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Lee, Jong Eun

Entomological Laboratory, Faculty of Agriculture, Kyushu University

Morimoto, Katsura

Entomological Laboratory, Faculty of Agriculture, Kyushu University

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The Egg and First-Instar Larva of *Oomorphoides cupreatus* (Baly) from Japan, with Notes on the Systematic Position of Lamprosomatinae (Coleoptera : Chrysomelidae)*

Jong Eun Lee and Katsura Morimoto

Entomological Laboratory, Faculty of Agriculture,
Kyushu University, Fukuoka 812, Japan

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The egg and first-instar larva of *Oomorphoides cupreatus* (Baly) are described and illustrated for the first time from Japan, and the systematic position of the subfamily Lamprosomatinae is discussed on the morphological and biological characters.

INTRODUCTION

The Lamprosomatinae are a small subfamily of the Chrysomelidae comprising 13 genera and some 200 species in the world, and 2 genera and 6 species in Japan. The study of their larvae lags far behind that of the adults and only *Oomorplus concolor* (Sturm) from Australia has properly been described up to the present by Kasap and Crowson (1976). The purpose of this paper is to discuss the phylogenetic position of the subfamily Lamprosomatinae on the larval characters, together with descriptions of the egg and first-instar larva of *Oomorphoides cupreatus*.

MATERIALS AND METHODS

The identification of larva was made from the reared adults by the senior author. The egg and larva were preserved in 70% ethyl alcohol. The larva was macerated in 10% KOH solution for several minutes, rinsed in water, and then dissected under a stereoscopic microscope. For detailed morphological studies on the various parts of larva, the stereoscopic microscope and the compound microscope were used. Drawings were made with aid of an ocular grid micrometer attached to stereoscopic microscope. The terminology of the setae used in this study is the same as that used by Anderson (1947) for the larvae of the Curculionidae and adopted by LeSage (1982) for those of the Chrysomelidae.

IMMATURE STAGES

***Oomorphoides cupreatus* (Baly)**
(Figs. 1-3)

Egg. Brown, oblong acorn-shaped (Fig. 1. F). 0.9-1.1 mm long, 0.4-0.5 mm at

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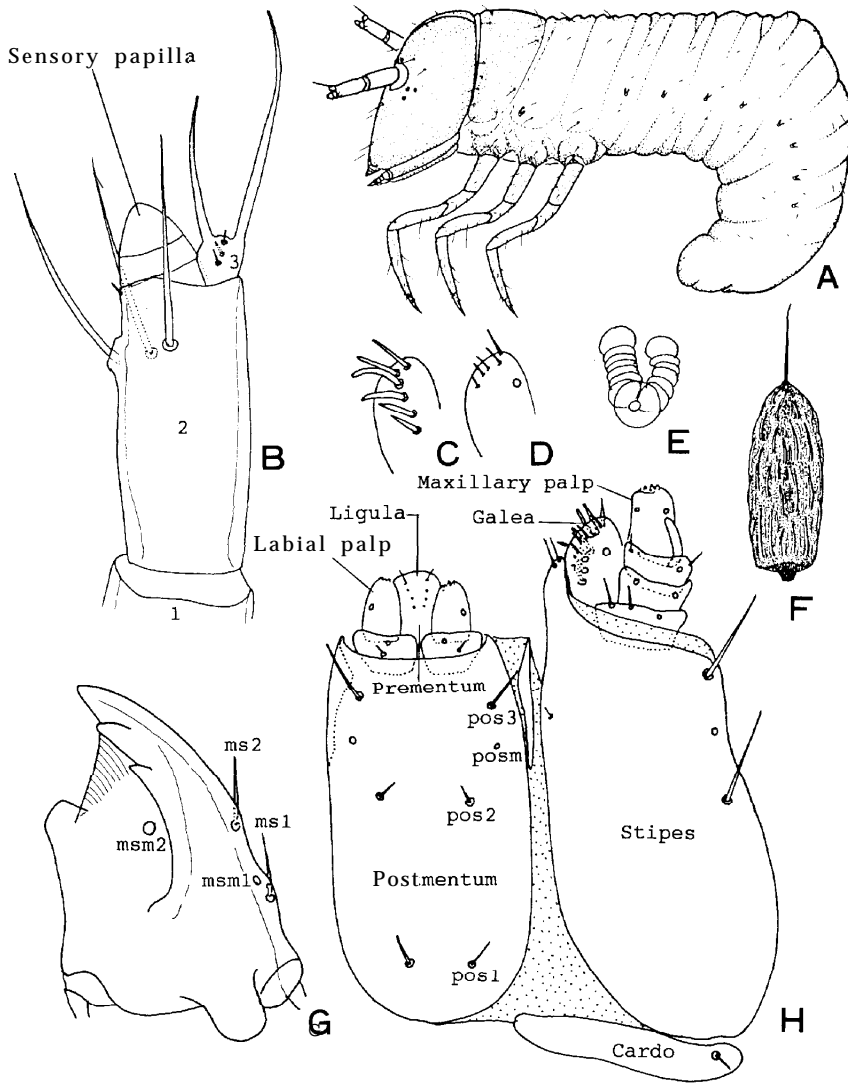


