianus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: THCd; eventDate: 11/17/2017; individualCount: 2 males (bra)
- x. scientificName: *Asthenocoris luzonensis paradisianus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TIR1d; eventDate: 12/05/2017; individualCount: 1 female (bra)
- y. scientificName: *Asthenocoris luzonensis paradisianus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TIR1d; eventDate: 09/22/2017; individualCount: 2 males (bra)
- z. scientificName: *Asthenocoris luzonensis paradisianus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TR1h; eventDate: 07/02/2017; individualCount: 2 males (bra), 1 female (bra)
- aa. scientificName: *Asthenocoris luzonensis paradisianus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TR1d; eventDate: 09/22/2017; individualCount: 1 female (bra)

- ab. scientificName: *Asthenocoris luzonensis paradisianus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TR2f; eventDate: 06/14/2017; individualCount: 3 males (bra)
- ac. scientificName: *Asthenocoris luzonensis paradisianus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TR2c; eventDate: 07/03/2017; individualCount: 3 males (bra)
- ad. scientificName: *Asthenocoris luzonensis paradisianus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TR2d; eventDate: 07/07/2017; individualCount: 2 males (bra), 1 female (bra)
- ae. scientificName: *Asthenocoris luzonensis paradisianus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TR2h; eventDate: 11/17/2017; individualCount: 2 males (bra)

Distribution

This subspecies is endemic to Mindoro (Zettel et al. 1999). See Fig. 5 for new records.

Taxon discussion

For identification, refer to the key by Zettel et al. (1999), a habitus illustration is provided in Fig. 4C. The genus *Asthenocoris* is endemic to the Philippines (Zettel et al. 1999). All material treated in here is brachypterous.

Habitat

Asthenocoris luzonensis paradisianus Zettel & Nieser, 2009 Fig. 4C is found in middle-sized streams running through secondary rainforest (Fig. 2B), as well as large, fast flowing streams, partly in secondary vegetation (Fig. 1C), but then only downstream of forested areas (Zettel et al. 1999). The specimens were retrieved in more or less fast flowing water from several substrates, foremost gravel, but also wood, leaf litter and root packs (Fig. 3G).

Aphelocheirus freitagii Zettel & Pangantihon, 2010

Materials

- a. scientificName: *Aphelocheirus freitagii*; island: Mindoro; country: Philippines; municipality: Baco; locationRemarks: 356c; eventDate: 29.08.2017; individualCount: 1 (N)
- b. scientificName: *Aphelocheirus freitagii*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: BR3m; eventDate: 04.12.2017; individualCount: 2 (NN)
- c. scientificName: *Aphelocheirus freitagii*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: BR3b; eventDate: 22.07.2017; individualCount: 7 males (bra)
- d. scientificName: *Aphelocheirus freitagii*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HR1e; eventDate: 17.06.2017; individualCount: 4 males (bra)
- e. scientificName: *Aphelocheirus freitagii*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HR2e; eventDate: 03.07.2017; individualCount: 1 female (bra)
- f. scientificName: *Aphelocheirus freitagii*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TDR1c; eventDate: 18.06.2017; individualCount: 1 female (bra)

- g. scientificName: *Aphelocheirus freitagi*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TR1f2; eventDate: 21.08.2017; individualCount: 1 (N)

Distribution

Aphelocheirus freitagi Zettel and Pangantihon, 2010 (see Zettel and Pangantihon 2010) (Fig. 4D) is endemic to Mindoro and was previously only known from its type locality, Malayas River in Victoria, Oriental Mindoro (Zettel and Pangantihon 2010). Here we present the first records from Baco and Roxas (Fig. 5).

Taxon discussion

For identification, refer to Zettel and Pangantihon (2010).

Habitat

Aphelocheirus species Westwood, 1883 thrives in rather large, fast flowing rivers (Fig. 1D; Fig. 2A and B) with substrates consisting of a mixture of gravel and sand. The species is a typical benthic bottom dweller.

Anisops kuroiwae Matsumura, 1915

Material

- a. scientificName: *Anisops kuroiwae*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TR2(L); eventDate: 03.07.2017; individualCount: 1 male (ma)

Distribution

The species (Fig. 4E) is known from Luzon, Catanduanes, Leyte, Mindoro (with an additional record, see Fig. 5), Negros, Palawan, Burias, Bohol, Panay, Samar, Siargao and Mindanao (Zettel et al. 2012). It is also a widespread species in the Oriental realm with records from India, southern China, Iriomote (off Japan), Melaka, and Batu Berendam, Malaysia (Nieser 2004).

Taxon discussion

For identification, refer to the key by Zettel (2003a) and the original description (Matsumura 1915).

Habitat

The single specimen was collected using a light trap not allowing for a specific microhabitat association. In general, representatives of this genus are found in isolated side pools (Fig. 3A) of streams and other stagnant water bodies (Zettel 2003a).

***Anisops nigrolineatus* Lundblad, 1933**

Material

- a. scientificName: *Anisops nigrolineatus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: THCT; eventDate: 25.06.2017; individualCount: 1 male (ma)

Distribution

Anisops nigrolineatus Lundblad, 1933 (see Lundblad 1933) is widely distributed from India, Myanmar, Thailand, Brunei, Java and up to the Philippines (Zettel et al. 2012), with only a single previous record from Sibuyan Island (Nieser and Chen 1999). This is the first record from Mindoro Island (Fig. 5).

Taxon discussion

For identification, refer to the key by Zettel (2003a).

Habitat

The specimen was found in a small side pool near a slow-flowing stream.

***Anisops rhomboides* Nieser & Chen, 1999**

Material

- a. scientificName: *Anisops rhomboides*; island: Mindoro; country: Philippines; municipality: Baco; locationRemarks: 353u1; eventDate: 24.08.2017; individualCount: 4 males (ma), 3 (NN)

Distribution

The species (Fig. 4F) is recorded from Brunei, Borneo, Sulawesi and the Philippines (Nieser and Chen 1999, Chen et al. 2005). Previous Philippine records refer to Leyte, Mindanao, Palawan and Tawi Tawi (Zettel et al. 2012). This is the first record from Mindoro (Fig. 5).

Taxon discussion

For identification, refer to the key by Zettel (2003a). Its specific epithet, *rhomboides*, refers to the lozenge-shaped fossa on the tylus (Nieser and Chen 1999), which is a good character for identification.

Habitat

Anisops rhomboides Nieser & Chen, 1999 (see Nieser and Chen 1999) is found in a variety of shallow, stagnant freshwater bodies, such as lakes, ponds, carabao puddles, marsh land and moats (Nieser and Chen 1999).

