

Salem Is the Center of a District Devoted to Legumes Worth Millions Annually

LEGUMES IN ROTATION INCREASE THE YIELD OF THE OTHER FIELD CROPS BY ELEVEN TO THIRTY-THREE PER CENT

This Was Demonstrated by a Farm Survey Conducted by the United States Department of Agriculture in Marion and Polk Counties—If All Farmers Realized That the Growing of Legumes Would Do This, There Would Be a Sudden Demand for Legume Seed, Says the Highest College Authority—The Legume Takes the Most Expensive Fertilizer element from the Air and Builds It Into the Most Expensive Nutrient

Editor Statesman:

If all farmers realized that growing legumes in a rotation would increase the yield of the other field crops by 11 to 33 per cent, there would be a sudden demand for legume seed. Yet that is exactly what a farm survey conducted by the United States department of agriculture in Marion and Polk counties showed. Farms which had 20 per cent of their acreage in clover produced from 11 to 33 per cent greater yield of wheat, oats, and potatoes than did the farms where no legumes were grown.

There are more than 70 different kinds or species of the botanical order leguminosae in cultivation. They include among the clovers, vetches, lupines, beans, peas, beggar weeds, sainfoin, alfalfa, velvet bean, cowpeas, serradella, and melilotus. While there are botanical means of distinguishing the family, a legume from the farmer's standpoint is any plant which has the power of taking nitrogen from the air for its own use and for storage in its roots. Strictly speaking, the plant itself does not have this power, but bacteria which are found in the nodules on legume roots take nitrogen from the air and change it to nitrates, which is the form used by plants. This process is known as nitrogen fixation.

College Supplies Bacteria

On land that has never grown the particular legume before, inoculation is recommended. The purpose of inoculation is to supply the bacteria for nitrogen fixation. The bacteriology department of the college supplies the cultures at cost with full directions for use. Each legume usually has a different bacterium, so the cultures are not generally interchangeable.

Nitrogen is an essential element in the crude protein of plants, in which form it is a valuable feed for animals. Very little nitrogen is found in the soil, the main source coming from decaying organic matters. If it were not for legumes with their nitrogen-fixation much of the nitrates required for crop growth would have to be purchased and added to the soil. This essential element is built into the crude protein, the most important food constituent.

The Most Expensive

Nitrogenous feeds and fertilizers are the most expensive, and both are supplied by legumes more cheaply than they can be obtained in any other way. By the use of leguminous crops the farmer can produce on his own land forages which approach in feeding value the various meals and oil cakes, and at the same time be growing a fertilizer crop that will supplant the expensive nitrate of soda, sulphate of ammonia, tankage, fish meal, or animal waste that must be purchased.

While the nitrogen content of the soil is not actually increased

unless the whole plant is plowed under or is fed to livestock and the manure returned to the soil, there is a storage of nitrates in the roots that becomes readily available to the crops which follow. It is this supply of nitrates that causes the phenomenal increase in the yields of the crops that are grown later.

Advantages of Legumes

In addition to the outstanding feature mentioned above, legumes have several other good points to recommend them to the farmer. Such crops as clover, alfalfa, vetch, and field peas need only be mentioned for one to realize their importance as forage crops. Hay from these crops is twice as rich in protein as the hay from grasses, and this protein is obtained largely from the air, while in the grasses it is all drawn from the fertility of the soil. Leguminous crops yield larger crops of hay to the acre than grasses, hence the production of food materials on an acre, especially protein, is several times larger from the legumes. They furnish the cheapest food for stock and the cheapest manure for the soil. They do this because they obtain from the air a substance necessary for both plants and animals, which costs in the form of fertilizer and feeding stuffs from 15 to 25 cents a pound.

Clovers and alfalfa, the most widely grown of the legumes, are noted as weed killers. They are especially effective in ridding a field of annual weeds, such as mustards, which are so troublesome in grain fields. For this and other reasons, they are widely used in rotations with grain and cultivated crops.

Another important feature is their deep root system which draws food from a greater depth than most plants do. When the plants die or are plowed under, the roots decay and leave channels through the soil which allow air and moisture to penetrate and improve the structure. The decaying roots add organic matter to the soil that is rich in potash and phosphates taken from the subsoil and nitrates taken from the air.

