Cannibalism in *Malpolon monspessulanus* and the importance of roadkill data

Adrián Martín-Taboada, José María García-Carrasco & Antonio-Román Muñoz

Departamento de Biología Animal, Facultad de Ciencias. Universidad de Málaga. 29071 Málaga. Spain. C.e.: jmgc@uma.es

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Resumen: Se reporta un nuevo caso de depredación intraespecífica en la culebra bastarda *Malpolon monspessulanus* (Hermann, 1809), sobre un individuo juvenil, y se pone de manifiesto la importancia del uso de datos procedentes de atropellos en carretera.

The Montpellier snake (*Malpolon monspessulanus*) is a euryphagous reptile distributed from the northwest of Africa (Western Sahara) to the frontier between Algeria and Tunisia, to the southeast of France, northwestern Italy, and the Iberian Peninsula, with a typical Mediterranean distribution (Pleguezuelos, 2017). On the 3 of March 2019, we observed a roadkilled individual near the village of La Cumbre, Extremadura, Spain (39°21'35.4"N / 5°59'51.4"W), which constitutes the first presence of this species in this 10x10 km UTM square (TJ46; SIARE, 2019). The specimen was an adult male, with the typical dark "saddle" on the foreparts, and a total length of 130 cm (Figure 1a and b). In a closer examination of the animal, we found another snake sticking out from a wound caused by the outrage (Figure 1c). The predated snake was a juvenile of Montpellier snake, with a total length of 63 cm (Figure

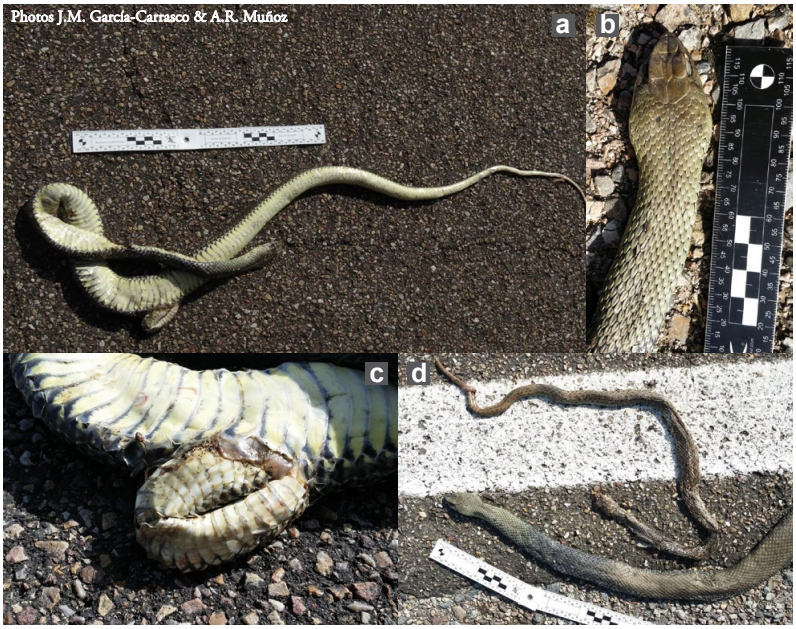

Figure 1: a) Specimen of a roadkilled *M. monspessulanus* with the remains of a juvenile of the same species. b) Details of the *M. monspessulanus* head. c) Parts of the stomach contents of the roadkilled individual. d) *M. monspessulanus* juvenile once outside its predator.
Figura 1: a) Ejemplar de *M. monspessulanus* atropellado con los restos de un juvenil de su misma especie. b) Detalles de la cabeza de *M. monspessulanus*. c) Parte del contenido estomacal del individuo atropellado. d) Juvenil de *M. monspessulanus* una vez sacado de su depredador.

1d), which means a case of cannibalism. The roadkilled individual was located on one side of a road crossing a pasture zone with several ponds around. This observation increases the overwhelming statistic that points to the Montpellier snake as the most roadkilled snake in Spain (PMVC, 2003; Blázquez & Pleguezuelos, 2004).

Although roads are linked to socio-economic development, they entail environmental consequences such as habitat fragmentation, barrier effects (Coffin, 2007), and collisions (Trombulak & Frissell, 2000). In fact, the impact of wildlife-vehicle collisions is particularly acute in reptiles (Choquette & Valliant, 2016).

The Montpellier snake has a wide range of prey (Valverde, 1967). Although it can feed on a variety of arthropods, amphibians, birds and mammals, its diet is primarily based on other reptiles (Alarcos, 2017), including other snakes (Pleguezuelos, 2017), even of the same species (Recuero *et al.*, 2010; Franch & San Sebastián, 2013).

Although the use of roadkilled animal data is a common practice in many countries since long time ago, in Spain it started at the beginning of 1990 (PMVC, 2003). Roadkill data recording represents a reliable source of information for species distribution mapping (Shilling *et al.*, 2015), and it also provides new information about the diet of killed specimens (Talegón & Alarcos, 2018; present study).

The information presented here prove the utility of roadkill data in environmental sciences. In this case, these data increase the knowledge on the trophic ecology of *M. monspessulanus*, demonstrating a new record of cannibalism, which confirms its herpetophagous strategy.

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