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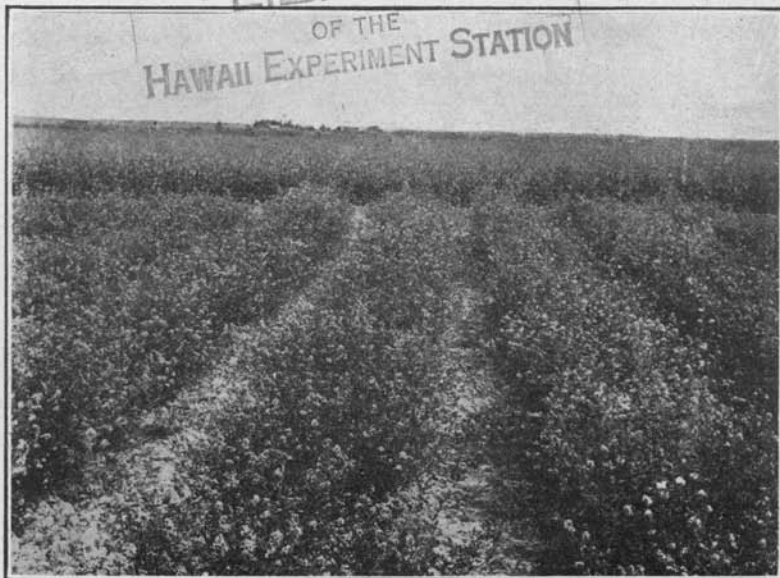
UNIVERSITY OF IDAHO  
AGRICULTURAL EXPERIMENT STATION  
ABERDEEN SUB-STATION

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The Production of Alfalfa Seed  
in Southern Idaho

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Grimm alfalfa in rows for seed production, irrigated land.  
Aberdeen Experiment Station.

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By L. C. AICHER

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# UNIVERSITY OF IDAHO

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## THE PRODUCTION OF ALFALFA SEED IN SOUTHERN IDAHO

### INTRODUCTION

The acreage given over to the production of alfalfa seed is rapidly increasing in Idaho because of the widespread interest thruout the east in alfalfa as a forage crop, the growing demand of eastern farmers for high-grade seed, and the higher prices obtainable since the beginning of the world war. In growing alfalfa farmers have discovered thru experience and heavy losses at times that it is more profitable to plant high-grade than inferior seed. In response to the demands of their customers and because of the stringent weed laws of some states, seedsmen are becoming more and more particular in the quality of the seed purchased.

Quality of seed is an important consideration in growing alfalfa. The slow increase in alfalfa acreage in eastern states, in a measure, may be traced to unsatisfactory stands resulting from the planting of inferior seed. If American farmers who plant alfalfa seed were to insist upon a high-grade seed, the stands of alfalfa in general would be much better and the income from hay yields much greater. High-grade seed of known origin will cost the growers of alfalfa more than inferior seed or seed of unknown origin, but it is to be remembered that the acre-cost of alfalfa seed is one of the smallest items in alfalfa production and decreased yields of hay from thin stands resulting from the planting of inferior seed may each year equal in money value many times the cost of the best seed obtainable. Much of the hardy alfalfa seed of bright color heretofore grown in Idaho has been bought by eastern seedsmen to mix with off-colored seed and with seed of lower vitality in order to make them more readily marketable. The importation of large quantities of inferior alfalfa seed is attributed to the wide margin of profit which prevails in handling it. The cost of inferior foreign seed has been so low that seedsmen could purchase and handle it in New York at a figure much lower than that for which home-grown seed could be purchased. Brown\* states that "The United States does not produce enough alfalfa seed to supply the domestic demands for seeding purposes. Imported seed is usually sold in this country on the basis of appearance without reference to the place of origin. Turkestan seed, which is the lowest priced alfalfa seed on the European markets, is the type now chiefly imported." The fact that many people will pay more for things imported, tho often inferior in quality, permits the seed buyer to sell this inferior seed at a higher price than superior home-grown seed can command. It is gratifying to know that the government has taken steps to curtail certain abuses in the handling of imported seed by making restrictions on seed importations more stringent.

Alfalfa seed is being produced in the Snake River valley of southern Idaho at elevations ranging from two thousand to five thousand feet. At the higher elevations frosts may cause considerable loss before the seed crop matures. To avoid obtaining frosted seed, which is black and injures the sale of the good seed if mixed with it, growers frequently

\*Brown, Edgar, Commercial Turkestan Alfalfa Seed, U. S. Dept. Agr. Bul. No. 138, 1914.

harvest the seed crop before it is fully ripened. Harvesting at this time causes the crop to contain considerable shrunken and green seed, which, however, can be largely removed when the seed is re-cleaned. Even at these high elevations, however, seed pods set heavily and fill well. Owing to the damage that can be done to the crop by frosts, there is not a great deal of alfalfa grown for the production of seed above five thousand feet. It requires more time for the seed to reach maturity at the higher elevations because of cool weather. Between the elevations noted, however, climate in general favors seed production and the possibilities in that direction are practically unlimited. The judicious use of irrigation water combined with proper methods of handling the seed crop practically insures profitable annual returns from the alfalfa fields.

#### SOME FACTORS TO BE RECKONED WITH IN SEED PRODUCTION

There are certain factors more or less beyond the control of the grower which make for or against success in the production of alfalfa seed.

*Climate:* The alfalfa seed plant requires warm, dry, sunny weather to produce and mature a profitable crop of seed. Piper\* states that "it now seems clear that automatic tripping is induced by hot sunshine tho it is not proved that flowers continuously in the sunshine will be tripped to the same extent as those alternately in the shade and exposed." The number of clear, sunny days actually recorded during the summer months and the large yields of seed secured every year in southern Idaho seem to prove the existence of a close relationship between sunshine and seed-setting.

