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SHIPMAST LOCUST
A VALUABLE UNDESCRIBED VARIETY
OF ROBINIA PSEUDOACACIA

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INTRODUCTION

The question of types, strains, or varieties of *Robinia pseudoacacia* L. is one that has recurred frequently in various portions of the range of this species. Woodsmen, farmers, and foresters have commonly designated these variations as "black", "yellow", or "white" locusts, and these various names have caused much confusion in popular literature. In one section of the country, people speak of "black" and "yellow" locusts; in other regions of "black" and "white", and in still others of "white" and "yellow." In a few sections "red" and "green" locust are also mentioned, to add still more confusion to this popular nomenclature.

Whether these names are really justified has not yet been definitely settled. *Robinia pseudoacacia* appears to be a rather variable species in which different morphological appearances and characteristics are produced by age, site, climate, etc. This possibility is well worth considering. But, whatever the conclusion of such studies may be, in New Jersey, New York, and the territory adjacent to Long Island there occurs a variety² of *R. pseudoacacia* which thus far has not received the attention it merits.

As early as 1882, John S. Hicks, of Roslyn, N. Y., had noted that the commercial trees of *Robinia pseudoacacia* of that section were of two distinct kinds, which he designated as the "white" and the "black or yellow" locusts.³ The "white" locust of Long Island

¹ Now conservationist, Forest Service.

² This variety, according to a local Long Island tradition, was introduced to the island from Virginia by John Sands about the year 1700. This tradition has not been historically verified, nor has this locust been found in Virginia; but a few of the original trees said to have been introduced by Captain Sands (1649–1712) occur at Washington Inn, Roslyn, and The Place, Glen Cove, Long Island.

³ HICKS, J. S. THE BLACK OR YELLOW LOCUST. Amer. Jour Forestry 1 : 465–469. 1883.

has many of the characteristics common to *R. pseudoacacia* throughout its range, but the Long Island "yellow" locust has morphological characters that distinguish it from all other listed varieties. Because of its potentially great economic importance, this hitherto undescribed yellow locust has been considered worthy of intensive study, preliminary to its extensive propagation for erosion-control purposes.

Owing to its unusually straight trunk, this Long Island yellow locust has been called shipmast locust, and in the following discussion it will be so designated in contradistinction to the type species of the common or black locust, *Robinia pseudoacacia*.

COMPARISON WITH THE COMMON LOCUST

SHAPE OF TREE AND METHOD OF BRANCHING

The main stem of the shipmast locust ascends nearly as straight as the excurrent trunk of a conifer or the main trunk of a Lombardy poplar. This striking form occurs not only when the trees are in groups (pl. 1) but also when they occur in isolated positions, indicating that it is an inherent and not an environmental character. The base of the trunk is very columnar with sides almost parallel and little or no indication of buttressing (pl. 2, A).

The lateral branches are comparatively few in number and after leaving the main stem tend to form an angle of 60° to 90° with the main axis. At the axil they make a much smaller angle (viz, 45° to 60°), but shortly they tend to flatten out, making the 60° to 90° angle mentioned. Very commonly the lateral branches do not taper out to the end in a uniform and gradual manner, but instead they narrow down abruptly after the manner of Japanese dwarf trees. This results in a characteristic "Japanese" appearance when the trees are in the winter condition. The crown is narrow and more or less columnar in form.

The common locust (pl. 3) has a wider crown than shipmast locust. While it may continue fairly straight for the first 10 to 20 feet, the bole soon becomes wavy and crooked; early forking of the main stem frequently results in a tree of the deliquescent type, with much the appearance of an elm tree, especially when grown in the open. The lateral branches leave the stem at an angle of 30° to 60° , bending after the fashion of elm branches and gradually tapering off at the ends. Bases of old boles are generally decidedly swollen, fluted, or buttressed (pl. 2, B). The result is a tree much less erect and much less striking in appearance than shipmast locust. While the latter commonly attains a height of 75 feet, such a height for the common locust is exceptional.

