Growing Alfalfa in Iowa

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Growing Alfalfa in Iowa

Abstract
When properly cared for, alfalfa can be grown almost anywhere in Iowa with success.

It is quite commonly accepted that this legume is not well adapted in Iowa's climatic and soil conditions and does not fit well into Iowa rotations, but practical experience does not justify this view. The success of many individual farmers and the result of experiments on various soils and under various climatic conditions demonstrate that if proper methods are followed alfalfa can be grown profitably on nearly all Iowa soils.

Keywords
Farm Crops

Disciplines
Agricultural Science | Agriculture | Agronomy and Crop Sciences

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Growing Alfalfa in Iowa

AGRICULTURAL EXPERIMENT STATION
IOWA STATE COLLEGE OF AGRICULTURE AND
THE MECHANIC ARTS

FARM CROPS SECTION

AMES, IOWA
An alfalfa field on the college farm. This piece of 7½ acres, seeded in August, 1908, gave a yield of 5½ tons per acre in 1909, and again in 1910. In spite of the drought of 1911 three cuttings made 4.3 tons per acre.
GROWING ALFALFA IN IOWA

BY H. D. HUGHES.

When properly cared for, alfalfa can be grown almost anywhere in Iowa with success.

It is quite commonly accepted that this legume is not well adapted to Iowa's climatic and soil conditions and does not fit well into Iowa rotations, but practical experience does not justify this view. The success of many individual farmers and the result of experiments on various soils and under various climatic conditions demonstrate that if proper methods are followed alfalfa can be grown profitably on nearly all Iowa soils.

The fact is that on most of the soils of Iowa alfalfa can be seeded successfully in much the same manner as red clover and the following year yield practically twice as much. It is claimed by successful alfalfa growers that it is easier to get a stand of alfalfa than of red clover. It is true the cost of alfalfa seed is usually some greater, but it yields so much more hay and generally is so much more valuable than red clover that the cost of seed becomes a small item.

Knowledge of these facts is increasing and such an interest in the raising of this crop has been aroused that something like 30,000 acres of land are now devoted to it in the state.

In some sections of Iowa the soils do not seem to be well adapted to alfalfa without special treatment. It has been demonstrated, however, that they can, with little expense, be made to grow the crop very successfully. This was shown especially in a series of co-operative experiments begun by the Iowa Agricultural Experiment Station in 1910 and carried forward on the different soils of the state.

THE ESSENTIALS FOR SUCCESS.

Success does not always come with first attempts with alfalfa, but that should not be discouraging. The per cent of failures in securing a stand of alfalfa is not so great as with many other crops commonly grown. Very simple measures turn failure to success. For instance, in a number of cases where the seeding of alfalfa failed without inoculation, the mere addition of 300 pounds per acre of soil from an alfalfa field or from a sweet clover patch brought success. After inoculation the soil produced a fine growth of alfalfa. In other sections of the state, particularly in the south-central, the application of from 1,500 lbs. to 3,000 lbs. of lime per acre brought success when various other trials without lime failed.

Perhaps the most important thing in securing a stand of alfalfa is the liberal use of manure even on soils above the average in fertility. Its application before plowing has increased the yield of alfalfa notably. On all soils below the average the use of manure has been absolutely essential to securing a satisfactory stand and yield.

Many Iowa soils will grow alfalfa very successfully without any
special treatment. This is indicated by the fact that only about 12
per cent of something like a thousand different seedings have been
reported to the station as failures.

THE PROFIT IN ALFALFA.

Alfalfa is capable of returning a greater profit, acre for acre, than
any other crop produced on our Iowa farms. This may seem a radical
statement to those accustomed to consider corn and wheat the only
sure money crops for the state and to look upon the adaptability of
alfalfa as more or less doubtful, yet the facts available and presented
in the following table prove this to be true.

TABLE I.

Showing the Average Yield and Farm Value of Alfalfa as Compared with
Other Staple Crops in Iowa

<table>
<thead>
<tr>
<th>Crop</th>
<th>Yield per Acre</th>
<th>Value per Unit</th>
<th>Value per Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alfalfa</td>
<td>2.85 Tons</td>
<td>$8.00</td>
<td>$22.80</td>
</tr>
<tr>
<td>Tame Hay</td>
<td>1.4 Tons</td>
<td>7.00</td>
<td>9.80</td>
</tr>
<tr>
<td>Winter Wheat</td>
<td>18.2 Bus.</td>
<td>.92</td>
<td>16.75</td>
</tr>
<tr>
<td>Corn</td>
<td>34.6 Bus.</td>
<td>.51</td>
<td>17.65</td>
</tr>
</tbody>
</table>

1916.

