Acta Botanica Malacitana 49 (2024)
DOI: https://doi.org/10.24310/abm.49.2024.17799

Nota

Three new native species to the portuguese flora from the rivers of Trás-os-Montes

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Recibido: 24 octubre 2023. **Aceptado:** 21 febrero 2024. **Publicado on-line**: 26 febrero 2024
Editado por: Marta Recio Criado

Abstract

In this note, we report the first records of three plant species in Portugal that result from non-systematic field surveys conducted in the past three years by the authors. They are native species that have never been reported before or there was no compelling evidence, probably because of their very restricted geographic ranges, small populations, the lack of botanical prospecting in bordering territories, or due to their confusion with similar species.

Keywords: *Achillea, Cuscuta, Epilobium*, new country records, rivers, Trás-os-Montes.

Resumen

Tres nuevas especies para la flora portuguesa de los ríos de Trás-os-Montes

En esta nota corta se reúnen las novedades florísticas para la flora portuguesa, procedentes de los trabajos de prospección efectuados por los autores en los últimos tres años en los ríos de Trás-os-Montes. Se tratan de especies nativas de Portugal, que no habían sido detectadas antes o no había pruebas convincentes, posiblemente debido a su distribución geográfica muy restricta, sus poblaciones muy pequeñas, por la falta de prospecciones botánicas en territorios rayanos, o porque son fácilmente confundibles.

Palabras clave: *Achillea, Cuscuta, Epilobium*, novedad corológica, ríos, Trás-os-Montes.

The region of Trás-os-Montes (TM), in northeastern Portugal, is well known for its extremely high floristic diversity, which is a consequence of the diverse array of lithological situations, coupled with strong climatic gradients and heterogeneous human influence (Aguiar, 2000). According to the typological proposal by Rivas-Martínez *et al.* (2017), the study area falls within the Mediterranean Region, West-Mediterranean

Subregion, West Iberian Mediterranean Province, Carpetania and León Subprovince. The southern part of the territory belongs to the Lusitanian Douro Sector, but most of the area is located in the Bierzo and Sanabria Sector. From the point of view of potential natural vegetation, the major vegetation series present are dominated by pyrenean oak, and holm oak, respectively *Holco mollis-Querco pyrenaicae* S., *Genisto falcatae-Querco pyrenaicae* S., and *Genisto hystricis-Querco rotundifoliae* S. This last one dominates in ultramafic substrates, especially in the singular serpentine outcrops present in the territory. The Bierzo and Sanabria Sector presence in Portugal is residual (Montesinho) and can explain the occurrence of certain taxa that are nearly exclusive to this region in Continental Portugal. Within these taxa, species like *Avenula pubescens* (Huds.) Dumort., *Rumex longifolius* DC., *Viola parvula* Tineo, and *Peucedanum carvifolia* Crantz ex Vill. exhibit a broad distribution across Europe, with their peripheral range extending to the Bierzo and Sanabria Sector. The region has been the subject of various floristic surveys, which resulted in a few dedicated publications (e.g. Aguiar, 2000; Aguiar & Monteiro-Henriques, 2020; Aguiar & Alves, 2020). The flora of the ultramafic soils is of particular relevance, and comprises a series of restricted endemics (Aguiar & Monteiro-Henriques, 2020). Also, other situations stand up in terms of floristic originality, namely the basophilic flora, associated with a few limestone “islands” (Aguiar & Alves, 2020), the Pyrenean oak forests (Habitat 9230 of the Habitats Directive 92/43/EEC), that comprises many very rare species and the meadows (Habitat 6510 of the Habitats Directive), in mosaic with the riparian habitats, also of high floristic originality (Araújo, 2021). All in all, a total of about 1560 native species have been recorded in TM (Flora-On, 2024) – ca. 55% of the native flora of Continental Portugal.

Despite this wealth of data, TM still has been insufficiently surveyed, for example along the remote river valleys in the north. Non-systematic floristic surveys in the past years along these valleys have resulted in the discovery of three new species to the Portuguese flora, adding to another one first published in Araújo (2021). One of these species had been collected by Hoffmannsegg around 1800 but the lack of location data and the lack of posterior collections prevented it from being considered to occur in Portugal. The objective of this work is to coherently report these three novelties to the Portuguese flora, which were somewhat expected, given the proximity of their populations in the neighboring region of Spain (Anthos, 2023) and the biogeographic context summarised earlier.

Achillea pyrenaica Sibth. ex Godr., Fl. France [Grenier] 2: 166 (1850).

