

Aquatic Beetles Fauna in Nohwa and Bogil Islands, and *Copelatus parallelus* (Coleoptera: Dytiscidae) and *Scirtes sobrinus* (Coleoptera: Scirtidae) New to South Korea

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ABSTRACT

A faunistic list and distribution of aquatic beetles were given with two newly records, *Copelatus parallelus* Zimmermann, 1920 (family Dytiscidae) and *Scirtes sobrinus* Lewis, 1895 (family Scirtidae) from Nohwa and Bogil islands in South Korea. As a result, a total of 30 species belonging to 24 genera and eight families were recognized: 12 Dytiscidae species, eight Hydrophilidae species, three Halipidae species, two Scirtidae species, two Gyrinidae species, one Noteridae species, one Elmidae species, and one Psephenidae species. Composition and habitus photographs of all collected aquatic beetles, habitats, and the diagnostic characters of *C. parallelus* and *S. sobrinus* are provided.

Keywords: *Copelatus parallelus*, distribution, fauna, new record, *Scirtes sobrinus*, South Korea

INTRODUCTION

Aquatic insects have a wide variety of associations with aquatic ecosystems (streams, wetlands, etc.), including aquatic Coleoptera. Among the wide variety of Korean aquatic ecosystems, islands habitats and beetle fauna have been much less studied than inland freshwater systems. Aquatic Coleoptera are about 12,600 species described in the world so far (Jäch and Balke, 2008). They are playing an important role in freshwater and good indicators they inhabit (Devi et al., 2017). In Korea, aquatic and semi-aquatic beetles have been reported 186 species by Jung et al. (2011, 2018). Moreover, the Korean aquatic Coleoptera has been reviewed taxonomically (Jung et al., 2015, 2020; Lee et al., 2015; Lee and Ahn, 2015, 2016a, 2016b, 2016c, 2016d, 2017, 2018).

The Nohwa and Bogil islands are located to the southwest of the Korean peninsula, and covers a total area of about 37.0 km². These two islands are connected to a large bridge, with lots of small wetlands, ponds, paddy fields, and one stream (Buhwang stream, 2.97 km). Although Korean biodiversity survey for freshwater monitoring has been conducted since 1986, most researches have generally focused on

inland freshwater diversity, with much less attention given to islands fauna and their diversity. In previous studies, Kim and Jang (1982) studied the insect fauna of Wando island regions (76 species, 40 families, 7 orders), and Kim (1997) conducted a faunistic study for terrestrial insects of southern sea area of South Korea (66 species, 40 families, 7 orders), and Min and Kim (2015) recently studied the biodiversity of insects in Bogil island (243 species, 75 families, 11 orders).

In this present study, we provide faunistic, distribution, and composition of aquatic beetles in the Nohwa and Bogil islands, based on a comprehensive field investigation. Also, we herein report the discovery of *Copelatus parallelus* Zimmermann in Dytiscidae and *Scirtes sobrinus* Lewis in Scirtidae for the first time in South Korea.

MATERIALS AND METHODS

All materials were collected using hand net (30 cm × 30 cm, mesh size 1 mm), sweeping and light traps from 18 sites (stream, pond, wetland, reservoir, etc.) between Mar and Nov 2015. The collected specimens were preserved in 80%

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ethanol. Identification is based on morphological characters under the stereo- and light microscopes. Dorsal habitus were taken using a digital camera (Nikon D90, Tokyo, Japan) and the several images were combined using the Helicon Focus software ver. 6.8.0 Pro (Helicon Soft Ltd., 2000, Kharkiv, Ukraine), and edited using Adobe Photoshop CS6.

One female of *C. parallelus* and both male and female of *S. sobrinus* are deposited in the National Institute of Biological Resources (NIBR) in Incheon, Korea; other studied specimens are deposited in the DASARI Research Institute of BioResources in Daejeon, Korea.

Distributions of all sampled species were recorded based on doctoral thesis of aquatic Coleoptera (Jung, 2015; Lee, 2016).

The following abbreviations of provinces are used: CB (Chungcheongbuk-do), CN (Chungcheongnam-do), GB (Gyeongsangbuk-do), GG (Gyeonggi-do), GN (Gyeongsangnam-do), GW (Gangwon-do), JB (Jeollabuk-do), JN (Jeollanam-do), and JJ (Jeju-do).

