Issued August 20, 1912.

U. S. DEPARTMENT OF AGRICULTURE,

BUREAU OF SOILS—CIRCULAR No. 65.

MILTON WHITNEY, Chief of Bureau.

SOILS OF THE EASTERN UNITED STATES AND THEIR USE—XXXVIII.

MUCK AND PEAT.

BY

JAY A. BONSTEEL,

Scientist in Soil Survey.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1912.

BUREAU OF SOILS.

MILTON WHITNEY, *Chief of Bureau.*
ALBERT G. RICE, *Chief Clerk.*

SCIENTIFIC STAFF.

FRANK K. CAMERON, in charge of Physical and Chemical Investigations.
CURTIS F. MARBUT, in charge of Soil Survey.
OSWALD SCHREINER, in charge of Fertility Investigations.

ADDITIONAL COPIES of this publication may be procured from the SUPERINTENDENT OF DOCUMENTS, Government Printing Office, Washington, D. C., at 5 cents per copy

SOILS OF THE EASTERN UNITED STATES AND THEIR USE.—XXXVIII.

MUCK AND PEAT.

GEOGRAPHICAL DISTRIBUTION.

Wherever an opportunity is offered for the accumulation of dead and partly decayed organic matter, deposits of Muck and Peat may be formed. The circumstances favoring such accumulation are usually those of humid climate, abundant vegetation, and a swampy condition resulting in the partial preservation of the successive deposits of vegetation. Peat and Muck are thus most commonly formed in swampy, low-lying positions where rank growths of various forms of vegetation have died and been preserved from complete disorganization.

As a result of these necessary processes of formation, accumulations of both Peat and Muck are far more frequent and more extensive in northern and cooler regions than in warmer climates. There are some exceptions to this general rule arising from the existence of exceptional conditions within semitropic regions.

Few accumulations of Peat or Muck are encountered within semiarid regions, and such as have been formed are chiefly confined to low-lying and poorly drained positions along the flood plains of the larger rivers.

Areas of distinctive Muck have been encountered in 44 different localities during the progress of soil survey work. They occur in 18 different States and occupy a total extent of 718,029 acres. Peat deposits have been mapped in 12 distinct localities, occurring in 8 different States, and covering 141,804 acres.

While the greater number of these areas of Peat and Muck, and usually the most extensive tracts, have been found in the cooler, humid regions of the Northeastern and North Central States, yet there are extensive deposits in the lower lying swampy sections of the Coastal Plains region and even some large deposits within the flood plains of some of the larger southern rivers.

CHARACTERISTICS OF SOIL AND SUBSOIL.

It is difficult to establish any rigid definition which shall always discriminate between characteristic Peat and true Muck, even when the definition is confined exclusively to agricultural uses. This arises

from the fact that there may be every degree of gradation between true Muck and true Peat within the limits of the same deposit. This gradation arises from the character of the processes by which the two classes of material are formed and preserved.

In general Peat consists of brown or black fibrous or cellular remains of organic matter formed chiefly in bogs or ponds. Peat is most frequently formed from accumulations of sphagnum moss, which has grown in such situations. While the moss may constitute the greater portion of any peat deposit, there are also included the remains of other water-loving plants and trees and sometimes the trunks, branches, and foliage of tamarack, white cedar, and birch. A peaty soil consists of material of this character more or less mingled with mineral matter.

Muck may be distinguished from peat by the fact that the organic remains within the deposit have reached a more advanced state of disintegration, and frequently the accessory mineral matter is more apparent. The process of disintegration has usually reduced the organic matter to a soft pulpy mass of vegetable material which has lost all resemblance to the fibrous and cellular structure of the original plant tissues. Muck is also likely to contain a larger proportion of mineral material. It is a mass of partly preserved vegetable matter which has passed to a more advanced stage of disintegration than peat and into which a considerable quantity of mineral matter has been washed or blown during the process of its formation. Muck is ordinarily black or dark brown, like peat.

In many areas there naturally occurs a zone of transition from true Peat to typical Muck, and it is a matter of careful discrimination to separate the two classes of material and to establish boundaries between them.

