Progressive production and pruning practices

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Maluma avo

If you were to prune a tree to *maximise production* and *limit alternate bearing* what would you do?

If you were to prune a tree to *maximise production* and *limit alternate bearing* what would you do?

Prune the weaker branch

Prune the branch that had fruit on

Prune the branch without fruit as window pruning

Not prune at all because it takes of potential flower

A few hypothesis

1. Weaker branches = weak potential
2. Healthy branches = superior potential
3. Heavy production = weak potential
4. Branches without crop = superior potential
5. Branches with fruit on during flowering won't crop

Micro-management

Def. Management especially with excessive control or attention on details.

To have an understanding of an environment and its variables and to make informed discussions for optimal results.

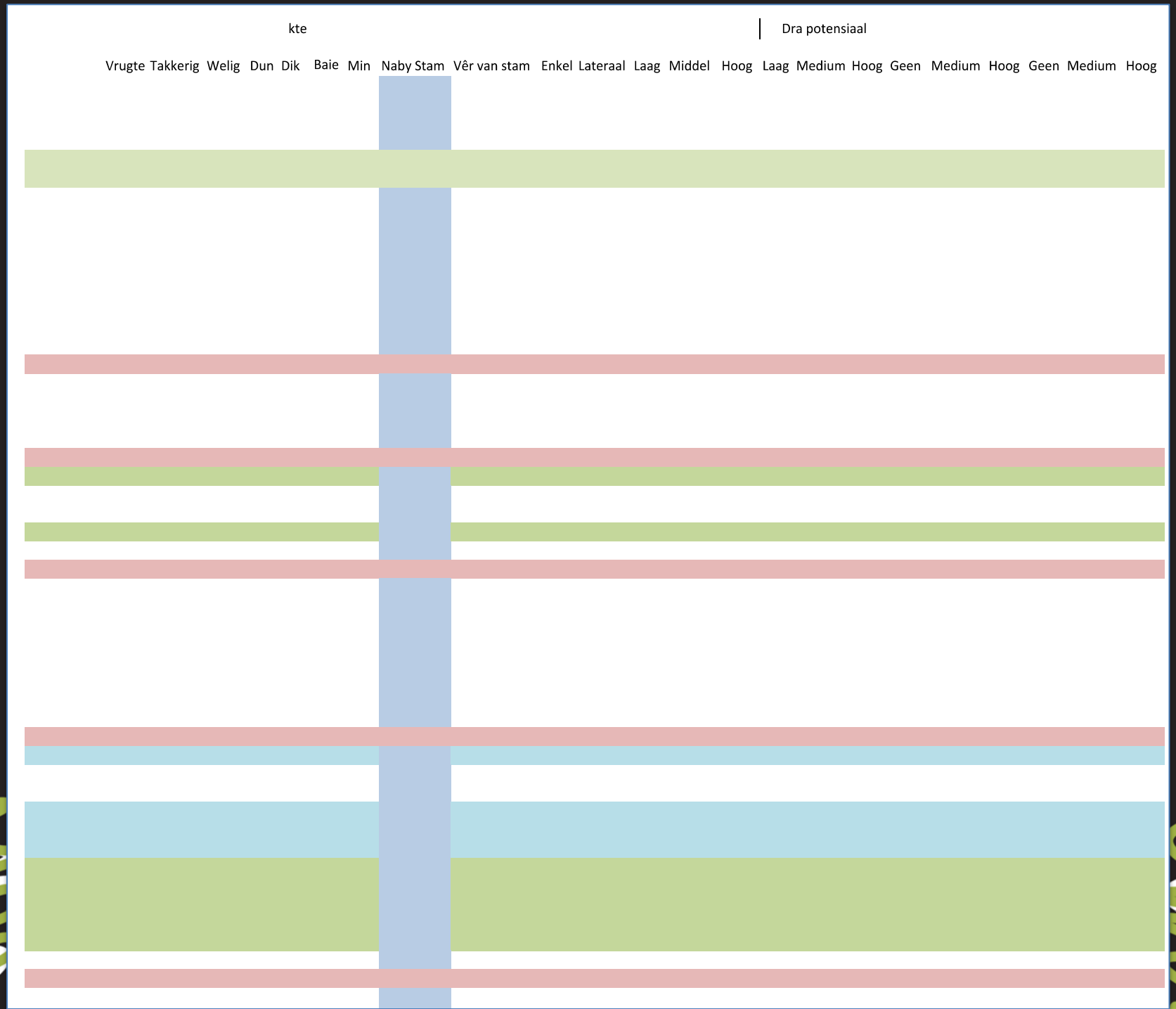
Micro Management?

Before we can start with micro management we first need to understand our trees.

Who remembers?

Assumptions

1. Branches that have cropped won't fruit again
2. Branches with many leafs has higher yield potential
3. Willowy branches have higher yield potential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What do we learn?

