GROWING ALFALFA WITHOUT IRRIGATION

(Written by Ira D. Cardiff, director of Washington Experiment Station, and George Severance, head of Department of Agriculture. Published by the Extension Department of the State College of Washington as Extension Bulletin No. 1, for free distribution.)

(Continued from last week)

6.—Inoculation

Alfalfa's superiority over other crops is due to the fact that it is rich in protein (muscle-building food) and also to the fact that it enriches rather than depletes the soil upon which it grows. Both of these qualities are possible because of the presence of exceedingly small plants called "bacteria," which live upon the roots of the alfalfa, there forming the familiar nodules. In each nodule are millions of these bacteria which have the power of assimilating nitrogen from the air, said nitrogen being the basic element in protein food and a most important factor in soil fertility, as stated above. If these bacteria are not present in the soil, alfalfa does not do well. It then becomes necessary to inoculate the soil with the bacteria. This is accomplished in various ways. First, soil from an alfalfa field known to contain the bacteria may be scattered over the ground in question at the rate of two or three hundred pounds per acre, and harrowed or disked in. Second, a portion of soil may be treated with a pure culture obtained from a bacteriological laboratory and this disked into the ground in question; or, third, the seed which is to be sown may be inoculated with a pure culture obtained from a laboratory and these seeds sown in the inoculated ground. Whichever method is used, the inoculated soil or seed should not be exposed to strong sunlight; that is, the inoculation should take place on a cloudy day or in the evening. These nodule-forming bacteria seem to be present more or less in most of the soils of Eastern Washington. Therefore, most alfalfa growers are not obliged to inoculate their soil. Yet, in most regions inoculation proves beneficial because it hastens the time of nodule formation, thus aiding the growth of the alfalfa. On the Experiment Station farm it has frequently been noted that in fields which have not previously grown alfalfa it does not make as rank a growth at first as it does upon fields which are already infected with the nodule-forming bacteria.

In Western Washington inoculation seems to be quite essential, although the whole alfalfa problem is more or less in an experimental stage in that region at the present time.

In general it can be said that inoculation is necessary when it is observed that the alfalfa is devoid of nodules, or produces only a few of the same, or if the soil is low in organic matter, or if the growth is irregular over the field, and it is found that some plants bear nodules while other do not. On the other hand, inoculation is not necessary when an average crop is being produced and nodules are abundant, or when the soil is already rich in nitrogen, as it is in some parts of the West. The most apparent indication of the need of inoculation is a yellowish, spindling growth of alfalfa.

The mistake should not be made of regarding the bacteria as fertilizer. They are not. They produce the fertilizer and the effect of inoculation must not be expected too early. It is also useless to inoculate upon acid or water-logged soil.

It has been the custom of the Experiment Station in the past to recommend inoculation by means of soil obtained from another alfalfa field. However, this method is attended with more or less danger, on account of the fact that a farmer may unconsciously introduce into his soil various fungous and bacterial diseases, Nematode worms, potato bugs, the potato tuber-moth, alfalfa weevil (which pupates in the soil) and also the seed of various and sundry noxious weeds. These are all real dangers. Inasmuch as some of these pests, like the bacterial leaf spot of the alfalfa, the alfalfa weevil, the potato tuber-moth, and the Colorado potato bug, are just commencing to enter the state, it becomes very important to exercise great care in inoculating by this method.

Inoculation by means of pure cultures is not attended with any of these dangers. However, there is one disadvantage in the pure culture and that is it is sometimes inert when obtained or so easily rendered inert by careless handling.

7.—The Nurse Crop

While in many instances farmers succeed with a nurse crop, the most uniformily good stands are secured by seeding alfalfa alone. Where rainfall exceeds twenty inches a fairly good crop of alfalfa hay may be secured the same season it is seeded, if no nurse crop is used. There are cases in which it is necessary to seed with some more rapid growing crop before seeding the alfalfa, in order to hold the soil from drifting, seeding the alfalfa after the quicker growing crop has made a good start. Rye has been used as a nurse crop quite frequently, with good success, on some of the drifting soils of the irrigated regions. It is questionable whether alfalfa can be grown with success where soils have begun to drift and no irrigation water is available. It should be attempted only in a very small way under such conditions until its merit is determined.

