

Disjunct distribution of *Evergestis alborivulalis* (Eversmann, 1843) in the Palaearctic (Lepidoptera: Crambidae, Evergestinae)

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FAZEKAS, I.: *Disjunct distribution of Evergestis alborivulalis (Eversmann, 1843) in the Palaearctic.*

Abstract: Data on the geographical distribution of *Evergestis alborivulalis* (Eversmann, 1843) in Palaearctic are given, with maps. Biological data and habitats of the species are presented. Structure of genitalia and morphological characteristic of wings are illustrated in colour. With 13 figures.

Keywords: Lepidoptera, Crambidae, *Evergestis alborivulalis*, bionomics, distribution, Palaearctic.

Introduction

The distribution patterns and life cycle of *Evergestis alborivulalis* have been of long-standing interest to researchers. The species was originally described from Russian material from the Ural region (EVERSMANN 1843). Systematically, *E. alborivulalis* belongs to the order Lepidoptera, family Crambidae, subfamily Evergestinae. There is very little information about the geographical range and bionomics of this species. Nobody has ever correlated and mapped distributional information already published in different works. Here, a map of its distribution in Eurasia is shown. Even though it is inevitably sketchy, it demonstrates the highly localised occurrence of *E. alborivulalis*. Until now, there has been no information about the larva and food plant, and little was known about the habitat preferences. In the last few years, intensive and systematic surveys in Hungary have been made by the author. Our database can be found in text. Detailed information can now be given about the habitat in Hungary. Natura 2000 habitat types of priority interest for the conservation of this moth have been selected. The species is protected in Hungary and an overall research program started to reveal its life cycle. The conservation of native populations of *E. alborivulalis* in the European Union fauna is regarded as important because it is considered to be a significant Siberian relict element, with a few fragmented populations known in the Pannonian Region of Hungary and Iberian Peninsula. The author will use this opportunity to demonstrate the gaps in the known distribution, and to stimulate colleagues into prospecting targeted areas.

Methods and material

The investigation started in 1978. In the field, moths were sampled using hand collecting and light trap. Material in the following Institutions was also examined: British Museum (Natural History), London; Hungarian Natural History Museum, Budapest; Jász Museum, H-Jászberény; Mátra Museum, H-Gyöngyös; Naturhistorisches Museum, Wien; Regiograf Institute, H-Komló. The photographs and drawings of the genitalia were made with an Olympus microscope with a drawing tube and BMS digital camera. Adults were photographed with a Sony camera type DSC-HX100V. Distribution maps were prepared on the basis of material examined and reliable literature records. A particular problem arises from the locality-names on the labels of collectors, who often used abbreviations of small hamlets or local names, which cannot be traced on topographical maps. Most of the information on the biology is based on personal observations supplemented by literature data. Much additional data were received by courtesy of F. Buschmann (H-Jászberény) and G. Pastorális (SK-Komárno).

Abbreviations used: HNHM: Hungarian Natural History Museum, Budapest; NHMW: Naturhistorisches Museum, Wien,

Results

Evergestis alborivulalis (Eversmann, 1843)

Emychnia alborivulalis Eversmann, 1843, Bulletin de la Société Impériale des Naturalistes de Moscou, 16 (3): 553–554. Locus typicus: Russia, prov. Orenburg, ad fluvios Sacmaram, Ic, Taschla etc.

Synonyma: *Evergestis canalesialis* Hampson, 1913, Annals and Magazine of Natural History, including Zoology, Botany and Geology, London (ser. 8) 11: 335–336. Locus typicus: Spain, Castille, Canales.

References – Buschmann 2004, Eversmann 1844; Fazekas 1988, 1996, 1989; Ganev 1988; Goater 2005; Gozmány 1963; Kovács 1985; Szent-Ivány 1942; Maes 1994; Martin 1986; Schawerda 1916; Vojtkó 1996.

Diagnosis – Wingspan 18–20 mm (GOATER 2005). Hungarian populations are smaller: first generation 15–17 mm, second generation 16–18 mm. Ground colour of forewing brownish or blackish, with four white crosslines (see Fig. 1–4). Ground colour of hindwing deep grey, a postmedian, curved white band and traces of a white subterminal line in tornal area.

