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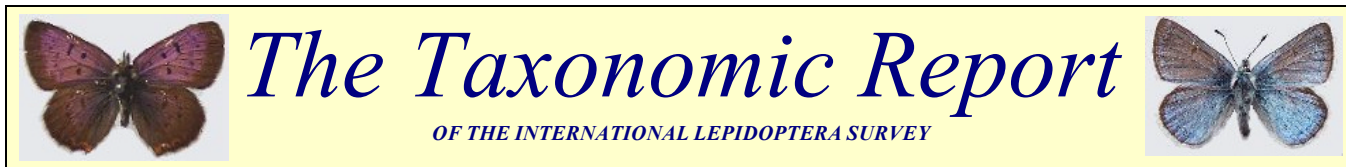


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NAME-BEARING TYPES AND TAXONOMIC SYNOPSIS OF THREE LYCAENID BUTTERFLY TAXA FROM WESTERN CANADA (LEPIDOPTERA: LYCAENIDAE)

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ABSTRACT: We clarify which of two designated lectotypes of *Chrysophanus florus* Edwards, 1884 is valid. We also show that the putative holotype of *Plebeius saepiolus insulanus* Blackmore, 1920 is actually a lectotype. A valid neotype designation for *Lycaena saepiolus amica* Edwards, 1863 is provided. Publication dates are corrected and we also briefly review the various taxonomic interpretations and distributions that appear in the literature with respect to these taxa.

Additional key words: *Plebejus*, *Aricia*, *Epidemia*, *dorcas*, *helloides*, *kodiak*, *rufescens*, Alberta, British Columbia

INTRODUCTION

The first purpose of this article is to clarify the name bearing type of the butterfly *Chrysophanus florus* Edwards, 1884. This is necessary because two lectotype designations have been published and two butterflies with lectotype labels exist in the Canadian National Collection of Insects and Arthropods (CNC, Ottawa, Canada). Our second purpose is to clarify the name bearing type of *Plebeius saepiolus* race *insulanus* Blackmore, 1920. This is necessary because the existing name bearing type is erroneously labeled as a holotype in the CNC. We also report the correct publication years for these two taxa. Thirdly, a valid neotype designation for *Lycaena saepiolus amica* is presented. This is necessary because the neotype designation by Brown (1970) is invalid. We also give an overview of the numerous and unresolved taxonomic interpretations related to these butterflies. Our overall purpose is to set the stage for subsequent taxonomic review.

Chrysophanus florus Edwards, 1884 (Figures 1 and 2)

Edwards (1884) described *Chrysophanus florus* as a distinct species. The original description appeared in *Canadian Entomologist* 12(11), which was published 17 January 1884 (Bird and Ferris 1979, Bridges 1988), rather than in 1883 as has generally been assumed (e.g. Miller and Brown 1981, Guppy and Shepard 2001). Two lectotypes have been designated and reside in the Canadian National Collection of Insects and Arthropods. Figures 1 and 2 show the dorsal and ventral views of the two putative lectotypes in the CNC.

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Brown (1969) published the first lectotype designation. He selected the lower specimen shown in Figures 1 and 2 for his lectotype but clearly showed that it was not from the type series (syntypes). A lectotype may only be selected from the type series, pursuant to the International Code of Zoological Nomenclature (henceforth, “the Code”) Article 74 (International Commission on Zoological Nomenclature 1999). It is clear from Brown (1969) that Edwards did not have available to him the specimen Brown selected as the lectotype and hence the lectotype designation by Brown is not valid. As noted by Brown (1969), Edwards only saw one or two of Geddes’ *L. florus* specimens and returned them to Geddes (the collector of the types). Also as noted by Brown (1969), none of the four Geddes *L. florus* specimens from Calgary in the CNC carry an Edwards label but two specimens from Crowsnest Pass do carry Edwards labels. Those two specimens are therefore the type series. We recommend that a label be added to the “lectotype” labelled by Brown (1969) stating that it is not a lectotype, along with a citation of this article for the benefit of future researchers who access these specimens.

