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## Designation of a Neotype for *Oeneis melissa* (Fabricius, 1775) and a Lectotype for *Oeneis polixenes* (Fabricius, 1775) (Lepidoptera: Nymphalidae: Satyrinae)

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**ABSTRACT.** The *Oeneis melissa* (Fabricius, 1775) “neotype” designations of Lukhtanov and Eitschberger (2000; 2001) do not meet several critical requirements of the ICZN and are therefore invalid. In addition, the locality data is too vague to be taxonomically useful, their “neotype” specimen is a specimen of the taxon generally known as *O. melissa semplei*, and acceptance of their specimen as neotype would change the meaning of the taxon *Oeneis melissa*. Hence, I reject their neotype designation. A neotype *Oeneis melissa* (Fabricius, 1775) is designated from Nain, Labrador with careful consideration of the Articles of the International Code of Zoological Nomenclature. The ‘barcode’ mtDNA (CO1 gene) structure for the neotype is provided.

The original number of type specimens of *Oeneis polixenes* (Fabricius, 1775) is unknown and a holotype was not designated explicitly or through implication; therefore, the type specimens are syntypes. There is one specimen that has been identified as a syntype of *O. polixenes* in the Natural History Museum in London (formerly the British Museum of Natural History), and no other extant specimens are known. I have expressly and deliberately designated the specimen in the collection of the Natural History Museum in London, as the lectotype of *Oeneis polixenes* (Fabricius, 1775) (ICZN Article 74.7.3) to fix a specific phenotype for the name.

**Additional key words:** Taxonomy, nomenclature.

### INTRODUCTION

The two butterflies *Oeneis melissa* and *Oeneis polixenes* (Nymphalidae: Satyridae) were described by Johann Christian Fabricius in 1775 (Fabricius 1775, pp. 484 and 513). The original descriptions are provided below in Figure 1. The type(s) of *Oeneis melissa* were from the Joseph Banks collection.

Transcription of Original Description	Translation of Original Description
<p>298. P. N. F. alis dentatis, fuscis: posticis subtus griseo-marmoratis. <i>Melissa</i>. Habitat in insula Terre neuve Americae. <i>Mus. Banks</i>. Alae supra fuscae, immaculatae. Posticae subtus albo nigroque variae.</p>	<p>298. P[apiliones] N[ympales] P[halerati]<sup>1</sup> with wings <i>Melissa</i>. Dentate<sup>2</sup>, dusky brown: posterior below gray-marbled. It lives in Terre neuve island of America. <i>Mus[eum] Banks</i>. Wings dark brown above, unspotted. Posterior below white and black variegated.</p>
<p><i>Polixenes</i>. 180. P. D. F. alis integris, fuscis; posticis subtus griseo fuscoque nebulosis. Habitat in America boreali. <i>Mus. Banks</i>. Statura praecedentis. Corpus hirtum, nigrum. Alae omnes supra fuscae, immaculatae, uti et anticae subtus. Posticae subtus griseo fuscoque nebulosae, fascia media obscuriore.</p>	<p><i>Polixenes</i> 180. P[apiliones] D[anai] F[estivi] with wings entire, cloudy grey brown. It lives in northern America. <i>Mus[eum] Banks</i>. Previous size. Body hairy, black. Wings all dark brown above, unspotted, ventral pattern shows through. Posterior below cloudy grey brown, medial band darker.</p>

<sup>1</sup> The first three abbreviations are defined on page p. 442 of Fabricius (1775); “Mus.” is assumed to be an abbreviation of “Museum”, which is the same word in English and Latin.

<sup>2</sup> “dentate” is assumed to refer to the “toothed” appearance of the alternating patches of white and brown scales of the wing fringe.

**Fig. 1:** Transcriptions and Translations of Original Descriptions of *Oeneis polixenes* and *Oeneis melissa*.

## DISCUSSION

### 1. JOSEPH BANKS AS THE COLLECTOR OF THE TYPE SPECIMENS

For *O. polixenes*, the stated type locality of “America boreali” (= northern America) is minimally helpful in identifying where the type specimen(s) were collected; anywhere in northeastern North America could have been the source of the specimen(s). For *O. melissa*, the stated type locality of “insula Terre neuve Americae” (= Newfoundland; for which “Terre-neuve” is the modern French language name) must have been an error, because *Oeneis melissa* has not otherwise been found on the island of Newfoundland (Layberry *et al.*, 1998).