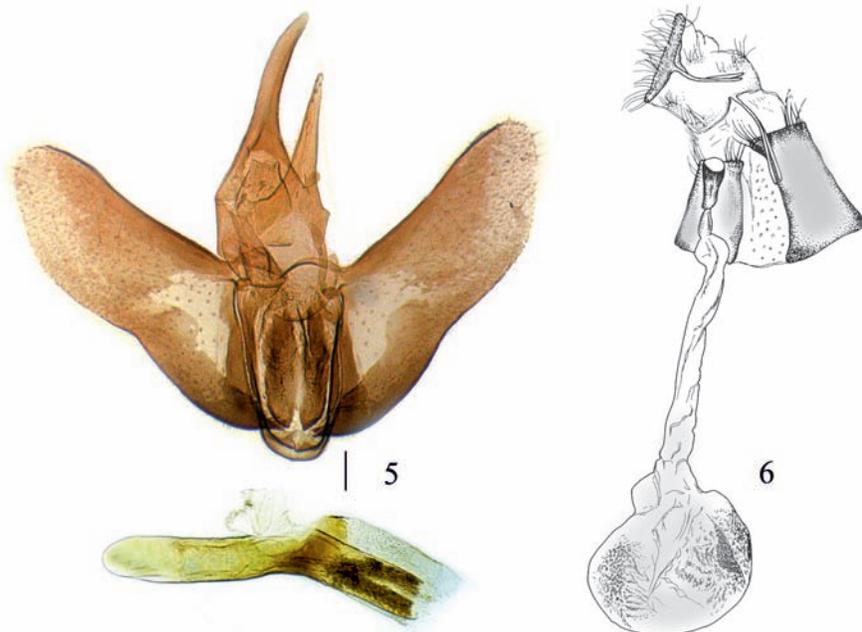
Remarks: morphological variability is insignificant and unknown the accepted subspecies. In Siberia, there are said to be some areas in which local populations form a clinal series, but without taxonomical rank: the different sizes and the variable wing-patterns are not common ecological modifications in Siberia, but no precise characters have been found to support specific separation. A similar situation exists in Spain (see *E. canalesialis*). Nevertheless, all Asiatic populations if these clinal complexes are in urgent need of taxonomic revision, based on the study of extensive material.

Male genitalia – Uncus broad-based, the apex in dorsal area widening and rounded. Valva relatively broad-based, apex mildly rounded (Fig. 5). Aedeagus longer than the valva, with several small cornuti in batch (FAZEKAS 1998, p. 60, Fig. 11).

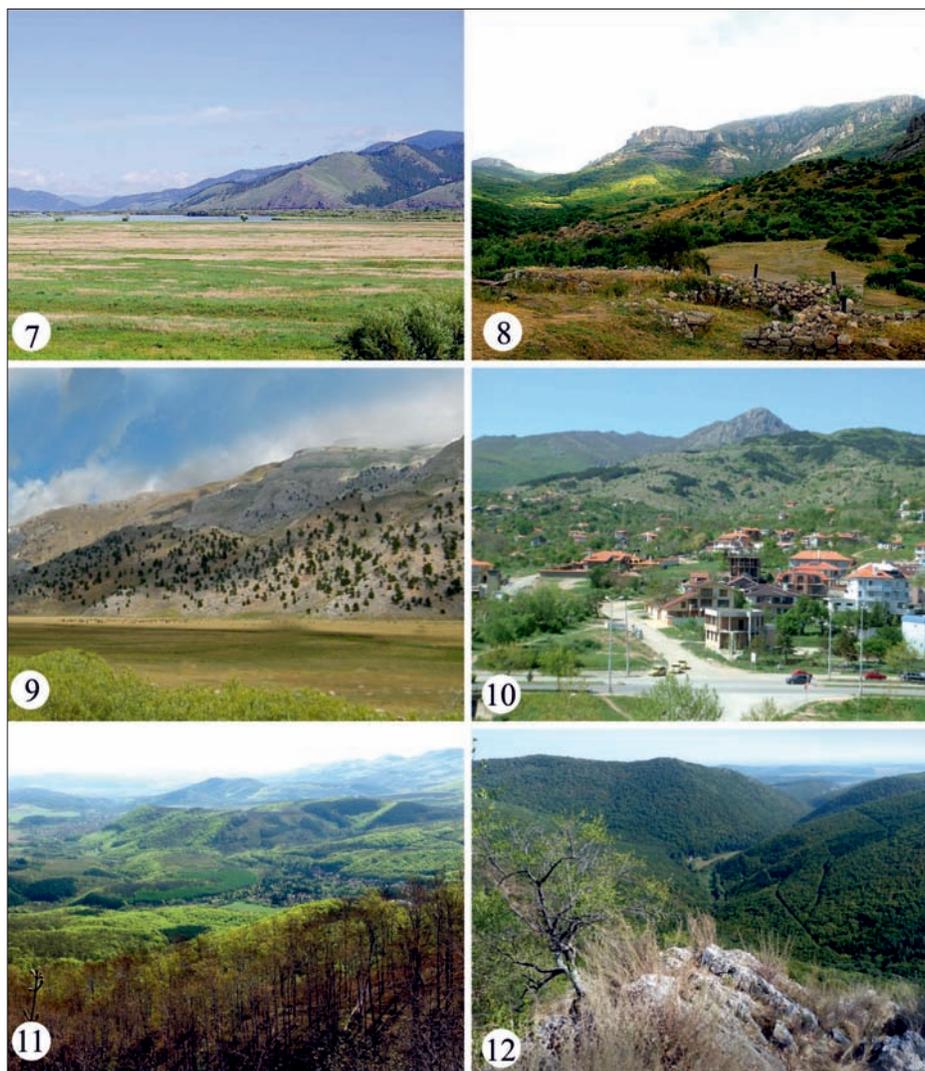
Female genitalia – Papillae anales small, apophyses posteriores short and the two together T-shaped. Antrum sclerotized and narrowly funnel-shaped, ostium ovoid, ductus bursae rather wide and long, corpus bursae subspherical with a short, turret-like projection from which ductus arises (Fig. 6).



