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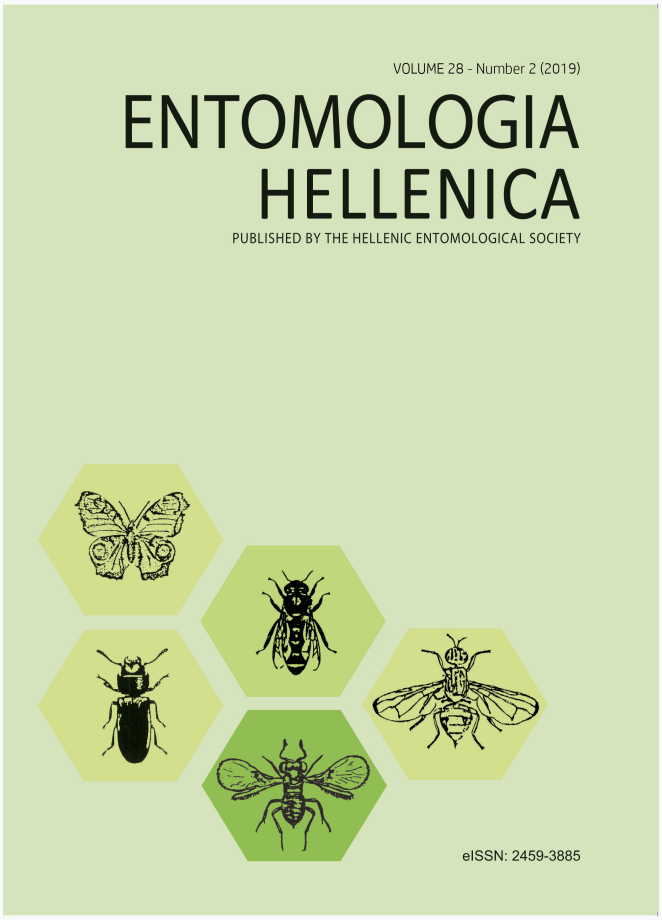

Towards a National Network of Entomological Collections in Greece

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Towards a national network of entomological collections in Greece

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ABSTRACT

Although the history of entomological research in Greece spans to more than 2400 years, entomological collecting started about 200 years ago, while established entomological collections were registered about 20 years later. This paper presents the history of these collections giving information on their current status, provides information on the legislation regarding entomological collecting in Greece based on national and international laws and proposes the establishment of a National Network of Entomological Collections.

KEY WORDS: collaboration, entomology, history, law, legislation, tools.

Introduction

The history of entomology in Greece, starts before the establishment of the current state and even before the first records of Greek specimens from visitors and scholars coming and collecting to what is now Greece. It starts even before the establishment of the binomial system that Linnaeus proposed in 1735. Someone needs to refer to the works of Aristotelis during the 4th century BC, as he was the one who described with (what regarded today) rudimentary ways the first insect species from Greece (Book IV: Animals without blood).

Nevertheless, although some specimens of Greek origin had made their way to Europe (see Dejean 1821-1838), entomological research in Greece and in the form we know today, began during the first scientific expedition in the area of Morée (today Peloponnisos) by Brullé (1833). It was then that the first insect specimens were collected and described adhering to the guidelines that *Systema Naturae* offered. Brullé recorded 880 species of insects of which for at least 363 offered descriptions, registering them as new species to Science. Of course, someone must take into consideration that many of these species are now synonyms but nevertheless, his contribution to the entomofauna of Greece was of utmost significance. The specimens of the Brullé collection are now part of the Muséum National d'Histoire Naturelle (Paris, France). Since then, other collectors have visited Greece contributing to the knowledge of entomology but all specimens were transferred back to their respective countries.

It was in 1835 that the Athens Natural History Society (Εταιρεία της Φυσικής Ιστορίας εν Αθήναις) was established in Greece and members such as Karl Nikolas Fraas, Xavier Landerer, Kyriakos Domnados, Dr. Anton von Lindermayer, Dr. Bernhard Jacob von Röser, and other members of the Society, having created collections on

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various fields of natural sciences, they also collected insects. Due to financial issues of the Society, the collections were donated to the recently established University of Athens (1837). Since then, the Physiographic Museum (officially established internally in 1858) held and developed the collections until they were split into different museums (Oryctological-Petrological, Paleontological-Geological and Zoological).

