

**Notes on the Hungarian populations of *Melanargia russiae* (Esper, 1783)  
extinct since a hundred years (Lepidoptera: Nymphalidae, Satyrinae)**

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**Abstract** – The 47 specimens of *Melanargia russiae* (Esper, 1783) collected in Budapest and Kunpeszér and deposited in the Lepidoptera collections of the Hungarian Natural History Museum are catalogued. The species considered extinct in Hungary was last collected in the Great Hungarian Plain before World War I. Various scenarios were proposed to explain the extinction of the species, including afforestation, more intensive forest management, and overcollecting. Via revising contemporary literature the alleged Pannonian distribution of the species is determined, and visits in the former *M. russiae* sites are recorded. Based on the catalogued specimens and further holdings in other collections it is demonstrated that none of the existed populations was ever overcollected. The most probable causes of the extinction were the region's heavy drainage and changes in forest management. According to the records Baron Charles Rothschild and his wife were the last observers of the species in Hungary in the year 1913. With 11 figures and 2 tables.

**Key words** – drainage, Kunpeszér, local extinction, *Melanargia russiae*, Pannonia, Rothschild

## INTRODUCTION

The Great Hungarian Plain has been under heavy anthropogenic influence at least since the Roman times. The influence increased during the passed two millennia when human communities became prosperous and cultivation spread successfully. Hence, the pressure became gradually heavier on the still non-human occupied lands (KÉRDŐ & SCHWEITZER 2010). The most striking mark of this is the increasing fragmentation of natural communities and more and more obvious pauperity in their biological diversity. For this biological degradation, besides many noticed or unnoticed local extinctions, one of the best-known example amongst lepidopterists in Hungary is the extinction of *Melanargia russiae* (Esper, 1783) from Pannonia.

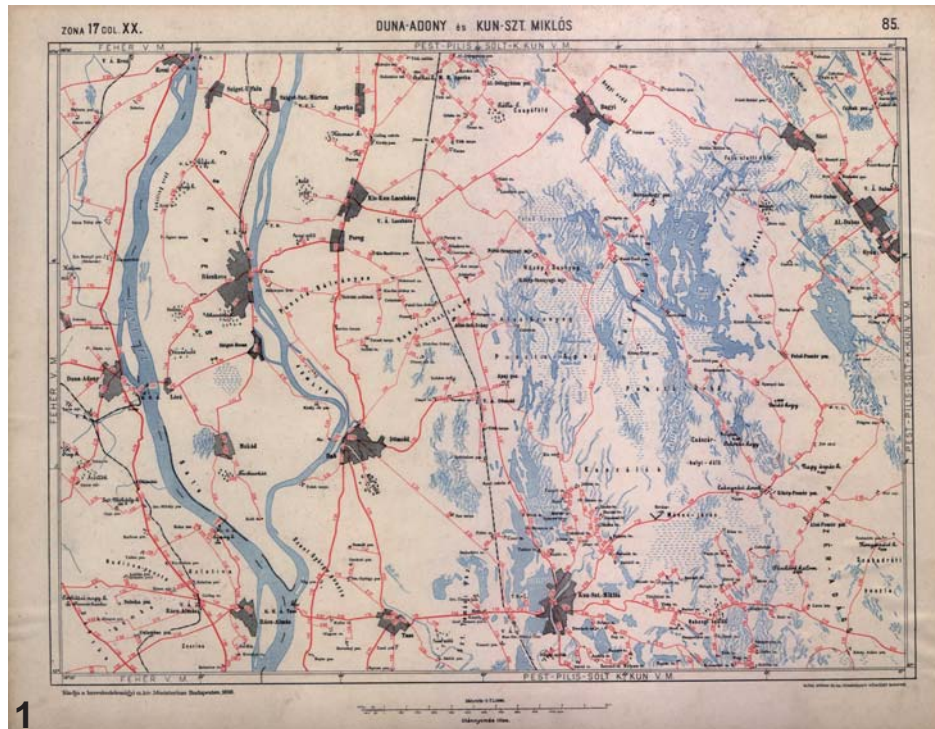
The species appears in the contemporary literature under the junior synonym names “Clotho”, “Japygia” or “Suwarovius”, yet now *Melanargia russiae*, the oldest available scientific name is used (GOZMÁNY 1968: 189). In the English

literature the common name of this species is Esper's Marbled White (HIGGINS *et al.* 1970: 133, TOLMAN & LEWINGTON 1997: 187, CHINERY 1998: 496). The Hungarian vernacular name was invented by Imre Frivaldszky first as "Cloto Szemőcz" (FRIVALDSZKY 1859: 25), then "Clotho Szemdísz" (FRIVALDSZKY 1865: 83). Subsequently it was changed to "magyar sakktábla" by ABAFI-AIGNER (1904a: 85) and finally to "magyar sakktábla lepke" ([GERE] 1950: 527). This latter name appears in the Hungarian "Red Data Book" (VARGA 1990). The name "Magyar szemőc" is given by the checklist of butterflies occurring in the Carpathian Basin with revised Hungarian names (BÁLINT *et al.* 2006: 134).