Collecting sites (Nohwa (N) & Bogil (B) Islands)

- N1 (34°13'38.3"N, 126°34'6.0"E): Korea, JN, Wando-gun, Nohwa-eup, Gomak-ri.
- N2 (34°13'6.9"N, 126°34'42.7"E): Korea, JN, Wando-gun, Nohwa-eup, Sinyang-ri.
- N3 (34°12'05.9"N, 126°34'11.9"E): Korea, JN, Wando-gun, Nohwa-eup, Deungsan-ri.
- N4 (34°12'4.1"N, 126°34'22.5"E): Korea, JN, Wando-gun, Nohwa-eup, Deungsan-ri.
- N5 (34°12'21.8"N, 126°34'40.2"E): Korea, JN, Wando-gun, Nohwa-eup, Sinyang-ri.
- N6 (34°12'51.0"N, 126°35'18.1"E): Korea, JN, Wando-gun, Nohwa-eup, Guseok-ri.
- N7 (34°12'46.8"N, 126°36'39.4"E): Korea, JN, Wando-gun, Nohwa-eup, Dongcheon-ri.
- N8 (34°12'05.5"N, 126°36'39.9"E): Korea, JN, Wando-gun, Nohwa-eup, Dongcheon-ri.
- N9 (34°12'7.0"N, 126°35'58.3"E): Korea, JN, Wando-gun, Nohwa-eup, Guseok-ri.
- N10 (34°12'15.6"N, 126°35'29.8"E): Korea, JN, Wando-gun, Nohwa-eup, Guseok-ri.
- N11 (34°11'38.4"N, 126°35'32.5"E): Korea, JN, Wando-gun, Nohwa-eup, Chungdo-ri.
- N12 (34°11'33.1"N, 126°34'40.9"E): Korea, JN, Wando-gun, Nohwa-eup, Dongcheon-ri.
- B1 (34°10'11.29"N, 126°33'13.41"E): Korea, JN, Wando-gun, Bogil-myeon, Buhwang-ri.
- B2 (34°09'52.72"N, 126°33'19.99"E): Korea, JN, Wando-gun, Bogil-myeon, Buhwang-ri.
- B3 (34°09'02.28"N, 126°32'15.63"E): Korea, JN, Wando-gun,

Bogil-myeon, Buhwang-ri.

B4 (34°09'34.6"N, 126°33'08.4"E): Korea, JN, Wando-gun,

Bogil-myeon, Buhwang-ri.

B5 (34°09'07.66"N, 126°31'39.1"E): Korea, JN, Wando-gun,

Bogil-myeon, Buhwang-ri.

B6 (34°09'58.1"N, 126°32'21.5"E): Korea, JN, Wando-gun,

Bogil-myeon, Jeongja-ri.

RESULTS

In this study, a total of 30 species of water beetles in 24 genera belonging to eight families were investigated in Nohwa and Bogil Islands (Table 1, Fig. 1): 12 Dytiscidae species (40.00%), eight Hydrophilidae species (26.67%), three Haliplidae species (10.00%), two Scirtidae and two Gyrinidae species (6.67%) respectively, and one Noteridae, one Elmidae, and one Psephenidae species (3.33%) respectively. Among them, *Copelatus parallelus* Zimmermann in Dytiscidae and *Scirtes sobrinus* Lewis in Scirtidae are identified for the first time in South Korea.

Order Coleoptera Linnaeus, 1758

Family Gyrinidae Latreille, 1810

Genus *Dineutus* MacLeay, 1825

Type species: *Dineutus politus* MacLeay, 1825.

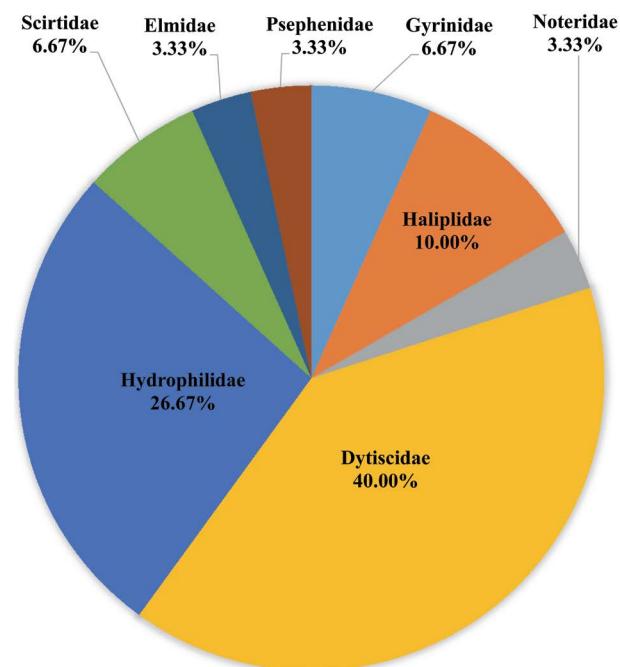


Fig. 1. Proportional diversity of water beetle families in Nohwa and Bogil Islands, South Korea.

