



Productivity of 'Hass', Carmen[®]-Hass' and 'Gem[™]'
using different plant spacings and manipulation techniques.

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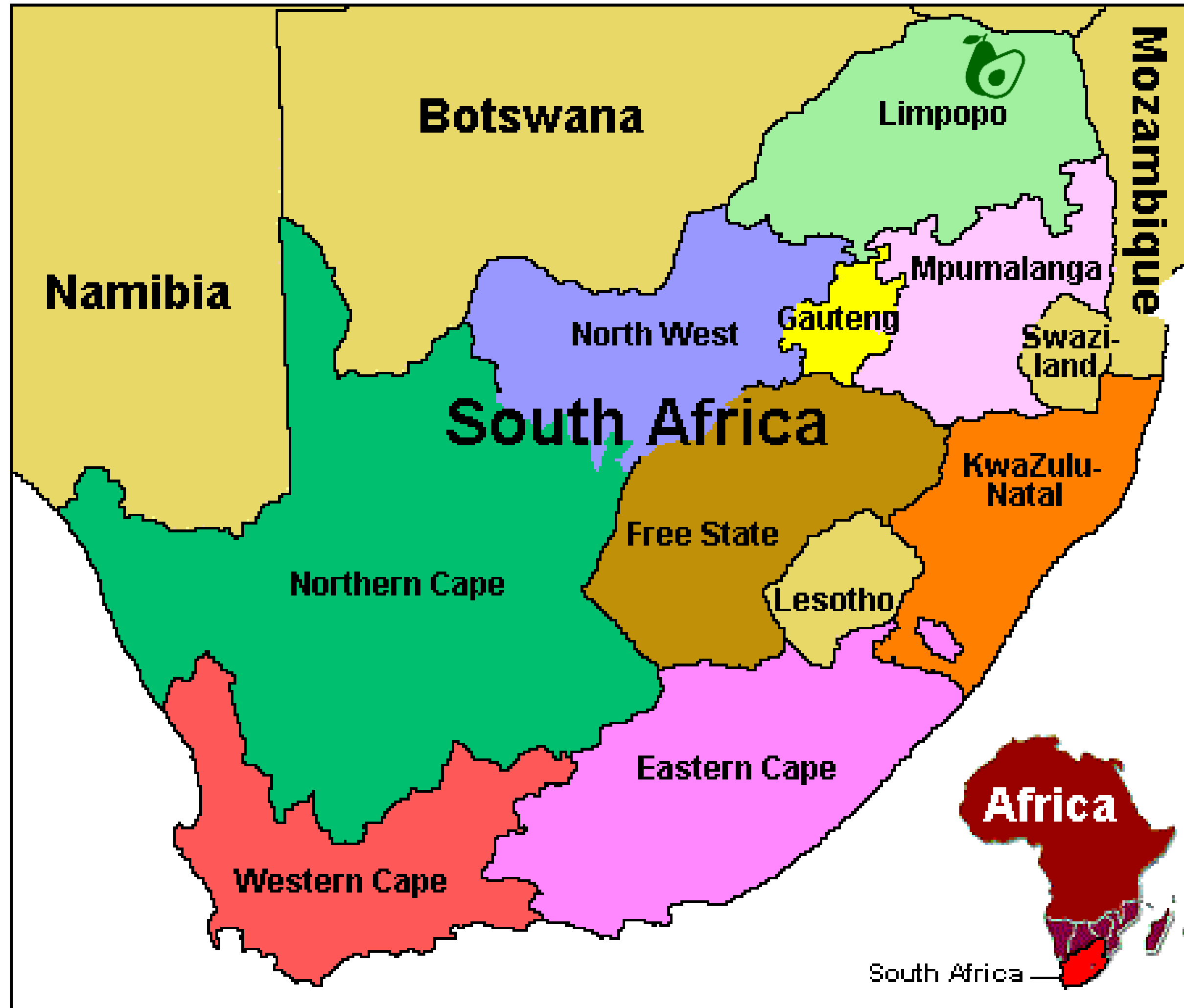


Introduction



- With increasing input and production costs, it is becoming more difficult for growers to produce profitable.
- A simple solution is to increase the number of trees planted per area to increase production per area and stay competitive.
- Superior plant material (cultivars and rootstocks), and manipulation techniques like pruning, tree training, the use of plant growth regulators (PGR's) and cincturing can also be used to increase productivity
- The strategic objective to add economic value to the greater Westfalia forms the basis for this project

