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An overview of the moth (Insecta: Lepidoptera) type material in the Fastré collection at the RBINS

João Pedro OLIVIEIRA DE ALMEIDA[1], Stefan KERKHOF[2], Wouter DEKONINCK[3] & Martijn VAN ROIE[4,5]

[1] Biodiversity Inventory for Conservation (BINCO) npo, Walmersumstraat 44, B-3380 Glabbeek, Belgium (e-mail: joao.dealmeida96@gmail.com)
[2] Royal Belgian Institute for Natural Sciences, Vautierstraat 29, B-1000 Brussels, Belgium (e-mail: skerkhof@naturalsciences.be, corresponding author)
[3] Royal Belgian Institute for Natural Sciences, Vautierstraat 29, B-1000 Brussels, Belgium (e-mail: wdekoninck@naturalsciences.be)
[4] Biodiversity Inventory for Conservation (BINCO) npo, Walmersumstraat 44, B-3380 Glabbeek, Belgium
[5] Department of Biology, Ecosystem Management Research Group, University of Antwerp, Universiteitsplein 1, B-2610 Wilrijk, Belgium (e-mail: martijn.vanroie@uantwerpen.be)

Abstract

The collection of Philippe Fastré at RBINS includes 400 drawers, 37.000 specimens and approximately 2.000 species of lepidopterans (Insecta). The majority of species in this collection are Erebidae and Noctuidae from Central and South Asia. To help make this information available we digitized the type material of this collection. Out of the 400 drawers, 191 paratype specimens belonging to 44 species were retrieved and digitized together with their original labels. The majority belonged to the family Noctuidae. The amount of species and type specimens contained demonstrates the importance and value of this collection.

Keywords: Erebidae, Noctuidae, RBINS-collections

Samenvatting

De collectie van Philippe Fastré op het KBIN omvat 400 dozen, 37.000 exemplaren en ongeveer 2.000 soorten Lepidoptera (Insecta). De meeste soorten in deze collectie zijn Erebidae en Noctuidae uit Centraal- en Zuid-Azië. Om deze informatie beschikbaar te maken hebben we het type-materiaal van deze collectie gedigitaliseerd. Van de 400 dozen werden 191 paratype-exemplaren van 44 soorten teruggevonden en gedigitaliseerd samen met hun originele labels. De meerderheid behoorde tot de familie Noctuidae. De hoeveelheid soorten en type-exemplaren die aanwezig zijn, toont het belang en de waarde van deze collectie aan.

Résumé

La collection de Philippe Fastré à l'IRSNB comprend 400 boîtes, 37.000 spécimens et environ 2.000 espèces de lépidoptères (Insecta). La majorité des espèces de cette collection sont des Erebidae et des Noctuidae d'Asie centrale et méridionale. Pour aider à rendre cette information disponible, nous avons numérisé le matériel type de cette collection. Sur les 400 boîtes, 191 spécimens de paratypes appartenant à 44 espèces ont été récupérés et numérisés avec leurs étiquettes d'origine, la majorité appartenant à la famille des Noctuidae. Le nombre d'espèces et de types démontre l'importance et la valeur de cette collection.

Introduction

In October 2016, the Royal Belgian Institute of Natural Sciences (RBINS) acquired a collection of Lepidoptera from the late Philippe Fastré (IG 33.354). Philippe Fastré was born in Liège on the 8th of November 1955 and passed away on the 30th of June 2014. His collection now entails 400 drawers, 37.000 specimens and approximately 2.000 species and was donated to the RBINS by Gilles Fastré, Philippe's son. Philippe Fastré focused on the families Erebidae and Noctuidae (Insecta, Lepidoptera) and assembled his collection from 1974 – 2014 mainly with specimens from Central and South Asia. The material from P. Fastré provides valuable distribution data on the lepidopteran fauna of countries like Oman, Turkmenistan, Nepal, Tajikistan, etc. where relatively little data are available. Consequently, this collection has been consulted frequently for taxonomical work and contributed valuable specimens for the description of several new species. There are also still many unidentified specimens. The holotypes of these described species were deposited in other museum collections at the moment of description, and the Fastré collection contains mostly paratypes.

