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# Chemical Fallow Weed Control

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Fallow is cropland left idle for one growing season while the soil is cultivated to control weeds and conserve moisture.<sup>1</sup> In areas with less than 16 to 18 inches annual precipitation, winter wheat is often grown in a wheat-fallow-wheat sequence. Annually, about 3 million acres is fallow ground in the Pacific Northwest, with about 450,000 acres of this occurring in Idaho.

The primary weeds occurring on fallow ground include downy brome (*Bromus tectorum* L.), volunteer winter wheat (*Triticum aestivum* L.), cereal rye, (*Secale cereale*), jointed goat grass (*Aegilops cylindrica* Host), mustards (Cruciferae), prickly lettuce (*Lactuca serriola* L.), pigweed (*Amaranthus* sp.), lambsquarter (*Chenopodium* sp.), kochia (*Kochia scoparia* L.), prostrate knotweed (*Polygonum aviculare* L.), horseweed (*Conyza canadensis* L.) and Russian thistle (*Salsola kali* L.). Fallow management systems presently used in Idaho are black fallow, stubble mulch (trashy) fallow and chemical fallow.

## Black Fallow

In black fallow systems, a moldboard plow is used to bury all surface straw and chaff, leaving the soil surface bare throughout the fallow period. Generally, a minimum of four tillage operations are used after plowing to control weeds and firm the soil surface for planting. The plow operation can control downy brome, volunteer wheat and broad-leaf weeds during wet falls but leaves the soil surface bare and subject to severe wind and water erosion.

## Stubble Mulch (trashy) Fallow

Stubble mulching leaves crop residues on the soil surface throughout the fallow period to protect the surface from wind and water erosion. If weeds such as Russian thistle are present in the stubble after harvest, cultivation with a sweep plow is necessary for weed control. If few weeds are present in the fall, the field is usually not tilled until the following spring.

The first spring tillage operation is usually done with a sweep plow or one-way disk plow set to till about 6 inches deep. The second cultivation is done with a sweep, chisel plow, disk or field cultivator and is shallower than the first tillage. A rod weeder is generally used for all subsequent cultivations.

During wet weather, equipment used in a stubble mulch fallow system may merely transplant shallow, fibrous-rooted grass weeds such as downy brome and volunteer winter wheat. Under these conditions, multiple tillage operations are required. Control is usually not achieved until dry weather prevails. Multiple tillage operations bury excessive amounts of residue, pulverize the soil and leave it susceptible to erosion. Lack of control, however, allows weeds to produce seed and use valuable stored moisture.

In many fallow areas, initial tillage is done in the early spring to control weeds. Once the soil is tilled, very little additional water is stored in the soil profile because of the disruption of the continuous water-conducting pores in the soil. This first tillage operation can also cause the rapid evaporation of moisture and prevent the further accumulation of moisture unless spring rains completely wet the entire tilled zone.

<sup>1</sup>Martin, J. H., W. H. Leonard, and D. L. Sharp. 1976. Principles of field crop production. Third Ed., Macmillan Publ. Co., Inc., New York.



Fig. 1. Fallow ground not treated with herbicide.



Fig. 2. Fallow ground treated in the fall with a registered herbicide.

Spring rains can add an additional 1 to 2 inches of moisture to the soil if the early tillage is not performed. A good rule of thumb for the wheat-fallow production areas of the Pacific Northwest is that for each inch of additional water stored in the soil, growers can produce about 6 bushels per acre more wheat. If tillage can be delayed until late spring, the maximum amount of soil moisture stored can be increased. A late spring tillage forms the dust mulch needed to reduce the soil's evaporative loss of moisture. If the initial tillage is delayed until late spring, weeds must be controlled with herbicides to prevent their use of soil moisture and to prevent seed formation.

## Chemical Fallow

Fallow management systems using herbicides for weed control in early spring combined with a delayed stubble mulching tillage are often referred to as chemical fallow. In a chemical fallow system, herbicides are usually applied before any tillage operations are performed. When large Russian thistle plants are present after harvest, however, it is necessary to undercut the stubble with a sweep plow.

