Nutrition of Maluma

B Snijder

Afrupro Exporters

2016 Maluma day - Tzaneen

Introduction

- Maluma was recently established as an economical cultivar (2007)
- Hass-like cultivar
- High yielding
- Good quality

Introduction

- Some of the questions asked are
  - What are the negative aspects (reported on in 2011 & 2012)
  - What are the positive aspects (reported on in 2011 & 2012)
  - What are the correct orchard practices

Introduction

- What are the orchard practices?
  - Irrigation **(discussed separately)**
  - Pest and disease control (Not discussed today)
  - Pruning (discussed separately)
  - Fertilizer application
  - Post harvest (discussed separately)

Fertilizer application

Normally use reference data from closest cousins

In the case of Maluma – Pinkerton, Lamb Hass and Hass norms were used

Normally also linked to specific phenological events

Fertilizer application

- With more commercial plantings
  - Need proper knowledge of the cultivar
    - Cultivation practices
  - Improve and maintain yield and quality

Fertilizer application

So far producers have done

- Leaf and soil analysis
- Fruit analysis
- Recommendations have been based on other cultivar norms

Fertilizer application

The question now:

Is this use of information correct for the long term viability of the cultivar?

Should we start extensive fertilizer trials?

What do we know about this cultivars growth habits?

What information is short?

- What research should we do to get to
  - The correct leaf norms
  - The correct Crop removal factors
  - Knowledge of phenology in relation to fertilizer needs

Methodology

- How can this information be gathered?
  - Farmer surveys
  - Proper fertilizer trials
  - Crop removal trials
  - Phenological studies

Methodology

- Fertilizer trials
  - Well laid out randomized trials
  - Focus on N, P, K mostly
  - Results are more yield related i.t.o amounts of fertilizer applied and tree age

Methodology

- Crop Removal Trials
  - Destructive trials
  - Relation with phenology
  - Detailed information

Methodology

- Survey trial
  - Non destructive
  - Low cost trial
  - Rely on farmer information

Methodology

- Phenological studies
  - Destructive & Non destructive
  - Medium cost trial (quite some analysis need to be done)
  - Needs some manpower and time
  - Need different orchard situations

Methodology

- In this case we used the Survey method and some phenological observations
  - Fast results
  - Good indicative information

Methodology

- Orchard observations
- Leaf and soil analysis results
- Yield data
- Crop removal figures as starting point
  - N = 5,6kg/tonnes of fruit removed
  - = inclusive figure i.e. takes growth development in account


Ga-Kgapane-A
Modjadjiskloof
Site C
Site A
Site B
Tzaneen
Nkowankow
Haenertsburg
Image © 2015 DigitalGlobe

Trial Sites

Site description

- Site A (D0295)
  - Planted in 2004
  - 7 X 3,5m
  - Duke 7
  - Hedgerow system
  - Pruning done in 2013 – height control

Site A

Trial Sites

Site B

Site Description

- Site B (D6953)
  - Planted in 2003
  - 7m x 4m
  - Duke 7
  - Light pruning done in 2012
  - Height control started in 2014

