Alfalfa Seed: Producing the Crop

Ralph E. Johnston

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ALFALFA SEED

Producing the Crop

SOUTH DAKOTA

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A L F A L F A S E E D
in
South Dakota

By
Ralph E. Johnston
Extension Agronomist.

Chapter On
A L F A L F A I N S E C T S

By
A. L. Ford
Specialist in Entomology.

Acknowledgment is hereby made of assistance received from:

Dr. A. N. Hume, Brookings, S. Dak.
Agronomist, State College.
Mr. Nick Caspers, Rapid City, S. Dak.
Mr. H. F. Hunscheier, Bristol, S. Dak.
Extensive Alfalfa Grower.
ALFALFA SEED. PRODUCING THE CROP. SOUTH DAKOTA.

The production of alfalfa seed is an important enterprise on many central and western South Dakota farms. South Dakota alfalfa seed has long been in demand for planting in the northern states. All South Dakota farmers who produce alfalfa seed should become familiar with the market demands for this crop and earnestly strive to meet these demands in the quality of seed produced.

The first alfalfa planted in South Dakota was in the northern Black Hills regions. This was about 1880 and some of these old fields are still producing profitable crops. These fields are the first of the now famous Western South Dakota No. 12 alfalfa. Western South Dakota is a natural alfalfa country. From the very first, fields produced seed, and year after year the acreage has increased, gradually spreading into Eastern South Dakota and Eastern states.

ALFALFA ACREAGE IN SOUTH DAKOTA.

<table>
<thead>
<tr>
<th>Federal Census</th>
<th>State Tax Commission</th>
</tr>
</thead>
<tbody>
<tr>
<td>1900........13,029 acres</td>
<td>1921........484,072 acres</td>
</tr>
<tr>
<td>1910........66,163 acres</td>
<td>1922........518,351 acres</td>
</tr>
<tr>
<td>1920........462,231 acres</td>
<td>1923........565,941 acres</td>
</tr>
</tbody>
</table>
Alfalfa Acreage in South Dakota for 1923.
Each dot represents 1000 acres.

-State Tax Commission.
The South Dakota Experiment Station planted alfalfa in their trials for the first time in 1887. This work was continued year after year but it was greatly increased in 1899 when the Highmore Sub-Station was established. At this time, seed of Turkestan alfalfa was planted. In 1902 the first Grimm alfalfa seed was planted. In 1905 seed of the Baltic alfalfa was planted. In 1907 seed of the Cossack alfalfa was planted. Many different alfalfas from all parts of the world have been tested by the Experiment Station. This work was of great value in the early stages of alfalfa growing in South Dakota. Any farmer interested in following these experiments can secure complete reports of them in the following South Dakota Experiment Station Bulletins, Nos. 66, 69, 74, 94, 96, 101, 115, 120, 133, 141, 163, 167.

The three principal varieties of alfalfa in South Dakota are: Western South Dakota No. 12; Cossack; Grimm. These are the three varieties of commercial importance as regards seed production.

This alfalfa comes from the first plantings in Butte and Meade counties, South Dakota, made about 1880. All genuine S. D. No. 12 alfalfa should trace back to these old fields. There are more acres of this alfalfa in South Dakota than any other kind. Growers who have
fields of the genuine S. D. No. 12 should keep them pure. The names of Sam Moore and Seth Bullock will always stand out as two men who pioneered in establishing this alfalfa in western South Dakota.

This is a strain of Western South Dakota which has received special propagation work. The original seed was first secured near the town of Vale in Southern Butte county. Only a limited number of growers now have the genuine Vale alfalfa. It has equalled every other alfalfa on trial in Experiment Station tests in yield of hay. Only a very small quantity of seed is produced.

The United States Department of Agriculture introduced several small lots of alfalfa seed from Turkestan in 1898. This first seed from Turkestan proved successful in the cold, dry portion of the United States. This caused a demand for Turkestan seed and ever since, this class of seed has been secured from all parts of Turkestan where alfalfa seed could be obtained. Commercial Turkestan alfalfa is inferior to the Common American-grown strains and is not a desirable variety. There is very little of this seed grown in S. D. South Dakota should concentrate on the Western S. Dak. No. 12.
The original seed of this alfalfa was gathered from a single plant growing wild in the central Volga River region, Russia. It was introduced into the United States in 1907 by Prof. N. E. Hansen of the South Dakota Experiment Station. Prof. Hansen increased the seed and plants of the Cossack and made wide distribution of the plants in 1911 and 1912. Cossack alfalfa varies greatly in color of flower, ranging from different shades of purple, green and yellow, even to clear white. Cossack flowers vary in color even more than the genuine Grimm. Cossack is a very hardy alfalfa. It is not yet as widely planted in South Dakota as the Grimm. There is not now as big a demand for seed of the Cossack as the Grimm. Cossack seed, because of the small supply, has sold for big prices until the past two years. It is now selling on a par with Grimm seed and on such a basis the market for Cossack will no doubt greatly widen.

