

DENDROLOGICAL ASPECTS OF VEGETATIVE REPRODUCTION OF SOME WALNUT GENOTYPES

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Walnut (*Juglans regia* L.) is the most widespread tree nut in the world. There is a great diversity of genotypes differing in forestry, productivity, physical and chemical nut traits. Using a range of methodologies, from morphological markers to the most recent advances in genome analysis, many genetic studies of walnut have been conducted during the past years, including examination of diversity, determination of relationships within or among germplasm collections and populations, phylogenetic and origin elucidation, genetic map construction, and biotic or abiotic stress investigations. The genetic improvement of walnut has undergone great evolution. Some of them have been evaluated as promising and may serve as germplasm sources for breeding. Germplasm diversity is commonly evaluated with the help of morphological descriptors. This is usually the first step in classifying and describing germplasm and in studying heritability of traits for a new breeding program and selection of superior genotypes.

Cultivated walnut varieties, generally well adapted to climatic conditions of the different production zones, often lack some important agronomic characteristics. It would therefore be useful to select in natural populations or create through hybridization new cultivars combining characters of improved climate adaptation, early fruiting, high productivity, disease tolerance and quality fruit production. This is possible given the very large and so far unexploited variability within the *Juglans regia* L. species. Long juvenility period and high variation between trees in terms of different characteristics, usually make it impossible to establish uniform orchards. Yield and quality of fruit and kernel is low and could not compete with the production of the countries that have used the cultivars. So, breeding and introducing of new suitable walnut cultivars is necessary for walnut development. However, both the common walnut *Juglans regia* and black walnut *J. nigra* are quite particular in terms of optimal growing conditions. Hybrid walnuts provide an exciting alternative. It is possible to encourage and control hybridisation through tree breeding programmes. Hybrid species tend to have greater than either of their parents, and may be more tolerant to a wider range of conditions.

Root systems have a strong influence on the vigor of the tree. Vigorous rootstocks are commonly used to increase productivity or to decrease it. This feature is especially important when dealing with trees, as most of the research in breeding with walnuts has been looking for very vigorous scions that must be grafted on seedling rootstocks of unknown and heterogeneous growth capabilities. Once selected scions are shown to be very vigorous and productive on their own roots, it can be assumed that micropropagated selections of walnuts must result in more homogeneous and vigorous trees than the same selections grafted onto seedling rootstocks.

Plant breeding has always impacted food production and played a vital role in improving human nutrition. However, this has also increased uniformity within the world's agricultural crops, contributing to increased genetic vulnerability to biotic and abiotic stresses. For these reasons, it is important to understand better the impacts of modern plant breeding on genetic diversity. In the same way, intelligent management of this diversity could be of valuable assistance to breeders.

Keywords: *Juglans regia* L., vegetative reproduction, varieties, breeding, introducing.