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UNIVERSITY OF IDAHO
AGRICULTURAL EXPERIMENT STATION
Sandpoint Substation

Alfalfa on the Cut-Over Lands of Northern Idaho

By
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Cutting Alfalfa at the Sandpoint Substation

BULLETIN NO. 169

MARCH, 1930

Published by the University of Idaho, Moscow, Idaho.

RECOMMENDED PROCEDURE FOR SEEDING ALFALFA

Fall plow. Leave land rough over winter.

Prepare soil in early spring to start weed seed germination.

Cultivate thoroughly later in season to kill off weeds previous to seeding.

Use hardy varieties of alfalfa.

Seed without nurse crop.

Inoculate the seed.

Seed shallow by broadcasting or drilling.

When broadcasting cover lightly with harrow.

Use roller after seeding operations.

Make gypsum application of 200 pounds per acre.

ALFALFA ON THE CUT-OVER LANDS OF NORTHERN IDAHO

By J. H. CHRIST*

Alfalfa has proved its adaptability on the cut-over lands of northern Idaho. It has become one of the most important hay crops yet introduced into this area. The extensive seeding of alfalfa and the stimulus in its use to replace run down timothy and clover meadows have presented a number of problems which in many cases have held back more extended seeding of the crop. The high yield which alfalfa maintains from year to year, its ability to yield well in dry as well as favorable seasons, and its suitability to the use of all kinds of livestock have been the chief factors in the rapid increase in acreage. These points are so evident that they have led many farmers to attempt to get a stand of alfalfa before their land was ready for it and others to use land, which, because of poor drainage, or a high water table, was unsuited to the crop and resulted in failure to obtain a stand.

This publication shows some of the more recent work of the Sandpoint Substation of the Idaho Agricultural Experiment Station with alfalfa problems and presents information on growing the crop which is in demand by men using the crop for the first time.

The acre yields of major legume forages in the cut-over region are illustrated in the following table. These represent the average of seven years, 1923 to 1929, inclusive.

TABLE I

YIELD OF LEGUMES AT THE SANDPOINT SUBSTATION AVERAGE OF SEVEN YEARS, 1923-1929

White blossom sweet clover	3.15 tons
Yellow blossom sweet clover	2.49 "
Grimm alfalfa	3.22 "
Common alfalfa	3.25 "
Medium red clover	2.35 "
Mammoth red clover	2.78 "
Alsike clover	2.01 "

These results show alfalfa outyielding even sweet clover and considerably superior to the other clovers.

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LAND ADAPTED TO ALFALFA

Most of the bench soils of northern Idaho are well adapted to the production of alfalfa. These soils are for the most part well drained; a point that is of vital importance when considering the advisability of alfalfa culture. On the lower lands alfalfa has not proved so successful and in many cases where it looked very promising the first year, it deteriorated rapidly and often by the end of the second or third year the fields contained only a scattering stand of plants. From this experience it would seem that the best practice of planting on doubtful areas would be that of seeding a small area until it was definitely proved that the crop is adapted. It has also been difficult to get a long lived stand on areas that get the drainage breaks on hillsides. Water is near the surface at these places practically all the year, and a condition arises similar to that on low lands. Proper drainage to carry off early spring moisture, to prevent the accumulation of standing water, or to reduce the height of the water table would be beneficial to a crop so deep rooted as alfalfa. On the drier soil phases there is hardly any crop that will produce a greater tonnage than alfalfa, even though only one crop may be obtained. Under normal soil and climatic conditions usually two good cuttings are obtained and in some sections a light third cutting. Where irrigation is available the last cuttings are increased considerably but there is only a very small portion of the farming land in this area where irrigation water is used on the crop.

SOIL PREPARATION

The first step in the preparation of the land previous to the seeding of alfalfa should be that of ridding the land of grass and weeds. It is very seldom that newly cleared land is seeded to alfalfa. In most cases it is land that has been in meadow or land that has been in stump pasture. These meadows usually are run down through the elimination of the former crops of timothy and clover by bluegrass, both the Kentucky Blue and the Canada Blue. Under such conditions it is very essential that these and other grasses or weeds are killed out before an attempt is made to seed the land to alfalfa, because, aside from certain noxious weeds, such as quackgrass and Canada thistle, there is nothing that is more effective in choking out a growth of alfalfa than the bluegrasses, and nothing more difficult to control in an alfalfa meadow. Consequently, the first aim should be to plan a cropping system for this purpose.