All genuine Grimm alfalfa seed traces back to the original seed brought into Carver County, Minn., from Germany by Wendelin Grimm, in 1857. The first genuine Grimm brought into South Dakota was planted in 1902 on the Experiment Station grounds. Many South Dakota Grimm fields trace back to this seed, while many other fields trace back to the original Grimm field through the early seed sales of Mr. A. B. Lyman and through the seed distribution of
the United States Department of Agriculture. Grimm alfalfa has variegated flowers ranging from dark purple to yellow. This variety has proved to be very hardy and there is a steady demand for genuine seed from the northern states.

This alfalfa gets its name because it was first grown near Baltic, Minnehaha County, South Dakota. The original source of this seed is unknown. The Baltic alfalfa first came to the attention of the South Dakota Experiment Station in 1905, but it had been grown in Minnehaha County since about 1895. The Baltic is a very hardy alfalfa. Careful tests indicate that it is practically identical with the Grimm.

There is need for standardization of the alfalfa varieties in South Dakota. A standard list would be the Western South Dakota No. 12, Cossack and Grimm, which are the three kinds of commercial importance so far as seed production is concerned. Individuals and communities, and in some instances counties, could well concentrate on one variety for seed production.

Note: - For a more detailed description of alfalfa varieties, see Farmers' Bulletin No. 757 entitled, "Commercial Varieties of Alfalfa".
Where Alfalfa Seed is Produced in South Dakota.
Average Yield for Years 1921 & 1922.
Each dot represents 100 bushels.
The total production of alfalfa seed in South Dakota varies considerably from year to year. During the past five years the production has been as follows:—

<table>
<thead>
<tr>
<th>Year</th>
<th>Production (Bushels)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1918</td>
<td>25,446</td>
</tr>
<tr>
<td>1919</td>
<td>38,667</td>
</tr>
<tr>
<td>1920</td>
<td>22,284</td>
</tr>
<tr>
<td>1921</td>
<td>54,783</td>
</tr>
<tr>
<td>1922</td>
<td>40,398</td>
</tr>
</tbody>
</table>

Alfalfa seed is produced to be sold for seeding purposes. Every South Dakota alfalfa seed grower must therefore give serious thought to the demands of the market to which he is expecting to sell his seed. The largest market for South Dakota seed is the country of the northern United States, north and east of South Dakota.

Every South Dakota alfalfa seed grower must also recognize the fact that there are other states also producing alfalfa seed for this same market. These are the states of North Dakota, Montana, Wyoming and Idaho.
States That Should Plant South Dakota Alfalfa Seed.

Recommended for:
- North Dakota
- South Dakota
- Minnesota
- Iowa
- Wisconsin
- Illinois
- Michigan
- Indiana
- Ohio
- New York
- Pennsylvania
- New Jersey
- New England States

Another important factor which has a direct bearing upon the marketing of South Dakota alfalfa seed is the quantity of imported alfalfa seed.
### Alfalfa Seed Imports

Year Ending June 30th, except for 1924 which is May 31.

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1924</td>
<td>12,087,500 lbs.</td>
</tr>
<tr>
<td>1923</td>
<td>8,784,000 lbs.</td>
</tr>
<tr>
<td>1922</td>
<td>7,259,100 lbs.</td>
</tr>
<tr>
<td>1921</td>
<td>941,600 lbs.</td>
</tr>
<tr>
<td>1920</td>
<td>18,831,100 lbs.</td>
</tr>
<tr>
<td>1919</td>
<td>770,400 lbs.</td>
</tr>
<tr>
<td>1918</td>
<td>44,700 lbs.</td>
</tr>
<tr>
<td>1917</td>
<td>3,169,600 lbs.</td>
</tr>
<tr>
<td>1916</td>
<td>3,251,796 lbs.</td>
</tr>
<tr>
<td>1915</td>
<td>6,950,000 lbs.</td>
</tr>
<tr>
<td>1914</td>
<td>5,203,000 lbs.</td>
</tr>
<tr>
<td>1913</td>
<td>6,104,000 lbs.</td>
</tr>
<tr>
<td>1912</td>
<td>3,394,000 lbs.</td>
</tr>
<tr>
<td>1911</td>
<td>1,272,000 lbs.</td>
</tr>
</tbody>
</table>

