Chemical Fallow

In Dryland Wheat Fields

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Introduction:
Chemical fallow is one of the more recent developments that can be used to supplement farming practices in a stubble-mulch fallow program. Dense stands of weedy grasses, volunteer grain, and other weeds can be temporarily controlled by a chemical treatment in place of tillage when weather is unfavorable or soil disturbance is not desirable.

Problems:
In eastern Washington, the primary weed problem in winter fallow is Bromus tectorum (downy brome), locally known as cheatgrass. This weed, a native of Eurasia, was first discovered in the western states about 100 years ago. It has forced farmers to change their technology, cropping practices, and management. The winter annual habit of downy brome enables it to thrive and survive well in a winter wheat, fallow rotation. The success of any fallow program in this area depends on the amount of weed seed and volunteer grain that can be destroyed so that they will not carry over into the crop year.

Wind and water erosion, loss of soil moisture, and added expense can be caused by excessive tillage or cultivation. Cultivation can be reduced by a chemical application which is easy to apply and economical. One chemical application is usually sufficient to suppress weed growth during the winter months.

Justification:
Chemical fallow in eastern Washington may be desirable during one of these periods:

1. In the fall after the weeds and volunteer grain have emerged.

2. In the spring if there was no germination of weeds and volunteer grain the preceding fall.

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Justification (cont.)

Experiments at several sites in eastern Washington, (Pullman, Lind, Dayton) showed that a combination of materials such as amitrole, amitrole-T, 2,4-D, and atrazine were effective for temporary vegetative suppression (fallow).

The value of chemical fallow depends upon one or more related factors:

1. Prevention of wind or water erosion.
2. The number of tillage operations that can be saved.
3. The length of vegetation control.
5. The future benefits from reduced downy brome seed in the soil.

Greatest usefulness of chemical fallow will be in areas of low to moderate rainfall (8-14 inches). In these areas, a stubble-mulch is necessary for soil stability, especially where the soils are light textured.

Chemicals:

The chemical combination which can be used depends on the situation. Amitrole-T (1 lb./acre) plus a low volatile ester of 2,4-D (2 lbs./acre) is excellent where only short term control is necessary. This mixture is effective only after the weeds and volunteer grain have emerged and can be used between October 1 and April 30.

For longer periods of weed control, the mixture of amitrole-T (.5 lb./acre) plus atrazine (.4 lbs./acre) is preferred because:

1. Downy brome, volunteer grain, and other weeds can be treated in the fall.
2. Treatment will continue to be effective on spring germinated weeds.

The use of a low volatile ester of 2,4-D (1 lb./acre) in combination with amitrole-T (.5 lb./acre) and atrazine (.4 lb./acre) is desirable where annual broadleaved weeds and volunteer grain are a problem. However, the triple combination has no particular advantage on the weedy grasses. This mixture is restricted to use during the period September 1 to January 1.

Method of Application:

The method of application is quite important, especially if atrazine is part of the mixture. A crop sprayer without positive agitation in the tank must be modified to keep the wettable powder (atrazine) in suspension. This can be done by mechanical or jet agitation. A jet agitator, requiring a constant, pressurized return to the tank, may reduce pump delivery at the boom, thereby necessitating a reduction in the number of tips used. A check should be made to insure that the calibrated pressure is being maintained at the boom.
Method of Application (cont.)

Volume of carrier depends upon field and weather conditions, but usually 20-40 gallons of water per acre is sufficient. It is advisable to increase the amount of water according to the amount of surface debris, litter, and weed growth that is present. Also, it is easier to keep atrazine in suspension if larger water volumes are used. Applications can be made over stubble, plowed ground, or stubble mulch. The minimum size screens or strainers in tips, filters, and suction lines should be 50-mesh when applying atrazine.

Nozzle tips are subject to increased abrasion and wear when wettable powders are used. Replace the tips periodically to assure uniform coverage and accurate application.

Avoid spray overlap. An overlap doubles the chemical application and injury can be expected in subsequent crops. This is particularly important when atrazine is part of the mixture.

Don’t use atrazine on soils that are shallow, heavily eroded, or highly calcareous. Use the combination of amitrole-T plus a low volatile ester of 2,4-D in such problem areas.

Time of Application:

Downy brome should be treated when it has fully emerged. Apply chemical fallow treatments when it is in the 3-4 leaf stage and volunteer grain and other weeds are less than four inches tall. Spring treatments of amitrole and 2,4-D can be equally as effective as fall treatments, especially when a dry fall has delayed weed emergence.

