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The larva of *Tricholeon relictus* Hölzel & Monserrat, 2002 a synanthropic antlion (Neuroptera, Myrmeleontidae)

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Abstract

The larva of *Tricholeon relictus*, a Spanish endemic antlion of Afrotropical affinities, is described and illustrated for the first time also providing a comparison with the only other European member of the tribe Dendroleontini, *Dendroleon pantherinus*. The larva of this species is synanthropic but probably originally lived in cave-like habitats.

Key words: larval morphology, Neuropterida, Myrmeleontiformia, Mediterranean, Iberian peninsula

Introduction

The tribe Dendroleontini Banks, 1899 includes 35 genera of antlions distributed in Eurasia, Africa and Australia, where its maximum diversity is attained, but comprising very few species in North America (Stange 2004). Exclusively two species belonging to this group are reported for Europe: *Dendroleon pantherinus* (Fabricius, 1787), an Eurosibirian faunal element, and *Tricholeon relictus* Hölzel & Monserrat, 2002, a rare and recently discovered species only known for southern Spain (Hölzel & Monserrat 2002; Monserrat 2010; Monserrat & Acevedo 2011; Monserrat & Triviño 2013). The latter is undoubtedly the most interesting European antlion for a biogeographical point of view, as the genus *Tricholeon* Esben-Petersen, 1925 comprises only two other described species, both limited to southern Africa: *T. hirtellus* Esben-Petersen, 1925 and *T. nigripes* Kimmins, 1948 (Mansell 1988, 2000; Stange 2004). The members of this genus are average sized antlions with a mimetic body colouring, whose larval stages are closely associated with cave mouths and rock overhangs.

Mediterranean – southern Africa disjunctions in distribution are well documented for many animal and plant groups and probably imputable to periods of homogeneous climatic and environmental conditions between these regions, before the progressive desertification of the African continent (Bologna *et al.* 2008, Kirk-Spriggs & McGregor 2009). Most Mediterranean genera of Myrmeleontidae and in a few cases even species (e. g. *Nemoleon notatus* Rambur) are shared with the Afrotropical region, where they normally reach their maximum diversity and probably take origin. Nevertheless this type of disjunct distribution pattern is rare among antlions and only reported for *Tricholeon* and very recently *Solter*, despite the latter also penetrates in the northern part of the Afrotropical region (Mansell 2013), while the other genera are considerably more widespread.

The southernmost part of the Iberian Peninsula also represented a primary refuge for numerous animals and plants species during the Pleistocene glaciations (Hewitt 1993, 1996, 1999) and the present distribution of *T. relictus* indeed suggests that it is a remnant of former warmer climates which persisted in this area; its cave-dwelling habits may have contributed to its survival during the most extreme glacial periods.

Mansell (1988) revised the two southern African species, detailing their larval morphology and ecology, while the larva of *T. relictus* is described for the first time in the present work.

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despite its presence there is actually possible, especially in the northern half, as suggested by the presence of this species in Mediterranean woody biotopes in Italy (Badano & Pantaleoni 2014; Badano pers. obs.). The larva of this species remained poorly known despite its early description (Brauer 1867) and it has been deeply treated only recently by Badano & Pantaleoni (2014). As underlined above, the larvae of *T. relictus* and *D. pantherinus* are noticeably similar in overall morphology, differing in relatively minor details. *D. pantherinus* is a proportionally larger species than *T. relictus* and it is also evident in the dimensions of the larvae (Table 1). *T. relictus* is instead characterized by comparatively stouter jaws. In *D. pantherinus*, one interdental mandibular seta is present between the median and apical teeth (Fig. 5) while it is always absent in *T. relictus*. Regarding body colouring both species are very pale, whitish antlion larvae but in *D. pantherinus* the head capsule is much more pigmented, with a typical reddish hue (Figs. 5, 6) while *T. relictus* shows median dark markings in the anterior part (Fig. 2). The colour of the setae is diagnostic: in *D. pantherinus* all the setae of the body are blackish, while in *T. relictus* the stouter setae on the dorsal side of the body and on the setiferous processes are black but the hair like setae (mainly ventro-lateral in position) are pale brown; this difference is immediately evident observing the tuft of hair-like setae on the mesonotum: black in the first species (Fig. 5) and pale brown in the second (Fig. 2). On the contrary, IX urite does not show remarkable differences between the two species (Figs. 4, 7).

From an ecological point view both species are specialized sit-and-wait predators in dark, protected environments. *D. pantherinus* is typically associated with tree holes but it is also able to colonize different micro-habitats, including human buildings (Gepp 2010; Badano & Pantaleoni 2014); as other species of *Dendroleon* are also cave dwellers (Stange *et al*. 2003) the larvae of this antlion may be at least potentially found in caves or similar environments.

Conclusion

The systematics of the genera of Dendroleontini is particularly complex and the placement of some genera is unclear (Stange 2004). Stange (1994, 2004) re-defined the tribe mainly on larval morphology, underlining the importance of some apomorphic characters, in particular the tuft of setae on mesonotum which is exclusive of this group. Nevertheless the larvae are exclusively known for a minority of genera and some of them are not even equipped with this peculiar structure, thus resembling those of Nemoleontini, implying the necessity of additional studies. The genus *Tricholeon* is a typical member of the tribe and it is particularly close to *Dendroleon* as suggested by both adult and larval characters and the larva of *T. relictus* further corroborates a strict relationship between these two genera. The known larvae of most Dendroleontini appear to be associated with dark and sheltered habitats, such as tree holes, rock overhangs and caves, (Badano & Pantaleoni 2014; Mansell 1988, 2000; Stange, 2004; Stange *et al*. 2003) potentially allowing them to colonize buildings as documented in *Dendroleon* and *Tricholeon*. Ultimately the cave-dwelling habits of the larva of *T. relictus* probably contributed not only to survive during adverse climatic events of the past but also to colonize the new habitats created by the anthropic activity of the present.

