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Trails with Sweet Clover as a Field Crop in South Dakota

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AGRICULTURAL EXPERIMENT STATION

**SOUTH DAKOTA
STATE COLLEGE OF AGRICULTURE
AND MECHANIC ARTS**

AGRONOMY DEPARTMENT

**TRIALS WITH SWEET CLOVER AS A
FIELD CROP IN SOUTH DAKOTA**

BROOKINGS, SOUTH DAKOTA

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TRIALS WITH SWEET CLOVER AS A FIELD CROP IN SOUTH DAKOTA

By A. N. Hume, Agronomist and Superintendent of Sub-
Stations, and Manley Champlin, Assistant
Agronomist and Collaborator.

Throughout the state of South Dakota, farmers are interested in learning about the possibilities of sweet clover. The South Dakota Experiment Station has made trial of this plant in certain cropping systems with a view to having some information available.

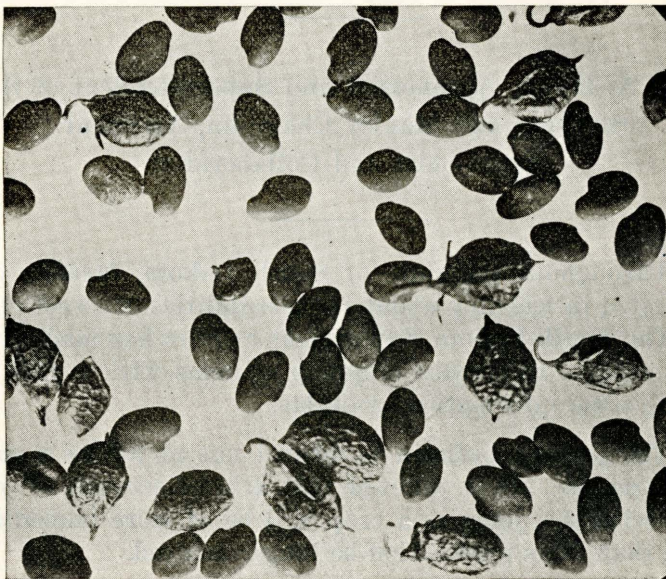
The present bulletin is offered not at all as a complete treatise. It is believed that a brief account of progress with the plant as a crop will be of more immediate value than if its publication be longer delayed.

POSSIBILITIES OF SWEET CLOVER

It is perhaps true that the South Dakota Experiment Station ought to offer some explanation by way of a reason why any plant, sometimes called a weed, should receive so much attention as to be discussed in an Experiment Station bulletin. It may be sufficient explanation to say that this weed is likely to take a place in South Dakota as a field crop of importance. The present bulletin does not seek to prove this statement, but merely to throw as much light upon it as is now available.

Not only has sweet clover already been utilized to some extent as a field crop by some farmers in South Dakota and other states, it is also a legume. The importance of legume crops for South Dakota is not discussed here from the standpoint of soil fertility. It is in place to say that if South Dakota is to establish permanent systems of

farming, the area of legume crops must be increased many fold. Such a fact does not diminish interest in sweet clover as a field crop.



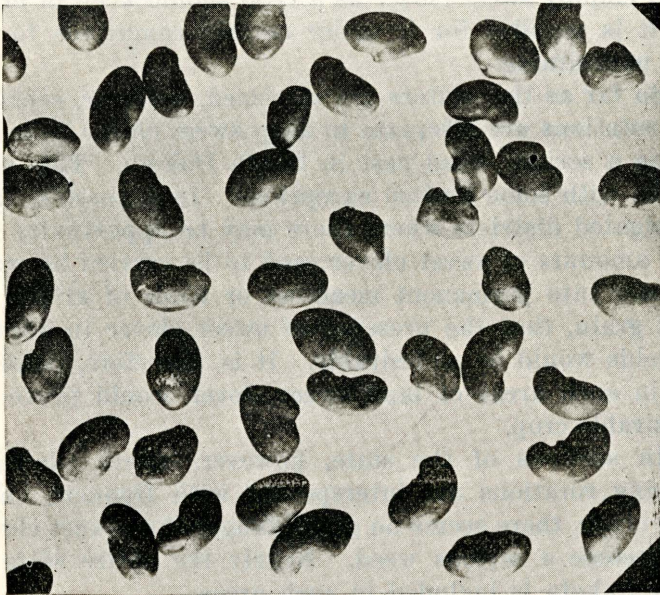
Seeds of *Melilotus alba* (sweet clover) with and without hulls. Note the scar (hilum) is well toward one end, and that a hollow (sinus) extends from the scar toward the opposite end, and that the seeds are oval, not angular.

