

Taxonomic Notes on Limnephilidae and Goeridae (Trichoptera: Limnephiloidea) of Korea

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ABSTRACT

Thirteen species of Limnephilidae and two of Goeridae are recorded from South Korea. Among them, *Brachypsyche schmidi*, is described as new to science, and *Limnephilus orientalis* Martynov and *Goera curvispina* Martynov are reported for the first time from the Korean peninsula. In addition, *Nemotaulius mutatus* MacLachlan, *Asynarchus amurensis* Ulmer, and *Hydatophylax formosus* Schmid are recognized as new to South Korean fauna. Diagnostic information with illustrations of adults, genitalia of both sexes, and distribution data are provided.

Key words: Trichoptera, Limnephiloidea, Limnephilidae, Goeridae, taxonomy, Korea, new species

INTRODUCTION

So far, eight species of Limnephilidae and two of Goeridae have been reported from South Korea. In Limnephilidae, four species, *Limnephilus correptus* MacLachlan, *Nemotaulius (Macrotaulius) admorsus* (MacLachlan), *Hydatophylax grammicus* (MacLachlan), and *Nemotaulius (N.) brevilinea* (MacLachlan) were recorded by Doi (1932). And, the larval stage of two species - *Limnephilus fuscovittatus* Matsumura (Kim, 1969) and *Hydatophylax nigrovittatus* (MacLachlan) (Kim, 1974; Yoon and Kim, 1988) were added from South Korea. Recently, two species, *Ecclisomyia kamtshatica* (Martynov) and *Hydatophylax magnus* (Martynov) were added

by Park and Bae (1998). In Goeridae, two species, *Goera japonica* Banks (Tsuda, 1942) and *Goera interregationis* Botosaneanu (Park and Bae, 1998) were reported.

In this study, we record all the species mentioned above except *Goera interregationis* Botosaneanu, and add one species new to science, two species new to Korea, and three unrecorded species from South Korea. We provide the taxonomic information (differential diagnoses, redescriptions, historical reviews, distribution data, and morphological variations) and ecological information (the mentions on collection sites, occurrence periods).

Trichoptera taxonomy based on adult stage in South Korea, is relatively little studied, when it is compared with its neighboring Eastern Palearctic regions. By this two year research, we extend geographical distribution of five species to their new southern most limits in South Korea.

MATERIAL AND METHODS

Specimens examined in this study have been collected from March, 1997 to October, 1998 by the use of black light trap and bucket light trap at night, and by the sweeping method near waters at day time. We have also used material deposited in Seoul National University, and ones lent from collections of other organizations in Korea.

Collection sites and organizations where material is deposited are abbreviated in the text as follows: KG (Kyunggi-do), KW (Kangwon-do), CB (Chungcheongbuk-do), CN (Chungcheongnam-do), JB (Jeolabuk-do), JN (Jeolanam-do), KB (Kyungsangbuk-do), KN (Kyungsangnam-do), CJ (Cheju-do), [SNU] (Seoul National University), [KFRI] (Korean Forestry Research Institute), [KNU] (Kangwon National University), [SWU] (Sungshin Women's University), [UIB] (Dept. of Biology, University of Incheon), [NIAS] (National Institute of Agricultural Science and Technology), [NMNH] National Museum of Natural History, Sofia, Bulgaria.

Total number of specimens examined is about 400, including the comparative ones from Japan and Germany.

SYSTEMATIC ACCOUNTS

Family Limnephilidae 우묵날도래과

Subfamily Dicosmoecinae

***Ecclisomyia kamtshatica* (Martynov, 1914)** 캄차카우묵날도래 (신칭) (**Fig. 1**)

Praecosmoecus kamtshaticus Martynov, 1914b, p. 478-479.

Ecclisomyia kamtshatica, Schmid, 1955, p. 59; Mey, 1989, p. 303; Kumanski, 1991, p. 18; Nimmo *et al.*, 1997, p. 98; Kuranishi *et al.*, 1998, p. 47.

Material examined. SNU 19♂ 7♀, Mt. Odae-san, KW, 29 V 1998, S. W. Park; NMNH 1♂ 2♀, Mt. Odae-san, KW, 29 V 1998, S. W. Park.

Redescription. Medium sized; fore wing about 12 mm, and it is grayish brown, apically rounded. Antennae serrated.

In male, 9th segment laterally broadened, and its posterior half hidden under the 8th segment.

Superior appendages long and horizontal. Intermediate appendages one segmented. Inferior appendages long, massive, horizontal, each with two teeth – subapical and middle ones, and two spurs basally.

In female, 9th segment not divided into tergite and sternite. Ventral portion of 9th segment bulbous, with two projections medially. 10th segment tubular, nearly fused with 9th one, its dorsal part more protruded than the ventral part.

Distribution. Korea, Japan (Hokkaido), Far Eastern Russia (Kamtchatka, Sakhalin, Kuriles, Khabarovsk region, Amur, Prymorye, Siberia).

Remarks. This locality may be the Southernmost one in the limits of its distribution. The habitat observed by Park S. W. in SNU (pers. comm.) is a slow running stream, where a large number of individuals, usually hidden under stones, was observed at day time. It is the only species of *Dicosmoecinae* found in South Korea, so far.

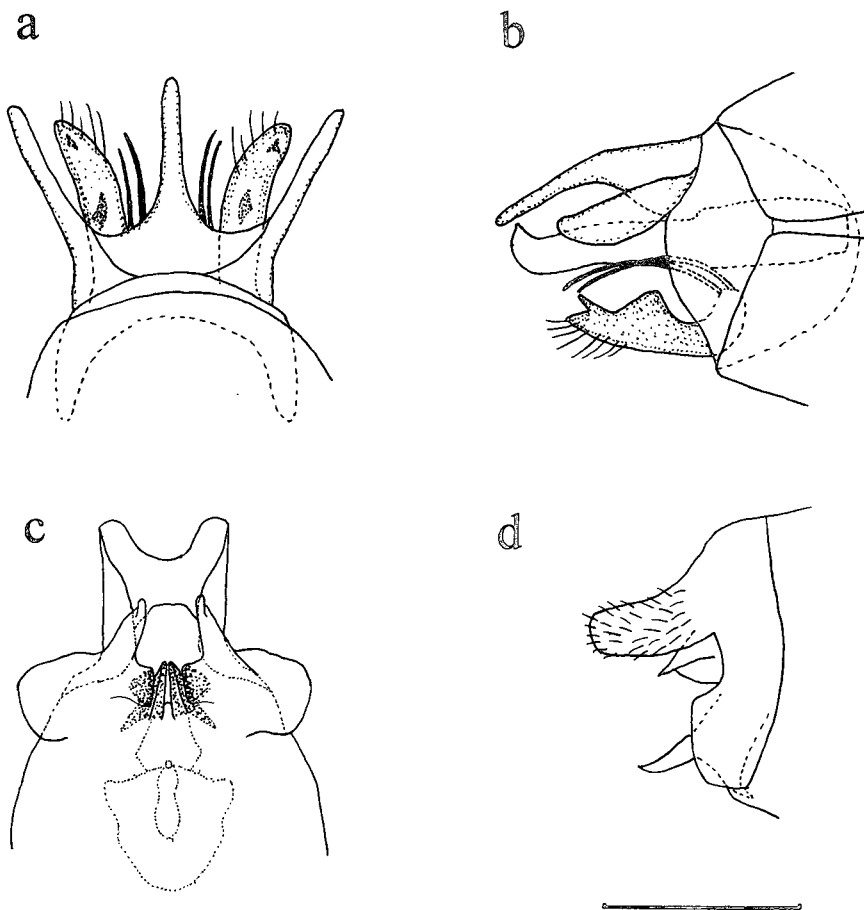


Fig. 1. Genitalia of *Ecclisomyia kamtschatica*. a, dorsal view of male; b, lateral view of male; c, ventral view of female; d, lateral view of female. Scale bar: 0.5 mm.

Subfamily Limnephilinae

***Limnephilus correptus* MacLachlan, 1880** 모시우묵날도래 (Fig. 2a, b)

Limnephilus correptus MacLachlan, 1880, p. 18 (suppl.); Doi, 1932, p. 74; Nozaki and Tanida, 1996, p. 812.

Material examined. KNU 1 ♂, Bangchung-ni, Gasan-myeon, KG, 16 V 1976, S. M. Lee; NIAST 1 ♂, Suwon, KG, 1927, Yugato.

Redescription. Medium sized; fore wing about 13 mm, yellowish and transparent. Hind wings transparent, their anal portion quite widened, as usual.

In male, when viewed laterally, superior appendages rectangular, intermediate appendages longer than superior ones. Inferior appendages small, with blunt ends. Parameres well developed, with strong and sclerotized setae.

Distribution. Korea, Japan (Hokkaido, Honshu), Far Eastern Russia (Sakhalin, Prymorye, Khabarovsk region, Amur), North East China.

Remarks. This is the second report of this species in Korea, after Doi (1932a) reported it from Seoul.

***Limnephilus orientalis* Martynov, 1935** 동양모시우묵날도래 (신칭) (Figs. 2c, d, 3a, b, 11a)

Limnephilus orientalis Martynov, 1935, p. 348; Schmid, 1955, p. 135; 1965, p. 29; Nozaki and Tanida, 1996, p. 815.

Material examined. SNU 1 ♂, Dapgok, Mt. Baekun-san, JN, 28 VII 1998, H. J. Choe and H. S. Lee; NIAST 1 ♂ 1 ♀, Muchu, JB, 21-25 IX 1992, S. B. Ahn.

Redescription. Medium sized; fore wing 15-18 mm. Fore wing coloration is very characteristic. It is brownish with scattered transparent spots. Fenestrated areas are present in the middle part and the bases of first six apical cells of fore wing. A_{1+2+3} and R_1 of fore wing black. Pterostigma of hind wing brownish. There is a small patch of spines on ventral side of R_1 of hind wing, i. e., 'beard', a feature evidently not mentioned in the literatures, so far. Dr. Takao Nozaki has kindly confirmed that Japanese representatives of *L. orientalis* also have this small patch. Genitalia structure is similar to that of *L. correptus*. In male, from the lateral view, intermediate appendages shorter than superior ones. Parameres with strong spines dorsally.

