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NOTES

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THE “DUSKY” WING TRAIT IN *UTETHEISA ORNATRIX BELLA* (EREBIDAE, ARCTIINAE)

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When Thomas Manley (1975) described the “greasy” wing trait in *U. ornatrix ornatrix* L., 1758, the latter taxon was already considered conspecific with *U. ornatrix bella* (L., 1758). Manley, however, seemed to have considered them as a separate species, referring to their hybridization as interspecific, differing from what was proposed by Pease (1968, p. 733), who states “Evidence from the field and from laboratory breeding experiments, proves that hybridization occurs in Texas, but there is no evidence that the subspecies differences are being swamped by interpopulation gene flow through the zone of hybridization.”

Manley (1975, p. 77) describes the “grease” trait as giving “the usually immaculate white forewing so common in this species a dull vitreous grey color.”

Here, I report another trait, this time observed in the northern subspecies, *U. ornatrix bella*. While rearing hundreds of specimens of this taxon from stocks originating in Gainesville, Florida, I came across this particular aberrant phenotype only twice. The “normal” females from the two broods in which the phenotype originated are illustrated for comparison (Fig. 1).

The trait that I nickname “dusky” constitutes a change from the usual orange, pink, or red ground colors of the forewing to

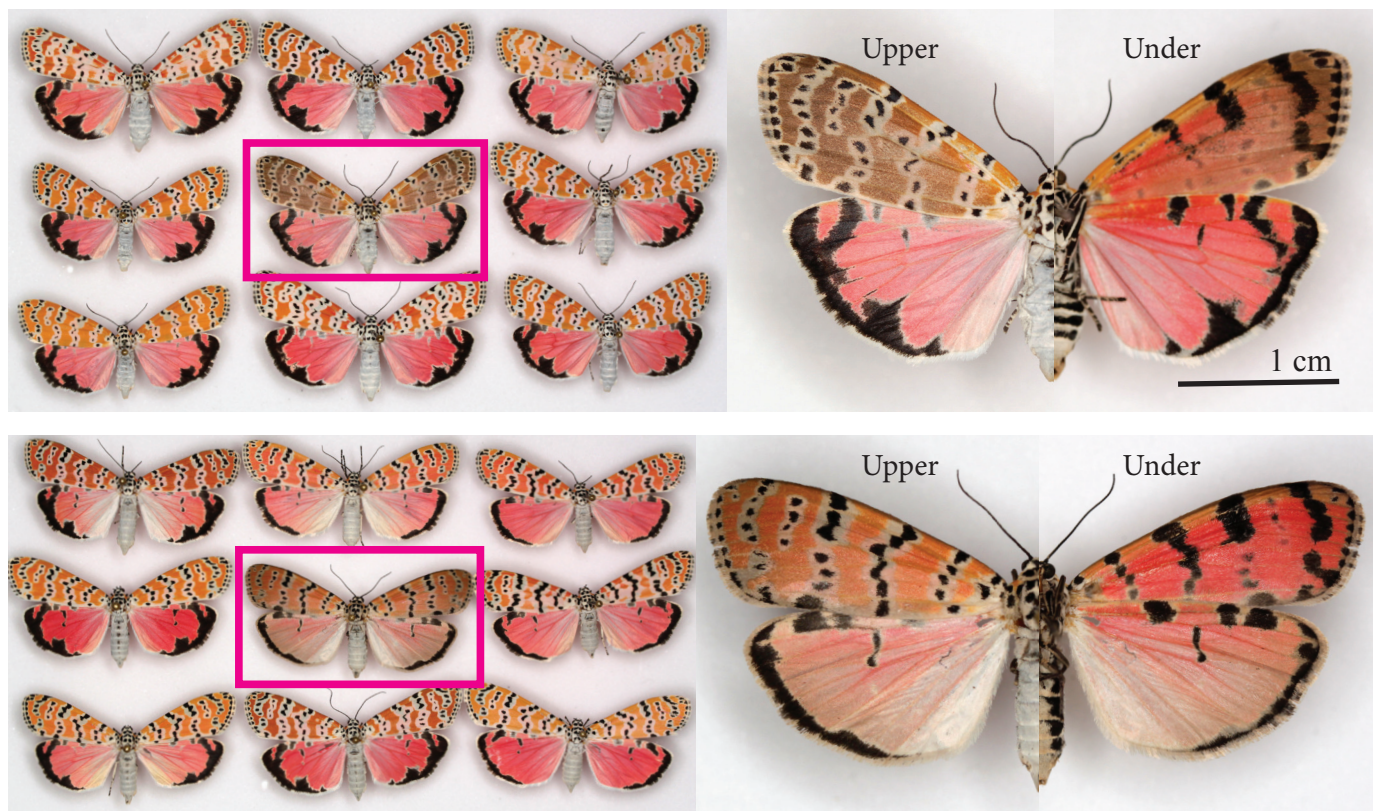


Fig. 1. Representative female specimens from two broods of *Utetheisa ornatrix bella* reared from Gainesville, Florida stock. Females in the middle (enlarged image of the same, both upper and under side shown, on the right) exhibit aberrant “dusky” coloration.

F-1 females -
100% had
pink fore and
hindwing

F-2 females from
sibling-to-sibling
cross had 6:4
ratio of parental
phenotype/partially
“dusky” phenotype



Fig 2. Two generations of *Utetheisa ornatrix bella*: females from the parental brood (top) were reared from Gainesville, Florida stock of wild-collected eggs; their daughters (bottom two rows) resulting from sibling-to-sibling cross.

a café-latte color. The hindwing color is also affected, changing from the normal bright pink or pink-white to a lighter, and in the case of one specimen, dusky-pink.