Bird and Ferris (1979) designated the second lectotype. Their lectotype designation is the valid lectotype designation but not for the reasons they present in their paper. They express the view that the Brown lectotype designation is invalid because of an error in the type locality as provided by Brown. In



Figure 1. Dorsal view of the two *florus* “lectotypes” in the CNC. Photo: N. Kondla



Figure 2. Ventral view of the two *florus* “lectotypes” in the CNC. Photo: N. Kondla



Figure 3. Dorsal view of the putative *insulanus* “holotype” (now a lectotype) in the CNC. Photo: N. Kondla



Figure 4. Ventral view of the putative *insulanus* “holotype” (now a lectotype) in the CNC. Photo: N. Kondla

fact, the ‘correctness’ of a type locality has no bearing on the validity of a lectotype. There is no Code requirement for a lectotype to have a ‘correct’ type locality. The type locality does not determine the lectotype; it is the lectotype that determines the type locality (Article 76.2 of the Code). However for the reasons explained above, we also conclude that the Brown lectotype is invalid and hence Bird and Ferris (1979) were justified in designating a new lectotype. The Bird and Ferris lectotype is valid because it was selected from the type series.

The type locality of *L. florus* was referenced as Red Deer River, and restricted to Didsbury, Alberta by Brown (1969) and by Miller and Brown (1981). Both this type locality and the alleged type locality restriction is incorrect. Brown (1969) did not restrict the type locality but rather alleged that “Garrett’s Ranche, Br. Amer.” is now called Didsbury. Brown (1969) quoted the type locality as “Taken on Red Deer River, Br. Am.”. We note that the Red Deer River is more than 80 kilometres from the town of Didsbury. Type locality confusion was further increased because the lectotype selected by Brown (1969) was collected near Calgary, which should have been cited as the type locality until the lectotype designation by Bird and Ferris (1979). All three of these alleged type localities are incorrect. The valid lectotype designation by Bird and Ferris (1979), along with the historical and geographical research reported therein, means that the type locality of *L. florus* is “Garnett’s Ranch, near Lundbreck, mouth of Crowsnest Pass, Alberta”.

The taxon *florus* has variously been placed in the literature as a subspecies of *Lycaena (Epidemia) dorcas* or as a subspecies of *Lycaena (Epidemia) helloides* (eg. Ferris 1977, Scott 1978), although Klots (1931) argued that *L. dorcas* and *L. helloides* are the same species because they have similar male genitalia. Various books have not contributed anything to resolution of this matter and have even contributed to confusion about the distribution of *L. florus* (eg. Layberry et al. 1998, Opler 1999). Bird et al. (1995) correctly described the Alberta distribution as being confined to the extreme southwest of the province. The status of *L. florus* in southern British Columbia is under review. It was not included in Guppy and Shepard (2001), although it is reported from British Columbia by Ferris (1977) and numerous specimens of phenotypic *florus* are known from southern British Columbia. Opler (1975: 314) expressed the view that high altitude *florus* populations in Colorado appear intermediate between *dorcas* and *helloides* but did not explain the perceived characters that resulted in such a view. Kohler (1980, pers. comm.) recognises *L. helloides* and *L. florus* as different taxonomic entities in Montana on the basis of phenotypic, phenological and ecological differences. A review of the specimens in the CNC by Kondla in 1998 and by Guppy in 2002 support the interpretation that *L. helloides*, *L. dorcas*, and *L. florus* all occur in Alberta as distinct species. Recent literature has seemingly been based on the unstated assumption that the taxon *florus* must be associated at the species level with either *dorcas* or with *helloides*, as pointed out by Kondla (1999). Nothing has been published to support treating *florus* as anything other than the full species that Edwards described it as. Clarity on the name bearing type is needed regardless of the differing taxonomic interpretations.

***Plebeius saepiolus* race *insulanus* Blackmore, 1920 (Figures 3 and 4)**

Blackmore (1920) described *Plebeius saepiolus* race *insulanus*, although the publication date has apparently always been stated in error to be 1919 (eg. Miller and Brown 1981; Guppy and Shepard 2001). The *Proceedings of the Entomological Society of British Columbia* were at that time normally published the following year, as was the case for the 1919 *Proceedings* (Bridges 1988). Further evidence for publication in 1920 is contained within the original description itself. The last three paragraphs are preceded by the words “AUTHORS NOTE (October, 1920)”. Since then the species *saepiolus*, with its subspecies *insulanus*, has been traditionally placed in the genus *Plebejus* or its variant spelling *Plebeius*. Detailed explanation of the *Plebeius/Plebejus* spelling variants is provided by Bálint et al. (2001), who also invoke Article 24.2 of the Code to make *Plebejus* the code-compliant spelling.

