

Lobesia virulenta Bae & Komai, 1991 recorded for the first time in Europe, with description of a new subspecies (Lepidoptera, Tortricidae)

Per Falck & Ole Karsholt

Falck, P. & Karsholt, O.: *Lobesia virulenta* Bae & Komai, 1991 recorded for the first time in Europe, with description of a new subspecies (Lepidoptera, Tortricidae). *Entomologiske Meddelelser* 66: 117-126. Copenhagen, Denmark, 1998. ISSN 0013-8851.

Lobesia virulenta Bae & Komai, hitherto known only from East Asia is recorded from Denmark and Norway. Based on differences in wings and genitalia specimens from these countries are described as a new subspecies, *Lobesia virulenta mieana* Falck & Karsholt **n. ssp.** It is compared with *L. reliquana* (Hübner) and *L. botrana* (Denis & Schiffermüller); the adult moths and their genitalia are described and illustrated. A lectotype of *Cochylis fischerana* Treitschke, 1835 is published.

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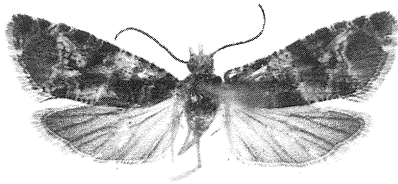
Introduction

In the winter of 1997 the first author became aware of some peculiarities in two specimens in his series of *L. reliquana* (Hübner). The specimens, a male and a female, were dissected, and surprisingly the genitalia differed from those of *reliquana*. In looking for further specimens of this, to him, unknown species the collections of the Zoological Museum, Copenhagen and the private collection of Gert Jeppesen were examined, and they revealed eight further specimens. Some of these specimens were dissected and the genitalia examined, when it became evident that these series of supposed *reliquana* actually consisted of two distinct species.

A search in relevant European literature failed to clarify the identity of the unknown species. He then consulted the second author who draw attention to a recently published revision of the Japanese species of the genus *Lobesia* (Bae & Komai, 1991). One of the new species described there, *L. virulenta* Bae & Komai, seemed to be conspecific with

the species he had discovered. A comparison of the material with specimens of *virulenta* from Japan revealed some small differences, and based on these we conclude that the populations from these two areas are different at subspecific level.

The genus *Lobesia* Guenée, 1845 contains more than 100 species and has a nearly worldwide distribution (Bae & Komai, 1991: 115). Nineteen species are currently recognized from Europe (Razowski, 1996: 145-146). They include *L. botrana* (Denis & Schiffermüller) (European Vine Moth), a serious pest of grapes. Among the European *Lobesia* species *virulenta* is, like *reliquana*, related to and easily confused with *botrana* (D. & S.), and these two species are therefore dealt with here in some detail. In East Asia several other closely related *Lobesia* species occur, viz. *arguta* Bae & Komai, 1991, *yasudai* Bae & Komai, 1991, *pyriformis* Bae & Park, 1992 and *atsushii* Bae, 1993. These species are very similar in both habitus and genitalia characters.



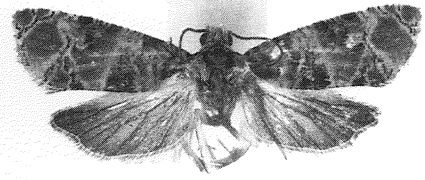
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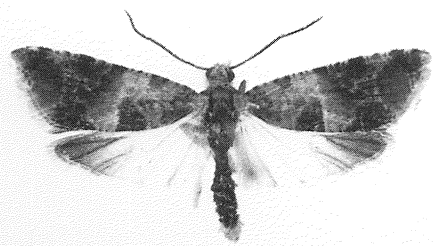
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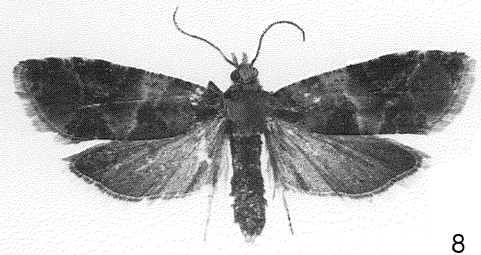
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Figs 1-10. Adults of *Lobesia*. Figs 1-3, *L. virulenta* ssp. *mieana* Falck & Karsholt. 1, holotype ♂, Denmark, NEZ, Asserbo; 2, ♂, Denmark, NEZ, Grønholt; 3, ♀, Denmark, B, Paradisbakker. Figs 4,5, *L. virulenta* ssp. *virulenta* Bae & Komai. 4, ♀, Japan; 5, ♂, Japan. Figs 6-8, *L. reliquana* (Hb.). 6, ♂, Denmark, EJ, Hald; 7, ♂, Denmark, LFM, Hamborg Skov; 8, ♀, Denmark, NEZ, Asserbo. Figs 9,10, *L. botrana* (D. & S.). 9, ♂, Spain; 10, ♂, Corse.

