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Transplanting Alfalfa

N.E. Hansen

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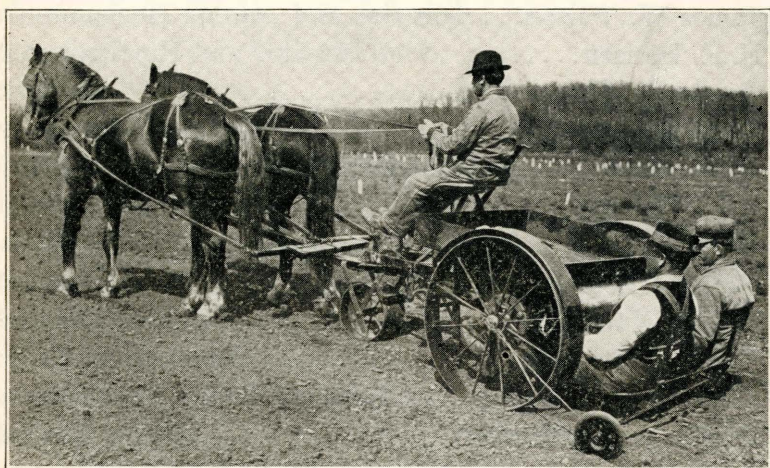
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AGRICULTURAL EXPERIMENT STATION

South Dakota State College
OF
Agriculture and Mechanic Arts

TRANSPLANTING ALFALFA



Transplanting Alfalfa at South Dakota Experiment Station, spring 1914

DEPARTMENT OF HORTICULTURE

Brookings, South Dakota

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TRANSPLANTING ALFALFA.

By N. E. Hansen.

So many letters have been received concerning my method of starting alfalfa by setting one year roots instead of by sowing seed, that it appears timely to summarize the experience up to date in this bulletin.

The question is often received, "Do you recommend transplanting to the farmer?" My reply is that I cannot recommend the method to anyone until it is fully standardized and perfected. Hundreds of farmers have had excellent results with transplanting in a limited way for seed. Many have grown seed at the rate of one pound of seed from eight or ten plants and in this way have built up a considerable acreage from a small beginning. But for any considerable area, success will depend on having the right machine. In like manner, the wheat industry of the United States may be said to depend in large measure upon the self-binder, and the hay industry upon the mower. On the uplands of an immense area of the far western states it is becoming a recognized practice to sow alfalfa in cultivated rows. For such regions I believe transplanting will be the coming method as it gives each plant the right distance from the beginning and there is no overcrowding of the plants in the row. Furthermore, many farmers on dry western uplands are learning by their own experience that transplanting insures a stand under conditions when seed fails.

Our own experience confirms this in seeding alfalfa, especially on stiff gumbo soils where the seeding was followed by heavy rains it prevented even germination and sometimes causes total failure, while alfalfa plants set under the same conditions made practically a perfect stand. It was not the fault of the seed since a few miles distant, on other soils where there was no baking of gumbo by heavy rains the stand from the same lot of seed was excellent.

At another place the seed failed because of the strong wind sweep and the attacks of blister beetles, but the transplanting of plants made practically a perfect stand.

From the beginning my endeavor has been to get the farmers to study the method for themselves in a limited way. In such matters, seeing is believing. Reading and hearsay are less satisfactory means of securing positive knowledge. So many people, experts included, are totally immune to a new idea in any line. The history of all inventions teems with examples of this immunity to new ideas and new methods.

