



W304

The Olive Tree From Juvenility To Maturity: Insight On The Developmental Changes Over Years and The Genetic Basis Of Vegetative and Reproductive Traits

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Fruit trees productivity is closely linked to their development. Integrating architectural traits in breeding programs could optimise cultivation management and improve bearing regularity. Here, we investigate the genetic determinism of architectural traits in the olive tree. During juvenility, growth and branching traits were investigated at whole tree, growth unit and internodes scales. Genetic models, including the year of growth, genotype effects and their interactions, were built, considering variance function and covariance structure of residuals. Morphogenetic factors impacting tree architecture were identified and heritability was estimated. These findings allow us to define when during tree ontogeny and at which observation scale, growth and branching traits are under genetic influence. Changes over time associated to the acquisition of reproductive competence were further observed. Our strategy was based on (i) a decomposition of adult growth units in quantitative variables related to flowering and fruiting process in relation to their growth and branching (ii) an annual assessment of trees yield. Olive trees were either 'on' or 'off' in a given year. This observation over four years revealed patterns of regular vs. irregular bearing. After developing a genetic map, a QTL mapping was carried out on reproductive traits. This study gives an overview of olive tree development during juvenility and maturity periods showing the existence of ontogenic trends, which result in traits heritable only at the tree periphery. A phenotyping strategy adapted to its architectural characteristics is proposed. Finally, regular bearing progenies were identified and could constitute sources for innovative materials in future selection programs.