

Pruning for sustainable production

The Allesbeste Way



Allesbeste



"Kwaliteit weens passie"
"Quality through passion"

Trends in Modern Fruit production

- High Density
- Intensive Pruning Programs
- Lower Pesticide Usage
- Spraying Efficiency
- Cost Efficiency
 - Less Labour Intensive
 - Mechanisation



"Kwaliteit weens passie"
"Quality through passion"

Altesbeste

The General Pruning Problem

- Overgrown trees
- Vigorous Re-growth
- Intensity of pruning
- Canopy Boundary Production
- Yield sacrificing and losses?
- Methods?

Allesbeste



"Kwaliteit weens passie"
"Quality through passion"

Premises for Pruning

- Increased light penetration within the tree to keep shoots active
- Tree size and shape maintenance for effective light utilisation
- Maintaining tree size and shape for effective tree management
- Encouragement of regular branch renewal ensuring that new wood becomes available for fruiting
- To obtain tree complexity for maximum bearing units for maximum production.



“Kwaliteit weens passie”
“Quality through passion”

Altesbeste

Allesbeste Pruning Methods

- Hedge rows
 - 10x5m
 - 8x4m
 - 7x3.5m



- High Density Central Leader Pruning
 - 7x3.5m
 - **6x5m**
 - 6x3m
 - 5x5m
 - **5x4m**
 - 7x3.5m Tramline
 - 3x3m
 - 2,5 x 2,5m



"Kwaliteit weens passie"
"Quality through passion"



- Stap 1 - Masjiensnoei vir grootte en vorm (winter)
- Stap 2 - Verwyder ongewenste takke en skep ligvensters (handsnoei)
- Stap 3 - Uniconazole-bespuiting (Blom)
- Stap 4 - Masjiensnoei vir ongewenste lote (somer)
- Stap 5 - Verwyder waterlote & vensterinstandhouding (handsnoei)
- Stap 6 - Uniconazole-bespuiting (Groeibeheer)

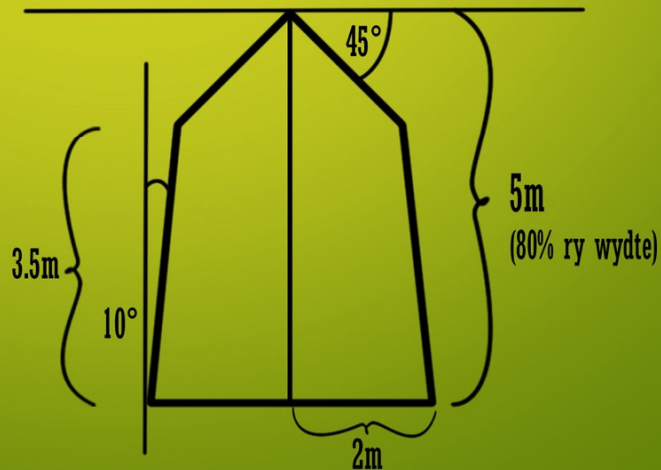


“Kwaliteit weens passie”
“Quality through passion”



Alles Beste

Meganiese snoei



Doel:

- Verbeter ligpenetrasie deur boom
- Optimaliseer kubieke produksiekapasiteit
- Verbeter effektiwiteit van bespuitings en oesaktiwiteite
- Verjonging en verbetering van boomgesondheid en -produksie
- Konstante produksie

Hedge rows



30 6 2003

Allesbeste



“waliteit weens passie”
“Quality through passion”

Hedge rows



waliteit weens passie
"Quality through passion"

Allesbeste

Hedge rows



Allesbeste



"Kwaliteit weens passie"
"Quality through passion"

Hedge rows



Hedge rows

ste



Hedge rows



Kwaliteit weens passie
"Quality through passion"

Allesbeste

Hedge rows

- Tips:
 - Manage watershoots
 - Manage main frame branches
 - Stimulate internal growth
 - Through window creation
 - Crinkle cut
 - Manage complexity



“Kwaliteit weens passie”
“Quality through passion”