Distribution. Korea, Japan (Hokkaido, Honshu, Shikokyu, Kyushu), Far Eastern Russia (Sakhalin, Siberia, Amur, Prymorye, Kuriles), China.

Remarks. Species new to Korea. It was collected in mountain regions (above 800 m altitude) of the southern part (Jeola-do) of the Korean peninsula.

***Limnephilus fuscovittatus* Matsumura, 1904** 검정모시우묵날도래 (신칭) (Figs. 2e, f, 3c-j, 11b)

Limnephilus fuscovittatus Matsumura, 1904, p. 171; Schmid, 1965, p. 30; Kim, 1969, p. 75; Kim *et al.*, 1993, p. 265.

Limnephilus subfuscus Ulmer, 1907a, p. 20; Martynov, 1914a, p. 185; Martynov, 1929, p. 305.

Material examined. SNU 1 ♂, Suwon, KG, 20 X 1927, Yugato; NIAST 1 ♂, Suwon, 27 IX

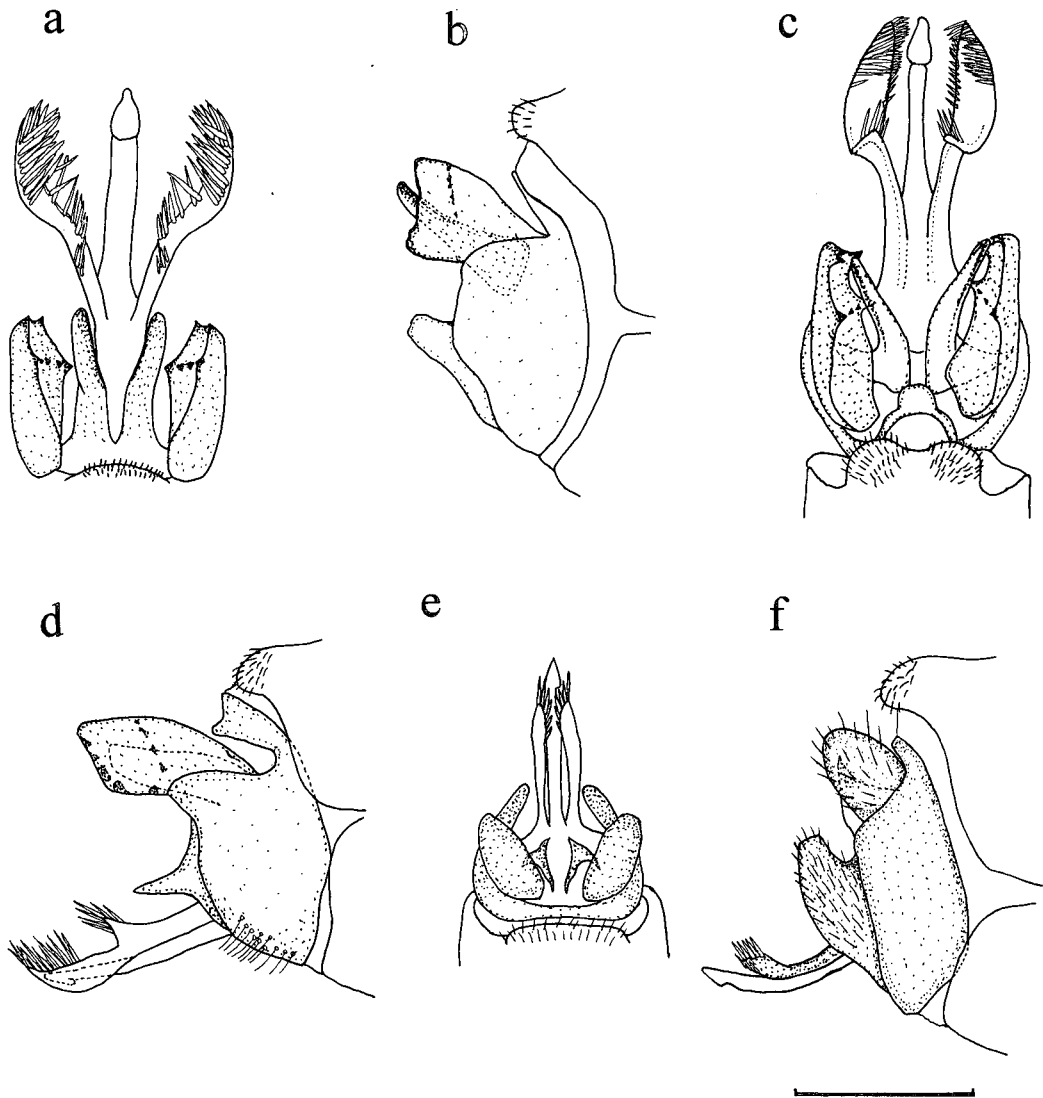


Fig. 2. Male genitalia of *Limnephilus* spp. a-b, *L. correptus* (a. dorsal view, b. lateral view); c-d, *L. orientalis*; e-f, *L. fuscovittatus*. Scale bar: 0.5 mm.

1982, Ryu C. H.; 1 ♂, Suwon, 20 X 1982, Ryu C. H.; 1 ♂, Gwangreung, KG, 9 V 199?, Kim H. J.; 1 ♀, Iri, 17 IV 1974, Cho W. S.

Comparative material. 1 ♂ 1 ♀, Lake Akan-ko, Ibeshibetsu Akan-cho, Hokkaido, Japan, 10 IX 1995, Leg. T. Ito, (Donation from Dr. T. Nozaki).

Redescription. Medium sized; fore wing 15–21 mm. Antennae, body, legs and fore wings blackish. Pterostigma, subthyridial cell and anal area on fore wing, darker. Hind wings wide, transparent, except for the pterostigma.

In male, dorsocaudal part of 8th segment, not strongly protruded and, in dorsal view, broad and

nearly straight. Superior appendages ovoid, concave, with long hairs. Intermediate appendages up-directed, and tapering. In dorsal view, the intermediate appendages close at base and diverged apically. Inferior appendages broadly attached to the 9th segment, narrowing distally, with obtuse tips. Viewed ventro-caudally, their distal parts closed to each other, the proximal margins forming an ovoid space. Parameres slender, slightly shorter than aedeagus, bearing strong, disto-dorsal spines.

In female, 9th segment divided only meso-ventrally. 10th segment not divided into tergite and sternite; the dorsal part longer than the ventral one. Appendages of 10th segment resemble the shape of the superior appendages of male. Vulvar scale, as usual, 3 lobed; median lobe nearly as long as lateral ones. Both appendages of 10th segment and vulvar scale are apparently variable in shape (cf. Fig. 3. c-j).

Distribution. Korea, Japan (Hokkaido, Honshu, Shikoku, Kyushu), Far Eastern Russia (Kuriles, Sakhalin, Siberia), Mongolia, China, Sikkim, North India.

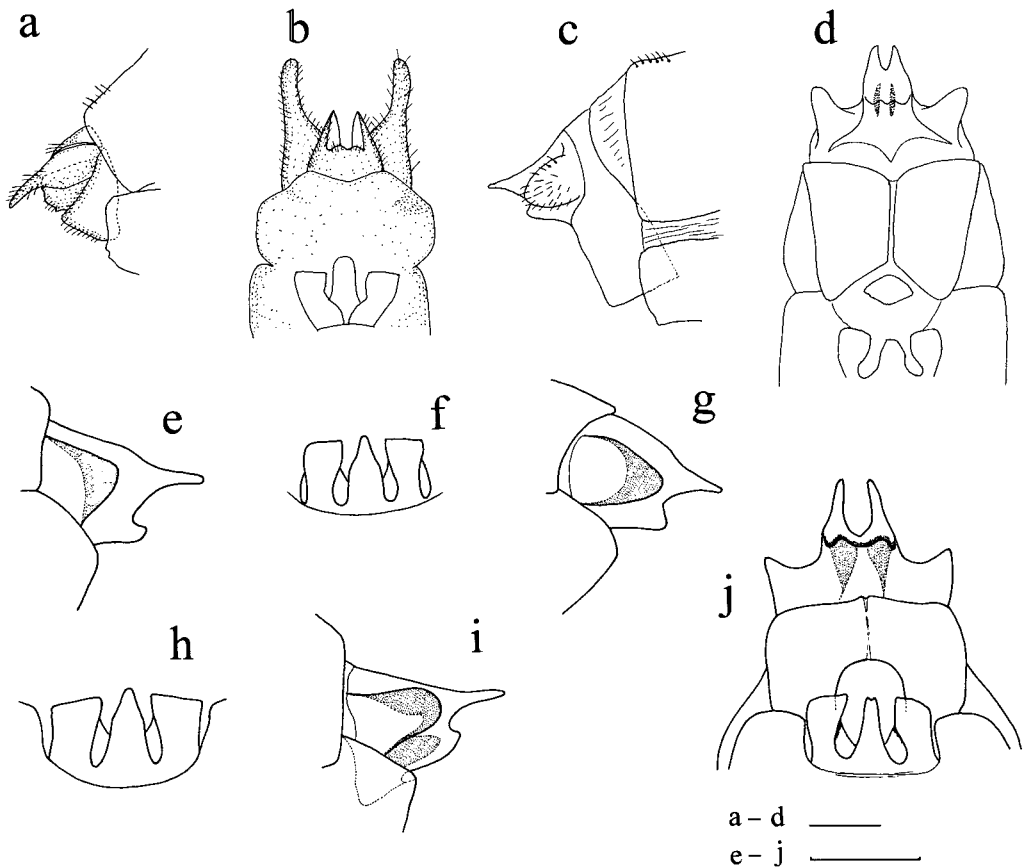


Fig. 3. Female genitalia of *Limnephilus* spp. a-b, *L. orientalis* (a. lateral view, b. ventral view); c-j, *L. fuscovittatus* (c. lateral view, d. ventral view; e-f. the same, specimen from Sogam dam, N. Korea; g-h, the same, specimen from Lake Akan-cho, Hokkaido, Japan; i-j, The same, another specimen from Sogam dam. Scale bar: 0.5 mm.