Joseph Banks may either have collected the type specimens himself, or they may have been given to him. According to his diaries (in: Lysaght, 1971) and his biography by Lysaght (1971), he visited Newfoundland and Labrador in 1766 aboard the ship *Niger*. The primary purpose of *Niger*'s voyage was to construct a blockhouse at Chateau Bay on the Labrador coast. Banks stayed in St. John's, Newfoundland for a month commencing 11 May, with snow still on the ground, to 11 June. Neither *O. polixenes* nor *O. melissa* would have been in flight by June 11; therefore, they could not have come from St. John's.

Banks then sailed to Croque, Newfoundland on June 11, 1766 and collected in the vicinity during June. He was ill through most of July and kept no diary and did little collecting. *O. melissa* is unknown from the island of Newfoundland, and *O. polixenes* is unknown from the eastern side of Newfoundland where Croque is located. Hence Banks could not have collected the type specimens at Croque. On 6 August he sailed for Chateau Bay on the Labrador coast, where he remained until 3 October (Lysaght, 1971).

The flight season in Labrador for resident (non-migratory), single-brooded, non-hibernating butterflies is early June to late August (GBIF database). There are 116 unique combinations of *Oeneis* species / locality / date records in Labrador, which provides a reasonable sample size. The latest flight date for the four species of *Oeneis* that occur in Labrador (*O. jutta*, *O. polixenes*, *O. melissa* and *O. bore*) is August 23, with all records from July 13 onward being for northern Labrador (north of 55°N) for *O. polixenes* and *O. bore* (there are no August records for *O. jutta* or *O. melissa*). Chateau Bay is in southern Labrador at 51.98°N, and therefore *Oeneis* there can reasonably be expected to have completed their flight period before the end of July.

### 2. TYPE LOCALITIES

Pelham (2008) defined the type locality of both *O. polixenes* and *O. melissa* as Chateau Bay, Labrador on the basis of Banks' visit there. There are several reasons for this being unlikely for *O. melissa*:

1. The most southern known locality for *Oeneis melissa* on the Labrador coast is 200 km to the north, at Cartwright. Chateau Bay is therefore not within the known range of *Oeneis melissa*.
2. Habitats near Chateau Bay appear to be a mix of low elevation barren rounded bedrock and conifer forest, neither of which is suitable habitat for *O. melissa* (viewed on Google Earth).
3. The flight season for *Oeneis melissa* in southern Labrador (if it is present) can be expected to end before August 6.

In contrast, *O. polixenes* may occur near Chateau Bay, with suitable habitat apparently being present (dry tundra and bogs), and *O. polixenes* has been collected on Belle Isle (GBIF database), less than 35 km off-shore from Chateau Bay, and about 82 km southwest along the coast at L'Anse-au-loup

(N. Kondla specimens). The dominant habitat on Belle Isle appears to be similar to that near Chateau Bay (viewed on Google Earth). However, the flight season for *O. polixenes* in southern Labrador can also be expected to end before August 6. Specimens of *O. polixenes* from southern Labrador (Blanc Sablon, L'Anse-au-loup, L'Asne-au-clair) in the collection of Norbert Kondla are dated June 30 to July 5.

Therefore, it is unlikely that Banks collected the type specimens of either *O. melissa* or *O. polixenes* near Chateau Bay, Labrador, although collection of *O. polixenes* during a late flight season cannot be completely ruled out.

After his stay at Chateau Bay, Banks returned to Croque (all butterflies would have ceased flight by that time), then a week later to St. John's, and then after another two weeks returned to Europe. Banks returned to London on 30 January 1767. Commencing in 1768 he sailed for three years on James Cook's first voyage, he then visited Iceland in 1772, and in 1773 he made his last voyage abroad to Holland (Lysaght, 1971). Therefore, it is impossible for Banks to have personally collected the type specimens of *Oeneis melissa* or *O. polixenes* after 1766.

