

# Growing Alfalfa in Western Oregon

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Alfalfa is the most important forage legume in Oregon. When properly harvested, western Oregon alfalfa finds ready markets for local livestock use. It produces large yields of high-quality forage and has a long life when grown under conditions to which it is adapted. Alfalfa grows well on deep, well-drained soils with adequate natural moisture. It responds favorably to irrigation. Its forage is an excellent source of protein, minerals, and vitamins for all classes of livestock and can be utilized as hay, silage, or pasture.

### Plant Description

Alfalfa, *Medicago sativa* and *Medicago media*, is a hardy, deep-rooted perennial. Rhizobia, members of a group of bacteria which grow in nodules on the alfalfa roots, are able to fix atmospheric nitrogen in a form available for plant use. This process may make available 200 pounds or more of nitrogen per acre each year for plant growth. The large single taproot may reach a depth of 25 feet in well-drained soil. Alfalfa is thus able to withstand periods of drought by utilization of subsoil moisture. Numerous erect stems arise from buds on the woody crown when older growth is removed by harvesting or as it matures.

### Varieties

A large number of alfalfa varieties are available in commercial seed channels. Most alfalfa varieties grown in Oregon belong to two groups:

1. *Variegated*. These alfalfa are generally quite tolerant and produce long-lived stands. Grimm, Ranger, Ladak, Vernal, Atlantic, and Narragansett have been the most popular varieties of this group in Oregon. This group represents the majority of the Oregon alfalfa acreage outside the Willamette Valley.
2. *Flemish*. Most of the recent Oregon plantings have been of the Flemish type. Varieties of this group have been developed from Western European stock. They are noted for early spring growth and quick recovery after cutting which well suit them to the seasonal rainfall patterns. They are sufficiently winter hardy for western Oregon conditions. Alfa Apex, Cardinal DuPuits, Flandria, Pat 30, Resistant, and Thor are varieties typical of this group which is suited for Willamette Valley conditions. New varieties are becoming available each year.

Bacterial wilt has been identified in western Oregon. Resistant varieties should be used where this disease is present.

### Certification of Varietal Purity

Once a specific variety with the desired characteristics has been chosen, the best assurance of varietal purity is to buy certified seed. The certified tag is issued only to seed that has passed rigid field standards designed to protect genetic purity and also has met minimum standards of seed purity and germination after processing.

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### Seedling Establishment

Alfalfa requires a deep, permeable soil with an adequate moisture supply during the growing season for maximum yields. It is *very* sensitive to poor drainage and compacted soil conditions which restrict root growth. Thus, alfalfa is most productive on loam or loamy soils that are both well drained and have good moisture-holding capacity. Alfalfa does not tolerate acid soils, especially in the seedling stage. Lime applications well in advance of seeding are required on soils having a pH below 6.0.

### Seedbed Preparation

A good seedbed for alfalfa is finely pulverized, leveled, and firmed to the seedling depth with soil moisture near the surface to initiate germination.

Leveling the field to eliminate dead furrows and low spots will result in a more uniform stand and ease equipment travel for the life of the stand.

Methods used to obtain the desired seedbed will vary with soil type and preceding crop. Fall plowing to prepare for spring planting is used where erosion is not a problem. This reduces winter weed growth and permits ample time for spring seedbed preparation. Lime can be spread in the fall and incorporated. This allows time for soil reaction to take place and avoids delays in the spring.

### Fertilization

A productive alfalfa crop is a heavy user of plant nutrients. A complete fertilizer program is essential to a long-lived stand. A soil test is the first step in planning a fertility program. Applications of fertilizer and lime should be based on the results of a soil test.

Phosphorus can be applied most effectively by banding 1/2 to 1 inch to the side or below the seed when seeding or by shallow incorporation just prior to seeding.

Potassium, sulfur, and boron should be worked into the seedbed just prior to the seeding operation. Potassium and boron should *not* be banded near the seed.

Lime should be applied and thoroughly mixed with the surface 6 inches of soil. Fall applications provide time for soil reaction to take place and avoid the spring rush which will often delay planting.

### Time of Seeding

The proper time of seeding alfalfa is determined by seasonal temperature and moisture conditions. Most Willamette Valley seedings are made during May or early June (April in southwestern Oregon) in time to allow good root systems to form before high temperature and low moisture conditions slow growth rates.

Late summer and fall seedings must be made early and have sufficient soil moisture to allow for enough growth to minimize loss of stand from winter injury. Fall seedings without irrigation to assure establishment by September 15 risk being winter-killed.