1. Branches with fruit can crop again
2. Fruit always hangs within 500mm of the central leader (or limb on normal hedgerows)
3. Higher complexity has higher fruiting potential
4. Healthier branches has higher tendency to better fruit set
5. Irrespective of branch health branches with more than 5 fruit did not crop again
6. Willow branches are mostly formed by heavy crop – fruit weight pulling branch down

What to we learn?

Perhaps my attention was misdirected. Focus was placed on measuring the potential of branches with fruit. More attention need to be applied to branches that were without fruit. However none was measure on any quantitative method. However photos don't lie.

A few hypothesis

1. Weaker branches = weak potential ✔
2. Healthy branches = superior potential ✗
3. Heavy production = weak potential ✔
4. Branches without crop = superior potential ✔
5. Branches with fruit on during flowering won't crop ✗

Micro management objectives

1. Increase production
2. Accuracy of tree management
3. Preventing / managing alternate bearing
4. Harnessing the full potential of a tree/orchard/hectare through careful branch selection

How do we apply micro management?

Are our pruning techniques and orchards adapted to micro-management and are we ready?

- No pruning (over grown trees)
- Mechanical pruning
- Mechanical pruning with window (hand) pruning
- Hand pruning on its own
- Mechanical pruning with limb removal
- Limb removal on its own

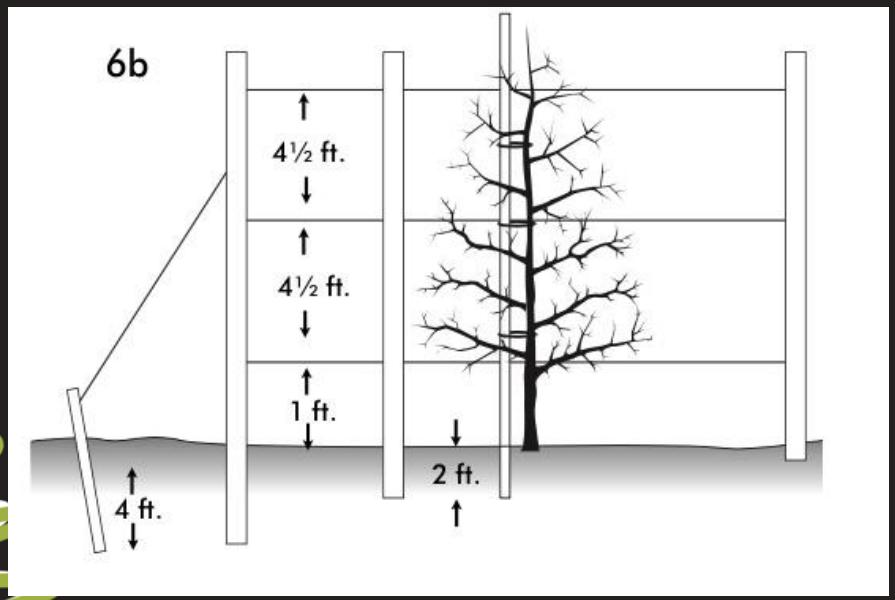
High Density orchards enables micro management, as the decision making process is simplified with a less complex and smaller tree.

Yet…*"we need limbs to produce fruit"*

this however might be one of the major limitations of high density pruning…

Introducing trellising

The main aim is to utilise the full potential of the tree, and maximise yields within the shortest timeframe.



Introducing trellising

Industries use trellising for different reasons. Some for support systems in high yields, others to improve quality, to protect against winds, or to influence the ripening of the fruit. Methodology also differs. Dwarfing rootstocks are used. Trellis systems differ. Pruning intensity and methods as well as the reasons for tying the up or down the branches

Introducing trellising

So this will never work on avos…or could it?

