

A New Record of the Genus and Species, *Drepanopteryx phalaenoides* (Linné) (Neuroptera:Hemerobiidae:Drepanopteryginae) from Korea

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낙엽날개뱀잠자리붙이아과의 미기록속 및 미기록종, *Drepanopteryx phalaenoides* (Linné) (풀잠자리목:뱀잠자리붙이과)

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ABSTRACT: In the subfamily Drepanopteryginae of Hemerobiidae, *Neuronema albstigma* has been the only species known in Korea. Here we report that the genus *Drepanopteryx* Leach, 1815 and its species *Drepanopteryx phalaenoides* (Linné), 1758 are newly reported as a member of Drepanopteryginae in Korea. Together with a key for the species of Korean Drepanopteryginae, a brief description, COI barcoding sequence, and photos of adult and male genitalia for the species are provided.

Key words: Neuroptera, Hemerobiidae, Drepanopteryginae, *Drepanopteryx phalaenoides*, Korean fauna

초록: 그 동안 국내 Drepanopteryginae 아과(낙엽날개뱀잠자리붙이아과; 신칭)에는 오직 *Neuronema albstigma*만이 기록되어 있었으나, 이번 연구를 통해 국내 미기록속인 *Drepanopteryx*와 이 속에 포함되는 미기록종 *Drepanopteryx phalaenoides* (낙엽날개뱀잠자리붙이; 신칭)를 새롭게 보고한다. 이 종에 대한 간략한 기재와 속내 분류키, COI 바코드 염기서열, 그리고 성충 및 수컷 생식기의 사진을 제공한다.

검색어: 풀잠자리목, 뱀잠자리붙이과, 낙엽날개뱀잠자리붙이아과, *Drepanopteryx phalaenoides*, 낙엽날개뱀잠자리붙이

Hemerobiidae is the third largest family of the order Neuroptera, containing c.a. 600 species worldwide (Oswald, 2004; Farahi et al., 2009). They are similar to the species of Chrysopidae in general structure, but differ in several aspects. Commonly, hemerobiids are brownish in color, while chrysopids are green. They are also much less common than the latter in number of specimens (Banks, 1905). In forewing, a forked recurrent humeral vein is found in hemerobiids except *Micromus* spp., but not in chrysopids. Their forewing characters can distinguish them from other neuropteran families by the

combination of (1) anterior radial trace with two or more radial sectors and (2) absence of nygmata (Oswald, 1993).

Eighteen species of Hemerobiidae have been recorded in Korea Peninsula, and most of them were listed from North Korea (Monserrat, 2000). So far, eight species have been described in South Korea (ESK and KSAE, 1994; Paek et al., 2010).

Drepanopteryginae (낙엽날개뱀잠자리붙이아과; new Korean name) are large hemerobiids, and are distributed in Asia, Europe, and Southern South America. Proposed synapomorphies for the subfamily include (1) temporal costae lost or poorly developed, (2) forewing intramedial crossvein 2im present, and (3) forewing intercubital crossvein 1cua-cup present (Oswald, 1993).

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Only one species, *Neuronema albstigma*, has been reported in Korea, and here we report *Drepanepteryx phalaenoides*, the second species in Drepanepteryginae of Korea. This species is rather a well-known species in the Palearctic region, but it is the first time that the occurrence of the genus and the species is reported as new to Korea.

Materials and Methods

We examined our collected specimens as well as some dried specimens loaned from the Korea National Arboretum (KNA). The samples were examined through a dissecting microscope with an imaging apparatus. The forewing length was measured from the base to the apex. For some samples, their genitalia were dissected, examined, and saved in glycerol. We also extracted its nucleic acids to get a sequence of COI barcode region following the method described in An et al. (2014). The specimens examined were deposited at the insect collection room of the Department of Plant Medicine in Chungbuk National University.

Taxonomic Account

Genus *Drepanepteryx* Leach, 1815

Drepanepteryx Leach, 1815:138.

Type: *Hemerobius phalaenoides* Linné, 1758:550.

Drepanepteryx [sic]: Burmeister, 1839:975.

Drepanepteryx Agassiz, [1847] 1842-1846:130 (unjustified emendation).

Megalomus Rambur, 1842:418.

Canisius Navás, 1913:512.

Oedobius Nakahara, 1915:44.

Phlebonema Kruger, 1922:170.

Bestreta Navas, 1924:222.

Diagnosis

Body size: middle to large. Forewing: crossvein 2sc-r present; anterior radial trace bearing eight or more radial sectors; costal space with gradate series of five or more crossveins.

Drepanepteryx phalaenoides (Linné 1758) 낙엽날개뱀잠자리붙이(신칭) (Figs. 1, 2a-c, and 3a)

Hemerobius phalaenoides Linné 1758:550.



Fig. 1. Wing venation and pattern of *Drepanepteryx phalaenoides*.

Drepanepteryx phalaenoides, Burmeister, 1839:975; Wesmael, 1841:219; Rostock, 1888:108; Kuwayama, 1962:358.

Drepanepteryx phalaenoides, Leach, 1815:138; Wallengren, 1871:33; Kuwayama, 1920:87, pl. 1, figs. 1, 4-7; Krüger, 1922:179; Matsumura, 1931:1161, fig.; Matsumura, 1933:8 (12), pl. 2, fig. 16; Killington, 1937:143, pl. 17, fig. 2, text figs. 98, 99.

Megalomus phalaenoides, Rambur, 1842:418. Pl. 9, fig. 6.

