SHILAP Revista de lepidopterología, 49 (194) junio 2021: 259-271 eISSN: 2340-4078 ISSN: 0300-5267
https://doi.org/10.57065/shilap.300

Contribution to an understanding of the biology and larval morphology of two taxa in the genus *Scopula* Schrank, 1802, subgenus *Glossotrophia* Prout, 1913 (Lepidoptera: Geometridae)

G. E. King & J. L. Viejo-Montesinos

Abstract

Descriptions of the larval morphology of two Iberian Sterrhinae taxa in the genus *Scopula* Schrank, 1802 subgenus *Glossotrophia* Prout, 1913 are provided: *Scopula* (*Glossotrophia*) *rufomixtaria* (Graslin, 1863): larval chaetotaxy: L_4 and *Scopula* (*Glossotrophia*) *asellaria dentatolineata* Wehrli, 1926: larval chaetotaxy: L_5. Original data is also provided on their biology which includes phenology, food-plants and parasitoids.

KEY WORDS: Lepidoptera, Geometridae, Sterrhinae, *Scopula*, larval morphology, phenology, food plants, chaetotaxy, Spain.

Contribución al conocimiento de la morfología y la biología larvaria de dos taxones del género *Scopula* Schrank, 1802, subgénero *Glossotrophia* Prout, 1913 (Lepidoptera: Geometridae)

Resumen

Se describe la morfología larvaria de dos taxones ibéricos de Sterrhinae pertenecientes al género *Scopula* Schrank, 1802, subgénero *Glossotrophia* Prout, 1913: *Scopula* (*Glossotrophia*) *rufomixtaria* (Graslin, 1863): quetotaxia larvaria de L_4 y *Scopula* (*Glossotrophia*) *asellaria dentatolineata* Wehrli, 1926: quetotaxia larvaria de L_5. Igualmente se incluyen datos de su biología relativos a la fenología, plantas nutricias y parasitoides.

PALABRAS CLAVE: Lepidoptera. Geometridae, Sterrhinae, *Scopula*, morfología larvaria, fenología, plantas nutricias, quetotaxia, España.

Introduction

The erstwhile genus *Glossotrophia* Prout, 1913 was downgraded to sub-genus status (SIHVONEN, 2005) within the sterrhine genus *Scopula* Schrank, 1802 which consists of 24 taxa in the Iberian Peninsula (REDONDO *et al.*, 2009, modifications according to SIHVONEN 2005). SIHVONEN & KAILA (2004) established three synapomorphies of the genus which include: uncus on the male genitalia absent; 8° sternite with cerata and mappa which is often polymorphic (HAUSMANN, 1999); corpus bursae ovoid with signum made up of small, flat spinules (HAUSMANN, 2004). In terms of biology, the Iberian taxa are generally univoltine with the first generation before the onset of the summer drought period (ASCHMANN, 1984). The larvae tend to be oligophagous or monophagous in lower plants, for example, the labiates (WILTSHIRE, 1962; SORIA, 1987; HAUSMANN, 2004). Larval ethology includes the fact that fully-grown examples often perch in the vicinity of the food-plant rather than directly on it (EBERT & STEINER, 2001; KING & GONZÁLEZ-ESTÉBANEZ, 2015).

Scopula (*Glossotrophia*) *rufomixtaria* (Graslin, 1863)

Corology: Western Mediterranean with a distributional focus in meso-Mediterranean and thermo-Mediterranean Spain eastwards to southern France and the Franco-Italian Maritime Alps south-westwards to the Maghreb (nominotypical subspecies in Morocco); in Algeria and Tunisia is found the subspecies: *S.* (*G.) rufomixtaria sahariensis* Hausmann, 1993 (HAUSMANN, 1993; 2004).

Phenology: The species is univoltine or bivoltine according to latitude or altitude (HAUSMANN, 2004); in the lowlands (Madrid, for example) it is bivoltine with the first generation end of May-end of July, with a probable third generation (KING & VIEJO-MONTESINOS, 2010) already alluded to by HAUSMANN (2004). In the mid-Ebro valley (NE Spain) *S.* (*G.) rufomixtaria* emerges earlier at the end of April flying until end of September (REDONDO & GASTÓN, 1999; REDONDO *et al.,* 2001). The larva (Fig. 1) is associated with the carnations (Caryophyllaceae): CHRÉTIEN (1928) cited *Silene* and *Dianthus* (Caryophyllaceae); in Spain recent data describe it as monophagous in *Gypsophila struthium* L. in Loefl. (KING, 2000; REDONDO *et al.*, 2001; KING & VIEJO-MONTESINOS, 2010).

Scopula (*Glossotrophia*) *asellaria dentatolineata* Wehrli, 1926

This taxon belongs to a "ring species" complex (MAYR, 1963) with various subspecies focussed on the Mediterranean region (northern and southern shores) and the Canary Islands (Macaronesia): (*S.* (*G.) asellaria gerstbergeri* Hausmann, 1993; *S.* (*G.) asellaria lenzi* Hausmann, 1993) (HAUSMANN, 1993; BACALLADO *et al.*, 2005). The nominotypical subspecies *S.* (*G.) asellaria asellaria* (Herrich-Schäffer, 1847) is found in Corsica and Sardinia. In the Iberian Peninsula itself there are two subspecies: *S.* (*G.) asellaria dentatolineata* Wehrli, 1926 in central and southern regions and *S.* (*G.) asellaria isabellaria* Millière, 1868 in the north-east to south-west France; the subspecies *S.* (*G.) asellaria romanaria* Millière, 1869 is distributed disjunctively in Sicily, western Italy, the southern Swiss valleys, Malta and Greece. In the Maghreb there fly three subspecies: *S.* (*G.) asellaria lenzi* Hausmann, 1993 (Great Atlas, Morocco); *S.* (*G.) asellaria philipparia* Prout, 1913 (northern Algeria, Tunisia); *S.* (*G.) asellaria tripolitana* Turati, 1929 (Libya, southern Tunisia, eastern Algeria) (HAUSMANN, 1993; 2004).

More recent data suggests that the two Iberian subspecies: *S. (G.) asellaria dentatolineata* Wehrli, 1926 and *S. (G.) asellaria isabellaria* (Millière, 1868) fly sympatrically in the south-eastern Spanish province of Murcia it being pointed out by the authors that it would be a "contact zone" between the two taxa (CALLE *et al.,* 2000; ORTIZ *et al*., 2009).

Phenology: HAUSMANN (2004) indicates two generations from the end of March-May, with a second generation from the end of September-early October with an absence of data at low altitudes in the summer months. Limited data from the Ebro valley (NE Spain) REDONDO & GASTÓN (1999) suggest that it is bi-voltine: early April and then in September. ORTIZ *et al*. (2009) include data from January to May, June, July to early September suggesting that it flies throughout the year. In terms of larval food-plants, it would appear to be polyphagous in the Scrophulariaceae, Zygophyllaceae and Lamiaceae (MILLIÈRE, 1869-1874; CHRÉTIEN, 1917) with snapdragon *Antirrhinum majus* L. (Scrophulariaceae) cited in central Spain (KING & ROMERA, 2004; KING & VIEJO-MONTESINOS, 2010). The ovum and oviposition strategy of *S. (G.) asellaria dentatolineata* are described in KING & VIEJO-MONTESINOS (2016).

