

## Recent records of the very rare European carabid beetle

### *Dyschirius (Eudyschirius) semistriatus* (Dejean, 1825)

#### (Coleoptera: Carabidae)

Wouter DEKONINCK<sup>1</sup>, Marc VAN KERCKVOORDE<sup>2</sup>, Lut VAN NIEUWENHUYSE<sup>3</sup> & Philippe ZORGATI<sup>4</sup>

1 Royal Belgian Institute of Natural Sciences, Vautierstraat 29, B-1000 Brussels, Belgium  
(e-mail: wdekoninck@naturalsciences.be)

2 Vennestraat 6, B-9051 Sint-Denijs-Westrem, Belgium

3 Monterreystraat 43, B-9000 Gent, Belgium

4 5 rue de la Jouennerie, F-50130 Cherbourg-Octeville, France

#### Abstract

Recent European records of the rare carabid beetle *Dyschirius semistriatus* (Dejean, 1825) are presented for France, Belgium, The Netherlands and Spain. Additionally an overview of its distribution in Europe and Northern Africa is given, as well as details on phenology, ecology and habitat preference.

**Keywords:** *Dyschirius*, rare European species, distribution

#### Introduction

In Europe the genus *Dyschirius* (Carabidae, Scaritinae, Dyschiriini) includes about sixty species within five subgenera (BALKENOHL, 2017). All of them are more or less active burrowing carabids journeying in small galleries, but they also use tunnels made by other insects like *Bledius* species (Staphylinidae) or other beetles. Moreover, many species are halophilic (BRO LARSEN, 1936; JEANNEL, 1941).

Amongst them *Dyschirius semistriatus* (Dejean, 1825) seems to be the rarest because it is very scarcely presented in public and private collections. It is recorded from small collection spots from the Netherlands to Morocco. The species was so far very rarely recorded and often these records are old ones and from a single specimen. Recent captures of the species in new localities in France (Fig. 1), Belgium, the Netherlands and Spain led us to write this paper, presenting these new records and summarizes all previously known findings of this species in Europe.

#### Methods

The faunistic work is based on the available material of museums and the material, records and information given by private collectors. In addition, data from the literature have been used. Moreover pitfall trap investigations from Belgium during the years 2014–2018 amended the work considerably.

**Abbreviations used:** BMNH – British Museum of Natural History; RBINS – Royal Belgian Institute of Natural Sciences; UTM – Universal Transverse Mercator.



Fig. 1. Habitus of *D. semistriatus* from Ger – Manche (Photo R. Ancellin).

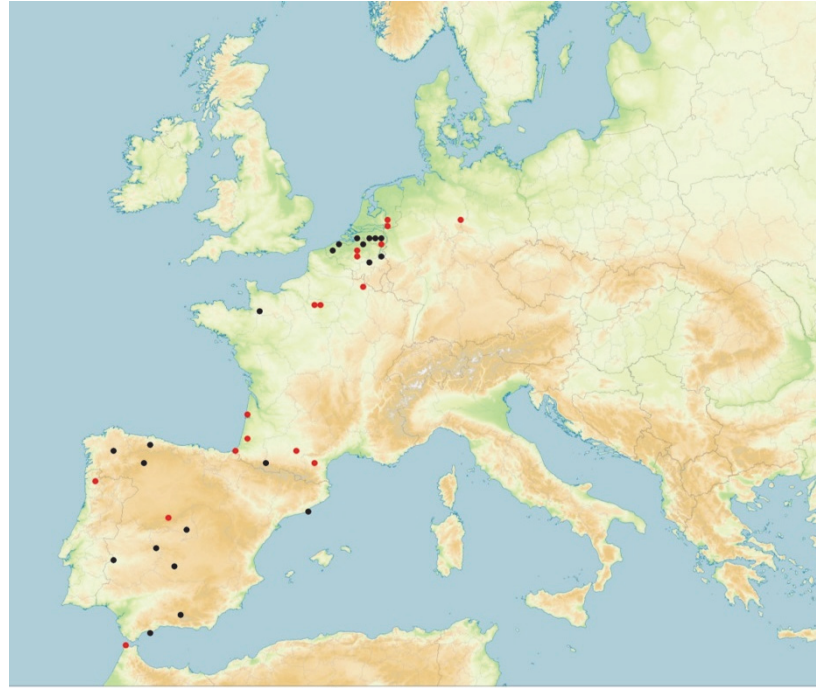


Fig. 2. Distribution map of *Dyschirius semistriatus* red dots are records before 1960, black dots are records after 1960.

