Eurema agave (Cramer) (Lepidoptera: Pieridae: Coliadinae). Rare in Trinidad and beyond, or just overlooked?

There were five different species of *Eurema* recorded for Trinidad in Cock (2014), one of which, (*albula* Cramer) has since been re-classified as *Abaeis* (Zhang *et al.* 2019). An additional three species of the closely related genus *Pyrisitia* were also treated as *Eurema* in Barcant (1970). Four of this group, *Abaeis albula*, *Eurema elathia*, *Pyrisitia leuce* and *P. venusta*, are amongst the most common butterflies found in Trinidad. *Eurema agave* is rare but is very similar in appearance to *A. albula* and might have been overlooked.

On 24 September 2022 at around midday, I was observing butterflies along the roadside about a quarter of a mile past the entrance to the Asa Wright Nature Centre, in the Northern Range of Trinidad. I saw a *Eurema* butterfly settled on a *Bidens alba* flower which looked a little 'different', so kept it as a specimen for further examination. After closer inspection I concluded it was *Eurema agave agave*, a species I had not seen in Trinidad in my 25 years of studying Trinidad butterflies.

I reported my find to Matthew Cock, and he was initially sceptical that it would be *E. agave* because although he had treated *E. agave* as a Trinidad butterfly in his 2014 checklist without question, he had since studied photographs of the *E. agave* specimens in the Angostura-Barcant collection, Port of Spain, which appeared to be *Abaeis albula marginella* (C. Felder & R. Felder), albeit with reduced black markings. So, he had concluded that *E. agave* may not in fact be a Trinidad species. However, I sent images of my specimen's dorsal and ventral views to Matthew and he agreed it did indeed appear to be *E. agave agave*. I subsequently set the specimen, shown in Fig.1 below.

Fig.1. *Eurema agave agave* male dorsal (left) and ventral (right) views. Near Asa Wright Nature Centre, Trinidad 24 September 2022.

I returned to the same locality over several days in late September/ early October 2022, but the weather was poor and the roadside vegetation had been cut down, and no further *E. agave* were seen.

I visited the Angostura-Barcant collection, and it was clear to me that all the specimens on display as *E. agave* are indeed *A. albula* with reduced black markings. Barcant (1970) stated that (over his many decades studying Trinidad butterflies) he had only ever found two *E. agave*, yet there are nine specimens on display in his collection labelled *E. agave*. These specimens are dated between 1965 and 1969, so possibly added after his book was finalised, or these lightly marked specimens of *A. albula* were erroneously placed against *E. agave* after Barcant had sold the collection to Angostura in 1974. The image in Barcant's book that is labelled as *E. agave* (see Barcant (1970); Plate 22, Fig 1) is in fact a specimen of *A. albula*. Also, the description of *E. agave* in his book matches variations of *A. albula* rather than *E. agave*, as he states that there is just a smudge of grey at the base of the forewing costa. Various forms of *A. albula marginella* are shown in Fig.2. Thus, it seems likely that Barcant himself never came across *E. agave* in Trinidad.

Kaye (1904) reported the first and only record of *E. agave* in Trinidad at that time, from Verdant Vale in 1896. His revised checklist (Kaye 1921) still refers to just one specimen. The Kaye collection is now held at the McGuire Center for Lepidoptera and Biodiversity, USA, who supplied the image below in Fig.3, which shows the original Kaye specimen on the left (a male), a specimen dated 1969 from 'Buckfield' (a female), and a specimen on the right dated 1981 (a female) from Wallerfield collected by June and Floyd Preston, reported in Preston and Preston (1983).

Eurema agave, like *A. albula,* has pure white dorsal wings with black borders. The best distinguishing feature of *E. agave* is the grey speckled bar on the costa of the forewing which extends from the base of the wing to just short of

Fig.2. *Abaeis albula marginella*. from various Trinidad localities showing variation in size and markings.

Fig.3. *Eurema agave agave*. Trinidad specimens held at the McGuire Center for Lepidoptera and Biodiversity.

the black border at the apex. In *E. agave* the black border on the forewing extends down along the termen, always terminating fairly squarely on reaching vein 2, leaving a gap to the tornus. In contrast, *A. albula* sometimes has grey speckling at the base of the dorsal forewing, but it only ever extends a short distance along the costa. Furthermore, the black border on the dorsal forewing of *A. albula* usually extends all the way to the tornus, although on variations where the band falls short of the tornus it usually tapers off more pointedly, and there is no consistency as to where the band extends. The dorsal hindwing of *E. agave* on specimens seen, often just shows a hint of black 'smudging' along the termen. The forewings of *E. agave* also appear to be more elongated than *A. albula*, and overall, the wing shapes differ.

