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CIRCULAR 215

Columbia, Missouri

November, 1941

Management of Sweet Clover In a Pasture System

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Sweet clover occupies an important place in the seasonal succession of Missouri pasture crops. Second-year sweet clover is equal or superior to all other crops for spring pasture; while first-year sweet clover, correctly managed, provides good pasture from October to December.

The usefulness of sweet clover as a pasture crop, as well as the need for its more extensive use in this capacity, has grown with the expanding use of Korean lespedeza for pasture through the summer months. By the combined use of sweet clover and Korean lespedeza, highly productive legume pastures are provided in spring, summer, and fall.

Success in such a system depends necessarily on management of the sweet clover to insure continuous renewal of the stand of this biennial. The livestock farmer who needs a definite acreage of first-year and second-year sweet clover needs only to adopt the practices that will produce a new stand every year.

Sweet Clover Growth Habits

The growth habits of sweet clover have an important relation to the management of the crop for pasture. Sweet clover is normally a two-year plant. Sown in the spring it lives through the following winter, reaching full growth and maturing seed in midsummer of the second year. The stand must then be renewed. In comparison, if sweet clover is sown in late summer and good growth is made before winter, the plant becomes a winter annual, completely dying out in the following midsummer.

In its second year sweet clover is a consistent and heavy seed producer. In seed production it is excelled among legume crops only by Korean lespedeza. Even under intensive grazing, well-

managed sweet clover will mature a large quantity of seed. As much as 80 per cent of the second-year growth may be pastured off, but the remaining 20 per cent will mature a quantity of seed several times in excess of the amount normally sown in obtaining original stands. Most of this seed is hard seed and does not germinate readily. Shattered and left on top of the ground it may remain there indefinitely without sprouting.

Soil Requirements

Sweet clover will not grow on acid soils. Lime must be used under such conditions. On poor lands, applications of superphosphate frequently are necessary to obtain full benefit from the lime. Sweet clover, like Korean lespedeza, makes its best growth on fertile soils.

Except for its specific lime requirement, sweet clover, like lespedeza, is adapted to a wide range of soil fertility and will thrive on land not suitable for alfalfa or red clover.

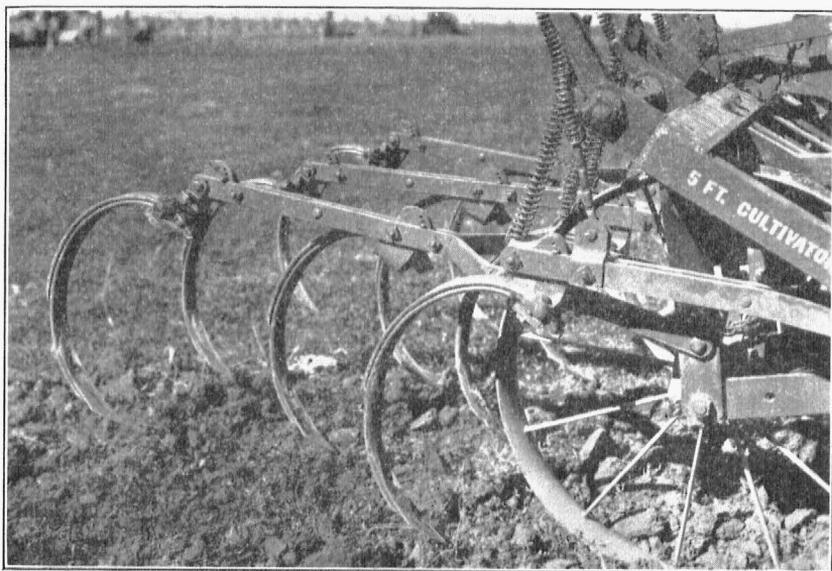
Management to Reseed Under Pasture

The grazing of second-year sweet clover should begin in the spring, just as soon as the ground is firm and the crop is producing enough feed. Normally it can begin in early April in South Missouri and in middle to late April in North Missouri. The number of animals pastured should be sufficient to keep the sweet clover eaten down to a growth of 6 to 8 inches. Uneven grazing of a rank growth may be corrected by clipping high with a mowing machine or binder adjusted for that purpose.

