

Distribution of *Laccobius a. atrocephalus* Reitter, 1872 and *L. a. ytenensis* Sharp, 1910 in the Iberian peninsula (Coleoptera, Hydrophilidae)

A. Millán, I. Ribera, G. N. Foster & J. J. Sánchez-Meca

Millán, A., Ribera, I., Foster, G. N. & Sánchez-Meca, J. J., 1997. Distribution of *Laccobius a. atrocephalus* Reitter, 1872 and *L. a. ytenensis* Sharp, 1910 in the Iberian peninsula (Coleoptera, Hydrophilidae). *Misc. Zool.*, 20.2: 113-117.

Distribution of Laccobius a. atrocephalus Reitter, 1872 and L. a. ytenensis Sharp, 1910 in the Iberian peninsula (Coleoptera, Hydrophilidae).— *Laccobius atrocephalus atrocephalus* is recorded for the first time in continental Europe, and *L. atrocephalus ytenensis* for the first time in North Africa. The subspecies was found in several localities in SE Spain, in coexistence with *L. atrocephalus ytenensis* (the European subspecies) in some of them. The detailed distribution of both subspecies in the Iberian peninsula is given.

Key words: Coleoptera, Hydrophilidae, *Laccobius atrocephalus*, Parapatric distributions, Iberian peninsula.

(*Rebut: 30 IV 97; Acceptació condicional: 14 VII 97; Acc. definitiva: 16 IX 97*)

A. Millán, Depto. de Ecología e Hidrología, Fac. de Biología, Univ. de Murcia, 30100 Murcia, España (Spain).- I. Ribera, Depto. de Biología Animal, Fac. de Biología, Univ. de Murcia, 30100 Murcia, España (Spain).- G. N. Foster, Environmental Sciences Dept., The Scottish Agricultural College, Auchincruive, Ayr KA6 5HW, Scotland, UK.- J. J. Sánchez-Meca, Apdo. de correos 5046, 30205 Cartagena, Murcia, España (Spain).

Introduction

Laccobius (Dimorpholaccobius) atrocephalus Reitter, 1872 was described from specimens collected in Ouahran, Algeria, and the typical form of the species has since been recorded in several localities in Morocco, Algeria, Tunisia, Libya, Egypt, Sudan, Israel, Syria, and Sicily (GENTILI & CHIESA, 1975; GENTILI, 1979).

Laccobius ytenensis Sharp, 1910 was described from three specimens taken in the New Forest, England. PEYERIMHOFF (1931) synonymised the species with *L. atrocephalus*, although according to GENTILI & CHIESA (1975) it is a well defined subspecies, both geographic and morphologically. *Laccobius ytenensis* has been recorded from most of Western Europe, but not from North Africa, where all forms were included under *L. atrocephalus atrocephalus* by GENTILI & CHIESA (1975).

The two subspecies can be clearly separated by the aedeagus, with the apex of the parameres short and straight in the nominal form, and elongated and with the apex curved inwards in the subspecies *ytenensis* (see figure 37 in GENTILI & CHIESA, 1975). According to the same authors, *Laccobius atrocephalus ytenensis* also has larger speculae and a darker general colour.

Laccobius canariensis d'Orchymont, 1940, an endemic of the Canary Islands, was considered to be a subspecies of *Laccobius atrocephalus* by GENTILI & CHIESA (1975), although BALKE et al. (1990) reinstated its specific status. It is not discussed further here.

Among material of *L. atrocephalus* from the Iberian peninsula some specimens of the nominal form were found in several localities in SE Spain, and typical specimens of *L. atrocephalus ytenensis* were found in Morocco. These are the first records of the nominal form in continental Europe, and of the subspecies *L. atrocephalus ytenensis* in Africa. The aim of this paper is to describe the detailed distribution of both taxa in the Iberian peninsula.

Material and methods

Male genitalia of the specimens were studied either in 70% alcohol or mounted in D.M.H.F. (dimethyl hydantoin formalde-

hyde). Material studied is deposited in the authors' collection: JJSM. J. J. Sánchez-Meca; IR. I. Ribera; GNF. G. N. Foster; AM. A. Millán.