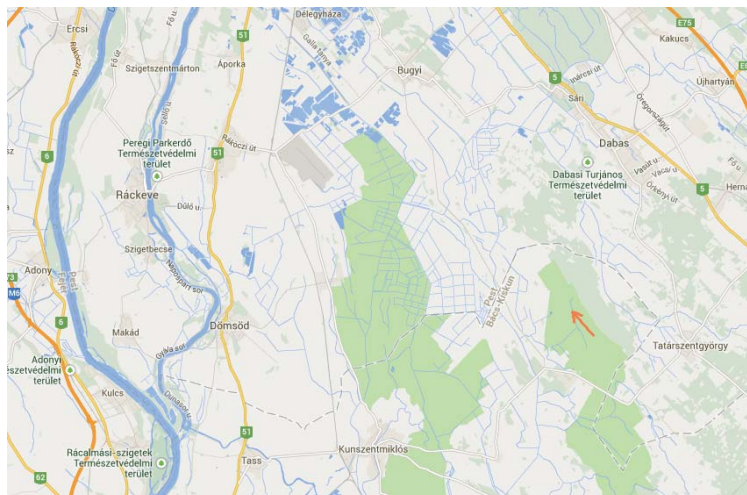
Colonies of *Melanargia russiae* were highly isolated in the Carpathian Basin, being separated approximately by 500 km from the main range of the species in every direction towards the Ukrainian steppe in the east, the Macedonian highlands in the south, and the Apennine Peninsula in the west. According to literature sources the species occurred in some sites on the plain, which is snaked by the rivulet Rákos northeast of the rapidly expanding free royal city Pest, and lies on the east side of the Danube. However, the habitats there became rapidly built in. Another locality where the species occurred in large numbers was the forest south of Dabas (FRIVALDSZKY 1859), known in the literature as "pezséri erdő" (= forest of Pészér). This is in the midst of the Hungarian "puszta", 50 km south of Budapest, somewhat northeast of the village Kunpeszér, county Bács-Kiskun, central Hungary (Figs 1–2).

The forest of Pészér became a legendary place amongst lepidopterists, where many "lepidopteran rarities" were discovered, along with *Melanargia russiae*. The most notable ones are *Chariaspilates formosarius* (Eversmann, 1837) (Geometridae), *Chondrosoma fiduciarium* Anker, 1854 (Geometridae), *Eublemma pannonica* (Freyer, 1840) (Noctuidae), *Orgyia ericae interemida* Frivaldszky, 1865 (Lymantriidae), *Oxytripia orbiculosa* (Esper, 1799) (Noctuidae), *Rhyparioides metelkanus* (Lederer, 1861) (Erebidae), and *Zygaena laeta* (Hübner, 1790) (Zygaenidae). The specimens, which were collected there and dispersed all over Europe in public and private collections, have the locality label inscriptions as Kunpeszér, Pészér, Pusztapeszér but sometimes Dabas or Tatárszentgyörgy (Fig. 2). All these refer to this unique area, which was declared by the Hungarian nature conservation authorities as a Special Area of Conservation (SAC), and as such, part of the Natura 2000 network of protected areas. According to the literature, the species was last seen in Kunpeszér in 1913, and the extinction was caused by afforestation (KOVÁCS 1955), more intensive forest management (GOZMÁNY 1968), or *Robinia* plantation and overcollecting (VARGA 1990).

The purpose of this paper is to catalogue all the Pannonian specimens of *Melanargia* deposited in the collections of the Hungarian Natural History Museum (HNHM), and connect them to literature sources. In the discussion we pose and



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Figs 1–2. Large scale overview of the Kiskunság region from 1898 and 2013. The reduction of permanent surface waters (indicated by filled blue patches) is conspicuous. 1 = map issued in 1898 by the Royal Hungarian Ministry of Trade (HNHM Archives), 2 = as stands in 2013 on Google-EarthMaps; arrow indicates “Peszéri erdő” (forest of Peszér), where *Melanargia russiae* occurred until 1913 (<https://maps.google.hu>)

answer such questions related to the discovery of the species in Hungary as how wide its range was in Pannonia, whether overcollecting could play a role in local extinctions, what the cause of the extinction in the Carpathian Basin could be, and finally when and by whom the species was last seen in Hungary. For the answers, we use the data of the specimens we catalogued plus further Pannonian *Melanargia russiae* specimens we found in the Natural History Museum (London) (NHM) and Museum National d'Histoire Naturelle (Paris) (MNHN).

Specimens located in the HNHM main Lepidoptera collection (nos 1–43 in drawer 11, cabinet 58A) and accessions (nos 44–47 in coll. Frivaldszky in drawer 17, shelf 75F) were databased using Excel work sheet and labelled in numerical sequence accordingly. Gathering secondary data in regard of trips to Peszér the extensive BioLep database in the HNHM was used (BÁLINT *et al.* 2006).

## THE CATALOGUE

*Technical note* – Label data are generalised, as collecting site, date of capture, and collector. These are followed by the specimen's number, which corresponds to the inventory label (“Magyar Természettudományi Múzeum; Magyar Szemőc – *Melanargia russiae*, no. ##”) with the previous owner or owners, and the sex of the specimen(s) in brackets.

