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## The seeding, growing, and curing of alfalfa. 1908

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UNIVERSITY OF WISCONSIN

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# Agricultural Experiment Station

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## SPECIAL BULLETIN

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### THE SEEDING, GROWING, AND CURING OF ALFALFA

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R. A. MOORE.

No forage crop has been given more attention in the United States during the past ten years than alfalfa, and while it is in the experimental stage in some parts of Wisconsin, yet, where proper precautions are taken it can be grown with a reasonable degree of success on any of our older and well cultivated farms.

Wisconsin is a great dairy State and the milk products bring to our farmers annually some fifty million dollars. A considerable portion of this money is expended for high protein feeds, as oil meal, oil cake, cotton seed meal, bran, etc., with which to balance the feed ration. The cost and the time expended in carting the feeds make them expensive for the farmer and take from him a large portion of what would otherwise be profit.

Alfalfa supplies the dairymen and stockmen with valuable forage and saves for them a large portion of the money annually expended for high protein feeds. The value of alfalfa as a feed for all farm animals, including swine and poultry, is so well known that it is unnecessary to speak extensively of

its merits here. No single forage plant combines the materials for a profitable ration for dairy cows, sheep, and brood sows so well as does alfalfa.

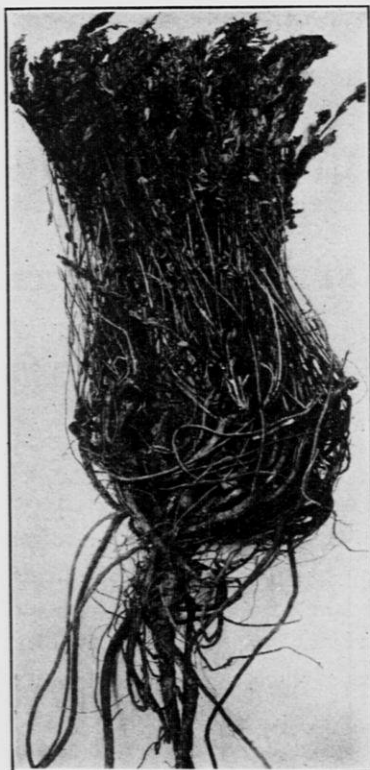


Fig. 1.—Spread of root and top development of an alfalfa plant seven years of age,—grown on the Experiment Station farm.

For seven years alfalfa has been grown successfully on the Station Farm near Madison, and many tests made to determine the best method of growing it under different conditions of soil and climate. When grown in comparison with red clover, timothy, and brome grass during the season of 1904, the yield per acre of hay was 5.4 tons for alfalfa, 2.5 tons for clover, 2.3 tons for timothy and 1.3 tons for brome grass. As a green forage the weight of alfalfa grown per acre was double that of clover, three times that of timothy, and five times that of brome grass. The per cent of protein found in the hay was as follows: 18.7

for alfalfa, 13.28 for clover, 4.74 for timothy, and 6.07 for brome grass. In total yield of protein per acre alfalfa produced three times that of clover, nine times that of timothy and twelve times that of brome grass.

The abundant root development of alfalfa, (See Figs. 1, 3, and 6), and the great depth to which the roots extend when once established enable the plant to secure food and moisture several feet below the surface. On the Station Farm, alfalfa that had been seeded one year had main roots extending to the depth of three feet, and where seeded for three years had roots extending to the depth of five feet. Alfalfa is said to extend its roots to the depth of twenty feet and over, and is regarded as one of our greatest soil renovators.