SHAW (2010) cites *Homolobus truncator* Say, 1828 (Hymenoptera: Braconidae; Homolobinae) as a larval parasitoid of both *S. (G.) asellaria dentatolineata* and *S.* (*G.) rufomixtaria.*

General morphological information of European *Scopula* larvae can be found in EBERT & STEINER (2001). SINGH (1951) deals with the chaetotaxy of three European sterrhine genera: *Problepsis* Lederer, 1853, *Scopula* and *Idaea* Treitschke, 1825 with *Scopula* larvae being diagnosed as follows: cephalic capsule granular; vertex almost rounded; frontal setae situated above level of pores; seta O2 alongside ocellus 1 (within complex of stemmata); O1 very near ocellus 3; lengthened abdomen (urites A1-10), granular cuticule; setae short; MD setae are microscopic; A1-A9; SD1 anterior to spiracles A1-A7; L1 posterior to spiracle and below it A1-A5; A6 and A8 at same level; anal shield (A10) is round, L1 next to L2, D1, L3 in a line; spiracles oval shaped; on A6 are bigger than those in T1; A7 and A8 are of a different size.

The aim of this present paper is to provide data on the biology of these two taxa which includes undocumented parasitoid data (Hymenoptera: Ichneumonidae, Braconidae) and to give a more detailed overview of the larva which includes larval chaetotaxy.

Materials and methods

Study area

The locality which formed the basis for the collection of imagines and of larvae in the Tagus Valley (Madrid; 590-600 m) was Ciempozuelos (Cerros de Palomera) (N40º 09'09.1 W003º 36'27.1).

The Miocenic and Triassic gypsyferous soils are relatively frequent in the Iberian Peninsula in the Tagus and Ebro basins, and the south-east Peninsular (FERRANDIS *et al*., 2005). The climate is Meso-Mediterranean, with important drought conditions from June to September. The little rain that falls does so in the spring (March to May), and in the autumn (September to November). In the winter, conditions of thermic inversion tend to prevail (IZCO, 1984). The general lack of precipitation and the corresponding aridity ensures that the influence of the gypsum soils is a constant, with a consequential effect on the vegetation which is generally understood to be included in the botanic order Gypsophiletalia.

Data collection. Collecting larvae

Larvae were collected within the confines of an intensive field study occurring January 2004 until May 2006, September 2007 until July 2008 (KING & VIEJO-MONTESINOS, 2010). *Scopula* larvae were obtained exposed on their food-plant, *Antirrhinum majus* or *Gypsophila struthium* amongst the leaves generally, but often in the immediate vicinity perched on the exposed gypsym cliff faces as described in KING & VIEJO-MONTESINOS (2010). Rearing out of larvae (and subsequent pupae) took place in plastic containers of various sizes ensuring that excess humidity did not build up which is invariably fatal for the larvae (STEHR, 1987). Pupae were left in situ in order for emergence of adults to occur.

Obtaining parasitoids

SHAW (1997) indicates how to breed out parasitoids (Hymenoptera: Ichneumonidae, Braconidae) ex ovo, ex larva (including ex pre pupal phase) or ex pupa in captive conditions, which includes the importance of associating the correct host-parasitoid, and so avoiding erroneous or improbable relations which can only slow up future studies. In the same way, it should be established in which larval instar (L1-L5) parasitoid attack occurred (or at least when the parasitoid was noted) (SHAW & HUDDLESTON, 1991). When breeding out larvae in captivity, whether a larva has been parasitised, the first sign is the wasp's cocoon being found, for example, in the whereabouts of a moribund larva, or if the larva has already pupated, within the host's cocoon, or if the wasp has exited the host, one finds the host's exuvium whilst the wasp larva is seeking out its own place in which to pupate (SHAW, 1997). In any of these cases, it is imperative that all events associated with the parasitisation of the host are kept: cocoon (individual or en masse) (Hymenoptera) (with host remains) being appropriately labelled which would include (date host taken in wild, date of finding of "parasitisation event", host food-plant, emergence date of parasitoid itself). All material thus obtained was sent to Mark R. Shaw, Royal Museum of Scotland for identification.

A collection GEK and UAM was maintained of larvae (including those that perished after field collection or those bred out under captive conditions) in 70% ethanol (in Eppendorf vials with appropriate data). A collection (Coll GEK, MNHN) was also put together of imagines which were either reared out ex larvae or of those imagines field collected in Madrid. Preparations of the genitalia mentioned in this paper were macerated initially in potassium hydroxide at c. 25% overnight and prepared in 70% ethanol in a Petri dish before being stained lightly with Chlorozol black and then dropped in DMHF (Dimethyl hydantoin formaldehyde) before a coverslip was secured in place.

SEM images of larvae (ex female or field-collected as appropriate, see captions) were obtained with material mounted on stubs with adhesive carbon discs and these were then bathed in gold using a Quorum Q150TS, the images themselves being taken with a SEM model Amray 1810 (10 kV). Images were taken either at the Universidad de Concepción (Chile) (2010) or at the Universidad Autónoma de Madrid (2011).

Terminology related to chaetotaxy was that according to HINTON (1946) and DUGDALE (1961).

Abbreviations

L1-L5	refers to the larval instars.
Coll.	collection:
Coll.	GEK Gareth Edward King, Madrid
Coll.	UAM Universidad Autónoma de Madrid
NMS	National Museum of Scotland, Edinburgh, UK
MRS	Mark R. Shaw

Results

Scopula (*Glossotrophia*) *rufomixtaria* (Graslin, 1863)

Larvae: 19-III-2005 (one larva: pupated 20-IV-05, pupa 6-V-05 (perished); 3-IV-05 (one larva); 26-III-06 (two larvae); 6-IV-08 (Fig. 1) (one larva: pupated 16-IV-08, pupa 25-IV-08, emerged 11-V-08) ♀ (slide preparation: GK1079MA; Coll. UAM); 15-V-08 (one larva).

Imagines: 1 ♀, 31-V-08 (GK1081MA);1 ♂, 8-VI-08 (GK1132MA) (GEK leg. det. Coll. UAM).

Larvae and imagines were found in gypsym outcrops with the six larvae being taken in *Gypsophila struthium* Loefl. mats (KING & VIEJO-MONTESINOS, 2010). All material belonged to the first generation.

Descriptions Larva: L1: 3.5mm (n=1) (ex ♀ 7-VII-11, Ciempozuelos) yellowish-green; faint pinkish spots ventrally; L4: (26-III-06: 17mm; n=2).

Chaetotaxy: L4 (larva 26-III-06): 17mm (n=2); cephalic capsule (Fig. 2): hypognathous; stemmata form an "scalene triangle"; ocellus 1 is 20% larger than the other ocelli; whilst, ocellus 5 is 10% smaller than the rest of the complex; ocellus 1 is positioned two ocelli from ocellus 2 whilst 2 is positioned one ocellus from ocellus 3; ocellus 3, 4 are to be found almost side by side; half an ocellus distant; ocellus 4 is positioned two ocelli from ocellus 6 which at the same time is positioned three ocelli from ocellus 5; seta O2 is positioned alongside ocellus 1; O1 alongside 3; SO2 proximo to ocellus 6; together with SO3 and O3 in a straight line from ocellus 5 they form a "triangle"; O3, ocellus 5, O1, ocellus 2, A3 form an ascendent line laterally; A1, A2, A3 form a "triangle" dorsally with A2, A3 not at the same level but with A2 more caudal and with seta A3 three ocelli from ocellus 2; labrum (Fig. 3): LR6, LR4 50% of the length of LR5; LR2, LR5 are the longest of the LR setae complex; thoracic region: T1 (Fig. 4): L1, L2 in front of spiracle; L1 fine, elongated; SD2, SD1 at the same level, SD1 fine, elongated; SV1, SV2 ventral region; abdominal region: A6 (Fig. 5): SV1, SV2, SV3 anterior area of abdominal pro-leg; SV4, V1; nine uniserial crochets (DUGDALE, 1961) (row of four, then five), divided by sole (Fig. 6); A10 (Fig. 5): anal shield rounded; D2, PP1 in apposition; distally pronounced; anterior zone with D1, SD1, abdominal pro-leg L3, CD2, L1, CP2 these setae are long, pronounced curving distally.

