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Control of Winter Annual Grasses in South Central Kansas

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Volunteer wheat and winter annual grasses (Downy Brome, Japanese Brome, and Cheat) are major weeds in winter wheat fields in south central Kansas. Volunteer wheat must be classed as a weed because it presents a wheat-streak mosaic threat to planted wheat. The winter annual grasses have the same life cycle as wheat.

Herbicides are not available to control winter annual grasses in growing wheat on sandy soils, so tillage or herbicides not compatible with growing wheat must be used. However, significant control can be obtained by planting (rotating) infested fields to a row crop like grain sorghum with effective tillage before planting. Control of volunteer wheat in continuous wheat, a difficult and weather-related problem, is not covered in this report.

Crop Rotation

Experience at the Sandyland Experiment Field (St. John) indicates the desirability of rotating wheat (W) and grain sorghum (S) in the following sequence:

Year	1	2	3	4	5	
Crop	W	W	S	S	F	(Fallow)

The fallow period could be replaced by production of another crop, like oats (or at Sandyland by production of foundation seed wheat), or fallow could be eliminated by planting wheat after the second-year

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sorghum is harvested. However, to be able to plant wheat immediately after grain sorghum, care must be exercised in selecting the herbicides used for weed control in the sorghum or damage may occur to the wheat.

Unless timely and effective tillage and/or chemical applications are used, the suggested cropping sequence will not control or eradicate the volunteer wheat or winter annual grasses.

Control by Tillage

Control of winter annual grasses, such as downy brome, by mechanical tillage requires that the winter annual grass seed be lightly tilled into the soil surface in the late summer of the second year of the rotation. Winter annual grasses germinate from late summer throughout winter. Control must come after they germinate and before they produce seed in spring or early summer.

Winter annual grasses have extensive fibrous root systems, so any tillage practice that does not separate the growing parts from the root system or bury the entire plant is ineffective. Moldboard plowing effectively controls downy brome, but it is not recommended for sandy soils because it destroys crop residues needed to control wind erosion. Stubble mulch tillage on sandy soils gives ineffective or no control because the plants are not killed or buried during the tillage operation.

Chemical Control

Since 1977, we have evaluated herbicide use as a substitute for intensive tillage to control downy brome and volunteer wheat at Sandyland. We have used atrazine between second-year wheat and first-year sorghum to control both volunteer wheat and downy brome.

Atrazine applied immediately after wheat harvest may be lost to photodecomposition unless it is incorporated in the soil by rainfall or some other means. Also, rainfall may leach the atrazine too deep below the soil surface. Then winter annual grasses like downy brome germinate above the atrazine later in the season. In our tests, applying atrazine 4L at 2 lbs (A.I.)/acre (2 qt of 4 lb/gal product) to volunteer wheat has given the best control. But it should be applied before the volunteer wheat plants are 2 inches high, although taller wheat has been killed in our tests. We recommend delaying the atrazine application until volunteer wheat emerges or as late as possible to be closer to the emergence of downy brome, but not later than November 15.

To keep from damaging the stand of grain sorghum to be established the next crop year, atrazine must not be applied later than November 15. Our experiments with spring application of atrazine have resulted in total loss of grain sorghum stands.

Late applications, best for downy brome control, do not solve the problem of controlling broadleaf and summer grass weeds between wheat harvest and the application of the atrazine. During that period, 2,4-D will control broadleaf weeds. If summer annual grasses are a problem, Roundup can be used. Control by such tillage operations as offset disking, undercutting, or one-way plowing can be effective during this period, but control depends on the weather. Tillage must not be so intensive that crop residues are reduced to the point of creating a wind erosion problem. When tillage is used to control broadleaf and annual summer grass weeds, application of the atrazine should be delayed until volunteer wheat emerges.

Downy brome and volunteer wheat have been effectively controlled without intensive operations by late summer to mid-fall applications of atrazine. Control, in this case, is defined as preventing seed production by downy brome and volunteer wheat. Exceptions to this control are those areas of the soil surface not covered with atrazine during the spraying operation. On soil tilled before the application of atrazine, some volunteer wheat plants have escaped control. It appears that this is due to the wheat germinating at a different depth than where the atrazine is located. Downy brome plants have not survived in our tests if coverage of the soil surface with atrazine was complete. However, downy brome and wheat seeds hav survived to germinate in the first-year sorghum stubble. Seed survival was more prevalent when the atrazine was applied to untilled stubble. In this case, seed survival or infestation of the first-year sorghum stubble appears to be a factor of uneven application of the atrazine, rather than loss of control by the chemical.

Tillage usually will be required the next spring to control weeds (broadleaf and summer grass) before grain sorghum is planted. To control weeds in the grain sorghum, apply recommended sorghum herbicide(s) during the sorghum growing season. However, sorghum herbicides will not control winter annuals that germinate the next fall in the sorghum stubble.

To date, spring applications of herbicides to control downy brome and volunteer wheat in the stubble of first-year sorghum before planting second-year sorghum have resulted in failure. Fall applications of 1.5 qt atrazine 4L immediately after harvesting the first-year sorghum have successfully eradicated these weeds. It is emphasized that the fall chemical applications should not be made later than November 15.

Reduction of Sources of Infestation

Noncropland areas, such as fence rows and abandoned farmsteads, that are infested with downy brome provide a continuing source of seed to reinfest cropland. We have controlled winter annual grasses like downy brome in fence rows and field roads with atrazine 4L at .7 lb A.I./acre (rate used on rangeland). The same treatment would control such winter annuals as downy brome and cheat in native pastures. Late fall application is not only desirable but necessary on pastures because they cannot be grazed for a period after application to comply with AAtrex label requirements. Follow directions and precautions on the label when you use AAtrex to control winter annual grasses in established native grass on rangelands or other noncropland.

Combines used to harvest wheat infested with downy brome become a source of seeds if later used in clean fields. Wheat fields should be harvested in a sequential order that prevents the infestation of clean fields with a combine. The machine should be cleaned or used on an area where infestation will not cause a problem.

Summary

The cropping sequence presented is necessary to completely eradicate the winter annuals (Downy brome, Japanese Brome, and Cheat).

Atrazine 4L can be used in a rotation to replace intensive tillage to control volunteer wheat and winter annual grasses and preserve crop residues for wind erosion control.

Identify the weed species in the stubble after wheat harvest. Use appropriate herbicides and tillage to control weeds between wheat harvest and application of atrazine. When tillage is used to control other weed species, atrazine should be applied after volunteer wheat or winter annuals emerge. Preferably, atrazine 4L should be applied as late in the season as possible, but not later than November 15. The atrazine must completely cover the soil surface to control volunteer wheat and winter annual grasses.

To keep winter annual grasses from reinfesting cropland, eliminate sources of weed seed in fence rows, abandoned farmsteads, pastures, and other noncropland areas by applying rangeland rates of AAtrex.

Trade names are used to help identify products. No endorsements are intended, nor is any criticism implied of similar products not mentioned.

The use of atrazine as described in this report is covered under the State of Kansas Special Local Need Labels, SLN NO.: KS-830006, KS-830007, KS-830008.

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