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Korean Species of Genus *Zeiraphera* (Lepidoptera: Tortricidae)*

韓國産 *Zeiraphera*屬(나비目: 잎말이나방科)의 分類

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ABSTRACT Five species of the genus *Zeiraphera* from Korea were recognized. Among them two species, *Z. demutana* (Walsingham) and *Z. rufimitrana* (Herrich-Schäffer), are reported for the first time from Korea.

KEY WORDS Systematics, *Zeiraphera*, Olethreutinae, Tortricidae, Lepidoptera, Korea

초 록 韓國産 *Zeiraphera*屬은 5種으로 정리되며 이 중 참나무애기잎말이나방 (*Z. demutana* (Walsingham))과 꼬마전나무애기잎말이나방 (*Z. rufimitrana* Herrich-Schäffer) 등 2種을 우리나라 미기록종으로 報告한다.

검색어 분류, *Zeiraphera*屬, 애기잎말이나방亞科, 잎말이나방科, 나비目, 韓國

Genus *Zeiraphera* belonging to the tribe Eucosmini in the family Tortricidae is mostly distributed in Palaearctic and Nearctic region. It has wide host ranges, mainly on *Quercus* sp., *Abies* sp., and various coniferous trees (Bradely *et al.* 1979, Ford 1949, Ishiki & Mutuura 1961, Liu & Pai 1977, Styles 1959, Suzuku & Komai 1984, Oku 1961).

The first record of the genus *Zeiraphera* in Korea is *Z. griseana* (Hübner) which was listed in "List of Forest Insect Pests in Korea" (Ko 1969). Later Park and Ahn (1987) added one species *Z. fulvomixtana* Kawabe. Recently Byun and Park (1992) reported *Z. virinea* Falkovitsh as new to Korea. In the present study the authors examined all materials which are preserved in the Center for Insect Systematics, Kangwon National University, Chuncheon, and compiled the biological informations from available literatures. As a result, a total of five species of the genus *Zeiraphera* from Korea is recognized. Among them, two species, *Z. demutana* (Walsingham) and *Z. rufimitrana* (Herrich-Schäffer), are reported for the first time from Korea with their brief redescriptions and illustrations.

SYSTEMATIC ACCOUNTS

Zeiraphera Treitschke

Zeiraphera Treitschke, 1829, Schmett. Eur., 7: 231.
Type species: *Zeiraphera lichena* Treitschke, 1829
= *Pyralis isertana* Fabricius, 1794

Zeiraphera virinea Falkovitsh 녹색점애기잎말이나방 (Fig. 1)

Zeiraphera virinea Falkovitsh, 1965: 429, figs 22-23; Kawabe, 1974a: 315. fig. 7; Kawabe, 1982, 1: 128, 2: 175, pl. 27, figs 19-20; Byun & Park, 1992: 204.

Male and female genitalia. See Byun and Park (1992).

Material examined. 1♂, 3♀, Mt. Kyebang-san, Kangwon-do, 2. VIII. 1989 (K. T. Park).

Host plant. unknown.

Distribution. Korea, Japan, Russian Far East (Ussuri).

Zeiraphera griseana (Hübner) 회색솔애기잎말이나방

Tortrix griseana Hübner, [1799], 4: 21.

Zeiraphera griseana: Oku, 1961: 191; Oku, 1964:

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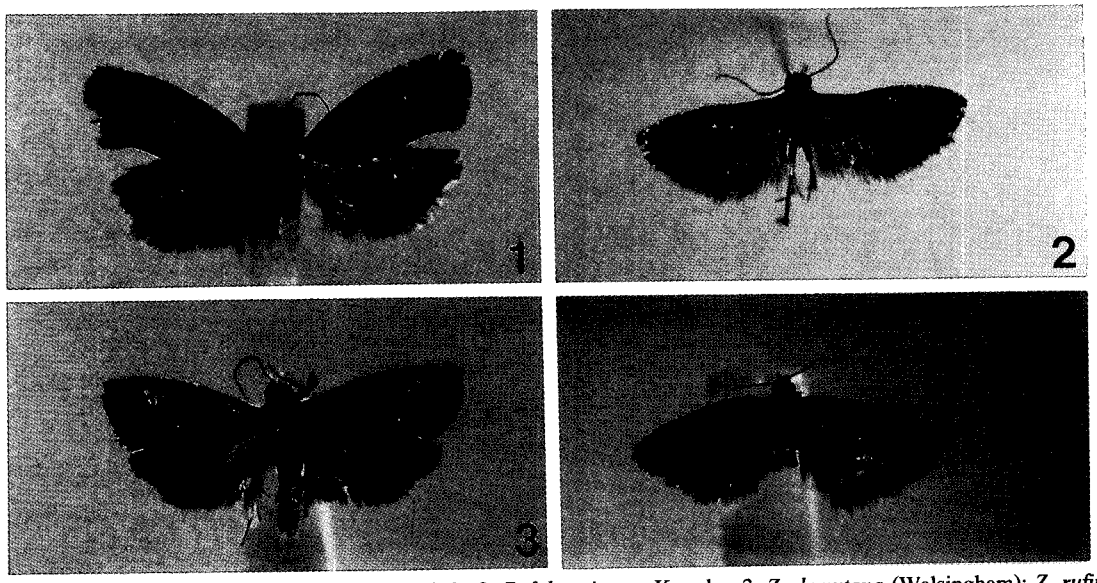


Figs. 1~4. adult: 1, *Zeiraphera virinea* Falkovitsh; 2, *Z. fulvomixtana* Kawabe; 3, *Z. demutana* (Walsingham); *Z. rufimitrana* (Herrich-Schäffer).

316, 319; Kuznetsov, 1978: 502; Kawabe, 1982: 129; Park, 1983: 37; Suzuki & Komai, 1984: 106; Larsen. & Vilhelmsen, 1988: 230, table 12: 29-31.

Sphaleroptera diniana Guenée, 1845: 167.

Semasia diniana: Kennel, 1916: 487-488. pl. 19, figs 27, 28; Escherich, 1931: 311.

Epinotia diniana: Kennel, 1910, 275: pl. 85, fig. 59.

Zeiraphera diniana: Pierce & Metcalfe, 1922: 57, pl. 19 (♂♀ genitalia); Heinrich, 1923: 171, fig. 287; Swatschek, 1958: 159; Hannemann, 1961: 153; Ishiki & Mutuura, 1961: 28; 1962: 4; Ishiki *et al.*, 1962: 9; Bentinck et Diakonoff, 1968: 128, pl. 19, Figs 4-5; Bradley *et al.*, 1979: 146-148, pl. 8, Figs 5, 6. pl. 33; Benz, 1988: 204.; Ko, 1969: 84; Kloet & Hincks, 1972: 30; Kor. Soc. Pl. Prot.: 135.

Eucosma diniana: Meyrick, 1928: 547; Ford, 1949: 67.

Host plants. Spun leaves of *Larix decidua*, various species of *Pinus*, including *P. sylvestris* and *P. contorta, Abies alba* (Bradley *et al.*, 1979); *Picea sitchensis* have been known from England (Styles 1959). No host record in Korea.

Distribution. Korea, Japan, North and central Europe to eastern Russia, and North America

Remarks. This species is listed in "List of Forest Insect Pests in Korea" Ko (1969), but no specimen has been observed to the authors to date.

Zeiraphera fulvomixtana Kawabe 좁은날개애기잎말이나방 (Fig. 2)

Zeiraphera fulvomixtana Kawabe, 1974b: 98, figs. 3, 10, 24; Kawabe, 1982, 1: 128, 2: 175, pl. 27, figs. 21-22; Park & Ahn, 1987: 182, fig. 6.