Some lightly marked females of *Eurema daira* (Godart) and *Eurema elathea* (Cramer) could also be possibly confused with *E. agave*, but they are both a creamy white, and their speckled band extends right across the forewing costa as far as the black border.

Based on the specimens in the McGuire collection and my own, the two females of *E. agave agave* appear to be very similar to males, though they seem to have slightly more light dusting of grey on dorsal hindwing termen. But further specimens would be needed of both sexes to see if these features are consistent in Trinidad.

Matthew Cock has spent many years researching Trinidadian butterflies, and local collectors Scott Alston Smith and Charles De Gannes have been studying Trinidadian butterflies for decades. Yet they have to date never come across *E. agave*. Matthew Cock advises that there are no *E. agave* specimens in the University of the West Indies Zoology Museum.

There is perhaps a parallel in Costa Rica. DeVries (2007) did not include *E. agave* as a Costa Rican species. Austin (1992) reported *E. agave* specimens dated 1986. Cordoba-Alfaro and Murillo-Hiller (2011) reported that two subspecies of *E. agave* exist in Costa Rica, and also stated that a specimen of *E. agave* collected in 1987 was found in the National Museum of Costa Rica, curated as *Eurema daira eugenia*. But the paper also reports that *E. agave* from Costa Rica had been described and illustrated as far back as Godmin and Salvin (1889-1890), who recorded it as its synonym *Terias mana* (Boisduval). The above demonstrates that confusion with this species has not been restricted to Trinidad.

Eurema agave is not included in the treatment of the butterflies of Suriname by Gernaat *et al.* (2012), but could well be found there, since it is found in Venezuela and French Guiana. Andrew Neild confirms (pers com) its presence in Venezuela, though he adds that it is uncommon and again probably overlooked.

There are currently three subspecies of *E. agave* accepted. *Eurema agave millerorum* (Llorente and Luis) with a range from south-east Mexico to Costa Rica, *E. agave agave* from Costa Rica to more northerly countries of South America (records seen for Venezuela, Ecuador, Colombia, Peru, French Guiana and Costa Rica), and *E. agave pallida* (Chavannes) found in southern Brazil and northern Argentina (Klimaitis *et al.* 2018).

Subspecies *millerorum* and *agave* are fairly similar, though *millerorum* apparently never has any black markings on the dorsal hindwing (based on the limited specimens I have seen from Mexico, Costa Rica, Ecuador, Venezuela, Peru and French Guiana). The single specimen of *E. agave pallida* shown on the Butterflies of America (BOA) website (Warren *et al.* 2017) shows much bolder yellow ventral coloration, and the dorsal forewing grey mottled band is

less pronounced. D'Abrera (1981) stated that ssp. *pallida* lacks the forewing costal band, but specimens seen from Argentina have it and as stated the specimen on BOA from Brazil has it, albeit less prominent.

To my knowledge the life history and early stages of *E. agave* have not been recorded. Beccaloni e*t al.* (2008) gave the larval foodplant in Trinidad as *Senna bacillaris*, but this record was supplied by Matthew Cock, who confirms that this should have been attributed to *A. albula*, not *E. agave*. They also reported *Cassia* spp. as foodplant for 'Neotropics'. However, it seems likely that the foodplant of *E. agave* in Trinidad could be *Senna, Mimosa, Cassia* or other similar *Fabaceae*, as these are the larval foodplants of some other Trinidadian *Eurema* species.

I conclude that *Eurema agave*, as in other countries, is far less common than other species of *Eurema*, for reasons unknown, though it has undoubtedly been overlooked due to its similarity to *A. albula* and possibly other species. Whilst there may well be further specimens in collections and museums, currently I am only aware of the three Trinidad specimens in the McGuire collection plus my recent specimen, so just four since 1896.

Footnote :- I alerted Scott Alston Smith to the specimen of *E. agave* that I found, and he has actively been looking for further individuals since. This paid off on 9 January 2023, when he found a single specimen atop a leaf at the roadside at Innis Field. This is the first known record from South Trinidad.

In January 2023, over a three-week period, I netted and released every white *Eurema* I saw at localities all over the island, but none were *E. agave.*

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