Fig. 1. *Oomorphoides cupreatus* (Raly). A, first instar larva, case removed, lateral view ; B, antenna ; C, galea, dorsal view ; D, same, ventral view ; E, mesothoracic spiracle ; F, egg ; G, mandible ; H, maxilla and labium, ventral view, prementum retracted.

widest diameter ($n=5$), surface with protuberances arranged in oblique rows. Eggs are attached to host plants by a stalk.

Larva. Body J-shaped (Fig. 1. A). Head pale brown, prothorax yellowish brown, mesothorax, metathorax and abdomen yellowish ; legs shiny, yellowish brown.

Head (Fig. 2. A, B). Hypognathous, slightly sclerotized. Epicranial suture weakly marked ; coronal suture one-fourth the length of head ; frontal sutures widely divergent and nearly straight. Stemmata (Fig. 2. B) well developed, 5 in number, distributed in 2 groups, 2 pairs of posterior stemmata behind antenna and 3 pairs of anterior stemmata below antennal bases, posteriormost stemma of the posterior group convex, often contiguous to the preceding one, 2 rear stemmata of the anterior group often contiguous to form a long spot on each side ; 3 pairs of stemmatal setae (ss) present, ss1 beside des4, ss2 and ss3 between vesm and lesm2. Epicranium (Fig. 2. B) with 4 pairs of posterior minute epicranial setae (pes 1-4) and 1 pair of epicranial sensilla (epsm) ; 5 pairs. of dorsal epicranial setae (des) present : des1 beside coronal suture, des2 before pes1, des3 long and between des1 and desm2, des4 rather large and before des2, des5 minute and close to convex stemma ; 2 pairs of dorsal epicranial sensilla (desm) present : desm1 absent, desm2 above fs2, desm3 in front of ssl. Two pairs of lateral epicranial setae (les) and 3 pairs of lateral epicranial sensilla (lesm) present : les1 beside ss3, les2 below les1, lesm1 between ss2 and les1, lesm2 between ss3 and les2, lesm3 below antennal base. Two pairs of ventral epicranial setae (ves) and 1 pair of ventral epicranial sensilla (vesm) present : ves1 below posterior stemmata, ves2 below lesm3, vesm below pes4. Frons (Fig. 2. A) with 5 pairs of frontal setae (fs) arranged in 5 transverse rows : fs1 minute and located below des3, forming first row ; fs2 longest and below desm2, forming second row ; fsm and fs3 corresponding to third row ; fs4 rather long and forming fourth row ; fs5 minute and forming fifth row. Frons, clypeus and labrum completely fused, without their boundaries. One pair of minute clypeal setae (cs1) located medially in fusion area of frons and clypeus. Three pairs of labral setae (lbs) and 2 pairs of labral sensilla (lbsm) present : lbs1 minute, below lbsm1, lbs2 along lateral margins, lbs3 rather long, along lateral margins, lbsm1 between cs1 and lbs1, lbsm2 beside lbs1. Labrum (Fig. 2. A and Fig. 3. B) transverse ; anterior margin slightly incised. Epipharynx (Fig. 3. B) with 6 pairs of anterior epipharyngeal spiniform setae (es1-6) of which outermost one somewhat short ; epipharyngeal sensilla (epsm) grouped in 2 clusters : 4 pairs in anterior cluster (acesm) and 4 pairs in posterior cluster (pcesm). Antenna (Fig. 1. B and Fig. 2. A) exceptionally long, 3-segmented, segment 1 with 4 sensilla, segment 2 with 3 long and one minute and a membranous conical sensory papilla, segment 3 small with 2 large and long and 3 minute setae. Mandibles (Fig. 1. G) robust, symmetrical, with 3 apical teeth and 1 blunt tooth at the middle of cutting edge, without mola, penicillus and retinaculum ; ventral surface between both cutting edges evenly concave, dorsal mesal surface convex with 2 mandibular setae (ms) on outer edge, and 2 sensilla (msm), of which 1 lateral and 1 ventral. Labium (Fig. 1. H) with prementum and postmentum not fused together ; postmentum with 3 pairs of postmental setae (pos1-3) and 1 pair of sensilla (posm) ; ligula rounded, with a seta and 3 pairs of sensilla. Labial palp 2-segmented, segment 1 with 1 seta and 1 sensillum, segment 2 with 1 sensillum. Maxillary palp 3-segmented, segment 1 with 2 sensilla, segment 2 with 2 setae and 1 sensillum, segment 3 with 2

