

International Macadamia Symposium 2023



IMS'23

MOVING FORWARD TOGETHER

Macadamias South Africa (NPC)  
(SAMAC)



Cross-pollination: the  
benefits and how to  
maximise it

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# The Proteas



# The Waratahs



# Protea family



Protea



Leucospermum



Waratah



Banksia

Pollinated by  
animals:  
birds, bats,  
rodents,  
possums,  
**bees**  
(macadamia)



Macadamia  
a



10/12/21  
7/1/21

BUZZBEE



# 1. Are macadamia yields limited by cross-pollination?

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We cross-pollinated whole trees

Honeybees 

Stingless bees 

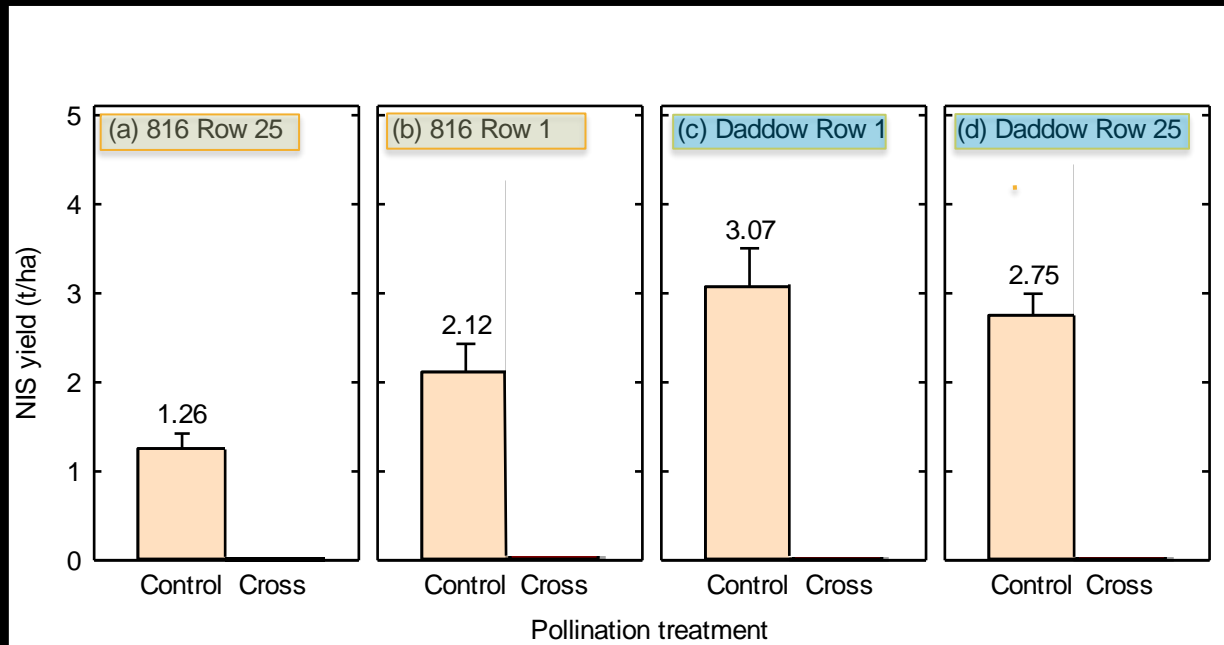
10 control and 10 cross-pollinated trees along each row



