

Cultural Practices in Alfalfa Seed Production

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Methods of growing alfalfa for seed differ basically from those used for hay production because we are concerned with a different phase of plant growth. Maximum vegetation is desired for hay, but in growing seed the reproductive phase is most important. Practices that insure maintenance of this stage without too much growth are essential.

In the study of practices used by successful growers, it has been noted that no standard procedure is followed by all. By necessity, practices followed by growers must be tailored to their own situations. The practices employed by one grower with certain conditions would be wrong for another with different problems.

The practices reported here are of a general nature and do not fit all needs. They are based on studies of practices of successful growers as well as on research in Idaho and other western states.

Seed Bed Preparation and Planting

Land preparation for establishment of alfalfa for seed does not differ from that for hay production. A firm, fine seed bed with ample moisture is most desirable. Fields to be irrigated should be leveled with enough slope to provide distribution of water.

Stands should be established either in the early spring or early fall since seedling mortality is greater when temperatures are high during the seedling stage. Late fall planting may be

hazardous because of winter injury to small seedlings. Excellent seed yields can be obtained the first year if stands are planted early in the spring.

If the alfalfa is to follow winter wheat, it should be seeded in the spring rather than the fall. Spring tillage prior to seeding the alfalfa will kill volunteer grain that otherwise would be difficult to control in fall seeded alfalfa.

Use of companion crops is not encouraged. If they are used, planting rates should be lower than when seeded without alfalfa. Alfalfa planted with a companion crop should be managed to insure successful establishment of the alfalfa, especially during the seedling stage. Recommended weed control practices should be followed to insure clean seed fields. Volunteer grain can pose a problem when alfalfa follows grain in the rotation or when grain is used as a companion crop. Removal or scattering of crop residue will result in a better stand of alfalfa.

Seeding Rates

Seeding rates depend on field conditions and purposes of the grower. In row planting, rates ranging from less than 1 lb. up to 3 lb. per acre have been satisfactory. The lower rates are most desirable if a precision planter is used. The higher rates are used if seed bed preparation is poor or if the planter does not give an even distribution of seed at the lower rates.

For broadcast planting, rates of 3 to 12 lb. per acre have been used for seed purposes although the higher rates are less desirable. High seeding rates provide fair weed control without use of herbicides. Higher rates are also used when seed establishment is difficult or when the crop might be used for hay. Rates of 3 to 6 lbs. are usually ample as they provide an average of 15 to 30 seeds per square foot.

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Solid Stands vs. Rows

Whether to use solid stands or row plantings must be decided by the individual grower. However, under most conditions, row culture offers many advantages over solid stands.

Row culture results in a more open stand at least in the first part of the growing season. This provides for:

1. Greater penetration of light resulting in healthier plants and earlier flowering due to higher air and soil temperatures.

2. Better seed set because of greater attractiveness to pollinating insects and because of better retention of flowers and pods on the lower part of stems.

3. Better penetration of agricultural chemicals resulting in better weed and insect control and in better effectiveness of desiccants and defoliant at harvest time.

4. Less favorable environment for foliar diseases because of lower humidity in the plant canopy.

Row plantings present an opportunity for better control of water. Because of less interference from vegetative growth, water movement through the field is possible with less flooding and penetration than in solid stands. This may often prove important, especially where some moisture is needed by the plant but overwatering must be avoided so that new growth is not stimulated.

Growers and seedsmen reported a higher percentage of scalded or brown seed in solid plantings than in row plantings. Whether this is because of increased severity of disease, interruption of physiological development of seed or other causes is not known.

Establishment of alfalfa in rows also has disadvantages. Costs of operations are higher because of the need of cultivation and herbicide application. Difficulty at harvest may be encountered in picking up the alfalfa especially if corrugations are deep. Commercially available pickup guards will help reduce this problem.

The most desirable row spacing has not been determined. In practice, distance between rows is governed by the row spacings used by other crops cultivated by the grower so that the same equipment can be used for all enterprises. Data from Idaho studies indicate that rows up to 36" are superior to solid plantings with little difference between 24 and 36 inches spacings. Row spacing less than 22" showed little advantage over solid plantings. Yields from row spacings over 36 inches have not been determined. However, data from other states show that yields decreased as row spacings increased beyond 48 inches.

The use of solid stands for seed production is successful where plant growth is restricted by soil conditions, other natural factors, or by man-

agement. If excessive vegetative growth is controllable, good seed yields can be obtained from solid plantings. Solid stands have an advantage on slopes subject to erosion.

Thinning of Stands

A common practice is to thin both solid and row plantings each year that the stand is kept for seed. Elimination of rows and plants within rows has usually stimulated seed yields. The advantages of opening stands by thinning are the same as those given for row plantings. Data indicate that thinning practices should not be extreme in any one year as the remaining plants may not be able to fully use the new space available, thus decreasing the seed potential for that particular growing season.