Trial Sites

Site description

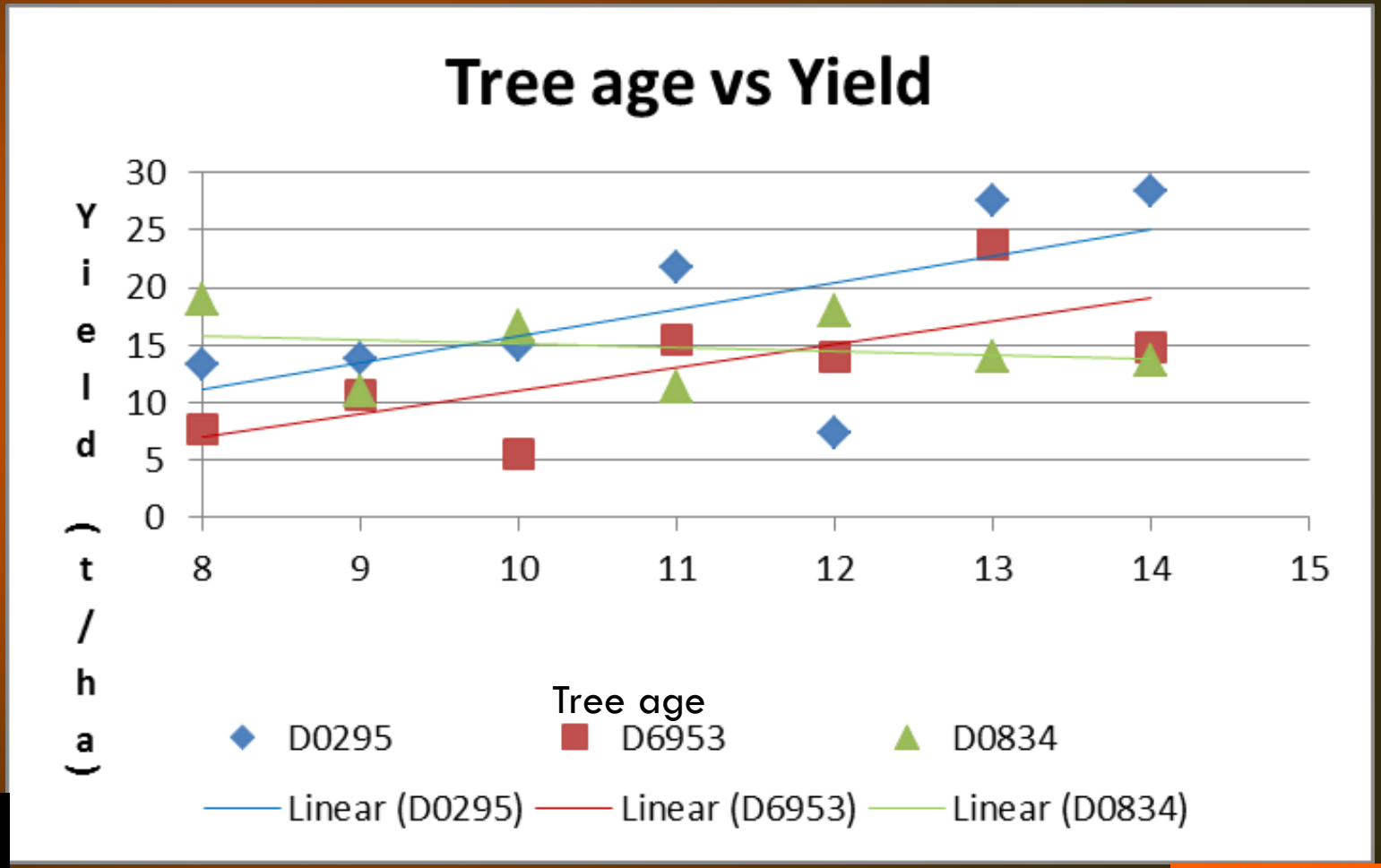
Site C

- Site C (D0834)
  - Planted in 2001
  - 7m x 3,5m
  - Duke 7
  - Light pruning done since 2008
  - Hedge row pruning since 2011

