

Koleopterologische Rundschau	66	39 - 45	Wien, Juni 1996
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## *Deronectes fosteri* sp.n. from northeastern Spain (Coleoptera: Dytiscidae)

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### Abstract

*Deronectes fosteri* sp.n. is described from the oriental and central pre-Pyrenees (NE of Spain). The species is most closely related to *D. oparinus* (GERMAR), being characterized mainly by its reddish-brown colour, the shape of the protibia, the shape and punctuation of the pronotum, the length of the tarsus and onychium, and its genitalia. Information about its known distribution, habitat and biology is provided.

**Key words:** Coleoptera, Dytiscidae, *Deronectes fosteri*, new species, taxonomy, Pyrenees, Spain

### Introduction

The genus *Deronectes* SHARP, as defined by NILSSON & ANGUS (1992) - metacoxal process with interlaminary bridge exposed, metatarsomere 5 twice as long as tarsomere 4, metatibia with anterior face covered with spiniferous punctures - has a Palaearctic distribution, and contains 33 known species. Most of them (17) have a European distribution; 13 occur in the Iberian Peninsula, of which 8 are endemic, mostly in the mountain systems of the west and the south. According to NILSSON & ANGUS (1992) the genus is monophyletic, being the sister group to all other genera included in the *Deronectes*-group (*Stictotarsus* ZIMMERMANN, *Scarodytes* GOZIS, and *Nebrioporus* REGIMBART).

The authors collected a new species in northern Spain which is described below.

#### Acronyms

CAB Coll. Aguilera, Barcelona  
CAL Coll. Angus, London  
CBP Coll. Bilton, Plymouth  
CFA Coll. Foster, Ayr  
CFB Coll. Fery, Berlin

CFP Coll. Fresneda, El Pont de Suert, Lleida  
CHB Coll. Hernando, Barcelona  
CRM Coll. Ribera, Martorell, Barcelona  
MZB Museu de Zoologia, Barcelona  
NMW Naturhistorisches Museum, Wien

### *Deronectes fosteri* sp.n.

**TYPE LOCALITY:** Saldes, Province of Barcelona, Spain.

**TYPE MATERIAL:** **Holotype** ♂ (NWM): "HISP. BARCELONA \ Saldes: Pla de l'Espinal \ 11.2.1995 P. Aguilera leg." and with holotype label. **Paratypes** (NWM, MZB, CAB, CAL, CBP, CFA, CFB, CFP, CHB, CRM): 12 ♂♂ and 8 ♀♀ with same original locality label as holotype and paratype labels; 1 ♀ with date 29.v.1993; 1 ♀ with date 5.vi.1994; 9 ♂♂ and 8 ♀♀ with date 1.iv.1995, leg. P. Aguilera & I. Ribera; 6 ♂♂ and 8 ♀♀ with date 10.vi.1995, leg. P. Aguilera, I. Ribera & D.T. Bilton. Chromosomes were studied in one female paratype deposited in CAL, scanning photographs were taken of one male paratype in CBP.

**DIAGNOSIS:** Total length 4.6 - 5.2 mm (with the head in a natural position), body length (head excluded) 4.3 - 4.8 mm. Some body and hind leg measurements of the holotype and average measurements of 10 males and 10 females are provided in Table 1. Habitus of the holotype as in Fig. 1. Body elongate, subparallel, with a carabiform appearance, flat, with marked angles between the pronotum and elytra.



Fig. 1: *Deronectes fosteri* sp.n., habitus, holotype.

Colour: Head, antennae, palpi, pronotum, elytra and legs uniformly reddish-brown, with the last segment of the antennae darkened distally (preserved specimens could become darker). Ventral surface black, except the underside of the pronotum and the elytral epipleura, which have the same colour as the dorsal surface, and a paler band covering the first visible abdominal sternite, part of the metasternal process and part of the metacoxa (clearly visible in freshly collected specimens).

