SURVIVAL OF HYBRID POPLAR AT CAMP EDWARDS, CAPE COD, MA

by Maurice E. Demeritt, Jr.,
Research Plant Geneticist,
Northeastern Forest Experiment Station,
Durham, NH 03824

ABSTRACT.--There were significant differences in survival among 11 hybrid poplar clones planted at Camp Edwards, Cape Cod, MA, after 2 years. The best survivor, clone NE-388 at 33.75 percent, barely reached the lower limit of stocking necessary for revegetation purposes. Hybrid poplar have difficulty growing on this coarse, harsh site.

INTRODUCTION

Hybrid poplars got their start in the Northeastern United States in 1925 when a hybridization study was instituted in Populus for increased pulpwood production (Stout and Schreiner 1933; Stout et al. 1927). Distribution of the poplars obtained from the study was mainly limited to the Northeast Region until "Hybrid Poplars Make News" was published in the Farm Journal in October 1954 (p. 76-78). Cuttings were sent to 3,469 of the more than 7,000 individuals who responded to the article (Schreiner 1975).

Since 1954, hybrid poplars have been planted on a variety of sites; there have been many reports of successes in the literature, but there have also been a number of failures. Most researchers agree that hybrid poplars grow best on well-drained soils free of plant competition where the high water table is at least 1 m below the surface and where there are no root-growth obstructions above this depth (Demeritt 1983; Dickmann and Stuart 1983).

In 1982, the USDA Forest Service was contacted by Massachusetts forestry officials about the possibility of initiating species demonstration plantings at Camp Edwards, Cape Cod. The Massachusetts Army National Guard, which manages the military base, was interested in the possibility of using abandoned and other base land to grow wood for energy to help reduce the base's dependence on coal to fire its heating system.

One tree of interest was hybrid poplar, which has been advertised in numerous periodicals as the salvation to the nation's dependence on imported oil. A study was established in the spring of 1982 to see if hybrid poplar could survive and grow on the base's well-drained, barren sites.

METHODS AND MATERIALS

During the spring of 1982, 11 hybrid poplar clones were planted. These are the clones most often sold and planted in the Northeastern United States. The planting site was once covered with buildings, but these were removed and the area filled with gravel and graded. The site is characterized as well drained with little topsoil and was predominantly free of competing vegetation. I decided to use both 10- and. 20-inch cuttings to see if cutting length affected clone survival. The experimental design was four blocks of each of the 11 clones. Each clone was represented by 50 cuttings of each of two cutting lengths (10- and 20-inch) in each block. Each set of 50 cuttings was planted in three rows of 16 or 17 cuttings with 6 feet between rows and between cuttings within rows.

During May of 1984, after two complete seasons in the ground, numbers of cuttings that leafed out were counted. Differences in survival among clones was tested for significance by analysis of variance with plot mean data transformed to square roots.

RESULTS AND DISCUSSION

There were significant differences in survival at the 5-percent level among clones (Table 1). I suspected that the moisture in the surface layers might be limited and thus reduce rooting of short cuttings. However, there were no significant differences in survival between cutting lengths or among blocks. Survival ranged from 33.75 percent for NE-388 to 4.50 percent for Cornwall.

Table 1.--Two-year survival, in percent, of hybrid poplar clones grown at Camp Edwards, Massachusetts

Description	Parentage	Survival
NE-388	P. maximowiczii x P. trichocarpa	33.75 a[1]
NE-41	P. maximowiczii x P. trichocarpa	30.00 b
Tamaque	Unknown	28.25 c
NE-51	P. maximowiczii x P. nigra 'Plantierensis'	28.25 c
DN-34	P. x Euramericana cv 'Eugene'[1]	28.25 c
1-45/51	P. x Euramericana	28.25 c
Ravendeau	P. x Euramericana	27.75 c
NE-359	P. deltoides x P. nigra 'Caudina'	26.25 d
NE-308	P. nigra 'Charkowiensis' x P. nigra 'Incrassata'	13.50 e
NE-19	P. nigra 'Charkowiensis' x P. nigra 'Caudina'	12.50 f
Cornwall	Unknown	4.50 g

[1] Percentages followed by the same letter are not significantly different at the .05 probability level using Duncan's New Multiple Range Test.

Clones with significantly different survival levels are tabulated in Table 1. First, clones NE-388 and NE-41 are full sib clones, but are significantly different. Clones Tamaque, NE-51, DN-34, 1-45/51, and Ravendeau, to the best of my knowledge, are not related, yet are not significantly different. Clones NE-308 and NE-19 are half sibs and are significantly different. I do not believe that conclusions can be drawn about the relationships between parentage and survival on this harsh site. However, the data suggest considerable natural variability and consistent performance ranking of sibs. It can be concluded that for these 11 clones, Clones NE-388 and NE-41 had the best survival after two seasons. Even for Clone NE-388, survival extrapolated to a per-acre basis would be only 408 of 1,210 cuttings. One may question whether this would constitute adequate stocking of the area. I believe that this may be the lower limit of acceptable stocking for volume production for this type of site. The top eight clones are recommended for erosion control because they have adequate survival for that purpose.

LITERATURE CITED

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