As the season advances toward the end of the growth period, the crop becomes less palatable. By June 15 to July 1 in South Missouri and two weeks later in North Missouri, sweet clover under grazing will begin to bloom. If by this time the crop has been well grazed, at least 80 per cent of the season's growth will have been utilized. The remaining growth is not relished by livestock. It is coarse and woody, and bitter to the taste. If grazing is continued beyond this stage, seed production will be reduced and the distribution of the seed in the field will be uneven. Most classes of livestock may lose weight or remain stationary in production if left on sweet clover after the clover begins to bloom. In South Missouri Korean lespedeza frequently is ready for grazing as early as May 20 and always by June 20. In North Missouri it is generally ready between June 20 and July 10. Thus by the time the sweet clover is finished—usually before—the Korean lespedeza is ready to take its place in the pasture succession.

With stock removed from the sweet clover, the field should remain idle until late August or early September. By that time the sweet clover will have matured seed and shattered most of it from the plants. The old growth will be dead.

Just as soon as there is ample soil moisture in late summer, this field should be prepared by thorough double disking or by using a field cultivator. The amount of weed growth and old sweet clover left on the land will determine the degree of disking or cultivating necessary to prepare a good seedbed. The old sweet clover growth, high in nitrogen, makes a valuable addition to soil fertility if it is worked into the soil.



The field cultivator may be used to prepare an excellent seedbed for sowing grain on second-year sweet clover ground. It operates well in both moist and dry soil and is especially effective on the trashy mulchy surface that is found where sweet clover is produced continuously.

By the process of preparing the land the sweet clover seed previously shattered on the ground will be distributed and covered as deep as the soil is worked. Plowing usually is less desirable than disking or field cultivating, as it will bury the sweet clover seed too deep for the renewal of the stand. Very shallow plowing, however, followed by disking as deep as the ground was plowed, will be safe.

Sow Small Grain in Early Fall

Winter rye or winter barley should be sown after sweet clover just as soon as the seedbed can be prepared and there is sufficient moisture to insure a good stand. In the southern half of the State either of these grains may be used. In the northern half, winter rye, preferably the Balbo variety, should be used instead of winter barley, since rye is more winter-hardy.

On medium to poor soils 20 per cent superphosphate should be applied with the small grain, at the rate of 150 to 200 pounds per acre. Even on productive soils a similar application will improve the crop.

The early fall-sown grain, except in seasons that are dry from summer to late fall, will provide good pasturage from October to early winter. In open winter seasons, especially in southern Missouri, a large amount of grazing can be obtained during the winter months. The vigorous growth made by grain crops sown after grazing off a crop of sweet clover is greater than that obtained from grain following other crops, because of the nitrogen added to the soil by the sweet clover. The application of phosphate fertilizer further increases this growth.

Natural Sweet Clover Reseeding

As already explained the sweet clover seed is distributed and worked into the surface of the soil in preparing the land for seeding fall grain. Most of this seed is hard and does not germinate for a considerable time. A small part, however, may sprout and develop plants in the fall. In some seasons when the grain crop is sown early and the fall season is unusually favorable, some of the sweet clover may develop in the fall and survive the winter. The greater part of the sweet clover seed, however, will remain dormant until the following spring. Some seed may sprout too early in the spring and be damaged or destroyed by later freezing weather. Most of the germination, however, will be distributed through the early spring to insure a new stand of first-year sweet clover in the barley or rye.

This method of re-establishing sweet clover is much more dependable than sowing the crop by hand at the usual rate of seeding. By managing sweet clover to obtain natural reseeded it is not unusual to have from 40 to 75 pounds of seed per acre mature, shatter, and become worked into the soil at varied depths. When seasons are favorable for a part of the seed to develop plants in the fall, the following spring will produce a mixture of small grain, second-year sweet clover, and first-year sweet clover for grazing purposes.

Spring Grazing of Small Grain and First-Year Sweet Clover

The spring growth of grain following second-year sweet clover will develop for spring pasture fully as early as would second-year sweet clover itself, and in combination with first-year sweet clover as the season is extended will equal if not exceed the pasture obtained the previous year from second-year sweet clover alone. The increasing growth of the first-year sweet clover, as the small grain is grazed, will continue the pasture through June and into July. Often it will last beyond the period that second-year sweet clover could have been used.

