Measuring honey bee reliance in self-fertile Carina

Dr Lisa Evans

Thank you:

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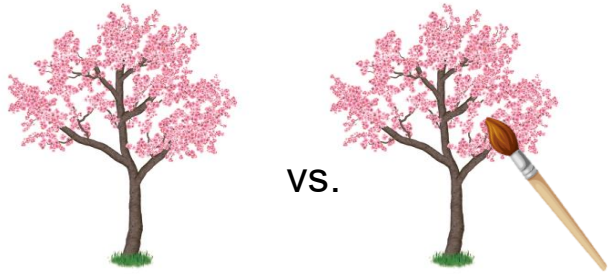
Research Aims

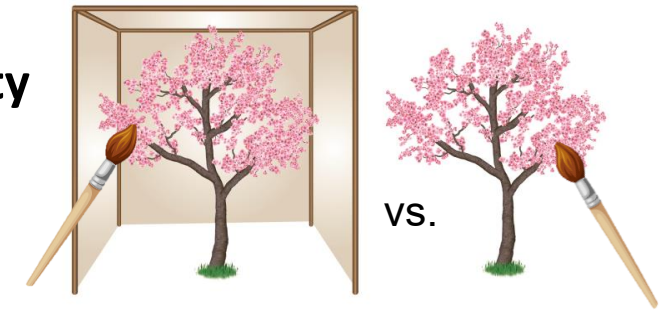
1. **Determine whether ‘Carina’ yield is limited by pollen transfer**

Compared **open-pollinated** and **hand-pollinated trees**



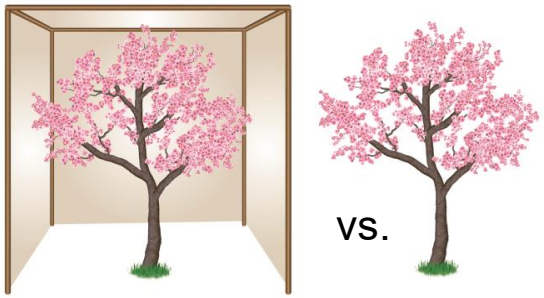
2. **Evaluate the impact of cross-pollen availability on ‘Carina’ yield and fruit quality**

Compared hand-pollinated **self-** and **cross-pollination** treatments



3. **Assess the reliance of ‘Carina’ on honey bees**

Compared tree yield and fruit quality between **pollinator-excluded** and **open-pollinated** treatments