WHAT IS SWEET CLOVER

Sweet clover is *Melilotus alba*, or again sweet clover is *Melilotus officinalis*. The former is *white* sweet clover. The latter is *yellow* sweet clover. It is worth while to learn the botanical names of the two species just put down for the reason that they are the ones commonly found in different parts of South Dakota. It has been introduced here, being a native of Europe, Africa and Asia. In other parts of the world other species are common. A total of about twenty species are found and several of them are mentioned to a greater or less extent, usually less, as having some importance as field crops.

J. F. Duggar of the Alabama Experiment Station,

writing in the Cyclopedia of American Agriculture, Vol. II, calls attention to the fact that both white and yellow sweet clover are generally regarded as weeds, except in the prairie region of Alabama and Mississippi, where they serve a useful purpose for forage and for soil renovation. He states further that *Melilotus macrostachys* is promising by reason of its being less bitter than most other species.



Seeds of *Medicago sativa* (alfalfa). Note the scar (hilum) is well toward the center of the curved side, and there is no hollow (sinus) usually extending from it, and the seeds are kidney shaped (reniform) often with angular ends—compare them with those above.

In addition to the three species cited above, another one, *Melilotus indica*, is reported as having been a successful cover crop at the Arizona Experiment Station.

It is reported that in California, and other places not so far west, both yellow and white sweet clover are pests in grain fields. This is chiefly due to the fact that when sweet clover seeds become mixed with small grain, they

impart their characteristic odor to the grain, thus rendering it less suitable for milling purposes.

A WEED IS A PLANT OUT OF PLACE.

A weed is a plant out of place. By such a definition, when sweet clover infests grain fields, it is certainly a weed. In the present bulletin the fact that sweet clover is a weed in many places is here emphasized. Whoever would employ sweet clover as a crop should keep in mind that it is possible for it under certain conditions to become undesirable.

So far as the writers are informed, however, sensible crop rotations are adequate to keep sweet clover from becoming a serious weed pest in South Dakota. This may be true with some limited exceptions. It is possible that in irrigated districts where there may be opportunity for large amounts of sweet clover seed to be carried by wind or water into permanent meadows or fields of alfalfa or small grain, that the presence of sweet clover in adjoining fields would be undesirable. It is, therefore, possible that in such areas of land sweet clover would prove an undesirable crop.

In sections of the state, however, where adequate cropping rotations are interspersed with frequent cultivated crops, there seems no great danger that sweet clover will become a serious weed. Nearly the entire state of South Dakota is included in such areas.

KEEP ALFALFA FREE FROM SWEET CLOVER

The presence of sweet clover seed in alfalfa seed is undesirable. In sections of the country where alfalfa is sown on land which has previously been in sweet clover, the latter sometimes appears as a weed, in the alfalfa especially, for the first year or two after seeding.

Such appearance is especially undesirable when it is the purpose to cut the alfalfa for seed. If, however, the alfalfa is to be cut only for hay, the presence of an occasional sweet clover plant is not very serious. Moreover,

frequent cutting of alfalfa will usually drive out the sweet clover by the end of the second year, the latter being a biennial plant. With the fact in mind that the use of sweet clover as a crop may well be accepted with some degree of caution, the writers believe, nevertheless, that the possibilities of the crop are such that South Dakota farmers will be interested in however brief an account the South Dakota Experiment Station may have to give concerning trials which have been made with it up to date.

Previous to the year 1912, a number of small plots of sweet clover were produced on what is called the West Farm at Brookings. Said plots, however, were included within several crop rotations as a green manure crop. These trials of sweet clover as a legume for green manure purposes previous to 1911, although not harvested for yield, served to inform the Agronomy Department that the plant would grow luxuriantly, in crop rotations.

