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LEGUMES FOR NON-IRRIGATED FARMS

By WALDO KIDDER



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SUMMARY

Legumes are needed on dryland farms for more profitable livestock and dairy production.

Legume hay and pasture crops furnish the protein needed to balance up the starchy feeds as corn, now abundantly grown. Of the legumes, sweet clover is best for the dryland farm, both for hay and pasture.

Sweet clover should be planted, without a nurse crop, very early in the spring on a firm seedbed.

Seed sweet clover at the rate of 8 to 10 pounds of clean seed per acre.

Do not cut the first year's growth and pasture only late in the fall.

Second year's growth may be heavily pastured all season.

Sweet-clover hay, properly cured, is practically equal to alfalfa.

LEGUMES FOR NON-IRRIGATED FARMS

By WALDO KIDDER

Diversification of crops and the feeding of livestock is increasing in the non-irrigated sections of Colorado. Farmers are changing from the old system of raising only cash crops which amounted in a large way to just gambling on the weather and markets, and are now practicing a system that includes not only the production of the cash crops but also of a large proportion of feed crops and livestock to consume the feed crops grown. This diverse system of farming is doing away with many of the weed-taken farms with the shack houses and the old tractors rusting in the fields. In place of these is appearing the well-tilled farm, feed crops replacing the weeds, good barns for the stock and good houses sheltering well-fed, well-cared-for folks.

The main feed crops raised now under non-irrigated conditions are corn and the small grains, and in many sections, some of the sorghums. Most stockmen know that such feeds fed alone are not properly balanced or do not contain quite the right food to make best production with the stock, especially growing stock or dairy animals. Such feeds need the addition of or "balancing" with some protein feed for best results.

Legume crops as alfalfa, sweet clover, peas and beans are good farm sources of the protein feed needed to balance the starchy feeds now grown in such abundance in the non-irrigated districts. While it is not possible to grow all of these crops in each dryland district, it is possible with careful work to grow some of them under practically every Colorado condition and provide a farm source of the high-protein feeds needed. Each one of the legumes meets quite different climatic and soil requirements which the farmer should know before deciding which legume to plant.

Alfalfa is the best known of the legumes and most liked. It is long lived and produces an abundance of excellent hay. However, it is not hardy or drouth resistant enough to be used on the large part of the non-irrigated farms of Colorado. There are a few places where alfalfa, especially the hardy varieties as Grimm, can be recommended. These are: Where the water table is close to the surface as in the creek beds; in draws where the crop may receive a good amount of run-off from the lands above; or in the higher altitudes where more rainfall is received and where it is cooler. But for the most of Colorado's drylands, alfalfa cannot be recommended and in place of this sweet clover

will be found to give excellent results. For this reason this circular will deal principally with sweet clover, its culture and use under non-irrigated conditions.

Sweet clover has in the past been thot of as a weed. Experience has now taught us that sweet clover is a very valuable crop for hay, pasture and soil improvement. Under dryland conditions it will give good yields of hay and pasture where alfalfa will not do well. It does well on many different types of soils.

Sweet clover hay, properly put up, is practically equal to alfalfa in its feed value. Stock like it.

For pasture sweet clover has many advantages, producing an abundance of excellent feed thruout the spring, summer and fall, and in addition seldom causes bloat. It is used with good results for all classes of stock.

For soil improvement sweet clover is one of the best crops. Being a legume it improves the nitrogen content of the soils. Its roots reach deep into the soils and when they decay the soil is left loosened up and with large amounts of organic matter well distributed thruout the soil. This will improve the ease of working the soil and also aid in holding moisture for crop use. For these reasons the use of sweet clover is advocated on every dryland farm where livestock is kept and where conditions are too severe for the growth of alfalfa.