Remarks. It is the first record on the adult stage from South Korea. Kim (1969) report its larval stage from River Kum-gang and River Hantan-gang. Due to the variable outlook of the inferior appendages of male, when the position of view is not absolutely lateral, Kumanski (1991) has wrongly announced *L. fuscovittatus* Matsu. as *L. sibiricus* Mart. from North Korea, the latter species is known so far only after the female, and should be deleted from the Korean list of Trichoptera. The latter is not mentioned neither from the Russian Far East (Nimmo *et al.*, 1997) nor from Japan (Nozaki and Tanida, 1996).

***Nemotaulius (N.) brevilinea* (MacLachlan, 1871) 줄우묵날도래 (Figs. 4a, b, 5a, b, 11d)**

Grammotaulius brevilinea MacLachlan, 1871, p. 107; Doi, 1932, p. 73.

Nemotaulius (N.) brevilinea, Schmid, 1952b, p. 242; Schmid, 1955, p. 148; Cho, 1963, p. 15; Kumanski, 1991, p. 20.

Material examined. SNU 1 ♀, Suwon, 18 IV 19??, Hukumoto; 1 ♀, Mt. Chilbo-san, Suwon, KG, 22 IV 1973, W. H. Kim; NIAST 1 ♂ 1 ♀, Suwon, KG, 20 VII 1973, Choi K. M.; 1 ♂, Mt. Chiak-san, KW, 30 V 1974, K. R. Choi; 1 ♂ 1 ♀, Ka-an, 1 VI 1922, Kasegawa.

Redescription. Big sized; fore wing about 20 mm, yellowish, narrow, with exterior margin cut and slightly waved. R_5 brownish. Two black stripes on its thyridial cell are the main character for identification of the genus. Anal area dark brown, and A_{1+2+3} blackish.

In male, the apical part of 8th segment protruded and divided into two parts, bearing small black spines. 9th segment laterally and ventrally broadened. Superior appendages ovoid, concave and with a small protrusion on the middle of the inner surface.

Intermediate appendages with sclerotized, sharpened tip. Inferior appendages small, directed medially. Aedeagus thick and bipartite at tip. Parameres absent.

In female, 9th tergite small, fused with 10th tergite. Dorsal part of 10th segment, with two narrow, long and postero-laterally diverged lobes.

Distribution. Korea (Cheju-do), Japan.

Remarks. It is the only species of the nominate subgenus of *Nemotaulius* recorded from Korea so far.

***Nemotaulius (Macrotaulius) admorsus* (MacLachlan, 1866) 우묵날도래 (Figs. 4b, c, 5b, c, 11e)**

Glyphotaelius admorsus MacLachlan, 1866, p. 250; Doi, 1932, p. 73.

Nemotaulius (Macrotaulius) admorsus, Schmid, 1952, p. 226; Kumanski, 1991, p. 20.

Material examined. SNU 1 ♀, Gwangreung, KG, 21 V 1994, S. G. Son; 1 ♀, Uian-dam, Chuncheon, KW, J. M. Oh, S. I. Han; NIAST 2 ♂, Muchu, JB, 21–25 IX 1992, R. G. O., S. B. Ahn; 1 ♂, Koheung, JN, 6–10 VII 1993, S. B. Ahn; 1 ♀, Pyoungtaek, KG, VII 1973, K. M. Choi; KFRI 1 ♂ 1 ♀, Gwangreung, KG, 27 VIII 1983, K. J. Won; 1 ♀, Gwangreung, KG, 1 V 1986, K. J. Won; SWU 1 ♀, 15–48, Hewha-dong, Seoul, 9 V 1985, H. J. Kwon.

Redescription. Scape very thick. Head and thorax broadly covered with setal warts, especially well developed on the thorax. Big sized; fore wing 25–32 mm, apically cut and strongly waved. R_5 blackish, and black mottlings scattered on Cu_1 , A_{1+2+3} . Pterostigma dark. Fenestrated area in form of an oblique strip in the middle of the fore wing.

In male, 8th segment protruded and covered with small black spines. Superior appendages with triangular projection in the middle of the apical margin and with strongly sclerotized, black area on the inner surface. Upper lobe of each intermediate appendage blunt, not visible laterally, because of the sclerotized portion of superior appendage, lower lobe membranous and, in lateral view, situated between superior and inferior appendages. Inferior appendages small. Aedeagus bipartite at apical part. Parameres curved upwards, with various number (5~14) of medially directed, long

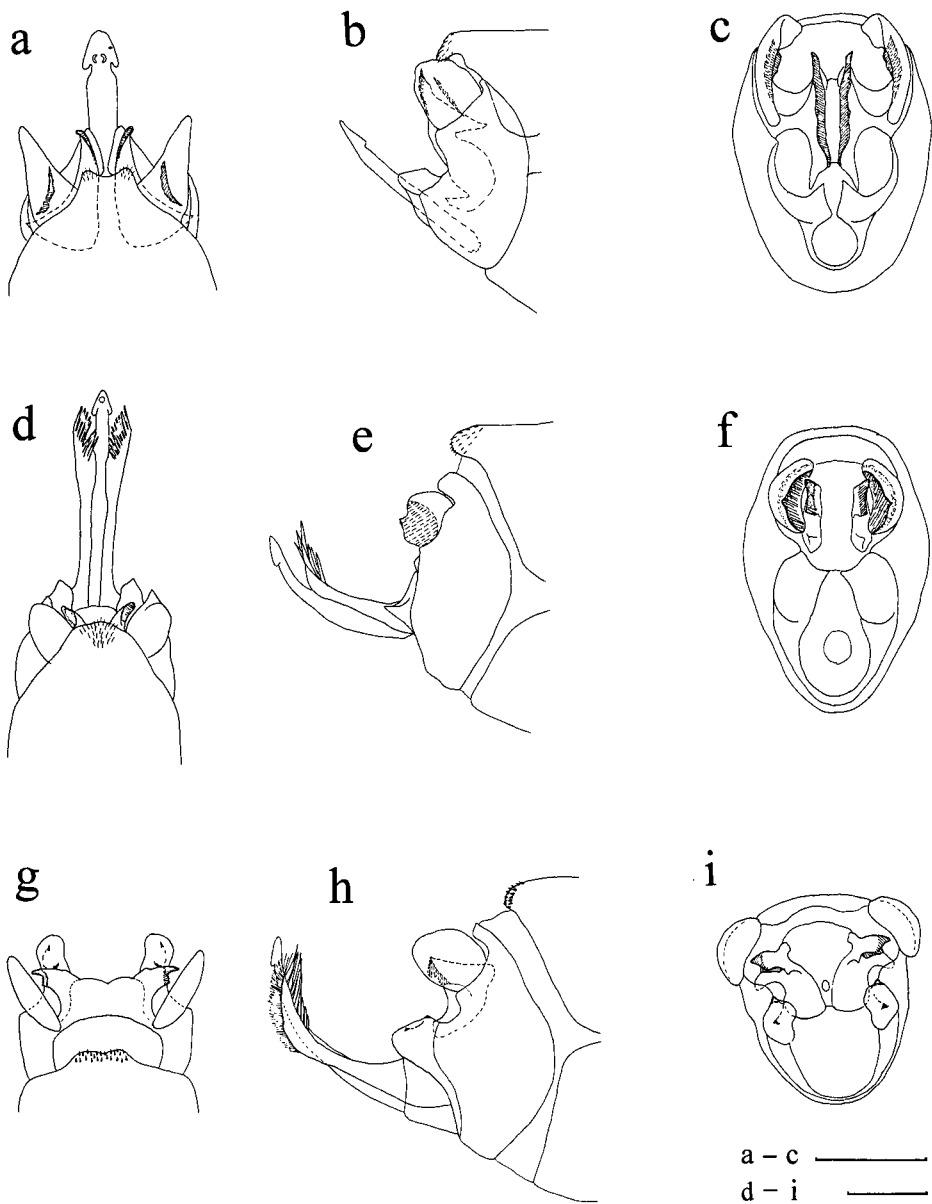


Fig. 4. Male genitalia of *Nemotalius* spp. a-c, *N. brevilinea* (a. dorsal view, b. lateral view, c. ventral view); d-f, *N. admorsus*; g-i, *N. mutatus*. Scale bar: 0.5 mm.

chitinized setae.

In female, 9th tergite fused with 10th tergite. 9th sternite bulbous, and divided into two parts ventro-medially. 10th segment tubular, dorsal and ventral parts slightly divided each. Vulvar scale massive, median lobe narrow, equal to the lateral ones.

Distribution. Korea, Japan, Far Eastern Russia (Kuriles, Sakhalin, Magadan, Amur, Prymorye, Ussuri, Siberia).

Remarks. Species new to South Korea. It was collected at Koheung, the southernmost coast of the Korean peninsula. This is the most large-sized species of the genus and one of the biggest Caddisflies in our fauna.

Nemotaulus (Macrotaulius) mutatus (MacLachlan, 1872) 어리우묵날도래 (신칭) (Figs. 4e, f, 5e, f, 11f)

Glyphotaelius mutatus MacLachlan, 1872, p. 60.

Nemotaulius (Macrotaulius) mutatus, Schmid, 1952, p. 231; Botosaneanu, 1970, p. 305; Kumanski, 1991, p. 21.