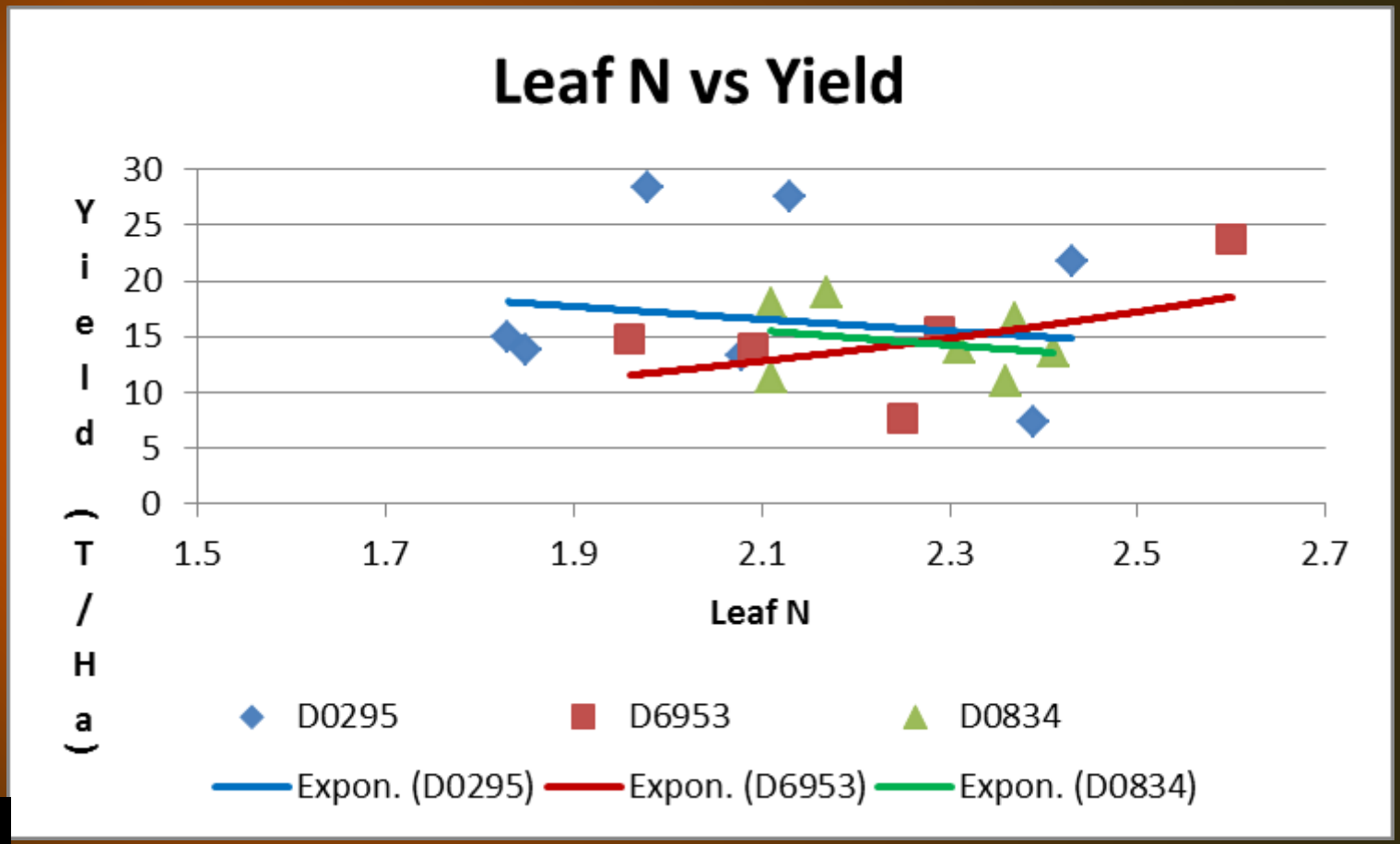
Results

- The following parameters are reported on
  - Yield results over time
  - Leaf N vs Yield
  - Applied N vs Yield
  - Phenological information

