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## ***Saturnia jonasii* Butler, 1877 on Jeju Island, a new saturniid moth of South Korea with DNA data and morphology (Lepidoptera: Saturniidae)**

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### **Abstract**

*Saturnia* (*Rinaca*) *jonasii* Butler, 1877 is distributed in Japan, including Tsushima Island and Taiwan, whereas *S. boisduvalii* Eversmann, 1846 is distributed in northern areas, such as China, Russia, and South Korea. In the present study we found that the specimens from Mt. Hallasan on Jeju, a southern remote offshore island, were *S. jonasii*, rather than *S. boisduvalii* based on morphology, DNA barcode, and nuclear elongation factor 1 alpha (EF-1 $\alpha$ ) sequences. The major morphological differences between the two species included the shape of wing pattern elements of fore- and hindwings and male and female genitalia. A DNA barcode analysis of the sequences of the Jeju specimens and *S. boisduvalii*, along with those of *Saturnia* species obtained from a public database showed a minimum sequence divergence of 4.26% (28 bp). A phylogenetic analysis also showed clustering of the Jeju specimens with *S. jonasii*, separating *S. boisduvalii* (Bayesian posterior probability = 0.99). The EF-1 $\alpha$ -based sequence and phylogenetic analyses of the two species from Jeju Island and the Korean mainland showed the uniqueness of the Jeju specimens from *S. boisduvalii* collected on the Korean mainland, indicating distribution of *S. jonasii* on Jeju Island in South Korea, instead of *S. boisduvalii*.

**Key words:** taxonomy, DNA barcode, elongation one alpha gene, *Saturnia boisduvalii*, Saturniidae, Jeju Island

### **Introduction**

*Saturnia* Schrank, 1802 is a genus in the family Saturniidae Boisduval, 1837 that includes approximately 40 described species (<http://www.saturniidae-web.de/index.html>). The genus occurs primarily in the Holarctic, with a few species distributed in the Oriental region of the Himalayas (Teramoto 1996). Several different generic and subgeneric names have been applied for the genus *Saturnia* and related groups in the tribe Saturniini (e.g., *Agapema*, *Calosaturnia*, *Eudia*, *Perisomena*, *Rinaca*, and *Caligula*). Nässig (1994) applied the generic name *Saturnia* with the subgeneric name *Rinaca* Walker, 1855 for those species that have long been treated as *Caligula* Moore, 1862, in which *Caligula boisduvalii* Eversmann, 1847 and *Caligula jonasii* Butler, 1877 have been classified, but controversy persists regarding the monophyly of *Rinaca* (Mirand & Peigler 2007).

Nässig (1994) distinguished the genus *Saturnia* based on the prominent black, white, and red apical pattern on the forewing; eyespots on the fore and hindwings, usually with rings and lunular semi-circles in yellow, black, and blue; a strongly indented, prominent postmedial fascia of the forewing and often reddish base of the hindwing; and a broad bifid uncus, a prominent harpe on the ventro-distal part of the valva, the two dorsal appendices on the juxta, and the asymmetrical pointed lateral sclerotization at the distal tip of the aedeagus on the male genitalia. The genus was tentatively divided into six subgenera (*Rinaca*, *Saturnia*, *Eudia*, *Calosaturnia*, *Agapema*, and *Perisomena*) and *S. boisduvalii* Jordan, 1911 and *S. jonasii* Butler, 1877 were included in the subgenus *Rinaca* (Nässig 1994).

In South Korea, three species of *Saturnia* s. l., such as *S. boisduvalii* Jordan, 1911, *S. japonica* Moore, 1862, and *Eriogyna pyretorum* Westwood, 1848 have been reported. Among them, *S. boisduvalii* is distributed in North and South Korea, northern China, the Russian Far East, and southeastern Siberia at the zone of deciduous broadleaf forest. South Korean *S. boisduvalii* have been collected from north of Mt. Jirisan in the Taebaek mountain range to

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