Material examined. SNU 1 ♂, Arboretum, Suwon, KG, 26 V 1989, S. J. Kim; 1 ♂, Mt. Odaesan, KW, VI 1993, Y. H. Kang; 1 ♀, CALS (College of Agricultural and Life Sciences), SNU, Suwon, KG, 26 V 1989, S. J. Kim; KNU 1 ♀, Mt. Myoungzi-san, KG, 25 V 1990, K. T. Park; SWU 1 ♂, Pal-a-ri, Namyangju, KG, 3 V 1986, E. K. Kim; NIAST 1 ♀, Suwon, KG, 12 IX 1984, S. N. Kim; 1 ♂, Suwon, KG, VII 1971, J. S. So; 1 ♂ 2 ♀, Suwon, KG, 19 IX 1976, K. R. Choe; 1 ♂, Mt. Yeogi-san, KG, 17 V 1985, H. G. Goh; 1 ♀, Gwangreung, KG, 15 V 1975; 1 ♀, Bibong, 26 VIII 1975, C. Y. Hwang.

Redescription. Generally similar to *N. admorsus*, except that the wave of fore wing is weaker than that of *N. admorsus*.

In male, the shape of 8th segment's spinulose zone various: As a rule, it is more or less protruded; with the specimen from Suwon, 1989 [SNU], it appears somewhat divided, and with the one from Pal-a-ri [SWU], deeply divided. Superior appendages ovoid and concave. Intermediate appendages widely separated from each other, pointed and curved laterad; their apical margins well sclerotized. When viewed laterally, intermediate appendages blunt. Inferior appendages concave, each with two small, black dorsal teeth. The distal portion of parameres with sclerotized setae dorsally and hairs ventrally.

In female, 9th tergite fused with 10th segment. 9th sternite triangular in lateral view, and divided medio-ventrally. 10th segment bigger than that of *N. admorsus*. The dorsal part of 10th segment medially narrowed, its ventral part truncate. Median lobe of vulvar scale much shorter than the lateral ones.

Distribution. Korea, Japan, Far Eastern Russia (Kuriles, Kamtchatka, Sakhalin, Amur, Prymorye, Siberia), China.

Remarks. Species new to South Korea, and previously reported twice from North Korea (Botosaneanu, 1970; Kumanski, 1991). This species appears to resemble *N. amurensis* Nimmo, 1995, which could also be found in Korea.

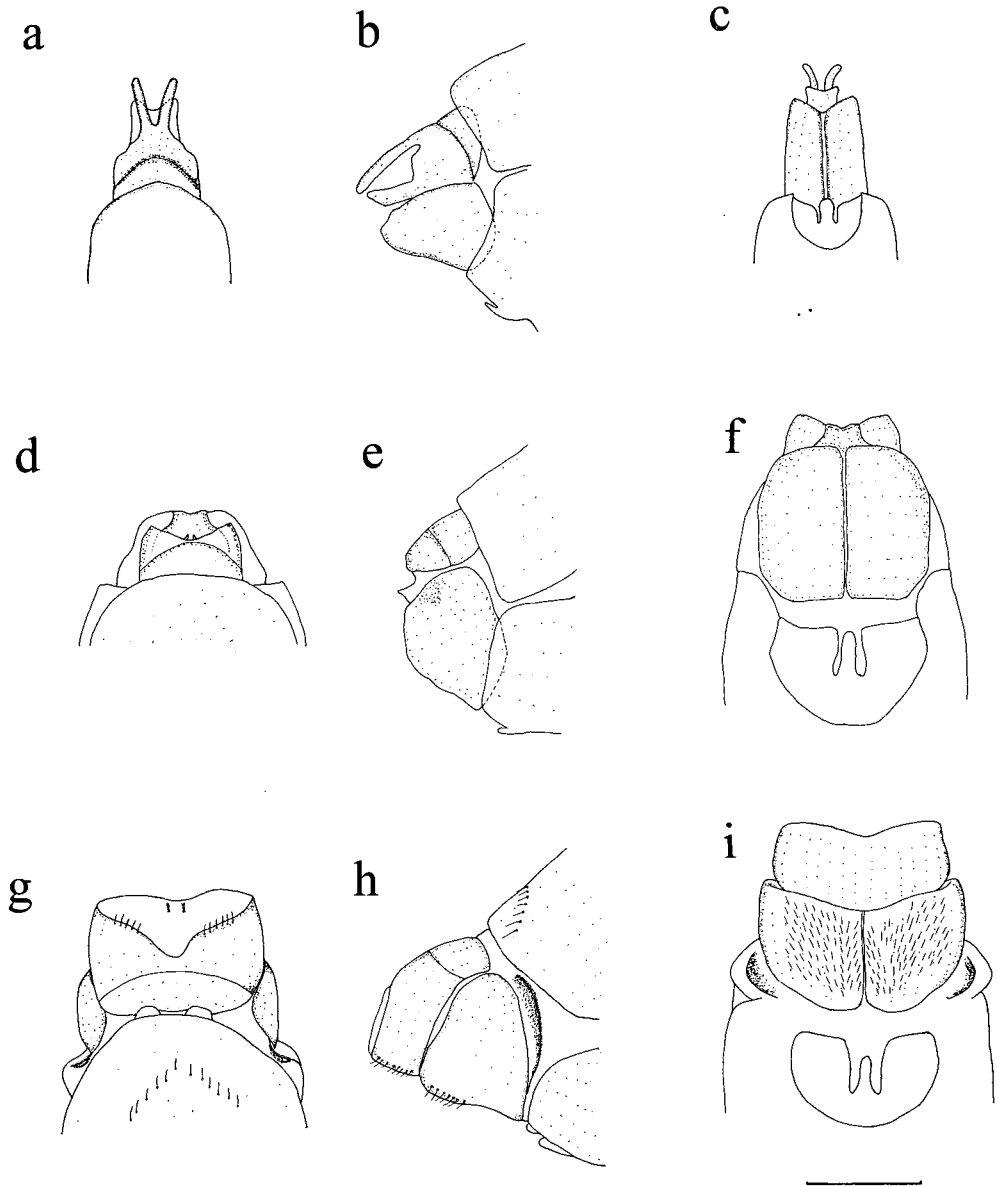


Fig. 5. Female genitalia of *Nemotaulius* spp. a-c, *N. brevilinea* (a. dorsal view, b. lateral view, c. caudal view); d-f, *N. admorsus*; g-i, *N. mutatus*. Scale bar: 0.5 mm.

***Asynarchus amurensis* (Ulmer, 1905)** 아무르검은날개우묵날도래 (신칭) (**Fig. 6a, b, c, 11c**)
Limnophilus amurensis Ulmer, 1905, p. 8.

Asynarchus amurensis Martynov, 1914a, p. 209; Schmid, 1954, p. 90; Schmid, 1955, p. 154; Botosaneanu, 1970, p. 305; Kumanski, 1991, p. 21; Malicky, 1993, p. 14.

Material examined. NIAST 1 ♀, Hoengkye, Yongpyung, Mt. Seorak-san, KW, 10 IX 1993, S. B. Ahn.

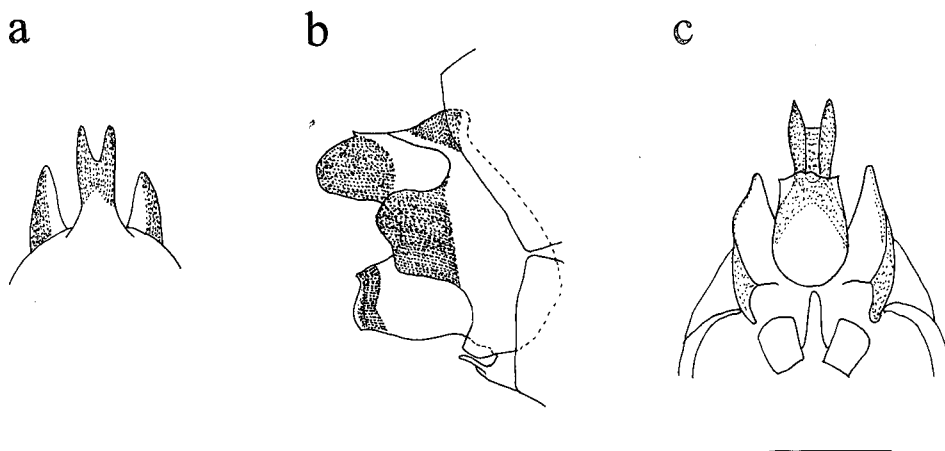


Fig. 6. Female genitalia of *Asynarchus amurensis*. a, dorsal view; b, lateral view; c, ventral view. Scale bar: 0.5 mm.

Diagnosis. It is medium sized, and the length of fore wing is 17 mm. It is blackish, but the pale area on costal and rounded anterior zone, which is similar in shape with that of *A. sachalinensis* Martynov, 1914 (Schmid, 1954). There are numerous, although faint (especially with the females), differences in the genitalia.

Distribution. Korea, Japan, Far Eastern Russia (Amur, Sakhalin, Prymorye, Siberia), Mongolia.

Remarks. Species new to South Korea. This is one of the most frequently reported species from North Korea (Botosaneanu, 1970; Mey, 1989; Kumanski, 1991; Malicky, 1993). Mt. Seorak-san seems to be the southern most limits of its distribution.

***Hydatophylax grammicus* (MacLachlan, 1880) 무늬날개우묵날도래 (Fig. 8a, b, 11g)**

Stenophylax grammicus MacLachlan, 1880, p. 83.

Astenophylax grammicus Ulmer, 1907b, p. 51; Doi, 1932a, p. 73; Kim *et al.*, 1993, p. 265.

Hydatophylax grammicus, Schmid, 1950, p. 279; Mey, 1989, p. 303; Kumanski, 1991, p. 21.

Material examined. KNU 1 ♀, Hangro-bong, 11 VI 1987, K. T. Park, U. Park; 1 ♀, Bongmyoung-ri, Chuncheon, KW, 23 V 1997, K. R. Keum, S. M. Lee.

Diagnosis. It is big sized, and fore wing 18–23 mm. Spurs on the tibiae are 1, 3, and 4. Antennae, dorsal part of the head, body, tibiae and tarsi are blackish, but ventral zone of head including mouthpart and femora are brown. Wings are very particular for its beautiful dark brown stripes between veins.