Manley’s “greasy” phenotype seems “to be an ‘all or none character’ which is sex influenced since it appears only in the females in a 1: 1 ratio” (1975, p. 78). Indeed, in the three populations (two Mexican and one Brazilian) for which he describes the “greasy” phenotype, the trait appears in almost half of the 69 females, while not appearing in the 122 males.

In the case of the “dusky” phenotype, the distinct trait only appeared in the females of my reared specimens and was a rare occurrence. Among the 20-30 broods (hundreds of specimens) that originated from the wild-collected females that I raised during the last five years, I found it only twice: a single female among 101 siblings in brood #1 (Fig. 1A,B), and a single female among 23 siblings in brood #2 (Fig. 1C,D). It is, however, possible that if these aberrant females had become founders of new isolated populations, they would have produced populations where this recessive trait would have been more common. In support of this latter supposition, I illustrate in Fig. 2 a part of the brood that I obtained by sibling-to-sibling crossing. The parental brood, originating from a batch of eggs collected in the wild and showing no aberrations, produced ten F-1 female offspring, four of which exhibited partial “duskiness” (darker forewings and lighter hindwings).

I also examined the extensive holdings of *U. ornatrix bella* in the Peabody Museum (Yale University), Smithsonian

National Museum of Natural History (NMNH), and the McGuire Center, Florida Museum of Natural History (MGCL). The latter did not yield any specimens that are relevant to the present note, and the Peabody Museum collection (YPM), despite numerous broods created by Charles Remington, had only a single specimen with dusky hindwings (Fig. 3). The NMNH, collection, however, contained a sample collected by Jacob Doll in Plainfield, New Jersey in the fall of 1920. Two males and four females in this sample stood out from the rest with their dusky coloration (Fig. 4).

One might suppose that this aberration is caused by some environmental condition. After all, it has been shown experimentally that a reaction norm exists in the wing pattern



Fig. 3. F-1 of Cross No. 72 reared in lab 7-9 May 1958, Charles L. Remington. The specimen exhibits partially dusky coloration. YPM.



Fig. 4. A sample of *Utetheisa ornatrix bella* from Plainfield, New Jersey, collected by Jacob Doll in the fall of 1920. Dusky-wing specimens in this sample (right) are unique in museum collections. NMNH.

