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Prince, Ford S.

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THE SOY BEAN
IN
NEW HAMPSHIRE

SOY BEANS UNINOCULATED AND INOCULATED

By FORD S. PRINCE.

NEW HAMPSHIRE COLLEGE
OF
AGRICULTURE AND THE MECHANIC ARTS
DURHAM, N. H.

THE SOY BEAN IN NEW HAMPSHIRE.

FORD S. PRINCE.

INTRODUCTION.

The soy bean is a new crop in many parts of the United States. It has been grown for centuries in Manchuria, Japan, and India, the seed being used for human food, and the stems and leaves as forage for farm animals. It was first cultivated in the United States in 1829, but did not attract much attention until the latter part of the last century. Since 1880 hundreds of varieties have been introduced into this country from Asia and the different strains of these exhibit all variations in habits of growth, yield, time of maturity, etc. It is because many of these varieties are heavy yielders of forage and are adapted to our climate and soils that we believe the soy bean, on many farms, will prove a profitable crop.

The purpose of this bulletin is to describe methods of growing and harvesting the soy bean, to discuss ways in which our farmers may use it, and to report some field trials of varieties, inoculation and fertilization which have been made at the Experiment Station during the past few years.

DESCRIPTION OF THE PLANT.

The soy bean is an annual legume, very similar in appearance to the common field bean. The plants themselves are erect and branching. The different varieties vary greatly in their habits of growth. Some varieties are very branching from the ground up; others do not branch as freely and then only nearer the top. A few varieties have a tendency to vine. Large leaves are associated with the least branching, small leaves with the most branching kinds. Those varieties which are most branching are usually better adapted for hay than the less branching kinds. The plants of all varieties are hairy, the pubescence being either tawny or gray. Tawny colored pubescence is nearly always found on those plants which bear purple flowers and dark colored pods, the white on those which have white flowers. The

flowers are either white or purple and are borne in clusters. Little or no crossing occurs in the field, the flowers being self-fertilized.

Plant of Medium Yellow Soy Beans with Leaves Removed to Show Pod Formation.

Pods are formed abundantly, each one containing from two to five seeds. The seeds vary in color from green to olive yellow, yellow, brown and black. They also vary greatly in size.

The soy bean has a short tap root with numerous fibrous roots which are covered with nodules if the plant is inoculated. Approximately one-tenth of the total weight of the plant is in the roots.

The following table is a summary of the characteristics of some of the leading varieties:

TABLE I. VARIETY CHARACTERISTICS OF SOY BEANS.

Variety.	Seed.			Plants.		
	Color of seed.	Color of seed scar.	Weight of 100 seeds.	Color of pubescence.	Color of bloom.	Character of foliage.
Kentucky	Yellow	Yellowish brown	16.6g.	Gray	Purple	Medium coarse
Wisc. E. Black	Black	Pale	11.3	Tawny	Purple	Medium fine
Black Champion	Black	Dark gray	7.5	Tawny	White	Fine
Guelph	Green	Brown	21.5	Tawny	Purple	Coarse
Swan	Yellow	Brown	19.6	Gray	White	Coarse
Manhattan	Yellow	Brown	17.7	Gray	White	Coarse
Medium Yellow	Yellow	Pale	17.6	Tawny	Purple and white	Medium coarse
Hollybrook	Yellow	Brown	13.4	Gray	Purple and white	Coarse
Ebony	Black	Pale	12.8	Tawny	Purple	Medium coarse
Haberlandt	Yellow	Dark brown	20.8	Tawny	Purple and white	Coarse
Mammoth	Yellow	Light brown	22.1	Gray	White	Coarse
Medium Yellow	Yellow	Pale	11.5	Tawny	Purple and white	Medium coarse
Wilson	Black	Black	9.3	Tawny (var.)	Purple and white	Very fine
Manchu	Yellow	Black	16.7	Tawny	Purple	Medium fine
Black Eyebrow	Brownish black	Gray	19.2	Tawny	White	Medium fine
Ito San	Yellow	Pale	15.7	Tawny	Purple	Medium fine

Roots of Soy Bean Showing Nodules.
A Veritable Nitrogen Factory.