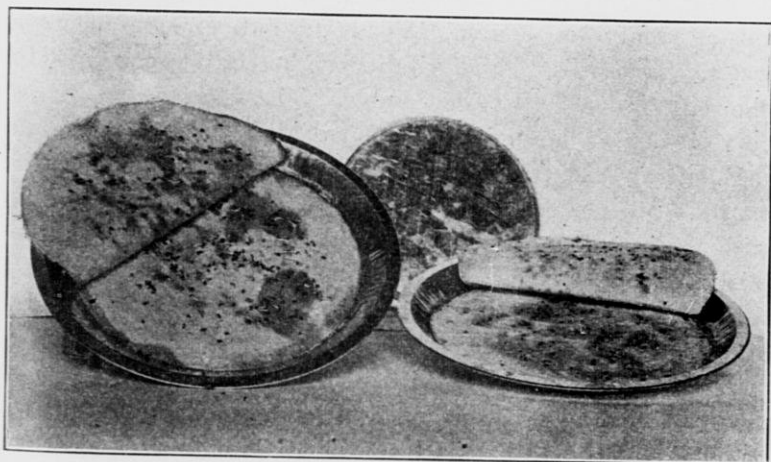


Fig. 2.—A convenient seed tester for farmers. The tin plate on the right side shows the seeds before any signs of germination are noticeable. The plate on the left shows the seed after germination has taken place.

Several hundred members of the Wisconsin Experiment Association have coöperated with the Station and made it possible to get data bearing upon the subject from many counties of the State under widely different conditions. The purpose of this bulletin is to state briefly the information gained with the hope that it may be beneficial to those desiring to grow alfalfa.

*Testing the seed.*—The success or failure with alfalfa depends largely upon the seed. Before placing an order for seed a sample should be secured from each of several good seed

houses and germination and purity tests made. Often seed that looks good will give a low test. Seed that shows a germination test below eighty per cent should be regarded with suspicion. Its vigor is seriously impaired even though it may sprout.

For the test a simple tin plate tester can be used by placing in it cotton flannel pads, cut to fit the inside of the plate (See Fig. 2). These pads should be soaked in water and then squeezed in the hand to remove excessive moisture. Lay the first pad in the larger of the tin plates used and scatter 100 seeds on the pad; put the other pad on top of the seed and then cover with the smaller plate to retain moisture. Plates should be kept at ordinary room temperature and examined at intervals of twenty-four hours. If pads dry out, sprinkle them with water. If seed is of high vitality at the end of four days, fine vigorous sprouts will be noticeable. The sprouted seed should be removed at the end of the fourth day and the unsprouted seed left at least two days longer. The germinating power is expressed in per cent. If the alfalfa seed appears to be filled with foreign seeds it is well to send the sample to the Agronomist, Wisconsin Experiment Station, Madison, with request to test for purity. The test will be made free for any resident of Wisconsin.

*Locating the field.*—Good growths of alfalfa are often secured in favorable seasons on level land, but better results will be obtained on land that is somewhat sloping, where water will not stand during any portion of the year. On level ground during sleet storms, water is apt to collect in all the depressions, forming on freezing an ice sheet which smothers many of the alfalfa plants. "Patchy fields" are hard to renew and generally necessitate reploting and reseeding. In no case should alfalfa be sown on land that is subject to overflow or where the water level is but two or three feet below the surface.

*Character of the soil.*—Alfalfa will grow on a wide variation of soil ranging from a rich sandy loam to a heavy clay, but a rich clay loam over a gravelly sub-soil seems to be best. It is practically useless to try to grow alfalfa on sandy or "worn out" soils without an abundant supply of good barnyard manure.