Other possible sources for the *O. melissa* and *O. polixenes* types are either Moravian missionaries based in Greenland (and thence Labrador), or Captain George Cartwright. Both are known to have provided Banks with natural history specimens from the Labrador coast (Lysaght, 1971).

George Cartwright made his first visit to Labrador in 1766, where he met Banks. When he returned in 1768, he decided to become a trader on the Labrador coast. There is no indication that he supplied Banks with natural history specimens in the period 1766 - 1768. From 1770 to 1775 Cartwright was based at Lodge Bay, Labrador (Cartwright 1792). Lodge Bay is 180 km south of the nearest known occurrence (Cartwright, NL) of *O. melissa*, and is therefore far outside the known range of *O. melissa*. It is therefore very unlikely that any *O. melissa* were collected there. Lodge Bay is within the range of *O. polixenes*, but there is no evidence one way or the other whether Cartwright collected any specimens there. It is therefore unlikely that the type specimen(s) of *O. melissa* and/or *O. polixenes* were collected near Lodge Bay 1770-1775, but it cannot be completely ruled out for *O. polixenes*.

In 1775 George Cartwright founded what is now the modern town of Cartwright. A letter from Cartwright to Banks (Lysaght, 1971, p. 265-66) dated October 12, 1775 refers to a lack of collecting equipment for "Flies", suggesting an intent to collect insects for Banks. However, that letter also makes it clear that Cartwright had collected very few natural history specimens for Banks to that date, and apparently he did not collect "Flies" in 1775. It is therefore unlikely that the type specimen(s) of *O. melissa* and/or *O. polixenes* were collected by George Cartwright near Cartwright in 1775, but it cannot be completely ruled out because both species are known to occur near Cartwright.

The Moravian Missions in Greenland sent their first missionaries to Labrador in 1752 but were not a major influence until after 1770 (Lysaght, 1971). They were at Davis Inlet in 1765 (where *O. melissa* is likely to occur), and founded Nain in 1770 (where *O. melissa* and *O. polixenes* are known to occur), Okkak in 1775 (where *O. melissa* and *O. polixenes* are likely to occur), and Hopedale in 1781 (where *O. melissa* and *O. polixenes* are known to occur). Banks had plants in his collection from the latter three settlements, sent to him by the Moravian missionaries (Lysaght, 1971); however, only Nain was established prior to the publication of the name *melissa*. Therefore, Moravian missionaries could have supplied Banks with the *O. melissa* and/or *O. polixenes* type(s), and Nain is the most likely location for the specimens to have come from. However other locations along the central and northern Labrador coast cannot be completely ruled out.

### 3. TYPE SPECIMENS

The type specimens of both *O. melissa* and *O. polixenes* can reasonably be assumed to have come from Labrador. The British colonial government of Newfoundland governed the Labrador coast during the 18th Century, resulting in the modern province of “Newfoundland and Labrador”, hence the error in the specified type locality for *O. melissa* is not unreasonable. The type locality of “America boreali” for *O. polixenes* could be anywhere in Newfoundland and Labrador.

The type specimen(s) of *Oeneis melissa* were in the Joseph Banks collection at the time the species was described by Fabricius (1775). The type(s) of *O. melissa* are now apparently lost (Zimsen, 1964), and Butler (1869 [1870]) could not find any specimen(s) in the Banksian Collection in the British Museum. Miller and Brown (1981), Lukhtanov and Eitschberger (2000; 2001), and Pelham (2008) also considered the original type specimen(s) of *Oeneis melissa* (Fabricius, 1775) to be lost. At my request, Kim Goodger, Curator of Butterflies at the Natural History Museum of London, searched the Joseph Banks insect collection, but was not able to locate any specimen that might be a type of *Oeneis melissa*. The only butterfly type specimen in the Banks Collection that is associated with the name “*melissa*” is a specimen of *Precis sinuata* (Nymphalidae), the phenotype of which does not approximate the original description of *Oeneis melissa*.