Sculpture and pubescence: Head with a compact microreticulation, covered with a faint and very dense puncturation that confines the microreticulation to the ridges between punctures. Areas between punctures generally not wider than their diameter. The puncturation is less dense in the central and distal parts of the clypeus (Fig. 2). Surface of the pronotum and elytra with the same dense and small microreticulation, with a double puncturation, one fine and dense and other large, ocellate and scattered (Figs. 1 - 5); large punctures of the pronotum more dense in the depressed areas of the sides and the base; a narrow longitudinal puncture close to the centre of the disc (Fig. 1). Elytra with two, weakly defined, non punctured longitudinal bands. Ventral surface densely covered with a rough small puncturation; metasternum and metacoxa with sparse, large, ocellate punctures. Head with a very sparse, short pubescence (Fig. 2), pronotum and elytra covered with a short, dense, white pubescence with golden reflections, and some sparse, deciduous, white, long hairs, specially at the apex of the elytra (Figs. 1 - 5). Ventral surface with a sparse, short, deciduous, white pubescence. Tibia and tarsi with whitish-gold swimming hairs, long in the middle of the tibia but not exceeding the length of the onychium.

Structural features: Labrum with a strong, medial indentation. Head with an uneven surface; clypeal grooves narrow and long; margin of the clypeus almost straight (Fig. 2). Pronotum transverse, broadest at the middle, slightly cordiform, with posterior corners right-angled,

depressed along the base and the lateral edges, with lateral margins finely bordered in the anterior part (Figs. 1, 3, 4). Elytra subparallel, broadest in the distal half, with two faint, longitudinal depressions, one (parasutural) reaching almost the apex of the elytra and the other shorter, before the humerus (Figs. 1, 5). Prosternal process lanceolate, with a narrow ridge in the middle and a row of setae on both sides of the central carina. Last abdominal sternite with a small incision. Protibia narrower in the base, strongly widening in the proximal half and with almost parallel sides in the rest of their length (Fig. 1). Femur, tibia and first segment of the metatarsus densely covered with setiferous punctures and spines. Tarsus, claws and onychia very long (Fig. 1); claws regularly curved. Wings apparently well developed.

**CHROMOSOMES:** The species has a high number of chromosomes (about 30 pairs of autosomes, R.B. Angus unpublished data). Although only one female could be studied, it is assumed that the species has, like all the studied species of the genus, neo-XY sex chromosomes (NILSSON & ANGUS 1992).

**SEXUAL DIMORPHISM:** Males with slightly smaller elytra, usually darker. Body of males more flattened, with the maximum height in a more posterior position (Table 1). Protarsal onychium longer (0.34 - 0.38 mm). Meso- and metatarsal onychia also slightly longer. Aedeagus in dorsal view regularly curved, ending in a smooth, rounded apex; elongate in lateral view, with a small basis and the apex curved downwards (Figs. 6, 7). Parameres broad, regularly curved, not truncate (Fig. 8). The genitalia are weakly sclerotised. Females with elytra usually paler and more elongate; higher in lateral view, with the maximum height in a more central position (Table 1). Protarsal onychium shorter (0.28 - 0.32 mm). Genitalia as in Figs. 9 - 10, with long, slender and weakly sclerotised gonocoxae, with two tufts of long setae at the apex, with black and flat tergal halves, and broad gonocoxosternites.

**VARIABILITY:** The colour of the head, pronotum, legs, head appendages and ventral surface is rather constant in all the mature specimens studied. The colour of the elytra ranges from pale reddish in some females to brown in some males. To check that the pale colour and the weak sclerotisation of the genitalia of both sexes were not due to material being teneral, nine specimens collected on 1.IV.1995 (two months later than the first captures the same year in the same locality) were kept alive for almost three weeks, with no signs of becoming darker or more sclerotised. Specimens collected in the same locality in 10.VI.1995 had the same colour and degree of sclerotization.