Allesbeste

Hedge rows

- Problems
 - Machine Only = Not Sufficient
 - Hand Pruning follow up
 - Growth outside canopy boundary
 - Some cultivars manage difficulty
 - Growth Retardants – Most cultivars
- Advantages
 - Managed correctly = Average yields are maintained
 - Uniform Production



“Kwaliteit weens passie”
“Quality through passion”

Allesbeste

Premises for High Density Plantings

- Low prices require efficient farming and increase in productivity.
- Return on Investment
- Easier and less expensive to harvest.
- Effective and more practical spraying
- Spatial utilisation
- Yields per Hectare
- Cost Efficient
- Less Labour Intensive



“Kwaliteit weens passie”
“Quality through passion”

Allesbeste

Prerequisites for High Density Plantings

- Cultivars are an important consideration. Hass trees on high density plantings may become problematical after a few years as they expand equally on all sides as they grow. Upright growers such as Gwen, Reed and Lamb Hass are better suited.
- Availability of reasonably priced clonal trees
- A plan for tree manipulation to extend the sustainability of high density.
- Tree removal rather than rejuvenation when productivity begins to decline.
- Dwarfing trees or rootstocks?
- Climatic conditions?



"Kwaliteit weens passie"
"Quality through passion"

Allesbeste

Space Utilisation



VS



"Kwaliteit weens passie"
"Quality through passion"

este

Citrus

- 60 tons /ha from 2500 – 5000 trees per hectare (Victoria Australia)
- South Africa
 - 3x6m Hedgerows (660 trees /ha)
 - 20 – 60 t/ha depending on cultivar
- Longevity
 - 18 to 32 years depending on cultivar



"Kwaliteit weens passie"
"Quality through passion"

Allesbeste

Apples

- Production per ha
 - 15 – 45 t/ha
- Up to 2400 trees/ha
- 1.5 – 2.7m apart
- More or less 2.5m high
- Dwarfing rootstocks
- Pruning techniques
 - Central leader (1970's) / spindle
 - Perpendicular V
 - Weights, toothpicks, wires
- Longevity 10 – 15 years



Pears

- Production per ha
 - 15 – 38 t/ha
- Plant density
- Dwarfing rootstocks
- Pruning techniques
 - Central leader
 - Spindle
 - Much same as apples



Peaches

- Production per ha
 - 16 – 34 t/ha
- Plant density
 - 370 - 1946 trees / ha
 - 4.2m x 6m to 1.21m x 4.26m
- Dwarfing rootstocks
- 12 – 18 year lifespan



“Kwaliteit weens passie”
“Quality through passion”

Altesbeste

Peaches

- Pruning techniques
 - Vase / open cut system
 - Steep ladder system
 - Upright renewal system – Perpendicular V
 - Single leader



"Kwaliteit weens passie"
"Quality through passion"

Allesbeste

Avocados

- Only few cultivars could work on high density in South Africa
 - Lamb Hass
 - Reed
 - Pinkerton
 - Maluma
- Only these cultivars are precocious and have relative dwarfing characteristics



“Kwaliteit weens passie”
“Quality through passion”

Allesbeste

The Suggested Method – Central leader

- A-shaped tree or,
- Cylindrical tree
- Obtained by removing vertical growth
- Cultivar selection critical
- Early training is critical



“Kwaliteit weens passie”
“Quality through passion”

Allesbeste

Volumetric Production Capacity

- Conventional methods
Trees are large and produce majority of fruit on canopy border
- Central leader pruning
Small trees are maintained and through increased light penetration the full capacity of each tree is used