The type specimen(s) of *Oeneis polixenes* were in the Joseph Banks collection at the time the species was described by Fabricius (1775). Butler (1869 [1870]) recorded one specimen of *O. polixenes* (as *O. bore*) in the British Museum collection, which was noted as “Presented 1845, by Dr. Thienemann” and therefore is not a type specimen of *O. polixenes* due to the date. There is apparently only one type specimen of *O. polixenes* presently in the Natural History Museum in London (formerly, British Museum of Natural History).

#### EXISTING “NEOTYPES” OF *OENEIS MELISSA* FABRICIUS, 1775

A “neotype” of *Oeneis melissa* (Fabricius, 1775) has twice been designated by Lukhtanov and Eitschberger (2000 and 2001) (Figures 2 - 4). Neither of these neotype designations, separately or together, fulfills the requirements of Article 75 of the International Code of Zoological Nomenclature (ICZN 1999). The following requirements (paraphrased for brevity) were not met: Article 75.3.2 A statement of distinguishing characters for the taxon; Article 75.3.5 Evidence that the neotype is consistent with the original description; and Article 75.3.6 Evidence that the neotype came from as near as practicable from the original type locality. The “neotype” is therefore not a neotype under the ICZN, because it does not meet the requirements for a neotype.

The requirements of the ICZN (1999) should be consistently followed to ensure nomenclatural stability. The *Oeneis melissa* “neotype” designations of Lukhtanov and Eitschberger (2000; 2001) do not meet several critical requirements of the ICZN and are therefore invalid. In addition, the locality data is too vague to be taxonomically useful.

For the sake of nomenclatural stability, my first thought was to simply re-designate, in a manner that meets the provisions of the ICZN, the specimen of Lukhtanov and Eitschberger (2000; 2001) as the neotype of *O. melissa*. Unfortunately, the original *melissa* description of “Wings dark brown above, unspotted. Posterior below white and black variegated” does not correspond to the neotype specimen selected by Lukhtanov and Eitschberger (2000; 2001). Failure to meet ICZN Article 75.3.5 – evidence that the neotype is consistent with the original description, and Article 75.3.6 – evidence that the neotype came from as near as practicable from the original type locality, apparently led Lukhtanov and Eitschberger (2000; 2001) to designate a specimen of a different taxon as the “neotype” of *O. melissa*.

Pl. 1,2, figs 10-12.

Distribution. Canada: Newfoundland, Labrador coast.

Note: The nomenclature of *Oeneis melissa* is very much confused. In the literature of XIXth and early XXth centuries it was mentioned exclusively under *semidea*, and this name is also sometimes used in the current literature for this species (Gross, 1970). From the 1930s on, the older name *melissa* is used for this species in the American literature. Since the type material of *Papilio melissa* F. is lost (Zimson, 1964), it is impossible to confirm whether *O. melissa* in the present understanding is identical to the one described by Fabricius. In the interest of stability of nomenclature, it is appropriate to use the name *melissa* for the taxon from Labrador and Newfoundland and *semidea* should be used only for the subspecies distributed in the White Mountains (New Hampshire, USA) as is done by most present authors. For the purpose of stability I here designate a neotype (male) of *Oeneis melissa* Fabricius, 1775 (see pl. 1/2, fig. 10) from [Canada], Labrador, deposited in EMEM as part of ZSM.

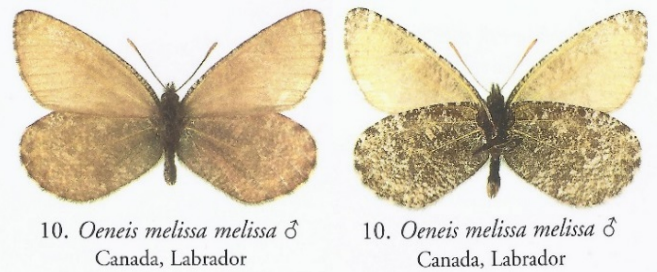
1d. *Oeneis melissa melissa* (Fabricius, 1775)

Distribution: Canada: Newfoundland, Coast of Labrador.

Fig. 10) ♂, [Canada], Labrador, ? Tanke, Neotype of *Papilio melissa* Fabricius, 1775, EMEM.

Fig. 11) ♀, [Canada], Labr[ador] merid.[ionalis], islandia; EMEM.