### Distribution (Fig. 2)

#### FRANCE

Ardennes: Sedan (1 specimen, coll. Caillol) (DEWAILLY, 1949); Aude: Carcassonne (1 specimen, coll. De Brunier) (DEWAILLY, 1949); Gironde: Arcachon (1 specimen collected on 27.IV.1916, leg. & coll. Tempère) (DEWAILLY, 1949); Yvelines: Forêt de Marly (3 specimens, coll. Marmottan) (DEWAILLY, 1949); Val d'Oise: Bois-Corbon – Forêt de Montmorency, leg. O. Schmitt, more than 100 specimens found between 1952 and 1956 (FONGOND & PERRAULT, 1989) of which 4 specimens in coll. RBINS; Hautes-Pyrénées: Argelès-Gazost, («bords sablonneux du Gave», 10.VII.1963 leg. G. Tiberghien) (Tiberghien, 1967), two specimens were given to L. Schuler for verification (Tiberghien, Pers. Com.); Haute-Garonne: Toulouse, «bords de la Garonne», 1 specimen coll. Fauvel in coll. RBINS (FEDORENKO, 1996); Landes: Pontonx-les-Forges, «bord de ruisseau», leg. C. Jeanne (VALEMBERG, 1997); 1 specimen collected in Pyrénées-Atlantiques: Biarritz, in coll. RBINS (FEDORENKO, 1996).

Some other old records, often lacking detailed information, were discovered in RBINS collection: «Fajari Brutaine» (unreadable label) coll. Putzeys in RBINS; «France» coll. Fauvel in RBINS; «Paris» no more details, in coll. RBINS; Toulouse March 1874 and March 1879, coll. Putzeys in coll. RBINS.

Invalid records: Vaucluse: Avignon (3 specimens «des inondations du Rhône», leg. Chobaut, coll. Fagniez); La Bonde (1 specimen, leg. & coll. Fagniez). These specimens belong to the species *Dyschirius lafertei* = *Dyschirius gracilis* (Heer, 1837), (DEWAILLY, 1949). Isère Vienne (leg. C. Rey), these specimens belong to the species *Dyschirius abditus* (Fedorenko, 1993) (COULON *et al.*, 2000).

Doubtful or not confirmed records: Old data from Lyon and border of the river Ain (AUDRAS & SHAEFER, 1959) could not be checked (COULON *et al.*, 2000) «En l'état actuel des connaissances, la présence de l'espèce dans la région Rhône-Alpes reste à démontrer». VALEMBERG (1997) mentioned also the following localities: Pyrénées-Orientales: Bords de la Têt; Haute-Vienne: Berneuil; Saône-et-Loire: Le Creusot; Aude: Carcassonne. All these later records are without dates and we did not find any publication mentioning and confirming these records.

New record: One specimen of *D. semistriatus* was collected on June 10th 2016 at «Pré Corbin» in Ger (Manche) and a second one on June 3rd 2017 by Philippe Zorgati. This protected area, managed by Conservatoire d'Espaces Naturels (CEN) de Normandie Ouest, consist mainly of wet meadows more or less with a peaty soil (Fig. 3). The first specimen was found near a drinking pond for cattle on



Fig. 3. Wet meadow in Ger “Pré Corbin” (Manche – France) where two specimens were found on June 10<sup>th</sup>, 2016 and June 3<sup>rd</sup> 2017.



Fig. 4. One of the recent restored heathland sites on a former corn field in Beisbroek, Brugge where *Dyschirius semistriatus* was collected.

trampled muddy ground, together with *Dyschirius (Dyschiriodes) tristis* Stephens, 1827. The second specimen was found in a meadow that was less wet.