The entomological collection of the later was initially curated by the first curator of the Museum, Theodor Heinrich Hermann von Heldreich and later taken up by Theobald Johannes Krüper until his death in 1917. Due to WWI and the lack of specialized personnel, it was not until 1934 when Charilaos Ilia Chatzisarantos, although working predominantly with Arachnida, curated some of the specimens of the collection. Krüper (1862) and Legakis (1983) provide further details on the history of the Zoological Museum. The entomological collection today is comprised of about 250 old, glass-top, wooden drawers in five (5) wooden cabinets, stored at the Preservation Room, while about 100 new, glass-top, wooden drawers in two (2) metallic cabinets are held at the Laboratory Room. The oldest specimens are from the 1850s' and the vast majority of the insects are donations to the Museum (from Brazil, southeast Asia and Continental Europe) with Greek specimens intermixed within them. Unfortunately, many specimens have minimal or lack completely collecting information (metadata) while the majority of them are in a rather bad state. Several undergraduate and graduate students of the Department of Biology have and are working with the old specimens trying to record, database and even digitize them.

Apart from the Entomological Collection of the Zoological Museum of the National and Kapodistrian University of Athens, there are several other collections around Greece (e.g. at the Natural History Museum of Crete, the Entomology Laboratory of the Agricultural University of Athens, Benaki Phytopathological Institute, Goulandris Museum of Natural History, and others). In addition, there are several private collections with very interesting and important specimens. A short review of their history is given further below.

There have been numerous publications on the benefits of natural history collections (as well as against them) (Lane 1996, Suarez & Tsutsui 2004, Bradley et al. 2014, McLean et al. 2015). Summarizing the benefits of them, one can say that they can be used to rapidly identify costly pests and parasites affecting agriculture, forestry and animal and human health, they enrich research and act as focal points for all science clades, they are the only points of reference where the planet's natural heritage is preserved forever to be studied from future generations and generally, natural history collections offer a look in the past, a snapshot of present and a prediction for the future. But Natural History Collections (NHC) are not just the specimens. It is also their infrastructure and their personnel (i.e. scientists/curators, technicians, administrators, bioinformatics specialists and educators). And all of this, in order to effectively work, needs rules and guidelines; whether internal (e.g. code of conduct, loan procedures etc.) or external (i.e. legal binding documents, legislation, etc.). And this is where things get complicated.

National Legislation

Looking into past legislation underlying the establishment, development and *modus operandi* of NHCs in Greece, we start off in 1834 with the Royal Decree of the Government Gazette N. 22/16.06.1834 (Section A, Article 1) for the establishment of a "Repository of Natural History Items", also providing guidelines for curators and committee members. It is evident throughout the text that the target for these collections was the antiquities, which were scattered throughout Greece at that time. One year

later, and in accordance to the establishment of the Athens Natural History Society, King Othon (or Otto), issued a Royal Decree (Government Gazette N. 21/17.05.1835, Section B) where Article 3 promotes the establishment of "*technical and scientific collections… to be used in higher education institutes*". With the Royal Decree of the Government Gazette N. 16/24.04.1837, the Othon University (of Athens) is established. During the following years, zoological, mineralogical, geological and botanical collections were established, and with the Royal Decree on the "Bylaw of the Physiographic Museum of Athens" (signed by Queen Amalia), they were pooled into one museum (Government Gazette N. 43/19.09.1958, Chapter A, Article 1). Indeed, this is the first proper legal entity that can be deemed as a Natural History Museum since the text tries to cover all aspects for its proper operation. The Decree was published again, this time signed by the new King of Greece, Georgios I, as a Royal Decree Government Gazette N. 31/05.07.1868) with minor additions. In both of those pieces of legislation, under Chapter 5 (About the duties of the taxidermist/dissectionist), Article 30 (or 32 in the later Decree), there is the first record of entomology curatorial duties (insect wings' spreading).

With the Law 3823/12.07.1911 (Government Gazette N. 178), Section Z, Article 23, Paragraph 5, the University Physiographic Museum is again broken up into five (5) separate museums (Anthropological, Zoological, Mineralogical, Geological and Paleontological, and Botanical). While the previous piece of legislation refers to the establishment of the "National University", Law 3825/17.07.1911 (Government Gazette N. 183) establishes the Kapodistrian University. The two Universities were merged with the Law 5343/23.03.1932 (Government Gazette N. 86) and this time a whole Segment (Section 12, Segment 5, Articles 297-307) refers to the University Museums (Anthropological, Hygiene, Criminological, Zoological, Mineralogical and Petrological, Paleontological and Geological, Botanical and the Botanical Garden) giving rules and guidelines for their organization. In Article 298, it is stated that although separate, the combination of the Anthropological, the Zoological, the Mineralogical and Petrological, the Paleontological and Geological and the Botanical Museums are deemed as the National Physiognostic Museum. With Article 305, the operations of the National Physiognostic Museum are to be conditioned by a Regulation proposed by the Museum Council and attested by the Senate.

