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Alfalfa Seed Production
in Southern Idaho

By

A. E. McClymonds

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ALFALFA SEED PRODUCTION IN SOUTHERN IDAHO

By

A. E. McClymonds

During the past few years the production of alfalfa seed in southern Idaho has developed into an extensive industry. This marked expansion of the industry in many sections may be attributed to very favorable soil and climatic conditions. The cool nights and warm, sunny weather, together with arid conditions, are conducive to the production of high quality seed. Idaho seed, because of its exceptional quality, commands a premium in price over that raised in other sections.

With the knowledge obtained thru experience in the production of seed and with the application of business principles in raising, handling and marketing the crop, the industry is becoming more stabilized. Altho the yield of seed in alfalfa is more affected by unfavorable seasonal conditions than such crops as wheat and potatoes, the net profits obtained by seed growers during the past five years indicate that alfalfa seed is one of the state's most profitable cash crops. Demand for Idaho grown seed should be even better in the future than it has been in the past. In order to maintain or to increase the demand present seed standards must be maintained or improved. This can be accomplished only thru the efforts of the growers themselves.

Consumption of alfalfa seed in the United States has increased considerably during the past few years. The alfalfa hay acreage is increasing at the rate of from one to five million acres per year. Alfalfa, in most sections, is used in rotation with other crops and is plowed up after four to six years. The demand for seed to provide for the increased acreage and the maintenance of the area already devoted to alfalfa production will provide a steady market for seed in the future.

The consumption of alfalfa seed in the United States is greater than the production and large quantities are imported. In 1923, 8,784,000 pounds were imported. This foreign seed furnishes a means of entry for serious weed pests not found in this country and, for the most part, is wholly unadapted except in the southern states. Even there home grown seeds do equally as well. Proper safeguards against the use of foreign seed and proper legislation curtailing importation of seed will protect this country from an invasion of weed pests as well as stabilize the seed growing industry.

During the past few years the demand for hardy strains of alfalfa has been increasing. Only hardy strains withstand satisfactorily the

severe winter weather of the northern states. Southern Idaho is particularly adapted for the production of hardy strains of alfalfa seed. The severe winters characteristic of this section maintain the hardiness of the strains, and the summer weather is conducive to the production of high yields. For this reason it is recommended that in the seed producing sections every farm should have some acreage devoted each year to the production of alfalfa seed.

The information and the conclusions given in this publication are based on experiments in alfalfa seed production on the Aberdeen Substation, and on observations made throughout surrounding sections. The author's aim is to supply information necessary to the profitable production of alfalfa seed in southern Idaho.

Varieties

Only a few varieties of alfalfa seed are produced in Idaho. The three main ones are Grimm, Common and Cossack. Other varieties such as the Hardigan may gain in popularity, and new strains may be developed that are superior, but until they are thoroughly proven the three named varieties should continue to be exclusively used for seed production in the state.

Grimm

Grimm alfalfa was introduced into the United States in 1857 by Wendelin Grimm, an immigrant from Baden, Germany. The original lot, consisting of less than half a bushel of seed, was sown by Mr. Grimm in 1858 on his farm in Carver County, Minnesota. In its half century of culture under severe climatic conditions, it has apparently gained additional winter hardiness through elimination of less hardy plants.

Grimm is a natural field hybrid between *Medicago falcata*, a very hardy, yellow-flowered, sickle-podded alfalfa and *Medicago sativa*, a common alfalfa. No plant breeder has so far been able to duplicate the hardiness and good qualities of Grimm by making an artificial cross between these two species. In many tests, conducted by northern state experiment stations, the Grimm has always shown its superiority for winter hardiness over the northern grown common alfalfa seed.

Common

Common alfalfa was originally brought from Chile, in the early fifties of the last century, by gold seekers who sailed around Cape Horn to California, and it has spread from California eastward across the country. In recent years most of the imported seed has come from Argentina and most of the European seed comes from Provence, France.

Idaho grown common alfalfa seed is much hardier and better to plant than Southern grown common, or imported seed.

Cossack

Cossack alfalfa was brought into the United States from Russia in 1907 by the Department of Agriculture. It is a variegated alfalfa that has been advertised as being more hardy than Grimm. Tests do not bear out this statement. It is unquestionably hardy, but is no hardier and has no advantage over Grimm.

Preliminary Cultural Methods

Preparation of the Soil

Preparation of the soil for seed production must be very thoro. Precautions should be taken to have the land free from weeds, particularly those which are noxious and those having seed similar in size to alfalfa. This may be accomplished by growing cultivated crops on the land for at least two years previous to planting alfalfa for seed.