Which Crop for Seed?

The decision of whether to delay the seed crop or not often faces the grower. In most cases, delaying growth by clipping, grazing, cultivating, or other means is advantageous as long as the seed crop is not delayed too long. Delaying the initial growth is beneficial for several reasons:

1. The blooming period can be altered to coincide with the period of greatest pollinator activity and the most desirable portion of the growing season.

2. Damage from red spider, chalcid and other insects is reduced.

3. Amount of vegetative growth in seed crop can be reduced.

4. Control of some weed problems is easier.

5. A small hay crop may be salvaged if delay is long enough.

6. Some foliar diseases can be reduced.

The practice of delaying the growth of the first crop is not always beneficial. In areas with short growing seasons, the whole growing season must be used to allow normal development of the alfalfa. Danger of damage to immature seed by early frost is lessened by this means. Seed yield losses up to 70% due to early frost were experienced by some growers in recent years.

Comparisons of different dates of clipping with non-clipped alfalfa made in Idaho indicate that substantially higher yields may be obtained under some conditions from non-clipped alfalfa. In some years a heavy early seed set was obtained prior to emergence of alkali and leaf-cutter bees. Since the areas were relatively free of competing bloom, concentration of available pollinators in the alfalfa resulted in good seed set early in June.

In these studies seed yields usually decreased as clipping date was delayed with lowest yields from alfalfa clipped between June 2 and 17.

These observations indicate that clipping after the first of June may reduce yields, especially when there are early frosts.

Using the first crop for seed has several disadvantages, especially when alfalfa is grown on deep, fertile soils with ample moisture. Under these conditions growth of alfalfa is rank and characterized by excessive vegetative growth, delayed and prolonged flowering period, and lodging. This type of growth is undesirable because:

1. It provides a poor environment for seed and pod development under dense, lodged vegetation.

2. It is unattractive to pollinators.

3. The prolonged period of blooming requires an extended period of protection from lygus and other harmful insects and also makes control more difficult.

4. It is more conducive to development of stem and leaf diseases.

5. More difficulty is encountered in harvesting because of the unevenness in seed maturity and also due to the larger amount of vegetation that must pass through the thresher.

These disadvantages apply also delayed growth where stand density and plant growth is not controlled.

Some growers with large acreages of alfalfa for seed have found it beneficial to manage so that all their alfalfa will not come into bloom at the same time. This can be accomplished by planting parts of their acreage to varieties which differ in maturity or by delaying or clipping portions at different times. By this means they can concentrate their pollinators on a specific area, set the seed, and then move them to another area when it is ready. The big advantage is that the period of maximum set is known and date of harvest can be judged accordingly. Leafcutter bees are especially suited to this type of management.

Time of Harvest

As a general rule, alfalfa seed should be harvested when about two-thirds of the seed pods are brown. However, this stage is often difficult to distinguish when the flowering period extends over a long period. Harvesting too early can result in seed losses due to immaturity of seed. Likewise, delayed harvesting can result in seed losses due to shattering and sprouting of seed. Inclement weather at harvest time reduced not only the amount of seed but also the quality.

Soil Fertility

In general, soil fertility levels of the major elements need not be high. As long as plants appear healthy, addition of fertilizer is not required. In some areas, minor elements may be deficient. Correction of these deficiencies would be beneficial to seed production.

No response in seed production has been credited to application of phosphorus or potassium in most cases unless deficiencies were severe. A soil test may be used to determine the levels of phosphorus and potassium in the soil. The practice of applying small amounts of nitrogen to soil at time of seedling establishment may prove beneficial if preceding crops had removed all the available nitrogen.

Irrigation

The amount of water required to produce a good crop of seed depends on the soil. Only enough moisture is needed to maintain a slow, even growth. The crop should not be allowed to burn at any time. Excessive irrigation and irrigation at the wrong stage of growth result in rank vegetative growth and may result in new growth. Irrigation should be withheld, if possible, from the bud stage until full bloom. Water should be applied as needed with lighter applications preferred. Ideally, fields should be kept so that water can be moved quickly through the field without completely soaking the soil profile.

Choice of Varieties

The variety grown for seed depends on market demands and the needs of the seedsman. Considerable differences exist between varieties in plant habit, disease and insect resistance, seed potential and response to management. Generally, the Flemish types of alfalfa are good seed producers whereas some of the pasture types and varieties with Turkestan parentage are lower seed producers. However, good seed yields can be obtained from the latter types with good management.

Weed and Insect Control

Latest recommendations for control of weeds and insects should be followed. Failure to control weeds and insects severely affects both seed quality and quantity. See Current Information Series entitled, "Weed Control in Alfalfa Seed Crops" and "Insect Control for Alfalfa Seed Production."

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