ALFALFA SEED
A Good Montana Crop

A Good Cash Crop Plus a Valuable Feed
Quality Is Essential

The acreage of alfalfa for seed and hay may be increased on the non-irrigated lands in adapted areas in Montana, if high quality seed is produced.

Alfalfa for seed or feed is adapted to most soils but does best in the coulees or valleys where the moisture supply due to runoff is greater or where some flood irrigation can be practiced.

Plant Montana registered Extra No. 1 or No. 1 seed.

Varieties recommended are Grimm, Cossack, and Ladak.

Thin seeding of one-half to one pound per acre is advisable. No nurse crop should be used.

Summer fallow is the best soil preparation for alfalfa seeding.

After alfalfa stands are established severe spring cultivation with field cultivator or springtooth harrow until May 20 is advisable.

Harvest seed crops with reaper or binder when one-half seed pods are brown.

Thresh with clover huller or grain separator with special alfalfa screens.

Have seed recleaned in authorized cleaning plant as soon as threshed.

Use every effort to save all seed and to produce clean, bright seed to permit best possible grading.

Save all alfalfa straw and hay. Build up feed reserves.
Alfalfa is grown extensively in Montana both for feed and for seed. On irrigated land where alfalfa is grown largely for feed the acreage may well be increased providing there is a corresponding increase in livestock. On adapted dry land where it is grown both for feed and seed, the acreage also may be increased because of the need for building up feed reserves and because the market outlook for high quality seed appears quite favorable.

There are set forth in this bulletin recommendations and suggestions for alfalfa production for seed and feed on dry land.

**Hardy Seed in Demand**

About 45 million pounds of alfalfa seed are produced annually in the United States. About one third of this amount is of the hardy kind suitable for planting in northern states where high yields and hardiness are essential. Montana produces seed which
is giving satisfaction in northern and eastern states. Alfalfa acreage in these states is increasing because farmers look with favor upon this excellent hay with its high feeding value, high yields, easy curing and long life. Thus there is increasing demand for hardy, northern alfalfa, particularly the Montana registered seed and there is opportunity for Montana growers to expand the market for high quality seed.

Montana produces annually from three to five million pounds of alfalfa seed. For the past six years the crop has averaged 156 pounds per acre according to federal-state crop estimates. Most of the seed is produced in the eastern and southeastern parts of the state with some production in the northeastern area along the Milk River and south to the Missouri River. There are a few scattered growers in western Montana. This distribution indicates that alfalfa seed production has possibilities in many sections of the state. Eastern and southeastern areas seem particularly adapted to alfalfa seed production.

**Adapted Soils**

Soils best adapted to alfalfa on dry land are those which are deep, of a sandy loam or even a silty loam character located in areas where the rainfall is 12 inches or more annually, where summer temperatures are fairly high and where the growing season is at least one hundred days. Fields to be planted to alfalfa for seed should be free from shallow soils, hardpan layers and from heavy alkali, and should be well drained. The soil must be of a nature as to hold moisture deeply and uniformly, for
alfalfa is a crop which roots deeply, and it must grow slowly and evenly if maximum seed crops are to be secured.

Alfalfa seems to produce better yields of seed in coulees or draws or in valleys surrounded by hills. This probably is due to the fact that more moisture is retained from drifting snows and from runoff in spring and summer; that the soil in the draws or valleys is inclined to be deeper and of higher fertility than that on hill sides or benches; and that there is protection from hot winds in summer. Whatever the reasons for this better seed yield in these favored locations, they do seem to exist and growers should make use of draws, coulees or sheltered valleys for growing alfalfa seed if possible. Many growers are harvesting very profitable seed crops from long narrow strips in coulees which otherwise might be considered unsuited to farming.

While these valleys seem to produce the best yield of seed the level or bench lands in many areas are producing good yields of seed and with proper cultural methods can be used for seed or feed production.

Varieties For Seed

The varieties of alfalfa now being grown in Montana for seed production are Grimm, Cossack, Ladak, and common. At this time the largest amount of alfalfa seed being produced is classed as common. Common alfalfa seed brings a lower price in the markets than seed of hardier varieties such as Grimm, Cossack and Ladak, although Montana common is generally in greater demand than common alfalfa seed from other sections of the United States, since it has been shown to produce superior hay yields under the severe northern climatic conditions. Common alfalfa usually does not produce as high yields of hay as the pure, registered seed of the variegated varieties. Yields of seed from common alfalfa fields in Montana are equal to those from registered seed. Of the pure, registered seed produced in 1930, Grimm made up about 90% of the production in Montana, Cossack less than 10%, and Ladak approximately one per cent.

