Additional data on the distribution and early stages of *Chrysoesthia verrucosa* (Lepidoptera: Gelechiidae)

H. ten Holt & J. H. Kuchlein

Abstract. The recently described gelechiid moth *Chrysoesthia verrucosa* Tokár, 1999 is recorded for the first time for Italy, where it was found in the Aosta region on 3 August 2002. Larvae were found mining the leaves of goosefoot (*Chenopodium* sp.) and the adults were reared; the early stages and foodplant(s) of this species were still unknown. Identification, bionomics and geographical distribution of *C. verrucosa* and some related species will be discussed.

Samenvatting. Aanvullende gegevens over de verspreiding en jeugdstadia van *Chrysoesthia verrucosa* (Lepidoptera: Gelechiidae)
De onlangs beschreven Gelechiidae *Chrysoesthia verrucosa* Tokár, 1999 werd voor het eerst in Italië waargenomen in de Aosta-vallei op 3 augustus 2002. Adulten werden gekweekt uit rupsen die mineerden in de bladeren van ganzevoet (*Chenopodium* sp.). De jeugdstadia en de voedselplant(en) van deze soort waren tot nu toe onbekend. Determineerkenmerken, bionomie en de geografische verspreiding van *C. verrucosa* en enkele verwante soorten worden besproken.

Résumé. Données supplémentaires sur la distribution et les stades pré-imaginaux de *Chrysoesthia verrucosa* (Lepidoptera: Gelechiidae)
L'espèce de géléchiide récemment décrite, *Chrysoesthia verrucosa* Tokár, 1999, fut trouvée pour la première fois en Italie dans la vallée d'Aosta le 3 août 2002. Des adultes ont été obtenus de chenilles minant les feuilles d'ansérine (*Chenopodium* sp.). Jusqu'à présent les stades pré-imaginaux et les plantes nourricières étaient inconnus. L'identification, la bionomie et la distribution géographique de *C. verrucosa* et de quelques espèces apparentées sont discutées.

Key words: *Chrysoesthia verrucosa* – *Chenopodium* – Distribution – Bionomics –

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Introduction

Chrysoesthia verrucosa Tokár, 1999 was described as a new species only recently by Tokár in the book on the Central European gelechiid moths (Elsner *et al*. 1999). Accordingly it is not surprising that the knowledge on its distribution is still incomplete and the early stages and foodplants were unknown.

The first author was confronted quite unexpectedly with *C. verrucosa*. He collected eight tenanted mines on goosefoot (*Chenopodium* sp.) in the Aosta region (Northern Italy) near Combes, a tiny village to the south of Arvier, on 3 August 2002. In the same month he obtained two adults and was surprised to find out that he was dealing with *C. verrucosa,* until then only known from more eastern parts of Central Europe. In the next sections attention will be paid to identification, bionomics and geographical distribution of this species and its Central European relatives.

Identification

Besides *C. verrucosa* three *Chrysoesthia* species occur in Central Europe, viz. *C. drurella* (Fabricius, 1775), *C. eppelsheimi* (Staudinger, 1885) and *C.*

sexguttella (Thunberg, 1794). Three more species are known from Europe but their distribution is restricted to the Mediterranean; they will not be considered here. With the aid of the key given below adults of these Central European species can be easily identified based on external characters.

1. Forewing bright orange with silvery markings..... *C. drurella*
   8.0–9.0 mm. Forewing with apical cilia black and also blackish at wing base and in middle of costa. Holarctic distribution: from England to East Siberia and in North America
– Forewing dark purplish-grey with yellowish-orange and whitish markings ...2
2. Forewing with pale subapical spot oblong, narrow and often reduced or disrupted, but sometimes extending as irregular fascia to termen; pale markings ill-defined, variable and occasionally nearly absent .... *C. sexguttella*
   8.0–10.0 mm. Holarctic distribution: from Ireland to East Siberia and in North America, but also in South Africa
– Forewing with pale subapical spot oval, broad, reaching to middle of wing and never reduced; pale markings edged distinctly and showing little variation..... 3
3. Forewing with three metallic silvery transverse fasciae; inner edge of first yellowish-orange fascia nearly parallel to body ..... *C. eppelsheimi*
   6.0–8.0 mm. Central and South Europe
– Forewing without metallic silvery fasciae; inner edge of first yellowish-orange fascia at an angle of 30°– 45° on costa..... *C. verrucosa*
   8.0–9.5 mm. Geographical distribution discussed in this paper.

