

Cross pollination mostly increased final raceme nut counts in Macadamia compared with self or open pollination

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Commercial macadamia cultivars are derived from two species, *Macadamia integrifolia* and *M. tetraphylla*. They are considered partially self-incompatible, and previous research indicates that for at least some cultivars, cross-pollination can result in increased yields. Hand cross-pollinating of flowers on single racemes and comparing nut counts with single non-crossed racemes has previously shown that this can increase nut set in at least some cultivars. However, published information on the possible benefits of cross-pollination across many cultivars has remained limited. Moreover, little is known about which cultivars in particular are most compatible for cross pollination. In this study, trials were conducted in orchards near Bundaberg (Australia) to assess whether hand cross-pollinating racemes altered final nut counts compared with non-hand pollinated racemes. All raceme treatments were left uncaged to allow potential pollen vectors to pollinate florets. Twelve separate trials were conducted using the cultivar '741', where pollen from a single alternative cultivar was used (one polliniser for each trial) to pollinate a single raceme per tree (up to twenty trees included per trial). Similarly, twelve trials were conducted on 'Daddow', twelve on 'A203', eleven on 'A268' and four on '842'. Assessments were also conducted to evaluate whether cross-pollinating multiple racemes within trees of '741' and '842' influenced nut counts within treated and untreated uncaged racemes and whether nut set occurred through self-pollination within three cultivars ('741', '816' and 'A203') using caged treatments. In most cases, hand cross-pollinating single racemes produced significantly more nuts than single racemes that were not hand cross pollinated. However, in trees where 100 racemes were hand cross pollinated, nut set within these racemes was lower compared to similarly treated racemes in trees where fewer racemes were crossed (15, 3 or 1 crosses/tree). Despite of this, overall nut counts were higher within the 100 crossed raceme trees compared to untreated control trees. Self-pollinated racemes also produced nuts, although numbers varied across the cultivars tested and were lower than from hand-crossed racemes in all cases. To improve nut yield through cross pollination, growers should evaluate potential yield gain in their own orchards through cross-pollination trials, incorporate multiple cultivars within new orchard blocks, and replace poor yielding trees within single cultivar blocks with trees of another cultivar. They should also ensure pollinators are present within their orchards.