

## Immature Stages of Korean *Thlaspida* Weise (Coleoptera: Chrysomelidae)

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**All immature stages, eggs, larvae, and pupae of Korean *Thlaspida*, *T. cribrosa* and *T. lewisii*, are described and illustrated for the first time. Two species belonging to genus *Thlaspida* in the subfamily Cassidinae; *T. cribrosa* and *T. lewisii*. Observations on bionomics of immature stages and on their taxonomic characters are also given.**

**KEY WORDS:** Chrysomelidae, Cassidinae, *Thlaspida*, Immature stages

In recent years there have been many studies of the taxonomy, behavior and general biology of the subfamily Cassidinae. Most of these studies, however, have concerned the adult stage. Although the larval stages are the parts of the life cycle which make "parasol" unique among leaf-beetles, very little is still known about them. One reason for this regard for the larval stages is the lack of a key for their identification which has hampered studies on, and take long time.

The genus *Thlaspida* is a small genus of cassidine chrysomelids with four species reported so far in Northeast Asia (Gressitt and Kimoto, 1963). Only two species occur in Korea: *T. cribrosa* (Boheman) and *T. lewisii* (Baly). The larvae of the genus *Thlaspida* are well known for their peculiar habits and shapes as well as other cassidine larvae. Ohno (1956) and Kimoto and Takizawa (1994) briefly illustrated the larvae of two Japanese *Thlaspida*, respectively.

The purpose of this paper is to provide a key, detailed description and a generic characterization of all immature stages of genus *Thlaspida* Weise.

### Material and Methods

All immature stages used in this study were collected by the authors with a sweeping net or by hand picking. The adults were identified and reared in petri dishes for oviposition. Larvae were also reared on leaves of host plants in petri dish for the pupae. For the detailed morphological investigations on the immature stages, dissecting microscope and compound microscope were used. The terminology of setae in this study is adopted essentially from Anderson (1947), and those for tubercles from Kimoto (1962).

### Description

Tribe Cassidini Hincks, 1952  
Genus *Thlaspida* Weise, 1899

#### Genus *Thlaspida* in the immature stages

**Egg** Dark yellow, laid on leaf-surface. Covered with feces.

**Larva** Body flat and long obovate, with 16 pairs of lateral projections and a pair of supra-anal processes; lateral projections covered with spinules. Spiracles and lateral parts of body

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blackish brown. Head rounded, brown, many spinules present on centrally, well sclerotized. Stemmata 5 in number, present on each side. Antenna 2-segmented; segment 2 long, with 1 seta laterally and a conical sensory papilla. Clypeus trapeziform. Mandible palmate, with 6 distal teeth and 1 mandibular setae. Maxillary palp 2-segmented; galea fused with lacinia; cardo absent. Labial palp 1-segmented; ligula biforked, with minute setae. Prothorax with 1 pair of large sub-triangular black shields, and with 4 pairs of lateral projections. Mesothoracic spiracles elevated, annuliform, situated on EPa (epipleural anterior parts). Legs rather short and stout; claw curved, hook-like, without seta; pulvillus absent. Abdomen with 1 pair of lateral projections on each segment. Abdominal spiracles elevated, present segments 1-7 similar to mesothoracic spiracles but smaller. Supra-anal process long, slender and sinuate.

**Pupa** Body flat and oval. Spiracles as high as wide, elevated on 1st abdominal segment; 7th and 8th abdominal segments each with a slender spinule-like process at lateral margin; apical process of 9th abdominal segment very long, slender and weakly chitinized.

**Bionomics** Eggs are laid in a semi-transparent egg-case, which consist of 2 layers of membranes. The egg case streaked with feces. The larva passes through 5 instars and bears the cast skins one after another on the supra-anal process. Pupal cast skins and feces are retained at the pupation.

