



Bioflavonoid Biostimulant:

Mango trials – Tamarak Mango Estate
Clanwilliam

Berné Grobler



What is C4L Technology?

C4L technology is a carefully formulated complex of unique flavonoids and different plant extracts, including *Citrus aurantium* and organic acids, designed as an organic, foliar-applied suspension concentrate.

 **Suspension concentrate**
Excellent compatibility

 **pH 2.66**
Low application rates

 **Organic product**
Ceres approved, OMRI listed, NPOP

 Extensively tested for more than **20 years** on **48 different crops**

 **Data-driven** and crop specific recommendations



Bioflavonoids as Biostimulants

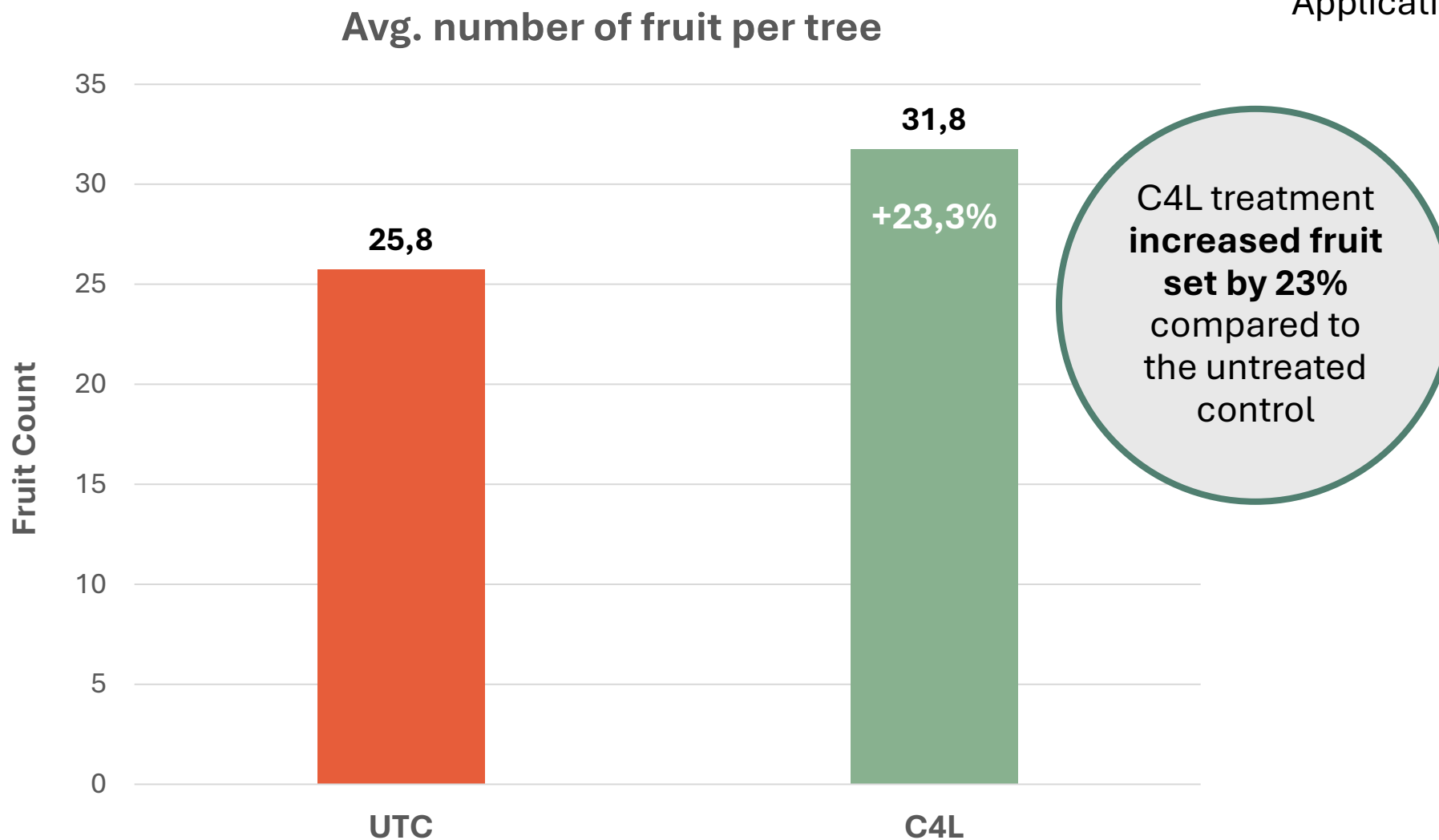
 **Bioflavonoids** are natural compounds found in plants

-  Involved in plant signaling
-  Activating



Fruit Set Improvement

Keitt – Clanwilliam 2025



Applications:

19 Jun 2025

(Start of Flowering)

17 Jul 2025

(Early Panicle Phase)

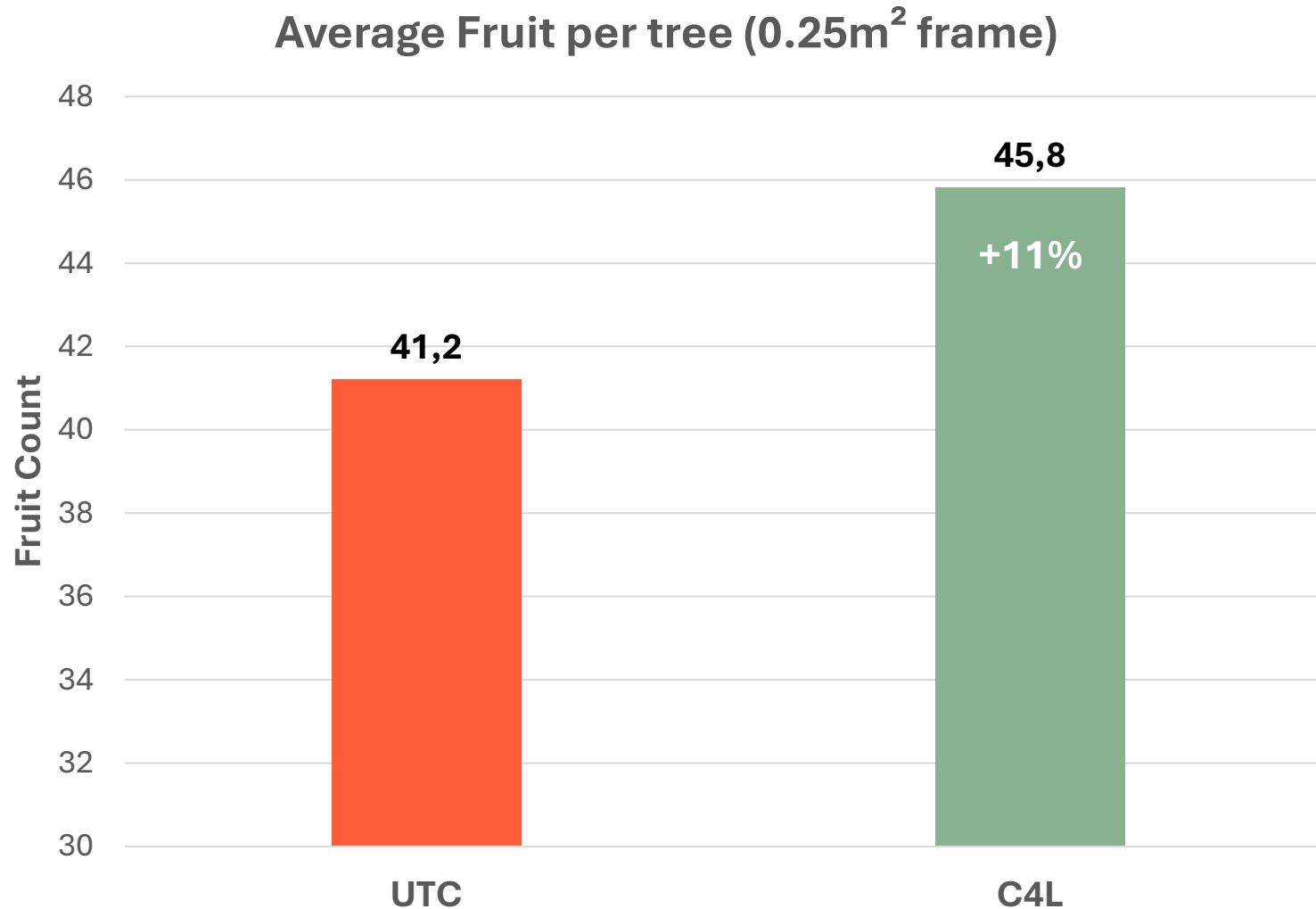
18 Aug 2025

(50% Flower Development)



Fruit Retention Improvement

Keitt – Clanwilliam 2025



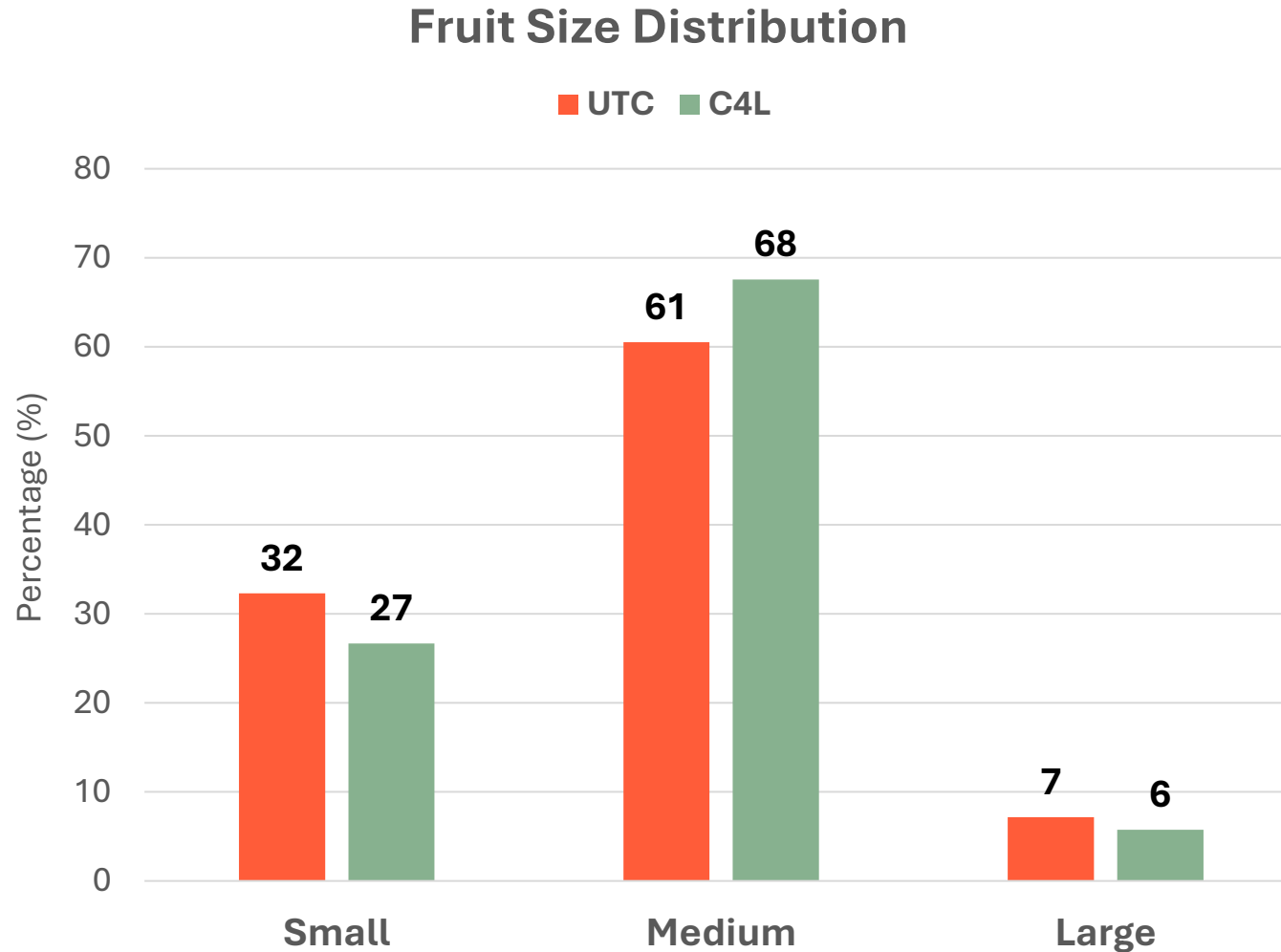
Applications:

19 Jun 2025 (Start of Flowering)
17 Jul 2025 (Early Panicle Phase)
18 Aug 2025 (50% Flower Development)

**C4L treatment
increased fruit
retention by
11% compared
to the untreated
control**

Fruit Size Distribution

Keitt – Clanwilliam 2025



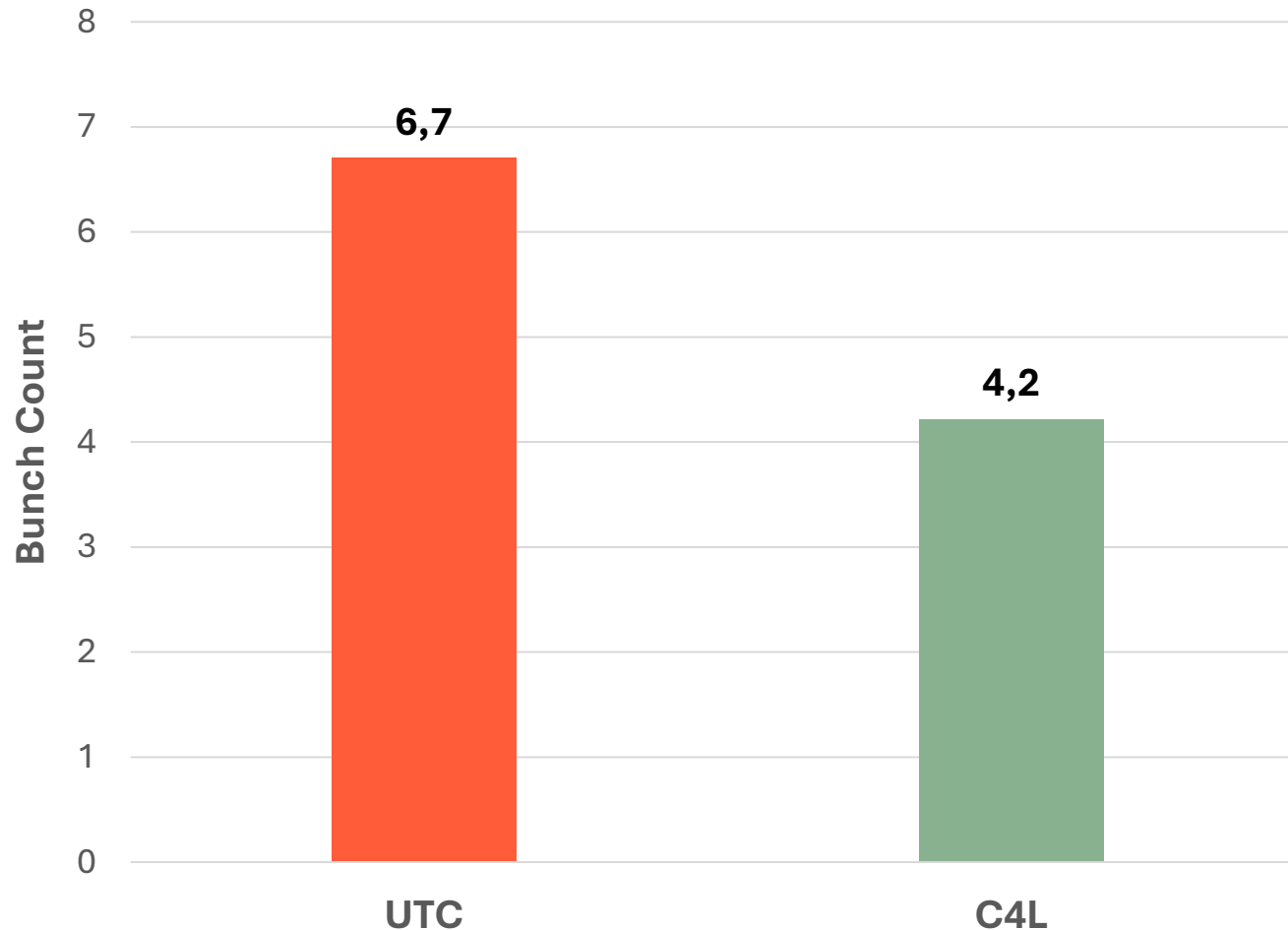
C4L shifted fruit size distribution toward **larger**, **more uniform fruit** compared to the untreated control