Fallow herbicides can be applied in the fall after harvest until freezing temperatures prevent spray application and/or in the spring and summer of the fallow season depending on the type and rate of herbicide used. Table 1 lists the fallow herbicides currently registered for use in Idaho, their recommended use rates and pertinent remarks pertaining to the use of each herbicide. **Always refer to the product's label before using any pesticide.**

Proper herbicide application allows growers to delay the initial tillage operation and reduces the total number of tillage operations performed during the fallow period. The amount of time that the tillage can be delayed depends on the degree of weed control the herbicide application gives. Factors such

as the herbicide used and rate of application, weather conditions after application, weeds present and soil type may influence the effectiveness of the chemical weed control. Contact your University of Idaho Extension county agent for more detailed information about these factors in your production area.

Once tillage operations begin, a conservation tillage program such as stubble mulching should be used throughout the remainder of the fallow period. Planting into a chemical fallow system can be accomplished using conventional planting equipment.

## Summary

Benefits of a well-managed chemical fallow system over a mechanical fallow system are:

1. Improved weed control.
2. Increased moisture storage.
3. Fewer tillage operations, saving time, fuel and money.
4. Reduced soil erosion through an increased amount of plant residue left on the soil surface.
5. Improved crop yield through better weed control, more moisture storage and better soil conservation.

Some precautions to consider with a chemical fallow system are:

1. Adoption of any new technology requires added knowledge and information.
2. Use of short residual herbicides in a chemical fallow may place restrictions on timing of certain operations such as planting.
3. Once a herbicide is applied, changing choice of crop may not be possible.
4. Available chemical fallow herbicides do not provide good control of perennial weeds. Such weeds must be controlled separately with other herbicides or tillage.