Parasitoids obtained: Larva L5 (3-IV-05) in *Gypsophila struthium*; *Homolobus truncator* Say, 1828; (Braconidae; Homolobinae) ex pre-pupa (L5): 7-IV-05; emerged: 1-V-05 (MRS det. deposited NMS; SHAW, 2010).

Scopula (*Glossotrophia*) *asellaria dentatolineata* (Wehrli, 1926)

All material [imagines (20); larvae (465)] was taken in gypsum outcrops (KING & VIEJO-MONTESINOS, 2010); adults resting on the rock surface whilst the larvae were collected in *Antirrhinum majus* L.; larvae were taken throughout the year with two peaks: the first in March which corresponds with those having overwintered, with adults of the first generation emerging the first half of April. Phenologically, May is the month with least larvae collected; the other peak is to be found in October with the larvae resulting from the summer generation.

Imagines: 1 ♂, 8-V-04 (preparation number: GK081MA); 1 ♀ 12-IX-04 (GK086MA); 2 ♀♀, 7-V-05 (GK101MA, GK104MA); 1 ♀, 22-V-05 (GK093MA); 1 ♂, 16-VII-05 (GK080MA); 1 ♀, 10-IX-05 (GK102MA); 1 ♀, 22-X-05 (GK105MA); 2 ♂♂, 29-IV-06 (GK976MA, GK990MA); 1 ♀, 13-V-06 (GK1201MA); 1 ♀, 20-V-06 (GK981MA); 1 ♀, 27-V-06 (GK987MA); 2 ♂♂, 12-IV-08 (GK1007MA, GK1014MA); 1 ♂, 20-IV-08 (GK1003MA); 1♂, 11-V-08 (GK1088MA); 1 ♂, 1 ♀, 15-V-08 (GK1101MA, GK1141MA); 1 ♀, 8-VI-08 (GK1152MA) all material GEK leg. det. Coll. UAM.

Descriptions Larva: L1: (ex 1 ♀, 22-V-10; Ciempozuelos) larvae eclosed: 29-V-10: (n=3) ± 3.8 mm; dorsally greenish-white, and reddish; L2: (ex 1 ♀, 22-V-10; Ciempozuelos) (n=4): 8.6 mm: overall greenish-white; A1-A5: lateral spotting reddish-black; cephalic capsule: greenish-white mottled in ochre; dorsally reddish-green; ventrally greenish-white; L3: 13 mm (n=2) (24-X-09; Ciempozuelos) larva pale ochre dorsal line absent; laterally one can appreciate a certain flattened rugosity in line with the spiracles; dorsally A2-A8 discontinuous blackish shapes; five black stigmata laterally in urites: A1, A3, A,5, A7, A8; spiracles ochre black margins; abdominal pro-legs, thoracic legs pale ochre; cephalic capsule: greyish-white; sutures black, mottled in ochre dorsally; 13 mm (n=2): (17-IV-10): greyish-white; small black spotting beneath the whitish roughened-fleshy laterals below spiracles; ventrally cuticle roughened and greyish in contrast with whiter dorsal area; thoracic, abdominal pro-legs, cephalic capsule: whitish mottled in ochre (a constant also in L5); L4: ex 1 ♀, 29-V-10): ± 15 mm (n=3): Larvae polychroic L5; greyish-green; ventrally with black maculation A2-A5; also dorsally A6-A2, these maculae alternate with blackish striping which is barely perceptible; faint dorsal line; cephalic capsule whitish mottled in ochre; in another specimen, of a greyer colour, maculation better defined; another specimen more whitish-green (Description: 22-VI-10); Larvae polychroic: dorsally pale ochre, becoming darker towards the anal shield; cephalic capsule: whitish spotted apically tawny-ochre; setae pale ochre; pro-thoracic shield: spotted pale ochre; corporal setae black; thoracic legs almost transluscent; (ex 1 ♀, 22-V-10; Ciempozuelos; description: 14-VI-10): 20.2 mm (n=3): ventrally whitish-grey; A1-A5 maculae black; A6 maculae absent; cephalic capsule: whitish; laterally maculae A1-A5, those beneath spiracles are golden with black margins; roughened-fleshy laterals A1-A10 are divided up in-between whitish and ochre tones dorsally and ventrally; dorsally pale ochre without dorsal line instead ochre irregular “diamond” shapes; setae black; another specimen ventrally whitish-bluish tones; dorsally ochre maculae A1-A7; laterally greyish ochre; a third specimen differed dorsally black maculae A5-A6 only with shapes hardly percepible on other segments; cephalic capsule: mottled in ochre; abdominal pro-legs, thoracic legs greyish-white. At time of pupation larva becomes transluscent with inter-segmental membranes green (n=1).

Chaetotaxy: Cephalic capsule (Fig. 8): hypognathous: stemmata form a rough “rectangle” (ocelli 1-5); ocellus 1 is 20% larger than ocelli 5, 6 the smallest in the complex; ocellus 5 is positioned four ocelli from ocellus 1 and two ocelli from ocellus 4; ocellus 1 is positioned two ocelli from ocellus 2; ocelli 2, 3, 4 are positioned in relative proximity 75% of an ocellus from each other in the complex; ocellus 6 is positioned two ocelli from ocellus 4 and two ocelli and-a-half from ocellus 5; seta O2 almost touches the base of ocellus 1; seta O1 is positioned in the proximity of ocellus 3 without actually touching its base; seta SO2 is positioned between ocelli 5, 6 being somewhat nearer to ocellus 6; ocelli 4, 5, in addition to seta O3 are in a horizontal plane; between setae O2, O1, O2 being thicker, with O1 being the more slender of the two distally; O3 is 75% the length of O2; setae A1, A2, A3 form a "triangle" (Fig. 8) in the latero-posterior zone of the cephalic capsule (cephalad); A1 is 25% longer than A2; A3, L1 are at the same level in an ascendent line (Fig. 8); setae P1, P2 are also in an ascendent line; clypeus: setae Cl1, Cl2 are of the same length; labrum (Fig. 9): seta LR6 finer and 25% shorter than setae LR1, LR2, LR3. The antennae (Fig. 10) located in a pit posterior to the stemmata are three-segmented with sensilla styloconica (S1, S2), sensilla basiconica (B1, B2, B3), and sensillum chaeticum (C) (RANA & MOHANKUMAR, 2017). In *S. asellaria dentatolineata* there is a single sensilla styloconica (Fig. 10) and three sensilla basiconica; the sensillum chaeticum projects beyond the pit and tapers finely from its thick-set base. Thoracic region: L5: T1: (Fig. 11) (19-III-11, Ciempozuelos) (n=2): dark setae; black pinnacles; SD1 fine and lengthened; setae SD2, SD1 both anterior to spiracle, SD2 10% longer and relatively thick, SD1 very fine; L2, L1, L2 25% longer than SD2, L1 50% less thick than L2: "hair-like"; setae SV1, SV2, V1 in proximity to the coxa; T2: D1, D2, SD2, SD1 in descending line; L2, L1 at the same level same length, L3; SV1, SV2 (Fig. 11). Abdominal region (Figs 7, 12): A6: SV4; five setae in the anterior zone of the abdominal pro-leg; long fine, especially SV1, SV3; A7-A9: D1 long, "thick-set"; A6 crochets form a complex of eight uninterrupted uniseries (DUGDALE, 1961) with each crochet undifferentiated size-wise; A7: SD1, L1, L2 lined up around spiracle forming a "sub-triangle"; A8: SD1, L1, L2; L3 beneath L2; SV1; A9: D1, D2, SD1, L1 in descending line; A10 (Figs 7, 12): anal shield not prominent in relation to A9 which is "swollen" dorsally; setae SD1, L1, L2 in vicinity of spiracle forming a "sub-triangle"; SV4 (=L4) five setae (V1 posteriorly); crochets form a complex of eight uninterrupted uniseries; six setae (V1 posteriorly) anteriorly of anal pro-leg: L3, L1, CP1, CP2.