Materials & Methods



- Large scale commercial trial planting of \pm 15ha
- Location: Tzaneen, Limpopo Province, South Africa
- Climate: Subtropical
- Rainfall: Summer, 1200mm/annum
- Temperatures: Summer 32°C/20°C
Winter 25°C/10°C
- Soil: Deep well-drained
Clay content 30-40%

Superior plant material

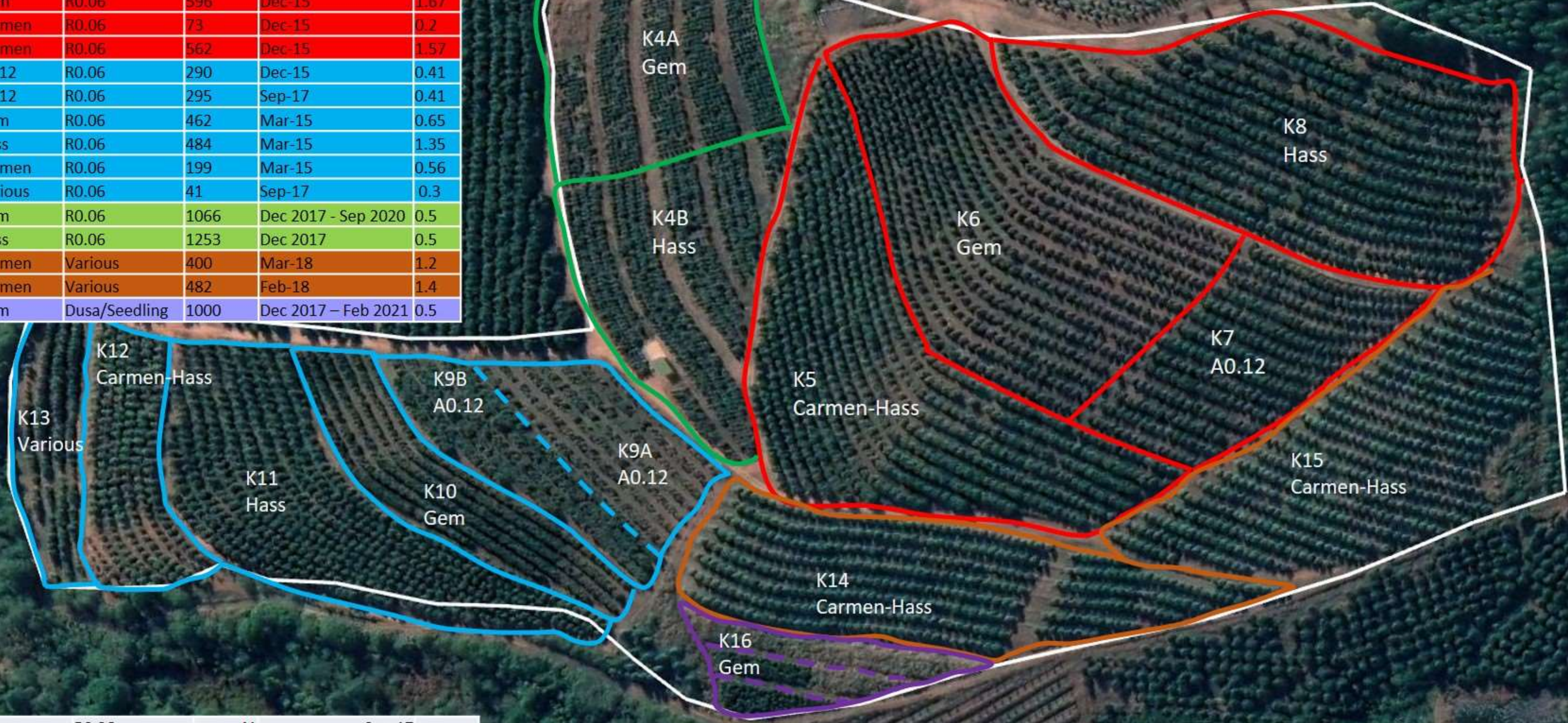


- Rootstock R0.06
 - Vigorous, strong tree with excellent yield potential
- Scion material
 - Early season: Carmen[®]-Hass
 - Late season: Gem[™]
 - Bench-mark: Hass



"Orchard of the future"