#### Key to eggs of Korean *Thlaspid*a

1. Lateral parts of egg-case serrated, 2.0 mm in length..... *T. cribrosa*
2. Lateral parts of egg-case not serrated, 1.8 mm in length ..... *T. lewisii*

#### Key to larvae of Korean *Thlaspid*a

1. Body larger, 9 mm in length; lateral process with many spinules; excretions covering exuviae of 1st to 4th instar larvae; coronal suture very short; epicranial suture V-shaped; ligular strongly incised at anterior margin; anal process long ..... *T. cribrosa*

2. Body smaller, 7 mm in length; lateral process with less spinules; excretions covering exuviae of 1st to 3rd instar larvae; coronal suture well developed; epicranial suture Y-shaped; anal process short ..... *T. lewisii*

#### Key to pupae of Korean *Thlaspid*a

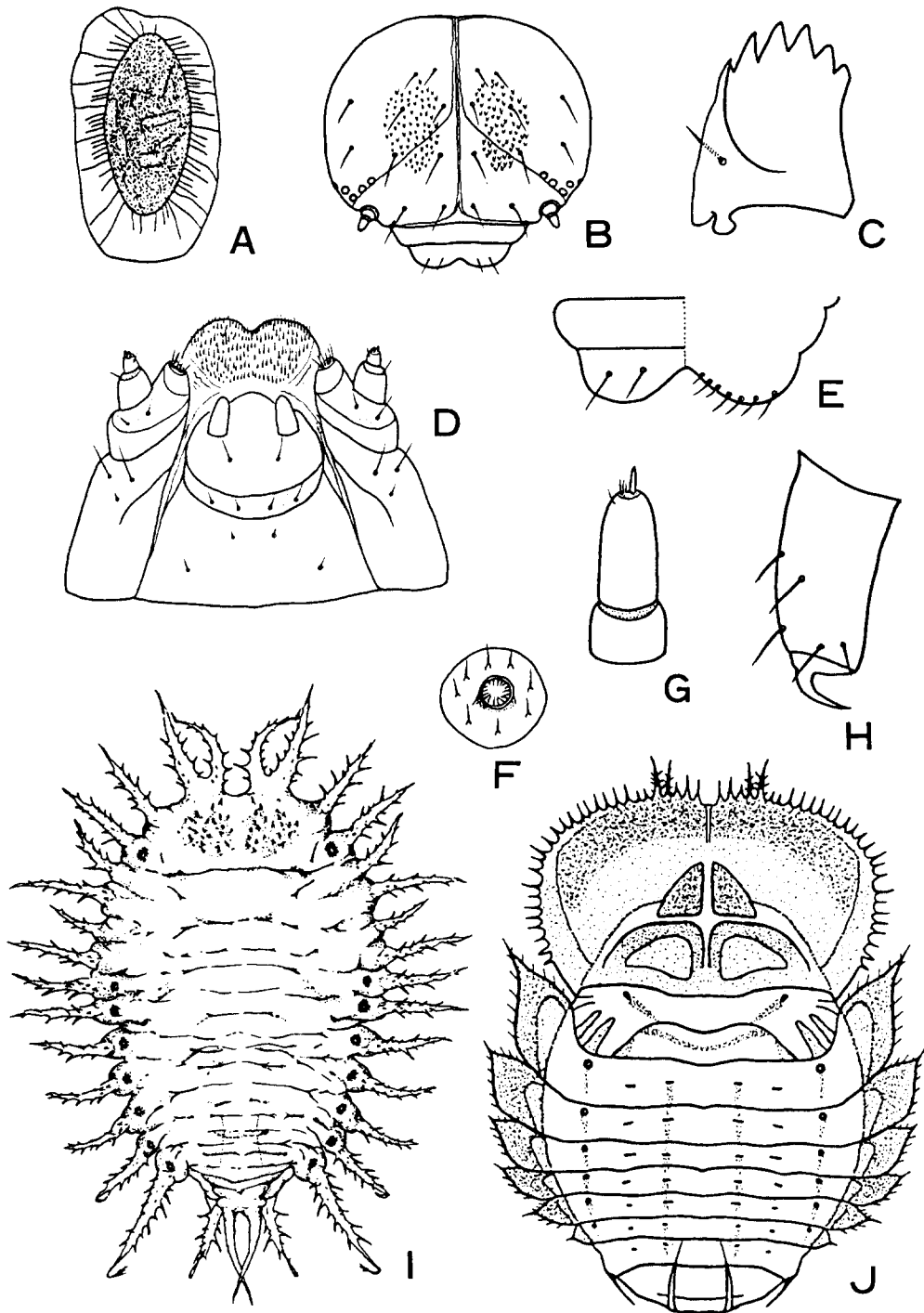
1. First to 5th abdominal segments each with 1 leaf-like lateral projection; pronotum with about 68 maginal spicules; lateral margin of body covered with minute setae ..... *T. cribrosa*
2. First to 6th abdominal segments each with 1 leaf-like lateral projection; pronotum with about 56 maginal spicules; lateral margin of body without minute setae ..... *T. lewisii*