Figs 1-4: Adults of *Evergestis alborivulalis* (Eversmann, 1843): 1) Bosnia-Herzegovina, Koricna, 2) Hungary, Mátra Mountains, 3) Bosnia-Herzegovina (?), "Eibes", 4) Bosnia-Herzegovina, Gacko. (Figs 1-2: in coll. NHMW, photo: I. Fazekas; Figs 3-4: in coll. HNHM, photo: Zs. Bálint)



Figs 5-6: Genitalia of *Evergestis alborivulalis* (Eversmann, 1843): 5) male, Hungary, Bükk Mts, Miklós-völgy, 28.iv.1968, leg. L. Zöld, gen. prep. I. Fazekas, No. 2898; 6) female, no locality, gen. slide in British Museum. Line drawing: I. Fazekas



Figs 7-12: Habitat of *Evergestis alborivulalis* (Eversmann, 1843) in Palaearctic region: 7) Russia, Ulan-Ude region, 8) Ukraine, Crimean Peninsula, 9) Turkey, Taurus Mountains, 10) Bulgaria, Sliven, 11) Hungary, Mátra Mountains, 12) Hungary, Bükk Mountains.

Bionomics – Early stages and host-plant unknown. Habitat type is diversified, generally xerothermophilous or mesophilous. Limited information available about habitat preference from Asia. Known principally in colline and mountainous regions as well as in Asian *Artemisia* steppes. The moth flies by day, in strong sunshine and at sunset. The flight is very rapid and erratic, over short distances. Feeding occurs at various flowers, but the spectrum of nectar sources has not been investigated in Hungary. The moth rests on grass stems and on the ground. The adults are very alert and cautious, suddenly flying up when approached. They also fly at night and can be collected at light. Copulation has

not been observed in Hungary and eggs have not been found. The adults fly from late April till September in two overlapping generations. According to personal observations, there seems to be only a single generation in certain geographical areas, but more study is needed.

Habitat in Hungary (Figs 11-12): Usually not rare in the hills from 150 m up to 1000 m above sea-level. Annual mean temperature: +7-9,8°C; mean January temperature: -2-4,0°C; annual precipitation: 550-900 mm; annual number of days with snow cover: 35-100. The dominant landscape types: low mountains predominantly under sub-continental climatic influence; *Quercetum petraeae-cerris* and *Querceto petraeae Carpinetum* forest (below 650 m. a. s. l.) and crests of volcanic mountains with black regolith brown forest, also high karst plateaux with rendzina, *Fagetum silvaticae* and in places *Quercetum pubescentis* forests and meadows. It is also quite strange that other authors give a wide range of habitats, despite which the moth has been found in only a few localities in Pannonian Region. Why is the range of distribution not contiguous and why does it reach its western limit in the Iberian Peninsula (see Fig. 13)?