Bálint and Johnson (1997) provide reasons based on genitalic structure for preferring use of the generic name *Aricia* for the species *saepiolus*. The genus *Aricia* was named after the town of Aricia in Latium on the Via Appia (Traupman, 1970) and is feminine. Brown (1951) incorrectly used the spelling *insulana* for the taxon *insulanus*, in combination with the masculine *Plebeius/Plebejus*. Use of the feminine spelling *insulana* in combination with the genus *Aricia* would also be an error. The Latin word *insulanus* (= an islander) is a noun, and as such Article 31.2.1 of the Code requires the original spelling to be retained, with gender ending unchanged. Gender agreement for species group names applies only if the name is a Latin or latinized adjective or participle in the nominative singular. Readers should also resist the temptation to change *saepiolus* to *saepiola* when placed in the genus *Aricia*, because the Latin word *saepiolus* is also a noun.

Blackmore did not designate a holotype in his 1920 paper, but three years later re-described the taxon *insulanus* and this time did designate a holotype (Blackmore 1923). Unfortunately this belated holotype designation is invalid, because Article 73 of the Code requires that a holotype designation be part of the original description of a taxon. A holotype can only be designated at the time of original description, thus the “holotype” designated by Blackmore (1923) is not a valid holotype. Code Articles 74.5 and 74.6 render the putative holotype a legitimate lectotype. We recommend to the CNC, as custodians of the type specimen, that a lectotype label be added to the specimen, along with a citation of this article for the benefit of future researchers. The dorsal and ventral views of the lectotype of *Plebeius saepiolus* race *insulanus* Blackmore, 1920 (type locality: Victoria, BC) are shown in Figures 3 and 4.

***Lycaena amica* Edwards, 1863 (Figures 5 and 6)**

The taxon *amica* was described as a full species by Edwards (1863). The type locality of *amica* Edwards is Fort Smith, NT by virtue of our neotype designation (below) and not Fort Simpson as erroneously listed in recent literature including Brown (1970). The original description gave “From Mackenzie’s River” as the type locality. Brown gave no reasons for arbitrarily saying that Fort Simpson is the type locality. Brown asserted that Fort Smith is upstream of Fort Simpson but this is incorrect. Fort Smith is located on the Slave River, which is separated from the Mackenzie River by Great Slave Lake.

Unfortunately Brown’s neotype designation is not compliant with the fourth edition of the International Code of Zoological Nomenclature. The fourth edition of the Code requires a valid neotype designation to be published with “a statement that it is designated with the express purpose of clarifying the taxonomic status or the type locality of a nominal taxon” (Article 75.3.1). Brown’s designation does not meet this test. The fourth edition of the Code supersedes all previous editions so this deficiency adequately demonstrates that the Brown neotype designation is invalid. To some this may seem to be a minor reason to invalidate Brown’s neotype designation. However it is critical to avoid the selective rejection of portions of the Code, based on personal opinion of “importance”, in the interest of taxonomic stability and consistency.

However, for the benefit of readers who mistakenly think that compliance with the version of the Code in effect in 1970 renders the Brown designation valid; we test the designation against the provisions of the second edition of the Code, which was in effect in 1970. The second edition of the Code required neotypes to only be designated in connection with revisory work and then only in exceptional circumstances (e.g. a complex zoological problem) when a neotype is necessary in the interests of stability of nomenclature. Brown did not designate the neotype as part of revisory work. He presented no exceptional circumstances that warranted a neotype. His stated motivation for designating a neotype was that the original description was very brief and left much to be desired and thus he felt obliged “to settle the question of *amica*’s identity”. Thus, Brown’s neotype designation was also invalid under the Code version in effect at the time.

