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Hidden among a forest of records and a misidentification, *Conistra gallica* (Lederer, 1857) (Noctuidae, Xylenina) is also in Portugal

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Abstract: A critical revision of the Portuguese records of the *Conistra rubiginosa* (Scopoli, 1763) species group (Noctuidae, Xylenina) revealed the first confirmed occurrence of *Conistra gallica* (Lederer, 1857) in Portugal, a species previously expected but undocumented in the country. One specimen from Trinta (Guarda), formerly identified as *C. rubiginosa*, matches diagnostic characters of *C. gallica*. The current addition to the Portuguese Noctuidae fauna represents the ninth *Conistra* Hübner, 1821 species known in the country and emphasizes the need for more winter sampling and a revision of previous records.
Key words: Lepidoptera, Xylenina, *Conistra gallica*, *Conistra rubiginosa*, distribution, Portugal, Iberian Peninsula.

Resumen: Oculta entre un bosque de registros y una identificación errónea, *Conistra gallica* (Lederer, 1857) (Noctuidae, Xylenina) también se encuentra en Portugal. Una revisión crítica de los registros portugueses del grupo de especies de *Conistra rubiginosa* (Scopoli, 1763) (Noctuidae, Xylenina) reveló la primera presencia confirmada de *Conistra gallica* (Lederer, 1857) en Portugal, una especie previamente esperada pero no documentada en el país. Un ejemplar de Trinta (Guarda), anteriormente identificado como *C. rubiginosa*, coincide con los caracteres diagnósticos de *C. gallica*. La actual incorporación a la fauna portuguesa de Noctuidae representa la novena especie de *Conistra* Hübner, 1821 conocida en el país y subraya la necesidad de más muestreos invernales y una revisión de los registros previos.
Palabras clave: Lepidoptera, Xylenina, *Conistra gallica*, *Conistra rubiginosa*, distribución, Portugal, Península Ibérica.

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Introduction

The genus *Conistra* Hübner, 1821 (Noctuinae, Xylenini, Xylenina) is well represented in the Iberian Peninsula by 11 species (Calle, 1983; Yela *et al.*, 1988; Yela, 2002): *Conistra (Conistra) intricata* (Boisduval, 1829), *C. (C.) vaccinii* (Linnaeus, 1761), *C. (C.) ligula* (Esper, 1791), *C. (C.) alicia* Lajonquiére

1939, *C. (C.) erythrocephala* (Denis & Schiffermüller, 1775), *C. (C.) rubiginosa* (Scopoli, 1763), *C. (C.) gallica* (Lederer, 1857), *C. (C.) daubei* (Duponchel, 1839), *C. (Peperina) torrida* (Lederer, 1867), *C. (Dasycampa) rubiginea* (Denis & Schiffermüller, 1775) and *C. (D.) staudingeri* (De Graslin, 1863). The status of a 12th taxon, *C. (C.) haleae* Fibiger & Top-Jensen, 2010, known from the south of Spain (e.g. Fibiger *et al.*, 2010; Gaona Ríos, 2020) and amply cited from Portugal (Corley, 2015; Marabuto, 2018; Corley *et al.*, 2020) remains disputed and probably falls within the intraspecific variability of *C. alicia*, being the subject studied within the framework of the Iberian Fauna: Noctuoidea project (Yela *et al.*, in prep.). Only *C. torrida*, *C. daubei* and *C. gallica* have not yet been cited from Portugal (Corley, 2015), whereas *C. intricata*, the Atlanto-Mediterranean vicariant of *C. veronicae*, and for a long-time considered conspecific with it, was the last to be added to the country's list in Corley *et al.* (2013).

Whereas most *Conistra* species are fairly widespread in Portugal, some are still poorly studied and lacking comprehensive approaches. One such example is *Conistra rubiginosa*, a fairly distinctive and widespread species in continental Europe and the northern third of Iberia, extending further south into the Iberian System (Zapater & Korb, 1892; Guerrero *et al.*, 2020), Sierra de María and environs (Garre *et al.*, 2019) and Sierra Nevada (Pérez López & Tinaut, 1993). The first reliable Portuguese record comes from the extreme north of the country in Rio de Onor (Bragança) (Monteiro & Maravalhas, 1987, figure 1) but it may have been preceded by an observation in Abrantes (Santarém) (Silva Cruz, 1967), as *C. vau-punctatum* (Esper, 1786), which has been considered as 'requiring confirmation' (Corley *et al.*, 2011), 'erroneous' (Corley *et al.*, 2014) and 'unlikely to be correct' (Corley, 2015). The causes for this dismissal probably lies in the fact that the specimen has never been found in Silva Cruz's collection (MHNCUP) nor was it later mentioned in Silva Cruz & Gonçalves (1977), although no precise justification for such statements has ever surfaced. Since then, *C. rubiginosa* has further been cited from the districts of Bragança: Abreiro, Vila Flor (Corley, 2009 *in* Corley *et al.*, 2011); Guarda: Trinta, Guarda (Pires & Romão, 2013 *in* Corley *et al.*, 2014); and Viana do Castelo: Podre, Castro Laboreiro (Corley, 2013, *in* Corley *et al.*, 2014); and finally Braga: Rio Caldo, Terras de Bouro (Dapling, 2023, *in* REBN, 2025, a non-peer-reviewed dataset).

