# Analyse de la diversité de processus de développement racinaire chez les Prunus. Aptitude au bouturage et réponses à la contrainte hybride

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## *Abstract:*

In breeding programs of *Prunus* rootstocks the aim is to use the existing genetic variability within *Prunus* species in order to create new rootstock genotypes with excellent agronomic traits, and improved resistance to biotic and abiotic stresses.

Exploitation of the genetic variability is based on the evaluation of phenotypic variation among individuals within genetic collections for desirable traits. This make possible to select specific genotypes to improve a given trait.

This study consists of two parts; we explored the genetic diversity within the genus *Prunus* regarding two important characteristics: rooting ability of hardwood cuttings and responses of some rootstocks to water stress.

In the first part, rooting ability of hardwood cuttings was evaluated among 222 genotypes preserved in genetic collection. The results show considerable variability among the sub genus *Amygdalus*, *Prunophora*, and also an interspecific variability within each of them. Rooting ability by hardwood cutting was significantly improved in interspecific hybrids if one parent belongs to *P cerasifera* species.

In the second part of this study we studied the responses of nine genotypes, commonly used rootstocks, to water stress. We applied three treatments: control, water stress and recovering.

Soil moisture was maintained at field capacity through all stages of the experiment for the control plants. On the contrary we stopped watering during 14 days for the stressed plants, and then we re-watered the recovered plants for 10 days.

During this experience, we performed morphological and physiological measurements on the above ground parts of plants and we excavated plants at the end of each phase to observe root system modifications.

Aboveground parts of plant responded to water stress by a significant decrease in net photosynthesis, total transpiration, stomatal conductance and leaf expansion.

Root system responded to water stress by several modifications:

Four genotypes (GF305, Montclar, GF677 and Myrobolan) showed a significant increase in root to shoot ratio under drought conditions. We also detected morphological modifications on the different traits of root architecture in response to water stress.

The length of the apical unbranched zone LAUZ and the apical diameter were decreased for all genotypes, consequently, roots became finer and reduced their rate of elongation. Fine roots enhance the surface of contact between roots and soil which in turn improve the acquisition of water under drought condition.

The inter-branch distance also responded, and it tended to decrease under the water stress treatment. The decrease in inter-branch distance can be explained by a production of more lateral roots in deep layers, where water was more available, moreover these new laterals roots were also finer.

Qualitatively, a common response to water stress was observed on the different traits of the root system architecture, but we showed a genotypic effect determining the level of the response.



***Keywords:*** ***Prunus, Hardwood cuttings, Rootstocks, Water stress, Root system architecture, Genetic diversity***