Cultivated crops like potatoes or other root crops; or corn, where it can be grown; make possible the best type of preceding crop. Even under the most favorable conditions it usually takes two years of cropping before the land is in shape for alfalfa. Under such a sys-

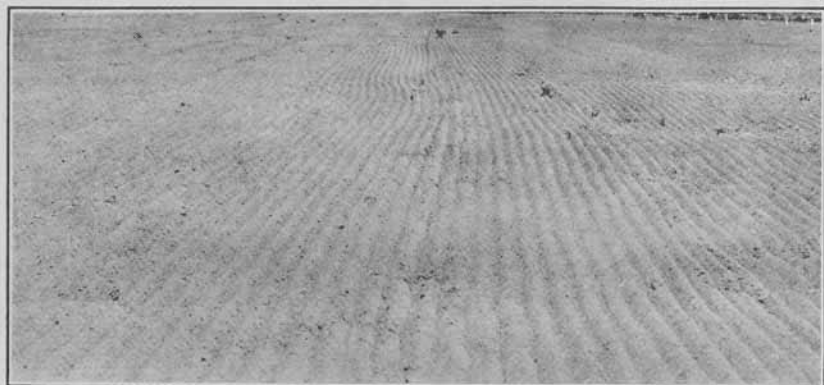
tem the plan is usually to seed a crop of grain and follow it the succeeding year with a cultivated crop. Another plan used by certain farmers is to summer fallow the land, seed it to fall wheat, and the subsequent year plant it to alfalfa.

Alfalfa is not commonly used in making the initial seeding on new land even though the practice has been used favorably a number of times. Probably the greatest drawback to such procedure is that the land is usually so rough after the removal of the stumps that it does not handle well in a long lived crop like alfalfa. Therefore a few years in other crops and the cultivation and leveling given the fields in connection with them make a more uniform seed bed and better conditions for machinery.

The immediate preparation for the seeding of alfalfa should consist of fall plowing whenever practical. With the lighter soils which are found over so much of the cut-over area it is very difficult to get a compact seedbed from spring plowing and there is also danger of a large loss of the moisture which is so essential to give the young plants the proper start after seeding. The land should be left rough over winter.

TIME OF SEEDING

In the early spring the soil should be worked up to a good seed bed by disking and harrowing. This preparation should be considered not only to make a good seed bed for the alfalfa, but primarily to hasten the germination of any weed seeds that are present in the upper soil surface. Early seedings of alfalfa made at the time of the preparation of the seed bed come in direct competition with germinating weed seed. Because of this it is preferable to give land subsequent cultivation with disk or harrows to kill off this growth. By



An alfalfa field after the use of a corrugated roller.

so doing the alfalfa comes on unhindered by weed competitors. Even on very dry, sandy soil as well as the more favorable types, it is found that a much better germination is obtained and that the crop develops faster the first year than that from an early spring planting. In work at the Sandpoint Substation, seedings have been made as late as the first of July with perfect success. This is later than necessary for such seeding, but it is often advisable to delay planting until the fore part of June or even the middle of June in late seasons.

USE HARDY VARIETIES

The choice of variety in alfalfa should rest in the use of the hardy varieties. Grimm is the variety most commonly used and under Sandpoint conditions has yielded slightly higher than Cossack. In Table 1 it was shown that common alfalfa slightly outyielded Grimm. During certain severe winters common alfalfa has killed badly, reducing the stand so much in many cases that it was necessary to break up the seedings. Results of this are given in Table 2.

A group of plats of the various clovers and alfalfa varieties were seeded in 1925. At the completion of the crop year in 1929 the estimated stand of each of the crops was taken. These results follow:

TABLE 2

PER CENT STAND OF LEGUMES FOUR YEARS AFTER SEEDING AT THE SANDPOINT SUBSTATION

Medium red clover	17	per	cent	stand
Mammoth red clover	23	"	"	"
Idaho red clover	18	"	"	"
Common alfalfa	48	"	"	"
Grimm alfalfa	80	"	"	"
Cossack alfalfa	70	"	"	"
Hardigan alfalfa	77	"	"	"
Alsike clover	28	"	"	"
Ladino clover	5	"	"	"
White Dutch clover	4	"	"	"
Idaho white clover	4	"	"	"