***Enithares martini mindoroensis* Nieser & Zettel, 1999**

Materials

- a. scientificName: *Enithares martini mindoroensis*; island: Mindoro; country: Philippines; municipality: Puerto Galera; locationRemarks: 304b; eventDate: 07/25/2017; individualCount: 1 female (ma)
- b. scientificName: *Enithares martini mindoroensis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HBTk; eventDate: 09/21/2017; individualCount: 1 female (ma)
- c. scientificName: *Enithares martini mindoroensis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HQCe; eventDate: 06/30/2017; individualCount: 6 males (ma)
- d. scientificName: *Enithares martini mindoroensis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HQCb; eventDate: 06/30/2017; individualCount: 4 males (ma)
- e. scientificName: *Enithares martini mindoroensis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TIRe; eventDate: 07/10/2017; individualCount: 1 female (ma)
- f. scientificName: *Enithares martini mindoroensis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TIRb; eventDate: 09/22/2017; individualCount: 1 female (ma)
- g. scientificName: *Enithares martini mindoroensis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TWCy; eventDate: 06/25/2017; individualCount: 2 males (ma)
- h. scientificName: *Enithares martini mindoroensis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TWCb; eventDate: 09/23/2017; individualCount: 1 female (ma)

Distribution

This species (Fig. 4G) is widely distributed in the Philippines, but the subspecies is endemic to Mindoro (Nieser and Zettel 1999). See Fig. 5 for the new records.

Taxon discussion

For identification, refer to the key by Nieser and Zettel (1999).

Habitat

Enithares martini mindoroensis Nieser & Zettel, 1999 (see Nieser and Zettel 1999) can be found in calm shores and connected and isolated pools on the banks of streams (Nieser and Zettel 1999, current study).

Hydrotrepes stereoides mindoroensis Zettel, 2003

Materials

- a. scientificName: *Hydrotrepes stereoides mindoroensis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HR2f; eventDate: 07/03/2017; individualCount: 13 males (ma)
- b. scientificName: *Hydrotrepes stereoides mindoroensis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TACb; eventDate: 07/09/2017; individualCount: 2 males (ma)
- c. scientificName: *Hydrotrepes stereoides mindoroensis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TDR1f; eventDate: 09/22/2017; individualCount: 2 males (ma)
- d. scientificName: *Hydrotrepes stereoides mindoroensis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TIR1b; eventDate: 07/10/2017; individualCount: 3 males (ma)

Distribution

The subspecies (Fig. 4H) is endemic to Mindoro Island. See Fig. 5 for new records. Other *Hydrotrepes stereoides* Zettel, 2003 (see Zettel 2003b) subspecies occur in north and central Luzon, namely ssp. *montanus* and ssp. *stereoides*.

Taxon discussion

For identification, refer to the key by Zettel (2003b).

Habitat

Hydrotrepes stereoides Zettel, 2003 is mainly associated with lentic sections of running waters, swimming actively at the edges of plant material, rarely benthic in running waters. We found most specimens attached to wood in clean mountain rivers.

Hebrus philippinus Zettel, 2006

Materials

- a. scientificName: *Hebrus philippinus*; island: Mindoro; country: Philippines; municipality: Puerto Galera; locationRemarks: 302j; eventDate: 25.06.2017; individualCount: 1 female (ma)
- b. scientificName: *Hebrus philippinus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HBTj; eventDate: 05.07.2017; individualCount: 1 female (ma)
- c. scientificName: *Hebrus philippinus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: THFj; eventDate: 07.07.2017; individualCount: 5 males (ma)
- d. scientificName: *Hebrus philippinus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TIR1b; eventDate: 22.09.2017; individualCount: 7 males (ma)
- e. scientificName: *Hebrus philippinus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TR1j; eventDate: 13.07.2017; individualCount: 1 female (ma)
- f. scientificName: *Hebrus philippinus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TR2j; eventDate: 07.07.2017; individualCount: 2 males (ma)

- g. scientificName: *Hebrus philippinus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TR2j; eventDate: 23.09.2017; individualCount: 3 males (ma)
- h. scientificName: *Hebrus philippinus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TWCj; eventDate: 23.09.2017; individualCount: 5 males (ma)

Distribution

The species is widely distributed in the Philippines, except for Palawan. This is the first record of this species in Mindoro (Fig. 7). It was previously recorded from Biliran, Bohol, Camiguin, Catanduanes, Cebu, Leyte, Luzon, Masbate, Mindanao, Negros, Panay, Polillo, Poro, Samar and Siquijor (Zettel 2006).

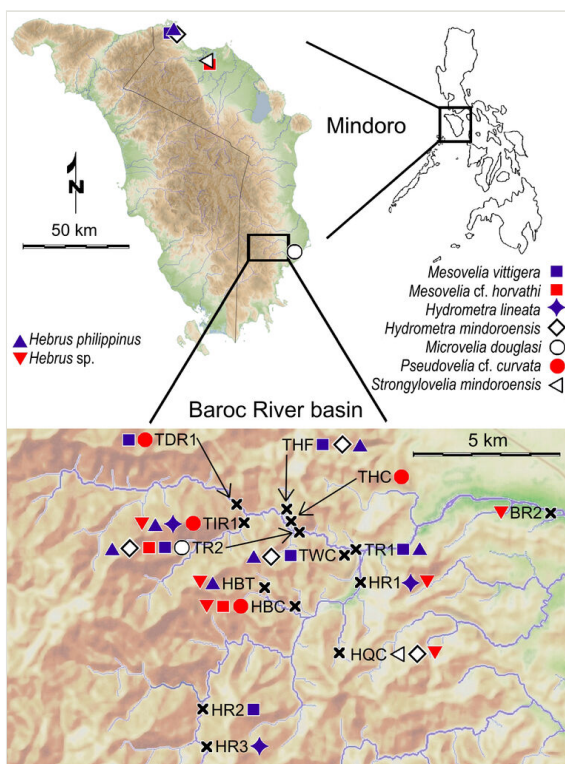


Figure 7. [doi](#)

Distribution of the collecting sites of Gerrhomorpha material (part 1) treated in this study.

Taxon discussion

For identification, see Zettel (2006). The parameres have long setae both in the lateral and apical portions. Most of the species have straight parameres and only few were directed mesally. In contrast to the *Hebrus harrisi* complex, this species has a less distinct endocorium with only a small and elongate white spot. All specimens examined were macropterous.