Following the establishment of the University of Patras (Law 4425, Government Gazette N. 216A), came the Presidential Decree N. 360/03.10.1973 (Government Gazette N. 264A) where the Zoological Museum of the University of Patras was established. It provides some general organizational information for the Museum, and within Article 1 it does briefly mention the need of specimen collections.

With the Presidential Decree N. 1082/03.12.1980 (Government Gazette N. 274), Article 3, Segment C, the Natural History Museum of Crete was established. The operations of the Museum were to be conditioned by an internal Regulation proposed by the Physicomathematical School and attested by the Senate of the University of Crete.

According to a website reference (AUTH, 2019), a NHM (as Wild Fauna Museum) started in the 1950s' and established in 1975 with the inauguration of the Laboratory of Wild Fauna and Fresh Water Fisheries at the Aristotle University of Thessaloniki. The Laboratory fits under the Section of Range Science and Wildlife – Fresh Water Fisheries established with the Ministerial Decree N. B1/420 (Government Gazette N. 231/29.04.1983). Nevertheless, the NHM is not quoted in legislation so its legal status is eluding. The museum's exhibits (including insects) will be gradually transferred to a

building at Thessaloniki Harbor (CNN.gr, 2019).

In addition to these Institutes holding entomological collections, numerous research laboratories have established their own collections (although some of them are stated as Museums, it was not possible to locate legislation clearly establishing such a term), predominantly for research and tertiary-level educational purposes (i.e. Agricultural University of Athens, University of Thessaly, Benaki Phytopathological Institute, Hellenic Agricultural Organization "DEMETER", and others).

Another significant private NHM holding an entomological collection is the Goulandris NHM in Kifissia, established as a Botanical Museum in 1964 [its Organization was ratified with the Royal Decree N. 2/10.02.1964 (Government Gazette N. 1A) and amended by the Presidential Decree N. 430/16.05.1977 (Government Gazette N. 132A)]. With the later, it is clearly stated that there will be an entomological exhibition within its premises. It currently holds more than 40,000 specimens.

Apart from these NHMs, a number of museums holding small entomological collections around Greece (e.g. NHM of Aegean in Samos, NHM of Kefalonia and Ithaki, NHM of Meteora, NHM of Alexandroupolis and many others) exist. Unfortunately, the majority of these collections are extremely small, malcurated and the specimens hold minimal or no collecting information. Also, many specimens come from acquisitions and donations outside of Greece, thus not truly depicting the diversity of Greek entomofauna.

Private entomological collections in Greece, although usually behind closed doors, are an important pool of information and research for amateur and professional entomologists. In recent decades, amateur entomologists (as in not holding a position in a research institute) seem to have gathered a significant number of specimens, usually of one particular taxon, and are publishing their work in taxonomical journals or books (e.g. Coutsis & Ghavalas 1995, Pamperis 2009, Anastasiu 2012, Gavalas 2013, Platia & Kakiopoulos 2014, Alexiou et al. 2017). Their level of expertise and dedication, in many cases surpasses that of entomologists holding positions in state research and educational institutions. One case of such a collection open to the public, is the Entomological Museum of Volos established in 1987, which is holding more than 100,000 specimens, of which butterflies is the majority.

Today, the legal framework of the museums in Greece is governed by the provisions of Article 45, Chapter 5 of the Basic Law N. 3028 on the Protection of Antiquities and in general Cultural Heritage (Government Gazette N. 153A/28.06.2002) where it in paragraph 1 is stated that:

As a "Museum" is characterized a service or a non-profit organization, with or without its own legal entity, acquiring, accepting, keeping, maintaining, recording, documenting, investigating, interpreting and, in particular, displaying and promoting to the public collections of archaeological, artistic, ethnological or other material testimonies of mankind and his environment for research, education and entertainment.

Later on, Law N. 3658 (Government Gazette N. 70A/22.04.2008) on the Protection of Cultural Property and other provisions, gives general guidelines on the procedures by Public Services, Courts and Armed Forces for the protection of cultural property. Both of these Laws and all legislation ever since, refer to antiquities and ancient and byzantine monuments and fail to mention anything that has to do with natural history elements.