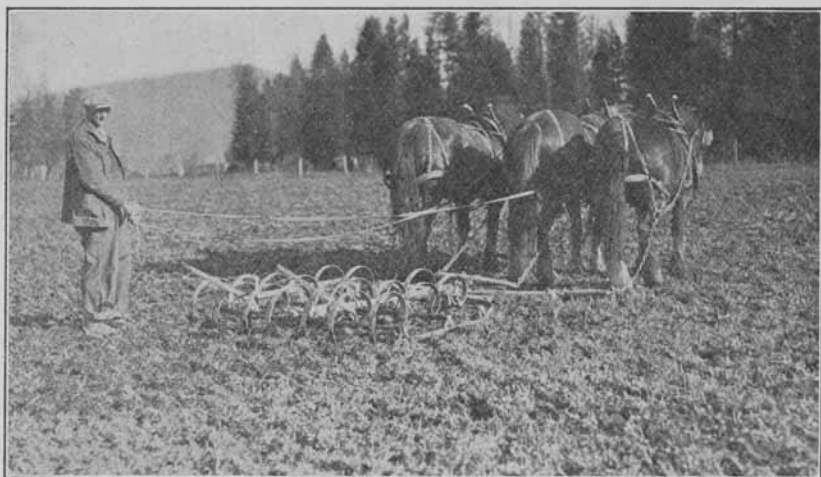
These plats had received no further cultural treatment or fertilization since the time of planting. The resulting stand of the various crops shows conclusively the effectiveness of the alfalfa varieties in maintaining their stand and examination showed their strength in preventing the encroachment of weeds and grasses. The only variety of alfalfa noticeably weakened was the common variety. This contained considerable bluegrass (*Poa pratensis*) and downy brome grass (*Bromos tectorum*).

SEED WITHOUT NURSE CROP

Seeding alfalfa without a nurse crop has proven the safest procedure. Under certain favorable conditions seeding with another crop has been satisfactory, but in the ordinary year it is much more certain to seed alone. To farmers from other sections this seems like waste not to get at least a partial crop off the new alfalfa land. It is our experience that even when a stand is obtained with a nurse crop the difference in productiveness of the alfalfa the second year nearly offsets the value of the grain crop obtained the first year. After the second year the effect is not so noticeable. When a nurse crop is planted the safest one to use is peas. The rate of seeding alfalfa commonly used is 10 pounds per acre. With a well prepared seed bed this is sufficient to assure a maximum stand.

INOCULATION IMPORTANT

Inoculation of alfalfa seed is of primary importance on most of the forest soils of northern Idaho. The cost of the material is so low and the function of the bacteria so necessary to the crop that it should not be overlooked or dispensed with. Cultures of these inoculating organisms are available through the Department of Bacteriology of the University of Idaho and instructions for the use of the material accompany the shipments.



Spring-toothing alfalfa.

METHOD OF SEEDING

Seeding is done by broadcast seeding or drilling. In the majority of cases broadcast seeding is preferable. With drilling, unless the field is level, there is danger of seeding too deep on some portions and too

shallow on others. This is especially true where the land has not been well leveled after breaking. Wheelbarrow seeders have proven satisfactory but other types have also been used to good advantage. After broadcasting, the seed should be covered immediately by a light harrowing. This prevents any extended injury to the bacteria used for inoculation purposes. A number of farmers are using a grain drill with a grass seeding attachment for making alfalfa seedings. Under such conditions it is the practice to pull the delivery tubes so that the seed will drop on the ground and be covered by the action of the discs and chains. This makes sufficient cover so that it is not necessary to harrow.

ROLLING

The use of a roller following the seeder is essential to a good stand. This packs the soil and brings a uniform germination and it is believed that this method holds the moisture nearer the surface so that the seed germinates more rapidly than it otherwise would. The type of roller to use includes a wide choice. Some farmers use log rollers to very good advantage, while others use the commercial types of corrugated rollers. The latter represents a suitable weight for pack-



Leveling alfalfa land previous to seeding.

ing and is very satisfactory in operation. By using the corrugated rollers on heavy soils there is less tendency for the soil to crust than with the smooth rollers. It is well to note that rolling the land after seeding often makes the difference between success and failure in obtaining a uniform stand of alfalfa and other legumes. While not generally recommended, some farmers have good success by rolling

spring plowed land previous to seeding and again after seeding. This is best adapted to very early spring plowing and years of abundant spring rainfall.