Our Most Common Legumes

The clovers are the most widely grown legume in western Oregon. They are known as the best soil builders, but not quite so high in feed value as alfalfa. They are better adapted to the moist conditions found in the Willamette valley than alfalfa. Clovers furnish good summer pasture, a high quality hay, or a good seed crop. The United States imports large quantities of clover seed each year. With this demand the growing of clover seed will be of increasing importance in Oregon believes G. R. Hyslop, chief in farm crops at the Oregon Agricultural college.

Red clover is the most widely grown member of the clover family. It will grow on any well drained, fairly rich soil that has plenty of lime. On some of the acid soils of the Willamette val-

ley an application of lime is necessary to start the crop. After the plants are well started they will take most of their nitrogen from the air.

The most common method of seeding red clover is on winter wheat, but it may also be sown in the spring with spring wheat or with rape or by itself. On winter wheat the sowing is usually done in February so the rains can splash a little soil over the seed. The seed is broadcast with a hand seeder at the rate of 12 to 15 pounds per acre. This gets a stand with the smallest amount of labor possible, since the seed is merely scattered and no working of the soil is necessary. A grain crop is produced while the clover is getting a start. The following year's crop, which is the first clover crop, is commonly cut for hay and the second crop used for seed, although both crops may be used for hay or occasionally in warm irrigated sections, both may be used for seed.

Import Much Seed

The United States imported 10,604,400 pounds of clover seed in 1927, most of which came from France and England. The problem for Oregon, in order to get more of this trade, is to grow the varieties that are needed in the eastern and southeastern states, which are the principal consuming areas. The east demands a northern hairy-stemmed type that is more winter hardy than the Mediterranean smooth-stemmed type that is grown here. The southeastern states demand an anthracnose resistant variety. Oregon has a start of both of these varieties. Many parts of the state are well adapted to their production, the market demand is good, and the price is good.

The present production in Oregon is 20 to 60 cars a year, while the amount imported from other countries amounts to about 400 cars. The yield here is 200 to 350 pounds per acre, and the price varies from 15 to 40 cents a pound. Community interest and cooperation in cleaning and threshing machinery is needed. Communities which build up a reputation for good seed in large quantities have a marketing advantage, because large buyers will come to them and bid competitively for their product. Further information regarding seed production may be had by writing to the Oregon Agricultural college.

The Alsike Clover

Alsike clover is adapted to higher altitudes, colder climates, more moisture, and sour soils where red clover will not thrive. Alsike is a perennial plant and will endure for many years either as hay or pasture. Seed is produced early and volunteers and spreads rapidly.

In feeding value and hay production it is the equal of red clover. The problem in seed production is to prevent inseparable mixtures such as white clover sorrel. The first crop is used for seed, as the second crop if any is usually short. Yields are a little heavier than red clover, and the price is about the same. Alsike has a tendency to shatter if allowed to get too ripe.

The Other Clovers

Other clovers of lesser importance are crimson, white, ladino and sweet. Crimson clover has brilliant red flowers. It is a profuse seeder, acid resistant and an annual plant. White clover is used for pasture, lawns, and seed production. It is difficult to handle the seed crop because of a lack of suitable machinery, but the price is 40 to 60 cents a pound. Ladino is closely related to white clover and is used mostly as a pasture plant, although both hay and seed are produced. Some sweet clover is grown for hay and pasture on alkali ground.

Difficulty in obtaining a stand

of alfalfa has been a big problem in the Willamette valley. Alfalfa is suited only to those soils that are mellow, warm, well drained, sweet and deep, and is not naturally adapted where the wet winters are common. In the irrigated regions alfalfa is the main crop, exceeding, both in quality and yield, any other forage plant.

In spite of these natural handicaps, alfalfa is increasing rapidly as a forage crop in western Oregon and has become an important crop in many sections where county agents have assisted in getting the right variety properly established on suitable land.

The object in seed bed preparation is to have a fine, firm, moist condition so the small seeds will come in contact with the soil particles. A float is a good implement to level the ground, break up the clods, and firm the seed bed. The seed bed is prepared as early as possible to allow for settling, and for light surface harrowings to kill young weeds. The field should be free from weeds, as the alfalfa plants start slowly, owing to a heavy root growth the first season.

Only Grimm Recommended

Grimm alfalfa is the only variety recommended by the experiment station. Certified seed is preferable as common seed has frequently been offered as Grimm, and common alfalfa means any kind that has lost its identity.

