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Monochroa monellii (Lepidoptera, Gelechiidae), a new species from Portugal

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Abstract. A previously undescribed species of *Monochroa* Heinemann, 1870 has been found and repeatedly collected from a single locality in central Portugal since 2020. It is closely related to three species with larvae feeding on Primulaceae: *M. conspersella* (Herrich-Schäffer, 1854), *M. servella* (Zeller, 1839) and *M. tetragonella* (Stainton, 1885) but differs in genitalia and DNA barcode.

Introduction

The genus *Monochroa* Heinemann, 1870 has about 60 described species, mainly in the Palearctic and Nearctic regions and about half of these occur in Europe (Gregersen and Karsholt 2022). Seven species are recorded in the Iberian Peninsula, six of these in Portugal. According to Gregersen and Karsholt (2022) the European species fall into eleven groups, each group associated with a particular plant family. The Portuguese species are each in a different group. Larvae are miners in leaves and stems.

On 29 July 2020 JR ran a mercury vapour light at Lagoa de São José, Carriço, Pombal, Beira Litoral. Among the microlepidoptera attracted to the light were some small gelechiids which could not be identified. Further night sessions in the same locality on 13 August and 3 September 2020 produced more specimens. After examination of male and female genitalia and DNA barcoding this can now be recognised as a new species, closely related to *M. conspersella* (Herrich-Schäffer, 1854), *M. servella* (Zeller, 1839) and *M. tetragonella* (Stainton, 1885).

Methods

Morphological examination: genitalia preparations were made following standard techniques (Robinson 1976), with permanent preparations mounted in DMHF and Euparal.

A DNA barcode of the Folmer fragment of the gene cytochrome c oxidase I (COI) was obtained using the methodology of the InBIO Barcoding Initiative described in Ferreira et al. (2024).

The average divergence (uncorrected p-distance) between the sequence of Portuguese specimens and sequences available in GenBank and BOLD was calculated in MEGA v.12 (Kumar et al. 2024).

Plant names follow Plants of the World On-line (POWO 2025).

Abbreviations

ECKU – Collection of Ecology Centre, Kiel University, Germany
GP, GU and gen. prep. – Genitalia preparation
INV – Reference number for invertebrate sample in InBIO Barcoding Initiative, Portugal
IZPC – Natural History Museum of the Sciences Faculty, Porto, Portugal
JR – Jorge Rosete
MFVC – Martin Corley
RCJR – Research collection of Jorge Rosete, Portugal
RCMC – Research collection of Martin Corley, United Kingdom
SF – Sónia Ferreira
ZMUC – Zoological Museum, Natural History Museum of Denmark, Copenhagen, Denmark

Results

Monochroa monellii Corley & Rosete, sp. nov.

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Figs 1, 2, 6, 10

Type material. ***Holotype male.*** • Lagoa de S. José, Mata de Urso, Carriço, Pombal, Leiria, BL, 40°00'19.52"N, 8°52'03.19"W. Ex pupa on *Lysimachia monelli*, 18.vi.2025, J. Rosete leg. | [Small white label] J. Rosete prep. gen. nº. 860 m. | [Red label] *Monochroa monellii* Corley & Rosete, 2025 sp. nov. HOLOTYPE. To be deposited in IZPC with code MHNCUP-ART-43666.

Paratypes. All with same locality and collector. • Portugal, Lagoa de S. José, Mata de Urso, Carriço, Pombal, Leiria, 40°00'19.52"N, 8°52'03.19"W, 1♀, 13.viii.2020, leg. J. Rosete, gen. prep. JR56 f, in RCJR, to be deposited in IZPC with code MHNCUP-ART-43667; • 1♂, 3.ix.2020, Rosete gen. prep. JR50 m, DNA barcode INV17383, in RCJR, to be deposited in IZPC with code MHNCUP-ART-43668; 1♂, 13.vii.2024, Bioscan DNA Voucher, Sample ID: BGE_00575_D12, Rosete gen. prep. JR804 m, in RCJR; • 1♂, 2♀, 29.vii.2020, M. Dale gen. preps MD02981 m, MD02977 f (in RCMC), MD02979 f (in RCJR); • 1♀, 13.viii.2020, M. Dale gen. prep. MD02978 f, in RCMC; • 1♂, 3.ix.2020, M. Dale gen. prep. MD02961 m, in RCMC; • 1♀, 3.ix.2020, M. Dale gen. prep. MD02980 f, in RCJR; • 2♂,1♀, 13.vii.2024, in RCMC.

Description. Wingspan 8–10 mm. Head light grey; labial palps with segment 2 slightly thickened with scales, 1.1 times as long as segment 3, dark fuscous on outer side, whitish on inner side, segment 3 slender, whitish with a few darker scales on outer side, sometimes with a blackish partial ring at base; antenna fuscous, dark brown at distal end of each segment. Thorax grey. Forewing fuscous, small blackish spot or short dash in fold at one-quarter and spot at end of cell; fringes dark grey with scattered dark dots, sometimes with a distinct dark grey fringe line; hindwing three-quarters width of forewing, grey, fringes grey. Abdomen light fuscous.

Variation. Forewing scales may be uniformly dark brown, or paler towards base to a varying extent, resulting in variation in ground colour. In the darker specimens the blackish spots are obscure.

