

Use of trunk girdling to advance timing of first commercial harvest in macadamia

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Trunk girdling has been used in many crops to reduce vegetative growth, increase flowering, fruit set, quality and yields. Results are generally dependent on the timing and/or severity of girdling treatments. In this project we applied two trunk girdling treatments in late-summer to promote earlier flowering and cropping on young macadamia trees. Girdling treatments were applied in a systematic design with 10 trees per treatment to 3- and 4-year-old trees planted in June 2013 and February 2012, respectively. The cultivar used was '344' grafted onto H2 seedling rootstocks. The 3-year-old trees had not produced any crop at the time of treatment; they were expected to produce some flowers in spring 2016, but their first significant crop was not expected until summer 2018. The 4-year-old trees had a small crop (<10 nuts/tree) at the time of girdling and were expected to produce their first significant crop in summer 2017. Treatments included application of a 2 mm or 5 mm wide trunk girdle, applied on 29 March 2016 (late summer), and a non-girdled control treatment. The number of floral racemes per tree was recorded in spring (October) 2016 and total yield was recorded in March 2017. A subsample of nuts was taken to determine the moisture content of the nut, and yield values adjusted to give the total weight of "nut in shell" (NIS) at 10% moisture content.

The trunk girdles did not affect either tree height or canopy dimensions, but they had a significant effect on flowering and fruit yields. The number of floral racemes was more than three-fold higher on girdled trees than on control trees, for both tree ages. Yields on 3-year-old trees of 0.83 and 0.82 kg/tree for the 2 mm and 5 mm girdled (respectively) were significantly higher than yields of 0.37 kg/tree on control trees. Four-year-old trees with a 5 mm wide girdle yielded 3.2 kg/tree while control trees yielded 1.6 kg/tree. There was a lesser, non-significant effect ($P = 0.096$) for the 2 mm girdle treatment on 4-year-old trees. The significance of this result for 4-year-old trees with a 5 mm wide trunk girdle is that by doubling the crop to over 2 kg/tree we have advanced the first commercial harvest for these trees by 1 year, with potential for machine harvesting.