It is interesting to know the countries from which most of this seed was exported. In 1919 Italy sent us 385,500 pounds and France and Siberia a total of about 300,000 pounds, each about an equal amount. In 1920 Italy sent over 9,000,000 pounds, Siberia over 3,500,000 pounds, (seed of Turkestan origin), Argentine nearly 2,500,000 pounds and England and France more than 1,000,000 pounds each. In 1921 Argentine sent 385,000 pounds and France and Italy a total of 300,000 pounds, each about an equal amount. In 1922 Argentine sent over 6,500,000 pounds and Chile and South Africa a total of about 300,000 pounds, each about an equal amount. In 1923, Argentine sent over 7,750,000 pounds, England 575,500 pounds (seed of Turkestan origin).
This imported seed generally sells at a lower price than the home grown seed. Thus South Dakota growers must compete with this lower priced seed, which is a factor to be considered. Much of this imported seed is not of the kind that farmers in the northern United States should plant. These farmers would much rather buy hardy, northern grown seed if they can get a good quality seed at a reasonable price. A careful study of the bulletins and circulars issued by the Agricultural Colleges of the northern states, will convince every South Dakota alfalfa seed grower that the farmers in these states are continually being cautioned to plant hardy seed. Likewise a study of the catalogs of the seed companies doing business in these states will show that these firms are striving to meet this demand by offering such seed as Western South Dakota No. 12, Cossack and Grimm.

PRODUCE WHAT THE MARKET WANTS.

South Dakota growers must know the competition which they have to meet; also the markets for which they are producing alfalfa seed and what these markets are demanding. These market requirements may be stated and summarized as follows: -

1. Seed from hardy varieties.
2. Genuine true-to-name seed.
3. Clean seed of high quality.
4. No dodder in seed.
5. Sold at a reasonable price.
1. South Dakota growers can supply seed of the hardy kinds of alfalfa. Buyers can choose from the genuine Western South Dakota No. 12; Baltic; Cossack or Grimm. Just now South Dakota grown alfalfa seed has an excellent name for hardiness and all growers should consider it a personal matter to do all in their power to keep this good name.

2. When a farmer buys alfalfa seed he wants to get the kind of seed for which he pays out his money. If a man wants Cossack or Grimm seed he wants the genuine article and not some other kind sold under either of these names. Alfalfa seed buyers of the Cossack or Grimm varieties are demanding proof of what they are getting. This is their privilege and South Dakota growers must meet this demand if they are to hold their markets. Competition in the marketing of seed of these varieties, especially the Grimm, is becoming stronger with each year. South Dakota growers can satisfy the markets on the question of genuineness by registering their fields. This work is under the direction of the South Dakota Crop Improvement Association, Brookings, South Dakota, from whom particulars can be secured. The South Dakota Grimm Growers Association closely cooperates with the Crop Improvement Association in all matters relating to the Grimm alfalfa fields.
3. Most of the buyers of South Dakota alfalfa seed want it free from weed seeds and of a high germination, which means seed of a good color. Many South Dakota alfalfa seed growers are entirely too careless about allowing weeds to grow in their fields and also about their seed harvesting and threshing methods. If a seed crop is to be harvested from an alfalfa field, every grower should strive to so manage his field that he will produce a crop that can easily be put into proper shape to bring the highest market price. Good cleaning equipment can be used to put dirty, weedy and poor quality alfalfa seed in fair shape to go onto the market. All such work however, costs money which means a smaller net return. Also, such seed can never be made to bring the highest market price.

The cooperative marketing of alfalfa seed makes it possible for growers to put on the market a first class quality product. This type of marketing permits the securing of the proper kind of machinery which is impossible with individual growers. An excellent example of this type of cooperation is the Western South Dakota Alfalfa Seed Growers Exchange, Rapid City, S. Dak.

4. No South Dakota alfalfa seed containing DODDER should ever be offered for sale, except as this fact is made known to the buyer. South Dakota grown alfalfa seed is beginning
to get a "black-eye" with respect to the dodder it contains. There is absolutely no excuse for a producer of alfalfa seed in South Dakota to long have dodder in his fields. It is absolutely essential to the future prosperity of all alfalfa seed growers that every "patch" of dodder in the seed producing fields in South Dakota be eradicated and that close watch be kept to see that no new areas get started. Every seed grower who has dodder in his fields and who fails to destroy it, is an enemy to the alfalfa seed business.