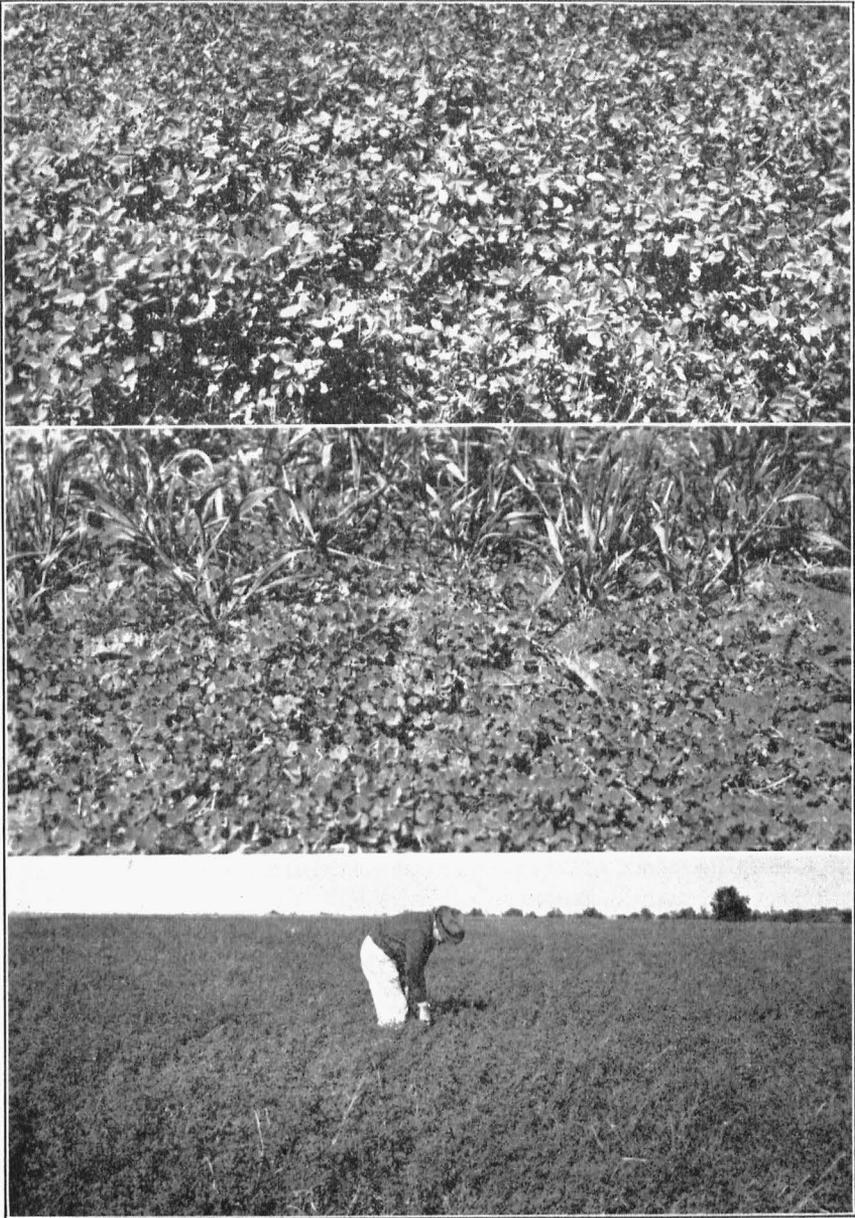
Summer and Fall Management of First-Year Sweet Clover

As in the previous season (when second-year sweet clover was used) the livestock should be transferred from the small grain and first-year sweet clover to Korean lespedeza as soon as the lespedeza is ready. The first-year sweet clover is then saved from July to October, and when the lespedeza declines in early fall growth the clover will again be ready for use. Very close fall grazing of first-year sweet clover may injure the growth. Winter killing (heaving) may result. Even if the winter stand is not damaged, the growth of the second-year sweet clover may be reduced the following spring. However, if grazing is delayed until early October and if grazing then is not too heavy, a reasonable quantity of top growth is left on the land and no serious winter damage or reduction in spring growth is likely to occur. Managed in this manner, sweet clover normally may be expected to provide 30 to 60 days of excellent fall pasture after stock is removed from Korean lespedeza.

Once well established, sweet clover may be continued year after year as long as it is desired. In the spring of one season the field is in second-year sweet clover, the next season it is in small grain and first-year sweet clover or occasionally a combination of first- and second-year sweet clover. In one fall the field is in first-year sweet clover, the next fall in early fall-sown grain. Usually the ground will be worked every other fall for seeding fall grain. Phosphate fertilizer may be applied every other fall.