Bundaberg

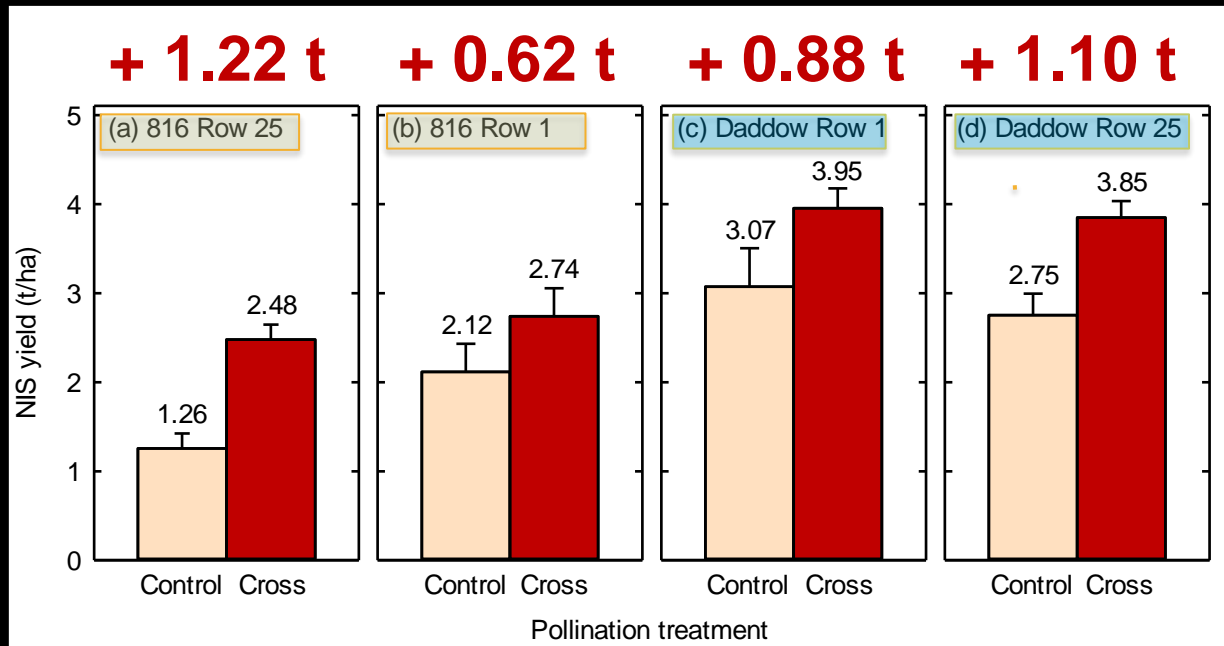


# NIS yields were lower in the middle of the blocks





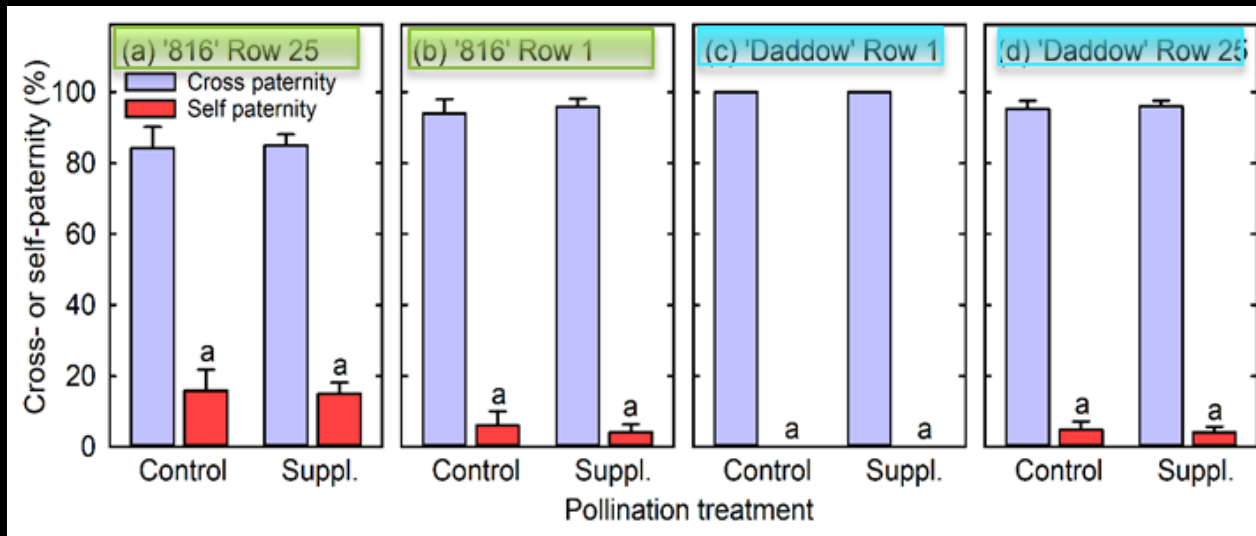
# Cross-pollination increased the NIS yields