Dodder is a noxious weed which is legislated against in every seed law in every state which makes up the market for South Dakota alfalfa seed. Many states will not allow to be sold in their state, any alfalfa seed containing dodder. All states which are not this strict will allow only a "trace" and then this fact must be stated on the shipping tag. Further facts in regard to dodder can be obtained by reading Farmers' Bulletin No. 1161 entitled, "DODDER". Write the U. S. Department of Agriculture, Washington, D. C., or the Extension Service, State College, Brookings, South Dakota, for a copy.
5. Alfalfa seed must be produced at a cost which will allow it to be sold at a reasonable price. South Dakota growers must recognize that alfalfa seed is produced in many western states of the United States, also in Canada and in foreign countries and that they have to compete on the markets with much of this seed.

No general discourse on the culture of alfalfa will be given in this circular. All of the important points in regard to securing a stand of alfalfa are covered in Extension Circular 193, entitled, "Alfalfa in South Dakota". Most South Dakota farmers who plant alfalfa do not plant it especially for the production of the seed. Alfalfa is a combination crop - furnishing pasture, hay and seed. Many South Dakota farmers will continue to plant alfalfa for these several uses, but where a new field is to be established, and seed production is to be one of the major points, it is well to consider the factors for a successful seed producing field.

For seed production plant alfalfa thin. It can be planted either broadcast or in rows. Over most of central and western South Dakota a light seeding, from 5 to 7 pounds of good, clean seed, planted broadcast with drill is recommended. When only small amounts of seed are planted, it is very important that
the best of seed be used, that a very good seed bed be prepared and that very careful seeding methods be followed.

The planting in rows, more especially for seed production, is recommended only for the higher lands in the drier parts of the state. On some of the heavy "gumbo" soils this method is followed. From two to three pounds of good seed planted in rows 36 to 42 inches apart is sufficient to make a good stand. Planting can be done with a variety of machines such as: 1. The corn planter equipped with special plates and gauge to prevent too deep planting. 2. The ordinary grain drill with all holes plugged or hopper partitioned off so that only the proper holes are open for seeding. 3. The small garden seeder, or two of them fastened proper distance apart, for seeding small areas.

If a seed crop of desirable quality is to be produced, some attention must be given to the care of the field. Since most alfalfa fields in South Dakota are supposed to yield at least one crop of hay, and also seed, the principal point of field management is to keep out all weeds. This is not always an easy task. Careful handling of the field through a term of years and judicious cultivation, will do much to keep a stand of vigorous growing plants, with but few weeds.
A field of alfalfa intended to produce seed should be planted on clean land and then every practical effort made to keep out the weeds. Fields that are very weedy should not be allowed to produce seed, not until most of the weeds are eradicated. Cultivation with the light-draft harrow fitted with special alfalfa teeth, the spring tooth harrow, or any like machines, does the most good. The common disk harrow, set at a small angle and the common spike tooth harrow, will do much good if used when the weeds are small. Row alfalfa can be cultivated with any of the corn cultivators. Cultivation should be done when there is sufficient moisture in the soil to do effective work.

Every alfalfa field intended for seed production should be thoroughly inspected for such noxious weeds as DCPDEER, sweet clover and small flowered Morning Glory or Bindweed, and all such weeds entirely eradicated or the field not saved for seed. Other weeds commonly found in alfalfa fields and which are difficult to clean out of the seed are: Russian Thistle, Green Foxtail, Lambsquarters, the small seeds of Wild Buckwheat. Other weeds of common occurrence in alfalfa fields are: Mustards (different kinds); Pigweeds; Wild Sunflower and Gumweed. Weeds and a high quality of alfalfa seed cannot be produced on the same field. Manage the alfalfa field so as to get rid of the weeds or stop trying to produce seed. There is no profit in producing a weedy seed crop.
The exact conditions which make for a good alfalfa seed crop vary greatly with the variations in climatic conditions during the growing period of the different years. Every grower must determine the best methods to follow in his particular section, very largely from practical experience, but the following points may be of some help.

**When To Save The First Crop.**

The first crop of alfalfa is generally saved for seed under the following conditions.

1. On the higher, drier, heavy-gumbo-soils, or poorer soils, of western South Dakota, especially when drought comes at blossoming time.

2. When planted in rows over most of South Dakota, and growing conditions - such as soil moisture, rainfall, atmosphere - are rather dry at blossoming time. If weather is moist at blossoming time then cut first crop for hay.

3. In central and northwestern South Dakota, and on the higher lands of northeastern South Dakota, on fields planted in rows, or a thin stand of broadcasted plants, when first crop is late in blossoming and weather gives signs of "turning-off" dry.
If such a crop is left and weather changes to sufficient rainfall to start second crop of stems, and blossoms fail to be setting seed, then cut crop for hay.