Distribution. Northern Palearctic region from Japan to North East Europe.

Remarks. Species new to South Korea. Kim *et al.* (1993) reported the larvae.

***Hydatophylax nigrovittatus* (MacLachlan, 1872) 띠무늬우묵날도래 (Figs. 7a-c, 8b, c, 11h)**

Platyphylax nigrovittatus MacLachlan, 1872, p. 64.

Hydatophylax nigrovittatus, Schmid, 1950, p. 284; Schmid, 1955, p. 198; Botosaneanu, 1970, p. 305; Kim *et al.*, 1987, p. 125; Yoon and Kim, 1988, p. 517; Yoon and Ro, 1990, p. 133; Kumanski, 1991, p. 21; Yu, 1994, p. 312; Yoon *et al.*, 1995, p. 142.

Material examined. SNU 1 ♂, Heungjung valley, Mt. Heungjung-san, KW, VI 1998, H. W. Kim, H. S. Lee; 1 ♂, Yeonsu, KG, 1 V 1991, Y. L. Park; 1 ♂, Mt. Myeongzi-san, KG, 25 V 1991, Y. L. Park; 2 ♂, Mt. Yongmun-san, KW, 11 IV 1992, S. W. Park, L. H. J.; 1 ♂, Arboretum, Anyang, KG, 25 V 1985, S. L. Ka; 1 ♂, Arboretum, Suwon, KG, 19 V 1987, J. Y. Choi; 1 ♂, Arboretum, Suwon, KG, 28 V 1987, J. Y. Choi; 1 ♂, Mt. Gwangkyo-san, Suwon, KG, 28 IV 1984, S. H. Yim; 1 ♂, Choungju, CB, 22 VI 1992, O. C. Kwon; 1 ♀, Arboretum, Anyang, KG, 9 VIII 1991, L. H. J.; 1 ♀, Dapgok, Mt. Baekun-san, JN, 20 VI 1986, S. M.

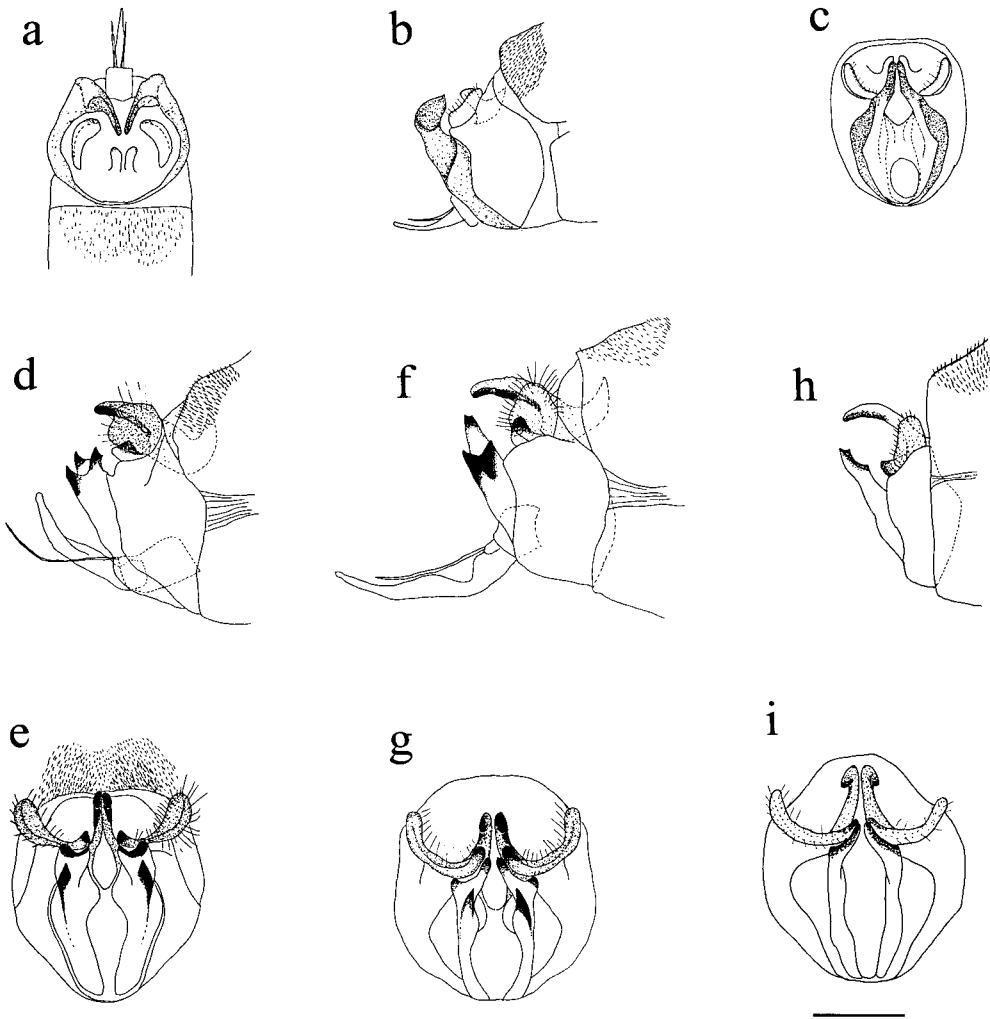


Fig. 7. Male genitalia of *Hydatophylax* spp. a-c, *H. nigrovittatus* (a. dorsal view, b. lateral view, c. caudal view); d-g, *H. magnus*, the two forms (d-e, with less prominent inferior appendages, f-g, with more protruded ones); h-i. *H. formosus* (h. dorsal view, i. caudal view). Scale bar: 0.5 mm.

Hwang; 1 ♀, Mt. Suri-san, KG, 17 V 1985, D. W. Lee; 1 ♀, Anyang, KG, 6 VI 1985, S. M. Hwang; 1 ♂ 1 ♀, Mt. Taewha-san, KG, 30 IV 1994, H. S. Lee; NIAST 2 ♂, Mt. Gwangkyo-san, Suwon, KG, 1 V 1987, S. B. Ahn; KNU 1 ♂ 1 ♀, Bongmyoung-ri, Chuncheon, KW, 23 V 1997, J. H. Kim, Y. L. Shin, Y. M. Kim, S. K. Han; 1 ♂, Mt. Chiak-san, KW, 30 IV 1972, S. M. Lee; 1 ♂, 28 V 1974, S. M. Lee; 1 ♂, Mt. Myoungzi-san, KG, 30 IV 1978, S. M. Lee; 1 ♀, Chuncheon-dam, Chuncheon, KW, 22–23 V 1997; SWU 5 ♂ 1 ♀, Mt. Chunma-san, KG, 18 IV 1981, S. H. Lee, Y. A. Kim, H. K. Park, S. N. Cho, D. R. Lee; 1 ♀, Gwangrenug, KG, 9 V 1987, H. K. Park; 3 ♂ 1 ♀, Mt. Buram-san, KG, 25 IV 1993, J. I. Kim; 1 ♀, Mt. Chunma-san, KG, 14 V 1981, H. K. Park; 1 ♀, Pyoungnae, KG, 28 IV 1980, K. S. Jang; 1 ♀, Mt. Odae-san, KW, 26 V 1995, S. A. Lee; 1 ♀, Mt. Odae-san, KW, 5 V 1989, H. S. Bae; 19 ♂ 2 ♀, Mt. Chulryung-san, Sudong-myeon, KG, 24 IV 1993, C. B. Han, Y. M. Choi, H. K. Hong, C. H. Gwak, M. Y. Eom, J. S. Heo, E. H. Kim, E. H. Lee, S. Y. Kim, M. N. Son, N. R. Kim, Y. J. Kang, J. M. Park, H. J. Kim, E. H. Seo, H. J. Kang, H. J. Kim, K. K. Kwon, J. Y. Lee, Y. E. Lee; 1 ♂ 2 ♀, Mt. Deokyu-san, Muchu, JN, 25 V 1993, K. I. Jeong, Y. J. Park, Y. M. Cho; 1 ♂, Bokwang-sa (temple), Paju-gun, KG, 23 IV 1988, J. E. Byun.

Diagnosis. Because of the similarity of the wing coloration, it resembles a somewhat smaller-sized *H. grammicus* McL. The conspicuous differences from *H. grammicus* McL. are the dark anterior, exterior, and posterior margins of fore wings and the narrow hind wings. Genitalia is definitely different, e. g., in male genitalia, the upper parts of the inferior appendages are more enlarged in lateral view.

Distribution. North Palearctic, including the Korean peninsula.

Remarks. This is one of the most frequently reported species from South Korea, based on the report of larvae by Yoon and Kim (1988).

***Hydatophylax magnus* (Martynov, 1914)** 큰우묵날도래 (신칭) (Figs. 7d-g, 8e, f, 11i)

Stenophylax magnus Martynov, 1914a, p. 49.

Hydatophylax magnus, Schmid, 1950, p. 291; Schmid, 1955, p. 199; Kumanski, 1991, p. 21; Park and Bae, 1998, p. 364.