This and other indications led the Department to feel that providing sweet clover could be at all useful as forage for live stock, it would be well worth while to secure data concerning its ability to make yields of hay and seed. Accordingly the trials were arranged.

AN ACCOUNT OF SWEET-CLOVER TRIALS

1. SWEET CLOVER SOWN INTO STANDING CORN

The first trial of growing sweet clover for a forage crop by the South Dakota Experiment Station was begun in the early fall of 1911, when sweet clover was sown in corn at the time of the last cultivation of the corn.

The corn land employed in sowing this sweet clover is known as Acre 740, West Farm, Brookings. Previous to 1909 Acre 740 had been in meadow. In 1909 it produced flax. Likewise in 1910, it produced flax. In 1911, it was prepared and put into experimental corn. The exact nature of the corn experiments need not be discussed here except to indicate that so far as planting and cultivation are concerned, the corn on Acre 740 in 1911 was planted and cultivated very much the same as would be the case

on an ordinary farm. On August 15, 1911, sweet clover seed was sown broadcast into this standing corn. The sowing was done with a small crank seeder and twenty-two pounds of unhulled seed per acre was used.

KIND OF SEED USED.

It may be well to describe the kind of sweet clover seed put on to the ground as above. The seed was threshed in the late summer of 1911 from roadside plants. These plants were those which had grown in some side streets of the city of Brookings, having been cut down by the city authorities. The Agronomy Department took the liberty to gather and haul them away and thresh out the seed for use on the plots and elsewhere. This method of getting seed is mentioned here in the thought that there are a good many wayside patches of sweet clover in South Dakota which might likewise occasionally be thus utilized if it seemed desirable to do so.

The sweet clover gathered from the roadside by the Agronomy Department was threshed with the small grain separator used for threshing grain from the plots. This threshing was a disagreeable job, owing to the hardness of the sweet clover stems. Sufficient seed was secured by this means for the then immediate needs. This seed was clear from impurities except that it contained a large amount of hulls of the sweet clover itself, and these remained in the seed as inert matter.

Accordingly the 22 pounds of seed used on acre 740 means 22 pounds of unhulled seed. The amount seemed to be altogether sufficient. After the seed was sown broadcast on the land as above described, it was covered by two cultivations, once each way, by a one-horse spring-toothed cultivator. A comparatively small number of the seeds on the acre germinated and came up in the fall. It was evident that the greater number of those that germinated did not germinate until the following spring.

After sowing the sweet clover, the ears of corn were husked, leaving the stalks standing. It was anticipated

in the beginning of the trial that these standing stalks might protect the young sweet clover plants to some extent, but as remarked above, such protection did not appear to have practical effect in this given instance. Very early in the spring of 1912, young sweet clover plants were observed to be coming up over Acre 740, making an even stand over the entire acre. Apparently the plants grew from seeds that had remained dormant in the ground over winter and had gone through a freezing process.

MAKING SWEET-CLOVER INTO HAY.

The sweet clover grew luxuriantly until July 16, when it was cut for hay. The entire acre was cut the same day. After cutting with a mower, it was left spread on the ground to cure as is usual with other clover hay. It was found to be more, rather than less difficult to cure sweet clover hay even than other kinds of clover or alfalfa.

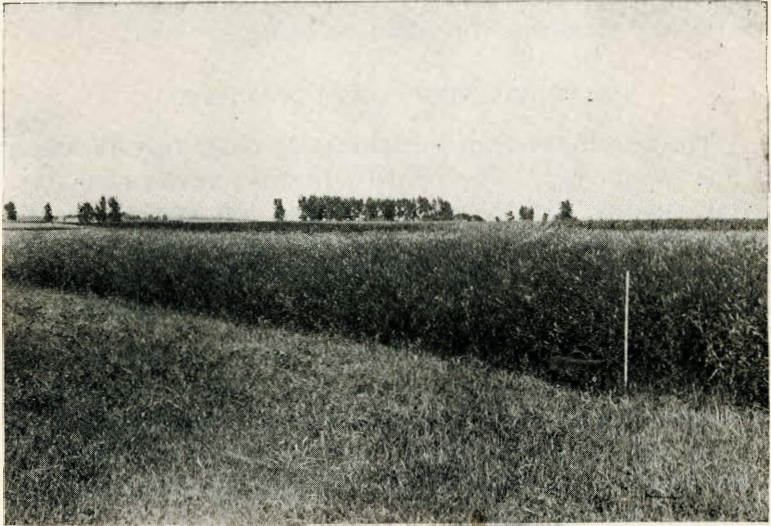
After partial drying, it was necessary to rake the hay into windrows and later pile it into small cocks as narrow and as high as practicable, allowing additional time for the hay to cure in cocks. It was noted that there was some trouble even thus to get it thoroughly cured without having it become dusty.