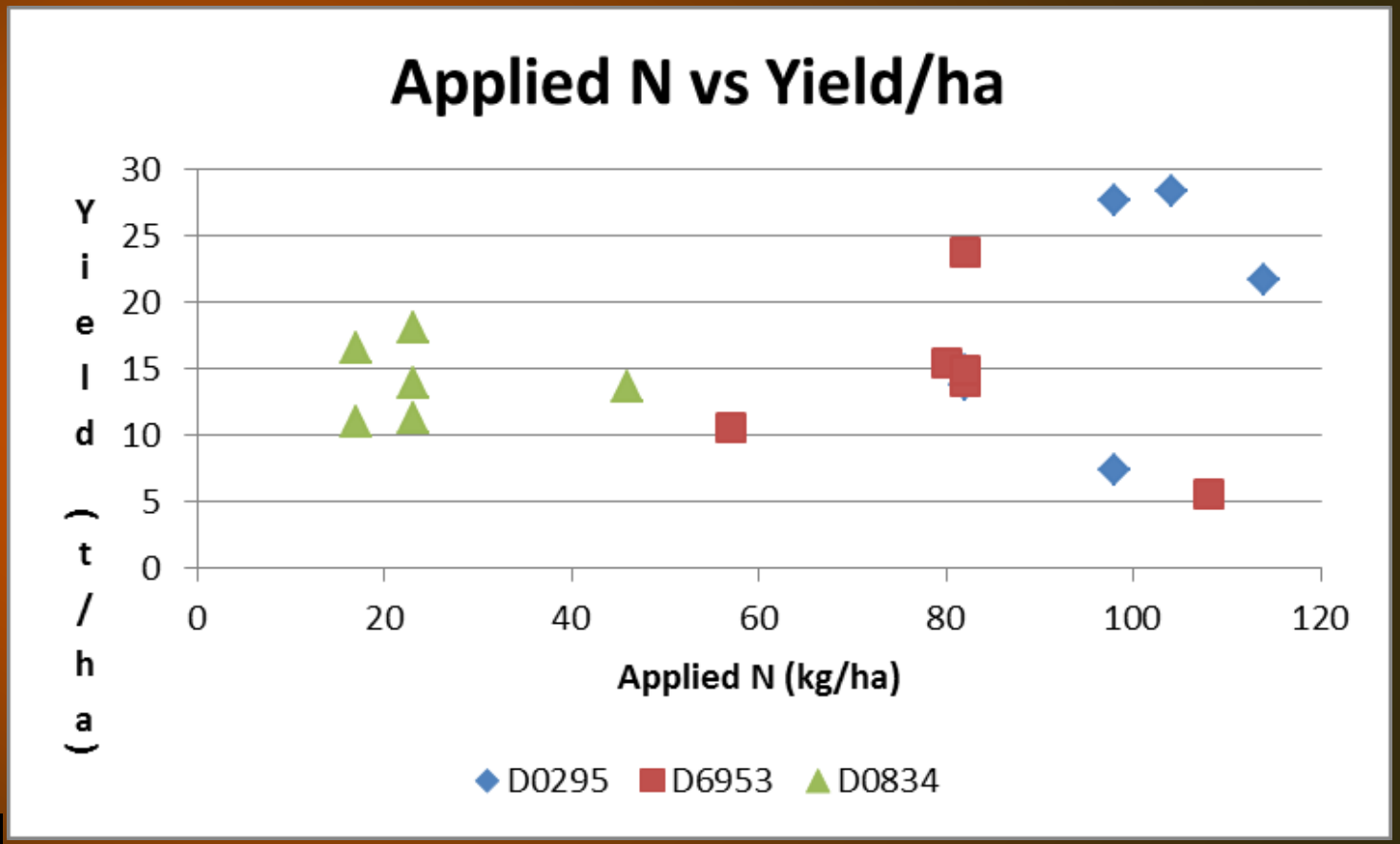
Results – yield results



Results – Leaf N vs Yield



Results – Applied N vs Yield



Phenological observations

- Maluma tends to have strong flushes after fruit set
- Hides it fruit well
- Good complexity
- Flowering
- Fruit set periods