The soy bean, like clover and alfalfa, is a legume. If properly inoculated it has the power of taking nitrogen from the air and building it up into its own tissue. If grown it increases the protein of the farm for feeding purposes and also gathers nitrogen to enrich the soil.

In contrast to field beans, the soy bean has no destructive diseases which attack it. In our trials here at the station, no disease whatever has developed on any of the plants, and the past two seasons have been unusually favorable for the development of fungous diseases.

The soy bean is frost resistant, excelling both field beans and corn in this respect. It is not hurt by light frosts in the spring when the plant is young, and is particularly resistant to the early frosts in the fall when it is nearing maturity.

The most serious pests of the soy bean in New Hampshire are woodchucks and rabbits. The plants can not be sprayed with a poison of any sort to combat these animals. They should be killed in their dens with carbon bisulphide or if their work

is likely to prove serious a field near the farm buildings should be selected for the crop.

Soy bean varieties vary greatly in their time of maturity as can be seen by the following table:

TABLE II.

Variety.	Number days till first bloom.	Number days till first pods.	Number days till fully podded.	Stage of maturity at cutting, 112 days after planting.
Kentucky	63	71	89	Seed well formed.
Wisc. E. Black	51	56	74	Ripe.
Black Champion	91	100	—	Pods partly set.
Guelph	69	79	91	Seeds well formed.
Swan	77	87	98	All podded. Seed small.
Manhattan	71	77	92	Pods well formed.
Medium Yellow (Conn.)	61	71	82	Seed mature. Leaves turning.
Hollybrook	84	89	105	Pods well formed.
Ebony	61	71	89	Seed well formed.
Haberlandt	79	89	100	Pods formed. Seed small.
Mammoth	100	110	—	In full bloom.
Medium Yellow (B.P.I.)	76	81	102	Pods well formed.
Wilson	87	95	108	Just fully podded.
Manchu	54	60	77	Leaves turning.
Black Eyebrow	56	63	80	Leaves turning.
Ito San	61	69	89	Bottom leaves turning.

REASONS FOR GROWING SOY BEANS.

Dairying is now the most important farm industry of the state, and is likely to continue as such. Our farmers produce very little of the grain which they feed to their dairy cows,—their feed bills are therefore very large. The most logical way to cut down these feed bills is not to raise more grain but to raise more leguminous forage crops which will take the place of a part of the grain in the ration of the dairy cow. These crops can be more economically grown here than grain.

Besides furnishing protein for the farm animals, legumes enrich the soil and add to the farm fertility because of their

A Field of Medium Green Soy Beans.

ability of acquiring nitrogen from the air. A leguminous crop does not have to be plowed under to enrich the soil. If it is fed on the farm and if the manure is carefully handled, the soil will be benefited by this added nitrogen.

The best leguminous crop for our farmers to grow is red clover. This crop is better adapted to our soils and climate than alfalfa. It is a rich feed, making a much better hay for dairy stock than timothy and is noted for its soil improving qualities. Oftentimes the red clover crop fails, because of adverse soil or climatic conditions. The farmer is left without a legume crop of any sort. Rather than try to feed his cows without any legume hay whatever he should attempt to grow some other rich forage. The soy bean, being a very quick growing annual legume, may be grown for hay under these conditions.

Corn silage possesses those succulent qualities which are so necessary to the production of milk, but is itself a very wide ration and must be supplemented with rich protein concentrates. Part of this protein may be grown on the farm in soy beans,

either with corn or in a separate field and later ensiled with the corn. A mixture of the two crops in the silo does not make a balanced ration. It is still necessary to feed some grain; but the milk flow can be maintained with less grain where a mixture of corn and soy bean silage is fed than where the silage is made from corn alone. Silage made from corn and soy beans has been found to be more digestible than that made from dent corn alone.* It seems reasonable, therefore, that many farmers could cut down their feed bills by growing soy beans and putting them into the silo with corn.