*Moisture* is without doubt another very important factor concerned with the production of alfalfa seed. Moisture can make or destroy a crop of seed. Too much moisture in the soil during the growing period produces a strongly vegetative growth that is unfavorable to the production of seed. Too much moisture in the soil at blooming time induces plant growth at the expense of the seed crop. In rainy or damp and cloudy weather the flowers will not trip sufficiently to make a profitable seed crop. Insufficient moisture previous to the blooming period results in the dropping of flowers and the failure of the seed crop. Cloudy weather, rainfall or humidity, of sufficient duration to injuriously affect the production of alfalfa seed, seldom occurs in the southern part of the state and the growers for the most part are able to control soil moisture by irrigation.

*Wind* aids tripping of flowers to some extent and, therefore, helps to increase the amount of seed produced.

Outside of an occasional untimely frost, more particularly at the higher elevations, the climate of southern Idaho greatly favors the growers of alfalfa seed.

*Insects:* Insects exert more or less influence in the tripping of alfalfa flowers, but, with the exception of certain instances where insect activity is very great, the influence of insects on seed production has been somewhat over-estimated. During the summer of 1916 a grower from the vicinity of Sterling brought to the Aberdeen Station two leaf-

\*Piper, C. V., Alfalfa Seed Production; Pollination Studies. U. S. Dept. Agr. Bul. No. 75, 1914.

cutting bees for identification. He stated that these insects were very numerous and were busily occupied in visiting alfalfa blossoms in his seed field. A few days later the writer visited this field and others in the immediate vicinity. The greatest activity of the leaf-cutting bee was found in seed fields about midway between Sterling and Springfield. In parts of these fields these leaf-cutting bees were so thick and active as to remind one of the swarming of a hive of honey bees. These same fields were visited later and were found to be heavily loaded with alfalfa seed-pods and seed. Evidently the activity of these bees had influenced seed production in these fields. Farmers often call these bees "alkali bees" because in some sections they are found in large colonies on barren waste land where vegetation has been killed by alkali. They live in burrowings made in the soil. They may be noticed at Aberdeen and in other sections of the state but usually not in such numbers as they were found in the seed fields mentioned above.

Bumblebees are more plentiful in the sections of lower elevations where a warmer climate prevails. Honey bees, while they visit alfalfa flowers very frequently to secure nectar, seldom trip them. Butterflies and other insects have been noticed visiting alfalfa flowers but they have not been observed tripping them. The leaf-cutting bee and the bumblebee are the most efficient of all insects in tripping alfalfa flowers. Piper states that "the leaf-cutting bee is by far the most efficient, tripping about nine out of every ten flowers visited. Bumblebees are decidedly inferior to Megachile (leaf-cutting bees), tripping only about thirty percent of the flowers visited."

#### THE PRODUCTION OF ALFALFA SEED UNDER IRRIGATION

The growing of alfalfa seed in southern Idaho with irrigation is not the game of chance it is on the dry farms of the state or in the non-irrigated states of the Middle West. The climate of southern Idaho favors the industry and the growers of seed in the irrigated sections are in a position to control almost absolutely the amount of water their fields are given. Success in producing the crop under these conditions depends very largely on a thoro understanding of the soil and its irrigation requirements to insure the kind of plant growth that favors seed-setting. In seed production a scant vegetative growth is desirable, but a growth sufficiently tall to harvest successfully is necessary. A thick stand such as is required to produce a good yield of hay should be avoided, too, because of the difficulty it presents in regulating properly the amount of water required for a seed crop and because that kind of growth shuts out sunlight which in itself is a factor of considerable importance in influencing the development of flowers and seed.\*

A scant vegetative growth is obtained in various ways. Some growers practice late fall irrigation and hold off water in the spring until the crop is in bloom. Others do not irrigate in the fall but make light applications of water only in the spring. Fall irrigation is a doubtful practice because of the strong vegetative growth which starts in the spring. Two adjoining farms may differ so widely in soil type and contour of land that thoro tested practices of soil management and irrigation on the one

\*Westgate, J. M., U. S. Dept. of Agr., Farmers' Bulletin No. 495.



might prove to be very poor practices on the other. Careful note of plant growth is the seed-grower's best guide for action in the application of irrigation water. It is to be remembered always that the blooming period and the ripening period can be hastened or retarded by the amount and time of application of water. Seed-growing with irrigation is a fascinating business requiring most intelligent, timely and sure action on the part of the grower in the use of irrigation water.

*Location of seed fields:* As a general thing, alfalfa for seed production should be planted on sloping land with good drainage. Bottom land, or flat land which is difficult to drain, is not well suited to the production of alfalfa seed. Flat land, as a rule, is either under irrigated or over irrigated. Over-irrigation occurs more frequently on flat land than under-irrigation. Under-irrigation may result from the holding off of water in the attempt to insure that over-irrigation shall not be given. Sloping land is much easier to handle than flat land in the production of alfalfa seed by irrigation.

Alfalfa does well on sandy land when once a stand is obtained, but sandy land requires more irrigation than clay land. In selecting land for seed growing the availability of the water supply and the readiness with which water can be secured must be given careful consideration. Ditches sufficiently large to permit the running of large heads of water are an advantage. It frequently happens that a light application of water secured by running a big head quickly over the land will make the seed crop.

Sub-irrigated land is good for the production of alfalfa seed if the water table is not too close to the surface. Seed is being successfully grown on land of that kind with a water table six to eight feet from the surface. On sub-irrigated land, however, the ripening period is often delayed to such an extent that frost kills the immature seed or the crop is cut in such an immature condition that much shriveled and shrunken seed results. The alfalfa plant cannot tolerate "wet feet;" if the water gets too close to the surface it will either cause too much vegetative growth for seed production or will kill the plant outright. Practically all alfalfa seed produced in southern Idaho by irrigation is grown on surface-irrigated land.

