A butterfly with olive green eyes discovered in the United States and the Neotropics (Lepidoptera, Lycaenidae, Eumaeini)

Robert K. Robbins¹⁺, Jeffrey Glassberg²⁺

¹ Department of Entomology, Smithsonian Institution, PO Box 37012, NHB Stop 105 (E-514), Washington, DC 20013-7012 USA ² North American Butterfly Association, 4 Delaware Rd., Morristown, NJ 07960, USA


Corresponding author: Robert K. Robbins (RobbinsR@SI.edu)

Academic editor: Carlos Peña  |  Received 8 March 2013  |  Accepted 7 May 2013  |  Published 28 May 2013

urn:lsid:zoobank.org:pub:2D757D70-22F6-4F01-88CF-79BB1BB812C3

Citation: Robbins RK, Glassberg J (2013) A butterfly with olive green eyes discovered in the United States and the Neotropics (Lepidoptera, Lycaenidae, Eumaeini). ZooKeys 305: 1–20. doi: 10.3897/zookeys.305.5081

Abstract

We describe Ministrymon janevicroy Glassberg, sp. n., from the United States (Texas). Its wing pattern closely resembles that of the widespread and well-known lycaenid, Ministrymon azia (Hewitson). The new species is distinguished by the structure of its male and female genitalia, by the patterning of the ground color on the basal half of the ventral hindwing surface, and by the color of its eyes. Adults of Ministrymon janevicroy in nature have olive green eyes in contrast to the dark brown/black eyes of M. azia. Ministrymon janevicroy occurs in dry deciduous forest and scrub from the United States (Texas) to Costa Rica (Guanacaste) with disjunct populations on Curaçao and Isla Margarita (Venezuela). In contrast, M. azia occurs from the United States to southern Brazil and Chile in both dry and wet lowland habitats. Nomenclaturally, we remove the name Electrostrymon grumus K. Johnson & Kroenlein, 1993, from the synonymy of M. azia (where it had been listed as a synonym of Ministrymon hernandezi Schwartz & K. Johnson, 1992). We accord priority to Angulopis hernandezi K. Johnson & Kroenlein, 1993 over Electrostrymon grumus K. Johnson & Kroenlein, 1993, syn. n., which currently is placed in Ziegleria K. Johnson, 1993. The English name Vicroy’s Ministreak is proposed for M. janevicroy. We update biological records of dispersal and caterpillar food plants, previously attributed to M. azia, in light of the new taxonomy.
Keywords
Butterfly Eye Color, Curaçao, Isla Margarita, Ministrymon azia, Ministrymon janevicroy, Vicroy’s Ministreak

Introduction

Ministrymon azia (Hewitson) (Fig. 1) is widely cited in faunal lists and occurs from the southern United States to southern Brazil, Paraguay, and Argentina in virtually all lowland habitats, ranging from desert in coastal Peru and Chile to rainforest in the Amazon Basin (Godman and Salvin 1887-1901, Draudt 1919-1920, Kaye 1921, Talbot 1928, Holland 1931, Stallings and Turner 1946, Hayward 1958, Brown and Mielke 1967, Ebert 1970, Lamas 1977, Robbins et al. 1996, 2012a, Gareca et al. 2009, Durante et al. 2010). Adults of M. azia appear to be highly dispersive, having been recorded migrating through Portachuelo Pass in northern Venezuela and being dispersed by dry season trade winds in Panama (Beebe 1951, Robbins and Small 1981). Caterpillars of M. azia eat the flowers of a wide variety of Fabaceae and are discussed in the biological control and agriculture literature (e.g., Cock 1985, Harley et al. 1995, Fernández and Rodríguez 1997, Vargas and Parra 2009). The ventral wing pattern of M. azia west of the Andes is slightly different from that in other parts of its range, but genitalia variation is negligible (Johnson and Miller 1991). The nomenclature and taxonomy of M. azia are stable (Robbins and Lamas 2002, ICZN 2006). This species lacks a common name in the agricultural literature (Bosik 1997) but has been called Gray Ministreak in recent works dealing with North American butterflies (Cassie et al. 1995, Wauer 2004, Allen et al. 2005, Cech and Tudor 2005).