Soy beans fit into the crop rotation, either as a silage crop or when red clover fails. We need a more systematic rotation of crops on our New Hampshire farms. We also need more legumes, to enrich and improve the soil and to furnish protein for our dairy cows. Soy beans can readily be utilized for these purposes.

SOILS AND FERTILIZERS.

Soy beans have a wide range of soil adaptation. They do well on sandy soils which are too light to grow profitable crops of clover. They also thrive on heavier soils. In general, any soil which will grow good corn will grow soy beans. Better yield for forage can be grown on rich soils than on poor soils. Where the soil is poor, barnyard manure or commercial fertilizer may be used profitably. If the beans are inoculated there is little need for any nitrogenous fertilizer. Here at the station we used ten tons of manure and 500 pounds acid phosphate per acre with inoculation. The beans grew well and gave excellent yields as our data show.

INOCULATION.†

Soy bean seed may carry enough of the inoculating bacteria to cause a liberal formation of nodules on the roots. A farmer can never be sure of this and it is better to inoculate either with soy bean soil or prepared pure cultures. Inoculated beans

*Henry's Feeds and Feeding, 1910.

†For methods of inoculation see N. H. Press Bulletin No. 44.

Uninoculated and Inoculated Soy Beans.

may show an increased growth over uninoculated ones. In 1915, in a test here at the station, we obtained the following results:

TABLE III.

Plot.	*Green Weight per Acre.*
Inoculated	7.192 T.
Uninoculated	4.672 T.
Gain for inoculation	2.520 T.

Inoculated beans are richer in protein than uninoculated ones, even though there is no increase in yield. At the Michigan Station* it was ascertained that inoculation increased the protein in soy bean plants almost 50 per cent.

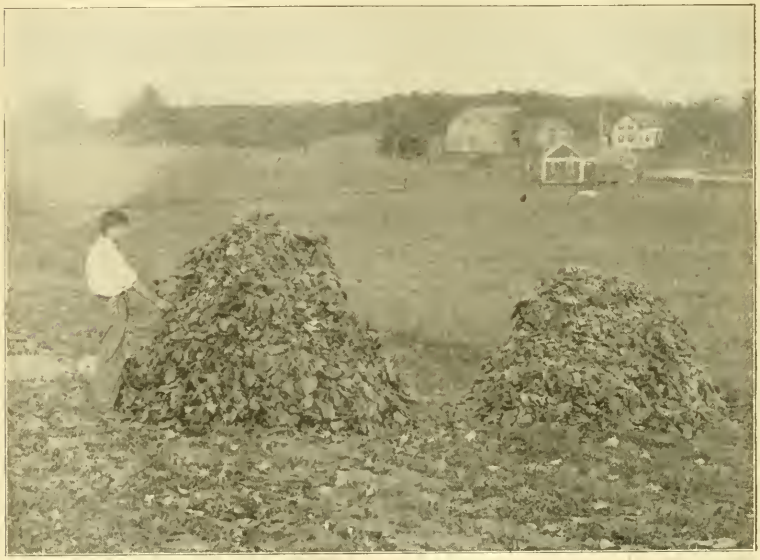
SEEDING THE CROP.

The seed bed for soy beans should be prepared the same as for corn, or other cultivated crops. They should be planted about the same time as corn, as they need a warm soil to insure the best germination. Planting in rows and cultivating as for corn has proved to be the best method of producing them. They

*Bulletin 224, Michigan Experiment Station, 1905.

may be planted with the garden drill, the ordinary one-horse or two-horse corn planter, or with the grain drill. If a grain drill is used certain cups may be stopped and the rows planted at any desired distance. The rows should be from 24 to 30 inches apart, and the beans should stand about 2 inches apart in the row.

The usual method of seeding for hay or soiling is to drill solid. If a fine stemmed variety such as the Wilson or Black



Inoculated and Uninoculated Soy Beans After Harvesting.

Champion is used, they may be seeded in rows the same as for silage. If coarser varieties are used they should be drilled solid, as oats or rye. Soy beans should never be broadcasted by hand.