Mango Malformation Disease (MMD) Incidence

Keitt – Clanwilliam 2025

MMD Flower bunches per tree

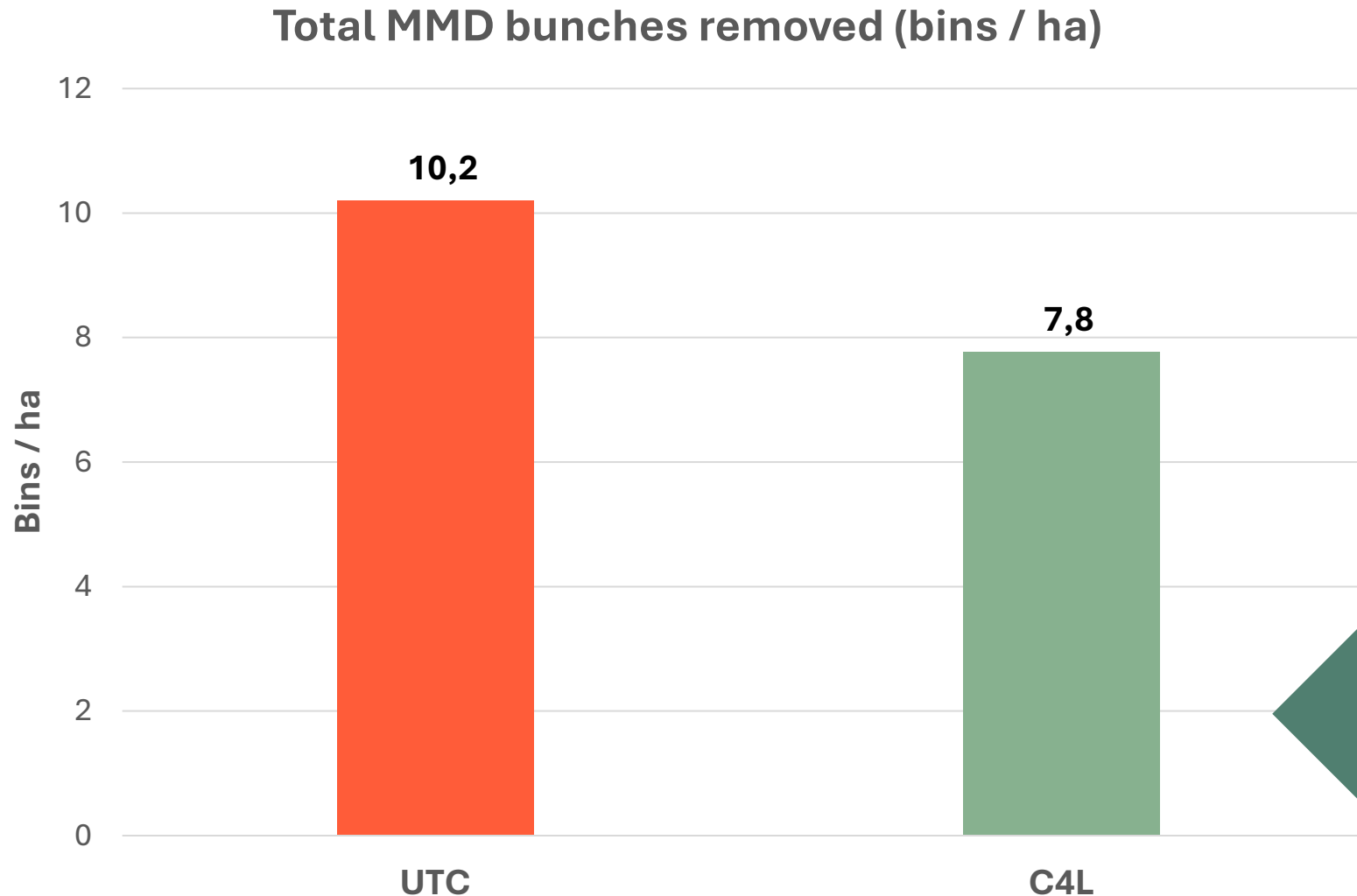


**C4L reduced
MMD incidence
per tree by 37%**
compared to the
untreated
control



Mango Malformation Disease (MMD) Severity

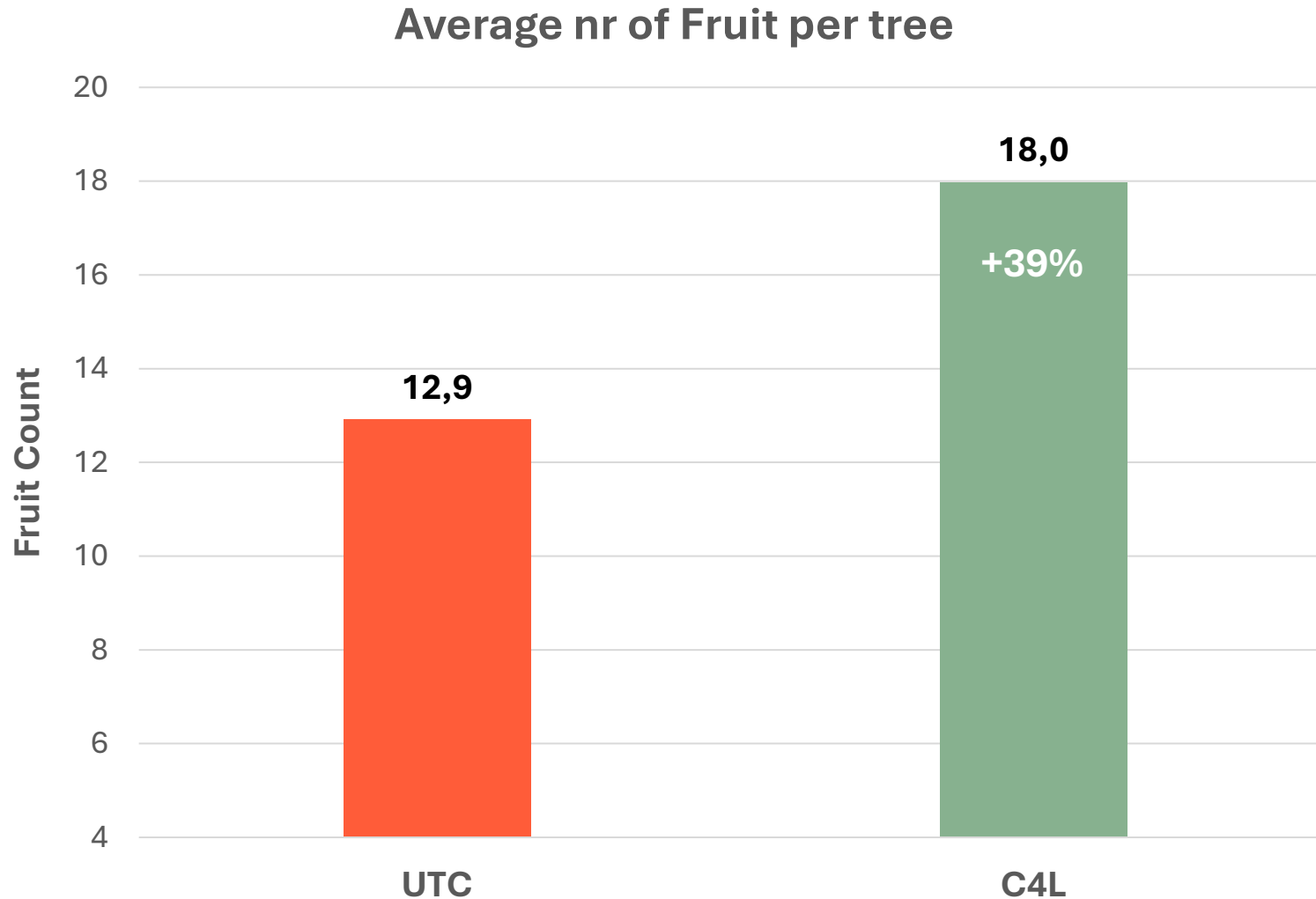
Keitt – Clanwilliam 2025



C4L suppressed MMD severity by 30,8% as compared to the untreated control

Fruit Retention Improvement

Heidi – Clanwilliam 2025

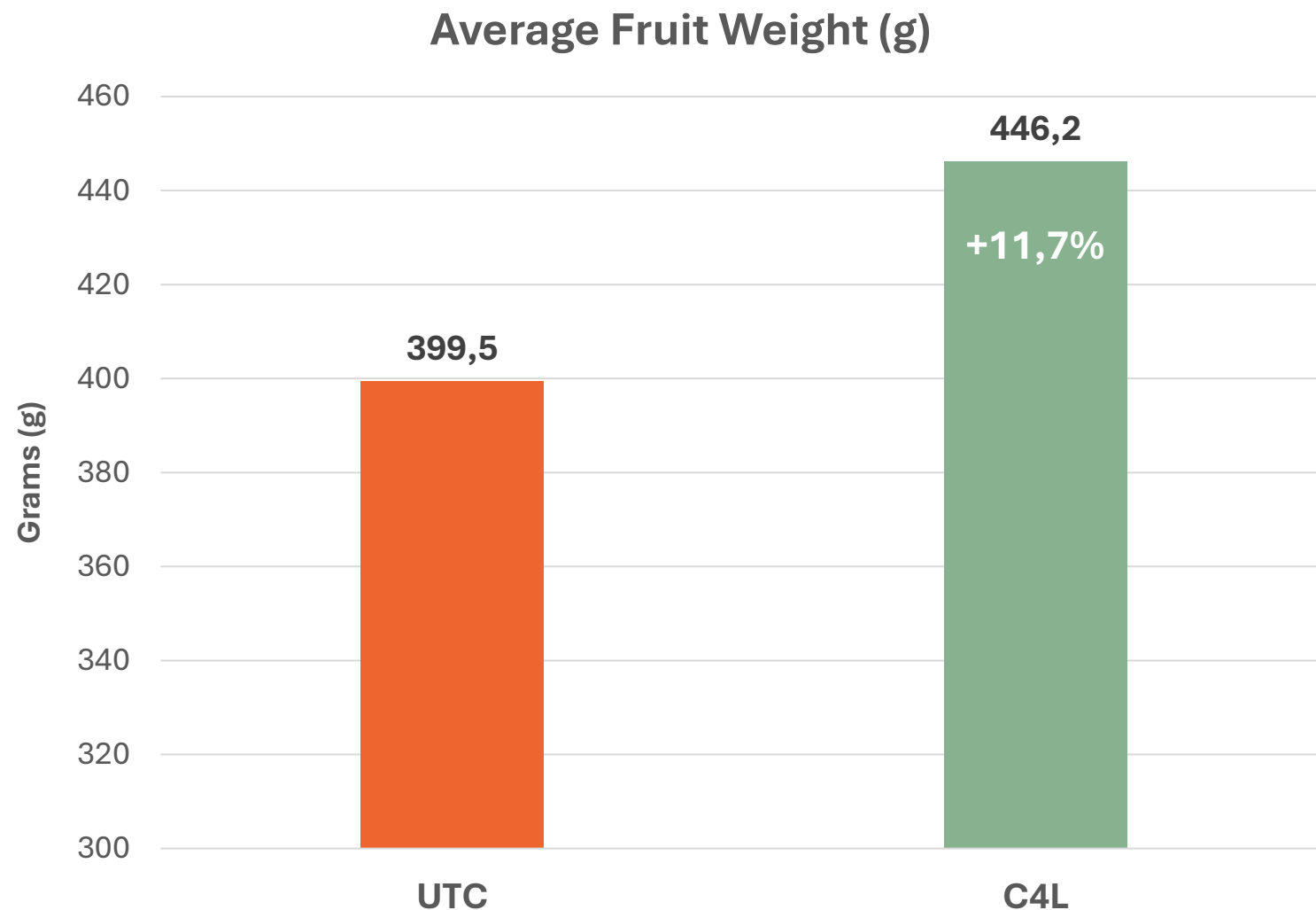


C4L treatment improved Fruit Retention by 39% compared to the untreated control.



Fruit Weight (after 2 weeks in cold storage)

Heidi – Clanwilliam 2025



Applications:
(Heidi &
Sensation)

16 Sept 2025

(Start of Flowering)

21 Oct 2025

(Early Panicle Phase)

19 Nov 2025

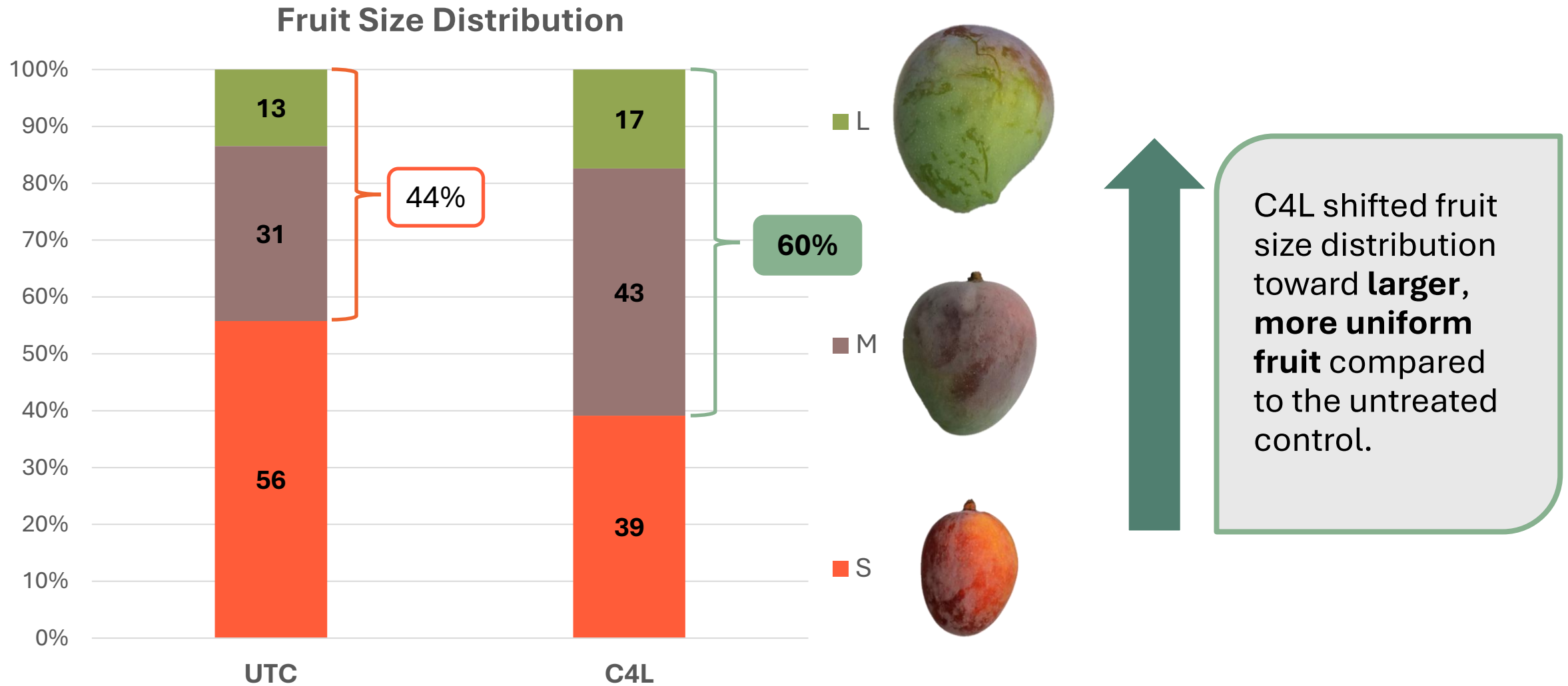
(50% Flower Development)

**C4L increases the
average Fruit Weight by
11,7% compared to the
UTC**

**C4L improved Fruit
Retention significantly,
without sacrificing fruit
weight.**

Fruit Size Distribution (after 2 weeks in cold storage)

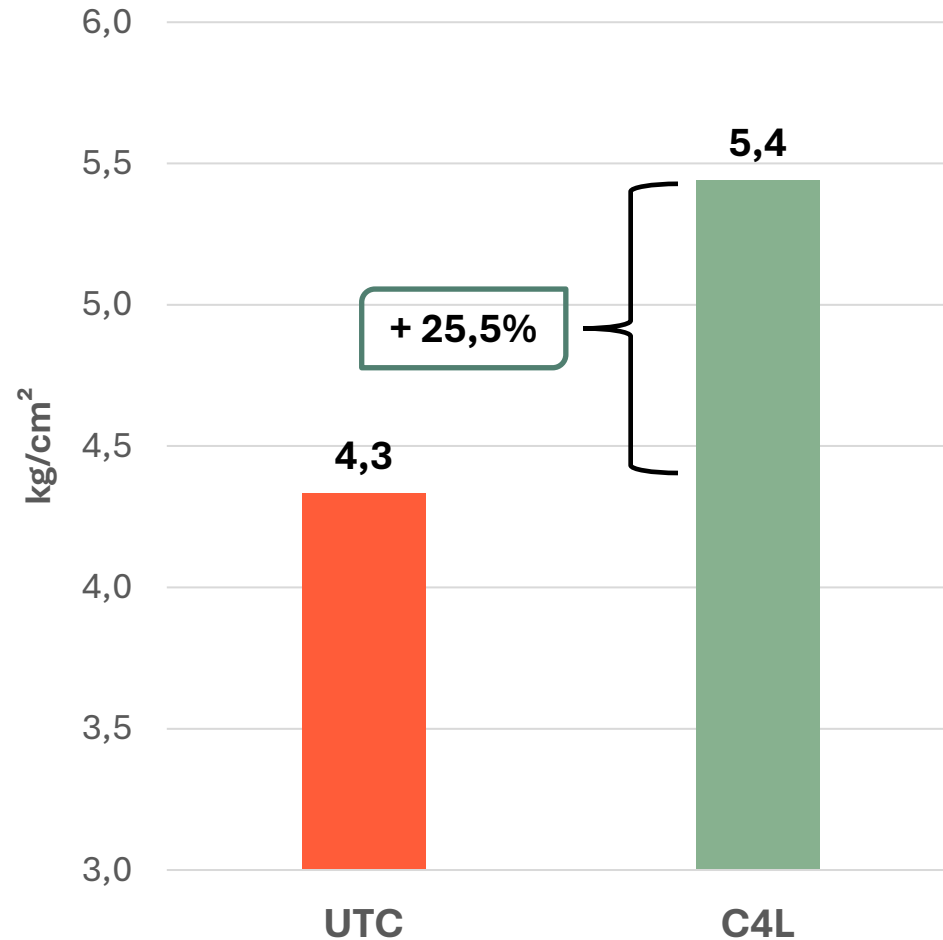
Heidi – Clanwilliam 2025



Fruit Firmness and °Brix (after 2 weeks in cold storage)

Heidi – Clanwilliam 2025

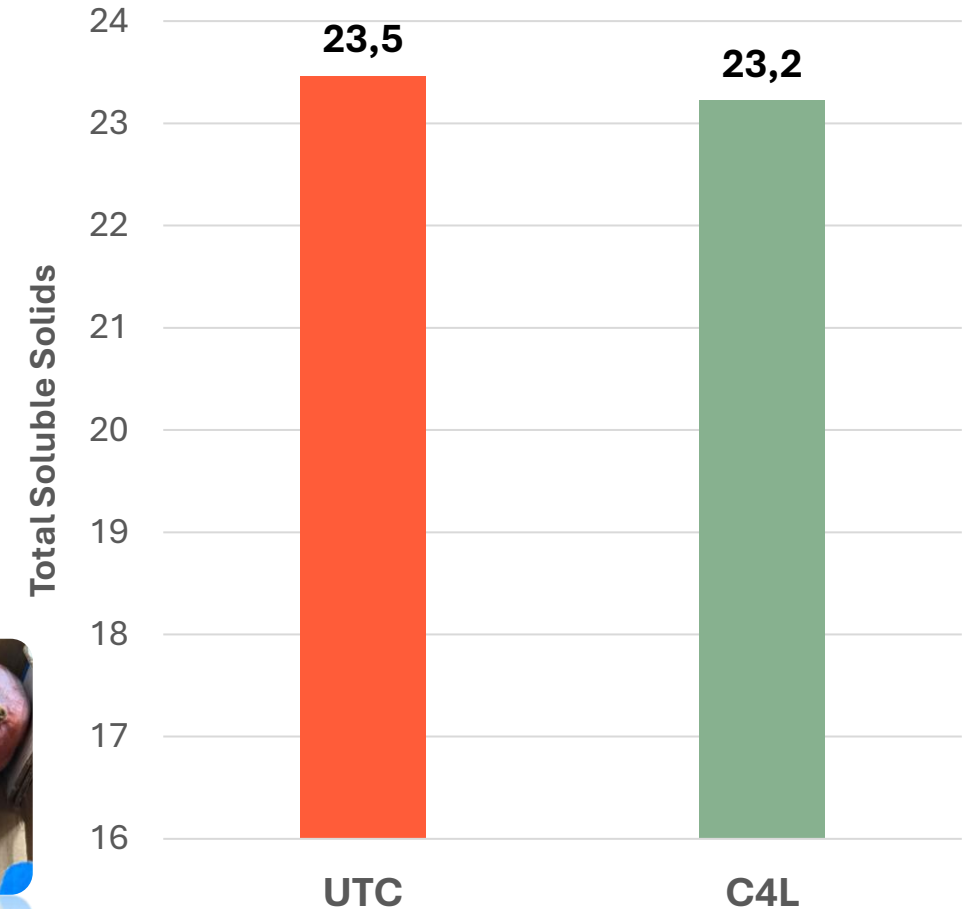
Average Fruit Firmness



C4L improved **Fruit Firmness** significantly compared to the untreated control.

