

1944

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Recommended Citation

Martin, J. N. (1944) "The Habits of Two Weedy Grasses, *Alopecurus carolinianus* Walt. and *POA chapmaniana* Scribn.," *Proceedings of the Iowa Academy of Science*: Vol. 51: No. 1 , Article 19.

Available at: <https://scholarworks.uni.edu/pias/vol51/iss1/19>

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THE HABITS OF TWO WEEDY GRASSES, *ALOPECURUS CAROLINIANUS* WALT. AND *POA CHAPMANIANA* SCRIBN.

J. N. MARTIN

The two grasses, *Alopecurus carolinianus* and *Poa chapmaniana*, shown in accompanying figure, are sometimes troublesome weeds locally in the early part of the season. In the Herbaceous Garden at Iowa State College these two grasses are difficult to control through May and the forepart of June. They are remarkably similar in size and habits of growth. Both are annuals and range in height from a few inches to a foot. Both are densely tufted, form thick stands, and have practically the same period of growth, both starting growth soon after the ground thaws in the spring, and seeding and disappearing the forepart of June. In the Herbaceous Garden they commonly intermingle.

WEEDY HABITS

Although they are annuals they are nevertheless difficult to eradicate after the soil has become infested with their seeds. Their ability to start growth early, grow with extraordinary speed, and form densely tufted stands gives them a decided advantage over many of the small, early, garden and truck crops, and they are also able to compete well in the field with young clover, timothy and other grasses. They produce seed so abundantly that the seeds from a single crop allowed to infest the soil can be the source of a number of succession growths, the result being that almost weekly cultivations are necessary to keep these weeds down.

Evidently they are cool weather plants but their growth is confined to the early spring. After they ripen their seeds, in late May and the forepart of June, they disappear suddenly and almost entirely until the next spring. This habit excites wonder concerning the physiology of their seeds.

TAXONOMIC DESCRIPTION

According to Hitchcock*, the *Alopecurus carolinianus* is a native and widely distributed grass in the United States, occurring in all but five of the states. It is generally described as preferring moist, open soil, but it has been observed to do well on moderately dry soil. In the Herbaceous Garden both *Alopecurus carolinianus* and *Poa chapmaniana* occur on the dryer areas.

The culms are tufted and much branched at the base—habits of growth that favor the formation of dense stands. The single flowered spikelets are borne in close cylindrical panicles, which resembles the

*Hitchcock, A. S. Manual of the Grasses of the United States.

tail of a fox, whence the name of foxtail for this group of grasses (B, fig. 1).

Poa chapmaniana, although apparently native to North America, is more limited in its description, being described as occurring in open ground and cultivated fields from Delaware to Iowa and south to Georgia and Texas.

Its culms, like those of the *Alopecurus carolinianus* are densely tufted and similarly form dense stands. The panicles are open with lower branches spreading. The spikelets are mostly three to five flowered (A, fig. 1).

GERMINATION OF THE CARIOPSES

The cariopses remain enveloped by the lemma and palea. In the Herbaceous Garden at Ames, Iowa, the plants ripen their seeds and close their period of growth suddenly around the middle of June. During the remainder of the season there is almost an entire absence of these grasses. The causes of the rather abrupt and complete discontinuous of the growth of these grasses at about the beginning of summer was not ascertained. The exhaustion of the supply of seeds in the soil cannot be the only factor, since the grasses appear on the same areas the following spring, although no reseeding had been allowed. One cause is probably the suppression of the germination of the seeds by the summer warmth of the soil.

The longevity of the seeds in the soil is not known, but observations in the Herbaceous Garden show that they have a longevity in the soil of at least six years.

Efforts to germinate the mature seed soon after harvest and after a year or more of storage in the laboratory were not successful, but after an exposure of four or more months to the temperature fluctuations of the cool seasons, they gave a high percentage germination. The seeds exposed to the outdoor temperatures were stored in loosely stoppered bottles which were protected from rain. Some samples were kept dry in the bottles and others were kept moist. The moisture differences in storage made little or no difference in the gain in the germinability of the seeds. This requirement of an exposure to fluctuations of temperature as a preliminary to germination accounts for the fact that seeds produce practically no plants the season they are borne.

SUMMARY

Two grasses, *Alopecurus carolinianus* and *Poa chapmaniana*, were observed as to manner of growth and weedy habits.

Their early rapid growth in the spring and their densely tufted habits make them strong competitors of early garden crops and also some early field crops as the clovers and grasses.

They end their season with the production of seed about the beginning of summer, and do not appear again until the following spring.

Their rather abrupt and almost entire discontinuity of growth at



Figure 1. (A) *Poa Chapmaniana*, and (B) *Alopecurus Carolinianus*. Habits shown below and inflorescences, about three times enlarged, above.

the approach of summer may be due in part to the exhaustion of the germinable seeds in the soil and in part to the suppression of the germination of the seeds by the summer warmth of the soil.

The seeds of each new crop require an exposure of several months to the fluctuations of temperature of the winter and spring months to make them germinable. They, therefore, do not germinate till the year after they are produced.

They seed abundantly and soil once infested usually has enough seed to support a number of successive crops of these weeds. For this reason almost weekly cultivations through their growing period is required to control them. The seeds are able to survive in the soil a number of years, at least six years according to observations in the Herbaceous Garden, and germinate when brought to the surface by cultivation.

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