Pleurodeles waltl in its northernmost Atlantic range

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Resumen: El gallipato (*Pleurodeles waltl* Michaelles, 1830) es un tritón endémico de la península ibérica y norte de Marruecos catalogado como Casi Amenazado por la IUCN. Se distribuye por la región mediterránea pero también presenta algunas poblaciones en la región atlántica a lo largo de la costa portuguesa al norte del río Duero. En esta región, los registros de gallipato se han localizado únicamente en localidades costeras, coincidiendo en áreas con un elevado grado de degradación, transformación y fragmentación del ecosistema costero ocasionado por fuertes presiones antrópicas durante las últimas décadas. En esta nota presentamos nuevos registros para la especie en la región atlántica y discutimos el aparente declive poblacional del gallipato en el límite septentrional de su distribución en la costa atlántica, coincidiendo con una escasa representación de la especie en la región atlántica.

The Iberian ribbed newt (*Pleurodeles waltl*) is a Mediterranean species endemic to the Iberian Peninsula and Morocco considered Near Threatened (IUCN Red List; Beja *et al.*, 2009). It is relatively common and widespread throughout warm regions included in the Mediterranean biogeographic region of central and southern Iberian Peninsula (Salvador, 2015) but is absent across most of the eastern and northern Spain and most of half north Portugal (Figure 1a). However, it shows a limited and fragmented distribution along coastal Portugal from Porto to Esposende (Figure 1b), which is included within the Atlantic biogeographic region (Malkmus, 1999; Loureiro *et al.*, 2010; Matos *et al.*, 2010). In this coastal range at north of the Douro River *Pleurodeles waltl* is highly rare and with a declining trend. In fact, Malkmus (1999) reported a critical reduction of the species range in this area, with the extinction of most populations in localities reported in the early 1900 and the observation in only two coastal localities between 1980-1999. More recently, Matos *et al.* (2010) found a single individual in the northernmost locality along the Atlantic coast located on a sandy patch with vegetation associated to humid areas (*Juncus* sp. and *Salix* sp.) surrounded by an agricultural and urban landscape (Marinhas, Esposende). Numerous surveys over the last decade in its currently closer population in the south (Mindelo), however, did not find *P. waltl* in this coastal region, and thus suggesting a population decline and probably local extinction (Velo-Antón, 2020).

This Atlantic coastal region is originally dominated by temperate broadleaf forests, which extends throughout the most humid areas in north Portugal, Galicia and the northern slopes of the Cantabrian Mountains. Thus, the ecosystem occupied by these northernmost coastal populations of *P. waltl* differs from the typical warmer and drier habitat with Mediterranean climate that largely characterize *P. waltl* distribu-

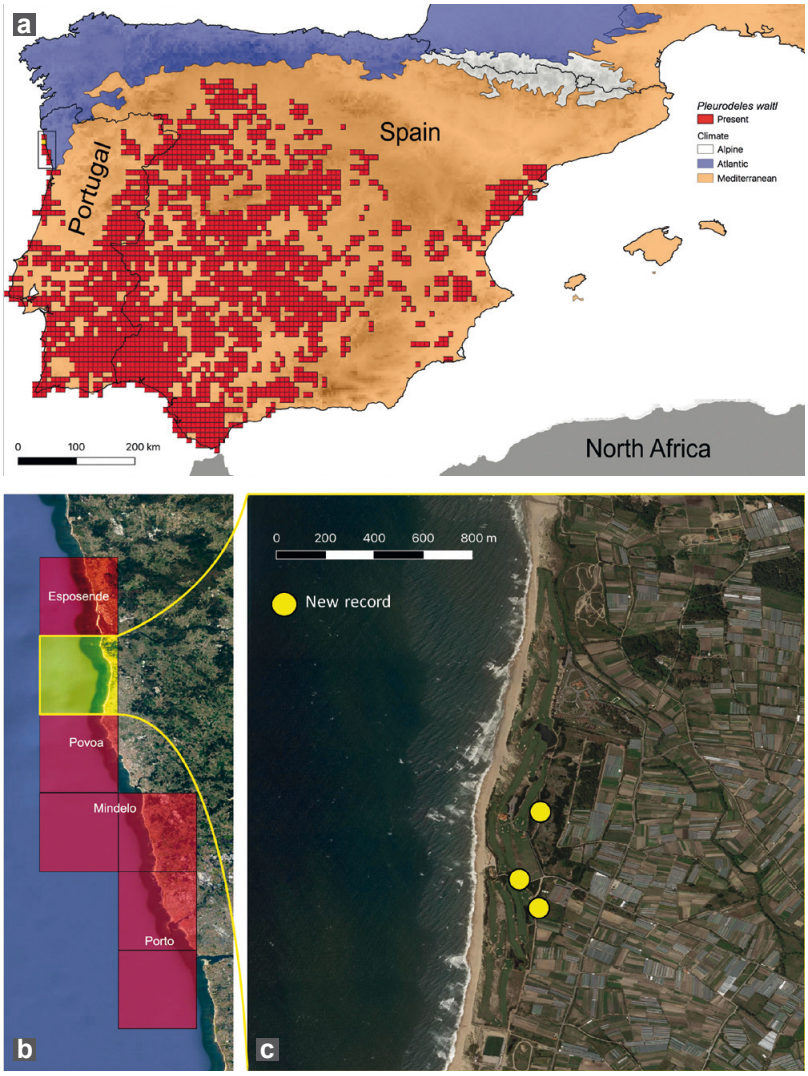

Figure 1: a) Map showing the known distribution of *Pleurodeles waltl* across the Iberian Peninsula based on herpetological atlases from Portugal and Spain (10x10 km), and the climatic bioregions therein. b) Distribution of *P. waltl* within the Atlantic region in coastal Portugal. c) New records of *P. waltl*.