BARK

The bark of the shipmast locust is generally dark ashy gray, and on the older trees it is extremely thick. It has a very fine "grain" or fibrous structure reminding one of redwood (*Sequoia sempervirens* (Lamb.) Endl.). Furthermore, the lines of the grain in the bark of old shipmast trees are conspicuously lengthwise with very few cross checks running at right angles to the bole (pl. 4, A).

The bark of the common locust, on the other hand, is lighter in color and is not so deeply furrowed as shipmast, and the grain is



A. Grove of shipmast locust trees at Northport, Long Island, N. Y.; B. shipmast locust on estate of George Roosevelt, Oyster Bay, Long Island. (Photographed by S. B. Detwiler.)



A. Shipmast locust at W. yandanch, Long Island, N. Y. Note the absence of buttressing at the base. (Photographed by S. B. Detwiler.) B. Common locust on estate of Mrs. A. M. White, Cove Neck, Oyster Bay, Long Island. Note the buttressed base. This is the place chosen for the type locality of shipmast because the two kinds of locust are here found in very close proximity to each other. (Photographed by N. A. Butterfield.)



Common and shipmast locusts on estate adjacent to that of A. M. White, Great Neck, Long Island, N. Y. The common locust is in the foreground and the shipmast in the background. While the view of the latter is not especially good, the differences in general shape are evident. (Photographed by S. B. Detwiler.)



A, Bark from an old shipmast locust tree, showing characteristic thickness and grain; *B*, bark from common locust tree, showing presence of checks as in oak and elm.

not conspicuously longitudinal. Instead, there are numerous cross checks, which give the bark somewhat the appearance of that of an elm or an oak (pl. 4, *B*). This is also seen in the bark of the straight locust of the upper coves in the southern Appalachians near Asheville, N. C. (pl. 5).

Furthermore, the width of the bark ridges is greater in shipmast locust than in common locust trees of Long Island of the same diameter. In the former the width of the bark ridges increases gradually with the size (and age) of the tree, while in the common locust the bark segments of trees 50 to 100 years old are only slightly wider than those of younger trees, remaining about $1\frac{3}{4}$ inches wide. Table 1 shows these differences in trees selected at random and arranged according to diameter.

TABLE 1.—*Comparison of depth of furrow and length and width of bark segment in shipmast locust with those in common locust*

Kind of locust and location on Long Island	Diameter breast high	Depth of bark furrow	Length of bark segment	Width of bark segment
Shipmast locust:	<i>Inches</i>	<i>Inches</i>	<i>Inches</i>	<i>Inches</i>
Syosset.....	5.4	$\frac{1}{2}$	$5\frac{1}{2}$	1
	6.5	$\frac{1}{2}$	$5\frac{1}{2}$	$1\frac{1}{4}$
	6.7	$\frac{1}{2}$	$6\frac{1}{4}$	$1\frac{1}{2}$
	8.0	$\frac{1}{2}$	6	$1\frac{1}{4}$
	8.0	$\frac{3}{4}$	7	$1\frac{1}{2}$
	9.4	$\frac{3}{4}$	7	$1\frac{3}{4}$
	9.8	$1\frac{1}{2}$	12	$2\frac{1}{2}$
	13.7	$1\frac{3}{4}$	15	$2\frac{1}{2}$
	13.7	$1\frac{1}{2}$	15	$2\frac{1}{2}$
Oyster Bay.....	14.9	$1\frac{3}{4}$	12	$2\frac{1}{4}$
	16.2	$1\frac{3}{4}$	12	3
	23.9	$2\frac{1}{2}$	18	$3\frac{1}{4}$
	33.1	$2\frac{3}{4}$	18	$2\frac{3}{4}$
Common locust:				
Deer Park.....	6.0	$\frac{3}{8}$	$3\frac{3}{4}$	$1\frac{1}{8}$
Syosset.....	8.9	$\frac{3}{8}$	4	$1\frac{1}{2}$
Deer Park.....	12.1	$\frac{3}{4}$	8	$1\frac{3}{4}$
	14.3	$\frac{7}{8}$	10	$1\frac{3}{4}$
Syosset.....	15.6	1	8	$1\frac{7}{8}$
	16.4	1	10	2
Deer Park.....	19.1	$1\frac{1}{2}$	8	$1\frac{3}{4}$
Syosset.....	23.1	$1\frac{1}{2}$	13	2
	25.3	$1\frac{1}{2}$	7	$1\frac{3}{4}$

It is seen that common locust trees about 2 feet in diameter have bark no more deeply furrowed than shipmast trees only about half as large. This is hardly attributable to site, because the identical differences can be seen in trees of the two kinds where both shipmast and common locusts are intermingled in the same row.