SOILS BEST SUITED FOR SWEET CLOVER

Sweet clover grows well on most soils. Even on the heavy alkali soils sweet clover is often seen making a rank growth and for this type of soils it is a good crop to use for soil improvement. In sandy or rocky soils sweet clover does fairly well if a stand can be secured. The best soils for maximum yields are the deep sandy or silt loams. In eastern states, lime is needed to fit soils for sweet-clover production but we do not find it to be needed in Colorado. So, in the dryland districts of Colorado, we find that practically all of the soils are fitted to sweet-clover production save the very sandiest, and with these the trouble will be in getting a stand due to drying out of the top soil and the blowing of the sand. On the very heavy soils, care will have to be used in preparation of the seedbed, but if properly done little trouble will be experienced in securing a stand or with good growth of the crop.

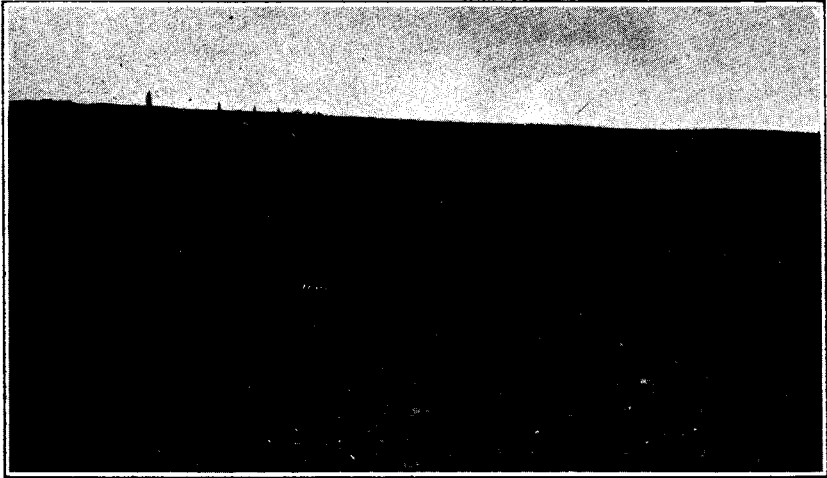
KIND OF SWEET CLOVER TO PLANT

There are several varieties of sweet clover. Most farmers are familiar with the white- and yellow-blossomed biennial sweet clovers and these are best for our conditions. The white-blossomed variety makes the largest amount of growth but during its second year's growth the production is very stemmy and for this reason it is not recommended as highly as the yellow-blossomed biennial variety. While the growth of the yellow-blossomed sweet clover is less, it is more leafy and has finer stems and makes a better grade of hay. It is also excellent for pasture. This variety produces blossoms all along the stem so reseeds itself under pasturing better than other varieties, which is an advantage in maintaining a pasture. Both the yellow and the white-blossomed varieties are very hardy and adapted to our dryland conditions. Both live two years and then die. Some provision must be made with either for reseeding every two years. Seed of both of these sorts is cheap and easy to get.

Another sweet clover often heard about is Hubam or the annual white sweet clover. This makes a rapid growth and lives only one year. The growth is stemmy with few leaves. Due to the trouble in securing a stand every year under dryland conditions and to its limitations for hay or pasture as well as because of the high price of seed, Hubam is not recommended for the dryland farms. The yellow annual sweet clover should not be used.

PREPARATION OF THE SEEDBED FOR SWEET CLOVER

In the soil preparation before the planting of sweet clover, the farmer must keep in mind that sweet clover seed is very small and must be planted close to the surface. This being the case the seedbed must be quite firm and full of moisture. It should also be free from weeds and weed seed. To meet these requirements, many successful growers use summer-fallowed or fall-plowed land, fitting in the spring only with a harrowing or light disking. Such a soil is well packed and has available all of the winter moisture for the starting of the young plants. The next best method of preparation of the seedbed is with the use of corn, bean, millet or cane land and preparing this in the spring with only a light disking to loosen up the top soil and to kill what weeds may have started. Whatever stalks are on the field should be left standing to prevent blowing off of the snow or the blowing of soil.



