TopNut

Boost your Beaumonts: the power of cross-pollination

The Beaumont macadamia cultivar offers the advantage of high yields during “on” years. However, it does have some limitations, such as lower kernel recovery and generally lower prices compared to cultivars like 816 and A4. Additionally, in “off” years, the decline in global prices might not adequately cover the potential losses. Given that a large portion of South African macadamia orchards are planted to Beaumont, it’s crucial to find ways to manage this cultivar more effectively. Recent data suggests that cross-pollination could be a viable solution to this challenge.

Cross-pollination for macadamia refers to the transfer of pollen from the raceme of one cultivar to that of another cultivar. This evolutionary mechanism enhances genetic diversity and reduces the risks associated with inbreeding. While some plant species are self-compatible, meaning they can bear fruit through self-pollination, macadamias are largely self-sterile. The degree of self-compatibility varies between cultivars.

This article examines the role of cross-pollination in macadamia production and addresses the question: Can implementing cross-pollination practices enhance yields and decrease yield variability in Beaumont orchards?

Australian research

The potential benefits of cross-pollination on yield was investigated in Australia, where researchers found compelling evidence supporting its advantages.

- Trueman *et al.* (2019) conducted paternity testing on "816," "Daddow," and "A4" orchards. It was discovered that at least 80% of the 816 nuts, 90% of A4, and 88% of Daddow nuts resulted from cross-pollination, not self-pollination. This finding underscores the critical role of cross-pollination in successful nut set.
- Trueman and Wallace (2020) evaluated the yield in rows located at the centre of an 816 block and compared it to the yield in rows along the perimeter, adjacent to a bordering Daddow block. The yield in the centre of the 816 block was less than half that of the perimeter rows, suggesting that closer proximity to different cultivars significantly enhances yield potential.
- Additionally, hand-pollinated trees in the middle of a 816 block, lead to a 97% increase in yield. This study emphasized that cross-pollination was the key limiting factor in the mono-cultivar 816 block (Trueman & Wallace 2020).

South-African research

South African research also supports the significant benefits of cross-pollination for the local industry:

- Allsopp (2020) demonstrated that the number of nuts that set per raceme can significantly be increased by hand-pollinating Beaumont racemes with other cultivars. When pollinated by the A4 cultivar, Beaumont racemes produced six times more nuts compared to self-pollinated racemes. Figure 1 illustrates the increase in nut set for Beaumont flowers hand-pollinated by various cultivars.

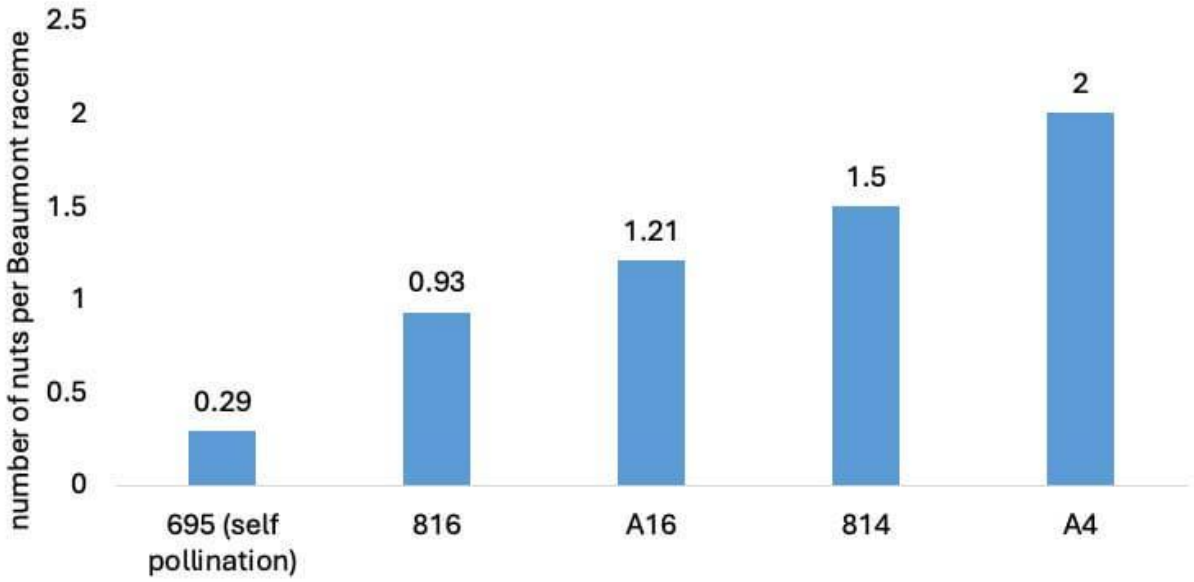

Figure 1. Number of nuts per racemes after Beaumont racemes were hand pollinated by five different cultivars including Beaumont (self-pollination).