While the bark differences are not well marked in young trees, in older trees this is one of the distinguishing characters between the two types. It is very frequently the case, as in this instance, that closely related varieties and even closely related species are difficult to distinguish with absolute certainty when young.

WOOD

COLOR

As previously stated, on Long Island the shipmast locust is commonly called yellow locust, with reference to the color of the heartwood, to distinguish it from the common or "white" locust. When the trees are young, or if the wood has not been well seasoned, there

may be little or no difference between the color of the two woods, but in old, seasoned heartwood there is a distinct difference; in shipmast locust the color is a deep, rich, reddish-brown, while that of the common locust is generally somewhat lighter, ranging from light cream to light brown.

PHYSICAL STRUCTURE

Samples of shipmast wood were submitted to G. A. Garratt, of Yale University, who reported that he was "unable to find any differences in wood structure from that of the other black locusts
* * * available."

DURABILITY AND VALUE FOR POSTS

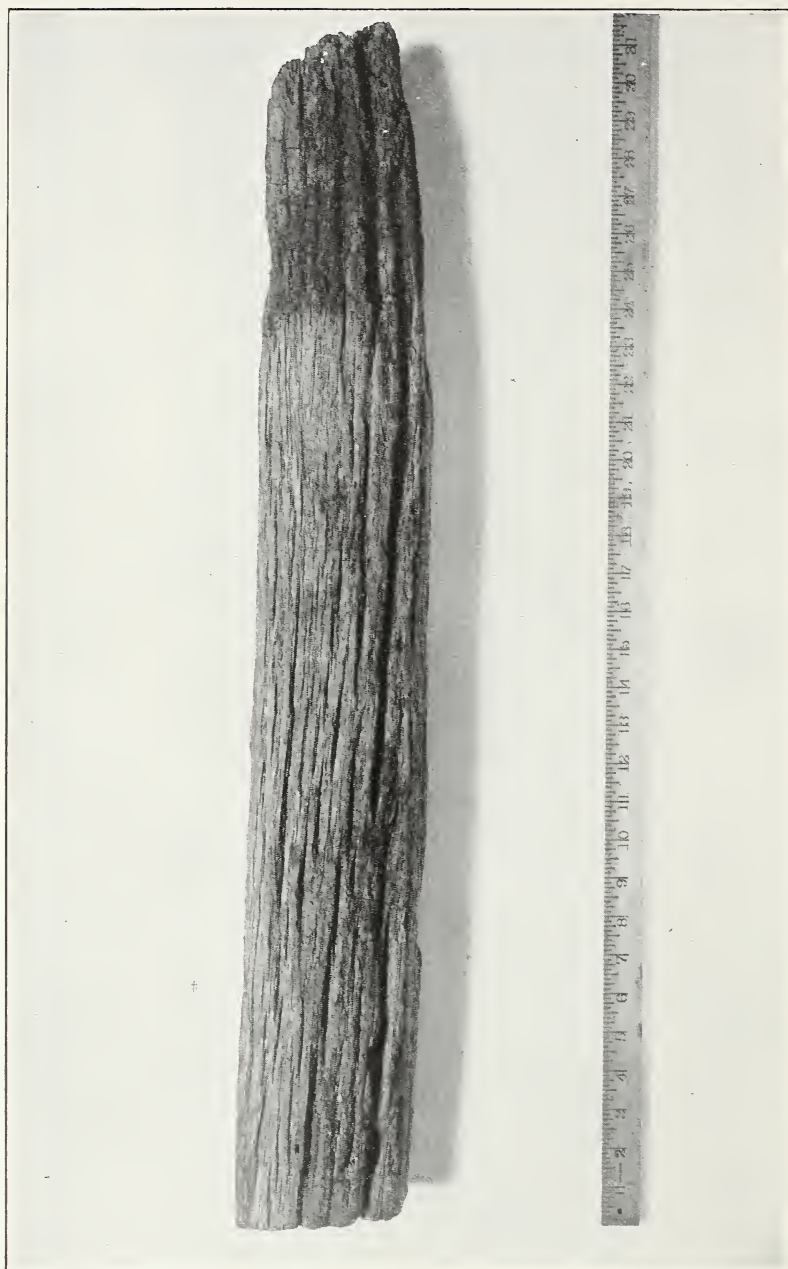
The shipmast locust seems to be especially suited for the uses to which wood of the common or black locust is ordinarily put, not only because of the long, straight boles, which make more and better-shaped posts than the shorter and more twisted trunks of the common locust, but also because of its greater durability when in contact with the soil.

