

Stefano Bertolini (1832-1904): tribute to one of the most important Italian entomologists and to his entomological collection

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SUMMARY - *Stefano Bertolini (1832-1904): tribute to one of the most important Italian entomologists and to his entomological collection* - Stefano Bertolini was born in Civezzano, near Trento (Italy), in 1832 and died in Madrano (Trento) in 1904. He was lawyer for job, and entomologist for passion. In Italy, it is remembered as one of the most important entomologists (mainly coleopterologists) because he got off the faunistic studies. He wrote the first monographs on the beetles' fauna of Italy, and on beetles and ground beetles of Trentino (Province of the Eastern Italian Alps). The Bertolini's catalogues, monographs and private collection are at the Museo delle Scienze di Trento (Italy) where they are studied, cared, and managed. Data on qualitative and quantitative content about his collection are presented in this paper for the first time. More than 34,000 specimens are included, mainly beetles (95%, ascribed by Bertolini to 71 families), collected in the Mediterranean basin. Some specimens come from other areas (e.g. America, Australia, Great Britain, and Norway). True bugs are also included (about 1850 specimens). To be mentioned the presence of two Types of carabid beetles, and about specimens of species he described and of species named in his honour.

RIASSUNTO - *Stefano Bertolini (1832-1904): tributo ad uno dei più importanti entomologi italiani e alla sua collezione entomologica* - Stefano Bertolini nacque a Civezzano (Trento) nel 1832 e morì a Madrano (Trento) nel 1904. Di mestiere era avvocato quindi l'entomologia era una passione. In Italia è ricordato come uno dei più importanti entomologi (principalmente coleotterologo) poiché uno dei primi a occuparsi di faunistica. Bertolini fu autore della prima monografia sui coleotteri italiani e su quelli del Trentino. I cataloghi, le monografie e la collezione privata di Bertolini sono depositate presso il Museo delle Scienze di Trento dove sono state studiate e tuttora conservate. Per la prima volta vengono presentati in questo lavoro i dati aggiornati qualitativi e quantitativi riguardanti la sua collezione entomologica. La collezione è composta da più di 34,000 esemplari, principalmente coleotteri (95%, appartenenti, secondo la nomenclatura adottata da Bertolini, a 71 famiglie), raccolti nell'area attorno al bacino del Mediterraneo. Alcuni individui provengono da altre zone geografiche (es. America, Australia, Gran Bretagna e Norvegia). Nella collezione sono inclusi anche alcuni emitteri (circa 1850 individui). Di valore è la presenza di due esemplari Tipo di coleotteri carabidi e di alcuni esemplari appartenenti alle specie da lui descritte e a lui dedicate.

Key words: Carabidae, Coleoptera, insects, museology, natural archives, types

Parole chiave: Carabidae, Coleoptera, insetti, museologia, archivi naturali, tipi

1. INTRODUCTION

Knowledge on the insects' spatial distribution, in the Italian peninsula, advanced significantly since the end of the eighteenth century due to the work of several specialists first of those Giovanni Antonio Scopoli with the catalogue *Entomologia Carniolica* published in the year 1763.

Many other catalogues has been published during the eighteenth and nineteenth century (Baccetti 1996). The first monographs related to the Italian fauna of whole orders of insects were published in the second middle of the nineteenth century. The main ones are: the *Catalogo sinonimico e topografico dei Coleotteri d'Italia* by Stefano Bertolini (1872) and the *Saggio di un Catalogo dei Lepidotteri d'Italia* by Curò (1875) (Vigna Taglianti 2005). These catalogues explain better the first efforts to document the insects' spatial distribution across the Italian peninsula.

Knowledge about the Italian beetle fauna advanced significantly thanks to Stefano Bertolini who is remembered as one of the most important Italian entomologists, belonging to the nineteenth century, in terms of literature published and

qualitative and quantitative content of personal collection. Both his personal collection and manuscripts are deposited at the Museum of Science (Trento, Italy) (acronym Mds).