Interestingly, two of the three *Conistra* species known from Spain but not from Portugal are close relatives to *C. rubiginosa* and at times can be confused with this species: *C. gallica* and *C. daubei*. If their potential detection in Portugal is to be confirmed, previous observations of *C. rubiginosa* ought to be verified.

Conistra gallica is an Atlanto-Mediterranean species endemic to the Iberian Peninsula, south France and, more recently, Italy (Ronkay *et al.*, 2001; Huemer, 2024). In Spain, it is apparently widespread and mostly overlaps the distribution of *C. rubiginosa*, yet records appear scarcer towards western Iberia and it seems to favour more xerothermophilous habitats than its counterpart. Larvae have been recorded feeding on *Crataegus*, *Quercus* (Yela *in* Ronkay *et al.*, 2001) and *Prunus*. Despite Portugal lies within the species' range in Ronkay *et al.* (2001), no precise record exists to support this. Nearest observations to the Portuguese territory are in Galicia, in Moscoso (Pontevedra) in Calle & Outerelo (1975) and Folgoso do Courel (Lugo) in Fernández Vidal (2018).

Conistra daubei is also an Atlanto-Mediterranean species with roughly the same broad distribution as *C. gallica* but appears to be ecologically more restricted. In Spain, it is known mostly between Cantabria and Catalonia (García *et al.*, 1983; Oliver Ruiz *et al.*, 2024) and then locally in La Rioja (Rodríguez Saldaña, 2022), the Iberian System (e.g. Calle, 1976; Ronkay *et al.*, 2001; Ortiz *et al.*, 2012), Madrid (Agenjo, 1945; Gómez de Aizpúrua, 2002) and to the south, in the Guillimona mountain range and nearby Murcia (Ortiz *et al.*, 2016; Albadalejo *et al.*, 2018). The main factor potentially limiting the distribution of this species seems to be its host-plant, as it appears to depend mostly on *Buxus sempervirens* (Ronkay *et al.*, 2001; Gómez de Aizpúrua, 2002). Its potential presence in Portugal is not known but is likely limited to the also limited distribution of *B. sempervirens*, whose autochthonous populations are endangered (EN) in Portugal and when still existant, mostly restricted to some tributaries of the Douro valley in the northern part of the country (Aguiar *et al.*, 2025).

Conistra rubiginosa and *C. gallica* are the two morphologically most similar species, and whose distinction may prove challenging if not for some wing-pattern details and genitalia (Ronkay *et al.*, 2001). Conversely, whilst *C. daubei* may be variable, wing-pattern of this species is distinct from its relatives, especially the submarginal row of black dashes, speckled appearance, and the usually non-darkened forewing reniform and orbicular stigmata (Ronkay *et al.*, 2001).

Conistra spp. overwinter as adults and may be recorded from October to April, depending on locality, annual weather patterns and species (Ronkay *et al.* 2017). Because these species are an important component of the autumnal and early spring forest and shrubland moth community, they may serve as useful bioindicators, and their study is therefore relevant. Thus, in order to set a baseline knowledge about the Noctuoidea in Portugal and whilst revising available records, we located that among the published records of *C. rubiginosa* at least one corresponds to *C. gallica*, which makes it the ninth species in the genus known from this country.

Material and methods

Published Portuguese records belonging to the *Conistra rubiginosa* species group were revised based on external morphology and associated data, updated, and summarised. New records originate from light-trapping events aimed at these species and others, through their attraction to manned setups consisting of a light-source emitting strongly in the UV light range (MV bulb or LED light source) either hanging over a white sheet or used synergistically with a box-type trap.