Table 1. Faunistic list and distribution of the species of aquatic Coleoptera from Nohwa and Bogil Islands, South Korea

Scientific name	Occurred sites	
	Nohwa Island	Bogil Island
Family Gyrinidae		
1. <i>Dineutus orientalis</i> (Modeer, 1776)	N7, N8, N10	–
2. <i>Gyrinus gestroi</i> Régimbart, 1883	N3	B6
Family Haliplidae		
3. <i>Haliplus eximius</i> Clark, 1863	N8	–
4. <i>Haliplus simplex</i> Clark, 1863	N8	–
5. <i>Peltodytes sinensis</i> (Hope, 1845)	N3, N4, N5, N8, N11, N12	–
Family Noteridae		
6. <i>Noterus japonicus</i> Sharp, 1873	N8	B1, B6
Family Dytiscidae		
7. <i>Agabus japonicus</i> Sharp, 1873	–	B2, B6
8. <i>Agabus regimbarti</i> Zaitzev, 1906	N6	B6
9. <i>Ilybius apicalis</i> Sharp, 1873	N4, N6, N8, N10, N11	–
10. <i>Platambus ussuriensis</i> (Nilsson, 1996)	–	B6
11. <i>Rhantus suturalis</i> (Macleay, 1825)	N3, N4, N9	B6
12. <i>Copelatus japonicus</i> Sharp, 1884	–	B1, B6
13. <i>Copelatus parallelus</i> Zimmermann, 1920	–	B1
14. <i>Cybister lewisiensis</i> Sharp, 1873	–	B6
15. <i>Hydaticus grammicus</i> (Germar, 1827)	N3, N4	B6
16. <i>Hydrovatus subtilis</i> Sharp, 1882	N3, N11	–
17. <i>Hydroglyphus japonicus</i> (Sharp, 1873)	N3, N10, N11	–
18. <i>Leiodytes frontalis</i> (Sharp, 1884)	N5, N11	–
Family Hydrophilidae		
19. <i>Amphiops mater</i> Sharp, 1873	N1, N3, N8	–
20. <i>Berosus lewisiensis</i> Sharp, 1873	N3	–
21. <i>Laccobius binotatus</i> d'Orchymont, 1934	N3	B6
22. <i>Laccobius oscillans</i> Sharp, 1884	–	B2
23. <i>Hydrophilus accuminatus</i> Motschulsky, 1854	N3	–
24. <i>Sternolophus rufipes</i> (Fabricius, 1792)	N1, N2, N3, N4, N6, N7, N8, N9, N10, N11	B1, B3
25. <i>Enochrus simulans</i> (Sharp, 1873)	N1, N3, N5, N10	B1
26. <i>Enochrus esuriens</i> (Walker, 1858)	N3	B6
Family Scirtidae		
27. <i>Scirtes japonicus</i> (Kiesenwetter, 1874)	N5, N10	B6
28. <i>Scirtes sobrinus</i> Lewis, 1895	N3	–
Family Elmidae		
29. <i>Zaitzevia tushimana</i> Nomura, 1963	–	B2, B4
Family Psephenidae		
30. <i>Eubrianax ramicornis</i> Kiesenwetter, 1874	–	B1, B2, B4, B5, B6

1. *Dineutus orientalis* (Modeer, 1776) (Fig. 2A)

Distribution. South Korea (GB, GG, GW, JJ, JN), North Korea, China, Japan, Far East Russia.

Genus *Gyrinus* Müller, 1764

Type species: *Dytiscus natator* Linneaus, 1758.

2. *Gyrinus gestroi* Régimbart, 1883 (Fig. 2B)

Distribution. South Korea (JJ, JN), Japan.

Family Haliplidae Kirby, 1837

Genus *Haliplus* Latreille, 1802

Type species: *Dytiscus impressus* Fabricius, 1787.

3. *Haliplus eximius* Clark, 1863 (Fig. 2C)

Distribution. South Korea (GB, JJ, JN), North Korea, China, Japan, Indonesia, Vietnam.

4. *Haliplus simplex* Clark, 1863 (Fig. 2D)

Distribution. South Korea (CB, CN, GG, GN, GW JJ, JN), North Korea, China, Japan, Far East Russia.

Genus *Peltodytes* Régimbart, 1879
Type species: *Dytiscus caesus* Duftschmid, 1805.

5. *Peltodytes sinensis* (Hope, 1845) (Fig. 2E)

Distribution. South Korea (CB, CN, GB, GG, GN, GW, JB, JJ, JN), North Korea, China, Japan, Philippines, Taiwan, Vietnam.

Family Noteridae Thomson, 1860
Genus *Noterus* Clairville, 1806
Type species: *Dyticus crassicornis* Müller, 1776.

6. *Noterus japonicus* Sharp, 1873 (Fig. 2F)

Distribution. South Korea (CB, CN, GB, GG, GN, GW, JB, JJ, JN), China, Japan, Far East Russia.

Family Dytiscidae Leach, 1815
Genus *Agabus* Leach, 1817
Type species: *Dyticus serricornis* Paykull, 1799.

7. *Agabus japonicus* Sharp, 1873 (Fig. 2G)

Distribution. South Korea (CB, CN, GB, GG, GN, GW, JB, JJ, JN), China, Japan, Far East Russia, Taiwan.