### PORTUGAL

Kult described in 1940 (KULT, 1940) a new species of *Dyschirius* (“*Dyschirius Iserlei*”) based on 3 specimens: A specimen designed as Type, from Tanger (Marocco), in coll. Kult, a specimen designed as Cotype, from Portugal (S. Martinho, Barros) in coll. Dr. Fleisher and a specimen from Spain (“Inondations du fleuve Tiertar, Candeleda, 1934, leg Dr. Baum, in coll. Museum Praha”).

This species was later designated as a junior synonym of *Dyschirius semistriatus* by Fedorenko (FEDORENKO, 1996) who was able to examine the specimens of Spain and Portugal.

The species was not recorded from Portugal since that record.

### SPAIN

In the recent Catalogue of Carabidae of the Iberian Peninsula (SERRANO, 2013), nearly no other localities as those from the Catalogue of Claude JEANNE (1986) are mentioned (SERRANO, 2013). Records: Léon: Lago de la Baña; Barcelona: Centellas; Madrid: El Escorial; Badajoz: Higuera la real. José Serano gave us two additional records: Ciudad Real: Navas de Estena and Málaga: Marbella. Further, FEDORENKO (1996) mentions the following records of *D. semistriatus*: Avila: Candeleda labelled “Inondations du fleuve Tietar, avril” (specimen formerly assigned to *D. iserlei* Kult, 1940); Léon: Branuelas (leg G.C. Champion), 3 specimens, coll. BMNH; Sierra Nevada, Laguna de Guejar 1270m, 1 specimen collected on 13.VI.1991 by D. Wrase. One more record was mentioned by GUTÉRREZ *et al.* (2004) from Picos de Europa National Park, where it was collected in 1993.

New record: Bernard Jünger recently examined a recent sample of *Dyschirius semistriatus*, communicated to him by Hervé Brustel. One specimen was collected in a window trap in Parc National de Cabañeros (Prov. Ciudad Real) - Gargantilla on 14.IV.2016 by CIBIO (Centro Iberoamericano de la Biodiversidad) of Alicante.

### BELGIUM

DESENDER *et al.* (2008) give records of *D. semistriatus* in two UTM 5x5km squares between 1830 et 1950, one UTM 5x5km square between 1950 and 1980 and two UTM 5x5km squares between 1980 and 2008. For the period before 1950 there are records from Ukkel (Bruxelles): 22.VII.1910 (Fort Jaco); Verrewinkel: 24.III.1918 and 2.III.1920; Epegem: 18.V.1918. There is one record of three specimens from Houthulst (West-Flanders) from 1978 without details of these records in the database of Belgian Carabidae. More recent observations of the species are from Hoeselt (Prov. Limburg): 4.III.2000 (Wijngaardbos) in a pitfall trap; Turnhout (Prov. Antwerp): during a survey in the former Military Domain “Sevendonk”, where two specimens were collected using pitfall traps: one specimen in the period 14-28.IV.2000 and the second specimen in the period 28.IV-13.V.2000. One specimen was collected with a pitfall trap at Sablière du Haut Fays in Villers-Le-Bouillet during the period 04.V-6.VI.2010 by Marc Migon.

Recently, more than 15 specimens of the species were collected in four succeeding years of sampling with pitfall traps, in recently restored heathland relicts west of Brugge (one of these sites is presented in Fig. 4). All specimens were collected between beginning of March and middle of June. Because the species was recorded in the same two localities during four consecutive, year-round sampling schemes, we can conclude that these sites have vital and stable populations in this site dominated by *Erica cinerea*, *Calluna vulgaris*, lichens and mosses in a mosaic of bare sand. Other characteristic carabid species at these sites were: *Amara equestris*, *Harpalus griseus*, *Harpalus rufipalpis* and *Anisodactylus nemorivagus*.

## THE NETHERLANDS

TURIN (2000) mentions two recent localities and several ancient records. We list the records here of these single specimens captures (unless otherwise mentioned): Prov. Gelderland: Warsveld (1850 and 1890) and Doetinchem (1918, two specimens); Prov. Noord-Brabant: Hoeven (1960), Tilburg (1965), Eindhoven (1969), De Hilver (1980, three specimens, one by pitfall), Baarschot (1980, 2ex) and Diessen (1980); Prov. Limburg: Exaeten (1850) and Heidse Peel (1987).