Fig. 12) ♀, [Canada], Amer. bor., Labrador, ZSM.



**Fig. 2.** Designation of “neotype” of *Oeneis melissa* (Fabricius, 1775) by Lukhtanov and Eitschberger (2001) – transcription of text:

**Fig. 3.** Illustration of “neotype” of *Oeneis melissa* (Fabricius, 1775) by Lukhtanov and Eitschberger (2000) – transcription of text and copy of images:



Photographs by Ulf Eitschberger & Joerg Nappert 2003, with permission.

**Fig. 4.** Images of data labels of *Oeneis melissa* (Fabricius, 1775) “neotype” designated by Lukhtanov and Eitschberger (2000 and 2001).

Specimens from the north coast of Labrador do match the original description of *O. melissa*. Specimens from Nain, Hopedale, and Hebron have “Wings dark brown above, unspotted. Posterior below white and black variegated”. This is an area that Moravian Missionaries could have obtained specimens and sent them to Joseph Banks. The neotype designated by Lukhtanov and Eitschberger (2000; 2001) has a different phenotype and appears to be the taxon generally known as *O. melissa semplei*, which occurs from “Quebec, interior Labrador, and Hudson’s Bay” (Layberry et al. 1995). The *semplei* specimen of Lukhtanov and Eitschberger (2000; 2001) may be from Smokey Mountain near Labrador City, which is at this time the most accessible (by a highway) interior Labrador location with *melissa* habitat. Acceptance (through re-designating) of the Lukhtanov and Eitschberger (2000; 2001) “neotype” would result in *semplei* becoming a synonym of *melissa* and leave the taxon on the north coast of Labrador without a name. This is not acceptable, and accordingly I designate below a neotype for *Oeneis melissa* (Fabricius, 1775).

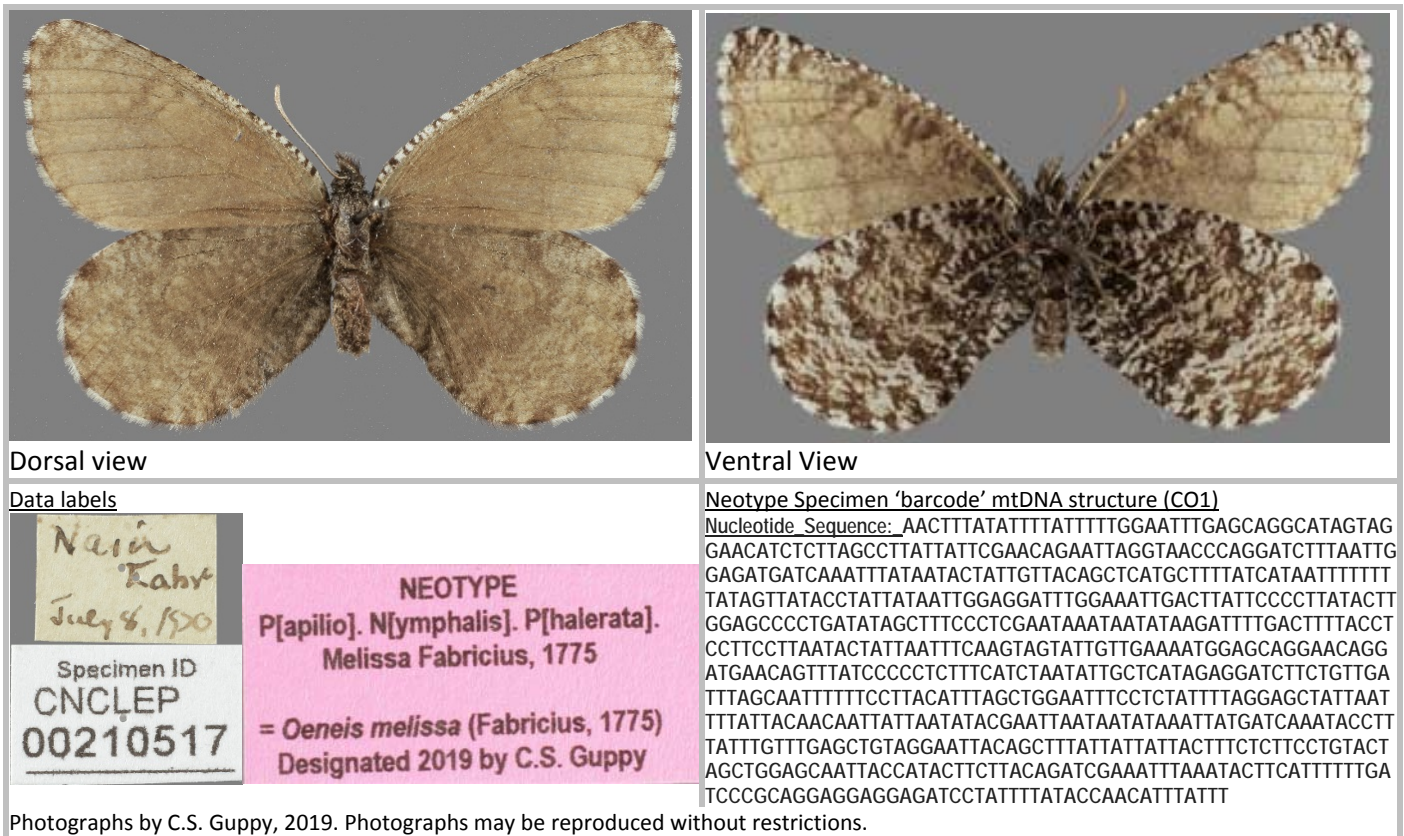
#### 4. DESIGNATION OF A VALID NEOTYPE FOR *OENEIS MELISSA* (FABRICIUS, 1775)