When To Save The Second Crop.

The second crop is the one which, during normal years, makes the seed crop on most South Dakota farms. This applies particularly to central and northern South Dakota and all the creek and river bottom fields in western South Dakota.

1. Cutting the first crop for hay helps to keep the field free of weeds. The second crop should come on quickly and give a cleaner crop of seed.

2. Take the first crop off rather early. Over the best producing sections - central and western South Dakota - this generally permits the second crop to get a good start, with sufficient moisture in the soil to make the necessary amount of stem growth, the blossoms to form and seed to set, before the driest part of the year. If the season promises more than the ordinary amount of moisture, the first crop may well be left on the land a little longer.

3. Where the alfalfa grows rank the first crop is generally too heavy and thick to produce seed. Such stands shut off a free circulation of air and sunshine, both of which
seem to be necessary for a good set of seed. The second crop generally does not grow so vigorous and hence gives greater opportunity for the blossoms to form and seed to set.

4. The second crop usually comes into blossom during a drier part of the year when conditions are better for pollinating the flowers. A dry atmosphere, bright sunshine, plenty of wind, and just enough moisture in the soil to support a rather small growth of the alfalfa plants, seem to be the best conditions for setting the seed. If the second crop can be brought to the blooming and seed-setting period under these conditions, there are good chances of securing a crop of seed.

When To Save The Third Crop.

1. The third crop seldom produces seed in South Dakota. In the extreme eastern and southeastern part of the state, during abnormal seasons, which are favorable for alfalfa seed production, the third crop does produce some seed. During years when the second crop is harvested early and there is a late fall, with only normal or slightly below normal early fall rains, seed will set and mature. In this section of the state, alfalfa is produced mainly for hay, but under these conditions seed can be harvested.
2. When the second crop has been left for seed and it fails to "set", a try can be made for seed on the third crop. Whenever an excess of moisture causes a large growth of vine, or the blossoms fail to pollinate, the second crop should be cut, just as soon as these facts show up. If conditions come just about right, as described in the preceding paragraph, seed may be secured.

It is well to state in the beginning that all experiments undertaken to help solve the problem of alfalfa seed setting have thus far fallen far short of its solution. The production of alfalfa seed is a peculiar combination of many forces, mostly climatic, the important ones being soil moisture, rainfall, temperature and winds. Wherever alfalfa can be grown, climatic factors are of more importance than soil factors. The seed grower can only study these factors as they apply to his conditions and strive to handle his fields the best way possible so they will meet the most of the "seed-setting" factors. No grower can expect to produce a profitable seed crop every year.

The following points are known to be important factors in this big problem of alfalfa seed setting:
1. A thin seeding is desirable for seed production. Alfalfa is a desert-like plant and does best when by itself. Thus a thin seeding permits of a greater development of the individual plants. Also with the thin seeding a greater amount of sunlight can reach each plant - a factor which tends toward greater seed production.

2. The moisture content of the soil in the alfalfa field is a very important factor. This should be sufficient to supply the needs of the alfalfa until it matures its seed, but not enough to induce great vegetative growth, especially a new crop. The ideal condition is when there is the right amount of moisture in the soil and no more. If an abundance of rain is received, the growth of stem will be rank and no seed will be produced. If the moisture in the soil is not ample to mature the seed crop, and no additional rainfall is received, very little seed will be produced. Very little rainfall should be received from the time the blossoms begin to appear, but there should be a sufficient amount in the soil.
If the soil moisture is not ample to mature the seed crop, but enough to carry the plants safely through the blooming period until the seed has begun to form, then more rain can be received with great benefit. Just enough should come to supply the needs of the plants for maturing the seed. Some of the very best seed producing alfalfa fields are on soils where the water-table is near enough to the surface so that the alfalfa roots can get sufficient moisture from this source. Thus with a supply of moisture from below, and no rainfall, almost ideal conditions are found for seed production. Damp, cloudy days are especially damaging to the seed crop at the time the blossoms are pollinating. Each alfalfa flower must first be pollinated before seed can be formed. Many experiments have been conducted to obtain the facts in regard to the pollination of the alfalfa flower. The reproductive organs of the alfalfa flower are tightly held within the flower. These organs must be released - called "tripping" - if a good set of seed is to be made. The act of tripping may be automatic, caused very largely by the combination of the proper amount of moisture in the plant, and bright, hot sunshine. Flowers that are not tripped rarely form any seed.