Male genitalia. Tegumen slightly more than half as long as valva, expanding distally, uncus a weak bulge, gnathos absent; valva with costal margin concave in middle, tapering from four-fifths to obtuse

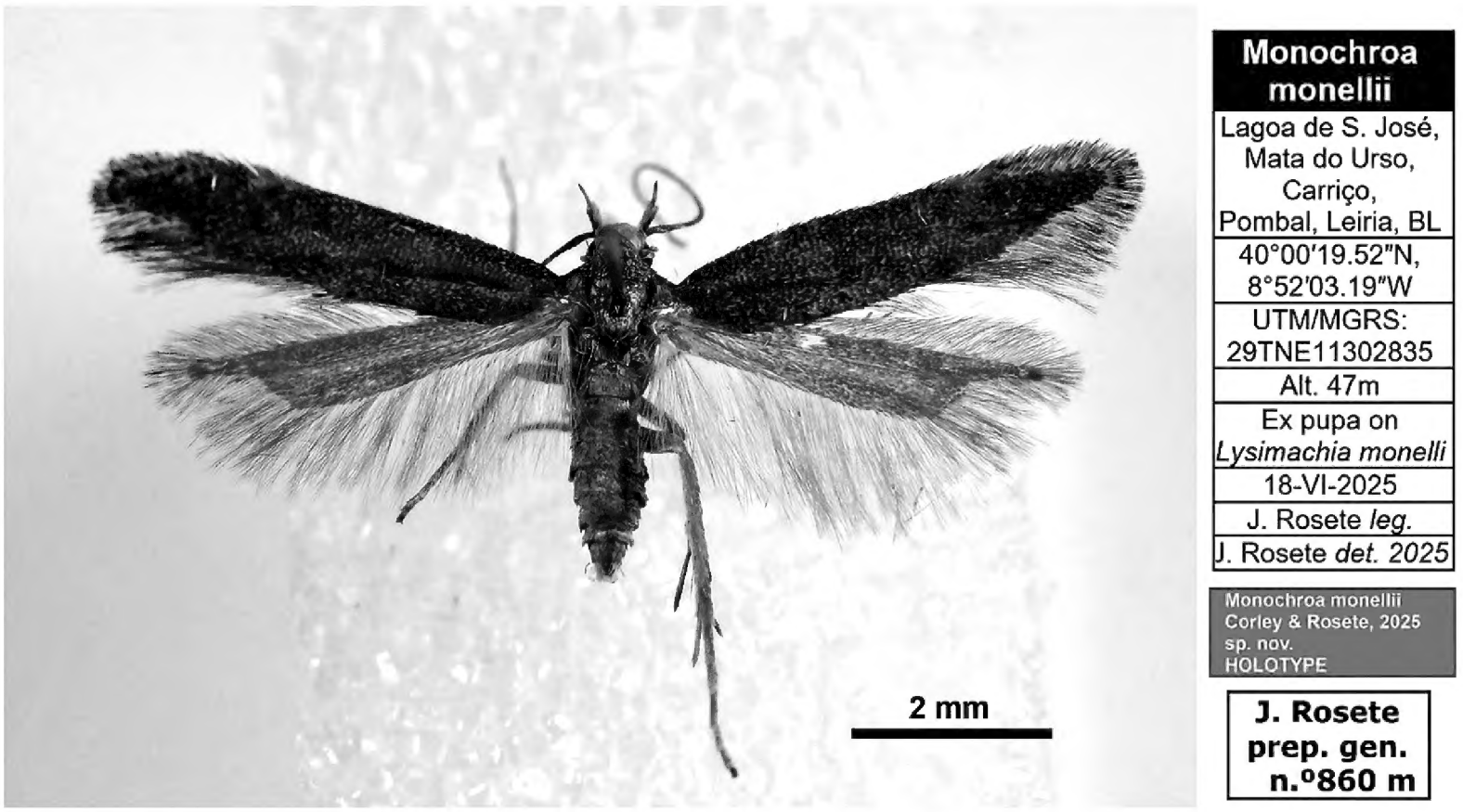


Figure 1. *Monochroa monellii* sp. nov. holotype male, Lagoa de São José, Leiria, Portugal, 18.vi.2025, leg. J. Rosete, gen. prep. J. Rosete JR860 m. Right: Labels of holotype. Photograph by André Lameirinhas.

