

Larva of *Liliocerus (Liliocerus) ruficollis* (Coleoptera: Chrysomelidae) from Korea

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한국산 고려긴가슴잎벌레(딱정벌레목: 잎벌레과) 유충에 대한 연구

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ABSTRACT: Detailed morphological descriptions and illustrations of the last instar larva of *Liliocerus (Liliocerus) ruficollis* (Baly, 1865) with the host species, *Dioscorea* spp., are presented for the first time. Taxonomical and ecological remarks on their biology are also given herein.

Key words: Coleoptera, Chrysomelidae, *Liliocerus (Liliocerus) ruficollis*, larva, Korea

조 록: 약용식물로 알려진 마류(*Dioscorea* spp.)를 기주로 하고 있는 고려긴가슴잎벌레[*Liliocerus (Liliocerus) ruficollis* (Baly, 1865)]의 유충에 대한 그림과 기재를 처음으로 보고하였다. 또한 그들의 분류학적 소견 및 생태적 특징도 작성하였다.

검색어: 딱정벌레목, 잎벌레과, 고려긴가슴잎벌레, 유충, 한국

The genus *Liliocerus* Reitter, 1912 is distributed throughout the Palaearctic, Oriental and Ethiopian regions. According to Lopatin (1977), 40 species are known in the Palaearctic Region (mainly eastern Asia). In Korea, the genus is represented by eight species as *Liliocerus (Chujoita) gibba* (Baly, 1861), *Liliocerus (Liliocerus) cyaneicollis* (Pic, 1916), *L. (L.) merdigera* (Linnaeus, 1758), *L. (L.) ruficollis* (Baly, 1865), *L. (L.) rufometallica* (Pic, 1923), *L. (L.) scapularis* (Baly, 1859), *L. (L.) sinica* (Heyden, 1887) and *L. (L.) triplagiata* (Jacoby, 1888) (Lee and An, 2001). Many of them are important pests on medicinal plants and garden flowers [(lily; yam; etc) Lee *et al.*, 200; Jang *et al.*, 2010; Kwon *et al.*, 2010]. There have been a few studies on the adult taxonomy of Korean *Liliocerus* (Gressitt and

Kimoto, 1961; An *et al.*, 1986; An and Kwon, 1995; An, 1995, 1996, 1998; Lee and An, 2001). Although the main damage to the plants is caused by their larvae, nothing is known about the larvae of Korean *Liliocerus*. *L. (L.) ruficollis* is associated with *Dioscorea* (Dioscoreaceae), especially *D. septemioba* which is a well-known medicinal plant in Korea.

In the present paper, detailed descriptions and illustrations of the larva of *L. (L.) ruficollis* are provided for the first time. Some remarks on their biology are also given.

Materials and Methods

Larvae of *L. (L.) ruficollis* were reared on the host plants, *Dioscorea* spp. in the laboratory. The specimens used in this study were preserved in 70% ethyl alcohol. For morphological study, they were cleared in 10% KOH solution for 30 minutes

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and then rinsed in water. The dissection was done under a stereoscopic microscope (SZX12; Olympus, Japan). For morphological studies of the minute structure, slides were made for the body part and observed through the compound microscope (SZ4045; Olympus, Japan). The terminology follows Anderson (1947) and Kimoto (1962).

Taxonomic Accounts

Subfamily Criocerinae Lacordaire, 1845.

Genus *Lilioceric* Reitter, 1912.

Diagnosis of the genus *Lilioceric* Reitter.

Dorsum with distinct tubercles, at least with small obscure tubercles on meso- and metathorax, or meso- and metathorax each with two rows of setae dorsally.

Subgenus *Lilioceric* Reitter, 1912.

Lilioceric (*Lilioceric*) *ruficollis* (Baly, 1865)

Crioceric *ruficollis* Baly, 1865. Ann. Mag. Nat. Hist., ser. 3, 16, p. 155 (N. China).

Crioceric *sievers* Heyden, 1887. Horae Soc. Ent. Ross., 21, p. 27 (Korea).

Lilioceric (*Lilioceric*) *ruficollis*: An et al., 1986. Ins. Kor. 6: 125-126.

Lilioceric (*Lilioceric*) *ruficollis*: An, 1995. Cheju. Folk. & Nat. Hist. Mum.: 154.

Lilioceric (*Lilioceric*) *ruficollis*: An, 1996. Res. Bull. Nat. Sci. Mus. 13: 42.

Lilioceric (*Lilioceric*) *ruficollis*: An et Kwon, 1995. Ins. Kor. Suppl. 5: 92.

Diagnosis. Body densely stippled with minute elevations; anterior margin of labrum deeply notched on anterior margin, with three pairs of setae and two pairs of sensilla.

Descriptions

First instar larva (Fig. 2A). Similar to mature larva except for following characters: body length 1.8 ± 0.2 mm, width 0.5 ± 0.1 mm, head width 0.36 ± 0.02 mm (n=5); head color black and body color white. Egg bursters (Fig. 1F) present on dorso-lateral region of metathorax.

