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Cleistogamy In *Poa Chapmaniana*

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It is usually difficult for a beginner in the study of grasses to distinguish between *Poa annua* L. and *Poa chapmaniana* Scribner. As in so many other instances, the differences between the two are clear after a few specimens of each have been seen, but it is difficult to visualize the characteristics from the descriptions. In the manuals in general use in the eastern part of the United States, and in many of the state floras, the keys use the presence or absence of cobwebby hairs at the base of the lemma and the prominence of the intermediate nerves of the lemma as distinguishing characters; but both prove confusing in practice, and the additional characterizations given in the descriptions are little more illuminating.

Some time ago it was pointed out to the writer by C. C. Deam that the anthers of his specimens of *P. chapmaniana* were only 0.2 mm. long, while other Indiana species of *Poa* had anthers much longer than this. Further investigation following this lead, showed that the difference between the two conditions is much more fundamental than merely length of anther. *Poa chapmaniana* is completely cleistogamous.

Differences between the spikelets of the two species may be seen in Figures 1 to 4. The flower of *P. annua* has large feathery stigmas, and three well-developed anthers, (Figs. 1 and 2.) at least 1 mm. long, and exerted on long, slender filaments at anthesis. Pollination is doubtless accomplished by contact and by the wind. The flower of *P. chapmaniana* has small, poorly developed stigmas, and a single stamen, whose anther (Fig. 3) is only 0.1 to 0.2 mm. long and produces only about 16 to 24 pollen grains. The floret does not open and self-pollination within the floret necessarily occurs. The

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anther is in contact with the stigma at the time of flowering and the dried remains of the two may be found together at tip of the mature seed.

Poa annua is common in many parts of Europe, but is supposed to have been introduced into the United States in recent times. *Poa chapmaniana* is thought to be a native of the United States. Practically nothing of the phylogenetic history of either is known, but the similarity of the two suggests



Fig. 1, spikelet, and Fig. 2, stamen of *Poa annua*. Fig. 3, stamen, and Fig. 4, spikelet, of *Poa chapmaniana*. Magnification: spikelets, x $12\frac{1}{2}$; stamens, x 25.

close relationship. It is probably not too rash to formulate the hypothesis that cleistogamy has here been a mechanism of evolution. In thinking of the formation of a new species from a pre-existing stock by any kind of mutative or selective process, we recognize the importance of barriers which prevent the blending of the two strains by hybridization. These barriers may be environmental, or they may take the form of anatomical or physical peculiarities of the organism itself. If we regard *P. chapmaniana* as having arisen as an offshoot from *P. annua* we have in cleistogamy a barrier more effective than a mountain range or a sea in keeping the new species from hybridizing with its parent.

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