

COMPARATIVE VALUE OF CLOVER AND TIMOTHY ON THE FARM.*

By A. T. WIANCKO, B.S.A.

MR. A. T. WIANCKO, of Sparrow Lake, Muskoka, Ont., is an alumnus of the Ontario Agricultural College who in 1895 received his degree of B.S.A. with honors in all departments. After his graduation he pursued a special course of six months in the chemical laboratory of the O.A.C. Since that time he



A. T. Wiancko, B.S.A.

has been engaged principally upon his father's farm, although he spent a valuable six months in Minnesota employed in dairy work. Mr. Wiancko is a young man of great ability and of a very practical turn of mind, as may be inferred from a perusal of his paper. He has already made a reputation as a writer on agricultural topics in his local papers, and we confidently predict a bright future for him.

Clover and timothy are two of the most important fodder crops grown on the farm, especially in this country. They form the bulk of the food fed to our animals for the production of either milk, beef, or work. It is, therefore, important to determine which of the two fodders is most valuable for the object in view, considering at the same time which is the cheapest to produce and how each affects the fertility of the soil; for it is high time that the farmer is looking into the problem of how best to keep up the fertility of his farm without having to resort to the use of commercial fertilizers.

Clover a Deep Feeder, Timothy a Shallow Feeder.

Of all the food elements necessary for the growth of crops and that we are called upon to supply, nitrogen, phosphoric acid, and potash are the most important; these are, therefore, the ones mainly to be considered in keeping up the soil's fertility. Some plants require a more liberal supply of these elements than do others; also, some plants have better facilities than others for gathering from remote sources their necessary amount of food. The latter ability depends upon the amount and nature of their root growth. Plants, such as clover, whose roots penetrate deeply into the soil, have an evident advantage, being able to draw food from a considerable depth; while shallow-rooted plants, such as timothy, must be satisfied with what available nourishment they find near the surface.

*A paper read at a meeting of the East Simcoe Farmers' Institute.

Clover a Nitrogen-Getting Plant.

Now, whether you are feeding plants or animals, nitrogen is the most costly food element. About four-fifths of the bulk of the atmosphere is nitrogen in the free state; but this is useless as a food for either plants or animals. Clover belongs to a family of plants (*Leguminosae*), other examples of which are the pea, bean and vetch, that have growing on their roots small white bodies, which, by virtue of micro-organisms contained in them have the power to appropriate the free nitrogen of the air and convert it into such a form that these plants can utilize it as food for themselves. Timothy has not this power of utilizing the free nitrogen of the atmosphere, but must obtain its supply wholly from the available nitrogen compounds already in the soil.

Clover Can Add Nitrogen to the Soil.

If a crop of timothy be grown and fed on the farm, and the manure carefully saved and applied, the soil will have neither lost nor gained in nitrogen. On the other hand, if a crop of clover be grown and likewise fed on the farm, and the manure carefully saved and applied, not only the nitrogen drawn from the soil will be returned but also a large quantity which the clover drew from the air will be left to the soil in a form available for plant food. Thus, in the case of the clover, the soil will have gained enough nitrogen to enable it to produce a good crop of corn, potatoes, wheat, or other grain.

Clover Obtains Nourishment From the Subsoil.

Clover being a deep feeder its roots penetrate deeply into the sub-soil and draw a large amount of phosphoric acid and potash from a depth that the roots of ordinary plants never reach. Timothy, being a shallow feeder, draws all of its phosphoric acid and potash from the surface soil. In this we can see, that if fed on the farm and the manure returned to the land, clover enriches the surface soil by the amount of phosphoric acid and potash drawn from the sub soil, while timothy has not this advantage.

Clover Brings Humus to the Soil.

If utilized on the farm, clover is unexcelled in keeping up the fertility of the land. Owing to its large development of roots, clover brings a great deal of organic matter (humus) to the soil (almost half the amount of its total growth is left in the soil as roots and stubble); it thus has a small effect in improving the tilth of soils naturally deficient in organic matter; making stiff clays more porous and sands more retentive. From what has been said we may draw that clover is especially valuable as a green manure, because of its extensive feeding habits and the large amount of organic matter it brings to the soil.

Clover Hay Rich in Albuminoids.