Numerous Laws and bylaws exist on the protection of habitats (Common Ministerial

Decree 33318/3028 (Government Gazette N. 1289B/28.12.1998) amended with the Common Ministerial Decree 14849/853 (Government Gazette N. 645B/11.04.2008)), the environment (Law N. 1650/18.10.1986 (Government Gazette N. 160A) amended with Law N. 3937/31.03.2011 (Government Gazette N. 60A), Paragraph 1, Article 51 of Law N. 4409 (Government Gazette N. 136A/28.07.2016) and Article 223, Law N. 4610 (Government Gazette N. 70A/07.05.2019) and fauna and flora (Presidential Decree N. 67/30.01.1981 (Government Gazette 23A) corrected in Section 5 of Government Gazette N. 43A/18.02.1981)). According to Law N. 1650 (Chapter Z, Article 28, Paragraph 9) specimens that have been confiscated according to Article 20, Paragraphs 2 & 3, are to be deposited to NHMs. With the above laws, anyone wishing to do research on insects should apply for a permit to the Directorate of Forest Management (Directorate General for the Protection and Development of Forests and the Rural Environment, Ministry for Environment and Energy) clearly indicating the objectives, purpose, aims of the research, the species to be studied, and other details (for more information and the actual forms for permits please visit http://www.ypeka.gr/Default.aspx?tabid=918&language=en). In the case of researchers from a state institute, the application is not necessary, but they should notify the local authorities on their presence and research in the area of study.

The culmination of these national laws and decrees is probably the National Biodiversity Strategy & Action Plan (Ministerial Decree N. 40332, Government Gazette N. 2383B/08.09.2014). Although it provides a plethora of general targets on the conservation and management of biodiversity and habitats, NHMs are only mentioned once within the 118 pages of the text (Specific target 1.1.2., General Target 1), while biological collections are mentioned once at Specific target 4.1.3., General Target 4 in regard to the genetic resources of Greece.

International Legislation

Greece is a member of several conventions on the protection of habitats and wildlife fauna and flora. Insects are an integral part of such conventions and are protected at various levels. An insect-focused analysis of these and how they are implemented within Greek legislation is provided below:

CITES (1975)

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) was ratified by the Law N. 2055 (Government Gazette N. 105A/30.06.1992) although it was implemented 7 years before with the Common Ministerial Decree N. 261554 (Government Gazette N. 112B/14.02.1985). Only one insect from Greece is included in this catalogue [i.e. *Parnassius apollo* (Lepidoptera)].

The Bern Convention (1979)

As one of the 50 country members of the Bern Convention on the Conservation of European Wildlife and Natural Habitats, Greece signed the treaty on 19.09.1979, and ratified it on 13.06.1983 putting into effect on 01.10 of the same year (Law N. 1335, Government Gazette N. 32A/14.03.1983), identifying 58 insect species in its Appendixes (56 in Appendix II and 2 in Appendix III).

EEC Directive 92/43/EEC (1992)

The EEC Directive 92/43/EEC (12.05.1992) on the conservation of natural habitats and of wild fauna and flora was ratified by the Common Ministerial Decree 33318/3028/1998 (Government Gazette N. 1289B/28.12.1998, amended by the Common Ministerial Decree 14849/853/E103, Government Gazette N. 645B/11.04.2008). It total 117 insect species are mentioned in the Appendixes of this binding document.

Discussion

Although the legislation is there (of course aspects of it need to be amended and enriched), there is a plethora of canonistic application problems. These arise from the lack of knowledge of the authorities on protected species (nomenclature, taxonomy, ecology etc.), limited public awareness and old information and data. More specifically regarding insects, specialized knowledge on species characteristics and identification usually takes years to master. Authorities simply cannot have such expertise nor the resources to check on collected specimens. Also, the available information on the protected species is in most cases outdated; not considering the dynamic nature of taxonomical studies introducing new nomenclature, novel identification methods and data on distribution and ecology.

One possible way of overcoming such issues is the direct collaboration of the authorities with experts in their field, as well as organized reference collections, databases and access to other resources such as bibliography and digital specimens. In order to achieve such a communication, the first step would be to create a register of all entomologists working and doing research in Greece, in possession, having access or managing an entomological collection. With the term entomologists, we include all individuals working with insects, irrespective of their academic background and current affiliation. A form to create such a catalogue has been created at the following link https://docs.google.com/forms/d/1QmRkcrMT3A6Fdwnpbd0Sw7ZsQ1nW7WFj9TyC7WN9lxQ/viewform?edit_requested=true. Through this catalogue, a direct way of communication with experts can be established, between the authorities and between the experts, so that identifications and dubious records of insect biodiversity can be resolved.