The generic placement of M. azia is a bit of an historical puzzle. Clench (1961: 196) described Ministrymon based on the presence of “two small erect ventral teeth near the tip” of the penis, but placed azia in Tmolus Hübner, a genus that lacks these teeth (as noted by Clench 1961). Ministrymon azia has four small erect teeth (Figs 5–6, first illustrated by Johnson and Miller 1991). It is puzzling that Clench did not observe the teeth because they are reasonably conspicuous. Robbins (2004a) listed 22 species in Ministrymon primarily based upon the presence of teeth on the ventral side of the penis near the tip. These teeth are otherwise unreported in the Eumaeini.

We recently discovered that the traditional species concept of M. azia includes a cryptic species that occurs sympatrically and synchronically with M. azia from the United States (Texas) south into the Neotropics. The cryptic species was discovered in Texas and Mexico (Glassberg 2005, 2012) because its adults have olive green eyes instead of the dark brown/black eyes of M. azia (Fig. 1). So far as we are aware, this is the first time that an undescribed butterfly species has been recognized on the basis of eye color, a point that is amplified in the discussion. We subsequently found that the genitalia and ventral wing patterns of these species differ substantially and consistently. It is the purpose of this paper to give the undescribed species a scientific name, to present data that support the hypothesis that it is biologically distinct, and to update information on the biology of these species using the new taxonomy.
**Materials and methods**

Standard methods were used to dissect genitalia and to prepare them for examination with an SEM (Robbins 1991). Genitalic terminology follows that in Clench (1961) and Klots (1970), as modified for the Eumaeini (Robbins 1991). Forewing length was measured with a digital vernier caliper. Wing vein names follow Comstock (1918), and terminology for male secondary sexual characters follows Robbins (1991) and Robbins et al. (2012b). Museum specimens of *M. janevicroy* studied are deposited (unless otherwise noted) in the USNM (see below for repository acronyms). Thirty images of *M. janevicroy* in nature from Texas, Mexico, and Venezuela were assembled (most taken without a flash). For this study, specimens and images of *M. janevicroy* were compared with a study series of 550+ specimens of *M. azia* from 20 countries deposited in the USNM and with 44 images of individuals of *M. azia* in nature.

We list genitalic dissections in Supplementary file 1 Ministrymon Genitalia Examined, images in nature in Supplementary file 2 Images of Live Butterflies, and data on forewing length and frequency of eye-color in Supplementary file 3 *M. janevicroy* Datasets.

Museum specimens cited in this study are deposited in the following collections – museum acronyms from Evenhuis (1993).

- **AMNH** American Museum of Natural History, New York, USA
- **BMNH** The Natural History Museum [formerly British Museum (Natural History)], London, United Kingdom
- **DZUP** Museu de Entomologia Pe. Jesus Santiago Moure, Universidade Federal do Paraná, Curitiba, Paraná, Brazil
- **FSMC** Florida Museum of Natural History (Allyn Museum/McGuire Center), University of Florida, Gainesville, Florida, USA
- **MC** Personal collection of Alfred Moser, Sao Leopoldo, RS, Brazil
- **TAMU** Texas A & M University, College Station, USA
- **UCRC** Entomology Research Museum, University of California, Riverside, California, USA
- **USNM** National Museum of Natural History, Smithsonian Institution, Washington, DC, USA

**Taxonomy**

*Ministrymon janevicroy* Glassberg, sp. n.
urn:lsid:zoobank.org:act:10ED3009-21F8-4B7C-B9B4-A93A5D867972
http://species-id.net/wiki/Ministrymon_janevicroy
Figs 1–4, 6–9

**Type material. Holotype:** ♂ (Fig 3). [hand written in black India Ink on white paper] July 12, 1969/Santa Ana Ref.[uge]/Hidalgo Co[unty]/Texas/J.B. Sullivan. [printed
red label) Holotype/Ministrymon janevicroy/Glassberg. [printed green label] Genitalia No./2013: 10♂/R. K. Robbins. Deposited USNM. Paratypes (9♂, 4♀). Uvalde County. 1♂, Concan[,] Tex[as]/7[July]-6-[19]36/W.D. Field. Hidalgo County. 8♂, same data as holotype. 1♀, June 12, 1976/Sullivan City/Hidalgo Co./Texas/J.B. Sullivan. 1♀ (Fig. 3), Pharr, Texas/20 April 1948/H.A. Freeman (via Nicolay collection). Kerr County. 2♀, Kerrville/Jun[e] 1917/Texas (via Barnes Collection). Paratypes have a blue printed paratype label and are deposited USNM. Five paratypes have been dissected and labeled as such (cf. supplementary file).