More seed is used in drilling solid, it requiring one and one-half to two bushels of seed per acre. In rows 24 to 30 inches apart only about one-half bushel of seed is required per acre.

Considerable care should be exercised in planting not to seed the beans too deeply. This is a frequent cause of failure. On sandy soils they may be put in as deep as two inches, on

heavier soils one and one-half inches should be the maximum depth.

SOY BEANS MIXED WITH CORN.

Many farmers have tried to grow soy beans and corn mixed in the same rows for silage. On account of the difference of the size and shape of the seeds it is hard to secure a uniform stand of either one. If seeded in this way it is better to plant the corn first and immediately plant the beans in the same rows with a planter or by hand. Some of the newer makes of corn planters have special attachments for seeding soy beans at the same time the corn is planted.

Good Soy Beans Can Be Produced in Corn if Conditions Are Favorable.

If the soil is well adapted for the beans and if the variety of corn planted is not too large, or seeded too thickly, a fair yield of beans may be secured by planting them in this way. Most farmers in this state plant their silage corn too thickly to allow for much growth of soy beans. If seeded with the corn, a harvester may be used to cut the beans and the corn at the same time.

Considering all these factors we believe that the best way to produce soy beans for silage is to grow them in a separate field and mix them with the corn at silo filling time.

The following is an extract from a letter written by A. W. Benner, County Agricultural Agent in Grafton County, to the author. Mr. Benner has had considerable experience in his county in growing soy beans mixed with corn.

"It has been my experience here that where soy beans have been sown extremely thick with the corn they have lodged so badly that they could not be harvested with a corn harvester. Where they have been planted with corn that has been too thickly planted, practically no growth has been obtained by the soy beans."

CULTIVATION.

Before the beans come up they may be cultivated with a weeder or a spike tooth harrow with the teeth slanted backward. They should not be cultivated while the beans are coming through the ground. Later cultivations should follow as for corn. A one-horse adjustable harrow cultivator is very useful in the narrow rows. All cultivations should be shallow, and should leave the soil level. Drilled beans may be cultivated before they come up with a harrow or weeder. The direction of these implements should be crosswise of the drill.

HARVESTING.

Soy beans may be harvested for silage any time after the pods form and before the leaves fall. If cut for hay they should be harvested at the time the pods are forming. They should not be allowed to stand too long for hay as the stems become woody very rapidly after the pods form. Great care should be taken to save all the leaves of the plants as they are the most valuable part.

If seeded alone for silage, the beans may be cut with a mower or scythe, hauled in and mixed with the corn as it goes into the silo. If grown with the corn it is best to use a corn binder for harvesting as the beans will then be bound in the bundles with the corn and thus be satisfactorily mixed.

If cut for hay the beans may be cut with a mower either in the morning or late in the afternoon. They should be raked up by hand before entirely cured so that no leaves will be lost. They may be put into small cocks and turned carefully until cured if the weather is fair. If the weather is rainy or unfavorable they may be placed in large cocks, covered with a canvas hay cap and left for several days. Soy bean hay is very palatable and highly nutritious and should be cured and handled properly.

SOY BEAN YIELDS.

From a study of the yield data herein recorded it will be observed that an abundance of green soy bean forage can be produced per acre, an amount equivalent to over 2 tons of legume hay. The average protein content per acre is equivalent to that produced in 3 tons of red clover hay; that in the best varieties to almost 4 tons. The highest green weight per acre recorded is slightly over 10 tons, with an average for 16 varieties of over 8 tons. The highest yield of dry weight per acre is slightly over 2.6 tons, with an average of 2.15 tons. While this is not as much green material or dry weight as can be produced in corn, it is nevertheless higher in nutritive value, ton for ton. The following table shows the analyses of corn varieties grown in variety tests by the county agents during 1915 and the analyses of five of the leading varieties of soy beans grown here in 1916.

Table IV. Soy Bean Yields and Analyses.