This register of collections can be regarded as the National Network of Entomological Collections (NNEC). The NNEC can then be used as a means to exchange experiences, information and technical knowledge with goals such as the harmonization and ultimately the standardization of common protocols, practices and tools (i.e. database software). In addition, as a collective entity, it will empower and put pressure on decision centers for the importance of collections and the benefits from them. Of course, there are more steps to be taken such as a cosigning of a memorandum of cooperation and potentially the establishment of a legal entity, officially recognized by the state. Through these steps, the NNEC could even request fiscal support and staffing for its activities.

The ultimate goal would be to collaborate with other such entities abroad. Such collective initiatives are currently under implementation on a regional (i.e. Consortium of European Taxonomic Facilities, SYNTHESYS program, Distributed European School of Taxonomy, Distributed System of Scientific Collections) or international level (i.e. The International Council of Museums Committee for Museums and Collections of Natural History, Society for the Preservation of Natural History Collections). Indeed, several NHMs in Greece are members of such initiatives, but a collective entity would maximize the benefits for all parts of the NNEC.

Finally, we must strenuously state the need for an official National Natural History Museum. Such an institution is still elusive. According to the legislation presented above, the closest to such a museum is the group of the museums under the National and Kapodistrian University of Athens. Still, there is no legally binding document that attests to such a notion. As in the case of other countries (e.g. USA, UK, France, Netherlands, Romania, Bulgaria, India, Malta etc.), a National NHM would be an institution acting as the depository of the Greek biodiversity wealth and a focal point for research, education and culture.

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Πρόταση για ένα εθνικό δίκτυο εντομολογικών συλλογών στην Ελλάδα

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ΠΕΡΙΛΗΨΗ

Αν και η εντομολογική έρευνα στην Ελλάδα ξεπερνά τα 2400 χρόνια (από τον καιρό του Αριστοτέλη), οι πρώτες συλλογές εντόμων πραγματοποιήθηκαν πριν από περίπου 200 χρόνια ενώ η πρώτη επιβεβαιωμένη συλλογή εντόμων στην Ελλάδα υπάρχει από τα μέσα του 1850 περίπου. Έκτοτε, οι εντομολογικές συλλογές στην Ελλάδα, αν και αναπτύχθηκαν και πλήθυναν, ποτέ δεν οργανώθηκαν στον βαθμό που είναι οργανωμένες στο εξωτερικό. Με την παρούσα εργασία γίνεται η προσπάθεια αποκωδικοποίησης της εθνικής (και της βασιζόμενης σε διεθνή) νομοθεσίας για την υπόσταση των εντομολογικών συλλογών στην Ελλάδα. Δυστυχώς το νομικό πλαίσιο για τα Μουσεία Φυσικής Ιστορίας είναι ασαφές, με αναφορές κυρίως σε αρχαιολογικά, βυζαντινά και νεότερης ιστορίας μουσεία. Ταυτόχρονα, η μη σαφής απόδοση του τίτλου Εθνικό Μουσείο Φυσικής Ιστορίας δημιουργεί ένα κενό στις προσπάθειες διαχείρισης και διατήρησης της ελληνικής βιοποικιλότητας. Προτείνεται η δημιουργία ενός μητρώου συλλεκτών εντόμων από την Ελλάδα. Βάσει αυτού του μητρώου δύναται η δημιουργία ενός Εθνικού Δικτύου Εντομολογικών Συλλογών (ΕΔΕΣ) με πρώτους στόχους την ανταλλαγή εμπειριών, πληροφοριών και τεχνογνωσίας και απώτερο στόχο την δημιουργία και χρήση κοινών πρωτοκόλλων, πρακτικών και εργαλείων (π.χ. λογισμικό βάσης δεδομένων). Εν τέλει, αυτό το δίκτυο, εφόσον ίσως αποκτήσει και νομική οντότητα, μπορεί να ενδυναμώσει την πίεση προς κέντρα αποφάσεων για την σημασία των συλλογών και τα οφέλη από αυτές. Το ΕΔΕΣ μπορεί να αποτελέσει το πρώτο βήμα για ένα Εθνικό Μουσείο Φυσικής Ιστορίας.

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