Diagnosis

Adult (Figs. 1 and 3a). Head: antennal flagellum 55-56 segmented. Thorax: brownish; prothorax blackish laterally; mesothorax longer than prothorax and metathorax. Wing: forewing length 13-16 mm; forewing (Fig. 1) light brown, brown along veins, with brown mesh-like pattern, distinctly falcate at apex, with a small blackish brown spot near basal 2/5 of M_1 ; 2sc-r present; with two dark brown lines, inner one along third intraradial and intramedial crossveins and outer one along fourth intraradial and intramedial crossveins, outer line usually narrower or fainter than inner line; with a dark brown line from near anterior 2/5 point of inner line to apex, line somewhat darker towards apex.

Male genitalia (Fig. 2). Ectoproct and anal plate sclerotized with setae (Fig. 2a); callus cerci rounded (Fig. 2c); gonarcus curved downward, beak-shaped (Fig. 2b); parabaculum elongated, clamp shaped, distally curved outwardly and downwardly, with pointed tip.



Fig. 2. Male genitalia of *D. phalaenoides*. a, caudal view; b, dorsal view; and c, lateral view.

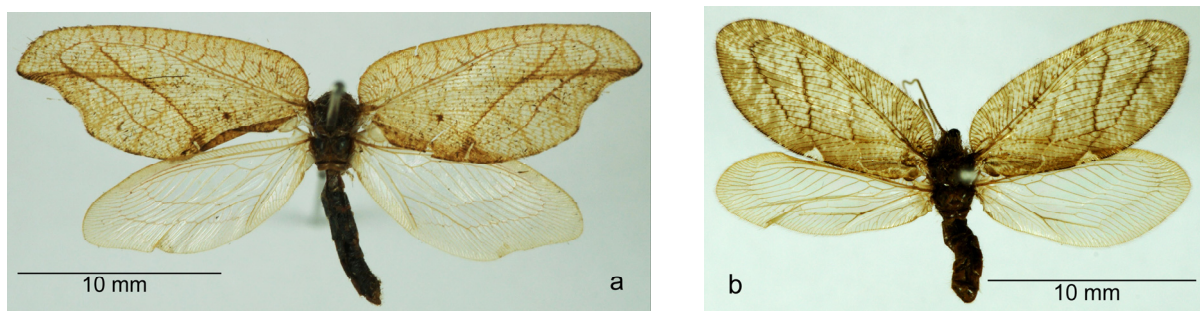


Fig. 3. Two species of Korean Drepanepteryginae. a, *Drepanepteryx phalaenoides*; b, *Neuronema albostigma*.

Material Examined

1 female, 1 male. Jangsan, Sangdong-eup, Yeongwol-gun, GW. May 18, 2010. S.Y. Park, J.S. Lim, B.K. Byun; 1 female. Jangsan, Sangdong-eup, Yeongwol-gun, GW. Jun. 14, 2010. S.Y. Park, J.S. Lim, B.K. Byun; 1 female. Bannonsan, Yeoryang-myeon, Jeongseon, GW. May 19, 2010. S.Y. Park, J.S. Lim, B.K. Byun; 1 female. Bannonsan, Yeoryang-myeon, Jeongseon, GW. Jul. 20, 2010. S.Y. Park, J.S. Lim, K.M. Kim; 1 male. Obong-ri, Geumseo-myeon, Sancheong-gun, GN. Jun. 4, 2013. S.K. Lee, S.K. Kim; 1 female. 34, Sambonghyuyangrim-gil, Nae-myeon, hongcheon-gun, GW. Jun. 6, 2015. S.K. Kim; 1 female. Yongmun, Daegwang-ri, Juam-myeon, Suncheon-si, JN. Jul. 15, 2015. G.H. Cho.

Distribution

The species is widely distributed in the Palearctic region including Russia, China, Japan and Korea.

Remarks

This species is known as a beneficial predator of plant-sucking insect pests. The species is widely distributed, but never reaching significant abundance, on different deciduous trees and shrubs (Stelzl and Devetak, 1999).

Key to the species of Korean Drepanepteryginae

1. Large-sized species; forewing length 13-16 mm; forewing distinctly falcate at apex, with narrow fenestella on posterior margin *Drepanepteryx phalaenoides* 낙엽날개뱀잠자리붙이(신칭) (Fig. 3a)
2. Medium-sized species; forewing length 11-13 mm; forewing tip not falcate, with whitish deltoid fenestella on posterior margin *Neuronema albostigma* 큰날개뱀잠자리붙이 (Fig. 3b)

COI barcode sequence

TTGATCAGGTCTTGTAGGAACAAGACTTAGATTATTAA

TTCGAGCAGAATTAGGTCAACCAGGTTCAATTAATTGGTGA
TGATCAAGTTTATAATGTTATTGTTACTGCTCATGCATTTA
TTATAATTTTTTTTATAGTTATACCAATTGTTATTGGTGGA
TTTGGAAACTGATTAGTCCCATTAATATTAGCTGCACCGG
ATATAGCATTCCCTCGAATAAATAATATAAGATTCTGAAT
ACTACCTCCCTCTTTAACACTTTTATTAGCTTCATCAATGG
TGGAAAGTGGGGCTGGTACAGGTTGAACTGTATACCCACC
CCTCTCATCAAGTATTGCTCATGCAGGAGCATCAGTTGAT
TTAGCAATTTTTAGCCTACATTTAGCTGGAGTCTCAAGAA
TTTTAGGAGCAGTAAATTTTACTACAGTTATTAATATG
CGTTTAAATTATATAACTTTAGATCGTATACCATTATTTGT
TTGATCAGTAGTAATTACTGCCTTACTTCTATTATTATCAT
TACCCGTATTAGCTGGAGCTATCACTATATTATTAACAGA
CCGAAATCTAAACACATCATTCTTTGACCCTGCAGGGGGA
GGGACCCAATTTTATATCAACATTTATTTTGATTTTT

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