Type specimens are references for the identity of a species and thus are extremely valuable historical and taxonomical material (ICZN, 1999). The locality of deposition, habitus and associated information (e.g. on the labels) are vital information in any taxonomic study. Digitization of type specimens thus forms a key priority of institutes. However, given the thousands of type specimens often deposited in institutes, this is not an easy task. To aid in the digitization of the RBINS collections, the non-profit organization Biodiversity Inventory for Conservation (BINCO npo) has been developing a low-cost method and volunteer protocol within the RBINS (Mertens *et al*., 2017, Merckx *et al*., 2018). This has already led to the digitization of more than 3.000 specimens (see e.g. Van Roie *et al*., 2019) and is now expanding to other institutes like the Royal Museum of Central Africa (e.g. the Carabidae collection of P. Basilewsky, Van Roie *et al*., *in prep*). Given the unique value of the Fastré collection, BINCO and the RBINS worked together to disclose the information of the type material in this collection, of which this paper discusses the results.

Fig. 1. Dorsal view and labels of a digitized specimen, *Hadena lypra hajara* (Hacker & Legrain, 1996). © Stefan Kerkhof.

Material and methods

All 400 drawers of the P. Fastré collection were examined, and all type specimens were digitized. To do so, each type specimen was photographed in dorsal and ventral view, using an Olympus TG4 digital camera with focus stacking functionality. We hereby followed the method as discussed in MERTENS *et al*. (2017). Afterwards, pictures of the type specimens were stacked with the Helicon Focus software (HeliconSoft Ltd, Kharkiv, Ukraine). Further post-production included adjustment of white balance and some manual cleaning of the background. The original labels of all the type specimens were also digitized. The pictures and data are publicly available on-line at the RBINS online databases (http://collections.naturalsciences.be/ssh-entomology and http://virtualcollections.naturalsciences.be/).

The authors are aware that nomenclature may have changed, and some species could have been synonymized or recombined. Nonetheless, we chose to report the original combination as indicated on the labels to facilitate tracking of the specimens. If the authors were aware of changes, these were reported under 'remarks' in a pdf list that is also published on http://collections.naturalsciences.be/ssh-entomology.

Results

A summary of the type species from the P. Fastré collection is added in Table 1. Full label data is accessible through the collections website either in tabular form (http://virtualcollections.naturalsciences.be/) or, to enhance readability, listed in pdf (http://collections.naturalsciences.be/ssh-entomology). From the approximately 2.000 species in the P. Fastré collection, 44 species had at least one paratype, with a total number of 191 paratype specimens. Four families of moths were represented in these paratypes, with respectively 1 (Erebidae), 2 (Geometridae), 1 (Lasiocampidae) and 40 (Noctuidae) species with at least one paratype specimen. An example of a digitized paratype, that of *Hadena lypra hajara* (Hacker & Legrain, 1996) is shown in Fig. 1.

Table 1. Digitized species with taxonomical placement and number of paratype specimens contained within the Philippe Fastré collection in RBINS.

Family	Subfamily	Genus	Species / subspecies	Author & Year	Speci-mens
Erebidae	Catocalinae	*Autophila*	*luxuriosa arnyekolta*	Ronkay, Varga & Hreblay, 1998	2
Geometridae	Ennominae	*Gnopharmia*	*musandamensis*	Witshire & Legrain, 1998	6
Geometridae	Sterrhinae	*Rhodostrophia*	*skulei*	Hausmann, 1998	4
Lasiocampidae		*Bufoidia*	*larseni*	Wiltshire & Legrain, 1997	3
Noctuidae	Acontiinae	*Acontia*	*peksi*	Hacker, Legrain & Fibiger, 2008	3
Noctuidae	Acontiinae	*Acontia*	*saldaitis*	Hacker, Legrain & Fibiger, 2008	10
Noctuidae	Amphipyrinae	*Allophyes*	*sericina*	Ronkay, Varga & Hreblay, 1998	11
Noctuidae	Amphipyrinae	*Polymixis*	*archrysa*	Ronkay, Varga & Hreblay, 1998	2
Noctuidae	Amphipyrinae	*Polymixis*	*carolina*	Hacker & Legrain, 1999	6
Noctuidae	Amphipyrinae	*Polymixis*	*schistochlora*	Ronkay, Varga & Hreblay, 1998	23
Noctuidae	Cucullinae	*Cucullia*	*behouneki*	Hacker & Ronkay, 1988	3
Noctuidae	Cucullinae	*Cucullia*	*boryphora oreomorpha*	Ronkay & Ronkay, 2009	1
Noctuidae	Cucullinae	*Cucullia*	*tamsi*	Ronkay & Ronkay, 1998	1
Noctuidae	Cucullinae	*Cucullia*	*grandpeteri*	Ronkay & Ronkay, 2009	2
Noctuidae	Cucullinae	*Cucullia*	*plantei*	Ronkay & Ronkay, 1998	1
Noctuidae	Cucullinae	*Cucullia*	*thomasi perscripta*	Ronkay & Ronkay, 1998	1