Variety.	*Per Acre.*		Dry matter.	Ash.	Protein.	Fiber.	Nitrogen free extract.	Fat.	Nitrogen.
	Pounds Green Weight.	Pounds Air Dry Weight.							
Kentucky	14,792	4,091	3,846	269	767	1,094	1,551	165	123
Wisconsin Early Black	7,826	3,074	2,890	202	732	773	948	235	117
Black Champion	18,920	4,277	4,020	280	640	1,275	1,726	99	102
Guelph	19,608	5,278	4,961	346	903	1,622	1,837	253	144
Swan	19,006	4,434	4,168	292	924	1,302	1,539	111	148
Manhattan	15,179	4,008	3,768	265	634	1,001	1,759	109	101
Medium Yellow (Conn.)	14,276	3,893	3,659	256	621	1,032	1,604	146	99
Hollybrook	19,006	4,873	4,581	321	634	1,360	2,171	95	101
Ebony	15,222	3,805	3,577	250	654	1,125	1,377	171	104
Haberlandt	20,253	5,105	4,799	337	565	1,547	2,247	103	90
Mammoth	18,576	4,179	3,928	275	706	1,364	1,498	85	113
Medium Yellow (B. P. I.)	14,663	3,986	3,747	262	736	1,119	1,542	87	118
Manchu	14,018	3,982	3,743	263	686	946	1,542	307	110
Black Eyebrow	17,587	4,795	4,507	315	868	1,376	1,637	311	139
Ito San	17,415	4,749	4,464	312	808	1,231	1,835	278	129
Wilson	19,522	4,521	4,250	298	831	1,335	1,686	100	133
Average 16 varieties	16,617	4,316	4,056	285	732	1,219	1,656	166	117

TABLE V.

Variety.	*Dry Matter per A.*	*Lbs. Protein per A.*
CORN		
Eureka	6,461	489
Longfellow	5,637	463
Leaming	5,655	479
Sanford	5,487	432
N. H. 500	5,513	453
Average	5,751	463
SOY BEANS		
Swan	4,168	924
Guelph	4,961	903
Black Eyebrow	4,507	868
Wilson	4,250	831
Ito San	4,464	808
Average	4,470	867

In general we may conclude that more dry matter can be grown in corn than in soy beans; but that considerably more protein can be grown in soy beans than in corn. It seems reasonable then that many farmers should grow soy beans for silage because at the present time they are forced to buy protein in high priced grains or protein feeds.

FEEDING VALUE OF SOY BEANS

The following table* will give some indication as to the feeding value of soy bean silage:

TABLE VI. DIGESTIBLE NUTRIENTS IN 100 POUNDS.

	Dry matter.	Crude protein	Carbohydrates.	Fat.	Nutritive ratio.
Corn silage	17.7	1.1	15.0	0.7	1:15.1
Soy bean silage	15.2	2.6	11.0	0.7	1: 4.8
Corn and soy bean silage	17.2	1.6	13.8	0.8	1: 9.8

From these analyses it can be seen that whereas corn silage alone has a very wide nutritive ratio, a mixture of corn and

*Henry and Morrison, Feeds and Feeding, 1915.

soy beans in the silo makes a much narrower ratio and greatly increases the feeding value of the silage.

(It might be explained in this connection that the nutritive ratio of a feed is the relation between its protein content and its carbohydrates plus the fat multiplied by $2\frac{1}{4}$. Thus a feed containing 1 pound of digestible protein, 5 pounds of digestible carbohydrates and 1 pound of fat would have a nutritive ratio of $1:7\frac{1}{4}$. The proper nutritive ratio for a dairy cow is approximately 1:5.5.)

While there are no feeding experiments on record to show what increase may be expected from feeding corn and soy bean silage over corn silage alone, the experience of farmers and feeders in general is that the mixture is a much better feed. Part of the grain or other protein concentrate may be omitted from the ration where the mixed silage is fed.

It should be remembered that soy beans alone do not make good silage. They cure into a black, rather offensive smelling mass. Where they are mixed with corn at the rate of one ton of beans to two or three tons of corn, no odor results and the silage is as palatable as straight corn silage. They can be mixed at silage cutting time in these proportions or ensiled as they grow naturally in the field when planted together.