8. *Agabus regimbarti* Zaitzev, 1906 (Fig. 2H)

Distribution. South Korea (CB, CN, GB, GG, GN, GW, JB, JJ, JN), North Korea, China, India.

Genus *Ilybius* Erichson, 1832
Type species: *Dyticus fenestratus* Fabricius, 1781.

9. *Ilybius apicalis* Sharp, 1873 (Fig. 2I)

Distribution. South Korea (CB, CN, GB, GG, GN, GW, JB, JJ, JN), China, Japan, Far East Russia.

Genus *Platambus* Thomson, 1859
Type species: *Dyticus maculatus* Linneaus, 1758.

10. *Platambus ussuriensis* (Nilsson, 1997) (Fig. 2J)

Distribution. South Korea (CB, CN, GB, GG, GW, JB, JN), China, Far East Russia.

Genus *Rhantus* Dejean, 1833
Type species: *Colymbetes pulverosus* Stephens, 1828.

11. *Rhantus suturalis* (Macleay, 1825) (Fig. 2K)

Distribution. South Korea (CB, CN, GB, GG, GN, GW, JB, JJ, JN), North Korea, China, Japan, Mongolia, Russia, North Africa, and Australian, Oriental, and Palaearctic regions.

Genus *Copelatus* Erichson, 1832
Type species: *Dytiscus posticatus* Fabricius, 1801.

12. *Copelatus japonicus* Sharp, 1884 (Fig. 2L)

Distribution. South Korea (JJ, JN), China, Japan, Taiwan.

13. *Copelatus parallelus* Zimmermann, 1920 (Fig. 2M, N) (Korean name: Nam-bang-deung-jul-mul-bang-gae)

Material examined. South Korea: 1♀, JN: Wando-gun, Bogil-myeon, Buhwang-ri, 28 Jul 2015, leg. Jung SW (NIBR: YYSSIN0000015547).

Diagnosis. Adults of *C. parallelus* can be distinguished from all Korean *Copelatus* species by the following characters: Body length 3.6 mm, small-sized; head reddish brown, with blackish marking medio-posteriorly between the eyes; antennomere 11 slightly longer than antennomere 10; pronotum black; elytra black with basal and apical testaceous band; each elytron with five striae and without submarginal stria; ventral surface black color except prosternum, middle parts of meso- and metaventrites, and abdominal ventrite II.

Distribution. South Korea (new record: JN), Japan.

Remarks. One female of *C. parallelus* was collected in shallow lentic area (Fig. 3A) with *C. japonicus* in Bogil island, South Korea. The holotype of *C. parallelus* has been reported by female and probably endemic to Japan (Zimmermann, 1920; Ohkura, 1957; Saito and Shiyake, 2004). In addition, immature stages and ecology of *C. parallelus* are described by Watanabe et al. (2017).

Genus *Cybister* Curtis, 1827
Type species: *Dytiscus lateralis* Fabricius, 1798.

14. *Cybister lewisi* Sharp, 1873 (Fig. 2O)

Distribution. South Korea (CB, CN, GB, JN), China, Japan.

Genus *Hydaticus* Leach, 1817
Type species: *Dytiscus transversalis* Pontoppidan, 1763.

15. *Hydaticus grammicus* (Germar, 1827) (Fig. 2P)

Distribution. South Korea (CB, CN, GB, GG, GN, GW, JB, JJ, JN), North Korea, China, Japan, and Palaearctic region (Iran, Kyrgyzstan, Kazakhstan, Turkmenistan, Uzbekistan).

Genus *Hydrovatus* Motschulsky, 1853
Type species: *Hyphydrus cupidatus* Kunze, 1818.

16. *Hydrovatus subtilis* Sharp, 1882 (Fig. 2Q)

Distribution. South Korea (CB, GB, GG, GN, JJ, JN), China, India, Indonesia, Japan, Laos, Malaysia, Taiwan, Thailand.

Genus *Hydroglyphus* Motschulsky, 1853
Type species: *Dytiscus geminus* Fabricius, 1792.

17. *Hydroglyphus japonicus* (Sharp, 1873) (Fig. 2R)

Distribution. South Korea (CB, CN, GB, GG, GN, GW, JB, JJ, JN), North Korea, China, Japan, Far East Russia.

Genus *Leiodytes* Guignot, 1936
Type species: *Hydroporus evanescens* Boheman, 1848.

18. *Leiodytes frontalis* (Sharp, 1884) (Fig. 2S)

Distribution. South Korea (GB, JJ, JN), Japan.

Family Hydrophilidae Latreille, 1802
Genus *Amphiops* Erichson, 1843
Type species: *Hydrophilus gibbus* Illiger, 1801.

19. *Amphiops mater* Sharp, 1873 (Fig. 2T)

Distribution. South Korea (CB, CN, GB, GG, GN, GW, JB, JJ, JN), China, Japan.

