

# Evaluation of genetic diversity of plane (*Platanus orientalis*) trees by morphological characteristics and SRAP molecular markers

Milad Orojloo

[m.orojlou@ag.iut.ac.ir](mailto:m.orojlou@ag.iut.ac.ir)

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Department of Agricultural Horticulture

Isfahan University of Technology, Isfahan 84156-83111, Iran

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1-N. Etemadi, Assoc. Professor (Supervisor), [Etemadin@cc.iut.ac.ir](mailto:Etemadin@cc.iut.ac.ir)

2- M. Talebi, Assist. Professor (Supervisor), [mtalebi@cc.iut.ac.ir](mailto:mtalebi@cc.iut.ac.ir)

## Abstract

Landscape is more importance, especially in urban areas. Among broad-leaved trees the plane (*Platanus* sp.) has major role in establishing landscape areas. This tree belongs to Platanaceae family. The geographical distribution of this genus includes from east mediterranean regions to northern America and Groenlands. Among *Platanus* species it is expected that only the *P. orientalis* would be native to Iran. With respect to plane importance in urban landscapes, prior to found and select elite genotypes or varieties the evaluation of possible differences in according to morphological and genetic characteristics among plane trees of various regions is necessary. For evaluation of genetic diversity among and within plant populations, morphological studies are one of the useful methods. In this respect, for evaluation of parameters such as number of lobes per leaf, leaf shape, succulent rate, number of fruit and dropping pattern of bark, the samples of *P. orientalis* from Isfahan, Arak, Karaj, Mahallat, Kashan and Natanz and also tow samples of *P. occidentalis*, were collected. Among and within species relationships of studied planes were drawn by using data those were obtained from morphological characteristics. For this purpose, Jaccard's similarity coefficient and UPGMA algorithm with cophenetic correlation coefficient of 0.846 has been used, that indicating suitability of UPGMA method for sample classification. The Results showed parameters, there was separation ability between species but the intra-specific difference was not sufficient to completely separate them. Since the morphological characteristics could be affected by environmental conditions, therefore, using molecular methods to detect and classify species and varieties are of very important. For determining genetic diversity among and within species, SRAP marker that targets coding regions were used. Thirteen used primer combinations on 79 plane genotypes, amplified 237 fragments, that 61 of them showed polymorphism. Calculated average PIC value was 0.153 for all primer combinations. Cluster analysis with usage of Jaccard's similarity coefficient and UPGMA algorithm with cophenetic correlation coefficient of 0.995 has been done. Cluster analysis separated *P. orientalis* and *P. occidentalis* species well, but samples of *P. orientalis* located on one-branch. PCA analysis also confirmed results of cluster analysis. Also  $F_{st}$  in this study was zero that indicates no genetic diversity within species. It is seems that the propagation type of this plant, that is cutting, caused high genetic similarities within this species.

**Keywords:** Plane, genetic diversity, morphological characteristics , SRAP marker, Iran