We remedy this situation by validly designating Brown’s putative neotype of *amica* as the neotype in accordance with the International Code of Zoological Nomenclature. The designation is organized in accordance with the Code neotype articles to clearly demonstrate compliance with the Code provisions:

- ◆ Article 75.1 – We believe that a name bearing type is necessary to define the nominal taxon objectively. We present below the numerous and conflicting and unsubstantiated interpretations surrounding the name *amica* and related names.
- ◆ Article 75.3 – We believe that there is an exceptional need to establish a name bearing type to allow for resolution of the various published and conflicting taxonomic interpretations surrounding *amica* and related names.
- ◆ Article 75.3.1 – We designate the neotype with two express purposes. One purpose is to establish Fort Smith, Northwest Territories, Canada as the type locality of the taxon *amica*. The second purpose is to clarify that we view *amica* as a distinct taxonomic entity from the taxa *insulanus* Blackmore, 1920 and *kodiak* Edwards, 1870.
- ◆ Article 75.3.2 – The taxon *amica* differs from *insulanus* by having females that often have blue scaling basad on the dorsal forewing and by being more strongly spotted on the ventral surface. The taxon *amica* is differentiated from *kodiak* by its larger size and lighter, greyish white ventral surface, with smaller spots, in the males.
- ◆ Article 75.3.3 – In the interests of stability and to avoid confusion; we designate as the neotype of *amica* the same specimen invalidly designated by Brown (1970). The neotype is a male in the Canadian National Collection of Insects and Arthropods in Ottawa, Canada. It is type number 10908 in said collection. It was collected at Fort Smith, NT by W.G. Helps on 28 June 1950. It is illustrated in black and white by Brown (1970) and is herein illustrated in colour as Figures 5 and 6.
- ◆ Article 75.3.4 – We believe that the type specimens of *amica* are lost because Brown (1970) quotes from a letter by Edwards to Holland that they were lost. Types were not located in sundry collections visited by Brown in his research on Edwards types.
- ◆ Article 75.3.5 – Brown (1970) presented evidence that the neotype is consistent with what is known of the former name-bearing type from the original description and we cite his paper as evidence herein. We have also compared the original description (Edwards 1863) to the neotype and find that it is consistent.
- ◆ Article 75.3.6 – We reference the information in Brown (1970) as evidence that the neotype came as nearly as practicable from the original type locality.
- ◆ Article 75.3.7 – The neotype is the property of the Government of Canada and is housed in the Canadian National Collection of Insects and Arthropods, Ottawa, Canada.



Figure 5. Dorsal view of the neotype of *amica* in the CNC. Photo: N. Kondla



Figure 6. Ventral view of the neotype of *amica* in the CNC. Photo: N. Kondla

Synopsis of the names attributed to the nominal species *Aricia saepiolus* in western Canada

With clarity of the types and type localities now in hand; we provide a brief synopsis of the various taxonomic interpretations and distributions presented in the literature since these animals were first described.

Blackmore (1920) limited *insulanus* to Vancouver Island and expressed the view that populations from Atlin in extreme northwestern British Columbia approach typical *saepiolus*. Llewellyn-Jones (1951) also followed this approach. Holland (1931:258, 259) treated *amica* and *insulanus* as full species rather than subspecies of *saepiolus*. Leussler (1935) reported collection of a few specimens from the area of the Mackenzie River delta, NT. He observed that “These are small and come nearest to race *insulanus* Blackmore, but are paler and duller looking above. They fit the description of *amica* Dew. [sic] somewhat indifferently”. Brown (1951) recognised nominate *saepiolus* as being present in extreme southern British Columbia; treated Vancouver specimens as *insulanus* and extended application of the name *insulanus* “on the mainland west of the Fraser River in British Columbia (Lillooet)”. Brown (1951) further stated that “*Amica* (?) extends eastward from the mountains in western Alberta” and made no comment on the placement of populations in northwestern British Columbia.

Downey (1975:343) assigned *insulanus* to populations from Vancouver Island and western British Columbia, and used *amica* for the remainder of British Columbia with the exception of a comment that nominate *saepiolus* ranges “northward to British Columbia where it gives way to *insulanus*”. Scott (1986) reported *insulanus* from southwestern British Columbia, south to northwestern California and east to Montana and used *amica* for the remainder of western Canada. Layberry et al. (1998) restrict *insulanus* to Vancouver Island and attribute *amica* to the remainder of the Canadian range. Shepard (2000) disputes the assignment of coastal Oregon populations to *insulanus* and asserts that Vancouver Island populations are a distinct subspecies found nowhere else in Canada. Guppy and Shepard (2001) restrict *insulanus* to Vancouver Island and apply *amica* to the remainder of BC and even south well into Oregon and east into Alberta and western Montana. This differs from the interpretation of Hinchliff (1994) who assigned Oregon coastal populations to *insulanus* and interior populations to *saepiolus*; and also differs from Hinchliff (1996) who assigned all Washington populations to *saepiolus*. Kohler (1980) assigned all Montana populations to *saepiolus*. Bird et al. (1995) noted that “Most Alberta material can be assigned to *Plebejus saepiolus amica*”. Note however that Bird et al. (1995) illustrated a phenotype that is different from that of any named *saepiolus* subspecies. Ferris et al. (1983) assign Yukon populations to *amica*.