Abbreviations.

Gs: Genitalia slide.

NHMÅ: Naturhistorisk Museum, Århus, Denmark.

NISK: Norwegian Forest Research Institute, Ås, Norway.

ZMUC: Zoologisk Museum, København's Universitet, Denmark.

ZMUO: Zoologisk Museum, University of Oslo, Norway.

Lobesia virulenta ssp. *virulenta*

Bae & Komai. New status

Lobesia virulenta Bae & Komai, 1991: 127.

Diagnosis. – Adult (figs 4-5). Wingspan 12-13 mm. Head pale ochreous. Antenna pale yellowish brown, ringed with darker brown. Labial palpus and thorax light yellowish brown suffused with dark brown. Ground colour of forewing light ochreous, suffused with plumbeous; basal patch ochreous brown, angulated at outer edge; area between basal patch and central fascia light ochreous at costa and fuscous at dorsum; central fascia subtriangular, ochreous brown, upper half of outer margin edged with black; pretornal and terminal patch tawny; apical spot ovate, surrounded by fuscous line; cilia lighter or darker ochreous with fuscous basal line. Hindwing in male subtriangular, with rather straight termen and pointed apex, pale greyish white, semi-pellucid, becoming darker towards apex; distance (in males) between veins CuA1 and CuA2 about twice the distance between CuA1 and M3; cilia white with a greyish subbasal line. Hindwing of female of normal shape, fuscous.

Genitalia, ♂ (fig. 11). Valva rather broad and angulated; sacculus with two spine clusters, linked by a series of small spines (16-20 spines in examined material). Aedeagus slightly shorter than half of caulis, gently curved at base, straight in middle and tapering distally, with a group of extremely minute dents on proximal half of its left wall. Abdominal segments weakly sclerotized.

Genitalia, ♀ (fig. 17). Sterigma pear-shaped, concave anteriorly, gradually tapering posteriorly; antrum with almost parallel walls; ductus bursae rather long; corpus bursae small and rounded; signum rather large, arrowhead-shaped.

Bionomics. – The mature larva has a body length of 8-12 mm. Head light yellowish brown with distinct black ocellar area. Prothoracic shield dark reddish brown. Anal shield dark brownish grey,

irrorated with black. Body dark brown or black. The pupa is 7 mm long, uniformly yellowish brown. Host plants are: *Pyrus serotina*, *Larix leptolepis*, *Angelica* sp., gall of *Ceratovacuna nekoashi* (Aphididae) on *Styrax japonicus*. When feeding on *Pyrus*, the larva attacks the fruits, on *S. japonicus* it feeds at the inner wall of galls made by *C. nekoashi* (Bae & Park, 1992: 129; Bae & Yasuda, 1992). In Japan the larva of *virulenta* is regarded as a pest on *Pyrus* (Bae & Yasuda, *op. cit.*).

Distribution. – Japan (Bae & Komai, 1991: 129), Korea (Bae & Park, 1992: 76), China (Liu & Bae, 1994: 853) and Taiwan (Bae, 1993: 519).

