An inter-species mating of *Melanis* spp. (Lepidoptera, Riodinidae)

Observations of mating insects are useful to provide information regarding mating behaviour. These observations are especially useful when the two partners do not resemble each other. This may reflect intraspecific variation and help define the limits of variability of a species. Alternatively, it may reflect sexual dimorphism and enable males and females to be associated, sometimes for the first time. Much less commonly, it may be an example of inter-species mating, indicating the possibility of hybridization. Here we report an example of the last situation.

Mark Hulme observed and photographed a mating pair of *Melanis* spp. (Lepidoptera, Riodinidae) at St. Augustine on 29 June 2023 at 1334h and posted the image on iNaturalist (Fig. 1). The male on the left (two pairs of walking legs) is the Orange-tipped Underleaf *Melanis smithiae xarifa* (Hewitson) (= *Lymnas xarifa*), whereas the female on the right (three pairs of walking legs) is the Underleaf *M. electron electron* (Fabricius) (= *Lymnas iarbas*).

Melanis electron is an occasional and widespread species in Trinidad & Tobago, whereas *M. smithiae* is much less common and predominantly found in forested areas (Kaye 1921, Barcant 1970). The recorded food plants of *Melanis* spp. are almost entirely Mimosoideae (Fabaceae) (Beccaloni *et al*. 2008). The Saman tree *Samanea saman* (Jacq.) Merr. (Fabaceae, Mimosoideae) is a food plant of *M. electron* in Trinidad (P.L. Guppy in Kaye (1921)), which may explain why it is commonly seen in parkland areas with Saman trees. DeVries (1997) cited Kaye (1921) as giving the food plant of *M. smithiae* as *Inga* sp. (Fabaceae, Mimosoideae). However, Kaye stated that he found this species 'on *Inga*' which is more likely to be a reference to an adult nectar source or resting site, since Kaye did not rear caterpillars during his visits to Trinidad. Hence, the food plants of *M. xarifa* appear to be unknown (Beccaloni *et al*. 2008), albeit most likely one or more species of Mimosoideae are used.

Very little has been published regarding mate location and courtship of Riodinidae, and we have not been able to locate any published descriptions of such behaviour for any *Melanis* species. Males of this genus do not have secondary sexual characters such as androconial scales or

Fig. 1. Mating pair of *Melanis* spp., male *M. smithiae xarifa* on the left and female *M. electron electron* on the right (https://www.inaturalist.org/observations/170287534).

Hulme, M., Yeap, Y.T., Morrall, J. and Cock M.J.W., 2024. Nature Note -An inter-species mating of *Melanis* spp. (Lepidoptera, Riodinidae). *Living World, Journal of the Trinidad and Tobago Field Naturalists' Club.* Early View.

hair tufts on the hind wings or abdomen (DeVries 1997, Hall and Harvey 2002) so these cannot be involved. However, in Costa Rica adult *M. pixie* (Boisduval) are observed to congregate around the food plant trees, especially when flowering, as well as nearby nectar sources (DeVries 1997); this may provide a mechanism to facilitate mate location for *Melanis* spp. It also seems likely that prospective mates are at least partially recognised by their black and orange markings and relatively weak flight. Beyond this, it is not possible to suggest what factors may facilitate or impede intra-species and inter-species mating in these two species.

It is possible that rather than an inter-species mating, this observation could indicate that these are two different colour forms of one species. Both 'forms' occur in both sexes in collections of Trinidad butterflies. To test this possibility, John Morrall provided leg samples from recent specimens from his collection, which Yuen Ting Yeap sequenced to obtain DNA barcodes. DNA barcoding, sequences of a defined section of the CO1 mitochondrial gene (Hebert *et al*. 2003), provides a tool that can be used to help clarify the status of different populations of taxa. Barcode Index Numbers (BINs) have been introduced to provide a permanent numbering system for clusters of similar barcodes (haplotypes) normally separated from others by at least 2% base pairs substituted, which in a high percentage of cases correspond to known taxonomic species (Ratnasingham and Hebert 2013).

Three sequences from *M. smithiae* (MJC_710, MJC_711, MJC_712) form part of BIN BOLD:ADN0446, whereas two from *M. electron* (MJW_713, MJC_714) form part of BIN BOLD:AEF9100, the two BINs being 1.87% different (BOLD Barcode Gap Analysis on Trinidad barcodes only). We conclude that the current treatment as two separate species is valid, although the two species are very close, and that this is an example of inter-species mating. The results of such a mating are unknown, but it raises the possibility of hybridization between the two species. Since, as noted above, most food plant records for the genus are Mimosoideae, food plant compatibility need not be a barrier to hybrid viability. However, there is no evidence that hybridization occurs between the two species in Trinidad, as no intermediate forms have been documented.

Matthew Cock and Yuen Ting Yeap gratefully acknowledge the core financial support from member countries of CABI, an international intergovernmental organisation (see https://www.cabi.org/about-cabi/who-we-work-with/key-donors/ for full details).

REFERENCES

Barcant, M. 1970. Butterflies of Trinidad and Tobago. London: Collins. 314 p.

Beccaloni, G.W., Viloria, A.L., Hall, S.K. and **Robinson, G.S.** 2008. Catalogue of the hostplants of the Neotropical butterflies. Catálogo de las plantas huésped de las mariposas neotropicales. (Monografías del Tercer Milenio, Vol. 8). Zaragoza, Spain Sociedad Entomológica Aragonesa. 536 p.

DeVries, P.J. 1997. The Butterflies of Costa Rica and their Natural History. Volume II: Riodinidae. Princeton, New Jersey: Pinceton University Press. xxvii, 288 p., 25 pl.

Hall, J.P.W. and **Harvey, D.J.** 2002. A survey of androconial organs in the Riodinidae (Lepidoptera). *Zoological Journal of the Linnean Society*, 136: 171-197.

Hebert, P.D.N., Cywinska, A., Ball, S.L. and deWaard, J.R. 2003. Biological identifications through DNA barcodes. *Proceedings of the Royal Society (London), Series B Biological Sciences*, 270: 313-321.

Kaye, W.J. 1921. A catalogue of the Trinidad Lepidoptera Rhopalocera (butterflies). *Memoirs of the Department of Agriculture, Trinidad and Tobago*, 2: 163 p.

Ratnasingham, S. and Hebert, P.D.N. 2013 A DNA-based registry for all animal species: the Barcode Index Number (BIN) System. *PLoS ONE*, 8: e66213.

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