Last instar larva (Fig. 1A-E, G-J; Fig. 2B). Body length 8.0 ± 1.5 mm, width 2.6 ± 0.3 mm, head width 1.2 ± 0.1 mm (n=10).

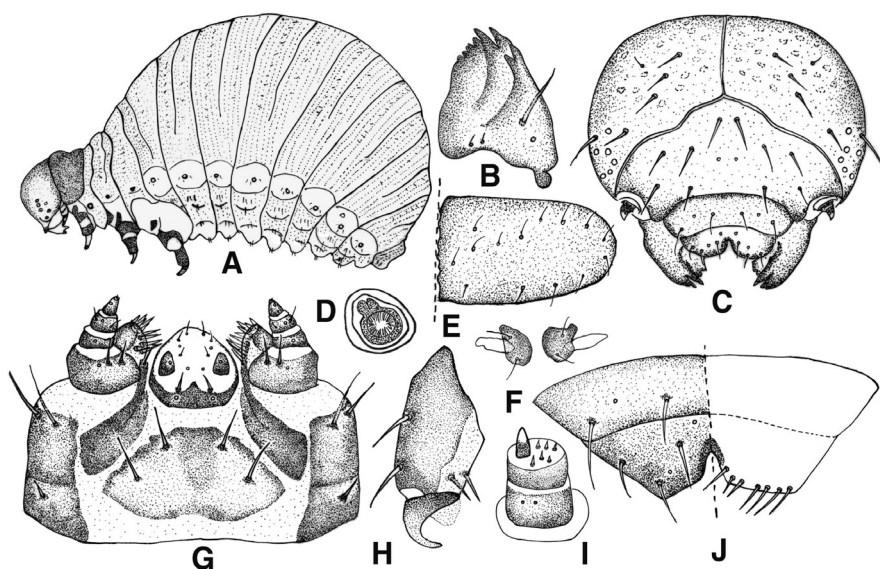


Fig. 1. *Lilioceric* (*Lilioceric*) *ruficollis* (Baly). A. last instar larva (l.v.); B. mandible (b.v.); C. head (d.v.); D. spiracle (thoracic, d.v.); E. pronotum (d.v.); F. egg bursters (d.v.); G. lower mouth parts (d.v.); H. tibia (d.v.); I. antenna (d.v.); J. clypeus and labrum (v.v. and d.v.). b.v.: buccal view; d.v.: dorsal view; l.v.: lateral view; v.v.: ventral view.



Fig. 2. *Lilioceris (Lilioceris) ruficollis* (Baly). A. first instar larva; B. last instar larva.

Body arched, brownish, covered with a slimy mucous secretion usually bearing excrement. Dorsum densely stippled with minute elevations.

Head (Fig. 1C). Hypognathous, orange, well sclerotized, epicranial suture Y-shaped; frontal suture distinct. Stemmata well developed, six in number. Endocarina absent; frons with 5 pairs of frontal setae and 1 pair of sensilla. Clypeus (Fig. 1J) trapezoid, with 2 pairs of setae and 1 pair of sensilla; labrum brown, deeply notched on anterior margin, with 3 pairs of setae and 2 pairs of sensilla; epipharynx with 7 pairs of setae. Antenna (Fig. 1I) two-segmented. Mandible (Fig. 1B) with 5 distal teeth and 3 mandibular setae and 1 sensillum. Maxillary palp three-segmented; palpifer with 1 seta; stipes with two setae; cardo with 1 seta (Fig. 1G). Lacinia fused with stipes; galea with 10 setae; Labial palp (Fig. 1G) one-segmented with 1 sensillum; prementum with four pairs of setae and 2 pairs of sensilla; postmentum with 2 pairs of setae.

Thorax. Pronotum (Fig. 1E) pale brown, sclerotized, with 14 pairs of setae. Meso- and metathorax with small obscure tubercles on dorsum. Thoracic spiracles (Fig. 1D) biforous. Legs long and slender; tibia (Fig. 1H) with 5 setae; tarsus strongly curved, hook-like; pulvillus present.

Abdomen. Abdominal spiracles present on segments I-VIII similar to prothoracic spiracles but smaller. Anal opening present on abdominal segment IX.

Materials examined. 10 exs., Doreokdo Isl., Yeosu City, Jeollanam-do, 29.V. 2010, J.Y. Park; 20 exs., Sanggyedo Isl., Yeosu City, Jeollanam-do, 13. VI. 2010, J.Y. Park.

Distribution. Korea, China, Japan.

Host plant. *Dioscorea* spp. (*D. septemioba*, *D. batatas* and *D. japonica*)

Remarks. This species is easily separable from the known Criocerine larvae by numerous spines present on mosaic-like microsculpture of the tergum except for the prothorax.

Biological note. This species has a single generation per year, overwinters in the adult stage. Adults appear in early April, begin ovipositing in early May. Eggs are laid singly inside or surface of the leaf. The larvae have a habit of accumulating their feces on their body, which serves them as a protection. The body of the larvae can also be enclosed in mucus. They then burrow themselves underground to pupate in a cocoon formed by saliva and small particles of soil. The emergence of adults starts in early June and lasts until later July. The total life cycle from egg to adult ranged from 30 to 35 days room temperature.

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