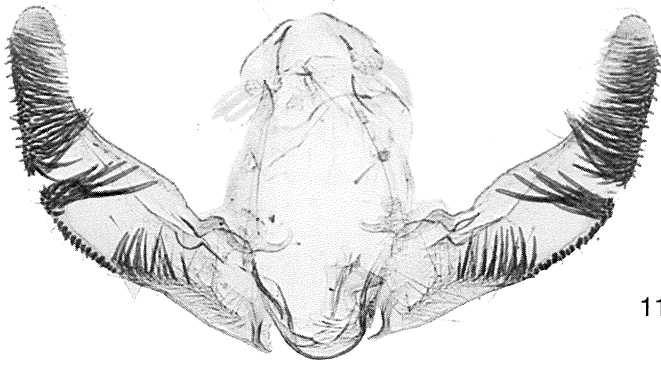
Lobesia virulenta mieana Falck & Karsholt. New subspecies.

Diagnosis. – Adult (figs 1-3). Wingspan 10-13 mm. Head pale ochreous. Antenna pale yellowish brown, ringed with blackish brown. Labial palpus and thorax yellowish brown, suffused with blackish brown. Ground colour of forewing ochreous, suffused with blackish; basal patch blackish brown, angulated at outer edge; area between basal patch and central fascia dark grey, lighter at costa; central fascia subtriangular, ochreous brown at dorsum, blackish at costa; on upper half of outer margin of central fascia a light yellow spot; pretornal and terminal patch tawny fuscous; apical spot ovate, indistinct, with darker centre, surrounded by fuscous line; cilia ochreous grey with fuscous basal line. Hindwing in male subtriangular with sinuous termen and rounded apex, light greyish and semi-pellucid at base, becoming fuscous towards apex; cilia light grey with a greyish subbasal line; distance (in males) between veins CuA1 and CuA2 about 1.5 times the distance between CuA1 and M3. Hindwing of female broader than in male, fuscous.

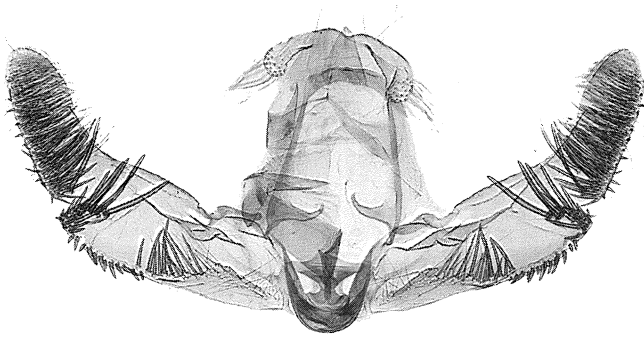
Genitalia, ♂ (figs 12, 15). Similar to those of *L. virulenta virulenta*, except that the two spine clusters at sacculus are linked by a shorter series of small spines (11-14 spines), caulis is smaller, and aedeagus is slightly longer than half length of caulis.

Genitalia, ♀ (fig. 18). Similar to those of *virulenta virulenta*, but sterigma more concave anteriorly, and ductus bursae about one fourth longer.

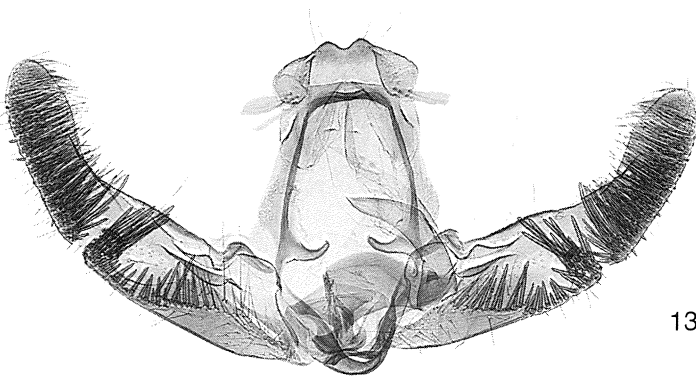
Bionomics. – Early stages unknown. Adults have been collected from the beginning of May to late