It was in quite an unexpected way that I got into the subject of machine transplanting of alfalfa. In the spring of 1907 I brought small lots of new alfalfas from Siberia and other parts of Russia. It was very necessary that as large an acreage be obtained as possible so I started transplanting as I knew it was an ancient practice in certain parts of the Old World, also is used in South America and that alfalfa should stand transplanting, the same as any other herbaceous perennial. I did not care how many thousands or millions of plants this would eventually lead to, because I worked four years in large commercial nurseries, long enough to be quite familiar with methods used for transplanting large numbers of plants. I was so much surprised by the tremendous growth obtained from these cultivated plants, that I continued work along this line and later, in the spring of 1912, started the machine transplanting of alfalfa. In this machine method I claim priority as I have seen no record of this being practiced by anyone before. By this means we have set at the rate of 6,000 plants per hour, the speed depending on the operators and on how fast the team walks. In practice seven or eight acres a day can be set. Since that time we have transplanted alfalfa each year, because the value of the method for special purposes, such as growing a lot of seed quickly from a small start, was quite evident.

My personal opinion at present is that this will be the method by which millions of acres on the driest uplands of our western states will be set to alfalfa. But this must be worked out slowly by the actual experience of many farmers. How far east the method will go I do not venture to say, but it may go further east than we realize at present. Instead of twenty pounds of seed per acre, it means one pound for twenty acres. It also means that part of the alfalfa work will be transferred from the seedsmen to the nurserymen because many farmers will prefer to buy their plants instead of growing them. Transplanting has many points of superiority over seeding. The only question is, can it be done cheap enough for field culture on a large scale?

TRANSPLANTING MACHINES.

We have tried three different makes of transplanting machines and the best one was found to be the Bemis, the old original machine which was first invented in Dane County, Wisconsin. It has been developed during the past thirty years at an estimated cost of \$50,000 and there are now about 100,000 machines in use in the United States and other countries. The Bemis transplanter is made by the Madison Plow Company, Madison, Wisconsin, and was at first especially designed for tobacco plants, but is now used extensively for cabbage, tomatoes, peppers, sweet potatoes and many other plants in the truck-farming section of Wisconsin, Michigan, Illinois, Kentucky and many other states. Florists use them for planting various flowering plants and for bulbs. It is being tested in growing sugar beet seed.

In the truck garden centers of the United States the machine is used for setting not only sweet potato, cabbage and tomato plants, but may be used also for sowing seed of peas, beans, watermelons and muskmelons. The tobacco industry of the United States may be said to rest in large measure on the transplanting machine, as it has greatly reduced the cost of production. Since



Cossack Alfalfa. A single plant grown on upland without irrigation at Wall, western South Dakota, and exhibited at the South Dakota State Fair, 1915. The growth shows first and second crop together. Total weight of this plant as shown was 8 pounds, dry weight.



The same 8-lb. plant of Cossack Alfalfa, dry weight. This cut shows clearly the strongly branched root system.

A. F. Mills, of Wall, Pennington County, western South Dakota, writes: "I am glad that you secured the big alfalfa plant shown in the Wall exhibit. This Cossack alfalfa plant was one of a lot sent out by you in the spring of 1911. The stems measured 7 feet 2 inches and the roots 17 inches long. Before sending it away we combed out quite a percentage of the growth, trying to smooth it into shape, as it and 4 or 5 other plants had fed a flock of chickens during the season. This plant has continued to grow larger each year. We now have 40 acres of Cossack sown in rows all on upland, 20 acres of which was sown in 1914, and 20 acres in 1915."