Genus *Berosus* Leach, 1817
Type species: *Dytiscus luridus* Linneaus, 1760.

20. *Berosus lewisi* Sharp, 1873 (Fig. 2U)

Distribution. South Korea (CB, CN, GB, GG, GN, GW, JB, JJ, JN), North Korea, China, Japan, Far East Russia, Taiwan.

Genus *Laccobius* Erichson, 1837
Type species: *Chrysomela minuta* Linneaus, 1758.

21. *Laccobius binotatus* Orchymont, 1934 (Fig. 2V)

Distribution. South Korea (CB, CN, GB, GG, GN, GW, JJ, JN), China, Far East Russia.

22. *Laccobius oscillans* Sharp, 1884 (Fig. 2W)

Distribution. South Korea (CB, GB, GG, GN, GW, JN), North Korea, China, Japan, Far East Russia.

Genus *Hydrophilus* Geoffroy, 1762

Type species: *Dytiscus piceus* Linneaus, 1758.

23. *Hydrophilus accuminatus* Motschulsky, 1854 (Fig. 2X)

Distribution. South Korea (CN, GB, GG, GN, GW, JB, JJ, JN), China, Japan, Far East Russia, Taiwan.

Genus *Sternolophus* Solier, 1834
Type species: *Sternolophus rufipes* Solier, 1834.

24. *Sternolophus rufipes* (Fabricius, 1792) (Fig. 2Y)

Distribution. South Korea (CB, CN, GB, GG, GN, JB, JJ, JN), China, Japan, India, Nepal, Taiwan.

Genus *Enochrus* Thomson, 1859
Type species: *Hydrophilus bicolor* Gyllenhal, 1808.

25. *Enochrus simulans* (Sharp, 1873) (Fig. 2Z)

Distribution. South Korea (CB, CN, GB, GG, GN, GW, JB, JJ, JN), North Korea, China, Japan, Far East Russia.

26. *Enochrus esuriens* (Walker, 1858) (Fig. 2AA)

Distribution. South Korea (JJ, JN), Bhutan, China, Iran, Iraq, Japan, Nepal, Pakistan, Saudi Arabia.

Family Scirtidae Fleming, 1821
Genus *Scirtes* Illiger, 1807
Type species: *Elodes hemisphaericus* Linnaeus, 1767.

27. *Scirtes japonicus* (Kiesenwetter, 1874) (Fig. 2BB)

Distribution. South Korea (CB, CN, GB, GG, GN, GW, JB, JJ, JN), North Korea, China, Japan, Russia, Taiwan.

**28. *Scirtes sobrinus* Lewis, 1895 (Fig. 2CC)
(Korean name: Al-kkot-byeo-ruk-sa-chon)**

Material examined. South Korea: 12♂♂13♀♀, JN: Wando-gun, Nohwa-eup, Deungsan-ri, 28 Jul 2015, leg. Jung SW; 5♂♂7♀♀, ditto but 8 Sep 2015.

Diagnosis. Adults of *S. sobrinus* can be distinguished from all Korean *Scirtes* species by the following characters: Body length 3.0–3.5 mm, oval shaped, black to blackish brown, shining, and strongly convex; head black and mouthpart brown; antennae stout, brown, and 11-segmented; antennomere 3 shortest; pronotum black and convex; scutellum large and subtriangular; elytra oval, convex, shining, and covered with short setae; legs short; fore- and middle legs yellowish brown; hind legs reddish brown; hind femora very large, with long hind tibial spurs; abdominal ventrite

