

**Research Note :**

MORPHOLOGICAL MARKERS FOR IDENTIFICATION OF *Populus deltoides* CLONES IN NURSERY

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Poplar (*Populus deltoides*) is a multiutility wood producing tree species and has been widely adopted under agro-forestry systems because of its fast growth, straight and clean bole and deciduous nature. Many genetically improved poplar clones have been developed for growing in North-Western part of India. However, there is problem to distinguish these clones phenotypically because of narrow genetic base of parents in breeding population and their multiplication. This problem of identification for purity of planting stock becomes more immense for a grower when he wishes to plant a specific clone. To overcome the problem an endeavour was taken to establish morphological marker for identification of ten widely grown clones of poplar.

Ten poplar clones namely G3, G48, S7C1, S7C4, S7C8, S7C20, L34, PP5, Fierelo and D121 were planted in nursery block of Agroforestry Research Centre, Govind Ballabh Pant University of Agriculture and Technology, Pantnagar, in a randomised block design with three replications. Each replication contained two row of each clone at 80 cm apart and each row had ten plants at 60cm distance. Observations were recorded for qualitative (leaf shape, leaf pigmentation, leaf serration, leaf tip type, ridge line, ridge shape) and quantitative (bud length, bud diameter, number of buds and internodal length) traits. Qualitative characters : leaf shape was recorded on the basis of curve in leaf lamina and attachment of petiole on scale 'A'-deep curve and 'B'-light curve. Leaf pigmentation was noted on scale 'A' (pigmentation on petiole and midrib), 'B' (pigmentation on petiole at the point of attachment of leaf lamina) and 'C'

(no pigmentation). Leaf serration studied on scale 'A' (full serration) and 'B' (partial serration). Leaf tip type was observed on scale 'A'-long tip and 'B'-small tip. Ridge line (bulging and length) was recorded on scale very prominent prominent and less prominent. Ridge shape on the stem was observed on scale 'A'-big ridge and 'B'-small ridge. Quantitative characters namely bud length (mm), bud diameter (mm), number of buds in one metre length at middle of stem and internodal length (cm) were recorded on five competitive plants in each replication and averaged.

Results on comparison of various morphological characters in ten prominent clones are presented in Table 1. Clone G3, S7C4, S7C8, L34 and D121 were showed similar kind of leaf shape 'B' while clones G48, S7C1, S7C20, PP5 and Fierelo showed 'A' type leaf shape. Clone S7C8 and G3 had type 'A' and 'B' pigmentation, respectively, other clones showed no pigmentation. All studied clones showed similar kind of leaf serration. A type of leaf tip was observed in clone G3, S7C4, S7C8, S7C20, L34 and PP5 while 'B' type leaf tip was found in G48, S7C1, Fierelo and D121. Bud length ranged from 3.12 mm (Fierelo) to 3.80 mm (S7C4) and bud diameter varied from 2.95 mm (G48) to 4.08 mm (G3). Maximum number of buds per metre stem length were observed in G48 and S7C20 while minimum buds were counted in D121. Similar fashion of ridge shape was observed in all the clones. Very prominent ridge was found in clone S7C4 while other clones have prominent ridge. Internodal length ranged from 3.38 cm in clone S7C1 to 4.25 cm in clone L34. Similarly Sidhu *et al.* (2) observed significant morphological differences for

Table 1: Morphological marker on the basis of leaf and stem characteristics of *Populus deltoides* in nursery.

Clone \ Traits	G3	G48	S7C1	S7C4	S7C8	S7C20	L34	PP5	Fierelo	D121
Leaf shape	B	A	A	B	B	A	B	A	A	B
Leaf pigmentation	B	C	C	C	A	C	C	C	B	C
Leaf serration	A	A	A	A	A	A	A	A	A	A
Leaf tip	A	B	B	A	A	A	A	A	B	B
Bud length (mm)	3.25	3.16	3.50	3.80	3.77	3.65	3.15	3.20	3.12	3.61
Bud diameter (mm)	4.08	2.91	3.85	3.95	4.06	4.05	3.50	3.45	3.38	3.94
No. of buds in 1 m stem at middle	21.40	22	21	23	20	22	21	18	20	17
Ridge shape	same	same	same	same	same	same	same	same	same	same
Ridge line	Prominent	Prominent	Very Prominent	Prominent	Prominent	Prominent	Prominent	Prominent	Prominent	Prominent
Internodal Length (cm)	3.75	4.20	3.38	3.89	4.02	3.80	4.25	3.80	3.81	3.50

intermodal length, branch angle, lenticels density length of ridges, leaf length and width and petiole length among seven clones. Genetic differences for leaf characteristics were also observed by Guzina (1). Morphological and phenological description of poplar clones based on 64 characters of young to adult tree was given by UPOV (3).

REFERENCES

- Guzina, V. (1998). Evaluation of genetic variability of poplars using polymorphism of isozymes and leaf size and shape parameters. *Topola*, **153-154**:35-40.
- Sidhu, D.S., Kaur, S. and Dhanda, R.S. (1999). Identification of *Populus deltoides* clones : Phenotypic variation in nursery. In National Seminar on Poplar, 25-27 Nov., FRI, Dehradun. P-34.
- UPOV (1981). Guidelines for the conduct of test for distinctness, homogeneity and stability in *Populus L.* *International Union for the Protection of New Varieties of Plants*. Geneva, Switzerland.