

A Taxonomic Review of the Genus *Monochroa* (Lepidoptera, Gelechiidae) in Korea

한국産 *Monochroa* 屬의 분류학적 정리

Sang Mi Lee and Kyu Tek Park

李相美 · 朴奎澤

Abstract - Six species of *Monochroa* Heinemann, including five newly reported species from Korea (*M. cleodoroides*, *M. divisella*, *M. japonica*, *M. subcostipunctella*, and *M. suffusella*), are reviewed, with illustration of their male and female genitalia. A key to all known species of the genus are provided.

Key Words - Taxonomy, *Monochroa*, Gelechiinae, Gelechiidae, Lepidoptera, Korea

초 록 - 빨나방과의 *Monochroa* 屬에 대해 분류학적으로 정리한 결과 5종의 미기록종 (*M. cleodoroides*, *M. divisella*, *M. japonica*, *M. subcostipunctella* and *M. suffusella*)을 포함한 6종의 국내 분포종을 확인, 정리하였다. 各種의 분류동정을 위한 검색표와 함께 암·수 생식기를 도해하였다.

검색어 - 분류, *Monochroa* 屬, 빨나방亞科, 빨나방科, 나비目, 한국

Genus *Monochroa* Heinemann, belonging to the subfamily Gelechiinae of the family Gelechiidae, superficially resembles and related to the genera *Eulamprotes* Bradley, 1971 and *Daltopora* Povolný, 1979. This genus comprises about 50 species in the Holarctic region: 16 species from European part of Russia (Piskunov, 1990), 26 species in Europe (Karsholt and Razowski, 1996), and 11 species from North America (Hodges, 1983). Recently Sakamaki (1994, 1996a, 1996b) reviewed 12 species for the Japanese fauna, including five new species. In Korea, *M. cleodora* has been only known (Park, 1983), but additional five species: *M. cleodoroides*, *M. japonica*, *M. subcostipunctella*, *M. suffusella*, and *M. divisella*, are newly recognized as a result of the present study. In the color pattern of the forewing, species of the genus *Monochroa* are very similar each other, especially *M. cleodora* is similar to *M. cleodoroides* and *M. japonica*, and *M. subcostipunctella* resembles

M. suffusella and *M. divisella* respectively. These species can be easily distinguished by the female genital character, rather than the male genitalia.

The specimens used in this study are based on the collection of the Center for Insect Systematics, Kangwon National University, Chunchon, and Department of Biology, University of Incheon, Incheon. Abbreviation for the provinces in Korea: S-Seoul, GW-Gangwondo, GG-Gyunggido, JB-Jeolabukdo.

Systematic Accounts

Genus *Monochroa* Heinemann, 1870

Monochroa Heinemann, 1870, Schmett. Dtl. Schweiz, (2)2(1): 308 (Type-species: *Tinea lenebrella* Hübner, [1817]).

Doryphora Heinemann, 1870, *ibid.*: 298 (nom. pre-occ.).

Xystophora Wocks, [1876], in Heinemann, Schweiz (2)2.

Catabrachmia Rebel, 1909, in Rothschild., Rovart. Lap. 16: 143.

Paltodora Meyrick, 1894, Entomologist's mon. Mag. 30: 230.

Key to the species of genus *Monochroa* in Korea

1. Forewing without any oblique white fascia 2
Forewing with more than one oblique white fascia from costa at basal 1/5 to middle of dorsum 4
2. Forewing with more than two black stigmata
..... *divisella*
Forewing with two black stigmata 3
3. Forewing with two black stigmata: one on subcostal vein at basal 1/2 and the other on disc
..... *subcostipunctella*
Forewing with two black stigmata: one on costal vein at apical 1/3 and the other on disc *suffusella*