Where irrigation is practiced, the land should be graded evenly and if possible should have a slight slope. There should be no spots so high that it is necessary to cover the surrounding land with more than three to five inches of water in order to get over the whole area. The practice of flooding under such conditions is very wasteful of water as well as conducive to the production of discolored seed. It is well to remember that a good even distribution of water quite often is the determining factor in making a seed crop profitable or unprofitable. The best crops to grow the year previous to planting alfalfa for seed production are beets and potatoes. They put the soil in excellent physical condition and insure a firm seed bed. Plowing is not necessary following these crops in case the land has been leveled. If plowing is necessary, it should be done in the fall soon after the crop has been removed. The land should be thoroly irrigated in the fall if seeding is to be done in the spring. A firm, well-prepared seed bed is of utmost importance in getting a satisfactory stand of alfalfa. Under irrigation a nurse crop should be used. Barley is best for this purpose. Wheat, peas and oats often give very satisfactory results. After ripening, the nurse crop should be stacked or threshed as soon as possible and the land irrigated. This produces a vigorous growth of alfalfa during the fall and gives good assurance of a vigorous growth the following spring.

In raising seed on dry land the ground should be summer fallowed and seeding should be done without a nurse crop early the following spring.

Seeding

The best rate of seeding for seed production is two to three pounds per acre on irrigated land and one to one and one-half pounds per acre on dry land. It is generally conceded by alfalfa seed growers that a thin stand gives the best results in seed production. A thick stand limits the bloom to the top of the plant, while a thin stand exposes a large portion of the plant to light and air. The stand should be uniformly thin with just enough space between the plants to allow them maximum opportunity to bloom.

The row method of planting alfalfa has not been very successful in Idaho. There is too much danger of getting the plants too close together in the row for maximum seed production.

Early spring seeding is much to be preferred under ordinary conditions in Idaho. Fall seeding, altho successful at times, is not as certain. This may be due partly to a better condition of the soil, much better soil moisture, or more favorable rainfall in the spring.

Cultural Treatment

The cultural treatment for the first seed crop is much different than that for subsequent crops. The stand is usually fairly thin and the rooting system has not developed to the point where cultivation and holding back of the growth are necessary. It is best to keep the plant growing normally the first year. Applications of water should be light and fairly frequent, but not more than just enough to keep the plant making a slow, healthy growth. The color of the plant should be medium to dark green at all times.

On dry land the first year's growth is largely governed by the water stored in the soil the previous year by summer fallow. If stored soil moisture is sufficient, a good seed yield should be obtained the first year. In succeeding years the feeding area of the roots is greatly enlarged and the yield of seed is governed by the amount and time of rainfall and thinness of stand. Each dry land seed producer must work out most of these problems to fit his own conditions.

Treatment of Old Stands for Seed Production

A crop of alfalfa that has been in two years or more is considered an old stand. By this time the roots will have developed so that they can withstand rather severe treatment. Very satisfactory yields of seed may be obtained from old stands by thinning down the number of plants.

The method of thinning followed by most growers is to take the mold boards off the two-way plows and cut a furrow with both shares down to a depth of three inches. The plows should be set four inches apart.

This tears out and cuts off alfalfa from 14 to 16 inches on either side of the row, making a row 4 inches wide with a space of 14 to 16 inches on each side of it. Where the alfalfa is too thick in the row, the ground should be cross plowed. This will thin out the rows and give plenty of space for each plant to develop. Under irrigated conditions the thinning



Fig. I.—Thinning Dry Land Alfalfa Seed and Cultivating to Keep Down Weeds. Large Acreages are Handled Economically with This Outfit.

operation should be done every two years. In raising dry land seed, it is even more important for the plants to be spaced widely apart, the width depending on the annual rainfall. With an annual rainfall of less than 15 inches, without irrigation or sub-irrigation from an underground water table, alfalfa seed production usually is a failure. Under favorable soil and climatic conditions dry land seed production is fairly successful with an annual rainfall of 18 to 20 inches.

The field that has been thinned early in the spring with a two-way plow should be double disked and floated within two weeks after the plowing is finished. The ground either should be double disked or floated every week after the first cultivation in the spring up to the end of the cultivation period, usually about June 1.