Block #	Spacing	Cultivar	Rootstock	# of trees	Planting date	ha
K 8	7x4	Hass	R0.06	553	Dec-15	1.55
K 7	7x4	A0.12	R0.06	150	Dec-15	0.42
		A0.12	R0.06	98	Sep-17	0.27
K 6	7x4	Gem	R0.06	596	Dec-15	1.67
K 5B	7x4	Carmen	R0.06	73	Dec-15	0.2
K 5A	7x4	Carmen	R0.06	562	Dec-15	1.57
K 9A	7x2	A0.12	R0.06	290	Dec-15	0.41
K 9B		A0.12	R0.06	295	Sep-17	0.41
K 10	7x2	Gem	R0.06	462	Mar-15	0.65
K 11	7x2	Hass	R0.06	484	Mar-15	1.35
K 12	7x2	Carmen	R0.06	199	Mar-15	0.56
K 13	7x2	Various	R0.06	41	Sep-17	0.3
K 4A	2x2	Gem	R0.06	1066	Dec 2017 - Sep 2020	0.5
K 4B	2x2	Hass	R0.06	1253	Dec 2017	0.5
K14	7x4	Carmen	Various	400	Mar-18	1.2
K15	7x4	Carmen	Various	482	Feb-18	1.4
K16	1x1	Gem	Dusa/Seedling	1000	Dec 2017 - Feb 2021	0.5



Block #	Spacing	Cultivar	Rootstock	# of trees	Planting date
K 13	7x2	Carmen	R0.06	41	Sep-17
		Gem	R0.06	39	Sep-17
		Hass	R0.06	43	Sep-17
		A0.19	R0.06	35	Sep-17
		A0.12	R0.06	38	Sep-17
		Maluma Hass	R0.06	32	Sep-17