Results

Material studied

Laccobius atrocephalus atrocephalus

Spain. Albacete: 3♂ 1 XI 1992, Riopar, río de la Vega, leg. JJSM (det. E. Gentili); 1♂ 2 III 1997, Paterna de Madera, río de los Endrinales, leg. AM & IR; 3♂ 2 III 1997, Paterna de Madera, spring by road CM3216, leg. AM & IR. Jaén: 1♂ 13 IV 1985, río Guadalbullón, leg. GNF & R. B. Angus; 1♂ 14 IV 1985 Puerto de Zagri, 1 km N de Venta de la Nava, leg. GNF & R. B. Angus. Málaga: 1♂ 6 I 1992, Cómpeeta, leg. GNF; 1♂ 16 IV 1985, Tolox, sur de río Grande, leg. GNF & R. B. Angus; 17 IV 1985 2♂, río Guadiara, leg. GNF & R. B. Angus.

Italy. Sicily: 1♂ 16 II 1988, Porto Empedocle, leg. M. D. Eyre.

Morocco: 9♂ 7♀ 29 III 1997, 30 km N of Taourirt, road S412, Oued Zebra, leg. IR, C. Hernando & P. Aguilera; 9♂ 20 VII 1997, Oued Ait-Baha, Ait-Baha, leg. AM, IR, C. Hernando & P. Aguilera.

Laccobius atrocephalus ytenensis

Only unpublished data are listed below.

Portugal. Algarve: 1♂ 5 VII 1986, Alijezur, leg. S. Bignal; 1♂ 4 I 1995, Fóia, leg. GNF; 1♂ 3 I 1995, Ribeira de Odeleuca, Sapeira, leg. GNF. Baixo Alentejo, 1♂ 5 VII 1986, Setubal, S of Marateca, leg. S. Bignal (recorded in GENTILI, 1988 with no specification of the ssp.).

Spain. Albacete: 1♂ 1 XI 1992, Riopar, río de la Vega, leg. JJSM; 1♂ 16 III 1997, Paterna de Madera, río de los Endrinales, leg. AM & IR; 3♂ 2 III 1997, Paterna de Madera, spring by road CM3216, leg. AM & IR. Badajoz: 1♂ 18 IV 1985, Monasterio, río Cala, leg. GNF & R. B. Angus (recorded in GENTILI, 1988 with no specification of the ssp.). Barcelona: 3 specimens 17 XI 1988, Campins, riera de les Canals, leg. IR (recorded in ISART et al., 1989 with no specification of the ssp.); 1♂ 2♀ 24 IV 1994, Castellfollit de Riubregós, Torrent Bó, leg. IR

& P. Aguilera; 1♂ 29 IX 1988, Matagalls, Coll Formic, leg. IR (recorded in ISART et al., 1989 with no specification of the spp); 1♂ 1 IV 1995, Saldes, Can Faldella, leg. IR & P. Aguilera. Cádiz: 1♂ 17 IV 1985, Tarifa, leg. GNF & R. B. Angus. Cantabria: 1♂ 8 VI 1990, Valle de Cabucraiga, leg. GNF; 1♂ 1♀ 11 VI 1990, Puerto de Palomera, leg. GNF. Girona: Cantallops, 1♂ 2♀ 12 XI 1994, riera de Fontdecà, leg. IR & P. Aguilera; 1♂ 2♀ 30 VI 1990, 44 specimens 28 VII 1990, 12 specimens 25 VIII 1990, 1 specimen 28 X 1990, 2♀ 25 XI 1990, 4 specimens 11 XI 1993, 1♂ 3♀ 11 XII 1993, 4 specimens 8 I 1994, 4♂ 4♀

19 II 1994, 1♂ 3♀ 19 III 1994, 1♂ 5♀ 16 IV 1994, 12 specimens 12 VI 1994, 7♂ 3♀ 9 VII 1994, 1♂ 15 X 1994, 1♂ 12 XI 1994, 2 specimens 7 XII 1994, La Junquera, Estanys de Capmany, leg. IR & P. Aguilera (recorded in RIBERA & AGUILERA, 1996 with no specification of the spp); 5 specimens 8 XI 1988, Sant Feliu de Buxalleu, riera d'Arbúcies, Can Folgueroles, leg. IR; 1♂ 10 IX 1994, Sant Climent, Rec de Grimaus, leg. IR & P. Aguilera. Huelva: 1♂ 5 I 1995, Villanueva de los Castillejos, leg. GNF. León: 1♂ 9 VI 1990, Felmin, río Torio, leg. GNF; 2♂ 9 VI 1990, río Bernesga, leg. GNF. Málaga: 1♂ 17 IV 1985, Ronda, leg. GNF & R.