Throughout Long Island the opinion is current that fence posts of shipmast locust are much more durable than those of the common locust, and an investigation of many fences and records bears this out. Near Westbury a fence with shipmast locust posts that are reported to have been set in the ground about 1807 on the farm of Isaac Hicks was removed in 1932 and the posts were found to be in fairly good condition (pl. 6). This record is authenticated by Henry Hicks, of Westbury, grandson of the original owner of the farm. Many fence posts that are reported to have been set for 50 to 75 years were found in a fine state of preservation. On the farm of J. W. Jackson, near Jericho, is a fence whose shipmast locust posts have been in the ground since about 1855 and are still in very good condition after nearly 80 years. While this was the oldest fence made from shipmast locust posts that was found in good condition, a more extensive search would probably result in locating others equally old and well preserved. Since many of the old farms and estates on Long Island have remained in the same family for 100 to 200 years, records here are more easily authenticated than in many other sections of the country.

Common locust posts are much less durable. On Long Island no records of such posts that had lasted more than 30 years were found. Here they are generally said to last for about the same length of time as white oak or chestnut posts. C. P. Earling, a surveyor at Huntington, Long Island, says that shipmast locust surveyors' stakes (1.5 inches square) will last for 25 years, while common locust stakes of the same size last only 15 years. The durability of a post depends upon so many factors that it is possible for a shipmast locust post, cut and placed under poor conditions, to be outlived by a common locust post cut and placed under very good conditions. Despite such variations, it appears to be a fairly well established fact that the shipmast locust on Long Island has lasted in the soil 50 to 100 percent longer than the common locust. Common locust posts are sometimes sold as shipmast locust posts by ignorant or unscrupulous dealers; but, in spite of this, the shipmast locust posts have a far better



Bark from locust tree in the upper coves of the southern Appalachians, near Asheville, N. C. This tree grows very straight in the forest, but otherwise does not resemble shipmast. Note the very different bark with the prominent cross checks.



Shipmast locust post from farm near Westbury, Long Island, N. Y. This post is reported to have been in the ground about 125 years. The specimen is about 31½ inches long.

reputation for durability and longevity than the common locust posts.

It must be borne in mind that shipmast posts are here being compared with the common locust of the same section and grown under the same climatic conditions. It is very possible (and records from other parts of the country so indicate) that common locust posts grown under different conditions might be better than the common locust of Long Island and vicinity. In Virginia and Tennessee locust posts have durability records that are better than those of the common locust on Long Island but not equal to those of the shipmast. For a true comparison, however, the posts of various origins should be placed in the same soil and under the same climatic conditions—a study that up to the present has not been made.

GROWTH RATE

A limited number of measurements, both on Long Island and in New Jersey, indicate that on an average site the shipmast locust may be expected to reach a breast-high diameter of about 2 inches at the end of 5 years, 4 inches at the end of 10 years, 7 inches at the end of 20 years, 9 inches at the end of 40 years, and 14 inches at the end of 80 years. Under exceptionally favorable conditions, however, the shipmast locust has been known to reach a breast-high diameter of 21 inches in 50 years, and the oldest trees on Long Island (about 250 years old) have a breast-high diameter of about 4 feet.