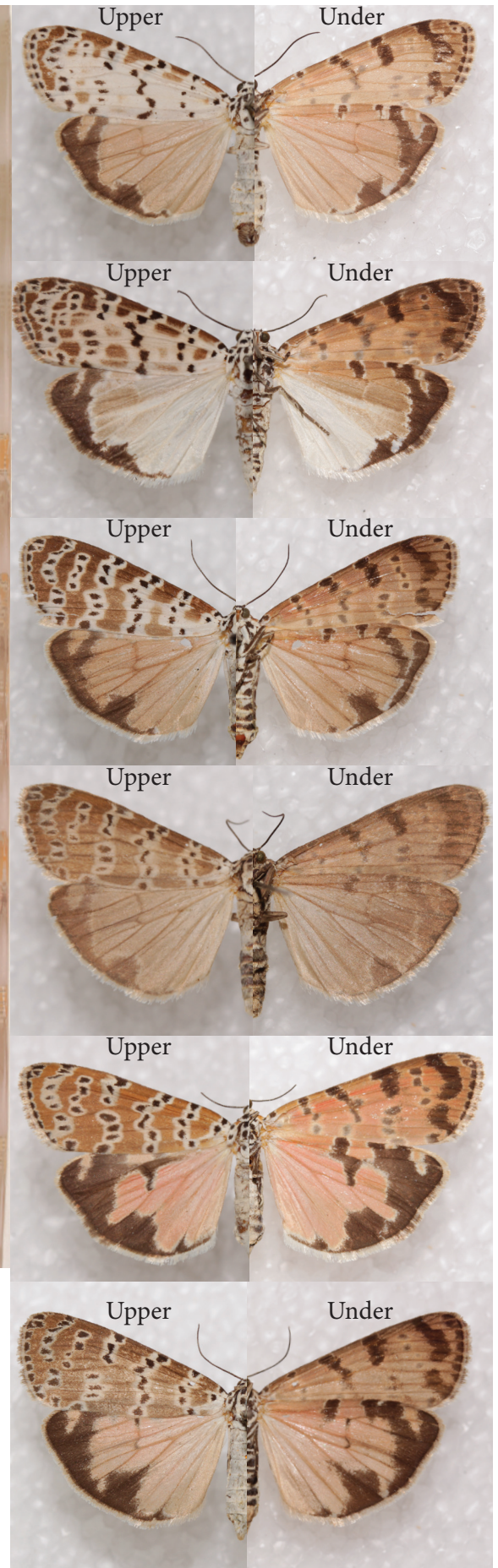




Fig. 5. A. *Utetheisa pulchella* (La Foa, New Caledonia, YPM); B. *Utetheisa connerorum* (Sta. Cruz, Galapagos, MGCL)

of *U. o. bella*, and that an increase in black markings can be caused by exposure to colder temperatures during larval/pupal development (Sourakov 2015). While within the wild population from 1920 New Jersey the environmental factors could have been a possible cause, in my three experimental broods illustrated here, the rearing conditions were controlled. Additionally, the fact that the sibling-to-sibling crossing produced partial “dusky” phenotype in roughly half of the female offspring also supports that “dusky” is a phenotypic expression of a rare recessive allele.

This is supported by observations in other species: the heritable melanic aberrations “dark cell” was found only in the females of *Papilio glaucus* (Scriber and Evans 1988). According to these authors, dark morphs can also be transmitted from one species to another during intraspecific hybridization (Scriber and Evans 1986), and perhaps Manley’s “greasy” is an expression of the same gene as “dusky” within a different *bella* genotype. Scriber et al. (2009) illustrate another striking melanic aberration “fletcheri” found in *P. canadensis*. Opposite to *bella* moths described here, the latter phenotype has only been collected in the wild and never reared (despite numerous crosses conducted by Scriber, resulting in ca. 100,000 individuals). Attempts to cross it with normal *P. canadensis* resulted in infertile eggs, which could be due to “fletcheri” being a sterile recessive mutant or hybrid. For discussions of genetics underlying melanization, the Scriber et al. (2009) paper is an excellent resource.

The “dusky” and “greasy” traits of *U. ornatrix bella* reported here may have some evolutionary significance for the genus as a whole and may be found in other species of *Utetheisa*. For instance, *U. pulchella* (L., 1758) is, at a glance, less aposematic than *U. ornatrix*, and too can exhibit the dusky color (Fig. 5A). Entirely grey-brown *Utetheisa connerorum* Roque-Albelo & B. Landry, 2009 (Fig. 5B) and its other nocturnal Galapagos relatives, while chemically defended (Roque-Albelo et al. 2002), have become cryptic. This clade supposedly has derived from the aposematic *Utetheisa* (DaCosta 2010), and perhaps natural selection favoring “dusky” trait had been involved in the origin of non-aposematic taxa of *Utetheisa*. Considering that even for distasteful moths, such as *Utetheisa*, escape from some predators is not guaranteed (Roque-Albelo et al. 2009; pers. obs.), one can easily see how more cryptic variants could be favored by natural selection when there is an abundance of

predators that are capable of tolerating the defensive compounds in its otherwise slow-flying and easy-to-spot prey.

Alternatively, the phenomenon described here could have neutral adaptive significance, as far as predator-prey interactions are concerned, and may simply reflect increased melanin deposition in an individual moth, which, by itself, can have a negative (e. g., Talloen et al. 2004) or positive (Liu et al. 2015) effect on fitness.

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