Results

Conistra gallica and *C. rubiginosa* are closely related and have slightly overlapping external characters (Yela *et al.*, 1988; Hreblay, 1992; Ronkay *et al.*, 2001). Yet, there are two basic features in the habitus of both species that allow for reasonably reliable separation: The first is the filling of the orbicular spot, where in the usual form of *C. rubiginosa* is filled with dark scales at least in its basal half or margin. In *C. gallica* the orbicular spot is generally concolourous with the wing background, rarely showing any traces of black. Occasionally, *C. rubiginosa* expresses a similar character but then the reniform spot is also concolorous with the background (f. *immaculata* Staudinger, 1871). The second distinguishing feature concerns the shape of the antemarginal line, which in *C. gallica* appears as a dark band towards the inner area, is followed by a lighter but much narrower band towards the outer part and where the two bands meet is clearly wavy. In *C. rubiginosa* there is either no well-marked antemarginal band or only a few spots are highlighted, slightly darker than the forewing's background. Additionally, the forewing background colour is greyish-brown in *C. rubiginosa*, whilst in *C. gallica* there is usually a dark reddish to maroon hue. In set specimens, the hindwings of *C. rubiginosa* usually bear a more pronounced discal spot than *C. gallica* and, in addition, the antemedial line is nearly always absent in *C. rubiginosa* whilst present in most individuals of *C. gallica*.

Of the five occurrence records of *C. rubiginosa* in Portugal so far published, we could verify two: the original first Portuguese confirmed record, collected by Ernestino Maravalhas and currently in the collection of Mosteiro de Singeverga (Santo Tirso) (E. Maravalhas, obs.), and one specimen from Trinta (Guarda) in 2013, previously determined by M. Corley as *C. rubiginosa* (F. Romão, obs.), which corresponds to the record published in Corley *et al.* (2014) (Fig. 2). This latter turns out to tightly fit the differential diagnosis of *C. gallica* above instead, and represents a hitherto unrecorded species in Portugal. Despite its unavailability for dissection or DNA sequencing, which would be more decisive techniques in the distinction of both species (see Huemer, 2024), this specimen shows most characters which unambiguously place it within the concept of *C. gallica* instead of *C. rubiginosa*.

Fig. 1.- Hitherto unpublished Portuguese specimens of *Conistra rubiginosa*. **1a.-** Beça, Boticas, 10.02.1997, leg. Ernestino Maravalhas, in coll. Maravalhas. **1b.-** Mata do Bugalhão, Viseu, 31.12.2019, Joaquim Teixeira. **1c.-** Beça, Boticas, 27.12.2009, Ernestino Maravalhas. **1d.-** Ribeiradio, Viseu, 09.01.2019, Eduardo Marabuto. Photos by recorders.

Fig. 2.- *Conistra gallica*. **2a.-** First portuguese observation, 21.11.2013. **2b.-** Habitat, alongside Mondego river near the locality of Trinta (Guarda). Photos by Fernando Romão.

We could further locate four more, yet unpublished records of *C. rubiginosa* in Portugal which we collect, alongside other likely or confirmed positive identifications as well as the singled out *C. gallica* record into Table 1 and the distribution map in Fig. 3, in a total of nine Portuguese records.

Table 1.- Portuguese records of *Conistra* spp. belonging to the *C. rubiginosa* species group.

Species	Locality	MGRS 1k	Date	Observer	Source	Status
Conistra rubiginosa	Rio de Onor, Bragança	29TPG9745	03.1983	E. Maravalhas T. Monteiro	Monteiro & Maravalhas (1987)	Confirmed
Conistra rubiginosa	Esculca, Beça, Boticas, Vila Real	29TPG0815	10.02.1997	E. Maravalhas	this work	Confirmed
Conistra rubiginosa	Abreiro station, Vila Flor, Bragança	29TPF4478	15.11.2009	M. Corley	Corley *et al.* (2011)	Unconfirmed
Conistra rubiginosa	Esculca, Beça, Boticas, Vila Real	29TPG0815	27.12.2009	E. Maravalhas	this work	Confirmed
Conistra rubiginosa	Podre, Castro Laboreiro, Viana do Castelo	29TNG6850	28.11.2013	M. Corley	Corley *et al.* (2014)	Unconfirmed
Conistra rubiginosa	Ribeiradio, Oliveira de Frades, Viseu	29TNF5808	09.01.2019	E. Marabuto	this work	Confirmed
Conistra rubiginosa	Mata do Bugalhão, Castro Daire, Viseu	29TNF8731	31.12.2019	J. Teixeira	this work	Confirmed
Conistra rubiginosa	Rio Caldo, Terras de Bouro, Braga	29TNG6714	20.01.2023	J. Dapling	REBN (2025)	Unconfirmed
Conistra gallica	Trinta, Guarda	29TPE3785	21.11.2013	P. Pires F. Romão	Corley *et al.* (2014), this work	Confirmed

