

THE ABERRANTLY-PIGMENTED GRAND CANYON SALAMANDER, *PLETHODON DORSALIS*

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ABSTRACT.— A second pair of *Plethodon dorsalis* with greatly reduced iridophore pigment is recorded from the Grand Canyon in southwestern Illinois. The significance of these specimens is discussed.

Two *Plethodon dorsalis* from the Grand Canyon, Jackson County, southwestern Illinois, were reported (Thurrow, 1957) to lack one of the three normal skin pigment cells — the white or iridescent iridophore. This cell was called a guanophore in the 1957 paper and other salamander literature, but Hertzler (1958) points out that guanine has not been identified from these cells in *Plethodon*. Twelve and a half years after the first two *P. dorsalis* were collected, I collected two more at the same locality, on March 22, 1967. These newer specimens also seemed to show a complete lack of iridophores. Both animals were juveniles (hatched late the previous summer), but comparisons with my photographs and notes for other juveniles of this species confirmed that some iridophore pigment would be expected normally, at least ventrolaterally. The finding of four iridophoreless animals from this locality over this time span would favor the second of three hypotheses given in 1957, i.e. that the whole population is aberrant, with at least a high frequency of unusual forms. To my knowledge, no other *P. dorsalis* have been taken from this canyon. Both Ozark and southwestern Illinois *P. dorsalis angusticlavius* average a less heavy iridophore pigmentation than some *P. d. dorsalis*, which suggests that more than one allele is involved. The absence of iridophores could be caused by one gene, however, which either prevents the differentiation of this kind of cell or interferes with its pigment synthesis.

Two careful re-examinations of the two 1967 animals at 7-30X (plus a similarly-sized *P. glutinosus* with iridophores and an adult Arkansas *P. dorsalis*) gave a surprising result. The orange dorsal stripes of the two juvenile *P. dorsalis* were in the characteristically reduced form (most similar to Figure 1-F of Thurrow, 1957), and iridophores were essentially lacking from the skin and eyes. However, a single iridophore cell was found midventrally on each animal. One cell was three intercostal spaces anterior to the insertion of the hindlimbs, and the iridophore in the other animal lay just one space further cranial. The animals could possibly be siblings or even identical twins. The physiological genetic effect would not seem to be a lack of substrate for iridophore pigment synthesis in the skin, since the normal amount of pigment seemed present in each cell, and no partially pigmented cells were noted. Similarly, some block to iridophore migration seems unlikely, since in each animal the cell has migrated as far as possible from the neural crest, and no other iridophores were seen near the neural crest area. Rather, it would seem that there is interference with iridophore differentiation. Lehman (1953) indicates that the time of amphibian guanophore (iridophore) differentiation is not known, but cites work indicating that the time may be before the cells have migrated away from the neural crest. His work in two other genera indicates that the number of guanophores which produce pigment is influenced by the properties of the local areas of ectoderm and mesoderm. The differentiation of a single cell in these two *P. dorsalis* could theoretically be due to two somatic mutations, but I see no easy explanation for the parallel differentiation of a single iridophore which appears at nearly the same location in two separate animals.

A population which develops an unusual allele frequency is often small and isolated, and the Grand Canyon population seems to possess these characteristics. The Mississippi lowlands at the mouth of the canyon are unfavorable as a habitat for *Plethodon*, as are the sheer dry cliffs which form the canyon walls. The tributary canyons cut through sandstone strata of varying resistance, and many overhangs are formed which are difficult to surmount from below. Only one salamander species, *Eurycea longicauda*, was found in these tributary canyons, in 1954 and also in 1967. The presence of *E. Longicauda* all along these tributaries can be partly explained by larval dispersal. Both *Plethodon dorsalis* and *P. glutinosus* are found in the major canyon. There would appear to be no advantage to assigning a trinomial to this aberrantly-pigmented form of *P.*

dorsalis as long as it is recorded from only one canyon and may represent altered allele frequencies at only one or a very few loci.

LITERATURE CITED

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