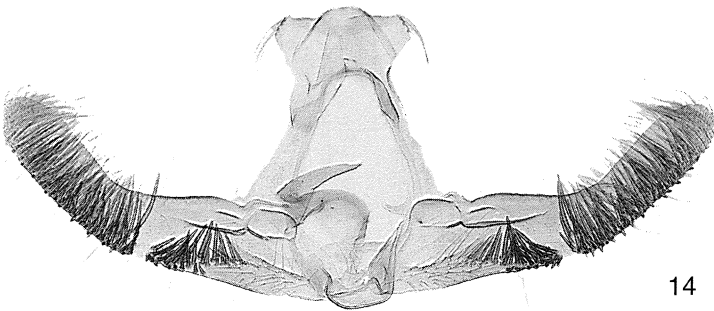
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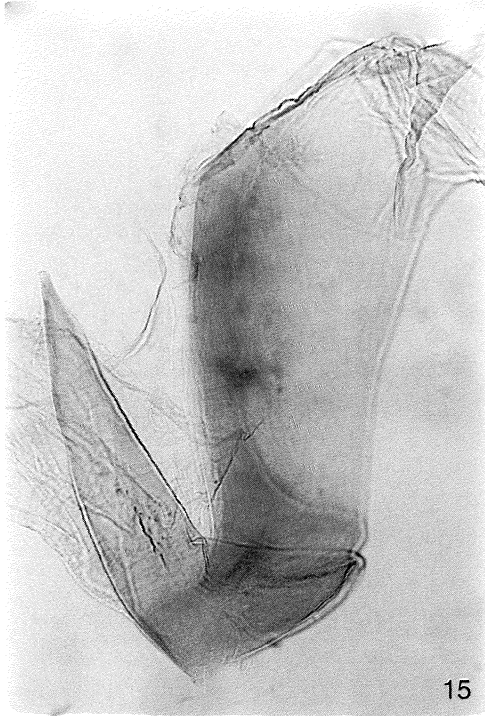


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Figs 11-14. Male genitalia of *Lobesia*. - 11, *L. virulenta* ssp. *virulenta* Bae & Komai; 12, *L. virulenta* ssp. *mieana* Falck & Karsholt; 13, *L. reliquana* (Hb.); 14, *L. botrana* (D. & S.).



Figs 15,16. Aedeagus and caulis of *Lobesia*. - 15, *L. virulenta* ssp. *mieana* Falck & Karsholt; 16, *L. reliquana* (Hb.).

July in mixed deciduous forests. Gert Jeppesen (*pers. comm.*) found *L. virulenta mieana* by beating bushes of *Prunus padus*.

Distribution. - Denmark, Norway. *L. virulenta mieana* is less common than *reliquana*. Among the c. 160 specimens of *reliquana* in the collection of ZMUC we found only six specimens of *virulenta*.

Remarks. - *L. virulenta mieana* differs from the nominal subspecies in being overall darker, having the brownish areas of the forewings brownish to fuscous (ochreous to brownish in Japanese *virulenta*), and in having the light yellow spot on the upper half of the outer margin of the central fascia much more distinct. Japanese males of *virulenta* moreover have the light part of the hindwing more whitish, the termen of that wing more straight, and the distance between veins CuA1 and CuA2 is about twice the distance between veins CuA1 and M3.