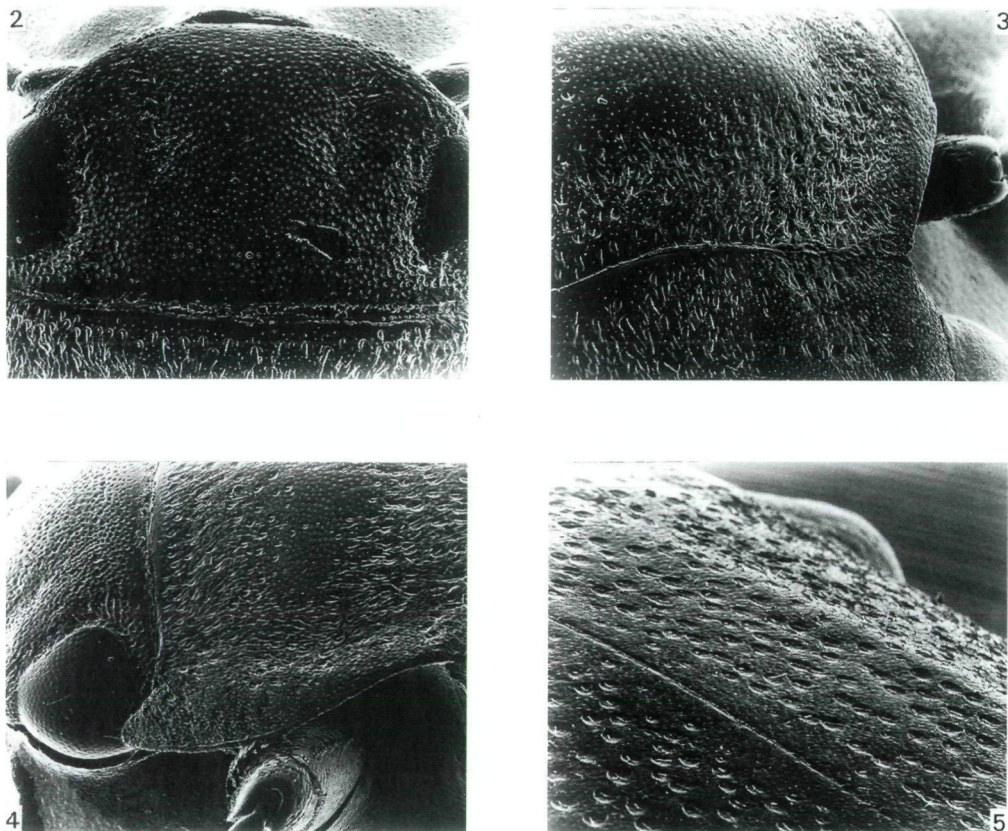
**RELATIONSHIPS:** According to the external morphology and the male and female genitalia the most similar species of the genus in the Iberian Peninsula is *D. opatrinus*. It can be distinguished externally from *D. opatrinus* by its reddish-brown colour (black in *D. opatrinus*, with yellow pubescence), its smaller size, the shape of the protibia (regularly widening from the base to the apex in *D. opatrinus*), the stronger depression along the base of the pronotum, the longer metatarsi, and the relatively longer onychia and claws of all the legs in both sexes, specially in the protarsi (although *D. opatrinus*, like *D. hispanicus*, has the same sexual dimorphism in the length of the protarsal onychia, see Table 1). The male and female genitalia are less robust and sclerotised than in *D. opatrinus*, with the aedeagus more slender and narrow in lateral view, and regularly curved and not pointed in dorsal view (Figs. 6 - 10). The setae of the apex of the gonocoxae are longer and tend to be grouped in two tufts (Fig. 9a).

**DISTRIBUTION:** The type locality is a mountain stream in the north side of the Serra d'Ensiya, in the Riu de Saldes basin (province of Barcelona). Other than at the type locality, we have found this species at the following localities (see Fig. 11):

Barcelona: Saldes, tributary of Riu de Saldes, 2 ♀♀, 11.II.1995, leg. P. Aguilera; Vallcebre, tributary of Riera de Vallcebre, 1 ♀, 11.II.1995, leg. P. Aguilera.