Parasitoids obtained: Only two species of parasitoid identified (MRS) to species level including:

BRACONIDAE

Homolobus truncator (Say, 1828) (MRS det. deposited NMS; SHAW, 2010) attacks the larva as host when *H. truncator* emerges as a larva in the host's pre-pupal phase (L5) with the braconid's cocoons in the host's cocoon itself: 465 larvae were taken 2004-2008 with a significant % parasitisation rate: February-April (141 larvae collected=33.1%) with nine cases involving *H. truncator* (6.4%); September-November (170 larvae collected =36.2%), with 14 cases involving this braconid (7.7%); on the other hand, in the summer months (June-August) of 95 larvae collected, only five cases were reported (5.2%).

Cotesia sp. (Braconidae: Microgastrinae) (MRS det. deposited NMS): larva L5: 23-VII-05 emergence: 2-VIII-05.

Glyptapanteles sp. (Braconidae: Microgastrinae) (MRS det. deposited UAM): ex larva 7-X-07 (no emergence).

Microplitis sp. (Braconidae: Microgastrinae) (MRS det. deposited NMS): Attacks L4 larva (braconid larva on emerging from host deposits subsequent cocoon between urites A6-A10); nine cases of parasitisation; summer months (May-July) seven cases (7.9%) of 88 larvae collected; October (77 larvae collected=two larvae=2.5% parasitised).

ICHNEUMONIDAE

Platylabus tricingulatus (Gravenhorst, 1820) Platylabini (Ichneumonidae: Ichneumoninae): five cases documented: 3-IV-05, 22-X-05 (two larvae), 21-I-06 (two larvae); wasp emerges ex pupa April, May (MRS det. deposited NMS).

Campoplex sp. (Ichneumonidae: Campopleginae): Larva: 13-III-05 in *Antirrhinum majus*; larva pupated 31-III-05; 3-IV-05 cocoon; emerged: 1-V-05 (MRS det. deposited with Klaus Horstmann).

Discussion and conclusions

Scopula (*Glossotrophia*) *rufomixtaria* (Graslin, 1863)

Biology: Only six larvae were taken between 2004-08 which were representatives of the first generation only although the species is bi-voltine (or trivoltine) (HAUSMANN, 2004). KING (2000), REDONDO *et al.* (2001) include data from the Mid-Ebro valley in NE Spain (Zaragoza, 200 m) of 25 larvae collected 23 (92%) were of the first generation with emergencies in captivity in April and May, nevertheless, two larvae taken in June emerged in June, July of the same year presumably representing a second generation, the first generation flies end of April-beginning of May, for this reason it must be assumed to be trivoltine at low altitudes in Spain (HAUSMANN, 2004), in fact, there is a female in the collection (Coll. GEK) of the first author from early October (Madrid, Tres Cantos, 720 m, 1 ♀, 2-X-03).

In terms of food-plants, CHRÉTIEN (1928) cites *Silene, Dianthus* (Caryophyllaceae); KING (2000); REDONDO *et al.* (2001) and KING & VIEJO-MONTESINOS (2010) describe larvae as monophagous in *Gypsophila struthium* in gypsym soils in both the Tagus and Ebro valleys in central Spain. HAUSMANN (2004) indicated the probability that it is oligophagous in the Caryophyllaceae in poor nutrient soils.

Parasitisation of the two *Scopula* taxa in the study area: Both *S. rufomixtaria* and *S. asellaria dentatolineata*, as well as another sterrhine moth: *Casilda consecraria* (Staudinger, 1871) (KING & ROMERA, 2004; KING & VIEJO-MONTESINOS, 2017) were attacked by the braconid *Homolobus truncator.* In the case of *S. rufomixtaria*, no more than six larvae were taken (see Results) with a parasitation rate of 16.6% which can be regarded as relatively important.

Other parasitoids known or documented ex larvae *S. rufomixtaria* include *H. truncator* (Shaw, 2010) and a species of *Ophion* (MRS det.) (Ichneumonidae: Ophioninae) (ex *S. rufomixtaria*: *Homolobus truncator*: 14, 21-III-99; *G. struthium*; Juslibol (Zaragoza); emergencies: 13-IV-99; *Ophion* sp. (Ichneumonidae: Ophioninae): 5-III-98; *G. struthium*; Juslibol (Zaragoza); larva pupated 29-III-98 emerged I-1999, NMS deposited). It should be pointed out, that those larvae attacked by *Ophion* were also taken in *Gypsophila struthium* and in gypsum soils (KING, 2000). *Ophion*'s strategy is different to *H. truncator* in the sense that this ichneumonid takes ten months to emerge from its own cocoon (in January) being presumably univoltine its main biological activity coinciding with the larval state of *S. rufomixtaria*, or similar species, during their own second generation. BORDERA *et al.* (1987) and BROCK (1982) document *Ophion* as recognised geometrid parasitoids (of Ennominae), making clear that their hosts overwinter as larvae, although this cannot be applied to the host in the form of *Agriopis* (BROCK, 1982; BORDERA *et al.*,1987; EBERT & STEINER, 2001b). Two larvae of *Calamodes occitanaria* (Duponchel, 1829) (Ennominae) taken in the study area (2005) suffered attack by *Ophion minutus* Kriechbaumer, 1879 (MRS det.), for this reason, these data are of interest as it would take a change of strategy on the part of the Hymenopteran if their hosts are at soil level and not in the tree layer (as is the case with *Agriopis*). On the other hand, it is noteworthy that no Scopulini larva was parasitised by *Ophion* in the Tagus valley if this was indeed the case in the ecologically similar Ebro valley.

H. truncator parasitises *S. asellaria dentatolineata*, especially in the winter months (see Results). This data is relevant because rates of parasitisation ex larvae of *C. consecraria* (KING & VIEJO-MONTESINOS, 2017) were documented before the onset of winter (July-October) with four cases of the 31 larvae then collected (=12.9%) (see Results). It would appear to be the case that *H. truncator* females attack *S. asellaria dentatolineata* larvae when the host in the shape of *C. consecraria* would not be available (these overwinter as pupa), so the braconid larvae would spend the winter within *S. asellaria dentatolineata* as koinobiont endo-parasitoids. The strategy of *H. truncator* involves its own larva taking advantage of the host constructing its cocoon within which it emerges ex host's pre-pupal phase when it then constructs its own cocoon (SHAW, 2010).