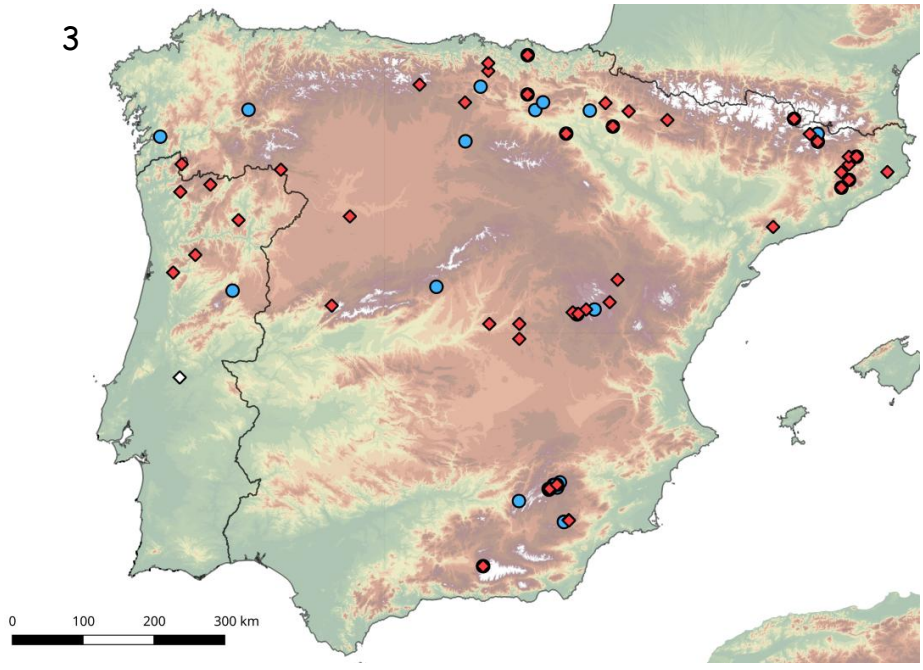

Fig. 3.- Currently known distribution of *C. rubiginosa* (red diamonds) and *C. gallica* (blue circles) in the Iberian Peninsula according to published data collected into the FAUNOCIB database, in GeoBrink (http://geobrink.uclm.es/Geobrink/) and this work. Unconfirmed record of *C. rubiginosa* from Abrantes (Silva Cruz, 1967) is represented as a white diamond.

The site of Trinta (Guarda), from which the only current known Portuguese record of *C. gallica* originates, lies within the Serra da Estrela Natural Park at approximately 740 m a.s.l. It is situated on the southern margin of river Mondego which flows eastwards at this point, and falls within a supra-mediterranean bioclimate. Little of the original woodland survives owing to recurrent fires in the region, although the potential climax vegetation series, that of the Pyrenean oak (*Quercus pyrenaica*) still dominates some pockets on the north-facing slope above the site. Along the road and on the lower part of the slope descending towards the river, old chestnut (*Castanea sativa*) groves are present.

The understorey is comparatively diverse and includes *Crataegus monogyna*, *Salix atrocinerea* and *Prunus insititia* (probably naturalised). After the meadow and by the river, a narrow gallery of Atlanto-Mediterranean alder woodland (*Alnus lusitanica*) is still preserved. Whilst sampling was carried out on the southern margin of the Mondego River, on a north-facing and more wooded slope, the opposite bank faces south and displays elements associated with a more strongly Mediterranean climate, such as holm oak (*Quercus rotundifolia*). This slope has also been more affected historically by human activities, such agriculture, grazing, fire and ultimately the installment of a wooden walkway, and is currently dominated by brooms (*Cytisus multiflorus* and *C. striatus*).

Discussion

The discovery of *Conistra gallica* in Portugal results from a careful re-examination of published and unpublished records of the *C. rubiginosa* species group, demonstrating how easily overlooked taxa can remain undocumented in relatively well-surveyed faunas. As in other overwintering Noctuidae, adult detection windows are long but highly weather and effort-dependent, and the overall scarcity of targeted sampling during the colder months likely contributes to significant underestimates of species richness. The present findings underscore this bias and highlight the importance of monitoring winter-flying moths, which contain both widespread and highly localised species.