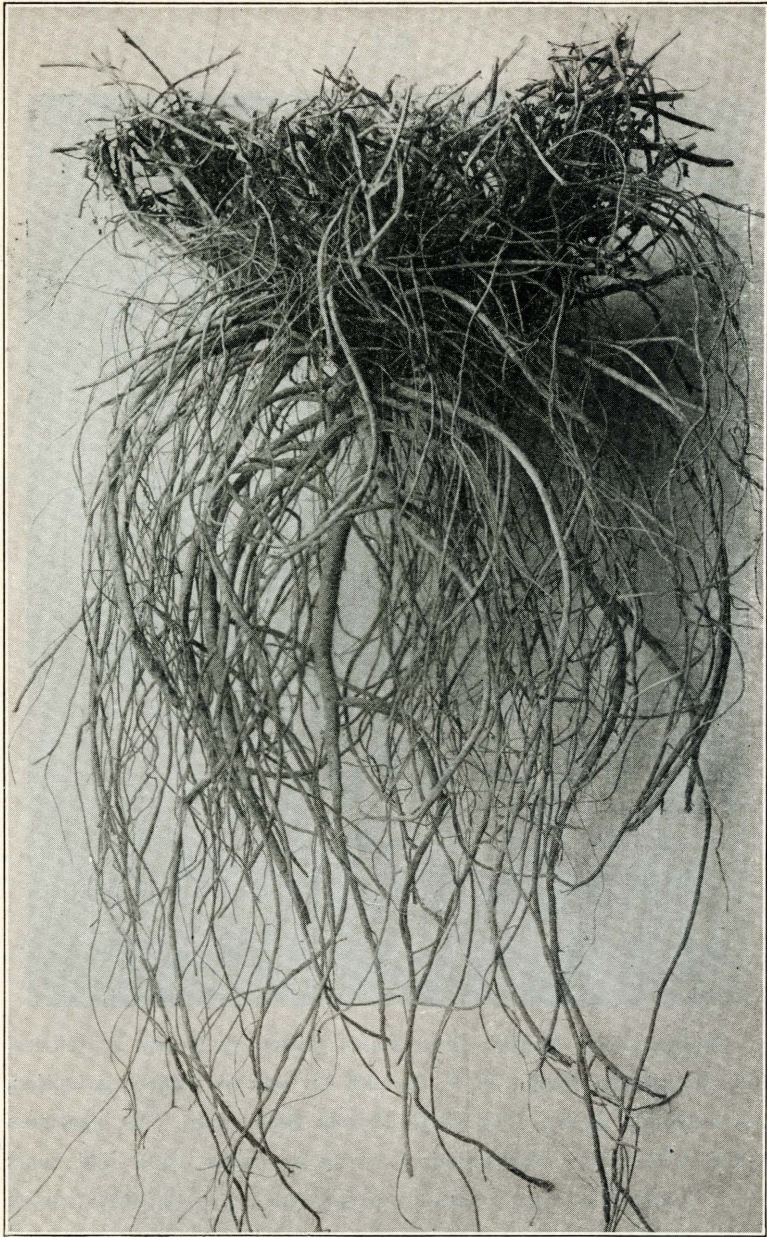
the plants may be watered automatically at the time of setting the machine transplanter gives a much better stand. In the Bemis transplanter the plow and the pressure plates are entirely free and float with the ground, the pressure being made by the weight of the two droppers or operators and this may be adjusted to any degree that is needed. The machine is equipped with a barrel for automatic watering, and with attachments and one shoe or plow costs about \$70. The potato planting attachment should be included as it is inexpensive and convenient for fields not large enough to warrant using a special potato planter. The plow-point style of shoe gives better suction than the shoe of the sleigh-runner type.

George P. Mertz, North Detroit, Michigan, reports on the Bemis transplanter: "I purchased the transplanter especially for transplanting celery, although I have used it for transplanting cabbage, tomatoes, peppers and planting potatoes.

I consider it a perfect success in planting celery, as well as other plants, and after my team and operators had a little experience we had no trouble in setting celery plants close enough in the row. We get a more perfect stand and from a week to two weeks quicker start where the planting is done by machine."



Row single plants of Semipalatinsk Alfalfa, on farm of Henry L. Jeffries, Sansarc, South Dakota, Transplanted 1911; photo 1912.



Root system of Semipalatinsk Alfalfa. A single plant transplanted spring 1911 by Henry L. Jeffries at Sansarc, Stanley County, South Dakota on high dry gumbo without irrigation. Grew well during the dry years of 1911-12-13. Plant dug September 4, 1914, and exhibited at the South Dakota State Fair. Green weight, first cutting 13 pounds; second cutting 4½ pounds; diameter across crown 16 inches; length of root about 40 inches.