Lleida: Coll de Nargo, Barranc Aubaga Negra, 1 ♀, 12.III.1995, leg. P. Aguilera.

Huesca: Sabiñánigo, Barranco de los Valles, 1 ♂, 14.V.1995, leg. P. Aguilera & I. Ribera.



Figs. 2 - 5: *Deronectes fosteri* sp.n., 2) head, 3) pronotum, dorsal view, 4) pronotum, lateral view, 5) right elytron.

**ETYMOLOGY:** The species is named after Dr. G.N. Foster, Secretary and co-founder of the Balfour-Browne Club.

**BIOLOGY:** The species has so far been found in small mountain streams with highly calcareous waters containing calcareous tufa (calc-tuff). A representative pH was 7.0, with a conductivity of about  $200 \mu\text{Scm}^{-2}$ . At the type locality the beetles were found between 1200 and 1400 m in small pools lacking any vegetation or detritus (about 1 - 2 m maximum diameter, 10 - 20 cm deep), over rock and stones covered with a narrow layer of fine silt. This habitat is quite unusual for the pre-Pyrenees or the Pyrenees, where streams typically have moss, vegetation, and abundant plant detritus coming from nearby trees. The fauna of these open streams without vegetation or detritus was very poor. The only aquatic Coleoptera occurring with *D. fosteri* sp.n. at the type locality were *Stictotarsus* cf. *griseostriatus* (sensu NILSSON & ANGUS 1992), *Deronectes moestus* (FAIRMAIRE), *Helophorus brevipalpis* BEDEL and *Hydraena subimpressa* REY. Other macroinvertebrates were also scarce, and the only vertebrates found were *Hyla* sp. tadpoles in 10.VI.1995. Aquatic Coleoptera occurring in nearby streams in the north side of the Riu de Saldes basin (Serra de Gisclareny, Saldes, between 900 - 1100 m), with similar water and lithology but partly shaded by trees and with vegetation and detritus, can be considered a typical assemblage of this area and altitude: *Deronectes delarouzei* (DU VAL), *Agabus guttatus* (PAYKULL), *Anacaena globulus* (PAYKULL), *Laccobius atrocephalus ytenensis* SHARP, *L. neapolitanus* ROTTENBERG, *Hydraena subimpressa*, *H. catalonica* FRESNEDA, AGUILERA & HERNANDO, *H. truncata* REY, *H.*



*angulosa* MULSANT, *Pomatinus substriatus* (MÜLLER), and *Riolus subviolaceus* (MÜLLER). The isolated specimens found in Huesca, Lleida and Vallcebre were also collected in mountain streams with very calcareous waters, but with more typical vegetation and detritus, and with the usual fauna of the area and the habitat.

The species seems to be very rare, the population density at the type locality in 1995 being unusually high. The first known specimen, a single female, was collected at the type locality on 25.v.1993. Another isolated female was found on 5.vi.1994, and no more specimens were found until the type series was collected on 11.ii.1995, despite almost monthly sampling in the area between 1993 and 1995.

The specimens collected, as well as other specimens seen but left in the field, were resting on the bottom of the pools or under stones, crawling or swimming in short bursts close to the substratum. When disturbed in their natural habitat or in a tray they proved to be poor swimmers, in accordance with the morphometric characteristics of the species, typical of this lotic water genus (RIBERA & NILSSON in press).