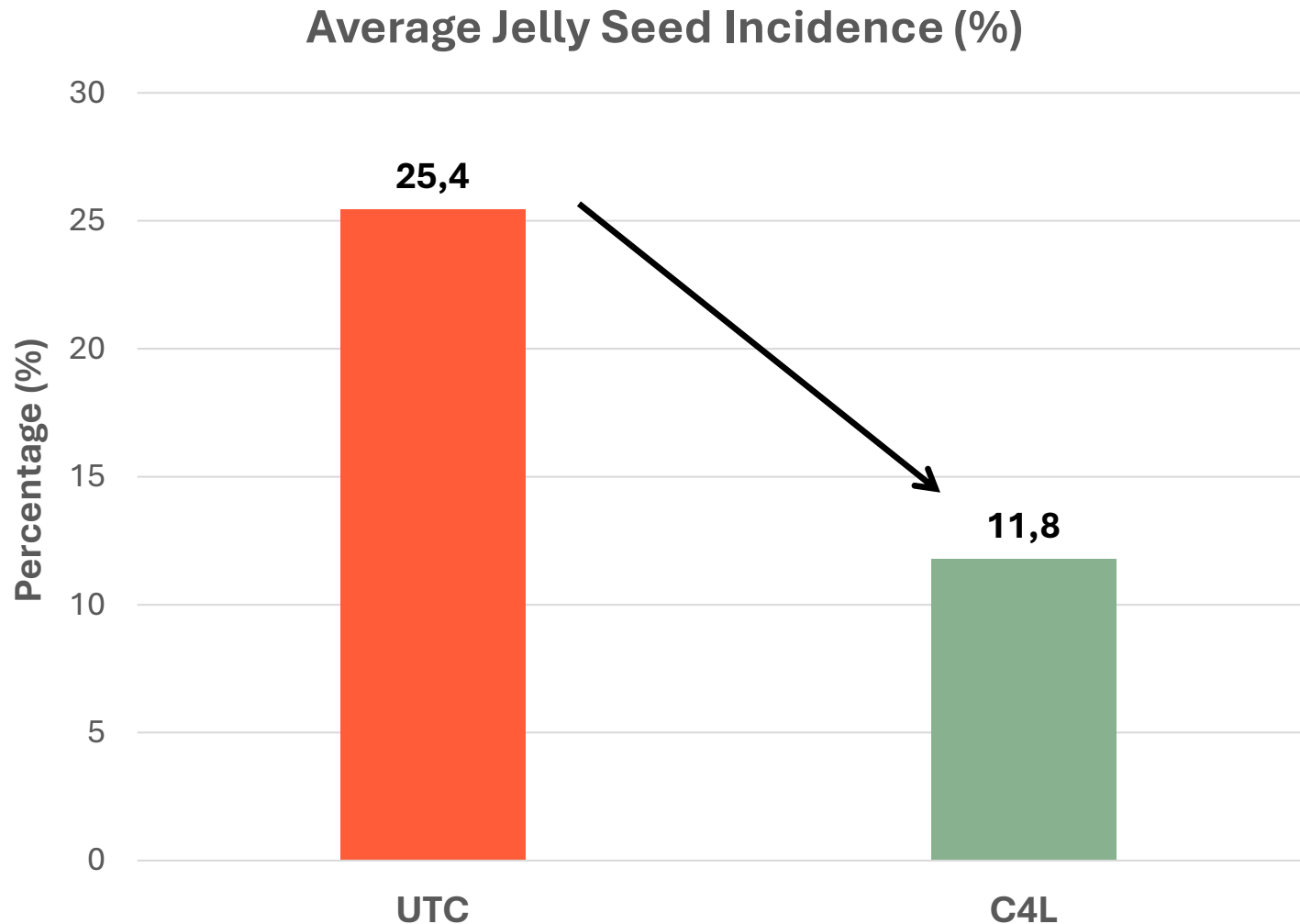


Average °Brix



Jelly Seed Incidence (after 4 weeks in cold storage)

Sensation – Clanwilliam 2025



C4L reduced the incidence of jelly seed significantly compared to the UTC

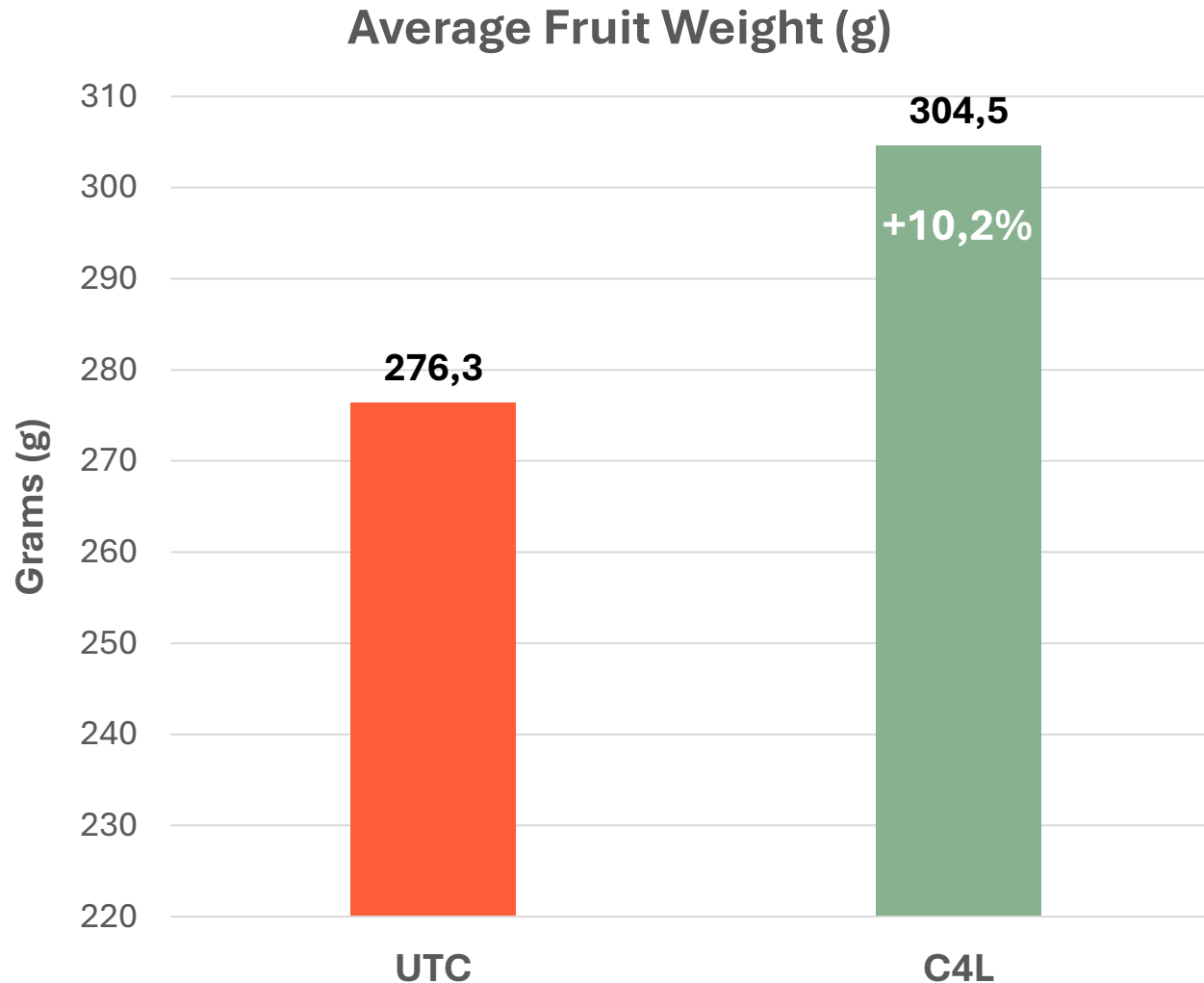


Healthy

Jelly Seed

Fruit Weight (after 4 weeks in cold storage)

Sensation – Clanwilliam 2025



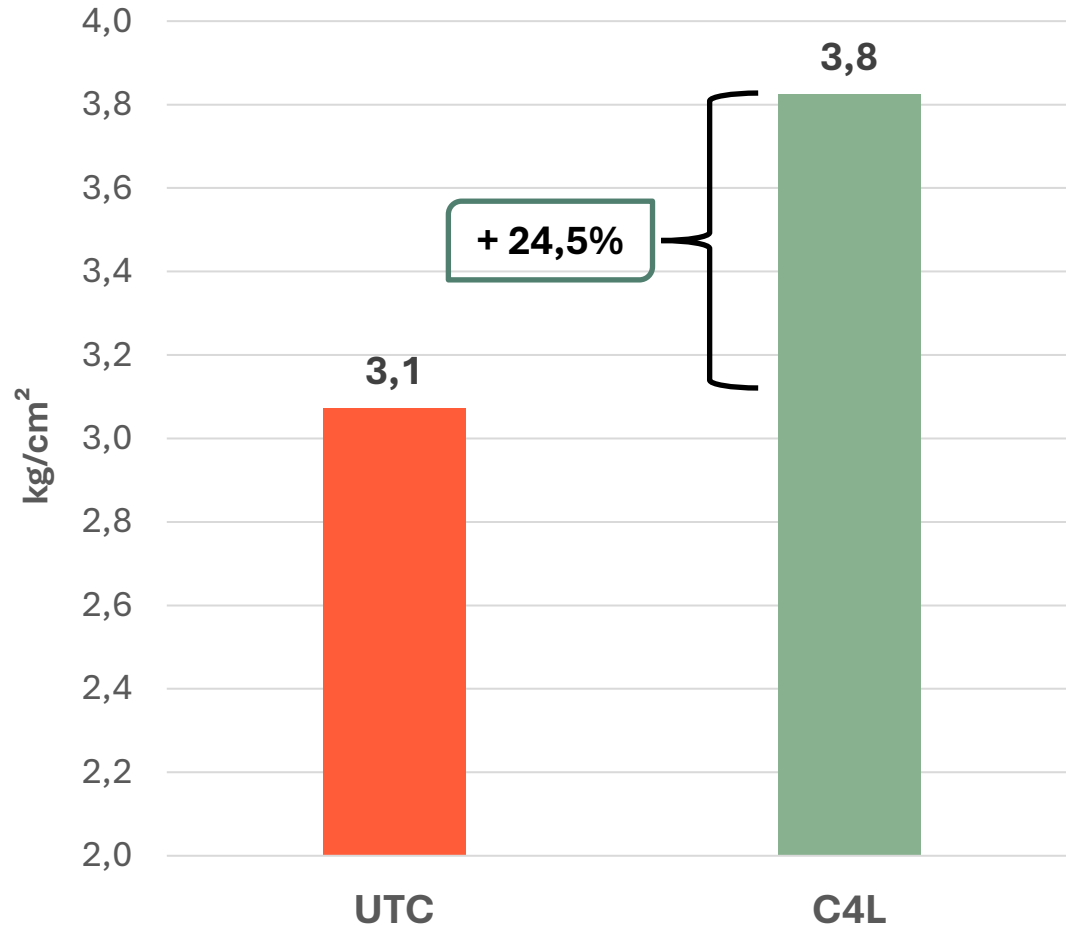
**C4L increased average
Fruit Weight by 10%
compared to the UTC**