PORTUGAL, Trás-os-Montes (TM), Moimenta da Raia, Rio Tuela, 41.95 Latitude, -6.95 Longitude, 765 m Altitude, nas fendas das rochas graníticas e tufos de herbáceas do leito de cheia, 13-VI-2022, *Miguel Porto & Sara Lobo Dias* (Figure 1A-C, LISI068550).

Achillea pyrenaica is a perennial herb that inhabits humid meadows and margins of mountain streams (Soriano, 2019). It is distributed from central and south of France to northern Spain, reaching Sierra de Cabrera (Zamora) and the Bibey river valley (Orense) to the west (Anthos, 2023; Casaseca, 1991; Willkomm, 1865-1870). The occurrence of this species in TM is, thus, not surprising, due to the proximity to the westernmost populations in Spain. Plants were found growing in granitic rock crevices and among herbaceous vegetation on the Tuela river bed (Figures 1A-C and 2). Despite the survey efforts along the Tuela river at different places and occasions, it was only found at a single location, in an area of no more than 4 m^2 and comprising less than 10 individuals. Because of the extremely small population, no plant was collected for herbarium. Besides the inherent vulnerability of this population to stochastic effects, no other apparent threats were identified. The habitat is stable and well preserved, and no decline is expected, given the wilderness character of the Tuela river in the surroundings. The only possible pressure (although not confirmed) is physical destruction by trampling, since it occurs very close to a popular bathing site. Eventual projects to requalify the area for leisure activities could also be a threat.

Although this is a very recent finding, available data is deemed enough to conduct the assessment of its extinction risk according to the IUCN Regional Red List criteria. *Achillea pyrenaica* shall be assessed as Critically Endangered in Portugal due to its extremely low number of individuals, fulfilling criterion D for the CR category. Since there are no suspected declines, other criteria do not apply. Following the IUCN

Regional Guidelines, the final category remains unaltered because a significant immigration of propagules from Spain is not likely to occur.

Figure 1. *Achillea pyrenaica*, Tuela river, Trás-os-Montes, Portugal; (A) Habit; (B) Close-up of a capitulum; (C) Lateral view of inflorescence. (D) Inflorescence of *Cuscuta europaea*, Montouto, Trás-os-Montes, Portugal, on *Urtica dioica*. (E) Habit of *Epilobium montanum*, Casares, Trás-os-Montes, Portugal. Photos: Miguel Porto.
Figura 1. Achillea pyrenaica*, río Tuela, Trás-os-Montes, Portugal; (A) Hábito; (B) Detalle de un capítulo; (C) Inflorescencia, vista lateral. (D) Inflorescencia de* Cuscuta europaea*, Montouto, Trás-os-Montes, Portugal, sobre* Urtica dioica*. (E) Hábito de* Epilobium montanum*, Casares, Trás-os-Montes, Portugal. Fotografías: Miguel Porto*

Cuscuta europaea L., Sp. Pl.: 124 (1753)

PORTUGAL, Trás-os-Montes (TM), Montouto, 41.92678 Latitude, -6.98418 Longitude, 857 m Altitude, parasitando *Urtica dioica* sob coberto de floresta sombria e húmida em fundo de vale, 2-VII-2023, *Sara Lobo Dias & Miguel Porto* (LISI055541) (Figure 1D).

Cuscuta europaea is a widespread species in Europe and Asia, extending south to northwestern Africa (Morocco). It inhabits the margins of mountain streams and nitrophilic areas. The species is known to have a clear preference for parasitising *Urtica* L. species (García, 2012). The occurrence of this species in Portugal is also not surprising, since it occurs about 20 km away from a known location in Spain (Anthos, 2023). The plant was found parasitizing a dense thicket of *Urtica dioica* L. in a humid and shaded place, in the understory of a mixed *Quercus pyrenaica* Willd. and hazelnut forest (Figure 2). Although *U. dioica* is very common in the region, in various types of habitats, *C. europaea* was only found at this single location, which suggests that it is, in fact, rare, despite the commonness of its host. Field observations suggest that it might be restricted to the more humid and less disturbed places with *U. dioica* thickets, which are many in this region. Thus, more detailed surveys are necessary, especially along the river valleys, to evaluate the status of its population and its eventual threatened status in Portugal.

