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Notes on Variation in *Micranthes texana*

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NOTES ON VARIATION IN MICRANTHES TEXANA.

L. A. KENOYER.

In the spring of 1900 I discovered near Independence, southeastern Kansas, a plant which had hitherto been unreported in the state. On submitting specimens to the National Herbarium, I determined it to be Buckley's *Saxifraga texana*, which was discovered in Texas about 1861. The plant has since been placed in Small's segregated genus, *Micranthes*, and has been reported from a few widely scattered localities in north Texas, Arkansas, and southeast Missouri.

The locality from which the Kansas samples come is a low and damp but open pasture area with sandy soil and some outcropping sandstone, which rock underlies the soil. There are not more than five hundred to a thousand specimens growing on this area of less than a hundred square rods. Yet there is among the plants a diversity of form that is remarkable inasmuch as it appears to represent a struggle on the part of a dying species to perpetuate its existence.

Specimens collected on March 28, 1914, showed some mature seed, for the plant had taken advantage of the earliest warm days of an unusually early spring. The scape is generally solitary, but there may be three or four to a plant. Sometimes a small, weak one comes out from the base of a stouter one. The flower cluster is of the determinate type—in some cases a compact, compound cyme, and in others much more loosely branching. The leaves range in form from ovate to linear-oblong, or spatulate, in margin from deeply crenate-serrate to entire. In these respects my specimens conform closely to the type description.

The most remarkable thing about the plants of this plot is the variation in the number of floral parts, particularly in carpels. It is the normal thing for Saxifragaceae to have two carpels to a flower. Small and Rydberg, in "North American Flora," say for the order, "rarely three," but make no mention of any departure from the normal number for the genus *Micranthes*, or for the species *Micranthes texana*. But our Kansas plant has virtually adopted the three-carpellate habit, this number being far more frequent than two. Four-carpellate flowers are about half as frequent as two-carpellate. There are a few fives, and observation on previous years has shown an occasional six. These larger numbers, when they occur, are not symmetrically arranged—as are the carpels of *Sedum*—but some carpels appear to be somewhat thrust aside by others. Sometimes one or more are small or abortive. The six-carpellate flowers that I have seen have two fairly definite rows of three each.

This spring I selected at random 140 plants for statistical study. These plants bore on an average thirteen flowers each, the number per plant ranging from one to forty-two. Of a total of 1831 blossoms, 233, or 12.7 per cent, had two carpels each; 1500, or 81.9 per cent, had three each; eighty-nine, or 4.9 per cent, had four each, and nine, or .5 per cent, five each. Very evidently the three-carpellate condition is so far in the lead as to be typical for this little colony of the species; three is what the statistician would call the modal number of carpels.

Another interesting series of figures is that representing the average number of carpels per plant for the 140 plants investigated. The accompanying curve, in which the abscissas represent the 140 plants consecutively arranged in the order of their average carpel number and the ordinates represent the average carpel numbers, shows a very typical conformance to Galton's Law, being nearly vertical at the ends and horizontal at the part which represents the three-carpellate condition. The lowest average is 2, the highest, 4.25. There were four plants with the flowers all two-carpellate, while thirty-five had them all three-carpellate, and six others averaged three each. The slight offset on either end of the long horizontal line on three can easily be understood when it is remembered that we are dealing with plants having such small numbers of flowers that the addition or subtraction of one carpel in a single flower makes a considerable difference in the average.

No rule could be established concerning the relative position or age of the flowers having the varying numbers of carpels. Sometimes the four and five-carpellate ones were older and sometimes younger than the average.

Another tendency was that toward multiplication of the floral parts. Saxifrages are normally pentamerous, but this colony affords not a few hexamerous and even heptamerous specimens. Even more common, perhaps, is the addition of a petal or two, the other parts remaining normal. As a general thing those flowers with more than three carpels are most likely to have a superabundance of the other floral organs.

I was led to make this preliminary study by the hypothesis of Standfuss, that species, like individuals, have life cycles, and that a period of mutation, or species-reproduction, precedes the period of death for the species. Since this species is so rare and so widely scattered, it would seem to be a disappearing species. The three-carpellate condition seems clearly to be a mutation, for we find here a newly established average about which fluctuation occurs. I hope by propagation of the plant and by further investigation to receive light on some of the many interesting problems of heredity and variation.