Semipalatinsk Alfalfa. Two plants grown by Henry L. Jeffries, Sansarc, Stanley County, S. D., on high dry gumbo, without irrigation, and exhibited at the 1915 South Dakota State Fair. The specimen exhibited in 1914 as illustrated in cut on preceding page, had roots about 40 inches in length, diameter across the crown 16 inches; green weight, first cutting 13 pounds; second cutting 4½ lb. Mr. Jeffries has also had excellent results from his large acreage of Cossack Alfalfa, which has done much to extend the present fields of Cossack, some 2,000 acres, in Stanley and adjoining Counties.

A SPECIAL OR GENERAL PURPOSE MACHINE.

The question from the beginning has been whether the machine should be intended only for alfalfa plants or should it be a general purpose machine which may transplant other plants as well. For large areas a special purpose machine, more or less automatic in operation, would be highly desirable. Experience shows that water is not necessary, so that the barrel on the standard transplanter may be omitted. On the other hand, the standard transplanter may be easily modified so as to do satisfactory work. Instead of the four-inch shoe which is used for tobacco, cabbage, tomatoes, sweet potatoes and many other small plants, a nine-inch nursery shoe is used. This was modified by turning the upper corner tips back and widening the shoe slightly at the back. Two curved flat bars of iron are also inserted, one at each side, to set the pressure plates further back. These changes were made first under my direction by a local blacksmith. The effect of these changes is to give more room for the operator's hands when setting branched rooted plants like these new alfalfas. This nine-inch shoe may easily be set so as to run as shallow as a four-inch shoe, so it really answers the purpose of both shoes. The alterations may be made by any good blacksmith or at the factory for the Bemis transplanter where this modified shoe is called the "Hansen Alfalfa Shoe." There is also a potato planting attachment and another attachment for sowing fertilizer. So there are a lot of reasons at present for favoring this general purpose machine for limited areas, as it may be used for many purposes, including the transplanting of small trees and nursery stock as well as all the other plants mentioned.

TRANSPLANTING LARGER PLANTS.

Much work has been done by inventors to help the nurserymen in their work of transplanting trees and nursery stock by the million.

Nurserymen find the standard transplanter useful

for strawberry and small tree seedlings and cuttings, using a nine-inch shoe instead of the standard four-inch shoe. But for larger nursery stock, another type of transplanting machine is required. The work is done with two separate machines: The "trencher" opens up a trench about 2 inches wide and 12 inches deep. The "firmer" makes the loose earth solid again around the roots.

There are two types of trenchers; one with a plow point which gives better suction; the other is of the sleigh-runner type. Each type has its own special advantage.

The sides of the trencher are made very long so as to plaster or trowel the loose earth on the sides of the trench and keep it open longer than otherwise would be the case. This is drawn by one team. Of several machines on the market we have tried only the Cashman trencher and firmer which both do good work. The apple, pear or other seedlings are now placed in the trench by hand at intervals to suit. The tramping or firming the loose earth, which was formerly done by men, is now done by the firmer, consisting of two cast-iron wheels weighing 1,500 pounds, set slanting so as to firm the earth on each side of the trench as fast as the team walks. When not in action the wheels are supported by two ordinary wheels. This machine does very much better work than can be done with the feet. By the aid of these two machines, the trencher and the firmer, transplanting is now done at a vast saving over the old methods in the nurseries of the United States. We tried them for alfalfa plants, but find that they are heavier than necessary for that purpose. Alfalfa plants are best handled after one season's growth, because during the second season so many side shoots or rhizomes form just beneath the surface which become interlocked and are difficult to separate when it comes to digging. Where it becomes necessary to handle two year or older alfalfa plants, the trencher and firmer would serve a useful purpose. The trencher costs about \$65 and the firmer \$100.

TRANSPLANTING WITHOUT A MACHINE.