The most recent record of the species from the Netherlands is from Meersen, Curfsgroeve in the Province of Limburg: 18.V.2013, leg. R. Jansen, det. J. Muilwijk (MUILWIJK & FELIX, 2014).

## GERMANY

Only one historical record of this species is known from Germany, Seligenstadt (Hessen) 1863 (according to HORION, 1941). No other recent records for this species for Germany exist (pers. com. M. BALKENOHL). The occurrence of the species in the Western parts of Germany cannot be excluded (KÖHLER & KLAUSNITZER, 1998).

## MOROCCO

One specimen of the Type serie of the former species *Dyschirius iserlei* KULT, 1940 was later synonymised by Fedorenko (FEDORENKO, 1996), a specimen collected from “Tanger”.

Patrice MACHARD (pers. com.) mentions that this species was never rediscovered in Morocco and for that reason he did not retained this record in his catalogue of 1997 (MACHARD, 1997).

## ROMANIA

The species was mentioned from Romania in the Palearctic Catalogue (BALKENOHL, 2017). This species was earlier excluded from the Romanian Carabidae checklist by JENISTEA (1979). However in 1982, Michael BALKENOHL (pers. com.) visited Prof. Dr. M.-A. Jenișteea who showed him two specimens of *Dyschirius semistriatus* from Romania that he got by exchange. Unfortunately he did not make more notes of the exact label and also does not know where this collection went after Jeniștea passed away. Nevertheless BALKENOHL (2017) judged this record reliable enough to take it into account for the Catalogue.

More recently, a record of *Dyschirius semistriatus* using a pitfall trap in Iasi (Moldavia) on 20.VI.2006 was cited by TĂLMACIU *et al.* (2007). We were not able to contact these authors for further details on this record.

## SWITZERLAND

Our colleague Bernard JÜNGER gave us a record from this country he got from Riccardo MONGUZZI. The unique specimen is labelled “HELVETIA / Büsch / 6.68 / Mallosi” (in coll. Monguzzi). We did not find any locality with this name in Switzerland. In the faunistic catalogue of Switzerland it is mentioned “no proven records” (MARGGI, 1992). The species is listed as “probable false report” in MARGGI & LUKA (2001).

### Some notes on the recent Belgian records

#### *Phenology*

To investigate the phenology of carabid species, pitfall traps had been installed in some heathland relicts in the northeast of Belgium near Bruges since 2014 (DEKONINCK *et al.*, 2015. LOCK *et al.*,

2017). In three localities (both dominated by *Erica cinerea*) a population of *Dyschirius semistriatus* was discovered. As the pitfall traps operated year-round, the records of *D. semistriatus* from these traps, allow to have an idea of the period the species is active in this type of habitat. Together with the dates we could gather from other observations in Europe (see above) it was possible to construct a phenology diagram of *D. semistriatus* (Fig. 5). Obviously the species is active mostly in spring and early summer (March to June with 82 % of all records) which confirms its status as spring species in Belgium (DESENDER, 1986a, b, c, d).