Distribution – The range of *E. alborivulalis* is strongly disjunct, polycentric-Siberian faunal element, the populations very fragmented in Palaearctic (FAZEKAS 1998, p. 60). The moth is relatively widespread in the southern part of Siberia, then after a vast gap of thousands of kilometres, it appears in the southern Urals, Crimea, Asia Minor, Balkan Peninsula, Pannonian Region and Iberian Peninsula. In Europe, *E. alborivulalis* has been observed only in Crimea Peninsula, Bulgaria, Bosnia and Herzegovina, Hungary, Slovakia and Spain. Reputedly also in Syria (“Marash”), but no vouchers traced (see CARADJA 1916; SZENT-IVÁNY 1942). The highly localised distribution in the European region can often be explained by isolation of populations within separate glacial refuges followed by inter- and postglacial expansion to the present distribution area (Fig. 13).

Range in Asia – Russia: East Siberia, Irkutsk province, Ust-orda envir., Kharat; Baikal region, Buryatia, Ulan-Ude (Fig. 7); Sayan mountains; Orenburg region; Kazakhstan: Uralsk; Turkey: Taurus (Fig. 9) and Anti-Taurus Mountains (?“Ebies”), Ahir Dagi (Kahramanmaras), Syria (? Marash).

Remarks: according to the published data, *E. alborivularis* reaches its eastern boundary in the Baikal region. According to KALIKHMAN (2012), the basin approach includes the entire drainage basin of Lake Baikal which contains units of four administrative entities within the Russian Federation: the Buryatia Republic, the Zabaikalsky Krai, the Irkutsk Oblast and the Tyva Republic. The biotic and landscape diversity of Lake Baikal is determined by the latitude-zonal, provincial and elevation-zonal differentiation. Ecosystems form three main types of environment: tundra, taiga and steppe. Biomes of the major mountain systems have significantly greater diversity compared to adjacent plains. Typical of the Baikal basin, the overlap latitudinal-zonal and elevation-zonal patterns lead to taiga and forest-steppe ecosystems that are largely mountainous, and steppes that have highland and lowland variants. Forest-steppe within the basin in most cases, forms an almost continuous band of zonally elongated areas, southward of the taiga mountain systems. In general, forest-steppe communities differ in the maximum structural and biotic (adaptive types and forms of life) diversity (see KALIKHMAN 2012, p. 203, Fig. 1.). Fauna in the steppe is limited, with low diversity, and therefore the sustainability of these ecosystems in the region is low.

Range in Ukraine

According to Yuriy Budashkin (in litt.) *E. alborivulalis* is a comparatively common species in Crimea, but in mountainous part of peninsula only. It is absent in the Crimean steppe. The moths fly in two generation: from May to mid-June and July, in many kinds of open landscape (Fig. 8).

Range in Balkan Peninsula

Precise data about the Balkan populations and habitats is lacking, compared with the Pannonian Region. Bulgaria: Burgas, Gramatikovo village, Strandza Mountains, Stara Planina Mountains; Sliven [Fig. 10] (GANEV 1988). Bosnia and Herzegovina: There are only very old records from this region (SCHAWERDA 1916): “*alborivularis* Ev.(sic!) (1261). Bei der Talsperre von Klinje bei Gacko. Fünf Stück. Juni 1914. Neu für Bosnien und die Herzegowina und ganze Monarchie. Türkei. Ural. Hawelka legit.”

Range in Pannonian biogeographical region

The moths has been observed only in northern Hungary and north-eastern Slovakia.

