STRAINS OF BLACK LOCUST RESISTANT TO BORER

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This report concerns work on a project that goes back about 14 years. It is part of the work that Dr. Henry Hopp was doing with black locust strains. Some of the information presented here regarding the origin of these strains was supplied by Dr. Steiner of the Soil Conservation Service at Beltsville, Maryland.

The black lopust selection program was very active in the thirties with the cooperation obtained from CCC and WPA programs. Extensive scouting disclosed many forms of black locust. About 1940 a test planting was set out on the SCS nursery at Zanesville, Ohio. This is now a State nursery of the Ohio Department of Natural Resources, Division of Forestry. The planting, as seen in the table presented here, contains ten strain selections plus the stock being grown in the nursery at the time. The latter is intended to serve as a check.

The number designated in table I, should be translated to common terms of reference or to source before going on to describe performance or make comparisons. Strain HC-4O22 is the shipmast locust. Strain HC-4051 is a Bryantsburg selection from Southern Indiana, collected by Hopp and designated by him as "Indiana 1-13". Strain HC-4176 is another Bryantsburg selection by Ralph Hall.

The information sought from this test planting was the relationship of survival of the trees in terms of both site and locust borer activity. On first examination it seemed that the borers had not been present in sufficient numbers to give a good measure of the resistance of these trees. This was deduced from the low incidence of externally visible borer damage such as swellings, crooks, borer Tholes, and frass ejections. However, the small diameter of some of the trees suggests that they may have been derived from sprouts of the original trees whose aerial portion was destroyed by the borer. Increment cores should help to clarify this point.

The most interesting part of the data presented concerns tree survival and diameter. Strain HC-4051 shows the highest survival (93 percent) with a second highest average diameter of 5.5 inches. The production stock shows only 47 percent survival but the highest average diameter (6.0 inches). (Two unusually large trees raise the average diameter from 5.0 to 6.0). From the data obtained from this planting it is obvious that Strain HC-4051 has been outstanding in growth rate, form and borer resistance in this small planting at Zanesville, Ohio, over a 14 year period. Its performance in other locations in larger plantings should be tested.

TABLE 1

BLACK LOCUST SELECTION PLANTING, ZANESVILLE NURSERY 1/

Selection number	Estimate of trees planted	Surviving trees		Average diameter
	Number	Number	Percent	Inches
Production stock (check)	30	14	47	6.0
HC-4230	30	14	47	5.5
HC-4022	30	13	43	3.1
HC-4185	25	8	32	5.0
HC-4027	27	11	41	2.9
HC-4051	30	28	93	5.5
HC-4010	30	12	40	4.0
HC-4183 (OP-15278)	30	14	47	2.5
HC-4183 (OP-15297)	29	19	66	3.5
HC-4183 (OP-15298)	29	24	86	3.8
HC-4176	30	19	63	4.3

1/ Planted about 1940 by Soil Conservation Service in a search for fast growing, straight-stemmed, borer-resistant black locust. Data compiled by the Division of Forest Insect Research, Central States Forest Experiment Station, Columbus, Ohio.

DISCUSSION

Bond What is shipmast locust? It seems to have disappeared; now it has reappeared.

Wollerman I don't know anything about the appearance or disappearance of it but I know of two plantings, one at Zanesville, Ohio, and one at Beltsville, with Hill Culture serial numbers registered in Dr. Steiner's files as shiomast locust. In regard to distinguishing characteristics, there is a Technical Bulletin No. 742 on the subject issued by the U.S. Department of Agriculture and written by Henry Hopp.

Littlefield I believe the shipmast locust is recognized as a definite botanical variety. Didn't somebody publish a monograph on this?

Wollerman The U. S. impartment of Agriculture Circular No. 379 by Oran Raber entitled, "Shipmast Locust, a valuable undescribed species of Robinia pseudoacacia", appeared in 1936. Raber found this locust on Long Island where it had been introduced over two centuries ago.

Schreiner The shipmast is apparently a single clone that was propagated from root suckers since itsintroduction on Sands Point, Long Island.

Littlefield Locust stands which appear to be genuine shipmast may still be found in the Glen Cove area and in fact, eastward to about the middle of the Island. These are straight-stemmed, relatively borer-free and sterile (I believe sterility is one of the diagnostic features of shipmast). When you get down to the east end of the Island the locust is exceptionally poor; scrubby, crooked and as I recoliect it bearing abundant crops of seed. It is evident that this is of separate origin from the Glen Cove type.

Zabel I would like to add that the shipmast locust now under discussion is a particularly decay-resistant strain of black locust.

Hansbrough Is there any evidence of resistance to borer?

Wollerman We haven't made comparisons with a designated standard of per formance. In general, the shipmast locust seemed to suffer greater injury from borers than did some varieties, such as the Bryantsburg strain, in the Zanesville and Beltsville plots. The shipmast locust seems to fare better on Long Island. Part of our investigation is concerned with performance of any one strain on different sites.

Hansbrough Under natural conditions how much resistance to borer is there?

Wollerman From the literature, the reports of the Central States program of 1930-1940, discussion with men who have worked on the problem and my own limited observations, I feel that good site conditions are as important as the genetic potential for borer resistance. When vigorously growing borer-free trees were found and, propagated, the resulting trees grown in another location did not show borer resistance. It is difficult to say how much resistance to borer exists naturally. In the Indiana, Ohio and Maryland plots, the Bryantsburg strain does show resistance to the borer.

Littlefield (Not recorded. Question on effect of soil on resist-ance. Ed.)

Wollerman The relation of soil to borer resistance, from my observations, is a minor one. Well aerated soil with good drainage, adequate mineral supply and sufficient rainfall produces vigorously growing locust on the strip mine spoils banks in Ohio. These trees are infested with borer. By contrast, in old fields a hundred yards away the trees grow much more slowly in the compact soil but they are also infested with borer.

Stone In New York, locust has been much more successful in the limestone area than elsewhere in the Stte. This is not simply a matter of soil reaction, however, and attempts to correlate growth and soil pH have not been very successful. Locust is sensitive to mineral nutrient supplies, as numerous reports of fertilizer response demonstrate. Observations here as elsewhere, also point to the necessity of open, well-drained subsoils for successful development. Soils with such properties are more widespread and

their fertility status generally higher, in the high lime region of the State than in the southern plateau where locust has so often failed. Locust will grow slowly or fail on poorly-drained soils, whether acid or calcareous, and it usually grows at least moderately well on well-drained soils with friable subsoils, provided they are not extremely acid or infertile. Any attempt to evaluate soil as a factor in growth rate or ability to withstand borer attack must consider fertility, and subsoil permeability and drainage in addition to soil reaction.