## Field Identification of the Postmen *Heliconius erato* and *H. melpomene* (Lepidoptera, Nymphalidae, Heliconiinae), in Trinidad & Tobago

Known as postmen in Trinidad & Tobago, Heliconius erato (Linnaeus) and Heliconius melpomene (Linnaeus) are widely distributed in Central and South America. Both species are common and widespread in open habitats in Trinidad and Tobago, H. erato being usually the more common. Both have been recorded from Chacachacare Island (Cock 1981 and Fig. 5), and are anticipated to occur on the other Bocas Islands. The Trinidad forms have been named H. erato adana J.R.G. Turner, 1967 and H. melpomene flagrans Stichel, 1919 (Cock 2014), while the Tobago forms which are similar but smaller and with narrower red bands on the forewing have been named H. erato tobagoensis Barcant, 1982 and H. melpomene tessa Barcant, 1982 (Barcant 1982). Although both species are extremely variable across their range on the mainland, in any given locality the colour and markings are constant, and the two species closely resemble each other as Müllerian comimics (Emsley 1964, Flanagan et al. 2004). Thus, in Trinidad and Tobago, both species are black with a broad red band across the dorsal forewing, which is paler on the ventral hindwing (all Figs.). The most reliable way to separate the two species is based on the number of small red spots at the base of the ventral hindwing: three in H. melpomene and four in H. erato (Barcant 1970), the extra one in H. erato being at the base of the cell (Figs. 1-4, 6, 11). However, in the field, and especially in photographs, often only the dorsal surface is visible, making specieslevel identification difficult. This note sets out how the two species may be separated in dorsal view in Trinidad and Tobago.

I examined pinned specimens from my own collection, and images from the Angostura Barcant Collection, Laventille, Trinidad (ABCT), and identified some possible diagnostic characters (Table 1, Figs. 1-4). Next, I successfully tested these criteria on unnamed images of pinned specimens provided by John Morrall from his collection. I then applied these characters to images on iNaturalist (https://www.inaturalist.org/), some of which include ventral views, but most of which don't. I found that the two species could be separated in dorsal view when sharp images were available, showing the wings at close to right angles to the viewer. However, when the images of wings were blurred, moving, or held at an oblique angle, the degree of confidence went down quickly. Figs. 1-4 show pinned adults of both Trinidad subspecies, but see Barcant (1982) for the Tobago subspecies. Figs. 5-11 show a selection of the two species in life.

Both species show minor variation in the detail of the outline and width of the red forewing band, which in extreme cases may make identification more difficult. Both species are long lived as adults (Brown 1981), and the intensity of the red and black markings decreases over time, old specimens becoming black-brown rather than black and orange rather than red. It was also noted that about 10% of *H. erato adana* have red spots at the base of the dorsal hindwings, but this has not (so far) been seen in any specimens of *H. melpomene flagrans*. One individual of *H. erato adana* (Fig. 7) had a particularly broad red forewing band, and a nearby red streak close to the dorsum. This resembles the form *vitellina* Stichel, 1919 which is an unavailable infraspecific name and treated as a synonym of *adana* (Cock 2014).

In conclusion, minor characters of the shape of the forewing red band can be used to separate specimens and images of the two species in Trinidad and Tobago, and with familiarity should also suffice to separate living individuals in the field – at least when stationary.

I thank John Morrall for sharing images from his collection, Mike G. Rutherford for sharing images from ABCT, and the photographers of living butterflies who used iNaturalist to make their images available as indicated in the figure legends (Figs. 5-11).

 Table 1. Characters that may be used to separate the dorsal view of the two species of postman in Trinidad and Tobago, Heliconius melpomene and H. erato.