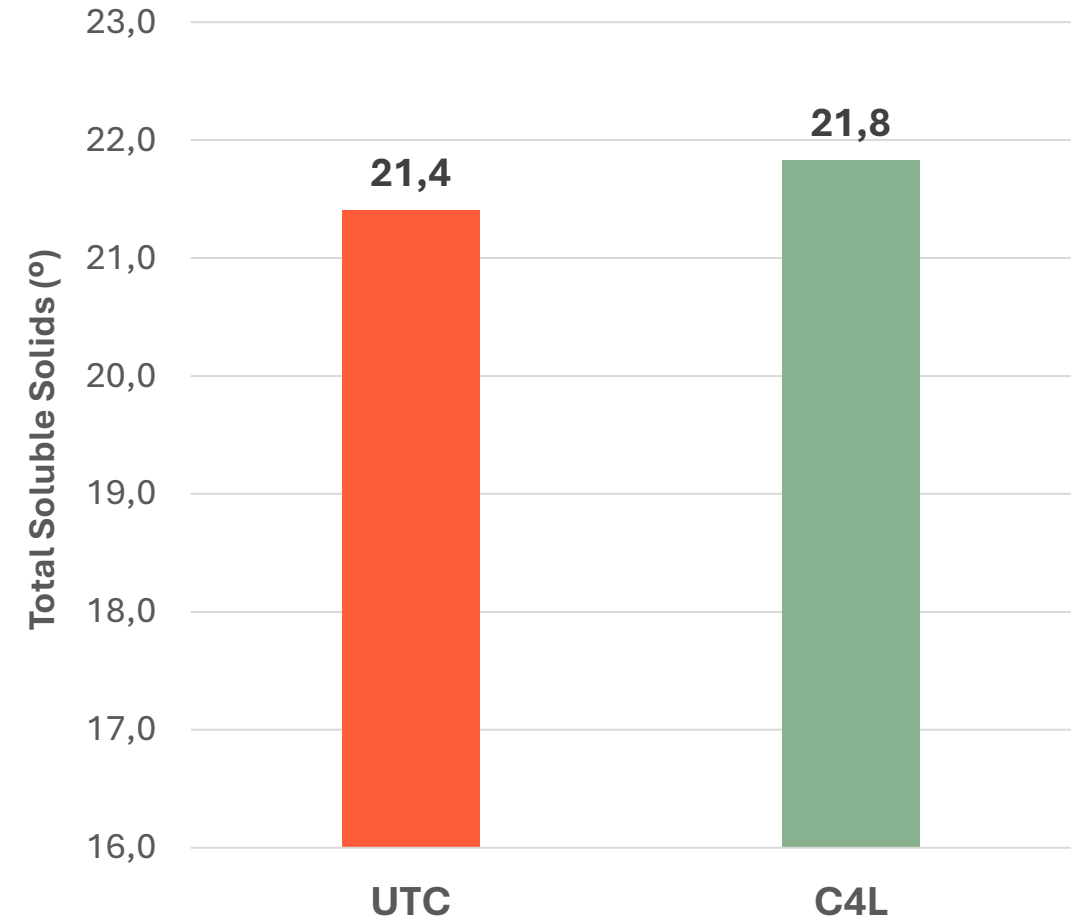
Fruit Firmness & °Brix (after 4 weeks in cold storage)

Sensation – Clanwilliam 2025

Average Fruit Firmness



Average °Brix



Scan QR Code for complete trial data

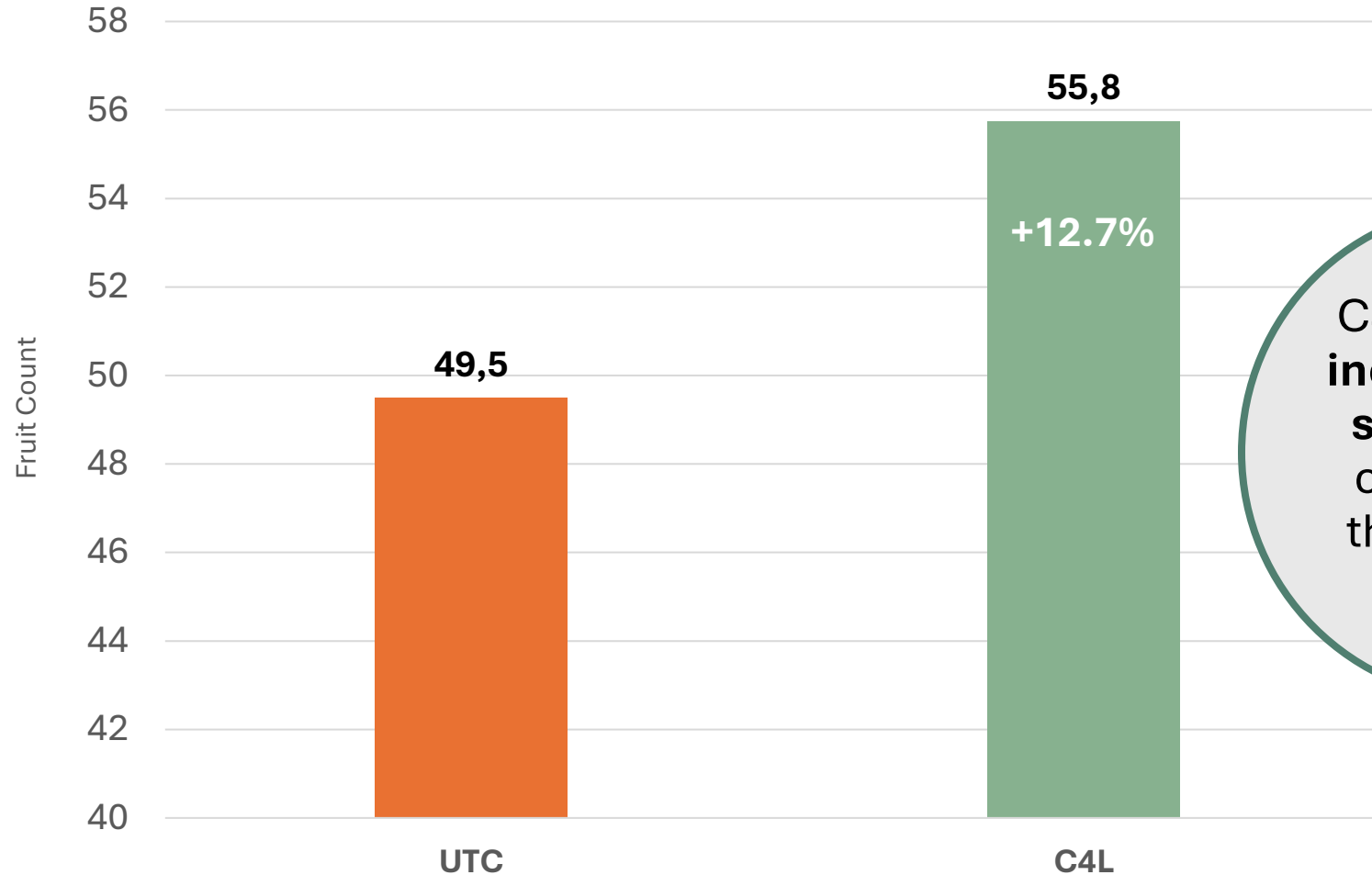
Keitt, Heidi & Sensation – Clanwilliam



Fruit Set Improvement

Keitt – Clanwilliam 2024

Average Number of Fruit per Tree



Applications:

5 Jun 2024

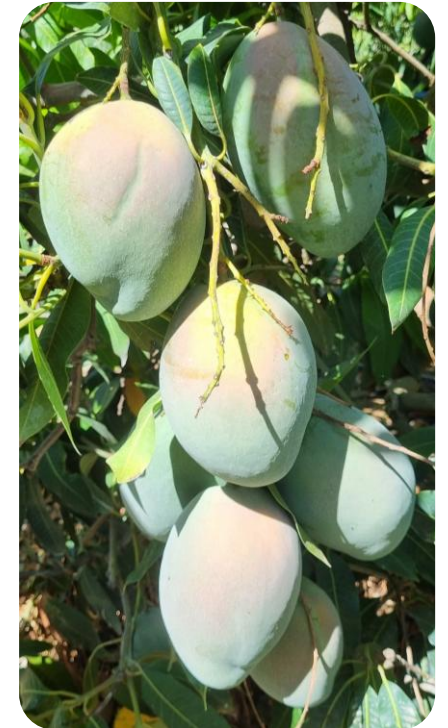
(Start of Flowering)

3 Jul 2024

(Early Panicle Phase)

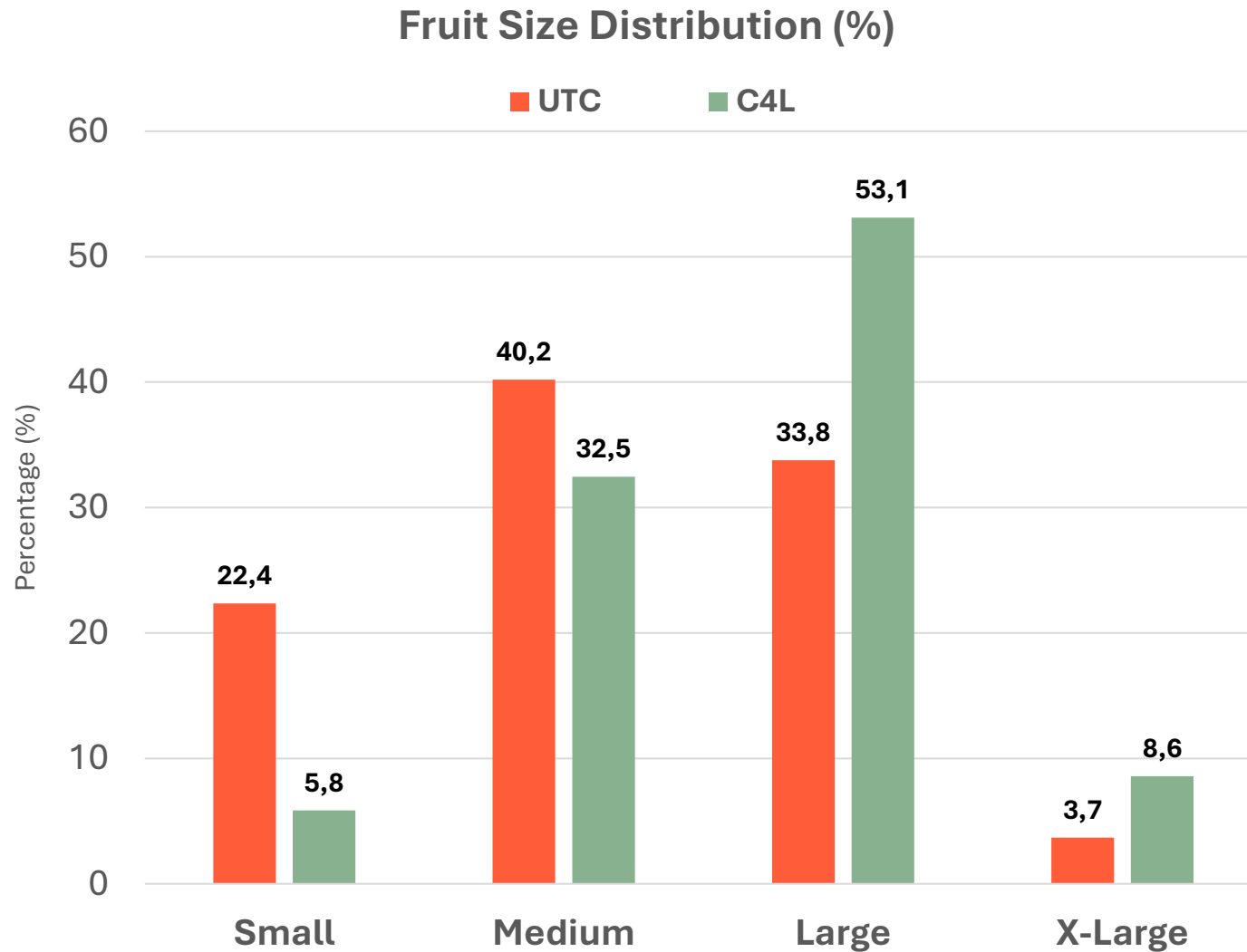
5 Aug 2024

(50% Flower Development)