As to growth in height, no accurate measurements have been made, but at Northport, Long Island, is a grove of trees (pl. 1, A) that, according to all estimates, are from 90 up to slightly more than 100 feet tall. Estimates from various groves whose age is only approximately known indicate that under medium growth conditions the shipmast locust will average 2 feet annual increase in height for the first 20 to 30 years, ultimately attaining a height of 75 to 100 feet. The common locust, on the other hand, seldom grows as high as 75 feet on Long Island.

RESISTANCE TO INSECTS

Preliminary examinations by the Bureau of Entomology and Plant Quarantine, United States Department of Agriculture, tend to show that the shipmast locust may be more resistant to the attacks of the locust borer (*Cyrtene robiniae* Forst.) than the common locust. Few trees of the shipmast locust seem to be broken off, and the damage is mostly confined to the branches rather than to the main stem. There is apparently no difference in the damage done to the two locusts by the locust leaf miner (*Chalepus dorsalis* Thunb.). It is a popular idea that the miner damage is more severe on shipmast locust, but the evidence suggests that this belief is due to the greater value set upon the shipmast locust by its owners, causing them to observe damage to these trees more closely than in the case of the less valued common locust trees. Also, since shipmast locust is the common shade tree around houses, any damage to these trees is a matter of especial concern.

FLOWERS AND FRUITS

The flowers of the shipmast locust are produced less abundantly than those of the common locust, although there is no difference in

the time of anthesis. While individual flowers of the two kinds are much alike, the calyx of the common locust flower is inclined to be more pubescent than that of the shipmast locust, which is frequently almost glabrous. More important still, the calyx of the common locust flower is practically always reddish or reddish brown, while that of the shipmast locust is green or yellowish green with only occasionally a reddish tinge or blotch. The investigation disclosed no genuine shipmast locusts in which the calyx was red. On the other hand, locust trees growing at high elevations in the southern Appalachians have been noted with calyces only very slightly reddish.

Seed pods (i. e., fruits) are extremely seldom found on the shipmast trees and if present at all occur so sparingly that they are very difficult to find. This contrasts markedly with the common locust, which is an early and prolific seed bearer. Since locust pods generally remain over winter on the trees, this constitutes one of the easiest and most certain ways to distinguish the two kinds of locust in fruitful years. Owing to this scarcity or absence of seeds, the shipmast locust is propagated only vegetatively, by means of root cuttings and sprouts. The absence of pods on the shipmast locust trees is due to several factors: (1) Fewer flowers are borne, as already stated; and (2) the flowers that are produced abscise very readily and soon drop off. After the flowers of the common locust have been spent, the floral envelopes (notably the corolla) fall off, but the pistil remains and develops. Search the shipmast trees as one will, however, where there have been racemes only a few days before, there is no sign of pistils or developing ovaries. Furthermore, the pollen grains of the shipmast locust are mostly aborted and fail to germinate. When examined under the microscope, only about 55 percent of the pollen grains looked normal as compared with 90 to 95 percent of the pollen grains of the common locust, the remainder appearing transparent, shriveled, or undersized.

When pollen collected from a group of trees in 1934 was germinated on a solution consisting of 1 g of agar-agar, 15 g of sucrose, and 100 cc of distilled water, about 75 percent of the common locust pollen germinated "with fine long tubes", while only about 10 percent of the shipmast locust pollen germinated and the tubes were "much shorter."⁴ This suggests the possibility that the shipmast locust is a hybrid or a sterile clone, but the real nature of the plant remains to be settled by future studies. Chromosome counts, made either from pollen mother cells or from root tips, and hybridization studies should throw some light on this problem.