The total amount of field cured hay, including some corn stalks, taken from the acre after this first cutting in 1912, was 4,690 pounds. A second cutting of hay was made August 12 and from this cutting 2,430 pounds of hay were made.

Thus the total yield, including some corn stalks in the first cutting, for the season 1912, was 7,120 pounds, 3.6 tons.

The sweet clover on Acre 740 remained for the second year, 1912. This was obviously the second year for the sweet clover in question as a crop. It withstood the winter of 1912 perfectly and began making early growth in 1913. It was cut for hay June 9th. At the time of cutting, its stage of growth was considered very immature.

Experience indicated, however, that it was not too immature. It may be given as general direction that when sweet clover is desired for hay, it is necessary to harvest it at an immature stage before the stems have become hardened. Having once become hard, they are quite unsuited for live stock.



Sweet Clover (*Melilotus alba*) at blossoming time. Second year of growth, 1913. Acre 740, Brookings.

At this first cutting of 1912, the acre yielded 1,516 pounds of field cured hay in good condition, namely, .78 tons per acre.

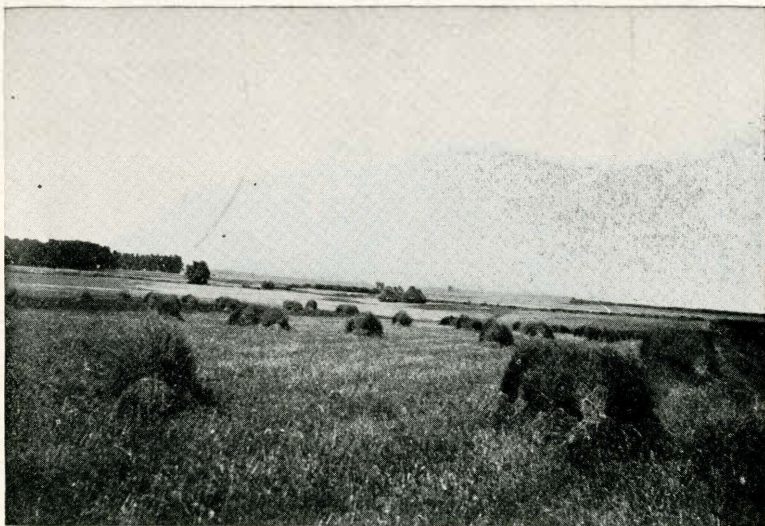
The second cutting of the sweet clover above in 1912 was reserved for a seed crop. It was observed on August 25 that the greatest number of seed pods were slightly brown. Accordingly the field was harvested with a binder. The sheaves were set up into shocks after the manner of other grain.

Threshing was found to be a difficult job and accordingly it was not accomplished on any given day even after the plants were sufficiently dry. Moreover, it was observ-

ed at the different times of threshing the seed that the seed was separated much more completely by threshing in the afternoon than in the forenoon. The yield of seed was noticed to vary almost with the lateness of the hour in the day when the threshing was done. This was evidently due to the fact that sweet clover is drier in the afternoon than in the forenoon. *It was found that the total amount of seed threshed from an acre, although some portion of it remained in the haulm, was 354 pounds, namely 5.9 bushels per acre. This represents unhulled seed, although it was recleaned and did not carry any great amount of hulls.*

2. SWEET CLOVER SOWN WITH SMALL GRAIN

In the spring of 1912, on Acre No. 770, West Farm, Brookings, durum wheat was sown at the rate of one bushel per acre. This acre of durum wheat was made up of several varieties, but it is not the intention at the present



Sweet Clover (*Melilotus alba*) standing in shocks on West Farm, Brookings. After becoming thoroughly air dry, it was threshed with a grain separator, then recleaned with a clover huller and fanning mill.

point to discuss the wheat except that it served as a nurse crop for sweet clover.