Trial Setup

Applied pollination treatments and assessed bee activity

Open pollinated

x 6

Hand-pollinated self

x 6

Hand-pollinated cross

x 6

No pollinators

x 6

Assessed yield, parentage, and nutrient content

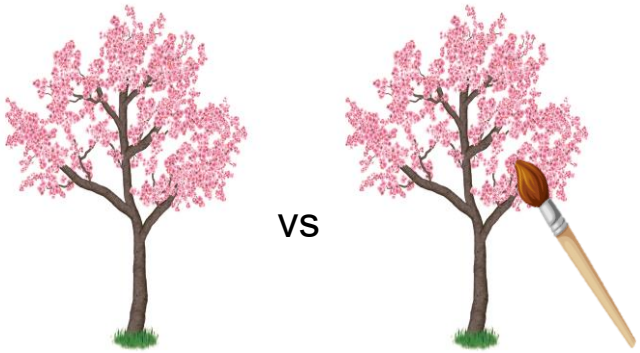
Yield: Fruit counts & weight per branch

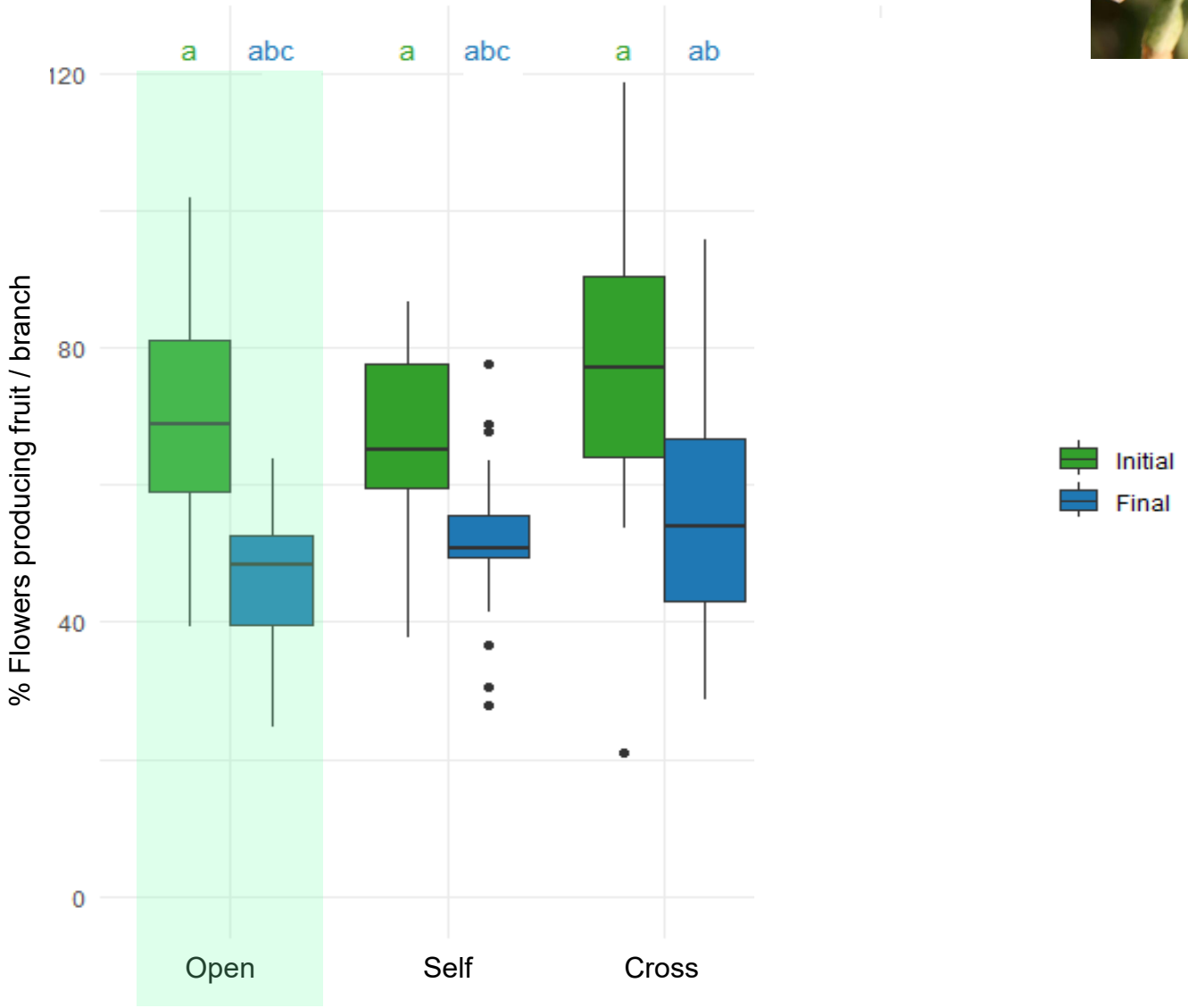
Parentage: 1,080 fruit (30 per branch) analysed

Nutrient content: being analysed for a sub-sample of cross- and self-pollinated nuts

Results

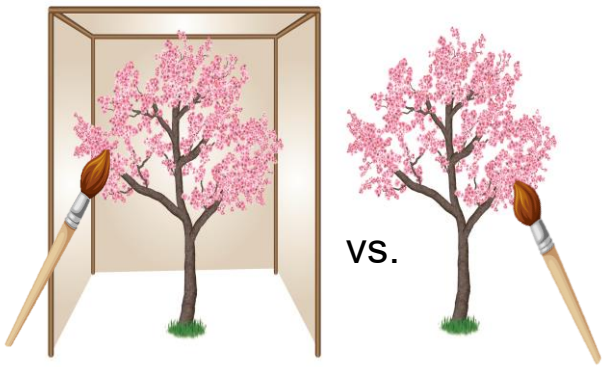
1. Determine whether yield is limited by pollen transfer rates: No

