

## MOLECULAR CHARACTERIZATION OF GENETIC DIVERSITY IN SYMPATRIC WHITE OAK SPECIES (*QUERCUS* SPP.)

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Gene flow in genus *Quercus* has been intensively studied because of the characteristic of oak species to intercross and hybridization is a common phenomenon that frequently co-occurs in mixed stands.

The main aim of the study is to evaluate the rate of gene flow and to analyze genetic diversity in molecular traits within a woody community of three sympatric and closely related white oak species of *subgenus Quercus* (*Quercus frainetto* Ten., *Q. petraea* Liebl. Matt. e *Q. pubescens* Willd.), using nuclear microsatellites (EST-SSRs).

A total of 268 oak trees, from 9 stands located in a natural mixed oak forest in central Italy, were genotyped at 12 microsatellite markers, using a PCR 12-plex protocol (Guichoux *et al*, 2011).

This study reports the results of genetic differentiation among the three species in particular to characterize the rate of hybridization and introgression and evaluate gene flow among the three species. All nuclear markers resulted 100% polymorphic and the number of alleles varies from 3 alleles in *Q. frainetto* to 14 in *Q. petraea* with an average of 8.611 alleles per locus.

The Bayesian cluster analysis (without *a priori* information), demonstrated elevated capacity in identifying genetically pure and mixed group of individuals while revealing inter-specific gene flow. Each of the groups individuated is characterized by a set of allele frequencies per locus which confirms the morphological traits (Viscosi & Fortini, 2011) recognizable as three species *Q. frainetto*, *Q. petraea* and *Q. Pubescens*. The individuals were not correctly assigned only in 0.75% of total samples. The overall percentage of hybrids varies considerably in the area of study ranging from 3.33% to 36.67%

In addition, the genetic composition of stands gave proof of evidence of relationships between environmental factors and spatial distributions of pure species and their hybrids.

### REFERENCES:

- Guichoux *et al*, 2011. Two highly validated multiplexes (12-plex and 8-plex) for species delimitation and parentage analysis in oaks (*Quercus* spp.) *Molecular Ecology*, 2011
- Viscosi & Fortini, 2011. Leaf shape variation and differentiation in three sympatric white oak species revealed by elliptic Fourier analysis. *Nordic Journal of Botany* (accepted, May 2011).