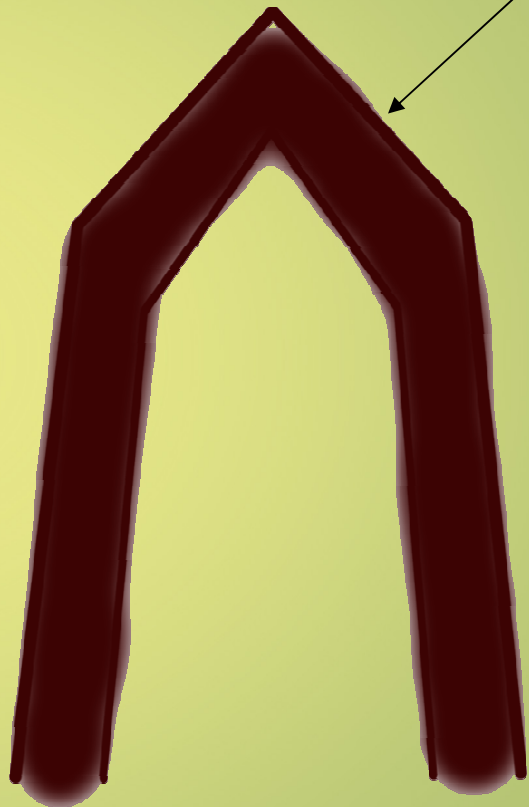


"Kwaliteit weens passie"
"Quality through passion"

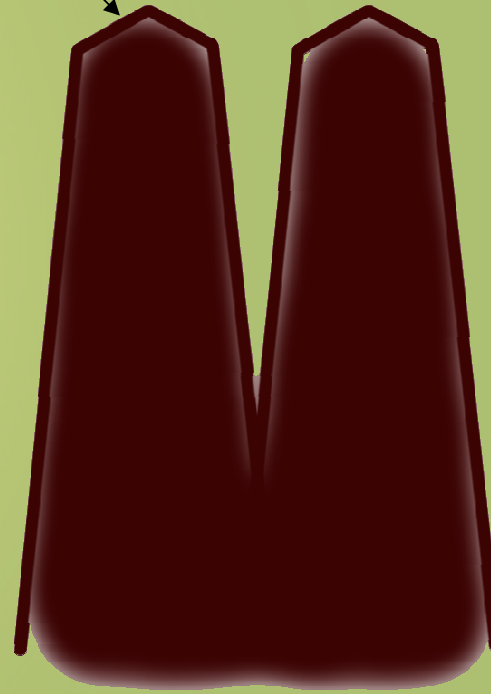
Allesbeste

Volumetric Production Capacity - Illustrated

Volumetric Production Capacity



Hedgerow orchards



High density CL orchards

Allesbeste



"Kwaliteit weens passie"
"Quality through passion"

Volumetric Production Capacity



Allesbeste



"Kwaliteit weens passie"
"Quality through passion"