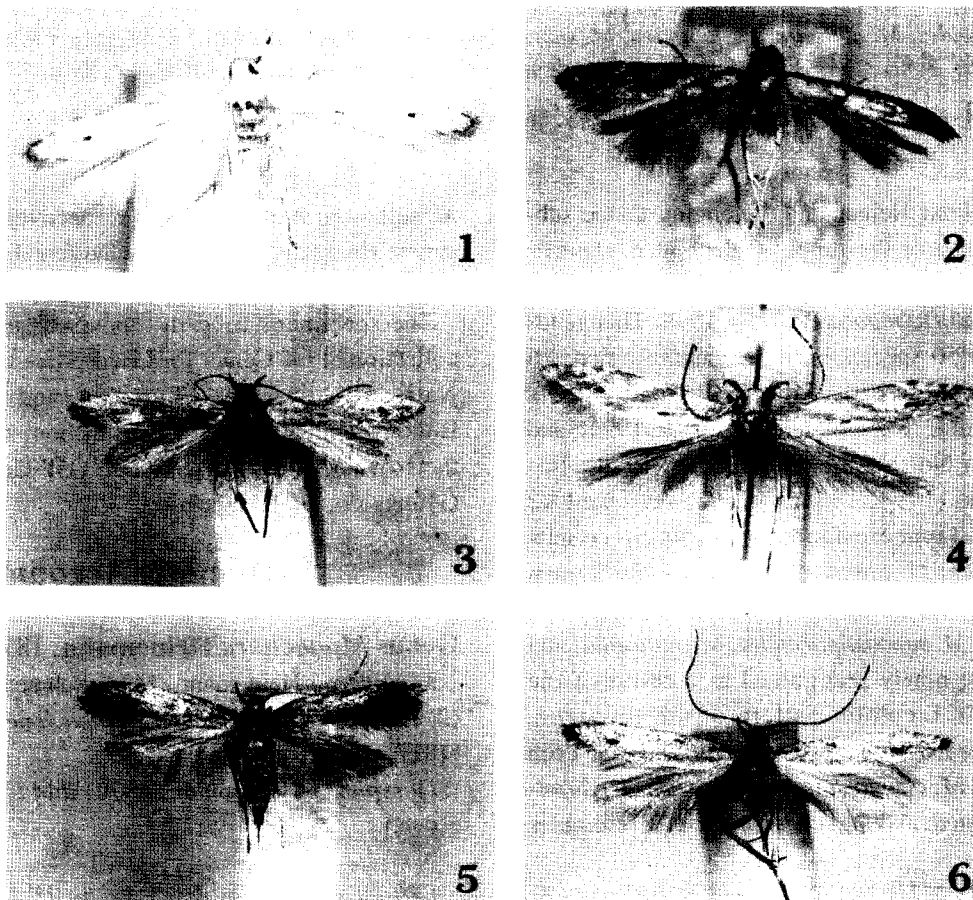
4. Female 8th abdominal segment ventrally with shallow hollow; cornuti of aedeagus arranged regularly
..... *japonica*
Female 8th abdominal segment ventrally with deep hollow; cornuti of aedeagus arranged irregularly 5
5. Female 8th abdominal segment ventrally with V-shaped hollow; signum with a quadrifid process
..... *cleodora*
Female 8th abdominal segment ventrally with U-shaped hollow; signum with a bluntly triangular process
..... *cleodoroides*

Monochroa cleodora (Meyrick, 1935)

흑점빨나방 (Figs. 1, 7, 12)

Aristotelia cleodora Meyrick, 1935, Exotic Microlepidoptera 4: 583; Clarke, 1969: 282; Moriuti, 1982: 276(I), 212(II); Park, 1983: 84. TL: Honshu, Japan.

Monochroa cleodora: Sakamaki, 1994: 167.



Figs. 1-6. Adults: 1. *Monochroa cleodora* (Meyrick); 2. *M. cleodoroides* Sakamaki; 3. *M. divisella* (Douglas); 4. *M. japonica* Sakamaki; 5. *M. subcostipunctella* Sakamaki; 6. *M. suffusella* (Douglas).

Diagnosis: Wingspan 11~14 mm. This species is very similar to *M. clerodoroides* and *M. japonica* in the forewing coloration. However, this species is easily distinguished from its allies by the weakly sclerotized internal tube of the ductus bursae and signum with a quadrifid process.

Male genitalia (Fig. 7). See Clarke (1969, fig. 2a~b) and Sakamaki (1994, fig. 1a~b). Aedeagus sigmoid, with numerous minute cornuti irregularly arranged.

Female genitalia (Fig. 12). See also Sakamaki (1994, fig. 1c~d). Caudal half of ductus bursae remarkably sclerotized into an internal tube. Corpus bursae rather long; signum oblong, with a quadrifid process and about four spines on cephalic margin.