Grimm Meets the Test

Grimm is a natural hybrid alfalfa having variegated blossoms ranging in color from yellow to purple. It has the deep set branching crown and more or less branching root typical of those hybrid alfalfas crossed with the yellow blossom "Medicago falcata." Grimm alfalfa seed was brought to America from Germany in 1857 by an immigrant named Wendelin Grimm. Seed produced on his farm in Carver county, Minnesota, was planted on other farms in the neighborhood. It was noticed that fields planted with the Grimm seed made profitable yields, while fields planted with other alfalfa seed usually resulted in failure.
In 1905 the United States Department of Agriculture started the testing of Grimm seed and found it to be so superior that it was recommended for general planting in a large part of northern United States. Because of unfavorable soil and climatic conditions alfalfa seed could not be produced in quantities in Minnesota and therefore, some Grimm seed was sent to Montana for increase by the Department of Agriculture. Dr. W. M. Williams of Harlem was supplied with some of this seed and this lot is the foundation seed to which practically all Montana registered Grimm now traces.

In winter hardiness Grimm has proved to be one of the best varieties tested, being exceeded slightly by Ladak. Grimm should be used by more farmers in Montana, both in the production of hay and seed.

**Cossack Not As Well Known**

Cossack is another hybrid alfalfa almost identical in appearance with Grimm. It may possibly have a little greater variegation in blossom color and grow just a little taller. The first Cossack alfalfa seed was imported from Russia in 1907, and then tested by both the South Dakota Agricultural College and the United States Department of Agriculture. At one time extravagant claims were made for Cossack and seed sold at very high prices. Continued tests have shown that Cossack does not yield any more hay nor is it any more winter hardy than Grimm and at the Montana Experiment station at Bozeman it has proved slightly below Grimm in winter hardiness. Cossack is not as well known or in as great demand in the seed consuming sections as is Grimm so a wide increase for seed or hay production cannot be very strongly recommended.

**Ladak Promising**

Ladak is another variegated blossom hybrid alfalfa. Seed of this variety was secured in 1910 by the United States Department of Agriculture from mountainous area of the Province of Ladakh in India.

This variety was tested by workers of the Department and found to possess remarkable winter hardiness together with high yield. By 1927, it had proved so good that seed was put out for increase. Montana was fortunate to get some of this seed and there are a few fields now planted to Ladak in the state. These fields are giving excellent yields of hay. Ladak is proving more winter hardy at the Bozeman Experiment Station than any other variety and it has given the highest yield of hay. It makes a very heavy first cutting of hay but recovers more slowly after cutting than do most varieties, but it makes up for this slowness in recovery by faster growth when it does start. It goes into
the dormant stage in the fall earlier than most other varieties. Ladak appears to be well adapted to regions where only one or two cuttings per year can be secured due to shortage of summer moisture or where the growing season is short. Ladak is proving more resistant to wilt and other diseases, which with its high yield and good quality may cause it to become a popular variety in the corn belt.

At the present time there is a small demand for Ladak seed and as there is only a very limited supply of seed, it is naturally, quite high priced. Whether this demand and price will continue is questionable and too many growers should not plant Ladak for the purpose of seed production until the market for Ladak seed is better established.

Montana Common Used Widely

Common alfalfa is the original alfalfa brought to South America by the Spaniards in the 15th century. It was brought to California from South America in the 50's and has spread from the western coast to practically all parts of the United States. Common alfalfa is a purple blossom variety known to everyone. It is a high yielding variety. It is not as winter hardy as Grimm or Ladak or the other hybrid alfalfas and, in Montana, does not yield as well as the variegated sorts. While Montana common has not proved to be as high yielding nor as winter hardy as pure Grimm or Ladak it does give good yields of hay and is greatly superior to common alfalfa produced in states to the south, in both winter hardiness and yield. If Montana registered seed is not used, Montana common should be planted on Montana farms.