Methods of Handling the Spring Cultivation

Disking and Dragging

Each grower has a somewhat different method of handling the spring cultivation but practically all accomplish the same results. The disk is one implement that all seed growers use in cultivation of seed fields. The disk is weighted down and the growth of the alfalfa plant is cut

back to the ground. At the same operation all weeds are killed and the ground is left in excellent physical condition. In a week or ten days, depending on the amount of growth made, the disk is followed by a heavy drag as is shown in Fig. III, or with a spike tooth harrow which has a woven wire tied onto the bottom. This treatment rubs and tears

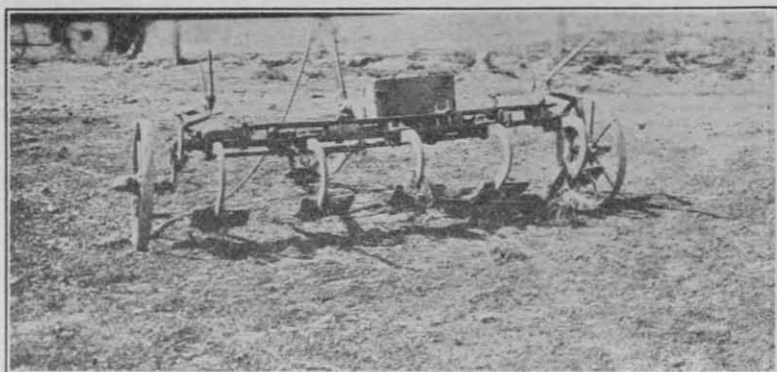


Fig. II.—A Home Made Thinning Implement.

off the plant growth. Other tools are used which give practically the same results. The object in the spring cultivation is to thin the stand, hold the crop back so the bloom will not come during the hot period of the year, and also to eradicate the weeds.

The Hyde Seed Drag

Following is Mr. Hyde's own description of the Hyde seed drag: "The drag makes a good six-horse load and by commencing while the alfalfa is not over three inches high in the spring and keeping the drag going weekly or not over ten days between draggings, you can keep the ground bare and at the same time keep a dust mulch to retain most of your moisture. I suggest disking the ground first thing in the spring to a depth of about three inches, then drag about twice, going around the field the last time in opposite direction from the first time to catch both sides of the crowns.

Then after first disking (and double dragging), disc only about two inches deep and double drag again, repeating this operation from the time the plants start to grow in the spring until about the first of June when you will probably have gone over the ground about twelve times. In ordinary years, this should retain enough moisture to bring your alfalfa into bloom about the 1st to 10th of July without any irrigation, then by irrigating about the time it comes into bloom you should make a good

crop of seed with one irrigation on level ground and two irrigations on rolling land. The float boards on the drag covered with galvanized sheet iron are necessary to keep the drag from leaving the land "wavy" when the edges of the drag boards jump over old, heavy alfalfa crowns.

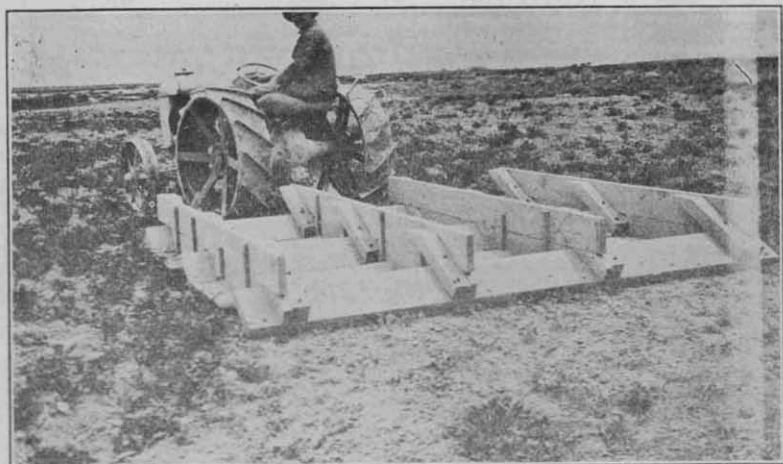


Fig. III.—The Hyde Seed Float.

Bill of Material for Hyde Alfalfa Seed Drag

- 3 pieces 3x12x10 ft.
- 4 pieces 2x10x14 ft.
- 6 pieces 2x12x10 ft.
- 30 lineal feet 4x4
- 30 lineal feet 2x6
- 30 lineal feet 1x6
- 12 lineal feet 2x4
- 2 pieces strap iron 3/16x4"x10 ft.
- 60 sq. ft. medium heavy gauge galvanized sheet iron
- 24 carriage bolts 3/8x7" to bolt drag boards to 4x4's.
- 18 machine bolts to bolt strap iron to drag boards.