Family	Subfamily	Genus	Species / subspecies	Author & Year	Speci-mens
Noctuidae	Cuculliinae	*Omphalophana*	*turcomana*	Ronkay, Varga & Hreblay, 1998	14
Noctuidae	Hadeninae	*Bornolis*	*crinomima diluta*	Ronkay, Varga & Hreblay, 1998	24
Noctuidae	Hadeninae	*Dasypolia*	*proverai*	Ivinskis & Saldaitis, 2010	2
Noctuidae	Hadeninae	*Dasypolia*	*rasa*	Saldaitis *et al*., 2011	2
Noctuidae	Hadeninae	*Gortyna*	*roseago*	Ronkay, Varga & Hreblay, 1998	2
Noctuidae	Hadeninae	*Hadena*	*confusa pseudodealbata*	Hacker, 1988	1
Noctuidae	Hadeninae	*Hadena*	*inexpectata podlussanyi*	Hacker, 1996	1
Noctuidae	Hadeninae	*Hadena*	*lypra hajara*	Hacker & Legrain, 1996	4
Noctuidae	Hadeninae	*Hadena*	*nobilis*	Hacker, 1996	1
Noctuidae	Hadeninae	*Hadena*	*secreta*	Hacker, 1996	1
Noctuidae	Hadeninae	*Hadena*	*subhyrcana*	Hacker, 1996	1
Noctuidae	Hadeninae	*Penigrapha*	*flora*	Hreblay, 1996	1
Noctuidae	Hadeninae	*Phlogophora*	*kriugeri*	Saldaitis & Ivinskis, 2006	5
Noctuidae	Hadeninae	*Scotocampa*	*sheljuzhkoi*	Gyulai & Ronkay, 2002	1
Noctuidae	Heliothinae	*Periphanes*	*delphinii tekke*	Ronkay, Varga & Hreblay, 1998	3
Noctuidae	Noctuinae	*Agrotis*	*frater*	Fibiger *et al*., 2006	4
Noctuidae	Noctuinae	*Agrotis*	*iremeli*	K. Nupponen *et al*., 2001	1
Noctuidae	Noctuinae	*Anarta*	*endemica*	Hacker & Saldaitis, 2010	1
Noctuidae	Noctuinae	*Chersotis*	*fidahusseini*	Varga *et al*., 2013	1
Noctuidae	Noctuinae	*Chersotis*	*laeta macini*	Rákosy *et al*., 1996	2
Noctuidae	Noctuinae	*Chersotis*	*nupponenorum*	Varga *et al*., 2013	4
Noctuidae	Noctuinae	*Dichagyris*	*korsak*	Varga *et al*., 2002	9
Noctuidae	Noctuinae	*Dichagyris*	*wilsoni*	Fibiger, 2002	1
Noctuidae	Noctuinae	*Euxoa*	*abualisinai esfahanica*	Varga & Gyulai, 2002	1
Noctuidae	Noctuinae	*Xenophysa*	*huberi*	Varga, 1989	2
Noctuidae	Psaphidinae	*Psaphida*	*palaearctica*	Ronkay *et al*., 2010	6
Noctuidae	Xyleninae	*Agrochola*	*oropotamica archar*	Ronkay, Varga & Hreblay, 1998	1
Noctuidae	Xyleninae	*Agrochola*	*turcomanica*	Ronkay, Varga & Hreblay, 1998	16

Discussion

The present project led to the digitization of 191 type specimens representing 44 species from four moth families, Erebidae, Geometridae, Lasiocampidae and Noctuidae. The majority of type material was from the family Noctuidae, a large family containing approximately 12.000 species worldwide. Not only the high number of paratypes in this collection, but the overwhelming amount of species (~2.000), underline this collections' unique reference value, especially considering that there is relatively little data available from the areas where most specimens were collected.

Next to the scientific value of the present project, it also underlined the value of collaboration between institutes like the RBINS and volunteer organizations like BINCO. Where funds, staff and equipment are often a limiting factor for institutes, using volunteers in collection digitization creates win-win situations where all parties benefit. This way, we can facilitate taxonomic studies, and train the next generation of entomologists simultaneously.

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