



## Prototype of a Side-row Continuous Canopy Shaking Harvester for Intensive Olive Orchards

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### Abstract

Olive producing countries worldwide invested largely in high density groves varying from 200 to 550 trees per hectare for which no efficient totally mechanized harvesting methodology and technology is available. Trunk shaking is not an adequate option due to lack of space and intense strain in labour and machinery. Continuous canopy shaking is the obvious approach, not only increasing working capacity but also overcoming the problem of scarce and expensive labour.

Continuous canopy shaking harvesting equipment available today are adapted over-the-row grape or coffee-beans harvesters. Recently purposely built, rotor type, large over-the-row olive harvesters, mainly of South American and Australian design, are too heavy and expensive, hardly suitable to the difficult wet soil conditions encountered in the Mediterranean countries.

Tree growth is a limitation for the over-the-row concept. These harvesters may be used for a considerable number of harvest campaigns in groves of the limited growth Arbequina cultivar, but only up to the third production year in groves based on normal growth local cultivars.

Tree growth limitation can only be adequately dealt with the side-row concept. Furthermore the side-row concept tends to be simpler and less expensive, meaning lower running costs.

In 2009, the SIDE-ROW CONTINUOUS CANOPY SHAKING FRUIT HARVESTER project was set to develop such technology.

This paper describes a prototype and gives an account of the different stages of its development.

The equipment comprises two symmetrical harvesters that follow a tree row one at each side. Each harvester is based on a trailed type structure towed by a farm tractor which also drives, through its power-take-off, the hydraulic power pack that ensures hydraulic energy for most of the hydraulic actuators. An operator in the control station controls the harvest through electro-hydraulic controls.

A vibratory rotor with flexible rods is used for engaging and shaking the fruit bearing branches.

Each harvester also comprises a catching platform with conveyors belts delivering fruits to a temporary storage bag which is hydraulically lowered to the ground when full.

The row side of the harvester is bordered along the edge by flexible synthetic interface with the tree trunk.

After two harvesting campaigns the basic concept is now set. Minor detail solutions will be addressed in 2013.

Investors are now being attracted to finance pre-series machines intended for durability tests which will define the product for the market.

**Keywords:** high density olive groves; olive harvesting; canopy shaking.

### Introdução

A colheita da azeitona nos olivais intensivos é normalmente efectuada com vibrador de tronco montado em tractor agrícola e recolha em panais movimentados manualmente. A utilização de vibrador com apara-frutos neste tipo de olival está limitada devido à falta de espaço entre árvores para colocar o apara-frutos.