- Dabas, 1896. VII, Aigner: no. 24 (coll. Issekutz) (male).  
 Hungaria (no data, no collector): nos 6 (“Clotho”), 13 (coll. Ulbrich) (males); nos 25 (coll. Tomala), 28 (coll. Kovács), 36 (colls Tomala, Liphay), 41 (coll. Liphay), 42 (coll. Ilosvai-Varga) (females).  
 Hungaria, (no data) [Frivaldszky]: no. 14 (male); no. 47 (female).  
 Hungaria, (no data) 317, Frivaldszky: nos 44–46 (males).  
 Peszér, (no data), Schmidt: no. 34 (coll. Kovács) (female).  
 Peszér, 1898, Aigner: nos 11, 21–22 (males); nos 32, 35 (female).  
 Peszér, 1912. VI. 12, Schmidt: nos 1–2, 4, 9 (coll. Kovács), 10, 15–16, 18, 20, 23 (males); nos 27, 30, 31 (females).  
 Peszér, 1913. VI. 14, Lengyel: no. 19 (male).  
 Pusztapeszér, (no year), VI. 10, (no collector): no. 29 (colls Kertész, Gergely) (female).  
 Pusztapeszér, 1898, (no collector): no. 7 (coll. Dahlström) (male).  
 Pusztapeszér, 1900. VI. 14, (no collector): no. 12 (coll. Velez) (male).  
 Pusztapeszér, 1905. VI. 11, [Aigner]: no. 26 (coll. Ulbrich); no. 33 (females).  
 Pusztapeszér, 1905. VI. 14, (no collector): no. 17 (coll. Velez) (male).  
 Pusztapeszér, 1908. VI. 12, (no collector): no. 37 (coll. Velez) (female).  
 Pusztapeszér, 1912. VI, (no collector): no. 5 (coll. Issekutz) (male).  
 Pusztapeszér, 1912. VI, [Schmidt]: no. 8 (male).  
 Pusztapeszér, 1912. VI. 12, Schmidt: no. 3 (males), nos 38–40 (“peték ezektől” = “eggs from these”) (females).  
 Pusztapeszér, 1928. VIII. 10, (no collector): no. 43 (coll. Velez) (female).

*Notes for the catalogue* – We catalogued 47 specimens (= 100%). Most of them (n = 35; 74%) were demonstrably collected in the forest of Peszér by Abafi-Aigner in 1896, 1898 and 1905 or Antal Schmidt in 1912; and a single specimen (no. 19) in 1913 by Gyula Lengyel. Specimens of Imre Frivaldszky (nos 14, 44–47) were most probably collected north of Pest (see below). Two of them (nos 14 and 47) lost the original Frivaldszky collection label but could be identified on the basis of their pin's type.

The specimens of the collection Zsigmond Velez (1884–1954) (nos 12, 37 and 43) clearly reflect the problem he caused for the HNHM (BÁLINT 2009: 177). We presume that all the seven specimens without any reliable data (nos 6, 13, 25, 28, 36 and 41–42; 15%) came either from the Frivaldszky collection or one of the collecting events organised by Lajos Abafi-Aigner or Antal Schmidt between the period 1896 and 1912 as catalogued.

## DISCUSSION

### Dahl or Koy as discoverer?

ABAFI-AIGNER (1898: 52) mentioned that it was Georg Dahl (1769–1831) who discovered “*Melanargia v. Suwarovius*” in the Great Hungarian Plain. Dahl first visited Hungary as the personal servant of Baron Johann Centurius Hoffmannsegg (1766–1849), who criss-crossed the country and collected natural history items in the years of 1793 and 1794. Subsequently Dahl established a private enterprise selling mainly Coleoptera specimens for collectors, but he was also interested in Lepidoptera. Thanks still to the Baron the entomologist Dahl could build tight contact with Tobias Koy (1757–1829), who lived in Ofen (= Buda), and whom he visited in 1812 and 1816. They collected in the close vicinity of Koy's hometown (DAHL 1822). Dahl published his list of insects in 1823 with the origin and price of the specimens he offered for sale (DAHL 1823). As he was fond of beetles, he did not pay too much attention to Lepidoptera, accordingly, in his list there were no provenances indicated for the butterflies and moths. Amongst many species “*Clotho*, H. O. (Arge, F.)” is also listed (DAHL 1823: 82). We think that this indication was the source of Abafi-Aigner's statement that “Dahl György” was the one who discovered *Melanargia russiae* in Hungary.

Abafi-Aigner is most probably wrong in suggesting that Dahl was the first who recorded the Hungarian occurrence of *Melanargia russiae*. There is no data that Dahl or Koy had ever collected on the left bank of the Danube, namely on the plain of Pest where *M. russiae* would be widely distributed in those times (see below). As we have already mentioned, prior to the publication of the Dahl catalogue they were collecting together but only around Buda, and the region was never

visited again by Dahl. For the enterprise of Dahl, one of the suppliers of specimens from Hungary was Koy, who certainly did not collect the species in Buda, as it was not listed in his catalogue (KOY 1800). But most interestingly, the name “*Arge Russiae*” has been given by italic letters on page 48, indicating that the species does not occur around Buda, but it is present in his collection (KOY 1800: 48).

Indeed, there are two specimens of *Melanargia russiae* in the Koy Collection (see BÁLINT 2008). The male has a label inside the glassin box with the inscription “*Arge Russiae*” and the female specimen is labelled similarly as “*Arge*” (Figs 3–4). These specimens were probably sent by Eugenius Johann Christoph Esper (1742–1810) in exchange; therefore they could be considered as syntypic originating from the stock examined by the describer of the taxon “*Arge Russiae, Die Russische Arge*” (ESPER 1776–1794[1783]: 162). The female specimen has an additional label glued outside to the lower glass from undersurface with the inscription “*Clotho*” in blue printed ornamented frame. This additional label indicates the nomenclature used in the Dahl catalogue, which was one of the most extensively consulted checklist in those times.