Material examined. 1♂, Ch'unch'ŏn, Kangwon-do, 21. VI. 1985 (K. T. Park); 1♀, same locality, 12. VIII. 1988 (K. T. Park); 1♂, temple Wŏnasa, near Mt. Kwangdŏk, Kangwon-do, 24. VI. 1994 (B. K. Byun); 1♂, Sŏmyŏn, Yangyang, Kangwon-do, 4. VI. 1987 (K. T. Park); 1♂, Kwangrŭng, Kyŏnggi-do, 26. VI. 1992 (K. T. Park & B. K. Byun); 1♂, Mt. Myŏngji, Kyŏnggi-do, 26. VI. 1992 (K. T. Park); 2♂. Ipsŏk-dong, Cheju-do, 30. VI. 1994 (B. K. Byun); 1♂, Yŏngsil, Cheju-do, 8. VI. 1993 (B. K. Byun).

Host plant. Unknown.

Distribution. Korea (Kangwon-do, Cheju-do) and Japan.

Zeiraphera demutana (Walsingham) 참나무애기잎말이나방(신칭) (Fig. 3)

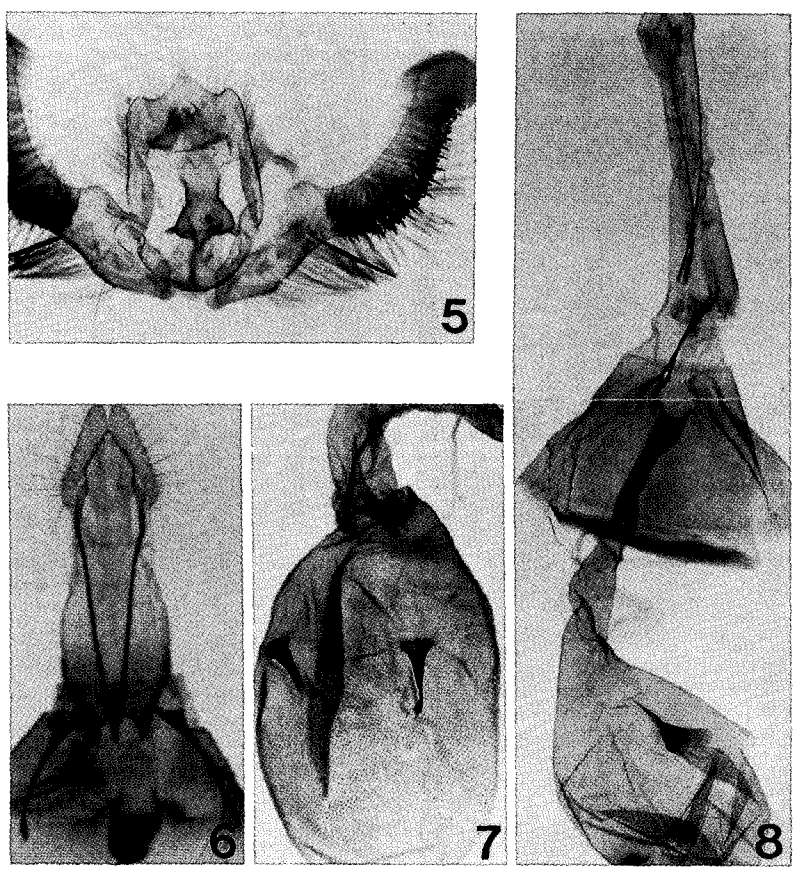
Crocidosema demutana Walsingham, 1900: 441; Inoue, 1954: 1: 103.

Zeiraphera demutana: Liu & Pai, 1977: 61, pl. 4: 23, fig. 96; Kawabe, 1982: 128.

Male and female. Wing expanse 16-18 mm. Head creamy white; vertex mixed with pale gray. Antenna with creamy-white scape; flagellum grayish brown, annulated with white. Labial palpus creamy white; median segment dilated apically with rough scales, and irrorated with grayish brown on outer surface. Thorax pale ocherous, speckled with blackish gray and white; posterior crest brownish gray in male, and blackish gray in female. Abdomen with anal tuft pale brownish gray.