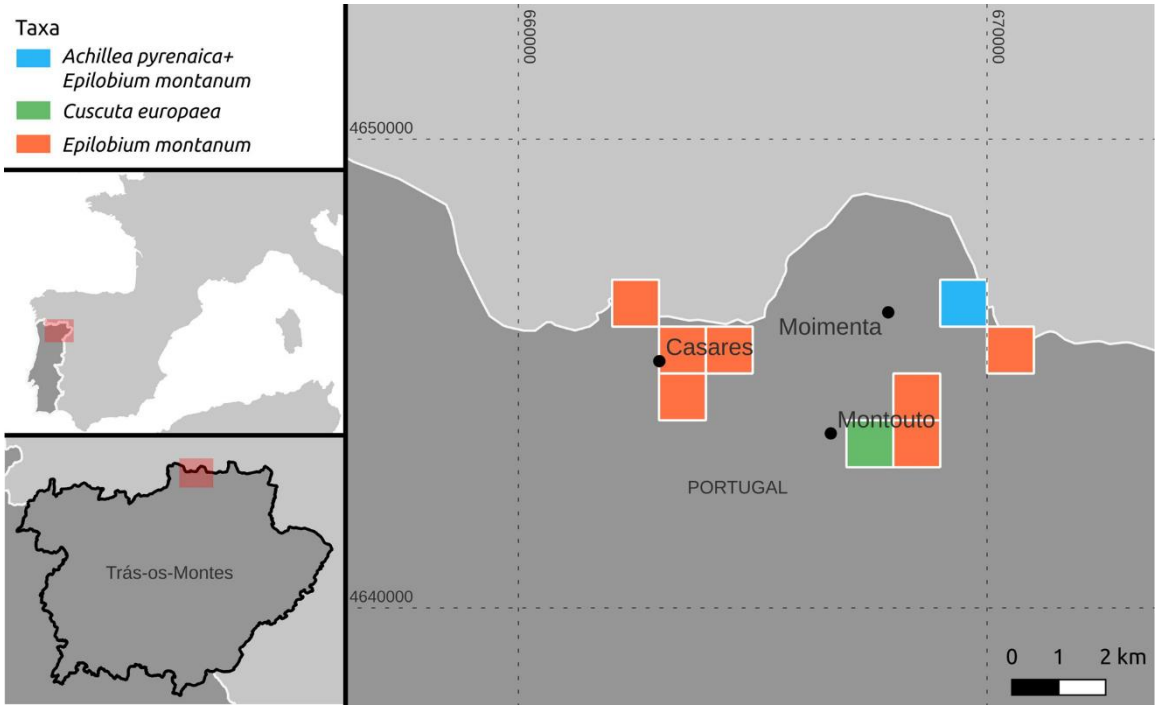

Figure 2. Known distribution of *Achillea pyrenaica*, *Cuscuta europaea* and *Epilobium montanum* in Portugal, in a 1x1 km UTM grid (WGS 84, UTM zone 29N).
Figura 2. *Distribución conocida de* Achillea pyrenaica, Cuscuta europaea *y* Epilobium montanum *en Portugal, en una cuadrícula UTM de 1x1 km (WGS 84, UTM zone 29N).*

Epilobium montanum L., Sp. Pl.: 348 (1753)

PORTUGAL, Trás-os-Montes (TM), Casares, 41.93611 Latitude, -7.02755 Longitude, 874 m Altitude, em carvalhal sombrio, 1-VI-2023, *Sara Lobo Dias & Miguel Porto s.n.* (LISI055542, LISI055543) (Figure 1E); *ibídem,* margem do Tuela a jusante da Ponte das Vinhas, 41.933661 Latitude, -6.965236 Longitude, na orla entre o bosque e o lameiro abandonado, 25-VI-2022, *Paulo Alves s.n.* (PO-V72260).

Epilobium montanum is a perennial herb that inhabits the forest understory (Nieto Feliner, 2007). It is widely distributed in Europe, including northern Spain, where it is relatively abundant (Anthos, 2023), but was not cited for Portugal in any of the Floras. There is only one specimen preserved in MA herbarium (MA-01-00084026) but without location and date, which was collected in Portugal by Hoffmannsegg and mentioned in his letter of 27 April 1801 (Medina & Aedo, 2022). The plant was now collected and

documented in three sites, but later was found in various other places in the extreme north of Portugal (personal observations), namely scattered in an area of about 9 x 3 km around Moimenta da Raia (Figure 2), occurring in river valleys, usually under the cover of riparian forests, always in nearly full shaded areas. The habitat of this species is common in this region; therefore it is likely that it occurs in a larger area than it is reported here. However, the fact that it had not been observed to date suggests that it is geographically restricted. We found no apparent threats to this species. Because the species is likely to occur in more locations and in a wider area, uncertainty exists in the parameters required for conducting the extinction risk assessment, thereby preventing a solid assessment as per the IUCN criteria.