Habitat

Hebrus philippinus Zettel, 2006 (see Zettel 2006) is quite euryoecious and can also thrive in anthropologically-disturbed habitats. It is commonly found on the banks of running waters and more rarely in nearby stagnant waters. Unlike other *Hebrus* species, it is often found in sunny and dry areas. We obtained most records from hygropetric microhabitats.

Hebrus sp.

Materials

- a. scientificName: *Hebrus* sp; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: BR2b; eventDate: 29.12.2017; individualCount: 1 female (ma)
- b. scientificName: *Hebrus* sp; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HBCg; eventDate: 30.06.2017; individualCount: 2 males (ma)
- c. scientificName: *Hebrus* sp; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HBTb; eventDate: 12.08.2017; individualCount: 1 female (ma)
- d. scientificName: *Hebrus* sp; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HBT(E); eventDate: 21.09.2017; individualCount: 2 males (ma)
- e. scientificName: *Hebrus* sp; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HQCk; eventDate: 21.09.2017; individualCount: 1 female (ma)
- f. scientificName: *Hebrus* sp; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HQCb; eventDate: 21.09.2017; individualCount: 5 males (ma)
- g. scientificName: *Hebrus* sp; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HR1a; eventDate: 01.07.2017; individualCount: 1 female (ma)
- h. scientificName: *Hebrus* sp; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TIR1b; eventDate: 22.09.2017; individualCount: 1 female (ma)

Taxon discussion

The *Hebrus harrisi* complex is discussed by Zettel (2004a), Zettel (2006). Due to the lack of specimens for comparison, our material (Fig. 6A) cannot be identified to species level. All specimens examined were macropterous.

Habitat

The specimens (Fig. 7) were found at the banks of more or less fast flowing sections of rivers of small to medium size.

Mesovelgia cf. *horvathi* Lundblad, 1933

Materials

- a. scientificName: *Mesovelgia* cf. *horvathi*; island: Mindoro; country: Philippines; municipality: Baco; locationRemarks: 353u; eventDate: 24.08.2017; individualCount: 1 female (ap)
- b. scientificName: *Mesovelgia* cf. *horvathi*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HBCb; eventDate: 08.07.2017; individualCount: 6 males (ap)

- c. scientificName: *Mesovelvia cf. horvathi*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TR2j; eventDate: 08.07.2017; individualCount: 1 female (ap)
- d. scientificName: *Mesovelvia cf. horvathi*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TR2e; eventDate: 10.08.2017; individualCount: 2 males (ap)
- e. scientificName: *Mesovelvia cf. horvathi*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TR2b; eventDate: 23.09.2017; individualCount: 1 female (ap)

Distribution

Mesovelvia horvathi (s.l.) Lundblad, 1933 (see Lundblad 1933) was reported from Australia, China, India, Indonesia, Japan, Malaysia, Philippines (see Fig. 7 for new records), Sri Lanka, Singapore, Thailand, and Vietnam (Lundblad 1937, Chandra and Jehamalar 2011, Yang and Murphy 2011, Zettel 2014).

Taxon discussion

For identification, refer to the key by Yang and Murphy (2011). More recently, Jehamalar et al. (2019) have shown that *Mesovelvia horvathi* consists of a complex of closely-related species. At least two species of this complex occur in the Philippines. Their correct names remain uncertain. As a result, we refrain from concluding that the previous records from other areas in the Philippines and specimens in this study are indeed *M. horvathi*.

Habitat

Mesovelvia horvathi Lundblad, 1933 is common in plains and mountains in stagnant, slow flowing and even in brackish water (Yang and Murphy 2011). We found the species in similar, partly identical habitats like *Mesovelvia vittigera*, but so far, never syntopic with the former species.

Mesovelvia vittigera Horváth, 1895

Materials

- a. scientificName: *Mesovelvia vittigera*; island: Mindoro; country: Philippines; municipality: Puerto Galera; locationRemarks: 305a; eventDate: 24.06.2017; individualCount: 1 female (ap)
- b. scientificName: *Mesovelvia vittigera*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HR2; eventDate: 03.07.2017; individualCount: 1 female (ap)
- c. scientificName: *Mesovelvia vittigera*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TDR1b; eventDate: 05.07.2017; individualCount: 4 males (ap)
- d. scientificName: *Mesovelvia vittigera*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: THFj; eventDate: 07.07.2017; individualCount: 4 males (ap)
- e. scientificName: *Mesovelvia vittigera*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TR1b; eventDate: 13.07.2017; individualCount: 11 female (ap)
- f. scientificName: *Mesovelvia vittigera*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TR2j; eventDate: 23.09.2017; individualCount: 1 female (ap)
- g. scientificName: *Mesovelvia vittigera*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TWCb; eventDate: 06.07.2017; individualCount: 2 males (ap)

- h. scientificName: *Mesovelia vittigera*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TWCj; eventDate: 23.09.2017; individualCount: 2 males (ap)

Distribution

The species (Fig. 6B) is widely distributed in the tropics and subtropics of the Old World, including the Philippines (Zettel 2014). See Fig. 7 for additional records.

Taxon discussion

For identification, refer to the key by Yang and Murphy (2011). All specimens examined were apterous.

Habitat

Mesovelia species are commonly found amongst marginal vegetation in standing waters of ponds and streams. *Mesovelia vittigera* Horváth, 1895 (see Horváth 1895) can also be found in brackish-water habitats (Yang and Murphy 2011). We found several specimens on shaded, wet rocks and at the stream littoral with mineral substrates (Fig. 1B).

Hydrometra lineata Eschscholtz, 1822

Materials

- a. scientificName: *Hydrometra lineata*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HR1b; eventDate: 01.07.2017; individualCount: 1 female (ma)
- b. scientificName: *Hydrometra lineata*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HR3y; eventDate: 21.06.2017; individualCount: 1 female (ma)
- c. scientificName: *Hydrometra lineata*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TIR1b; eventDate: 30.06.2017; individualCount: 2 males (ma)

Distribution

Hydrometra lineata Eschscholtz, 1822 (see Eschscholtz 1822) is widely distributed in the Philippines (see Fig. 7 for new records), the Oriental Realm, Wallacea and New Guinea (Polhemus and Lansbury 1997, Gapud et al. 2003).

Taxon discussion

For identification, refer to the key by Gapud et al. (2003). All specimens examined were macropterous.

Habitat

The species is often found in large stagnant water bodies and rarely seen in running waters; however, all our samples are from stream banks.