Additional uncertainty in subspecies status and geographic boundaries in the northwest is introduced by the taxon *Lycaena kodiak*, described by Edwards (1870). This valid taxon has been essentially ignored in the literature although Holland (1931:263) did note that it was originally described from Kodiak Island and that it “is widely diffused through Alaska and the northwestern parts of British America” [= Canada]. The name may have been ignored because, as Brown (1970) points out, none of the three butterflies he illustrates under the name of *kodiak* are even of the same species as *kodiak*. Brown also notes that other authors have historically misplaced the name *kodiak*. Brown (1970) clarified the status of *kodiak* and designated a lectotype that correctly associates *kodiak* with the species *Aricia saepiolus*. Guppy and Shepard (2001) provide a colour photograph of the male ventral surface of a butterfly that resembles this taxon under the name of *amica*, from Atlin, British Columbia. The taxon *kodiak* is distinguished from *amica* by its smaller size and darker grey ventral surface with more pronounced dark spots.

The taxon *rufescens* has been reported from southern British Columbia (Blackmore 1920, Llewellyn-Jones 1951). This butterfly was described as a full species, *Lycaena rufescens* Boisduval, 1869, but has usually been treated as a female form name (e.g. Comstock 1927, Miller and Brown 1981). A lectotype was designated by Emmel et al. (1998), who also restricted the type locality to Bear Valley, near Olema, Marin County, CA. Emmel et al. (1998) treated *rufescens* as a junior synonym of the subspecies *aehaja* Behr, 1867 (type locality: alpine headwaters Tuolumne River, CA); although they gave no rationale for this taxonomic interpretation. In contrast, Austin (1998) presents ample evidence for treating

rufescens as a subspecies of *Aricia saepiolus* distinct from *aehaja*; at least in the geographic area he was dealing with. At this time we do not know if *rufescens* is present in British Columbia as a form without standing under the Code or if there are populations that warrant recognition as a species level name under the Code.

Further elaboration and clarification of the *insulanus* component of this confused situation is hindered by the fact that *insulanus* has not been found on Vancouver Island since 1979 (Shepard 2000; specimens in Kondla collection). It may well be extirpated there and future workers therefore are limited to examination of historical material in sundry collections for the purpose of comparing *insulanus* with other taxa. Shepard (2000) itemises the location of approximately 146 specimens of *insulanus* in sundry collections. A search of the Canadian Biodiversity Information Facility website by Kondla revealed the existence of a few additional specimens in the collections of the Nova Scotia Museum of Natural History, the Royal Ontario Museum and the Royal Saskatchewan Museum. There are likely still additional specimens in various museums and private collections, including specimens collected by Richard Guppy who supplied Vancouver Island butterflies to numerous collectors over many years. We would welcome notification of the details of such additional specimens.

We provide photographs of two series of *insulanus* held by the CNC as an aid to future researchers of *saepiolus* taxonomy. Figures 9 and 10 show dorsal and ventral views of *insulanus* from the type series and the vicinity of the type locality. Figures 11 and 12 show an interesting series from Saratoga Beach (east-central Vancouver Island) that is plainly different from the appearance of butterflies from the type locality (southern Vancouver Island). Figures 7 and 8 show the types of *insulanus* and *amica* side by side to control for the vagaries of photography and to allow easy comparison of the differences and similarities.

It is clear from this brief review that there are numerous and conflicting interpretations regarding *Aricia saepiolus* in northwestern North America. It is equally clear that there is insufficient information presented in the literature to allow an unambiguous assessment of which interpretation is most defensible and congruent with reality in the field. There is no clarity as to where *saepiolus* grades into *insulanus* and *amica* or even if they do. There is no clarity as to where *kodiak* grades into *amica*. The literature also presents differing descriptions of the appearance of the taxa under discussion. We do not elaborate on that here since it is more appropriate to include in a future taxonomic review.