Genital characters of *C. verrucosa* are discussed and figured in Elsner *et al*. (1999), the genitalia of the other Central European *Chrysoesthia*-species are figured there as well.

Bionomics

The larvae of the Central European representatives of the genus *Chrysoesthia*, are leaf miners, feeding on *Chenopodiaceae* and *Caryophyllaceae* and possibly also on *Amaranthus* (*Amaranthaceae*) (Hering 1957).

The larva of *C. drurella* mines the leaves of goosefoot (*Chenopodium* spp.) and orachle (*Atriplex* spp.) in a highly contorted gallery with the windings close together and subsequently forming a blotch. The egg is laid on the upperside of the leaf. Frass is retained in the mines, at first coloured greenish, later darker. The larva of *C. sexguttella* mines on the same plant species as *C. drurella*. However, the mine of *C. sexguttella* starts immediately as a blotch without distinct initial gallery and is enlarged pear-shaped. Another difference is the position of the egg which is laid on the underside of the leaf. The dark frass is partly expelled from the mine. There are also morphological differences between the larvae of both species. Mines of *C. drurella* and *C. sexgutella* are described and pictured by Hering (1957) and Bland *et al*. (2002).

The larva of *C. eppelsheimi* mines the leaves of *Silene nutans* and *S. flavescens*. The mines of this species, resembling those of *C. sexguttella*, start

with a straight or contorted gallery, which is enlarged to a blotch. The mine is described and pictured by Hering (1957).

Figure 1. *Chrysoesthia verrucosa*, adult. Combes, Aosta-region, Italy (Photo: F. Bink).

Figure 2. Mine of *Chrysoesthia verrucosa* on goosefoot (*Chenopodium* sp.). Combes, Aosta-region, Italy (Photo: H. ten Holt).

The *C. verrucosa* mines were found on goosefoot, often with more mines in one leaf. The mines strongly resemble those of *C. sexguttella*, both in size and in shape. The *verrucosa*-larvae form transparent whitish pear-shaped blotches without initial gallery. In contrast to *sexguttella* all or most dark-green frass seems to be retained in the mine. Also in contrast to *sexguttella*, the larvae seem

to stack the frass in the central part of the blotch, forming a gradually widening stretched line of frass as the larva enlarges the blotch. The egg is deposited on the upperside of the leaf.

Adults of *C. drurella* and *C. sexguttella* are observed in The Netherlands from May to September, the larvae living from summer to next spring. Both Hering (1957) and Bland *et al*. (2002) mention two generations per year for both species. The Dutch data do not yet point to discrete generations. According to Hering (1957) *C. eppelsheimi* is also bivoltine.

Concerning *C. verrucosa* Elsner *et al*. (1999) report one generation found in May and June; no records of larval findings existed. Nevertheless, bivoltinism could also be the case for *C. verrucosa*, as the Aostan adults were obtained in August 2002 from nearly full-grown larvae found in the beginning of that month.

Geographical distribution

Characteristics of the geographical distribution of *C. drurella*, *C. sexguttella* and *C. eppelsheimi* are already given in the identification key. Their distribution in Europe is now fairly well known. However, the knowledge of the range of the recently described *C. verrucosa* is still far from complete. With certainty the species is known from the Czech and Slovak Republics and Austria (Elsner *et al*. 1999). Afterwards also reported from Thuringia (Buchsbaum & Löbel 2000) and Bavaria (Gaedike & Heinicke 1999) in Germany and presumably found in Poland (Elsner *et al*. 1999). Now the alpine zone of Northern Italy is added to the known range; the larvae were found here at an altitude of 1300 m. It looks as though *C. verrucosa* is restricted in its distribution to the higher mountains of Central Europe.

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