*Preparing the seed bed:* Fall plowing should be practiced in preparing the seed bed for the planting of alfalfa. The practice will permit the soil to regain that firm condition so much to be desired previous to planting. Moreover if plowing is done sufficiently early in the fall many weed seeds will germinate and make a good growth. Cultivation can be practiced to bring to the surface additional weed seeds for germination and to kill the growth already started. Weed seeds brought to the surface by cultivation and not germinating in the fall will start growth early in the spring, at which time it will be killed by the spring cultivation necessary to prepare the land for sowing the alfalfa seed. It is good practice to disk stubble land a couple of weeks previous to the plowing in order to start weed growth and to make the plowing easier. Plowing itself will then destroy many weeds. In the preparation of land for the production of alfalfa seed the killing of weeds is of as great importance as the actual preparation of the seed bed. Where it is

necessary to practice spring plowing for the planting of alfalfa the plow should be run shallow. The turned soil should be firmed, preferably with a corrugated roller or a tool similar to it. A firm seed bed is essential because alfalfa seeds are small and must be brought into close contact with the soil moisture to insure germination.

*Control of weeds:* Weed control is one of the big problems in southern Idaho in the production of a readily marketable crop of alfalfa seed. The best of seed has little value commercially if foul with weed seeds. Thoro soil preparation to kill weeds and the selection of pure



Fig. 1. The alfalfa renovator, a good tool for cultivating alfalfa.

clean seed are two means of reducing the number of weed pests, but, after the crop has been started, measures to control weed growth must be given first consideration. The fields should be thoroly cultivated in the spring after the weeds have started to grow. Alfalfa cultivators, spring tooth harrows, and disk harrows can be used for the cultivation. Care should be exercised the first season after planting not to cultivate too severely or many plants will be killed. Thereafter, however, the most thoro cultivation will be necessary to kill not only weeds but to keep stands properly thinned out for seed production. During the growing season many weeds will show up in spite of thoro spring cultivation. All noxious weeds, and weeds having seeds which cannot be taken out of the alfalfa seed, should be destroyed. An efficient irrigator can accomplish much in this direction while attending to the irrigation, but if extra help is required to cut out noxious weeds that help should be put on, for it

may mean the difference between a profitable crop and one which cannot be sold.

*Cultural methods:* Alfalfa seed is produced successfully in southern Idaho from normal stands as for hay, from broadcast seedings, and fields planted in rows of various widths. Location seems to have a greater influence on seed production than methods used in planting. In the western part of the seed-growing sections of southern Idaho the greater part of the alfalfa seed is produced from rather thin hay stands. Very little of it is produced in row-planted fields in that section of the state, but some of the fields there have been thinned to rows of varying widths by use of the plow or other tool. In the eastern part of the seed-growing sections of southern Idaho, particularly on the Aberdeen-Springfield tract, the greater percentage of alfalfa seed is produced from fields planted in rows. The rows vary in distance apart from 21 to 36 inches. Practically all of the Grimm alfalfa thus far grown on this tract is row-planted.

Weeds are a problem in the first-year seed fields. This is no doubt due to the use of the nurse crop the previous year and allowing the weeds to ripen and drop before the harvest and removal of the crop. During the second and following seasons, cultural methods, particularly where the first crop is used for the seed crop, should practically eliminate the weed nuisance. Good heavy disking after the alfalfa and the weeds have reached a height of about 6 inches will get practically all the weeds. If this method will not get the weeds, row-planting permitting cultivation may be necessary. Row-planting makes it easier to control the irrigation of the seed field, but the rows must run with the slope of the land. Planting with the slope of the land is necessary to avoid water pockets and prevent certain sections of the field from getting too much water. Rowed culture, however, has one drawback if row-cultivation is practiced. It is a little more difficult to harvest alfalfa seed grown in cultivated rows than it is to harvest the normal rowed seed field or the regular thickly planted field. The cultivator often leaves an uneven surface which interferes with the cutter-bar of the mower. The practice of dragging a wheel, similar in size to a mowing machine wheel, thru the rows after cultivation will usually smooth out the uneven surface sufficiently to prevent this trouble particularly if irrigation is practiced afterwards.

Alfalfa is usually planted with a nurse crop on irrigated lands. Both barley and wheat have been extensively used as nurse crops. It has recently been found however that field peas make an excellent nurse crop for alfalfa and they are now preferred to either wheat or barley. An advantage in the use of field peas is that they may be planted at the normal rate of seeding for the crop; a thick stand will not injure the alfalfa plants. On the Aberdeen Station both alfalfa and clover have been planted with peas for a nurse crop with most excellent results. The alfalfas and clovers grow more vigorously, probably because of the greater supply of nitrogen made available for them in the soil by the growing peas. The shading caused by a heavy growth of pea vines does not injure the young alfalfa or clover plants. In the use of a nurse crop with alfalfa it is to be remembered however that there usually comes a time in the growth of the plants when the welfare of one crop must be



sacrificed somewhat for the welfare of the other. That time usually comes just before harvest or at the last irrigation. The ripening period of the nurse crop comes at the hottest and driest period of the summer. That, too, is the most critical period in the life of the alfalfa crop; all haste possible should be made in harvesting and removing the nurse crop in order that water may be given the young alfalfa plants.

*Varieties:* In most of southern Idaho, and particularly in the upper half of the Snake River valley, hardy types of alfalfa should be planted. The Grimm variety, one of the hardiest types known in this country, is already firmly established on the Aberdeen-Springfield tract, and is being sown to some extent in other sections of the state. Experiments with Grimm, Baltic, Turkestan and Idaho Common alfalfa have been under way for several years on the Aberdeen Station; the first three mentioned are still under test. The tests thus far show that Grimm, Baltic and Idaho Common are most winter-resistant and are therefore best adapted to the upper half of the Snake River valley. Winter-killing has not been noticed to any appreciable extent in the Grimm and Baltic varieties. The Idaho Common lost a small part of its stand because of the severe winter in 1914. At the same time the stand of Turkestan was damaged heavily. Turkestan is not recommended for planting in southern Idaho.

