

CHESTNUT CULTIVATION DEVELOPMENT IN LOMBARDY: LEVERAGING NATIVE GENETIC RESOURCES IN TWO PILOT AREAS

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Castanea sativa Mill. (sweet chestnut) is a multi-functional tree species with a high ecological and cultural relevance. Thanks to its features, sweet chestnut has become an essential element of subsistence for many societies in mountain and sub-mountain areas.

In this context, the principal aim of the two recently funded projects CASTADIVA and CASTANEVAL (PSR, Lombardy Region) is to characterize the chestnut germplasm grown in pilot areas of the Lombardy Region (provinces of Brescia and Varese) by integrating genetic and morphometric data analysis, in order to evaluate the regional chestnut genetic resources and promote their conservation.

In the frame of CASTADIVA project, twelve polymorphic microsatellite (SSRs) markers were used for genotyping 467 trees sampled between 2021 and 2022 in eight orchards and three natural populations of sweet chestnut. Leaves and embryos were sampled for each individual to evaluate inter and intra-population genetic diversity. In parallel, a subset of forty to fifty individuals from different collection sites were selected for replicated fruit morphological and nutritional analyses (specific carbohydrates,

moisture, fat, protein, ash and fiber). Genetic data showed a number of clones identified as “Marrone” in Serle area (province of Brescia). The analysis of the genetic structure revealed different gene pools representing the two geographical areas. The combined data of mother plants and embryos from Varese showed high genetic similarity among individuals sampled in each area, whereas we found high genetic divergence between mother plants and embryos in Serle area. In addition, we identified large inter-individual variation of several morphological and nutritional traits, with the dimensional characteristics principally affected by local environmental drivers. Our results suggest that the genetic diversity and structure of the cultivated chestnut populations was shaped by different historical management systems in the two areas.

The CASTANEVAL program will continue the study with new orchards investigated in the two Lombardy provinces and will develop a chestnut micropropagation system in order to offer a concrete, sustainable and economical tool for the conservation and multiplication of native germplasm of high local interest.