Acarologia 53(4): 425–427 (2013)
DOI: 10.1051/acarologia/20132106

NOTES ON THE GENUS *BERONIUM* (ACARI, EUTROMBIDIINAE) ENLIGHTENED BY NEW CAPTURES OF *BERONIUM LAEMOSTENIS* IN SPAIN

Jaime G. MAYORAL

(Received 14 May 2013; accepted 11 July 2013; published online 19 December 2013)

Dpto. Biología y Geología. CITE II-B. Universidad de Almería, 04120, Almería, Spain. jgmayoral@hotmail.com

ABSTRACT — The genus *Beronium* encompasses only three species, one described from Morocco, one from the Canary Islands and another from the south-east of the Iberian Peninsula. Each of these species was reported from a single location, their type localities. Captures in six new locations, all caves, are reported for one of the species, *Beronium laemostenis* Mayoral and Barranco 2005, previously considered endemic to a single cave in the south of Spain. Of the fifty larvae studied, a single teratological case in the second dorsal sclerite is reported and illustrated. Comments on the morphology, host specificity and distribution in caves for the genus *Beronium* are provided.

KEYWORDS — *Beronium laemostenis*; Spain; Andalusia; teratology; cave

INTRODUCTION

The genus *Beronium* was erected by Southcott (1986) in order to accommodate the species *Hoplothrombium coiffaiti* (Beron, 1973); this species was captured from the cave Jebel El Ouad in Morocco as a parasite of the carabid beetle *Laemostenus kolbi* (Coiffait, 1972). Two additional species have been described as belonging to the genus, *Beronium veronicae* Haitlinger (1994) from Tenerife (Canary Islands) captured parasitizing *Licinopsis alternans* (Dejean,1828), and *Beronium laemostenis* Mayoral and Barranco, 2005 described from Cueva Larga cave in Almeria (Spain) also a parasite of a carabid beetle, *Laemostenis barrancoi* Mateu, 1996. All these species have been described only in their larval stages.

In the following report, mites parasitizing beetles from six caves in three provinces of Andalusia (Spain) are studied. These captures are in the frame of a grant subsidized by the Environmental Protection Agency of Andalusia (Southern Spain) which aims to characterize the arthropod-fauna inhabiting the caves of the south of Spain in order to protect those enigmatic and threatened species.

MATERIAL AND METHODS

All the carabids hosting parasitic mites were captured using pit-fall type traps in different caves in the south of Spain. Parasites were removed in the laboratory under the microscope. Specimens were cleared in 50 % lactic acid and mounted on slides with PVA medium using a Nikon Optiphot-2 compound microscope.