S. asellaria dentatolineata was also attacked by an additional koinobiont braconid: an unidentified specie of *Microplitis* (MRS det.) (Braconidae: Microgastrinae) with data between May and July with seven cases (7.9%) from 88 larvae collected, as well as October (77 larvae=2 larvae=2.5%). This parasitoid emerges when the host is in L4, leaving a characteristic cocoon stuck and exposed between A6 and A10; the host does not perish immediately but lives several days more (SHAW & HUDDLESTON, 1991). Although the braconid remains unverified and so the precise host-parasitoid relationship cannot be established, several geometrids have been recorded as hosts in Madrid although only one host included a sterrhine:

Ex *Idaea ochrata albida* (Zerny, 1936): *Microplitis* sp. (emerged 5-12-VI-08) ex two larvae Madrid, Tres Cantos, 720 m, 18-V-08); in the leaf litter; pupated 1-VI-08; *Microplitis* sp. (emerged 16-VI-08) ex larva: 1-VI-08; *Microplitis* sp. (emerged V-09) ex four larvae 18-IV-09; pupated 9-V-09; *Microplitis* sp. ex two larvae 9-V-09; *Microplitis* sp. (emerged 7-VI-09) ex larva 23-V-09; latter data from Madrid, El Goloso, 720 m, in the leaf litter (all material MRS det., Coll. NMS).

It can be appreciated that female host-hunting *Microplitis* orientate at soil level, additionally, two species also attacked by *Microplitis*: *Microloxia herbaria* (Hübner, [1813]) (Geometrinae) and *Perigune narbonea* (Linnaeus, 1767) (Ennominae) (MRS det., Coll. NMS) use the same food plant: *Teucrium capitatum* subsp. *capitatum* L. to orientate towards the potential host, in this case, taking advantage of air-born volatiles released by the labiate (TURLINGS *et al.*, 1995).

Two braconids belonging to the same subfamiliy: Microgastrinae: *Cotesia* sp., *Glyptapanteles* sp. were also documented ex *larvae S. asellaria dentatolineata*, a species of *Glyptapanteles*: *G. vitripennis* (Curtis, 1830) was taken ex *larva Calomodes occitanaria* (Duponchel, 1829) (Ennominae) (*Glyptapanteles vitripennis* (Curtis, 1830) ex L2; 30-XII-06; Madrid, Cerros de Vallecas, 600 m; *Thymus lacaitae* Pau; pupated 15-I-07 emerged 2-II-07, MRS det., Coll. NMS).

The only parasitoid documented which emerged from a pupa was *Platylabus tricingulatus* (Gravenhorst, 1820) (MRS det., Coll. NMS) (Platylabini: Ichneumoninae: Ichneumonidae) ex *S. asellaria dentatolineata* with larvae collected late or very early in the year which would have meant that the parasitoid overwintered in its chosen host until it contructed its own cocoon and metamorphosed with the wasp exiting from the pupa (PERKINS, 1959; SELFA *et al.*, 1988; ANENTO & SELFA, 1997). Other data from the tribe Platylabini ex geometrids indicate: *Apaeleticus bellicosus* Wesmael, 1845 ex *I. ochrata albida* (*A. bellicosus* emerged V-2009 ex pupa, host larva: 1-III-09; El Goloso beneath *Rumex acetosa* L. and *Onobrychis viciifolia* Scop. pupated 9-V-09 (MRS det., Coll. NMS).

Campoplex sp. ex *S. asellaria dentatolineata* (1 case: 2005) (Campopleginae: Ichneumonidae) a characteristic of this subfamily is that the larvae on emerging from host leave the host's exuvium crumpled up on its own cocoon (BUENO DOS REIS FERNANDES *et al.*, 2010). In any case, this single *Campoplex* species behaved differently, as this ex *S. asellaria dentatolineata* would have spent the winter inside the host which was not the case with the *Campoletis* documented ex *C. consecraria* (KING & VIEJO-MONTESINOS, 2017) which was taken in the summer months in the second generation of *C. consecraria*. These two Campopleginae species emerge as a larva exiting the host in the pre-pupal phase within the host's cocoon constructing its cocoon alongside the moribund larva (SHAW *et al.*, 2009).

Scopula (*Glossotrophia*) *asellaria dentatolineata* (Wehrli, 1926)

Confirmation of the subspecies: *S. asellaria dentatolineata* Wehrli 1926: according to HAUSMANN (1993, 2004) the lamina antevaginalis in the anterior zone of the female genitalia is elipsoid.

Biology: Larvae were taken throughout the year with two peaks: the first in March (62 specimens = 13.13%) which corresponds with those having overwintered, with adults of the first generation emerging the first half of April. Phenologically, May is the month with least larvae collected (13 = 2.6%); the other peak is to be found in October (76 = 16.2%) with the larvae resulting from the summer generation. Adults were taken from the month of April (2 ♂♂, 12-IV-08) until late October (1 (♀). 22-X-05), it can be concluded therefore that the taxon is tri-voltine in the study area, nevertheless, the first generation is more numerous, with 17 specimens taken in April and May (=73.6%).

Larval ethology: In the initial instars larvae hide in amongst the leaf litter which accumulates beneath the food-plant, moving rapidly amongst the litter which also forms in the ledges of the gypsym outcrops. In later instars (L3-L5) the larvae are to be found erect on the food-plant or in the proximities on the rock surface. On being disturbed they spring off the support on to the substrate beneath (King, personal observation).

Imagine ethology: The moths rest on the gypsym outcrops or in the fissures with the wings held flat at the rock surface (planiform) (King, personal observation).

Morphology and chaetotaxy: In this paper original data has been presented for two taxa in the genus *Scopula* of the larva and the chaetotaxy of L4 *S. rufomixtaria* and L5 *S. asellaria dentatolineata* the latter information is summarised in Table I with regard to that published in SINGH (1951). In terms of a difference in why penultimate instar larvae (L4) rather than L5 larvae of *S. rufomixtaria* were studied was due to the expediency of having this instar available in alcohol for SEM studies.

Table I.– Chaetotaxy: comparisons with larvae of *Scopula* Schrank, 1802 according to SINGH (1951) with *S. rufomixtaria* and *S. asellaria dentatolineata*.

Character	***Scopula***	***S. rufomixtaria***	***S. asellaria dentatolineata***
Cephalic capsule	Granular; vertex almost rounded; O2 in proximity to ocellus 1; O1 near ocellus 3 (seems to be between ocelli, 3, 4 (stemmata).	Granular; vertex almost rounded; O2 in proximity to ocellus 1; O1 near ocellus 3 but half ofan ocellus from ocellus 4.	Granular; vertex almost rounded; O2 in proximity to ocellus 1; O1 near ocellus 3 but 75% of an ocellus from ocellus 4.
urites	Lengthened abdomen, cuticle granular; setae “short” and not prominent at base; A1-A9; SD1 anterior to spiracle A1-A7; L1 posterior to spiracle and below it A1-A5; urites A6-A8 positioned at same level; anal shield (A10) rounded: L1 next to L2 (SD1 according to Dugdale, 1961), D1, L3 in a row.	Lengthened abdomen, cuticle granular; setae “finely tapering” and well-defined pinnacles; L1 posterior to spiracle and below it, anal shield (A10) rounded.	Lengthened abdomen, cuticle granular; setae “finely tapering” and well-defined pinnacles; SD1 anterior to spiracle A1-A7; L1 posterior to spiracle and below it A1-A8; anal shield (A10) rounded.
spiracles	Ovoid; A6 larger than that in T1; A7, A8 are of different sizes.	Ovoid; A6 same size as that in T1.	Ovoid; A6 same size as that in T1; A7, A8 same sizes also.

