

The roots penetrate deeply into the soil. It has a tap root (see illustration page 12) which has been known to go to great depths where the subsoil was permeable.

The rootlets bear nodules which enable it to secure its nitrogen supply from the air. The young plant consists of a number of low branches springing from a simple basal stalk at the crown of the root. These branches ascend directly above ground and form a compact tuft. On the old plant, however, certain of the more robust stems elongate underground and become new branch-producing stocks.

In this way the simple stock or rhizome becomes two or many-headed.' (For fuller description of plant and illustration see part III.)

SOILS.

As just stated, alfalfa is a deep-rooted plant, hence in considering soil suitable for this crop the character of the subsoil must always be of primary consideration. Two qualities are absolutely necessary in the subsoil for an alfalfa crop to succeed. It must be well drained to a depth of at least 2 feet, and it must be possible of penetration by the roots of the alfalfa plant to a similar or greater depth.

Any field likely to be under water, or the soil saturated with water at any time, for more than thirty-six hours at a time, is quite unsuitable for alfalfa. Any field with a hard-pan subsoil within two feet of the surface will prove unsatisfactory for alfalfa.

The most suitable soil conditions for securing a good stand of plants and securing good and continuous crops afterwards, are a light sandy loam in good heart over a deep loose alluvial subsoil.

A subsoil rich in plant food is of course very valuable, but, while fertility in the subsoil is important, permeability is still more to be sought after. A sandy subsoil while not in itself so rich in plant food is likely to give much better results than a clayey subsoil under a similar surface soil. Upon the fertility and physical condition of the surface soil more than upon any other factors depends the success of the first year. The success or failure of later years depends in a great measure upon the subsoil.

SOIL PREPARATION.

To insure a good stand three conditions are necessary in the land selected:

1. Freedom from weeds.
2. Excellent physical condition or tilth.
3. Abundance of plant food.

Freedom from weeds may be secured by sowing immediately after a hoed crop as potatoes, corn or roots, or by sowing after a complete or a partial summer fallow. Clover sod, stubble, or even old meadow ploughed shallow in August, rolled and cultivated at frequent intervals during September, and receiving proper treatment in October, may be expected to give good results. In October it should be ploughed again with a subsoiler attached to the plough, or ploughed with two ploughs, one without a mould board following in the track of the other, and stirring the subsoil as much as possible, or cultivated lengthwise, crosswise and angling with a strong stiff-toothed cultivator, to be followed by a double mould board plough, leaving the whole field in ridges about 7 inches high and 22 inches apart.

Such treatment insures a seed bed permeable to early roots, fairly rich in plant food, and in excellent physical condition. The latter condition is insured by the retention of the humus or decayed vegetable matter (roots, fallen leaves, &c., of previous crop) in the surface soil, and by the facilities for drainage afforded by the ridging of the surface soil and consequent exposure of the upper subsoil to the effects of the frost.

In the spring as early as possible the proposed alfalfa field should be prepared for seeding. The preparation should consist of frequent cultivations, harrowings and rollings until the seed bed is perfectly smooth and mellow.