Hungary: *E. alborivulalis* has been known for a long time from the present area of Hungary since PONGRÁCZ (1932) discovered specimens on the North Hungarian Mountains, in the Mátra Mountains as early as 1922 (in coll. Nat.-hist. Mus. Wien). The mountainous region is the traditional Hungarian locality of the moth. Mátra Mountains

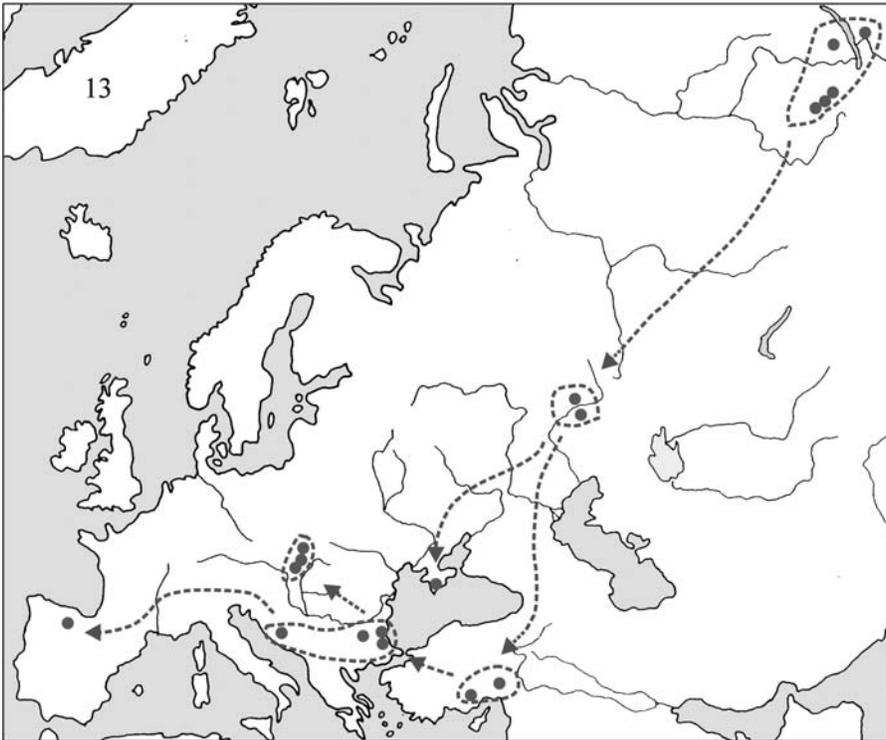


Fig. 13: Distribution map of *Evergestis alborivulalis* (Eversmann, 1843) in Palearctic region.

are the highest region in Hungary and the maximum altitudinal range of *E. alborivulalis*, 1014 m, is reached on Mount Kékes.

The first population of the moth in Bükk Mountains was found by Miklós Reskovits (SZENT-IVÁNY 1942, RESKOVITS 1963). The Bükk National Park was established in 1977. It preserves the natural flora, fauna and the cultural values of the Bükk Mountains. The area of the park is 43,200 hectares of which 97% is covered with forests. The highest mountains are Istállóskő (959m) and Bálvány (956m).

Two lepidopterist, József Jablonkay and Ferenc Buschmann collected specimens of *E. alborivulalis* in the Sár Mountain near Gyöngyös in 1969-2003 (BUSCHMANN 2004). The original and ancient vegetation of "Sár Mountain" was closed and open dry deciduous woodlands. In this environment were loess- and mixed steppe oak woodlands at the foothills. Nowadays, the surface of the mountain "Sár-hegy" (Sár Mountain) at Gyöngyös is mostly covered by wine and fruit crops. The open pasture is largely formed from the lawn of the *Diplachno-Festucetum rupicolae* that as a result of intensive grazing on degraded *Cynodonti-Festucetum pseudovinae*. Secondary grasslands of wide present distribution in the Pannonic basin, have developed mainly on sites previously occupied by primary steppes and forest steppe. The forest vegetation of the mountain is mostly thermophilous oak forest (*Corno-Quercetum*). In the cooler mesophilous conditions of the northern slope we find the extensive *Quercetum petraeae-cerris* oak forest developed.

As a result of recent research, mostly by the author, the distribution of the moth in Hungary is better known (FAZEKAS 1998, p. 58–62, Fig. 11, 12). Voucher specimens can be found in the following collections: Hungarian Natural History Museum in Budapest; Jász Museum, Jászberény; Mátra Museum, Gyöngyös; The Museum of Natural History Vienna; British Museum London; Regiograf Institute, Komló.

The nature conservation status of the habitats of the moth in the Hungary is now recognised, and almost all of the sites are protected to some extent. Further discoveries of potential habitats with *E. alborivulalis* are in Aggtelek National Park near Slovakian boundaries. The Bükk and Mátra Mountain region is relatively well examined though there are still many potential habitats with *Evergestis* which are lepidopterologically unexplored. As a summary, we can be sure that both the sites in this Nature 2000 region ensure habitat for *E. alborivulalis* populations with relatively good density. However, in the Natura 2000 sites, *E. alborivulalis* is not regarded as a "marker species", so its habitat requirements are not included in Natura 2000 management plans.