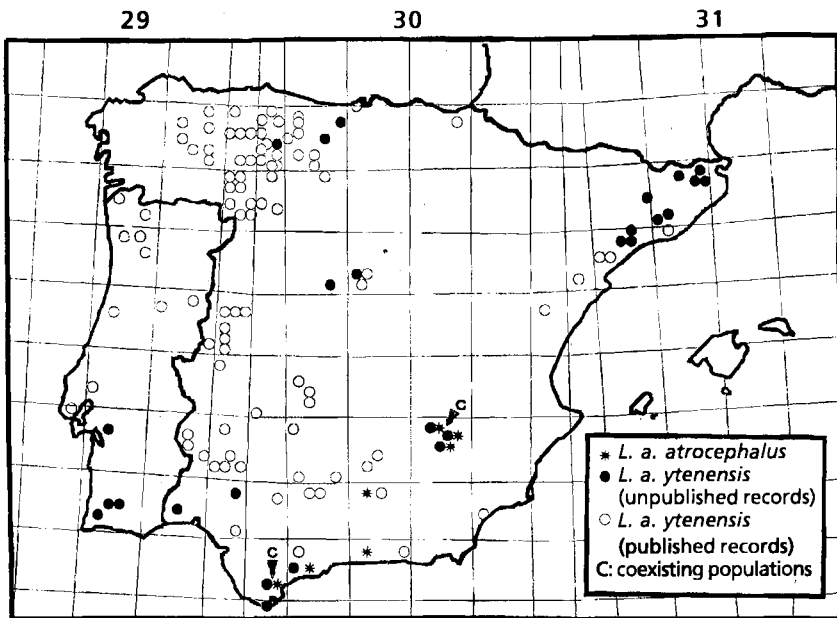


Fig. 1. Distribution of *Laccobius atrocephalus* s. l. in the Iberian peninsula. Data from FUENTE (1929), GENTILI & CHIESA (1975), GENTILI (1979, 1982), GARRIDO et al. (1994a, 1994b), VAN BERGE HENEGOUWEN (1982), LAGAR (1984, 1987), D'ORCHYMONT (1935), RIBERA & AGUILERA (1996), RIBERA et al. (1996) and VALLADARES (1995). Data from Sierra Nevada in SÁINZ-CANTERO & ALBA-TERCEDOR (1991) are not included because there is no specification of the subspecies. (UTM: 100x100.)

Distribución de Laccobius atrocephalus s. l. en la península Ibérica. Datos de FUENTE (1929), GENTILI & CHIESA (1975), GENTILI (1979, 1982), GARRIDO et al. (1994a, 1994b), VAN BERGE HENEGOUWEN (1982), LAGAR (1984, 1987), D'ORCHYMONT (1935), RIBERA & AGUILERA (1996), RIBERA et al. (1996) y VALLADARES (1995). Los datos de Sierra Nevada en SÁINZ-CANTERO & ALBA-TERCEDOR (1991) no se incluyen al no especificar la subspecie de la que se trata. (UTM: 100x100.)

B. Angus; 1♂ 8 I 1992, Tolox, leg. GNF; 1♂ 17 IV 1985, río Guadiara, leg. GNF & R. B. Angus. Segovia: 1♂ 20 IV 1985, La Granja, Valsaín, leg. GNF & R. B. Angus; 3♂ 19 IV 1985, Villacastín, leg. GNF & R. B. Angus. Tarragona: 2♂ 24 VII 1994, Corbera d'Ebre, riu Gaià, leg. IR & P. Aguilera; 2♂ 1♀ 16 V 1994, Querol, Les Torretes, leg. IR, GNF & D. T. Bilton, 23 XII 1995; 3♂ 4♀ 16 V 1994, Querol, Torrent d'Esblada, leg. IR, GNF & D. T. Bilton; 6♂ 7♀ 2 VII 1994, Santa Perpetua de Gaià, riu Gaià, Cal Corralet, leg. IR; 3 specimens 15 VIII 1984, 4 specimens 31 XI 1984, 5 specimens 31 VIII 1984, 1 specimen 9 VII 1985, Vila-rodonà, riu Gaià; leg. IR.