Acknowledgements

To the staff at the SIDI of the Universidad Autónoma de Madrid without whose help throughout the summer of 2011 it would have been impossible to have obtained the larval images with the Scanning Electron Microscope. Most grateful thanks to the Research Section of the Universidad Autónoma de Madrid for the concession of two grants to enable the author to work under the auspices of Luis Parra at the Universidad de Concepción (Chile) (November 2010-January 2011) and then with David Wagner at the University of Connecticut (USA) (November 2011-January 2012). These two specialists taught the essentials related to Chaetotaxy. We are also indebted to Mark R. Shaw (now retired) at the National Museum of Scotland who determined all parasitic Hymenoptera species reared out and for his more than helpful comments over the years. A big thank you to José Martín Cano, “Pepe” (now retired) at the Universidad Autónoma de Madrid for the images taken of a larva for this paper.

BIBLIOGRAPHY

ANENTO, J. L. & SELFA, J., 1997.– Primeros datos sobre la fauna de Ichneumoninae (Hymenoptera; Ichneumonidae) en tres parques naturales de la Comunitat Valenciana.– *Ecología*, **11**: 501-509.

ASCHMANN, H., 1984.– A restrictive definition of Mediterranean climates.– *Bulletin de la Société Botanique de France,* **131**(2-3-4): 21-30.

BACALLADO, J. J., HAUSMANN, A., MORO, L. & DE VERA, A., 2006.– La subfamilia Sterrhinae Meyrick, 1892 (Lepidoptera: Geometridae) en las Islas Canarias.– *Revista de la Academia Canaria de Ciencias*, **17**(4): 73-102.

BORDERA, S., SELFA, J. & JIMENEZ, R., 1987.– Citas de los géneros *Ophion* y *Erometylus* Förster (Hymenoptera: Ichneumonidae) en España.– *Miscelánea Zoológica*, **11**: 173-178.

BROCK, J. P., 1982.– A systematic study of the genus *Ophion* in Britain.– *Tijdschrift voor Entomologie*, **125**(4): 57-97.

BUENO DOS REIS FERNANDES, L., DIAS FILHO, M. M., ADORNA FERNANDES, M. & PENTEADO-DIAS, A. M., 2010.– Ichneumonidae (Hymenoptera) of Lepidoptera caterpillars feeding on *Croton floribundus* Spreng (Euphorbiaceae).– *Revista Brasileira de Entomologia*, **54**(2): 263-269.

CALLE, J., LENCINA, F. GONZÁLEZ, F. & ORTIZ, A. S., 2000.– *Las mariposas de la Región de Murcia. Macrolepidópteros diurnos y nocturnos*: 396 pp. Ed. Nausicaä, Murcia.

CHRÉTIEN, P., 1917.– Contribution a la connaissance des lépidoptères du nord de l'Afrique; notes biologiques et critique.– *Annales de la Société Entomologique de France*, **85**(3): 369-400.

CHRÉTIEN, P., 1928.– Remarques sur quelques Acidalies de la faune Français.– *Amateur de Papillons*, **4**: 33-37; 49-51; 65-69; 81-83; 97-99; 113-118; 129-133; 145-153.

DUGDALE, J. S., 1961.– Larval characters of taxonomic significance of New Zealand Ennomines (Lepidoptera: Geometridae).– *Transactions of the Royal Society of New Zealand*, **16**: 215-233.

EBERT, G. & STEINER, A., 2001.– Sterrhinae. Nachfalter VI, Geometridae.– *Die Schmetterlinge Baden-Wüttermbergs,* 8: 541 pp. Verlag E. Ulmer, Stuttgart.

EBERT, G. & STEINER, A., 2001b.– Larentiinae. Nachfalter VI, Geometridae.– *Die Schmetterlinge Baden-Wüttermbergs*, **8**: 541 pp. Verlag E. Ulmer, Stuttgart.

FERRANDIS, P., HERRANZ, J. M. & COPETE, M. A., 2005.– Caracterización florística y edáfica de las estepas yesosas de Castilla-La Mancha.– *Investigación Agraria, Sistemas y Recursos Forestales*, **4**(2): 195-216.

HAUSMANN, A., 1993.– Zweiter Beitrag zur Taxonomie und Systematik der Gattung *Glossotrophia* Prout, 1913.– *Mitteilungen der Münchener Entomologischen Gesellschaft,* **83**: 77-107.

HAUSMANN, A., 1999.– Falsification of an entomological rule: polymorphic genitalia in Geometrid moths (Lepidoptera: Geometridae).– *Spixiana*, **22**: 83-90.

HAUSMANN, A., 2004. Sterrhinae.– *In* A. HAUSMANN (editor). *The Geometrid Moths of Europe*, **2**: 600 pp. Apollo Books, Stenstrup.

HINTON, H. E., 1946.– On the homology and nomenclature of the setae of lepidopterous larvae, with some notes on the phylogeny of the Lepidoptera.– *Transactions of the Entomological Society of London*, **97**: 1-37.

IZCO, J., 1984.– *Madrid Verde*: 517 pp. Ministerio de Agricultura, Pesca y Alimentación, Madrid.

KING, G. E., 2000.– Undocumented food-plant for *Glossotrophia annae* (Mentzer, 1990) and *Chlorissa etruscaria* (Zeller, 1849) (Lepidoptera: Geometridae) in Zaragoza, NE Spain.– *Butlletí de la Societat Catalana de Lepidopterologia*, **85**(1): 51-57.

KING, G. E. & GONZÁLEZ-ESTÉBANEZ, F. J., 2015.– Geometridae larvae collected in the Maritime Alps National Park (district of Valdieri (Cuneo, Italy), 2008-11, with a description of the larvae of two species in the Gnophiini Pierce, 1914 (Insecta: Lepidoptera; Geometridae).– *Zoosystema*, **37**(4): 621-631.

KING, G. E. & ROMERA, L., 2004.– Contribución al estudio de la biología de los geométridos en Madrid (España), con datos nuevos sobre sus plantas nutricias (Lepidoptera: Geometridae).– *SHILAP Revista de lepidopterología*, **32**(126): 139-147.

KING, G. E. & VIEJO-MONTESINOS, J. L., 2010.– Geometrids and their food-plants in the south of Madrid (Central Spain) (Geometridae).– *Nota lepidopterologica*, **33**(1): 45- 61.

KING, G. E. & VIEJO-MONTESINOS, J. L., 2016.– Description of the ova and ovipositional strategies of six sterrhine taxa from Madrid, including comparative data with other species of this subfamily (Lepidoptera: Geometridae: Sterrhinae).– *Graellsia*, **72**(1): 1-11.

KING, G. E. & VIEJO-MONTESINOS, J. L., 2017.– A contribution to an understanding of the biology and early stage morphology of *Casilda consecraria* (Staudinger, 1871) (Insecta: Lepidoptera: Geometridae).– *Zoosystema*, **39**(4): 463-472.