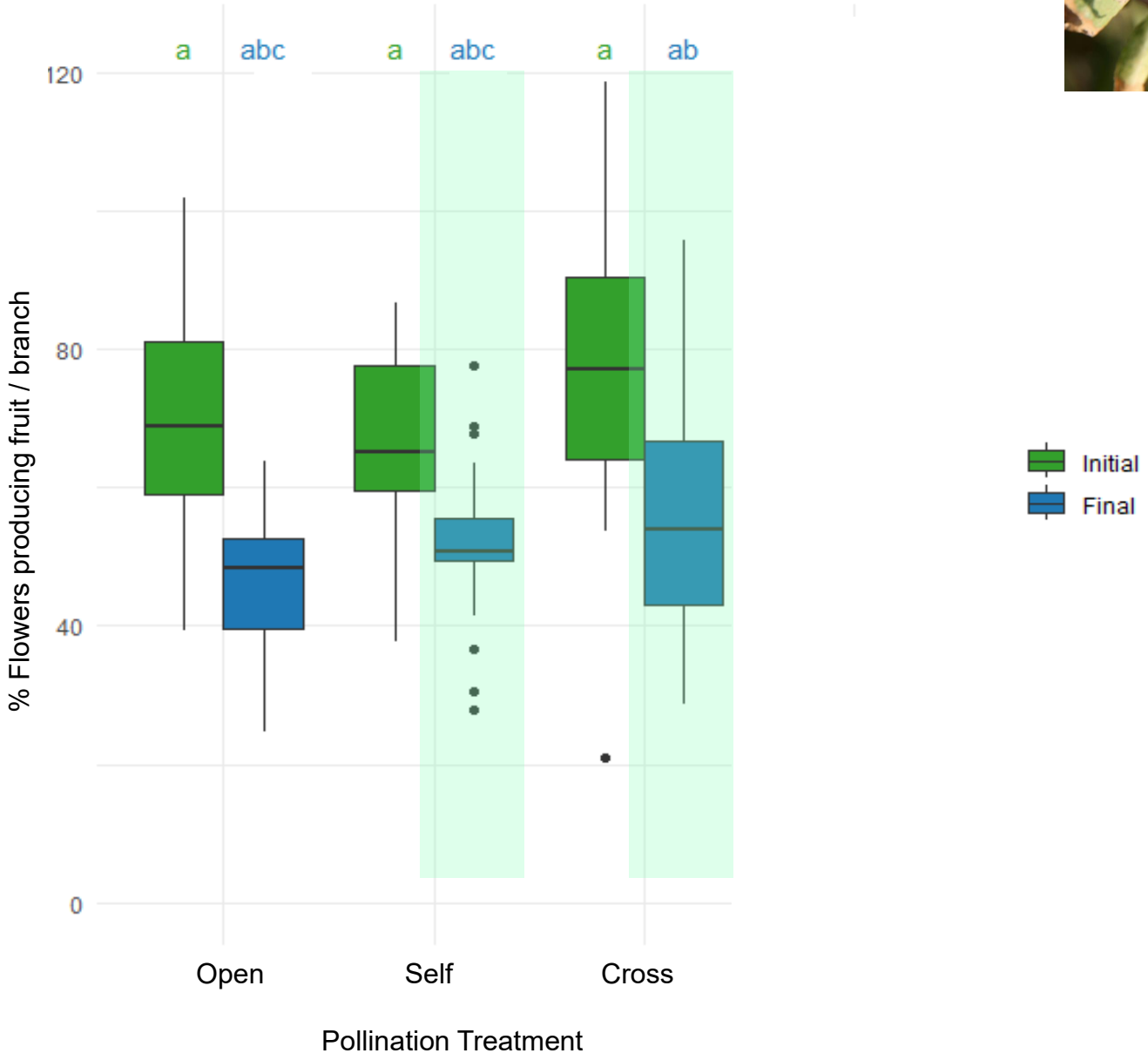




Results

2. Evaluate the impact of cross-pollen availability on yield: No difference in yield

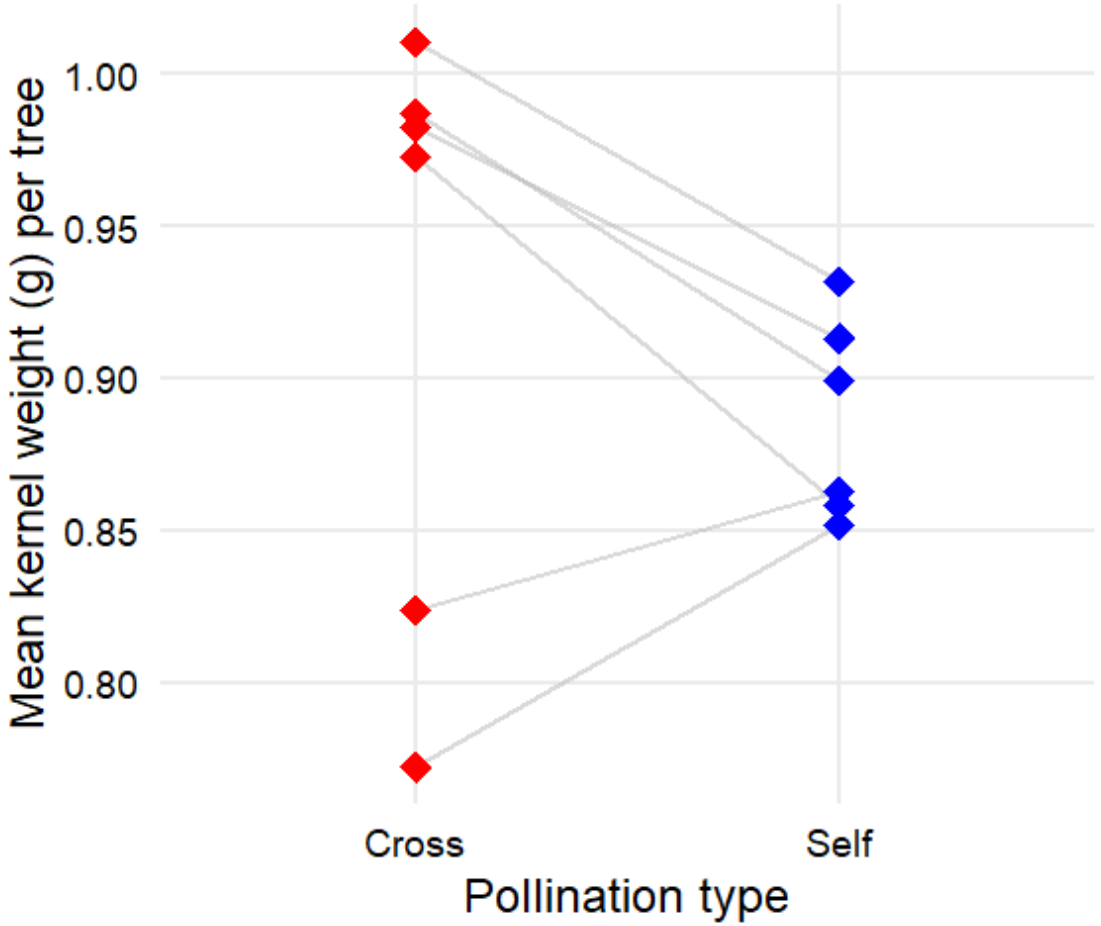




Results

