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## ERYTHRONIUM MESOCHOREUM

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ERYTHRONIUM MESSACHOREUM Knerr, "which means the Midland Erythronium," was described in 1891 in a magazine published by Midland College,<sup>1</sup> Atchison, Kansas, where Knerr was professor of science. In the following year it was included in Smyth's *Check List of plants of Kansas* (with the etymologically impossible spelling changed to *mesochoreum*). Reference to the original description is made difficult by the obscurity of its place of publication; even the library of the Missouri Botanical Garden has no copy of this periodical. In the herbarium of this institution, however, filed with Knerr's specimens and two manuscript letters to Dr. Trelease, is the single page bearing the description. Since others may have difficulty in finding a copy, it may be worth while to summarize here the chief characters by which Knerr differentiated between his new species and the nearly related and very similar *E. albidum* Nutt. *E. mesochoreum* is said to occur only on open slopes facing northward, or on wooded northern slopes; *E. albidum* being found in woods and ravines. *E. mesochoreum* has a longer perianth (1-2 inches as compared with  $\frac{3}{4}$ -1 inch), less reflexed and tinted with blue; walls of the ovary more convex; style straighter, more slender, with larger and more curved stigmas; the capsule longer (up to  $1\frac{1}{4}$  inches); leaves longer, more slender, and never mottled; a more slender and elongated bulb, which does not form runners, but develops the new bulb within itself at the base. *E. mesochoreum* flowers earlier, and flowering plants appear before the sterile plants, which are relatively less numerous than in *E. albidum*.

<sup>1</sup> Midl. Coll. Monthly 2: 5 (1891).



I have found typical *E. mesochoreum* near Columbia only on a certain dry and rocky ridge which falls off sharply to the north. Here the plants have long slender leaves, not mottled. Flowers appear early, before the leaves of the sterile plants. The flowers are tinted with blue. The bulbs produce no runners; instead a short "dropper" breaks through the base of each bulb. Elsewhere in this region the plants have conspicuously mottled leaves, which often become 40 or 50 mm. broad; and each bulb characteristically gives rise to two spreading runners, the tips of which bend downward and form new bulbs. Such plants are usually considered typical *E. albidum*. Many of these plants, however, growing in various situations (some on the same rocky ridge), approach *E. mesochoreum* in one or more characters. Almost all the flowers are bluish on the outside, and the perianth is reflexed to various degrees. Many of the characters which distinguish the two species are quantitative, and it is not surprising that gradations should appear between the two extremes. The length of the perianth varies from 25 to nearly 40 mm., being oftenest between 30 and 35 mm.; some of the smallest were found on plants otherwise clearly referable to *E. mesochoreum* (in the location already mentioned); and in general there is no correlation between the length of perianth, the degree to which it is reflexed, and the shape and marking of the leaves. Individuals may be found in flower throughout April in most of the places where patches of *Erythronium* occur; the flowering plants occur in various relationships with the sterile plants. In attempting to identify such plants one is apt to assign them to one or the other species as characters of leaves or of flowers seem most impressive. A similar lack of clear differentiation is evident in the herbarium.

In the hope that the underground parts might furnish a surer means of differentiation, I have carefully dug up about 100 plants at various times during their brief season of growth and in various situations. I have not been able to distinguish the bulbs by shape; one finds various sizes, since each bulb is somewhat larger than its parent. The parts which give rise to new bulbs are often difficult to obtain unbroken and are seldom seen on herbarium sheets. They are apparently similar to those of *E. americanum* studied and described by Blodgett.<sup>1</sup> The seedling of this species forms a "dropper," a structure which originates near the base of the cotyledon and contains the apex of the

<sup>1</sup> Bot. Gaz. 50: 340-372 (1910).



stem. The dropper elongates vertically downward, carrying within its tip the apical meristem, which ultimately becomes the new bulb. The remains of the old bulb may often be seen encircling the summit of the new one; Rimbach<sup>1</sup> figured a series of four such remnants surmounting the fifth bulb. The later bulbs, which are considerably larger than the first, form runners, which often spread laterally for several inches before their tips turn downward. The runner has an origin similar to that of the dropper, the difference being mainly in the degree of elongation; intermediate structures occur. Each bulb of *E. americanum* forms usually three runners, one being apical in origin, the other two axillary. Each contains within its tip a meristem which may become a new bulb.