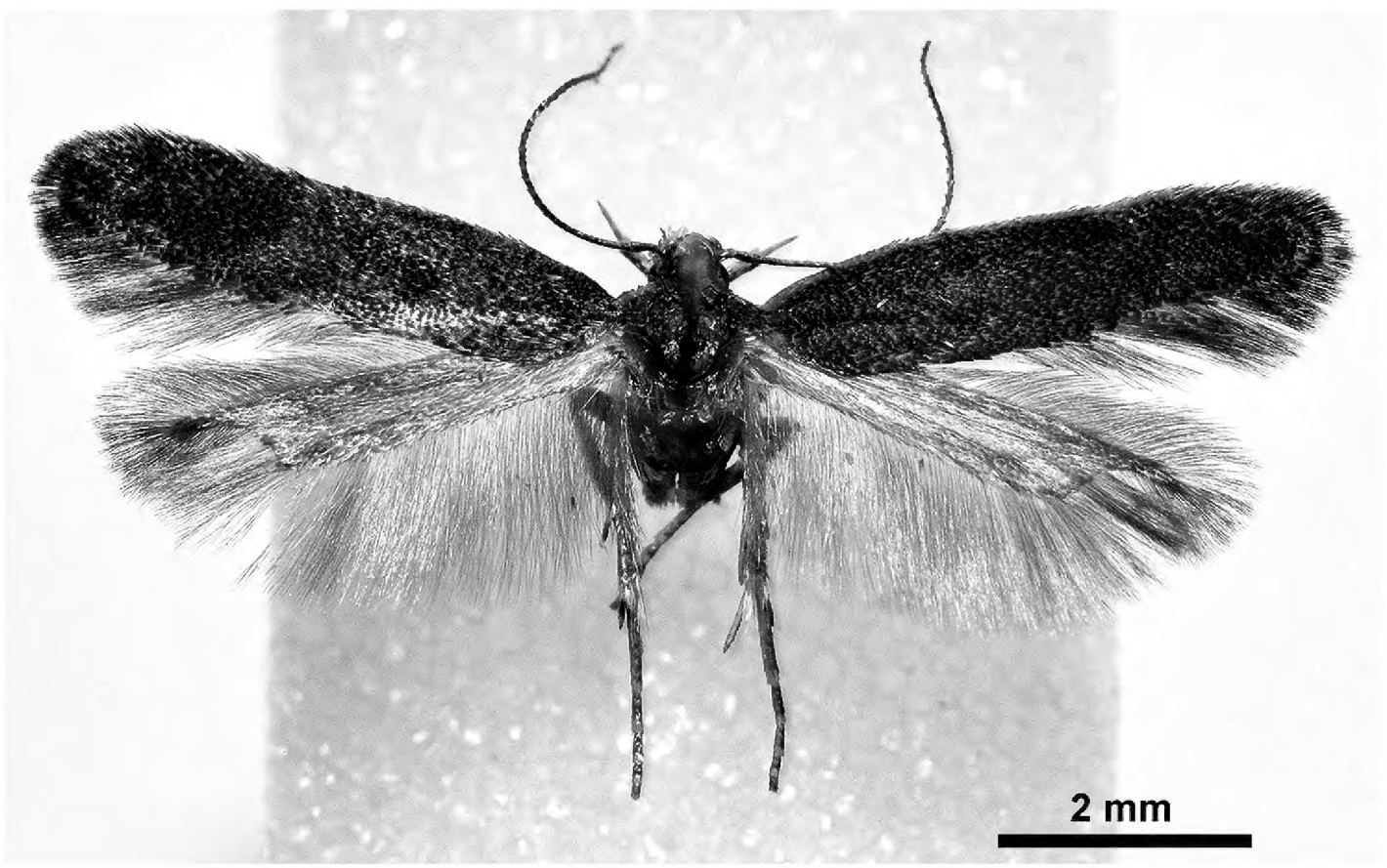


Figure 2. *Monochroa monellii* sp. nov. paratype female, Lagoa de São José, 29.vii.2020, leg. J. Rosete, gen. prep. M. Dale MD02977 f. Photograph by André Lameirinhas.

or truncate apex with one or two small teeth before apex, ventral margin with long gradual curve to digitate sacculus which extends very shortly beyond harpe which forms a very large oval flap; phallus with basal part longer than parallel-sided distal part, swollen in middle and with a large oval, thin-walled 'window', cornuti very numerous, largest only slightly longer than those in the middle of the group.

Female genitalia. Posterior and anterior apophyses about equal in length; ostium opening at distal margin of segment VIII, antrum gradually tapering, ductus bursae twice as long as ovate corpus bursae with ductus seminalis arising at middle and colliculum at one-third ductus length from corpus bursae; signum a broad plate constricted in middle by a pair of chess pawn-shaped structures on the longitudinal axis.

Diagnosis. Externally *M. monellii* sp. nov. is extremely similar to *M. conspersella* (Figs 3, 7), *M. servella* (Figs 4, 8) and *M. tetragonella* (Figs 5, 9). The last species, according to Gregersen and Karsholt (2022) has much of the forewing with whitish scales thus looking paler. The specimens they illustrate are from localities around the Baltic Sea, but those from England (Fig. 5) are uniformly dark brown. All four species vary in the extent of pale coloration at the base of the scales which affects the overall coloration of the forewing. Reliable identification by morphology therefore depends on genitalia characters. In the male genitalia, *M. monellii* has the costal margin of the valva slightly concave in the middle, whereas the margin is straight or slightly convex in the other species. The phallus has a cluster of numerous cornuti, with little difference in size in *M. monellii* while in *M. servella* and *M. conspersella* the size of the cornuti increases considerably from one end of the cluster to the other, the longest cornuti being about 3 times as long as those in the middle of the cluster; in *M. tetragonella* the increase in size is less marked. Other differences are in the shape of the costal margin and apex of the valva and the length and shape of the sacculus. These features can be seen in Figs 6–9. In the female genitalia there are differences between species in the shape of the signum, also clearly visible in Figs 10–13.