DRYLAND PASTURE MAY 10

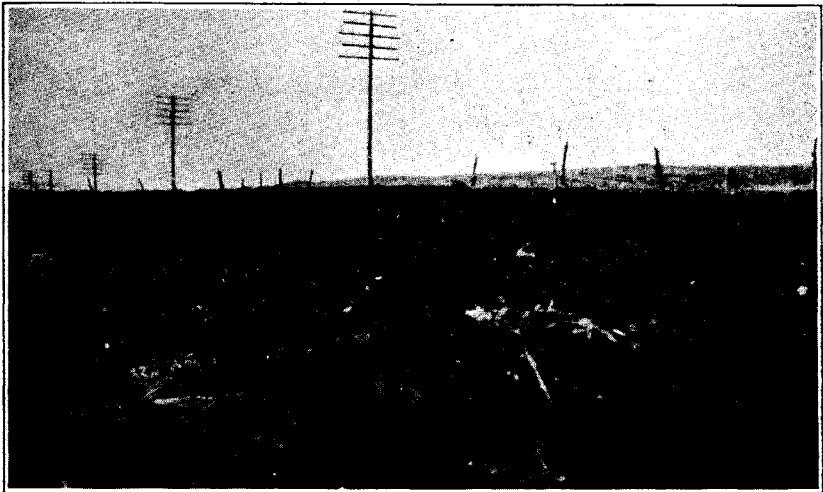
The poorest method of field preparation for sweet clover on drylands is the spring plowing and having the soil in a loose condition, for when this is done the soil dries out quickly and the young clover plant often has just enough moisture to start growth and then be killed due to lack of moisture. Perhaps more stands of sweet clover on drylands have been killed by too good farming than any other cause.

TIME OF PLANTING

The best time of planting sweet clover under non-irrigated conditions is early in the spring, from the first of March until the fifteenth of April. At this time the soil holds an abundance of moisture received during the winter. Many showers are received during the early spring which keep the top of the soil moist and permit the rapid germination of the clover seed. After the first of May it is usually not advisable to plant sweet clover as the soil has become dried and the days warmer, quickly drying out the soil even when showers are received. Some growers have secured good stands in planting in July after the rains start, but this method is a good deal less certain than the early spring planting.

METHOD AND RATE OF SEEDING

Under non-irrigated conditions, sweet clover should be seeded at the rate of from eight to ten pounds of re-cleaned seed per acre. If possible the seed should be scarified. Best results are secured by drilling the seed, covering about an inch deep in the



DRYLAND SWEET CLOVER MAY 10

heavier soils to an inch and a half to two inches deep in the sandier soils. In planting sweet-clover seed it must be kept in mind that the seed is small and the young plants will not be strong enough to grow up thru too great a depth of soil.

If it is not possible to set the drill shallow enough for the best results, the seed should be broadcast and harrowed in. For best results after broadcasting, the field should be harrowed both ways both to cover the seed well and to firm the soil.

It is usually advisable to use no nurse crop seeded with the sweet clover as there is not enough moisture under dryland conditions to make both a clover crop and one of the nurse crop. However, at the government dryland experiment station at Akron, excellent stands of sweet clover have been secured each year when seeded with wheat as a nurse crop. But the clover has always died out when the wheat headed due to lack of moisture. The planting of a nurse crop with the clover and cutting the nurse crop when it starts to joint may in a few cases prove effective in controlling blowing and weeds. For general conditions, however, the nurse crop is not to be recommended.

CARE OF CROP AFTER SEEDING

After seeding no further care need be given the crop until after weeds get started, when it will be well to clip these with a mower, setting the sickle high enough to miss the small clover plants. After one clipping of the weeds the clover usually will grow fast enough to crowd out any later weed growth. Clipping

should be done when the weather is cool and cloudy for best results, especially if the weed growth is large.

