



Original Article

Three species of Limacodidae (Lepidoptera, Zygaenoidea), new to Korea

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ABSTRACT

Three species of Limacodidae, *Ceratonema butleri* Kawada, 1930, *Microleon decolatus* Sasaki, 2016, and *Isopenthocrates japona* Yoshimoto, 2004, are recorded for the first time from Korea. Photos of external and genital features are provided for the three species.

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Introduction

Limacodidae belong to the Apoditrysiian superfamily Zygaenoidea, as supported by morphological (Epstein 1996), molecular (Regier et al 2013), or both (Heikkilä et al 2015) data. Limacodidae comprise about 1,000 species in the world (Epstein et al 1999). This family includes two subfamilies, Limacodinae and Chrysopolominae, only the former of which occur in Korea. The monophyly of Limacodidae is supported by six synapomorphies, four from their immature stages and two from adults (Epstein 1996). Within Limacodidae, it turned out that Limacodinae are paraphyletic against Chrysopolominae (Epstein et al 1999).

The Korean species of Limacodidae were first recorded by Fixsen (1887). Since then, they were studied, based on piecemeal records in the faunistic works by foreign researchers (Leech 1889, 1899; Kawada 1930; Matsumura 1931; Bryk 1948). The Korean Limacodidae were first fully reviewed by Okano and Park (1964) who recorded 15 genera and 19 species. Nam (1982) revised the previous records of Limacodidae from Korea representing 16 genera and 19 species but, probably by mistake, omitted two species, *Narosa edoensis* Kawada and *Ceratonema imitatrix* Hering. Incorporating the recent additions (Kim et al 2009; Sasaki 2013; Sohn and Choi

2017), a total of 19 genera and 26 species of Limacodidae have been recorded from Korea. In the present article, we report three species of Limacodidae new to the Korean fauna.

Material and methods

All the specimens examined were deposited in the Department of Environmental Education, Mokpo National University (MPNU) and in the National Institute of Biological Resources, Incheon (NIBR). Pinned specimens and slide preparations were examined using dissecting and compound microscopes (Leica EZ4 and Leica DM-500). Dissected genitalia were mounted on slides in Euparal. In the specimen data, "GSN" in brackets indicates the number of the genitalia slide. Terms for genitalia follow Klots (1970).

Taxonomic accounts

Ceratonema Hampson, 1893

Ceratonema Hampson, 1893: 373 (key), 393. Type species: *Limacodes retractata* Walker, 1865.

This genus is closely related to *Trichogyia* Hampson, 1894, based on the forewing venation and the filiform male antennae but differs from the latter in having elongate gnathos in the male genitalia and the signum with a sparse subbasal ring of short spines in the female genitalia (Holloway 1986). *Ceratonema* comprise 17 species occurring in the Palearctic and Oriental Regions (Beccaloni et al 2003). There have been two species of *Ceratonema* known from Korea

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(Okano and Pak 1964): *Ceratonema christophi* (Graeser, 1888) and *C. imitatrix* Hering, 1931.

***Ceratonema butleri* Kawada, 1930**

향토뽕기나방 (Figures 1A and 2C)

Aphendala sericea Butler, 1881: 595 [Type locality: Japan, Tokyo] (preoccupied).

Thosea sericea; Leech, 1899: 102.

Thosea (Aphendala) sericea; Matsumura, 1905: 184.

Ceratonema butleri Kawada, 1930: 233 (objective replacement name); Solovyev and Saldaitis, 2014: 14.

Ceratonema sericea; Inoue, 1982: 300; Solovyev, 2010: 359.

Ceratonema sericeum; Sasaki, 2013: 53, 323.

Description. Head—frons and vertex yellowish gray; antenna brownish gray; labial palpus yellowish gray with grayish brown line along lower lateral edge. Thorax—patagium brownish gray; tegula pale brownish gray; mesonotum yellowish gray. Forewing length 12–14 mm (n=5), pale grayish brown; antemedian line dark brown, curved; median line as dark brown, oblique streak; postmedian line dark brown broadly curved toward tornus; fringe brownish gray. Hindwing pale brownish gray, tinged with yellowish gray on anal margin; fringe brownish gray.