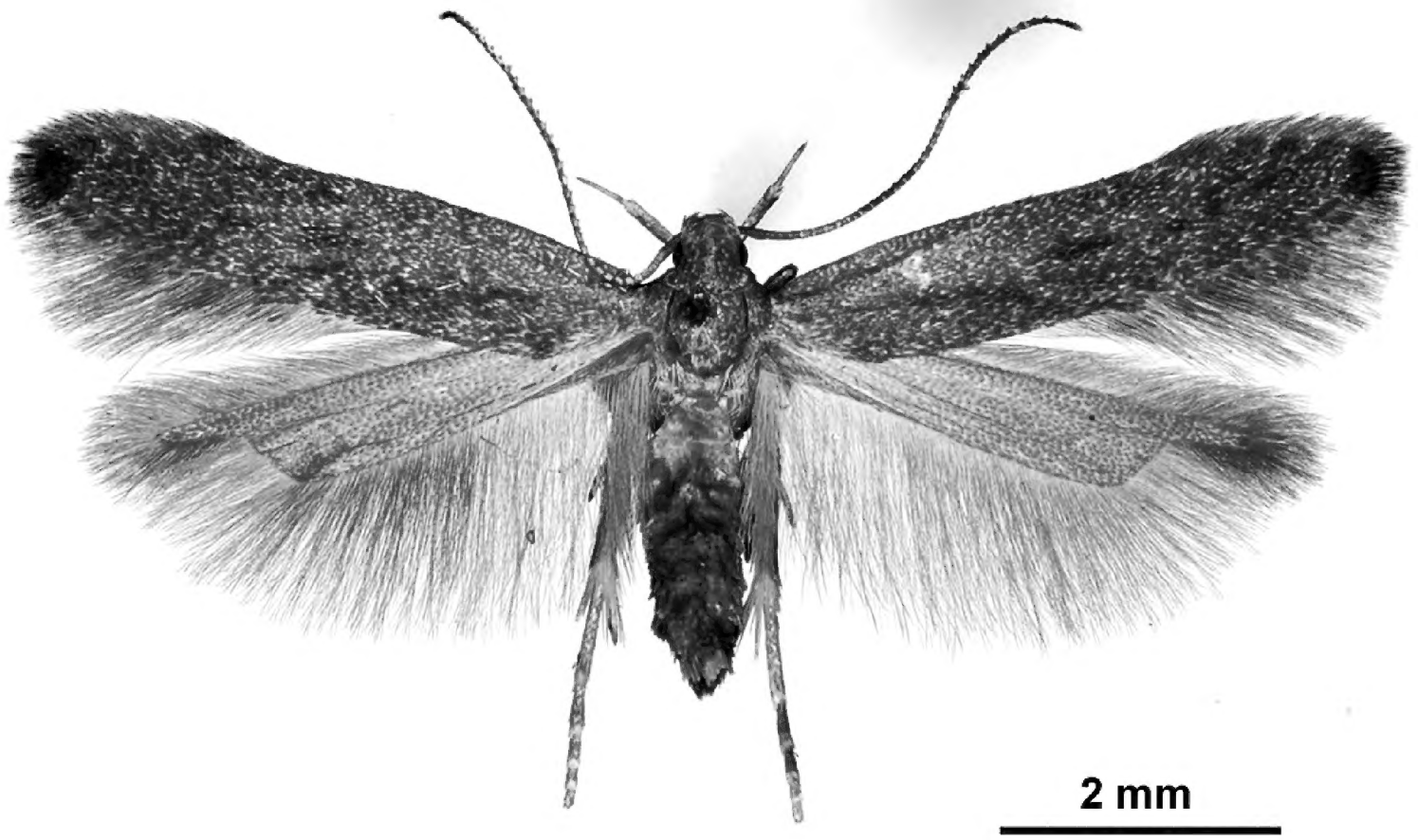
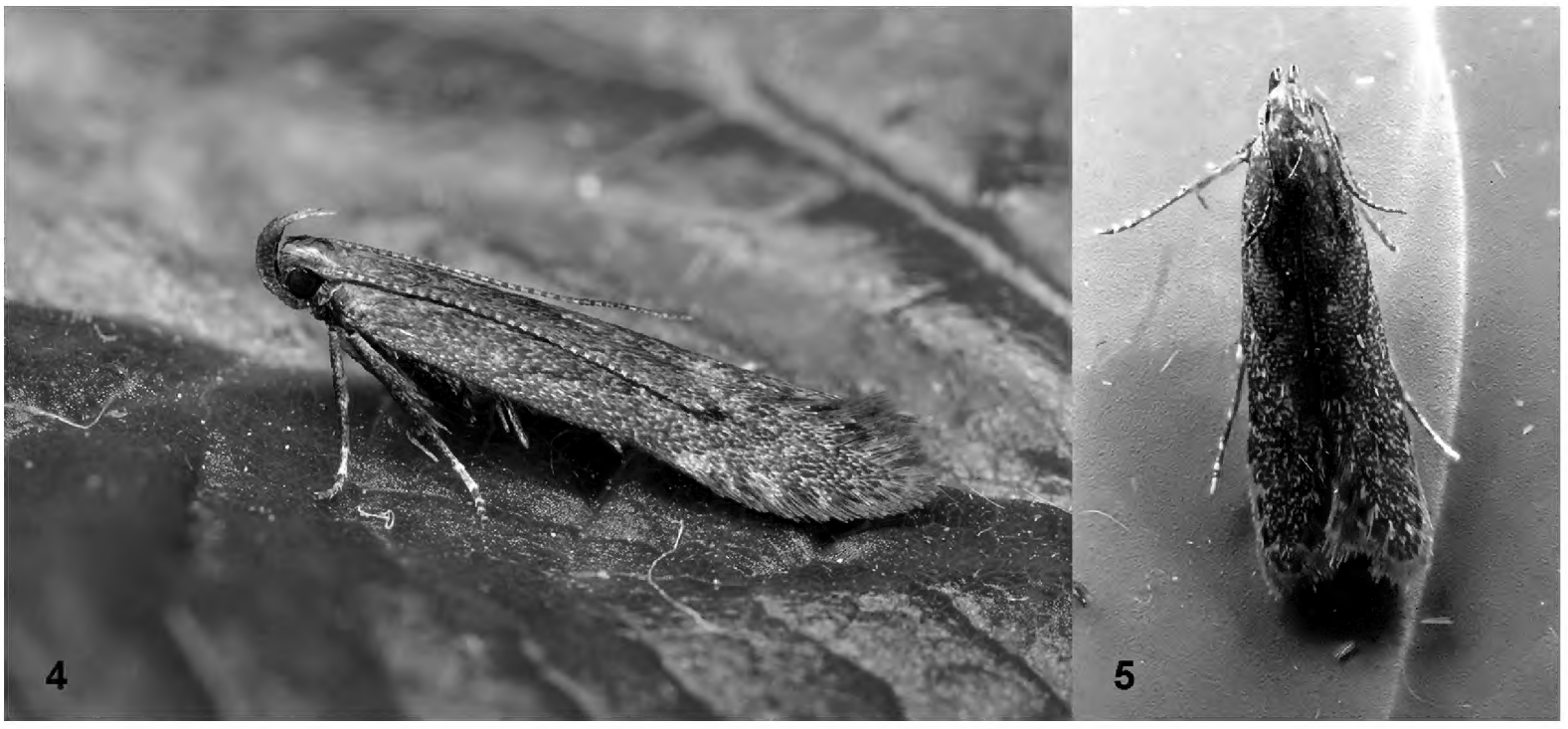