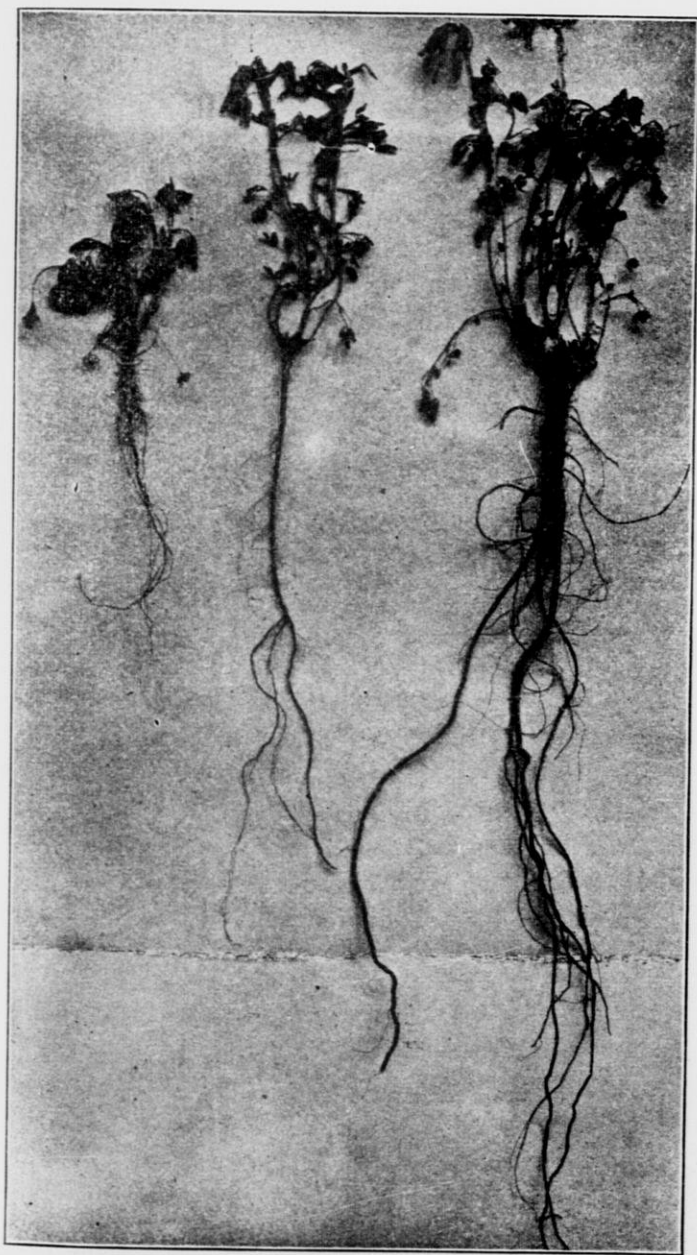


Fig. 3.—Comparison of the root development of alfalfa plants with a medium red clover plant. The plant on the right, alfalfa three years old; middle plant, alfalfa one year old, clover plant one year old on the left. Scale, one inch to the foot.



Alfalfa will not do well on new and unsubdued soil, but develops best on the well cultivated soils.

*Soil inoculation.*—Alfalfa belongs to the plant family known as leguminosae. Like our common red and white clovers it has the power, through minute living organisms found in the little nodules on the roots, to take the free nitrogen from the air for the purpose of building plant tissue. Consequently, the plant is exceedingly high in nitrogen content and receives the greater portion of that valuable constituent from the air instead of from the ground. These little organisms or bacteria are necessary for the successful growing of good crops of alfalfa, and where the soil only contains them in limited numbers the alfalfa plants soon wither and die. In some sections of the State the ground is sufficiently supplied with the alfalfa bacteria, but there are many localities where they are present in so limited a number that it seems impossible to get a catch of alfalfa that will succeed in surviving the first winter.

Sweet clover, an ordinary roadside weed, which naturally grows to the height of five or six feet throughout nearly all of the counties in southern Wisconsin, is one of the essential alfalfa bacteria distributors. When a farmer is in doubt as to whether or not his land contains the proper bacteria he can successfully inoculate his fields by scattering on them soil from an old alfalfa field or where sweet clover has grown. For best results, two tons of earth per acre should be scattered immediately preceding the sowing of the alfalfa seed. For farmers who have not alfalfa or sweet clover near at hand from which to get infected soil in large amounts we advise the securing of a sack of one hundred pounds of alfalfa soil from the Experiment Station or elsewhere and scatter on about eight or ten square rods of the field where it is desired to sow the alfalfa seed. The year following the seeding, soil can be taken from the portion of the alfalfa field where the infected soil was scattered and used for the inoculation of larger areas. Alfalfa responds readily to these methods of inoculation, and nearly all plants will be found to have the proper nodules on the roots the first season of growth.