In patches of *Erythronium* near Columbia it is easy to distinguish the leaves which arise from early generations of bulbs; they are smaller than those which come from later bulbs, more slender, and often not appreciably mottled even in colonies of typical *E. albidum*. If one takes up a cluster of these small plants, all occurring within a radius of 20 or 30 mm., one usually finds some bulbs with runners, some with droppers. This suggests that the transition from droppers to runners in this species occurs irregularly rather than at some definite time after the germination of the seed. It is possible also that there is a segregation of genetic factors which influence the method of vegetative reproduction. Larger sterile plants in the same colonies have usually broad and conspicuously mottled leaves; each bulb of such plants sends out usually two runners (characteristically unequal in length). Occasionally, however, even these plants form droppers instead of runners; there is no strict correlation between the characters of leaves and the nature of underground parts. Frequently only one runner is formed, and this may grow vertically downward instead of at first horizontally; this is evidently a structure intermediate between a runner and a dropper. One bulb sent out two runners from its opposite ends. Flowering plants have usually two mottled leaves, rather narrower than those of the sterile plants. The flowering bulb often forms neither dropper nor runner, but renews itself in place. Sometimes runners appear, frequently singly instead of in pairs; the occasional flowering plant that has only one leaf instead of two usually has a single runner. Often a single dropper is formed, but elongates to such a slight extent that it barely protrudes through the base of the

<sup>1</sup> Bot. Gaz. 30: Plate XIII, fig. 9 (1900).



old bulb. Many plants approach typical *E. mesochoreum* in the characters of the leaves and underground parts. The latter species evidently differs in failing to change from droppers to runners in its later generations of bulbs; this change occurs generally but irregularly in



*E. albidum*. Both species occasionally form axillary buds which develop new bulbs in place, the new bulb thus formed being during the following season surrounded by the outer scales of the parent bulb. The drawings illustrate typical *E. albidum* and *E. mesochoreum*, with a few of the intermediate combinations of characters. At the left is typical *Erythronium albidum*; at the right *E. albidum* var. *meso-*



*choreum*; in the middle intermediate forms. One bulb has been dissected to show the dropper within. The two small plants at the left are from a colony of typical *E. albidum*. Plants with the same numbers were collected at the same time from the same colony ( $\times \frac{1}{3}$ ).

I have had no opportunity to study in the same way plants from the type location of *E. mesochoreum*. Through the kindness of Dr. J. R. Jackson I have a number of specimens from high hills along the Missouri River near Parkville, Missouri, only about 30 miles from Atchison. Some of these are typical *E. mesochoreum*; others represent the same intergrading combinations of characters described above. The same lack of correlation is evident between length of perianth, shape and marking of leaves, and method of vegetative reproduction.

In seeking to account for the differences among older bulbs of the same colony we may again suppose a genetic segregation; this is to be expected if the not very unlike species, *E. albidum* and *E. mesochoreum*, are interfertile and yield a "hybrid swarm," in which their differentiating characters occur in various combinations. In addition the more frequent occurrence of droppers and of slender, non-mottled leaves on exposed ridges and slopes suggests a selective effect of the environment. It is interesting to recall that Blodgett noticed that runners of *E. americanum* are less numerous in well-drained soil. The solution of the problem must await careful cultural work. Meanwhile we may conclude that *E. mesochoreum* is probably an ecotype of *E. albidum*, more or less stabilized in certain places by environmental selection. In any case the existence of many intergradations between the two groups, and the consequent impossibility of determination of many specimens, render specific separation difficult to justify. I propose therefore that *E. mesochoreum* Knerr be reduced to varietal rank with the name

ERYTHRONIUM ALBIDUM Nutt. var. **mesochoreum** (Knerr), comb. nov. *E. mesochoreum* (as *mesachoreum*) Knerr in Midl. Coll. Monthly, 2: 5 (1891).

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