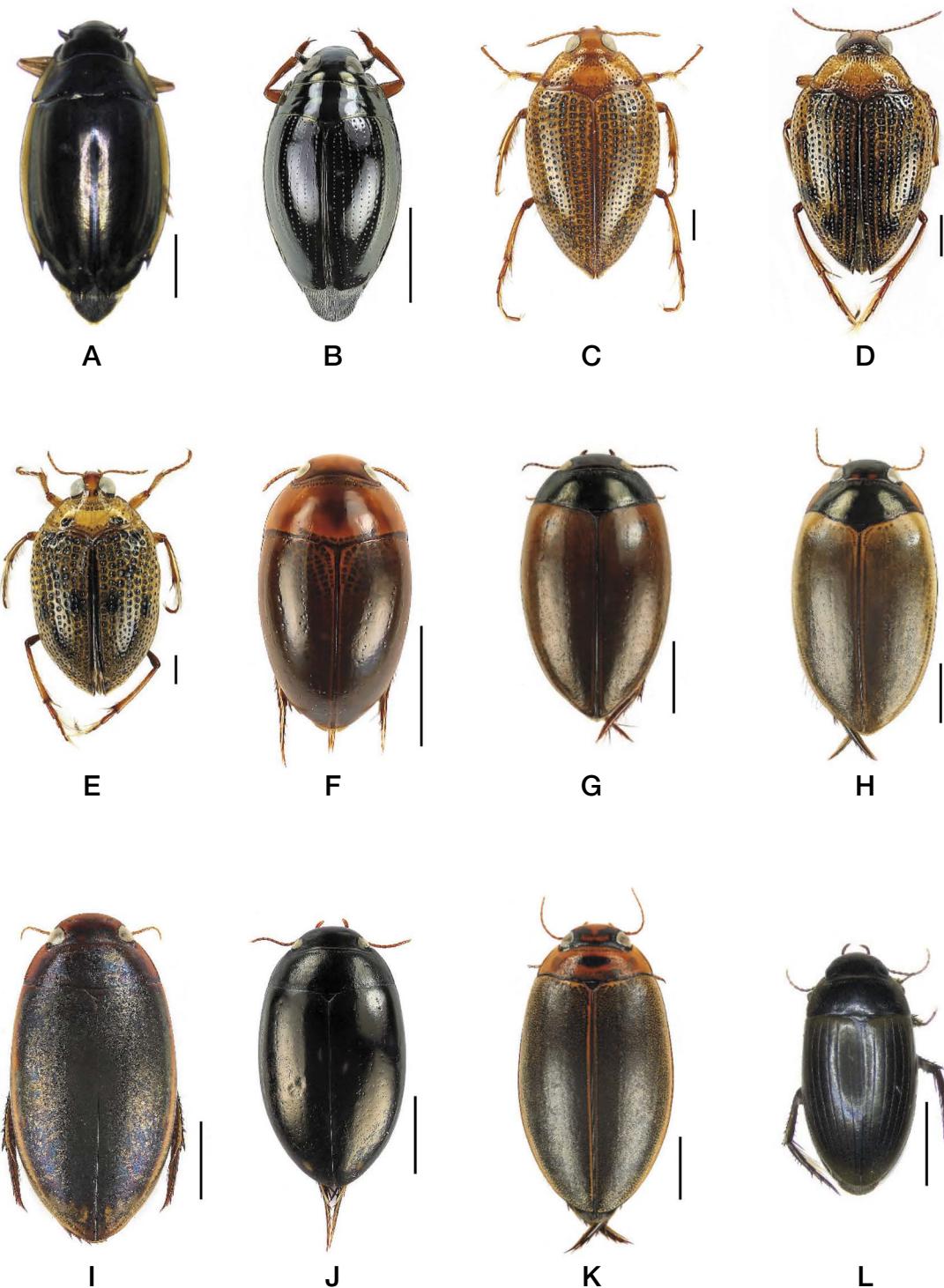


Fig. 2. Habitus photographs of water beetles of the Nohwa and Bogil Islands. Gyrinidae: A, *Dineutus orientalis*; B, *Gyrinus gestroi*. Halipidae: C, *Haliphus eximius*; D, *H. simplex*; E, *Peltodytes sinensis*. Noteridae: F, *Noterus japonicus*. Dytiscidae: G, *Agabus japonicus*; H, *A. regimbarti*; I, *Ilybius apicalis*; J, *Platambus ussuriensis*; K, *Rhantus suturalis*; L, *Copelatus japonicus*; M, *C. parallelus* (dorsal); N, ditto (ventral); O, *Cybister lewisianus*; P, *Hydaticus grammicus*; Q, *Hydrovatus subtilis*; R, *Hydroglyphus japonicus*; S, *Leiodytes frontalis*. Hydrophilidae: T, *Amphiops mater*; U, *Berosus lewisius*; V, *Laccobius binotatus*; W, *L. oscillans*; X, *Hydrophilus accuminatus*; Y, *Sternolophus rufipes*; Z, *Enochrus simulans*; AA, *E. esuriens*. Scirtidae: BB, *Scirtes japonicus*; CC, *Scirtes sobrinus*. Elmidae: DD, *Zaitzevia tushimana*. Psephenidae: EE, *Eubrianax ramicornis*. Scale bars: A, B, F-N, P, U, Y, Z, BB, CC, EE=2.0 mm, C-E, Q-T, V, W, AA, DD=0.5 mm, O=5.0 mm, X=10.0 mm.