Frivaldszky or Neichel as discoverer, and the population north of Budapest

In our opinion, the species was discovered in Budapest by Imre Frivaldszky (1799–1870) or one of his friends Károly Neichel (1793–1837), both studying in the same faculty of the University of Pest. Although there is no record supporting this scenario, they probably collected butterflies together during their university years. After receiving their diploma, Frivaldszky became seriously engaged with his natural history works whilst Neichel started his practice as a local surgeon in Pest. In those times, Neichel was very active in collecting Lepidoptera. Abafi-Aigner wrote that he was the one who found “*Melanargia Clotho*” in a site north of Pest called “*rákospataki Ördögmalom*” (ABAFI-AIGNER 1898: 58). The site



**Figs 3–4.** Probably syntypic specimens of *Arge Russiae* Esper, 1783 from the Koy collection. 3 = male, 4 = female (scale: left edge of the glassin box is 55 mm) (coll. HNHM)

was situated along the main road towards Vác as the great botanist Pál Kitaibel (1757–1817) recorded in 1817 under the name “Teufelsmühle” (LÖKÖS 2001: 401). This was the ruins of the Roman fortress Transaquincum at the firth of the rivulet Rákos. The site was considered by the local people the place of witches (Ördögmalom = Teufelsmühle = Mill of Devil).

As Neichel died in 1837, this finding had to be taken in the 1820s or early 1830s. In this time Imre Frivaldszky could already purchase the Koy collection and its accession library, for he worked as an adjunct of natural history cabinets of the Hungarian National Museum (= Magyar Nemzeti Múzeum). He started his serious work in natural history publishing the catalogue of his insect collection (FRIVALDSZKY 1834). In this catalogue under the headings “Papiliones Linnei” and “Hipparchia no. 35” the following indication is given: “Clotho H. Hung”. This clearly indicates for that Frivaldszky collected *Melanargia russiae* in 1834 or earlier, or he possessed specimens collected in Hungary. Indeed, there is a manuscript note by Frivaldszky originating from 1830, which says: “Teufels Mühl. Clotho schon abgefl.” testifying that he knew that the species occurs there and he collected it (Fig. 5). On the contrary, we could not find any evidence for supporting the claim of Abafi-Aigner that the discoverer of *Melanargia russiae* at the site Ördögmalom was Neichel.

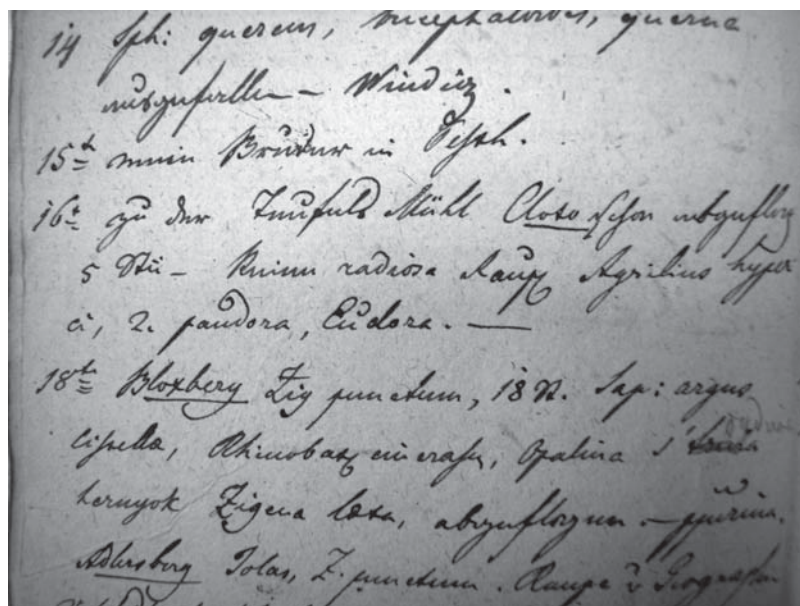


Fig. 5. Fragment from the page June 16 of Imre Frivaldszky's “*Diarium entomologicum de anno 1830*” indicating in German that he collected five specimens of Clotho, which were worn: “Teufels Mühl Clotho Schon abgeflogen, 5 Stück” (HNHM Archives)

It is also known that the senior Albert Kindermann (?–1847) collected the species around the Hungarian capital. He was a well-known collector and dealer living in the imperial city Buda. We know that he collected on both sides of the Danube. The name “*Melanargia Clotho*” appears in the list of Lepidoptera Kindermann compiled in 1837, which enumerates all the species he captured in the surroundings of Pest and Ofen (ABAFI-AIGNER 1898: 54). Most regrettably, this manuscript was lost, therefore no further steps could be taken to find out more precise information. Frivaldszky himself stated that the species was allegedly distributed between the settlements Újpest and Rákos, but it became extinct because of the expanding development (FRIVALDSZKY 1865: 83).

#### The discovery in Peszér and the population there

According to literature sources, Frivaldszky found the species in Kunpeszér in 1854, when he first visited the forest there. He wrote that around the middle of June the species “*hiparchia Clotho*” swarmed in large numbers in the forest glades (FRIVALDSZKY 1859: 21). Yet before Frivaldszky the forest was most probably also visited by Kitaibel in 1810, who recorded the stinking swamps and extended surface waters used for fishing near Dabas (LÖKÖS 2001: 197).

This site was subsequently visited several times by Ferenc Metelka (1814–1885), a close friend to Frivaldszky, whom he sent specimens he collected in the surroundings of his home village Dabas. Many of these were great rarities at that time (VÁNGEL 1885). This is testified by a short series of *Melanargia russiae* specimens we found in the collections of Museum National d’Histoire Naturelle (Paris) purchased from Achille Deyrolle (1813–1865) labelled as “Deyrolle, Hongrie, Puszta-Peszér, 1860, Frivaldszky”. Deyrolle was a well-known French insect dealer in Paris, whom Frivaldszky and Metelka were in contact with.