Character	H. melpomene	H. erato
Inner margin of red band	Relatively evenly rounded	More irregular
Outer margin of red band	A black notch in the upper part of space 1B (Cu <sub>2</sub> -2A)	Regular, no indentation in upper part of space 1B (Cu <sub>2</sub> -2A)
Red spots at the base of the dorsal hind wing	Not seen	Occasionally (c.10%)



**Figs.** 1-4. Pinned adult *Heliconius erato adana* (left) and *H. melpomene flagrans* (right)(author's collection); males above, females below; dorsal and ventral view of each specimen. 1, Maracas Valley, 25 July 1978; 2, Toco, 4 June 1978; 3, Mal d'Estomac Bay Trace, 6 September 1982; 4, Point Gourde, 15 October 2011.



**Fig. 5.** *Heliconius erato adana*, dorsal view. Chacachacare Island, 10 November 2018, nandani\_bridglal. This is a new record for Chacachacare Island (Cock 1981). Cropped from https://www. inaturalist.org/observations/35557049, Creative Commons License CC-BY-NC.



**Fig. 6.** *Heliconius erato adana*, ventral view. Trinidad, Point-A-Pierre, 27 August 2017, H. Fletcher (hfletchr). Cropped from https://www.inaturalist.org/observations/7682479. © Prof. Horace Fletcher, with permission.



**Fig. 7.** *Heliconius erato adana* f. *vitellina*, dorsal view. Trinidad, Asa Wright Nature Centre, 25 December 2019, M. McFarlane. Cropped from https://www.inaturalist.org/observations/36950292, Creative Commons License CC-BY-NC.



**Fig. 8.** *Heliconius erato tobagoensis*, dorsal view. Tobago, Friendship, 12 May 2011, E. Rooks. Cropped from https://www.inaturalist.org/observations/577366, Creative Commons License



**Fig. 9.** *Heliconius melpomene flagrans*, female, dorsal view. Trinidad, Point Gourde, 15 October 2011, M.J.W. Cock. The red band has an unusual tone to it (compare the same specimen in Fig. 4), perhaps because this female was newly emerged.



**Fig. 10.** *Heliconius melpomene flagrans*, dorsal view. Trinidad, east of Upper Carapachaima, 14 December 2019, M. Hulme. The colour of the red band has faded to orange-red. Cropped from https://www.inaturalist.org/observations/36688595, Creative Commons License CC-BY-NC.



**Fig. 11.** *Heliconius melpomene flagrans*, ventral view. Trinidad, Asa Wright Nature Centre, 25 December 2018, C. Harrison. Cropped from https://www.inaturalist.org/observations/19213070, Creative Commons License CC-BY-NC.

## REFERENCES

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

**Barcant, M.** 1982. Two new subspecies of Heliconiinae (Lepidoptera: Nymphalinae) from Tobago, West Indies. *Bulletyn of the Allyn Museum*, 68: 5 p.

**Brown Jr., K.S.** 1981. The biology of *Heliconius* and related genera. *Annual Review of Entomology*, 26: 427-456.

**Cock, M.J.W.** 1981. Butterflies from Chacachacare Island including three species new to Trinidad. *Living World. Journal of the Trinidad and Tobago Field Naturalists' Club*, 1981-1982: 25.

**Cock, M.J.W.** 2014. An updated and annotated checklist of the larger butterflies (Papilionoidea) of Trinidad, West Indies: Papilionidae, Pieridae and Nymphalidae. *Insecta Mundi*, 0353: 41 p.

**Emsley, M.G.** 1964. The geographical distribution of the color-pattern components of *Heliconius erato* and *Heliconius melpomene* with genetical evidence for the systematic relationship between the two species. *Zoologica*, 49: 245-286.

Flanagan, N.S., Tobler, A., Davison, A., Pybus, O.G., Kapan, D.D., Planas, S., Linares, M., Heckel, D. and McMillan, W.O. 2004. Historical demography of Müllerian mimicry in the neotropical *Heliconius* butterflies. *Proceedings of the National Academy of Sciences of the United States of America*, 101(26): 9704-9709.

## Matthew J.W. Cock

m.cock@cabi.org / mjwcock@btinternet.com