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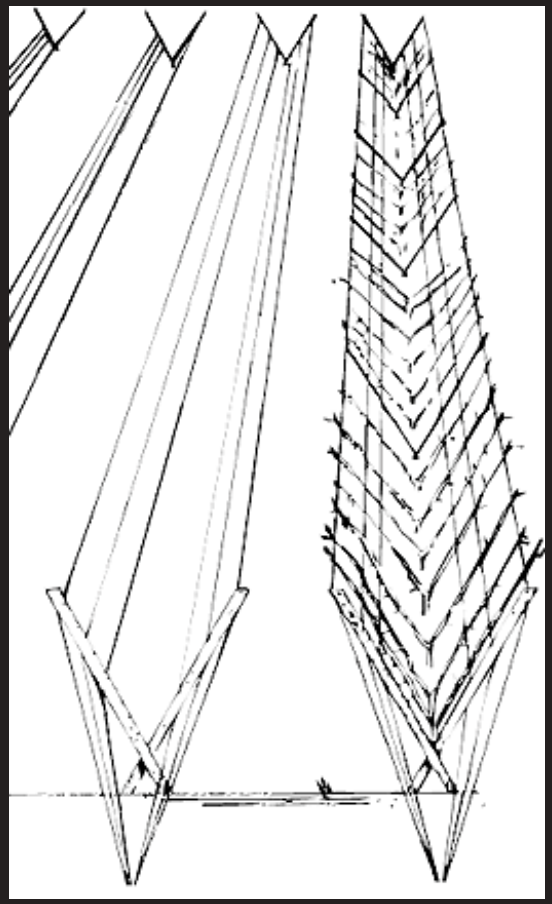
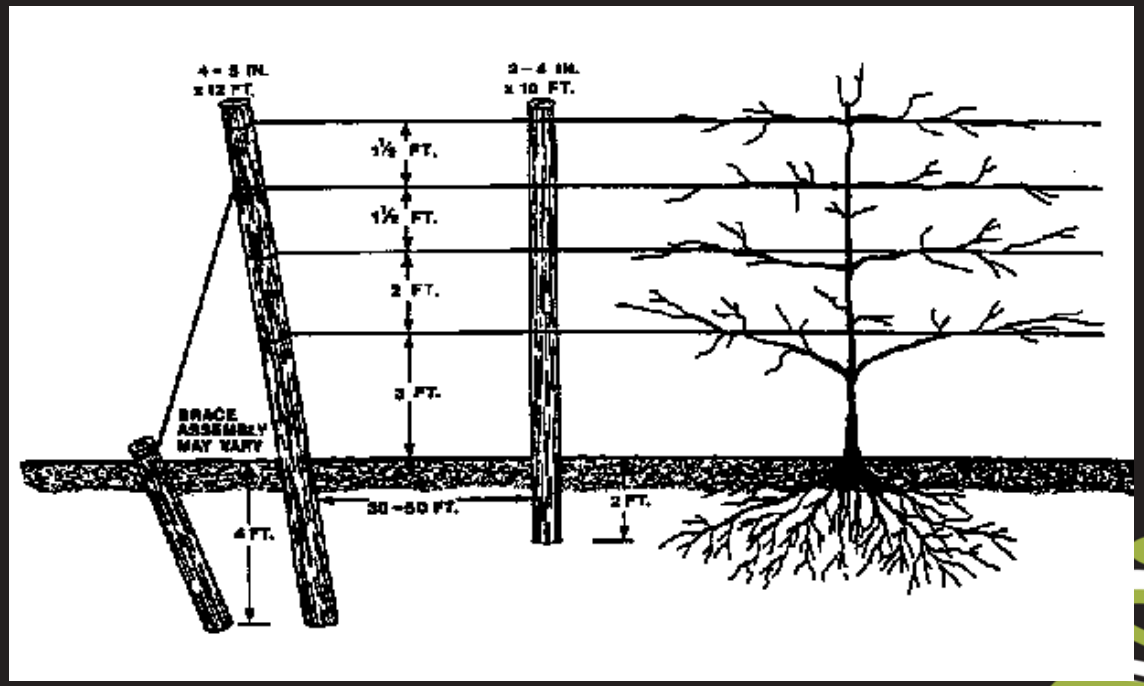
Introducing trellising

Our method's

Tatura trellis



Vertical axis trellis



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Our method's

Tatura trellis

Vertical axis trellis

Input costs = R8000 – R25000 /ha (depending on spacing)

Trellising on Avocados

What makes it different.

- Evergreen
- No dwarfing rootstocks
- Precocious cultivars often need support systems
- Manage sunburn & Light penetration
- Need 4-6 month old wood to produce flower – planning
- Natural sylleptic attachment angle
- Cropping pattern of fruit

So let's not play around

What are the assumptions?

- Sunburn will be higher
- High pruning cost
- High input cost
- Higher cumulative production
- Avos are to complex
- Improved spatial uitilisation

Before & after

Before & after

Light penetration improvement without removing branch

Wire provides support once branch crops

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Pruning analysis

Hand pruning – 7,3h/ha & 1,6min/tree

Mechanical Pruning – 12h/ha & 1,7min/tree

Trellis pruning – approx 10mins/tree

Added advantage of micro management

trees weren't trained from year 1

Production comparison

Central leader

25 fruit/tree – 6,25kg/tree
5t/ha

Vertical axis trellis

60 fruit/tree – 15kg/tree
12t/ha

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In conclusion

We might still realise many other advantages of trellising and high-density production such as:

- Maturation uniformity
- Earlier fruit (harvest ready)
- Fruit count improvements
- Changes in irrigation management
- And more…

In conclusion

For High-density to be a success, we need to have an understanding of the tree and its complexities. With some understanding of the complexity of the avocado tree we can implement micro-management principles to possibly improve production and limit alternate bearing

In conclusion...

One such method might be the implementation of trellis systems. The implementation of this will however be much different from other industries, as the characteristics of the trees do in fact differ.

Cultivar selection is crucial to the success of such systems as the growth characteristics within cultivars and the availability of dwarfing characteristics are also crucial.