PASTURING SWEET CLOVER

Sweet clover makes the best pasture for stock of any of the crops adapted to non-irrigated farms in Colorado. It provides an abundance of feed rich in protein from early in the spring until late in the fall. Most Colorado farmers find that with a good stand of sweet clover, from one to sometimes two head of cattle per acre can be carried thru the entire summer. While sweet-clover pasture is not entirely free from bloat for cattle or sheep, the danger from this is very small, particularly if stock are not turned on the pasture when hungry. The pasture should not be used when wet with rain or dew, for bloating may result. However, if the stock are kept on the pasture at all times there will be but little trouble from this source. It will probably be well to have available some dry roughage for the stock while on the pasture as they need some dry feed.

Sweet clover should not be used for pasture too soon after planting. The crop should have opportunity to get well rooted and to make a good top growth of eight to ten inches. It is best not to pasture the first year's growth until late in the season. The second year's growth should, on the other hand, be pastured quite heavily beginning in early spring to prevent the crop from becoming too stemmy. If the clover does get too large it should be cut with a mower, cutting high enough to leave some buds on the stems left as from these buds is produced the second growth. The clover should be cut in such a case, before blossoming and before the stems get too woody. The cutting should be cured for hay. Because of the fact that it produces a finer stemmed and leafier growth and grows closer to the ground, the yellow biennial sweet clover is preferred by most farmers for pasture and hay. Under pasturage conditions, there is often sufficient seed produced on the branches next to the ground that have escaped pasturage or when cut for hay to reseed the yellow-blossomed variety, thus making such a pasture more or less permanent.

If the maximum pasturage is desired each year, it is well to reseed some sweet clover each year, depending mostly on the second year's crop for the bulk of the feed to be produced.

In sweet clover there is a bitter substance that is called cumarin. This substance gives sweet clover its peculiar odor and taste. It is often claimed that stock will not eat sweet clover as pasture or hay due to this taste. Cumarin is present only in small amounts when the crop is small, so it will be well to ac-



PASTURES ARE NECESSARY FOR GOOD DAIRY PRODUCTION

custom stock to the taste by beginning pasturage when the crop is small. Hay cut early contains less of this substance and is more palatable than hay cut when the crop gets more mature. After stock become accustomed to this taste they eat sweet-clover hay or pasture as readily as any other crop.

SWEET CLOVER FOR HAY

Sweet-clover hay has been proved to be practically equal to alfalfa in feeding value for stock when the clover hay is properly cured. Sometimes, however, stock will at first refuse to eat the sweet-clover hay, especially if it is old and stemmy. After a few days they get used to the taste and eat the clover hay as readily and do practically as well on it as on any other hay.

Sweet clover should be cut for hay before it gets too woody. The best stage to cut is just before it starts to bloom. In cutting, the sickle should be raised to leave a stubble four or five inches high so there will be some buds left on the stems from which is produced the second growth. If the crop is cut too close to the ground or too late in the development of the plant the plant will die, causing the loss of the second feed-crop which might easily be saved. As soon as the clover is cut and just wilted, it should be raked and shocked into loose shocks and allowed to cure in the shock. This precaution is needed as the stems of sweet clover, particularly the white, are very heavy and full of moisture. If allowed to dry thoroly in the swath, the leaves become brittle be-

fore the stem is dry and break off and the resulting feed is mostly a lot of woody stems and no leaves. It will be found to be easier to cure the yellow-blossomed sweet clover for hay than the white and that it makes a higher quality of feed.

Following the suggestion of cutting the crop before it starts to blossom and leaving the stubble four to five inches high and with favorable weather conditions, two cuttings of hay can be secured from sweet clover.

Do not feed moldy sweet-clover hay to stock as it is apt to cause serious trouble and even death. Where the crop is properly cured there is practically no danger in feeding sweet-clover hay.

GETTING RID OF SWEET CLOVER IN FIELDS

There is often the criticism that sweet clover is hard to kill out after getting it started on the farm. This is not true as the crop only lives two years and if not permitted to go to seed, there will be no sweet clover after the second year, or the sweet clover may be plowed the second spring after growth has started which will effectively kill the crop if plowing is well done.