VPC – Canopy Boundary Production

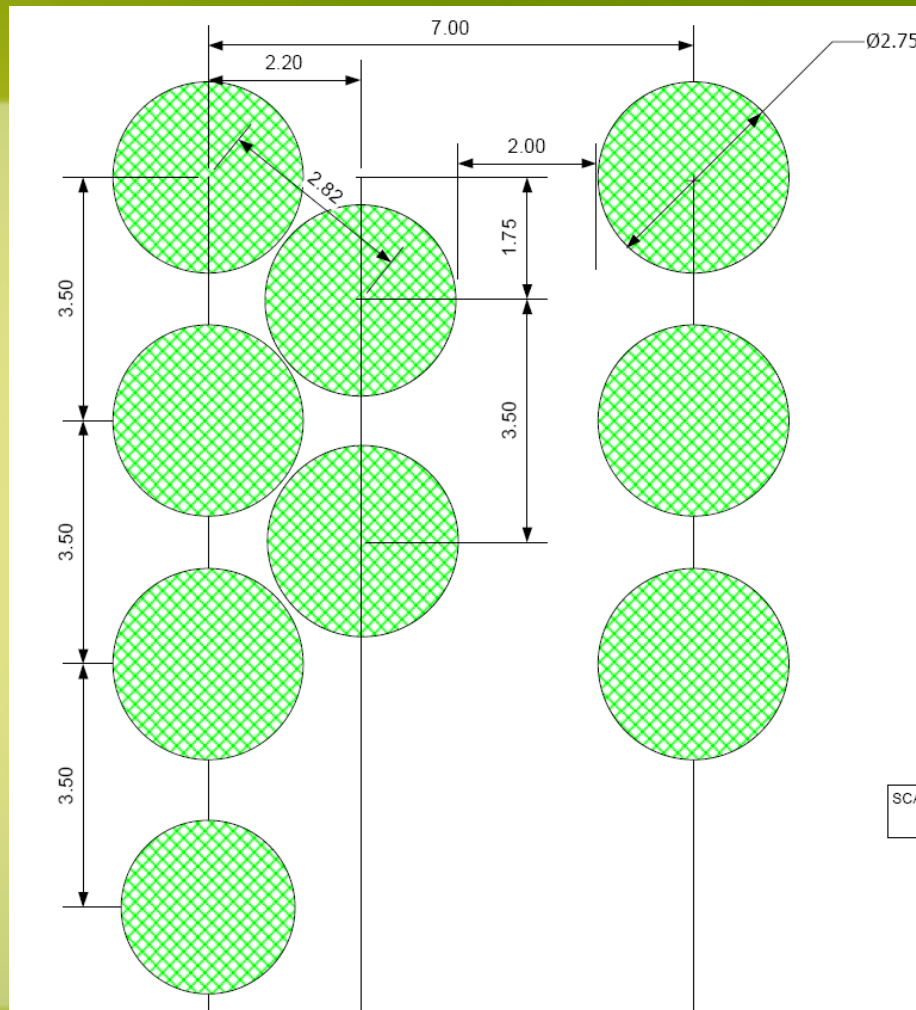


Allesbeste



“Kwaliteit weens passie”
“Quality through passion”

High Density - Tramline Planting



Allesbeste



"Kwaliteit weens passie"
"Quality through passion"

Orchard 1 – D5



Allesbeste



"Kwaliteit weens passie"
"Quality through passion"

Orchard 2 – E4



Image © 2011 GeoEye
© 2011 AirGIS (Pty) Ltd



“Kwaliteit weens passie”
“Quality through passion”

Allesbeste

CLP – Process: Young trees

1. Identify the central leader
2. Remove strong vertical growth
3. Growth with an angle smaller than 45° to the central leader is removed.
4. Any lateral branches that grow inward, into the tree, towards the central leader, as well as those that cross other branches need to be removed



"Kwaliteit weens passie"
"Quality through passion"

Allesbeste

Example Nursery Tree

Prominent Central Leader from Nursery



Allesbeste



"Kwaliteit weens passie"
"Quality through passion"

CLP – Process: Young trees



Allesbeste

“Kwaliteit weens passie”
“Quality through passion”

CLP – Process: Young trees



Allesbeste



“Kwaliteit weens passie”
“Quality through passion”

CLP – Process: Young trees



Allesbeste



“Kwaliteit weens passie”
“Quality through passion”

Methodology – Process: Maintenance pruning

1. Remove only strong vertical growth
2. Growth with an angle smaller than 45° to the central leader is removed.
3. Any lateral branches that grow inward, into the tree, towards the central leader, as well as those that cross other branches need to be removed



"Kwaliteit weens passie"
"Quality through passion"

Allesbeste

CLP– Process: Maintenance Pruning



"Kwaliteit weens passie"
"Quality through passion"

CLP– Process: Maintenance Pruning



Allesbeste



“Kwaliteit weens passie”
“Quality through passion”

Examples



"Kwaliteit weens passie"
"Quality through passion"

Allesbeste

Examples



Allesbeste



"Kwaliteit weens passie"
"Quality through passion"

Examples



Allesbeste



"Kwaliteit weens passie"
"Quality through passion"

Examples



Allesbeste



"Kwaliteit weens passie"
"Quality through passion"

Examples



Allesbeste



"Kwaliteit weens passie"
"Quality through passion"

Maintaining Production

- Maintaining multiple generations (micro management)
 - 3 generations?