While the close resemblances between these two classes of material and their intimate association may in some cases render separation difficult, there is usually little difficulty encountered in distinguishing either from other classes of soils. In all cases Peat and Muck are very dark colored and contain a noticeably higher percentage of organic matter than the normal upland soil. They are almost universally saturated with water in their natural condition. It is only when a deposit of one or the other of these materials becomes thinned out in contact with areas of upland soil that any difficulty should be experienced in recognizing either as a distinct class of soil. Few upland soils contain more than 15 per cent of organic matter, and the presence of as much as 25 per cent should serve to distinguish the soil mass as a mucky or peaty soil. For convenience in classification the average depth of 8 inches has been assumed as a minimum which would warrant the separation of distinct areas of Muck or Peat from upland soils highly charged with organic matter.

SURFACE FEATURES AND DRAINAGE.

The surface features of both peat and muck deposits are almost universally those of a level plain. In general the deposits have been formed within the areas of small lakes or ponds or along the courses of sluggish streams. Consequently there may be wide differences in absolute elevation of different deposits, but each separate occurrence will possess a nearly level and very uniform surface. Those deposits which border streams to any great extent may possess a slight surface slope down the course of the stream. The deposits are also thicker in some portions than in others, and when they become partially drained, as the result of either natural or artificial causes, irregularities in shrinkage may give rise to slight differences in elevation. This is particularly the case with shallow deposits, which may assume something of the surface configuration of the underlying subsoil when the Muck or Peat shrinks in drying.

Areas of Muck and Peat occur nearly or quite at sea level in the Atlantic and Gulf Coastal Plains and also in the lower courses of some of the flood plains of the rivers tributary to the Gulf of Mexico. Other areas are to be found within the small ponds and partially filled lakes of the glaciated region at altitudes of 1,200 to 1,500 feet above tide. There could be no general statement as to range of altitude, since the conditions which give rise to such accumulations are widespread within all of the cooler and more humid portions of the country.

It is a characteristic of all such deposits, however, that they are found in depressed areas, where the natural drainage is deficient and decaying vegetation may become partially preserved through its submergence in water. Thus Muck and Peat are always naturally swampy.

LIMITATIONS IN USE.

Lack of adequate drainage in their natural condition limits the uses to which peat and muck soils may be devoted. It is only after the installation of drainage systems that either class of material may be brought under cultivation. Even then there is considerable variation in the agricultural adaptation and cropping value of different areas, frequently within the same deposit.

It has been the usual experience that areas of Muck are more easily reclaimed than areas of Peat. This arises chiefly from the fact that the more advanced stage of decomposition of the Muck, coupled with the universal presence of an appreciable amount of mineral matter, renders it more compact, better fitted to hold the growing crop in an upright position, and to furnish a regular and adequate supply of moisture throughout the growing season. The fibrous Peat is usually

too loose and too light to maintain any high-growing crop in position, thus corn and even the small grains are liable to fall down and become lodged.

Moreover, the Peat is sufficiently fibrous to absorb large amounts of water, which it holds tenaciously within its own cellular structure at the expense of the growing crop. For these reasons, chiefly, the reclamation of Muck for agricultural uses has been more successful than that of Peat.

Differences in the agricultural values of the reclaimed areas also occur among muck deposits. It has been noticed that those deposits encountered within swampy areas underlain by limestone rock or where a large proportion of the accessory mineral matter within the muck itself has been derived from limestone are the areas which have given the most profitable returns under agricultural occupation. It may be that the limestone is necessary to counteract the effect of the organic acids formed through the decay of the large amounts of organic matter, or it may be that the organic matter itself exists in different forms, better suited to agricultural purposes, when an excess of lime is present. At any rate the beds of Muck which occur in limestone regions or which overlie deposits of calcareous marl are those which have been most successfully used for the production of many of the general farm crops and for the growing of the majority of special crops.