## 2. Does macadamia require cross-pollination?

# DNA showed that most nuts came from cross-pollination



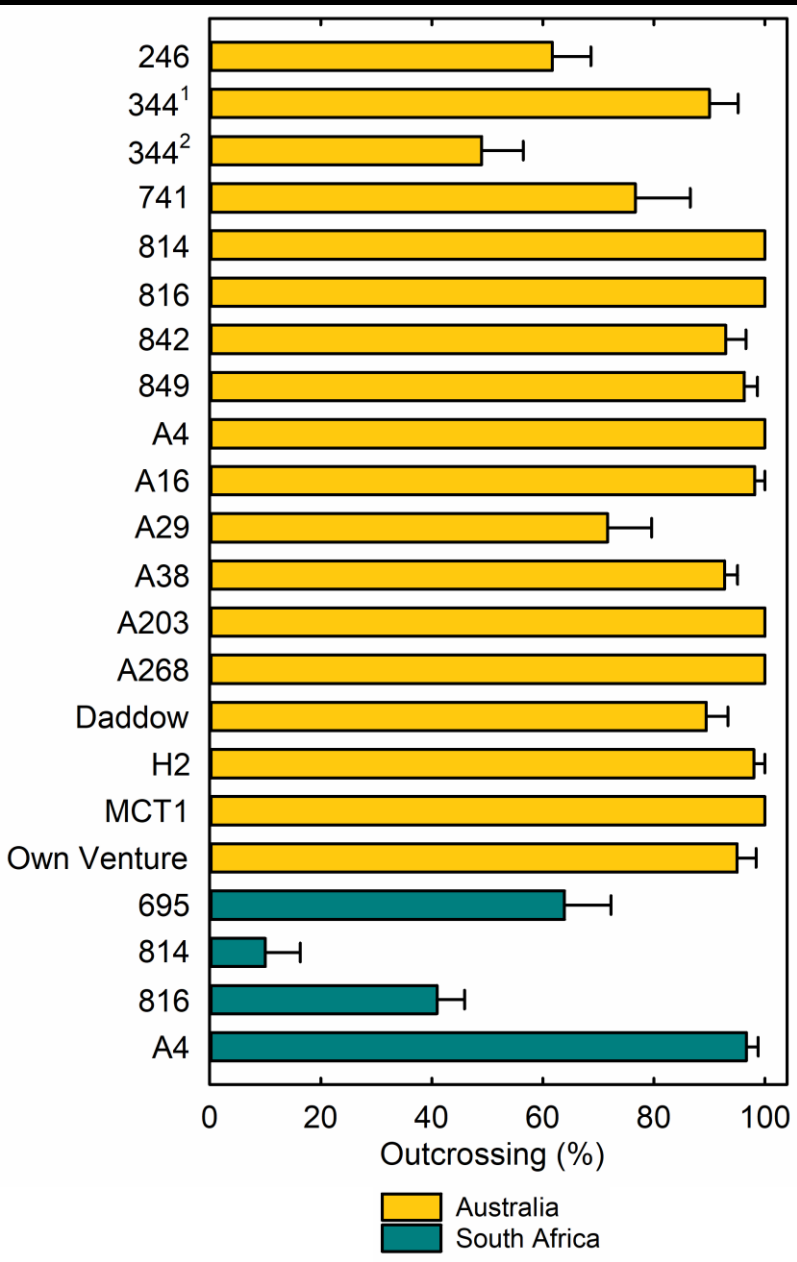
Self-pollination provided less than 0.2 t / ha