"Affidavit Grimm" a Detriment

The bulk of alfalfa grown in Montana is called common, and while there are a large number of fields which are true common there are many others which are common mixed with the harder varieties such as Grimm, and might properly be called Montana Variegated. Some of this mixed seed as well as common alfalfa seed has found its way into the seed trade and is sold under the name of "Affidavit Grimm," a practice which should be stopped as it is detrimental to all alfalfa seed growers in Montana.

Plant Montana Registered Seed

The production of Montana registered seed has in most cases been more profitable to the growers than production of common alfalfa seed. Registered alfalfa seed does not require a great deal more care or expense in growing than the production of common seed. For this reason alfalfa seed growers are urged to qualify for the production of Montana registered seed.

Growers who intend to grow registered seed should have-
in mind the following points before planting: That Montana registered seed must be seeded on clean land, free from alfalfa, and that only Montana registered extra No. 1 (blue tag) or No. 1 (red tag) grade alfalfa seed may be used in planting registered fields. Keep this in mind for if such seed is not used, fields will not be accepted for registration. Montana’s seed grades are defined on page 21. The Montana registered seed used must be from officially sealed and tagged bags; the seals and tags should be saved as they will be asked for when the grower applies for registration. Inspection usually should be asked for on such registered fields the year after planting for generally the best seed yields are taken the second to fourth year after planting. Application for inspection should be made to the Secretary of the Montana Seed Growers Association at Bozeman.

The registration of Montana alfalfa seed is handled by the Montana Seed Growers Association which works in close cooperation with the Extension Service of the Montana State College. Complete rules and information for the production of Montana registered seed may be had by writing to the Secretary.

Seed Bed Preparation

Next in importance after selection of fields for production of seed and the securing of the best seed to plant, is the preparation of the seed bed. If seed bed preparation is not properly handled, a poor, weedy, unprofitable stand will usually be the result. Since the crop remains on the land for a considerable length of time and since best returns are secured only on good fields, it will pay the grower to be particularly careful in the preparation of the seed bed before planting the alfalfa seed.

A firm soil, full of moisture, free from all weeds and with a light cloddy surface mulch not over an inch or inch and one-half deep are the requirements of a good seed bed. Such a seed bed will be firm enough so that the horses’ feet or implement wheels sink in the soil not over an inch to an inch and a half, depending on soil type.

Summer fallowed land, spring plowed the year before seeding, is recommended for planting of alfalfa seed. This fallow ground must be kept clean of weeds following plowing and until planting time. Land that has been planted to cultivated row crops such as corn, beans or potatoes the year previous also makes a good seed bed for alfalfa providing all weed growth has been kept out and there is sufficient moisture in the soil. In preparing such land for planting in the spring all weeds should be killed but the soil should not be stirred too deeply. The spike tooth harrow or the springtooth harrow, set shallow; or the disk, set fairly straight and not weighted, will give fair results in the
clean summer fallow should precede the seeding of alfalfa. In the seed will be exhausted before the plant can make its own way. If alfalfa is planted too deeply many of the seeds that germinate will die before the tiny plants are able to get to the surface and a poor stand will result.

Every effort to secure a perfect seed bed for alfalfa before planting is a good investment. Weed growth uses the moisture and plant food needed by the alfalfa. The easiest and cheapest time to kill weeds is when they are small and since it is impossible to cultivate the alfalfa soon after planting, fields must be thoroughly cultivated before seeding to kill out weed growth. If a firm seed bed, free from weeds can be secured usually there will be but little difficulty in securing a good stand of alfalfa providing rainfall is normal.
Rate of Seeding

On the uplands or on the benchlands, where moisture is a limiting factor, alfalfa usually produces best where it is seeded in rows three or three and one-half feet apart so the field can be cultivated to control weeds and conserve moisture. Where soils are poor or moisture particularly limited, rows seven feet, or even wider, apart are proving satisfactory. In creek bottoms and coulees and other places where there is more moisture, the alfalfa may be seeded broadcast. In the production of seed alfalfa, plenty of air and sunlight around each plant is required if large seed yields are to be secured. This requires a thin seeding whether in rows or broadcast. The best rate of seeding alfalfa in rows for a seed crop is from one-half to one pound of seed to the acre. The best rate of broadcast seeding for seed is from one to not more than three pounds of seed per acre. The thinner seedings are recommended.