Aims of this paper are: a) to describe the historical, scientific and social role of Stefano Bertolini, b) to document for the first time the content of his collection, and c) to contribute to the knowledge of the first faunistic researches on beetles developed in Italy.

2. LAYER FOR JOB, ENTOMOLOGIST FOR PASSION

Stefano Bertolini (Fig. 1) was born on 30 June 1832 in a little town (Civezzano) near Trento (Trentino, NE-Italy). He studied law achieving the degree of lawyer in Innsbruck (Austria) and until his retirement he practised the employment of lawyer (Conci and Poggi 1996). His noble origin is testified, in the signature, by the appointed "De" before the surname; the Bertolini's surname is belonging to a famous dynasty of lawyer in Trento, yet.



Fig. 1 - Stefano Bertolini's portrait by Camillo Bernardi (1906) (at to day deposited in the Bibliotheca of the Museum of Science, Trento).

Fig. 1 - Ritratto di Stefano Bertolini (di Camillo Bernardi, 1906) (il quadro è ad oggi depositato presso la Biblioteca del Museo delle Scienze di Trento).

Since he was young, Bertolini cultivated the passion for the entomology and already to the age of 23 years old he became partner of the Zoological and Botanical Society of Vienna (Austria) and of the Entomological Society of Szczecin (Poland). In 1868 he became partner of the Entomological Society of Berlin (Germany) and Adviser of the Italian Entomological Society (Conci and Poggi 1996).

In 1850 and thus at the age of 18 years old, he began to cooperate with the "Museo del Trentino" (this was the name of the present MTSN at that date, Tomasi 2004) by cooperating in the first steps to the consolidation of the arising new museum of the Municipality and by preparing its first entomological collection including beetles (Coleoptera), true bugs (Hemiptera) and butterflies (Lepidoptera) (report of the MTSN dated 30 June 1924). This collection began of the permanent exhibitions. During the Second World War bombardments (1944), that destroyed part of the museum's palace (Tomasi 2004), partly of this material was probably lost (true bugs and butterflies were never more found). The rest of entomological collection, containing 3657 beetles in 15 entomological boxes remained in the permanent exhibitions until the year 1975 (when the third author of this paper was director of the MTSN). This is probably the only world case of collection used for ostensive purposes towards 120 year (since 1850 to 1975). Since 1976 up to day it is stored in the collection's museum rooms. Other 32,519 specimens recovered in 50 boxes belong to the private collection, deposited as well at the MTSN.

Bertolini was buried in a little town near Trento (Madrano) on 15 April 1904.

3. RELEVANCE OF THE ENTOMOLOGICAL ACTIVITY

The entomological activity of Bertolini is inferable by three monographs (see Bertolini 1867, 1872-79, 1899), two manuscripts, the abundant correspondence letters with various entomologists around the world, and papers about: his entomological catches (e.g. Bertolini 1870, 1871, 1874a, 1876, 1879), the relationship between insects and agriculture (e.g. Bertolini 1886) and about the local distribution of particular taxa (e.g. Bertolini 1860, 1864, 1868, 1872, 1874b, 1874c, 1875). Among his main works of national interest there is the *Catalogo sinonimico e topografico dei Coleotteri d'Italia* (published in 1872) which was the first monograph related to the Italian beetle fauna. Numerous monographs have regional value because including for each species detailed information on spatial distribution, two examples are: *Carabici del Trentino* (published in 1867), and *I Coleotteri del Trentino* (published in 1899); the former is on ground beetles (Carabidae), while the latter is on various families of beetles (Coleoptera).