Another general rule, which has some exceptions, is that the areas of Muck which are underlain at a depth of 2 feet or more by a subsoil of clay or heavy loam are more durable under tillage than those which are underlain by deposits of loose sandy loam or sand.

Peat when reclaimed is chiefly valuable for the growing of special vegetable crops, while muck possesses as great a value for these purposes and at the same time may be used for the growing of many of the general farm crops in regular rotation, notably corn, potatoes, and timothy hay.

Frequently the desirability of reclaiming a given area of Peat or Muck will depend almost exclusively upon the accessibility of markets for the special and highly valuable crops which are grown to best advantage upon these soils. A very valuable area of Muck, so far as the volume of its production is concerned, might be so located as to possess no available market for its products.

All of these considerations must be borne in mind when the reclamation of any particular area of either Peat or Muck is under consideration. They are quite as essential as the engineering features of the reclamation.

IMPROVEMENT IN SOIL EFFICIENCY.

In many instances reclaimed areas of Peat or Muck have proved a disappointment to their owners when cleared, drained, and brought under cultivation. The dark color of the material and its evident high content of organic matter have persuaded those familiar with the indications of fertility among upland soils that the peat or muck deposits must be extraordinarily fertile because they possess these characteristics. Yet in many instances it has been found necessary to make considerable applications of mineral fertilizers and even of stable manure to such soils before they could be brought to a highly profitable condition of cultivation. Among the fertilizers which have been used to the best advantage may be mentioned the various potash salts and the different combinations of phosphoric acid. It has been found that both potash and phosphoric acid produce large increases in yield when applied liberally to these soils. Heavy applications of coarse stable manure have also proved of great advantage upon many areas. It may be that the bacterial condition of these freshly drained organic soils is not favorable to the growth of certain crops and that this deficiency is supplied through applications of stable manure.

For the production of cabbage, onions, beets, and turnips upon Peat and Muck it is usually advisable to apply considerable quantities of lime. This may be added in the form of caustic lime, slaked and spread upon the soil at the rate of about 1 ton per acre, or by applying 2 to 3 tons per acre of ground limestone. Not infrequently larger applications of these materials have proved very beneficial. It has even been found profitable to add nitrates to soils of this class for the production of such crops as celery and lettuce. Where available in any quantity, wood ashes have been found of considerable value for the growing of corn and oats upon mucky soils.

LIMITATIONS UPON SPECIAL CROPS.

Peat and Muck are primarily adapted to the production of special rather than general farm crops. They have been found, experimentally, to constitute particularly favorable soils for the growing of cabbage, celery, onions, lettuce, turnips, table beets, and peppermint. Potatoes are also grown to advantage upon many muck areas, but something of high quality is sacrificed to large yields in the majority of instances.

Practically all of these special crops depend for their value upon the accessibility of markets which will absorb a large volume of each crop and will maintain a reasonably constant demand. As a result, only small areas of the great aggregate acreage of Peat and Muck have been reclaimed and brought under cultivation. The initial

expense of draining and subduing such soils has been the chief hindrance, but where a good market exists for the sale of the special crops best suited to production upon these soils, the high acreage value of these special crops warrants the outlay of large sums for reclaiming favorably situated deposits. There are many instances where the cost of draining, clearing, and subduing muck areas has been repaid within two or three years' time by the sale of high-priced crops like lettuce, celery, onions, and cabbage. Such lands when cleared frequently appreciate in value sufficiently to render their development one of the most remunerative forms of land improvement.

EXTENT OF OCCUPATION.

Probably not more than 5 per cent of the total area of Muck and Peat in the eastern part of the United States has yet been drained. By far the greater part of such deposits supports a growth of tamarack, white cedar, birch, and water maple, in the more northern regions, or gum, cypress, and a thick tangle of undergrowth in the southern localities.

Even in the case of areas which have been drained and cleared, the greater part of the acreage is given over to the production of hay or small grains and only limited tracts have yet been occupied for the more valuable special crops. It is therefore apparent that the country possesses a very great reserve of highly valuable soils which may be reclaimed and devoted to the production of the luxuries and the necessities of the table whenever the demand for increased production shall justify such utilization of this land.