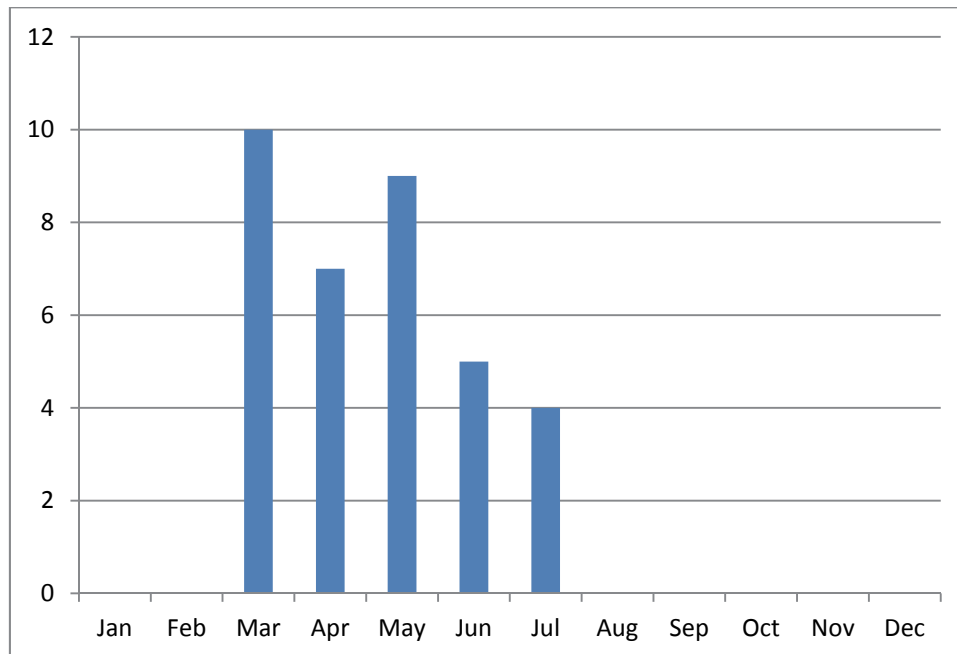


Fig. 5. Number of records of *Dyschirius semistriatus* for each month during the period 1900 and 2018 in Europe (pitfall traps and collections).

#### *Its survival in highly fragmented heathland vegetations near Bruges*

The habitat in which the three populations of *D. semistriatus* were found, recently and during several consecutive years, is a recently restored dry (and in the winter wet), mosaic heathland vegetation with open sandy places, dominated by *Erica cinerea*, *Calluna vulgaris*, lichens and mosses. Two of these sites were recently transformed (8 years) from maize field into heathland by removing the fertilized top layer up to the sandy soil. For these sites, this open habitat seems to be a temporary habitat in the succession to more mature heathland where, on bare sandy soil as in time a thick layer of litter will be formed, produced by mature heathland as is the case in nearby older heathland patches. It will be very interesting to see if these subpopulations will survive at these sites and how the population will develop compared to the population at the reference heathland. The sampling will be continued in 2018 and later.

### Discussion

It seems that *D. semistriatus* is only occasionally recorded in Europe so far, nevertheless it has a wide distribution from the Netherlands in the north to Marocco in the south and from Portugal to Romania. Some explanations for its rarity might be that the period when it is most active is quite early in the Carabidae-season (peak in March-April) and most Carabidae samplings take place starting from May until September in Europe (at least for Belgian pitfall trapping campaigns conducted during the last 40 years). In this way the species might have been missed during such summer pitfall trapping surveys. Moreover species from the genus *Dyschirius* are in general not often found in pitfall traps (the only exception is *Dyschirius globosus*) and hence overlooking of members of the genus is very probable in pitfall trap studies. *Dyschirius* sp. usually occur at banks with slow or not running water, watering places for cattle, small ponds, etc. *Dyschirius semistriatus* belongs to a smaller number of species who

adapted to dry habitats and carabidologist not often look for *Dyschirius* there. As the new finds demonstrate, the species might not be so scarce as supposed.

Another explanation might be found in its ecology and habitat preference. All *Dyschirius* species are digging, soil inhabiting carabids living in small burrows and tunnels made by species like for instance Staphylinidae of the genus *Bledius*. Several *Dyschirius* species have specific preferences for the galleries of a certain species of *Bledius*. Some species within the genus *Dyschirius* are widely regarded as the principal predators of *Bledius* species. Nevertheless little evidence is found so far to support a species-specific host-prey relationship. More likely, the relationship of *Bledius* and *Dyschirius* is based on a similar geographical distribution and habitat preference (HERMAN, 1986) and a symbiotic relationship is also possible. In Bruges *D. semistriatus* was found in heathland relicts where *Bledius gallicus* is present and *Bledius femoralis* was found in high numbers.

So far only little is known about the habitat preferences of *D. semistriatus*. It seems that temporary wet but also thermophilic and oligotrophic habitats (like heathlands and temporary marshes) are ideal places to search for this rare European carabid species. For Flanders but also elsewhere in Europe this kind of particular habitat is becoming more and more rare and therefore we suggest to give special attention both to the Carabid and Staphylinidae communities of these - in certain regions - endangered habitats.

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