Oakley and Westover\* of the United States Department of Agriculture have the following to say about Grimm alfalfa: "To the casual observer, Grimm alfalfa does not differ materially from the common strains, but a closer examination will reveal a greater diversity of forms, upright and decumbent individuals often occurring side by side. While a large percentage of the flowers are of the same color as those of common alfalfa, there are a few that are greenish, smoky, or blackish, and occasionally a plant is found with yellow flowers indicating quite definitely that the strain is the result of a cross between the common and yellow-flowered species. The tap roots show a tendency to branch and the crowns to be low-set and spreading, characters which are undoubtedly of great importance in rendering a variety resistant to cold. In ability to produce seed Grimm alfalfa is about equal to most of the common strains.

"The hardiness of Grimm alfalfa is probably due in part to the processes of natural selection which took place under the severe climatic conditions to which it was subject for a long period of years in Minnesota. On account of its superior hardiness the variety is particularly recommended for the northern part of the Great Plains region and all parts of the Northwest where little protection is afforded by the snow. It has also proved better able to survive the winters in the colder portions of the humid sections of the country, where winter killing is a serious factor.

"Carefully conducted tests with Grimm seed produced in Montana, Idaho, and the Dakotas indicate quite definitely that it has not decreased any in hardiness as a result of having been grown for one seed generation under these changed conditions. The supply of seed on the market is still, however, rather limited and commands a high price. As a result, unscrupulous dealers have offered for sale large quantities of common

\*Oakley, R. A., and Westover, H. L., Commercial Varieties of Alfalfa, U. S. Dept. Agr. Farmers' Bul. No. 757, 1916.

alfalfa under the name of Grimm. Because of this practice, prospective purchasers should take every means possible to learn whether seed is true to the name before buying."

The Baltic is similar to the Grimm in practically all of its characteristics; no difference can be distinguished between them at the Aberdeen Station.

*Seeding:* Alfalfa for seed production is being planted at rates varying from one to eight pounds per acre. Broadcast seeding and row-planting is practiced. Practically all of the Grimm being planted in southern Idaho is drilled in rows 21 to 28 inches apart. In row-seeding, from one to four pounds per acre are planted. The cost of seed and the desire to be able to cultivate the crop in order to keep out weeds, should it become necessary, have contributed somewhat in bringing about the general practice of row-planting. The main object attained by that method of seeding however is the more perfect control of irrigation, and a thinner, more open stand—conditions that make for greatest yields of seed. Very little common alfalfa is being planted in this state for seed production altho common alfalfa seed is still harvested from stands that

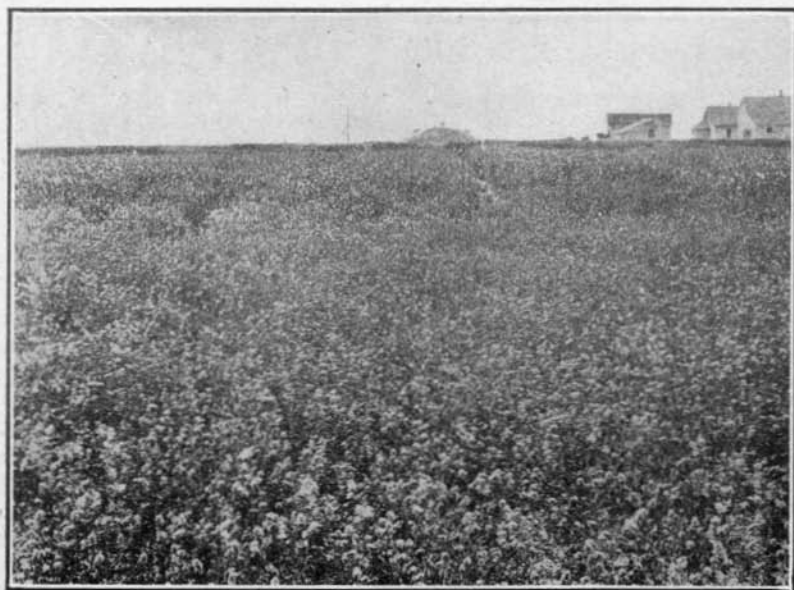


Fig. 2. Hay stand for seed production, irrigated land, Aberdeen Experiment Station.

have become too thin for hay production and from hay stands that have been thinned by mechanical means.

The proper time to plant alfalfa seed varies with season and elevation. Spring and early summer planting is most successful. When sown with a nurse crop the seed should be planted immediately following the planting of the nurse crop. If grain is used as a nurse crop a good prac-

tice, especially on lands which show a tendency to blow, is to delay the sowing of the alfalfa seed until the grain is up. Planting in grain stubble on land subject to blowing has also been found very practical. If peas are used for a nurse crop the alfalfa seed should be planted after the peas have been planted but before they come up. Where it is desired to plant alfalfa seed without a nurse crop, late spring and early summer planting can be successfully practiced. It is advisable in that case to irrigate the soil before planting, to work it down well, and to irrigate soon after planting until the plants are up and about two inches high.

Alfalfa seed should not be covered to a greater depth than one inch and it is better practice if a covering of not over one-half inch is given. The seed should be drilled. Drilling permits of sowing at a uniform depth and of an even distribution of seed; a good stand is secured with less seed than is required when broadcasting is practiced. Seeds sown broadcast are never covered uniformly; some are left partially exposed on the surface of the ground and some are so deeply buried that they cannot grow.

*Care of the seed field:* Alfalfa will produce a seed crop the same season it is sown if sowing has been early and the season is sufficiently long to permit of maturity. A small crop of seed has been obtained the first season by a few growers on the Aberdeen-Springfield tract at an elevation of 4400 feet. The practice of taking off a crop of seed the first season however is not to be encouraged. It is far better practice to clip the field before it is in full bloom and start a new growth from the crown for the purpose of developing larger and more vigorous plants next season and to guard against winter-killing. Practically all seed fields in the state are permitted to produce seed for the first time the second season after planting.

