Indian J. Genet., **63**(3): 287 (2003)

Short Communication

Identification of poplar (*Populus deltoides* Bartr.) clones through leaf protein profiling

Lakshmi Chaudhary and Salil K. Tewari

Department of Genetics and Plant Breeding, GBPUA&T, Pantnagar 263 145

(Received: April 2003; Revised: August 2003; Accepted: August 2003)

Poplar (*Populus deltoides* Bartr.) is one of the most important agroforestry tree species. Many genetically improved poplar clones have been developed for northwestern regions of India. Clonal identification before planting the poplars is helpful in maintaining the purity of clones and achieving higher yield thus saving labour, energy and time. Morphological identification of poplar clones is quite difficult due to lack of distinctive phenotypic features. Gel electrophoresis technique is being increasingly used as an additional tool in research programmes dealing with identification of cultivars, genomes for tracing back the evolution of various groups of plants [1, 2]. The present investigation was carried out to identify prominent clones through study of their leaf protein profiles.

Nine poplar clones *viz.*, G3, G48, D121, D163, S_7C_1, S_7C_4, S_7C_8, S_7C_{15} and S_7C_{20} were used. Most of the clones were introduction in India from Europe and the United States of America and few clones were developed in India using introduced material. For preparing protein extract, 5 g of young leaves were homogenized with 400 µl of chilled extraction buffer (to prepare extraction buffer 0.124 g boric acid and 0.762 g borax were dissolved separately in 100 ml distilled water, then 25 ml solution of boric acid was taken and added slowly solution of borax to it, upto pH reaches to 8.9 then added 10 g sodium chloride and make volume upto 100 ml). The samples were left in refrigerator for 1 hour. The contents were centrifuged at 2000 g for 20 minutes and to the supernatant an equal amount of sample buffer was added. The samples were electrophoresed in 12 per cent SDS-poly acrylamide gel using 20 mA current for 30 minutes followed by 30 mA current. Later gel was viewed and photographed.

The banding pattern of nine poplar clones was characterized by four distinct zones *viz.*, I, II, III and IV on the basis of mobility of protein. Zone I was nearest to the origin i.e. point of sample loading and zone IV was the farthest from it. The highest number of bands (10) were observed in clone D121, followed by clones G3, G48, S_7C_4 and S_7C_{20} which showed 8 bands. Clone D163 exhibited seven bands, clone S_7C_{15} showed five bands, clone S_7C_8 showed four bands and least number of band (3) were observed in clone S_7C_1. Following sub-banding pattern was observed:

Zone I: Band Ia was present in all clones, while Ib was present in only clone S_7C_{20}.

Zone II: Band IIa was present only in three clones D121, D163 and S_7C_4. Band IIb was present in all clones except S_7C_1 and S_7C_8. Band IIc was observed in all clones except S_7C_1, S_7C_8 and S_7C_{15}. Band IId was observed in clones G3, G48, D121 and D163, whereas band IIe was observed only in clone D121.

Zone III: Band IIIa was present in all clones except D163, while band IIIb was present only in clones S_7C_4 and S_7C_{20}. Band IIIc was observed in clones G3 and G48. Band IIId was found in all clones except G48 and S_7C_1.

Zone IV: Band IVa was present only in G48 and D121 while band IVb was observed in all clones. Bands also varied substantially for their intensity. This showed that all poplar clones under study were characterized by distinct and unique banding pattern even in the cases where clones showed certain phenotypic similarity. Thus, it may be concluded that inherent differences exist among these clones for leaf protein profile. Poly acrylamide gel electrophoresis can be used as a tool for varietal identification in poplar like it has been used in some other crops [1-3].

References

1. **Ladizinsky G. and Hymowitz T.** 1979. Seed protein electrophoresis in taxonomic and evolutionary studies. Theor. Appl. Genet., **54**: 145-151.
2. **Hussain A., Khan S. T. and Bushuk W.** 1988. Field pea cultivar identification by electrophoretic patterns of cotyledon proteins. Canadian J. Plant Sci., **68**: 1143-1147.
3. **Singh H. P., Singh D. P. and Singh B. B.** 1992. Electrophoretic analysis for cultivar identification in chickpea (*Cicer arietinum* L.). Indian J. Pulses Res., **5**: 132-137.