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VARIOUS

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BUREAU OF PLANT INDUSTRY.

BEVERLY T. GALLOWAY, *Chief of Bureau.*

BOTANICAL INVESTIGATIONS AND EXPERIMENTS.

FREDERICK V. COVILLE, *Botanist.*

SEED AND PLANT INTRODUCTION AND DISTRIBUTION.

A. J. PIETERS, *Botanist in Charge.*

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MISCELLANEOUS PAPERS.

I.—THE SEEDS OF RESCUE GRASS AND CHESS.[a]

By F. H. Hillman, *Assistant, Seed Laboratory, Botanical Investigations and Experiments.*

There have recently been received at the Seed Laboratory from different States of the South several samples of the seed of chess, or cheat (*Bromus secalinus*), which had been offered for sale as rescue grass (*Bromus unioloides*). Notwithstanding the close botanical relationship of chess to rescue grass, and the fact that the former is sometimes, like the latter, employed as a hay crop, the difference between the two is so considerable that, if the seeds of both are to be handled in the trade, they should pass under their true names.

The brome grasses belong to the genus Bromus and vary widely in their agricultural value. One of them, the awnless brome grass (*Bromus inermis*), also called smooth and Hungarian brome grass, is highly valued in the West as a drought-resisting forage and hay plant. Rescue grass bears a somewhat similar relation to the agriculture of the South, while the chess is less valuable than either. Some value is assigned to it in certain localities, but it has been long and widely recognized as a most troublesome weed. The frequency with which it occurs in grain fields has led to the erroneous belief, adhered to by many farmers even to the present day, that chess is a degenerated form of wheat. Chess seeds are often abundant among the seeds of the cereal grains and the larger grass seeds, and sometimes occur with red clover seed.

With the aid of specimens, or descriptions, there should be no difficulty in distinguishing the seed of rescue grass from that of chess. The differences between the seed of chess and that of its near ally, *Bromus racemosus*, are more difficult to detect; but from a practical

[a] For some reason confusion has arisen in the Southern States regarding rescue grass and chess. Seed of the latter, which, though occasionally grown as a forage crop, is ordinarily a grain-field weed, has been offered for sale repeatedly under the name of the former, which is a valuable forage grass; and it has been thought desirable to issue a brief description of the two, so that both seedsmen and purchasers may be able to distinguish them. The present paper is therefore presented. It was prepared under the direction of Mr. A. J. Pieters, Botanist in Charge of the Seed Laboratory.—Frederick V. Coville, *Botanist.*

standpoint this is not so important, since the two plants are very similar in habit, and it is probable that in many localities the latter would prove quite as undesirable as chess.

Bromus unioloides (Willd.) H. B. K.

(*B. schraderi* Kunth.)

RESCUE GRASS. SCHRADER'S BROME GRASS. ARCTIC GRASS.

Florets, or "seeds,"[a] 11 to 25 mm. (½ to 1 inch) long, strongly compressed from the sides, sharply keeled along the back, lanceolate as viewed from the side, the apex tapering and usually tipped by a short awn, at the base of which the glume is slightly notched; margins of the glume membranous-edged and usually not infolded except at the base; veins 4 or 5 on each side of the midnerve, or keel, evident as narrow ridges; palea two-thirds to three-fourths the length of the glume, which wholly incloses it; grain folded lengthwise and tightly clasping the infolded center of the palea. The florets are light or yellowish brown or straw-colored, often greenish and sometimes purplish. The surface varies from smooth to very finely rough-hairy, the latter condition being particularly evident on the veins and pedicel. When spread thinly on a level surface the seeds lie on one of the flattened sides. (Fig. 1.)

FIG. 1.—Florets, or seeds, of rescue grass (*Bromus unioloides*): *a*, side view of a seed; *b*, front view of a seed, showing the palea and pedicel between the edges of the glume; *c*, seeds, natural size.

Bromus secalinus L.

CHESS. CHEAT. WILLARD'S BROME GRASS.

Florets about 7 mm. (¼ to $\frac{5}{16}$ inch) long, exclusive of the awn, which varies from 1 to 3 mm. in length, not compressed, cylindrical or somewhat spindle-shaped, obtuse at the apex; glume notched at the apex above the insertion of the awn; margins more or less infolded below the middle, narrowly or scarcely membranous-edged above the middle, usually not at all flaring at the apex; veins 3 on each side of the midnerve, very indistinct; palea equal to the glume, deeply grooved conformably with the grain, the keels hispid-ciliate and partially or wholly

[a] The seeds of these grasses in a commercial sense consist of the grain inclosed in the chaff—i. e., glume and palea.

exposed; grain equal to the glume and palea, often exposed at the apex of the floret, deeply grooved, reddish brown, sometimes occurring free from the glume and palea. The florets are light or dark brown and mostly smooth, and sometimes have a slight diffused luster under the lens. (Fig. 2.)

