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Downy Brome (Cheatgrass) Control In A Dryland Winter Wheat-Fallow Rotation

The similar growth cycles of downy brome and winter wheat make weed control difficult. Each downy brome plant growing in a square foot area decreases wheat yield about 4 percent. Downy brome may be effectively controlled by combining three practices:

- (1) Tilling fallow early enough in the spring to retain good seedbed moisture and thereby increase early fall downy brome germination;
- (2) Rodweed just before planting winter wheat;
- (3) Plant wheat after mid-September.

The winter annual grass commonly known as downy brome is *Bromus tectorum* L. It was introduced from Europe. *Tectorum* means a "covering" or "thatch", and downy brome is so named because it grows so densely. It has also been called cheatgrass, bronco-grass, downy chess, early chess, slender chess, June grass, military grass and hobo grass.

The seeds germinate in the fall, and to a lesser extent in the winter and spring, when temperatures are above freezing and soil moisture is sufficient for germination and root development. The seed will germinate readily on the soil surface or may emerge through as much as 2 inches of soil.

Emerging seedlings are soft and downy and the new leaves are rolled. With the first warm days of

spring, the plant develops rapidly and by early summer has matured viable seed. The stems grow erect and may reach a height of 2 feet, although plants 1 to 3 inches high will produce viable seed. The leaves are covered with fine soft hair.

The seed head is loose and branched, similar to oats, and is 2 to 6 inches long. The soft hairy spikelets on each branch droop and turn purple as they mature. Each spikelet produces 4 to 7 seeds 1/16 to 1/8 inch long with an awn 3 times that length. The mature seeds are slender and sharp pointed. Because they shed readily, they can catch in the hair, mouth and ears of animals and cause injury.

WHEAT YIELD REDUCTIONS

Wheat yields were reduced about 4 percent by each downy brome plant per square foot in wheat at the University of Idaho Research and Extension Center at Teton Idaho (Fig. 1). Yield reductions of 20 to 40 percent were common where there were 5 to 10 downy brome plants per square

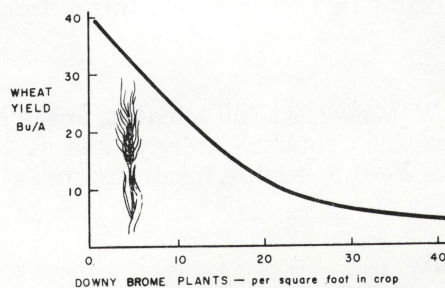


Fig. 1. Wheat yield of downy brome plants during U-I tests at Teton test site.

foot. Heavier infestations had little further effect because the weed stand was already solid (Fig. 1). Soil moisture samples taken from cropped wheat plots indicated that downy brome infestations used moisture from the top 2 feet of soil before the wheat could. The crop was then so weakened that it did not use the moisture from the soil profile as effectively on the weed-free plots. Without downy brome competition, wheat grew vigorously and used most of the soil moisture to the 6-foot depth.

SEMI-TO-NONEFFECTIVE CONTROL MEASURES

Herbicides are not yet accepted for downy brome control. Available herbicides are not selective enough and present too much risk to the wheat.

Plowing gives control by burying seed too deep for them to emerge. . . about 4 inches. Although deeply buried, most seeds will germinate within a year and will die. Plow furrow inversion is never complete, however, so many seeds are left for reinfestation. Also, because plowing destroys the stubble mulch that is important for erosion control, this method should be used only as an emergency measure.

Fall burning stubble does not usually give control. The fire would need to heat the shattered seed to a higher temperature than is normally obtained — at least 250F for five minutes.

Harrowing the crop to separately uproot seedling cheat is not normally possible because downy brome roots so quickly and thoroughly.