2. Evaluate the impact of cross-pollen availability on fruit quality:

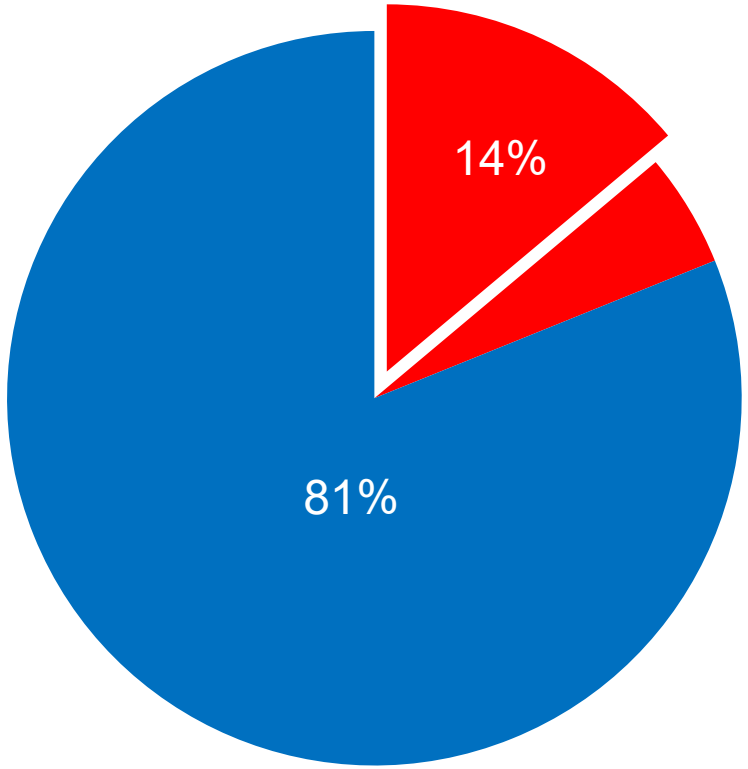
Larger fruit with cross-pollen



Mean fruit weight was ~9 % higher for cross-pollinated fruit (0.96 vs 0.88g)