A few plants are easily set in good loose soil by stretching a garden line and planting with a spade, the same as for small trees or strawberry plants. The spade is thrust into the ground and the handle shoved forward so as to make a wedge-shaped opening into which the plants are inserted. In all kinds of transplanting where the hole is too small it is best to cut off the roots rather than double them up, the idea being that the new roots should go straight down. This is a general rule in nursery practice. As to what the ultimate and best type of transplanter will be, I do not yet know. Some farmers get along by turning the furrow with a plow and setting the plants up against the landside of the furrow. Some farmers who do not have these machines have success by setting the shovels of a corn cultivator so as to make a lister furrow, the same as for corn, but deeper. This has worked fairly well in practice, but of course is not the neat transplanter job.

DIGGING THE PLANTS.

The plants are best dug in the fall when dormant. It is practically impossible to dig the plants in the spring successfully, because they start before the frost is out so that they are badly skinned and split in digging since the bark is slippery. Plants are best dug with a nursery tree-digger that cuts under one side at a time. The one we are using is the Feigly tree digger, costing about \$25; it is made at Skiatook, Oklahoma. The plants may be plowed out with an ordinary plow, but it is too much work to scratch them out of the furrow, whereas the tree-digger leaves the plants standing in place so that they may easily be pulled up as fast as they can be handled. However, one farmer reports having improvised a potato digger to do the work.

STORING OF ALFALFA PLANTS.

After the plants are dug in the fall they should be stored away for winter. We have had excellent results storing them in layers of earth, the same as small tree seedlings in nursery cellars. The plants are laid in double layers out from the wall, with the roots slightly overlapping and the tops out. An air space of three or four inches is then left for the next tier or stack of plants. It does not hurt to freeze in the cellar as long as the roots are covered with earth. Toward spring the cellar should be kept as cool as possible, opening the cellar doors at night and closing them during the day to keep in the cold. It is inadvisable to store plants where there is artificial heat overhead. A potato cellar is good, provided there is not a lot of decayed vegetation in which case there might be trouble from mould. Where no cellar is available they may be heeled in outside in a plow furrow or in pits, the principle to observe being that the plants should not be stored in large bunches without earth in between to prevent moulding. This is a general rule in heeling in all nursery plants.

SHIPPING ALFALFA PLANTS.

The shipping of alfalfa plants was begun in the spring of 1910 as a means of distributing quickly to many states the new varieties of alfalfa I brought from my second and third tour to Siberia in 1906 and 1908. At once the method was taken up by a lot of men entirely unacquainted with the technique of nursery plant propagation. Some very soon found out that not every alfalfa is adapted to transplanting, and that a farmer or a seedsman is not necessarily acquainted with nursery methods. The whole method had to be worked out from the beginning. The right kind of implements are necessary. As in all other lines, there is a right and a wrong way of doing the work. No claim is made that the present method is perfected. At first the plants were packed too wet and close in moss, causing trouble in heating enroute. Since the spring of 1915 we have shipped

mostly in tight wood fibre boxes, saved at local dry goods and grocery stores. In this way very little or no moss, or other packing such as shingle tow or straw, is needed and the plants have carried safely east and west across the continent.



A single plant of Cossack Alfalfa transplanted spring 1913 on the farm of Eugene Murlbut, 9 miles north of Pierre. Green weight 6 lb.; dry weight 2 lb. Photo summer 1914.

TRANSPLANTING THE FIRST SEASON.

When I first began transplanting alfalfa in the spring of 1897 we sowed the seed in flats in the greenhouse and transplanted to other flats and later into the field. But as we got more seed, we found it much cheap-

er to sow the seed outside with a garden drill and dig the plants at the end of the first season when the plants were dormant, any time before the ground froze. The plants were either transplanted at once or stored in layers of earth in the cellar, the same as tree seedlings for spring planting.