***Hydrometra mindoroensis* Polhemus, 1976**

Materials

- a. scientificName: *Hydrometra mindoroensis*; island: Mindoro; country: Philippines; municipality: Puerto Galera; locationRemarks: 305h; eventDate: 24.06.2017; individualCount: 1 female (ma)
- b. scientificName: *Hydrometra mindoroensis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HQCy; eventDate: 30.06.2017; individualCount: 1 female (ap)
- c. scientificName: *Hydrometra mindoroensis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HQCb; eventDate: 21.09.2017; individualCount: 5 males (ap, ma)
- d. scientificName: *Hydrometra mindoroensis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: THFj; eventDate: 07.07.2017; individualCount: 1 female (ap)
- e. scientificName: *Hydrometra mindoroensis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TR2j; eventDate: 08.07.2017; individualCount: 1 female (ma)
- f. scientificName: *Hydrometra mindoroensis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TWC2y; eventDate: 25.06.2017; individualCount: 1 female (ap)

Distribution

Hydrometra mindoroensis Polhemus, 1976 (in Polhemus and Reisen 1976) (Fig. 6C) is a widespread species in the Philippines and neighbouring areas (Borneo, Sulawesi, New Guinea) (Polhemus and Lansbury 1997, Gapud et al. 2003).

Taxon discussion

For identification, refer to the key by Gapud et al. (2003).

Habitat

This species can be found in both stagnant waters and edges of streams and rivers (Gapud et al. 2003). We found the species in shaded hygropteretic sites and at stream banks with mineral and organic substrates (Fig. 1B).

***Microvelia douglasi* Scott, 1874**

Materials

- a. scientificName: *Microvelia douglasi*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: BR3m; eventDate: 08.07.2017; individualCount: 1 female (ap)
- b. scientificName: *Microvelia douglasi*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TR2e; eventDate: 23.09.2017; individualCount: 10 males (ma), 18 males (ap)

Distribution

This species (Fig. 6D), which was originally described from Japan (Scott 1874), is widely distributed in the Oriental, Australian and Melanesian Regions reaching eastwards to the remote islands of the West Pacific Region (Andersen and Weir 2003). See Fig. 7 for the additional records.

Taxon discussion

See Andersen et al. (2002) for identification. The species is rarely collected in the Island.

Habitat

The species was found on stream banks, specifically in side pools (Fig. 3B), such as at site BR3 (Fig. 2A).

Pseudovelgia cf. *curvata* Hecher, 2006

Materials

- a. scientificName: *Pseudovelgia* cf. *curvata*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HBCg; eventDate: 30.06.2017; individualCount: 2 males (ap)
- b. scientificName: *Pseudovelgia* cf. *curvata*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TDR1h; eventDate: 04.07.2017; individualCount: 1 female (ap)
- c. scientificName: *Pseudovelgia* cf. *curvata*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: THCe; eventDate: 07.07.2017; individualCount: 1 female (ap)
- d. scientificName: *Pseudovelgia* cf. *curvata*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TIR1b; eventDate: 22.09.2017; individualCount: 6 males (ap)

Distribution

The typical form is only known from the Mountain Province in northern Luzon (Hecher 2006). See Fig. 7 for the collecting sites of the slightly varying Mindoro material.

Taxon discussion

The specimens (Fig. 6E) closely resemble those of *Pseudovelgia curvata* Hecher, 2006 following the key in Hecher (2006), displaying the following characters: first metatarsal segment devoid of a tuft of very long setae basally; first and second metatarsal segment with a row of long setae over entire length; and metatarsus about half as long as metatibia. However, the pygophore of males has long, bristle-like setae on its caudo-lateral margin like *P. gapudi* Hecher, 2006. Given the lack of any records, except for the specimens in hand and the type material from northern Luzon, it must remain

unsolved if the material is conspecific or represents a new, but related species. This variation is only recognised in our specimens from Mindoro.

Habitat

The specimens were found at banks of creeks and rivers, both in calm and flowing sections.

***Strongylovelia mindoroensis* Lansbury & Zettel, 1997**

Materials

- a. scientificName: *Strongylovelia mindoroensis*; island: Mindoro; country: Philippines; municipality: Baco; locationRemarks: 353u; eventDate: 24.08.2017; individualCount: 3 males (ma)
- b. scientificName: *Strongylovelia mindoroensis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HQCy; eventDate: 21.09.2017; individualCount: 2 males (ma, ap)

Distribution

Strongylovelia mindoroensis Lansbury & Zettel, 1997 (see Lansbury and Zettel 1997) (Fig. 6F) is endemic to Mindoro and only known from the type locality in Puerto Galera (Lansbury and Zettel 1997) and our records from Baco and Roxas (Fig. 7).

Taxon discussion

For identification, refer to the key by Zettel (2003c).

Habitat

The species was found in slow flowing water and a residual pool with floating plants.

***Rhagovelia mindoroensis* Zettel, 1994**

Materials

- a. scientificName: *Rhagovelia mindoroensis*; island: Mindoro; country: Philippines; municipality: Puerto Galera; locationRemarks: 304b; eventDate: 24.06.2017; individualCount: 2 males (ap)
- b. scientificName: *Rhagovelia mindoroensis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HR3e; eventDate: 19.06.2017; individualCount: 1 female (ma)
- c. scientificName: *Rhagovelia mindoroensis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TDR1y; eventDate: 23.06.2017; individualCount: 2 males
- d. scientificName: *Rhagovelia mindoroensis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TDR4y; eventDate: 04.07.2017; individualCount: 1 female (ap)

- e. scientificName: *Rhagovelia mindoroensis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: THCy; eventDate: 29.06.2017; individualCount: 1 female (ma)
- f. scientificName: *Rhagovelia mindoroensis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TWCt; eventDate: 25.06.2017; individualCount: 1 female (ma)

Distribution

Rhagovelia mindoroensis (Fig. 6G) is an endemic species in Mindoro (Zettel 1994). See Fig. 8 for our additional records.

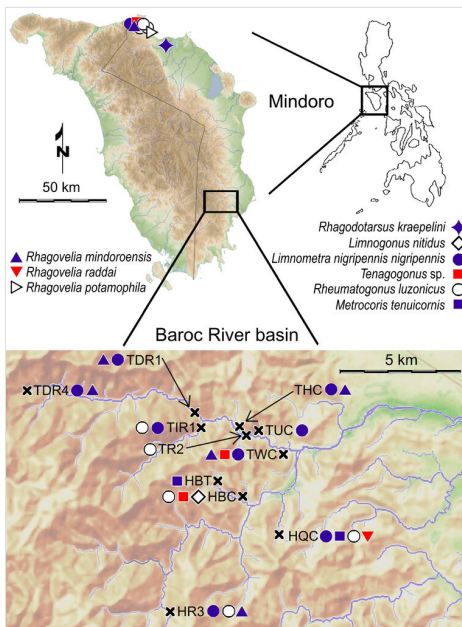


Figure 8. [doi](#)

Distribution of the collecting sites of Gerromorpha material (part 2) treated in this study.