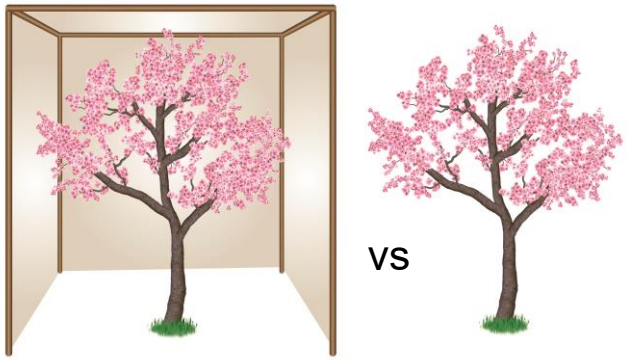
Results

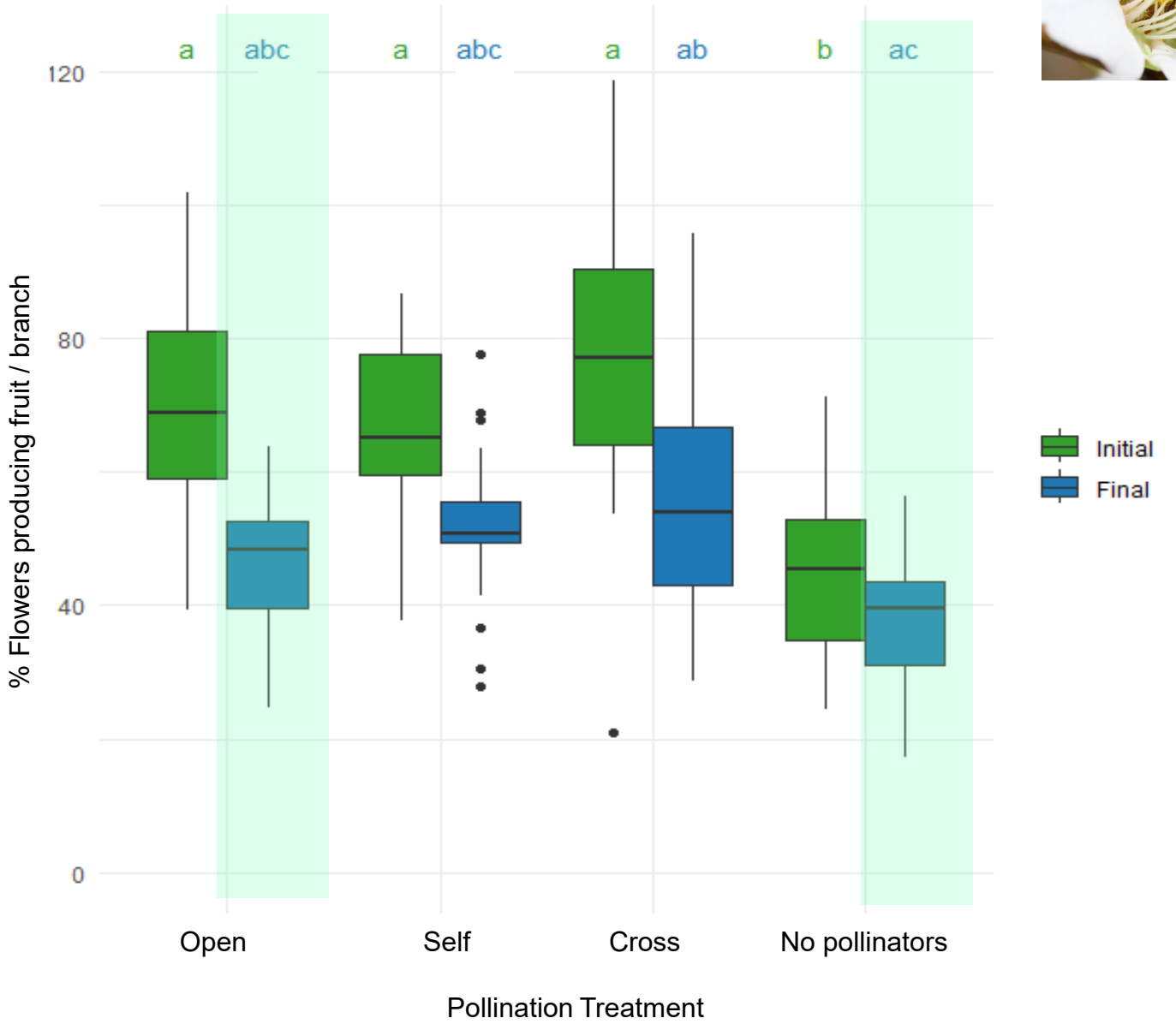
Most ‘Carina’ nuts self-pollinated — only 