Pasturing

Another method of holding back the seed crop is by pasturing with sheep, cattle or horses. Sheep and horses have given the best results for they tend to eat the alfalfa and clover more uniformly. The practice is to keep enough animals on the field so that they will eat the alfalfa very close to the ground. When the sheep are taken off, the field appears bare of vegetation. Weeds are destroyed by tramping and close grazing and all weak alfalfa plants are destroyed. The practice of cultivating

along with close grazing has been found to be much more successful than close grazing alone. When the stock is taken off, the plants come up uniformly and come into bloom at the same time. The practice of pasturing old ewes and their lambs on alfalfa seed fields has become quite popular and profitable during the past few years. The pasturing utilizes a by-product of the seed industry and produces fat lambs for the early June market.

Letting the Plant Go

Spring cultivation is continued until the proper time to let the plant go. This varies in different parts of the state. In the Aberdeen section best average results have been obtained when spring cultivation is discontinued about June 1. This usually brings the full bloom on late enough to avoid the hot period of the year. The limits of this period vary from year to year.



Fig. IV.—Forkner Light Draft Harrow—a Good Weed Killer.

Irrigation

When to Irrigate

Proper irrigation is one of the most important items in production of alfalfa seed. Experiments were conducted at the Aberdeen Substation to determine the best time for irrigating alfalfa grown for seed. The experiments were not on a large enough scale to determine all of the factors entering into the irrigation of seed, but it was found that the plant should be allowed to make a slow but steady growth. Frequent and light applications proved much better than one heavy irrigation.

If there is plenty of moisture stored in the ground during the spring,

it usually is not necessary to irrigate before the full bloom period. A heavy application of water during the bud stage cut the yield in half three years in succession. It is much better to irrigate just after the last cultivation and after the corrugations are made than to wait until the bud stage.

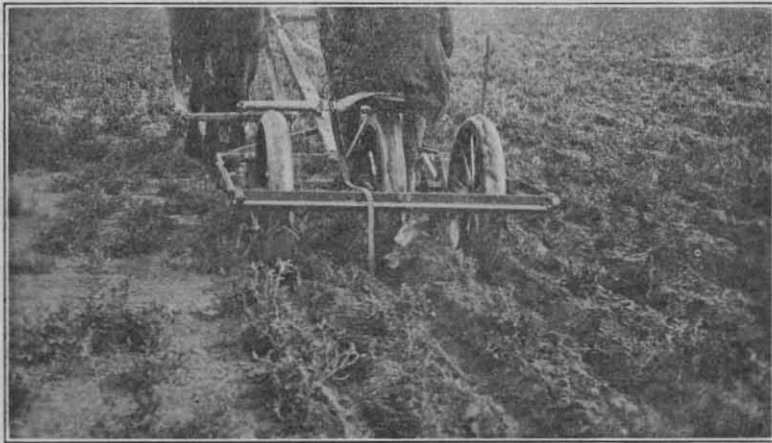


Fig. V.—The Corrugator, a Very Necessary Implement.

Irrigation during the bud stage has a tendency to throw the plant into a second growth and cut the seed yield. From the full bloom stage to shortly after full bloom is a very good time to apply water. Light and frequent irrigation from the full bloom period on does not seem to throw the plant out of the seed stage and does produce a heavier yield of seed during ordinary years.

Growth

The plant should never be allowed to burn no matter what stage of growth it is in. A dark or blue green color should be maintained. This means a very slow but steady growth. When a light green color is obtained from over watering the yield invariably is cut in these spots. In some soil, it is much easier to maintain an even moisture supply and usually such soils can be depended upon to make high yields. If the land is uniform and is adapted to seed production, profitable yields are made during average years by the growers who have made a study of the industry. Some years weather conditions cause a complete failure. This is not often the case and on the average seed production pays much bigger profits than hay production.

Harvesting

After the last irrigation, which is usually applied before the middle of August, the seed is allowed to ripen as rapidly as possible. Most of the roguing is done during the irrigating season. What is not done should be finished after the last irrigation.

When to Start Cutting

It is a common practice to start cutting the seed crop when three-fourths of the curls are black. This is a very good time to start if the grower has a large acreage to cut. Where there is little danger of an early killing frost one is safe in waiting until all of the curls have turned brown or black. It is characteristic of the variegated alfalfas to produce seed of a greener color than the common varieties so that it is practically impossible to get a field so ripe that some green seeds are not present.