Material examined. SNU 20 ♂ 1 ♀, Dapgok, Mt. Baekun-san, JN, 28 VII 1998, H. J. Choe; 3 ♂ 3 ♀, Mt. Chiak-san, KW, 14 IX 1997, H. J. Choe, H. S. Lee, S. W. Park; 1 ♂ 1 ♀, Mt. Bukhan-san, Seoul, 19 X 1975; 1 ♂, Dapgok, Mt. Baekun-san, JN, 25 VI 1986, S. M. Hwang; 1 ♀, Inchun, KG, 19 X 1990, P. Y. L.; 1 ♂, Dapgok, Mt. Baekun-san, JN, 23 V 1994, H. K. Shin; 3 ♂ 4 ♀, Mt. Baekun-san, JN, 27 VI 1995, K. S. Woo; 3 ♂ 8 ♀, Simwon, Mt. Chiri-san, JN, 4 VIII 1996, D. H. Kim, H. T. Kim, D. H. Oh; 14 ♂ 7 ♀, Mt. Weorak-san, KW, 15 IX 1996, J. J. Jeon, Y. K. Choe, Y. W. Won, J. I. Kang; 2 ♂ 2 ♀, Simwon, Mt. Chiri-san, JN, 28 VII 1997, J. S. Kwon; 2 ♀, Bangdong lake, Daejeon, CN, 28 VIII 1997, J. S. Kim; 3 ♂ 7 ♀, Mt. Sudo-san, Cheongam-sa, KB, 27 VIII 1975, J. Y. Choi; 2 ♂, Unbong, Namwon, CB, 14 IX 1998, J. Y. Choi; NIAST 4 ♂ 4 ♀, Muchu, CN, 12 VIII 1997, K. T. Park, J. Y. Shim; 3 ♂ 2 ♀, Gwangreung, KG, 20 V 1981, K. R. Choe; 6 ♂ 1 ♀, Mt. Gyeryong-san, CN, 20 IX 1981, K. R. Choe; 1 ♂ 1 ♀, Is. Kangwha-do, KG, 11 IX 1965, Jung; 1 ♂, Seoguipo, CJ, 12 VI 1975, H. S. Kim; 1 ♂, Mt. Chiri-san, 12 IX 1991, S. H. Lee; 1 ♂ 1 ♀, Mt. Keumjung-san, 21 VII 1993, S. B. Ahn; KNU 1 ♂, Mt. Chiak-san, KW, 29 IX 1972, S. M. Lee; 1 ♂, Deoktuwon Chuncheon, KW, 3 VI 1986, S.

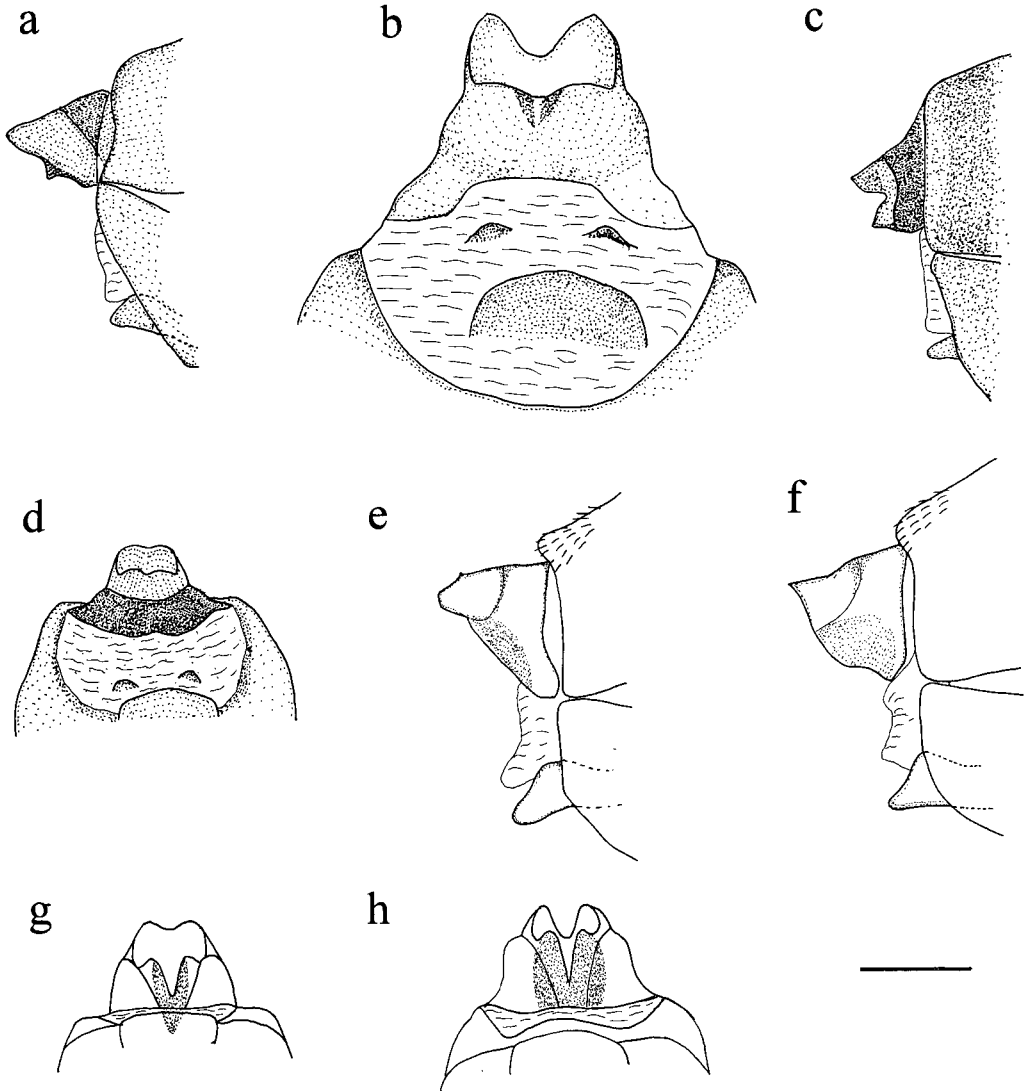


Fig. 8. Female genitalia of *Hydatophylax* spp. a-b, *H. grammicus* (a. lateral view, b. ventral view); c-d, *H. nigrovittatus*; e-f, *H. magnus*; g-h, *H. formosus*. Sclae bar: 0.5 mm.

I. Chae, H. S. Park; 1 ♀, Gachang-myeon, KB, 12 IX 1982, Y. J. Kwon; 1 ♀, Mt. Myeongzi-san, KG, 1 X 1979, S. M. Lee; SWU 1 ♀, Mt. Chunggae-san, KG, 29 VIII 1987, S. H. Ha; 1 ♂ 1 ♀, Mt. Dobong-san, Seoul, 21 IX 1993, E. H. Kim; 1 ♂, Mt. Chunma-san, KG, 29 VIII 1981, K. M. Park; 1 ♂, Mt. Chunma-san, KG, 11 VIII 1982, K. J. Kim; 1 ♂ 1 ♀, Mt. Dobong-san, Seoul, 20 IX 1987, Y. M. Lee; 1 ♂ 1 ♀, Mt. Dobong-san Seoul, 16 IX 1982, Y. Kim; 1 ♂, Daehyun, Sukpo, Bongwha, KB, 24 VII 1989, J. I. Kim.

Redescription. Big sized; fore wing length variable from 18 to 28 mm. Brownish. Antennae and R_1 dark at base.

In male, 8th tergite protruded and covered with short spines caudally. Superior appendages like a dish. Intermediate appendages long, sclerotized, forming a semicircular arch. Inferior appendages well developed and apically consisting of three sharp processes. The two kinds of variety in length of the basal or inner process (Martynov, 1914a) was observed. Each one was collected in each locality within a period, in some cases, two various types were collected in a locality (e.g., Dapgok) in different periods. Aedeagus a simple tube. Parameres thin thread-like.

In female, 9th tergite and 10th segment fused to form a triangular structure. The caudal end of 10th segment obtuse. From the ventral view, the inner wings form an acute angle basally. 9th sternite membranous. Vulvar scale one pieced.

Distribution. Korea, Far Eastern Russia (Kuriles, Amur, Sakhalin), North East China.

Remarks. Numerous insects have been often observed in autumn at light traps in high mountain regions. It is distributed in Is. Cheju-do, Is. Kangwha-do and the whole Korean peninsula.

***Hydatophylax formosus* Schmid, 1965** 우리나라우묵날도래 (신칭) (Figs. 7h, i, 8g, h)

Hydatophylax formosus Schmid, 1965, p. 32.

Hydatophylax sakharovi Kumanski 1991, p. 21; figs. 4-6, 8-9.

Material examined. SNU 1 ♂, Yuukirel, 28 VIII 1922, H. Okamoto, Y. Hasegawa; 2 ♂ 2 ♀, near Jindong bridge, Jindong 1-ri, Mt. Zeombong-san, KW, 21 VIII 1998, H. T. Kim, J. M. Oh, H. J. Choe, K. Jung; 1 ♂, Bisundae, Mt. Seorak-san, KW, 23 VIII 1998, J. W. Kim; 28 ♂ 13 ♀, Suchung-gol (valley), Mt. Gyeongbang-san, KW, 27 VIII 1998, H. J. Choe, Y. M. Chu, Y. C. Park; 12 ♂ 11 ♀, Ulsu valley, Mt. Sogyeongbang-san, KW, 28 VIII 1998, H. J. Choe, Y. M. Chu, Y. C. Park; 3 ♂ 8 ♀, Mt. Heungjung-san (about 400 m alt.), KW, 2 IX 1998, H. J. Choe, H. S. Lee, H. W. Kim; 2 ♀, Bene-gol, Eonyang, Ulju, Ulsan, KN, 26 VIII 1998, J. Y. Choi; NIAST 2 ♂, Mt. Odae-san, KW, 10 IX 1993, S. B. Ahn; 1 ♂, Hange-ru, Mt. Seorak-san, KW, 24 VII 1973, S. M. Lee; 1 ♀, Mt. Palgong-san, KB, 20 IX 1980, Y. J. Kwon; 1 ♀, Mt. Gazi-san, KB, 1 X 1984, Y. J. Kwon; 5 ♂ 2 ♀, Siheung-sa, Oe-Seorak, KW, 20 IX 1997, K. Jung; SWU 1 ♀, Sokeumgang, KW, 12 VIII 1983, B. Y. Kang; 1 ♂, Mt. Chunma-san, KG, 27 IX 1980, J. S. Lee; UIB 3 ♀, Gapyoung-gun, KG, 25 VIII 1998, Paek, Lee, Ahn.

Diagnosis. Big sized; fore wing 20~26 mm. Generally similar to *H. magnus*. The most characteristic parts are the inferior appendages of male genitalia, which are much slender and longer than those of *H. magnus*, their tips well sclerotized.

Intermediate appendages a little longer than those of *H. magnus*. Superior appendages somewhat smaller than the corresponding ones of *H. magnus*.