Images in nature examined (excluded from the type series, specifics listed in a supplementary file). United States (Texas): 19, Mexico 10, Venezuela 1.

Etymology. This species is named for my wife, Jane Vicroy Scott, whose love and patient forbearance have sustained me, and made me a more effective advocate for butterflies. Her tireless work in support of the North American Butterfly Association, especially with the National Butterfly Center in the Rio Grande Valley (less than 40km from the type locality of Ministrymon janevicroy), has helped make the world a little bit more friendly for butterflies and thus for people. The name is a non-latinized noun in apposition. I have proposed the English name Vicroy’s Ministreak for this species (Glassberg 2012).

Diagnosis and description. Ministrymon janevicroy is placed in Ministrymon because there are small erect teeth on the ventral surface of the penis near the distal end (Fig. 6). Clench (1961) originally noted this generic distinguishing trait, albeit limited.
A butterfly with olive green eyes discovered in the United States and the Neotropics...

...to two teeth. In museum collections, specimens of *M. janevicroy* are routinely curated with *M. azia* because of the similarity in ventral wing patterns (Fig. 1). For this reason, we differentiate *M. janevicroy* from *M. azia*. However, *Ministrymon* has not been revised, so it would be premature to suggest that these species are phylogenetic sisters, even if it is likely.

Adults of *M. janevicroy* are differentiated from those of *M. azia* by (1) the male and female genitalia, (2) the ventral wing pattern, and (3) the color of the eyes.

The male genitalia of *M. janevicroy* (7 dissections, listed in supplementary information) differ consistently from those of *M. azia* (11 dissections), primarily by structures of the posterior penis (Fig. 6). The four—as illustrated—or five small erect teeth on the ventral surface of the penis tip of *M. janevicroy* are clustered anterior of the posterior penis tip while in *M. azia* two teeth are located near the posterior penis edge, well posterior of two other teeth. Inside the penis shaft, there is a single slender cornutus in

---

**Figure 2.** *M. janevicroy* (left, close-up on bottom) with variegated “pebbly-textured” ground color and *M. azia* (right) with “smooth-textured” gray appearance. Both specimens from Managua, Nicaragua.
M. janevicroy while the vesica on either side of the cornutus in M. azia is sclerotized. Depending upon the amount of sclerotization and the extent to which the vesica is everted, these sclerotizations may appear as a double prong (as in Fig. 6) or as a pair of lateral sclerotized triangular teeth. The shorter and squatter valvae in ventral aspect and the shallower and wider notch between the labides in dorsal aspect of M. janevicroy (illustrated in Fig. 6) represent individual variation and do not distinguish the species. The illustrated longer saccus of M. janevicroy (Fig. 6) may differentiate the species statistically, but this length in the study series was overlapping.

The female genitalia of M. janevicroy (6 dissections) differ substantially and consistently from those of M. azia (5 dissections). The female genitalia of M. janevicroy are distinguished from those of M. azia by a membranous “neck” just posterior of the cervix (arrow on the left of Fig. 7) and the lack of a well-formed posterior pouch from which the ductus seminalis arises (arrow on the right of Fig. 7). These differences are conspicuous and immediately distinguish the species. The illustrated ductus bursae

Figure 3. Male holotype (top) and female paratype of M. janevicroy. Eye color in the male appears to have darkened more post mortem than that of the female.
A butterfly with olive green eyes discovered in the United States and the Neotropics...

...of *M. janevicroy* is longer than that of *M. azia* (Fig. 7), but this difference represents individual variation.

Glassberg (2012) distinguished the variegated “pebbly-textured” appearance on the basal half of the ventral hindwing surfaces of *M. janevicroy* from the more “smooth-textured” appearance in *M. azia* (Fig. 2). In the study series, the variegated “pebbly-textured” appearance on the hindwing (but not always the forewing) correlates without exception with genitalic structures for the 29 dissected specimens of *M. janevicroy* and *M. azia*. The wing scales that are responsible for the variegated “pebbly-textured” appearance in *M. janevicroy* are gray basally and whitish at their tips and do not lie flat against the wing. In contrast, the wing scales that are responsible for the gray “smooth-textured” appearance in *M. azia* are almost uniformly gray and lie flat against the wings. The scales in *M. janevicroy* are also wider than those of *M. azia*, and have a jagged terminal edge, but it is unclear how these shape differences affect wing appearance.