The occurrence of *E. alborivulalis* in the Bükk (Fig. 12: calciferous region) and Mátra Mts (Fig. 11: typical volcanic area) shows a very interesting isolate fragment. How did these populations originate? Very local in Balkan Peninsula (see Fig. 2), then after a vast gap of hundreds of kilometres it appears in northern Hungary. On most of the Bükk and Mátra Mts the fauna very similar to the that of the other parts of the Central Hungarian mountain range. Mainly on the higher parts of the Bükk Mts plateau and in some gorges, it can be observed that the fauna is rather similar to that of the Carpathians. The two enormous mountains are part of the range "massifs de refuge" of the inner mountain-chains of Pannonian biogeographical region from fauna genetic point of view. The chorological centres of *E. alborivulalis* are mostly in the Eastern Palaearctic and Balkan peninsula. According to the author, the Balkanian and Pannonian populations form two geographically isolated groups but without distinct genitalia and wing-pattern.

Known and detailed localities in Hungary:

(1) PONGRÁCZ (1936): First record from Mátra Mountains. The time of the collection: 1922. According to author, the species a subalpine fauna element ("alhavasi").

(2) SZENT-IVÁNY (1942a): New localities from Hungary: Mátra: Galya-tető, Gyöngyös (Sár-hegy); Bükk: Szarvaskő (Almár-völgy), Felsőtárkány (Hidegkúti-völgy), Cserépfalu (Hór-völgy).

(3) SZENT-IVÁNY & UHRIK-MÉSZÁROS (1942b): The data are identical with the previous.

(4) GOZMÁNY (1963): There is not new data, repeating the old localities already published.

(5) RESKOVITS (1963): Newer localities from Bükk Mountains: Vár-hegy, Almár, Hármaskút, Faktor-rét.

(6) BALOGH (1967): There is not new data.

(7) JABLONKAY (1972a): Two new records from Mátra Mountains: Gyöngyös (Sár-hegy), Mátrafüred.

(8) JABLONKAY (1972b): Newer localities from Bükk Mountains: Hór-völgy, Vöröskő-völgy.

(9) ÁCS & SZABÓKY (1993): Summarized localities from Bükk National Park: Andornaktálya (Szállás-völgy, Bükkzsérc (Kis-rét, Vasbánya-tető), Cserépfalu (BNP kutatóháza, Hór-völgy), Eger (Almár, Leshely, Mész-hegy, Szőlőske), Felsőtárkány (Hereg-rét, Hidegkúti-völgy, Kis-som, Vár-hegy, Vöröskő-völgy), Miskolc (Kerek-hegy), Nagyvisnyó (Hármaskút).

(10) FAZEKAS (1996): Detailed overview of the species from Hungary and Europe in Hungarian and German.

(11) BUSCHMANN (2004): Newer localities from the region: Bükk Mountains: Hór-völgy (leg. Reskovits, M.), Miklós-völgy (leg. Zöld, L.), Vöröskői-völgy (Jablonkay, J.); Mátra Mountains: Mátrafüred (Jablonkay, J.), Gyöngyös, Sár-hegy (Buschmann, F.).

Slovakia: first recorded as a new species from the country (TOKÁR et al. 2010): NP Slovenský kras – Hačavská planina [7391], 560 m, 31.7.-5.8.1998, 1 ex., 7.-10.8.2000, 1 ex., 1.-10.8.2001, cca. 30 ex., 16.7.-22.7.2003, 8 ex., 15.7.-30.7.2009, 5 ex., S. Böhm leg., det. & coll. They discovered one habitat of *E. alborivulalis* in Slovakian karst region. This very local colony is widely separated from Hungarian populations. As a summary we can say that the entomological exploration in this area is still in its infancy, and the moth could have been overlooked. There is a small chance that other Slovakian localities could be discovered.

Range in Iberian Peninsula

Moth is very rare and local in Spain: “Castille, Canales” other Prov. Logrono, Canales. We have no information about the present status of the moth in Spain. It is clear that the records have been less and less frequent towards the west and its western area-border is in northern Spain.

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