DISTRIBUTION

The members of the Society of Friends (Quakers) who settled on northwestern Long Island early recognized the value of the shipmast locust and propagated it extensively, with the result that in the time (about 235 years) since its introduction there it has been generally established throughout the northern and western portions of Long Island. Here also are the richer soils of the island. The

⁴ STOUT, A. B. REPORT ON POLLEN GERMINATION OF SHIPMAST AND COMMON LOCUST AS CARRIED OUT BY LEO LE VANN AT THE NEW YORK BOTANICAL GARDEN, JUNE 4, 1934. (Unpublished.)

shipmast locust does not occur, at least in any quantity, east of a line drawn through Middle Island. Also, it may be noted that the shipmast locust is always closely associated with plantations, since it does not propagate from seed. Outside of Long Island this variety of locust was found near Pawling, N. Y.; near Sagamore and Sandwich, Mass.; and in the vicinity of Moorestown, Mercerville, and Shrewsbury, N. J. Since all of these places were settled by Friends, the shipmast locust was presumably carried there by them. It was also found in various older settlements in the vicinity of New York City (e. g., Rye, N. Y.) and Moorestown, N. J., but it has not been observed south of Philadelphia, along the Tidewater country in Virginia, nor in the mountain sections of Virginia, the Carolinas, Tennessee, or West Virginia.

The common locust is scattered here and there along with the shipmast locust in the northern and western portions of Long Island, but it does not seem to have been much planted. Instead, it is more likely to be found among the native growth in woods and thickets. Occasionally it is found along roadsides in groups of 2 or 3 trees, and in the eastern part of the island similar small clusters or isolated trees are found near homes and farm sites. It is impossible to tell whether these trees were planted there or whether, once they were established, they were permitted and encouraged; but there is seldom the evidence of serious planting that one sees in the case of the shipmast locust.

The common locust, however, was not native to the island. While the Friends seem to have recognized very early the superior merits of the shipmast locust, this does not hold true for all the residents of the island. It is the opinion of some that common locust seed was brought in accidentally and then spread naturally over the island, while others hold that the common locust was brought in by growers who wished to plant from seed—a matter impossible in the case of the shipmast locust—and who did not know that there were two distinct plants differing in durability and general merit.

VARIETAL NAME AND TECHNICAL DESCRIPTION

Since this variety of *Robinia pseudoacacia* is unique and has not been hitherto described, and since such varieties are entitled to a distinct varietal name regardless of their origin, it is hereby proposed that this variety be known as *Robinia pseudoacacia* var. *rectissima*. The diagnostic varietal characters are as follows:

Robinia pseudoacacia var. *rectissima*, nov. var.

Arbor usque ad altitudinem 100 pedum; caulis rectissimus excurrens, columnaris, basi haud latiore, cortex arborum veterum crassissimus, vix tessellatus, lineis transversis paucis; lignum durissimum; foliae et flores ut in *Robinia pseudoacacia*, racemis paucioribus, calyce minus pubescente, flavido-viride; ovarium sterile deciduum.⁵

Type locality.—Estate of Mrs. A. M. White, Cove Neck, Oyster Bay, Long Island, N. Y.

⁵ Tree growing up to 100 feet high; stem excurrent, very straight, columnar, scarcely or not at all spreading at the base; bark of old trees very thick, not much checked, transverse lines few; wood very hard and durable; leaves and flowers as in *R. pseudoacacia*, racemes fewer, calyx less pubescent, yellowish green; ovary sterile, deciduous.

SUMMARY

The shipmast locust of Long Island, N. Y., is described and compared with the common black locust, from which it differs in several respects. The shipmast locust has a more erect stem with less spread at the base, a narrower crown, thicker bark with deeper furrows, more durable wood, and fewer flowers with greener calyxes than has the common locust of the locality. Furthermore, most of the pollen grains fail to germinate in media that favor the germination of the pollen of common locust, and the pistils soon abscise and do not develop. The result is that the shipmast locust trees, unlike those of common locust, very seldom if ever bear pods and seed; the trees must, therefore, be propagated vegetatively by sprouts or root cuttings.

Because of these characters this tree is considered to be a distinct variety. It is described and given the name *Robinia pseudoacacia* var. *rectissima*.