8.—Care During First Summer

Contrary to the common belief that alfalfa will root better and give better results by clipping back, experiments have clearly shown that alfalfa will become better established, producing a better crop the ensuing season if it is not clipped back the first season until it has made a full growth. However, when weeds come in badly, it is best to cut the weeds, setting the mower bar to run high, to avoid cutting back the alfalfa plants as much as possible.

9.—Cultivation

Alfalfa should be cultivated each spring as soon as the soil is fit to work and if possible after every cutting. The purpose is to conserve moisture, promote the necessary chemical changes in the soil for the preparation of available plant food, and to eradicate weeds. In light land the spring-tooth harrow is one of the best tools for this purpose. The results will be so much the better if the soil can be thoroughly worked up to the depth of four or five inches. The Alfalfa Renovator is one of the best tools in the heavier soils for this purpose and will do excellent work if weighted. In the absence of a special tool a disk harrow may be used satisfactorily. It is usually best to follow the renovator or the disk with a smoothing harrow to fine the soil and form a better mulch. The purpose of this cultivation is not to tear the plants to pieces as many imagine, but to secure the usual advantages of cultivation, the eradication of weeds, the pulverizing and ventilation of the soil causing more rapid development of plant food, and the conserving of moisture. With this viewpoint, one can appreciate that a mere mussing up of the surface is of no great value.

10.—Pasturing

To secure the largest returns from pasturing alfalfa it should be allowed to make a good start in the spring before turning on the stock and should be allowed to go into winter with a little top. Stock should be kept off the fields during the winter. At no time should it be pastured real close. The pasture should be divided into two or three parts and the parts pastured successively. This gives the alfalfa frequent opportunity to recuperate. Cultivation is just as beneficial to alfalfa pasture as to alfalfa meadow. There is danger of bloating in pasturing cattle or sheep on alfalfa, but the danger is not great in the wheat belt if the stock is worked into it gradually and is kept off of luxuriant alfalfa when it is wet. Danger is also lessened by giving access to some other feed for part ration. Seeding orchard grass with alfalfa has helped to solve this problem in many cases.

11.—Making Hay

A common rule is to cut alfalfa when one-tenth in bloom, but the proper time should be determined to some extent by the purpose for which the hay is made. If for horses or fattening animals it should be slightly more mature than if for dairy cattle. If left very long after the new shoots have started at the crown the succeeding growth will be materially lessened. If cut too green it will lack substance and be more apt to cause scouring, bloat, or other troubles. It should be handled much the same as clover, curing it principally in the cock, aiming to haul when no juice can be twisted from a wisp of stems. The leaves, the most valuable part, waste badly if cured much in the swath. The exact procedure and the time needed for curing must necessarily vary with the immediate weather conditions.

12.—Probable Yields

The college has been raising from thirty to fifty acres of alfalfa per year for a good many years and the yield records show average yields for the entire area usually of from two to three and one-half tons per acre. In only a few instances has the yield of any considerable acreage fallen as low as two tons and in some instances it has reached nearly four tons per acre. The second crop has usually been pastured, otherwise the yields per annum of cured hay would have been slightly higher. Alfalfa tracts unbroken for years show no signs of deterioration, except when pastured very close continually or when not given cultivation. One small tract seeded in 1902 is as good as ever. The college does not aim, however, to establish permanent meadows, but to grow alfalfa or clover on all the fields of the state farm in rotation with the other crops. While summer fallowing was practiced on the college farm ten years ago, the soil is being built up so that for several years summer fallowing has been discontinued and excellent crops are being produced regularly, averaging fully as high as on good farms where grain is the sole crop, and summerfallowing is practised.