It may bear on this point to say that in 1911, previous to wheat, Acre No. 770 was also in durum wheat, and in 1910 in oats, in 1909 in small grain. In 1908 in small grain. Thus the sweet clover in question was sown upon land that had previously been in small grain for at least four successive years.

The sowing of Acre 770 with sweet clover in durum wheat, bears date April 24, 1912. The sweet clover seed, (the same kind of seed as described on page 8) was mixed as evenly as possible in the drill with the seed wheat, thus put on at the same date. It germinated soon thereafter and produced a noticeably good stand of sweet clover plants, in the durum wheat, which came forward nicely after the cutting of the wheat, which occurred August 7, 1912.



Ten and eight-tenths bushels of unhulled sweet clover seed by weight were threshed from Acre No. 770 in 1913 (Brookings field).

Obviously, sweet clover being a biennial, the plants neither blossomed nor produced seed in this first summer after being sown in the spring. The plants lived nicely through the winter of 1912-13.

In the summer of 1913, two cuttings of the crop were made—one for hay and one for seed. The first cutting for hay was made June 9, the seed crop was cut with a binder August 25 at the time when apparently the greatest number of seed pods were turned brown. The cutting and curing of the hay was done in the same way as described on page 9.

Yields of Sweet Clover (*M. alba*) from Given Plots at
Brookings, 1913

Plot No.	Yield per acre		
	Tons hay First cutting	Bushels seed Second cutting	Tons straw, i. e. After threshing
770	1.69	8.2	.88
771	1.69	8.3	.98
772	1.78	9.2	.81
773	2.15	11.0	.89
774	1.89	13.2	.89
775	2.42	12.0	.71
776	2.01	11.8	.91
777	2.22	12.3	.91
778	2.21	10.5	.81
779	2.29	11.3	1.01
Average	2.03	10.8	.88

The total weights of hay and seed harvested from acre No. 770 in 1913, are easily seen from the above table. The weights harvested from the several tenth-acre plots are put down as a matter of record, there being no present conclusion to be drawn from the separate weights. Difference in yields of seed from the several one-tenth acre plots are due rather to the differences in the time of day when the

threshing was done, and consequent different degrees of dryness of the material before threshing.

The chief feature at present to which one may call attention is that the total yield of field cured hay from the entire acre was 2.03 tons. The hay was first cutting. The total yield of unhulled seed from the acre, second cutting, was 10.8 bushels.

SUMMARY OF YIELDS OF HAY AND SEED GIVEN NUMERICALLY

From Brookings Field

The yields of sweet clover (*Melilotus alba*) put down in the previous pages from Acres No. 740 and 770, West Farm, Brookings are summarized for the purpose of making them all easily visible at one time.

YIELDS OF HAY OR SEED FROM BROOKINGS FIELD IN 1912 AND 1913.

Acre in west farm	Year	Tons of field cured hay per acre		Bu. of unhulled seed per acre	Remarks
		First Cutting	Second cutting		
740	1912	2.3*	1.2		1st year after fall seeding
740	1913	0.8		5.9	2nd year after fall seeding
770	1912	2.03		10.8	2nd year after spring seeding
Average		1.71	1.2	8.3	

*Some corn stalks.

The yields of sweet clover, summarized in the table above, may be said to have come in all cases from seed sown with a nurse crop. Seed sown in 1912 was put into a nurse crop of corn, that sown in 1913, into a nurse crop of durum wheat. Therefore, there was no loss of a season in either case, assuming that the nurse crop in each case may be called a full crop.