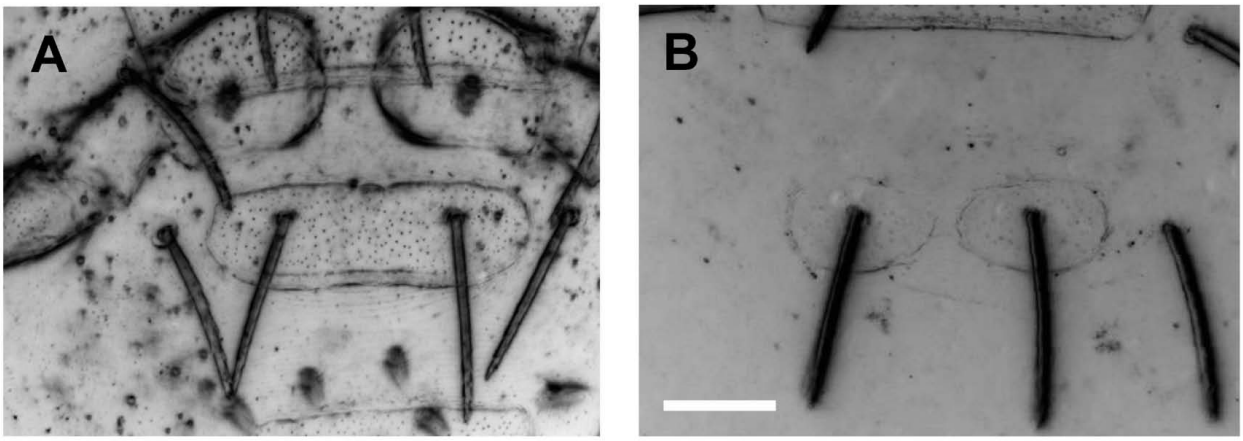

FIGURE 1: *Beronium laemostenis* Mayoral and Barranco 2005, with abnormal second dorsal sclerite. A – normal, B – teratological. Scale bar: 60 μm.

MATERIAL STUDIED

Cadiz: 5 larvae. Cueva de Berrueco. T.M. Ubrique-Cortes de la Frontera, Cadiz, Spain. 12-IX-2009. GIEX leg. On Carabidae (R296A-E). 1 larva. Cueva de Motilla Paralejo. Complejo Motillas. T.M. Jerez-Cortes de la Frontera, Cadiz, Spain. 8-XI-2009. GIEX leg. (R297). 1 larva. Cueva Berrueco. Ubrique-Cortes de la Frontera, Cadiz, Spain. 7-XI-2009. GIEX leg. (R298).

Jaen: 12 larvae. Sima Curva del Espino. Pozo Romero. T.M. Siles, Jaen, Spain. 7-IX-2009. GEV leg. (R299A-L). 20 larvae. Sima Curva del Espino. Pozo Romero. T.M. Siles, Jaen, Spain. 7-IX-2009. GEV leg. On *Laemostenis* (*Antisphodrus*) sp. (R300A-P). 1 larva. Sima de los 30 años. Cerro de Bucentaina. T.M. Siles, Jaen, Spain. 8-IX-2009. GEV leg. (R301). 4 larvae. Sima Curva del Espino. Pozo Romero. T.M. Siles, Jaen, Spain. 16-I-2010. GEV leg. (R302A-D).

Almeria: 3 larvae. Cueva del Lago. Sierra Cabrera, T.M. Turre, Almeria, Spain. 11-XII-2009. ECA leg. On *Laemostenis* (*Antisphodrus*) sp. (R303A-C). 3 larvae. Covadura, T.M. Sorbas (Almeria). Spain. Ruiz-Portero, C. leg. 20-III-2002. (R324A-C).

RESULTS AND DISCUSSION

Fifty larval mites of *Beronium laemostenis* were found parasitizing Carabidae or free-living in caves of Andalusia. The morphometric data and chaetotaxia are identical to those 14 specimens previously described as been parasites of the carabid *L. barrancoi* from Cueva Larga (prov. Almeria) (Mayoral and Barranco, 2005). The key characters which separate this species from the other two in the genus are the presence of seven normal setae on tibia I and the presence of one solenidion on genua III (Mayoral and Barranco, 2005). These distinctive characters are conserved in the *B. laemostenis* specimens from the new locations. In addition to those aforementioned, other characters are also well conserved in all specimens. We have found only one abnormal specimen out of the fifty larvae studied; this abnormality was present on the second dorsal sclerite. This is normally a single and continuous plate that bears two setae (Fig.1A); in this specimen, the sclerite has been reduced and it is medially split in two, each part bearing a single seta (Fig.1B); however, its overall chateotaxia and measurements are identical to the other 49 specimens.

These new captures expand the known distribution of *B. laemostenis* from a unique cave in Almeria (the type locality, Cueva Larga) to a total of seven locations; two additional caves in Almeria, two new locations in Jaen, and also two new locations in Cadiz. The new data shows a wide distribution of *B. laemostenis* throughout Andalusia. Previously, Mayoral and Barranco (2005) pointed out the absence of eyes in this species, which is a character typically

found in troglobite species.

