

Flycatching foraging behavior by the montpellier snake, *Malpolon monspessulanus*

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RESUMEN: Se describe la observación en campo del comportamiento de captura al vuelo de un artrópodo (lepidóptero) por parte de un ejemplar adulto de culebra bastarda mientras practicaba forrajeo activo. Se relaciona con el elevado grado de visión binocular que probablemente posee esta especie.

Flycatching, capture of prey while in flight, is a well-documented foraging behavior among flying vertebrates (e.g. birds and bats; Remsen & Robinson, 1990), but this behavior is less well documented among reptiles. Some lizards leap into the air to capture flying insects (Ehrlich & Ehrlich, 1982), and some snakes capture airborne prey during sit-and-wait maneuvers from suitable perches. For instance, several long bodied and climbing snake species remain at cave entrances, or in narrow cave passages, and catch flying bats during daily movements, mostly in the tropics (Esbérard & Vrcibradic, 2007), but also in temperate regions (Barti *et al.*, 2019). As far as we know, however, there are no literature references to active flycatching as a foraging behavior among fully terrestrial snake species.

On 23 May 2004 at 14:20 hours, we observed from a distance of approximately 8 meters

a male Montpellier snake (*Malpolon monspessulanus*; snout-vent length ca. 110 cm) moving slowly in typical active-foraging mode for this species (de Haan, 1999). The anterior portion of the snake's body was elevated, in this case over grass with a height of about 30 cm, when a large and unidentified low-flying lepidopteron appeared in sight approximately three meters from the snake. The snake actively focused upon and pursued this flying prey for approximately 30 seconds, pointing its head toward it, until the lepidopteran was successfully captured in mid-air. The prey was swallowed within less than 10 seconds, a brief period because of the relatively small prey size compared to the snake size. After the capture, the snake departed from the grassland patch, at which time it was photographed (Figure 1).

Figure 1: Male Montpellier snake, *Malpolon monspessulanus* (Aldeaquemada, Jaén province, Spain), photographed immediately following its swallowing of a large lepidopteron using fly-catching.

Figura 1: Macho de culebra bastarda, *Malpolon monspessulanus* (Aldeaquemada, provincia de Jaén, España), fotografiada inmediatamente después de la ingestión de un gran lepidóptero mediante su captura al vuelo.

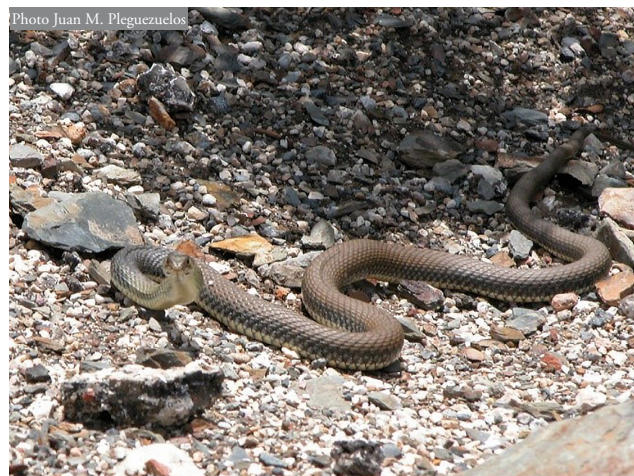


Photo Juan M. Pleguezuelos

Consumption of arthropods by this large Mediterranean snake has been previously recorded in the Iberian Peninsula (Valverde, 1967; Mellado, 1974; Vericad & Escarré, 1976; López-Jurado & Dos Santos, 1979). However, these studies did not cite butterflies as a dietary item. Thus, Lepidoptera is a new prey type to add in the rather long list of prey items consumed by this diet generalist (reviewed in Pleguezuelos, 2017).

This natural history note increases the rather low number of flycatching behavior records for snakes, with added interest corres-

ponding to a feeding event during a rare active-foraging technique. We speculate that this rare feeding behavior is linked to the peculiar head shape and its inherent functionality: the large eyes and facial grooves anterior to the eyes permit an increased visual field for *M. mopsessulanus*, improving the degree of binocular vision (Mangiaccotti *et al.*, 2014), thereby increasing its depth perception. Binocular vision (and concomitant change in head shape) has been associated with other snakes that rely on visual cues to orient, such as those that are arboreal (Lillywhite & Henderson, 1993).

REFERENCES

- Barti, L., Péter, Á., Csősz, I. & Sándor, A.D. 2019. Snake predation on bats in Europe: new cases and a regional assessment. *Mammalia*, Retrieved 5 Sep. 2019, from doi:10.1515/mammalia-2018-0079.
- De Haan, C.C. 1999. Die Europäische Eidechsen natter *Malpolon mopsessulanus* (Hermann, 1804). 661-756. In: Bohme, W. (ed). *Handbuch der Reptilien und Amphibien Europas, Vol. 3/IIA, Serpentes II: Colubridae 2*. Aula-Verlag, Wiesbaden.
- Ehrlich, P.R. & Ehrlich, A.H. 1982. Lizard predation on tropical butterflies. *Journal of the Lepidopterists Society*, 36(2): 148-152.
- Esbérard, C.E. & Vrcibradic, D. 2007. Snakes preying on bats: new records from Brazil and a review of recorded cases in the Neotropical Region. *Revista Brasileira de Zoologia*, 24(3): 848-853.
- Lillywhite, H.B. & Henderson, R.W. 1993. Behavioral and functional ecology of arboreal snakes. 1-48. In: Seigel, R.A. & Collins, J.T. (eds.). *Snakes: ecology and behavior*. New York: McGraw-Hill.
- López-Jurado, L.F. & Dos Santos, L. 1979. Datos complementarios sobre la alimentación de *Malpolon mopsessulanus*. *Doñana, Acta Vertebrata*, 6(1): 119-120.
- Mangiaccotti, M., Limongi, L., Sannolo, M., Sacchi, R., Zuffi, M.A. & Scali, S. 2014. Head shape variation in eastern and western Montpellier snakes. *Acta Herpetologica*, 9(2): 167-177.
- Mellado, J. 1974. *Malpolon mopsessulanus* alimentándose de saltamontes (*Anacridium* sp.). *Doñana, Acta Vertebrata*, 1(1): 55.
- Pleguezuelos, J.M. 2017. Culebra bastarda - *Malpolon mopsessulanus*. In: Salvador, A. & Marco, A. (eds.). *Enciclopedia Virtual de los Vertebrados Españoles*. Museo Nacional de Ciencias Naturales, Madrid. <<http://www.vertebradosibericos.org/>>.
- Remsen Jr, J.V. & Robinson, S.K. 1990. A classification scheme for foraging behavior of birds in terrestrial habitats. *Studies in Avian Biology*, 13: 144-160.
- Valverde, J.A. 1967. Estructura de una comunidad de vertebrados terrestres. *Monografías de la Estación Biológica de Doñana*, 1: 1-218.
- Vericad, J.R. & Escarré, A. 1976. Datos de alimentación de ofidios en el Levante sur ibérico. *Mediterránea*, 1: 5-33.