Farmer's Evaluation of a Rolling Canvas Prototype Against his own System for Harvesting Olives

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ABSTRACT

An olive grower was invited to organise a full day harvesting test based on two rolling canvas prototypes, using his own trunk shaker, tractors and labour. This paper reports the results observed, making also a comparison with the usual harvesting method followed by the farmer, based on a trunk shaker and canvas manually placed under the trees.
Results show the rolling canvas based system production slightly higher work rate, and according to the workers, less demanding in terms of physical effort.

INTRODUCTION

Almeida *et al* (2003) revealed the potential of the inverted umbrella linked to the trunk shaker, as the most cost effective system for olive harvesting.
However, towards densities of approximately 300 or 400 trees per hectare, which means 4 to 5 metres between plants in the row, there is not enough space to open the inverted umbrella.
Alternatives should be contemplated. A mechanical rolling canvas interceptor prototype, Peça *et al* (2004), was design to solve this problem (Fig. 1 and 2).

Fig.1 and 2. Rolling canvas prototype at work**.**

MATERIAL AND METHODS

Olive orchards

Field tests took place in Alentejo region (Portugal), in a olive orchard of cultivar Cobrançosa, planted with the spacing of 7 m x 3,5 m.
The average yield per tree is 20 kg.

Harvesting systems

System 1 – Is the usual farmer harvesting system (Fig. 3). A 75 kW tractor with a front mounted multidirectional tree shaker is moved along the tree lines, harvesting olives onto canvas placed under the trees by six workers witch also move the canvas along the tree lines (Fig.4). When the load on the canvas is too heavy the fruits are transferred to a small canvas witch is left behind. Later a tractor with a rear mounted hydraulic crane and a trailer, load the small canvas into the trailer (Fig.7).

Fig. 3. System 1:
usual farmer harvesting system**.**

Fig.4. System 1:
canvas being moved manually**.**

System 2 – The alternative harvesting system is based on two rolling canvas prototypes, each one moving along its own line of trees. The tractor/shaker unit, previously used in System 1, moves between the two rows of trees, harvesting alternatively trees from each row. Four of the workers of System 1 (two per prototype), are employed to unroll the canvas (Fig.5), as well as to assist at the discharge of the olives when full storage capacity is attained (Fig.6). In System 2 is also used the same equipment and method used in System 1 to load the olives into a farm trailer.

Fig. 5. System 2: based on two rolling canvas prototypes, using farmer's equipment

Fig.6. Rolling canvas prototype discharge operation of rolling canvas prototype.

Fig.7. Rear mounted hydraulic crane, loading olives.

RESULTS

With the usual farmer harvesting system (System 1), 91 olive trees were harvested over the period of the trial. The average performance results are presented on Table 1 and 2.
With the alternative harvesting system (System 2), 209 olive trees were harvested over the period of the trial. The average performance results are presented in Table 3 and 4.
The following measurements were taken:
T1 – average vibrating time per tree; **T2** – average time between the vibration of two consecutive trees; **T3** – average time of actual manoeuvre/shaker between two consecutive trees; **T4** – average time of discharge.

Table 1. Results obtained with farmer's harvesting system (System 1).
T1 – average vibrating time per tree; **T2** – average time between the vibration of two consecutive trees; **T3** – average time of actual manoeuvre/shaker between two consecutive trees; **T4** – average time of discharge.

Measurements	Average time (seconds)
T1	6,9
T2	30,8
T3	28,5
T4	67,7

Table 2. Work rates obtained with farmer's harvesting system (System 1)

Trees per hour	Trees/man hour
77,4	11,1

Table 3. Results obtained with alternative harvesting system (System 2).
T1 – average vibrating time per tree; **T2** – average time between the vibration of two consecutive trees; **T3** – average time of actual manoeuvre/shaker between two consecutive trees; **T4** – average time of discharge.

Measurements	Average time (seconds)
T1	7,3
T2	32,4
T3	30,3
T4	234,5

Table 4. Work rates obtained with alternative harvesting system (System 2)

Trees per hour	Trees/man hour
79,8	11,4

DISCUSSION

Similar results were obtained by the two systems, with a slight advantage to System 2, witch is able to harvest an extra 358 kg of olives over a full 7 hours work day.
Without any reduction in labour and with two more tractors and two prototypes, one can expect that cost are a major issue in System 2. However, and according to the workers, System 2 is less demanding on physical effort, something that is extremely relevant when contracting labour in an increasingly difficult market.

LITERATURE CITED

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