Sweet Clover Stand Insurance

The longer this management is followed, the greater the assurance of a continued stand of sweet clover. Under this management much more seed is produced and shattered than would normally be sown by hand. Most of the sweet clover seed is hard to a varied degree, so that not all the seed will germinate in any one season.



OUTLINE OF CONTINUOUS SWEET CLOVER-SMALL GRAIN PASTURE

Top: Second-year sweet clover, in early May, 1940.

Middle: First-year sweet clover and barley, in early May, 1941. This growth resulted from natural reseeding by the growth shown in the top picture. (Barley plants removed in foreground in order to photograph growth of sweet clover.)

Bottom: October view of sweet clover shown in middle picture.

The frequent disking of the land will first cover some seed too deep for germinating, but later disking will bring much of this seed near the surface where it will sprout. In favorable seasons a good stand of sweet clover may develop in the fall with the grain seeding. Additional plants will come up in the spring. There will then be a mixture of first- and second-year sweet clover growing with the grain crop, all under pasture.

In July, after the small grain has been fully pastured out, a part of the sweet clover stand will develop seed while the remaining first-year plants will continue growth through the summer. That fall all growing plants are first-year sweet clover. If they are sufficient to insure a good stand, nothing will be gained by seeding the field with grain in the fall. If the stand is not sufficient, the ground may be prepared and sown to small grain with little damage to the sweet clover then established. Except in unusually dry seasons, the major portion of these plants will survive and continue to grow.

Sweet Clover on Two Fields

The management of sweet clover as outlined up to this point is based on the use of only one field with first- and second-year sweet clover alternating from one year to the next. By using two separate fields, or by dividing one field into two parts, the crop may be so managed that each season one field will be in second-year sweet clover, and the other in first-year sweet clover with small grain. This method has some advantage over the one-field system, especially in the more uniform and more reliable pasture available from one season to the next.

This procedure can be followed simply by establishing a stand of first-year sweet clover on one field and the next season sowing sweet clover on the second field. The crops will be so alternated that each season thereafter first-year sweet clover will be available on one field with second-year sweet clover on the other. Each fall one field would be prepared and sown to small grain. The next fall the other field would be handled the same way. The procedure on either field would follow exactly that used under the one-field system.

Small Grain on Sweet Clover Land

Under this method of managing sweet clover for continuous pasture, it is generally not advisable to permit the small grain crop to mature grain for harvest, unless in the beginning the land is rather infertile. Where sweet clover has been pastured off a large supply of nitrogen is left readily available. The next grain crop there, if

left to mature grain, will produce a rank growth that will almost certainly lodge. Also a rank crop of grain left for harvest may in dry seasons damage or destroy the stand of first-year sweet clover growing in it. Assurance of a stand and good growth of sweet clover, year after year, is of primary importance in this method of managing sweet clover for pasture.

Where two fields are used and so managed that second-year sweet clover is available each year for early spring pasture, the spring growth of small grain may not be needed for pasture. With the increased use of small grain crops for silage it would be practicable to utilize the small grain for this purpose. The best grain silage is obtained by cutting small grain in the early milk stage. The grain crop would thus be removed so early that there would be no great danger of serious lodging and no damage to the stand of sweet clover.

Control of Bloat and Scours

Both small grain and sweet clover, especially the sweet clover, may cause cattle to bloat. Scouring also is common. Excessive scouring can be prevented and occurrence of bloating much reduced by making available to the animals at all times some good quality hay, oats straw, or barley straw. After livestock are accustomed to this type of pasture, the stock once turned in to pasture may remain there both night and day, unless cases of bloating develop. Bloating may occur in individual cases, and certain animals may need to be removed permanently from this type of succulent pasture.

The Use of Permanent Grass Pasture in Connection with Sweet Clover and Korean Lespedeza.

Second-year sweet clover or small grain and first-year sweet clover (where the small grain is fall-sown following sweet clover) will provide good pasture in the spring, normally from one to two weeks before other than the best permanent pastures are ready for grazing. The sweet clover or small grain and first-year sweet clover acreage should be adjusted to the fixed acreage of permanent pasture, so that the two combined will safely meet all requirements from very early spring to early summer, or until Korean lespedeza has made ample growth to carry all the animals previously carried on both the sweet clover and the permanent pasture.