Figure 3. *Monochroa conspersella* (Herrich-Schäffer, 1854), Schleswig-Holstein, Germany, without locality, 25.vi.1959, ex larva. (ECKU). Photograph taken by Mona Dahmen, made available by Hartmut Roweck in Gregersen and Karsholt (2022).

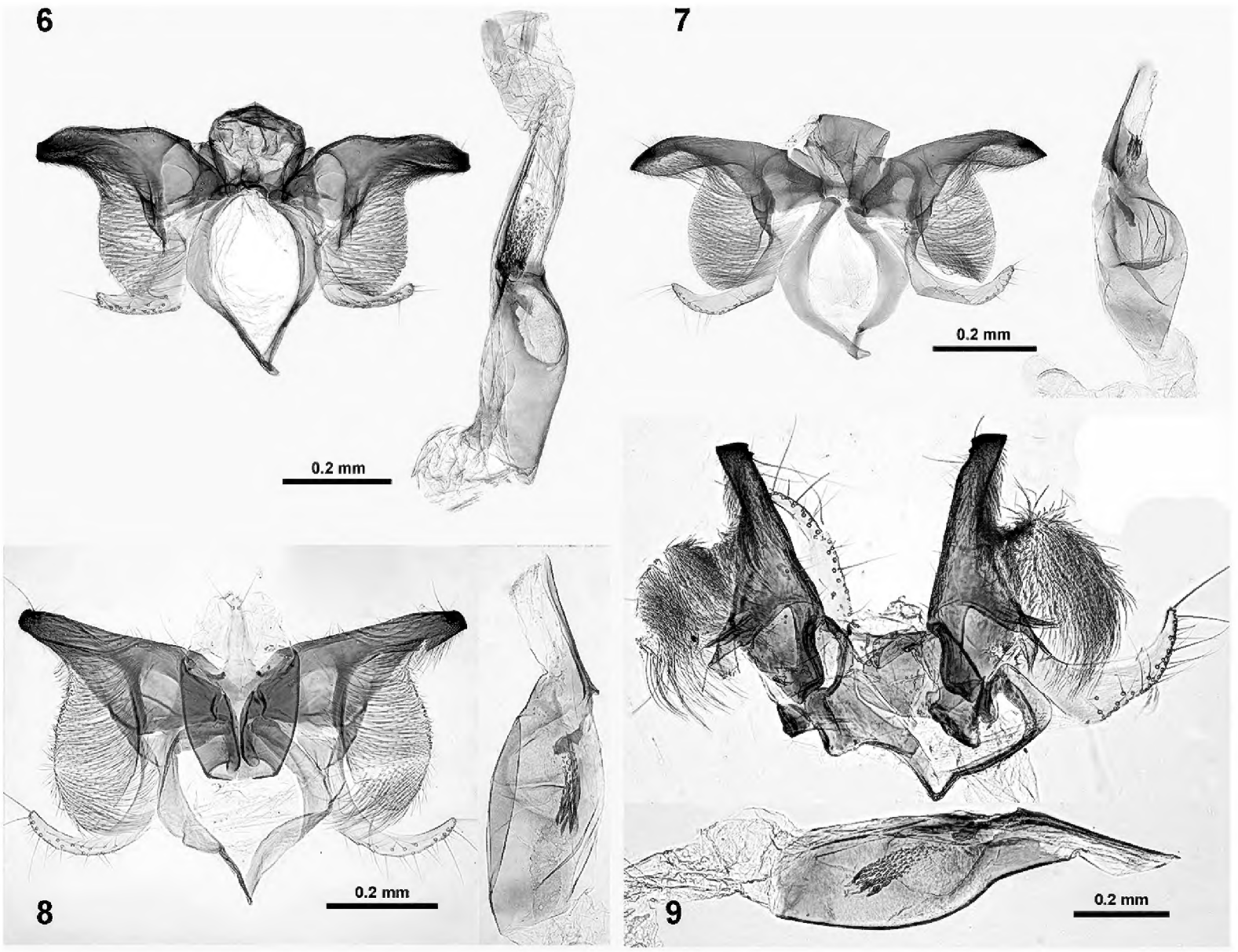


Figures 4, 5. Imagoes. **4.** *Monochroa servella* (Zeller, 1839), male, Maria Ansbach im Wienerwald, Austria, 13.vi.2014, leg. P. Buchner. Photograph by P. Buchner. **5.** *Monochroa tetragonella* (Stainton, 1885), female, Hollesley, Suffolk, England, 6.viii.2025, leg. R. A. Watson. Photograph by R. Watson.

DNA Barcode. Specimen INV17383 is currently the single representative of the BIN BOLD:AGQ5413. The molecular results from the specimen from Leiria of the partial COI gene sequence show that *M. conspersella* is the closest related species (uncorrected p-distance 4.4%) followed by *M. servella* and *M. tetragonella* with sequences available with 4.9% and 5.7% divergence, respectively.

Bionomics. Collection dates for *M. monellii* sp. nov. are between 13 July and 3 September. The habitat is a roadside with limited vegetation near a small lake which is gradually silting up. The coastal forest is mainly composed of *Pinus pinaster* Aiton. The sandy soil has a variety of shrubs including species of *Erica* L., *Cistus* L., *Halimium* Spach and *Corema album* (L.) D. Don with scattered larger shrubs such as *Morella faya* (Aiton) Wilbur, *Rhamnus alaternus* L., *Arbutus unedo* L. and *Salix repens* L. Herbaceous plants include *Juncus* L. spp., *Ammophila arenaria* (L.) Link, *Elymus* L. sp., *Silene littorea* Brot., *Iberis procumbens* Lange, *Seseli tortuosum* L. and *Asphodelus* L. From March onwards, coinciding with the beginning of the corresponding flowering, scattered clusters of *Lysimachia monelli* (L.) U. Manns & Anderb. are visible. It was on this plant that several pupae of *M. monellii*. were found which suggests that this is its host-plant. The pupae were found under the sandy soil, inside a silk tunnel, approximately one centimetre long, attached to the plant along the transition area between the stem and the root. No signs of stem mining were detected in any plants that were examined. This suggests that the larva feeds on upper parts of the plant and then descends to pupate at the base of the stem.

Etymology. *Monochroa monellii* sp. nov. is named after its host-plant *Lysimachia monelli* (L.) U. Manns & Anderb. It is appropriate to mention here that the genus *Lysimachia* has recently been expanded to include species that were placed in *Anagallis* L. and *Glaux* L. (Manns and Anderberg 2009).