Taxon discussion

For identification, see Zettel (1994).

Habitat

Rhagovelia mindoroensis Zettel, 1994 (see Zettel 1994) is usually found in secondary forests and in anthropogenic terrains close to the coast. They particularly inhabit still waters sections of streams (Zettel 1994). We also found it in small side pools of medium-sized rivers and creeks. The collection at site TDR4 (Fig. 2C) at 700 m altitude is surprising.

***Rhagovelia raddai* Zettel, 1994**

Materials

- a. scientificName: *Rhagovelia raddai*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HQCz; eventDate: 30.06.2017; individualCount: 4 males (ap)
- b. scientificName: *Rhagovelia raddai*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HQCy; eventDate: 23.09.2017; individualCount: 4 males (ma)

Distribution

Rhagovelia raddai Zettel, 1994 (see Zettel 1994) (Fig. 6H) is endemic to Mindoro (Zettel 1994). See Fig. 8 for additional records.

Taxon discussion

For identification, see Zettel (1994).

Habitat

The species is commonly found in moderately fast flowing creeks and lotic sections of the river (Zettel 1994), such as in our study.

***Rhagovelia potamophila* Zettel, 1996**

Material

- a. scientificName: *Rhagovelia potamophila*; island: Mindoro; country: Philippines; municipality: Puerto Galera; locationRemarks: 305z; eventDate: 22.06.2017; individualCount: 2 males (ma)

Distribution

Rhagovelia potamophila Zettel, 1996 (see Zettel 1996) is endemic to Mindoro (Freitag and Pangantihon 2010). We present one additional record (Fig. 8).

Taxon discussion

For identification, see Zettel (1996), a habitus illustration is provided in Freitag and Pangantihon (2010).

Habitat

The specimens were found neustic on flowing water near root packs of a small river in a rural area (Fig. 1B).

***Rhagadotarsus (Rhagadotarsus) kraepelini* Breddin, 1905**

Material

- a. scientificName: *Rhagadotarsus (Rhagadotarsus) kraepelini*; island: Mindoro; country: Philippines; municipality: Baco; locationRemarks: 353u1; eventDate: 24.08.2017; individualCount: 4 males (ap)

Distribution

Rhagadotarsus (Rhagadotarsus) kraepelini Breddin, 1905 (see Breddin 1905) is a widespread species in southern and south-eastern Asia and Micronesia (Polhemus and Karunaratne 1993). In the Philippines, *R. kraepelini* is distributed throughout the country, but the limits of its distribution in the Philippines are still unclear (Zettel 2014). See Fig. 8 for the additional record.

Taxon discussion

For identification, refer to the key by Polhemus and Karunaratne (1993).

Habitat

The specimens were found amongst floating water plants in a residual pool of a dried-up lowland creek in a rural area.

***Limnogonus nitidus* (Mayr, 1865)**

Material

- a. scientificName: *Limnogonus nitidus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HBCy; eventDate: 08.07.2017; individualCount: 3 males (ap), 4 males (ma)

Distribution

The species (Fig. 9A) is widespread in the Philippines, Maldives, India, Sri Lanka, southern China and Indonesia (Damgaard et al. 2014), with the first records from Cambodia recently documented by Zettel et al. (2017). See Fig. 8 for our additional records.

Taxon discussion

Refer to Cheng et al. (2001) for the identification.

Habitat

In the Oriental realm, most species of *Limnogonus* Stål, 1868 prefer sheltered places in standing waters, which makes them somewhat gregarious. *Limnogonus nitidus* (Mayr, 1865) (see Mayr 1865) and *L. fossarum* (Fabricius, 1775) (see Fabricius 1775) are

probably the only Oriental species of the genus that successfully colonise intermittent habitats.

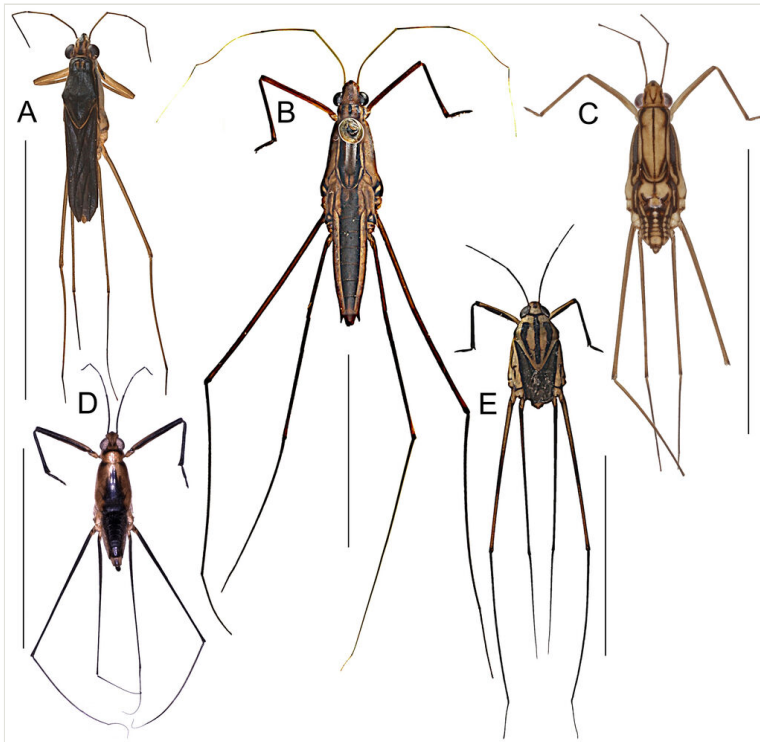


Figure 9. [doi](#)

Selected habitus illustrations of Gerromorpha of Mindoro **A.** *Limnogonus nitidus*; **B.** *Limnometra nigripennis nigripennis*; **C.** *Tenagogonus* sp. (mutilated specimen); **D.** *Rheumatogonus luzonicus*; **E.** *Metrocoris tenuicornis*. Scale bars 10 mm.