Morocco: 16♂ 20 VII 1997, Oued Aït-Baha, Aït-Baha, leg. AM, IR, C. Hernando & P. Aguilera.

Distribution

The two subspecies of *Laccobius atrocephalus* are parapatric, being in contact in SE Spain and Morocco. According to GENTILI & CHIESA (1975) specimens of *L. atrocephalus atrocephalus* in Morocco can have an intermediate morphology, with the apex of the parameres of *L. atrocephalus atrocephalus* slightly elongate. However, in the studied material from the Moroccan Anti-Atlas both forms could be clearly distinguished, not only by the length of the parameres but also by the shape of their base (more open in *L. atrocephalus ytenensis*, see GENTILI & CHIESA, 1975 fig. 37a; and DROST et al., 1992 fig. 643). Both subspecies were also found to coexist in some of the Iberian localities (in Albacete and Málaga, see above and figure 1), and specimens had aedeagi typical of their respective forms.

Discussion

The records of *L. atrocephalus atrocephalus* in the Iberian peninsula, and of *L. atrocephalus ytenensis* in SW Morocco, extend the contact zone to at least the whole SW Mediterranean area, and thus it becomes difficult to accept their subspecific status. Although the existence of contact zones with a certain degree of genetic interchange does not preclude the maintenance of subspecies both genetically and

morphologically well defined, almost by definition these contact zones must represent a small fraction of their whole geographical range, with intermediate specimens due to the limited genetic mixing between them (BULL, 1991; HEWITT, 1996).

Additional studies on the morphology of coexisting populations, in particular those from North Africa (in where the distribution of *L. atrocephalus ytenensis* is almost completely unknown), are required in order to establish whether specimens with an intermediate morphology are true hybrids or just extremes of variability of one of the forms, in which case the specific status of *L. ytenensis* should be reinstated.

Acknowledgements

We thank Elio Gentili for the identification of the first specimens of *Laccobius atrocephalus*, and E. Gentili, Franck Bameul and two anonymous referees for their helpful comments on the paper.

Resumen

Distribución de Laccobius a. atrocephalus Reitter, 1872 y L. a. ytenensis Sharp, 1910 en la península Ibérica (Coleoptera, Hydrophilidae)

Se cita *Laccobius atrocephalus atrocephalus* por primera vez en Europa continental, y *L. atrocephalus ytenensis* por primera vez en el continente africano. La forma nominal se encontró en varias localidades en el sureste Ibérico, en coexistencia con *L. atrocephalus ytenensis* en algunas de ellas; y la subespecie *L. atrocephalus ytenensis* en el Anti-Atlas marroquí, también en coexistencia con *L. atrocephalus atrocephalus*. Se da la distribución de las dos subespecies en la península Ibérica (fig. 1).

Tanto el solapamiento en la distribución de las dos subespecies como la constancia en las diferencias morfológicas de la genitalia masculina hacen suponer su validez específica, aunque para establecerla formalmente son necesarios estudios más detallados de poblaciones en todo su rango de distribución.