Treatment Sequence:

Amitrole-T (1 lb./acre) plus a low volatile ester of 2,4-D (2 lbs./acre) can be used as a chemical fallow treatment in spring or fall. This mixture must be applied during the period October 1 to April 30 and the succeeding fall wheat crop must be seeded after August 1. A spring crop must be delayed for at least three weeks after treatment, however results on light soils have led us away from this use (E.M. 2177, Weed Control In Cereals, C&E Washington).

The mixture of amitrole-T (.5 lb./acre) plus atrazine (.4 lb./acre) is limited to fall use and must be applied September 1 - January 1. The treated area must remain in fallow for one full year and the succeeding crop must be winter wheat. The same restrictions would apply if a mixture of amitrole-T (.5 lb./acre) plus atrazine (.4 lb./acre) plus a low volatile ester of 2,4-D (1 lb./acre) was used.

Use customary cultivation or stubble-mulch tillage to destroy any weed growth that may appear in early spring or summer. A chemical fallow treatment will generally suppress weed growth until May. Even though weed growth is being suppressed, some tillage may be necessary to prepare a mulch and establish the moisture level needed for fall seeding.
Usefulness in Hard to Cultivate Areas:

The treatment of steep hillsides in the higher rainfall areas with chemicals can reduce tillage operations and sheet erosion on unstable surfaces. The edges of fields or other hard-to-handle spots such as draws, moist areas, and waste places may be treated to reduce tillage while providing reasonable weed control.

Waste areas and hard to cultivate areas are potential weed sites. Downy brome and annual broadleaved weeds are the chief invaders. Areas that remain wet for long periods, such as draws and gullies, can be chemically treated and good weed control maintained until tillage can be resumed.

Edges of fields are common sources of downy brome invasion. These areas can be treated with a longer lived (greater residual) mixture such as amitrole-T (.5 lb./acre) plus atrazine (.4 lb./acre) in the fall. In many cases, this will be all the treatment needed if the interior of the field is free of cheatgrass.

Cost:

The use of chemical fallow can eliminate 1 to 4 tillage operations. Treatments can be made for $4 to $10. The cheapest mixtures that did an effective job cost $4 to $7 per acre (1965 price).

Summary:

The following chemical fallow alternatives can be used depending upon the specific climatic requirement or cropping situation.

Fall Treatment:

Treat fall-emerged downy brome, volunteer grain, and other annual weeds with either (a) amitrole-T (.5 lb./acre) plus atrazine (.4 lb./acre) or (b) amitrole-T (1 lb./acre) plus a low volatile ester of 2,4-D (2 lbs./acre). Apply either mixture in 20 to 40 gallons of water per acre. A mechanical or jet agitator must be used when atrazine is included in the mixture. If fall-emerged downy brome is not treated until the following spring, the chemical treatments may not be as effective. Whenever atrazine is used, the treated area must remain in fallow for one full year.

Spring Treatment:

Spring-emerged downy brome, volunteer grain, or annual weeds can be treated with the recommended chemical fallow mixture which does not contain atrazine. Spring treatments are useful for temporary growth suppression in situations where (a) only short-term weed control is needed, (b) during wet weather when tillage is difficult or ineffective, or (c) when weed emergence has been delayed until spring. In (a), (b), and (c) above, use amitrole-T (1 lb./acre) plus a low volatile ester of 2,4-D (2 lbs./acre).
Restrictions:

Amitrole-T (1 lb./acre) and a low volatile ester of 2,4-D (2 lbs./acre) are restricted for use during the period October 1 - April 30, and the succeeding fall wheat crop must be seeded after August 1. Spring-seeded crops must be delayed for at least four weeks following treatment, and the crop should be wheat.

Amitrole-T (.5 lb./acre) plus atrazine (.4 lb./acre) must be applied during the period September 1 - January 1. This treatment is restricted to fall application. The treated area must remain in fallow for one full year or cannot be cropped for one full year, and succeeding crop must be winter wheat.

LABEL INSTRUCTIONS:

BE SURE AND CHECK THE LABEL OF EACH HERBICIDE SO THAT FORMULATION, ACTIVE INGREDIENT, AND SPECIAL PRECAUTIONS ARE ACCURATELY UNDERSTOOD. DO NOT ALLOW LIVESTOCK TO GRAZE TREATED AREAS. PLANT TREATED LAND ONLY TO WINTER WHEAT THE FOLLOWING YEAR. LABEL INSTRUCTIONS ARE SUBJECT TO CHANGE EACH YEAR.

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