Variation in grafted European chestnut and hybrids by microsatellites reveals two main origins in the Iberian Peninsula

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Abstract This is the first known large-scale molecular study of simple sequence repeats (SSR) loci based on samples from grafted trees found in the Iberian Peninsula and Canary Islands and hybrids. Interspecific hybrids resistant to 'ink disease' (Phytophthora spp.) were obtained in France, Portugal and Spain, although difficult to distinguish by morphology. This study focuses on genetic variation using 10 SSRs (11 unlinked loci) from clonally propagated cultivars (574 accessions) of European chestnut (Castanea sativa) and hybrids (71 accessions). They were compared with a representative sample of exotic chestnut species present in the Atlantic area, 47 accessions of Castanea crenata, 37 of Castanea mollisima and 33 of Castanea henryi. Accessions were analysed using a model-based Bayesian procedure (Structure), factorial correspondence analysis and analysis of molecular variance. The

main chestnut species, hybrids and alien introgressions were differentiated. Two main origins of variability in European cultivated chestnut were found in the Iberian Peninsula, one in the North and a second in the Centre. Andalusian and Canary Island accessions could be assigned to both of these zones, which indicate that they could have been colonised with cultivars originating from either zone, in the case of the Canary Islands from the sixteenth century on.

Keywords Chestnut - Castanea sativa - Interspecific hybrids - Simple sequence repeats (SSR) - Genetic diversity

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