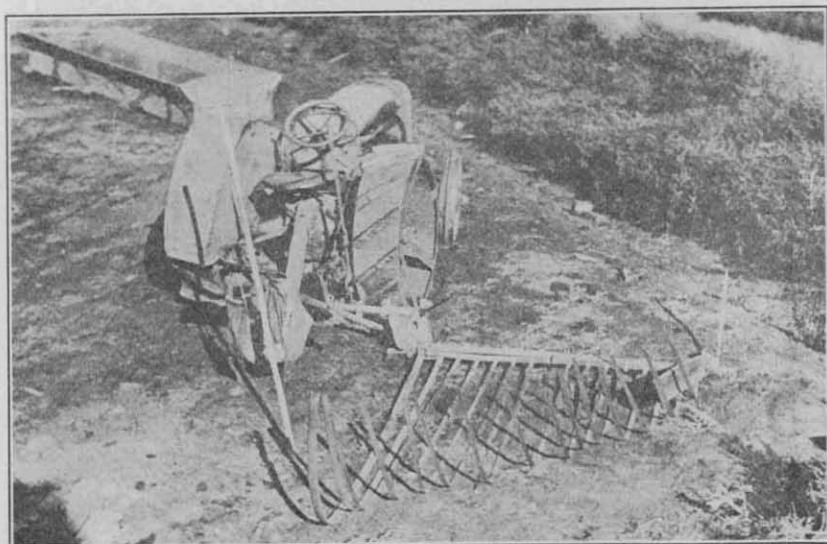


Fig. VI.—A Windrower Should Be Used in Every Seed Field.

If all of the seed is to be saved, the cutting should be done early in the morning while the dew is on and the curls are tough. This is not practical where large acreages are to be harvested.

Mowing and Stacking

The practice of using a windrower attachment on the mower is quite common. This throws the seed in rows and out of the way of the team. Some of the windrowing attachments now manufactured are too short to roll the seed out of the way of the horses. This difficulty has been met

by buying a six foot windrower attachment, putting it on a five foot mower and cutting off the attachment one foot back of the outer end.

The seed should be piled in small cocks as low and flat as possible. A large cock is apt to be caught by the wind and blown to a neighbor's field or piled up along the fence. The cocking should be done immediately after the mowing.

If hulling or threshing equipment is readily available, it is not necessary to stack the seed. If, however, the crop must be left in the field for any great length of time, danger of loss by fall rains or wind storms is sufficient to warrant stacking. Seed stacks should be narrow and high. Wagons or slips used in handling the seed should have tight bottoms to prevent the loss of the shattered seed. Slings are better to use in placing the seed on the stack. The stacker should not tramp over the stack any more than is necessary for it will probably not stand for more than a month or two until threshed.

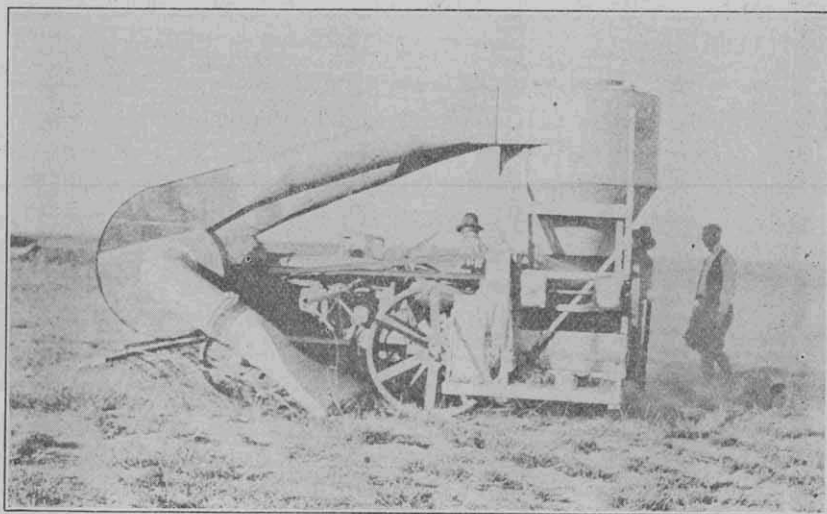


Fig. VII.—When Seed is High Priced it Pays to Glean Fields with a Suction Sweeper.

Threshing

Threshing of the seed is done either with a huller or a separator with a re-cleaning attachment. Where a separator is used the chaff pile usually is re-threshed. Most of the large seed growers have threshing machines of their own and do no custom threshing. Where this is possible it is much more satisfactory than waiting for a custom thresher and can be done much more cheaply.

Seed direct from the huller or threshing machine is not fit to be put on the market. It should be sold on its quality on a re-cleaned basis. Some buyers purchase seed in the dirt. This is somewhat of a gamble and usually is unsatisfactory to one of the parties.

Cleaning Plants and Good Seed

The central cleaning plants are much more satisfactory than small individual cleaning plants on the growers' farms. In a central plant the seed can be brought to a good, uniform grade. These plants should make every effort to bring No. 1 seed up to a high grade and still save all seed that is valuable for planting. There is quite a demand for the No. 2 seed that is free from weeds. This seed should be sown only for hay purposes.