Row seeding is best accomplished by fitting sections of a grass seeder box from a grain drill to a corn planter having

Thin seeding of alfalfa in rows can be easily done with grass seeder attachments mounted to corn planter as shown. Note that seed is dropped behind the openers.
the seeding mechanism driven from the corn planter sprocket wheel, with a large driven sprocket and a small drive sprocket, together with feed adjustments. The alfalfa seed falls thru the feed cups of the grass seeder box through a hose either in the opener or behind the opener of the corn planter. With this type of planter as small an amount of seed as is desired can be seeded evenly. If the seed is permitted to fall in the shoes of the planter these should be equipped with floats or guides to insure seeding at an even depth. If the seed falls back of the opener there should be some covering device such as a wheel or chain to cover this seed. This type of a seeder for row alfalfa has been worked out by G. E. Lewis, County Agent, Terry, Montana. A drawing of the seeder attachment is shown herewith. A grain drill, if in good condition and not badly worn sometimes can be used to advantage in planting row alfalfa by stopping up four or five openings and leaving the fifth or sixth holes open to seed. In using a grain drill for alfalfa seeding the cups should be closed up tight.

Then if too much seed is being planted, leather strips may be put thru the feed cups or the seed may be diluted with inert material (see below) sufficient to provide the desired rate of seeding. For small areas the small garden seed drill may be used. Seeding alfalfa broadcast is best done with a grain drill using the grass seeder attachment and letting the seed fall behind the openers if the seed bed is loose, or through the openers if the
seed bed is firm and if shallow planting can be secured. After broadcasting, the field should be lightly harrowed to cover the seed. This should be followed by a packer if the surface soil is loose.

It is usually quite difficult to seed as small an amount as a half pound or a pound of alfalfa seed without its dilution with some inert material of the same size and weight as the alfalfa seed. For this dilution Montana growers are using fine ground coal, screened to the same size as the alfalfa seed, or millet screened to same size as the alfalfa and baked in hot oven for about two hours to prevent its growth. Ground wheat, carefully screened, may be used. In diluting, five to eight parts of the inert material is mixed with one part of the alfalfa seed. Before seeding the drill should be thoroughly tested to determine where it should be set for planting the right amount of seed per acre. This can be done by jacking up one wheel and turning it 25 turns catching the seed from one spout and weighing it. The seeding rate can be figured and drill adjusted accordingly. The drill should be further adjusted in the field after the first round or two. Heavy seeding of alfalfa for seed production on the non-irrigated lands should be discouraged.
Nurse Crops

The seeding of a nurse crop with alfalfa usually is not recommended. In some sections and in some years when the rainfall is quite heavy and subsoil moisture abundant, nurse crops may be used satisfactorily. If so, flax is one of the best. If flax is used it must contain no wild mustard seed to infest the alfalfa in the following years. The alfalfa seed crop the year after seeding is never as good where a nurse crop has been used as where it has not been used. If no nurse crop is used it may be necessary to clip back weed growth shortly after the middle of the summer in order to prevent the loss of moisture. Weed growth in row alfalfa can be easily controlled by cultivation between the rows the same as any other row crop.

Cultivation

One of the advantages of seeding alfalfa in rows is that fields may easily be cultivated the first year. The cultivation of broadcast alfalfa should not start until the year after planting and then it can be fairly severe, using the springtooth harrow, the field cultivator equipped with narrow points, or the disk. The severity of the second year cultivation is determined by the strength and size of plants. If large and strong, cultivation the year after seeding may be quite severe.
After the second year alfalfa grown for a seed crop should be treated quite severely. Much cultivation should be done before the alfalfa for the seed crop is permitted to start to grow, particularly with broadcast alfalfa. The cultivation should be finished by the middle or the latter part of May. With row alfalfa cultivation should stop by the time the plant comes into bloom. Cultivation has for its object the control of weed growth; the loosening of the soil to permit rapid intake of moisture and air; the conservation of soil moisture; the thinning out of the stand and finally the holding back of the crop so that it will not come into bloom too early. Tools used for cultivation after the field has been well established should be the springtooth harrow or the field cultivator commonly called the “duckfoot cultivator” equipped with narrow points. The disk is sometimes used but is not recommended as it splits the crowns and encourages disease. All cultivation should be deep and quite severe. Such cultivation will cut off or pull off the sprouts that are starting to grow and will hold back growth. This cultivation should continue until the latter part of May in most sections in ordinary years. Where cultivation is finished by the latter part of May the alfalfa will start to grow quite soon and usually will come into bloom about the first of July and so should escape extremely hot dry weather at the time it is in full blossom.