Bertolini was descriptor of 4 new species of beetles that are at the time taxonomically accepted: the carabids *Abax ecchellii* Bertolini, 1887 and *Abax ecchellii ecchellii* Bertolini, 1887; the tenebrionids *Isomira costessii* (Bertolini, 1886) and *Omophlus longicornis* Bertolini, 1868 (source: Fauna Europaea Web Service 2011). In 1870 he described also a species of beetle, the dytiscids *Agabus venturii*, now synonymous of *Agabus congener* (Thunberg 1794) which is the accepted name. Five species were dedicated to him: the carabid *Carabus bertolinii* Kraatz, 1878; the cantharid *Malthodes bertolinii* (Fiori, 1905), and two curculionids: *Tropiphorus bertolinii* Stierlin, 1894, and *Hoplopteridius lutosus bertolinii* (Stierlin, 1892) (source: Fauna Europaea Web Service 2011), and the staphylinid *Ligoluta bertolinii* Zanetti 2010 (Zanetti 2011).

4. THE MANUSCRIPTS

The most important inheritance about the entomological field activities conducted by Bertolini is not only the already cited collection made for ostensive purpose, but also his private collection of beetles and true bugs donated, in 1922, by his child Marco at the "Museo del Trentino" (report of the Museum dated 18 June 1922), now called Museo delle Scienze. (Fig. 2).

To completion of the historical-scientific patrimony of the collection, there are two volumes manuscripts (the first one deposited at the Section of Invertebrate Zoology of the MTSN), the latter at the Civic Bibliotheca of the Trento Municipality). The first volume probably represents the ambitious project of Bertolini to list, in systematic order, the species located in the private collection and for each species are pointed the morphological features helpful for the identification. Such volume, of 736 pages, is incomplete because compiled just for the carabid beetles family. The latter volume, deposited at the Civic Bibliotheca, consists instead in



Fig. 2 - Part of the collection of Stefano Bertolini (Photo by M. Gobbi).
 Fig. 2 - Parte della collezione di Stefano Bertolini (Foto di M. Gobbi).

699 pages (complete of index) in which are listed, in systematic order, species of beetles (only some deposited at the MTSN) with locality information. This volume contains in the first pages a legend of the countersigns used in the private collection to point out Italian and foreign places. In his collection, these countersigns are represented by tapped cardboards variedly conformed and coloured, each one referring to specific localities. For example green cardboards indicated Italy, those black the Great Britain, those orange the Spain, those clear blue the France and for what concerned the Italian locality: cardboards green square indicated Trento, the triangle turned downward indicated the Ledro Valley.

5. THE COLLECTION CONSISTENCE

The first quotation on consistence of the Bertolini's collection is in Ambrosi (1894) which reported: "tiene presso di se una stupenda collezione d'insetti; la quale continua ad aumentare colle ricerche e lo scambio esteso da lui agli entomologi di Germania, d'Italia e di altri più lontani paesi" ("it holds near of it a stupendous collection of insects; which continuous to increase with the researches and the exchange extended by him to the entomologists of Germany, Italy and others more distant countries"). In Bargagli (1926) it is possible to find the first documentation of the numerical dimension of the collection quantified it in 18.000 samples. This value is reported in the report of the MTSN dated 30 June 1924, but after our cataloguing it resulted abundantly underes-

timated. In a letter, dated on 25 October 1929 (report of the MTSN) wrote by Marco, son of Stefano Bertolini, is reported that in the Bertolini's house there was a modest collection of manuscripts related to the collection, but after innumerable requests, the material was surrendered to an anonymous editor in Wien (Austria).

The study and cataloguing of the two collections allowed to list, according to the nomenclature used by Bertolini, 71 families of beetles (Tab. 1) for a total of 1935 taxa (subspecies and variant includes) and 34,365 specimens stored in 65 entomological boxes. Specifically 3657 specimens recovered in 15 boxes belong to the ostensive collection, while 32,519 specimens recovered in 50 boxes belong to the private collection.

In the collection there are three boxes with true bugs (Heteroptera) and two boxes of miscellaneous, one with beetles and the others containing grasshoppers and phasmids cached in the New Guinea, and gifted in 1884 by the Marquis Giacomo Doria (1840-1913), the founder and first Director of the Natural History Museum of Genova (Italy) which is one of the most important Italian museum. Overall, 85% of sample localities are Italian (Deflorian et al. 2009).