CROP ADAPTATIONS.

When drained, Muck is frequently used for corn growing for a few years until the roots of trees and other obstructions to intensive cultivation have been removed. Unless the land is located too far north or occupies some hollow which is abnormally frosty, the yields secured are fair to good. Upon the best areas a production of 40 to 50 bushels of corn per acre is not at all unusual. Frequently the yields are increased by the use of coarse stable manure and in many instances applications of potash salts and of phosphoric acid in some form have proved to be highly advantageous. Corn may be grown for two or three years in succession or a regular rotation of corn, followed by oats, followed by a stand of mixed timothy and alsike clover for hay may be adopted.

Oats constitute the best small-grain crop for production upon Muck in the majority of northern areas. The crop is favored by the moist soil and the cool climate. Heavy yields of oats, ranging from 50 to 80 bushels per acre, have been grown. The chief difficulty encoun-

tered with this crop has been the liability of the grain to make a heavy growth of straw which becomes lodged with consequent damage to the grain. This is usually remedied, in part, by the liberal use of the mineral fertilizers.

Among the grass crops suited to muck-land conditions timothy hay is the most profitable. Frequently a pure seeding of timothy is secured which will cut from 1½ tons to 2½ tons per acre. Usually alsike clover is seeded with the timothy, especially upon farms where the hay is to be fed to dairy cows or to cattle raised for fattening. The mixed hay has a somewhat higher feeding value for meat cattle. Alsike is better suited to production upon Muck than any other clover, since it will grow well upon moist to wet soils which have not yet become fully sweetened by the application of lime. When the land has been fully subdued and lime has been supplied, the medium red clover will also make a good growth.

In some of the more northern areas, where corn may not be grown to advantage except upon the best-drained soils, potatoes constitute the intertilled crop adopted for muck areas. The yields secured are usually heavy, ranging from 150 bushels to 350 bushels per acre. It is sometimes the case that the quality of the tubers is not so good as of those grown upon drier, upland soils, but the extraordinarily heavy yields compensate for any slight defect in quality. Heavy applications of fertilizer high in sulphate of potash have been found to give good results when used in connection with potato growing upon Muck.

Buckwheat has also been used as a small-grain crop on the more northern occurrences of Peat and Muck. Buckwheat matures in a shorter growing season than almost any other common farm crop and it also aids in shading the ground for the repression of noxious weeds.

Corn, oats, buckwheat, hay, and potatoes constitute the crops most extensively grown upon reclaimed areas of Muck. They are the general farm crops best suited to production upon land of this character.

Muck lands have secured their principal reputation as agricultural soils through the production of certain exceptionally valuable special crops.

In the northeastern and north-central States celery is probably the most important crop for muck-land production. It grows luxuriantly and produces heavy crops upon the partially drained soils of this character. The soft, easily worked Muck is favorable to the large amount of cultivation and ridging required for the proper growing and blanching of the celery. This crop, which has established the reputation of southern Michigan, is chiefly grown upon drained muck areas. Similarly, extensive areas of Muck have been drained and

devoted to celery culture in central and eastern New York. An acre of celery will contain from 18,000 to 20,000 plants and will produce from 900 to 1,000 dozen of bunching plants. Early celery is frequently produced upon the more eastern muck beds, being set in double rows, so that a single set of blanching boards may serve for both rows. This celery is frequently marketed sufficiently early to permit of the use of the land for spinach or some other succession crop. The value of a celery crop, of course, varies, but an acreage output ranging from $200 to $300 is not at all unusual. The cost of growing may be estimated at $80 to $120 per acre. Land which is especially well located for the growing of this crop frequently brings an annual rental of $20 to $30 per acre.

Onions constitute another favorite crop with those who make intensive use of muck lands. In some of the New York State areas where onion growing upon muck land is a special industry yields of 400 to 800 bushels per acre are secured, with a general average of 500 bushels. Both the yellow and red varieties are grown, with a smaller acreage of white onions. The onions are grown from the seed and special precautions are taken to prevent the blowing away of the soil and seed before the latter has germinated. Windbreaks of quick-growing trees are planted and the growers endeavor to keep the surface soil moist until the young plants are well established.

