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Peer reviewed

The new Checklist of the Italian Fauna: Elateridae, not including Cebrioninae, Drilinae and Lissominae

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Keywords: Coleoptera, Elateridae, click beetles, Italy, Italian fauna, Checklist, distribution

SUMMARY

This work presents an updated checklist and distribution of Coleoptera Elateridae of Italy. The data come from literature, from museums and private collections directly examined by the authors. The subfamilies Lissominae, Cebrioninae and Drilinae, which were previously considered independent families, are not included in the checklist, because there are not sufficient data. The distribution of the species is recorded and figured on maps at the provincial level, provided in a supplementary file, while the world distribution is given at the state level according to the Palearctic catalogue published by Cate in 2007 and the most recent works. The genus *Pseudathous* Méquignon, 1930 was resurrected for the species previously classified in the genus *Hemicrepidius* Germar, 1839 and *Megathous nigerrimus* (Desbrochers des Loges, 1870) is transferred to the genus *Hemicrepidius* Germar, 1839 according to recent taxonomic revision. For not recorded species that may occur in Italy, we remand to the volume of the Fauna d'Italia.

INTRODUCTION

Click beetles (Coleoptera, Elateridae) are beetle family widespread around the world with about 10,000 species characterized by a structure between pro- and mesothorax which let the insect jump if it is upside down. Elateridae live in all terrestrial habitats, from the shores to the high mountain ecosystems. In Italy the richest biotopes are the deciduous woods, but a lot of species live in mountain meadows, on the riparian vegetation and on the gravel and the sand of riverbanks. Unfortunately, the biology and the habits of some rare, and sometimes endemic, species are little known; so it is often difficult collecting data about these beetles. This work belongs to the project for an updated Checklist of the Italian Fauna started in 2020 (Bologna et al. 2022), which aims to create a public database containing constantly updated data about the Italian fauna. The complete and updated checklist is available on the LifeWatch Italy web site, and in a synthetic version in the Supplementary file S1. Furthermore, a supplementary file presents the updated world distribution and the list of the provincial records for each species (Supplementary file S2), while another one gives the maps with the provincial distribution for each species (Supplementary file S3). Each province is associated to a number to recognize it on the maps. Finally, the references of the distributional checklist reported on S2 are listed in the Supplementary file S4.

RESULTS

Taxonomical notes

The nomenclature used in checklist follows the last works published by the specialists of this family, however the species of the subfamilies Drilinae Blanchard, 1845, Cebrioninae Latreille, 1802 and Lissominae Laporte de Castelnau, 1835, recently included in the family Elateridae, are excluded because for these groups there is a strong deficit of research in Italy. Our generic classification differs from that of *Hemicrepidius* Germar, 1839 as published by Etzler (2021)

on a global revision of the genus *Hemicrepidius* Germar, 1839. *Megathous nigerrimus* (Desbrochers des Loges, 1870) was transferred by this Author to the genus *Hemicrepidius* Germar, 1839 according to the generic features of the type-species of the genus, the Nearctic *Elater memnomius* Herbst, 1806. The same Author includes in the genus many other species, Nearctic and Palearctic, two of them belonging also to the Italian fauna and classified under the genus *Hemicrepidius* since many years: *Elater niger* Linnaeus, 1758 and *Elater hirtus* Herbst, 1784. According to our studies it is not possible to include all the Nearctic and Palearctic species listed by Etzler (2021) in a single genus, because of very important morphological characters. The above cited *Elater niger* and *Elater hirtus*, with many other species from the Palearctic region, differ from the type-species *Elater memnomius* Herbst particularly because of two constant features: the straight posterior margin of propleurae and the lack of an antescutellar notch. All the other characters (antennae serrated from the third or fourth article, the hind angles of pronotum carinate or not carinate or only with a vestige of carina) are variable. So, the species with the above-mentioned characters of the pronotal base are here re-included in the genus *Pseudathous* Méquignon, 1930 (type-species: *Elater hirtus* Herbst, 1784).

Summary statistics

Since the last update of the checklist (Platia 2005), 23 species have been added to the list, so now Italian Fauna includes 257 species of click-beetles (not including Cebrioninae, Drilinae and Lissominae, for which there are not sufficient data to provide an updated checklist). Of these species, 43 are endemic and 11 of them are exclusive of Sicily and Sardinia. There are also 4 allochthonous species (Ruzzier et al. 2021, Pulvirenti & Platia 2021). The wealth of species is tied to the geographic position and the structure of territory: the Italian peninsula extends for nine degrees of latitude and is characterized by a longitudinal mountain range, the

Apennines, that favour the presence of different local climates and related habitats (different kinds of forests, etc.). Furthermore, the Alps divide the peninsula from the rest of Europe and Ibero-Provençal species and Balkanic species are recorded in western Liguria and in the Carso (Friuli-Venezia Giulia), respectively. In the end, Sardinia and Sicily, the largest islands of the Mediterranean Sea, give an important contribution to Italian biodiversity. Finally, the complex geological history of Italian Peninsula had a key role in endemization and relictness processes.

