

Give me five: a case of polymelia in the Common Midwife Toad, *Alytes obstetricans* (Laurenti, 1768), in Central Spain

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Amphibians are facing a wide range of threats, which are driving them into a drastic global decline (Luedtke et al., 2023). Their biphasic life cycle and highly permeable skin make them particularly vulnerable to several stressors, including chemical pollutants, ultraviolet (UV) radiation, or pathogenic infections (Croteau et al., 2008; Salla et al., 2023; Johnson et al., 2024). Exposure to these factors, especially during early developmental stages, can result in various morphological malformations (Kiesecker, 2002; Pollo et al., 2019). Individuals with such deformities generally have lower survival rates due to reduced fitness and increased vulnerability to predation (Michel and Burke, 2011). Malformations typically affect fewer than 5% of individuals in most amphibian populations, and higher prevalence levels are considered indicative of significant concern (Johnson et al., 2010).

One of the most frequently observed deformities in amphibians is polymelia, defined as the presence of extra limbs (Blaustein and Johnson, 2003). This congenital malformation typically originates from developmental anomalies during embryogenesis (Blaustein and Johnson, 2003), which results in fully or partially formed limbs, although often non-functional (Henle et al., 2017; Martínez-Gil and Martínez Solano, 2024). In the Iberian Peninsula, cases of polymelia have been commonly reported in adult urodeles, such as salamanders or newts (e.g., Escoriza and García-Cardenete, 2005; Martínez-

Silvestre et al., 2014; Zamora-Camacho, 2016; Poch and Carné, 2021; Velo-Antón et al., 2021; Cantero, 2024); while records of this malformation in terrestrial anurans (e.g. toads) are less documented (e.g., Escoriza and García-Cardenete, 2005; Pinya et al., 2012; Martínez-Gil and Martínez Solano, 2024).

Here we present a case of polymelia in the Common Midwife Toad, *Alytes obstetricans* (Laurenti, 1768), observed in Arganda del Rey (Community of Madrid, Central Spain), where we have conducted a seven-year Capture-Mark-Recapture monitoring program of the species based on photo-identification (Caballero-Díaz et al., 2022; Caballero-Díaz, unpublished data). The study site (40.2691°N, -3.4339°W; elevation 665 m) is located in an anthropised landscape that combines Mediterranean scrubland (dominated by *Quercus ilex*) and agricultural fields (olive trees, vineyards). Breeding in the region typically occurs in artificial waterbodies (Caballero-Díaz et al., 2020, 2022). These habitats are often subject to environmental deterioration and contamination, particularly from agrochemicals (Gálvez et al., 2018; Caballero-Díaz et al., 2020, 2022).

During a sampling session on 21 April 2025 at 23:20 h (mean air temperature = 12.4 °C; relative humidity = 70%), we captured an adult individual of the subspecies *A. o. pertinax* (Ambu et al., 2025) exhibiting an extra limb located next to the right forelimb (Fig. 1). We carefully checked the limbs, sexed, weighted, measured snout to vent length (SVL), and took several photographs of the specimen. In addition, a standardised dorsal photograph was taken to verify that this was the individual's first recorded occurrence, using the photo-identification software Wild ID (Bolger et al., 2012).

Visually, the extra forelimb appeared well ossified and seemed to originate from the right shoulder. It also lacked mobility and was dragged during toad's locomotion. We were unable to determine the sex of the specimen due to the absence of sexual dimorphic traits. The individual was in apparently good condition, measuring 48 mm (SVL) and weighting 8.27 g, indicating that it was a sexually mature adult (Sánchez-Montes, unpublished