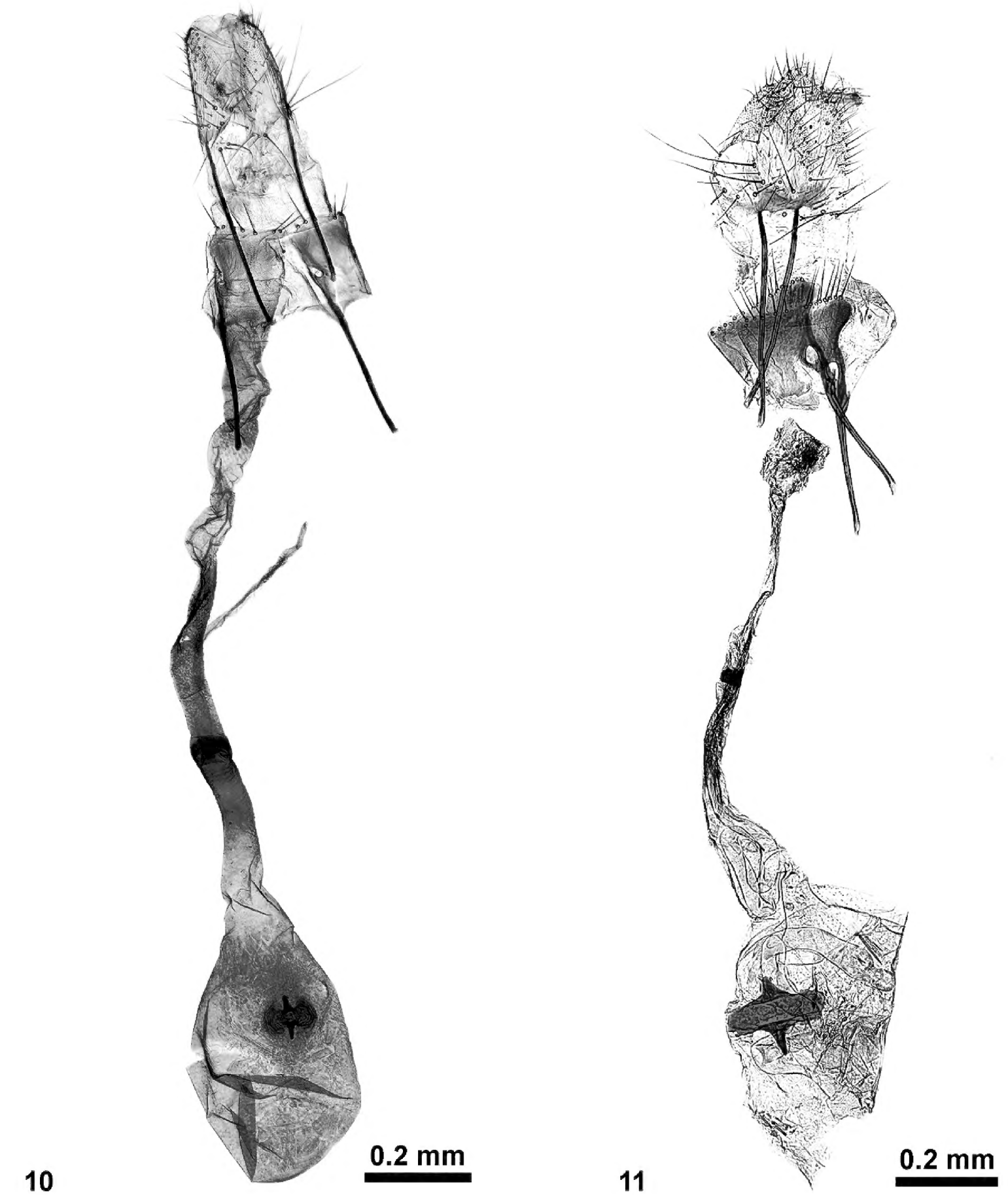
Figures 6–9. Male genitalia. **6.** *Monochroa monellii* sp. nov., paratype male, Lagoa de São José, Leiria, Portugal, 29.vii.2020, leg. J. Rosete, gen. prep. M. Dale MD02981 m. Photograph by M. Dale. **7.** *Monochroa conspersella* (Herrich-Schäffer, 1854), male, Őrség National Park, Hungary, 24.viii.2023, leg. P. Davey, gen. prep. P. Hall. Photograph by P. Hall (Wheeler et al. 2025). **8.** *Monochroa servella* (Zeller, 1839), male, Maria Ansbach im Wienerwald, Austria, 13.vi.2014, leg. P. Buchner, gen. prep. PB2214. Photograph by P. Buchner. **9.** *Monochroa tetragonella* (Stainton, 1885), male, Hollesley, Suffolk, England, 29.vi.2018, leg. and gen. prep. R. A. Watson Photograph by R. A. Watson.

Discussion