# What about other cultivars?

18 cultivars in **Australia** and **South Africa**

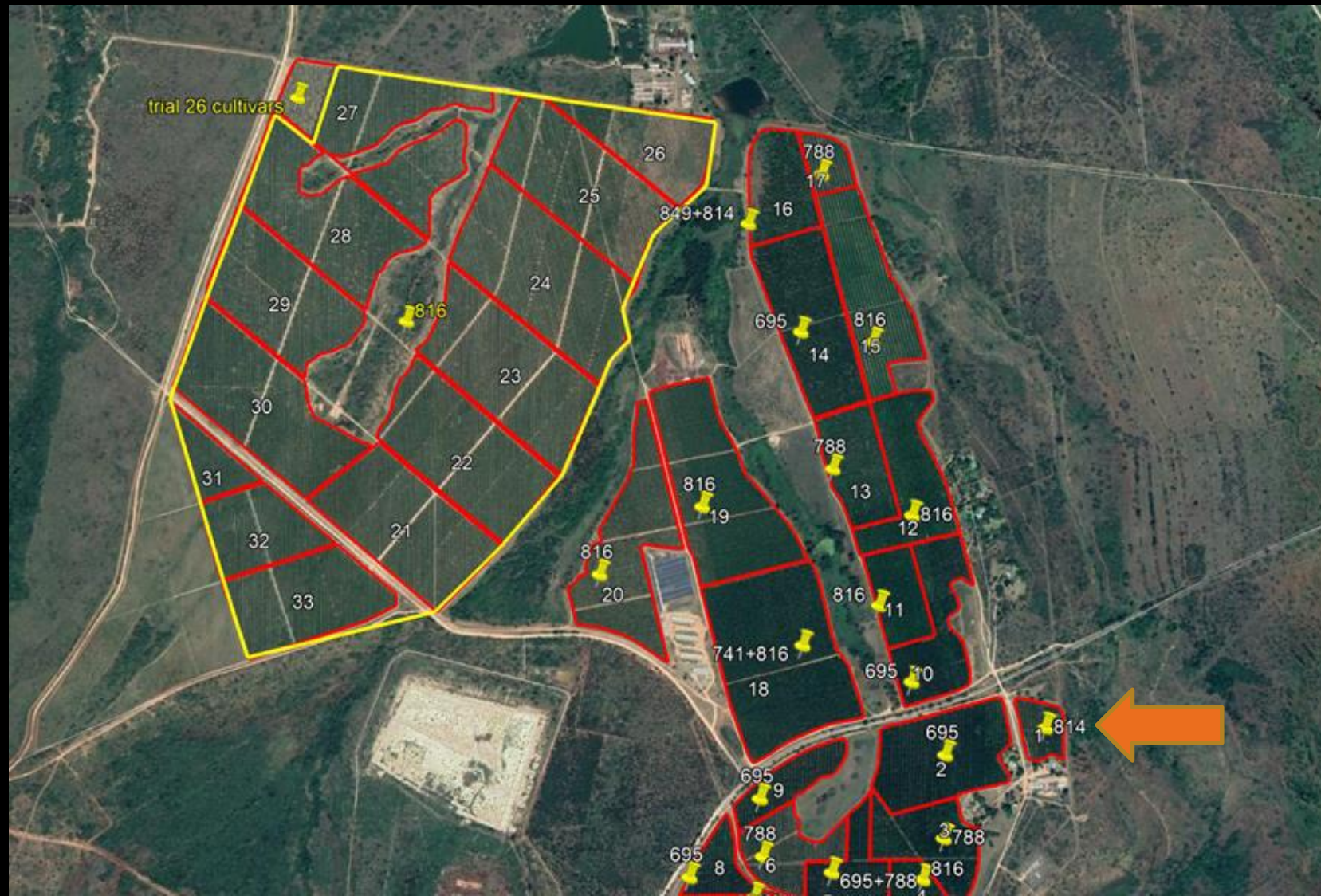
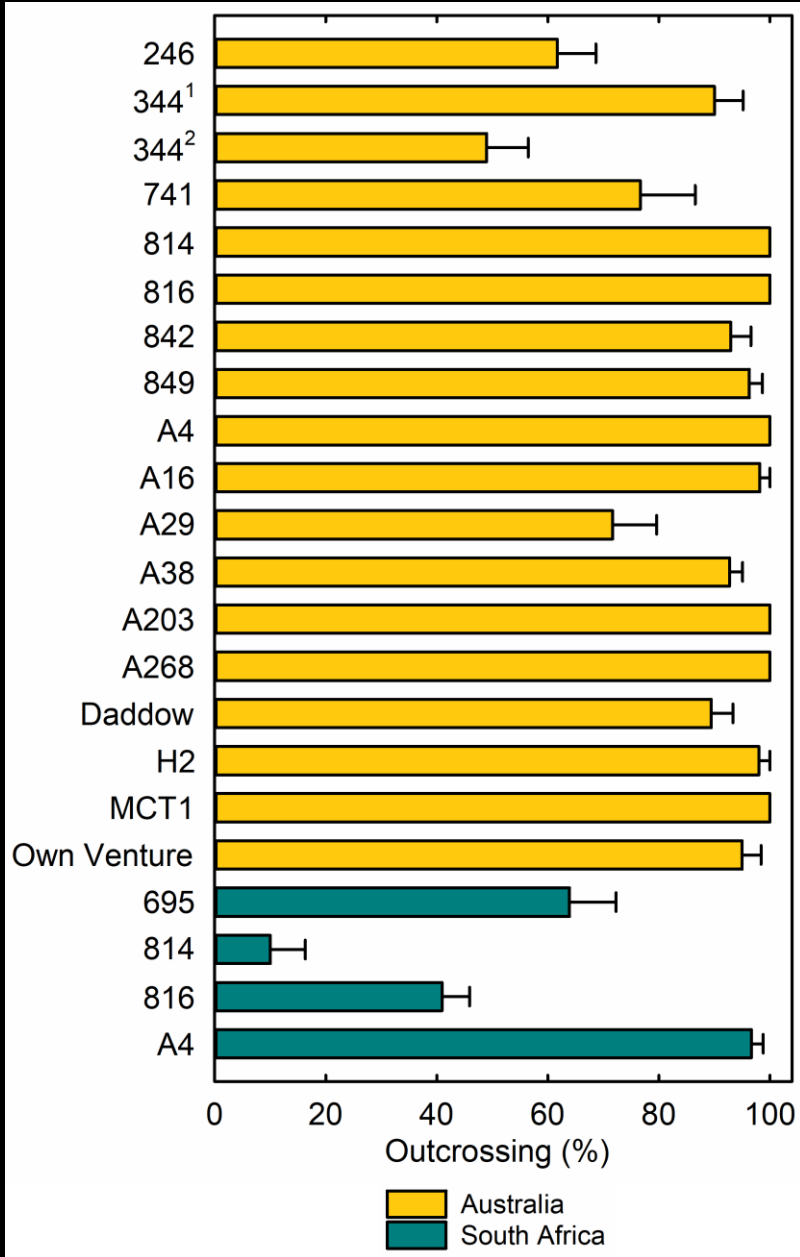
**246, 344, 741, 814, 816, 842, 849,  
A4, A16, A29, A38, A203, A268,  
Daddow, H2, MCT1, Own Venture  
695 (Beaumont), 814, 816, A4**