References

- BALKE, M., HENDRICH, L. & CUPPEN, J. G. M., 1990. Wasserkäfer von den Islas Canarias (Coleoptera: Haliplidae, Dytiscidae, Gyrinidae, Hydrochidae, Hydrophilidae, Hydraenidae, Dryopidae). *Entomofauna, Zeitdchr. Ent.*, 11: 349-373.
- BULL, C. M., 1991. Ecology of parapatric distributions. *Annu. Rev. Ecol. Syst.*, 22: 19-36.
- DROST, M. B. P., CUPPEN, H. P. J. J., VAN NIEUKERKEN, E. J. & SCHREIJER, M. 1992. *De waterkevers van Nederland*. Uitgeverij K.N.N.V., Utrecht.
- FUENTE, J. M. DE LA, 1929. Catálogo sistemático-geográfico de los Coleópteros observados en la Península Ibérica, Pirineos propiamente dichos y Baleares (continuación). *Bol. Soc. ent. Esp.*, 12:84-99.
- GARRIDO, J., DÍAZ-PAZOS, J. A. & RÉGIL, J. A., 1994a. Fauna acuática de la Comunidad Foral de Navarra (España) (Col., Adepfaga y Polyphaga). *Bull. Soc. ent. France*, 99: 131-148.
- 1994b. Coleópteros acuáticos de Extremadura II (Hydraenidae, Hydrochidae, Helophoridae, Hydrophilidae, Dryopidae y Elmidae). *Boln. Asoc. esp. Ent.*, 18: 113-133.
- GENTILI, E., 1979. Aggiunte alla revisione dei *Laccobius* Paleartici. *Boll. Soc. ent. Ital.*, 111: 43-50.
- 1982. *Laccobius* del vecchio mondo: nuove specie e dati faunistici (Coleoptera, Hydrophilidae). *Osservatorio di fisica terrestre e Museo Antonio Stoppani del Seminario Arcivescovile de Milano*, 4(1981): 31-38.
- 1988. Verso una revisione del genere *Laccobius* (Coleoptera, Hydrophilidae). *Osservatorio di fisica terrestre e Museo Antonio Stoppani del Seminario Arcivescovile de Milano*, 9(1986): 31-47.
- GENTILI, E. & CHIESA, A., 1975. Revisione dei *Laccobius* Paleartici (Coleoptera Hydrophilidae). *Memorie della Società Entomologica Italiana*, 54:1-187.
- HEWITT, G. M., 1996. Some genetic consequences of ice ages, and their role in divergence and speciation. *Biol. J. Linn. Soc.*, 58: 247-276.
- ISART, J., RIBERA, I., HERNANDO, C. & VALLE, M. A. N., 1989. Aportació al coneixement de l'entomofauna aquàtica del Montseny: revisió i contribució al coneixement dels coleòpters. In: *II Trobada d'estudiosos del Montseny*, 18: 35-42. Diputació de Barcelona, Col·lecció Monografies, Barcelona.
- LAGAR, A., 1984. Palpicornia del curso superior del rio Algars (Tarragona - Teruel) (Coleoptera). *Graellsia*, 40: 7-17.
- 1987. Palpicornia del alto valle del rio Brugent (Gerona) (Coleoptera). *Graellsia*, 43: 29-37.
- ORCHYMONT, A. D', 1935. Inventa entomologica itineris Hispanica et Maroccani quod a 1926 facerunt Harald et Hakan Lindberg. XXII Palpicornia. *Soc. Scient. Fenn., Comm. Biol.*, V(1): 1-22.
- PEYERIMHOFF, P. DE, 1931. Mission scientifique du Hoggar, Coléoptères. *Mém. Soc. Hist. Nat. Afr. Nord*, 2: 42-43.
- RIBERA, I. & AGUILERA, P., 1996. Els Estanys de Capmany: the missing Spanish pingo (or palsa) fens? *Latissimus*, 7: 2-6.
- RIBERA, I., FRESNEDA, X., HERNANDO, C. & AGUILERA, P., 1996. Insecta: Coleoptera 8 (Familias 11-26): Coleópteros acuáticos. Familias: Gyrinidae, Haliplidae, Noteridae, Hygrobiidae, Dytiscidae, Hydraenidae, Helophoridae, Georissidae, Hydrochidae, Hydrophilidae, Elmidae, Dryopidae, Heteroceridae, Psephenidae, Scirtidae, Chrysomelidae Donaciinae. *Cat. entomofauna aragon*, 10: 3-22.
- SÁINZ-CANTERO, C. E. & ALBA-TERCEDOR, J., 1991. Los Poliphaga acuáticos de Sierra Nevada (Granada, España) (Coleoptera: Hydraenidae, Hydrophilidae, Elmidae, Dryopidae). *Boln. Asoc. esp. Ent.*, 15: 171-198.
- VALLADARES, L. F., 1995. Los Palpicornia acuáticos de la provincia de León. III. Helophoridae, Hydrochidae e Hydrophilidae (Coleoptera). *Boln. Asoc. esp. Ent.*, 19(1-2): 281-308.
- VAN BERGE HENEGOUWEN, A., 1982. De Nederlandse soorten van heu genus *Laccobius* Erichson (Coleoptera, Hydrophilidae), en Systematische studie. *Zoologische Bijdragen*, 28: 59-84.