#### Other sites

In the book “Fauna Regni Hungariae”, besides Budapest and Peszér, the southern Hungarian town Pécs is also indicated as the occurrence site of “*Melanargia Japygia* Cyr. V. Suwarovius Hbst.” (ABAFI-AIGNER *et al.* 1896: 18). We are of the opinion that it is an original lapsus. This record is not repeated and was never critically revised by the subsequent accounts dedicated specially to the species and written by Abafi-Aigner himself. Although the region of Pécs has changed considerably since classical times of entomology, we believe that the occurrence of *M. russiae* was unlikely there, as no suitable habitat for the species is known. To support this claim we underline that none of the great “rarities” of Peszér we mentioned in the introductory part of the present paper has ever been recorded in the surroundings of this Hungarian town. The contemporary checklists did



not indicate the occurrence of *M. russiae* in Pécs (NENDTVICH 1846, VIERTL 1894) either.

ABAFI-AIGNER (1904*b*: 3) wrote that the species was “allegedly captured in Gödöllő”. Although this record suggests that there was a *Melanargia russiae* population between the sites north of Pest and Peszér, it was never confirmed or falsified subsequently. Even ABAFI-AIGNER (1907*b*: 144) himself failed to mention this record, although he repeated his own remark published in the same paper that he himself was the only one who was able to collect a single specimen near Budapest. We did not find this specimen in the HNHM where most of the specimens collected by Abafi-Aigner are deposited.

Based on the above sources we are sure that Peszér remained the only habitat where *Melanargia russiae* occurred in Hungary at the turn of the 19th and 20th centuries as remarked by FRIVALDSZKY (1865), HORVÁTH & PÁVEL (1875), FOUNTAINE (1898), ABAFI-AIGNER (1907*a*), and FROHAWK & ROTHSCHILD (1912*a*).

#### The life history studies

ABAFI-AIGNER (1907*a*: 15) wrote that the caterpillar of the species was unknown. Probably this short remark was the catalyst of Charles Rothschild’s (1877–1923) great effort for focusing on the life history of “*Melanargia Japygia* subsp. *Suwarovius*”. He travelled to Peszér in 1910, 1911 and 1913 with his wife according to the published accounts, and the material they assembled is now deposited in the NHM. They photographed the habitat, collected specimens and observed females laying eggs. For caterpillar rearing the Baron asked the help of Frederick William Frohawk (1861–1946), an experienced butterfly breeder, the one who discovered *Maculinea myrmecophily* (SALMON 2000: 193–197).

In their first article, FROHAWK & ROTHSCHILD (1912*a*) published two halftone photographs of the habitats, presented good descriptions of the soil and vegetation, and described the eggs and the first instar larva. The rearing experiment was unsuccessful, as all the larvae died under the damp British conditions in the laboratory of Frohawk. However, thanks to the repeated attempts, in the end they got the results they wanted, presenting the descriptions of all the early stages (FROHAWK & ROTHSCHILD 1912*b*).

Based on specimens nos 28–30, which are equipped with the label “peték ezektől” (= eggs from these) (Figs 6–7), it is apparent that Antal Schmidt (1880–1966) working as curator of Lepidoptera in the HNHM from 1906, also started to run an experiment on the species. Schmidt was well known for his life-history expertises on “legendary” Hungarian Lepidoptera species (his best paper is on

*Oxytripia orbiculosa* (Esper, 1799): SCHMIDT 1912), but there is no sign in his publications that his experiments on *M. russiae* had any results (Figs 8–9).

#### Who collected Esper's Marbled White in Peszér?

Apart from Frivaldszky and Metelka very few people have collected the species at Peszér since the discovery of the site. Based on the HNHM specimen catalogue and the material in the NHM the following collecting events can be reconstructed.

- 1896: Abafi-Aigner visited the forest south of Dabas.
- 1898: An expedition was organised for Mrs Fontaine, led by Abafi-Aigner (CATER 1980).
- 1905: Abafi-Aigner visited again the forest near Kunpeszér.
- 1910: Charles Rothschild and his wife visited the forest.
- 1911: Charles Rothschild and his wife repeatedly visited the forest.
- 1912: Antal Schmidt visited Kunpeszér.
- 1913: Charles Rothschild and his wife again visited the forest; in this year Gyula Lengyel also visited the place.