#### *Thlaspid*a *cribrosa* (Boheman) 큰납생이잎벌레 (Fig. 1)

**Material Examined** Kyungbuk Prov.: Mt. Juwang, 8. VII. 1993, 20 eggs, 35 larvae, 10 pupae.

**Egg** Dark yellow, 2.0 mm in length, 1.0 mm in width. Laid on leaf-surface. Covered with feces.

**Larva** Body reddish brown, flat and long obovate, 9.0 mm in length and 7.0 mm in width, with 16 pairs of lateral projections and a pair of supra-anal processes; lateral projections covered with many spinules; dorsum densely covered with short setae. Spiracles and lateral parts of body blackish brown. Head rounded, brown, many spinules present on centrally, well sclerotized. Epicranial suture V-shaped; Coronal suture very short; endocarina distinct; frontal suture weakly curved at middle. Stemmata 5 in number, present on each side. Antenna 2-segmented, segment 1 with 2 sensilla, segment 2 long, with 1 seta laterally and 1 conical sensory papilla and 2 setae at apex. Clypeus trapeziform, with 1 pair of setae; labrum weakly notched at anterior margin, with 2 pairs of setae. Epipharynx with 3 pairs of setae. Mandible palmate, with 6 distal teeth and 1 mandibular setae. Maxillary palp 2-segmented; palpifer with 2 setae and 1 sensillum; stipes with 2 setae; galea fused with lacinia, with 8 setae; cardo absent. Labial palp 1-segmented; ligula biforked, strongly incised at anterior margin, with some minute



**Fig. 1.** Immature stages of *Thlaspidia cribrosa* (Boheman): A, egg and egg-case; B-I, last instar larva; J, pupa; B, head; C, mandible; D, lower mouth parts; E, clypeus, labrum and epipharynx; F, spiracle; G, antenna; H, leg; I, last instar larva in dorsal view.

setae; prementum with 1 pair of setae; postmentum with 3 pairs of setae. Prothorax with 1 pair of large sub-triangular black shields, and with 4 pairs of lateral projections. Mesothoracic spiracles, elevated, annuliform, situated on EPa. Legs rather short and stout; claw strongly curved, hook-like, without seta; pulvillus absent. Abdomen with 1 pair of lateral projections on each segment. Abdominal spiracles elevated, present segments 1-7 similar to mesothoracic spiracles but smaller. Supra-anal process long, slender and sinuate; anal process long.

**Pupa** Body flat and oval, about 8.0 mm in length and 6.8 mm in width; lateral margin of body covered with minute scale-like setae. Pronotum pale yellow with prothorax, meso- and metathorax dark brown. Pronotum with about 68 marginal spicules, of which 2 pairs on anterior margin longer. First to 5th abdominal segments each with 1 leaflike (acuminate) lateral projection which rather acutely narrowed to apex; spiracles as high as wide, elevated on 1st segment; 7th and 8th abdominal segments each with 1 slender spinule-like process at lateral margin; apical process of 9th abdominal segment very long, slender and weakly chitinized, reaching 4th abdominal segment.

**Host plant** All collected and reared by the coauthor on *Fraxinus mandshurica* Ruprecht.

**Distribution** Korea, Taiwan, India, Thailand.

**Biological Notes** Laid singly on the leaf-surface in a yellowish transparent egg-case and covered with feces. The larva passes through 5 instars and bears the cast skins one after another on the supra-anal processes. Cast skins and feces of pupa are retained at the pupation.