CLIPPING

Unless the stand of alfalfa the first year is in danger of being reduced by heavy weed growth or is sufficient to make a cutting of hay, clipping is not ordinarily advisable. At any rate it should not be cut until somewhat late in the season and even then it is preferable to wait until after a good rain, as the use of teams and machinery on light soils may kill out the young plants. So far there is no evidence that clipping causes a stronger root development as some claim, and there is proof that clipping late in the season prevents the storage of food reserves necessary to carry the plant through the winter in strong condition. Late fall pasturage on the older stands has a similar effect.

TIME OF CUTTING

Time of cutting the crop varies widely through northern Idaho. Some sections have the first crop made before the first of July, while in others it is not made until after this period, and in seasons of late rainfall it has sometimes gone until the tenth of July before haying conditions were suitable. The proper time for cutting is usually indicated by the development of the shoots for the succeeding crop. Some growers use the bloom period as an indication of the time of cutting. Cutting when in early bloom or one-quarter bloom will give a high quality hay but will also result in a slight loss of tonnage over the later seedings. The same procedure will stand in the later cuttings though in most cases the growth is not as coarse as the first cutting. When a third cutting is made the seasonal conditions are ordinarily not favorable for rapid curing.

HAY MAKING

The common practice in making alfalfa hay is to cut it one day and rake it into windrows the next day. It is then put in small cocks and left until it cures sufficiently to put in barns. The curing process is hastened particularly with the first cutting if put in small windrows and small cocks. The hay can be mowed away sooner and with less chance of mow burn than with large cocks. Also, if wet by rain the cocks need only to be turned over, while with the larger ones it is often necessary to tear them apart. At this time an introduction of other hay making machinery is being made and on some farms side delivery rakes, hay loaders, and bull rakes are being used. On the larger acreages it is important that the hay be made as rapidly and as cheaply as possible and these tools are effective on these phases of production. Hay is not stacked in the open except on a few farms. Where it is stacked it is usually baled out before un-

favorable weather sets in. Stacks cannot be left without cover over winter without a very heavy loss.

CULTIVATION

When proper precaution is taken to kill out grass, alfalfa will maintain good yields for a long time. The crop is often left for a period of six or eight years before breaking. Aside from the natural reduction in stand by heavy plant growth, the most serious cause for reduced yields is the encroachment of weeds, particularly the bluegrasses. If the growth of these is not excessive, cultivation may prove effective to check the growth. From experience at this station, cultivation with a spring-toothed harrow has been found to give a slightly larger yield and has helped somewhat in keeping the grass under control. Three year averages on a double spring cultivation with a spring-toothed harrow gave a yield of 3.37 tons for the cultivated portion and 3.13 tons for the untreated; an increase of nearly one-quarter ton. When the grass is very heavy and a thorough job of cultivating is done, much of this sod may be picked up when making hay. This lowers the quality of the hay and makes it disagreeable to handle. The best practice should be to plant the crop on clean land rather than attempt to keep the grass under control after the alfalfa is seeded. Cultivating alfalfa with a disk cuts the crowns and permits more opportunity for disease to enter the plants and is therefore less recommended than spring-tooth harrowing.

FERTILIZERS

The fertilizers commonly used on alfalfa are gypsum and manure. Gypsum is used as a sulfur fertilizer as it contains about 18 per cent of this element. On most of the cut-over lands it has shown a remarkable stimulation to the increase in productivity of the crop. It is applied at the rate of 200 pounds per acre and will last for three or four years. The most suitable time for using the material is on the new seeding, preferably at the time of seeding or not later than in the fall after the crop is planted. It can be put on the plowed land previous to seeding or can be used at any later period. When applied in the fall it will be effective for the next year's crop while a spring application often



Alfalfa from equal areas, that on the left from land treated with gypsum at the rate of 200 pounds per acre and that on the right from untreated land.

has no effect on crop production unless put on very early. In a five-year comparison of fertilized and unfertilized areas the alfalfa with gypsum yielded an average of 3.07 tons per acre and the unfertilized fields 1.45 tons per acre. Sulfur has given about the same results as gypsum.

Stable manure is very effective in increasing the yield of alfalfa but is not used very extensively. Most farmers prefer to use this on potato or grain land and when these crops are followed by alfalfa the carry-over has a decided effect on promoting the growth of this crop. Where manure is used on alfalfa care should be exercised in not using too coarse material, because the heavy strawy portion does not rot rapidly and will be picked up with the rake in harvesting.

Lime is used to a slight extent but on most of the forest soils has not given the response obtained from gypsum. To be of any material benefit the application should be at least a ton per acre. Considering the cost and effectiveness, gypsum is more economical in practically all cases.