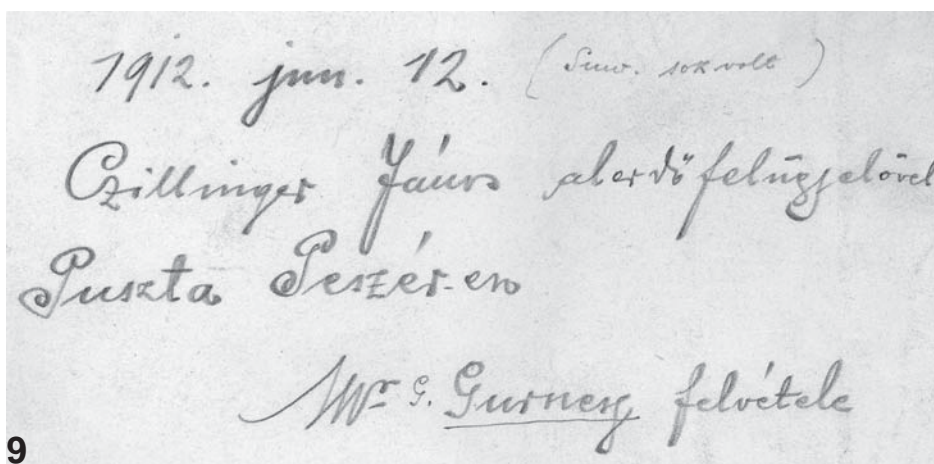
Not counting the Frivaldszky specimens ( $n = 5$ ), most of the HNHM material can directly ( $n = 28$ ) or indirectly ( $n = 7$ ) be attributed to one of the events above (see the Catalogue). Six specimens are labelled insufficiently so their place and day of capture cannot be identified. According to the enumeration Lajos Abafi-Aigner collected one specimen in 1896, six specimens in 1898 and seven in 1905. Antal Schmidt captured 18 specimens in 1912, and Gyula Lengyel caught a single one in 1913.

In the NHM main collection there is a pair (male and female) dated as “June 1898” (coll. Elwes), originating from Mrs Fontaine's catch. There are two males and one female with the date “12 June 1912” by Sheldon Bequest in the main collection plus one male and female in the Rothschild collection. The specimens



**Figs 6–7.** HNHM female *Melanargia russiae* (Esper, 1783) specimen (No. 39) collected by Antal Schmidt in 1912, which laid eggs. 6 = dorsal view, 7 = labels (coll. HNHM)

were most probably exchanged with Schmidt who was in contact with Sheldon according to the HNHM archives. All the other specimens were collected by the Rothschilds (main collection: 18, Rothschild collection: 24) or are of uncertain origin (main collection: 4, Rothschild collection: 9).



Figs 8–9. Half-tone photograph taken in Peszér during the 1912 collecting trip. 8 = János Czillinger, vice forest inspector (left) and Antal Schmidt, curator of Lepidoptera (right) standing with butterfly nets in the *Melanargia russiae* habitat; 9 = script in the back side of the photograph written by Schmidt in Hungarian: “12, June, 1912 (there were many *suwarovius*) with vice forest inspector János Czillinger in Puszta Peszér, taken by Mr. G. Gurney” (HNHM Archives)

## Specimens: was there any overcollecting?

We know the health of Frivaldszky started to decline, when he decided to sell his collections to the National Museum of Hungary (BÁLINT & FRIVALDSZKY 2007: 58). He compiled the first catalogues in 1857 and 1858, and based on these manuscripts the official catalogue was prepared in 1864 for serving as part of the contract in the acquisition. In this catalogue under serial number 317 seven specimens of “*Melanargia Clotho*” from Hungary are listed. From these we could detect three male specimens based on the typical Frivaldszky-collection label (nos 44–46) and one male and one female specimen based on their pin (no. 14: male, no. 47: female). Although there is no supporting evidence that HNHM Frivaldszky specimens were collected prior to 1854, when the Peszér site was discovered, we presume that some of these specimens may have been taken in north of Pest, where Frivaldszky collected several times according to his diaries.

We found records in the old MNHN inventory books (see BÁLINT & NGUYEN 2006: fig. 3) that Frivaldszky sold “*Coléoptères & Lépidoptères d’Europe*” in 1835 and 1836 but we could not trace back any *Melanargia russiae* specimens for these stocks. Similarly we also found traces of Frivaldszky’s business in the NHM files prior to 1848 (BÁLINT & ABADJIEV 2006: 186), but there were no *M. russiae* specimens from him in the collections.

In sum there are very few surviving specimens from the classical period of lepidopterology when *Melanargia russiae* was collected in north of Pest. Hence, it can be stated with great certainty that the species was never intensively collected in large numbers there.

Excluding the Frivaldszky specimens discussed above we are sure that the Hungarian *Melanargia russiae* material found in Hungary and other private or public collections all originate from the forest of Peszér. Although in the HNHM there is a single specimen labelled as Dabas, with the earliest precise collecting date (1896), the inscription “Dabas” on the label certainly refers to the forest where *M. russiae* lived between Dabas and Peszér (see Fig. 2).

As Frivaldszky wrote in 1859, the species was conspicuously common in its habitats. It is clearly reflected in the literature through more than a half century (EMICH 1868: 188, FOUNTAINE 1898: 286, ABAFI-AIGNER 1907: 15). Nevertheless, this does not mean that the site was visited often and the species became regularly overcollected. It is obvious from the detailed description of FOUNTAINE (1898: 286–287; beautifully transcribed to Hungarian by László Gozmány (see BÁLINT *et al.* 2011) and published by MÉSZÁROS & VOJNITS (1972: 108–109) that the forest was extremely difficult to approach, therefore the visits of Peszér were very seldom until the period 1910 and 1913, when yearly

visits took place (Table 1). According to the given numbers of the secured specimens and the estimated density of *Melanargiini* populations, we exclude with certainty that the *Melanargia russiae* population in Peszér was ever oversampled.

#### Scenarios about the local extinction

We have already mentioned, FRIVALDSZKY (1865) indicated that the local extinction of the species in sites north of Pest was caused by the expanding industry; the habitats became destroyed. Indeed, maps reveal that the region of Ördögmalom was already built in when the three cities Buda (Ofen), Óbuda and Pest united under the name Budapest and became the capital of Hungary in 1873. This extinction in the area was a fact as in the checklist of HORVÁTH & PÁVEL (1875) only the site “Puszta-Peszér (Pest vm.)” was indicated for “*Melanargia Japygia* Cyr. Var *Suwarovius* Hbst. (Clotho Hb.)”.