The seed sown for seed production should be of the highest quality, at least 99.5 per cent pure and from short pedigree fields. It is very important that the seed grower keep up the standard of his fields. He cannot do this by sowing No. 2 seed. No seed which grades No. 2 is certified and only No. 1 seed of known origin can be certified in the future.

Weather

In reviewing general climatological data in this connection, it is not to be forgotten that the loss or diminution of yields in any particular field may be due to occurrence of inopportune storms, hot winds and untimely frosts, the presence of which is not revealed in the averages. The direct statistical correlation of climatological elements with yields per acre is not necessarily final. There should be some value in the correlation in allowing the grower to strike an average of the best time of year to bring the plant into full bloom and setting of seed. In some years everyone can raise seed, while in other seasons it takes the best management and very careful irrigation practice to produce a profitable crop.

From an examination of weather data of the Aberdeen Substation it appears that a warm dry spring followed by a cool dry summer is especially favorable to seed production. Cool, wet springs followed by wet summers produce the small average yields. A low minimum temperature in June showed some correlation with high seed yields.

Alfalfa seed production under irrigation allows several opportunities to produce a crop. In 1922 and 1923 the first blooms were entirely lost. Timely irrigation brought on another bloom and the later bloom produced the seed. When an exceptionally heavy seed yield is obtained, weather conditions were favorable to all of the blooms setting seed.

Harmful Insects

Insects are either friends or enemies to seed production. The harmful

insects in the Aberdeen section are the grasshopper, weevil, blister beetle, and chalcis fly.

Grasshoppers

The grasshopper is one of the worst pests with which the seed producer has to deal. It is very difficult to fight. An irrigated district usually is a narrow strip, about 10 to 20 miles in width, with a large area of dry land on either side. Grasshoppers breed on the dry lands and rocky knolls and when they reach the wing stage, if the dry lands are short of feed, they invade the irrigated regions in such large numbers that fighting them seems a hopeless task.

To destroy the eggs and then to keep the pest in control on irrigated lands, fall cultivation is the best treatment that has been discovered. The ground should be given a good double disking in the fall and the eggs exposed to winter freezing. Very few eggs will hatch from ground that is fall plowed or fall disked. Poison bran mash is the only remedy known that is at all successful. Hopperdozers do more harm than good. Two years ago the hopperdozer was tried out quite extensively at the Aberdeen Substation and in the fall the trail of the hopperdozer could be followed by the poorer set of seed. It is best to apply poison bran mash just after an irrigation. The bran is kept moist for a greater length of time and larger kills are obtained.

Weevil

Weevil will completely destroy a crop of seed if they are unmolested. Where they are present, even if the grower feels that there is hardly enough of them to bother about, he will find it profitable to spray. Weevil work in buds of the plant during the budding and early blossom stage. They destroy just the number of flowers they have access to. The calcium arsenate spray is the only method of control that gives uniformly good results. It is applied at the rate of two pounds per acre. The sprayer holds 100 gallons of water and four pounds of calcium arsenate is mixed with water and strained into the barrel of the machine. The spray is driven by the wheels and a pressure of 100 pounds is used in applying. From 25 to 50 acres can be sprayed in a day at a cost of less than \$1.50 per acre. The spray is applied at the peak of the weevil infestation, usually about June 10.

Blister Beetles

Blister beetles during the latter period of their lives are very injurious to the seed. They cut off curls and leaves and in large numbers are very destructive. They usually come after a year in which grasshoppers have

caused damage. The beetle is hard to poison and the only method that has been successfully used is driving them out of the seed fields. This is accomplished with sacks and several men walking thru the field beating the tops of the plants.

Chalcis Flies

Chalcis flies have never become numerous but there are always a few. They lay their eggs in the seed during the early stages of seed development when it is soft. The egg hatches and the larva feeds on the inside of the seed until it emerges into the adult stage, when it makes a hole out thru the seed. They have never caused much loss and will probably be kept in check by fall pasturing with sheep, which destroy their host plants.

Beneficial Insects—Bees and Pollination

It is a proven fact that under certain climatic conditions, automatic self pollination takes place. The amount of pollination varies with seasons and with individual plants.

Every year in the seed growing sections of Idaho it has been observed that blooms have been lost at certain periods of the year. In 1923 both the first and second blooms were lost. The third bloom set on late and frost came before it was thoroly ripe causing a poor color in the seed. In 1925 the first or lower bloom was very heavy, and the second bloom was lost due to several extremely hot days during the first part of July and the third bloom was making an excellent start toward forming curls. Automatic tripping does occur under favorable conditions, but where the large seed yields are obtained it has been observed that there are always a large number of insects in the field.