It is interesting to observe the care with which Bertolini has created his collection. Each family of insects is distributed in one ore more boxes, and to each family there are associated labels of all species potentially collectable. This technique was able to inform Bertolini about the species lacking into his collection. Besides, for each taxon there are four specimens.

All species described by Bertolini are in the collection and these are: the carabid beetle *Abax ecchelii*

Tab. 1 - List of the Coleoptera families belonging to the Stefano Bertolini's collection (the nomenclature is that used by Bertolini).
 Tab. 1 - Lista delle Famiglie di coleotteri incluse nella collezione di Stefano Bertolini (la nomenclatura è quella adottata da Bertolini).

Alleculidae	Cucujidae	Nemonychidae
Anobiidae	Curculionidae	Nitidulidae
Anthicidae	Dascillidae	Oedemeridae
Anthribidae	Dermestidae	Ostomidae
Bostrychidae	Dytiscidae	Parnidae
Brentidae	Elateridae	Paussidae
Bruchidae	Endomychidae	Phalacridae
Buprestidae	Erotylidae	Pselaphidae
Byrrhidae	Eucnemidae	Ptinidae
Byturidae	Georyssidae	Pyrochroidae
Cantharidae	Gyrinidae	Pythidae
Carabidae	Heteroceridae	Rhinomaceridae
Cebionidae	Histeridae	Rhipiphoridae
Cerambycidae	Hydrophilidae	Scaphiidae
Chrysomelidae	Hylophilidae	Scarabeidae
Ciidae	Lagriidae	Scolytidae
Cistelidae	Lariidae	Scydmaenidae
Clambidae	Leptinidae	Silphidae
Clavigeridae	Lucanidae	Sphindidae
Cleridae	Lyctidae	Staphylinidae
Coccinellidae	Melandryidae	Tenebrionidae
Colydidae	Meloidae	Thorictidae
Corylophidae	Mordellidae	Trichopterygidae
Cryptophagidae	Mycetophagidae	

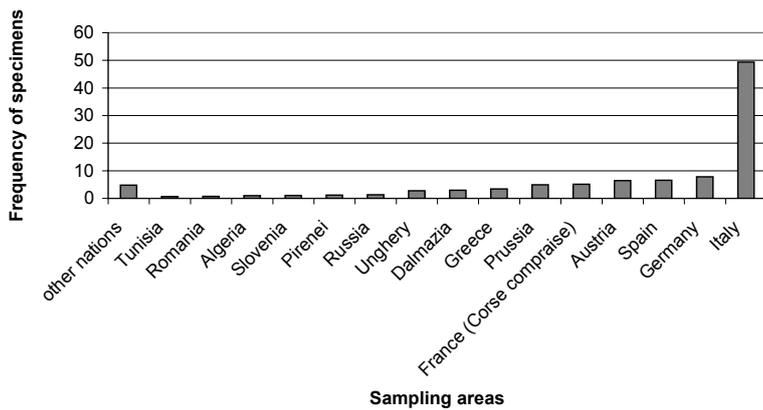


Fig. 3 - Frequency of specimens (Coleoptera Carabidae) sampled, by Stefano Bertolini or gifted by colleagues, around the world ("other nations" accounts areas for which sample frequency was < 0.6%).