Contrary to the area north of Pest, the region of Peszér seemingly did not change too much. There were no threatening human settlements in the very close vicinity. The forest was managed as the property of the Crown until World War I, and later it belonged to the State. The afforestation activity was intense in late 18th and the 19th centuries, and the southern part of the forest was strongly impacted. The northern part remained in its original state, as remarked by FROHAWK & ROTHSCHILD (1912a). Thus, at the turn of the 19th and 20th centuries there were quite extensive and old *Robinia* plantations beside the original hardwood oak groves. The forest and its neighbourhood were grazed by livestock

**Table 1.** Number of *Melanargia russiae* specimens collected in Peszér in various years according to different sources. Specimens with doubtful labelling are not considered. Sources: FC = Fountaine collection<sup>1</sup>; HNHM = Hungarian Natural History Museum (Budapest), Lepidoptera collection; NHMMC = Natural History Museum (London), Butterfly collection, Main collection; NHMRC = Natural History Museum (London), Butterfly collection, Rothschild collection

Year	Total number of specimens collected	Number of specimens collected (with source)
1896	1	1 (HNHM)
1898	39	31 (FC), 6 (HNHM), 2 (NHMMC)
1905	4	4 (HNHM)
1910	13	6 (NHMMC), 7 (NHMRC)
1911	20	13 (NHMRC), 7 (NHMMC)
1912	23	18 (HNHM), 3 (NHMMC), 2 (NHMRC)
1913	10	5 (NHMMC: all reared from egg), 5 (NHMRC)

<sup>1</sup> See FOUNTAINE (1898: 287); specimens should be in the Fountaine-Neimy Insect collection, deposited in Norfolk Museums & Archeology Service.

randomly, mainly by herds of the Hungarian Grey Cattle. The construction of Duna-völgyi-főcsatorna (= main channel of Danube valley) started in 1912, and was completed in 1929. This had a tremendous impact on the watering systems. One of the most remarkable results is the severe reduction of permanent water surfaces (Figs 1–2).

Probably we will never find out the causes of the local extinction of *Melanargia russiae*, but secondary data suggest that the species was already extinct before 1924. The decade that followed the last collecting year 1913 was heavily affected by World War I, and then the society got several shocks via various post-war events. In these years the activity of Hungarian lepidopterists was probably minimal; therefore it is impossible to follow the fate of *M. russiae* because virtually there are no records from this era. What we definitely know is that after the consolidation, lepidopterists returned to Peszér, but *M. russiae* was never collected again (Table 2).

Regarding the extinction of “*Melanargia suwarovius*” KOVÁCS (1955: 329) wrote the followings: “Its sole reliable locality of capture had been in Peszér, in the centre of the territory between the Danube and the Tisza. We cannot find it anymore, ever since 1913; it fell victim most probably to afforestation. On the evidence of photographs published in the 1912 volume of “The Entomologist”, it lived in a *Festucetum sulcatae* association of some meadows around the groves. It can be established from contemporary account of collectings that it had been on wings in annually big numbers”. Kovács’s claim is erroneous as there is no evidence that the forest where the species dwelled was cleared and afforested. MÉSZÁROS & VOJNITS (1972: 110) wrote that in the 1960s they were able to recognise the classical sites without any problems with the help of Gyula Lengyel (1891–1968), a Hungarian lepidopterist who collected the species himself in 1913. This is also the experience of the contemporary lepidopterists: the habitats are still there (Fig. 10).

**Table 2.** Visits in Peszér after 1913 based on *Carcharodus lavatherae* (Esper, 1783) material, an also extinct species, member of the early summer butterfly aspect in the “puszta”, and to which *Melanargia russiae* also belonged

Year	Name of collectors
1924	György Vargha
1929	Rezső Szurdoky
1931	Rezső Szurdoky, Tivadar Uhrík
1933	Antal Friedrich, Rezső Szurdoky, Tivadar Uhrík
1937	Antal Friedrich, István Gergely

According to GOZMÁNY (1968: 189), the local extinction of the species was caused by altered natural conditions because of the more intensive forestry management. This is not supported by the facts, as forestry was not more active at all in the critical period. Nevertheless the environment changed tremendously indeed, but because of different conditions.

VARGA (1990: 208) thinks that the local extinction was caused by even more complex circumstances. According to his opinion, the habitats were visited by several collectors, partly from abroad, and captured the species in large numbers. Consequently the butterfly, although in some places it was common, first became considerably scarce, then, when its habitats became afforested by *Robinia*, it became extinct permanently and forever. What we know from the reports and the evidence offered by the specimens, only a few people visited the site in Peszér, and the number of the specimens secured was not damaging (see Table 1). The other claim of Varga regarding afforestation has nothing to do with reality (see above).

#### What was the cause of extinction?

If none of the accounts on the local extinction of *Melanargia russiae* in the Great Hungarian Plain give the correct answer, what would be a better explanation? One clue can be found already in the paper of FROHAWK & ROTHSCHILD



Fig. 10. Kunpezér forest, in 2010, still having typical *Betula-Festucetum* associations where *Melanargia russiae* (Esper, 1783) once occurred (photo: L. Németh).