The more evident characters by which rescue-grass seed and chess seed may be distinguished upon comparison are as follows:

Rescue-grass seeds, being strongly compressed, lie only on one side when resting on a level surface; and thus appear lance-shaped or broadly awl-shaped, tapering uniformly to a sharp, short-awned point. In contrast, the chess seeds are from little more than one-fourth to one-half as long, more robust, not evidently flattened, nearly cylindrical, grooved along one side, abruptly pointed, the apex with a very short or somewhat longer awn or awnless. When resting on a level surface they may lie slightly at one side of the midvein of the back, exposing to view the grooved face and a part of one side, or they may lie on the grooved face, showing the back. They more rarely rest directly on the back. Furthermore, the general color of a sample of chess is much darker brown than one of rescue-grass seed.

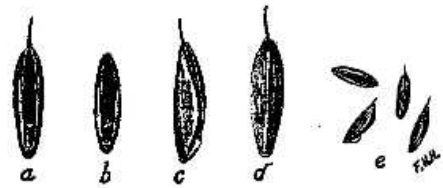

FIG. 2.—Seeds of chess (*Bromus secalinus*): *a* and *b*, front views; *c*, edge view; *d*, back view of seeds; *e*, seeds, natural size. The first three show the palea and pedicel.

Bromus racemosus L.

UPRIGHT CHESS.

Florets about 9 mm. (⅓ inch) long, exclusive of the slender awn, which varies from 4 to 9 mm. in length, similar to those of *Bromus secalinus* in general form. The glume is broader than in *B. secalinus* and usually more arched at the margins; edges sometimes membranous, especially at the apex, which is notched above the insertion of the awn and often flaring; veins sometimes distinct; palea shorter than the glume, broadly hollowed or grooved, its keels more or less exposed and hispid-ciliate; grain shorter than the palea or at least covered by it, more broadly grooved than in *Bromus secalinus*. The

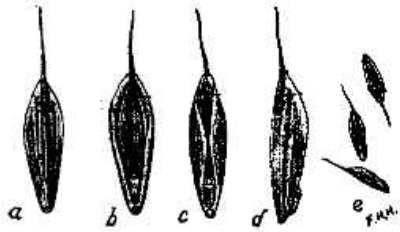

FIG. 3.—Upright chess (*Bromus racemosus*): *a*, back view; *b* and *c*, front views, and *d*, side view of seeds; *e*, seeds, natural size. Views *b* and *e* show the palea and pedicel.

florets are smooth or finely roughened and straw-colored or light brown. (Fig. 3.)

These seeds are as easily distinguished from rescue-grass seeds as are those of chess. They are most readily distinguished from chess seeds by the broader glume, longer awn, and shorter palea and grain.

The following statement of the relative values of rescue grass and chess is contributed by Mr. Carleton R. Ball, Assistant Agrostologist of the Department of Agriculture:

Rescue grass was introduced into the South some fifty years ago and has since been widely cultivated. Its chief value is for winter and early spring grazing. It is very hardy, and makes a luxuriant and rapid growth throughout the winter under favorable conditions. Although it is an annual plant, it is said to become a short-lived perennial under close grazing, which prevents the production of seed. In ordinary practice the grass is allowed to reseed itself each season. Where grazed, stock should be taken off long enough to allow seed to ripen in the early summer. If it is cut for hay in March, the aftermath will usually reseed the ground. A summer crop may be grown on the same ground if it be taken off early enough to allow the young plants to begin their growth in the fall. Rescue grass is best adapted to rich, loamy soils. On light, poor soils it is probably inferior to rye or oats for pasturage or hay.

Chess is becoming more and more common as a weed in southern wheat fields. In some parts of the country, particularly in the Northwest, it has considerable value as a hay crop. A similar value has sometimes been claimed for it in the Southern States, but the general opinion is quite the opposite. It often appears abundantly where grain crops have been killed by unfavorable conditions. There are, however, other catch crops with fewer weedy tendencies and greater forage value which may be employed in such cases. In feeding value, as indicated by chemical analyses, chess ranks lower than most grasses, including rescue grass. This has been proved to be true of it even in the Northwest, where it is so largely used for hay.