The genus *Monochroa* has not been revised. Additional species are likely to exist (Huemer and Karsholt 2020) although these authors do not mention any such possibility in the *M. servella* group.

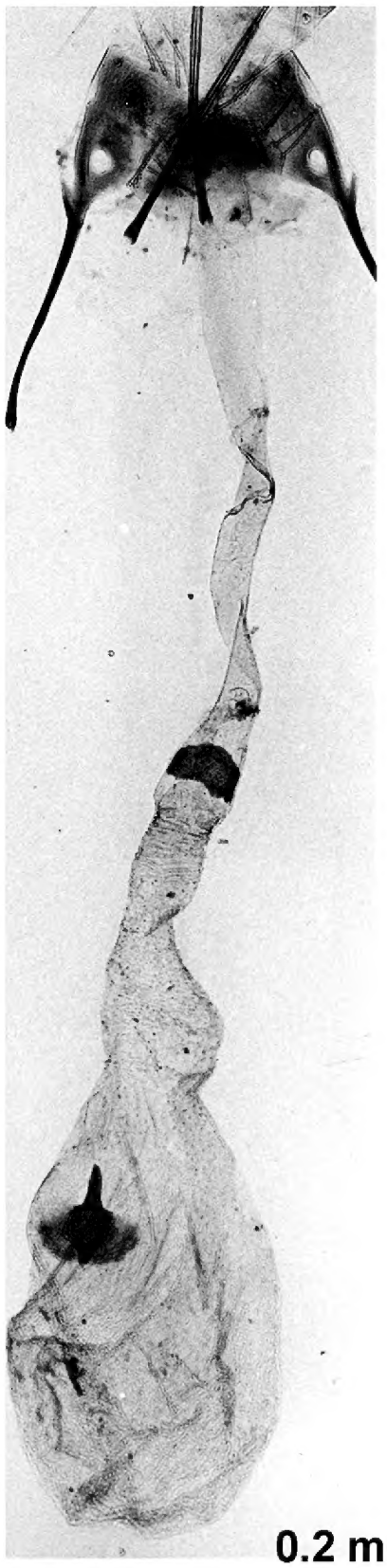
Although feeding larvae on *Lysimachia monelli* have not yet been found, the position of pupae that have been found leaves no doubt that this is the host-plant. The three most closely related species of *Monochroa* all feed on Primulaceae: *M. servella* (Zeller, 1839) on *Primula* L., *M. conspersella* (Herrich-Schäffer, 1854) on *Lysimachia vulgaris* L. and *M. tetragonella* (Stainton, 1885) on *Lysimachia maritima* (L.) Galasso, Barfi & Soldano (formerly *Glaux maritima*). According to Gregersen and Karsholt (2022) all three mentioned species feed as leaf-miners in autumn. However, unlike the other two species, *M. tetragonella* mines stems of its host-plant in the following year.