Allesbeste



"Kwaliteit weens passie"
"Quality through passion"

Maintaining production



Allesbeste



"Kwaliteit weens passie"
"Quality through passion"



“Kwaliteit weens passie”
“Quality through passion”

Why Maluma

- Production capability
- Natural Central leader tendency
- Lateral growth
- Less vigorous growth – shorter internodes
- Willowy branches
- Superior light penetration
- Precocity
- Post pruning re-growth
- Post pruning flower
- **NO** Growth retardants
- Orchard Frost Resistance



“Kwaliteit weens passie”
“Quality through passion”

Allesbeste

Maluma Production Capability



Allesbeste



"Kwaliteit weens passie"
"Quality through passion"

Maluma Production Capability



Allesbeste



"Kwaliteit weens passie"
"Quality through passion"

Maluma Production Capability



Maluma Production Capability



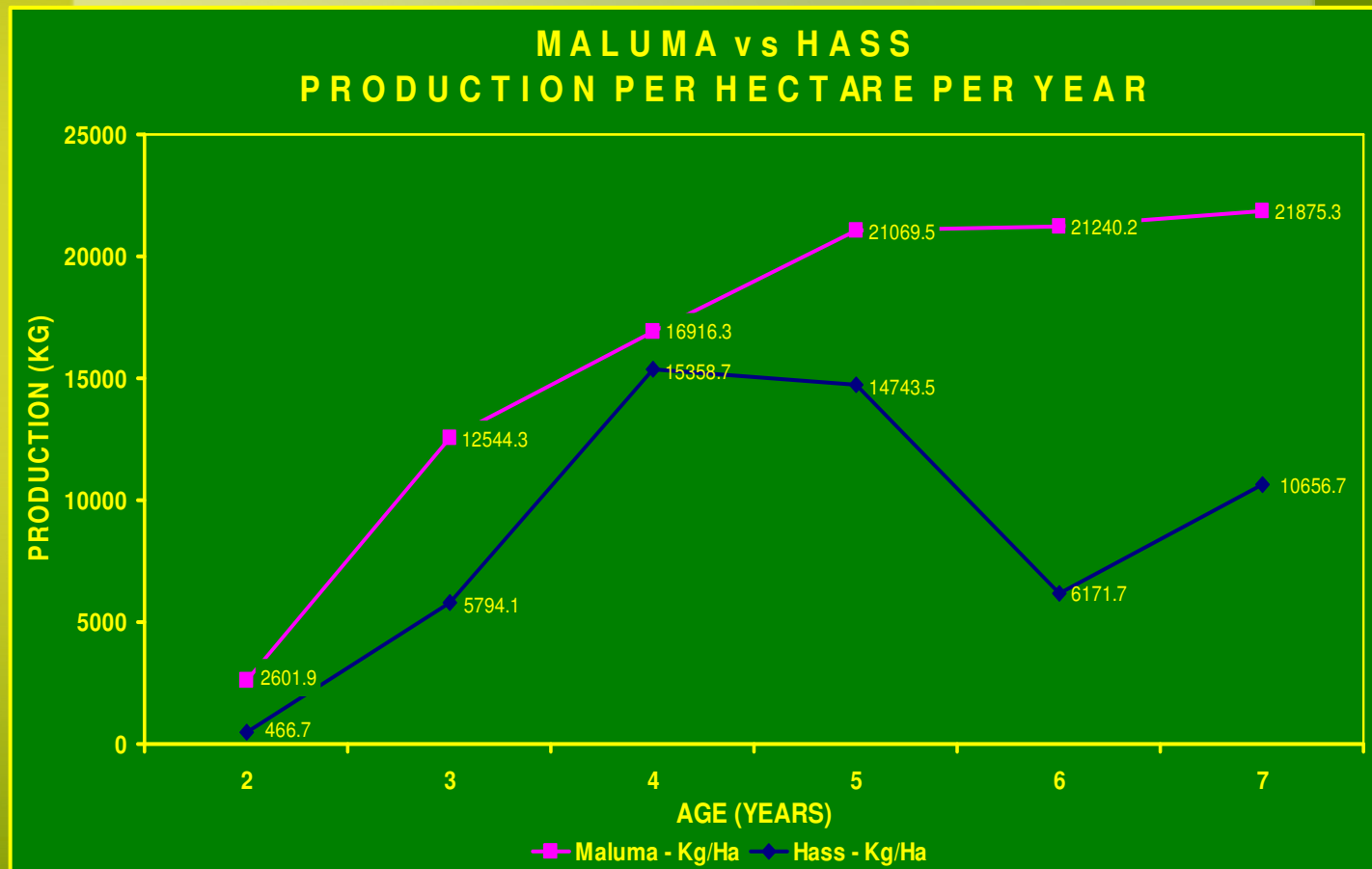
Allesbeste



"Kwaliteit weens passie"
"Quality through passion"