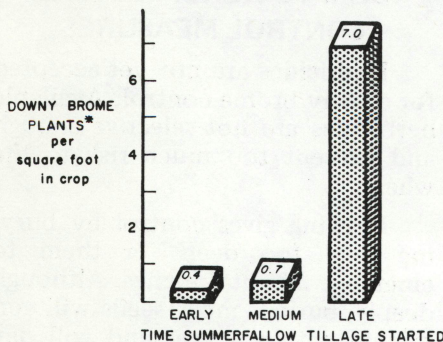
EFFECTIVE CONTROL OF DOWNY BROME

The following three management practices, when used together, gave very good control in tests at Teton. They don't add expense, as they essentially involve the timing of normally performed practices:

1. Early Spring Fallow Tillage.

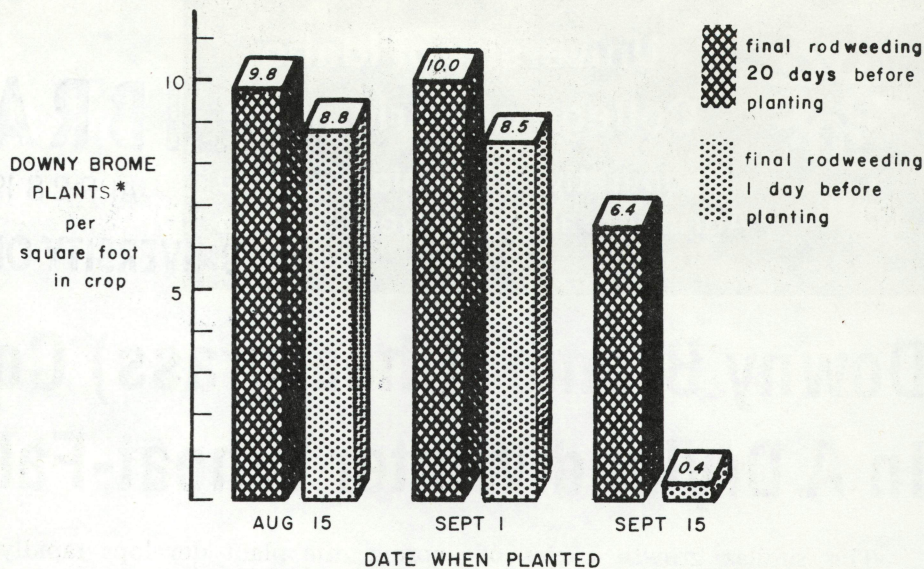
This accomplishes two objectives: (a) it removes the downy brome before it can reseed or become so well established it is difficult to kill, and (b) it enhances moisture retention in the seedbed, allowing existing downy brome seeds to germinate before the late summer tillage is finished.

Comparisons of crop-year downy brome populations on plots weeded just before planting on Sept. 15 are shown in Fig. 2. Early tillage, within a few days after the surface soil dried enough to allow implements on the field, resulted in only 0.4 downy brome plants per square foot in the crop year.



* with best rodweeding and planting date for control

Fig. 2. Comparisons of crop-year downy brome populations on plots.



* with early fallow tillage

Fig. 3. Downy brome control comparisons using experimental rodweeding at different times before planting.

Medium tillage plots were started 2 weeks later, when nearly one-half of the available moisture was lost from the 3- to 6-inch soil layer. This treatment resulted in 0.7 downy brome plants per square foot in the crop. Late tillage plots were not started until 5 weeks after early tillage. By then most of the available seedbed moisture had been lost. The next year, cropped plots had 7.0 downy brome plants per square foot. Moisture levels at the time of initial tillage remained nearly the same until fall seeding time, and also caused large differences in germination of fall-planted wheat.

2. Weeding Just Before Planting.

Experimental rodweeding was timed so that the final weeding was done 20 days before planting on half of the plots and delayed to one day before planting on the other half. Downy brome control from

the late treatment was more effective, especially when the Sept. 15 planting date was used (Fig. 3). By Sept. 15, downy brome seed generally had germinated and, although the seedlings had not emerged, the rodweeding killed them. Therefore, this weeding needs to be done whether downy brome plants are visible or not.

3. Planting Late (Sept. 15 at Teton.)

This date of planting wheat is near the end of the normal germination period of downy brome. Top wheat yields were still obtained with the Sept. 15 wheat planting date but the seeding rate was increased to 70 pounds per acre to compensate for reduced wheat tillering. Late rodweeding was especially necessary for downy brome control with this seeding date (Fig. 3).

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