<table>
<thead>
<tr>
<th>Crop</th>
<th>Yield per Acre</th>
<th>Value per Unit</th>
<th>Value per Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alfalfa</td>
<td>2.7 Tons</td>
<td>$11.60</td>
<td>$31.32</td>
</tr>
<tr>
<td>Tame Hay</td>
<td>1.1 Tons</td>
<td>10.15</td>
<td>11.16</td>
</tr>
<tr>
<td>Winter Wheat</td>
<td>18.5 Bus.</td>
<td>.86</td>
<td>15.91</td>
</tr>
<tr>
<td>Corn</td>
<td>39.8 Bus.</td>
<td>.36</td>
<td>14.32</td>
</tr>
</tbody>
</table>

How profitable alfalfa is when properly cultivated is shown in the
yields secured at the Iowa experiment station on soils of only
average fertility which received no fertilizer other than from 8 to 10
tons of manure per acre before seeding. Sixteen seedings made
since the year 1903 have produced an average yield of 4.38 tons per
acre; yields of over 2½ tons at a single cutting have been quite
common, and as high as 3½ tons have been secured. One seeding
at the station yielded 7½ tons per acre in a single year, while another
field has an average for three years of 5½ tons.

FOOD VALUE OF ALFALFA.

The high value of alfalfa for feed, either in the form of hay or as
pasture, can hardly be over-estimated.

From an examination of the average yields of our various Iowa
crops for the years in which the alfalfa data is available we find
alfalfa producing 5.5 times as much protein per acre as timothy, 4
times as much as oats, 2.75 times as much as corn, and 2.6 times as
much as red clover. The following table compares the alfalfa food
values with other Iowa crops:
An old alfalfa plant showing the strong root system which secures water and plant food far below the surface.
TABLE II.
Food Value of an Average Acre of Alfalfa Compared with an Average Acre of other Iowa Crops, Based on Average Yields for 1909 and 1910

<table>
<thead>
<tr>
<th></th>
<th>Water</th>
<th>Ash</th>
<th>Protein</th>
<th>Crude Fiber</th>
<th>Nitrogen Free Exs.</th>
<th>Fat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alfalfa</td>
<td>450</td>
<td>4.8</td>
<td>8.08</td>
<td>16.00</td>
<td>2.37</td>
<td>116</td>
</tr>
<tr>
<td>Red Clover</td>
<td>3.25</td>
<td>15.5</td>
<td>3.07</td>
<td>2.30</td>
<td>0.52</td>
<td>82.5</td>
</tr>
<tr>
<td>Timothy</td>
<td>3.42</td>
<td>11.0</td>
<td>14.75</td>
<td>7.22</td>
<td>1.12</td>
<td>62.2</td>
</tr>
<tr>
<td>Corn Total</td>
<td>4.06</td>
<td>16.2</td>
<td>2.93</td>
<td>1.45</td>
<td>0.21</td>
<td>127</td>
</tr>
<tr>
<td>Grain</td>
<td>221</td>
<td>31.2</td>
<td>2.15</td>
<td>1.48</td>
<td>0.44</td>
<td>101</td>
</tr>
<tr>
<td>Stover</td>
<td>84.2</td>
<td>70.6</td>
<td>7.9</td>
<td>4.11</td>
<td>0.63</td>
<td>22</td>
</tr>
<tr>
<td>Oats Total</td>
<td>490.3</td>
<td>135.0</td>
<td>195.20</td>
<td>852</td>
<td>1450</td>
<td>94.5</td>
</tr>
<tr>
<td>Grain</td>
<td>104.8</td>
<td>32.4</td>
<td>114.8</td>
<td>1.09</td>
<td>0.58</td>
<td>45.3</td>
</tr>
<tr>
<td>Stover</td>
<td>155.5</td>
<td>102.6</td>
<td>80.4</td>
<td>743</td>
<td>852</td>
<td>46.2</td>
</tr>
</tbody>
</table>

VALUE AS A SOIL BUILDER.

As a soil builder each acre of alfalfa in the state annually adds to the farm over twice as much nitrogen as the average acre of red clover. This phase of alfalfa growing will not be overlooked nor the importance underestimated as farmers realize more fully the need of giving greater attention to maintaining the fertility of our Iowa soils, in order that we may at least retain our present crop yields, to say nothing of increasing them.

CHOICE OF SOIL.

Of 128 men who reported to the Iowa Agricultural Experiment Station their method of seeding and handling the alfalfa crop, 85.5 per cent said their seedings were successful, 13.4 per cent, partially successful, and 1.1 per cent, failures.

While these facts made it quite certain that alfalfa can be grown successfully on at least portions of practically every farm in Iowa, provided that proper methods are used in preparing the soil, there are no doubt particular soils and locations which are better adapted to alfalfa growing than others.