In more southern areas corn, oats, rice, and cotton constitute the principal crops grown upon drained areas of Muck. In eastern North Carolina and at other points along the Atlantic coast corn gives yields of 30 to 65 bushels per acre, oats produce from 30 to 40 bushels, rice yields 35 to 40 bushels, and cotton attains a production of two thirds to 1½ bales per acre. These yields are considerably in excess of those which are normally secured upon adjacent upland soils. The mineral fertilizers give good results when applied to crops grown upon these muck areas of the Coastal Plain, and applications of lime produce such marked results that the portion of the fields to which it has been applied may be distinguished to the single row.

Muck soils produce practically all of the peppermint that is grown in the Eastern States. Michigan leads in the production of this crop and seems to be able to grow practically all of the mint which can find a market in the form of peppermint oil at the present time.

The mint is usually planted in the spring, though some growers practice fall planting. The roots for transplanting are secured from an old field and, after the land has been prepared by plowing and harrowing, the roots are scattered in trenches which are opened to a depth of about 6 inches, with 3 feet between rows. The rootstocks are dropped in these trenches and covered. It is very essential to keep the weeds subdued for the first year after planting, since their presence depreciates the product of the still. Machine cultivation is effective

at first, but later the hand weeding of the field is necessary. During the second year's growth the plants will cover the ground.

The harvesting of the crop begins in the latter part of July and is usually continued until October. The mint is cut with a mowing machine, cured for several hours, raked into cocks, and hauled to the distillery. At the still the mint is unloaded into large, tightly hooped vats, which are covered with lids. Steam is then passed through the mass of mint, volatilizing the oil, which passes into a worm and is condensed. The mixed oil and water are collected and separated. A product of 40 pounds of oil per acre is considered a good yield and $2.50 per pound is a fair average price for the oil.

Peppermint is usually allowed to occupy the field for a number of years, although it is possible to plow the fields in the fall and to secure a new set from the roots the following spring.

Probably the most profitable crop grown upon Muck and Peat is the cranberry.[1] For the establishment of good cranberry bogs several conditions, aside from the existence of the necessary muck or peat bed, are required. The topography must be such that the Muck or Peat, when cleared, may be embanked to retain the water used in flooding the beds; there must be an easily accessible supply of clean sand for the top-dressing of the bed; there must be a dependable supply of water, sufficient to flood the beds to a depth of 6 inches or more and to maintain the flooding for long periods of time, when necessary, together with facilities for drawing off the water so that it will remain 6 inches or a foot below the surface of the bed. Such conditions do not occur in connection with every area of Muck or Peat, and the absence of any one condition renders the establishment and maintenance of the bog that much more difficult and costly.

Cranberries are produced in the cooler climates and the muck and peat deposits of the Northeastern and North Central States have been extensively used for this crop. These deposits frequently occur in small, rounded depressions, the kettle holes of old glacial moraines, and not infrequently the adjacent upland deposits consist of sandy and gravelly materials which supply the top-dressing of sand for the bog. Moreover, large springs frequently break out at the edge of the bog, supplying an abundance of water for the flooding of the established beds.

Where all of the essential conditions for cranberry culture are provided in such localities, the establishment of the bog is usually a profitable venture.

The first step in the formation of a cranberry bog is the clearing away of all timber and brush which might interfere with the sanding

[1] Reference is made to Farmer's Bulletin 176, Cranberry Culture, to Farmer's Bulletin 178, Insects Injurious in Cranberry Culture, and to Farmers' Bulletin 221, Fungous Diseases of the Cranberry, for further information in regard to this crop.

and cultivation of the Muck or Peat. Frequently the top layer of soil, to a depth of 5 or 6 inches, is bodily removed so that all weeds, brush, and roots may be eradicated. The surface of the bed is then graded to secure an economical and uniform application of water over the bog, insuring a sufficient covering to protect the young plants. Embankments are then built to supplement the natural elevated borders of the bog to retain the irrigation waters. Provision is made for drawing off the water and frequently some artificial drainage is installed to assist in this. Large ditches are usually cut around the edge of the plantation. Sand is then applied to the surface to a depth of 3 or 4 inches and the bed is ready for the transplanting of the shoots which will form the new bog.