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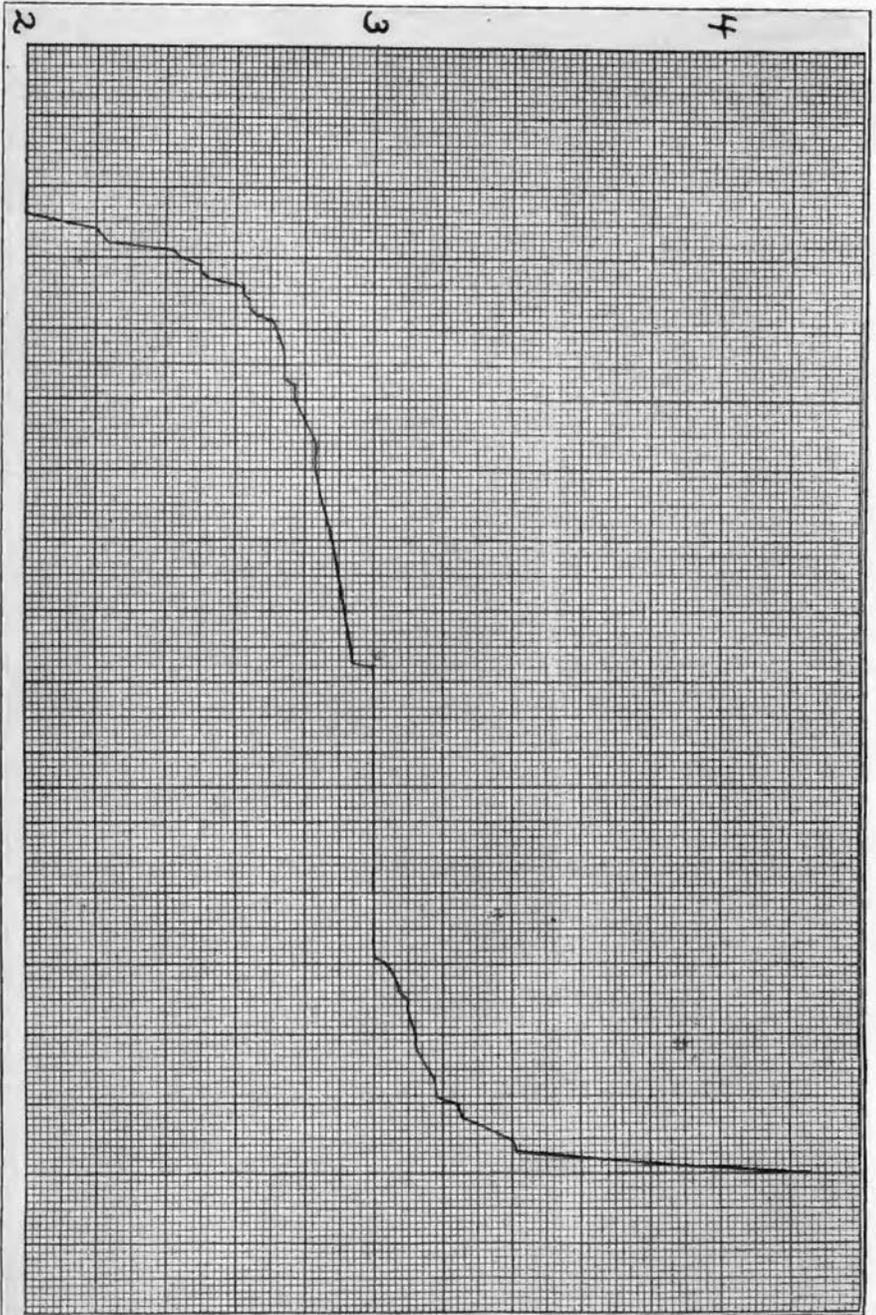


PLATE XVII. Curve showing average number of carpels in *Micranthes texana*.