It is useless to attempt to grow alfalfa on land which is not thoroughly well drained, either naturally or by the use of tile or open ditches. Some of the best results have been secured on bottom lands, as these are likely to be quite fertile; but no matter how much available fertility is present, an attempt to grow alfalfa without good drainage is almost sure to result in failure. This does not mean that the highest ground available should be chosen, as this ground is likely to be quite unfertile. Land which is slightly rolling or nearly level and well drained is usually considered the best. No doubt the best fields of alfalfa are to be found near streams on what is known as second bottom land; this soil is usually well drained and is also very fertile.

MANURE.

The use of manure is by far the most important factor in securing successful results with alfalfa on Iowa soils. While good stands and yields have been secured on fertile land without the aid of manure, yet these yields are in almost every case largely increased by it.

To get a satisfactory stand and yield, the land must either be fertile, or it must be well manured immediately preceding the alfalfa
Alfalfa sown on the Iowa Agricultural experiment station fields, August, 1908, on soil only medium in fertility and which received no special treatment other than soil inoculation. Yield for the years 1909, 1910 and 1911, 5 tons, 4.4 tons and 3.2 tons, respectively.

crop. We have never known of an alfalfa field which gave good yields on soil low in fertility and which was not manured liberally before alfalfa was sown.

It is a notable fact that of 23 of our alfalfa co-operators who make special mention of the fact that they manured their field before plowing, 21 met with excellent success, one was only partially successful and but one failed. On soils which are only medium in fertility, manure is essential to success, and on soils below the average in fertility, successful stands are practically never secured without its liberal use.

Before the alfalfa plant has established its root system so as to give it a large feeding area and before the bacteria have developed in sufficient numbers to make available the abundant supply of nitrogen from the air, an abundance of available plant food must be at hand. To provide this, 10 or 12 tons per acre of well-rotted manure should be applied before plowing for alfalfa.

INOCULATION

While it is true that a majority of the successful stands of alfalfa throughout the state have been secured without inoculation, yet fewer failures are recorded where the presence of the necessary bacteria
was guaranteed by inoculation. Besides, a number of the co-operative experiments have shown that in practically every instance where the soil was inoculated, a more vigorous growth resulted than where no soil was added. In many cases the difference has been very marked and noticeable—the difference between an absolute success and a total failure. Considering the ease and slight expense of inoculation, alfalfa growers can ill-afford to risk a loss by neglecting it.

If soil can be secured from a nearby alfalfa field, or from a sweet clover patch in the community, use 300 lbs. or more per acre, distributing it as uniformly as possible over the land and harrowing it in well. This work may well be done at the time of seeding.

Do not expose this soil to the sun any more than necessary and apply it toward evening and harrow it in thoroughly at once, as the direct rays of the sun soon kill the bacteria.

THE USE OF LIME.

The results of the co-operative alfalfa tests indicate that on many Iowa soils the use of lime on alfalfa fields is to be recommended, as its application has in many cases been very beneficial. At any rate no harm can come from an application of from 1,000 to 2,500 pounds of lime per acre and especially if this be in the form of finely ground limestone or limestone screenings, which is the best kind to use.

In a number of co-operative tests the application of lime was absolutely essential before alfalfa could be grown successfully, indicating that the soil was strongly acid. In other cases, while a satisfactory growth was secured without the use of lime, its use gave a more vigorous growth and better color.
Alfalfa requires for its best growth a large amount of calcium, which is the active principle of lime. Also, alfalfa cannot grow and thrive in soils which are at all acid, owing to the fact that the nitrogen-gathering bacteria which live upon its roots, and upon which in turn the alfalfa plant depends most largely for its supply of nitrogen, cannot live, thrive and multiply in an acid soil.

Soils may easily be tested for acidity by the use of litmus paper. Take soil from a few inches below the surface of the ground and after thoroughly wetting it press it into a ball. Halve this with a knife and after placing a piece of blue litmus paper between the two cut surfaces, put them together again into a ball. At the end of 10 or 15 minutes remove the litmus paper and examine. If it has changed from blue to a distinctive red color it is reasonably sure that the soil is acid and is in need of lime.

Litmus paper can be secured in small amounts at any drug store.

**SEED BED AND SEEDING.**

In the main there are in common use in Iowa, four methods of seeding alfalfa which may be enumerated as follows:

1. Seeding in the spring with nurse crop.
2. Seeding in the spring or early summer without a nurse crop.
3. Seeding in the late summer following the removal of some other crop.
4. Seeding in the late summer on summer fallowed land.

**SPRING SEEDING**

In using the first method alfalfa may be seeded in the small grain in the spring in identically the same manner in which red clover is ordinarily sown.