Because of variation in the seasons the carrying capacity of Korean lespedeza will also vary from year to year. Consequently the acreage of lespedeza should always be large enough to produce pasture in excess of the amount needed in a favorable season. On this basis sufficient pasture is assured in the unfavorable seasons. This

is practicable, since Korean lespedeza is not limited to pasture alone. It may also be utilized for hay, for a seed cash crop, or in some seasons for both hay and seed.

Otherwise, in the unfavorable seasons, the permanent pasture grazed to full capacity from spring to summer may be needed again in midsummer to take care of the pasture shortage caused by an insufficient acreage of lespedeza. Such need will occur in seasons when summer grazing of the permanent pasture is least profitable and most harmful to the pasture itself.

By resting the permanent pasture from midsummer to late fall or early winter, sufficient growth will develop to supply a limited but valuable pasture during the winter months. To save the permanent pasture for winter use, first-year sweet clover and early sown fall grain must be utilized from some time in October, following full utilization of the lespedeza, to the winter season.

The management of the permanent pastures as here outlined is the basis for its improvement and for increasing its carrying capacity. Any and all soil treatments and practices in weed control that may be made on the permanent pasture will become more effective when the grazing is well managed.

Sweet Clover and Korean Pasture on the Northeast Missouri Experiment Field

The returns from good management of sweet clover and Korean lespedeza used in combination to produce an all-season legume pasture, are illustrated in the results obtained during 1938 to 1941 on the Northeast Missouri experiment field near Paris, Missouri.

Following the application of lime and phosphate, applied in 1936, a good stand of sweet clover was established in 1937. Beginning in the spring of 1938 this second-year sweet clover was pastured from April 20 until July 2, producing 122 days of cattle pasture and 232 pounds of cattle gains per acre.

The following spring, in 1939, the field in small grain and first-year sweet clover was pastured from April 8 to August 9, producing 164 cattle days and 289 pounds of cattle gain per acre.

The second-year sweet clover in the spring of 1940 was again pastured from April 24 to June 14, producing 213 cattle days and 327 pounds of cattle gain per acre. In the fall of 1940 small grain sown in early September was pastured from October 15 to November 1, producing 72 days and 55 pounds of cattle pasture and gain per acre.

In the spring of 1941 the field was again in small grain and first-year sweet clover. Because of serious damage to the stand of small grain, by the severe freeze of November, 1940, only 24 cattle days and 74 pounds of cattle gain were obtained in pasture from April 15 to May 31.

The first-year sweet clover in the extremely wet fall of 1941 was again pastured from October 11 to October 27, producing 38 cattle days and 45 pounds of gain per acre.

No fall pasture of measurable value was obtained in 1938 and 1939 because of the abnormally dry fall periods extending well into November. The results, beginning with the seeding of sweet clover in 1937 to and through 1941, were all obtained from the same field. The stand of sweet clover has been maintained year after year from its own reseeding. It has not been necessary to use additional seed at any time. In fact, the stands of sweet clover developed from natural reseeding have been more uniform, more vigorous, and earlier than could normally be expected from mechanical seeding.

Two fields of continuous wheat and Korean lespedeza and a permanent pasture of redtop and Korean lespedeza were maintained along with the sweet clover. On one field of wheat and Korean lespedeza, wheat was left to mature grain and the lespedeza was pastured during the remainder of the season. On the other field, both the wheat and lespedeza were pastured off.

With these available pasture combinations the logical procedure would be to keep the sweet clover grazed to its full capacity, utilizing the grazed field of wheat and Korean lespedeza and the permanent pasture as a supplementary pasture.

In the summer period the acreage of Korean pasture is doubled following the harvesting of wheat from the one field. Thus from 1937 to 1941 the one field of wheat and Korean with both crops used for pasture was grazed, on the average, from April 15 to October 5, producing 111 days and 188 pounds of cattle pasture and gain per acre. During 1937 to 1941, following harvesting of an average of 12½ bushels of wheat per acre, the Korean lespedeza in the wheat stubble was pastured from August 4 to October 5, producing 71 days and 90 pounds of cattle pasture and gain per acre. Redtop and Korean lespedeza permanent pasture was grazed during 1937 to 1941 on the average from April 29 to September 15, producing 83 days and 148 pounds of cattle pasture and gain per acre.