An excellent plan for supplying the soil with the proper germs is to use a mixture of one-fourth alfalfa seed and three-fourths clover seed for general seeding. The clover hay will be of a better grade where alfalfa is grown in connection therewith. The alfalfa plants that survive become bacteria producers and distributors for future crops of alfalfa.

Some seedsmen have advertised cultures of organisms for inoculating alfalfa seed previous to seeding. The data obtained from experiments indicate that much more certain results can be secured by the use of the infected soil.

*Soil preparation.*—Good results have been obtained on both fall and spring plowed lands, depending upon the texture of the soil and freedom from weeds. With fall plowing it is well to plow early so as to cover weeds before they produce seed. Double disc in the spring as soon as the land works well, and put in garden condition with a fine tooth harrow. The ground should be heavily spread with barnyard manure before plowing, using from ten to twenty tons per acre. If seeding is done on spring plowed land, the ground should be heavily manured during the winter and plowed in the spring. The fine tooth harrow should be used within a few hours after the furrows are turned to prevent drying and hardening of the soil. If the soil once becomes lumpy it is hard to put in proper condition for alfalfa seeding. A planker or roller should be used immediately before and after seeding, which aids much in firming the soil to permit of rapid germination of the seed. Good results have been obtained in Wisconsin by sowing as soon as the ground can be worked to best advantage.

*Nurse crop.*—Where ground is inclined to be weedy, it is preferable to use a nurse crop as it assists the alfalfa to keep down the weeds until it becomes established. Barley at the rate of three pecks per acre has given best results as a nurse crop, and can usually be left to ripen without apparent injury to the alfalfa. If oats are used do not exceed one bushel of seed per acre, and if the season is dry cut the oats for hay at the time of heading.

Thin seeding of the nurse crop is important as it gives the small alfalfa plants sufficient space to grow between the grain



plants without crowding. (See Fig. 4). It also prevents to a great degree the lodging of the grain crop, which will invariably kill the alfalfa plants. The drain of moisture and fertility from the land is not so great where a thin nurse crop is used.



Fig. 4.—Protection afforded tender alfalfa plants by a thin seeding of barley during the early period of growth.

Land on which tobacco, sugar beets, or any highly cultivated crop has been grown the preceding year can be seeded to alfalfa without a nurse crop with fair chances of getting a good, thick stand. Where alfalfa is seeded without a nurse crop the ground should be cultivated with a disc and a fine tooth harrow until May 15, or June 1. Weeds will then have been quite thoroughly killed and the ground will be in fine condition to sprout the alfalfa seeds in the shortest possible time. Where a nurse crop is not used, frequently a cutting of alfalfa can be secured by September 1. Sowing with a nurse crop is most generally practiced in Wisconsin, as it enables the farmer to get a stand of alfalfa and a fair grain crop the year of seeding. An excellent method of getting a good stand of alfalfa is to manure the ground heavily in the fall and plow. As soon in the spring as the land works well disc and drag at intervals until May 20

or May 25. The discing and dragging not only put the ground in good tilth but aid in the sprouting and killing of weeds. Sow twenty pounds of good alfalfa seed and three pecks of barley. The barley should be cut for hay when headed and the alfalfa left without further disturbance until the following year. Five pounds of seed extra per acre will usually yield enough finer and better quality of hay to amply repay. Alfalfa is a perennial plant and will grow for many years without reseeding.

*Machinery for seeding.*—A drill or broadcast seeder with grass seeder attachment is the most convenient machine for seeding, as both the nurse crop and alfalfa seed can be sown at one operation. The Cahoon whirling grass seeder and the wheelbarrow seeder are also used to advantage. Sowing by hand is often resorted to where the area is limited.

*Cutting the crop.*—Where alfalfa is sown as above described, no hay crop can be expected the first season except under the most favorable conditions. In no event should the alfalfa be cut or clipped after September 1. If the growth of alfalfa is sufficient to warrant taking a crop from the land by September 1, it should be cut then regardless of the stage of growth.