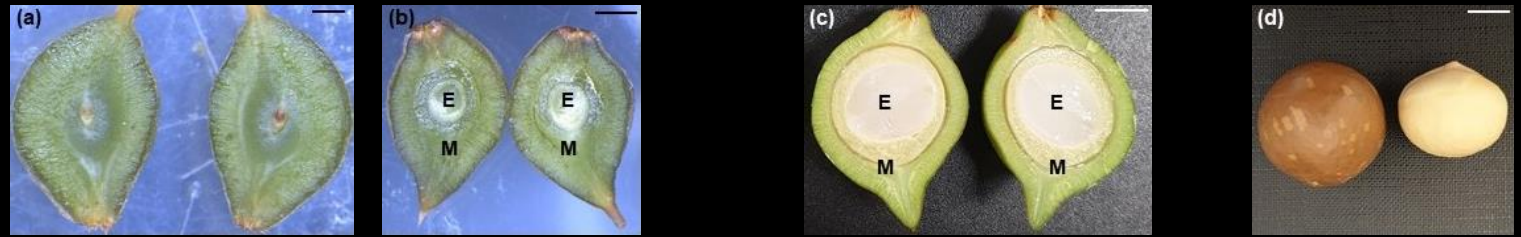
Most nuts in **Australia** came from cross-pollination

