

# Evaluation of biometric parameters of 'Belona', 'Guara' and 'Lauranne' cultivars in a superhigh density orchard

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## Abstract

In Portugal, the first almond superhigh density (SHD) orchard was planted in 2012. The trees were trained to obtain a hedge with dimensions controlled to allow the use of over-the-row machinery for harvesting. In this orchard most of the cultivars used, are from foreign almond breeding programs. Although the lack of knowledge about the behaviour of almond cultivars in SHD orchard, a lot of new plantations were made. This study shows some biometric parameters of 3 almond cultivars registered in the first season after plantation. The SHD orchard was established in September 2014 at the Herdade da Torre das Figueiras, Monforte, Portalegre, Portugal (39°04'N; 07°29'W). The orchard is planted in a 5×1,5 m array with East-West orientation. 'Belona', 'Guara' and 'Lauranne' were the cultivars used in this study. In each cultivar, 3 lines of 93 trees were randomly selected. From each line, 3 plots of 10 trees were randomly chosen in order to measure biometric parameters. In April 2015, July 2015 and March 2016 the following measurements were made: trunk diameter, tree height, height and width of the canopy. Green pruning intervention was performed by the farmer in July and September 2015 to control canopy dimension and to increase the number of shoots inside the canopy. It consisted in mechanically topping the canopy parallel to the ground and hedging each side of the canopy. These measurements allow to verify that 'Lauranne' registered the higher trunk diameter and canopy dimension before summer pruning. Summer pruning seems to be an efficient solution to get an adequate canopy for the harvesting machine.

**Keywords:** SHD almond, trunk diameter, canopy dimension

## INTRODUCTION

In Portugal after the expansion of the super high density olive orchards, some super high density almond orchards have also been planted. According to Torrents (2015), the main goals of these training systems are to reduce the harvesting costs due to the use of the same machinery as in vineyards and olive orchards. Also the reduction of labor cost for planting and pruning with an increase of almond production, namely in the first years, with a reduction of alternation in production increasing also the quality of the almonds. To achieve these goals it is necessary to use rootstocks with low vigour, self-fertile cultivars, late flowering and resistant to the main diseases (Torrents, 2015).

The canopy could be trained as a disorganized hedge with multi axes. The canopy dimensions shouldn't overcome the 0.70-0.80 m width and 2.75 m height. In super high density (SHD) orchards tree dimensions represent a major challenge for the orchard management, since there is an absolute priority to guarantee that harvesting machinery is capable to perform efficiently without causing damage and also to make sure that tree canopies receive enough sun light (Tous et al., 2014; Dias et al., 2018).

In order to control canopy dimension, Torrents (2015) suggests the use of topping and

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