Zootaxa 3745 (5): 533–550
www.mapress.com/zootaxa/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

http://dx.doi.org/10.11646/zootaxa.3745.5.3
http://zoobank.org/urn:lsid:zoobank.org:pub:E6FBA088-D1B5-4F57-9DBC-C53BBE0DB48D

Stictonectes abellani sp. n. (Coleoptera: Dytiscidae: Hydroporinae) from the Iberian Peninsula, with notes on the phylogeny, ecology and distribution of the Iberian species of the genus

ANDRÉS MILLÁN[1], FÉLIX PICAZO[1], HANS FERY[2], JOSÉ LUIS MORENO[3] & DAVID SÁNCHEZ-FERNÁNDEZ[1, 4]

[1] *Departamento de Ecología e Hidrología, Facultad de Biología, Universidad de Murcia. Campus de Espinardo, E-30100 Murcia, Spain. E-mail: acmillan@um.es*

[2] *Räuschstr. 73, D-13509 Berlin, Germany. E-mail: hanfry@aol.com*

[3] *Centro Regional de Estudios del Agua (CREA), Ctra. de las Peñas km 3, E-02071 Albacete, Spain*

[4] *Institut de Biologia Evolutiva (CSIC-Universitat Pompeu Fabra), Passeig Maritim de la Barceloneta, 37–49, E-08003 Barcelona, Spain*

Abstract

Stictonectes abellani sp. n. is described from the Iberian Peninsula. On average, the new species is larger and the colouration of the upper surface darker than in most other species of the genus. Seemingly the species has been confounded with others in the past, particularly *S. optatus* (Seidlitz, 1887). Males can be separated from externally similar species by studying the shape of the parameres. Additionally, the anterior margin of the clypeus is provided with a distinct rim in both sexes, which is absent or only weakly present in other species. The habitus and the male genitalia of the new species are illustrated, and compared with those of *S. optatus*. External morphological differences from other members of the genus are discussed. According to studies of the molecular phylogeny, based on fragments of four mitochondrial genes, *S. abellani* sp. n. is clearly separated from previously described species of *Stictonectes* Brinck, 1943, apparently being relatively basal within the genus. The new species is rather widely distributed in the south-western part of the Iberian Peninsula, inhabiting pools in small temporary siliceous streams. We provide distributional maps for all eight Iberian *Stictonectes* and estimate the potential distributional areas of the new species and the other two endemic Iberian species *S. occidentalis* Fresneda & Fery, 1990 and *S. rebeccae* Bilton, 2011, based on environmental niche modelling.

Key words: Dytiscidae, Hydroporinae, *Stictonectes*, new species, Iberian Peninsula, molecular phylogeny, distribution models

Introduction

The genus *Stictonectes* Brinck, 1943 consists of 12 species (including the one described here), all of which are restricted to the western Mediterranean and Macaronesian regions (Bilton 2011; Nilsson & Hájek 2013). The Iberian Peninsula harbours eight of these species, three of which are endemic. *Stictonectes epipleuricus* (Seidlitz, 1887)—mainly distributed in the Iberian Peninsula—is also recorded from the south of France and therefore cannot be considered as a true Iberian endemic. Species of the genus are rather similar externally and even the shape of the male genitalia is of little help if it is not very accurately studied—this all making a reliable identification difficult. In order to identify individual specimens it is mainly necessary to study the dorsal colour pattern, the dorsal and ventral punctation and the shape of the male parameres. In general, *Stictonectes* species have similar habitat preferences, it being common to find more than one species of this genus living together in the same locality; something that can additionally complicate their identification.

In this work we describe a new species which, surprisingly, shows a wide distribution across the south-western part of the Iberian Peninsula. It has probably remained undetected due to its external similarity to *S. optatus* (Seidlitz, 1887), which often co-occurs with the new species. In addition, we include a molecular phylogeny showing the relationships between the new species and all other members of the genus. Finally, based on known

Accepted by M. Toledo: 18 Nov. 2013; published: 9 Dec. 2013

distribution of the new species and other members of the genus in order to get more accurate information about their degree of vulnerability.

