

cultivation starts long before the mangels are up.

Second. Mr. Rennie's method of cultivation will, I admit, conserve some soil moisture, but it is not as if it does not keep it in the right place, as there is always a high ridge of earth left just where the mangels are and just where the moisture is most needed, that is apparently in the best possible condition dry out and lower the vitality and hardness of the young plants.

Third. Scuffling the drills will kill the weeds between the rows, but these are not the ones that really count. It is the ones in the rows that are the hardest to get at. Try letting the weeder take them out for you—it is surprising how well it can do it.

Fourth. When roots are sown on drills there is always a lot of dirt left by the sculler to be moved and levelled down by the harrow. This is not only a lot of needless work, but it is a positive injury to the plants, as it leaves the roots almost entirely bare, so that it takes them days, sometimes weeks, to get covered, and occasionally they never do so.

It is not necessary or advisable to hoe deeply or to move much soil when thinning roots. As long as the weeds and superfluous plants are cut below the crown, they will not grow. Scuffle if necessary after thinning, and do not be afraid to use the weeder occasionally until the leaves are quite large.

Use a scuffer with knives that cut shallow until quite late in the season, when it may be desirable to cultivate deeper. The above method of cultivation applies well to corn, only this should be sown forty-two inches apart using plenty of seed to insure an even stand, then thinning to the desired distance in the row.

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How to get a Sure Stand of Alfalfa

Failures to successfully grow alfalfa are more often due to insufficient preparation of the soil than to all other causes combined. Experience has shown that the soil must be well drained, rich, well supplied with humus, lime, phosphorus and potash. With these necessities supplied, it is not difficult to obtain a stand of alfalfa.

There are just two soil conditions which seem almost fatal to the alfalfa plant. The first is a soil constantly wet. It will not succeed where the water is nearer to the surface than six feet, or where water will stand on the ground for over forty-eight hours. This invariably smothers it. If water simply flows over the field for a short time during a freshet, alfalfa will not necessarily be injured, if too much mud has not been deposited upon the plants. Even in such cases fields have been saved by disking once or twice, but it is not wise to sow on a field subject to overflow, or one where water rises to the surface in winter or spring, nor on a field so flat that water will not run off in time of heavy rain.

The other kind of soil upon which alfalfa will not grow is that which is too acid. This is a condition that can be remedied before sowing the alfalfa by an application of lime to the land at the rate of five hundred to one thousand pounds per acre.

A simple test for acidity is to make a cut in the damp ground with a knife, pressing the earth slightly apart; then push a piece of blue litmus paper into the opening and press the earth together. Leave the paper there for a few hours. If, upon examination, the litmus paper is found to have turned pink or red, the soil is sour and requires lime.

Having the soil in good condition, the seed requires consideration, for alfalfa varies greatly in hardness according to where it is grown. That from Farnham seed is a rank, coarse, prodigious yielding sort, but not at all hardy in a cold climate. Imported seed may come from Germany and be very good, or it may come from Algeria and be very unsale. The best source of seed for America is the Northwestern States, but they do not produce enough to supply all wants, consequently there is a lot of adulterated stuff upon the market. It is always a good plan to submit a sample of the alfalfa seed about to be purchased to the Seed Commissioner at Ottawa, or the Agricultural College at Guelph, for examination, for there are various weeds introduced with this seed that are difficult to eradicate.

The time at which alfalfa should be sown has been a much argued question. It seems, however, to be of very little importance in itself, success being attained equally in spring, summer or autumn. Other conditions being favorable, in Ontario probably the best time for sowing is June or July. The land should be plowed early, harrowed and allowed to lie until the weeds sprout, then it should be harrowed again. This should be repeated until late in June or some time in July, care being taken to harrow after every rain, so as to conserve the moisture. By July, all the weed seeds near the surface will have sprouted and died. Then the alfalfa may be sown. It is best to do this after a rain, when the soil is moist, then cover with a harrow. No clipping is usually needed, and a strong stand is almost certain if the land is inoculated with the necessary bacteria.

Experienced men differ as to whether it is better to sow alfalfa broadcast or to drill it in. It would seem, however, that, given a soil in good clink and well properly adjusted, there will be a more even and hence more economical distribution and a better and more uniform covering of the seed. It is claimed that by the use of the drill, five pounds of seed per acre can be saved by a common method when using the drill, is to mix an equal quantity of wheat bran with the seed, thereby ensuring even distribution and a not too excessive seeding. The quantity of seed to be sown may depend upon a variety of circumstances, such as the germinating quality of the seed, condition of the soil, the weather at the time of sowing and the bacterial life present.

With land prepared by sowing a few pounds of seed six months or more beforehand, so as to induce the development of bacteria, careful soil preparation, normal moisture and clean seed, testing ninety per cent. germinable, there should be no need for more than ten pounds to the acre. The disking that the field ought to have later, will split the crowns and many new stalks will be sent up; so that in a few years a square foot of surface will not accommodate more than six to ten robust plants, and having these, the ideal stand has just

about been attained. In any event, if the seed be strictly good, well cleaned, and all conditions favorable, twelve pounds of seed would in all probability be too much, rather than too little.

In regions where alfalfa is new, the land may require to be inoculated. The best way to do this, is by the use of soil from an established alfalfa field, or it may be taken from a patch of sweet clover (*melilotus*). The same bacteria inhabit each of these plants.

It does not matter how much soil is used, so that it is made fine, scattered over the field and harrowed in before the action of the sun destroys the germs. As little as two hundred pounds will inoculate an acre and a ton may be used with better results. Distribution is the main thing. After inoculation is established, its effects exist for a long time even if the alfalfa is plowed under and other crops have been grown. Thus it is always easier to start a new stand the second time and a stronger growth is usual from it.

Prof. Harcourt on Testing Soils

Editor of The Farming World:—In your issue of May 15th I noticed a reference to the need of some simple way of determining the deficiencies in soils.

In the past, barnyard manure has been about the only plant food directly supplied to the soil, and it is quite possible that in many cases one or more constituents of the soil may have been used up to such an extent that there is not sufficient of these in the barnyard manure to supply the needs of the crop. In the other hand, it is equally possible that either the growing of clovers, which gather large quantities of nitrogen from the atmosphere, or the keeping of a large amount of stock on the farm has so enriched the soil in nitrogen that it is present in an undue proportion. We do know that on many farms oats lodge badly. It would seem as though those constituents which force leaf and stem growth are in abundance in the soil, and those which have to do with the production of the seed are deficient. Unfortunately there is no reliable or rapid method of determining the amount of available plant food in the soil. We can readily determine whether there is sufficient of the various constituents in the soil to produce crops, but the difficulty is that no really satisfactory method has been devised for determining the amount of plant food that is available to the crop. I think it is generally recognized that we have at present no better method of detecting the deficiencies of the soil than by noting the nature of the growth.

For two years now we have at the Ontario Agricultural College been conducting co-operative experiments with fertilizers to see if we can supply in proper proportions the constituents which are lacking in soils upon which the grain lodges badly. So far we have not obtained entirely satisfactory results, but we hope when this season's returns are in that we shall be in a position to give some definite advice as to the treatment of this class of soil. In the meantime we shall be glad to hear from farmers who have had difficulties with this or any other class of soils.

R. Harcourt.

O. A. C., Guelph.

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