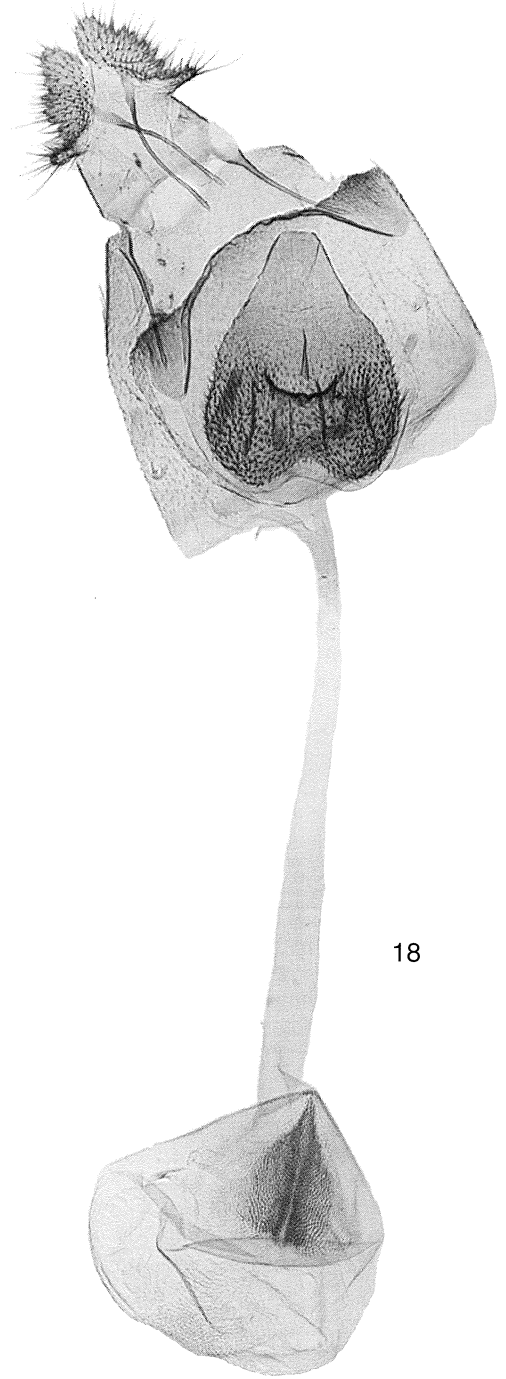
The forewing coloration and pattern in ssp. *mieana* are also very similar to those of *reliquana*, but in the latter the subtriangular dark area on the dorsal half between the basal patch and the

central fascia is more pronounced; in ssp. *mieana* the small light yellow spot between the central fascia and the terminal patch is more distinct, and the plumbeous lines between the central fascia and the terminal patch are edged with light yellowish scales which give a more speckled appearance. The forewings of *reliquana* are more pointed apically compared with *virulenta*. Sexual dimorphism in *virulenta* ssp. *mieana* is slightly pronounced, with the male hindwing often darker than that of *reliquana*, subtriangular with a more sinuous termen (a fine diagnostic character); the distance (in males) between veins CuA1 and CuA2 about 1.5 times the distance between veins CuA1 and M3 (in *reliquana* this distance is about twice); the hindwing in females is similar to that of related species.

Our comparison of the specimens listed under 'type material' below with material of *reliquana* and *virulenta* from Japan clearly shows that they are more closely related to the latter than to *reliquana*. Considering the small differences between the closely related species of this group in Asia we have, of course, discussed whether

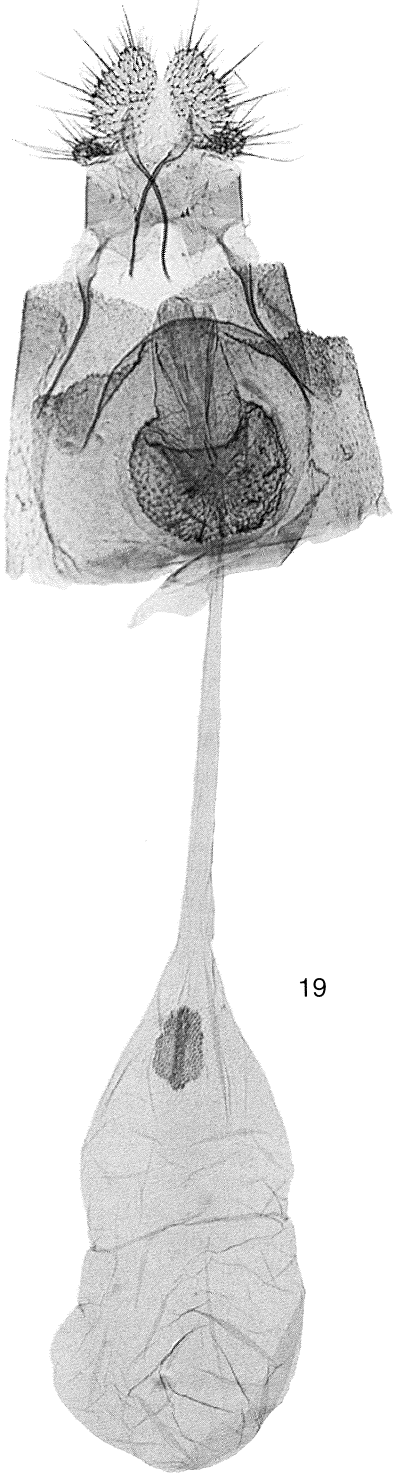


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Figs 17,18. Female genitalia of *Lobesia*. - 17, *L. virulenta* ssp. *virulenta* Bae & Komai; 18, *L. virulenta* ssp. *mieana* Falck & Karsholt.