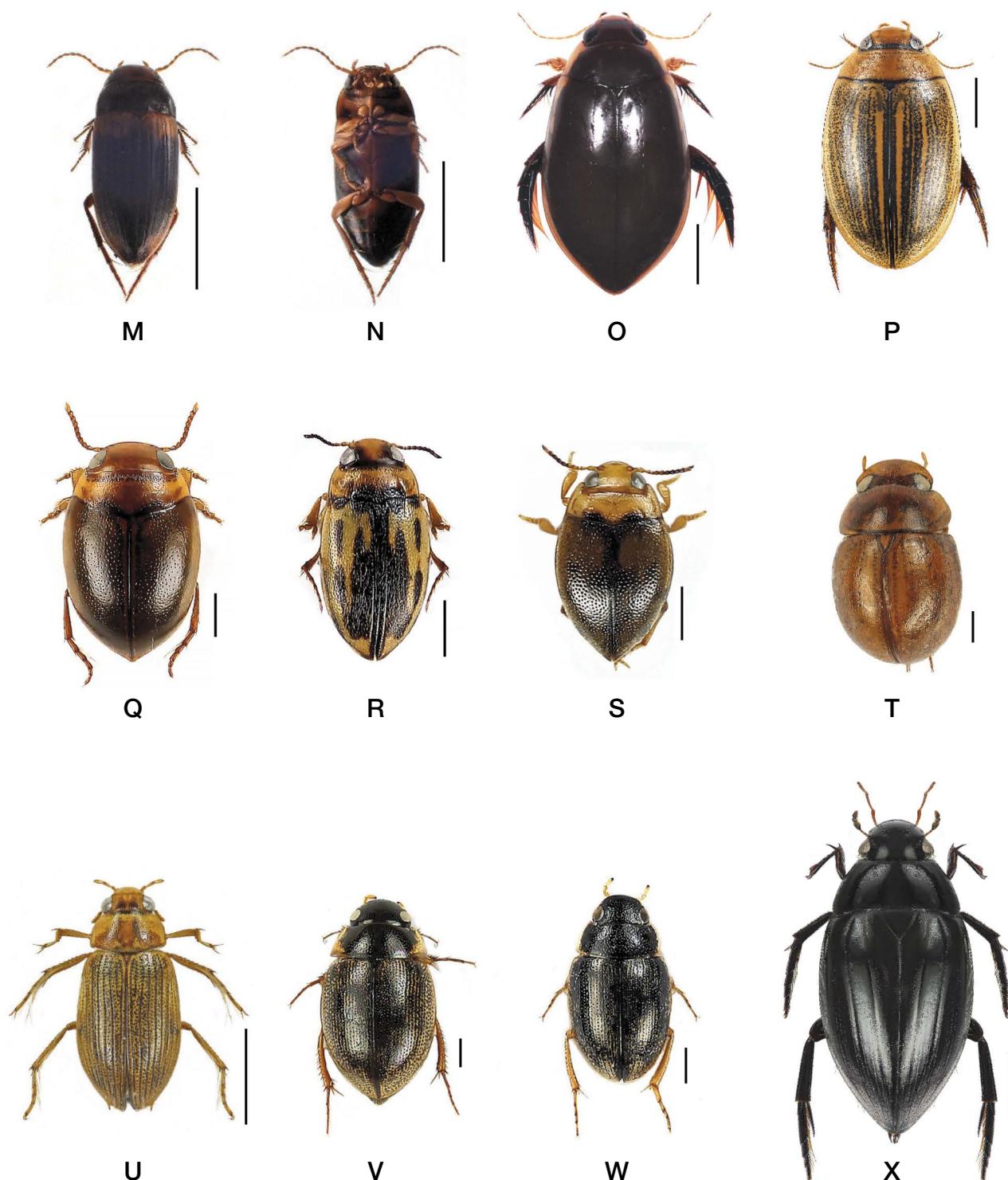


Fig. 2. Continued.

VII slightly concave. For full description of adult and larva refer to the revision by Yoshitomi (2005).

Distribution. South Korea (new record: JN), North Korea,

Japan.

Remarks. The adults of *S. sobrinus* were collected near the wetlands (Fig. 3B). To date, it is showed that this species is