The writer has many times watched honey bees sucking the nectar from alfalfa flowers and in no case has he found any flowers tripped by honey bees. Under favorable conditions, honey bees undoubtedly trip some flowers. Bumble bees, however, are much more efficient in tripping. Often a bumble bee will trip flowers other than the one from which he is getting honey. They are awkward insects and heavy, but are much more valuable in an alfalfa field than honey bees.

The leaf cutting bee, *Megachile latimanus*, is the most efficient insect in the alfalfa seed section. The writer has observed these insects tripping alfalfa flowers at the rate of 22 flowers in two minutes and ten seconds. Out of 134 observations the bees tripped 114 flowers and failed to trip 20. Every one of the 20 flowers the bee failed to trip was a young flower and the keel and wings were tightly closed.

The process of tripping is thus described by Evans: "When *Megachile*

latimanus visits an alfalfa flower, it grasps the wings or the keel petals apart from the standard, so that it can push its head down and reach the honey. As a result the flower is usually tripped. When this occurs the pollen is thrown in a miniature cloud that is sometimes visible to the eye. There is an abundant opportunity for the pollen to lodge upon the head and other parts of the bee, where portions of it can come in contact with the stigma of the next flower that it trips. Occasionally, the proboscis of the bee is caught by the pistil. Thus caught, the bee braces up on all six legs and after one or two vigorous shakes, releases itself. Such an accident merely causes a delay. The insect then rubs its proboscis with its two front feet and flies off to gather honey from another flower."

Short tongued bees of the genus *adrena* were also observed tripping flowers of alfalfa. These, however, are much slower in their action and they spent much more time between flowers than *Megachile latimanus*.

The Weed Problem

The control of weeds is one of the most important problems connected with raising alfalfa seed. Idaho now has a law whereby a weed district may be declared and this problem taken up as a community activity. This is practically the only way the menace can be overcome. Under our present system of individually fighting weeds, they are gaining. They may in time prove a very serious danger to the industry unless concerted effort is made to eradicate them.

The state seed law compels all parties to have their alfalfa and clover seed tested and this test must meet Idaho seed law requirements before it may be sold for seeding purposes. This is a big step toward weed eradication.

More weeds are distributed thru planting weedy seed than in any other way. These are often introduced by buying seed from seedsmen and from other parts of the country. Foxtail was introduced into Idaho from imported seed and Russian knapweed came in the same way. The lots of seed that these weeds came in could have been avoided if a test had been made on them. The weed problem is a vital one and everyone should do all in his power to help solve it.

Weeds—Description and Control

Dodder (Cuscuta Sp.)

The farmer who sees his newly seeded clover or alfalfa field partly in the grip of this parasite gets a realizing sense of the value of clean seed. Dodder is there because it was sown there with the crop. If the plant is allowed to ripen fruit, the ground will be made foul for at least eight years.

The parasite germinates late, nearly a month after the green-leaved plants, on which it must depend, have started growth. It germinates in the soil but draws no sustenance from it. The seedling looks like a bit of yellowish red hair, two to four inches long, with a slight knot or swelling at one end, swaying pliantly about, searching for a host plant to which it may attach itself. If no plant is within reach, the seedling falls to the ground and dies. If there is a plant, the parasite quickly twines about it, develops tiny, wart-like suckers at the point of contact, breaks connection with the earth and thereafter "sponges its living," drawing from the host plant the food assimilated by the green leaves for its own growth. Consequently, the dodder needs no leaves and has none. The whole plant is a mere yellowish-red thread, branching very freely. The growth from a single seed may cover a considerable extent of ground, binding the herbage into a tangled mass and sucking out its life. The seeds are very small, rounded and yellowish brown. No seed should be harvested from a dodder infested field and such seed should be unsalable at any price. Neither should such a crop be harvested for hay, for the seeds, uninjured and viable, often pass the digestive tracts of animals, and may be spread on other fields in the manure.

Means of Control

The use of clean seed is essential. Infestation often is found in patches where a single seed or but a few have germinated. In such a case the infested plant should be cut close to the ground, if possible, before any seeds have ripened, piled on the spot where it grew, soaked with kerosene and burned. If the seed has matured, it is best to pile straw on top of the patch without cutting it or handling any more than necessary. This straw should be burned and another pile of straw put on and burned. This will kill most of the seed. Cultivated corn or beet crops should be grown for several years before alfalfa is sown again.