Male genitalia. (Figure 2C) Uncus elongate, triangular, densely setose laterally; gnathos with bifid medial process, as long as uncus. Valva elongate, nearly of even width, broadly round apically, sensely setose; sacculus simple. Phallus curved dorsad, slender, with spiniform cornuti.

Female genitalia. Unknown.

Material examined. 1♂, Mt. Sobaeksan, Danyang-gun, Chungbuk Prov., (3701'N, 12831'E, alt. 280 m), 21 vii 2005 (SW Choi), NIBR; 1♂, Mt. Gyeryongsan, Gongju-si, Chungnam Prov., (3619'N, 12715'E, 340 m), 30 vii 2004 (MNU), NIBR; 1♂, Mt. Jirisan, Gurye-gun, Jeonnam Prov., (3517'N, 12733'E, alt. 1350 m), 17 vii 2005 (SW Choi), MPNU; 1♂, Mt. Jirisan, Toji-myeon, Gurye-gun, Jeonnam Prov., (3518'12"N, 12733'34"E, alt. 1318 m), 20 vii 2007 (SW Choi), MPNU; 1♂, Mt. Jirisan, Sandong-myeon, Gurye-gun, Jeonnam Prov., (3518'21"N, 12730'45"E, alt. 1074 m), 23 vii 2009 (J Lee), NIBR; 1♂, Mt. Jirisan,

Gwangui-myeon, Gurye-gun, Jeonnam Prov., (3517'31"N, 12729'39"E, alt. 660 m), 1 vii 2011 (SW Choi), [GSN] SJC-1067, MPNU.

Distribution. Korea, Japan, China (Jilin, Shaanxi, Sichuan, and Zhejiang), and Russia (Amur).

Host plants. Clethraceae—*Clethra barbinervis* Siebold & Zucc.; Eupteleaceae—*Euptelea polyandra* Siebold & Zucc.; Hamamelidaceae—*Hamamelis japonica* Siebold & Zucc.; Sabiaceae—*Meliosma myriantha* Siebold & Zucc.; Sapindaceae—*Acer palmatum* subsp. *matsumurae* Koidz. (Nakatomi 1968, 1987; Inoue 1982).

Remarks. Kawada (1930) proposed a substitute name, *butleri*, for *Ceratonema sericea* that turned out to be a secondary homonym with *Phrixolepia sericea* Butler, 1877. There is still nomenclatural confusion between those two names for the species even in recent literature such as Sasaki (2013). See Solovyev and Dubatolov (2015) for the details of the nomenclatural issue involving *C. butleri*.

***Microleon* Butler, 1885**

Microleon Butler, 1885: 121 [Type species: *Microleon longipalpis* Butler, 1881].

Microleon can be distinguished from other limacodid genera in Korea by the combination of three characteristics (Okano and Pak 1964): hind tibiae with two pairs of spurs; male antennae filiform and not flattened; and labial palpus ca. 3× longer than the diameter of the eye. This genus had been known as monobasic until Sasaki (2016) who described two cryptic congeners from Japan. In Korea, only *Microleon longipalpis* has been known (Okano and Pak 1964).

***Microleon decolatus* Sasaki, 2016**

나도꼬마뽕기나방 (Figures 1C and 2A, E)

Microleon decolatus Sasaki, 2016: 101 [Type locality: Japan, Akita Pref., Kawabe Town, Uwanodai].

Description. Head—frons and vertex pale yellowish brown; antenna pale yellowish brown on basal 1/8, pale grayish brown on distal 7/8; labial palpus pale yellowish brown, intermixed with dark brown scales laterally. Thorax—patagium pale grayish brown;



Figure 1. Adults of Limacodidae: A, *Ceratonema butleri* Kawada; B, *Isopenthoctates japona* Yoshimoto; C, *Microleon decolatus* Sasaki; D, *Microleon longipalpis* Butler. <scale bars: 5 mm.>

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