However, some farmers have experimented with methods of their own in transplanting the first season with a view to getting the plants into permanent position as soon as possible. A sample of this is the experience of Geo. Findlay, South Bulkley, B. C., Canada, who writes under date of October 27, 1914. "In the latter part of July last I set out 7,240 Semipalatinsk alfalfa plants, had 32 days of hot dry weather following and on October 1st there were only 27 plants that had failed to grow." These were from a small plot or bed. Mr. Findlay under date of June 15, 1915, reports as follows: "I made no mistake in transplanting the first season as it is over a month ahead of what I set out this spring. And we had a hard spring on alfalfa. Snow went away very early, leaving pools of water on field and it froze hard for about two weeks.

One corner of mine was covered with water and ice for 12 days. Cannot see there is any ill effects from it. Up to the present time I have lost less than 2 per cent and do not consider it was the fault of the plants as all that failed to grow I had not set them deep enough. I set out about 5,000 plants this spring and only 3 failed to grow. There is a gravel ridge running through the field. I planted these on the ridge the same as in the good soil and those on gravel are doing the best as it is warmer. We have had a good deal of rain and cloudy weather for the last six weeks. What plants I gave Mr. Hatch last year were eaten right into the ground last fall by the rabbits but came along this spring."

25 REASONS FOR TRANSPLANTING ALFALFA.

1. Plants in hills may be kept cultivated, and from such plants it is possible to raise seed entirely free from dodder and other weeds. The seed raised from these plants may be guaranteed 100 per cent pure. The parasitic vine known as dodder is a very serious menace to the alfalfa industry in the Old and New World. It is extremely difficult to separate it, and when in the field will soon ruin it. In Europe such fields are put out of commission by the government. Cut at once and burn the hay is the best remedy. Pure seed laws will shut out dodder-infested seed in this country more and more.

2. Since the plants are all raised on inoculated soil, every plant had nodules containing bacteria on the roots. Transplanting is a certain method of securing inoculation. My experience is that by growing alfalfa plants in well inoculated soil, every plant is abundantly provided in the course of the first season with nodules containing the nitrogen-gathering bacteria so essential to the growth of the plant. This reason alone would be a very strong one in favor of this new method, since there is much complaint due to lack of inoculation in many soils, and the farmer can see the nitrogen-gathering bacteria nodules with his own eyes.

3. Seed from transplanted alfalfa plants is larger and more plump than common, because it is from plants that are in full strength and vigor, instead of weakened by being crowded by other plants. Such seed is worth more.

4. Transplanting means a perfect stand where seed is often a failure. It is like starting in the poultry business with the chickens instead of the eggs. The eggs may never hatch, the seeds may never germinate.

5. Actually there are about 230,000 alfalfa seeds in one pound but in field practice we raise 100,000 plants from each pound of seed. At 5,000 plants per acre this is enough for 20 acres. This makes a little seed go a long ways, as the usual recommended amount is 20 pounds for one acre. Three pounds of seed sown in 18

inch drills on 1 acre, usually furnishes about 300,000 plants, enough for 60 acres. At this distance it is necessary to use wheel hoes. If a horse cultivator is desired where land is cheaper, sow half that amount of seed in 3 foot drills which will furnish about 150,000 plants or enough for 30 acres.

6. Alfalfa is at a disadvantage the first year as the main strength goes below the ground to develop the roots. Hence it is often choked out by weeds like Russian thistles, which make more top than root. But by setting out a good sized alfalfa plant, often as big as your middle finger, they can hold their own better against the weeds.

7. The plants may be transplanted in the fall of the first year. The remainder should be kept in outdoor cellars, such as used for storing potatoes or trees, or they may be heeled-in close together in furrows made with a plow. One advantage in the spring is that by keeping the cellar cool, the work of transplanting may be deferred until the work of planting small grain and corn is over. We have transplanted as late as early June with good results. However, they should be set before the new shoots have made too much growth.

8. The very fact of transplanting seems to favor the setting of seed. Many farmers have expressed their surprise the way the plants seeded so heavily the first season. Our practice has been to let the plants seed on the first growth and not to cut the plants the first season until late in the fall. This strengthens the roots.