**Table 1. Herbicides labeled for fallow weed control in Idaho. Always read the label before using any pesticide.**

Product	Rate per acre	Remarks
<b>Weed problem: Annual grass weeds and some broadleaves</b>		
atrazine + cyanazine (atrazine + Bladex)	0.2 to 0.32 lb + 2.0 to 2.4 lb (0.25 to 0.4 lb 80W or 0.2 to 0.33 qt 4L + 2.5 to 3.0 lb 80W)	Use lower rates on sand to sandy loam soils having an average annual precipitation of less than 10 inches. Use intermediate rates on finer textured soils with 10 to 15 inches annual precipitation and higher rates when the average annual precipitation is greater than 15 inches. Do not spray after Nov. 15 of the year preceding the planting of winter wheat. Only corn or sorghum can be planted the spring after application. Do not apply to calcareous or caliche soil outcroppings. On fallow land having an existing and established weed population, 0.25 to 0.5 lb (1 to 2 pt) of paraquat (Ortho Paraquat CL) may be tank mixed with atrazine + cyanazine. Use the higher rate when weed growth is particularly heavy or dry weather conditions prevail. Add X-77 nonionic surfactant at the rate of 1 qt per 100 gal of diluted spray when using paraquat. The tank mixture can be applied by ground or by air.
dalapon + cyanazine (Dowpon M + Bladex)	Up to 5.9 lb + 1.6 to 2.4 lb (up to 8 lb + 2 to 3 lb 80W)	Apply to stubble after fall rain but before April 1. Follow only with winter wheat. Refer to cyanazine label for rate and use precautions.
glyphosate [3 lb(ae)/gal] (Roundup)	0.375 lb + 0.5% v/v nonionic surfactant (1 pt + 0.4 pt/10 gal diluted spray)	Apply to actively growing weeds that are less than 6 inches tall.
glyphosate + 2,4-D amine (Roundup + 2,4-D amine)	0.375 lb + 0.5% v/v nonionic surfactant + 0.5 lb (1 pt + 0.4 pt/ 10 gal diluted spray + 1 pt 4 lb/gal)	Will control some additional broadleaf weeds such as kochia, lambsquarter, prickly lettuce, Russian thistle and redroot pigweed.
glyphosate + dicamba (Roundup + Banvel)	0.19 to 0.375 lb + 0.5% v/v nonionic surfactant + 0.25 to 0.5 lb (0.5 to 1.0 pt + 0.4 pt/ 10 gal diluted spray + 0.5 to 1 pt)	Will control some additional broadleaf weeds (see weeds listed under glyphosate + 2,4-D amine remarks) and provide short-term residual control of selected broadleaf weeds (see Banvel label). Use low rates only when weeds are small, less than 4 inches and actively growing. If weeds are drought stressed or 4 to 6 inches tall, use the high rate of glyphosate plus the recommended rate of dicamba. Crop injury may occur if the interval between application and planting is less than 45 days/pt of dicamba used/acre excluding days when the ground is frozen.
metribuzin (Lexone)	0.33 to 0.67 lb (0.67 to 1.33 pt 4L, 0.45 to 0.90 lb DF or 0.67 to 1.33 lb 50W)	Use lower rates on coarse soils and higher rates on fine textured soils. Best results are obtained if the application is made before weed emergence or during early stages of weed growth (less than 2 inches tall or across). Do not replant winter wheat within 8 months of treatment. A contact herbicide (used according to its label) may be useful to control volunteer wheat and weeds that are more than 2 inches tall. Treat only where straw and chaff have been evenly spread over the field. Rainfall is necessary for activation of the herbicide (0.5 to 1 inch).
metribuzin (Sencor: after harvest application)	0.5 to 0.63 lb (1 to 1.25 pt Sencor 4, 1 to 1.25 lb 50W or 0.67 to 0.83 lb 75% Sprayule)	Use higher rate for longer weed control or for weeds designated on the label as requiring the higher rate for control. Rainfall is necessary for herbicide activation (0.5 inches or more). Where weed growth is present at application time, Sencor may be mixed with paraquat or other contact herbicides. Refer to the other registered product's label for additional directions, rates and weeds controlled. Do not plant crops in treated areas earlier than 10 months after fall applications.
metribuzin (Sencor: spring applications)	0.38 to 0.5 lb (0.75 to 1 pt Sencor 4, 0.75 to 1 lb 50W or 0.5 to 0.67 75% Sprayule)	Apply to wheat stubble in spring. Use higher rate for longer weed control or weeds designated on the label as requiring higher rates for control. Rainfall is necessary for herbicide activation (0.5 inches or more). Refer to after harvest application for information on tank mixtures. Wheat can be planted 120 days after the spring application.
propham with PCMC (ChemHoe 135)	3 to 4 lb (4 to 5.33 qt)	Do not plant crops in treated area within 8 months of application. Do not apply after March 1. Do not till ground before application. Apply after soil temperature has cooled to 50° F or cooler at 1-inch depth. Use lower rates on coarse textured soils when plants have 3 leaves or less. Use higher rate on medium to fine textured soils or larger plants. Will not control broadleaf weeds.
<b>Weed problem: Annual and perennial broadleaves</b>		
SULV 2,4-D, amine	0.95 to 2.85 lb (1 to 3 qt)	For fallow land used in rotation to grow wheat, barley, rye or oats. Do not make application within 30 days of planting. Refer to label for recommended carrier rates.
dicamba (Banvel)	0.25 to 2 lb (½ to 4 pt)	For best results make application when weeds are less than 6 inches tall and actively growing. Wheat may be planted in the fall or spring after applications. Crop injury may occur if the interval between application and planting is less than 45 days per pint of product used per acre, excluding days when ground is frozen.

### **Chemical Recommendations**

The recommendations given here are based on the best information currently available for each chemical listed. If followed carefully, residues should not exceed the tolerance established for any particular chemical. To avoid excessive residues, follow suggestions on dosage levels, number of applications and minimum time interval between application and reentry or harvest.

### **Trade Names**

Trade names are used to simplify the information presented. Use of these names neither implies endorsement of products nor criticism of similar products not mentioned.

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