Without attempting here to decide which method of seeding is best, to seed in corn, or with small grain; but

taking the sum of the tons per acre from first cuttings 1.71 plus the 1.2 tons per acre cutting of 1912, there is a total average *yield per acre per year of 2.93 tons of field cured hay.*

Such a return would seem reasonable to hope for, when hay alone was desired. When second cuttings were reserved for seed (which is possible in the second year after seeding) it would seem reasonable to expect an average of *1.71 tons per acre of field cured hay and 8.3 bushels per acre of seed per year*, under conditions of this trial at Brookings.

SWEET CLOVER AT COTTONWOOD

One of the trial crop rotations at Cottonwood field includes sweet clover. This rotation is (1) Corn, (2) Wheat, (3) Sweet Clover, (4) Grain Sorghum, (5) Oats, (6) Canada peas.

Thus, in this rotation at Cottonwood, *sweet clover* follows *wheat*. Accordingly, in 1912, a seeding of sweet clover was put in with wheat seeded on what is called Acre 200 (South) at Cottonwood. Owing to the dry season, this did not germinate until the spring of 1913, when an even stand of plants was secured over the entire acre. Thus the hay harvested was the produce of young plants from seed that had remained in the ground a year then germinated.

The season of 1913 at Cottonwood was also one of extremely scant rainfall. This was the very apparent reason why not any crop at that point produced a luxuriant growth.

The yield of field-cured sweet clover hay in 1912 at Cottonwood, under the conditions, was 670 pounds per acre.

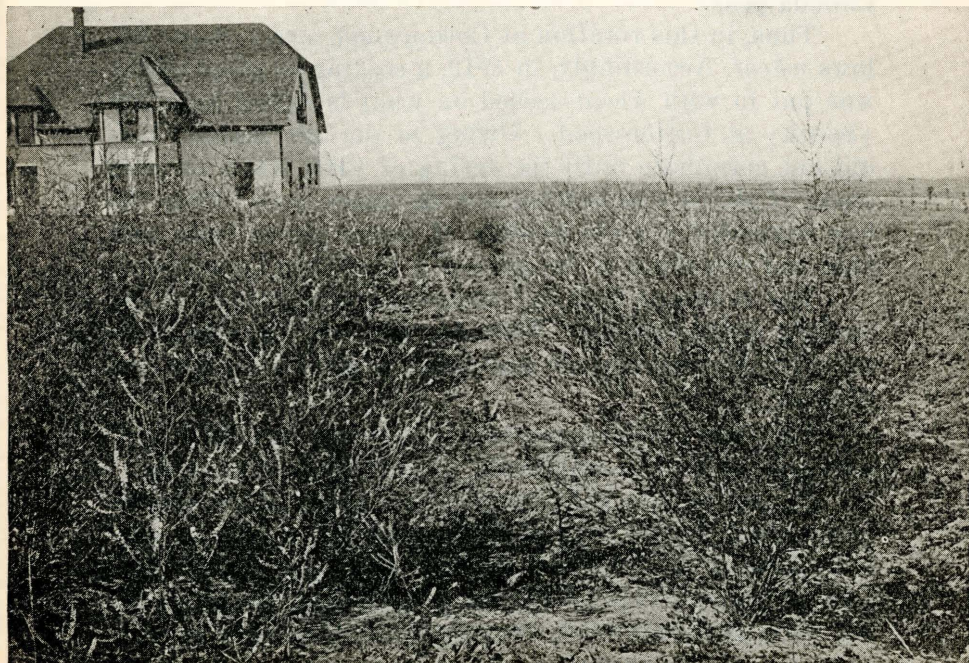
It may be said that sweet clover appeared as able to adapt itself to the arid conditions of the season as any other crop at Cottonwood. Such a statement, though general, is made in view of the fact that among the crops being tried at Cottonwood, is every kind, ordinarily supposed to be drought-enduring. The same is true of all South Dakota Experiment fields where crops are raised.

SWEET CLOVER AT HIGHMORE AND EUREKA

At Highmore in the spring, 1913, sweet clover was sowed with a nurse crop of winter rye. It was observed in the fall of 1913 that there was no resulting stand of sweet clover.

In the spring of 1913, sweet clover was put in at Eureka, in McPherson county, with a nurse crop of spring grain. A fair stand resulted and will be reported upon later.

As has been suggested, it might be worth while in South Dakota to produce sweet clover merely as a green manure crop. If experience proves further that the plant has great utility value as a hay and fodder crop, any information concerning it assumes still greater importance.