One site in **South Africa** had very low cross-pollination

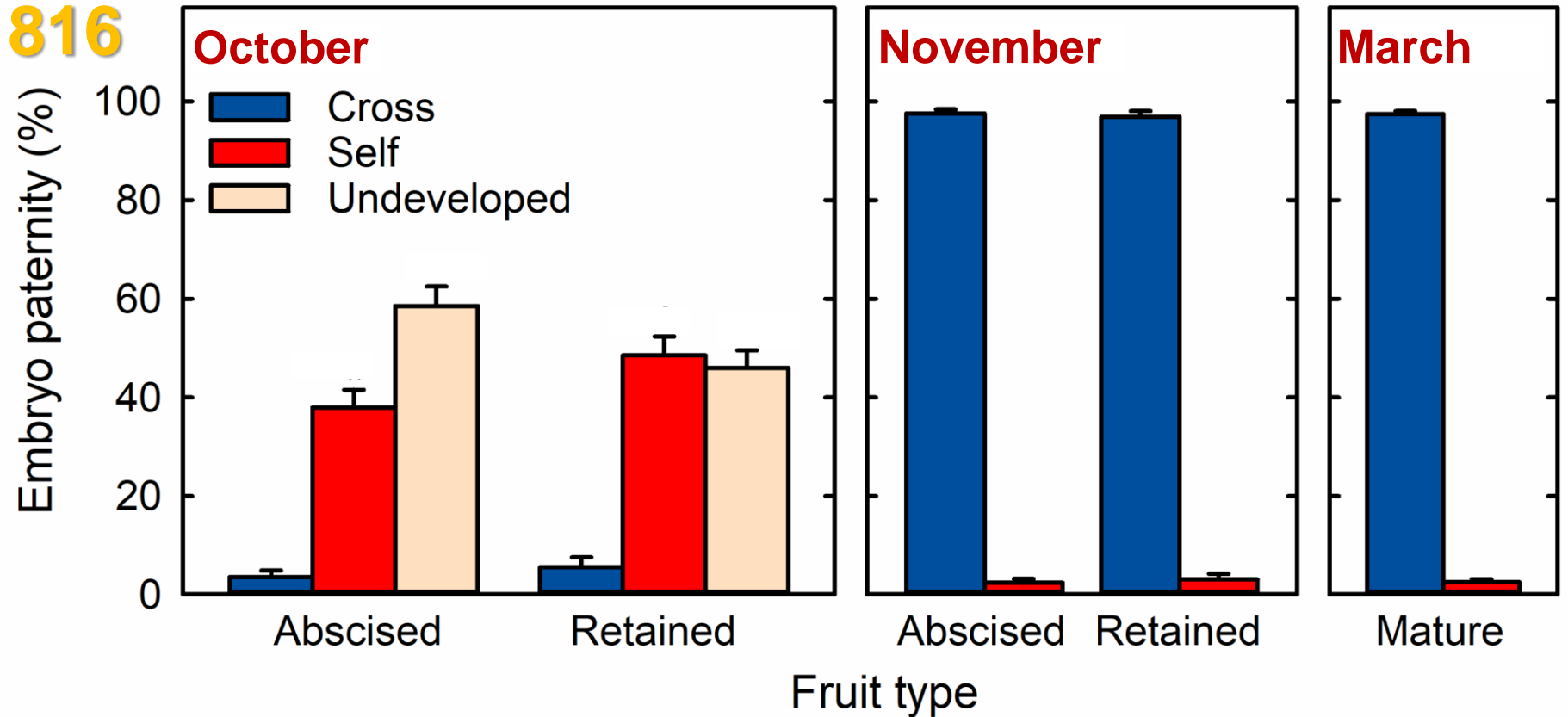


Undeveloped  
and self-  
pollinated nuts  
drop during  
October

The remaining  
nuts are mostly  
cross-pollinated



816

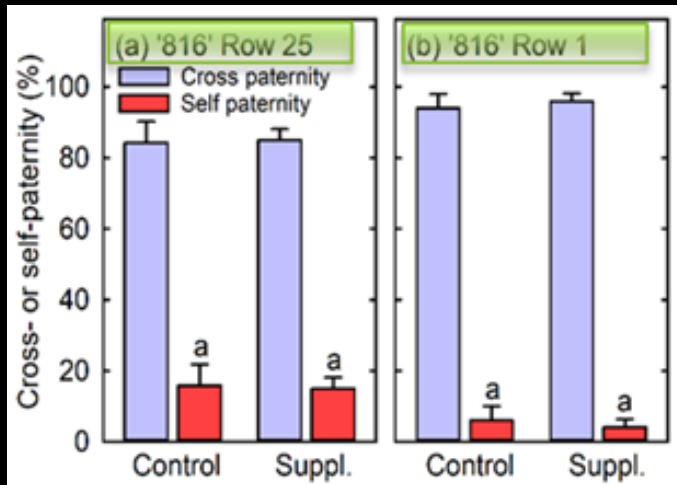




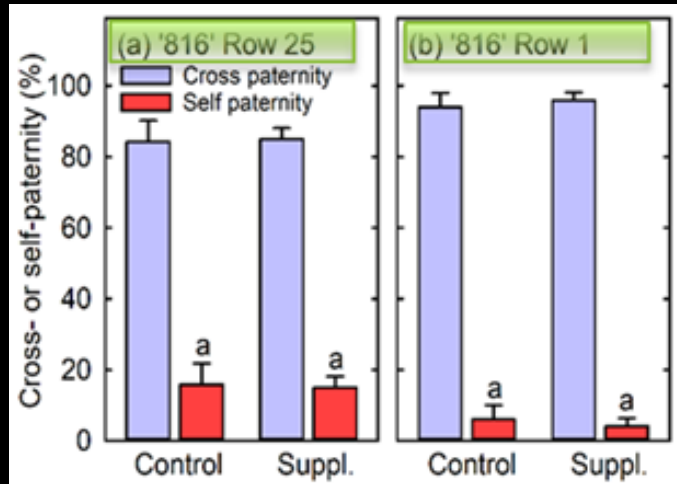
# 3. Does the pollen parent affect kernel recovery?



### 3. Does the pollen parent affect kernel recovery?



# Cross-pollinated nuts had higher kernel recovery



816	816 × 816 (self)	816 × Daddow (cross)
Kernel recovery	44.8 ± 1.6 a	47.2 ± 0.3 b

→ 2.4%



### 3. Does the pollen parent affect kernel recovery?

246, 344 (in QLD), 344 (in NSW)

741, Daddow, 695 (Beaumont)



<b>246</b>	246 × 246 (self)	246 × 344 (cross)	246 × 508 (cross)	246 × 741 (cross)
