

1160 W. Orange Grove Ave., Arcadia, California, U.S.A. 91006

© Copyright 1969

ESTIMATION OF NATURAL MUTATION RATES FOR ALBINISM IN TWO SPECIES OF THE SATYRID GENUS *CERCYONIS*

THOMAS C. EMMEL

Department of Zoology, University of Florida, Gainesville 32601

IN THE PAST DECADE OF FIELD WORK and laboratory research with the woodnymphs of the Nearctic genus *Cercyonis* (Satyridae), I have had the opportunity to collect data on the frequency of various mutant genes within the four species: *C. pegala*, *oetus*, *sthenele*, and *meadi* (See Emmel, 1969, for taxonomic summary).

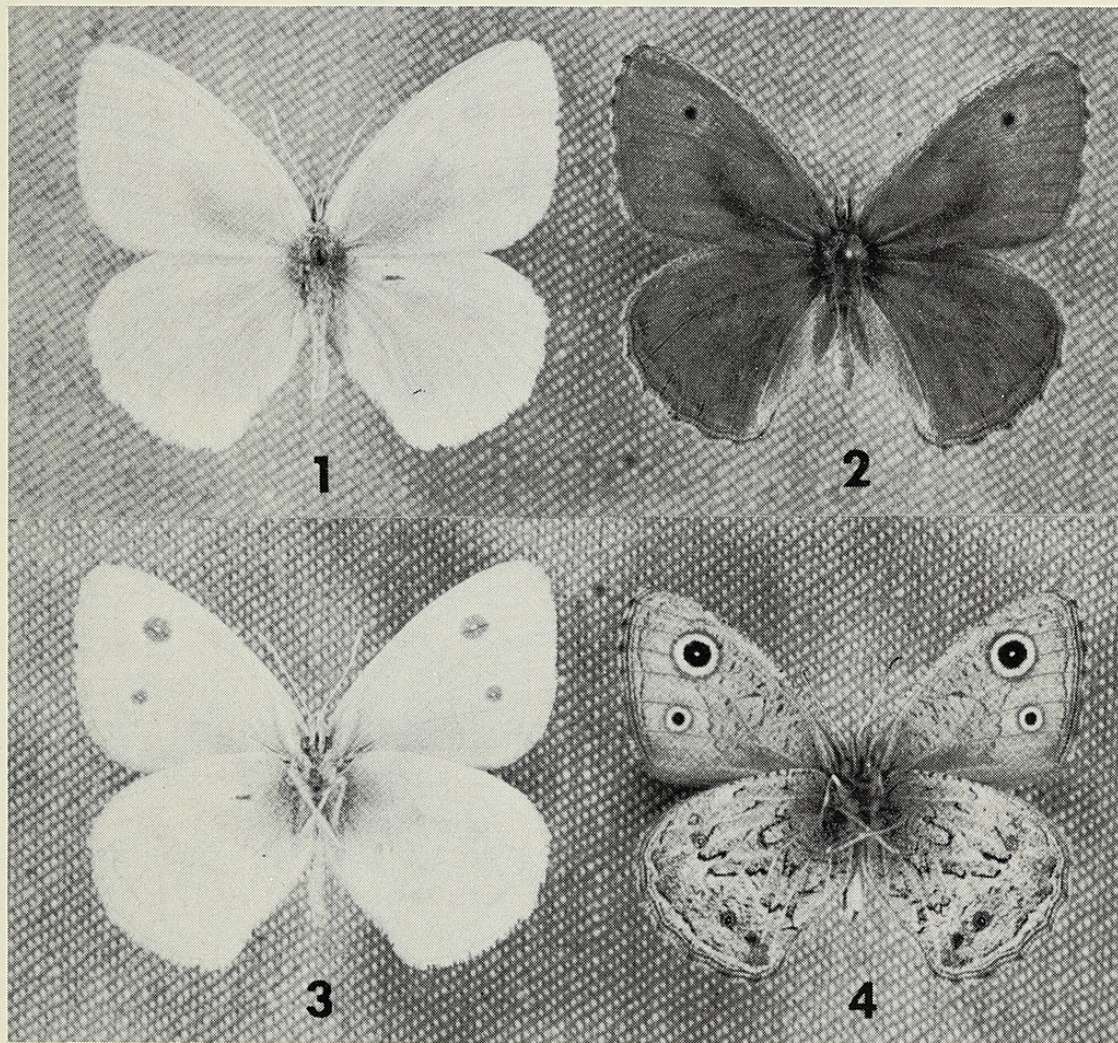


Fig. 1-2.—Dorsal surfaces of albinic and normal male specimens of *Cercyonis oetus* from a population in the Reese River Valley, Lander County, central Nevada.

Fig. 3-4.—Ventral surfaces of same specimens.

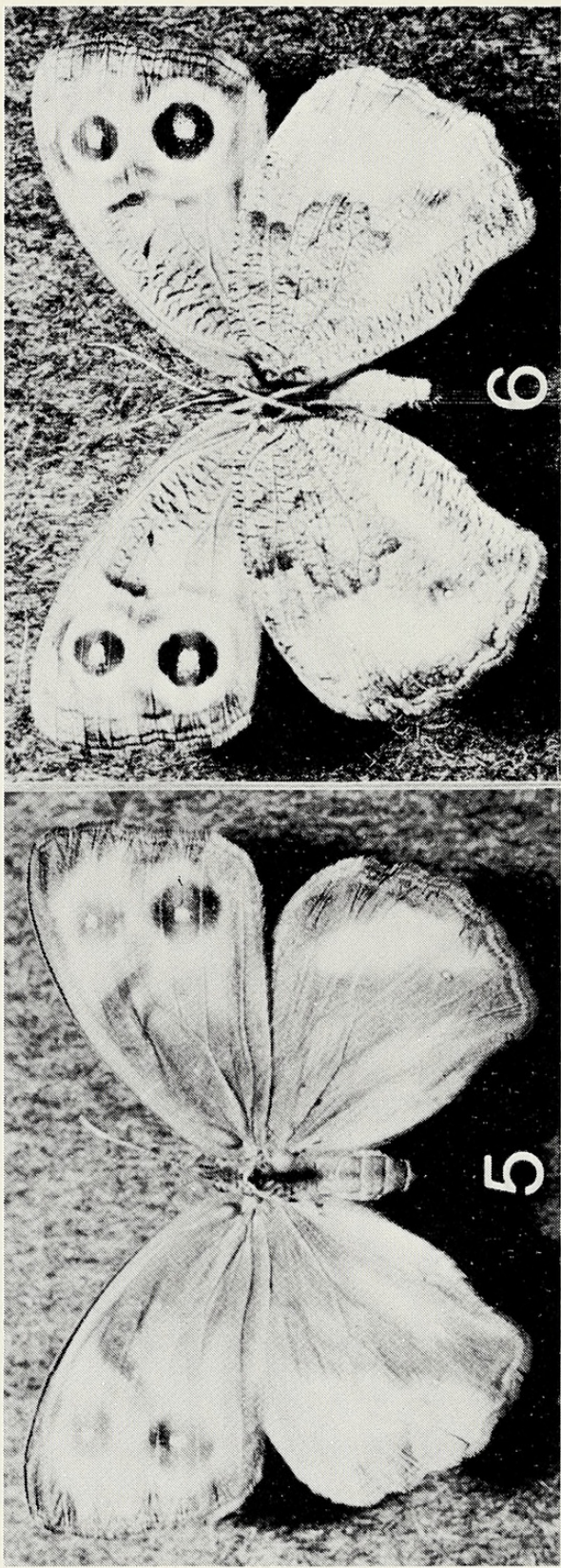


Fig. 5-6.—Dorsal and ventral surfaces of partially albinic female specimen of *Cercyonis pegala* from Boardman, Morrow County, Oregon.