Limnometra nigripennis nigripennis Mayr, 1865

Materials

- a. scientificName: *Limnometra nigripennis nigripennis*; island: Mindoro; country: Philippines; municipality: Puerto Galera; locationRemarks: 304b; eventDate: 07/24/2017; individualCount: 1 female (ap)
- b. scientificName: *Limnometra nigripennis nigripennis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HQCb; eventDate: 06/30/2017; individualCount: 2 males (ma)
- c. scientificName: *Limnometra nigripennis nigripennis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HQCc; eventDate: 06/30/2017; individualCount: 3 males (ma), 1 female (ap)
- d. scientificName: *Limnometra nigripennis nigripennis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TDR1b; eventDate: 06/23/2017; individualCount: 3 males (ap)

- e. scientificName: *Limnometra nigripennis nigripennis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TDR4c; eventDate: 07/04/2017; individualCount: 1 female (ap)
- f. scientificName: *Limnometra nigripennis nigripennis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: THCb; eventDate: 06/25/2017; individualCount: 1 female (ap)
- g. scientificName: *Limnometra nigripennis nigripennis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: THCb; eventDate: 06/29/2017; individualCount: 1 female (ma)
- h. scientificName: *Limnometra nigripennis nigripennis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TIR1b; eventDate: 09/22/2017; individualCount: 5 males (ap), 1 female (ap)
- i. scientificName: *Limnometra nigripennis nigripennis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HR3e; eventDate: 06/19/2017; individualCount: 4 males (ma)
- j. scientificName: *Limnometra nigripennis nigripennis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TUCb; eventDate: 11/17/2017; individualCount: 1 female (ap)
- k. scientificName: *Limnometra nigripennis nigripennis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TWCt; eventDate: 06/25/2017; individualCount: 2 males (ma)
- l. scientificName: *Limnometra nigripennis nigripennis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TWCb; eventDate: 09/23/2017; individualCount: 3 males (ap)

Distribution

Limnometra nigripennis nigripennis Mayr, 1865 (see Mayr 1865) (Fig. 9B) is endemic and widespread in the Philippines. Records are available from Biliran, Bohol, Camiguin, Guimaras, Leyte, Luzon, Mindanao, Mindoro (see Fig. 8 for our additional records), Negros, Panay, Polillo, Sibuyan, Tablas, Ticao, as well as unpublished records from Masbate (Zettel 2014 and references therein).

Taxon discussion

For identification, refer to Zettel (2004b).

Habitat

Limnometra nigripennis Mayr 1865 is amongst the most widespread and abundant Gerrromorpha of Philippine running waters (Zettel 2004b, Zettel 2014). It exhibits higher tolerance to environmental disturbances in streams than other species. However, we recorded it predominantly from clean streams (Fig. 2C, D). Lentic sections of very small to medium-sized streams and pools associated with running water are its typical habitats (Zettel 2014).

Tenagogonus* sp.*Materials**

- a. scientificName: *Tenagogonus* sp.; island: Mindoro; country: Philippines; municipality: Puerto Galera; locationRemarks: 301y; eventDate: 22.06.2017; individualCount: 2 males (ap)
- b. scientificName: *Tenagogonus* sp.; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HBCy; eventDate: 08.07.2017; individualCount: 1 female (ap)
- c. scientificName: *Tenagogonus* sp.; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TWCy; eventDate: 25.06.2017; individualCount: 1 female (ap)

Taxon discussion

This genus is in need of revision (Zettel 2014). The specimens (Fig. 9C) probably belong to a new species related to *Tenagogonus bergrothi* Hungerford & Matsuda, 1958 (see Hungerford and Matsuda 1958), from Luzon. The genus is widespread throughout the Afrotropical, Oriental and Australian Regions, extending eastwards up to Fiji (Damgaard et al. 2014). Fifteen species are known in the Malesian Region, including the Philippines (Chen et al. 2005).

Habitat

The collected specimens were found in small forest streams, a common habitat of representatives of the genus.

Rheumatogonus luzonicus* (Kirkaldy, 1909)*Materials**

- a. scientificName: *Rheumatogonus luzonicus*; island: Mindoro; country: Philippines; municipality: Puerto Galera; locationRemarks: 301y; eventDate: 22.06.2017; individualCount: 4 males (ap)
- b. scientificName: *Rheumatogonus luzonicus*; island: Mindoro; country: Philippines; municipality: Puerto Galera; locationRemarks: 305y; eventDate: 24.06.2017; individualCount: 4 males (ap), 1 female (ap)
- c. scientificName: *Rheumatogonus luzonicus*; island: Mindoro; country: Philippines; municipality: Puerto Galera; locationRemarks: 396y; eventDate: 02.07.2017; individualCount: 2 males (ap)
- d. scientificName: *Rheumatogonus luzonicus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HBCb; eventDate: 08.07.2017; individualCount: 1 female (ap)
- e. scientificName: *Rheumatogonus luzonicus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HQCz; eventDate: 30.06.2017; individualCount: 6 males (ap)
- f. scientificName: *Rheumatogonus luzonicus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HQCy; eventDate: 30.06.2017; individualCount: 3 males (ap)

- g. scientificName: *Rheumatogonus luzonicus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HR3b; eventDate: 31.06.2017; individualCount: 7 males (ap)
- h. scientificName: *Rheumatogonus luzonicus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TIRb; eventDate: 22.09.2017; individualCount: 1 female (ap)
- i. scientificName: *Rheumatogonus luzonicus*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: TR2y; eventDate: 25.02.2017; individualCount: 6 males (ap)

Distribution

Rheumatogonus luzonicus (Kirkaldy, 1909) (see Kirkaldy 1909) (Fig. 9D) is endemic to the Philippines and has been recorded from Luzon, Mindanao, Mindoro (Freitag and Pangantihon 2010, see Fig. 8 for additional records), Negros and Panay (Chen and Nieser 2002). Some unpublished records from Catanduanes, Marinduque, Sibuyan, Ticao, Cebu, Samar, Leyte, Mindanao, Siquijor and Poro have also been recognised belonging to this species (Zettel 2014).

Taxon discussion

For identification, refer to Chen and Nieser (2002).

Habitat

The specimens were collected from the surface and littoral of calm and moderately fast flowing creeks and medium-sized rivers (Fig. 1A, B). In general, *Rheumatogonus* Kirkaldy, 1909 species inhabit mountain streams, creeks and waterfalls in the Oriental Region, specifically the shaded, steady slow-lotic sections of such watercourses (Chen et al. 2005).

