

The fruit detachment force/fruit weight ratio can be used to predict the harvesting yield and the efficiency of trunk shakers on mechanically harvested olives

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Abstract

From 2004 to 2007, trials were carried out in order to assess the importance of some agronomical factors, namely canopy density (sparse, medium and dense), growth habit (erect, spreading and dropping) and fruit detachment force and weight, in determining the percentage of mechanically detached olives (harvesting yield) using a trunk shaker. The investigation was carried out in Central Italy using mature average-sized trees (average crown volume 23 m³) of several olive cultivars characterized by differences in canopy density, growth habit, fruit detachment force and weight. Fruit detachment force and weight were the most important factors affecting harvesting yield. The ratio of fruit detachment force/fruit weight was linearly related to the harvesting yield, explaining about 60% of the total variability. The results show that with trees with total canopies up to around 13,000 m³/ha, which are very common in intensive olive orchards, it is necessary to have ratios of fruit detachment force/fruit weight equal or lower than 2.3 to ensure harvesting yields equal to or higher than 85%. Harvesting yields equal to or higher than 85% are considered the breakeven point for mechanical harvesting of olives with trunk shakers. In conclusion, the results clearly demonstrated a linear relationship between the fruit detachment force/fruit weight ratio and the harvesting yield obtainable with trunk shakers. This ratio can be used as a powerful harvesting index to decide the best harvesting time to execute the mechanical harvesting with trunk shakers in intensive olive orchards.