Some growers now practice sowing the seed field in rows 21 to 28 inches apart, taking three or four crops from it and then plowing it up, a new field being planted in the meantime. This system of treatment is practiced with Grimm alfalfa in particular because the rapid thickening of the fields soon renders seed production unprofitable. On very sloping land it is not necessary to plant in rows so far apart. A normal thin seeding from every drill hole can be made to yield seed crops successfully. Thickening up does not take place so rapidly either on land of pronounced slope. Over-irrigation, and insufficient cultivation to kill the new growth resulting from seeds lost in harvest, are largely responsible for the thickening up of alfalfa stands. Under-irrigation and severe cultivation will aid very greatly in holding growth in check from year to year.

As already stated, fertilization of the alfalfa flower takes place most readily when the weather is warm and dry. The alfalfa plant should be brought into full bloom during the hottest and driest time of the season, at which time the activity of insects is greatest. The time for bringing about full bloom varies with increase in elevation and also with the crop that is to be used for seed production. At lower elevations the first crop is usually cut for hay; the second is left for the production of seed. The hot dry season at lower elevations begins about the first of July and lasts several weeks. As the elevation increases the hot season comes on more slowly and is of shorter duration. At Aberdeen it begins about the

middle of July and lasts until the first of August. The bloom should be brought on as uniformly as possible; a prolonged vegetative growth and correspondingly long blossoming period are to be avoided as they are made at the expense of the seed crop. The bloom can be forced by the right use of irrigation water. A dwarfed growth is highly desirable as it is much easier to handle in regulating the blossoming period, which at the higher elevations should be reasonably short to insure the completion of seed-setting within a rather limited period. At lower elevations, where the season is very long, danger from frosts is slight and the period of seed-setting may be lengthened considerably without danger. A long period of seed-setting naturally results in a larger crop of seed than a short one and accounts for the large yields of alfalfa seed so frequently reported from the western part of the state.

At the higher elevations a full hay crop and a seed crop cannot be obtained the same season. Clipping, pasturing or severe cultivation up to about the middle of May, particularly the latter, are practiced to hold back the growth of the seed crop that the bloom may appear during the hot time of the summer. Care must be exercised not to pasture or clip too late for if the growth is late in coming into bloom there is not sufficient time for the setting of a full crop of seed and its perfect maturity and harvest before frosts occur. Late growth seed crops are undesirable because of the considerable amount of shriveled and frozen seed they usually contain.

*Irrigation:* Success in the production of seed rests very largely on the amount and time of application of irrigation water. From the standpoint of irrigation no two farms can be handled in exactly the same manner. Variations in soil require variations in methods of irrigation and amounts of water. Set rules for irrigation in the production of a crop of alfalfa seed are out of the question. The proper kind of plant growth must ever be the foremost consideration regardless of the amount of irrigation required to accomplish it. Some growers of alfalfa seed produce a seed crop with but one irrigation; some apply as many as four irrigations. The slope of the land and the kind of soil in use largely determine the amount of irrigation water required. Sloping or hilly, clay land requires more water than flat clay land; sandy land requires more water than clay land. New ground takes more water than old ground. Practices that are perfectly good for the production of seed on one farm are frequently entirely out of place on another.

Various methods of applying water are being used successfully. The greater portion of the upper Snake River country is irrigated by flooding. Corrugation and considerable flooding are practiced in the Twin Falls country and westward. Some fields are rowed considerably deeper than they are by ordinary corrugations for the irrigation of seed crops. Sub-irrigation is practiced to a very limited extent and in a very few sections of the state. All of these methods are satisfactory from the standpoint of irrigation, but row-irrigated fields cause some trouble in harvesting and the loss of some seed unless extra labor is employed. Flooding has been found to be very satisfactory at the Aberdeen Station. Less water is required by this method as the waste can be very largely prevent-



ed. Corrugation irrigation demands the running of small streams of water in corrugations until the subbing has taken place. Waste in water results particularly if clay land is being irrigated. Some lands however must be corrugated to prevent washing.

Heavy applications of irrigation water are to be avoided in the production of alfalfa seed. Control of the situation is more easily kept and growth more easily regulated by light, frequent applications of water. Some growers practice the irrigation of alfalfa seed fields in the fall. This practice has merit where irrigation water may be short during certain seasons of the year or where the spring growth is to be pastured off or clipped. The early growth is always heavier on fields where fall irrigation is practiced, and for this reason it is a doubtful practice in alfalfa seed production, as a comparatively thin, dwarfed growth is most desired.

*Thinning*: The practice of thinning old and thick stands for the production of seed is becoming quite general. Seed growers who do not care to plow up stands that are three or more years old go over the fields

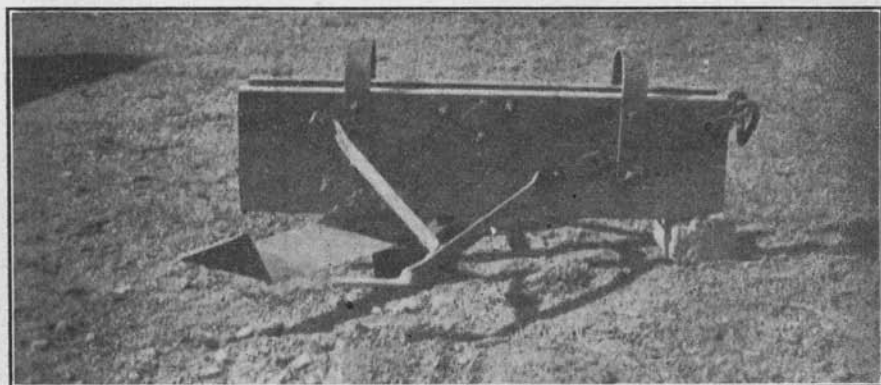


Fig. 3. Sled-like machine used in thinning alfalfa stands for seed production.

with various devices for cutting out strips of certain width. There are various machines used for this purpose. Figure 3 illustrates a sort of sled-like machine with a large knife on each side which has proven to be a very good tool for the thinning of alfalfa stands. The two-way plow with the moldboard removed also makes a very good tool for thinning out old stands. Some growers use the walking plow or the ordinary sulky for this kind of work. Some plows are made so that the moldboard can be removed. The share, well sharpened, then acts as a knife over which the crowns and soil slide as the plow is pulled along. In all work of thinning, shallow cutting or crowning is all that is necessary. With the work thoroughly done the cut-off crowns exposed to the sun and wind soon die. Irrigation should be withheld until the crowns are all dead.

