SOME EXPERIMENTAL COLOR ABERRATIONS IN *DANAUS PLEXIPPUS*

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During the summer of 1964 we conducted a pilot rearing project in which 114 larvae of *Danaus plexippus* (L.) were reared under controlled light conditions in three cages, 38 in each cage. Light was provided by G.E. fluorescent lamps in combination with Rosco gelatine filters to produce the spectral energy distribution and input shown in the figure. The cages were painted with nonselective, nontoxic Pittsburgh white paint. The temperature within the cages ranged from 69° to 80°, while the temperatures outside for the same period ranged from 45° to 90°. The experiments were conducted in a completely darkened underground room which was notably humid. Humidity, however, was not measured. The purpose of the experiment was to study the effects of specific light upon the complete metamorphosis of this insect. Each cage was given 14 hours of light and 10 hours of darkness in each 24-hour period.

The first six larvae were found in the field in Walpole, Massachusetts, on May 31 and installed, two in each cage, while in the first and second instars. Of these, one in each cage survived. Cage 1 ("Blue," spectral energy: 4,000–5,000 angstroms) and cage 3 ("Red," 6,000–7,000 angstroms) produced color aberrations. The color of the scaling of the underside of both wings was normal, but on the upperside of the forewings the orange scales were fewer and paler than usual, the apex showing almost no orange. The overall effect was of a monarch with buff-colored hindwings and blue–black forewings with some dusky orange. The insect in cage 2 ("Green," 5,000–6,000 angstroms), although not brightly colored, was fairly normal. All three insects were females.

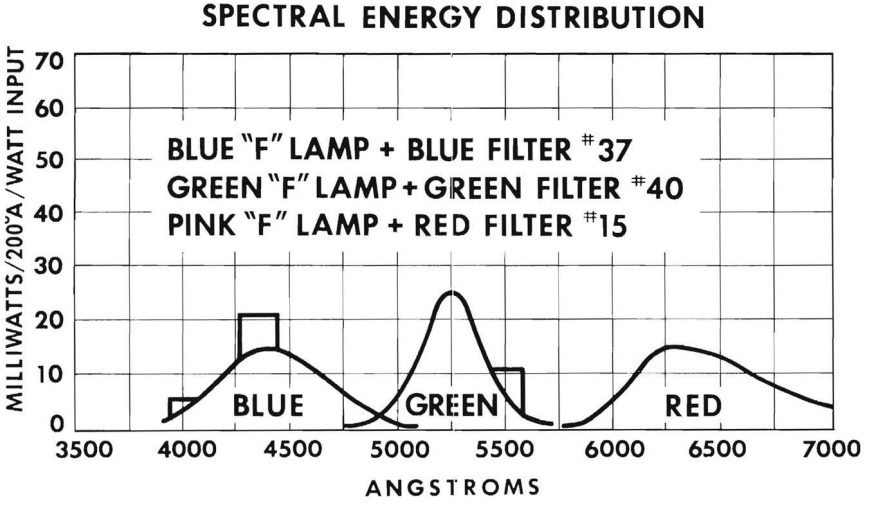
The next three larvae were also found in the field, in Bennington, Vermont, in the first and second instars, and were installed in the cages on June 20. These emerged on July 7–10, and produced two females and one male. All were of normal color. The male mated with both females, and a total of 884 eggs resulted. Of these, 105 were installed, 35 in each cage. The distribution was as follows.

	Eggs	*Female*	*July*
In each cage,	10	1	15
	5	2	18
	10	2	20
	10	2	23

Controls,	30	1	16
	71	2	18
	91	2	20
	74	2	23

The controls were reared in separate cages according to day of oviposition.

Of the 30 eggs which reached maturity in the cages, four resulted in color aberrations. Cages 1 and 3 each produced another butterfly with dark forewings and light hindwings. Cage 2 produced two insects in which both forewing and hindwings were buff-colored. All were females.



In the control group, kept under normal conditions of light and heat, 93 of the original 215 emerged with no color aberrations. In brief, the only color aberrations came from the light-controlled cages. They were offspring of three different females and two different males. They may have been genetic mutations. There are two specimens somewhat similar in the Andrew J. Weeks collection of Lepidoptera at the Museum of Comparative Zoology, Harvard, both taken around 1900. However, in the course of rearing and banding during eight years I have never seen another living monarch with colors even approaching those mentioned above. It seems plausible that a lack of certain qualities of light, a lack of total light energy, a lack of stimulation provided by sharply rising and falling temperatures, or a combination of all three factors may have contributed to the alteration of wing scale color. No conclusions can be drawn until the experiment has been repeated with tighter controls, but