Alfalfa may be held back by close pasturing with sheep until May 20, thus utilizing feed that might otherwise go to waste. If sheep are used to pasture the alfalfa a thorough cultivation should be given after taking the sheep off and before the crop is permitted to grow. Pasturing is not as uniformly successful as cultivation and is not recommended if there is little soil moisture.

Inspection

After the cultivation of alfalfa has been completed and the crop allowed to grow there is but little that can be done until harvest except to rogue out sweet clover and other weeds with seeds that cannot be removed by cleaning machinery and which lower the grade and price of alfalfa seed. The grower who has planted Montana registered alfalfa seed and who wishes to complete registry on this alfalfa seed must make application for inspection to the Montana Seed Growers Association by the first of June of the years when he plans to take a seed crop. Applications for inspection of any new plantings should be made as soon as the plantings are established and a seed crop is to be taken from them.

As soon as the alfalfa comes into full bloom, inspectors from the Montana Seed Growers Association, working in cooperation with the Montana State College Extension Service, will visit the
fields and make inspection to see that the crop is pure and free from mixture and serious weed growth. Final registration of seed from fields which show sweet clover and other weeds will depend upon seed tests and grading after recleaning.

Inspectors of the Montana Seed Growers Association inspect registered seed fields to determine parity and cleanliness of fields.

Weeds In Alfalfa

The cultivation of fields for the removal of weeds is very important for three reasons. First, weeds take moisture, food and sunlight that may be needed to produce more alfalfa. Second, weeds interfere with harvest and increase the expense of harvest and third, some noxious seeds, particularly those of fanweed, wild mustard and large seeded dodder, being practically the same size as alfalfa seed, are almost impossible to remove and their presence lowers the seed value greatly.

Other weed seeds usually not considered as serious as those mentioned but which are difficult to remove from alfalfa seed are those of sweet clover, green foxtail, Hare's Ear mustard, Russian thistle, and the pigweeds. The presence of these weed seeds
also causes a lower grade and price, and every effort should be made to prevent their growth in alfalfa fields. The seed grower should acquaint himself with the weeds found in his alfalfa and use every effort to free the fields of this source of loss. Complete weed descriptions and control measures are available in Montana Extension Bulletin 45, "Fifty Important Weeds in Montana."

The general control measures recommended for all of those weeds are:

1. Plant Clean, weed-free seed. Montana Registered Extra No. 1, or No. 1, seed meets these requirements.

2. Plant on clean summer fallow land.

3. Thorough spring cultivation each spring after stands are established should be given.

4. Hand pull escaped plants of sweet clover, wild or hares ear mustards, or fanweed. Cut dodder areas, cover with straw and burn the plants on the area where cut.

Clean Up Fields Before Harvest

Growers can well afford to clean up fields before harvest. While such cleaning usually must be done by hand and may seem slow work the returns generally are very high. Montana registered seed that has over a trace of noxious weed seed in it is graded as
“sample” or is not sealed at all. This seed brings a relatively low price. Most of the noxious weeds found in Montana cannot be entirely removed from alfalfa seed even with the best seed cleaning machinery and methods. Weed seeds that may be cleaned out usually cause considerable shrinkage. Therefore, it is better for growers to spend considerable time in the removing of sweet clover, wild mustard, fanweed and dodder from fields before harvest. Some growers have figured that they can make over $20 a day by this kind of work. Removal of weeds before they seed makes for fewer cultivations the following years and insures cleaner crops from year to year.

Irrigation of Alfalfa for Seed Crops

The bulk of alfalfa grown for seed in Montana is grown without irrigation. There are however, a few growers producing alfalfa seed under irrigation. Cultural methods for alfalfa seed production under irrigation are practically the same as those for producing alfalfa seed on non-irrigated land, except that the crop is usually seeded a little heavier.