Alfalfa fields if properly taken care of will live for many years. For reasons already explained, some seed growers find that the older the field grows, unless means are found for keeping the stand properly thinned,



the less valuable it becomes for seed production. Where thinning is practiced every few years the stands may be kept indefinitely for the production of seed. Old fields thus kept should really be the producers of the best seed for sowing locally and in other sections of the country where similar conditions prevail. Good farm practice, however, in the irrigated sections, demands the regular plowing up of alfalfa fields for the benefit of the soil and crops which follow. Rotation of crops should be practiced here as elsewhere in the state. When new stands for seed crops are so easily obtained as they are in irrigated sections there is little to be lost in plowing under old stands. A prominent grower of Grimm alfalfa seed on the Aberdeen-Springfield tract plows up his seed fields after three or four seed crops have been removed. Crop rotation is followed on this farm on which from 75 to 100 or more acres of Grimm alfalfa are always available for seed production. His rotation includes potatoes, cereals, and field peas.

*Yields:* Yields of alfalfa seed of from one to fifteen bushels per acre have been reported in southern Idaho. The average yields decrease with increase of elevation. Growers making a specialty of the alfalfa seed business average from four to seven bushels per acre. Higher averages are often reported from the western part of the state. In Owyhee County, and in sections of the Boise valley where seed is successfully produced, the yield per acre is usually greater than it is in the upper Snake River valley for reasons already mentioned. Some buyers however prefer the quality of seed produced in the upper Snake River valley. The more rigorous climate influences to some extent the quality of the seed produced and is responsible for this preference. The low average yields of alfalfa seed in southern Idaho can be attributed in part at least to inattention to details on the part of the grower in the production of the crop. The great interest now being manifested in alfalfa seed is however directing the attention of growers to the most approved methods of production. Yields in bushels per acre of Grimm alfalfa seed on the Aberdeen Station in 1914, 1915 and 1916 are tabulated below:

1914		1915		1916	
Clipped	Not clipped	Clipped	Not clipped	Clipped	Not clipped
Lost on account of wind	3.00	3.1	3.0	5.7	4.0

#### THE PRODUCTION OF ALFALFA SEED ON DRY LAND

The production of alfalfa seed on dry land is still in the experimental stage. Very few dry farmers have attempted seed production. The Aberdeen Station has produced alfalfa seed on dry land since 1914. The highest yield of seed was one bushel per acre obtained in 1916 from a field of the Grimm variety. The seed was somewhat shrunken, but viable. Moisture is the controlling factor in the production of seed on dry lands as it is on irrigated lands. Insufficient moisture to make a satisfactory seed crop is usually the cause of failure in the production of seed on dry lands. Seed production under dry-land conditions must, there-

fore, involve the use of hardy types of alfalfa, the practice of thin seeding and sowing in rows far apart. Hardy types are necessary to withstand the rigors of drouth and severe winters. Thin stands and rows far apart are necessary in order that the plants may get sufficient moisture for maturing seed.

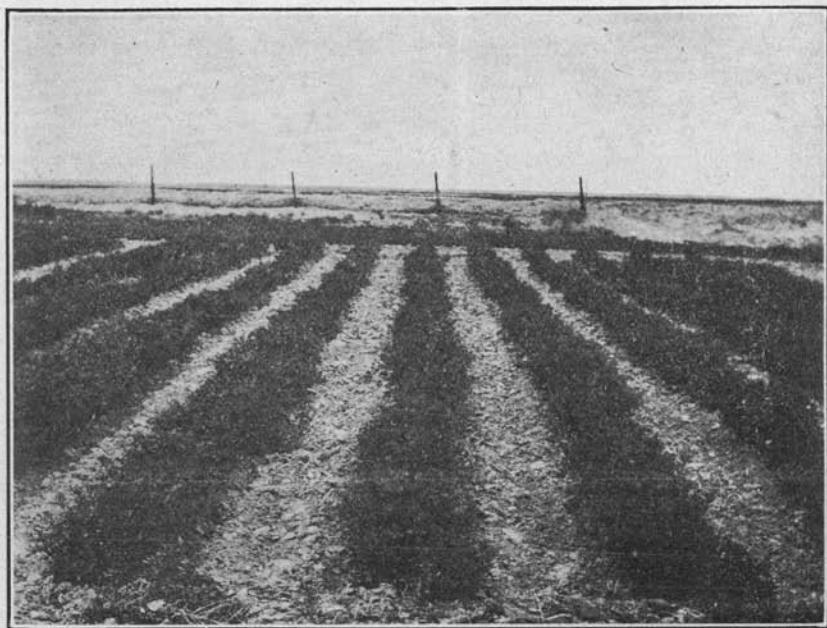


Fig. 4. Aberdeen Station. Grimm alfalfa for seed, 36-in. rows, dry land.

The distance between alfalfa seed rows on the Aberdeen Station varies from 7 to 60 inches. Alfalfa in rows 48 to 60 inches apart seem most promising. This distance apart of rows permits the plants to draw upon a fairly large area for their supply of moisture.

There is a comparatively large number of alfalfa fields planted for hay and forage on the dry lands of the state. The Cambridge district (Washington County), where there is an average rainfall approximating 18 inches, usually produces a good first crop of hay and occasionally a second crop, or considerable pasture. Seed production on dry land has probably been given more attention by farmers there than in any other dry-land section of the state. Very little of the Grimm, or closely related varieties of hardy alfalfa have as yet been planted in the Cambridge district. Several small fields of Grimm have been planted on the dry lands in eastern Idaho, but results in yields of seed have not as yet been obtained.