14 % cross-set from Nonpareil



Results

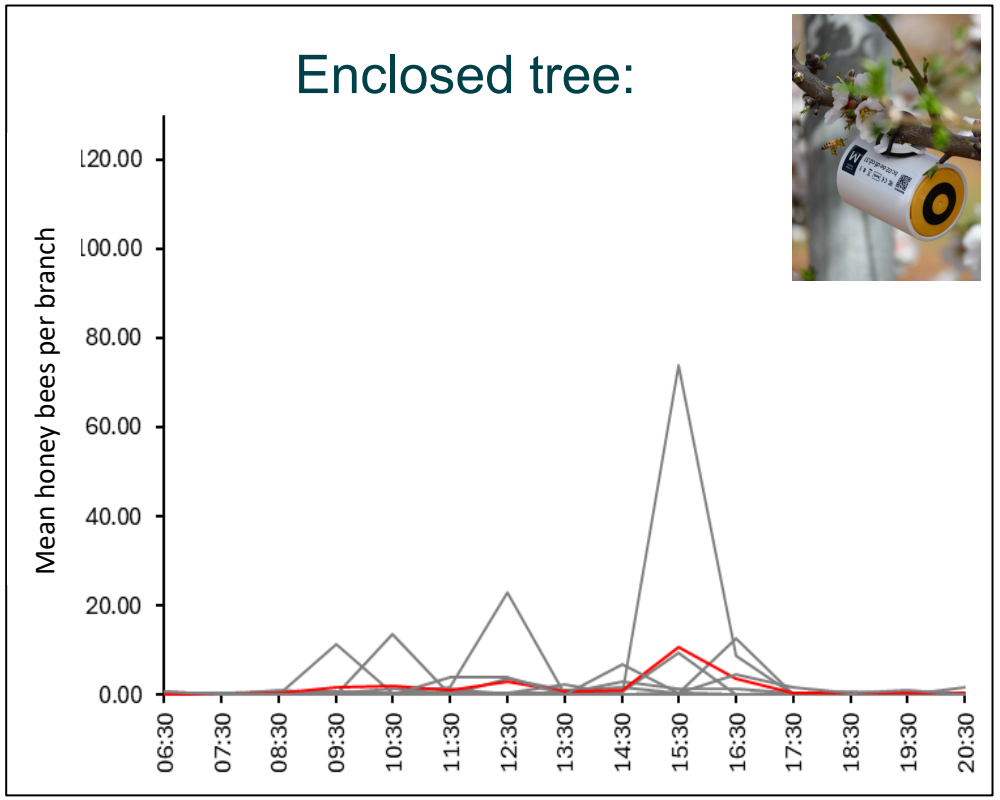
2. Assess the reliance of ‘Carina’ on honey bees:

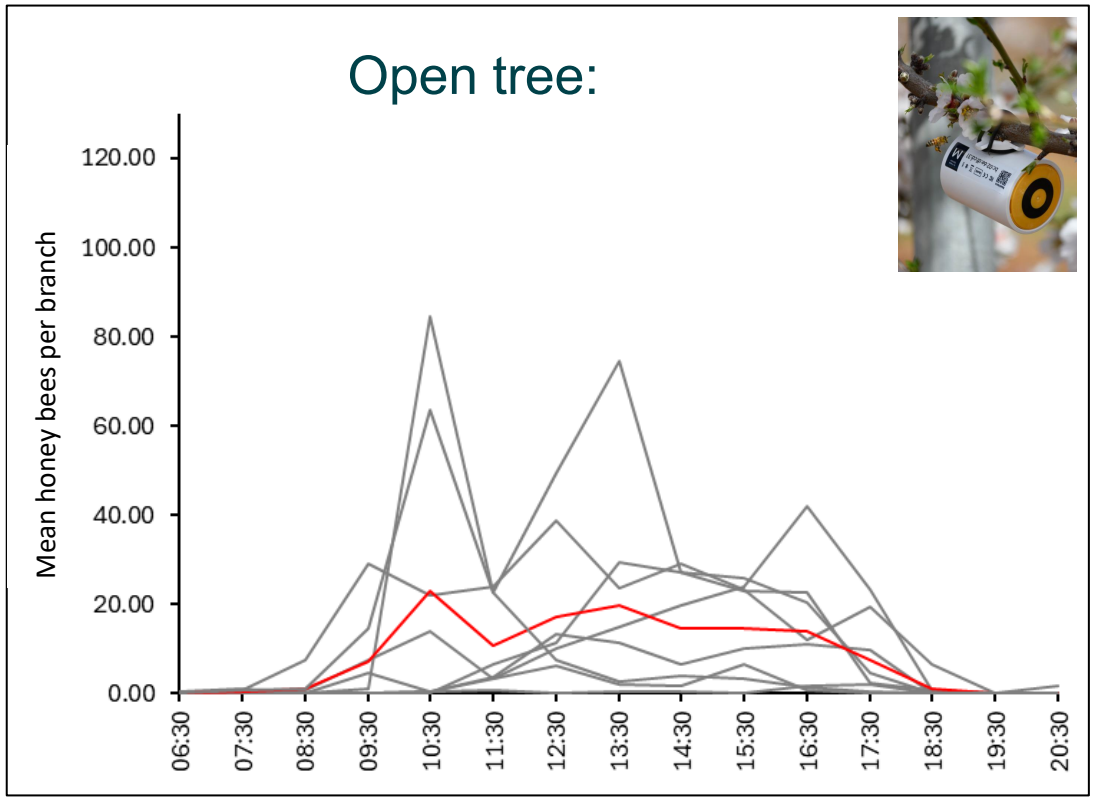




Results

2. Assess the reliance of 'Carina' on honey bees: **Low reliance**





Trial Setup – Season 2

Open pollinated

x 8

Hand-pollinated cross

x 8

No pollinators

x 8

Season 2

Open pollinated

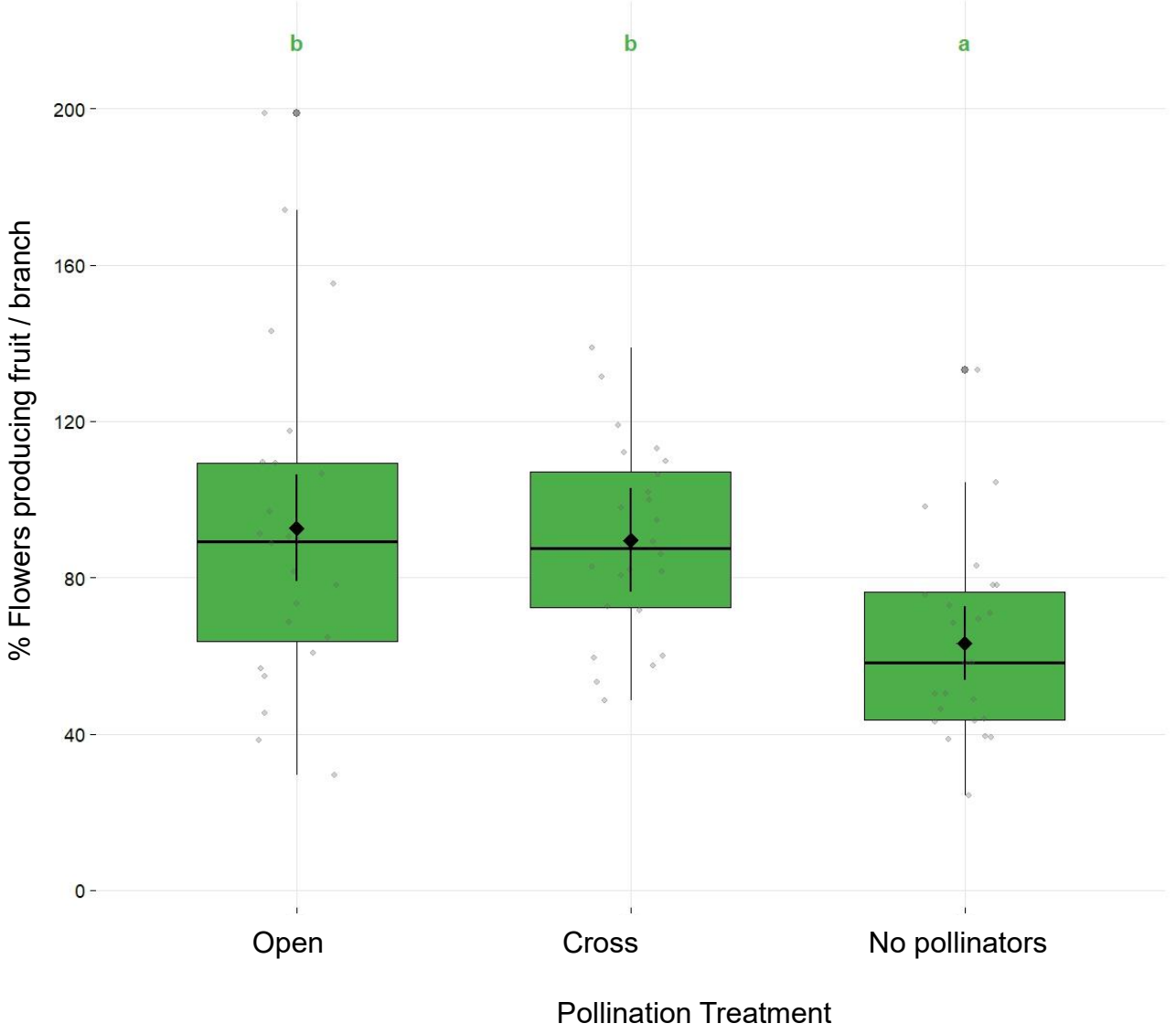
x 8

Hand-pollinated cross

x 8

No pollinators

x 8



Summary:

- **Carina is a flexible, self-sufficient variety**, capable of setting comparable yields with its own pollen.
- **Cross-pollen provides a modest quality boost**, increasing nut weight by ~9 %, so there is some benefit to having another variety nearby.
- **Carina appears to have low pollinator dependence**, meaning reliable production even when pollinator activity is limited.

Next steps:

- **Ongoing fruit quality analysis:** moisture content, mineral nutrient analysis and fatty acid composition.
- **Season 2 data collection and analysis**: harvest still to come and video footage to analyse.

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Thank you