Forewing with a narrow elongate costal fold reaching to 1/4 of costa, the inner side with a pale ocherous hair pencils. Ground color dark brownish gray, variably tinged with olive green. Costa with six pairs of costal strigulae from apex to basal 1/5. Basal patch creamy white, costa and dorsum mottled with gray. Median fascia of ground color, broadly connected with terminal patch. Subtriangular pretornal marking well developed, irregularly with four or five dark-gray streakers. Terminal patch of ground color. Preapical spot on outer third large, circular, creamy white. Cilia dark gray; subbasal line dark brownish gray, irrorated with ocher. Hindwing elongate-ovate, pale brownish gray, with pale ocherous scales hair-like scales arising from median vein. Cilia concolorous, and with a dark subbasal line.

Male genitalia (Fig. 5). Uncus short, triangular, apex top emarginated. Socius broad and drooping. Gnathos



Figs. 5~8. male and female genitalia: 5, ♂, *Zeiraphera demutana* (Walsingham); 6-7, ♀, ditto; 8. ♀, *Z. rufimitrana* (Herrich-Schäffer).

weakley sclerotized. Valva slenderly curved, with long scale-like hairs on its outer surface; sacculus narrow, roughly hairy; cucullus long, roundly prominent, with narrow before apex. Aedeagus broad and short; cornuti a bunch of many transparent spines.

Female genitalia (Figs. 6-7). Apophysis posteriores long, two times as long as apophyses anteriores. Sterigma shallow, cup-shaped; ductus bursae sclerotized on its neck; ductus seminalis originating from just after its entrance. Signa strong, composed of two large horns.

Material examined. 1♂, Kwangrŭng, Kyŏnggi-do, 27. VI. 1986 (M. K. Ko)- gen. sl. no. 3791; 1♀, same locality, 8. VII. 1992 (K. T. Park & B. K. Byun)- gen sl. no. 3345; 1♂, Sŏmyŏn, Yangyang, Kangwon-do, 10. VII. 1978 (K. T. Park).

Host plant. It has been known the larvae feed on the leaves of *Quercus* sp. from Japan; No host was known from Korea.

Distribution. Korea (Kyŏnggii-do and Kangwon-do), China and Japan.

Remarks. This species is easily distinguished from the other species of the genus by the well developed subtriangular pretornal marking and large circular creamy white preapical patch of forewing. The male genitalia resemble that of *fulvomixtana* Kawabe, but differs from it by having short uncus with emarginated apex. This species is recorded for the first time from Korea.

Zeiraphera rufimitrana (Herrich-Schäffer) 꼬마전나무애기잎말이나방(신칭) (Fig. 4)

Coccyx rufimitrana Herrich-Schäffer, 1847: 220.

Zeiraphera rufimitrana: Suzuki & Kamijo, 1967: 21 (Biology).

Zeiraphera truncata Oku, 1968: 229, figs 1: 6, 2:6, pl. 8: F; Yamaguchi, 1972: 121; Suzuki, 1981: 1; Suzuki & Komai, 1984: 106; Komai, 1991: 7.

Zeiraphera rufimitrana truncata; Kuznetsov, 1976: 86; Kawabe, 1982, 1: 128, 2: 175.

Wing expanse 13.5-15 mm. Head dark gray; vertex mixed with dark ocherous. Antenna and labial palpus dark gray. Fore wing narrow; ground color pale brownish gray; markings dark gray, edged narrowly with silvery-white.

Hind wing elongate-ovate, dark brownish gray.

Male genitalia. Unknown.

Female genitalia (Fig. 8). Apophyses posteriores long enough two times as long as apophyses anteriores. Sterigma sclerotized, cup-shaped; ductus bursae sclerotized on its posterior 1/3; ductus seminalis originating from near middle of ductus bursae. Two signa comprising one small horn-like and the other large, blunt.

Material examined. 2♀, Kwangrŭng, Kyŏnggi-do, 6. VII. 1989 (K. T. Park & B. K. Byun)-gen. sl. no. 2990.

Host plant. *Abies sachalinensis* from Japan (Suzuki & Komai, 1984); No host was known from Korea.

Distribution. Korea (Kyŏnggi-do), Japan, Russian Far East (Sakhalin).

Remarks. This species resembles Japanese *Z. suzukii* Oku superrficially, but differs from it by the larger size (13.5-15 mm) and by large and blunt signa. This species is recorded for the first time from Korea.

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