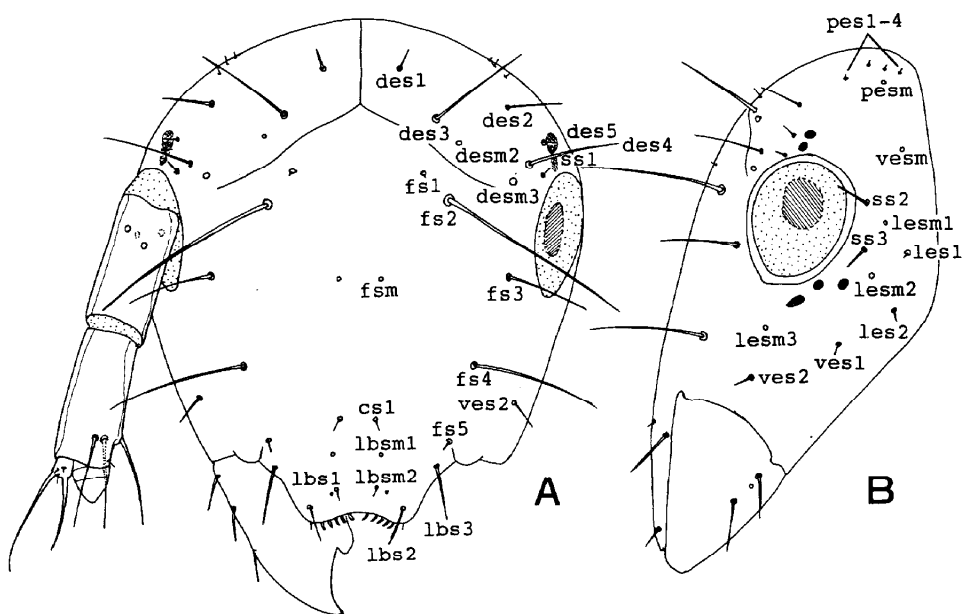


Fig. 2. *Oomorphoides cupreatus*, larva. A, head, dorsal view ; B, same, lateral view.

sensilla and a finger-like appendage, which fit into a groove on the exterior side. Palpifer with 2 setae and 1 sensillum. Stipes with 2 large outer marginal setae, 1 minute inner seta and 1 sensillum ; lacinia fused with stipes, forming elongate process at inner apical corner of stipes, bearing 2 spiniform apical setae ; galea with 6 dorsal and 5 ventral setae and 1 ventral sensillum. Cardo elongate, with 1 seta.