This work highlighs once more the importance of botanical surveys even in areas that one could think that were already well surveyed, especially in biogeographic hotspots. Although these findings may not be surprising from a biogeographic point of view, they have a disproportional weight to the political dimension of biodiversity conservation by strengthening the importance of this region as home to three more species that are found nowhere else in Portugal.

Conflict of interest

None.

Financing

Part of this work was conducted in the scope of the project “MontObEO – Montesinho biodiversity observatory: an Earth Observation tool for biodiversity conservation” (MTS/BRB/0091/2020) funded by Fundação para a Ciência e Tecnologia.

Acknowledgements

We thank Pedro Arsénio and Ana Paula Paes (LISI), for assistance in the preparation of the voucher specimens and for granting us access to their collection and facilities; Leopoldo Medina and Eva García Ibañez (MA) for providing the high-resolution scan of the specimen of *Epilobium montanum*; and two reviewers for the suggestions that improved the manuscript.

References

Aguiar, C. (2000). *Flora e vegetação da Serra de Nogueira e do Parque Natural de Montesinho*. Tese de Doutoramento. Instituto Superior de Agronomia. Lisboa.

Aguiar, C. & Alves, P. (2020). Afloramentos de carbonatos do norte de Portugal. In M. Porto (Ed.), *Sítios de Interesse Botânico de Portugal Continental*, Coleção Botânica em Português, Volume 5 (pp. 8-17). Lisboa: Imprensa Nacional.

Aguiar, C. & Monteiro-Henriques, T. (2020). Afloramentos ultramáficos do nordeste de Portugal. In M. Porto (Ed.), *Sítios de Interesse Botânico de Portugal Continental*, Coleção Botânica em Português, Volume 5 (pp. 18-33). Lisboa: Imprensa Nacional.

Anthos (2023). Sistema de información de las plantas de España. Real Jardín Botánico, CSIC – Fundación Biodiversidad. Recurso electrónico en http://www.anthos.es. Accessed on 2023-08-23.

Araújo, P.V. (2021). Vale do rio Mente. In J. Farminhão (Ed.), *Sítios de Interesse Botânico de Portugal Continental* – Tomo II, Coleção Botânica em Português, Volume 5 (pp.260-269). Lisboa: Imprensa Nacional.

Casaseca, B., Rico, E., Giráldez, X. & Guillén, A. (1991). Aportaciones al conocimiento del grupo *Achillea ptarmica* L. Asteraceae) en la Península Ibérica. *Saussurea*, 22, 83-94.

Flora-On (2024). Flora Interactiva de Portugal. Sociedade Portuguesa de Botânica. Recurso electrónico en https://flora-on.pt . Accessed on 2024-01-23.

García, M.A. (2012). *Cuscuta* L. in S. Silvestre, M.J. Gallego & A. Quintanar (Eds.) *Flora iberica* vol. 11 (pp. 292-310). Madrid: Real Jardín Botánico, C.S.I.C.

Medina, L. & Aedo, C. (2022). Vascular Plants from the Journey through Portugal (1797–1801) by Hoffmannsegg and Link at the Herbarium of the Real Jardín Botánico of Madrid. *Plants*, 11(18), 2438.

Nieto Feliner, G. (2007). *Epilobium* L. In G. Nieto Feliner (Ed), *Flora iberica* vol. 8 (pp. 101-131). Madrid: Real Jardín Botánico, C.S.I.C.

Rivas-Martínez, S., Penas, Á., Díaz González, T.E., Cantó, P., del Río, S., Costa, J.C., Herrero, L. & Molero, J. (2017). Biogeographic units of the Iberian Peninsula and Baelaric Islands to district level. A concise synopsis. In J. Loidi (Ed.), *The Vegetation of the Iberian Peninsula* Vol. 1 (pp. 131–188). Springer International Publishing.

Soriano, I. (2019). *Achillea* L. In C. Benedí, A. Buira, E. Rico, M.B. Crespo, A. Quintanar & C. Aedo (Eds.) *Flora iberica* 16-III (pp. 1753-1774). Madrid: Real Jardín Botánico, C.S.I.C.

Willkomm, M. & Lange, J. (1865-1870). *Prodromus Florae Hispanicae*, Vol. II. Stuttgartiae, Sumtibus E.