### Inoculation

The presence of effective nodules on the roots of the plants is *essential* to a vigorous, productive stand. These nodules are formed by bacteria known as *Rhizobium meliloti* that are able to fix nitrogen from the air for use by the alfalfa plants. These bacteria may be present in fields

that have grown alfalfa recently, but all strains of bacteria are not equally effective. All alfalfa seed should be inoculated with a fresh commercial inoculum *immediately prior* to seeding, regardless of cropping history of the land or any previous inoculation of the seed. Inoculated seed should be kept cool and moist until being seeded.

### Rate of Seeding

Twelve pounds of seed per acre is sufficient for a good stand of alfalfa. Higher seeding rates are sometimes used to compensate for poor soil preparation or seeding methods. A seeding rate of 12 pounds per acre planted in 6-inch rows will provide 30 seeds per linear foot of drill row or 60 seeds per square foot if broadcast seeded. This is more than adequate to establish a good stand.

### Depth of Seeding

Alfalfa seed must be placed in contact with moist soil. Seedlings are unable to emerge from the soil if planted too deep. For best seedling survival, seeds should be drilled approximately 1/4 inch deep. Seedlings will not emerge from depth greater than 1/2 inch.

Grain drills equipped with legume-seeding attachments and band fertilizer placement can be set for proper seed placement and provide for banding fertilizer near the seed. Seeding should be followed by cultipacking to firm the soil and place the seed in intimate soil contact. Severe surface compaction that might cause soil crusting after rains or an irrigation should be avoided.

### Use of a Companion Crop

Alfalfa seedlings are poor competitors and require favorable conditions for survival and establishment. A companion crop should not be used except in areas where wind erosion is a problem. The nurse crop will tend to shade out the alfalfa and compete with it for moisture.

### Alfalfa-Grass Mixtures

Alfalfa for hay production is usually seeded alone. The decision to seed grass with alfalfa for forage use must be made on an individual basis. There are several advantages in seeding an adapted grass with alfalfa.

- An alfalfa-grass mixture may produce higher quality silage than alfalfa alone.
- A vigorous alfalfa-grass mixture may discourage encroachment of weedy grasses as they mature.
- Alfalfa-grass mixtures may be less likely to cause bloat in livestock grazing the stand.

Disadvantages of planting grass with alfalfa include:

- Grass seedlings compete severely with alfalfa seedlings for moisture, nutrients, and light.
- The presence of grass in the hay may lower its marketability.

Alfalfa-grass mixtures in western Oregon will tend to yield more on the first and second cuttings than alfalfa grown alone, while producing less later in the season. This seasonal shift in production may be advantageous when the early cuts can be harvested as silage.

### Weed Control During Establishment

Selective herbicides can be used on alfalfa seedlings in pre-emergence or post-emergence applications for control of annual weeds. EPTC or benefin can be incorporated during seedbed preparation to control perennial grasses or in fields where grassy weeds are likely to be problems. It should not be used when an alfalfa-grass mixture is to be seeded.

Annual broadleaf weeds can be controlled selectively with 2,4-DB or dinitro amine applied after alfalfa has two or more true leaves and before the weeds have three true leaves. To obtain the current recommendations and forage tolerances of herbicides, consult your county extension agent or the most recent edition of the *Oregon Weed Control Handbook*.

Annual weed competition is often controlled during the seedling year by clipping.

### Management of an Established Stand

#### Fertilization

The fertility requirements of a productive alfalfa stand are quite high because large quantities of nutrients are removed with the crop. The fertility status of the soils must be considered in planning a fertilizer program; thus, all applications should be based on a soil test. Where soil tests indicate moderate or low soil fertility levels, annual fertilizer applications are the key to a productive stand with a long life.

Experiments have shown that alfalfa will economically respond to applications of phosphorus, potassium, sulfur, boron, and lime. The need for these elements will vary with the soil and cropping history. The need for nutrients other than sulfur can be determined with a soil test.

Timing of application, rates, and specific information for western Oregon conditions is given in OSU Fertilizer Guide #18.

#### Weed Control

Certain weedy annual grasses and broadleaves can be selectively controlled with diuron (Karmex), simazine (Princep), propham (IPC), or chlorpropham (CIPC) without serious crop injury if applied when the alfalfa is dormant. Annual broadleaf weeds can be controlled with 2,4-DB or dinitro amine by application before the weeds have more than three true leaves. Since local conditions influence the safety and time of application of these herbicides, consult local authorities or the *Oregon Weed Control Handbook*.

Cultivation with a springtooth or harrow has been used in the past to control annual weeds in alfalfa. This practice, however, injures alfalfa crowns, opening them to attack by disease organisms, and weakens the stand. It is *not* recommended.