The yield of berries ranges from 25 to 125 bushels per acre. The general average may be stated as close to 75 bushels per acre upon well-established bogs. The fruit is marketed in barrels and brings from $4 to $10 per barrel under prevailing market conditions.

Massachusetts, Rhode Island, New York, New Jersey, Michigan, and Wisconsin are the leading producers of this fruit.

Peat is less generally used for agriculture, and in all cases where it has been profitably reclaimed it has been the black, well-rotted deposits which have become fitted for the production of farm crops rather than the brown fibrous material chiefly formed from sphagnum moss.

The agricultural uses of the purer deposits of peat are indirect. Thus, considerable amounts of dried peat have been used as a filler for fertilizers. In some localities peat has been cut, stacked, and dried to be used as an absorbent in stables, its high absorptive capacity making it particularly valuable for this purpose. Dried and pulverized or broken peat will absorb a larger amount of liquid manure than either straw or sawdust. It is also readily decomposed when applied to the soil or built into a compost heap. It is, therefore, one of the best stable absorbents that can be used.

FARM EQUIPMENT.

Since the majority of tilled areas of Peat and Muck consist of small tracts upon individual farms, which are worked incidentally to the other operations of the farm, the equipment of such soils is not distinctive.

Where larger areas of Muck and Peat have been reclaimed for the growing of special crops the equipment is sometimes unusual. In many instances the farm dwellings are built upon adjacent uplands. Similarly, the barns and stables are erected upon firmer soils. Thus there is liable to be a lack of permanent building equipment upon the larger areas of muck land.

Mention has been made of the planting of protecting hedges which are used to break the force of spring winds and to prevent the bodily removal of the surface soils and even the seed. The North Carolina poplar is frequently used for such purposes, since it makes a rapid growth. When the trees become fully grown, there is need for the interplanting of lower-growing forms in order to thicken the hedge, thus forming a complete windbreak.

Sometimes special devices are used to prevent the horses from sinking into the soft surface soil of the Muck or Peat. A bog shoe of boards fitted with clamps, so that it may be temporarily attached to the regular horseshoe, is generally employed for this purpose. The bearing area of each foot is increased until there is little danger that the work horses will become "bogged down" in the soft soil.

Frequently cold frames or small greenhouses are established near the muck beds for the forcing of the plants required for transplanting upon the Muck or Peat. This usage is more common where extra-early truck crops are produced than where onions or the later field crops are grown. A later use of the cold frames is sometimes made for growing special crops under glass.

SUMMARY.

Deposits of Muck and Peat are of wide extent in all of the cooler, more humid sections of the United States, and occur in some of the more southern States where exceptional conditions of moisture and abundant low-growing vegetation prevail.

Peat consists of nearly pure, partially decayed remains of vegetable tissue. Muck is formed by the mingling of such material with an appreciable amount of extraneous mineral matter. It is also more completely disintegrated than peat in the majority of areas occupied for agricultural uses.

Nearly 1,000,000 acres of Peat and Muck have been encountered in the progress of soil surveys, and it is probable that deposits of this character will ultimately be found to cover an area in excess of 15,000,000 acres in the eastern United States.

Owing to the method of formation of these deposits, they are almost universally poorly drained under natural conditions, and the installation of proper drainage is the first step in their utilization for crop production. Each area constitutes a separate drainage problem.

While the Peat and Muck are primarily special-purpose soils, considerable areas which have been reclaimed are used for the growing of general farm crops, such as corn, potatoes, oats, buckwheat, and timothy hay. These uses are common in the more northern localities.