Bottom lands and deep loam bench lands, because of their greater moisture-holding capacity, seem best adapted to the production of dry-land alfalfa seed. It is not advisable to plant alfalfa for the production of seed on the Plains area where the soils are thin and their moisture-



Fig. 5. Alfalfa for seed production in the dry land section of the Big Willow Creek country near Payette.

holding capacity limited. Failures have already been recorded for that combination of conditions. Fall-plowed, or summer-fallowed land is best for the planting of alfalfa on dry farms. A firm, moist, seed-bed is highly desirable. If spring plowing must be used it is very essential that the land be well firmed by the use of a corrugated roller, or a disk with the disks set to run straight. A comparatively fine seed-bed must be made for alfalfa seed; they are small and will not germinate in the soil unless brought into close contact with the fine, moist soil particles. The fining of the seed-bed, however, must not be carried too far, or it will encourage soil blowing. Blowing soils are most difficult to hold down with any kind of crop. Hardy types of alfalfa, as the Grimm, are recommended for planting on the dry lands.

Rows for the production of alfalfa seed on dry land, as previously suggested, should not be less than 36 inches apart. Wider plantings are desirable on the Snake River Plains area. The narrower plantings are better adapted to the bench lands and to sections where fifteen inches or more of rainfall are received. The seed should be drilled in at a uniform depth of from one-half inch to one inch. Deeper planting is to be avoided. Early planting is desirable on dry land in order to get the crop up and well along before the dry weather of summer occurs. The plants are then better able to withstand drouth. The time of seeding varies with altitude. At the lower elevations April sowing can be practiced. At higher elevations

plantings can be made during the latter part of April or the first week in May. If possible, the plantings should follow a good rain.

A nurse crop should not be planted with alfalfa on dry land. Soil moisture available for plant growth will not be sufficient for the nurse crop and the alfalfa. The stronger, faster growing nurse crop will take it.

It is not advisable in the Plains area to clip or to pasture dry-land alfalfa intended for the production of seed, unless an unusual amount of rainfall has been received. In the Cambridge country, however, where a greater rainfall occurs than in the Plains area, it may at times be good practice to pasture off the crop for a short time, as the first growth is not satisfactory for seed production. Clipping might also be practiced in this section to advantage in the fields where the early growth is rank. Ordinarily, however, in dry-land areas the crop should be permitted to go to seed without clipping or pasturing in order that the plants may grow and mature the seed crop before the soil moisture is exhausted.

Cultivation for the control of weeds should be given during the early growth of the alfalfa plant. Alfalfa cultivators, springtooth harrows, disks, and harrows can be used in cultivation. Care should be exercised the first year after planting when the plants are small not to cultivate too severely. Row-culture crops, with rows wide apart, are more easily cut out by disks and other cultivating machinery than are broadcasted or thickly planted fields. Cultivation for the conservation of soil moisture should be given sparingly; moisture is actually lost from the soil by continually stirring its surface after a mulch is once made. Weeds use moisture and are not desirable in commercial seed crops; every effort should be made to kill them.

#### HARVESTING AND MARKETING THE ALFALFA SEED CROP

Excepting that grown at lower elevations, alfalfa seed should be harvested as soon as the greater portion has taken on a bright yellow color. At that time over one-half of the seed on the plants is hardened and ripe. At lower elevations where early fall frosts are less likely to occur, the entire crop may be permitted to thoroly ripen before it is harvested. The pods at the top of the plants ripen last. It frequently happens that seed may be well set on the lower branches of the plant, while the tips of the higher branches are still blooming. Some shattering of seed is almost certain to occur in harvesting, as it never ripens uniformly. Shattering, of course, can be reduced to the minimum if the crop is cut when slightly damp. In cutting, advantage is frequently taken of the dampness of the early morning hours. At the higher elevations, as from American Falls upward in the Snake River valley, the seed is seldom allowed to become thoroly ripened before it is harvested. The crop is frequently cut when only about half the pods are ripe and most of the seeds have turned yellow. Further ripening must take place in the cock. Heavy frost occurring a day or two after the harvesting of seed not hardened or ripe is capable of causing considerable loss.

Various machines are used in harvesting alfalfa seed. The self-rake reaper is the best machine and is used by nearly all growers of a large acreage. The mower with a windrowing attachment is also in



use by seed growers having a small acreage only. Cocking is much more easily accomplished and with less shattering of seed behind the reaper. To reduce the losses from shattering to a minimum, cocking or bunching should be done immediately after cutting. Small cocks should be made, not only that the seed may dry more quickly, but that each may be pitched onto the wagon in one forkful. Tearing apart a cock of ripened alfalfa results in a great deal of shattering and waste of seed.

After cutting, alfalfa should not be handled any more than is absolutely necessary. If hulling or threshing equipment is available, it is not necessary to stack the seed crop. If for any reason, however, the crop might have to be left in the field for a considerable length of time, danger of loss as the result of wind storms, fall rains, and the attack of insects, is sufficient to warrant the stacking of the crop. Seed stacks should be narrow and comparatively high. Wagons used to haul the seed to the stack-yard or to the huller in the field should have a tight bottom to prevent the loss of seed which shatters in handling. A strong canvas spread over the bottom of the wagon helps to prevent losses from shattering.



Fig. 6. Threshing alfalfa seed in the Springfield section, southern Idaho.

Seed direct from the huller or threshing machine is not fit to be placed on the market. Only a few of the growers of alfalfa seed in the state have re-cleaning outfits. Alfalfa seed is generally bought in the "dirt," on a "re-cleaned basis," or as re-cleaned seed ready for market. Most of the Idaho seed is bought on a re-cleaned basis and cleaned by the cleaning plants of the seed-buyers. Some seed is bought already re-cleaned and a considerable quantity is bought in the dirt. Buying in the dirt is something of a gamble and the seed grower who is not familiar with the value of seed in that condition usually gets the worst of the deal. In quoting a price on such seed, the seed buyer always makes it low enough to protect himself.