***Thlaspidia lewisii* (Baly) 루이스큰납생이 잎벌레 (Fig. 2)**

**Material Examined** Kyungbuk Prov.: Mt. Juwang, 8. VII. 1993, 25 eggs, 47 larvae, 19 pupae. Mt. Sobaek, 14. VII. 1993, 15 eggs, 51 larvae, 20 pupae. Mt. Cheongryang, 2. VII. 1993. 23 eggs, 43 larvae, 13 pupae.

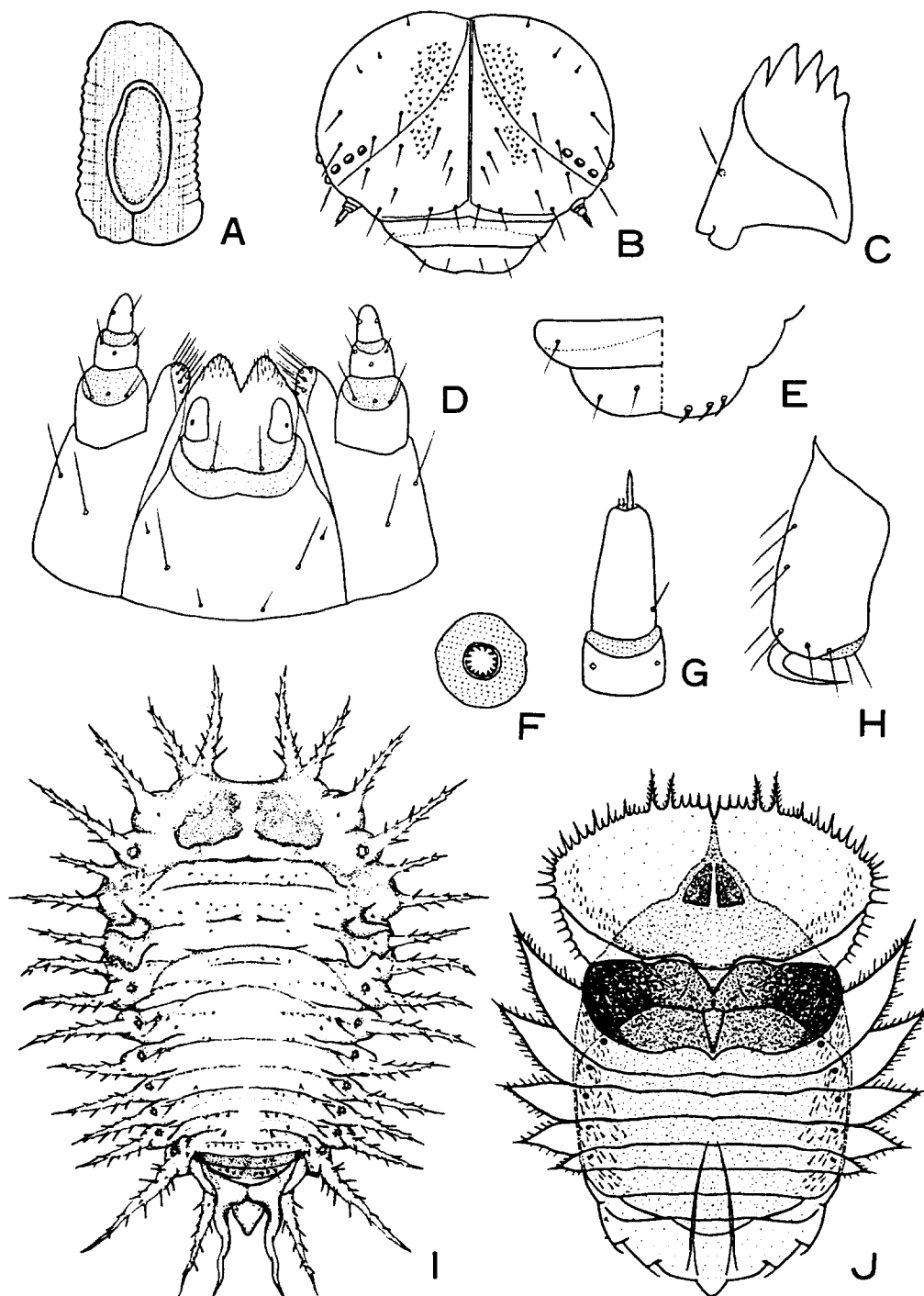
**Egg** Dark yellow, 1.8 mm in length, 1.0 mm in width. Laid on leaf-surface. Covered with feces.