In female, the tip of 10th segment, sharp in lateral view. The inner wings of 10th segment parallel to each other.

Distribution. Korea.

Remarks. Species new to South Korea, which was described from North Korea as *Hydatophylax sakharovi* (Kumanski, 1991) (cf. the synonymy above).

It is distributed in the east mountains of the Korean peninsula, between Mt. Kumgang-san in the North, and Bene-gol, Ulju in the South.

***Brachypsyche schmidi* sp. n.** 슈미드우묵날도래 (신칭) (Fig. 9a-e)

Material examined. SNU Holotype ♂, near Pilye mineral water spring, Karisan-ri., Guidun-myeon, Inze-gun, KW, 15 IV 1998, J. Y. Choi, J. B. Jeon.

Description. Big sized; fore wing 23 mm long. Yellowish. Fore wing with erected short chaetae on the membranes, almost monotonous; their tips incised below the apics. Hindwing, as usual, somewhat shorter and more than twice as broad as front one. Spurs 1, 2, 2.

In male, 8th segment caudally divided into two areas, covered with short, black setae. 9th segment dorsally narrow, but laterally and ventrally broadened, when viewed laterally. The front margin of 9th segment regularly rounded, the hind one, viewed laterally, with an obtuse protrusion

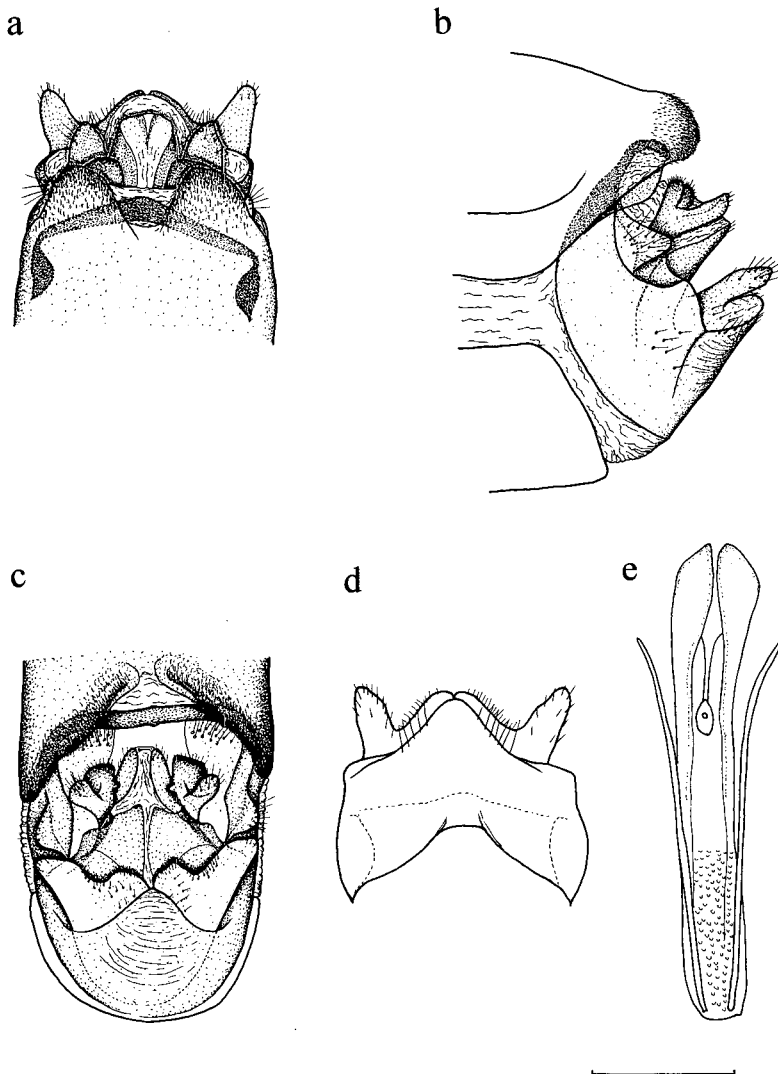


Fig. 9. Male genitalia of *Brachypsyche schmidi*, sp. n. a, dorsal view; b, lateral view; c, caudal view; d, ventral view; e, phallic apparatus, dorsal view. Sclae bar: 0.5 mm.

near the middle. Superior appendages small and located rather low, at 2/5 of the 9th segment's height. Intermediate appendages moderately sclerotized, each of two branches, forming an angle. The inner branch, bulbous, set with short spinules; the other one longer, almost horizontal. Inferior appendages also with two braches, the dorsal one somewhat slender, though nearly equal in length with the ventral one when viewed laterally. Between the bases of inferior appendages, there is a triangled protrusion of the ventral part of the 9th segment. Aedeagus membranous, long and flat, with its apex deeply bipartited, its basal 1/3 covered with small projections. Parameres shorter than aedeagus, sclerotized, thin and spine-like.

Female unknown.

Distribution. Korea.

Remarks. This interesting, big insect seems to be closely related with *Br. rara* (Martynov, 1914), which occurs in the East of Siberia, including Amur and Ussuri regions. However, there are several conspicuous differences: disto-dorsal part of 8th tergite with two distinct zones of small dark brownish spinules (which are lacking in the other two species of the genus); the intermediate appendages are also quite different in shape. The other species of that genus, *Br. sibirica* (Mart.) appears to be much more distant from *Br. schmidi* sp. n., according to the exhausting redescription in Schmid (1952a). The new species show some similarities with some species of the other genera of the Chilostigmiini Tribe, e. g., *Chilostigma sieboldi* McL. (shape of the aedeagus), *Grensia praeteriba* (Waek.) (bipartite 9th tergite), etc.

Main diagnostic features here are the combination of following ones : Spurs 1, 2, 2; 9th tergite of two deeply separated spinulose zones; shape of both intermediate and inferior appendages.

Derivatio nominis. We devote this new species to the memory of the great trichopterologist, the late Dr. Fernand Schmid (died 1998).

Family Goeridae 가시날도래과 (신칭)

Subfamily Goerinae

Goera japonica Banks, 1906 일본가시날도래 (Fig. 10a, b, c, 11j)

Goera japonica Banks, 1906, p. 108; Tsuda, 1942, p. 235; Yoon and Kim, 1988, p. 530; Kumanski, 1991, p. 25; Yu, 1994, p. 312.

Material examined. SNU 2♂ 1♀, Kangjung-chun, Bokpandong, CJ, 16 IV 1998, H. J. Choe, K. S. Woo; 4♂ 23♀, Foothill of Mt. Sokni-san, Hwabuk-myeon, Sangju, KB, 31 V 1998, H. J. Choe, K. S. Woo, H. Y. Kim, J. H. Kim; 1♂ 3♀, Seonam-sa, Mt. Zogae-san, JN, 24 VI 1997, S. B. Ahn; 4♂ 2♀, Mt. Yumyeong-san, KG, 14 VI 1997, S. B. Ahn; 5♂, Ziam, Chuncheon, KW, 10 VI 1997, M. J. Han, S. B. Ahn; 1♂ 1♀, Is. Geojae-do, KN, 4 VI 1997, K. J. Hong; 2♂ 3♀, Mt. Suri-san, Anyang, KG, 19 V 1997, H. J. Choe, S. B. Ahn; 4♂, Sagok-myeon, Kongju, CN, 4 V 1997, S. B. Ahn; 6♂, Mt. Taewha-san, KG, 4 IV 1998, J. Y. Choi; 2♂ 5♀, Kugok-gegok, Kangchon, KW, 10 VII 1998, H. J. Choe; 2♂ 6♀, Piagol, Mt. Chiri-san, JN, 29 V 1997, S. W. Park; 2♂ 2♀, Youngsil, CJ, 2 VII 1994, Y. M. Park; 12♂ 7♀, Near Jindong bridge, Jindong 1-ri, Mt. Zeombong-san, KW, 10 VIII 1998, H. T. Kim, J. M. Oh, H. J. Choe, K. Jung; 3♂ 7♀, Mt. Chiak-san, KW, 14 IX 1997, H. J. Choe, H. S. Lee, S. W. Park; 23♂ 22♀, Sohacheon, Dongweol, Mt. Gyeryong-san, CN, 24 VII 1998, H. J. Choe, H. S. Lee; UIB 5♂ 8♀, Mt. Balgyo-san, 7 VII 1998, Paek, Lee, Kim, Song.

