

## An “upside-down” juvenile slow-worm (*Anguis fragilis*): could this be a thermophilic behaviour?

ELLIOTT LEWIS HAILS<sup>1\*</sup> & COLIN THOMAS STRINE<sup>2</sup>

<sup>1</sup>EAD Ecology, Exeter, U K.

<sup>2</sup>Suranee University of Technology, Nakhon Ratchasima, Thailand.

\*Corresponding author Email: elhails01@gmail.com

During a routine reptile survey on 4 July 2016 at 12:45 hrs, we found two adult and five juvenile slow-worms *Anguis fragilis* motionless beneath an artificial refuge (roofing felt, 0.5 m<sup>2</sup>). One of the juveniles was in a partially “upside-down” position. The posterior ventral and subcaudal scales were facing upwards, as shown in Fig. 1. The juvenile remained in this position for approximately 10 seconds before slowly retreating into adjacent vegetative cover. The observation was made within the district of Torquay, Devon, England (alt. 102 m) although the exact location has been withheld because of confidentiality issues. The habitat was classified as semi-improved neutral grassland with sections of ruderal vegetation, hard standing and semi-natural broadleaved woodland in the wider area (JNCC, 2010). The refuge had been approached slowly and quietly in an attempt to minimise disturbance to any reptiles in the area.

It is possible that the individual was flipped over in the motion of lifting the refuge. The roofing felt that is commonly used in reptile surveys can become adhesive in hot conditions. If the adhesive strength of this was strong enough to invert an individual, it seems plausible that this would be strong enough to restrain an individual, something that would present a problem to current UK practices. As the individual remained motionless for an extended period, it would appear to be undisturbed, so this is considered to be an unlikely explanation.

Slow-worms, like most reptiles, are ectothermic, requiring an external heat source to meet their temperature requirements. However slow-worms are most commonly found under refugia, rarely basking in exposed areas (Beebee and Griffiths, 2000). Under refugia they maintain body contact with the warm surface as a means of thermoregulation, making the use of artificial refugia (typically corrugated iron and roofing felt) a useful tool for surveying as they absorb and retain heat quickly (Reading 1996, Platenberg, 1999, Hubble & Hurst, 2006).

This thermoregulatory function of refugia provides a potential explanation for the inverted posture described here. A study of thermoregulation in melanistic *Vipera berus* found that the monitored individuals were able to heat faster than normally pigmented individuals (Forsman, 1995). The juvenile we observed had black ventral and subcaudal scales with a copper coloured dorsum, so possibly it might have been able to increase its temperature faster or maintain a high body temperature more effectively if these were positioned towards the external heat source.



Figure 1. An inverted juvenile and adult *A. fragilis*.

This hypothesis is sufficiently intriguing to warrant further investigation.

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