Figura 1: a) Mapa de la distribución conocida de *Pleurodeles waltl* en la peninsula ibérica basado en los atlas herpetológicos de Portugal y España (10x10 km), y sus regiones bioclimáticas. b) Distribución de *P. waltl* dentro de la región Atlántica en la costa de Portugal. c) Nuevos registros de *P. waltl*.

tion (Beja *et al.*, 2009; Salvador, 2015). Atlantic coastal ecosystems, and in particular wetlands, have been severely transformed during the last decades in both the Iberian Peninsula and Morocco due to anthropogenic activities (Green *et al.*, 2002). This had a direct impact on water dependent species, resulting in population declines, local extinctions and highly fragmented and vulnerable populations that now represent remnant populations of formerly abundant communities (e.g. Velo-Antón *et al.*, 2015). This is well exemplified in the coastal area north of Porto, where industrial and intensive agricultural activities together with the expansion of urban areas, resulted in a profound transformation of the coastal habitat and a drastic reduction of wetlands. The historical protection of the coastal area in Mindelo (first protected Portuguese area in 1957) have largely secured the preservation of this coastal ecosystem, including the wetlands therein and its biodiversity, despite the increasing agricultural activities and urban expansion that occurs in

part of the reserve (Andrade & Martins, 2021). Indeed, Mindelo area constitutes an amphibian micro-hotspot (with eight anurans and four urodeles recorded), and one of the richest Portuguese regions for amphibians (Velo-Antón, 2020). Outside of this reserve, however, the number of amphibian species, and their abundance, is in accelerated regression due to the drastic transformation of coastal wetland habitats into urban areas and intensive agricultural fields with plastic greenhouses (see Figure 1c), which lead to irrigation and drainage practices for a high water-demand, as well as the chemical pollution of the few streams that are left.

In this note we report a new locality for *P. waltl*, in its northernmost range along coastal Portugal within the biogeographic Atlantic region (Figure 1c). In August 28th, 2021 we conduced a 4 km hike along a coastal path between Barranha and Apulia (within the municipality of Póvoa de Varzim; District of Porto). Most of this coastal area is occupied by a private golf course and surrounding agricultural fields, with small patches of sand dunes covered with scrubs, pinewoods, invasive forests (*Acacia* sp. and *Eucalyptus* sp.) and scattered oak trees. We found a total of five roadkill (i.e. flattened and dry) carcasses of *P. waltl* in three locations along a 500m track next to the existing golf course and about 50-200 meters from two permanent water ponds with dense riparian vegetation (*Typha* sp., *Phragmites* sp. and *Salix* sp.) located inside this private property, with other small ponds located further away (300-600m) both inside and outside of the golf course. Considering the most recent known observations for *P. waltl*, this new record is located between the 20 km southward population in Mindelo (although not confirmed during surveys over the last decade; Velo-Antón, 2020), and the 6 km northward record of a single individual near Esposende (Matos *et al.*, 2010). This new record suggests the presence of a permanent and apparently abundant population of *P. waltl* at its northernmost limit of the Atlantic distribution. Although it is unclear the population status and trends of *P. waltl* across this patchy coastal wetlands, previous findings and numerous herpetological surveys across this region suggest a clear population decline for the species rather than an expected northward population expansion potentially triggered by current climatic change, as it occurs in other vertebrates across the Iberian region (Moreno-Rueda *et al.*, 2012). Further field sampling will be conducted in this area during favorable climatic conditions to provide an adequate characterization of the distribution, habitat requirements and preliminary population size estimate for this interesting *P. walt* population. *Pleurodeles waltl* uses lentic water bodies, mostly permanent or temporary ponds that are preferable large and relatively deep, during its aquatic stage (Gómez-Rodríguez *et al.*, 2012). Therefore, the few permanent water ponds still existing in these coastal regions and where the species could reproduce and complete its life cycle are key for the long-term survival of the *P. walt* populations occurring along the Atlantic coast of northern Portugal. Although *P. waltl* has a wide Iberian distribution and tolerates some organic pollution and salinity we highlight the interest and urgent need of preserving these peripheral populations occurring within a unique ecological and biogeographical setting, which has been highly transformed by human activities.

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Extant but rare: *Salamandra salamandra* and *Bufo spinosus* in Cortegada Island

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Resumen: La isla de Cortegada (54 hectáreas; Ría de Arousa; SO Galicia) se separa por tan solo 200 m del continente, estando prácticamente comunicada con la población de O Carril durante la bajamar. Está caracterizada por una amplia cobertura forestal dominada por una de las mayores extensiones de *Laurus nobilis* en Europa. Pese a su reciente aislamiento, cercanía al continente, disponibilidad de agua dulce y excelentes condiciones climáticas y forestales, la presencia de anfibios en esta isla es extremadamente rara. En esta nota presento el primer registro de *Bufo spinosus* en Cortegada, añadiendo una especie de anfibio a las ya conocidas en el Parque Nacional de las Islas Atlánticas de Galicia, al que esta isla pertenece. También aporto nuevos hallazgos de *Salamandra salamandra gallaica* que confirman la presencia de una población aparentemente muy escasa en esta isla, y resalto la necesidad de estudiar esta población para poder conocer su modo reproductivo (larvíparo o puerícparo), y evaluar si pudo evolucionar a un modo reproductivo terrestre como ocurrió en otras islas del parque (Ons y Cíes).

Cortegada is a flat (54 hectares) and an almost tidal island (i.e. low-depth seawater flows at low tide between the island and the mainland) at the end of a coastal inlet (Ría de Arousa) in