Fruit Size Distribution

Keitt – Clanwilliam 2024

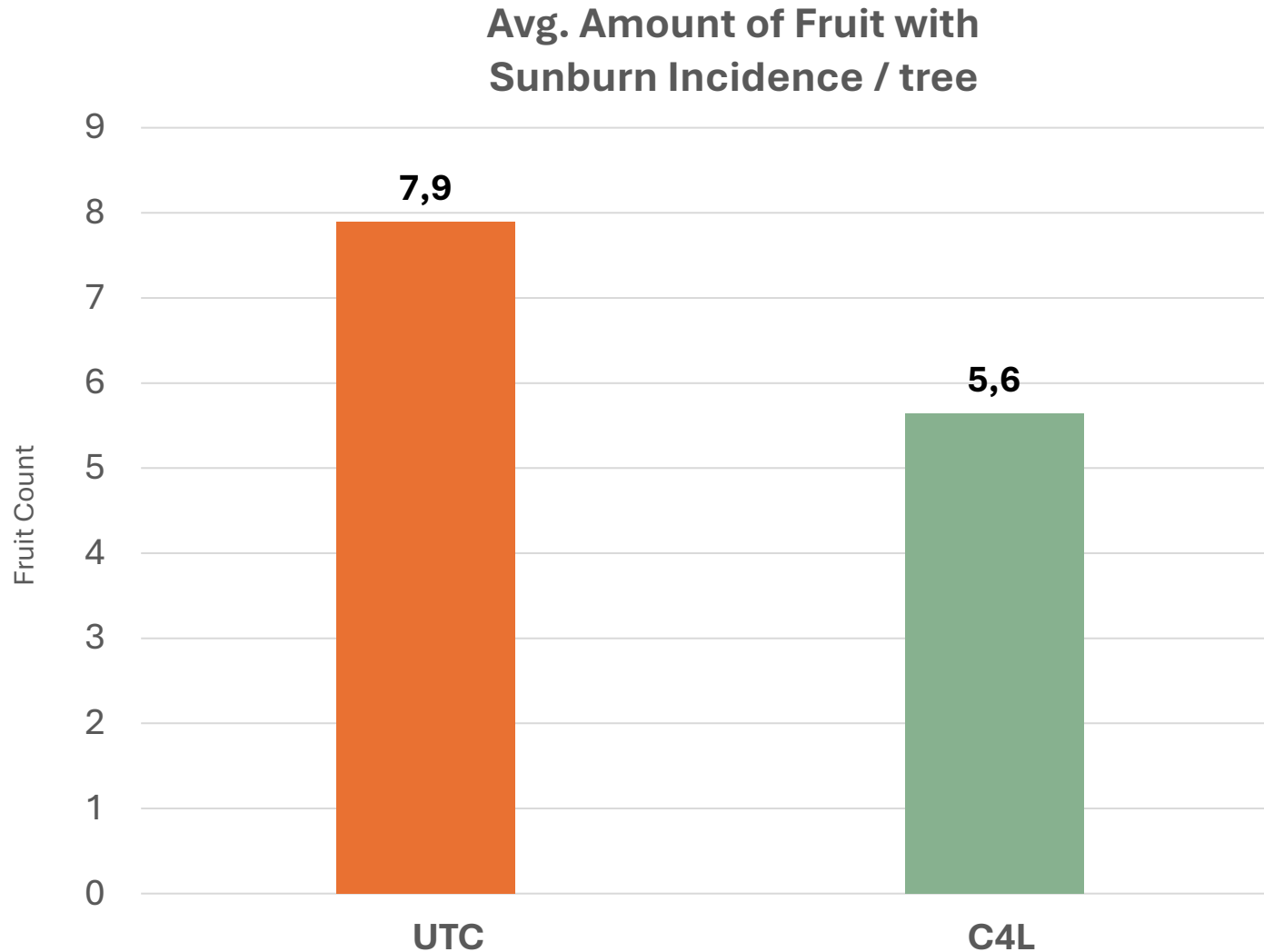


C4L shifted fruit size distribution toward **larger**, **more uniform fruit** compared to the untreated control



Sunburn Incidence

Keitt – Clanwilliam 2024



C4L decreased the amount of fruit with **sunburn incidence by 28.6%** compared to the UTC

Application Rate & Timing (500 mL/ha):

5 Jun 2024

(Start of Flowering Stage)

3 Jul 2024

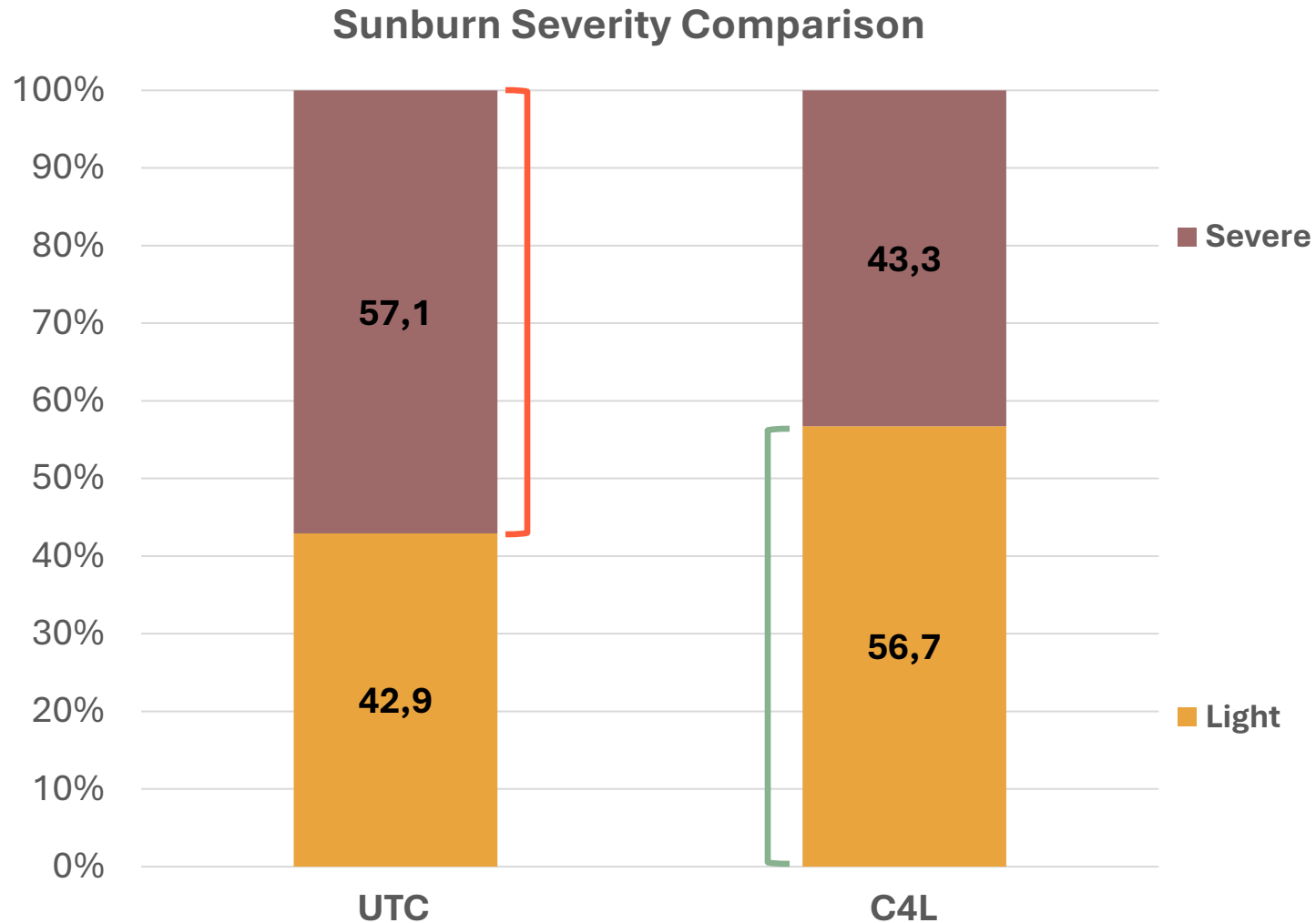
(Early Panicle Phase)

5 Aug 2024

(50% Flower Development)

Sunburn Severity

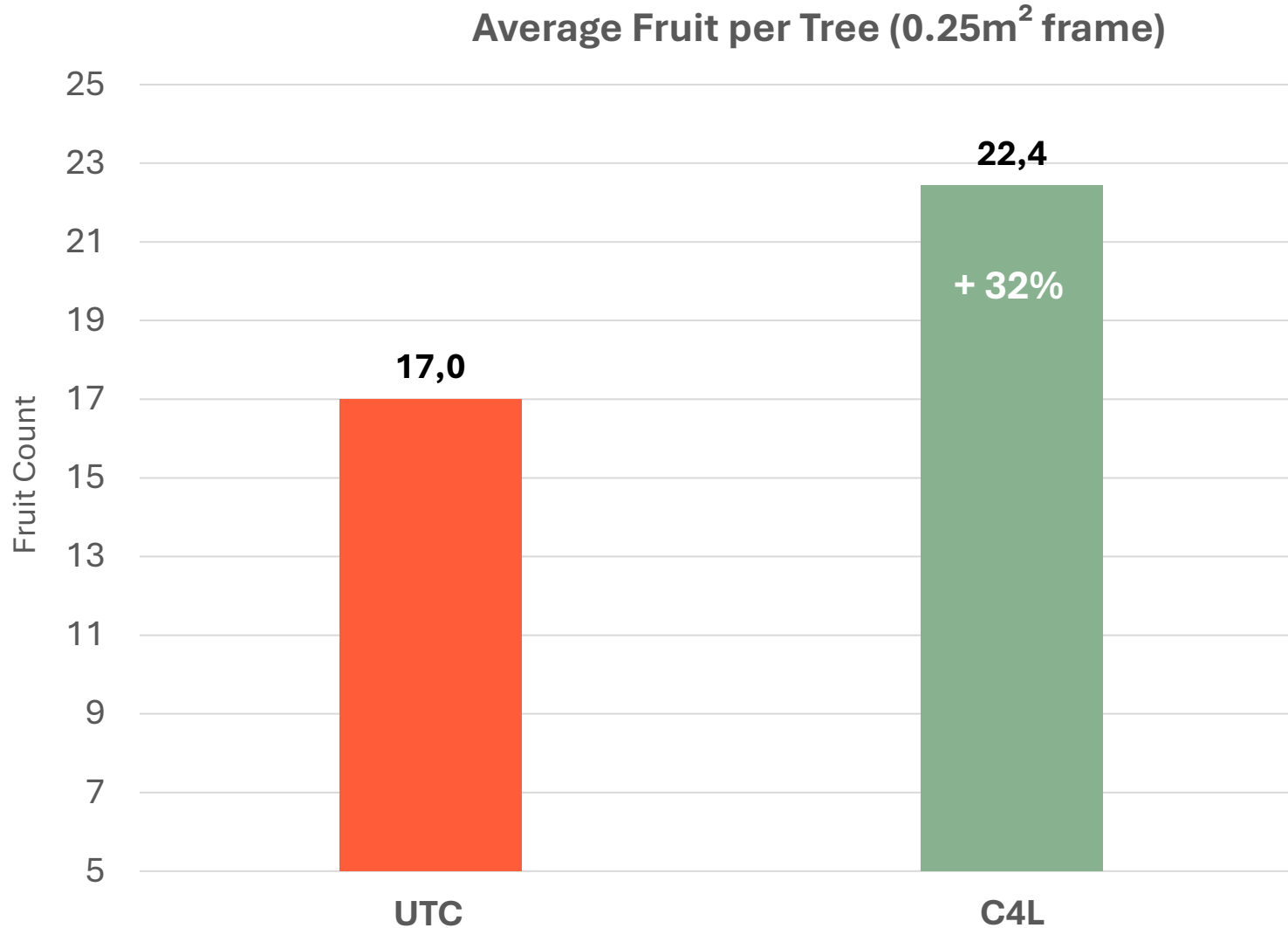
Keitt – Clanwilliam 2024



C4L significantly **reduced sunburn severity**, demonstrating improved photoprotection and stress resilience.