Metrocoris tenuicornis Esaki, 1926

Materials

- a. scientificName: *Metrocoris tenuicornis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HBTb; eventDate: 12.08.2017; individualCount: 1 female (ap)
- b. scientificName: *Metrocoris tenuicornis*; island: Mindoro; country: Philippines; municipality: Roxas; locationRemarks: HQCy; eventDate: 21.09.2017; individualCount: 3 males (ap, ma)

Distribution

Metrocoris tenuicornis Esaki, 1926 (see Esaki 1926) (Fig. 9E) is a widespread species in western India, southern China, mainland southeast Asia, Sumatra, Java and Borneo, but only known so far from Mindoro and Greater Palawan, in the Philippines (Chen and Nieser 1993, Freitag and Zettel 2012).

Taxon discussion

For identification, refer to Chen and Nieser (1993).

Habitat

Quiet bays of smoothly-flowing streams and the edge of large rocks in the middle of streams are the preferred habitats of *Metrocoris* Mayr, 1865 species (Chen and Nieser 1993), such as the records presented here (Fig. 8).

Checklist of the Nepomorpha of Mindoro

Genus *Ranatra* Fabricius, 1790

Distribution: Philippine-endemic

Notes: undescribed species

Ochterus polhemusi Gapud, 1981

- GBIF <https://www.gbif.org/species/9451187>

Distribution: Philippine-endemic

Ochterus magnus Gapud & San Valentin, 1977

- GBIF <https://www.gbif.org/species/9564741>

Distribution: Philippine-endemic

Notes: new Mindoro record

Ochterus marginatus subsp. *insularis* Rieger, 1977

- GBIF <https://www.gbif.org/species/9636304>

Distribution: Philippine-endemic

Ochterus philippinensis Gapud, 1977

- GBIF <https://www.gbif.org/species/9344209>

Distribution: Philippine-endemic

Micronecta quadririgata Breddin, 1905

- GBIF <https://www.gbif.org/species/4781040>

Genus *Micronecta* Kirkaldy, 1897

Notes: unidentified species

***Asthenocoris luzonensis* subsp. *paradisianus* Zettel & Nieser, 1999**

- GBIF <https://www.gbif.org/species/9414246>

Distribution: Mindoro-endemic

***Aphelocheirus (Aphelocheirus) freitagii* Zettel & Pangantihon, 2010**

- GBIF <https://www.gbif.org/species/9307826>

Distribution: Mindoro-endemic

***Anisops kuroiwae* Matsumura, 1915**

- GBIF <https://www.gbif.org/species/2020497>

***Anisops nigrolineatus* Lundblad, 1933**

- GBIF <https://www.gbif.org/species/10548908>

Notes: new Mindoro record

***Anisops rhomboides* Nieser & Chen, 1999**

- GBIF <https://www.gbif.org/species/9030290>

Notes: new Mindoro record

***Anisops stali* Kirkaldy, 1897**

- GBIF <https://www.gbif.org/species/4780156>

***Nychia sappho* Kirkaldy, 1901**

- GBIF <https://www.gbif.org/species/5813019>

***Enithares bakeri* Brooks, 1948**

- GBIF <https://www.gbif.org/species/8823438>

***Enithares martini* subsp. *mindoroensis* Nieser & Zettel, 1999**

- GBIF <https://www.gbif.org/species/10363548>

Distribution: Mindoro-endemic

***Hydrotrepes stereoides* subsp. *mindoroensis* Zettel, 2003**

- GBIF <https://www.gbif.org/species/9598999>

Distribution: Mindoro-endemic

Checklist of the Gerromorpha of Mindoro

***Hebrus haddeni* Porter, 1954**

- GBIF <https://www.gbif.org/species/9464372>

Distribution: Philippine-endemic

***Hebrus hoberlandti* Porter, 1959**

- GBIF <https://www.gbif.org/species/9015705>

Distribution: Philippine-endemic

Notes: unpublished records as stated by Zettel (2014)

***Hebrus philippinus* Zettel, 2006**

- GBIF <https://www.gbif.org/species/9619952>

Distribution: Philippine-endemic

Notes: new Mindoro record

Genus *Hebrus* Curtis, 1833

Notes: unidentified species of the *H. harrisi* complex

***Mesovelia* cf. *horvathi* Lundblad, 1933**

Notes: Possibly an undescribed species of the *M. horvarti* complex

***Mesovelia vittigera* Horváth, 1895**

***Hydrometra julienni* Hungerford & Evans, 1934**

***Hydrometra lineata* Eschscholtz, 1822**

- GBIF <https://www.gbif.org/species/9293320>

***Hydrometra mindoroensis* Polhemus, 1976**

- GBIF <https://www.gbif.org/species/9615221>

***Hydrometra orientalis* Lundblad, 1933**

- GBIF <https://www.gbif.org/species/9499832>

***Microvelia douglasi* Scott, 1874**

- GBIF <https://www.gbif.org/species/6130046>

***Pseudovelvia cf. curvata* Hecher, 2006**

Notes: New Mindoro record, varies slightly from the typical form from north Luzon

***Halovelvia bergrothi* Esaki, 1926**

- GBIF <https://www.gbif.org/species/6454022>

***Halovelvia esakii* Andersen, 1989**

- GBIF <https://www.gbif.org/species/6454007>

***Haloveloides christyae* Zettel, 1998**

- GBIF <https://www.gbif.org/species/8159203>

Distribution: Philippine-endemic

***Strongylovelia mindoroensis* Lansbury & Zettel, 1997**

- GBIF <https://www.gbif.org/species/9240789>

Distribution: Mindoro-endemic

Genus *Xenobates* Esaki, 1930

Notes: unidentified species as stated by Pangantihon et al. (2016)

***Angilia philippiensis* Drake & Hoberlandt, 1953**

- GBIF <https://www.gbif.org/species/9304493>

Distribution: Philippine-endemic

***Rhagovelia cotabatoensis* Hungerford & Matsuda, 1961**

Distribution: Philippine-endemic

Notes: unpublished records as stated by Zettel (2014)