Kernel recovery	30.4 ± 0.9 a	33.6 ± 1.1 ab	35.2 ± 1.3 b	34.3 ± 1.0 b

→ **4.8%**

<b>344 (QLD)</b>	344 × 344 (self)	344 × 842 (cross)	344 × 849 (cross)	246 × Daddow (cross)
Kernel recovery	26.4 ± 2.6 a	31.4 ± 0.7 ab	30.6 ± 0.8 ab	32.8 ± 0.9 b

→ **6.4%**

<b>344 (NSW)</b>	344 × 344 (self)	344 × 246 (cross)
Kernel recovery	27.1 ± 0.9 a	31.2 ± 1.3 b

→ **4.1%**

<b>741</b>	741 × 741 (self)	741 × 842 (cross)	741 × A16 (cross)
Kernel recovery	33.9 ± 1.1 a	37.0 ± 0.7 ab	39.7 ± 1.4 b

→ 5.8%

<b>Daddow</b>	Daddow × Daddow (self)	Daddow × 344/741 (cross)	Daddow × 849 (cross)
Kernel recovery	35.7 ± 0.9 a	40.1 ± 1.0 b	39.0 ± 0.6 ab

→ 4.4%

<b>695 (Beaumont)</b>	695 × 695 (self)	695 × 788 (cross)	695 × 814 (cross)	695 × 816 (cross)
Kernel recovery	38.8 ± 0.8 a	44.0 ± 1.1 b	42.2 ± 1.1 b	42.1 ± 0.9 b