9. A grain crop may be grown and harvested at the usual time, the ground plowed as soon as possible, and still there is time enough in the fall for setting alfalfa plants before the ground freezes. Such a field has a good start over a seeded field. The soil becomes well settled by the rain and snow and the plants start very early in spring, even before the frost is out.

10. The general effect of transplanting in a plant is to strengthen the root system as it makes abundant side roots. These plants do not heave out as easily.

The root system of these varieties is naturally much branched, so it will be very hard to heave out such plants by the freezing which often causes heaving of ordinary tap-rooted plants, especially on heavy clay soils.

11. The attacks of various insects, such as blister beetles, and of cut worms, sometimes destroy plants just coming up from seed. Experience shows that transplanted plants come on again promptly. The transplanted field means more labor and cultivation the first two or three years, but after that the crowns become so large that little trouble is experienced in keeping it clean. Some farmers write that these transplanted plants keep down even the Russian thistles as they shade the ground so quickly in the spring. Strong one year plants of the best varieties, such as Cossack, Semipalatinsk and Orenburg, often make a growth so that they cover the ground the first year, even when set as close as $2\frac{1}{2} \times 3\frac{1}{2}$ feet. Setting the plants further than $3\frac{1}{2}$ feet apart appears not so desirable as it leaves a hard ridge in cultivating with an ordinary corn cultivator. Rows closer than 3 feet is not advised as it is too hard to get in with available tools and it does not give the plants the chance they should have.

12. Experience shows that transplanted plants may be set in dry ground and will keep alive for many days until rain comes, when they will start promptly into growth. The Semipalatinsk is especially tenacious of life in this respect.

13. Experience shows that jack rabbits are extremely fond of digging down and eating these alfalfa roots at every opportunity. But even crowns that have been destroyed several inches under the surface have thrown up strong sprouts, and the following year were apparently little or none the worse for their experience. In fall transplanting it is especially necessary to set the plants two inches deeper than they stood so that the crowns are entirely covered with earth. This avoids excessive drying out over winter. In spring transplant-

ing the crowns should be barely covered, but enough to allow for settling of the loose earth. Cultivate very carefully so as not to tear out the plants before they get established. Some farmers report injury from hail, floods and ice crust, but still these plants would come through and make strong growth, showing the wonderful vitality of these transplanted alfalfa plants after they have made one season's growth.

14. Hay from transplanted plants, while perhaps coarse-stemmed the first two or three years, soon becomes fine enough as the stems increase so quickly in number, often 500 by the second year, and from that time increasing in number each year. Plants should not be cut the first year as the top is needed to give strength to the roots. All the food for the roots is made in the top, and so the roots are robbed by premature and frequent cutting.

15. The stems of transplanted plants are much more leafy, clear down to the ground, as they have more room for light and air than in broadcast fields. This is desirable as the leaves are the best part of the plants.

16. The present methods of over-crowding alfalfa plants give an inadequate supply of moisture. Such plants are much dwarfed and cannot form the long roots necessary to endure drouth. The drier the region, the more space is needed by each plant.

17. Plants in hills seed much better than broadcast fields since they have more sunlight and air.

18. A transplanter costing around \$70 is too large an outlay for a small field of alfalfa. But there is a potato planting attachment to it, and where several farmers can club together, especially where it can be used for other plants such as cabbage, tomato and strawberry plants and small trees, it is not so much of an expense. A lot of good farmers are now working out their own methods, and they may do better yet.

19. It is impossible to space plants evenly in sowing seed since the germination is not certain. By transplanting the plants are set evenly, so that each plant has



A single plant of Semipalatinsk Alfalfa, Sansarc, South Dakota. Transplanted 1911; photo 1912. Farm of Henry L. Jeffries.

a fair chance instead of being crowded out. In one place in a broadcast field 25 plants were found on one square foot; in another place 13 plants on two and one-half square inches, all of them about as big as a darning needle. Such plants do not have a fair chance for development, and those that survive have been hurt by the struggle for existence.