Maluma

- Production Comparison



"iteit weens passie"
"Quality through passion"

Altesbeste

Maluma Natural Central Leader tendency



"Kwaliteit weens passie"
"Quality through passion"

Maluma Natural Central Leader tendency



Allesbeste



"Kwaliteit weens passie"
"Quality through passion"

Maluma Lateral Branches



Allesbeste



"Kwaliteit weens passie"
"Quality through passion"

Maluma Lateral Braching



Allesbeste



“Kwaliteit weens passie”
“Quality through passion”

Maluma Less Vigorous Growth

Hass



Maluma



Allesbeste



"Kwaliteit weens passie"
"Quality through passion"

Maluma Less Vigorous Growth



Allesbeste



"Kwaliteit weens passie"
"Quality through passion"

Maluma Less Vigorous Growth



MALUMA



HASS

Allesbeste



"Green's passie"
Quality through passion"

Maluma Willowy Branches



Allesbeste



"Kwaliteit weens passie"
"Quality through passion"

Maluma Superior Light Penetration



Allesbeste



“Kwaliteit weens passie”
“Quality through passion”

Maluma Precocity



"Kwaliteit weens passie"
"Quality through passion"

Altesbeste

Maluma Post Pruning Re-growth



Allesbeste



“Kwaliteit weens passie”
“Quality through passion”

Maluma Post pruning flower



Allesbeste



“Kwaliteit weens passie”
“Quality through passion”

Maluma Post pruning flower



Allesbeste



"Kwaliteit weens passie"
"Quality through passion"

Maluma Post pruning flower



Allesbeste



“Kwaliteit weens passie”
“Quality through passion”

Maluma

- 800 trees per Ha
- 15 – 33 t/ha
- Lower disease pressure
- Plants are 4m high
- Lower tree complexity
- Relatively dwarfing
- Less labour intensive



“Kwaliteit weens passie”
“Quality through passion”

Allesbeste

Maluma

- 1 600 trees/ha – How?
 - 60 fruit per tree (count 16) (3/4 Lug)
 - 24 t/ha
 - 100 fruit per tree (count 16) (1,5 Lug)
 - 40 t/ha
- 2.1m high trees
- 2.5m x 2.5m



“Kwaliteit weens passie”
“Quality through passion”

Maluma in a Nutshell

- First commercial SA cultivar
- Precocious
- Less vigour
- Lateral branching
- Triangular tree shape
- Central leader tendency
- High & constant bearing
- Good light penetration = Yields
- No Growth Retardant
- High density plantings
 - 2.5m x 2,5m > 7m x 3.5m
- High orchard cold tolerance



"Kwaliteit weens passie"
"Quality through passion"

Allesbeste

A Tribute to Maluma's Central Leader



Allesbeste



"Kwaliteit weens passie"
"Quality through passion"

Conclusion

- Maluma is a preferred cultivar for Central Leader Pruning and High density cultivation
- Yield per hectare and spatial utilisation is increased
- Crop potential is not decreased as vegetative growth is removed without removing flower.
- Central Leader Pruning on Tramline plantings is a successful High Density Cultivation method
- Central Leader Pruning on Maluma reduces input costs and increases efficiency and effectiveness
- Alternate bearing can be avoided through micro management
 - Careful branch management
- Alternate bearing managed through cultivar selection



"Kwaliteit weens passie"
"Quality through passion"

Allesbeste

Questions

Allesbeste



"Kwaliteit weens passie"
"Quality through passion"