***Rhagovelia mindoroensis* Zettel, 1994**

- GBIF <https://www.gbif.org/species/9348222>

Distribution: Mindoro-endemic

***Rhagovelia potamophila* Zettel, 1996**

- GBIF <https://www.gbif.org/species/9281967>

Distribution: Mindoro-endemic

***Rhagovelia raddai* Zettel, 1994**

- GBIF <https://www.gbif.org/species/9396752>

Distribution: Mindoro-endemic

***Rhagadotarsus (Rhagadotarsus) kraepelini* Breddin, 1905**

- GBIF <https://www.gbif.org/species/5866044>

***Aquarius philippinensis* Zettel & Ruiz, 2003**

- GBIF <https://www.gbif.org/species/9739670>

Distribution: Philippine-endemic

***Limnogonus hungerfordi* Andersen, 1975**

- GBIF <https://www.gbif.org/species/4773682>

***Limnogonus nitidus* (Mayr, 1865)**

- GBIF <https://www.gbif.org/species/8114430>

***Limnometra ciliata* Mayr, 1865**

- GBIF <https://www.gbif.org/species/9688002>

***Limnometra nigripennis* subsp. *nigripennis* Mayr, 1865**

- GBIF <https://www.gbif.org/species/9731155>

Distribution: Philippine-endemic

***Limnometra rossii* Hungerford & Matsuda, 1958**

- GBIF <https://www.gbif.org/species/9790486>

Distribution: Mindoro-endemic

Genus *Tenagogonus* Stål, 1853***Rheumatogonus luzonicus* (Kirkaldy, 1909)**

- GBIF <https://www.gbif.org/species/9684453>

Distribution: Philippine-endemic

***Halobates calyptus* Herring, 1961**

- GBIF <https://www.gbif.org/species/6453976>

***Halobates maculatus* Schadow, 1922**

- GBIF <https://www.gbif.org/species/6453984>

***Metrocoris tenuicornis* Esaki, 1926**

- GBIF <https://www.gbif.org/species/9764735>

Discussion

Fifty-one species of Gerromorpha and Nepomorpha are known from Mindoro, of which 29 were documented in this study. Four of them were new records to the Island, namely *Anisops nigrolineatus*, *Anisops rhomboides*, *Ochterus magnus* and *Hebrus philippinus*. Some of the remaining species/subspecies are common and widespread in the Philippines and neighbouring areas, while nine are endemic to Mindoro (see checklists above). In addition, at least three species are likely to be new to science, although we refrain from a formal description here.

As generally observed in the Philippines and adjacent areas, Veliidae (riffle bugs) and Gerridae (true water striders) are the most speciose families. With the two new records of *Anisops*, Notonectidae are also surprisingly diverse.

The biogeographic history of the Island is partly reflected by the species assemblages, especially in terms of a good number of island-endemic species. Unlike many other Philippine Islands of marine origin, Mindoro belongs to the so-called Palawan Microcontinental Block, a fragment of the Eurasian continental margin (Hall 2002). This is, however, not notably reflected in the current species composition of water bugs, since more recent dispersal and species radiation mechanisms might have had more impact on the current species distribution. Amongst the taxa treated here, only *Metrocoris tenuicornis* Esaki, 1926 (see Esaki 1926) has a distinct Palawan-Mindoro distribution range in the Philippines (although it is widely distributed in southeast Asia). An unusual pattern is observed for some closely-related species/subspecies of the *Rhagovelia papuensis* Lundblad, 1936 (see Lundblad 1936) group, of which two different subspecies of *Rhagovelia kawakamii* (Matsumura, 1913) (see Matsumura 1913) are distributed in either Borneo and Palawan or Taiwan and Luzon, respectively, but missing on Mindoro Island, where it is replaced by the closely-related *R. mindoroensis* (Zettel et al. 2020).

Despite their close vicinity to Luzon, the Islands remained always disconnected during the Quaternary (Hall 2002). Nevertheless, Mindoro and the eastern Philippine Islands share a large proportion of water bugs.

Amongst the species of the checklist that were unambiguously identified, 20% are endemic to Mindoro, another 28% Philippine-endemic, making almost half of all species endemic to the country. The island-endemism rate is slightly lower than in Palawan, with one-third endemism amongst aquatic and semi-aquatic bugs (Freitag and Zettel 2012). This is likely due to the closer vicinity of Mindoro to other intra-Philippine biogeographic regions - notably Luzon - enabling easier dispersal across sea barriers.

In this study, special emphasis was given to the collection in lotic systems, which might have led to an under-representation of typical pond- and lake-dwelling species. Nevertheless, stream-associated lentic microhabitats, such as side pools and residual pools, were sampled in most collecting sites. Representatives of the genera *Anisops*, *Enithares*, *Hydrometra*, *Micronecta*, *Microvelia* and *Ranatra* are typically found there, but also *Rhagadotarsus kraepelini* (which is usually a pond or lake dweller) (Freitag and Pangantihon 2010, current study).

Worth noting is that hygropetric microhabitats are an important habitat for several, partly rare and endemic species, foremost of these being *Hebrus philippinus*, *Hydrometra mindoroensis*, *Mesovelia vittigera* and *Ochterus* spp. Such habitats are particularly threatened by deforestation and land-use changes since they are prone to drying up when not continuously fed with water from the forested areas or when they are fully exposed to direct sunlight.

Fast flowing or even torrent waters, on the other hand, are typically inhabited by species of *Aphelocheirus*, *Asthenocoris* and *Hydrotrepes*, as well as *Rhagovelia raddai* amongst the taxa treated here.

A few nepomorphan taxa are particularly attracted to light. *Micronecta* sp. and *Anisops kuroiwae* were only retrieved by black light traps in this study. Emergence traps rarely yield aquatic and riparian Heteroptera. We caught only very few specimens of *Ochterus polhemusi* and *Hebrus* sp. in such traps.

Acknowledgements

This project was partly funded by an Ateneo de Manila University Research Council Grant (URC 16-15), a Philippine Commission on Higher Education project (CHED-PHERNet program AdMU), and the School of Science and Engineering Industry 4.0 Research Fund (SI4-013). We would like to thank the Bureau of Fisheries and Aquatic Resources (BFAR) Manila for issuing a Gratuitous Permit, the local government units of Mindoro, the indigenous Buhid community in San Vicente, PENRO Calapan, SENRO Roxas and NCIP Oriental Mindoro for their prerequisite consent. We are also deeply grateful to the members of the Biodiversity Laboratory, Ateneo de Manila University (Jhoana Garces and Emmanuel Delocado) for their valued support during fieldwork in Puerto Galera and Roxas. Thanks are due to Angelito Felipe Puno, Quezon City, for his assistance in digital processing and background cleaning of several habitus illustrations. Two copyright-protected photographs of the NHMW Hemiptera Image Collection taken by Harald Bruckner were kindly provided and printed with permission. We would also like to extend our appreciation to Pensoft through the Biodiversity Conservation Society of the Philippines (BCSP) for sponsoring the conference proceedings. Gratitude is extended to the reviewers Felipe Moreira and Anh Duc Tran, as well as to the subject editor Laurence Livermore for their helpful comments.

The graduate study of several authors (AL Pelingen, KMD Aldaba, JM de Leon) is supported by the Department of Science and Technology - Science Education Institute (DOST-SEI).

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