Adults of *M. janevicroy* have olive green eyes in nature while those of *M. azia* have dark brown/black eyes (Fig. 1). The 30 images of adults in nature with a variegated “pebbly-textured” basal hindwing have olive green eyes, and the 44 images of those with a smooth-textured gray basal hindwing have dark brown/black eyes. In the museum study series, all *M. azia* adults had dark brown/black eyes while 9.5% of *M. janevicroy* adults had eyes as dark as those of *M. azia* (data in a supplementary file).
The remaining adults of *M. janevicroy* had lighter eyes, ranging from yellow-brown to brown (this variation is shown in Fig. 3). It would appear that eye color darkens a variable amount post mortem in *M. janevicroy*. A survey of eye color in other *Ministrymon* species is presented in the discussion.

The wing venation of male and female *M. janevicroy* is illustrated (Fig. 8). In *M. janevicroy* forewing vein M₂ arises closer to M₁ than to M₃ in both sexes, but is otherwise typical of the Eumaeini (Eliot 1973). Males of *M. janevicroy* have a scent patch at the distal end of the forewing discal cell in which the tan androconia are partially or wholly (in some individuals) covered by dark brown wing scales (Fig. 9). This scent patch structure is the same as that in *M. azia*. There is no evident sexual dimorphism in size (♂ mean forewing length = 9.1 mm, s=0.62, N=10, ♀ mean forewing length = 9.1 mm, s=0.33, N=4, data in supplementary file).

**Distribution, habitat, and phenology.** *Ministrymon janevicroy* occurs from southern Texas (there is also an image of an individual of this species from Big Bend National Park in western Texas, cf. supplementary information) to Guanacaste Province, Costa Rica and in South America on the islands of Curaçao and Margarita (Ven-
A butterfly with olive green eyes discovered in the United States and the Neotropics...

Figure 6. Male genitalia of *Ministrymon janevicroy* (top) and *M. azia*, posterior of butterfly at right, both from Yucatan, Mexico. Ventral aspect with penis removed (top left), lateral aspect with penis removed (left middle), lateral aspect of penis (bottom), penis tip in ventral aspect (right middle), and dorsal aspect of tegumen (top right). Scale 1 mm.
Venezuela) (Fig. 4). It is a relatively common species in Central America, where it is as well represented in museum collections as *M. azia*. *Ministrymon janevicroy* appears to be absent from the Antilles (including Florida and the Lesser Antilles) and from South America, except for Curacao and Venezuela’s Isla Margarita. It may also occur on Aruba, where *M. azia* was recorded (Miller et al. 2003), but we have not seen specimens. *Ministrymon janevicroy* inhabits dry deciduous forest and scrub. It and *M. azia* occur at the same localities. For example, both have been collected at the type locality for *M. janevicroy* (Santa Ana Wildlife Refuge) in Hidalgo County, and both were photographed on the same day at the same locality (Rio Blanco Canyon) near Orizaba, Veracruz, Mexico. In Texas, adults of *M. janevicroy* have been found from January to August. Elsewhere, there is no evidence for seasonality.

**Figure 7.** Bursa copulatrix of the female genitalia of *Ministrymon janevicroy* (left, Venezuela) and *M. azia* (Mexico) in dorso-lateral aspect, posterior of butterfly at top. Arrow on left points to the membranous “neck” of the anterior ductus bursae. Arrow on right points to the well-formed posterior pouch from which the ductus seminalis arises. Scale 1 mm.
A butterfly with olive green eyes discovered in the United States and the Neotropics...

Figure 8. Male (left, Yucatan, Mexico) and female (Santa Tecla, El Salvador) venation of *M. janevicroy*.

