

Opportunities and Challenges in Macadamia Breeding

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There are obvious challenges in breeding new macadamia cultivars. These relate to large tree size, extended juvenile period, cultivar longevity, securing stable funding and long-term field trials for measurement of productivity. Macadamia has been commercially cultivated for less than 160 years and current cultivars are only two to four generations removed from the wild. There is significant potential for release of improved cultivars with continued selective breeding. We are studying methods to improve breeding efficiency through the use of quantitative genetics, genome-wide selection, cooperative field trials with commercial producers and alternative breeding population structures through use of polycrosses. Previous breeding has selected primarily for nut-in-shell yield, kernel recovery and tree size. We are exploring opportunities to select for other traits including alternative tree architecture, altered reproductive biology, kernel quality characteristics and disease resistance. Part of this process involves exploitation of the wild germplasm that is native to Australia in the search for novel traits and increased diversity.