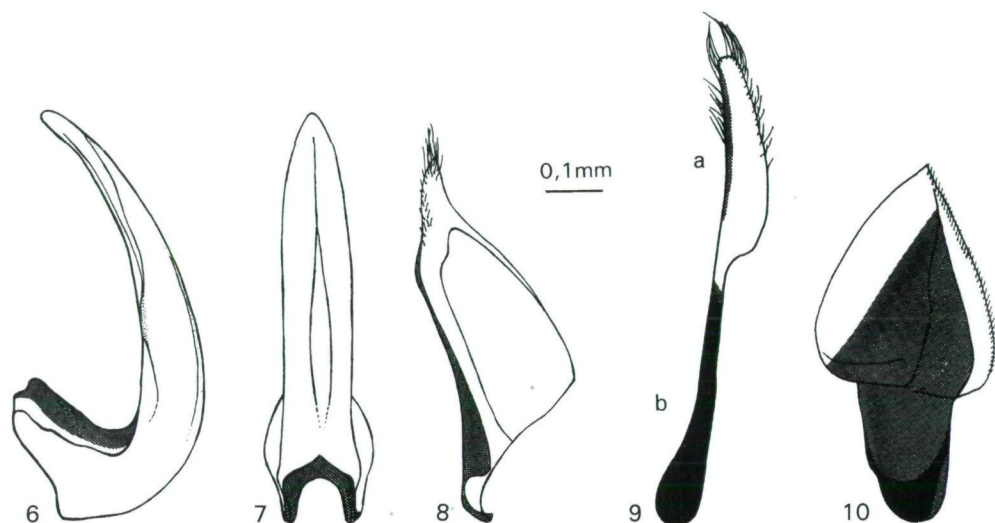
All the females collected on 10.vi.1995 at the type locality had spermatophores, and most of the specimens had ectoparasites, a sign of ageing. On the same day, D.T. Bilton collected a single, very poorly pigmented *Deronectes* larva that does not correspond with the description of the larvae of *D. moestus* or *D. delarouzei*, nor with any other known Iberian species (BERTRAND 1961) (currently under study, Dettner & Fery in litt.).

	TL	MW	DW	HL	PL	PW	MH	DH	FL	BL	RL	FW	OL
HOLOTYPE	4.60	2.55	2.00	0.67	1.00	2.07	1.50	2.33	1.50	1.25	1.85	0.33	0.37
MALES	4.53	2.49	1.99	0.67	0.96	2.02	1.49	2.17	1.55	1.26	1.82	0.33	0.36
FEMALES	4.64	2.49	2.04	0.69	0.97	1.99	1.56	2.30	1.55	1.26	1.81	0.33	0.30
AVERAGE	4.59	2.49	2.01	0.68	0.96	2.00	1.53	2.24	1.55	1.26	1.81	0.33	0.33
<i>D. opatrinus</i>	4.97	2.75	2.30	0.70	1.22	2.17	1.73	2.55	1.79	1.34	1.72	0.35	0.36/0.30

Table 1: Measures (in mm) of the holotype and average values of ten females and ten males of *Deronectes fosteri* sp.n., together with those of *D. opatrinus* (from RIBERA & NILSSON in press, except OL). TL: total length (head excluded); MW: maximum width of the elytra; DW: distance between level of MW and apex of elytra; HL: length of the head (horizontal), from the medium line between the posterior margin of the eyes to the anterior margin of the clypeus; PL: length of pronotum medially; PW: maximum width of pronotum; MH: maximum body height, lateral view; DH: distance between level of MH and apex of elytra; FL: length of metafemur (to medium line of metacoxal process); BL: length of metatibia; RL: length of metatarsus, claws excluded; FW: maximum width of metafemur; OL: length of the protarsal onychia (male/female in *D. opatrinus*).

## Discussion

All other species of the genus known to occur in the northeast of the Iberian Peninsula (*D. opatrinus*, *D. hispanicus*, *D. moestus*, *D. fairmairei* (LEPRIEUR), *D. aubei* (MULSANT) and *D. delarouzei*) also occur in southern France and other areas in Europe (RICO et al. 1990). The scarcity of true endemics among the aquatic Coleoptera of the Pyrenees is generally attributed to recent deglaciation and to their geographically intermediate situation (BERTRAND 1955, 1964). The only described endemics of the main chain are *Ochthebius ferroi* FRESNEDA, LAGAR & HERNANDO, known from the holotype alone, and *Agabus solieri* ssp. *pyrenaicus* FRESNEDA & HERNANDO, restricted to one high altitude lake. Other endemics of the area have wider distributions, including mountain ranges south of the main chain (e.g. *Hydraena delia* BALFOUR-BROWNE; see FRESNEDA 1993, RIBERA & AGUILLERA 1995), and, in some cases, the north side of the Pyrenees (e.g. *H. curta* KIESENWETTER; see VALLADARES & MONTES 1991). *Deronectes fosteri* sp.n. is so far known from some mountain ranges running east-west in the oriental and central pre-Pyrenees (Fig. 11), but it is likely that its actual distribution could extend to other mountain systems in the area.