Material examined: GG: 1 ♂, Mt. Cheonggye-san, 19. VIII. 1976 (KT Park), gen. prep. CIS-877; 1 ♂, Suweon, 2. VII. 1974 (KT Park), gen. prep. CIS-673, 1 ♀, same locality, 29. VI. 1976 (CY Whang).

Distribution: Korea (South), Japan (Honshu).

Monochroa cleodoroides Sakamaki, 1994

줄물결빨나방 (新稱) (Figs. 2, 8, 13)

Monochroa cleodoroides Sakamaki, 1994, Jpn. J. Ent. 62(1): 170; Sakamaki, 1996b: 251. TL: Honshu, Japan.

Diagnosis: Wingspan 8~10 mm. This species is characterized by the female genitalia, with U-shaped ventral hollow on 8th abdominal segment and a blunt triangular process of signum.

Male genitalia (Fig. 8). See also Sakamaki (1994, fig. 2a~b). Aedeagus with numerous minute processes on its basal half in double rows.

Female genitalia (Fig. 13). See also Sakamaki (1994, fig. 2c~d). Cestum sclerotized, occupying about median one-third of ductus bursae. Corpus bursae pyriform, having an oblong signum with a blunt triangular process on cephalic margin.

Material examined: GW: 1 ♀, Mt. Gubong-san, Chunchon, 19. VI. 1988 (SM Lee); 1 ♂, Mt. Taebaek-san, 27. VI. 1996 (YS Bae & MK Paek); S: 1 ♀, Haengjusan-sung, Kimpo, 21. VIII. 1997 (SH Kang).

Distribution: Korea (South; new record), Japan (Honshu, Kyushu).

Monochroa divisella (Douglas, 1850)

벌박이빨나방 (新稱) (Figs. 3, 14)

Gelechia divisella Douglas, 1850, Trans. Ent. Soc. Lond. (N.S.) 1: 60. TL: Huntingdonshire, England.

Monochroa zarichella Piskunov, 1975: 867.

Monochroa divisella: Sattler, 1971: 106; Kloet & Hincks, 1972: 21; Karsholt & Nielsen, 1976: 32; Sattler, 1992: 106; Karsholt, 1995: 141; Sakamaki, 1996b: 249.

Diagnosis: Wingspan 11~13 mm. This species resembles *M. suffusella* and *M. subcostipunctella*, but differs from the latter by three black stigmata on the forewing.

Female genitalia (Fig. 14). See also Sakamaki (1996b, fig. 2c~d). Corpus bursae pyriform. Signum long, about 1/3 of corpus bursae, surrounded by many dentate processes.

Material examined: GW: 1 ♀, Mt. Samak-san, Chunchon, 19. VII. 1989 (KT Park).

Host plants: *Iris pseudacorus* Linné in Europe, *Iris ensata* var. *spontanea* (Makino) in Japan (Sakamaki, 1996a).

Distribution: Korea (South; new record), Japan (Honshu), Europe.

Monochroa japonica Sakamaki, 1996

노랑물결빨나방 (新稱) (Figs. 4, 9, 15)