Figure 9. Male dorsal forewing scent patch showing dark brown wing scales covering tan-colored androconia.
Generic Placement and Identification. Ministrymon janevicroy is placed in Ministrymon because it possesses small erect teeth on the ventral surface of the penis near the distal end (Fig. 6). This synapomorphy for Ministrymon was proposed by Clench (1961) and has not been reported in other eumaeine genera. Other characters accord with this placement (Robbins unpubl.). Forewing vein M₂ arises closer to M₁ than to M₃ in the male (Fig. 8) and the corpus bursae of the female genitalia is posteriorly constricted (Fig. 7). These traits are widespread (but not universal) in the Tinolus Section of Eumaeini, to which Ministrymon belongs (Robbins 2004a). A male dorsal scent patch is situated at the distal end of forewing discal cell and is partially covered by dark brown wing scales (Fig. 9). Within the Tinolus Section, this type of scent patch occurs in all Ministrymon, all Tinolus, and some Nicolaea K. Johnson.

The hypothesis that M. janevicroy is reproductively isolated from the sympatric M. azia is well-supported. The male and female genitalic differences between the two are distinct and distinguishing (Figs 6–7). The variegated “pebbly-textured” ground color appearance of the basal part of the ventral hindwing (Fig. 2) is also distinguishing. The eye color difference is distinct and distinguishing in live individuals (Fig. 1) and in the majority of museum specimens. Ministrymon janevicroy is unrecorded from tropical wet lowland forest (>200 cm annual precipitation, Holdridge 1967) while M. azia occurs in both wet and dry habitats. Ministrymon janevicroy occurs from Texas to Costa Rica and on Curaçao and Isla Margarita. In contrast, M. azia occurs commonly in wet and dry habitats from Texas and Florida to southern Brazil and Argentina. In sum, the two species differ morphologically and biologically in many respects, supporting a hypothesis of reproductive isolation between M. janevicroy and M. azia.

The substantive differences in the genitalic structures of M. azia and M. janevicroy (Figs 6–7) could be interpreted to mean that these two taxa are not closely related within Ministrymon. However, these species are sympatric in the same habitats, have very similar wing patterns, and the same androconial structures. If reproductive isolation between these species evolved by sexual selection acting on the genitalia (e.g., Eberhard 1985, Arnqvist 1998, Hosken and Stockley 2004), then the genitalic differences observed could be a consequence of this evolutionary process, and is not an indication of a lack of relationship.

In the diagnosis and previous paragraphs, we distinguished M. janevicroy from M. azia because both share a similar ventral wing pattern. If M. janevicroy were more closely related to another described Ministrymon species, its ventral wing pattern would distinguish it immediately from that species.

Eye Color. The “hairiness” of adult eyes has been widely used in lycaenid taxonomy for more than a century (cf. Eliot 1973 and included references), but adult eye-color has not been used traditionally (e.g., Godman and Salvin 1887-1901, Scudder 1889, Draudt 1919-1920, Eliot 1973). More recently, Glassberg (2001, 2005) used eye color in live individuals to differentiate the lycaenid Cyanophrys goodsoni (Clench) from other Cyanophrys species and to distinguish between the lycaenids Strymon ba-
A butterfly with olive green eyes discovered in the United States and the Neotropics...
are also recorded on islands just off the north coast of South America, but not from the dry continental forests of northern Venezuela and northern Colombia. It is possible that remnant populations of species that were once more widespread persist only on these islands, but alternately, the mainland Guajira peninsula of Colombia/Venezuela is yet poorly documented.

There is one female in the *M. azia* species group in the USNM from the Brazilian state of Minas Gerais that has the olive green eye color and variegated “pebbly-textured” wing pattern of *M. janevicroy*, but a different postmedian line on the ventral surface of the hindwing. Additionally, two males of the same species in MC are genitalically distinct from *M. janevicroy* (genitalic images sent to us by A. Moser). This species is a potential phylogenetic sister species of *M. janevicroy*. We are collaborating with Moser to find more specimens with the intention of describing it.

