Evaluation of the Use of a Disc-Saw Machine in Winter Pruning 'Rocha' Pears Orchards – an Account of Five Years

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Abstract

Manual pruning with pneumatic shears is a current practice used by 'Rocha' pear farmers in Portugal. However, it is labour-intensive and therefore expensive. Work started in 2008 to study a mechanised alternative based on a discs-saw pruning machine mounted on a front loader of an agricultural tractor. The following three treatments were compared: T1 – manual pruning performed annually using pneumatic shears; T2 – mechanical pruning, performed annually, topping the canopy parallel to the ground; in 2008 and 2010 topping was followed by mechanical hedging of both sides of the canopy; in 2011 mechanical topping was complemented with manual pruning; T3 – mechanical pruning, performed annually, topping the canopy parallel to the ground followed by a manual pruning complement; in 2008, prior to the manual complement, trees were hedged on both sides of the canopy. A randomised complete block design was used, with three replications, leading to 9 plots with three lines of 10 trees per plot. In each plot only the central line was used in the evaluation. Trials were performed in a 20-year-old commercial orchard, planted in an array of 4×2 m with trees trained as central leader system. The following data were collected: tree height and canopy width, before and after pruning interventions; weight of biomass removed; fruit yield and working rates. Results show that yield in treatment 2 was always lower than in treatment 1; yield in treatment 3, except once, was always lower than in treatment 1. Mechanical pruning leads to a more uniform orchard when compared to manual pruning.

Although not beneficial in terms of yield, the use of the tractor mounted cutting bar prior to manual pruning interventions result in a reduction of time required by this expensive operation. However, further field work at a real scale is needed to validate the economic value of the strategy of performing mechanical pruning, based on a disc-saws pruning machine, followed by a manual complement.

INTRODUCTION

Manual pruning with pneumatic shears is a current practice used by pear farmers in Portugal leading to a great dependence on labour work and increasing production costs. As an alternative, mechanical pruning performed by a tractor mounted cutting bar provided with circular disc saws can be used. Dozier et al. (1980) refers that is possible to maintain 'Van Red Delicious' apples yield without significant differences using mechanical pruning combined with manual pruning complement.

In order to contribute to the reduction of the dependency on labor work the authors started in 2008 a trial to evaluate the use of the disc-saws pruning machine in the winter pruning of 'Rocha' pear.

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