Figs. 6 - 8: Male genitalia of *Deronectes fosteri* sp.n., 6) aedeagus, lateral view, 7) aedeagus, dorsal view, 8) paramere.

Figs. 9 - 10: Female genitalia of *Deronectes fosteri* sp.n., 9a) gonocoxa, 9b) tergal half, 10) gonocoxosternite.

### Acknowledgements

We are grateful to Xavier Fresneda, Carlos Hernando and Hans Fery for their most useful help in the study of this species. Robert B. Angus kindly gave us the unpublished information about its karyotype. David Bilton provided the scanning photographs. Our sincere thanks are due to Garth Foster and Manfred A. Jäch for very helpful comments on the text.

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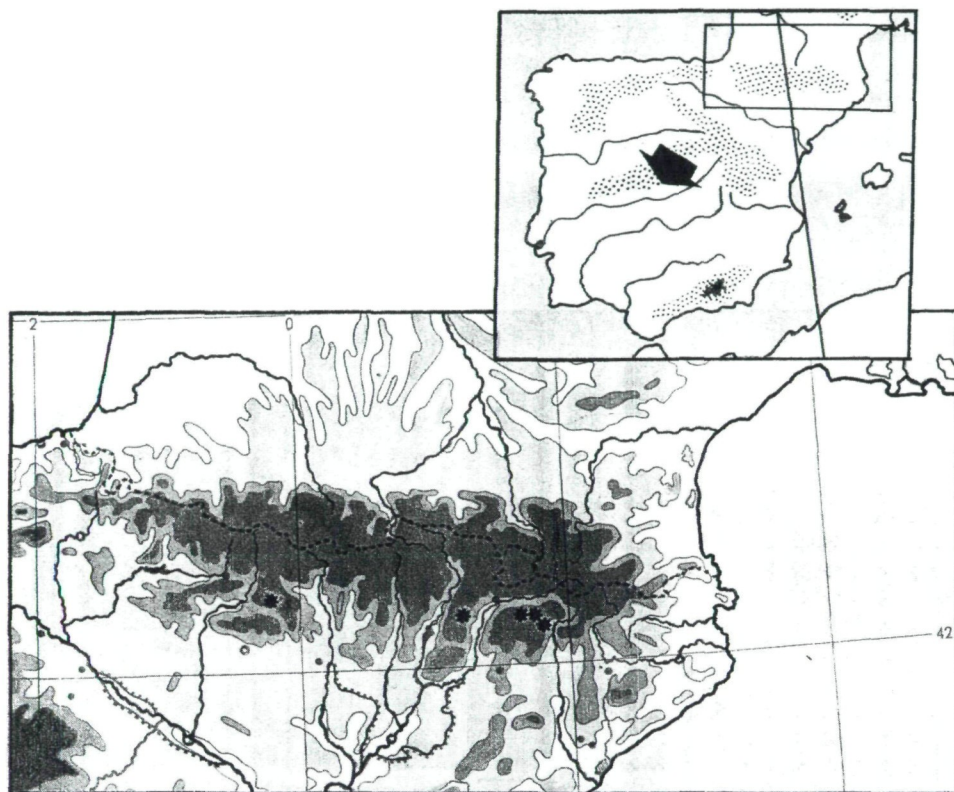


Fig. 11: Known distribution of *Deronectes fosteri* sp.n.

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Jahr/Year: 1996

Band/Volume: [66\\_1996](#)

Autor(en)/Author(s): Aguilera Pedro, Ribera Ignacio

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