#### Maintaining Plant Vigor

The timing of the removal of top growth of alfalfa by mowing or grazing may have a profound influence on the productivity and length of life of an alfalfa stand. The large taproot of the alfalfa plant is a storage organ for food reserves needed to renew top growth in the spring and

after each cutting. The maintenance of food reserves is necessary to keep the stand vigorous and productive. Food reserves in alfalfa roots have been shown to increase as the interval between cuttings is increased to 35 days, after which it declines. Cutting more frequently than 28 days or continuous grazing will lower the root reserve and weaken the stand.

## Making Alfalfa Hay

Most of the alfalfa grown in western Oregon is harvested as hay. The procedures used vary with the locality and the season; however, several general principles apply.

### Timing of Cutting

Cutting at the proper stage of growth can have a greater influence on hay quality, total production, and life of the stand than any other management decision. The highest quality hay is that cut in the early bud stage when the plants have a high proportion of leaves that are rich in protein. As the plants mature, the stems become coarser and constitute a larger proportion of the total plant. As the plant matures, protein percentage decreases and fiber content increases. However, alfalfa cut at the pre-bud stage produces less forage per acre and continued early cutting seriously weakens the stand.

The bloom is often delayed by cool weather in the spring in western Oregon and is not the best indication of cutting time. The appearance of new bud growth at the crown, near the soil surface, or the yellowing of lower leaves, is the indication of time to make the first cutting. This stage of growth is most often reached in early May. Later cuttings may be made at the late bud or early bloom stage of growth.

### Curing

New mown hay contains 70 to 80 percent moisture, depending upon atmospheric conditions. Well-cured hay contains 15 to 20 percent moisture. The objective of the curing step is to provide conditions for the removal of this moisture as rapidly as possible while preserving the green color and preventing leaf shatter. Overdrying, with associated leaf loss during handling is one of the more common causes of loss in hay quality. Raking should be done before the leaves dry or during periods of high humidity such as the night or early morning to reduce leaf loss.

Mechanical devices which crush or tramp the alfalfa stem may be helpful in speeding the curing process, thus reducing the time that the hay is exposed to the risk of rain. This is particularly important for the first cutting under western Oregon conditions.

### Pasturing Alfalfa

Early season grazing often provides a method of utilizing early alfalfa growth that could not be successively made into hay because of frequent rains. The soil must be

dry enough to avoid damage to the stand from trampling.

Continuous close grazing will damage the stand and result in thinning or winter kill. If alfalfa is to be used primarily for pasture, a system of rotational grazing must be provided which allows for a regrowth period of 30 to 35 days to allow for re-establishment of root reserves. If continuous grazing is allowed, the grazing intensity must be adjusted to allow a plant height of three to six inches and the plants must never be completely defoliated. In the fall, the growth must be allowed to reach 8 to 12 inches and remain until the tops are frozen back.

Grazing may be a profitable way of utilizing regrowth following the last alfalfa cutting of the season. Regrowth must be allowed to build root reserves to reduce winter injury; however, this top growth may be removed after the first killing frost without affecting root reserves.

### Bloat

When alfalfa is grazed, caution must always be exercised to prevent livestock losses to bloat. Hungry cattle should never be turned on new alfalfa growth. Feeding grass hay or straw before turning livestock on alfalfa may be of value in reducing excessive intake. Allowing stock to graze only a short time each day until they become accustomed to alfalfa pasture is also recommended. Bloat preventative materials are available which can be fed as a feed additive or in salt blocks.

### Alfalfa for Silage

Alfalfa prepared as silage makes excellent feed and avoids many of the harvest problems associated with field curing of hay. Best results are obtained when the alfalfa is cut at the same growth stage as for hay and wilted to 60 to 68 percent moisture before placing in the silo. Thirty to 80 pounds of molasses or 75 to 250 pounds of ground grain to each ton of green alfalfa will provide sufficient carbohydrate to assure proper fermentation to preserve the silage. More information is available in PNW Bulletin No. 14, "Making and Feeding Grass and Legume Silage," available at your county agricultural extension office.

### Rodent Control

Gopher, mole, and field mice populations build up in perennial stands of alfalfa because of ample feed supplies and protection of nesting sites. Left uncontrolled, these rodents will lower alfalfa productivity and shorten the life of the stand.

Prevention of population invasions during the seedling year is most desirable. Relative effectiveness of trapping, baiting, and poisoning varies with location and skill of the operator. Detailed recommendations for control of these rodents are given in Extension Bulletin 804, "Mole and Gopher Control."

Encouragement of the natural predators—owls, hawks, fox, and skunks—will also be helpful.



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