Fruit Retention Improvement

Heidi – Clanwilliam 2024



C4L treatment improved Fruit Set by 32% compared to the untreated control.

Application Rate & Timing (500 mL/ha):

1 Oct 2024

(Start of Flowering Stage)

1 Nov 2024

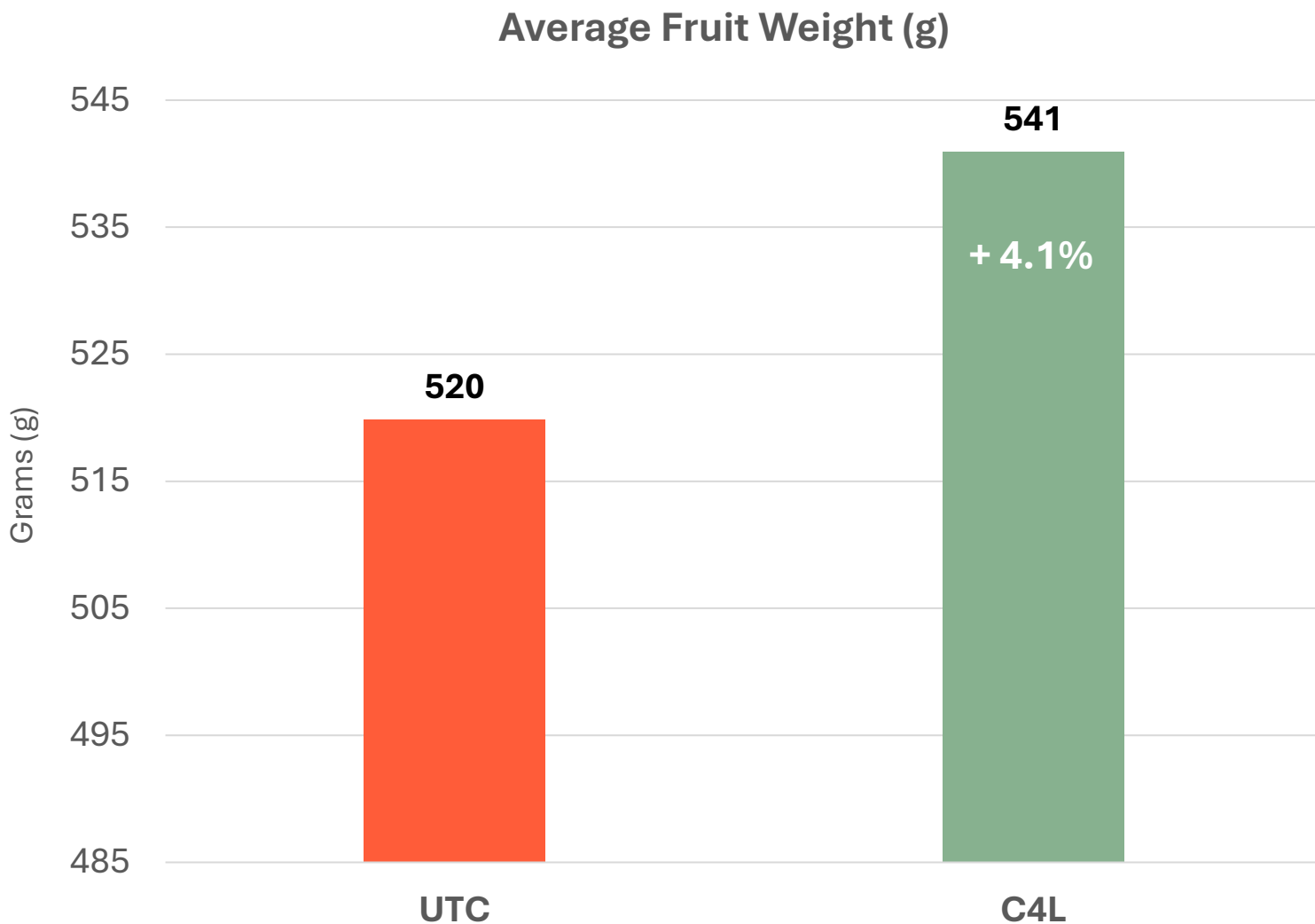
(Early Panicle Phase)

6 Dec 2024

(50% Flower Development)

Fruit Weight

Heidi – Clanwilliam 2024

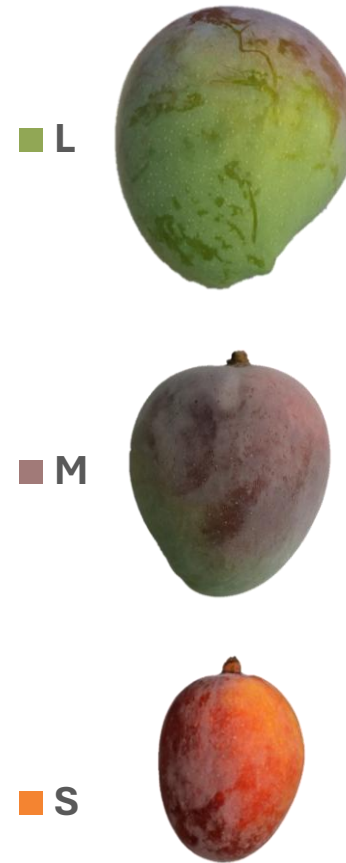
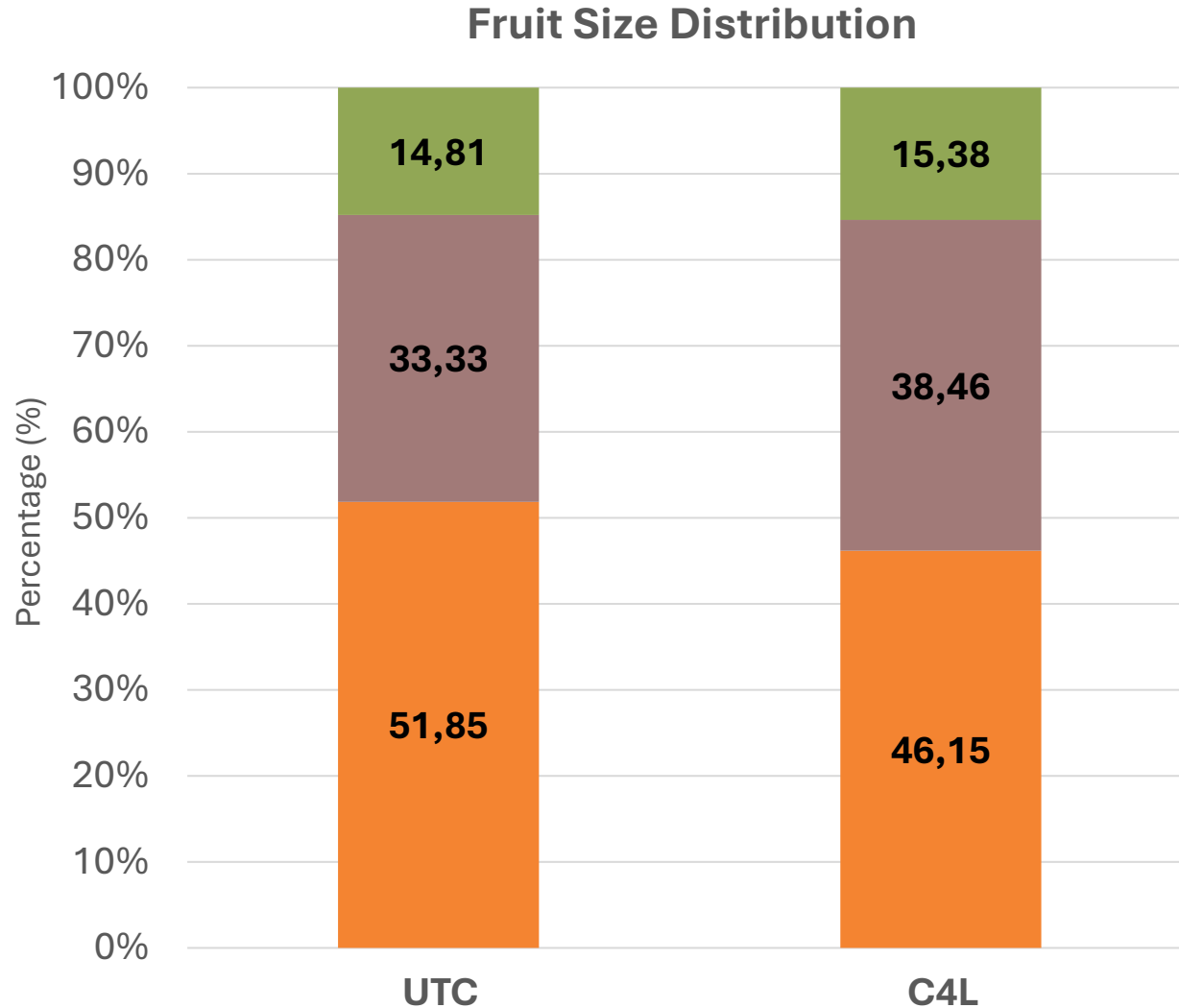


C4L increases the average Fruit Weight by 4.1% compared to the UTC

C4L dramatically improved Fruit Set, without sacrificing fruit weight.

Fruit Size Distribution

Heidi – Clanwilliam 2024

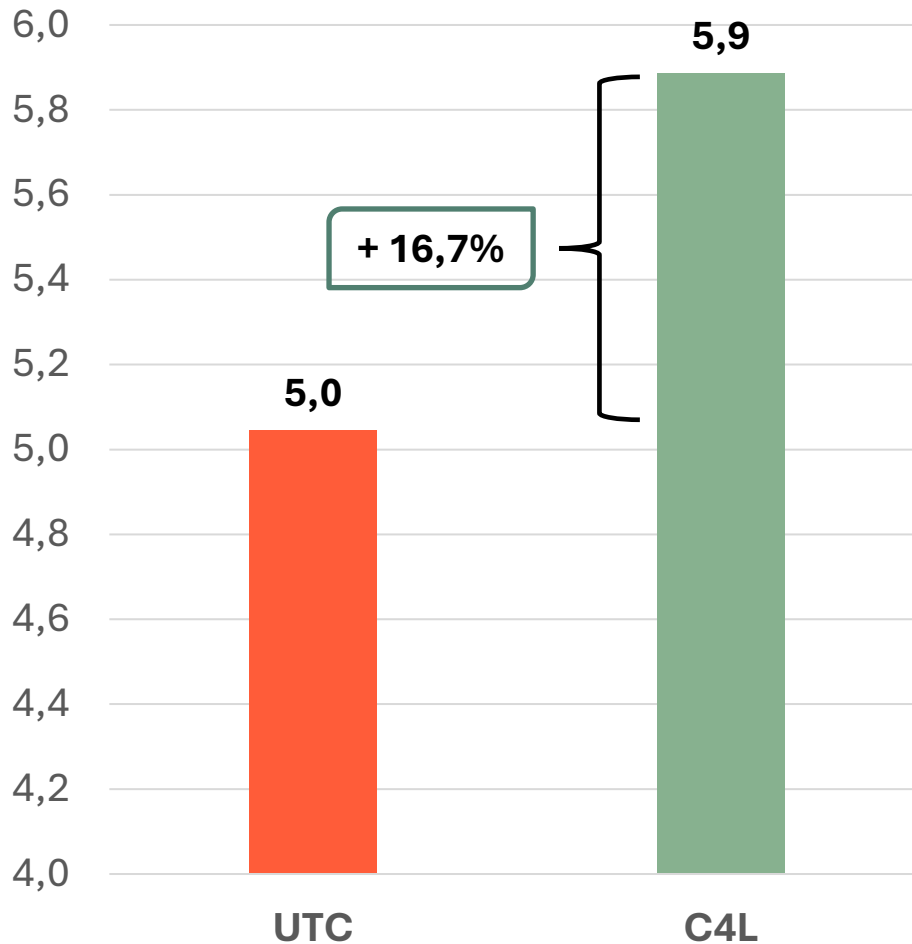


C4L shifted fruit size distribution toward **larger, more uniform fruit** compared to the untreated control.