Acknowledgements

Andrés Mellado provided the material of the new species from Portugal. Ignacio Ribera (Barcelona, Spain) supplied mitochondrial DNA sequence data and constructed the phylogeny presented here. Pedro Abellán (Murcia, Spain), David Bilton, Ignacio Ribera and Josefa Velasco (Murcia, Spain) gave valuable comments on an earlier version of this work. David Bilton also revised the English language. Félix Picazo was funded by a "Fundación Séneca" predoctoral grant from the Murcia Region Agency for Science and Technology and David Sánchez-Fernández was supported by the "Juan de la Cierva" program from the Spanish Ministry of Economy and Competitiveness. This work was funded by the Ministry of Environment, project 23/2007 (with Andrés Millán as PI).

References

Abellán, P., Sánchez-Fernández, D., Picazo, F., Millán, A., Lobo, J.M. & Ribera, I. (2013) Preserving the evolutionary history of freshwater biota in Iberian National Parks. *Biological Conservation*, 62, 116–126. http://dx.doi.org/10.1016/j.biocon.2013.04.001

Aragón, P., Baselga, A. & Lobo, J.M. (2010) Global estimation of invasion risk zones for the western corn rootworm *Diabrotica virgifera virgifera*: integrating distribution models and physiological thresholds to assess climatic favourability. *Journal of Applied Ecology*, 47, 1026–1035. http://dx.doi.org/10.1111/j.1365-2664.2010.01847.x

Basille, M., Calenge, C., Marboutin, E., Andersen, R. & Gaillard, J.M. (2008) Assessing habitat selection using multivariate statistics: some refinements of the ecological-niche factor analysis. *Ecological Modelling*, 211, 233–240. http://dx.doi.org/10.1016/j.ecolmodel.2007.09.006

Beaumont, L.J., Hughes, L. & Poulsen, M. (2005) Predicting species distributions: use of climatic parameters in BIOCLIM and its impact on predictions of species' current and future distributions. *Ecological Modelling*, 186, 250–269. http://dx.doi.org/10.1016/j.ecolmodel.2005.01.030

Bilton, D.T. (2011) *Stictonectes rebeccae* sp. n. from the Iberian Peninsula, with notes on its phylogenetic position (Coleoptera, Dytiscidae). *Zootaxa*, 3188, 42–54.

Etherington, T.R., Ward, A.I., Smith, G.C., Pietravalle, S. & Wilson, G.J. (2009) Using the Mahalanobis distance statistic with unplanned presence-only survey data for biogeographical models of species distribution and abundance: a case study of badger setts. *Journal of Biogeography*, 36, 845–853. http://dx.doi.org/10.1111/j.1365-2699.2008.02041.x

Farber, O. & Kadmon, R. (2003) Assessment of alternative approaches for bioclimatic modelling with special emphasis on the Mahalanobis distance. *Ecological Modelling*, 160, 115–130.

Fery, H. & Fresneda, J. (2007) Los "Hydradephaga" (Coleoptera: Dytiscidae, Gyrinidae, Haliplidae, Noteridae, Paelobiidae) de la Península Ibérica e Islas Baleares de las colecciones J. Fresneda y H. Fery. *Boletín de la Sociedad Entomológica Aragonesa*, 41, 119–171.

Franciscolo, M. (1979) *Coleoptera-Haliplidae, Hygrobiidae, Gyrinidae, Dytiscidae. Fauna d'Italia*. Vol. XIV. Edizioni Calderini, Bologna, 804 pp.

Fresneda, J. & Fery, H. (1990) *Stictonectes occidentalis* n. sp. vom Südwesten der iberischen Halbinsel (Coleoptera: Dytiscidae). *Entomologische Zeitschrift*, 100 (5), 73–83.

Grasso, D. (1983) Osservazioni sugli *Stictonectes* interessanti la fauna italiana (Coleoptera: Dytiscidae). *Annali del Museo Civico di Storia Naturale Giacomo Doria, Genova*, 84 (1982–1983), 425–434.

Guignot, F. (1947) Coléoptères hydrocanthares. *Faune de France*, 48, 1–287.

Guignot, F. (1959) Revision des hydrocanthares d'Afrique (Coleoptera Dytiscoidea). 2. *Annales du Musée Royal du Congo Belge, Tervuren (Belgique), Série 8vo, Sciences Zoologiques*, 78, 321–648.