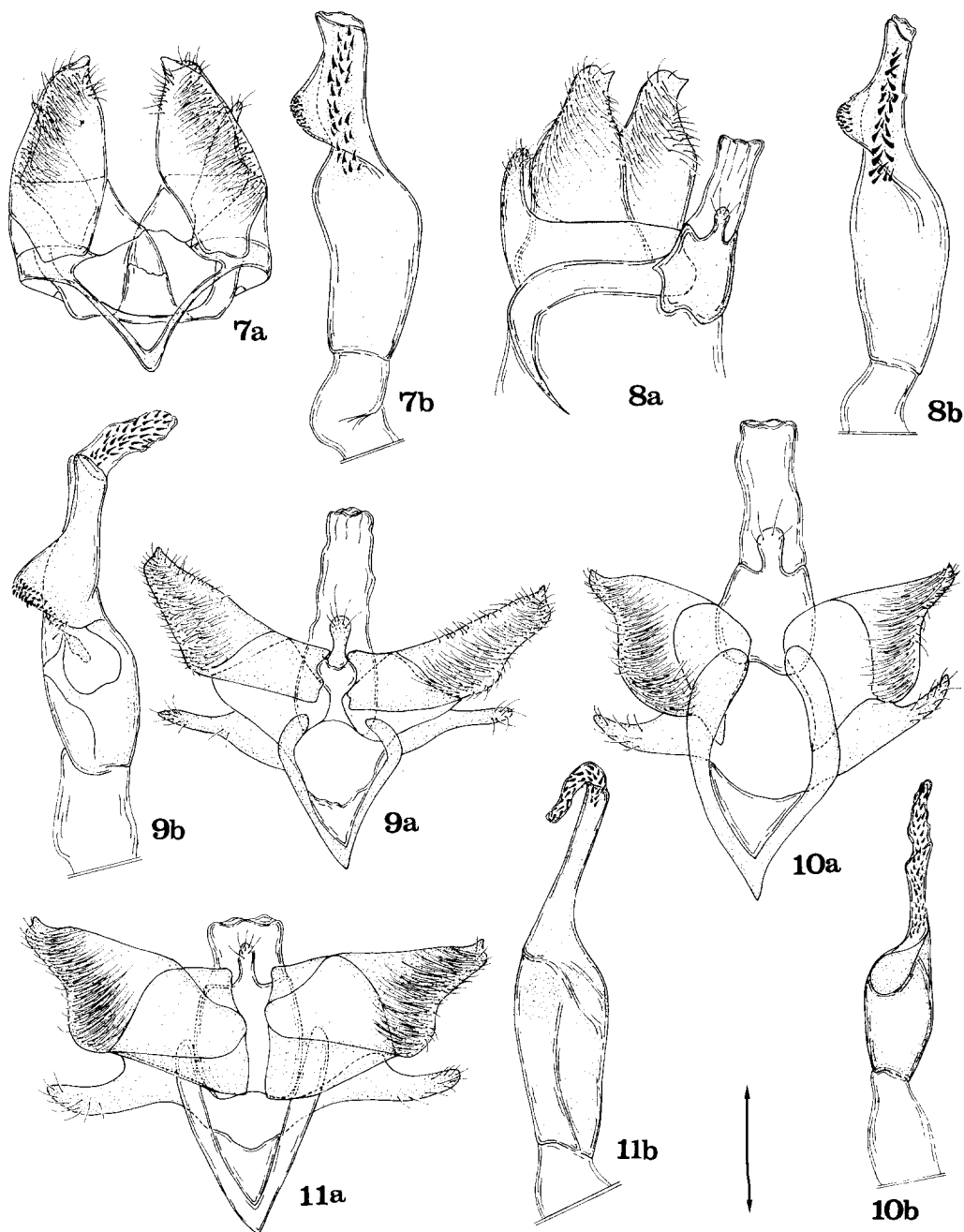
Monochroa japonica Sakamaki, 1996a, Jpn. J. Ent., 64(2): 251; Sakamaki, 1996b: 252. TL: Hokkaido, Japan.

Diagnosis: Wingspan 10~14 mm. This species closely resembles *M. cleodora* and *M. cleodoroides*, and hardly distinguishable from the latter by the superficial character, but it can be clearly separated from them by the female genital character.

Male genitalia (Fig. 9). See also Sakamaki (1996a, fig. 4a~b). Aedeagus with a sclerotized triangular plate on apical half, numerous minute processes on basal margin, and numerous minute cornuti regularly arranged.

Female genitalia (Fig. 15). See also Sakamaki (1996a, fig. 4c~d). Corpus bursae with a long oval signum, having about five minute processes on cephalic margin.

Material examined: GW: 2 ♂, Mt. Palbong-san, 5. VII. 1990 (KT Park); 1 ♂, Chunchon, 1. V. 1989 (KT Park), 1 ♂, same locality, 2. VII. 1989 (KT Park & BK Byun), 1 ♂, same locality, 12. VI. 1990 (KT Park & BK Byun); 2 ♀, 4 ♂, Mt. Kwangduk-san, Whachon, 20. VII. 1996 (YS Bae & MK Paek); 1 ♂, Pyungchang, 31. VII. 1991 (KT Park). GG: 1 ♀, Suwon, 2. VII. 1974 (KT Park), gen. prep. no CIS-673, 1 ♂, same locality, 29. VI. 1976 (CY Whang); 1 ♀, 1 ♂, Mt. Suri-san, 15. VI. 1990 (SH Oh & HY Choi); 1 ♂, Mt. Cheonggye-san, 19. VIII. 1976 (KT Park), gen. prep. no CIS-877. JB: 1 ♂, Muju, 13. VIII. 1975 (KT Park).