Fig. 3 - *Abbondanza di individui (Coleoptera Carabidae) per nazione di raccolta, campionati da Stefano Bertolini o donati da colleghi stranieri ("other nations" si riferisce alle nazioni in cui l'abbondanza di individui è < 0.6%).*

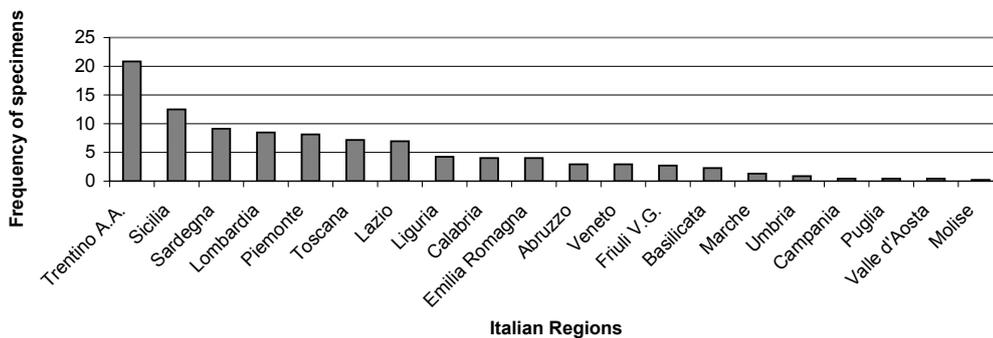


Fig. 4 - Frequency of specimens (Coleoptera Carabidae) sampled, by Stefano Bertolini or gifted by colleagues, from Italian regions.

Fig. 4 - *Frequenza di individui (Coleoptera Carabidae) per regione italiana, raccolti da Stefano Bertolini o donati da colleghi.*

Bertolini, 1887 (locality: M.te Cridola, Val Tagliamento, Udine, Italy), and the tenebrionid *Isomira costessii* (Bertolini, 1866) (locality: for two is generically reported Trentino, for one Peio Valley, Trentino-Alto Adige, Italy) and *Omophlus longicornis* Bertolini, 1868 with 7 specimens sampled in Spain. Unfortunately anyone belong to the type series. The majority of the specimens were sampled by Bertolini, but there are a part of these gifted by famous Italian and world coleopterologists like: Agostino Doderò, Giacomo Doria, Raffaello Gestro, Paolo Luigioni, Giorgio Fiori, Ludwig Ganglbauer and Edmund Reiter.

A deep study was carried out by the first author of this paper on the Carabidae family due to the accounting of most part of specimens (13%) of the Bertolini's collection. This section accounts some exotic species, collected by Bertolini or donated by various entomologists during his life (until one year before his death). There are specimens from the whole Eurasia, at all latitudes (es. Lapland and Iceland) and those near the equator and the tropics (e.g. South America, Africa, Australia). Considering that the political confinements in the 19th century were different respect to the actual ones, it results difficult to furnish a detailed picture of the nations in which Bertolini has done its researches. The greatest part of the sampling sites comprises the States that lean out on the basin of the Mediterranean Sea (Fig. 3). For what concern the catch done in Italy it emerges that the Eastern Alps (mainly the Trentino-Alto Adige Region) is the area with the greatest number of species, followed by the greatest Italian islands: Sicily and Sardinia (Fig. 4). The habitat requirement of the species testifies that the specimens were collected in a wide range of habitat, from desert to the glaciers fronts.

It is important to highlight the presence of many endemic species from Italy and other nations and of two Type

specimens (white labels, ? paratype): *Carabus heteromorphus* K. Daniel, 1896, from the type locality Colle d'Arietta (Val d'Aosta, Italy) and *Percus brunneipennis* A. Costa, 1847 (now *Percus bilineatus* (Dejean 1828)) from the type locality Pratella (Abruzzo, Italy).

6. FINAL REMARKS

Document the biodiversity "deposited" in the museum's collections, catalogues and papers is useful to reconstruct biodiversity trends at local and global scale being the collections memories of the past biodiversity (Shaffer et al. 1998; Latella 2005).

Within this context, this paper and the electronic catalogue filled at the MTSN by Pego© MTSN software, acquire special value as useful research instruments for all entomologists or molecular biologists involved in DNA barcoding programmes interested in biodiversity trend's reconstructions at local or global level. Specifically at to day the Bertolini's collection is viewed and studied by many Italian and European entomologists, yet.

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