Fruit Firmness and °Brix

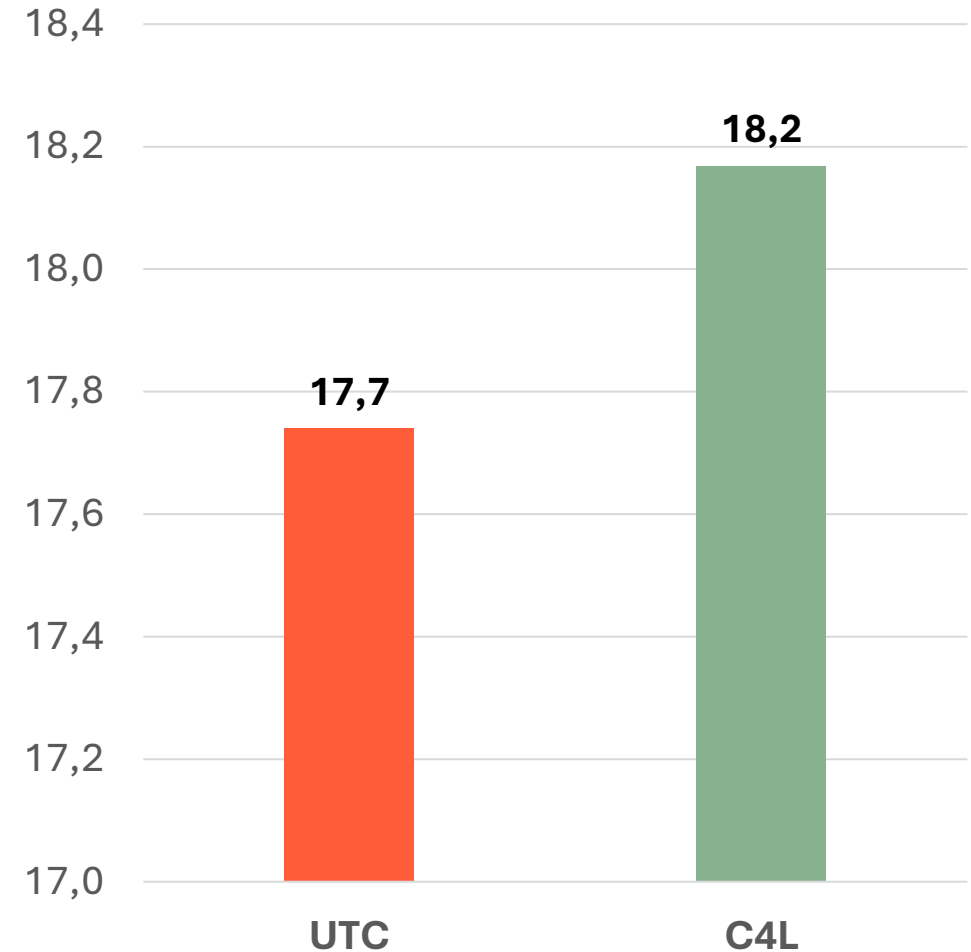
Heidi – Clanwilliam 2024

Average Fruit Firmness



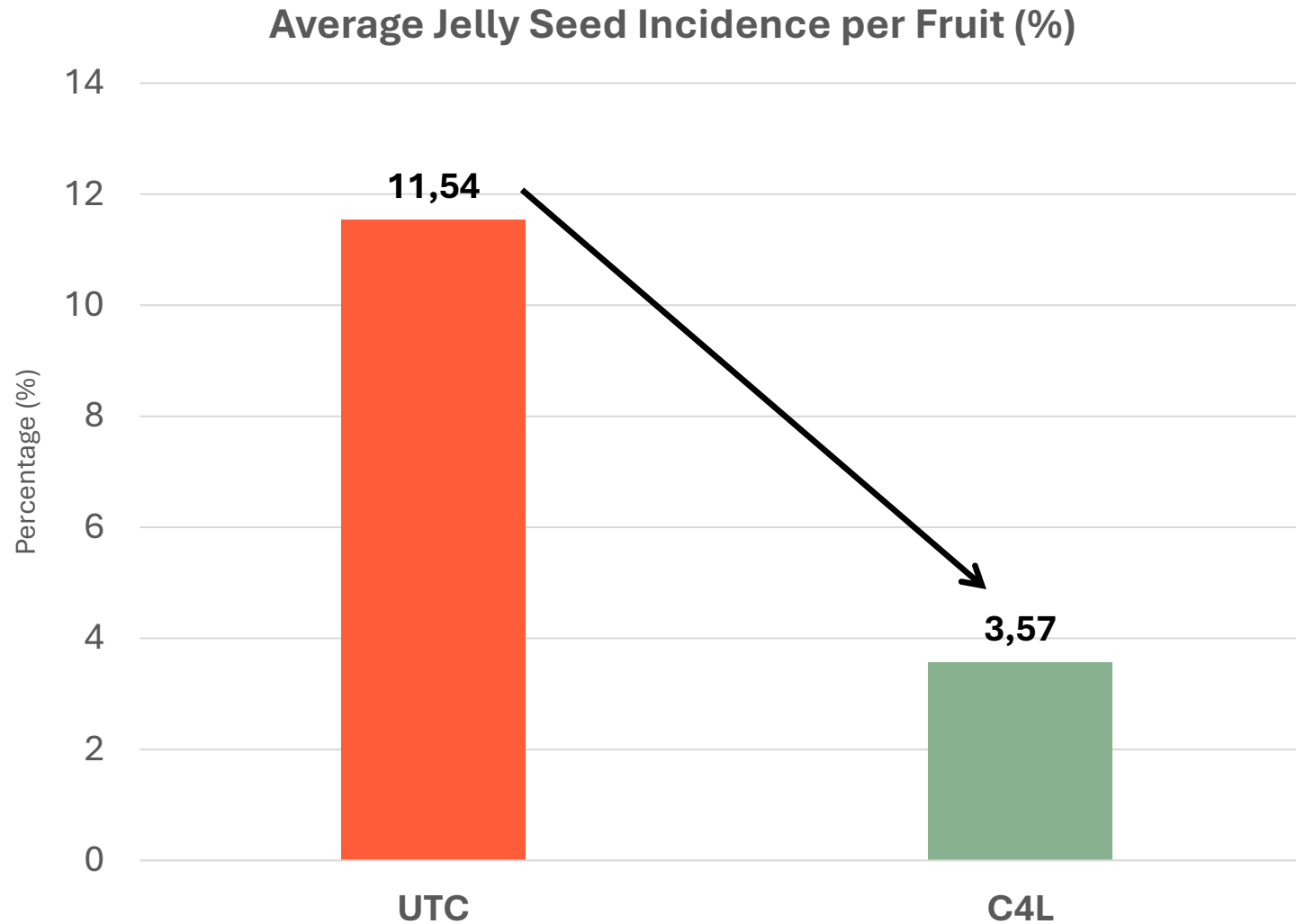
C4L improved **Fruit Firmness** & enhanced °Brix values compared to the untreated control.

Average °Brix

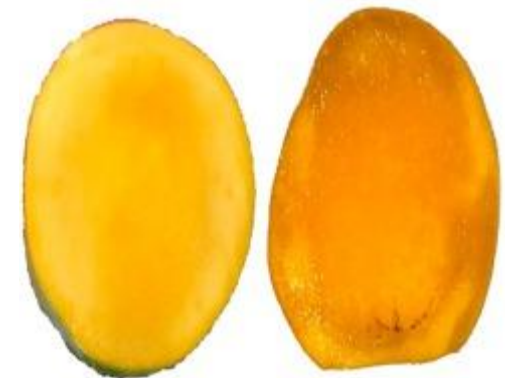


Jelly Seed Incidence

Sensation – Clanwilliam 2024



C4L reduced the incidence of jelly seed significantly compared to the UTC

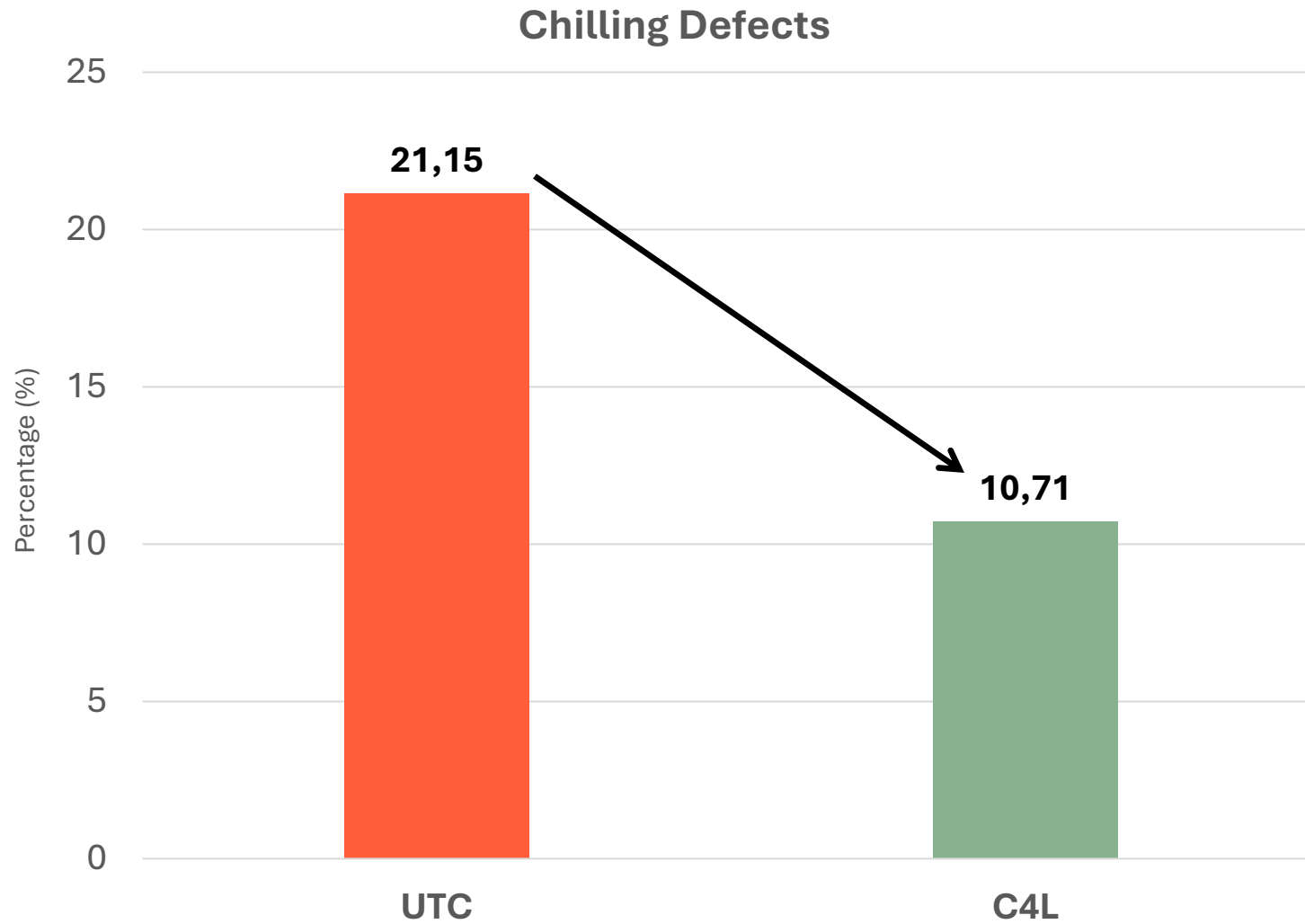


Healthy

Jelly Seed

Chilling Defects

Sensation – Clanwilliam 2024



**C4L reduced the effects
of cold storage
significantly compared to
the UTC**