MAYR, E., 1963.– *Animal Species and Evolution*: XVI + 797 pp. Harvard University Press, Cambridge.

MILLIÈRE, P., 1869-1874.– Iconographie et description de chenilles de lépidoptères inédits.– *Annales de la Societé Linnéenne de Lyon*, **3**(23-25): 1-488, 101-154 plates.

ORTIZ, A. S., CALLE, J. A., RUBIO, R. M., GUERRERO, J. J. & GARRE, M., 2009.– Análisis de la fauna de los macrolepidópteros de Murcia (Sureste Península Ibérica).– *Boletín de la Asociación Española de Entomología*, **33**(1/2): 171-210.

PERKINS, J. F., 1959.– *Hymenoptera. Ichneumonoidea, Ichneumonidae*, *Key to subfamilies and Ichneumoninae* I. *Handbooks for the identification of British insects,* **7** Part 2 (ai): 116 pp. Royal Entomological Society of London, London.

RANA, S. & MOHANKUMAR, S., 2017.– Comparison of sensory structures present on larval antennae and mouthparts of lepidopteran crop pests.– *Florida Entomologist*, **100**(2): 230-250.

REDONDO, V. M. & GASTÓN, F. J., 1999.– Los Geometridae (Lepidoptera) de Aragón (España).– *Monografías de la Sociedad Entomológica Aragonesa*, **3**: 1-129.

REDONDO, V. M., BLASCO-ZUMETA, J. & KING, G. E., 2001.– Macrolepidópteros (Insecta: Lepidoptera) de un sabinar de *Juniperus thurifera* L. en Los Monegros (Zaragoza).– *SHILAP Revista de lepidopterología*, **29**(116): 323-370.

REDONDO, V. M., GASTÓN, F. J. & GIMENO, R., 2009.– *Geometridae Ibericae*: 361 pp. Apollo Books, Stenstrup.

SELFA, J., BORDERA, S. & JIMÉNEZ R., 1988.– Nuevas aportaciones al conocimiento de la subfamilia Ichneumoninae (Hymenoptera: Ichneumonidae) en España, I Tribus Phaeogenini, Platylabini y Protichneumonini.– *Butlletí de la Institució Catalana d'Història Natural*, **55**(Sec. Zool., 7): 101-108.

SHAW, M. R., 1997.– *Rearing Parasitic Hymenoptera. The Amateur Entomologist,* **25**: 52 pp. Orpington, Kent.

SHAW, M. R., 2010.– Palaearctic Homolobinae (Hymenoptera: Braconidae) in the National Museums of Scotland, with host and distribution records and a key to British species.– *Entomologist's Gazette*, **61**: 43-51.

SHAW, M. R. & HUDDLESTON, T., 1991.– Classification and Biology of Braconid wasps.– *Handbooks for the Identification of British Insects*, **7**(11): 1-126.

SHAW, M. R., STEFANESCU, C. & VAN NOUHUYS, S., 2009.– Parasitoids of European Butterflies: 130-156.– *In* J. SETTELE, T. SHREEVE, M. KONVIÈKA & H. VAN DYCK.– *Ecology of Butterflies in Europe*: 515 pp. Cambridge University Press, Cambridge.

SIHVONEN, P., 2005.– Phylogeny and classification of the Scopulini moths (Lepidoptera: Geometridae; Sterrhinae).– *Zoological Journal of the Linnean Society*, **143**(4): 473-530.

SIHVONEN, P. & KAILA, L., 2004.– Phylogeny and tribal classification of Sterrhinae with emphasis on delimiting Scopulini (Lepidoptera: Geometridae).– *Systematic Entomology*, **29**: 324-358.

SINGH, B., 1951.– Immature stages of Indian Lepidoptera, No. 8: Geometridae.– *Indian Forest Records*, **8**(7): 67-160.

SORIA, S., 1987.– Lepidópteros defoliadores de *Quercus pyrenaica* Willdenow, 1805.– *Fuera de serie*, **7**: 302 pp. Ministerio de Agricultura, Pesca y Alimentación, Madrid.

STEHR, F. W., 1987.– *Immature insects*: 975 pp. Kendall/Hunt Publishing Company, Dubuque.

TURLINGS, T. C. J., LOUGHRIN, J. H., MCCALL, P. J., RÖSE, U. S. R. & LEWIS, W. J., 1995.– How caterpillar-damaged plants protect themselves by attracting parasitic wasps.– *Proceedings of the National Academy of Sciences*, **92**: 4169-4174.

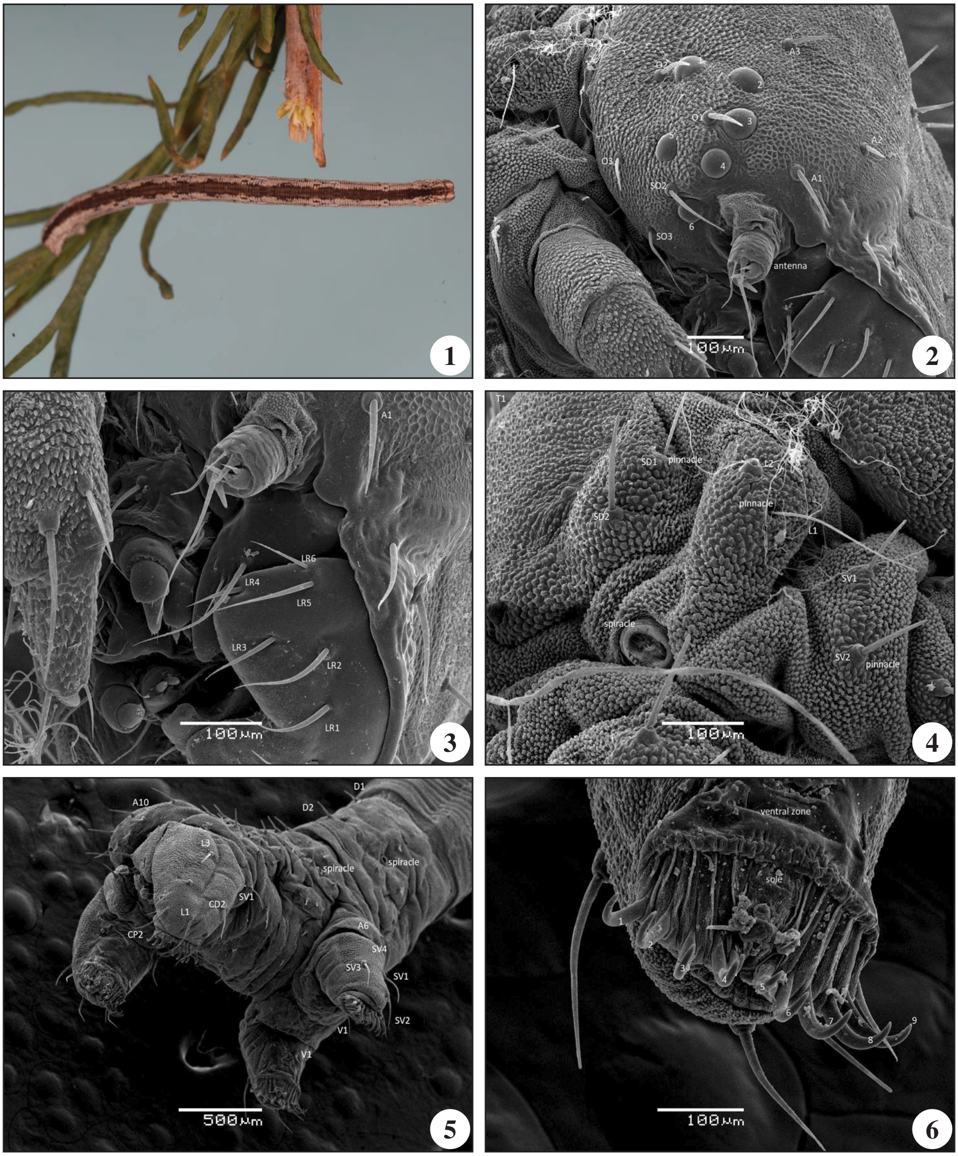
WILTSHIRE, E. P., 1962.– Early stages of the Old World Lepidoptera XII.– *Journal of the Bombay Natural History Society*, **59**: 778-800.