The year following the seeding you may reasonably expect three good crops. Your first crop will be ready for cutting the early part of June, a trying time for curing alfalfa. Cut when about one-tenth of the plants are in bloom and on a morning after the dew has disappeared, on a day that promises fair weather. Adjust the cutter bar of the mower so that the stubble left will be at least one inch in height. This will prevent injury to root buds of the alfalfa plants.

*Curing alfalfa.*—In the afternoon of the same day of cutting, if weather has been favorable, the alfalfa can be raked and put into small cocks. These cocks should not be left standing in the field more than two or three days without moving, or the alfalfa plants underneath the cocks will be partially or completely smothered. By taking a pitchfork and running it into a cock of alfalfa near the bottom one can easily pull alfalfa from the place previously occupied. If alfalfa is

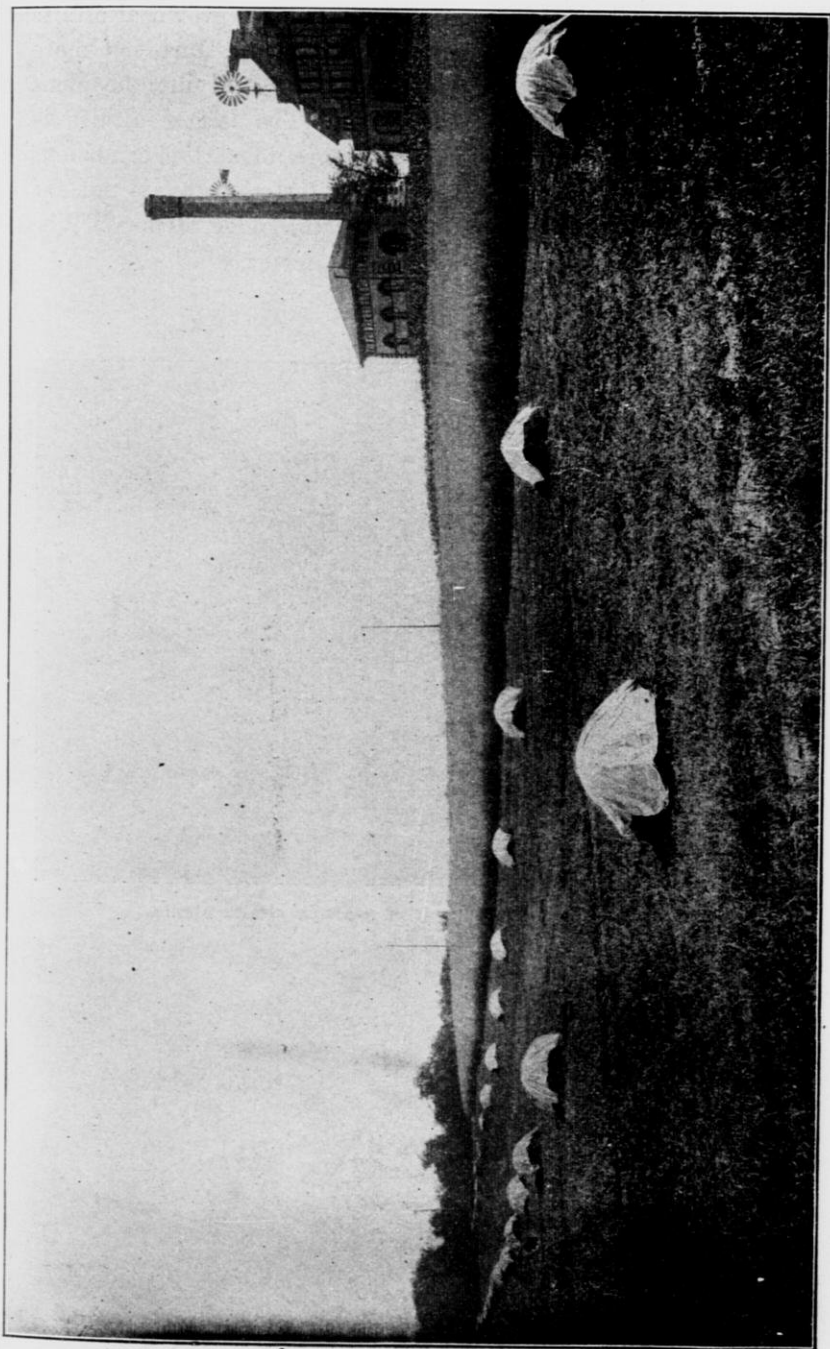
exceedingly green when cocked or rainy weather sets in it will "heat" unless the cock is opened every day or two. In favorable weather no more difficulty will be experienced in curing alfalfa than in curing heavy growths of clover. Like clover the leaves are rich in nitrogen, and they drop off readily when dry, and therefore the aim of the farmer should be to cure the alfalfa with the least possible handling. One-half of the feeding value may be lost through the weathering and improper handling of the crop.