Alfalfa to produce maximum crops of seed must grow slowly and uniformly. If extra moisture is needed by the crop a light irrigation should be given. It is desirable to apply irrigation water before the crop comes into bud or after it is in full bloom. For a light irrigation, use of a large head of water with a short run, and crowd over the land quickly. While it usually is better not to apply water while the crop is coming into bloom, the crop should never be permitted to burn. Burning can be detected by the yellowing of the plants or the drying of the lower leaves. When this condition occurs a light, quick irrigation should be given. Alfalfa for seed under irrigation should be planted only on fields which have been well leveled and that can be irrigated evenly, otherwise there will be spots in the field where too much water will be applied during irrigation and where there will be
a large vegetative growth which will interfere in the uniform set and maturity of seed.

Harvesting Alfalfa Seed

Alfalfa seed is a valuable crop. At harvest every effort should be made to save all the seed possible. This requires careful study as to the proper time of cutting and the proper machinery to use in harvesting and threshing. There is no method that will prevent the waste of some seed, but the best method will keep these losses at a minimum.

The time to cut alfalfa for seed depends on the method of harvesting and threshing and upon soil moisture conditions. If the seed crop is to be harvested with a reaper or header, it should be cut when one-half to two-thirds of the seed pods are brown and ripe. If the soil is dry it will be well to cut earlier. When cut at this stage there is the least loss from shattering of seed and most of the green seed will mature normally after cutting and be plump and of good color. Early cutting also insures a better feeding value of the alfalfa straw.

If the crop is to be combined the aim should be to harvest when all the seed pods are fully ripe. Permitting alfalfa to stand

The self-reaper is one of the best harvesting implements. Cut for seed when one-half seed pods are ripe.
as long as is necessary for combining, increases the risk of loss of seed pods from shattering and from seed discoloration due to frost or weather conditions, and reduces the amount of seed that can be saved because of weeds or second growth in the alfalfa. Combining is not a favored harvesting method.

Many harvesting methods now being used are quite wasteful of seed and should be changed. Best results are being obtained from the use of the self-reaper or the header with low delivery and continuous canvas collecting the crop in tight header barges and then stacking in long, narrow stacks. The mower equipped with a windrowing device is used by many growers although it is more wasteful than the reaper or header. All harvesting machines should be equipped with pea guards or lifters to lift the hay from the ground thus saving all seed with as little dirt as possible. After cutting, the alfalfa should be left in the small flat shocks until it dries enough to stack.

Stacks should be long and narrow and not too high. Many growers put about four loads to a stack, making them four to six feet wide. Hay should not be tramped. Such stacks will stand a fair amount of rain, and the stacks should be permitted to dry out before threshing.

**Threshing**

As soon as possible after the alfalfa has cured it should be threshed using a good alfalfa or clover huller or grain separator equipped with alfalfa seed screens and equipment. The combine is used as a thresher by some growers with excellent results. Clover or alfalfa hullers are built especially for this work and, if in good condition and properly run, will do an excellent job of threshing, saving practically all of the alfalfa seed in good condition. Where the alfalfa huller is not available, the modern grain thresher may be used with almost complete satisfaction providing it is in good condition, equipped with special screens and cylinder teeth and providing the operator understands the threshing of alfalfa seed. Where the grain thresher is used all the concaves should be used and set up close. The speed of the cylinder should be reduced about one-third. The air should be regulated so that unthreshed seed pods are not carried past the tailings auger. Alfalfa screens should be used to permit all seed to be carried over and to the recleaner where the unthreshed seed pods will be carried back to the cylinder for rethreshing. If the alfalfa has to be threshed while slightly damp, it may prove profitable to rethresh the straw. A one-half hour's run will prove this.

If the combine is used for threshing alfalfa seed it should be handled about the same as the thresher, permitting seed to be caught from the recleaner.
If the crop threshed is Montana registered alfalfa seed the grower must secure a statement signed by the thresherman stating the number of bushels of seed threshed from the registered seed fields. This statement is to be sent to the Montana Seed Growers Association.

**Cleaning After Threshing**

On threshing, alfalfa should be sacked in good, new, seamless cotton bags. Alfalfa seed is worth a lot of money and the loss from one leaky bag will probably be worth more than it would cost to buy new bags for the entire crop.

Seed should be cleaned immediately after threshing, particularly if there are green weed seeds in the alfalfa or if the alfalfa is at all damp. Such cleaning should be done on the farm over a small mill as the seed comes from the thresher. The purpose of this is to remove the green or wet material rather than to do a finished job of cleaning. If such green wet material is not removed immediately the alfalfa will heat, discolor and be greatly reduced in value.