*G. E. K.
Departamento de Biología (Zoología)
Universidad Autónoma de Madrid
Darwin, 2
E-28049 Madrid
ESPAÑA / *SPAIN*
E-mail: sterrhinae@gmail.com
https://orcid.org/0000-0003-0804-5353

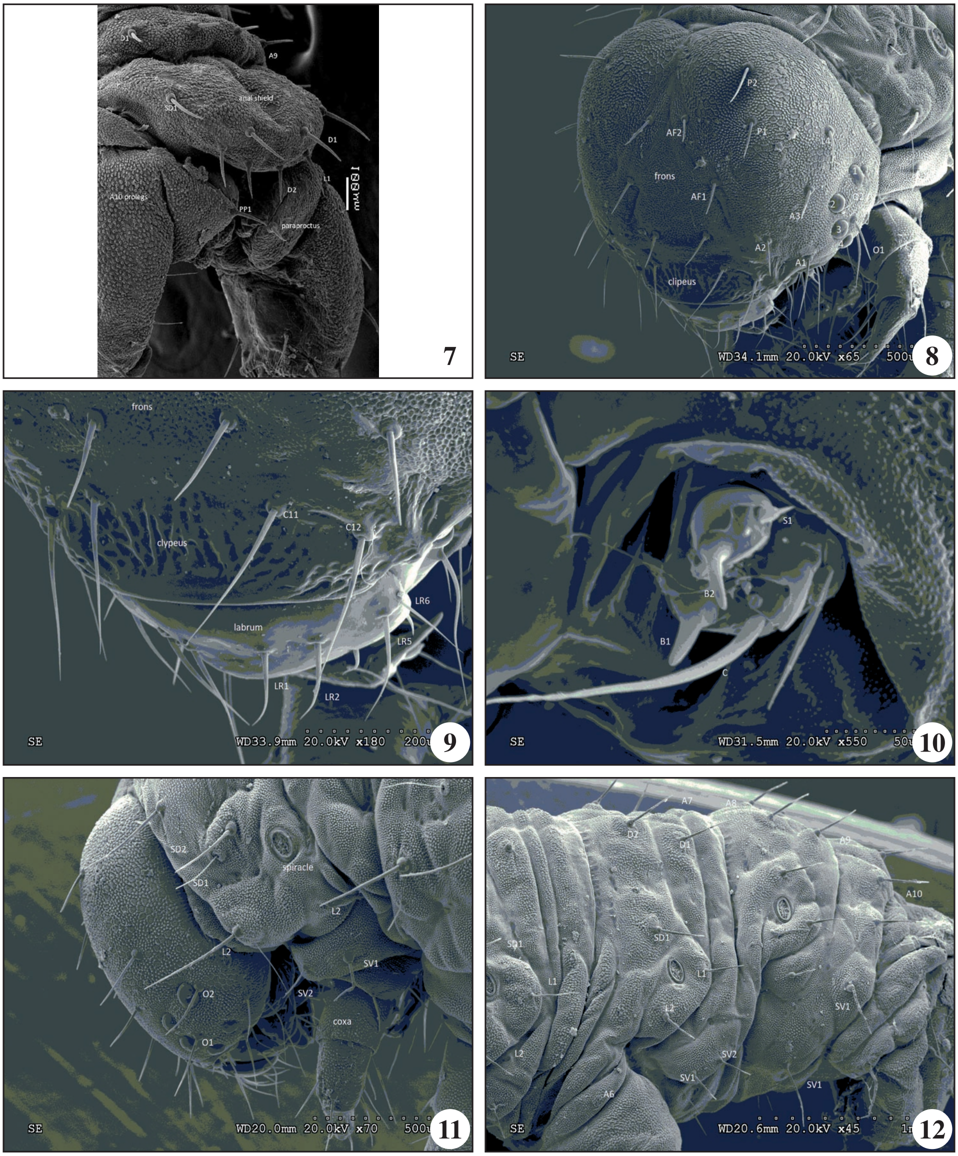
J. L. V. M.
Departamento de Biología (Zoología)
Universidad Autónoma de Madrid
Darwin, 2
E-28049 Madrid
ESPAÑA / *SPAIN*
E-mail: joseluis.viejo@uam.es
https://orcid.org/0000-0003-3160-6892

*Autor para la correspondencia / *Corresponding author*

(Recibido para publicación / *Received for publication* 3-IX-2020)
(Revisado y aceptado / *Revised and accepted* 21-XII-2020)
(Publicado / *Published* 30-VI-2021)



Figs 1-6.– 1. *Scopula* (*Glossotrophia*) *rufomixtaria* (Graslin, 1863): L5 larva (V-2008, Ciempozuelos in *Gypsophila struthium*) (photo: José Martín Cano). **2.** *Scopula* (*Glossotrophia*) *rufomixtaria* (Graslin, 1863): larva L4: cephalic capsule, lateral view (26-III-2006), Ciempozuelos in *G. struthium*. **3.** *Scopula* (*Glossotrophia*) *rufomixtaria* (Graslin, 1863): L4: labrum; corresponding setae; lateral view (26-III-2006, Ciempozuelos). **4.** *Scopula* (*Glossotrophia*) *rufomixtaria* (Graslin, 1863): L4: thoracic region (T1); corresponding setae. **5.** *Scopula* (*Glossotrophia*) *rufomixtaria* (Graslin, 1863): A10 anal shield; A6, A10 pro-legs, anterior; latero-ventral view; corresponding setae. **6.** *Scopula* (*Glossotrophia*) *rufomixtaria* (Graslin, 1863): A6 pro-leg, ventral view; crochets.



Figs 7-12.– 7. *Scopula* (*Glossotrophia*) *asellaria dentatolineata* Wehrli, 1926: larva: L5: abdominal region; A10; prolegs; corrresponding setae. **8.** *Scopula* (*Glossotrophia*) *asellaria dentatolineata* Wehrli, 1926: larva: L5: cephalic capsule; latero-ventral view; corresponding setae. **9.** *Scopula* (*Glossotrophia*) *asellaria dentatolineata* Wehrli, 1926: larva: L5: labrum; positioning of setae. **10.** *Scopula* (*Glossotrophia*) *asellaria dentatolineata* Wehrli, 1926: larva: L5: antenna; lateral view. **11.** *Scopula* (*Glossotrophia*) *asellaria dentatolineata* Wehrli, 1926: larva: L5: cephalic capsule; thoracic region T1; corresponding setae; lateral view. **12.** *Scopula* (*Glossotrophia*) *asellaria dentatolineata* Wehrli, 1926: larva: L5: abdominal region; A6-A10; prolegs; corrresponding setae.