The original type specimen(s) of *Oeneis melissa* (Fabricius, 1775) did not originate from the nominal type locality of Newfoundland and could have come from various locations. The type(s) came from somewhere along the Labrador coast, but the exact location cannot be determined (see previous sections). A name-bearing type of *Oeneis melissa* (Fabricius, 1775) is necessary to define the nominal taxon objectively to allow a taxonomic review of the species, and I have determined that there are no extant specimens identifiable as the type(s) of *Oeneis melissa* (ICZN Articles 75.1, 75.2, 75.3.4).

The vicinity of Nain, Labrador is a reasonable choice for the type locality, and is at least as probable as any other location along the northern Labrador coast (ICZN Article 75.3.6). I therefore select a specimen as neotype with the specific locality data of “Nain, Labr.”, which is as near as practical to the original type locality (ICZN Article 75.3.6) as discussed above.

The selected location of Nain, Labrador for the neotype is consistent with the selection of Hopedale, Labrador for the neotype of *Oeneis taygete* Geyer, [1830] by dos Passos (1949). Nain and Hopedale are only 150 km apart on the coast of Labrador with similar ecological characteristics. However, Hopedale was founded after the description of *O. melissa*, and therefore is very unlikely to be the source of the type(s).

The neotype specimen (a female) and its data labels are illustrated in Figure 5. The neotype specimen is in the Canadian National Collection of Insects and Arthropods (CNC), Ottawa, Canada (ICZN Article 75.3.7). The neotype corresponds to the original description of *melissa* (ICZN Article 75.3.5) in having wing fringes of alternating patches of white and brown scales (“dentate”), the overall colour of the upperside is “dark brown” and “unspotted”, and the underside of the hindwings is “gray-marbled” / “white and black variegated”. The data label reads “Nain Labr July 8, 1970”; the collector is unknown.