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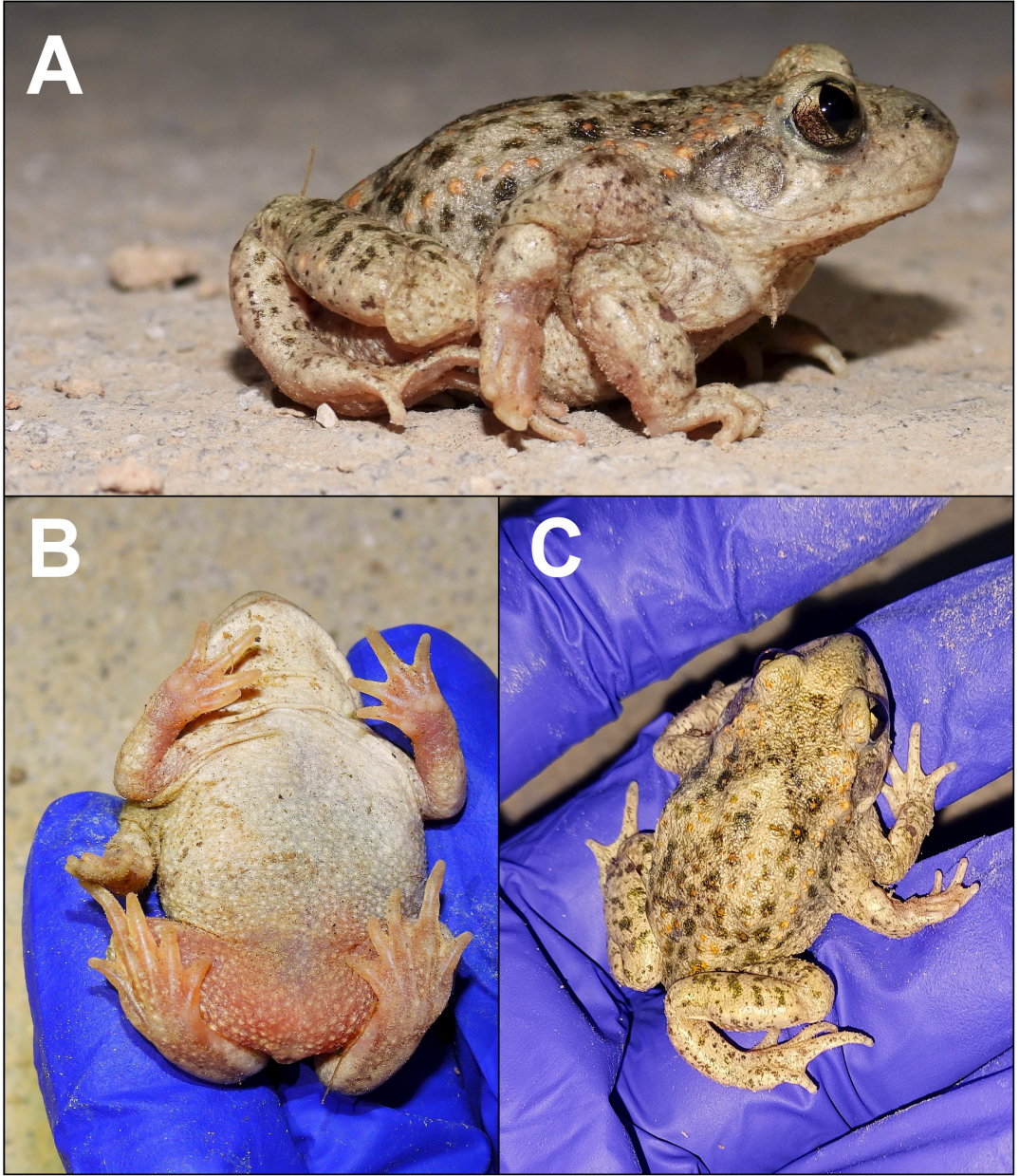


Figure 1. Lateral (A), ventral (B) and dorsal (C) views of the individual of *A. obstetricans*, with detail of the extra forelimb. Photographs by Luis Javier Cuéllar (A and B) and Carlos Caballero-Díaz (C).

data). Only a single case of polymelia has been previously documented in *A. obstetricans*, occurring in an introduced population in Great Britain (Goodman et al., 2022). To our knowledge, our observation constitutes the first reported instance of polymelia in a native population of the species, as well as the first such case described within the *pertinax* subspecies. During our monitoring program (Caballero-Díaz et al., 2022), we have previously detected other malformations in *A. obstetricans* individuals, including one case of polydactyly and two of ectrodactyly (i.e. the presence of

extra digits or lack of them, respectively). Nonetheless, when combined with this reported individual with polymelia, the overall incidence of these deformities remains below the critical threshold of 5% established for population-level concern (Johnson et al., 2010). In addition, the study site is subject to pollution, including the accumulation of garbage and exposure to agrochemical products which are recognised stressors linked to malformations in amphibians (Reeves et al., 2010, Henle et al., 2017).

During the last years, these environmental pressures have already caused fatal mortality events in *A. obstetricans* larvae across multiple water tanks in the region, which Forestry Agents of the Community of Madrid have associated with the cleaning of pesticide equipment (Caballero-Díaz et al., 2020, 2024). In this context, polymelia findings like those reported here highlight the urgent need not only for systematic monitoring of amphibian malformations, but also the evolution of environmental stressors, to understand the underlying causes and the survival implications, and to develop effective conservation strategies.

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