In Northern Italy 211 species are recorded, while only 157 in the peninsular Italy. Sicily hosts 77 species and 38 species are recorded in Sardinia. The regions with the highest diversity are Piemonte with 146 species and Lombardia with 138 species, while the least studied regions are Umbria and Molise, with 64 and 51 species, respectively. The knowledge of Italian click beetles is often fragmentary because some Italian regions such as Marche, Umbria, Molise and Puglia have been little explored by entomologists.

Data set sources

This data paper describes the checklist of the Elateridae within the new “Checklist of the Italian Fauna” but it provides also the distribution of the species at the provincial level (Supplementary file S2). The records have been obtained from the collections of the authors, from collections of museums and from the direct examination of the specimens of other entomologists. Some data come from internet platforms as F.E.I. (<http://www.entomologiitaliani.net/>). Moreover, for each species we reported the world distribution at state level according to the Palearctic catalogue by Cate (2007), updated with new records published in later works (Supplementary file S2). Examined literature has been obtained asking authors of the single papers or on the website of the journal on which the research has been published.

Data set description

The dataset includes information on 40 columns (Table 1). The first columns refer to the hierarchical taxa from Phylum to Family, followed by Genus and Genus authorship, Species and Species authorship, and eventually, when available, Subspecies and Subspecies authorship. The following column reports the species names as mentioned in the Fauna Europaea database (de Yong 2016) if present. Two columns report whether the species is currently known to be endemic to Italy or whether it is a recent alien introduction, according to the definition of the Secretariat of the Convention on Biological Diversity (2002). The following columns report the known occurrence of Elateridae in different geographical areas in which Italy has been divided: Northern Italy (N), Peninsular Italy (S), Sicily (Si) and Sardinia (Sa). The successive columns report the occurrence of the single species in the eighteen administrative regions of continental Italy. In the end two final columns report nomenclatorial changes occurred since the publication of the previous checklist by Platia (2005) and the literature reference used to expand the species list and the distribution of the species since Platia (2005).

Data set information

Object name: Checklist of the Italian Fauna: Elateridae, not including Cebrioninae, Drilinae and Lissominae.

Characters encoding: Unicode (UTF-8).

Data set citation: Pulvirenti E., Platia G., 2021. Elateridae, not including Cebrioninae, Drilinae and Lissominae. In: Bologna M.A., Zapparoli M., Oliverio M., Minelli A., Bonato L., Cianferoni F., Stoch F. (eds), Checklist of the Italian fauna. Version 1.0. Last update: 2021-05-31.

Format name: xml, Extensible Markup Language, for the online version at LifeWatch Italy.

Format version: 1.0

Distribution: <https://dataportal.lifewatchitaly.eu/view/urn%3Auuid%3Ac1f2ab37-61e4-48e9-b3a9-15bdbf002f9d>

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Date of last revision: May 31st, 2020

Metadata Language: English

Table 1. Description of the dataset with specific information relative to definitions and storage type for each of the 49 columns of the dataset.

Variable (column)	Description	Storage type
Phylum	Phylum name, Arthropoda for all records	string
Class	Class name, Insecta for all records	string
Order	Order name, Coleoptera for all records	string
Family	Family name, Elateridae for all records	string
Genus	Valid genus name, used according to the latest works	string
Genus authorship	Genus descriptor, reported according to the rules of the ICZN	string
Species	Valid species name, used according to the latest works	string
Species authorship	Species descriptor, reported according to the rules of the ICZN	string
Subspecies	Valid subspecies name, used according to the latest works	string
Subspecies authorship	Subspecies descriptor, reported according to the rules of the ICZN	string
Fauna Europaea (name)	Species name as reported in FaunaEuropaea	string
Endemic	Species known as endemic	binary
Alien	Species known as alien	binary
N	Occurrence of the taxon in Northern continental Italy (grouping: Friuli - Venezia Giulia, Veneto, Trentino - Alto Adige, Lombardia, Valle d'Aosta, Piemonte, Liguria, Emilia-Romagna)	binary
S	Occurrence of the taxon in Southern continental Italy (grouping: Toscana, Marche, Umbria, Lazio, Abruzzo, Molise, Campania, Puglia, Basilicata, Calabria)	binary
Si	Occurrence of the taxon in Sicily	binary
Sa	Occurrence of the taxon in Sardinia	binary
Ao	Occurrence of the taxon in Valle d'Aosta	binary
Pi	Occurrence of the taxon in Piemonte	binary
Lo	Occurrence of the taxon in Lombardia	binary
VT	Occurrence of the taxon in Trentino - Alto Adige	binary
V	Occurrence of the taxon in Veneto	binary
FVG	Occurrence of the taxon in Friuli - Venezia Giulia	binary
Li	Occurrence of the taxon in Liguria	binary
ER	Occurrence of the taxon in Emilia Romagna	binary
To	Occurrence of the taxon in Toscana	binary
Ma	Occurrence of the taxon in Marche	binary
Um	Occurrence of the taxon in Umbria	binary
La	Occurrence of the taxon in Lazio	binary
Abr	Occurrence of the taxon in Abruzzo	binary
Mo	Occurrence of the taxon in Molise	binary
Cp	Occurrence of the taxon in Campania	binary
Pu	Occurrence of the taxon in Puglia	binary
Bas	Occurrence of the taxon in Basilicata	binary
Cal	Occurrence of the taxon in Calabria	binary
Taxonomic notes	Nomenclatorial changes from the previous check-list of Platia (2005)	string
Distribution notes	Literature reference for the records in a geographical unit not reported in Platia (2005)	string