3. A relatively high temperature is best when the alfalfa plants are setting and developing seed. A cool season with damp, cloudy days, is unfavorable for seed production. Extremely high temperatures with hot, dry winds are detrimental
to seed setting. Such a combination often results in serious harm to the flowers, causing them to dry up and drop off the plants. Windy days together with a warm atmosphere and bright sunshine, favor a good set of seed.

4. Insects are a factor in the "setting" of a crop of alfalfa seed. The tripping of the alfalfa flower has been explained. Insects help to do this work which is so essential. Insects also help to carry the pollen from the alfalfa flower of one plant to the flower of another plant. This is called cross-pollination and results in a larger seed yield. Bumble bees and leaf cutting bees are the most efficient in tripping alfalfa flowers. Honeybees secure much honey but trip few flowers. Night-flying insects and butterflies are of little or no value.

A summary of the factors making for maximum seed production are:

1. Thin stands.
2. Sufficient amount of moisture in the soil but no excess, or the alfalfa roots reaching the water-table.
3. No rain at time of pollinating.
4. Warm, dry, sunny weather from time of blossoming until seed is formed.
5. Some wind, but not excessively hot and dry winds.
6. Numerous insects, especially those that trip the alfalfa flowers and help in cross-pollination.
In harvesting a crop of alfalfa seed it is very important to cut the crop at the proper time and also to prevent the loss of seed. Careful harvesting must be done on some soils, to avoid picking up numerous small stones and pieces of gumbo. This applies mainly to row alfalfa and when the crop is cut close to the ground or the land raked.

**Time To Cut.**

All the alfalfa seed pods do not ripen at the same time. The pods at the top of the plants ripen last. Some shattering of seed is almost certain to occur in harvesting, as it never ripens uniformly. It is necessary to cut the crop when the greatest percentage of the good seed can be saved without trying to save either the earliest or the latest maturing seed. The usual practice is to cut when one-half to two-thirds or more of the pods have turned brown. Most farmers cut their seed too soon. The seed will ripen some in the cock. If the crop is late in maturing, it may be necessary to cut some time before the proper signs appear as a heavy frost on the seed when uncut, or a day or two after harvest, will cause considerable loss.

**Harvesting Machines.**

The methods and machines used in harvesting a
crop of alfalfa seed may mean the difference between profit and no profit. Starting with the cutting operation, it has been found that the most satisfactory machines for that purpose are those that cut the crop and automatically rake it, leaving it in small unbound bunches.

The modern self-rake reaper is perhaps the best machine. This implement handles the crop with very little shattering and places it in small bunches out of the way of the machine for the next round. This is perhaps the most satisfactory machine for all fields and it is used extensively upon the large fields in the alfalfa seed raising districts.

The ordinary grain binder is also used, both with and without the binding part. If the crop is tall enough to bind, then the binding attachment can be left on and loose bundles made. These bundles must be set up in shocks in order that the straw can properly and thoroughly dry out. The binder can also be used by removing the binding part and letting the bundles come out loose, dropping onto the carrier which is dumped to make cocks of the proper size. Flax harvesting attachments for binders are also useful.
The mower with windrowning attachment is used by some seed growers. This windrowning attachment is a set of curved steel fingers attached to the rear of the cutter bar which rolls the falling alfalfa into a windrow. This removes the alfalfa from the swath into a windrow, out of the way for the next round. If a bunching attachment is added, then the alfalfa can be left in bunches instead of in a long windrow. If no buncher is added to the windrower then it will be necessary to make small bunches or cocks by hand. The mower without any attachment whatever is sometimes used. The crop is then put up the same as hay. This is a poor method, however, as there is considerable loss of the seed. If the crop is cut by this method do so in the early morning when there is dew on the plants or when it is damp. If the simple "dropper" or "buncher" is attached to the mower it is an improvement. This device puts the cut alfalfa in small bunches to one side out of the way of the mower on the next round. If the bunches are left in the way there will be considerable loss of seed by trampling, especially if the crop is dry. Set the mower to leave a HIGH stubble. This is important. Close cutting leaves no protection and alfalfa plants may kill out during the winter.

Care After Cutting.