13.—Alfalfa Versus Clover

Clover as well as alfalfa has been grown in field quantities on the college farm for nearly twenty years, and the following conclusions seem to be justified:

a. Where the annual rainfall exceeds twenty inches, red clover can be grown successfully and will yield about the same as alfalfa without irrigation.

b. In the wheat regions with an annual rainfall of from twenty to twenty-five inches, the requirements noted for preparing the soil and seeding alfalfa, are even more imperative when seeding clover; but with strict adherence to methods outlined, an excellent stand may be relied upon with much certainty.

c. Alfalfa produces a better crop than clover the season of seeding.

d. Alfalfa is more apt than clover to produce a good second crop during dry summers.

e. Alfalfa seems to endure pasturing better than clover.

f. Clover deteriorates after three or four years, while alfalfa does not.

g. Clover is better adapted to short rotations than alfalfa, and it is much less expensive to plow up and eradicate.

h. Alfalfa is usually better adapted to permanent or semi-permanent meadows or pastures.

i. They may be classed together as soil improvers, and are practically equal in feeding values.

Reports from a number of farmers show that alfalfa is being grown in a small way by a great many farmers in the Inland Empire; and that it is entirely past the experimental stage where the rainfall exceeds fifteen inches, with several reports of success in regions of twelve inches rainfall.

Estimates of yields by farmers about Pullman, who are growing from five acres to two hundred and fifty acres, run from two to four tons per acre, averaging about three tons from two cuttings.

R. S. Booth feeds alfalfa hay to his horses, as the only roughage when at hard work, and reports no sickness since he began feeding it fourteen years ago. He says: "Alfalfa beats forty bushels of wheat per acre."

Max Hinrichs, with one hundred and fifty acres of seed alfalfa, and one hundred of hay and pasture, replies: "It is a decidedly paying crop; grain crops are much better after alfalfa."

R. S. Curtis replies: "A paying crop, even if soil improvement alone is considered."

Preston Morris: "A paying crop to the extent that it can be used up; would not advise growing it for market. Farmers should grow more alfalfa, but keep stock enough to consume it."

J. D. Carson reports: "Two tons of hay with good pasture afterwards; a good crop so far as it can be fed on place."

Nat Bryant has been growing alfalfa for eight years, and now has eighty-five acres.

Thomas Halpin has twenty-five acres of alfalfa, and feeds it to beef cattle: He says: "A paying crop to the extent that it can be fed out."

J. H. Weeks, who runs a dairy, has fifty acres in alfalfa.

B. Atherton reports ten acres of alfalfa, and will seed more next year. He has raised it for nine years, averaging about two and one-half tons, first cutting, with pasture afterwards. He has secured as high as four tons per acre, and says: "A good paying crop."

The State College does not advocate the wholesale introduction of alfalfa, or any other crop, by the inexperienced, but does urge the gradual introduction of alfalfa; also, clover, peas and corn, where the rainfall will justify it, to meet the needs mentioned at the outset of this article; and, also, urges the keeping of enough live stock for the consumption of such crops.

Farmers in the very dry wheat belt are advised to try alfalfa in a small way, exercising extreme care in every step. A few trials about Ritzville indicate that it may be grown there to good advantage.

Senator D. A. Scott of Ritzville has a small acreage, and considers it a success.

Thorough soil preparation, seeding with a drill, thin seeding, and vigorous cultivation become very important under such conditions.

In Western Washington, clover, peas and vetch all do so well and are so much better adapted to short rotations that alfalfa has been given very little trial. Wherever tried, it has made a sickly growth, and in every case seems to need inoculation. Owing to its superiority as a drouth-resistant plant, it may prove a superior crop for some of the lighter soils of Western Washington, but that point remains to be proven.

It must be borne in mind that the State of Washington is so varied in its soil and climatic conditions, that it is impossible to recommend without reserve, or to lay down an absolute set of rules to cover all conditions. Farmers are therefore advised to consider the points brought out in this bulletin and to work out the problems carefully to meet their local conditions.

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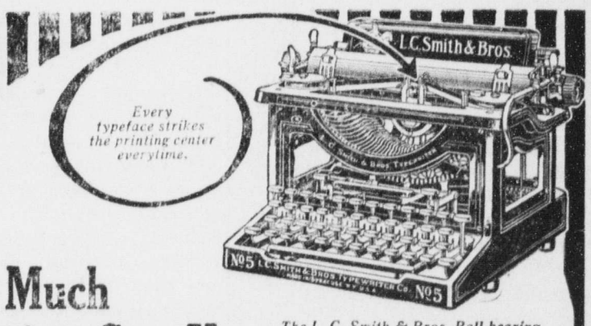

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