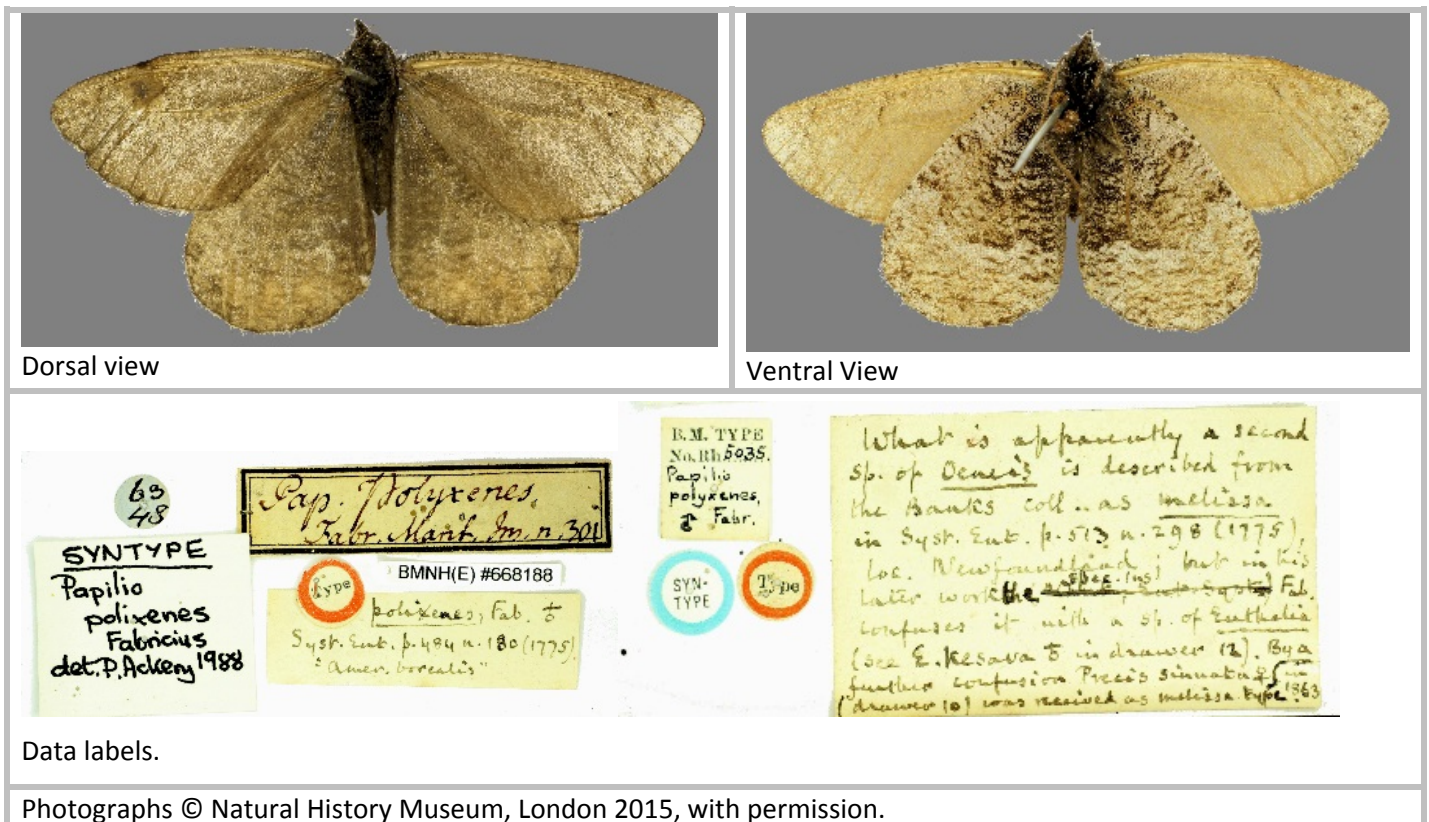
**Fig. 5.** Neotype of *Oeneis melissa* Fabricius, 1775

The distinguishing characters for the taxon (ICZN Article 75.3.2) are the dark brown, unspotted colour of the dorsum and the “gray-marbled” / “white and black variegated” ventral hindwings. The ‘barcode’ mtDNA nucleotide sequence is also provided in Figure 5. I submitted one leg of the neotype specimen to the Barcode of Life laboratory at the University of Guelph to obtain the ‘barcode’ - a 658 base pair portion of the cytochrome oxidase I (COI) mtDNA gene, and the data is available through the public BOLD database. The ‘barcode’ structure is apparently unique to the species “*Oeneis melissa*”, although the structure may be present in more than one subspecies (C.S. Guppy, in prep.).