The greatest values derived from the cultivation of Muck and Peat have arisen from their use as special-crop soils. Cabbage, onions,

celery, lettuce, spinach, carrots, beets, turnips, and peppermint are among the most valuable crops which are grown upon the intensively farmed areas of Peat and Muck. The acreage values of these crops so far surpass those of the general farm crops that the reclamation of any large areas of Peat or Muck should be undertaken with the special object of their production.

For the profitable sale of these special crops it is desirable that such areas of Peat and Muck as are easily accessible to large city markets or to rapid transportation should first be reclaimed.

Large applications of certain mineral fertilizers upon the Peat and Muck have been found decidedly beneficial. The use of the potash-bearing and phosphatic fertilizers has been experimentally proven to give excellent returns through increased crop production. Even coarse stable manure has been used to advantage. The application of lime to these soils has given marked increases in yield of many of the special crops.

Only a small proportion of the total area of Peat and Muck has been reclaimed for any agricultural use, and the remaining areas constitute one of the most valuable portions of the land reserve which may still be brought under cultivation.

Approved.

JAMES WILSON,
Secretary of Agriculture.

WASHINGTON, D. C., *March 26, 1912.*

APPENDIX.

The following table shows the extent of the Muck and Peat in the areas surveyed to this time. In the first column is stated the particular soil survey in which the area was encountered, in the second column its extent in acres, and in the third column the volume of the Field Operations of the Bureau of Soils in which the report upon the area may be found. Those desiring a detailed description of the soils and of the general conditions which surround them in any particular area may consult these volumes in almost any public library.

Areas of Muck and Peat encountered in the soil survey.

MUCK.

Surveys.	Area of soil.	Date.[1]
Alabama:	*Acres.*	
Baldwin County	20,672	1910
Florida:		
Gainesville area	128	1904
Georgia:		
Bulloch County	640	1910
Illinois:		
Winnebago County	2,167	1903
Indiana:		
Allen County	11,392	1908
Madison County	1,152	1903
Marion County	256	1907
Marshall County	24,768	1904
Tippeeanoe County	1,664	1905
Iowa:		
Cerro Gordo County	12,096	1903
Kentucky:		
Madison County	320	1905
Louisiana:		
New Orleans area	21,056	1903
Maine:		
Caribou area	55,296	1908
Orono area	35,136	1909
Michigan:		
Allegan County	49,280	1901
Alma area	17,408	1904
Cass County	25,728	1906
Munising area	20,480	1904
Owosso area	9,088	1904
Oxford area	20,416	1905
Pontiac area	7,936	1903
Saginaw area	46,784	1904
Wexford County	7,744	1908
Minnesota:	*Acres.*	
Carlton area	17,408	1905
Mississippi:		
Scranton area	6,464	1909
New York:		
Auburn area	512	1904
Binghamton area	128	1905
Livingston County	5,120	1908
Lyons area	3,840	1902
Madison County	18,944	1906
Montgomery County	1,920	1908
Niagara County	4,608	1906
Syracuse area	16,960	1903
Washington County	3,712	1909
North Carolina:		
Lake Mattamuskeet area[2]	24,128	1909
Pitt County	128	1909
Raleigh to Newbern area	6,230	1900
North Dakota:		
Grand Forks area	6,592	1902
Ohio:		
Cleveland area	768	1905
Vermont:		
Vergennes area	384	1904
Wisconsin:		
Janesville area	10,368	1902
Portage County	128,640	1905
Racine County	21,760	1906
Superior area	47,808	1904

PEAT.

Illinois:	*Acres.*	
Tazewell County	1,644	1902
Indiana:		
Allen County	640	1908
Greene County	2,624	1906
Newton County	10,368	1905
Louisiana:		
Tangipahoa Parish	59,200	1905
Maine:		
Orono area	12,416	1909
Minnesota:	*Acres.*	
Blue Earth County	7,680	1906
Crookston area	8,256	1906
Rice County	16,320	1909
New York:		
Bigflats area	576	1902
North Carolina:		
Lake Mattamuskeet area	17,600	1909
Ohio:		
Wooster area	4,480	1904

[1] Year of publication, Field Operations.

[2] Mapped as Hyde mucky loam.