USE OF SWEET CLOVER IN THE ROTATION

Sweet clover, as well as furnishing a much-needed protein feed for all classes of livestock, is also an excellent soil builder. Thru its growth are stored in the soil large amounts of available plant food as well as much organic material which improves the workability and water-holding capacity of the soil. Sweet clover should be followed, under dryland farming system, with such a crop as corn or some row crop.

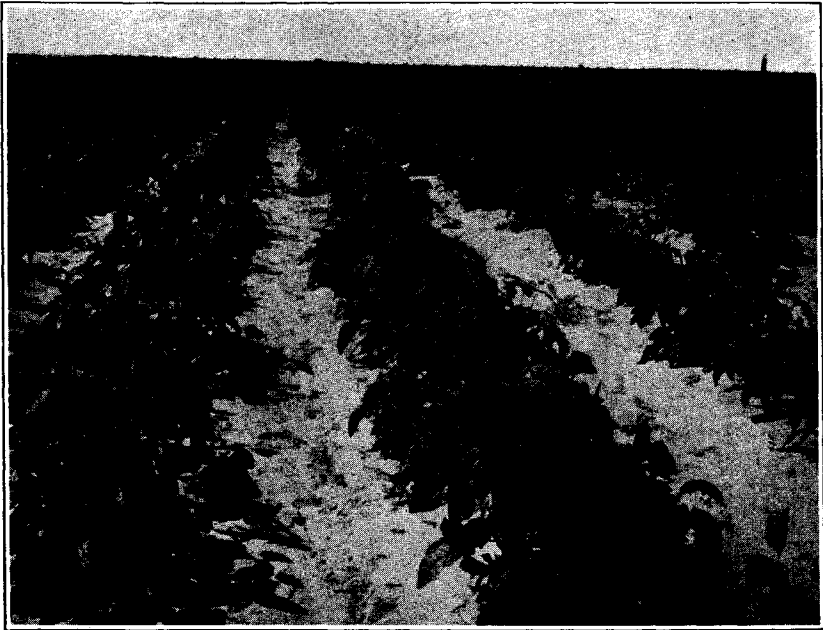
CULTURE OF ALFALFA UNDER DRYLAND CONDITIONS

The points mentioned relative to the culture of sweet clover under non-irrigated conditions apply for alfalfa as well, save in the matter of cutting and making hay. Alfalfa seed is small and needs to be planted with the same care as sweet clover. Only hardy varieties as Grimm should be used under dryland conditions.

USE OF OTHER LEGUMES UNDER DRYLAND CONDITIONS

While sweet clover most nearly meets all the needs for a good legume crop under dryland conditions, there may be farms where other legumes are needed and can be grown successfully. For these fieldpeas, soybeans or cowpeas may be grown.

Fieldpeas are a crop that are adapted to cool, moist conditions. For this reason when grown under dryland conditions



SOYBEANS GROW WELL ON DRYLANDS

they should be planted very early, and they will mature ahead of the hottest weather of summer. Early round peas are recommended to be seeded at the rate of from 30 to 40 pounds of seed per acre thru a drill on a firm seedbed, planting from 2 to 3 inches deep. A small amount of barley or oats may be used to support the peas and make cutting for hay easier. The hay should be ready to cut by the first to fifteenth of July. Such hay is of excellent quality and gives a good yield.

SOYBEANS

The early maturing varieties of soybeans grow well and can be matured under dryland conditions. Of these Ito San, Black Eye Brow and Minsoy are the best. They should not be depended upon for good yields in communities infested with rabbits as rabbits seem to prefer soybeans to other food and it is seldom that there are many soybeans left to harvest in the fall. When soybeans are used, they should be surface-planted at the same time as field beans, well cultivated, especially early and then cut for hay when the beans are forming or for the grain when the lower leaves are turning yellow.

Cowpeas.—Cowpeas are a warm-weather crop and not especially adapted to Colorado conditions. They are free from most disease and rabbit injury. The Black Eye and the New Era varieties mature in the warmer sections and produce a fair amount of hay. Their use is recommended under only a few conditions.

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