When compared on an even footing as foods, clover is more valuable pound for pound than timothy, especially when fed to cattle or sheep. Clover is rich in those substances which make beans what they are generally considered to be—a strong food for a working man. By the chemist these substances are called "albuminoids," or "protein." They contain

practically all of the nitrogen in the plant, and are the chief materials in lean meat and the curd of milk. The remaining organic substances of the plant (viz., those that contain no nitrogen, such as starch, sugar and fat) are called "non-nitrogenous," or "non-albuminoids," and are valuable chiefly for keeping up the heat of the animal body. But, as all plants contain an abundance of these non-albuminoids, they need not be considered in determining the value of fodders. A food is considered rich in proportion to the amount of digestible albuminoids that it contains; in other words, the greater the proportion of digestible albuminoids to digestible non-albuminoids the more valuable will be the food. Clover hay, fed alone, is a well-balanced ration for a milch cow or a beef animal, containing about one part of digestible albuminoids to six parts of digestible non-albuminoids; in other words, it has a nutritive ratio of about 1 to 6.* Timothy hay is not so rich, having a nutritive ratio of only about 1 to 9*. According to these figures two pounds of clover hay are worth three pounds of timothy hay. The manure resulting from the two fodders, if made under the same conditions, will show a similar comparative value, two tons of that from the clover hay being worth three tons of that from timothy hay.

Clover Should not be Sold off the Farm.

It is thus quite evident that clover is of too much value as food for both animals and plants to allow of its being sold off the farm. If you must sell hay, sell timothy; it not only has a readier sale and a higher price on our markets, but is worth less on the farm either as food or manure.

It is a lamentable fact that so many farmers have not yet learned how to make good clover hay; and until they do they will not be able to appreciate, by experience, its real value over timothy.

CATTLE FORAGE CROPS—CROP ROTATION.

By Lieut.-Col. McCRAE, Guelph, Ont.

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The farmer who confines his operations mainly to grain growing has not now an equal chance with the stock farmer. Mixed farming and the keeping of cattle has become more popular than grain growing because more profitable. Cattle feeding embraces three considerable branches, which may be more or less mixed: (1) the breeding and raising of cattle; (2) the feeding of dairy cows; and (3) the fattening of beef animals.

For the profitable feeding of cattle, forage crops are necessary and the following system has been adopted because it is found suited to the growth of winter cattle feed. It may not be the best, but certainly it has considerably increased and cheapened the amount of rough winter feed available when compared with plans in use a few years ago.

The farm is of moderate size—95 acres; part of this is taken up by small fields and paddocks near the barns for bulls and breeding stock. The soil is a sandy loam, in good order

*Calculated from a table of composition by Warington.

and easily worked, slightly rolling with porous gravel or sand subsoil.

The land for hoed crop—roots and corn—is ploughed the previous fall out of sod—a new clover sod. It is manured during the winter and spring with fresh manure direct from the byres spread broadcast when drawn. The land for roots is given about sixteen loads per acre. The ground for mangolds is manured in the fall and ridged up for the winter, and the seed is sown about the first of May, if the ground and weather be suitable.

The ground allotted for roots will be about one-third of twenty-five acres, the other two-thirds being for corn. An estimate is made of the manure available for the corn lands, and it is put in the same way on the frozen ground or snow in the winter, worked up in the spring with the disc harrow and the corn planted in drills forty-two inches apart, about the middle of May. These twenty-five acres are for grain the following year—oats and peas. The root ground is used for oats, either lightly ploughed in the fall or left till spring and worked over with the cultivator and disc harrow.

I have not yet been able to determine what is best for the corn ground. I am inclined to think that fall working is the best, but it may be that the spring cultivation is desirable for the corn ground. I have tried both plans without definite results.

The part (one-third) for peas may be left and ploughed in the spring after the other crops are in. The oats are sown with the drill, and seeded with 10 pounds of clover per acre, mixed, red and alsike. Clover seed is sown before the drill, and a portion mixed with the oats. I have tried seeding clover with the peas, but results have not been satisfactory, and the plan has been abandoned. In the fall, the pea ground is worked over and sown with wheat.

The oat ground, with its seeding of clover, is sown over with winter rye. If the catch of clover be but thin, two bushels of rye may be used; drilled in on top of the stubble in the last week in August, or the first week in September, preferably after a rain. It may grow so rank as to need pasturing, which will be best done by calves or young stock, if they be available.

The next year, this rye field with the clover mixture is made into hay, being cut after the bloom is off the rye and just as the clover is coming into blossom. It may be handled and cured as hay or cut with the binder and shocked like grain. The former has given the best results.

As soon as the wheat is off, the land may be ploughed, and sown to a catch crop of rape; or it may be seeded to clover in the early spring to plough down in the fall for roots the following spring. In the fall the clover sod is pastured and afterwards ploughed down for a corn crop as before.

This, therefore, is a three year rotation—hoed crop, grain crop, hay and wheat. Of the larger crops, corn, oats and hay, the rotation comes every third year at one time and every sixth the next time. The smaller crops, roots, peas and wheat, may be managed to come only once on the same ground every nine years.

This plan may not suit every section, but with me it has given a large quantity of good, cheap, winter feed.