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Figs 19,20. Female genitalia of *Lobesia*. – 19, *L. reliquana* (Hb.); 20, *L. botrana* (D. & S.).

mieana in fact represents a distinct species. However, to give a satisfying answer to this question one needs to study material from different intervening areas to see if intermediate populations occur. Information on the bionomics of *mieana* will probably also be helpful to clarify this. Based on our present knowledge we consider it, at least for the time being, most informative to treat *mieana* as a subspecies of *virulenta*.

Type material. – Holotype ♂, Denmark, NEZ, As-serbo, 31.v.1986 (P. Falck; gs. PF 1646; ZMUC).

Paratypes. DENMARK. **WJ:** Husby, 1♂ 27.vii.1979 (P. L. Holst; gs. PF 1678Å; NHMÅ); **LFM:** Tømmerholt, 1♂ 13.vi.1970 (leg. K. Pedersen, ZMUC); Bøtø, 1♂ 16.vi.1990 (G. Jeppesen; gs. PF 1656); Løgnor, 1♂ 24.vi.1991 (P. Falck; gs. 1649); **SZ:** Gjørslev Bøgeskov 1♂, 1♀ 19.vi.1960 (E. Traugott-Olsen & N. L. Wolff; gs. ETO 906; ZMUC); **NEZ:** Tokkekøb Hegn, 1♂ 28.v.1895 (C. S. Larsen; gs. PF 1677Å; NHMÅ); Grønholt, 1♂ 4.vi.1965 (W. van Deurs; gs. PF ZM3; ZMUC); Ostrupgård, 1♂ 27.vi.1967 (J. E. Jelnes; ZMUC); Gribskov, 1♂ 7.v.1990 (G. Jeppesen; gs. PF 1657); **B:** Paradisbakkerne, 1♀ 1.-2.vii.1978 (O. Karsholt; gs. OK 3243; ZMUC). NORWAY. **Ø:** Sarpsborg, 1♂, 1♀ 25.v. & 5.vi.1921 (E. Barca; gs. ZMO 879, NISK 98016; NISK & ZMUO); **VE:** Larvik, Rakke, 1♂ 11.vi.1990 (L. Aarvik; gs. LAA 2543); **AAy:** Arendal, Bjelland, Tromøy, 1♂ 26.vi.1955 (A. Bakke; gs. NISK 98015; NISK), 1♂ same locality 25.vi.1986 (S. A. Bakke; gs. LAA 98043); **STi:** Trondheim, Sjetremyra, 1♂ 6.vii.1987 (S. A. Bakke; gs. LAA 98042).

Data from Norway are provided by Leif Aarvik. Where no depository is mentioned the specimens are in the collection of the collectors.

***Lobesia reliquana* (Hübner)**

Tortrix permixtana Hübner, [1799]
(misidentification).

Asthenia reliquana Hübner, [1825].

Tortrix leucoptera Frölich, 1828.

Cochylis fischerana Treitschke, 1835.

Diagnosis. – Adult (figs 6-8). Wingspan 12-14 mm. Forewing overall similar to that of *virulenta* and *botrana* (compare these). Sexual dimorphism pronounced, in that males have the hindwing triangular with almost straight termen and pointed apex, whereas the hindwing in females is of normal shape. This is reflected in the venation of the male hindwing in which the distance between veins CuA1 and CuA2 is about double the distance between M3 and CuA1. The colour of the

hindwing varies in males from whitish with dark grey apex to almost unicolorous blackish grey; all females have such unicolorous dark hindwings.

Genitalia, ♂ (figs 13, 16). Valva less broad and basally more curved compared with *virulenta*; sacculus also with two spine clusters, but the number of small spines linking the two clusters is less (4-8 in examined material). Aedeagus almost as long as caulis and almost twice as long as in *virulenta*, more curved and with a series of serrate dents on its dorsal wall. The abdominal segments distinctly sclerotized.