Cured as hay, soy beans have been found palatable and nutritious. The following table* shows the relative nutritive value of different kinds of hay:

Table VII. Digestible Nutrients in 100 Pounds.

	Dry matter.	Crude protein.	Carbohydrates.	Fat.	Nutritive ratio.
Soy bean hay	53.6	11.7	39.2	1.2	1: 3.6
Alfalfa hay	51.6	10.6	39.0	0.9	1: 3.9
Red clover hay	50.9	7.6	39.3	1.8	1: 5.7
Timothy hay	48.5	3.0	42.8	1.2	1:15.2

It can be seen here that the soy bean is high in digestible nutrients. That it is a good feed is borne out by careful feeding

* Henry and Morrison, Feeds and Feeding, 1915.

experiments. At the Tennessee Experiment Station* soy bean and alfalfa hay were fed in conjunction with corn and cob meal to two lots of Jersey cows, four in each lot. The average milk yield per lot for 30 days was 245 pounds in favor of the soy bean ration and the fat yield for the same period from the soy bean hay exceeded that from the alfalfa by 20.5 pounds.

At the Ohio Experiment Station† after trials in 1908 and 1909 it was concluded that soy bean hay can replace much of the high-priced protein concentrates in the ration of the dairy cow.

Soy bean hay is relished by all kinds of stock. The chief objection to it is the coarse woody stems. The beans for hay should either be drilled close to keep the stems fine or a fine stemmed variety should be planted.

Soy bean hay should be fed carefully at the start until the animals become accustomed to it. The hay can be increased from about three feeds per week to one feed per day to milch cows and young stock.

VARIETIES.

The following is a list and brief description of some of the leading varieties.

Guelph or Medium Green (seeds, green). This variety is a rank grower, highly valued for its forage. It will be mature enough for silage in our state in about 90 days, but will be most valuable at 110 days. All of these varieties have a cutting period of three to four weeks during which time they might be cut for silage. The cutting period for hay is much shorter, as the stems get woody rapidly.

Hollybrook (seeds, straw yellow). A variety maturing about the same time as the Guelph and similar in habits of growth. Although the analysis of this variety revealed a low percentage of protein it is nevertheless a very satisfactory yielder of green forage and dry matter.

Haberlandt (seeds, straw yellow). A variety about one week later than the Guelph. Does not grow as erect as the Guelph.

Swan (seeds, straw yellow). Similar to the Haberlandt.

* Bulletin 80, Ten. Agr. Exp. Sta., 1908.

† Bulletin 267, Ohio Exp. Sta., 1913.

Mammoth (seeds, straw yellow). The latest maturing variety grown. A fairly satisfactory yield of green forage, but does not mature sufficiently to set many pods. The seed of this variety is plentiful, however, and usually cheaper than that of other varieties.

Wilson (seeds, black). A fine-stemmed variety suitable for hay when grown in rows, if seeded early and on an early soil. A very good yielder.

Black Champion (seeds, black). Similar to the Wilson but a few days later.

Medium Yellow (seeds, straw yellow). An early maturing variety. Forms an abundance of pods and seed here. It is very branching and suitable for either silage or hay.

Ito San (seeds, straw yellow). An early variety suitable for hay or silage. Although it does not produce as much green forage as some of the later maturing varieties, it is a good yielder, of both dry matter and protein. Not so branching or fine stemmed as the Medium Yellow. Will mature seed here if planted by June 1.

Manchu (seeds, straw yellow). An early variety very similar to the Ito San. Will mature its seed here.

Black Eyebrow (seeds, mottled black and yellow). A variety similar in appearance to the Manchu and maturing a few days later. Suitable for either hay or silage. Will also mature seed.

Wisconsin Early Black (seeds, black). The earliest variety we grew here. Suitable for hay or seed. Matures its seed in about 100 days.

OTHER USES OF THE SOY BEAN.