Foxtail (Setaria Sp.)—Other names; pigeon grass, wild millet.

This is an annual weed which propagates by seed. Foxtail seeds are among the most frequent impurities in other grasses, seeds, clover and alfalfa. Once in the soil it retains its vitality for years, springing up whenever brought near enough to the surface warmth and light. Cattle and sheep will eat it when it is young.

Culms branch from the base and usually grow one to four feet tall from fibrous and clustered roots but when started late and pressed for time, it will mature when no taller than three inches.

Sheep should be turned into the seed field to graze down the aftermath. When patches are small the fields should be rogued and the foxtail carried out, piled and burned. When the field is badly infested, it should be plowed and put into a cultivated crop.

Pigweed (Amaranthus retroflexus)—Other names; red root, chinaman's greens.

This plant is seldom absent from seed fields and is becoming much more troublesome each year. One reason for its recurrence is the long vitality of its seeds, which are known to survive in the soil for more than 30 years. The stems are stout, tough, erect, green, rough, hairy, much branched, from one to six feet tall, springing from a long, fleshy toproot, befringed with pink or white rootlets. Leaves are long ovate or rhombic ovate, three to six inches in length, rough hairy, with long petioles and prominent ribs and veins. Flowers are large, dense, terminal and axillary panicles, each subtended by three rigid, prickly bracts; they are very small, greenish, with five sepals and five stamens. Each flower produces but one oval, flattened jet black, and shining seed which readily falls from its place when ripe.

There is only one method of control and that is prevention of seed production. This means cutting out with a hoe.

Prostrate Pigweed (Amaranthus blitoides)—Other names; matted pigweed, low amaranth.

This pigweed is coming into the fields and is very difficult to combat due to its low habit of growth and many seeds. The seeds are larger and very difficult to remove entirely from alfalfa seed. They are smooth, highly polished, jet black, double convex, nearly circular with a slight notch at one end. The weed thrives on sandy and gravelly soils.

Poverty Weed (Iva Axillaris)

This is without doubt one of the worst weed pests in seed fields. Poverty weed is a native of the western states and is distributed from Montana to Mexico. It is a perennial that spreads by means of underground root stems. It does not spread rapidly from seed.

The method of eradication is clean cultivation with or without a crop and planting of smother crops. All perennial crops store up food in underground root stock. They should be plowed deep at blooming time and clean cultivation should be used thereafter. Smother crops have given very good results. Fields of alfalfa where poverty weed occurs may be plowed and re-planted at the rate of 20 pounds per acre. The plant growth may be encouraged by heavy applications of water and a hay

crop taken off for three years. This crop may again be plowed and put into beets or potatoes, clean cultivated for two years and the poverty weed will be well eradicated.

Sweet clover is a very common weed in alfalfa fields. Sowing clean seed is one of the best ways of keeping a field clean. Cutting the plants off in the field during the irrigating season usually will bring control.

Other weeds that may cause trouble in alfalfa fields are Hoary Cress, Russian Knapweed, and Yellow Trefoil.

The threshing machine is one of the biggest factors entering into weed distribution. It would pay every farmer to spend two hours cleaning out the separator before it is allowed on his place, especially if he knows the machine has finished a job where a large quantity of weed seed has been put through the machine.

Marketing Alfalfa Seed

The common method of marketing the alfalfa seed is to sell to traveling representatives of large seed concerns. The farmer usually assembles his seed and has it cleaned at a central warehouse. In recent years it has become a common practice among producers to pool the crop thru cooperative marketing agencies and sell in car load lots to the seedman. This is to the mutual benefit of the buyer and seller for a car load may be bought much cheaper than individual lots.

The cooperative marketing associations handle a large majority of the Grimm alfalfa seed. This seed originally was grown in a small area in Bingham county, which made it ideal for the association to get a start. The seed was produced by farmers interested in building up the business and this made it much easier to put out a guaranteed product of high merit. This association has grown rapidly and now handles more than 1,000,000 pounds of seed per year.

The area of Grimm seed production has been greatly increased thruout the state during the past five years, and now Grimm seed is produced in practically every alfalfa seed growing section in Idaho. This seed should be graded to a high quality free from weeds and sold in sealed bags with the seller's guarantee that it is true Grimm and of high quality. The certification rules, operating under the jurisdiction of the Agricultural Extension Service, demand this of all certified Grimm but there is a large amount of so-called Grimm sold thruout the east as affidavit Grimm. This may range anywhere from 100 per cent to 10 per cent Grimm seed. Some of it may be nothing more than Common and is sure to hurt the reputation of certified Grimm seed.