## (IV)

## CLONAL TRIAL ON *POPULUS DELTOIDES* IN TARAI REGION OF UTTARANCHAL

*Populus deltoides* has recently gained considerable importance in Agro-forestry plantations of Western Uttar Pradesh, Uttaranchal, Haryana, Punjab and Jammu & Kashmir, mainly due to its deciduous nature, quick growing habit, easy workability, clonal propagation by cuttings and industrial requirements. The species prefers fertile, deep, well-drained soil and sub-tropical to temperate climate. In India some poplars are indigenous to Himalayas but poplars being cultivated in foothills of Himalayas and Indo-Gangetic plains are exotic ones. Clones of *P. deltoides* which initially gained commercial importance in India were developed in Australia. In India, commercial cultivation of poplars under Agro-forestry system of farming started during 1984.

Jha *et al.* (1993) reported performance of exotic poplars in Tarai. They recorded G3, G48 and D121 as established clones for Tarai region. Out of 60 clones, they observed, D66, D75, S7C1, S7C8, S7C20, 69/55 and 2502 as promising clones for Tarai and concluded that overall performance of Italian, Australian, Dutch and German clones was inferior than American clones. From intercropping point of view and pulp wood production, they advocated rotation of 6 to 8 years for cultivation of poplars. Chandra and Joshi (1994) reported performance of 32 exotic Poplar clones in Tarai of Uttar Pradesh. They found the clone S7C4 performed better than commercial clone G3 (control). On the basis of results it was concluded that 6 clones namely S7C4, S7C8, S7C15, S7C20, G3 and G48 be multiplied in commercial nurseries instead of mass propagation of only clone G3, which was becoming prone to leaf blight caused by *Bipolaris maydis*. Sidhu *et al.* (1980) were of the opinion that non-availability of suitable clones for different sites and for different land use needs immediate attention of researchers. Barfal (1999) was of the opinion that clones lose vigour and resistance to pests and diseases by progressive multiplication, therefore it is necessary to evolve new clones. Based on the trial of 30 clones of L-series (Lalkuan), it was reported that productivity of new clones is much higher than traditional clones. Sharma (1999) concluded that clones G3, G48, D66, D67, D121 and S7C8 are largely being planted on commercial scale under Agroforestry and five new clones Kranti, Udai, L-82, L-83 and L-84 are significantly important for production. Rawat *et al.* (1999) tried 20 clones and found clone S7C15 and T-6(91) as better growing clones.

A clonal trial of 17 exotic clones of poplars was planted during March, 1987 with 4 replications in plot no. 29 of Research & Development Farm, Chandain of WIMCO Seedlings Limited. Chandain farm is located at 28°N latitude and 200 m above mean sea level. It gets annual rainfall around 1500 mm with annual temperature