Genitalia, ♀ (fig. 19). Sterigma pear-shaped, more or less concave anteriorly, but abruptly tapering posteriorly; antrum becoming wider posteriorly; ductus bursa of same length as in *virulenta virulenta* but shorter than in *virulenta mieana*; corpus bursae large and ellipsoidal; signum small and rhomboidal.

Bionomics. – The larva is described by Bradley *et al.* (1979: 68). Its main host plant is *Quercus*, but larvae of *reliquana* have also been recorded from *Anchusa*, *Betula*, *Fagus*, *Juniperus*, *Prunus* and *Solidago* (Bradley *et al.*, *op cit.*). Some of these host plants may eventually be referred to *virulenta*.

Distribution. – From Europe throughout the Palearctic region to Japan (Liu & Bae, 1994: 852; Razowski, 1996: 146).

Remarks. – *Tortrix permixtana* Hübner, [1799]: pl. 12, fig. 75 is a misidentification of *Tortrix permixtana* [Denis & Schiffermüller], 1775 (now in the Cochylini genus *Gymnidomorpha*). Hübner later on (1799: pl. 29, fig. 187) figured the correct *permixtana* D. & S., and he renamed ([1825]: 381) the species, which he had originally misidentified, *Asthenia reliquana*.

When Frölich (1828: 66) proposed the name *Tortrix leucoptera* he was apparently unaware that Hübner had already proposed a new name for his misidentified *permixtana*.

Treitschke (1835: 146-147) was aware of Hübner's *reliquana*. However, he misidentified it and used the name for the European Vine Moth (*botrana*). Treitschke (1835: 145-146) moreover described a similar species as *Cochylis fischerana*. A single syntype of this taxon is kept in the Treitschke collection at The Natural History Museum in Budapest. Through the kindness of László Ronkay of that museum we had the opportunity to study that specimen. Judging from the wing pattern we consider it belongs to *reliquana* (Hb.). However, it has a (false) male abdomen glued on, and by dissection that proved to belong to *Phiaris*

micana (Denis & Schiffermüller, 1775), a species which Treitschke described under the name of *Sericoris olivana*. We have selected this specimen as the lectotype. It is labeled: "Lectotype ♀, *Cochylis fischerana* Treitschke, 1835, O. Karsholt design., 1998 / with false, glued abdomen, Gen. præp. nr. 4931 ♂, O. Karsholt, belonging to *Phiaris micana* (Den. & Schiff. (= *olivana* (Tr.)) / *Lobesia* ♀, *reliquana* (Hübner), O. Karsholt det. 1998".

Lobesia botrana **([Denis & Schiffermüller])**

Tortrix botrana [Denis & Schiffermüller], 1775.

Phalaena vitisana Jacquin, 1788.

Olindia rosmarinana Millière, 1865.

Diagnosis. – Adult (figs 9-10). Wingspan 9-14 mm. Forewing light greyish brown; outer margin of central fascia black from costa to the small yellowish spot between central fascia and terminal patch. Sexual dimorphism only slightly pronounced, with hindwing in male similar to that of female but lighter, especially towards base, and distance between veins CuA1 and CuA2 about equal to distance between M3 and CuA1 in both sexes.

Genitalia, ♂ (fig. 14). Resembling those of *reliquana*. Valva slender; spine clusters at sacculus not linked by row of small spines; aedeagus shorter than caulis, straight, gently tapering towards apex; distally with a few extremely minute dents on proximal half of its left wall. Abdominal segments weakly sclerotized.

Genitalia, ♀ (fig. 20). Sterigma tongue-shaped, wrinkled posteriorly; ductus bursa of about same length as in *reliquana*; signum about three quarters the length of corpus bursae, with distinct medial keel.

Bionomics. – A description of the larva is given, e.g., by Bradley *et al.* (1979: 70). It feed on various shrubs and climbing plants including *Clematis*, *Suida*, *Lonicera*, *Viburnum*, *Ligustrum*, *Ribes*, *Hedera* and *Berberis*, but it is especially well known as a pest of grapes, *Vitis vinifera*. It is bivoltine in central Europe, but in warmer regions there are three or more generations (Bradley *et al.*, *op cit.*). Because of its status as a serious pest on grapes there is an extensive literature on the biology and the control of this species (see Roehrich & Boller (1991: 512-514) for further references).