Figs. 7-11. Male genitalia: 7a. *Monochroa cleodora* (Meyrick), 7b. ditto, aedeagus; 8a. *M. cleodoroides* Sakamaki, 8b. ditto aedeagus; 9a. *M. japonica* Sakamaki, 9b. ditto aedeagus; 10a. *M. subcostipunctella* Sakamaki, 10b. ditto aedeagus; 11a. *M. suffusella* (Douglas), 11b. ditto aedeagus. Scale bar: 0.5 mm.

Host plant: *Polygonum thunbergii* Sieb. et Zucc. (Sakamaki, 1996a).

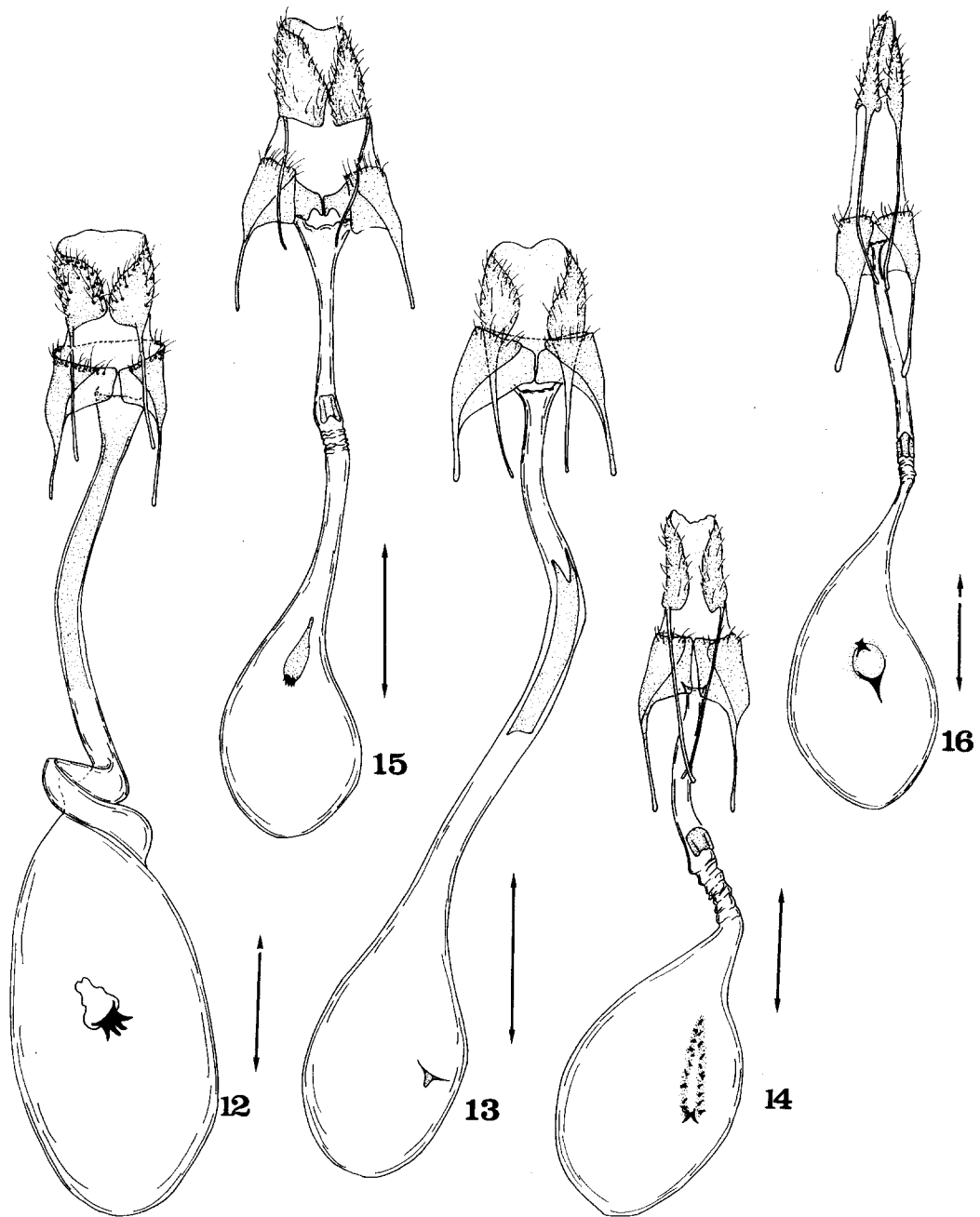
Distribution: Korea (South; new record), Japan (Hokkaido, Honshu, Kyushu).