20. It permits planting so the plants need never be touched by a disk or other implement that splits the

crown and gives access to fungi which cause crown-rot and other serious troubles. My belief is that the present methods of disking are extremely injurious, and that we should not mutilate alfalfa plants by disking and harrowing. This is in distinct contradiction to the present generally recommended practice; but examination of many plants that have been split through the heart with the disk or harrow, shows they heal with difficulty, and many are black-hearted or diseased, giving free access to bacteria. An alfalfa plant should be good for at least four centuries; but this means that the heart of the plants must be held sacred. A field set out in plants can be cultivated one way like fodder corn, and then laid by for the season. By giving each plant just the right amount of space in the beginning, this useless mutilating of the plant is avoided.

21. Alfalfa plants should be given full opportunity for maximum development. When set in the garden 2 x 4 feet we get plants with over 500 shoots to the crown, and bearing as high as 3 ounces of seed per plant the third year, on plants transplanted the first year from seed. This is at the rate of 1,022 pounds of seed per acre. The variety was the one secured in Russia which I have named the Cossack.

22. The present method of using 20 pounds of seed per acre means 106 seeds per square foot. Instead of that, every plant should have several square feet, the exact number no one knows as yet. Probably one to a square yard, or in round numbers 5,000 plants per acre. The distance will probably depend upon the soil, elevation and moisture conditions. Even 5 pounds of seed per acre means 26 seeds per square foot which is still too thick if it germinates evenly.

Many farmers who sow at the rate of 20 pounds of alfalfa seed per acre report the pleasure of having a good stand, stating that it was as "thick as hair on a dog." But the point that is generally overlooked is that these plants will send out a large number of shoots.

What would become of a dog if each hair developed 500 hairs?

23. My transplanting method has lead to a quick method of hybridizing alfalfa. This is described in my bulletin 159. This is done by transplanting the two varieties alternately. The hybrid variety, mentioned in this bulletin derived in this way from the yellow-flowered and blue-flowered Siberian alfalfa proved perfectly proof against the late freeze of June 9, 1915, when common alfalfa had to be cut prematurely as it was injured. Last season's experience clearly showed the value of the method. The plants are set alternately in the row; as in this manner the branches interlock and cross pollination is favored. Save the seed of each variety separately; those that produce plants with variegated flowers are true hybrids and should be dug in the fall of the first year and transplanted to a separate field.

These hybrid alfalfa plants are all strongly resistant to late frosts in spring and early frosts in the fall. This characteristic is derived from the Siberian ancestors. This experience is fortified by reports from other states, so I know it is not unusual. Many farmers have reported on the frost-resistant character of the various yellow flowered Siberian alfalfas, the strongest growing one of which is probably the Semipalatinsk.

For selection purposes the plants should be set further apart at least 4 x 6 feet otherwise the branches interlock too much for careful study. The tops of many plants of Cossack and Semipalatinsk alfalfa are 10 to 12 feet across and more. A Saskatchewan, Canada, farmer reports a Cossack alfalfa plant 15 feet across. Detailed individual study of plants is impossible where seed has been sown broadcast or in drills.

24. My own work is done from the standpoint of experience in large commercial tree nurseries, but I maintain there is nothing in transplanting alfalfa that is beyond the reach of any good farmer. I believe transplanting of alfalfa roots is the coming method for growing seed and hay of alfalfa in cultivated rows on dry upland. But it must be a variety that will respond to being given plenty of space, such as my Cossack for the main purpose of seed raising, and the Semipalatinsk for the driest uplands. Common alfalfa does not stool out or branch enough. My own personal opinion is that it will be the means of reclaiming millions of acres of dry land where now it is too difficult to get a stand. But both the variety and method must be right.

25. Finally, the alfalfa transplanting problem is being worked at by many of the best farmers I know. At present, my only claim is that transplanting is a very sure and quick method of raising seed from a small start of any new variety.



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