**Larva** Body reddish brown, flat and long obovate,

7.0 mm in length and 4.5 mm in width, with 16 pairs of lateral projections and 1 pair of supra-anal processes; lateral projections covered with spinules. Spiracles and lateral parts of body blackish brown. Head rounded, brown, many spinules present on centrally, well sclerotized. Epicranial suture well developed, Y-shaped. Coronal suture 1/2 width of head capsule; endocarina distinct; frontal suture strongly curved at middle. Stemmata 5 in number, present on each side. Antenna 2-segmented; segment 1 without seta, segment 2 long, with 1 seta laterally and 1 conical sensory papilla and 3 setae at apex. Clypeus trapeziform; labrum strongly incised at anterior margin, with 2 pairs of setae; epipharynx with 7 pairs of setae. Mandible palmate, with 6 distal teeth and 1 mandibular seta. Maxillary palp 2-segmented; palpifer with 2 setae; stipes with 3 setae; galea fused with lacinia, with 6 setae; cardo absent. Labial palp 1-segmented; ligula biforked, slightly incised at anterior margin, with numerous minute setae; prementum with 3 pair of setae; postmentum with 2 pairs of setae. Prothorax with 1 pair of large black shields, and with 4 pairs of lateral projections. Mesothoracic spiracles, elevated, annuliform, situated on EPa. Legs rather short and stout; claw somewhat curved, hook-like, without seta; pulvillus absent. Abdomen with 1 pair of lateral projections on each segment. Abdominal spiracles elevated, present segments 1-7 similar to mesothoracic spiracles but smaller. Supra-anal process long, slender and sinuate; anal process short and rounded.

**Pupa** Body flat and oval, about 7.5 mm in length and 6.5 mm in width. Pronotum yellow with prothorax, anterior margin brownish, meso- and metathorax pale brown. Pronotum with about 56 marginal spicules, of which 2 pairs of on anterior margin longer. First to 6th abdominal segments each with 1 leaflike (attenuate-acuminate) lateral projection which rather acutely narrowed to apex; spiracles as high as wide, elevated on 1st segment; 7th abdominal segment with 1 slender spinule-like process at lateral margin; apical process of 9th abdominal segment long, slender and weakly chitinized, reaching 6th abdominal segment.

**Host plants** All collected and reared by the coauthor on *Fraxinus sieboldiana* Blume,



**Fig. 2.** Immature stages of *Thlaspid lewisii* (Baly): A, egg and egg-case; B-I, last instar larva; J, pupa; B, head; C, mandible; D, lower mouth parts; E, clypeus, labrum and epipharynx; F, spiracle; G, antenna; H, leg; I, last instar larva in dorsal view.

*Ligustrum obtusifolium* S. & Z. and *Callicarpa japonica* Thunb.

**Distribution** Korea, Japan, China.

**Biological Notes** Laid singly on the leaf-surface in a yellowish transparent egg-case and covered with feces. The mature larvae bears a large subtriangular mass of feces on the cast skins of the 4 preceding larval instars, and pupates with all the cast skins and feces.

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한국산 큰납생이잎벌레屬(*Thlaspida*)의 미성숙 단계에 관한 연구(딱정벌레목: 잎벌레과)  
이종은 · 박중직(안동대학교 자연과학대학 생물학과)

한국산 큰납생이잎벌레속의 큰납생이잎벌레와 루이스큰납생이잎벌레의 2종의 미성숙단계가 처음으로 기재된다. 또한 이들 2종의 미성숙단계에 관한 분류 및 생태학적 소견도 언급한다.