There is considerable objection to leaving the
Alfalfa in loose bunches or in open windrows, and unless the weather is very favorable, and the purpose is to thresh at once, it is best to follow the mower closely, placing the alfalfa in larger piles or cocks, about what a man can lift at one fork-full. This avoids pulling the bunches apart in loading, which causes the pods to break off and the seed to shatter. When the alfalfa is placed in cocks at once the seed is prevented from bleaching and the straw settles and sheds rain better. After cutting and cocking, the alfalfa should not be handled any more than is necessary. If it can be hulled or threshed very soon after cutting, or as soon as it is ready, then it is not necessary to stack. When alfalfa is ripe it can be threshed, in many cases, after curing one week. If the crop must be left in the field for any considerable length of time, it is best to stack as preventive against loss from insects, windstorms and fall rains. Rain on the seed-pods causes shattering and loss of seed, also discoloring and sprouting which lowers its value. Seed stacks should be narrow and rather high. Also tops protected from rain. The crop must be thoroughly dry before stacking. Careful handling and but little tramping save seed. The wagons used to haul the crop to the stack yard or to the huller should have tight bottoms and a canvas can well be spread over the bottom to save the seed that will shatter.
Threshing should be done only when the crop is perfectly dry and especially so when it is necessary to use a grain separator. Alfalfa, when dry, usually threshes easily, but it is hard to save. The regular alfalfa or clover huller is the best machine but if this machine is not available, the later models of grain separators equipped with special alfalfa hulling attachment, is the next best. By screwing down the concaves and providing a special set of alfalfa sieves, fairly satisfactory results can be obtained. There are corrugated teeth manufactured especially for threshing alfalfa, which can be used in place of the smooth teeth. By the use of these teeth and setting the concaves well against the cylinder, then running the machine rather slowly, satisfactory work can be done. This will of course require close attention to the machine and it must be properly adjusted. Care must be taken not to run the machine too fast as seed will be carried over. It may pay to thresh the straw twice.

The theresher should be thoroughly cleaned when changing from such crops as sweet clover, red clover, or grain crop containing many weeds, to the alfalfa seed crop. A good clean crop of alfalfa seed can be greatly harmed by not paying attention to this point. When changing from one variety of alfalfa to another, the machine MUST be thoroughly cleaned. This point must be very rigidly adhered to in producing genuine Baltic, Cossack or Grimm seed. Insist on a clean machine. Alfalfa growers in a community should cooperate on this point.
Marketing The Seed Crop.

The alfalfa seed crop is produced to be marketed as seed for seeding purposes. This circular has been written with this very important point in mind. A class of seed should be grown such as will bring the highest possible price. A summary of the most important production points, as they vitally affect marketing are:

1. Produce a clean product. This means proper care of fields to keep out weeds, especially all NOXICUS weeds and those difficult to separate from the alfalfa seed.

2. Produce a quality product. This means proper harvesting methods, subsequent care, threshing and storage.

3. Produce a genuine product. This means that Western South Dakota No. 12 will trace back to the genuine old western South Dakota fields. Also that Baltic, Cossack and Grimm will be genuine, true-to-name seed, and not Common seed selling under these names.

4. Produce seed at a low cost, so it can be sold at a reasonable price. South Dakota seed must sell on the market in competition with seed from other states and foreign countries.
Storage.

After the seed has been threshed it should be stored in a dry, well ventilated place covered with a rainproof roof. Put the seed in good sacks. If there is more than one kind of alfalfa seed, or it is desired to keep several lots of seed separate, be sure to label the sacks.

Cleaning the Seed.

To command the best prices, all alfalfa seed should be thoroughly cleaned before it goes to market. Individual farmers who desire to merchandise their seed cannot hope to sell at retail prices unless they can put out a product that meets retail seed demands. To do this requires too large an investment in cleaning machinery for each individual farmer. The solution lies in producing a cleaner class of seed and then a cooperative seed cleaning plant. The growers in western South Dakota now have their own facilities for cleaning and marketing in the form of the Seed Growers Exchange, Rapid City. This organization is equipped to put out a superior grade of seed and all farmers interested in the true cooperative marketing of alfalfa seed should become acquainted with the way it does business.

Growers who desire to sell to buyers in the "dirt"
but on a recleaned basis, can well afford to take all practical precautions about the class of seed they produce. Such growers could many times well afford to run their seed through a good fanning mill to remove most of the "dockage" or excessive "clean-away". Some lots of alfalfa seed offered for sale contain so much of this worthless material that seed buyers would be justified in absolutely refusing to buy it.

**Time To Sell.**

It is impossible to name the best time to sell. In the fall the price is generally the lowest, while in the late winter and spring it is generally the highest. Try to get the seed in the best possible shape to sell. Study the markets. Get the facts in regard to the crop of seed harvested in the United States, the imports of alfalfa seed and the probable demand for alfalfa seed as evidenced by the interest in the crop. It is better to sell at a reasonable price than to hold for too high a price and then carry-over considerable seed. Every grower who will produce a first quality product can in a large measure name his price, and thus the best time to sell, so long as his price is reasonable.
Alfalfa Seed. Average Price per 100 pounds, basis clean seed, paid to growers in South Dakota.