Thorax (Fig. 3. A). Pronotum weakly sclerotized, with 12 pairs of setae and 2 pairs of sensilla. Meso- and metanotum not sclerotized, with an egg-burster on each side. Mesothoracic spiracle (Fig. 1. E) of bicameral type, situated on epipleural anterior (EPa) part ; peritreme slightly sclerotized. Legs (Fig. 3. D) elongate and without pulvillus. Pro-, meso-, and metathoracic legs similar in color, shape and chaetotaxy ; coxa with 15 setae (10 of them minute), trochanter with 4 setae and 7 sensilla, femur with 7 setae and a few spinules, tibia with 5 long and 4 minute setae and scattered spinules. Tarsungulus slightly curved and awl-shaped, with a seta at base.

Abdomen. Somewhat bent forwards (Fig. 1. A and Fig. 3. C), nearly J-shaped, not sclerotized. Abdominal spiracles present on segments 1-8 similar to metathoracic spiracles but smaller. Two spiracular setae present on abdominal segments 1-5 on each ; one spiracular seta present on abdominal segments 6-8 on each. Two large setae present on dorsal region (DL) of abdominal segments 6-8. Epipleuron and pleuron each with 2 setae on each side ; pedal area with 1 seta on each side ; eusterium with 2 setae on each side.

Larval case. Bell-shaped, 1.0-1.3 mm long, 0.5-0.6 mm at widest diameter ($n=10$). Color dark brown. The shape of larval case change in the course of the growth.