Sweet Clover (*Melilotus alba*) in rows at Highmore, 1913. Rainfall was limited.

The feeding of sweet clover both as pasture and as hay is not an entirely new proposition. It is said of some varieties of apples, without intent of very cutting sarcasm, that they are good when one has no others. Fully as much, perhaps more, may be said for sweet-clover hay and pasture. Sweet clover already has practical use in Western Nebraska and other parts of the country.

Experiment stations outside of South Dakota, notably Iowa (Bulletin 136), Wyoming, and Ohio (Bulletin 244) have reported feeding trials indicating considerable value for sweet clover.

Attention is here directed to South Dakota Experiment Station, Bulletin 143, written by Professor J. W. Wilson, and giving results of feeding sweet clover hay produced from Agronomy plots as described in previous pages. South Dakota Bulletin 143 says:

"White sweet clover is an excellent roughage, when fed with a grain ration, for fattening lambs. The gains made rank next and close to gains made by lambs fed alfalfa hay as roughage. This plant has a place in our system of grain and livestock farming for the production of hay. It is also one of the nitrogen-nodule bearing plants and the soil on which it grows will be in a better condition for the succeeding crop."

Following analyses are extracted from South Dakota Bulletin 143. They likewise indicate a comparatively high value.

	Moisture per cent	Ash per cent	Ether Extract per cent	Crude Protein per cent	Nitrogen Free Extract per cent	Crude Fibre per cent
Common alfalfa	9.76	8.64	4.51	19.69	34.69	22.71
White sweet clover	8.38	7.42	3.78	16.44	38.49	25.49
Prairie hay	6.40	7.13	3.82	6.62	44.59	31.44

Enough is indicated to lead to the belief that South Dakota farmers will need to know about sweet clover.

Accordingly the Agronomy Department will continue making such studies of the crop as resources will permit and further reports will be forthcoming.

Experience of Mr. G. D. Wimer, Frankfort, S. Dak., and Mr. R. A. Morgan, Vermillion, S. Dak., with sweet clover.

The following letters from Mr. Wimer and Mr. Morgan are included in this bulletin because they indicate actual farm experience. These letters also are typical of others which might be included from South Dakota and other states.

Frankfort, South Dakota, March 26, 1914.

Dr. A. N. Hume,

Brookings, South Dakota.

Dear Sir:—

In regard to sweet clover, will say that I have had experience in a limited way for a number of years. I have the *Melilotus alba*, or the white flowering variety. It has been very satisfactory to me.

I only cut the seed crop last season, got three bushels seed per acre. In 1912 we cut one cutting for hay. It made two and one-fourth tons per acre. It was along the side of a corn field and prairie meadow and after shocking the corn, I turned the horses and cattle in before I fenced the stacks and they ate the sweet clover in preference to the other hay or corn stalks. They laid around it all the time until they ate it all, and the cows almost doubled in milk while running to the stack. I find as a honey crop it has no equal. Five dollars an acre for the honey alone would be a low estimate.

There seems to be a prejudice in this neighborhood against sweet clover, especially among those who never saw it growing, and when I first sowed it, some predicted dire calamity for the country, but it is still confined to my own farm.

I have pastured it more or less every year and the stock seemed to relish it very much. I have had no trouble from cattle bloating.

I do not know of anyone else growing it. I have no seed for sale.

If you think there is anything of value to you in this letter, you are perfectly welcome to use it.

Yours truly,

(Signed) G. D. Wimer.

Vermillion, South Dakota, March 26, 1914.

Dr. A. N. Hume,

Brookings, South Dakota.

Dear Sir:—

I am not a practical farmer, so could not give anything first handed concerning the value of sweet clover as a forage plant.

I claim to be an Apiarist and as such will give you my experience. There are a great many honey producing plants, but white sweet clover is certainly the best one known at this time, both in the amount and quality of honey produced.

I would not hesitate to offer \$25.00 per acre (as rental) for the exclusive right of my bees to pasture on each acre of white clover to be grown within 160 rods of my apiary, this offer to be good up to 100 acres.