- In 2022, Bernhard Jordaan conducted a study similar to Allsopp's, comparing Beaumont racemes hand-pollinated with A4 and Nelmak 2 cultivars to self-pollinated Beaumont racemes. The results showed that cross-pollinated racemes produced significantly more nuts than those that were self-pollinated (figure 2,3).

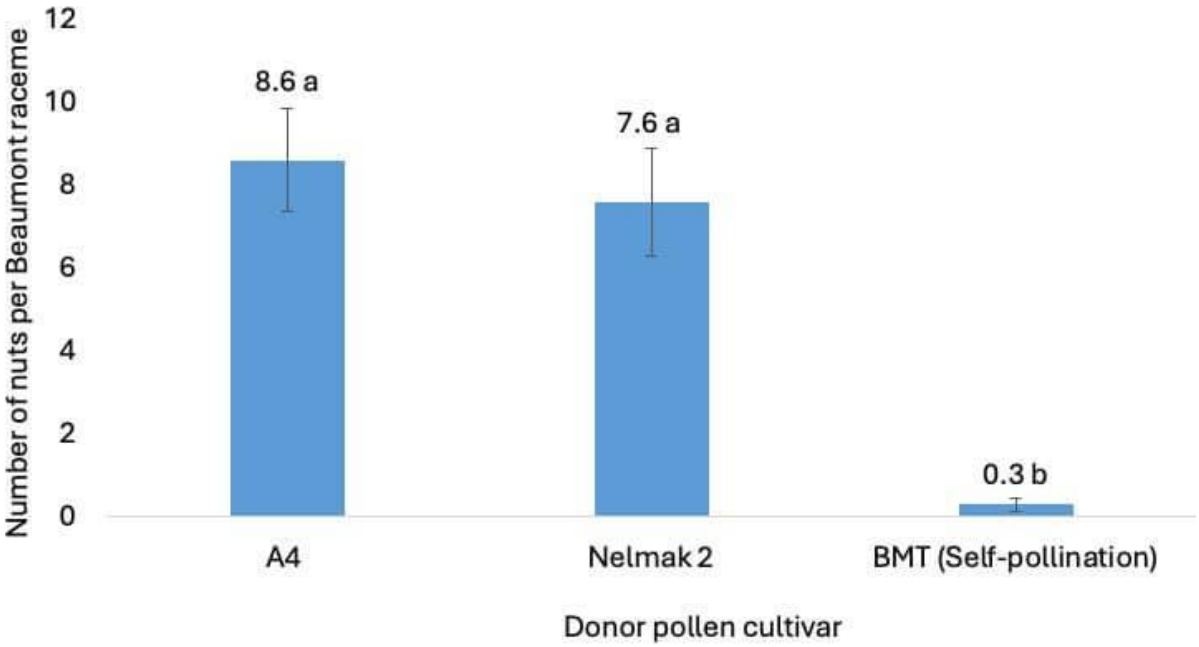

Figure 2. Number of nuts per racemes after Beaumont racemes were pollinated by A4, Nelmak 2 and Beaumont (self-pollinated).

Figure 3. Nut growth of a Beaumont raceme hand pollinated by a A4 raceme.
A- 09/09/2022, B-19/10/2022, C-09/11/2022, D-16/01/2022.

Recommendations

- **Incorporate pollinating cultivars at establishment**: When establishing a new orchard, include cultivars that serve as pollinators. Some cultivars, like Beaumont, respond particularly well to cross-pollination and require pollen from other cultivars for optimal nut set.
- **Introduce cross-pollinators in single-cultivar orchards:** Consider introducing cross-pollinators into orchards planted with a single cultivar. This can be done by topworking existing trees. It is recommended that one third (33%) of the orchard be converted to a pollinator.
- **Ensure adequate bee colonies:** Introduce a sufficient number of bee colonies to flowering orchards to facilitate effective pollen transfer between trees. While the minimum is 2 colonies per hectare, it is recommended to place at least 4 colonies per hectare to ensure optimal pollination.

Conclusion

The research and data presented in this article highlight the critical role that cross-pollination can play in enhancing the performance of macadamia orchards. While Beaumont is widely planted in South Africa and capable of high yields during “on” years, its lower kernel recovery, inconsistent production, and susceptibility to global price fluctuations present significant challenges. To address these issues, it is essential to adopt practices that leverage the benefits of cross-pollination. By integrating pollinating cultivars, utilizing top working to introduce cross-pollinators, and ensuring adequate bee populations for effective pollen transfer, growers can potentially improve yield consistency, and make Beaumont orchards more resilient and economically viable.

Written by: Bernhard Jordaan
TopNut: Technical manager
Cell : 067 2141 800
Email : bernhardj@topnutgroup.com
Website: https://topnutgroup.com/

TopNut