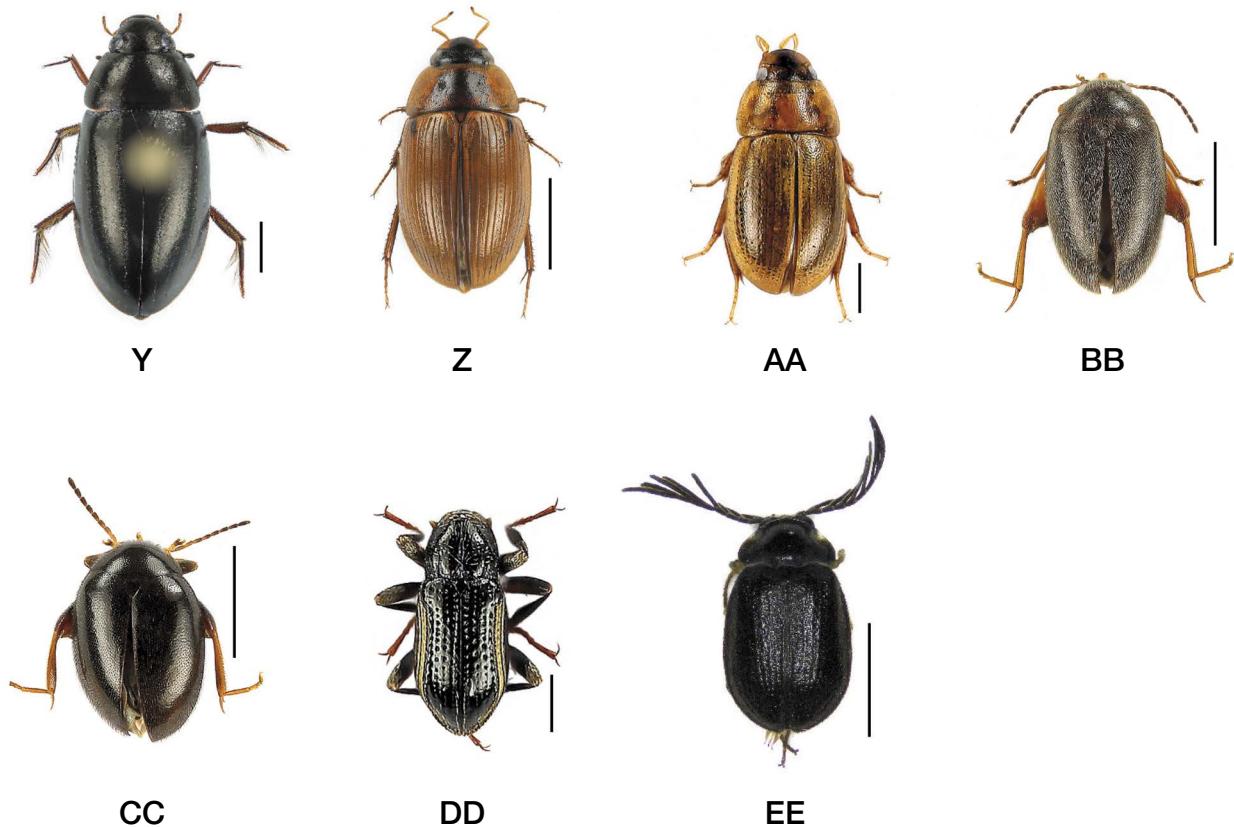


Fig. 2. Continued.



Fig. 3. Habitats: A, *Copelatus parallelus*; B, *Scirtes sobrinus*.

very common and widespread in Korean peninsula and they often occurred with *S. japonicus*. This species has been reported as one female specimen collected from North Korea (Klausnitzer et al., 2005) in South Korea.

Family Elmidae Curtis, 1830

Genus *Zaitzevia* Champion, 1923
Type species: *Zaitzevia solidicornis* Champion, 1923.

29. *Zaitzevia tushimana* Nomura, 1963 (Fig. 2DD)

Distribution. South Korea (GW, GG, JJ, JN), China, Japan, Far East Russia.

Family Psephenidae Lacordaire, 1854
Genus *Eubrianax* Kiesenwetter, 1874
Type species: *Eubrianax ramicornis* Kiesenwetter, 1874.

30. *Eubrianax ramicornis* Kiesenwetter, 1874 (Fig. 2EE)

Distribution. South Korea (CB, CN, GG, GW, JB, JJ, JN), North Korea, Japan, Far East Russia.

DISCUSSION

In this study, 30 species of water beetles are recognized from the Nohwa and Bogil islands, including two species *C. parallelus* in Dytiscidae and *S. sobrinus* in Scirtidae as new records for South Korea. Among them, 22 species (73.3%) were investigated in Nohwa island without family Elmidae and Psephenidae, whereas 18 species (60.0%) were found in Bogil island without family Haliplidae. For this reason, Nohwa island differs from the composition of water of Bogil island due to its flowing water (Buhwang stream) in the middle of the island. According to Jung et al. (2015, 2020), both of elmids and psephenids species prefer lotic area (ex. stream) to lentic area (ex. wetland, pond, reservoir) under the bottom of the submerged stones in stream.

The new recorded species of *C. parallelus* is clearly distinguished by five striae on each elytron and without submarginal stria from the related species, although only one female has been collected in Bogil island. In genus *Copelatus*, five species, *C. japonicus* Sharp, *C. kammurensis* Tamu & Tsukamoto, *C. koreanus* Mori, *C. weymanni* Balfour-Browne, and *C. zimmermanni* Gschwendtner have been reported and reviewed in South Korea by National Institute of Biological Resources (2019), Lee and Ahn (2018), and Park et al. (2008). Among them, the species of *C. koreanus* doubt to distribute in South Korea because they could not find since Mori's description in 1932. The species of *S. sobrinus* is also easily identified as small size and oval body shaped from other related species. This species usually inhabits the standing water, however some other Scirtidae species also prefer to running water. More research for this family is needed in the near future.

Although aquatic beetles surveys have been carried out on two islands (Nohwa & Bogil), it is necessary that more detailed and comprehensive investigations should be conducted on insects inhabiting domestic islands in South Korea.

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CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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