Figure 7. Dorsal view of *insulanus* (top) and *amica* (bottom) types. Photo: N. Kondla.



Figure 8. Ventral view of *insulanus* (top) and *amica* (bottom) types. Photo: N. Kondla

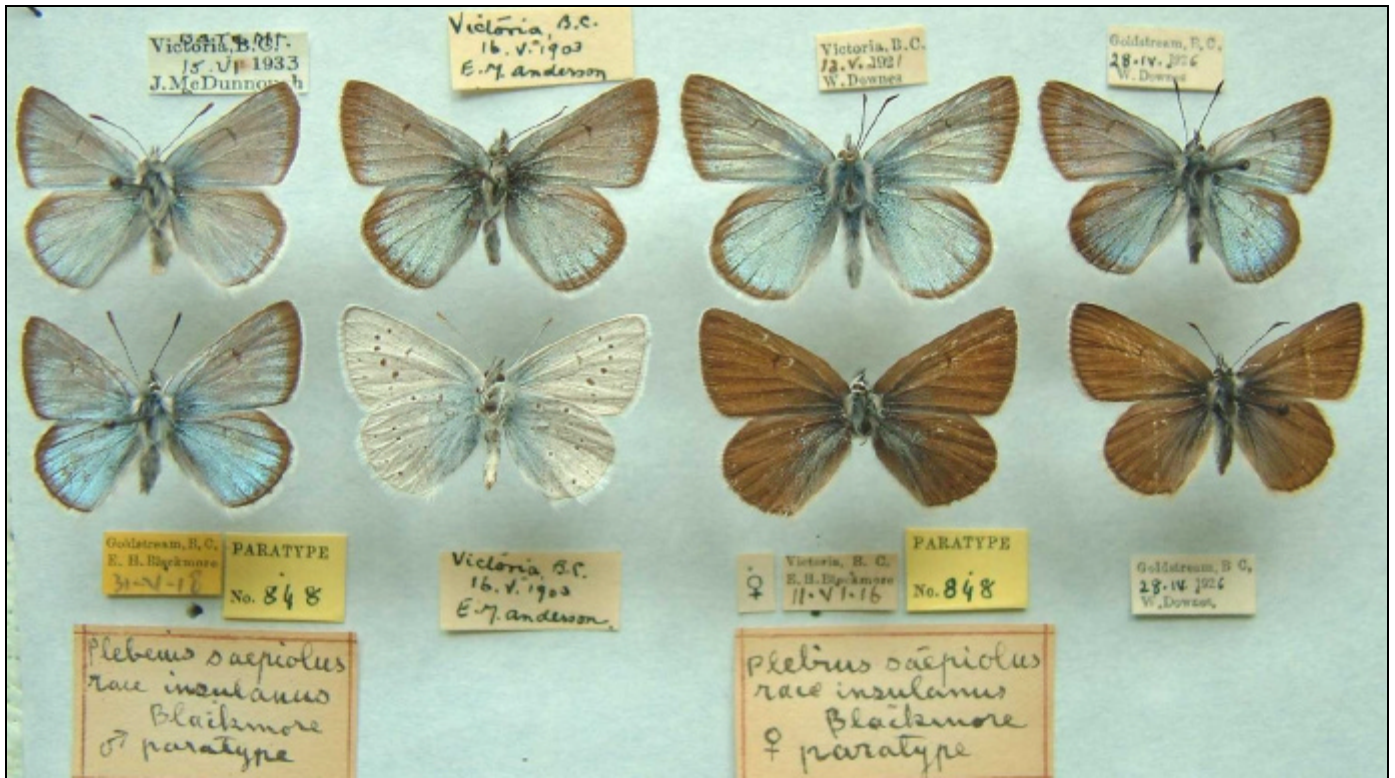


Figure 9. *Aricia saepiolus insulanus* specimens from the type locality. Photo: C. Guppy



Figure 10. *Aricia saepiolus insulanus* specimens from the type locality. Photo: C. Guppy



Figure 11. Additional *insulanus* specimens. More than one collection date on individual specimen labels, otherwise all labels are identical to the example shown. Photo: C. Guppy



Figure 12. Additional *insulanus* specimens. Same specimens and same data as figure 11 above.

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