Beronium coiffaiti is another species solely found in caves. Southcott (1986) stated about this species, "from its lack of eyes one may deduce that it is probably a well-adapted cavernicolous species". In fact, all of the three members of the genus lack eyes. Anophthalmia is a character found in cave-dwelling arthropods (troglobites) as an adaptation to low-light habitats. However, it is unclear whether this is the case for this genus of mites since the third species *B. veronicae* was captured outside of caves, despite the fact that Haitlinger (2004) described this species with "eyes absent". The description of further hypogeal and epigeal species in the genus will clarify whether the presence of eyes is either a generic character or indicative of an adaptation to live in low-light environments.

The three species of the genus show a high host-specificity. The specimens of *Beronium* spp. found parasiizing a host were captured on beetles of the family Carabidae, subfamily Platyninae Bonelli, 1810, tribe Sphodrini Laporte, 1834, subtribe Sphodrina Laporte, 1834. *Beronium coiffaiti* and *B. laemostenis* were found on members of the genus *Laemostenus* (but in a different subgenera, *Ceuthosthenes* Antoine, 1957 and *Antisphodrus* Schaufuss, 1865), and *B. veronicae* was parasitizing a member of the genus *Licinopsis* Bedel, 1899. The distribution of the hosts *Laemostenus barrancoi* and *Laemostenus kolbi* is also singular and restricted to caves; *L. barrancoi* is known from its type locality, Cueva Larga, and two nearby caves BC-4 and Sima de Pedro Navarro. *L. kolbi* was known from a single cave in Morocco, but recently reported from two other Moroccan caves (Casale and Comas, 2012). Unfortunately, no parasites were found on these new specimens (Dr. Casale, personal communication). The restricted distribution of these two species of *Laemostenus* suggests that they could have searched for refuge in caves; and if this is the case, it is likely that the host and the parasite arrived simultaneously at the caves. Interestingly, the host of *B. laemostenis* in "Cueva del Lago", Almeria (one of the new locations reported here for the species) represents a new species of the genus *Laemostenis* (*Antisphodrus*) and it is currently being described (Drs. Ortuño and Barranco, personal communication). In the Canary Islands, *L. alternans*, host of *B. veronicae*, was not found in caves and as it was highlighted above, further data is needed to understand the morphology and life history of this scarce genus of parasites.

ACKNOWLEDGEMENTS

I thank Dr. Pablo Barranco and Solomon Osei-Amo for their comments on the final version of the MS. I would like to thank the three speleology clubs that sampled the caves: ECA (from Almeria), GEV (from Jaen) and GIEX (Cadiz). Also, I thank the institutions that provided funding to do the field work: FEADER (EEC) and "Consejeria de Medio Ambiente de la Junta de Andalucia" (Environmental Protection Agency in Andalusia).

REFERENCES

Beron P. 1973 — Une nouvelle larve d'Acarien (*Hoplothrombium coiffaiti* sp. n., Trombidiidae), parasite d'un coléoptère cavernicole du Maroc — Annales de Speleology, 28: 413-416.

Casale A., Comas J. 2012 — New or little known *Laemostenus* species from southern Spain and Morocco (Coleoptera: Carabidae: Sphodrini) — Heteropterus, Revista de Entomologia, 12: 173-182.

Haitlinger R. 1994 — Four new larval mites (Acari: Trombidiidae: Eutrombidiidae) ectoparasitic on carabids (Insecta: Coleoptera: Carabidae) — Revista Chilena de Entomologia, 21: 47-56.

Haitlinger R. 1997 — A new species of *Hexathrombium* Cooreman, 1944 based on parasitic larva on Erotylids from Brazil (Acari: Eutrombidiidae) — Memórias do Instituto Oswaldo Cruz, 92: 81-83. doi:10.1590/S0074-02761997000100015

Mayoral J.G., Barranco P. 2005 — A new larval mite *Beronium laemostenis* sp. nov (Acari: Eutrombidiidae host on a troglobius beetle from Spain — Biología, 60: 113-119.

Southcott R.V. 1986 — Studies on the taxonomy and biology of the subfamily Trombidiinae (Acarina: Trombidiinae) with a critical revision of the genera — Australian Journal of Zoology: 123: 1-116.

COPYRIGHT