(1912a), where they report on the very high caterpillar mortality during aestivation, then hibernation. Indeed this is the crucial point in *Melanargia* life history, which is specially regulated by microclimatic factors of the breeding site (JUTZELER *et al.* 1995). If one of the variables changes, the caterpillars do not awaken and they die. The botanist Ádám Boros (1900–1973) noted in his personal diaries run from 1916 to 1971 (preserved in the HNHM archives) that the lake north of the forest of Peszér, mentioned by Kitaibel in 1817 and clearly seen in the map published in 1898 (see Fig. 1), was not extant anymore in 1920, and the region had been heavily drained. This indeed could change fundamentally the natural conditions in the forest of Peszér as Gozmány indicated. Aestivating and hibernating *Melanargia russiae* larvae in an ecosystem having lost its balance and inner rhythm most probably could hardly survive.

Another clue is that during World War I the livestock in large herds was hidden in the forest (shepherd István Rusznyák, Kunpeszér, *pers. comm.*), which caused heavy and completely new pressure on the environment. Before the war the forest was closed for private use, and livestock grazing occurred randomly and remained under control. Therefore, this restricted forest use did not threaten the ecosystem including the caterpillars aestivating and hibernating in mass on haulms. Most probably, forest glades, where the species once occurred, were overgrazed by large number of cattle, and with the grass the caterpillars were also consumed.

As the population of *Melanargia russiae* in the Kunpeszér region was highly restricted to a small territory, where the pressure on the habitats turned to be severe, and the natural conditions also changed, the local extinction was the most probable reaction from the side of the butterfly species.

#### The last sightings

According to MÉSZÁROS & VOJNITS (1972: 110), the last Hungarian person who collected the species in 1913 was Gyula Lengyel (see above). Indeed, there is one male specimen (no. 19), which originates from his collection, and it was captured on the 14th of June. Yet the last records and the sightings of living *Melanargia russiae* in the Great Hungarian Plain can be contributed to Baron Charles Rothschild and his wife Rózsika, who according to the material kept in NHM also collected in Peszér in 1913 between 19 and 21 of June securing one female and four male specimens (see Table 1).

Therefore, the last person born in Hungary, who saw *Melanargia russiae* gliding elegantly along the paths of the forest of Peszér, was Baroness Rózsika Edle von Wertheimstein (1870–1940). Their yearly visits stopped in 1914 as Great Britain and Austria-Hungary became opposing forces in World War I. After the war the family property in Cséhtelek in county Bihar (now Ciutelec, Romania), where



they spent many happy weeks during summer vacations (ROTHSCHILD 1983), became under Romanian regulation. The eastern edge of the Great Hungarian Plain, historically called Partium, became divided by a new border. Charles and Rózsika never returned to Peszér. They took forever the living memory of the Hungarian Esper's Marbled White, the Magyar Szemőc (Fig. 11).

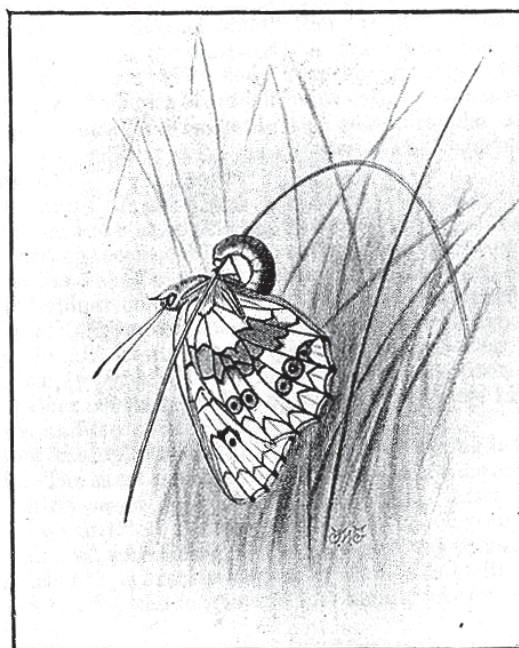
#### CONCLUSION

The Hungarian occurrence of the butterfly species Esper's Marbled White (*Melanargia russiae*) was discovered most probably by Imre Frivaldszky before

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#### COMPLETION OF THE LIFE-HISTORY OF *MELANARGIA* *JAPYGIA* SUBSP. *SUWAROVIVUS*.

BY F. W. FROHAWK, M.B.O.U., F.E.S., and the Hon.  
N. CHARLES ROTHSCHILD, M.A., F.L.S.



*M. suwarovius* depositing.

**Fig. 11.** Half-tone drawings of Francis W. Frohawk showing a female observed depositing eggs in Peszér, 19th of June, 1911, 11 a.m. by Charles and Rózsika Rothschild (from FROHAWK & ROTHSCHILD 1912b) (HNHM Library)

1830 in north of Pest, where the species was reported to be extinct in 1865. Then *M. russiae* was found in 1854 living in large numbers in the forest of Peszér (Kunpeszér, south of Budapest), where it was last seen and collected in 1913 by the Hungarian lepidopterist Gyula Lengyel and the British Rothschild couple. The species was never found again during any subsequent visits and since then it has been considered extinct. The causes of extinction were most probably the heavy drainage of the region, which changed the mesoclimate, and the increased use of the forest for livestock during World War I years.

\*

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<sup>1</sup> Géza Gere (1927–2013) was a lecturer of zoosystematics at Eötvös Loránd University. According to certain information via personal communication the Lepidoptera chapter of Móczár's book was written by him, and not by János Balogh (1913–2002), later academician and acarologist, as indicated.

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