***Monochroa subcostipunctella* Sakamaki, 1996**

꼬마빨나방 (新稱) (Figs. 5, 10, 16)

Monochroa subcostipunctella Sakamaki, 1996a, Jpn. J. Ent. 64(2): 248; Sakamaki, 1996b: 249. TL: Hokkaido, Japan.

Diagnosis: Wingspan 9~13 mm. This species resembles



Figs. 12-16. Female genitalia: 12. *Monochroa cleodora* (Meyrick); 13. *M. cleodoroides* Sakamaki; 14. *M. divisella* (Douglas); 15. *M. japonica* Sakamaki; 16. *M. subcostipunctella* Sakamaki. Scale bar: 0.5 mm.

M. suffusella and *M. divisella*, but can be distinguished by the position of the costal stigmata on the forewing: with a black stigma on basal 1/2 of subcostal vein and similar stigma on disc, 3 or 4 white minute dots on apical 1/3 of costa and similar dots on termen. Also it is remarkably characterized by the long ellipsoidal signum with only a pair of processes in the female genitalia.

Male genitalia (Fig. 10). See also Sakamaki (1996a, fig. 3a~b). Aedeagus pyriform, with minute processes on cylindrical part of apical half.

Female genitalia (Fig. 16). See also Sakamaki (1996a, fig. 3c~d). Cestum trapezoid, medially convex on cephalic margin. Corpus bursae with a long ellipsoidal signum, having two large processes; long one on caudal

margin and the other short one on cephalic margin.

Material examined: GG: 1 ♂, Gwangleung, 10. VII. 1982 (KT Park); 1 ♀, same locality, 6. VII. 1989 (KT Park & BK Byun); 8 ♀, same locality, 10. VII. 1990 (KT Park); 1 ♀, Is. Yongyu, Inchon, 28. VIII. 1997 (YS Bae).

Host plant: *Juncus* sp. (Sakamaki, 1996b).

Distribution: Korea (South; new record), Japan (Hokkaido, Honshu).

***Monochroa suffusella* (Douglas, 1850)**

백색날개뿔나방 (新稱) (Figs. 6, 11)

Aristotelia suffusella Douglas, 1850, Trans. Ent. Soc. Lond. 2: 64; Meyrick, 1925: 44. TL: C. Europe

Doryphora suffusella: Heinemann, 1870: 308.

Monochroa suffusella: Kloet & Hincks, 1972: 21; Karsholt & Nielsen, 1976: 32; Svensson, 1980: 76-77; Piskunov, 1990: 952; Buhl *et al.*, 1992: 5; Karsholt, 1995: 141; Sakamaki, 1996a; 245; Sakamaki, 1996b: 248.

Diagnosis: Wingspan about 9~11 mm. This species is characterized by the position of costal stigmata on the forewing.

Male genitalia (Fig. 11). See also Piskunov (1990, figs. 3~4) and Sakamaki (1996a, fig. 2a~b). Aedeagus cylindrical, spiculous on the surface, and with about thirty minute cornuti arranged in vesicae. Cucullus with a triangular sclerotized process dorsally.

Material examined: GG: 1 ♂, Is. Kanghwa, 16. VII. 1995 (YS Bae).

Host plants: *Eriophorum angustifolium* and *Carex* sp. in Europe, *Carex* sp. in Japan (Sakamaki, 1996a).

Distribution: Korea (South; new record), Japan (Hokkaido), C. Europe.

Acknowledgement – We would like to express our thanks to Dr. Y. Sakamaki, Hokkaido University, Sapporo, Japan for the valuable references, and Dr. Y.S. Bae, University of Inchon, Korea, for the donation of the specimens. This study was financially supported by Korea Science and Engineering Foundation (965-0603-002-2).