Phenological observations

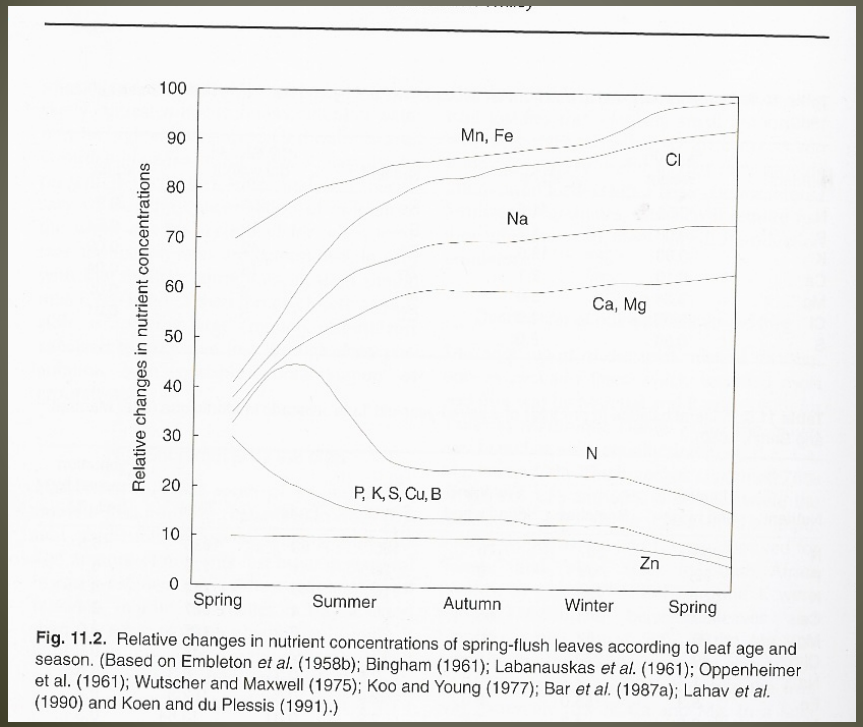


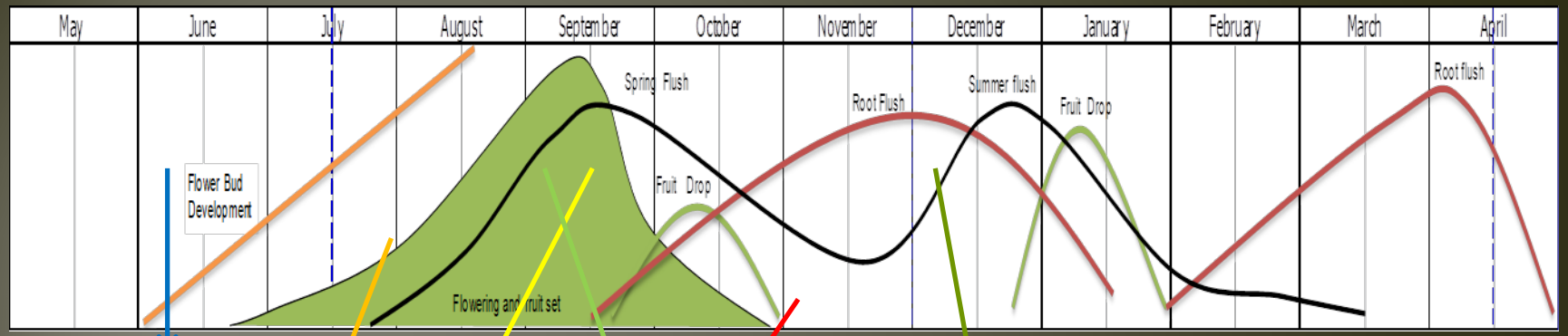
Fig. 11.2. Relative changes in nutrient concentrations of spring-flush leaves according to leaf age and season. (Based on Embleton *et al.* (1958b); Bingham (1961); Labanauskas *et al.* (1961); Oppenheimer et al. (1961); Wutscher and Maxwell (1975); Koo and Young (1977); Bar *et al.* (1987a); Lahav *et al.* (1990) and Koen and du Plessis (1991).)

- Nitrogen is driver in production
- Calcium very much quality driver
- Potassium and Phosphorous drive many energy and water related processes

Phenological observations

- Timing of nitrogen very important
  - Influences next years yield
    - Number of flushes
    - Bud quality
  - Influences fruit quality (esp internals)
    - Balance between N and Ca

Phenological observations



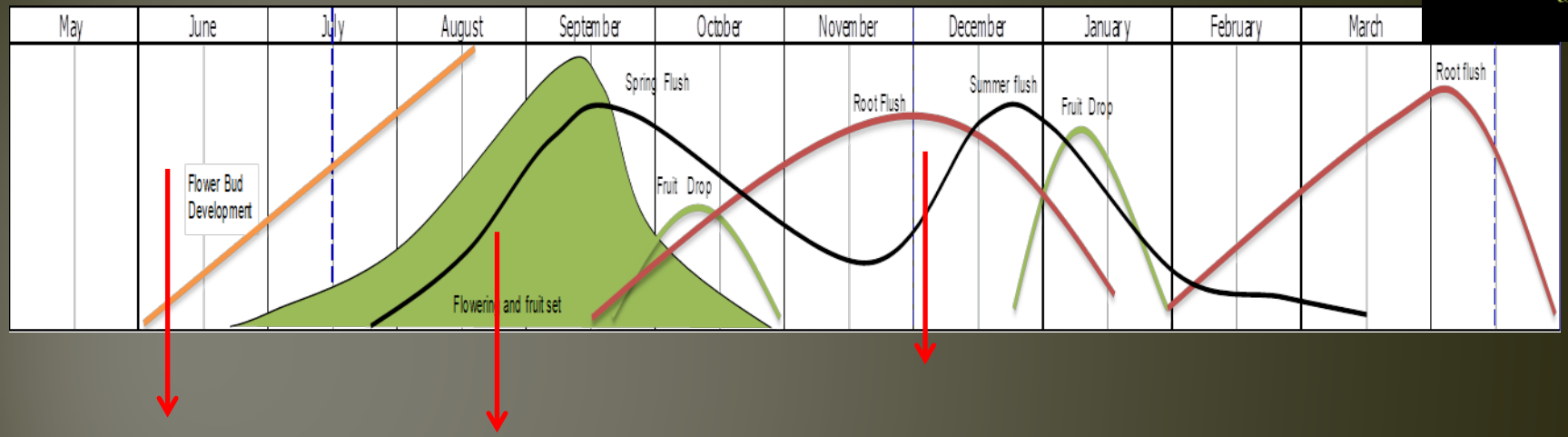
Flower bud development = Micro nutrients, Ca
Flowering period = micro nutrients, Ca, P

Fruit set = N, Ca

Fruit enlargement period = Ca, K

Spring and summer flushes = N, K, P, Micros

Phenological observations



Proposed nutrient application timings

1. Early winter for bud development (decent application)
2. Mid spring to enhance fruit set and enlargement (lightish application)
3. Early summer just before summer flush appearance (decent application)

Nitrogen application throughout the growing season could help with alleviation of internal quality issues

Conclusions

- Indications are that Maluma does not have the same requirements as Hass (leaf norms must be adjusted when more data is available)
- Alternate bearing does not seem to be a serious issue as yet (although 1 or 2 cases have been reported)

Conclusions

- Proper research needs to be done to verify trends
- Fastest results to do Crop Removal trials
- Relate them to the phenological stages
- Long term trials too cumbersome

- Thank you for your attention