

A NOTE ON HEREDITY OF *EUREMA NICIPPE* PUPAL COLORATION

These interesting data of Mr. EVANS provide an exercise in fitting genetic combinations. For this, it must first be assumed that these pupal colors are due to genetic and not environmental differences and that the various genotypes are equally viable. It is hardly possible that the four color types are controlled by a single locus, even if any two of EVANS's four are lumped to make a total of three (blending inheritance) or two (simple dominance) classes, because his F_1 of "black" \times "green" included both parental types, plus others, and the ratios in the next generation are far from any to be expected on a single-locus hypothesis. Assuming now that there are four discrete types: "black", "blotched", "speckled", and "green", the number of theoretical possibilities which fit the figures are several.

Perhaps no two-locus hypothesis fits the data. But a close match is obtained if it is supposed that three loci are required and that: a) the "speckled" type results with homozygous recessive alleles at one locus, regardless of the genotypes at the other two loci; b) if there is a dominant allele at the "speckled" locus, "blotched" must result if homozygous recessive alleles are at the second locus, regardless of the genotype at the third locus; and c) if a dominant allele is at each of the first two loci, "green" results with homozygous recessive alleles at the third locus, with "black" the alternative phenotype there (1st hypothesis). For c), essentially as probable at the third locus is the reverse, "black" being homozygous recessive and "green" dominant (2nd hypothesis).

These two alternative genotypes for the four phenotypes can be represented as follows:—

<i>Phenotype</i>	<i>1st hypothesis</i>	<i>2nd hypothesis</i>
"speckled":	SS -- --	SS -- --
"blotched":	S- bb --	S- bb --
"green":	S- B- nn	S- B- N-
"black":	S- B- N-	S- B- nn

Thus the normal, plain green wild type, presumably homozygous in most populations, would be (1st) SS BB nn or (2nd) SS BB NN.

Several crosses are obvious in planning tests of these hypotheses, such as pairing an individual from a "black" or a "speckled" or a "blotched" pupa with a mate from a population with nothing but "green" pupæ. It would be essential, too, to discover whether the background of the pupating larvæ influences the pupal color, as it does with *Papilio* and *Pieris*.

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