Literature Cited

Buhl, O., P. Flack, B. Jørgensen, O. Karsholt, K. Larsen, and K. Schinack. 1992. Records of Microlepidoptera from Denmark in 1990. Ent. meddr. 60: 1~12.

Clarke, J.F.G. 1969. Catalogue of the Type Specimens of Microlepidoptera in British Museum (Natural History) described by Meyrick, E. 6: 1~537, pls. 1~267. London: British Museum (Natural History).

Heinemann, H. 1870. Die Schmetterlinge Deutschlands und der Schweiz. 2(1): 1~825. Braunschweig.

Hodges, R.W. 1983. Gelechiidae. pp. 19~25. Check List of the Lepidoptera of America North of Mexico, eds. by Hodges, R.W., T. Dominick, D.R. Davis, D.C. Ferguson, J.G. Franclemont, E.G. Munroe and J.A. Powell. 284 pp. Ltd., London/ the Wedge Entomological Research Foundation, Washington.

Karsholt, O. and E. Schmidt Nielsen. 1976. Gelechiidae. pp. 32. Catalogus of the Lepidoptera of Denmark. Scandinavian Science.

Karsholt, O. 1995. Kommentiertes Verzeichnis der Symmocidae, Blastosidae und Gelechiidae Ostdeutschlands (Lepidoptera). Beitr. Ent. 45(1): 137~154.

Karsholt, O. and J. Razowski. 1996. Gelechiidae pp. 107. The Lepidoptera of Europe, A Distributional Checklist. Apollo Books.

Kloet, G.S. and W.D. Hincks. 1972. A check list of British Insects (2nd ed.). Royal Entomological Society, part 2 (Lepidoptera): 20~21.

Meyrick, E. 1935. Exotic Microlepidoptera 4: 1~642. Taylor & Francis., London.

Moriuti, S. 1982. Gelechiidae. part I: 275~288, part II: 212~215, pls.: 13, 227, 233, 242~244, 257~260 in Moths of Japan, eds. by Inoue, H., S. Sugi, H. Kuroko, S. Moriuti, and A. Kawabe. part I: 966 pp., part II: 552 pp. (In Japanese). Kodansha, Tokyo.

Park, K.T. 1983. Microlepidoptera of Korea. Ins. Koreana 3: 84.

Piskunov, V.I. 1975. Novye dannye po faune vyemchatokrylykh molei (Lepidoptera, Gelechiidae) evropeiskoi chasti SSSR [New information on the fauna of notch-winged moths (Lepidoptera: Gelechiidae) of the European part of the USSR]. Entom. Obozr. 54(4): 857~871. (In Russian)

Piskunov, V.I. 1981. Family Gelechiidae. pp. 657~748 in Keys to the Insects of the European part of USSR, Lepidoptera. eds. by Likharev, I.M., O.L. Kryzhanovskii, Z.I.

Baranova, I.M. Gromov, V.F. Zaitsev, L.A. Kutikova, G.S. Medvedev, M.E. Ter-MinAsian, and N.A. Filippova. 4(2): 596pp. Izdavaemye Zoologicheskim Muzeem Akademii Nauk, Leningrad.

Sakamaki, Y. 1994. *Monochroa cleodora* (Meyrick), comb. n. (Lepidoptera, Gelechiidae) and its allied new species from Japan. Jpn. J. Ent. 62(1): 167~174.

Sakamaki, Y. 1996a. Notes on Japanese species of the genus *Monochroa* with description of two new species (Lepidoptera, Gelechiidae). Jpn. J. Ent. 64(2): 245~254.

Sakamaki, Y. 1996b. A revision of the Japanese species of

- the genus *Monochroa* (Lepidoptera, Gelechiidae). Trans. lepid. Soc. Japan 47(4): 243~265.
- Sattler, K. 1971. Some new synonyms of European Gelechiidae (Lepidoptera). Ent. Gazette 22: 103~ 108.
- Sattler, K. 1992. New Synonyms of European Gelechiidae (Lepidoptera). Ent. gall. 3: 107~112.
- Svensson, I. 1980. Remarkable finds of Microlepidoptera in Sweden 1979. Ent. Tidskr. 101: 75~86.

(Received April 13, 1999; Accepted November 17, 1999)