All seed may just as well be cleaned immediately after threshing since recleaning seed can be bargained for on a more satisfactory basis than seed in the dirt. It is well also for the grower to be in a position to sell alfalfa seed at as early a time as possible in order not to have to pass any good chances for sale.
Alfalfa seed cleaning requires very good equipment and very careful skilled operation of this equipment. Most of the growers are using the services of authorized cleaning plants which have the proper equipment and skilled operators for saving the most of the seed and securing the best possible grades. Among the few growers who attempt to clean their own seed, some have been able to make very high grades in their seed, but undoubtedly shrinkage is very heavy. It seems better for the average seed grower to use authorized cleaning plants for this work.

Screenings that have no commercial value should be destroyed by burning. They are worth little as feed and the use of such screenings for feed tends to infest the farm with weeds. The planting of screenings should be discouraged, since this also spreads weeds.

Immediately after threshing and before delivery to cleaning plants registered seed must be sealed by the grower with seals of the Montana Seed Growers Association, which may be obtained from the secretary at Bozeman or from cleaning plants.

A representative sample is taken from each lot of registered seed after it has been cleaned at the cleaning plant and these samples are sent to the Seed Growers Association for testing and grading. Growers of registered seed who clean their own seed will send representative samples of each recleaned lot to the Association when cleaning is done. The State Grain Laboratory does the official seed testing. Authorization for sealing and grading is given on completion of tests. When seed is sealed, recheck samples taken from the sealed bags are drawn and immediately tested and graded. The results so obtained are final and official, if any changes in grades is ordered, the grower is required to pay costs of change in tags and seals. Requirements for grades, which are the same for all the states producing state registered alfalfa seed are listed below:

**Grades**

Extra No. 1. Fancy seed. Purity at least 99.5%. No noxious weeds. Sweet clover free (tolerance 9 seeds per lb.) Good appearance and color.

No. 1. Good commercial grade. Purity at least 99.0%. Sound plump seed. Slightly lower standards as to appearance and color than for Extra No. 1. Noxious weed free (tolerance of 9 seed per lb. except for dodder). No dodder. Not more than one-sixteenth of 1% sweet clover (180 per lb.)

Sample grade. Genuine pedigreed seed, below the standards of the above mentioned grades. The Association certifies as to the genuineness of variety, but from the standpoint of quality,
the seed is sold on sample and on basis of purity test data indicated on the bag.

Noxious weeds referred to in above grades are dodder, wild mustard, hoary cress or white top, Canadian thistle, buckhorn, perennial sow thistle and fanweed. A tolerance of $\frac{1}{2}$ of 1% of inert matter not materially affecting appearance of the seed is permitted in above grades.

After the seed has been graded, and providing the regulations of the association have been complied with, the secretary's office sends out authorization to its representative for the sealing and tagging of each lot with the official tags and seals of the association. All Montana registered seed is sold only in officially sealed and tagged bags.

**Marketing**

Montana has good outlets for marketing alfalfa seed. Early in the fall, as the harvest and cleaning of alfalfa seed progresses, many seed buyers representing the larger seed companies come into the state to purchase seed needed the coming year. These men usually work in the neighborhood of the cities having the
authorized cleaning plants. This gives the growers in such areas the opportunity to meet with a number of buyers and to bargain for the sale of their seed. In several parts of the state, growers have pooled their interests and are selling their seed cooperatively. There are a few growers who still retail their own seed. Such a procedure sounds quite profitable to the person who has not attempted this retail business, but it requires a lot of time and correspondence and the grower must have the facilities for handling varying sized orders promptly. Most growers have found that it takes too much time to make it profitable.

The Montana Seed Growers Association which supervises the inspection, registration and sealing of alfalfa seed is not a sales organization and all inquiries about the sale of alfalfa are referred to the marketing associations or authorized cleaning plants or to growers who have indicated their desire to retail their seed. The association does, however, carry on an advertising program in the seed consuming states telling of the merits of Montana registered seed. It also cooperates with Montana State College in arranging tests comparing Montana registered seed with seed from other states and in securing crop and market reports and other information which is sent to members of the Association and others who are interested.