The three similar species within this group, *C. rubiginosa*, *C. gallica* and *C. daubei*, represent a known challenge for identification, for their overlapping phenotypes, subtle but consistent pattern differences, and partially overlapping geographic distributions have been repeatedly emphasised in the literature (e.g., Yela *et al.*, 1988; Hreblay, 1992; Ronkay *et al.*, 2001). The re-identification of one Portuguese specimen formerly attributed to *C. rubiginosa* demonstrates how such confusion can obscure the actual distributions of taxa. Given that *C. gallica* was previously expected to occur in Portugal based on its Iberian and southern French distribution range, the confirmed Portuguese record not only fills a biogeographical gap but also compels a review of earlier determinations. This is considerably more challenging task where voucher specimens are lacking.

In particular, records from clearly Mediterranean environments should be subject to critical reassessment for refining the species' Iberian distribution patterns. Among these, we particularly highlight the record from Abreiro (Vila Flor, Bragança). This locality lies well within the climatic envelope typical for *C. gallica*, which lies within the xerothermophilous habitat more typical of *C. gallica*. Its confirmation would help refine the Iberian distribution patterns of whichever species the record belongs to.

Whilst the habitat and other ecological requirements of *C. gallica* need further study, it appears the area of Trinta, within the eastern continental supramediterranean montane realm harbours more suitable conditions for the presence of *C. gallica* rather than *C. rubiginosa*. The meadow and adjacent river-valley is inhabited by an assemblage of suitable host-plants such as *Crataegus monogyna* and *Prunus* spp. (*P. avium*, *P. insititia*), This site has been visited by the authors for a number of times since the early 2000's and harbours a rich Lepidoptera community with many less known or seldom recorded species. For example, it is the type-locality of the western Iberian endemic *Micropterix herminiella* Corley, 2007 (Lepidoptera, Micropterigidae) (Corley, 2007), the first locality where three other species were located in Portugal (Corley *et al.*, 2006) and also probably resource-sharing with *C. gallica*, where

occurs a population of one of the most elusive butterflies in Portugal, *Thecla betulae* (Linnaeus, 1758) (Lepidoptera, Lycaenidae) (Marabuto *et al.*, 2022). However, the presence of such habitat and trophic resources also suggests that *C. gallica* may be more widespread in central and northern Portugal than is currently documented, with its apparent rarity reflecting insufficient winter sampling rather than genuine scarcity.

This contrasts with *C. daubei*, which apparent strict dependence on *Buxus sempervirens* greatly limits its potential presence in Portugal. As *Buxus* is itself scarce, fragmented, and declining domestically, the potential occurrence and likelihood of detection of *C. daubei* in the country should be limited to the best conserved Douro riverine margins. Nonetheless, if not for this species (nearest occurrence areas are in the Guadarrama range and in León (Fernández Vidal & Rodríguez Fandiño, 2025), these areas for their threat status and potential biotic uniqueness should offer rare opportunities for other noteworthy findings.

Although certain external characters reliably distinguish *C. gallica* from *C. rubiginosa*, the variation in both taxa can render identification from photographs alone challenging. This is especially true for overwintered individuals, which are often worn or faded. Whilst genitalia dissection remains the dependable standard for species-level identification in this group, DNA barcoding also unambiguously distinguishes these species (see Huemer, 2024) and the synergy of both methods is desirable. Although it is possible to claim identifications of these species after careful external morphology diagnosis, as undertaken here, more integrative analyses relying on categorical methods are always advisable and required in older or more damaged specimens. This is particularly contrasting with the modern trends in recording moths originating from non-scientist-led initiatives, which mostly rely on photography-based-only datasets. Here, the risk of misidentification is high, unless supported by voucher-based evidence or an impractical critical analysis by experts of thousands of specimens. Future monitoring should therefore emphasise specimen collection, proper labelling, and deposition in accessible collections to ensure verifiability of both past and future records.

The addition of *C. gallica* to the Portuguese fauna has increased to nine the number of *Conistra* species documented in the country. This gain supports the view that the Iberian Peninsula, including its western portion, is a centre of diversity for the genus and suports its role as a biogeographical unit, albeit heterogeneous. The discovery also highlights the role of fine-scale microhabitats and local climatic regimes in shaping species distributions. From a conservation perspective, accurate species identification within this complex is important. Since several *Conistra* species are considered indicative elements of late-autumn and early-spring forest and scrub communities, understanding their true distribution helps refine bioindicator frameworks.

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