The second method is to seed in the spring without a nurse crop somewhat later than the small grain is usually put in. When this method is used, it is very important to work the land thoroughly for some weeks in advance of seeding, so that weed seeds in the soil will be sprouted and killed.

**LATE SUMMER SEEDING.**

While a great many successful stands have been secured from spring seeding, the surest method is to plow in the spring and then summer fallow the land. Seed this land about the middle of August, having previously applied the manure, inoculated the soil, and applied lime. The value of this method is upheld by a large number of reports from practical men over the state. It is true that this method is somewhat more expensive than the other methods which have been used, but the yield the following year is often considerably greater. If the work is thoroughly done and the land cultivated repeatedly throughout the summer, there is little chance of failure even in very dry seasons, such as experienced in 1910 and 1911.

In seasons with a normal amount of rainfall a very excellent method of procedure is to cut a small grain crop for hay, apply manure and plow at once, working the land into as good condition as possible early in July. The soil should be thoroughly firmed, either by thorough diskling or by rolling, and the alfalfa seeded about the middle of August as in the case of summer fallow land.
PREPARATION OF THE SEED BED.

It is interesting to note that 10 of the most successful farmers make the special statement that it is absolutely necessary to work the ground well previous to sowing in order to conserve moisture and get rid of weed seed; to disk and harrow, as one man said, "until you are weary." This cultivation should begin as soon as the preceding crop is removed. In case that no crop is sowed in the spring, the land should be worked well throughout the summer.

Disk the land and harrow it thoroughly immediately after plowing, and then work it every ten days or two weeks, or at least after every rain.

The necessity of thoroughness in this preparation cannot be overemphasized. Unless the land is prepared early in the summer and then a good mulch maintained, there will be great danger of insufficient moisture to insure germination. Then again, alfalfa will not fight weeds and unless the soil is stirred often, bringing the weed seeds to the surface and germinating them before the alfalfa crop is put in, difficulty and possible failure will result. Further, while the surface soil should be very well tined and loose, the subsurface should be rather compact. Late and insufficient preparation means a loose seed bed with more drying out, and then in the winter great danger from heaving, with the loss of the whole crop as a result.

THE SEED AND METHOD OF SEEDING.

In buying alfalfa seed, as in buying seed for other crops, the highest priced seed is usually the cheapest. In order that the seed may all be sowed under proper conditions for germination, it should preferably be put in with an ordinary grain drill, and in average soil covered to a depth of about 1 inch. To distribute the seed uniformly it is a good plan to set the drill so as to sow only about 10 pounds per acre and then to go over the land twice; for example, crossing the field north and south first, and then east and west.

VARieties.

There has been much discussion regarding the variety of alfalfa best suited to Iowa conditions. Since the per cent of winter killing has been comparatively low and seed of the hardier varieties is very high priced and also uncertain as to purity, the only variety which can well be recommended for general use is that known as the common American. This is grown almost altogether in such states as Kansas and Nebraska. Seed grown on non-irrigated land, under conditions so nearly as possible the same as are found in Iowa, is usually preferable.

HANDLING THE CROPS.

No hay should be removed the year that the alfalfa is seeded. Spring seeding may be clipped once or twice when necessary to keep down the weeds, but a good growth should cover the ground when freezing weather comes on in the fall.

A top dressing of well rotted manure in the winter will be found very valuable, both in protecting the alfalfa and in otherwise increasing the yield.

Usually the alfalfa should be cut when about one-tenth of the heads are in bloom, which generally is early in June, as this is about the
The side delivery rake is a most important implement in the economical making of alfalfa hay of good quality.

time that the new shoots begin to appear at the bottom of the stalk.

Much has been said regarding the difficulty of handling and curing the first cutting, but reports from those men in Iowa who have the largest acreages state that alfalfa is not more difficult to cure than red clover. A number have said that it is easier to cure.

Various methods of curing have been used successfully.

In dry, sunny weather alfalfa cut one afternoon may be raked the following day, put in bunches and much of it stacked the same day.

It is important that as few of the leaves as possible be lost. In order to save the leaves many growers rake the alfalfa into windrows as soon as it has wilted and before the leaves are dry, bunch the hay with a rake as soon as dry enough to stack and haul it at once. This method also eliminates the labor of cocking the hay, a feature which has been found desirable by a number of men who handle large acreages.

Where one has much alfalfa hay to cure, a side delivery rake will be found to be of the greatest value.

Where the hay is to be cocked it is cut late in the afternoon or the morning, raked before dinner and put in cocks in the afternoon. Here it should be left for two or three days. The use of hay covers assures one of little difficulty in curing even the first cutting and produces a hay of very excellent quality.