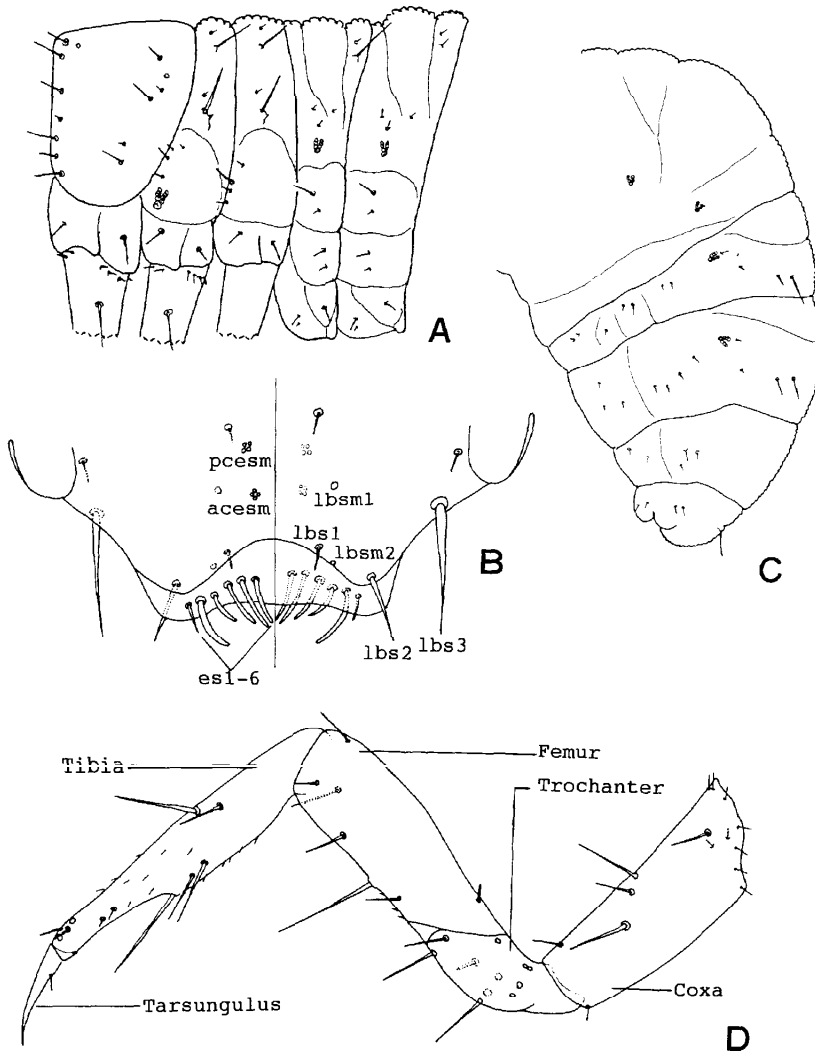


Fig. 3. *Oomorphoides cupreatus*, larva. A, thorax and abdominal segments 1 and 2; B, epipharynx, dorsal and ventral views; C, abdominal segments 5-10; D, fore leg, lateral view.

Body length : 1.6 mm.

Head width : 0.29 mm.

Material examined. Mt. Tachibana, Fukuoka pref., 20. IV. 1988, adult collected and reared on leaves of *Aralia elata* Seem.

DISCUSSION

The subfamily Lamprosomatinae had been classified in the group Cyclica including Eumolpinae by such old authors as Chapuis (1874), Jacoby (1908), Chen (1934) and Gressitt (1942). Böving and Craighead (1931) transferred the Lamprosomatinae from the group Cyclica to the group Camptosomata on the morphology of the larvae. Monros (1959) proposed a new system placing the Lamprosomatinae in the division Alticae Clytriformes. Chen (1964, 73, 86) placed the Lamprosomatinae in his family Eumolpidae together with Eumolpinae, Chlamisinae, Clytrinae and Cryptocephalinae. Crowson (1955) classified the Lamprosomini in the Clytrinae, which are equivalent to the Camptosomata. Kasap and Crowson (1976) and again Mann and Crowson (1981) fixed the phylogenetic position of the Lamprosomatinae in the Camptosomatan line.

Our present study supports the conclusion of Mann and Crowson on the larvae. The synapomorphic characters of the Camptosomata in the larvae can be summarized as follows : Body J-shaped ; head without endocarina ; frons and clypeus fused, and their boundary indefinite or absent ; maxillary palp 3-segmented excluding palpifer ; lacinia fused with stipes ; legs slender, without pulvillus ; egg-bursters present on meso- and metathorax ; larva lives in a case.

The autapomorphic characters of the Lamprosomatinae are as follows : Antennae located a little behind the middle of head, 3-segmented, first and second segments cylindrical, remarkably longer than wide, third segment with a long slender outgrowth, sensory papilla conical ; stemmata 5 on each side ; anterior part of clypeus emarginate ; legs slender, tarsungulus slender ; spiracles bicameral.

Kasap and Crowson (1976) stressed on the importance of the visible paramenta as a key character, but the paramenta of our material are normally vertical to or behind the mentum in position, and only visible when the maxillae and mentum are mounted on slide well expanding the maxillae laterally as in Fig. 1, H.

The first-instar larva of *Oomorphoides cupreatus* is different from that of *Oomorphus concolor* by comparing with the description made by Kasap and Crowson (1976) in the following points : Second segment of antennae with 3 stout and 1 minute setae, instead of 1 stout seta ; mandible with two small teeth on ventral cutting edge behind apical tooth, instead of no such teeth ; terminal segment of maxillary palp with a finger-like appendage.

The comparison of the chaetotaxy between these two species is impossible because some of the sensilla and minute setae were probably overlooked by them on *O. concolor*.

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