**Table 1**

*Growth performance of Poplar clones under study*

| Name of Clone | Initial | | Growth after 6 years | | Survival (%) | Days in Dormancy | Basal Area/ ha ($m^2$) | Vol. ($m^3$) | Vol. ($m^3$/ha) | MAI ($m^3$/ha) | Ht./Dia Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ht. (m) | Dia(cm) | Height (m) | Diameter(cm) | | | | | | | |
| St-70 | 4.7 | 2.8 | 22.9 (1.35) | 21.0 (1.30) | 93 | 78 | 20.12 | 0.296 | 172.3 | 28.7 | 109 |
| St-74 | 4.4 | 2.8 | 20.4 (0.53) | 19.6 (0.94) | 79 | 75 | 14.87 | 0.237 | 116.8 | 19.4 | 104 |
| St-109 | 4.9 | 2.7 | 21.0 (1.85) | 20.2 (1.46) | 50 | 111 | 9.99 | 0.256 | 79.9 | 13.3 | 103 |
| St-148 | 4.8 | 2.8 | 20.0 (1.24) | 19.4 (1.21) | 95 | 104 | 17.52 | 0.228 | 135.7 | 22.6 | 103 |
| St-171 | 4.3 | 2.3 | 20.9 (1.48) | 18.6 (1.67) | 64 | 96 | 10.86 | 0.221 | 88.4 | 14.7 | 112 |
| St-181 | 4.6 | 3.1 | 19.4 (1.05) | 20.0 (0.44) | 95 | 94 | 18.62 | 0.235 | 139.3 | 23.2 | 97 |
| 110128 | 4.8 | 2.7 | 21.5 (1.19) | 19.8 (0.45) | 91 | 90 | 17.48 | 0.252 | 143.5 | 23.9 | 108 |
| 110236 | 4.9 | 3.0 | 21.6 (1.46) | 20.3 (0.15) | 95 | 91 | 19.19 | 0.265 | 157.2 | 26.2 | 106 |
| 112910 | 4.9 | 2.8 | 24.2 (2.40) | 22.4 (2.98) | 82 | 93 | 20.17 | 0.350 | 179.5 | 29.9 | 108 |
| 6366 | 4.4 | 2.6 | 15.5 (0.73) | 14.1 (1.13) | 100 | 105 | 9.75 | 0.111 | 69.7 | 11.6 | 109 |
| 6402 | 5.4 | 3.6 | 18.1 (0.60) | 17.4 (1.04) | 95 | 112 | 14.10 | 0.174 | 103.6 | 17.2 | 104 |
| 4/68 | 4.9 | 3.0 | 19.4 (0.73) | 17.4 (1.53) | 98 | 114 | 14.55 | 0.185 | 113.3 | 18.8 | 111 |
| 19/66 | 5.0 | 3.2 | 22.2 (0.74) | 20.6 (1.48) | 98 | 101 | 20.39 | 0.283 | 173.3 | 28.8 | 107 |
| IC | 4.8 | 2.8 | 17.5 (1.40) | 18.0 (1.14) | 98 | 116 | 15.57 | 0.179 | 109.5 | 18.3 | 97 |
| I-18/62 | 5.2 | 3.0 | 22.7 (1.55) | 20.7 (1.17) | 78 | 91 | 16.38 | 0.286 | 139.7 | 23.2 | 109 |
| G3 | 4.6 | 2.4 | 19.9 (1.46) | 19.7 (1.26) | 80 | 87 | 15.24 | 0.234 | 117.0 | 19.5 | 101 |
| G48 | 5.6 | 3.0 | 21.9 (1.16) | 20.2 (0.48) | 82 | 78 | 16.40 | 0.266 | 136.2 | 22.7 | 108 |

ranging from 5°C to 38°C. Winter frost is quite common in the locality. 16 plants were planted per plot keeping distance 4m x 4m. Attempt was made to plant saplings of uniform size and all cultural operations were kept uniform.

Initial height and collar diameter were recorded immediately after planting. Annual observations for height and diameter growth were recorded for six years and mean for all 17 treatments along with survival percentage, number of days in dormancy are presented in Table 1. In this study clone G3 and G48 have been used as control. Observations recorded at the end of six years for height and diameter were put to statistical analysis and found significant among the treatments at 5% and 1% level of significance (C.D for plant height 2.5 m and for diameter 2.8 cm at 1%).

In case of height growth, clone 112910, St-70, I-18/82, 19/66 and G48 were recorded performing better than rest of the 12 clones. For diameter growth, 11 clones excluding St-148, St-171, IC, 6402, 4/68 and 6366 were at par. However, 4 clones namely 112910, St-70, I-18/62 and 19/66 registered better diameter growth.

From the Table 1 it is observed that clones St-109, St-148, 6366, 6402, 4/68, 19/66 and IC may suit temperate climate, because they have longer dormancy period. Clones St-70, St-74 and G48 have shorter dormancy period of 75-78 days and are suitable for warmer locations where sprouting in Poplar starts early in the season. Other clones namely St-171, St-181, 110128, 110236, 112910, I-18/62 and G3 are suitable for Tarai region where winter ends earlier than hills and is considerably late than plains. To consider volume production MAI/ha was taken as indicator and it was observed that clones St-70, St-148, St-181, 110128, 110236, 112910, 19/66 and I-18/62 are capable of producing higher volumes than control namely G3 and G48.

As such, it is concluded that following clones hold promise in agroforestry system of our country and can be planted commercially for timber production. They are clones St-70, St-148, St-181, 110128, 110236, 112910, 19/66 and I-18/62.

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