Until the seed growers become more familiar with the marketing of seed and the quality and kind of re-cleaning necessary to put up a good grade of seed, it is a good thing for the interests of the seed business in the state that central cleaning plants are in use. It is doubtful if small individual cleaning plants on growers' farms are economical or prac-



tical. The central cleaning plants in most instances are maintained in the larger seed-growing centers by representatives of several of the largest seed companies in the United States. A few privately-owned cleaning plants are in operation and a few of the larger seed growers are now installing cleaning plants for the seed they produce.

Only a small amount of the alfalfa seed produced in the state is sold cooperatively. Prices fluctuate greatly. Sometimes re-cleaning cannot be done immediately after threshing. The price of alfalfa seed is usually at its lowest during the time that hulling is at its height. Buyers take advantage of a flooded market, as a rule, and pay prices which later on

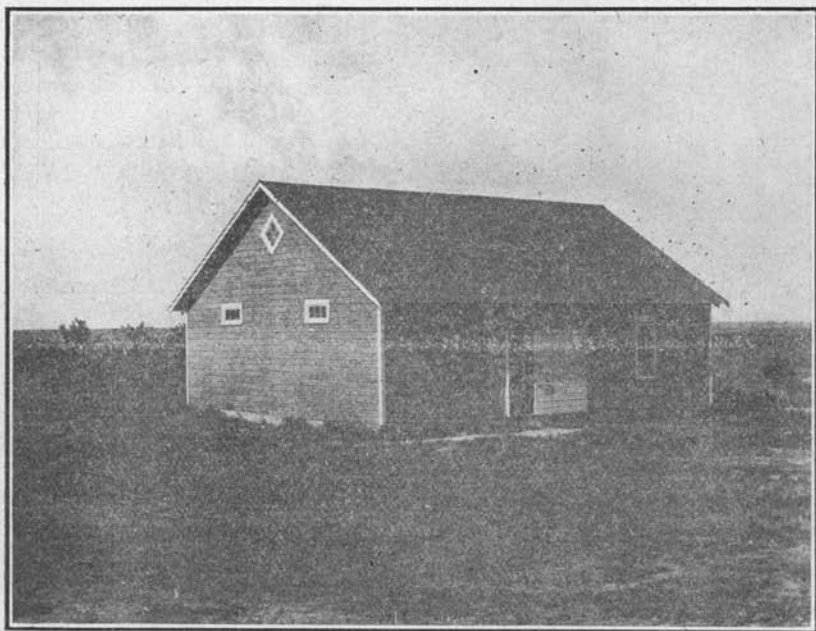


Fig. 7. An alfalfa seed warehouse and cleaning plant on the farm of H. K. Wiley, Springfield, Idaho.

in the season seem low. Rodents often cause considerable loss by chewing holes in bags of seed if placed where they can get to them. Growers of large acreages of alfalfa seed can annually save considerable money in cost of bags by providing suitable storage room for the seed that is taken direct from the huller or thresher. Fig. 7 is an illustration of a suitable storage house for alfalfa seed.

Relative prices paid for alfalfa seed in Idaho are based on purity and color. The presence of weed seeds has a greater influence on price than color, unless the seed has been badly frosted. At the present time the price of alfalfa seed is arbitrarily made by the local buyer and not altogether in accord with prices prevailing in the general seed market. "Scoops" are frequently reported in which buyers, knowing the market better than the seed growers, pick up good lots of seed at their own

prices. It is seldom that a "scoop" can be made on the same grower twice. Experience of that kind makes him do what he should have done before he sold—investigate the market situation. Investigation is a good thing for all growers. It sometimes happens that they are forced to carry over a quantity of seed because they asked more than the market would stand.

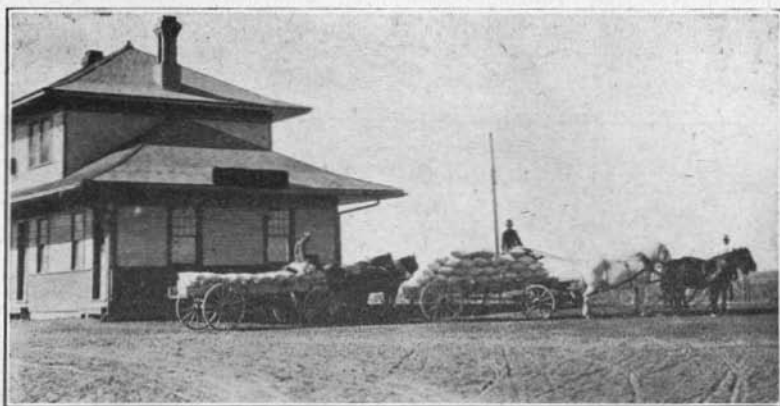


Fig. 8. Marketing alfalfa seed, southern Idaho.

The operation of the Idaho Pure Seed Law is having a wholesome effect on both the producer and the buyer. On the whole, Idaho growers obtain a higher price for their seed than do the growers of alfalfa seed in other states. The higher price realized in a measure is due to the reputation which Idaho seed has earned for vitality and purity. The color of Idaho seed also adds greatly to its sale.

It is unfortunate that all of Idaho's alfalfa seed is not sold on its real merit in competition with Eastern and foreign-grown seed instead of being used to blend with them to make them more readily marketable. If real competition could be brought about, the prices obtained for Idaho grown seed would greatly stimulate production. It is realized that the alfalfa seed crop of southern Idaho is a small part only of the alfalfa seed required annually in the United States, but there is almost unlimited capacity for increased production, and that will follow if the price of the crop to the grower warrants. A uniform alfalfa seed standard similar in nature to the corn, cotton and wheat standards already established by the United States Department of Agriculture is highly desired in Idaho. These standards put a premium on high-grade commodities and cause them to be sold on merit. A uniform alfalfa seed standard would secure for the conscientious seed grower a reward for the extra effort required in the production of pure and high-quality seed. It would also tend to curb speculation in alfalfa seed and thereby give the grower a better opportunity than he has now to secure more nearly the actual value of his crop. The standard for alfalfa seed could be so formulated to include grades based on color, purity and vitality as indicated by the plumpness of the seed.