## 5. DESIGNATION OF A LECTOTYPE FOR *OENEIS POLIXENES* (FABRICIUS, 1775)

The original number of type specimens of *Oeneis polixenes* (Fabricius, 1775) is unknown and a holotype was not designated explicitly or through implication; therefore, the type specimens are syntypes (ICZN Article 73). There is one specimen that has been identified as a syntype of *O. polixenes* in the Natural History Museum in London (formerly the British Museum of Natural History), and no other extant specimens are known. The BMNH accession number is '63 48', with the original accession number label still attached to the specimen (Figure 6). The BMNH register indicates that specimen number '63 48' was from 'America' and was a Fabrician type. The material was part of the Joseph Banks collection that came to the museum via the Linnaean Society (John Chainey, pers. comm. Feb. 2015). The current catalogue number label is BMNH(E) 668188. This specimen of *O. polixenes* is not that listed by Butler (1869 [1870]) (John Chainey, pers. comm. Feb. 2015).

There are at least two different phenotypes (potentially different species or subspecies) of *O. polixenes* in Labrador, one inhabiting northern tundra habitats and one inhabiting southern Labrador with at least some populations in bog habitats (C.S. Guppy, in prep.). I expressly and deliberately designate the specimen shown in Figure 6, in the collection of the Natural History Museum in London, as the lectotype of *Oeneis polixenes* (Fabricius, 1775) (ICZN Article 74.7.3) to fix a specific phenotype for the name.



**Fig. 6.** Lectotype of *Oeneis polixenes* Fabricius, 1775

## CONCLUSION

The *Oeneis melissa* (Fabricius, 1775) “neotype” designations of Lukhtanov and Eitschberger (2000; 2001) do not meet several critical requirements of the ICZN and are therefore invalid. In addition, the locality data is too vague to be taxonomically useful, and their “neotype” specimen is a specimen of the taxon generally known as *O. melissa semplei*, and acceptance of their specimen as neotype would change the meaning of the taxon *Oeneis melissa*. Hence, I reject their neotype designation.

A neotype *Oeneis melissa* (Fabricius, 1775) is designated from Nain, Labrador with careful consideration of the Articles of the International Code of Zoological Nomenclature. A name-bearing type of *Oeneis melissa* (Fabricius, 1775) is necessary to define the nominal taxon objectively to allow a taxonomic review of the species, and I have determined that there are no extant specimens identifiable as the type(s) of *Oeneis melissa* (ICZN Articles 75.1, 75.2, 75.3.4). The vicinity of Nain, Labrador is a reasonable choice for the type locality, and is at least as probable as any other location along the northern Labrador coast (ICZN Article 75.3.6). A female specimen has been selected as neotype with the specific locality data of “Nain”, which is as near as practical to the original type locality (ICZN Article 75.3.6). The neotype specimen is in the Canadian National Collection of Insects and Arthropods (CNC), Ottawa, Canada (ICZN Article 75.3.7). The neotype corresponds to the original description of *melissa* (ICZN Article 75.3.5) in having wing fringes of alternating patches of white and brown scales (“dentate”), the overall colour of the upperside is “dark brown” and “unspotted”, and the underside of the hindwings is “gray- marbled” / “white and black variegated”. The ‘barcode’ mtDNA (CO1 gene) structure for the neotype is provided.

The original number of type specimens of *Oeneis polixenes* is unknown and a holotype was not designated explicitly or through implication; therefore, the type specimens are syntypes (ICZN Article 73). There is one specimen that has been identified as a syntype of *O. polixenes* in the Natural History Museum in London (formerly the British Museum of Natural History), and no other extant specimens are known. There are at least two different phenotypes (potentially different species or subspecies) of *O. polixenes* in Labrador, one inhabiting northern tundra habitats and one inhabiting southern Labrador with at least some populations in bog habitats. I have expressly and deliberately designated the specimen in the collection of the Natural History Museum in London, as the lectotype of *Oeneis polixenes* (Fabricius, 1775) (ICZN Article 74.7.3) to fix a specific phenotype for the name.

## ACKNOWLEDGMENTS

Norbert G. Kondla provided comments and suggestions throughout the many years this paper has been in progress. Christian Schmidt provided access to the specimens in the Canadian National Museum of Insects and Arthropods (Ottawa, Canada). Many others have provided specimens of *Oeneis* and taxonomic comments for my on-going research on the genus.

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