**Nomenclature.** Seven names have been applied to the species now called *M. azia* (Robbins 2004a), and it is the purpose of this section to explain why these names do not apply to *M. janevicroy*. The name *Thecla guacanagari* Wallengren, 1860 (Ecuador), which has a ventral wing pattern that appears to be transitional between that of *Thecla azia* and *Thecla brocela*, was suppressed by ICZN Opinion 2144 (ICZN 2006). We examined the lectotype of *Thecla azia* Hewitson, 1873 (Mexico) in the BMNH and received images of its male genitalia (courtesy R.I. Vane-Wright and B. Huertas). It is the basis for our identification of this name. We examined the holotype of *Thecla nipona* Hewitson, 1877 (Brazil). It has the smooth-textured gray appearance on the basal half of the ventral wing surface. Also, *M. janevicroy* does not occur in Brazil. We examined the holotype of *Thecla brocela* Dyar, 1913 (USNM). Its ventral wing pattern is typical of those populations of *M. azia* that occur west of the Andes from southern Ecuador to Chile. The genitalia, gray smooth-textured appearance on the basal half of the ventral wing surface, and uniform dark brown/black eyes are the same as those of *M. azia* from elsewhere. We examined an image of the holotype of *Ministrymon quebradiwaga* K. Johnson & L.D. Miller, 1991 (Chile). As with *M. brocela*, its wing pattern is typical of those populations of *M. azia* that occur west of the Andes from southern Ecuador to Chile. The genitalia illustrated in the original description are those of *M. azia*, not of *M. janevicroy*. We know *Ministrymon hernandezi* Schwartz & K. Johnson, 1992 (Cuba) from the original publication. The male genitalia illustrations are stylized renderings, but the placement of the teeth on the ventral penis tip and the shape of the cornuti place this name in the synonymy with *M. azia*. Further, *M. janevicroy* does not occur in the Antilles. Finally, we accord nomenclatural priority to *Angulopis hernandezi* K. Johnson & Kroenlein, 1993 (a male holotype) over *Electrostrymon grumus* K. Johnson & Kroenlein, 1993 (a female holotype), **new synonym**, and remove the latter name from the synonymy of *M. azia*. Robbins (2004a) had erroneously listed *grumus* as a synonym of *hernandezi* Schwartz & K. Johnson rather than as a synonym of *hernandezi* K. Johnson & Kroenlein. The name *Angulopis hernandezi* is currently placed in genus *Ziegleria* K. Johnson (Robbins 2004a, Duarte and Robbins 2010).

**Faunal documentation.** The Eumaeini fauna of the United States is well-documented, and most species described in the past 75 years have arguably been cryptic
species that had been overlooked because of wing pattern similarity with known species. Specific examples are *Satyrium caryaevorus* (McDunnough), *Satyrium kingi* (Klots & Clench), *Callophrys hesseli* (Rawson & Ziegler), and *Strymon solitario* Grishin & Durden. To this list, we add *Ministrymon janevicroy*. In sharp contrast, slightly more than 20% of the Central and South American eumaeine fauna is undescribed (Robbins 2004b), but the vast majority of these undescribed species are exceedingly rare in museum collections, unlike *M. janevicroy*. Assessing variation of these rare species remains an obstacle to documentation.

**Biology and updated taxonomy.** The purpose of this section is to assess previously published biological information about *M. azia* in the context of the updated taxonomy. As noted in the introduction to this paper, *M. azia* occurs from the United States (Texas and Florida) to Chile in virtually all lowland habitats, ranging from desert in coastal Peru and Chile to rainforest in the Amazon Basin. The information in this paper is consistent with this statement, and we note that there are specimens of *M. azia* in the USNM from Hidalgo, Cameron, and Edwards County in Texas. *Ministrymon janevicroy* is restricted to dry deciduous forest and scrub, and its range is a subset of that of *M. azia*. These species appear to be sympatric wherever *M. janevicroy* occurs.

*Ministrymon azia* was the most common lycaenid migrating through Portachuelo Pass in northern Venezuela (Beebe 1951), and it was one of the species being dispersed by dry season trade winds on the Pacific slope of Panama (Robbins and Small 1981). There are 34 vouchers of *M. azia* and none of *M. janevicroy* in the USNM that were caught migrating through Portachuelo Pass. There are 12 vouchers of *M. azia* and none of *M. janevicroy* in the USNM that were being dispersed by dry season trade winds at the Cerro Campana ridge in Panama. The records of migration and dispersal would appear to refer to *M. azia*, not to *M. janevicroy*.

Published larval food plant records (all Fabaceae, one exception) for *M. azia* from areas where *M. janevicroy* does not occur are the plant genera *Acacia* Willd. in the United States (Florida) and Chile, *Mimosa* L. in Cuba, and Trinidad, and *Leucaena* Benth. in the United States (Florida) (Boscoe 1982, Cock 1985, Fernández and Rodríguez 1997, Vargas and Parra 2009, Glassberg 2012, images of the immatures of *M. azia* on *Leucaena* available from Chin-Lee, http://bugguide.net/node/view/133700, accessed April 22, 2013). Miller et al. (1997) wrote that caterpillars of *M. azia* in Florida will eat *Schinus terebinthifolius* Raddi (Anacardiaceae), but this anomalous record needs confirmation.

