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## RESULTS OF ASPEN SCREENING TESTS.

II. SEED SOURCES OF EUROPEAN ASPEN (Populus tremula Linnaeus)S. S. Pauley, A. G. Johnson and F. S. Santamour, Jr.<sup>1/</sup>

During the period 1951-54, under sponsorship of the Maria Moors Cabot Foundation for Botanical Research of Harvard University, unreplicated outplantings were established near the village of Weston, Middlesex County, Massachusetts with the objective of screening various seed sources and hybrids of native and exotic aspens of possible usefulness in further tree improvement studies. Results of similar quaking aspen seed source screening tests were reported in Minnesota Forestry Notes No. 136.<sup>2/</sup>

The present report is concerned with the performance of 12 seed sources of European aspen collected by cooperating individuals in northern and central Europe and Italy (Table). The methods of collection, propagation, and outplanting in Plantation VIII were the same as those previously described for quaking aspen.<sup>2/</sup>

Reaction of the five high latitude (ca. 55° to 60°) P. tremula sources to the eastern Massachusetts test site (Lat. 42° 22'N.) was similar to that of the high latitude and high altitude sources of P. tremuloides previously reported.<sup>2/</sup> Although average height at three years of age was less than one foot, survival was relatively high (74%). But after 11 growing seasons only one plant, 12 ft. in height, had survived.

Performance of the mid-latitude sources of European aspen, from the latitudinal band ca. 51° to 54°, is comparable in a remarkable degree to the Northeast and Lake States sources of quaking aspen.<sup>2/</sup>

The Italian sources were unfortunately limited to only two localities and very few plants: a Cuneo source acquired in 1951 (Lat. 40° 25', elev. 3950 ft.); and a Torino source collected in 1952 (Lat. 45° 10', elev. 4300 ft.). The 1954 survival of both sources was high but by 1962 survival had markedly decreased in both sources. The surviving plants of the Cuneo source are, however, particularly vigorous and healthy.

The question of survival per se is evidently a highly complex matter involving numerous, if not all, interactions of a particular genotype with its environment. But in such intolerant plants as the aspens survival appears to be primarily associated with the rate of height growth. If for any reason, chiefly genetic or chiefly environmental, marked reduction in height growth does occur, the weakened plants are subsequently subjected to an array of parasites that still further hasten their decline.

The consistently poor survival and height growth of such short growing season sources as the high latitude European aspen and quaking aspen, and the high elevation Rocky Mt. sources of quaking aspen, may reasonably be attributed in large part to their unfavorable growth response under the day-length regime prevailing at the comparatively low latitude and long growing season of the test site. Such reactions have been previously reported for European aspen by Sylvén<sup>3/</sup> and Johnsson<sup>4/</sup> and for other Populus species.<sup>5,6/</sup>

1/ Respectively, Professor, School of Forestry, Univ. of Minn.; Assoc. Scientist, Hort. Dept., Univ. of Minn.; Geneticist, Northeastern For. Exp. Sta., U.S. Forest Service.

2/ Pauley, S.S., A.G. Johnson and F.S. Santamour, Jr. 1963. Minn. For. Notes No. 136.

3/ Sylvén, N. 1940. Svensk Papp-Tidn. 43 (17): 317-324; (18): 332-342; (19): 350-351.

4/ Johnsson, H. 1956. Z. Forstgen. Forstpflanzenz. 5: 156-160.

5/ Hoffmann, D. 1953. Z. Forstgen. Forstpflanzenz. 2: 45-47.

6/ Pauley, S. S. and T. O. Perry. 1954. Jour. Arn. Arboretum 35: 167-188.

The results suggest that high latitude sources of European aspen hold little promise for planting in the Northeast or Lake States. On the other hand, central and southern European sources are promising and should be sampled more thoroughly.

TABLE

*P. tremula* seed sources.

(Survival and average height classified by geographic area of source and year of accession.)

| Source <sup>1/</sup>                                | Acc. Year | No. Sources | No. Plants | Survival (%) - Av. Ht. (Ft.) |     |      |       |
|---|-----------|-------------|------------|------------------------------|-----|------|-------|
|   |           |             |            | 1954                         |     | 1962 |       |
|   |           |             |            | %                            | Ft. | %    | Ft.   |
| (A) NORTHERN EUROPE<br>(Den., Nor.,<br>Swed., Fin.) | 1952      | 5           | 19         | 74                           | 0.9 | 15   | 12.0* |
| (B) CENTRAL EUROPE<br>(Neth., Pol.,<br>Ger.)        | 1952      | 5           | 36         | 100                          | 2.8 | 22   | 23.0  |
| (C) ITALY   | 1951      | 1           | 12         | 92                           | 6.8 | 25   | 22.0  |
|   | 1952      | 1           | 17         | 83                           | 2.7 | 12   | 7.0   |

<sup>1/</sup> Latitude and elevation limits of the source areas follow:

- (A) Lat. 55-00 to 60-15; Elev. 200 - 500 Ft.
- (B) Lat. 51-26 to 54-00; Elev. 35 - 1150 Ft.
- (C) Lat. 40-25 to 45-10; Elev. 3950 - 4300 Ft.

\* One surviving plant.