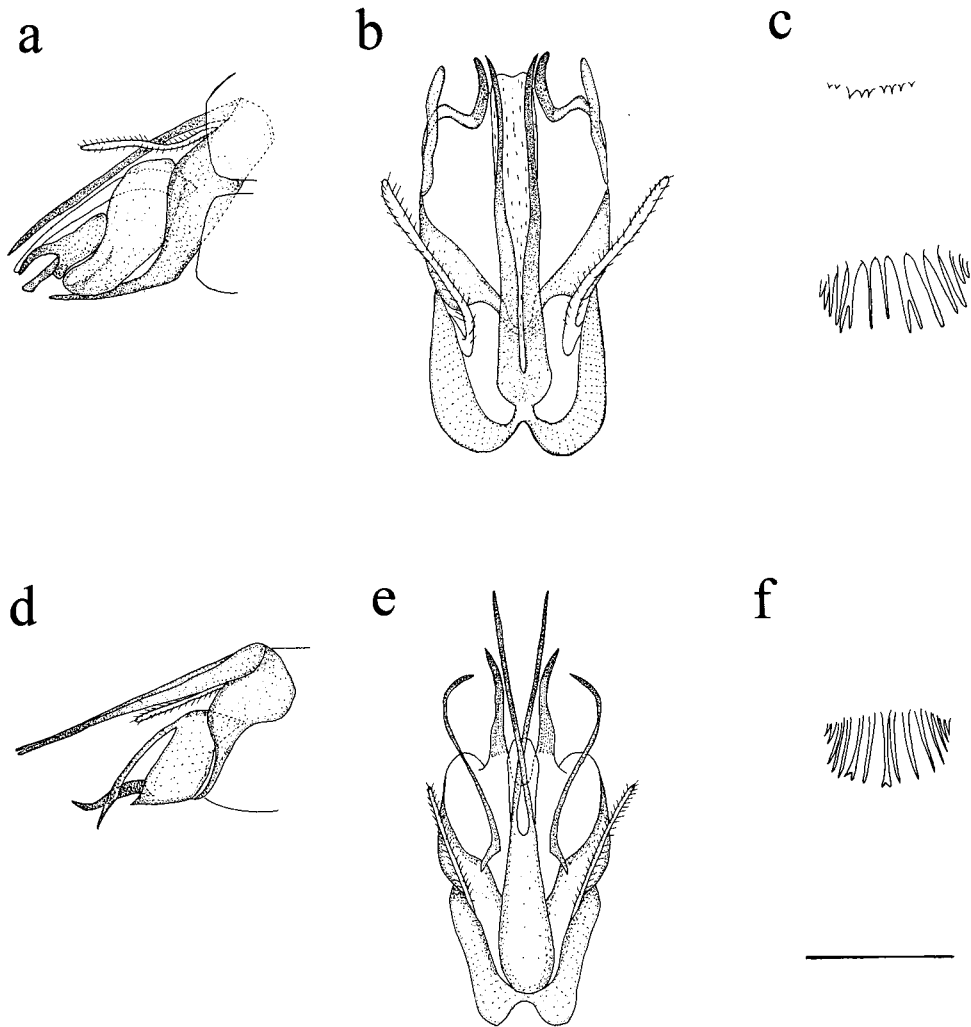


Fig. 10. Male genitalia of *Goera* spp. a-c, *G. japonica* (a. lateral view, b. dorsal view, c. spines on the 5th sternite (below) and 6th one (above)); d-f, *G. curvispina* (f. spines on the 6th sternite). Scale bar: 0.5 mm.

Redescription. Small sized; fore wing 7–11 mm. Scapes thick, longer than head and covered with blunt ended, yellowish and grayish hairs. Compound eye big. Ocelli absent. Head and thorax covered with yellowish, long hairs. Wings grayish, covered with hairs. Maxillary palpi of male modified into 2 segments which look like a pair of ovals on the frons. First segment very short and second segment membranous, rolled, and on the inner surface covered with blackish hairs. Maxillary palpi of female five jointed. On 6th sternite of male, there is a semicircle, consisting of 12~16 spines; some of these spines could be branched at the apex. In some cases, on 5th ones of male, with short spines.

In male, dorsal part of 9th segment narrowed, while the sternite protruded, and long. Appendages of 9th segment directed caudally, faintly undulating. Dorsal appendages of 10th

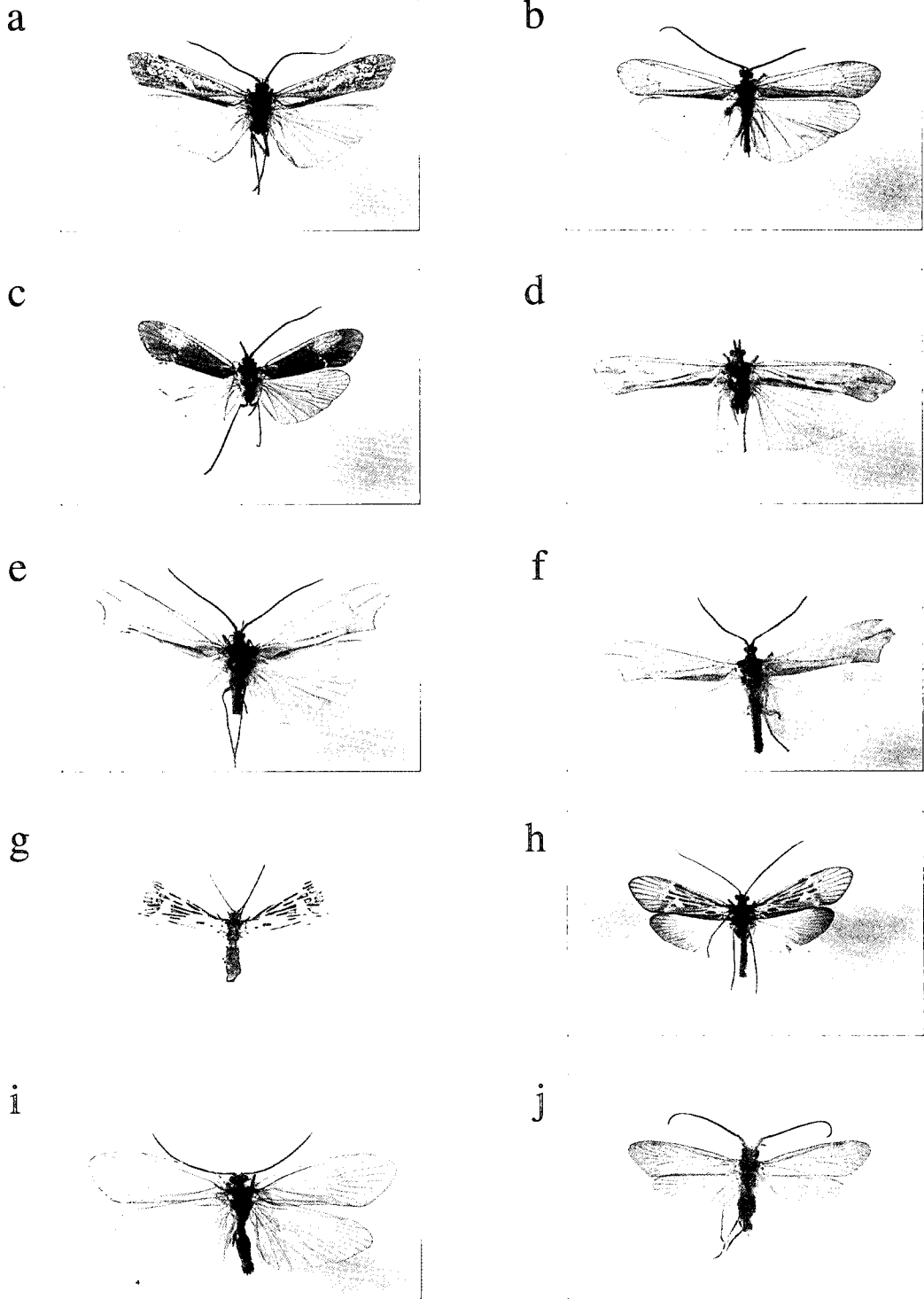


Fig. 11. a, *L. orientalis*; b, *L. fuscovittatus*; c, *A. amurensis*; d, *N. brevilinea*; e, *N. admorsus*; f, *N. mutatus*; g, *H. grammicus*; h, *H. nigrobittatus*; i, *H. magnus*; j, *G. japonica*.

segment well sclerotized and parallel in dorsal view. Claspers, or gonopods, consist of two segments. The second segment (harpago) with a dorsal finger-like lobe and a well sclerotized appendage medially.

Distribution. Korea, Japan, Far Eastern Russia.

Remarks. This is one of the most common caddisflies in Korea. The report of this species by Kim *et al.* (1993) is based on larvae only. Unless a comparison of material from Korea, resp. Japan, We remain in considering *G. japonica* and *G. interrogationis* different species, as Park and Bae (1998) did.

***Goera curvispina* Martynov, 1935** 방동가시날도래 (신칭) (Fig. 10d, e, f)

Goera curvispina Martynov, 1935, p. 208; Arefina, 1997, p. 127.

Material examined. 2 ♂, Bangdong lake, Daejeon, CN, 28 VIII 1997, H. J. Choe, H. S Lee.

Diagnosis. It is similar to *G. japonica*. However, in male, claspers are complicated; its basal part (coxopodite) is large, sloped, acute at ventral tip; and the ventral processes of the coxopodite is long and thin. Dorsomedial appendages of 10th tergite are common in basal 1/3 and distal parts, crossed, which is better observed in dorsal view.

Distribution. Korea, Far Eastern Russia.

Remarks. First record from Korea. The locality appears to be the southernmost one.

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We wish to express our thanks to Dr. W. Mey (Naturkunde Museum, Berlin, Germany), and Dr. Takao Nozaki (Kanagawa Environmental Reserach Center, Japan) for providing valuable comments on some cases of identification of species and some comparative specimens. Our thanks are extended to Drs. John C. Morse (Clemson University, USA), Yang Lianfang (Nanjing Agricultural University, China) for providing the valuable reprints, and Korean organizations such as Korean Forestry Research Institute, Kangwon National University, Sungshin Women's University, Dept. of Biology, University of Incheon, National Institute of Agricultural Science and Technology, for lending specimens for this research. We appreciate very much our colleagues, Mr. Choi Jun-Yeol and Mr. Jeon Jung-bae (NIAST, Korea) for providing type material of *Brachypsyche schmidi* sp. n.. We are obliged for total photos of species on Fig. 11, to our colleagues, Lee Heung-Sik and Kim Heung-Tae.

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한국산 우묵날도래 과와 가시날도래 과의 분류학적 검토

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요 약

남한에 분포하는 우묵날도래 과와 가시날도래 과에 속하는 15종을 보고하며, 성충 동정에 필요한 기재문과 외부생식기의 도해, 건조표본의 사진 그리고, 지리적 분포에 대한 정보를 제공한다. 이 중, 슈미드우묵날도래 *Brachpsyche schmidi* sp. n.는 신종이며, 동양모시우묵날도래 (신칭) *Limnephilus orientalis* Martynov와 방동가시날도래 (신칭) *Goera curvispina* Martynov 등 2종은 한국에서 처음으로 보고된다. 그리고, 어리우묵날도래 (신칭) *Nemotalius mutatus* MacLachlan, 아무르검은날개우묵날도래 (신칭) *Asynarchus amurensis* Ulmer, 우리큰우묵날도래 (신칭) *Hydatophylax formosus* Schmid 등 3종은 남한미기록종이다.