The intelligent apiarist can take about \$100.00 worth of honey and other things that are helpful to the business, such as wax, pollen, and increase in bees, from each acre of sweet clover in one year.

I understand that sweet clover is a very profitable crop for the farmer, but it is much more so if visited by bees during the blooming season, as he will then secure a full crop of seed.

Yours truly,

(Signed) R. A. Morgan.

RAINFALL AT THE SEVERAL STATIONS

	Brookings										Cottonwood				Eureka				Highmore					
	1905	1906	1907	1908	1909	1910	1911	1912	1913	1910	1911	1912	1913	1909	1910	1911	1912	1913	1908	1909	1910	1911	1912	1913
Jan.	0.22	0.17	1.06	0.20	1.20	1.07	0.61	0.28	0.02	0.66	T	0.17	0.16	0.10	0.60	0.50	0.25	0.10	T	0.26	0.82	0.11	0.13	0.05
Feb.	1.00	0.02	0.28	1.80	1.57	0.40	0.53	0.24	0.24	0.97	0.15	0.05		0.45	1.70	0.73	0.40	0.30	0.53	0.34	0.19	0.39	0.11	0.03
Mch.	0.68	0.58	0.55	1.16	0.37	0.35	0.53	0.26	0.45	0.76	T	3.00	0.43	0.14	1.23	0.62	1.05	0.90	0.00	0.13	0.58	2.54	0.27	0.87
Apr.	1.01	1.40	1.67	2.10	1.16	2.34	1.62	3.36	2.24	1.06	0.85	3.32	1.15	0.50	0.82	2.24	1.29	0.68	1.35	0.30	1.40	0.32	1.05	1.27
May	6.14	3.51	2.36	6.46	4.85	0.87	1.90	6.98	3.60	2.54	1.10	1.18	2.95	2.65	0.42	0.97	3.37	1.97	2.68	4.72	0.94	2.31	2.20	4.56
June	6.09	4.89	5.65	6.35	2.29	1.85	3.78	2.09	1.96	1.30	0.64	0.95	0.59	3.35	3.80	1.29	1.50	2.91	5.78	1.69	3.74	0.09	1.31	0.97
July	0.98	1.86	3.77	4.69	2.44	1.68	3.32	2.52	2.99	1.11	0.59	2.42	0.81	2.21	0.53	0.43	2.19	2.16	2.49	1.81	0.85	2.69	1.44	1.79
Aug.	4.54	4.28	1.41	2.37	3.39	2.46	3.81	4.68	1.33	0.48	2.41	3.42	1.84	1.39	2.60	3.57	3.27	1.53	3.53	3.74	0.66	2.52	3.39	1.20
Sept.	2.16	5.13	1.28	3.89	1.67	0.96	3.08	1.61	1.55	0.82	3.59	1.30	1.15	1.25	3.65	1.15	1.43	0.54	0.62	1.70	0.89	3.06	0.71	0.53
Oct.	1.50	3.01	0.96	1.43	1.71	0.38	5.12	0.96	1.18	0.32	1.15	0.11	0.76	0.17	0.18	0.61	0.07	1.52	2.19	1.04	0.24	1.05	0.20	0.61
Nov.	2.45	0.89	0.10	1.30	0.65	0.17	0.23	0.00	0.81	0.53	0.20	T	0.14	0.60	T	0.88	T	0.06	1.39	0.71	0.40	0.35	0.00	0.03
Dec.	T	0.52	1.12	0.42	1.14	0.10	0.42	0.20	0.09	3.00	0.42	0.12	0.38	2.40	0.25	0.80	0.11	0.52	0.31	1.41	0.44	0.44	0.35	0.28
Total	22.77	26.26	20.21	32.17	22.44	12.63	24.95	23.18	16.46	12.65	11.10	16.04	10.36	15.21	15.78	13.79	14.93	13.19	20.87	17.85	9.05	15.87	12.06	12.19

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111. A Study of South Dakota Butter with Suggestions for Improvement.
112. The Killing of Mustard and other Noxious Weeds in Grain Fields by the use of Iron Sulphate.
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- 148. Corn Silage for Steers.
- 149. Oats.
- 150. Weeds.

