

"ORANGE" BANDS, A SIMPLE RECESSIVE IN
ANARTIA FATIMA (NYMPHALIDAE)

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ABSTRACT. Breeding experiments with aberrant *Anartia fatima* butterflies having orange instead of red hindwing markings produced results consistent with the interpretation that the orange color is due to the homozygous condition of a simple Mendelian recessive allele.

We report here on the genetics of a color aberration in the common Central American nymphalid butterfly *Anartia fatima* Fab. Throughout its range, from southern Texas south into eastern Panama, *A. fatima* bears on the hindwings a conspicuous, elongate red band, approximately 9 mm long by 2 mm wide (Fig. 1, arrow). Wing pattern is identical in males and females, and it is usually necessary to examine the genitalia in order to distinguish the sexes.

Butterflies in which the hindwing markings are orange instead of red (Fig. 1, right) appeared among the progeny of a phenotypically "red" female from Achiote, Colon Province, Panama. This individual had been brought to Barro Colorado Island in the Canal Zone during June 1977 as part of a larger study involving the rearing of many *A. fatima* for behavior and genetic research. Among her 91 offspring, 21 had orange bands, a ratio of 3.33:1, "red":"orange" butterflies.

Using these offspring, we obtained the crosses shown in Table 1. "Orange" bred true. Two "red" to "red" crosses produced entirely "red" individuals, while one other "red" to "red" cross produced a ratio of 3.53:1 "red":"orange" individuals. Three "orange" to "red" crosses produced 44 "red" butterflies, with no "orange" appearing.

These results are consistent with the interpretation that a simple Mendelian recessive allele (*r*) is involved, with a double dose (*rr*) resulting in the "orange" phenotype. The "red" female from Achiote must have been heterozygous for "orange" (*Rr*) and so must have been her mate. The same would be true of the two "red" pairs which produced the 15 "orange" out of 68 offspring.

A. M. Shapiro (pers. comm.) has seen an orange variant in *A. amathea* at Cali, Colombia. Considering both the partial genetic intercompatibility of *A. fatima* and *A. amathea* (Silberglied and Aiello, in prep.) and the intermediate expression of red pigmentation among hybrids,

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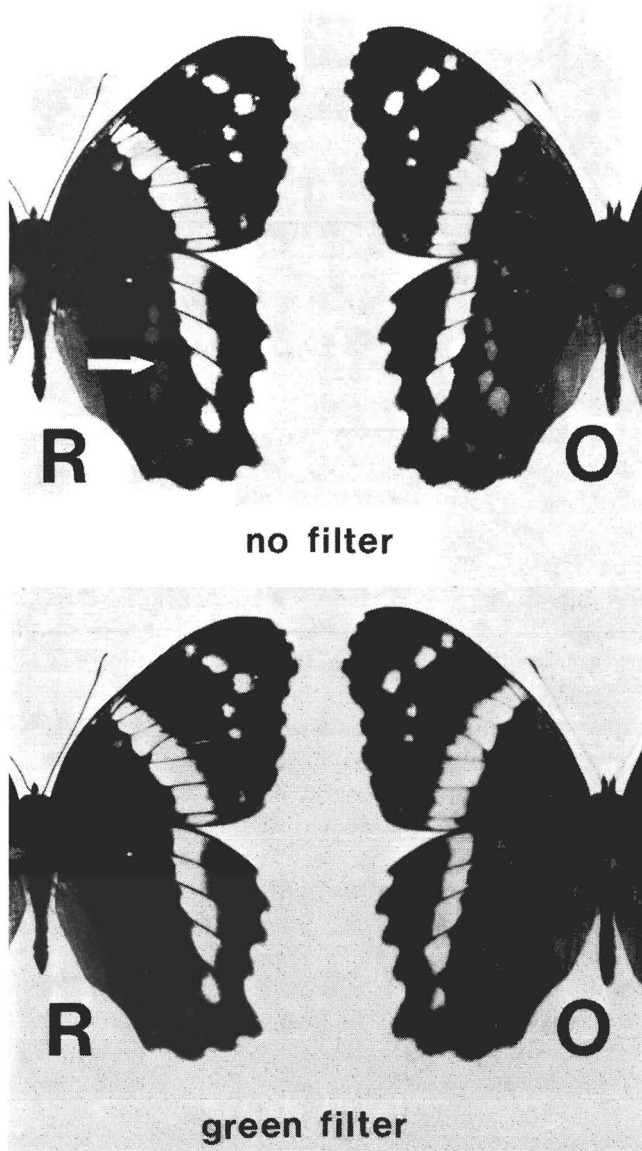


Fig. 1. "Red" (wild type, left) and "orange" (aberration, right) phenotypes of *A. fatima* (males). The arrow (upper left) indicates the characteristic colored band. The lower photographs were taken through a green filter (Tiffen green no. 1) to enhance the contrast between the bands of the two phenotypes.

TABLE 1. Crosses involving the "orange" phenotype of *Anartia fatima*.

Phenotypes ¹ of parents		Number of crosses	Phenotypes of progeny		Expected ratio, R:O, if a simple recessive	p ²
♀	♂		"red"	"orange"		
R ³	P ⁴	1	70	21	3:1	>.5
R ⁵	R ⁵	1	53	15	3:1	>.5
R ⁵	R	2	38	0	1:0	-
O ⁵	R	3	44	0	1:0	-
O ⁵	O ⁵	1	0	78	0:1	-

¹ R = "red," O = "orange."

² Probability (Chi-square test, 1 degree of freedom) that differences between expected and observed values are due to chance alone.

³ Female collected in Achote, Panama.

⁴ Phenotype of male unknown; presumed (based upon results) to be "red" (and genotype presumed to be Rr).

⁵ Progeny of female collected in Achote, Panama.

that variant is likely to be genetically homologous with the one reported here.

Specimens of this aberration have been deposited in the collections of the Museum of Comparative Zoology, Harvard University; Peabody Museum of Natural History, Yale University; American Museum of Natural History, New York; National Museum of Natural History, Washington, D.C.; and G. B. Small, Panama Canal Zone.