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Necrophiliac behaviour of *Epidalea calamita* in Sierra Norte de Sevilla Natural Park, SW Spain

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RESUMEN: En esta nota describimos un comportamiento necrofílico en sapo corredor (*Epidalea calamita*) relacionado con una depredación, posiblemente de nutria. En ella, discutimos las implicaciones de este fenómeno y sus posibles implicaciones reproductivas cómo se ha descrito en otros trabajos.

Necrophiliac behaviour has been described in several anuran species of the genus *Rhinella* (de Matos Brito *et al.*, 2012), *Dendropsophus* (Bedoya *et al.*, 2014) and *Bufo* (Marco & Lizana, 2002). Far from being incidental or useless, this behaviour has been even proposed to be valid reproductively, as in the case of *Rhinella proboscidea*, in which the dead female can still eject eggs after death, allowing fertilization by the male (Izzo *et al.*, 2012). This behaviour and its implications, however, have not been

reported in Europe under natural conditions, and more specifically in the south of the Iberian Peninsula. In addition, necrophily has been described as a consequence of the female drowning (Izzo *et al.*, 2012), but not in the case of corpses with signs of predation (e.g. by otter, *Lutra lutra*). Cases of predation by otter over amphibians (Cogălniceanu *et al.*, 2010) or aquatic reptiles (Rodríguez-Rodríguez, 2016) have been previously described in the study area or nearby.

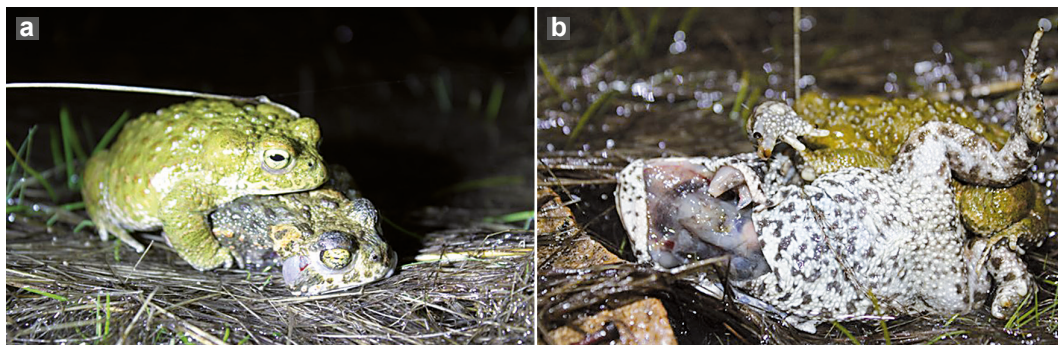


Figure 1: a) Necrophiliac behaviour, and b) jugular wounds of the dead female.
Figura 1: a) Comportamiento necrófilo y b) heridas en el cuello de la hembra muerta.

The Sierra Norte de Sevilla Natural Park is located in the north of Seville province (southern Spain), within the Sierra Morena mountain range. It occupies 177 484 hectares with predominantly low slope mountains covered by “dehesa” forest of cork oak (*Quercus suber*) and holm oak (*Quercus ilex*). The natterjack toad (*Epidalea calamita*) is an amphibian of the family Bufonidae (Graybeal, 1997). This Palearctic anuran species is widely distributed through Europe: from the Iberian Peninsula to Belarus and Ukraine (Beebee, 2004). It occupies a wide variety of habitats, from coastal areas to mountains up to 2500 masl –although it has been traditionally considered a lowland species–, and from arid zones to humid areas (Beebee, 1983; García-París *et al.*, 2004). The short larval period of this species (Reques y Tejedo, 1997) allows it to breed in a wide variety

of temporary ponds, from inundated grasslands to ditch puddles, including vehicle rolls. The reproduction peak in southern Iberian Peninsula occurs between the end of January and the beginning of March. The amplexus is axillar.

On the evening of January 25th of 2020, at 8:50 p.m., with a temperature of 11° C and after four days of continuous rains, we observed a necrophiliac behaviour in *E. calamita* involving an adult male (SVL: 56 mm) and an adult dead female, of larger size (SVL: 65 mm) in a restored temporary pond (part of a group of artificially created ponds in the Park, coordinates: 6.084° W, 37.783° N; 729 masl), in the proximity of Almadén de la Plata village. The male individual was in an evident amplexus over the dead female (Figure 1), grasping her by the axilla. Dorsally, and at first sight, the female presented no wounds or other

Figure 2: Remains of natterjack toads with signs of predation by otter (*Lutra lutra*) recovered on the same pond where the necrophiliac amplexus was observed. The dead female is the individual on the centre.

Figura 2: Restos de sapos despellejados con signos de depredación por nutria (*Lutra lutra*) recuperados en el mismo estanque donde se observó el amplexo necrófilo. La hembra muerta es el individuo del centro.



evident signs of damage. Only after turning it to perform a detailed exam, were a big open wound in the gular areas and some other lower damages observed. This pattern of wounds and the very recent observation (< 24 hours) of more than eight dead natterjack toads with their skin turned over (Figure 2), suggest that they were predated by otter (*Lutra lutra*) (Ayres & García, 2011). Otters are

common in the study area, where they have been directly observed by the authors. This necrophilic behaviour is very interesting as it was not previously described for the species in their natural habitat. It remains unknown whether or not it may be of some reproductive value, as proposed by Izzo *et al.* (2012). The study of this kind of behaviour in this species have a big research potential.

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Depredación de un metamorfo de *Boana* sp. (Anura: Hylidae) por un adulto de *Leptodactylus fuscus* (Anura: Leptodactylidae)

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Leptodactylus fuscus (Schneider, 1799) es una rana de tamaño pequeño a moderado y de hábitos terrestres. Las hembras presentan un tamaño corporal (longitud rostro-cloaca) entre 36.5–56.3 mm (promedio = 44.8 mm), y los machos

entre 32.4–55.3 mm (promedio = 43.4 mm) (de Sá *et al.*, 2014). Es una especie común en hábitats abiertos y se considera un buen colonizador de zonas degradadas (Lynch, 2006; Sugai *et al.*, 2012; Santana *et al.*, 2019). La especie presenta pliegues