Hernández, P.A., Franke, I., Herzog, S.I., Pacheco, V., Paniagua, L., Quintana, H.L., Soto, A., Swenson, J.J., Tovar, C., Valqui, T.H., Vargas, V. & Young, B.E. (2008) Predicting species distributions in poorly-studied landscapes. *Biodiversity & Conservation*, 17, 1353–1366. http://dx.doi.org/10.1007/s10531-007-9314-z

Hijmans, R.J., Cameron, S.E., Parra, J.L., Jones, P.G. & Jarvis, A. (2005) Very high resolution interpolated climate surfaces for global land areas. *International Journal of Climatology*, 25, 1965–1978. http://dx.doi.org/10.1002/joc.1276

Hirzel, A.H., Hausser, J., Chessel, D. & Perrin, N. (2002) Ecological-niche factor analysis: how to compute habitat suitability maps without absence data? *Ecology*, 83, 2027–2036.
http://dx.doi.org/10.2307/3071784

Jiménez-Valverde, A., Lobo, J.M. & Hortal, J. (2008) Not as good as they seem: the importance in concepts in species distribution modelling. *Diversity and Distributions*, 14, 885–890.
http://dx.doi.org/10.1111/j.1472-4642.2008.00496.x

Jiménez-Valverde, A., Peterson, A.T., Soberón, J., Overton, J., Aragón, P. & Lobo, J.M. (2011) Use of niche models in invasive species risk assessments. *Biological Invasions*, 13, 2785–2297.
http://dx.doi.org/10.1007/s10530-011-9963-4

Millán, A., Abellán, P., Sánchez-Fernández, D., Picazo, F., Velasco, J., Lobo, J.M. & Ribera, I. (2012) *Efectividad de la red de parques nacionales peninsulares en la conservación de la biodiversidad acuática*. *In*: Ramírez, L. & Asensio, B. (Eds.), *Proyectos de Investigación en parques nacionales: 2008–2011*. Madrid: Organismo autónomo de parques nacionales. EGRAF SA, pp. 151–181.

Nilsson, A.N. & Hájek, J. (2013) Catalogue of Palearctic Dytiscidae (Coleoptera). *Internet version 2013-01-01*. Available from: http://www2.emg.umu.se/projects/biginst/andersn/Cat_main.htm (accessed 15 September 2013)

Ribera, I. (2000) Biogeography and conservation of Iberian water beetles. *Biological Conservation*, 92, 131–150.

Ribera, I. (2003) Are Iberian endemics Iberian? A case-study using water beetles of family Dytiscidae (Coleoptera). *Graellsia*, 59 (2–3), 475–502.
http://dx.doi.org/10.3989/graellsia.2003.v59.i2-3.261

Ribera, I., Hernando, C. & Aguilera, P. (1999) An annotated checklist of the Iberian water beetles (Coleoptera). *Zapateri, Revista Aragonesa de Entomología*, 8 (1998), 43–111.

Sánchez-Fernández, D., Bilton, D.T., Abellán, P., Ribera, I., Velasco, J. & Millán, A. (2008a) Are the endemic water beetles of the Iberian Peninsula and the Balearic islands effectively protected? *Biological Conservation,* 141, 1612–1627.
http://dx.doi.org/10.1016/j.biocon.2008.04.005

Sánchez-Fernández, D., Lobo, J., Abellán, P., Ribera, I. & Millán, A. (2008b) Bias in freshwater biodiversity sampling: the case of Iberian water beetles. *Diversity and Distributions*, 14, 754–762.
http://dx.doi.org/10.1111/j.1472-4642.2008.00474.x

Sánchez-Fernández, D., Lobo, J.M., Abellán, P. & Millán, A. (2011a) How to identify future sampling areas when information is biased and scarce: an example using predictive models for species richness of Iberian water beetles. *Journal for Nature Conservation*, 19, 54–59.
http://dx.doi.org/10.1016/j.jnc.2010.05.003

Sánchez-Fernández, D., Lobo, J.M. & Hernández-Manrique, O.L. (2011b) Species distribution models that do not incorporate global data misrepresent potential distribution: a case study using Iberian diving beetles. *Diversity and Distribution,* 17, 163–171.
http://dx.doi.org/10.1111/j.1472-4642.2010.00716.x

Stamatakis, A., Hoover, P. & Rougemont, J. (2008) A rapid bootstrap algorithm for the RAxML web servers. *Systematic Biology*, 57, 758–771.

Velasco, J., Millán, A., Hernández, J., Gutiérrez, C., Abellán, P., Sánchez, D. & Ruiz, M. (2006) Response of biotic communities to salinity changes in a Mediterranean hypersaline stream. *Saline Systems*, 2, 12.

Zimmermann, A. (1932) Monographie der paläarktischen Dytisciden. III. Hydroporinae (3. Teil). *Koleopterologische Rundschau*, 18, 69–111.