1923 crop........... $18.35
1922 crop........... $17.00
1921 crop........... $13.20
1920 crop........... $18.75
1919 crop........... $31.45
1918 crop........... $16.75

--Bureau of Agricultural Economics.

In case it is necessary to carry-over seed from one year to the next, it can be done with little or no loss in vitality if it is stored in a dry place.

Longevity of Alfalfa Seed:

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<th>ITEM</th>
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<tr>
<td>Age of Seed in Years</td>
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<td>Percentage of good seed.....</td>
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<td>84</td>
<td>79</td>
<td>63</td>
<td>68</td>
<td>71</td>
<td>46</td>
<td>41</td>
<td>65</td>
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--Farmers' Bulletin 495.

Other Marketing Factors.

Alfalfa seed must germinate well to bring the highest price. In testing alfalfa seed for germination, it
is found that a certain percentage is generally reported as "hard seeds". These are the seeds which have a seed coat through which water cannot penetrate, and thus such seeds do not germinate. By scratching or "scarifying" the seed coat, many of these seeds can be made to germinate. There are several scarifying machines on the market, namely, the Ames, the Johnson and a Canadian machine. Blue prints of the Ames machine can be secured and a machine made at home. Write to Extension Service, Brookings, for further particulars. Alfalfa seed that contains a high percent of "hard seeds" should be scarified if seed is soon to be planted. If alfalfa seed contains no more than 10 to 15 percent of "hard seed" it generally does not pay to scarify, for there is always some loss in doing this work. If alfalfa seed is likely to be held over from one year to the next it should not be scarified as such seed will in a years time rapidly loose its vitality.

During some seasons a considerable percentage of brown colored seed will be produced. Many growers claim that this is just as good as the seed of natural color. Usually this is not true. Seed of the natural color always sells at a higher price. The light brown seeds, that are plump, are
usually of good germination, while the real dark brown seeds and especially the small and somewhat shriveled seeds, are distinctly inferior.

The Seed Testing Laboratory, Agronomy Department, State College, Brookings, yearly makes a large number of tests of alfalfa seed. Samples will be tested in the future to the full equipment of the laboratory.

Insect Enemies of the Alfalfa Seed Crop.

by

A. L. Ford

Specialist in Entomology.

The principal insect enemies of alfalfa (from the Insect Pests seed standpoint) are grasshoppers, blister beetles, of Alfalfa. black crickets, and thrips, grasshoppers being by far the most important in South Dakota. The alfalfa seed
chalcis, although not a major pest in this state at present, is very apt to become serious in the near future unless the growers take immediate steps towards its suppression.

GRASSHOPPERS

Grasshopper control is fully discussed in "Extension Circular No. 38 which may be had for the asking. We would suggest that all growers in the grasshopper infested portions of the state, equip themselves with this circular.

BLISTER BEETLES AND CRICKETS

As yet no practical control for blister beetles is known. Attempts to poison them by sprays and baits have failed. Black crickets also are very difficult to control on dry land, but may be greatly reduced in numbers by using grasshopper poisoned bait applied immediately after an irrigation.

THRIPS

Thrips, a tiny midge like insect, which feeds on the bloom causing it to blight without setting seed, is becoming
somewhat serious in this state. In the case of this pest, the only practical control measures are preventative rather than curative. Injury can be readily reduced by clipping the first cutting before any bloom has appeared. Since the pest feeds only on the bloom, this procedure simply starves them out.

**ALFALFA-SEED CHALCIS.**

In some alfalfa seed growing sections of the United States, the alfalfa seed chalcis has been known to take 85% of the seed crop. Since this pest is already established in South Dakota in limited numbers, we feel that the seed growers should familiarize themselves with preventative measures and put them into practice before it is too late.

This is a very small, gnat-like insect whose development takes place entirely within the alfalfa seed. The eggs are deposited directly into the seed while still green in the pods. There are at least two generations each year. The winter is passed in the larval stage within the alfalfa seeds, whether these seeds be in storage, in screenings at the straw pile or in waste places such as fence rows and ditch banks.
In cleaning alfalfa seed for market, the infected seeds pass off as light seed. This class of seed should be destroyed before the adults emerge. The man who sows low grade seed or alfalfa screenings is very apt to introduce this serious pest into previously clean fields.

The screenings which are left after the alfalfa is threshed, often contain large number of infested seeds. These should be burned before the adults emerge the following spring.

Early maturing alfalfa plants in waste places, such as ditch banks, fence rows and road sides, are always a source of danger. These should be cut before seed pods form, thus eliminating egg-laying places for the early emerging adults.