As a soiling crop. On account of its high feeding value the soy bean may be utilized as a soiling crop where such a system is practised on the farm. If grown for soiling, the stems should be kept fine the same as for hay, so that all of the forage will be eaten.

As a seed crop. The four earlier varieties described above will mature seed and can be grown as a seed crop. We have made no trials of their seed-producing capacity here but expect to do

so next season. The soy bean should produce as much seed per acre as the ordinary bean.

As a human food. Although the soy bean has not been in general use as a human food, it is highly nutritious and is at present on the market in the larger cities for human consumption on account of the prevailing high prices and scarcity of field beans. It is not as palatable at first as the ordinary bean, but there is no doubt that our people can acquire a taste for it. The bean is prepared by either stewing or baking. It requires considerably longer to cook the soy bean than other beans.

As a crop for soil improvement. By reference to the table on page 15 it can be seen that the soy bean is high in nitrogen. The average nitrogen content of the 16 varieties was found to be 117 pounds per acre. Assuming that one-half of this came from the air it is evident that about 58 pounds of nitrogen has been added to the farm fertility for every acre of soy beans grown. Every pound of this nitrogen is worth at least 15 cents in commercial fertilizer. The value of this added nitrogen per acre is $8.70, and can be figured as such, provided the manure is carefully handled.

If it is felt that a soil is so sandy or so low in fertility that a year should be utilized in growing green manure crops to plow under, the soy bean will be found to produce as much green material for this purpose as any other plant. It may be grown in the summer and followed in the fall by rye or rye and vetch.

The following letter from Prof. R. A. Moore, Agronomist of the Wisconsin Agricultural Experiment Station, speaks for itself in this connection:

"It is really remarkable how rapidly the acreage of soy beans has increased in our state. We are now growing them through the sandy region that we thought at one time was practically useless. Farmers are growing them for seed and growing the hay. They take the place of clover and after we have grown soy beans for two or three years on this land we can readily get catches of clover on the Jack Pine soils which are very light in character. Then after we get them under cultivation we can grow corn. Thus we are practically reclaiming the sand belt, which governs a portion of several counties of our state."

County Agent Sweeton, of Windham County, Vermont, asserts that the soy bean acreage in his county increased from 15 acres in 1915 to 240 acres in 1916, in conjunction with corn silage.

SUMMARY.

The soy bean is a new crop which may be utilized by the farmers of our state.

Soy beans are easier to grow than field beans because they are not attacked by any serious diseases.

Soy beans are legumes and are rich in nitrogen and protein.

It will pay to inoculate for soy beans when growing them for the first time on any soil.

Soy beans fit into the crop rotation when red clover fails or as a supplementary silage crop.

Any soil that will grow corn will produce soy beans; soils that are too sandy to produce corn will grow good yields of this crop.

Soy beans for silage are planted in rows and cultivated as corn. If conditions are favorable they may be seeded in the same rows with corn.

For hay they should be drilled solid, unless a fine stemmed variety is used, when they may be drilled in rows as for silage.

Soy beans may be harvested for silage any time after the pods form and before the leaves fall.

For hay they should be harvested when the pods are forming. They should be handled carefully when cut for hay, in order that all the leaves will be preserved.

Soy beans should be mixed with corn in the silo, one ton of the beans to two or three tons of corn.

Silage made from mixed corn and soy beans is a much better feed than corn silage and less grain need be fed where it is used.

Soy bean hay is as valuable for feeding dairy cows as alfalfa.

There are a number of varieties of soy beans which will prove satisfactory for New Hampshire conditions.

The soy bean improves the soil; can be grown for seed; can be used as a human food; and is an excellent crop for green manuring.

The soy bean will probably assume its maximum importance in New Hampshire as a crop to supplement corn in the silo.

The author desires to express his appreciation to B. E. Curry, Experiment Station Chemist, under whose direction the chemical analyses herein reported were made.

Names of growers and seed dealers who handle the different soy bean varieties can be obtained by writing to the New Hampshire Agricultural Experiment Station.