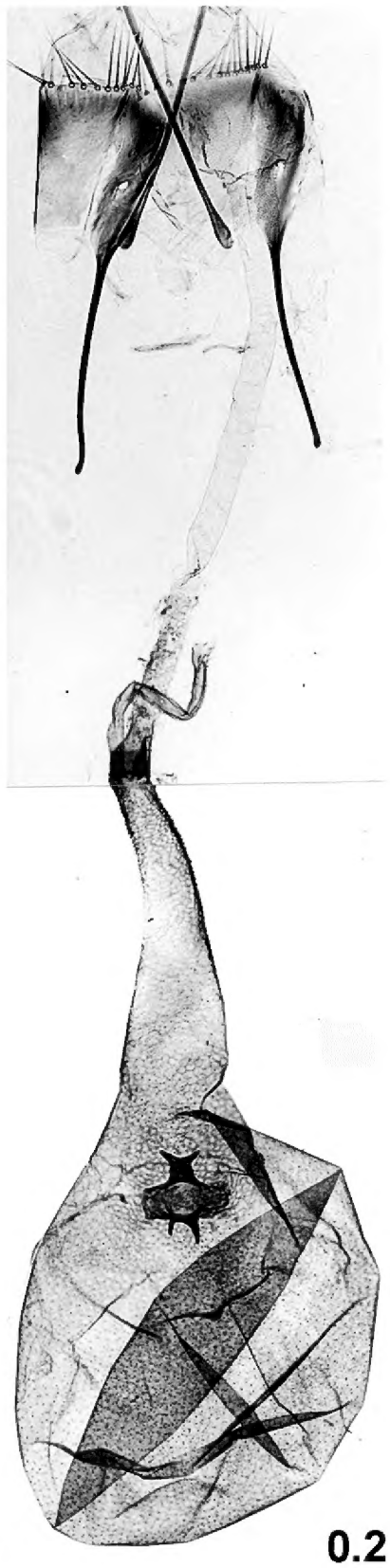
Subsequent to devastating wildfires in 2017, the Portuguese government brought in a law forcing landowners to 'clean' their land of combustible shrubs and herbage. The roadside where *M. monellii*.



Figures 10, 11. Female genitalia. **10.** *Monochroa monellii* sp. nov., paratype female, Lagoa de São José, Leiria, Portugal, 29.vii.2020, leg. J. Rosete, gen. prep. M. Dale MD02979 f, photograph by M. Dale. **11.** *Monochroa conspersella* (Zeller, 1839), female, Gorička National Park, Slovenia, 28.v.2023, leg. P. Davey, gen. prep. P. Hall, photograph by P. Hall (Wheeler et al. 2025).

has been found shows signs of cultivation with a tractor-drawn fixed tine cultivator, leaving the very sandy soil with longitudinal striations (Fig. 14). In May 2024 much of the soil was bare, with some *Lysimachia monelli* plants surviving (Fig. 15), but others having been ripped out and desiccated.





Figures 12, 13. Female genitalia. **12.** *Monochroa servella* (Zeller, 1839), female, Sweden, gen. prep, HH1737 (ZMUC). **13.** *Monochroa tetragonella* (Stainton, 1885), female, Denmark, gen. prep. HH1440 (ZMUC). Photos from preparations of Henning Hendriksen, taken by Reinhard Sutter and published in Gregersen and Karsholt (2022).

Although *M. monellii* is very much a 'small brown job' it is remarkable that it has only been detected in a single locality, particularly as it appears to be locally plentiful and comes freely to light. The host-plant is widespread in south-west Europe. A possible explanation is that the roadside habitat is not one that invites light-trapping activity. We predict that *M. monellii* will eventually prove to be much more widely distributed.

Mendes (1904) recorded *Xystophora farinosae* Stainton (now *Monochroa servella*) as rare in June at São Fiel, near Fundão in Beira Baixa, Portugal. This was rejected in Corley (2015) on the

Figure 14. Roadside at Lagoa de São José, Leiria, Portugal, habitat of *Monochroa monellii* sp. nov., photograph by Jorge Rosete.

Figure 15. *Lysimachia monelli* L., foodplant of *Monochroa monellii* sp. nov., photograph by Jorge Rosete.

grounds that no specimens had been found, the record was improbable and identification would have been unreliable at that time. With the discovery of *M. monellii*.sp. nov. this record could possibly refer to the new species. However, according to Flora-on, *Lysimachia monelli* has not been recorded in the Fundão area.

Acknowledgements

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