Metadata managers: Marco A. Bologna, Lucio Bonato, Fabio Cianferoni, Alessandro Minelli, Marco Oliverio, Fabio Stoch, Marzio Zapparoli & LifeWatch Italy

Management details

Project title: The new Checklist of the Italian Fauna: Elateridae, not including Cebrioninae, Drilinae and Lissominae.

Database manager: Edoardo Pulvirenti, Giuseppe Platia; Marco A. Bologna, Lucio Bonato, Fabio Cianferoni, Alessandro Minelli, Marco Oliverio, Fabio Stoch, Marzio Zapparoli & LifeWatch Italy

Temporal coverage: Anything published until 15 June 2020.

Funding grants: No funding was specifically available for the project on Elateridae; funding for the update of the Checklist of the Italian fauna was obtained from LifeWatch Italy.

Geographic information

General description: The dataset includes records from the national territories of Italy, including the two major islands Sardinia and Sicily, together with archipelagos and minor islands politically under the Italian legislation.

Geographic units: The geographical units within the Italian national territories refer to the administrative boundaries of the 20 Italian regions. Additionally, this paper presents data referred to the 107 administrative provinces (Supplementary file S2). According to the geographical subdivision of Platia (2005), continental and peninsular Italy was also divided in only two units, namely North (Friuli - Venezia Giulia, Veneto, Trentino - Alto Adige, Lombardia, Valle d'Aosta, Piemonte, Liguria, Emilia-Romagna) and South (Toscana, Marche, Umbria, Lazio, Abruzzo, Molise, Campania, Puglia, Basilicata, Calabria).

Bounding box: All areas falling under Italian administration from 35° 25' to 47° 06' N and from 6° 35' to 19° 20' E (WGS84 reference system) were included.

Sampling design: Authors integrated the published data with the examination of collections and web platforms (see Data set sources, above), so they did not perform any additional sampling.

Habitat type: Any type of habitat where Elateridae can be found was considered (Platia 1994), so nearly all terrestrial habitats.

Biogeographic region: Within the Palearctic realm, according to the definitions of the European Environmental Agency (2017), the dataset covers three European biogeographical regions: Alpine, Continental, and Mediterranean.

Countries: Italy.

Quality control for geographic data: authors checked that the records in the examined collections and in the published localities in the papers indeed matched the geographical units used for the checklist at the level of administrative provinces.

Literature records

General description: published and few unpublished regional records are included.

Literature search methods: direct request to the authors of the works or consulting the websites of the journals.

Literature list: The nine papers published after the previous checklist by Platia (2005) that provided new records of Elateridae for the Italian Fauna are: Parisi et al. (2020), Platia (2011, 2012, 2015, 2017), Platia & Pedroni (2010), Platia & Pulvirenti (2021) Platia, Pulvirenti & Ruzzante (2020) Wurst & Mifsud (2012). The works that provides new data for the worldly distribution of the species of the checklist are included in the references (Supplementary file S4).

Quality control for literature data: Additional references were searched through the literature, scanning the cited references of each paper.

Taxonomic information

General description: Only records reporting species or subspecies were included, disregarding records identified only at higher levels like genus, family, etc.

Taxonomic coverage: family Elateridae excluding Cebrioninae, Drilinae and Lissominae.

Taxonomic rank: Only species and subspecies are reported; the dataset reports higher taxa for each species, including Phylum, Class, Order, Family, Genus.

Taxon specialists: Edoardo Pulvirenti, Giuseppe Platia.

Nomenclature: Nomenclature followed Cate (2007), Bouchard et al. (2011), Schimmel et al. (2015), Kundrata et al. (2019).

Taxonomic remarks: All taxonomic changes that occurred since the publication of the previous checklists (Platia 1995, 2005) are reported. Species that were included in the previous checklist and are now considered not valid are excluded from the dataset.

Quality control for taxonomic data: Taxonomic data were checked and updated to include revision of names, synonyms, delimitation of genera and higher taxa.

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