CAGE STUDIES OF WHITE PINE WEEVIL RESISTANCE WITH POTTED EASTERN WHITE PINE

D. P. Connola[1]

The studies reported here mark the completion of a 3-year test period, 1964 through 1966, with potted eastern white pine. The trees were 4 to 6 feet tall and were placed in four 24' X 24' X 8' cages and exposed to weevil attack at the Saratoga Tree Nursery in New York. These were wild non-weeviled seedlings with naturally regenerated parentage and were dug from open fields in the spring of 1964 from two sources in New York; the Oneonta area, a heavily weeviled area in the southern tier, and the Warrensburg area, a sparcely weeviled area in the Adirondack Mountains. The areas are 150 miles apart. The tree arrangement in the cages was such that there were 32 trees placed 4 feet apart in rows in each cage. The trees were numbered consecutively, The odd numbered trees were from Warrensburg and the even numbered from Oneonta. The number 32 was selected for statistical purposes. Although the source of the trees in relation to weevil resistance was considered the paramount factor in the study, height of trees, diameter of leaders, length of leaders and water balance in the plants were also studied in relation to weeviling. Half of the trees from each source were kept water-deficient.

In 1964, 160 weevils collected from an area geographically midway between Oneonta and Warrensburg were liberated in each cage with the trees early in May, Results of those tests showed that 50 percent of the trees in the four cages became weeviled. Of the weeviled trees, 80 percent were from the Oneonta source. Also, daily weevil counts on the trees during the period of weevil attack showed that 80 percent of the weevils were found on the Oneonta trees. The data also showed more weeviling among trees from both sources which were kept water-deficient. Data analyzed for common dimensions in leader diameter, leader length and tree height also showed more weeviling among the Oneonta trees.

Non-weeviled trees remaining from the experiment were kept in reserve for further testing. The weeviled trees were planted, bare rooted, in a field row at the Saratoga Nursery for observation on growth and natural weeviling.

The 1965 cage experiment, with unused reserved stock trees from the same sources, was a failure because of DDT contamination. However, it provided an opportunity to make a more detailed study of growth on the trees. Results of those studies showed that there was twice as much lateral elongation and three times as much terminal elongation on the Oneonta trees as compared to the Warrensburg trees.

The trees were later outplanted in a field at the Saratoga Nursery for further observations on growth and weeviling. Their original positions as in the cages were kept as much as possible in the outplanting.

In 1966 the trees which escaped weeviling in the 1964 tests were rerun. The plants by then had a chance to establish themselves in their 5-gallon pail pots and were making better growth. There were sufficient trees to make one cage test of Oneonta versus Warrensburg trees. Another cage was made up entirely of Warrensburg trees, Since these trees were the survivors of one cage test, it was felt that more weevils would have to be used in order to obtain a good test. Therefore, 260 weevils were put in each cage in May of 1966. Results of tests at the end of the season showed that in the cage containing Oneonta versus Warrensburg trees, there were twice as many weevils counted during the period of weevil attack on the Oneonta trees as were counted on the Warrensburg trees, but only 2 trees or 6 percent of the trees became weeviled. Both were Oneonta trees. This compares with the 50 percent weeviling in the 1964 tests. In the cage containing only Warrensburg trees there

[1]Sr. Scientist, Entomology, New York State Museum & Science Service.

was no weeviling. Also, the weevil count in that cage was less than half that of the other cage. Apparently the weevils did not frequent the Warrensburg trees so well. Source of the weevils was the same as in previous tests.

Growth of the trees followed the same pattern as was noted in 1965. There was about 25 percent more elongation of terminals and laterals on the Oneonta trees as compared to the Warrensburg trees. The 1964 weeviled trees which were outplanted with bare roots in a field row showed almost twice as much growth among the Oneonta trees as compared to the Warrensburg trees. All live trees remaining from the 1966 series of cage tests are being outplanted at the Saratoga Tree Nursery for further observations on growth and weeviling.