→ 5.2%



# 4. How do we maximise cross-pollination?

# Managing pollinators

Recommendation  
(Australia) is 5–8 hives per  
hectare

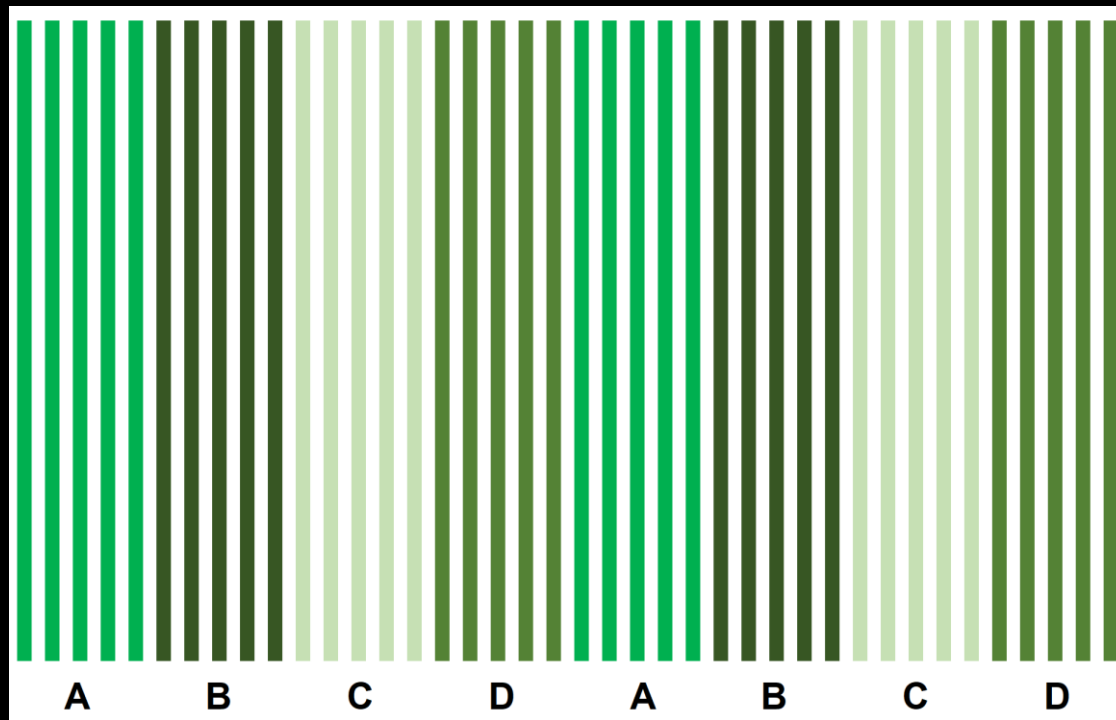
Distribute them as widely as  
possible

Plan pest control before  
flowering

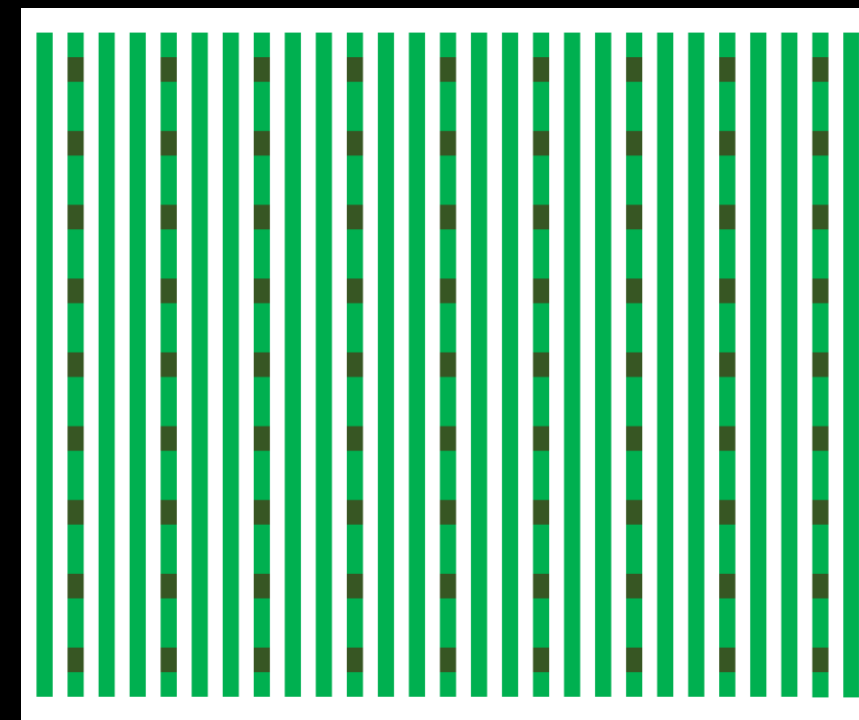


# Interplanting cultivars

What some growers are doing



5-row blocks



Every 3<sup>rd</sup> tree in every 3<sup>rd</sup> row




# Interplanting cultivars

## Selecting pollinisers:

- Overlapping flowering
- Similar pest, disease, irrigation, fertiliser, and harvesting time
- High kernel recovery
- Heavy flowering
- (Similar whole kernel %)

*Fact sheet*  
**POLLINATION**



**Indicative Macadamia Cultivar Main Flowering Guide**

Early	Mid	Late
246	G	A268
741	P	MCT1
842	A203	R
344		Beaumont
Daddow		A4
660		A16
816		A38
849		
814		

# Conclusions

1. Macadamia yields are limited by cross-pollination
2. Macadamia flowers require cross-pollination
3. Cross-pollination increases kernel recovery
4. We maximise cross-pollination by:

Managing bee populations

Interplanting cultivars







QUESTIONS ?



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