An additional point is that spontaneous mutant specimens are probably eliminated from the populations largely by mate selection. Brown females undoubtedly refuse strange-looking *white* males (e.g., see Sheppard, 1961) and brown males most likely fail to approach white females as being of the "wrong" species.

I. *Cercyonis oetus*

On July 12, 1969, a totally albinic male *C. oetus* was taken by John F. Emmel in a population of brown specimens located four miles northeast of the Reese River on Highway 2, 5700 feet elevation, west-southwest of Austin, Lander County, Nevada. The dorsal and ventral surfaces of this specimen are compared with the normal male phenotype of this population (itself being extraordinary; see Emmel and Emmel 1970) in Figures 1-4. The only significant departure from complete lack of pigment is in the forewing ocelli, which are light brown instead of the usual black. The specimen is in essentially freshly emerged condition.

II. *Cercyonis pegala*

A partially albinic female individual of *Cercyonis pegala* was collected on the west side of the town of Boardman, 200 feet elevation, in Morrow County, Oregon, on July 11, 1964, by Edwin M. Perkins and Stephen F. Perkins. In this specimen, the albinic portions are mainly restricted to the outer half of each wing (but both surfaces).

DISCUSSION

One can calculate an approximate rate of spontaneous mutation for the expression of albinism by dividing the number of known mutant individuals by the total number of individuals observed. I have personally examined or seen in the field more than 12,000 individuals of *C. oetus* and more than 6,000 individuals of *C. pegala*, at a conservative estimate. With respect to albinism, the two specimens reported here are the only mutants I have seen. A number of other lepidopterists with many years in the field confirm these observations, adding still more to the base number observed for each species.

Thus we can estimate the probable maximum natural mutation rate for albinism in the two species, within an order of magnitude, as:

Cercyonis oetus 10^{-5} (.00001)

Cercyonis pegala 10^{-5} (.00001)

These figures, of 10^{-5} per gene per generation, are in the same

order as those known for *Drosophila* and man (Dobzhansky, 1951, p. 59) and for the domesticated silkworm, *Bombyx mori* (Tazima, 1964, p. 179-180).

Only two mutations involving albinism have come to my attention, and the purpose of this note is to provide an estimation for the spontaneous rate of mutation for this character in two species of these satyrids.

LITERATURE CITED

- DOBZHANSKY, THEODOSIUS, (1951). Genetics and the Origin of Species. Columbia University Press, New York. 364 pp.
- EMMEL, THOMAS C., (1969). Taxonomy, distribution and biology of the genus *Cercyonis* (Satyridae). I. Characteristics of the genus. *Journ. Lepid. Soc.*, 23:165-175.
- EMMEL, THOMAS C., and JOHN F. EMMEL, (1970). An extraordinary new subspecies of *Cercyonis oetus* (Lepidoptera, Satyridae) from central Nevada. *Pan-Pacific Entomologist*, in press.
- SHEPPARD, P. M., (1961). Some contributions to population genetics resulting from the study of the Lepidoptera. *Advances in Genetics*, 10:165-216.
- TAZIMA, YATARO, (1964). The Genetics of the Silkworm. Academic Press, London. 253 pp.



Emmel, Thomas C. 1969. "Estimation of natural mutation rates for albinism in two species of the Satyrid genus *Cercyonis*." *The Journal of Research on the Lepidoptera* 8(2), 65–68. <https://doi.org/10.5962/p.333552>.

View This Item Online: <https://www.biodiversitylibrary.org/item/225389>

DOI: <https://doi.org/10.5962/p.333552>

Permalink: <https://www.biodiversitylibrary.org/partpdf/333552>

Holding Institution

Smithsonian Libraries and Archives

Sponsored by

Biodiversity Heritage Library

Copyright & Reuse

Copyright Status: In Copyright. Digitized with the permission of the rights holder

Rights Holder: The Lepidoptera Research Foundation, Inc.

License: <https://creativecommons.org/licenses/by-nc-sa/4.0/>

Rights: <https://www.biodiversitylibrary.org/permissions/>

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.