Distribution. – Southern part of central Europe, South Europe, North and East Africa, Middle East, Central Asia (Bradley *et al.*, 1979: 70; Razow-

ski, 1996: 145). Records from Japan are due to misidentification (Bae & Komai, 1991: 115), as are records from North America. *L. botrana* has sometimes been found in North Europe, but such records probably refer to specimens introduced with grapes as larvae or pupae.

Remarks. – Koçak (1984: 136) considered *Tortrix botrana* Denis & Schiffermüller to be a nomen nudum and replaced it by *vitisana* Jacquin, 1788. However, this is not in accordance with the generally accepted interpretation of Denis & Schiffermüller's names (Sattler & Tremewan, 1984).

Dansk sammendrag

Lobesia virulenta Bae & Komai, 1991 fundet i Europa for første gang, samt beskrivelse af en ny underart (Lepidoptera, Tortricidae).

Under bestemmelsen af årets fangst blev denne artikels første forfatter opmærksom på to afvigende eksemplarer af *L. reliquana* (Hb.). En efterfølgende undersøgelse af genitalorganerne viste, at disse adskilte sig fra genitalierne hos *reliquana*. Ved en gennemgang af Zoologisk Museums og G. Jeppesens samlinger fandtes yderligere otte eksemplarer. Bestemmelsen voldte problemer, men det viste sig, at eksemplarerne tilhører *L. virulenta* Bae & Komai, der er beskrevet fra Japan så sent som i 1991. *L. virulenta* kendes på de mere spraglede forvinger, den mørke trekant på randen er mindre markant, midtpletten er tydeligere, der er flere gule skæl omkring blylinierne i vingens yderste trediedel, og den er mindre spidsvinget. Bagvingerne er generelt mørkere, og for hannens vedkommende betydeligt mere rundvingede. I genitalierne findes de største forskelle hos hannen i aedeagus og hos hunnen i sterigma, antrum, ductus bursa, samt i corpus bursa. En detaljeret sammenligning mellem danske og japanske eksemplarer viser en række små forskelle i udseendet; bl. a. er sidstnævnte lysere gule, og hannens bagvinger er smallere og lysere. Desuden afviger genitalorganerne i nogle detaljer. På den baggrund konkluderer vi, at den danske population tilhører en særlig underart, *mieana* n. ssp. Ud over Danmark, hvor vi har set eksemplarer fra distrikterne WJ, LFM, SZ, NEZ og B, er ssp. *mieana* også fundet i Norge. Den nominelle underart er udbredt i Østasien, og biologien af denne er udførligt beskrevet af Bae & Yasuda (1992). I Japan er larven fundet på en række forskellige planter, bl.a. *Pyrus*, *Larix* og *Angelica*. De danske eksemplarer er fanget i blandet løvskov.

Acknowledgements

L. Aarvik, NISK Ås, Norway placed unpublished records of *virulenta* from Norway at our disposal; P. Gjelstrup, Naturhistorisk Museum, Århus gave us access to the collection under his care; G. Jeppesen, Elkenøre pr. Idestrup, Denmark provided information and loaned material; F. Komai, Osaka University of Arts, Osaka, Japan presented material of *virulenta* from Japan; M. Nuss, Staatliches Museum für Naturkunde, Dresden, Germany and Wolfgang Nässig, Senckenberg-Museum, Frankfurt am Main, Germany helped with literature; L. Ronkay, Hungarian Natural History Museum, Budapest, Hungary loaned us the holotype of *Cochylis fischerana* Treitschke; M. Stanescu, Muzeul de Istorie naturala "Grigore Antipa", Bucarest, Romania provided information on *L. matici* Stanoiu, 1974 so that this taxon could be excluded from the present study. G. Brovad and N. P. Kristensen, both ZMUC, made the photographs of adults and genitalia, respectively. K. Tuck, The Natural History Museum, London, U. K. corrected the English of the manuscript.

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