*Hay caps.*—A much better quality of hay will be secured if the crop is cured under hay caps than in open cocks or windrows. Caps can be made from light cotton duck by hemming the edges to prevent raveling. Eyelets should be made in the corners in which strings should be tied to fasten the caps. Heavy wire cut eighteen inches in length and a loop made at the top in which to tie strings attached to cap make a convenient arrangement to hold the caps in place. The wire pegs can be either run into the ground or pushed into the sides of the cocks of alfalfa. (See Fig. 5.)

Ex-Governor Hoard recommends horse shoe attachment for strings. To make these, cut old horse shoes at toe calk making two weights of each shoe. Punch holes through shoe about two inches from the cut end so that the short end of shoe will stick into the hay and thus hold the cap in place. Some make little sacks or pockets in each corner of the cap and fill with gravel or stone for cap weights.

*Storing the crops.*—Alfalfa is either stacked or placed in a barn after curing. Considerable of the feeding value is lost through stacking as the hay is porous and rain penetrates the stacks to the extent of two or three feet. An outside mow with roof does fairly well and little of the alfalfa is lost when stored under cover. A covering of marsh hay or a tarpaulin will prevent damaging of alfalfa in the stack. It is well to let the alfalfa "sweat" in the cock, otherwise it will heat and get musty in the barn.

The great amount of valuable forage taken from a limited acreage has led many to think that a large portion of the farm should be sown to this important crop regardless of conditions.



**Fig. 6.**—Alfalfa protected by hay caps.

A word of caution to farmers who have never grown alfalfa is necessary. Try only a limited acreage on the start, not more than one or two acres, for the purpose of studying the plant and the soil conditions of the farm. The longer alfalfa is grown and fed upon the farm the more ideal the conditions for successful growth become and we feel the day is not far distant when alfalfa will be grown on the older farms of Wisconsin as generally as our common red clover.

January 10, 1908.

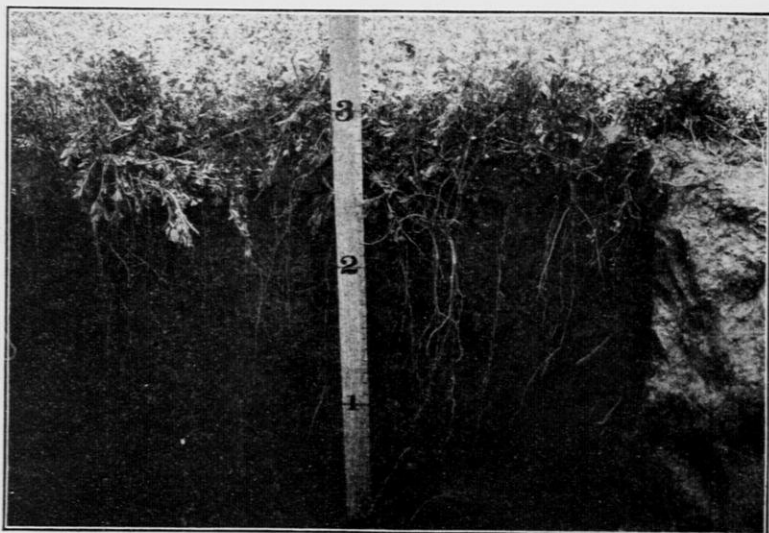


Fig. 6.—Root development of yearling alfalfa plants.