Reared museum specimens that we have seen have all been *M. azia*. We examined individuals of *M. azia* in the USNM that were reared from *Leucaena* in Florida (2♂, 2♀) and from *Mimosa* in Guerrero and Veracruz, Mexico (1♂, 1♀) and in Trinidad (2♀). In DZUP, there are reared specimens from *Mimosa* in Pernambuco and Rio Grande do Sul, Brazil (2♂). Finally, we identified an adult female that was reared from *Prosopis* L. in Tarapacá, Chile, but deposition of this specimen is unknown.

Other caterpillar food plant records are currently ambiguous and may refer to *M. azia* or to *M. janevicroy*. Harley et al. (1995) reared “*M. azia*” in Mexico and Venezuela from *Mimosa*, but the deposition of the vouchers is not known. In TAMU, there are
reared adults from *Leucaena (3♂, 3♀)* and from *Mimosa (4♂, 3♀)* in the United States (Texas). In UCR, there are two reared individuals from *Leucaena* in Sonora, Mexico. These reared individuals need to be re-examined to determine their specific identify.

**Acknowledgments**

We thank Karie Darrow, Brian Harris, and Vichai Malikul for illustrative and technical assistance that greatly improved the quality of the paper. We are pleased to express our gratitude to Blanca Huertas and Dick Vane-Wright for sending images of the lectotype of *M. azia* and its genitalia; to Jackie Miller for arranging a loan of specimens that were a critical part of this paper; and to Nick Grishin for sending us copious quantities of relevant information. For sharing data, we thank Greg Ballmer, Richard Boscoe, Robert Busby, Mirna Casagrande, Mathew Cock, and Olaf Mielke. For pertinent nomenclatural and biogeographic discussion, we thank Gerardo Lamas. We are especially grateful to Alfred Moser for working with us on the taxonomy of *M. azia* in Brazil. For reading and commenting on the manuscript, we thank Robert Busby, Nick Grishin, Gerardo Lamas, Alfred Moser, Jane Vicroy Scott, Bo Sullivan, and an anonymous reviewer who made insightful suggestions.

**References**


Kaye WJ (1921) A catalogue of the Trinidad Lepidoptera Rhopalocera. Memoirs of the Department of Agriculture of Trinidad and Tobago 2: i-xii, 13–163.


A butterfly with olive green eyes discovered in the United States and the Neotropics...


Appendix 1


Copyright notice: This dataset is made available under the Open Database License (http://opendatacommons.org/licenses/odbl/1.0/). The Open Database License (ODbL) is a license agreement intended to allow users to freely share, modify, and use this Dataset while maintaining this same freedom for others, provided that the original source and author(s) are credited.

Citation: Robbins RK, Glassberg J (2013) A butterfly with olive green eyes discovered in the United States and the Neotropics (Lepidoptera, Lycaenidae, Eumaeini). ZooKeys 305: 13–32. doi: 10.3897/zookeys.305.5081.app1
Appendix 2


Copyright notice: This dataset is made available under the Open Database License (http://opendatacommons.org/licenses/odbl/1.0/). The Open Database License (ODbL) is a license agreement intended to allow users to freely share, modify, and use this Dataset while maintaining this same freedom for others, provided that the original source and author(s) are credited.

Citation: Robbins RK, Glassberg J (2013) A butterfly with olive green eyes discovered in the United States and the Neotropics (Lepidoptera, Lycaenidae, Eumaeini). ZooKeys 305: 13–32. doi: 10.3897/zookeys.305.5081.app2

Appendix 3


Copyright notice: This dataset is made available under the Open Database License (http://opendatacommons.org/licenses/odbl/1.0/). The Open Database License (ODbL) is a license agreement intended to allow users to freely share, modify, and use this Dataset while maintaining this same freedom for others, provided that the original source and author(s) are credited.

Citation: Robbins RK, Glassberg J (2013) A butterfly with olive green eyes discovered in the United States and the Neotropics (Lepidoptera, Lycaenidae, Eumaeini). ZooKeys 305: 13–32. doi: 10.3897/zookeys.305.5081.app3