The important thing in sowing is to get the seed distributed evenly and not covered too deep. The most common method is to broadcast the seed with a hand sower and cover either by harrowing lightly if the ground is firm or by rolling with a corrugated roller if the soil is loose. If a good drill is obtainable and the ground is firm, it may be drilled one inch deep. For this method 10 to 12 pounds per acre is sufficient, but for the broadcasting method 15 pounds are recommended. Nurse crops are not advisable, especially on unirrigated farms.

The best time to sow in western Oregon is as soon as the weather warms enough for fairly prompt germination, which is usually from April 15 to May 15, although successful stands have been secured at a later date. Fall sowing is unsafe. The best condition is early sowing on clean land in good tilth.

From 50 to 75 pounds of land plaster per acre previous to sowing the seed has been found to give the plants a better start. After they are started, mowing is not advised until the blooming stage unless the weeds are crowding the alfalfa out. Clipping probably weakens the plants.

The Vetches

Vetch is the most important annual legume in Oregon, with a yearly production of 15,000 to 45,000 acres. Vetch is suited to a moist, cool climate free from extremes of heat or cold during the growing season. Practically all vetch seed is grown in western parts of Washington, Oregon and California, with Oregon as the main producer. The climate here with its mild winters is well adapted to vetch culture.

The principal uses of the crop are hay and seed, but it is also used for soiling, silage, pasture, green manure, cover crops, and honey production. Value of the vetch hay crop in western Oregon, ranges from \$400,000 to \$500,000 a year, the seed crop from \$125,000 to \$153,000 a year, and the other uses approximately \$50,000 to \$75,000 a year.

The United States imported more than 3,000,000 pounds of vetch seed in 1927. This would allow for a limited increase in production to supply the home demand. Oregon vetch seed is superior to the imported seed in pur-

ity and winter hardiness. The most common varieties are Common, Hungarian, Purple, Hairy and Woolly Podded.

Any plant which takes the most expensive fertilizer element from the air and builds it into more expensive nutrients, and at the same time produces a high yield itself and increases the yield of other crops to follow, deserves recognition in any system of permanent agriculture both from the standpoint of present and future profits.

—RALPH WARD.

Corvallis, Or., April 10, 1928.

(Mr. Ward is connected with the department of industrial journalism of the Oregon Agricultural college.—Ed.)

POLK COUNTY LAND DEVOTED TO LEGUMES

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alfalfa was attempted on many occasions, but its failure was probably due to lack of proper seed strains and proper soil preparations. Orders have been pooled for a period of three years for the best seed strains in the country, and have been brought in and made wonderful growth on the farms where seeded.

At the present time alfalfa growers in Polk county to the number of 100 are all preparing themselves for competition for a fine silver loving cup offered by the Dallas Chamber of Commerce for the best field of alfalfa on July 1st, 1928. These 100 farmers have established acreages of alfalfa totaling something over 500 acres. These plantings vary in age from one to five years, and from past experience their yields have been running around three to seven tons per acre.

Some Alfalfa Growers

Various demonstrations such as the use of artificial culture, lime-rocks, cultivation and soil preparation have resulted in a rather highly uniform set of fields. Some of the outstanding alfalfa fields in Polk county from the point of general knowledge are those of Hugh Hanna, Independence; Pence Bros., Rickreall; W. J. Garner, Dallas; W. O. Morrow, Greenwood; Dick Clanfield, Ballston and with several other prominent farmers joining the ranks within the last year or so, such as Governor I. L. Patterson, Eola, and Henry Keyt of Perrydale, and dozens of others in various parts of the county.

Competing for Cup

Of noteworthy importance in the alfalfa acreages is the confidence shown in the success of this crop by Ernest Zielesch of the Parker community, by making a new planting of about 50 acres this season, as the result of a small acreage seeded in 1926. A neighbor of his, Geo. Dickenson, is planning on seeding ten acres also. Then, further, basing their decision on past experience, W. O. Morrow, and S. H. Robison will put in about ten acres apiece. These are but a few of the many Polk county farmers who are thoroughly convinced of the success of this crop.

Through the county agent's office a complete set of elimination contests will be held in June to determine which fields are eligible to compete for the cup mentioned above, and final placement will be made on July 2nd.

Because of the nature of the crop and our climatic conditions, sweet clover has never gained any particular headway, although there are three or four plantings in Polk county, and the largest is about 25 acres on the Henry Keyt place at Perrydale. There is considerable doubt about the advantages of growing sweet clover under our farming conditions where

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EVERY CROP ROTATION SCHEME MUST TAKE IN THE LEGUMES