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References

Badano, D. & Pantaleoni, R.A. (2014) The larvae of European Myrmeleontidae. *Zootaxa,* 3762 (1), 1–71. http://dx.doi.org/10.11646/zootaxa.3762.1.1

Bologna, M.A., Audisio, P.A., Biondi, M. & Casale A. (2008) The biogeographical patterns of disjunct distribution with special emphasis on the Mediterranean and southern African model. *Biogeographia, Lavori della Società Italiana di Biogeografia*, 29, 7–17.

Brauer, F. (1867) Beschreibung und Verwandlung des *Dendroleon pantherinus* Fbr. und Vergleich der bis jetzt bekannten

Myrmeleoniden- und Ascalaphiden-Larven. *Verhandlungen der Kaiserlich-Königlichen Zoologisch-Botanischen Gesellschaft in Wien*, 17, 963–966.

Gepp, J. (2010) *Ameisenlöwen und Ameisenjungfern. Myrmeleontidae. Eine weltweite Betrachtung unter besonderer Berücksichtigung Mitteleuropas. 3., neubearbeitete Auflage.* Die Neue Brehm-Bücherei 589. Westarp Wissenschaften-Verlagsgesellschaft, Hohenwarsleben, Germany, 168 pp.

Hewitt, G.M. (1993) Post-glacial distribution and species substructure: lessons from pollen, insects and hybrid zones. *In*: Lees, D.R. & Edwards, D. (Eds.), *Evolutionary Patterns and Processes. Linnean Society Symposium Series*. Academic Press, London, 14, pp. 97–123.

Hewitt, G.M. (1996) Some genetic consequences of ice ages, and their role in divergence and speciation. *Biological Journal of the Linnean Society,* 58, 247–276.
http://dx.doi.org/10.1111/j.1095-8312.1996.tb01434.x

Hewitt, G.M. (1999) Post-glacial re-colonization of European biota. *Biological Journal of the Linnean Society*, 68, 87–112.
http://dx.doi.org/10.1111/j.1095-8312.1999.tb01160.x

Hölzel, H. & Monserrat, V.J. (2002) *Tricholeon relictus* nov. sp. - ein neuer europäischer Ameisenlöwe (Neuropterida: Neuroptera: Myrmeleontidae). *Linzer Biologische Beitrage*, 34, 1151–1154.

Kirk-Spriggs, A.H. & McGregor, G.K. (2009) Disjunctions in the Diptera (Insecta) fauna of the Mediterranean Province and southern Africa and a discussion of biogeographical considerations. *Transactions of the Royal Society of South Africa*, 64 (1), 32–52.
http://dx.doi.org/10.1080/00359190909519236

Mansell, M.W. (1988) The Myrmeleontidae (Neuroptera) of southern Africa: Genus *Tricholeon* Esben-Petersen. *Neuroptera International*, 5, 45–55.

Mansell, M.W. (2000) Neuroptera (Insecta). *In*: Kirk-Spriggs, A.H. & Marais, M. (Eds.), *Dâures-biodiversity of the Brandenberg Massif, Namibia*. *Cimbebasia Memoir*, 9, 163–176.

Mansell, M. (2013) First record of the genus *Solter* Navás from southern Africa, with description of a new species (Neuroptera: Myrmeleontidae: Myrmecaelurini). *Zootaxa,* 3731 (3), 381–385.
http://dx.doi.org/10.11646/zootaxa.3731.3.7

Monserrat, V.J. (2010) Nuevas o interesantes citas de neurópteros en la Península Ibérica (Insecta: Neuroptera), *Heteropterus Revista de Entomologia*, 10 (1), 19–34.

Monserrat, V.J. & Acevedo, F. (2011) Nuevos datos sobre las hormigas león de la Península Ibérica (Insecta: Neuroptera): Myrmeleontidae. *Heteropterus Revista de Entomología,* 11 (1), 123–136.

Monserrat, V.J. & Triviño, V. (2013) Atlas de los neurópteros de la Peninsula Iberica e Islas Baleares (Insecta, Neuroptera, Megaloptera, Raphidioptera, Planipennia). *Monografias S.E.A.*, 13, 1–154.

Stange, L.A. (1994) Reclassification of the New World antlion genera formerly included in the tribe Brachynemurini (Neuroptera: Myrmeleontidae). *Insecta Mundi*, 8, 67–119.

Stange, L.A. (2004) A systematic catalog, bibliography and classification of the world antlions (Insecta: Neuroptera: Myrmeleontidae). *Memoirs of the American Entomological Institute*, 74, 1–565.

Stange, L.A., Miller, R.B. & Wang, H.-Y. (2003) *Identification and biology of Myrmeleontidae (Neuroptera) in Taiwan*. I-Lan County Museum of Natural History, Taipei, Taiwan, 160 pp.