Results and discussion

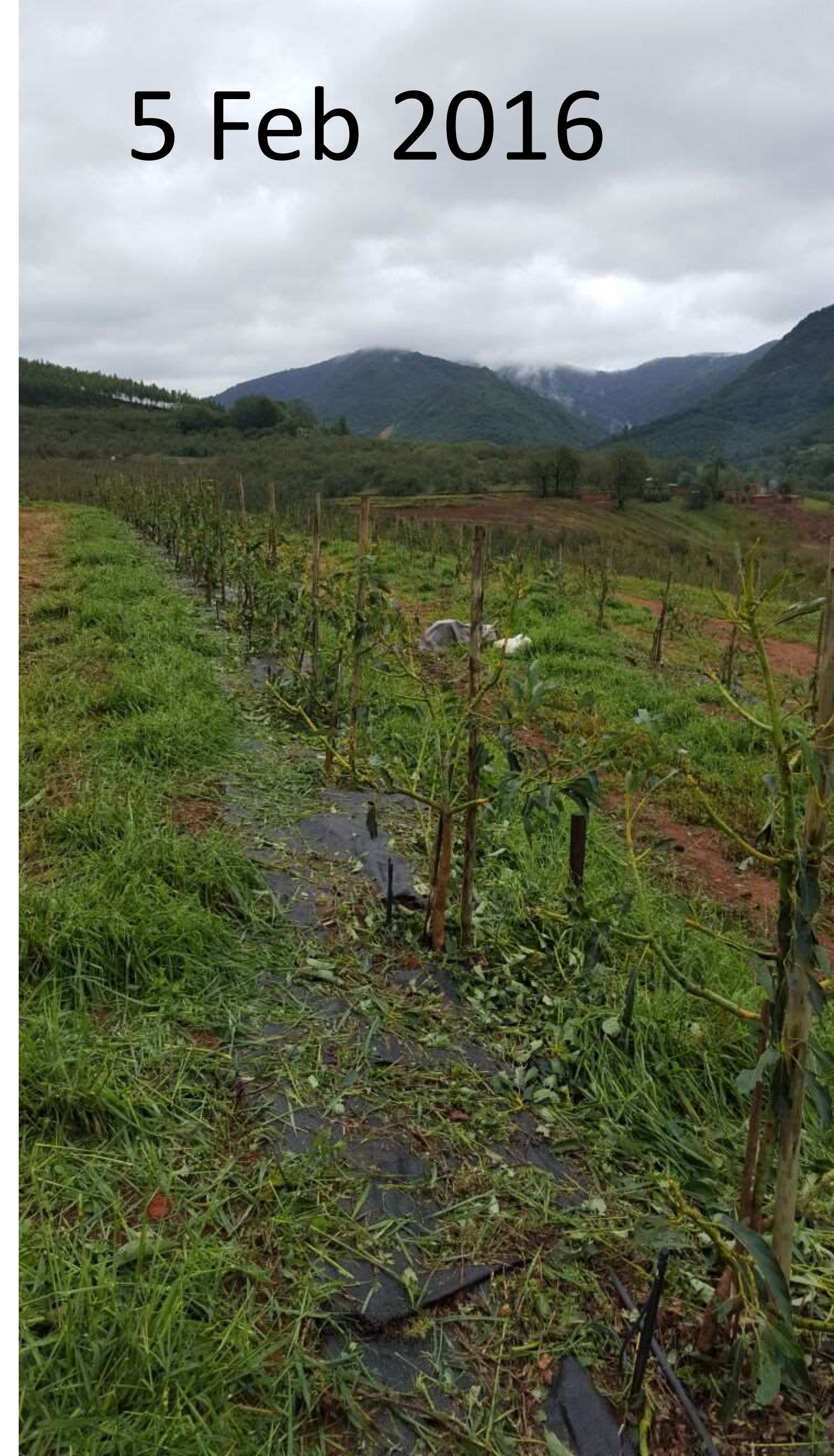


First trees established in March 2015





October 2015



5 Feb 2016

5 Feb 2016

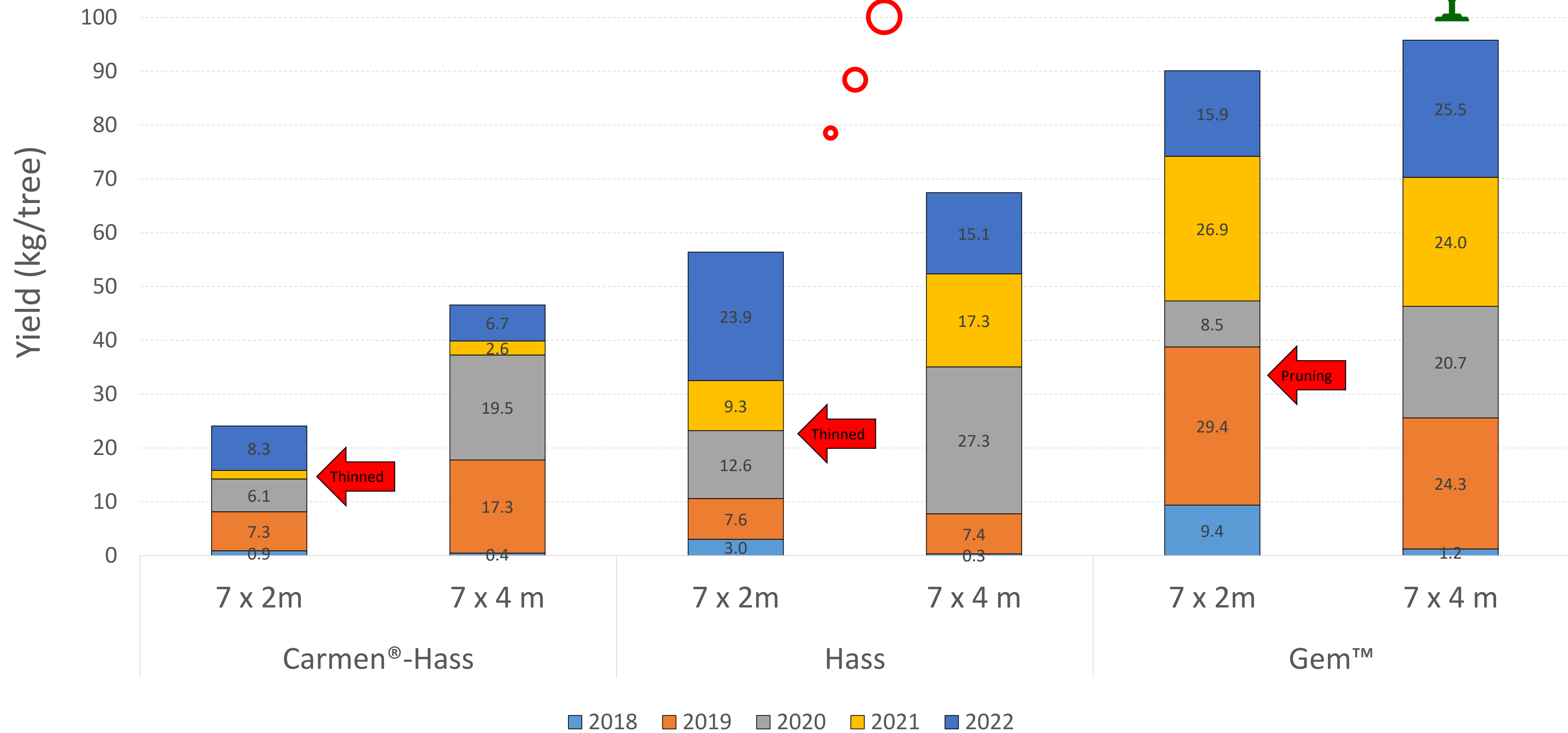


June 2017



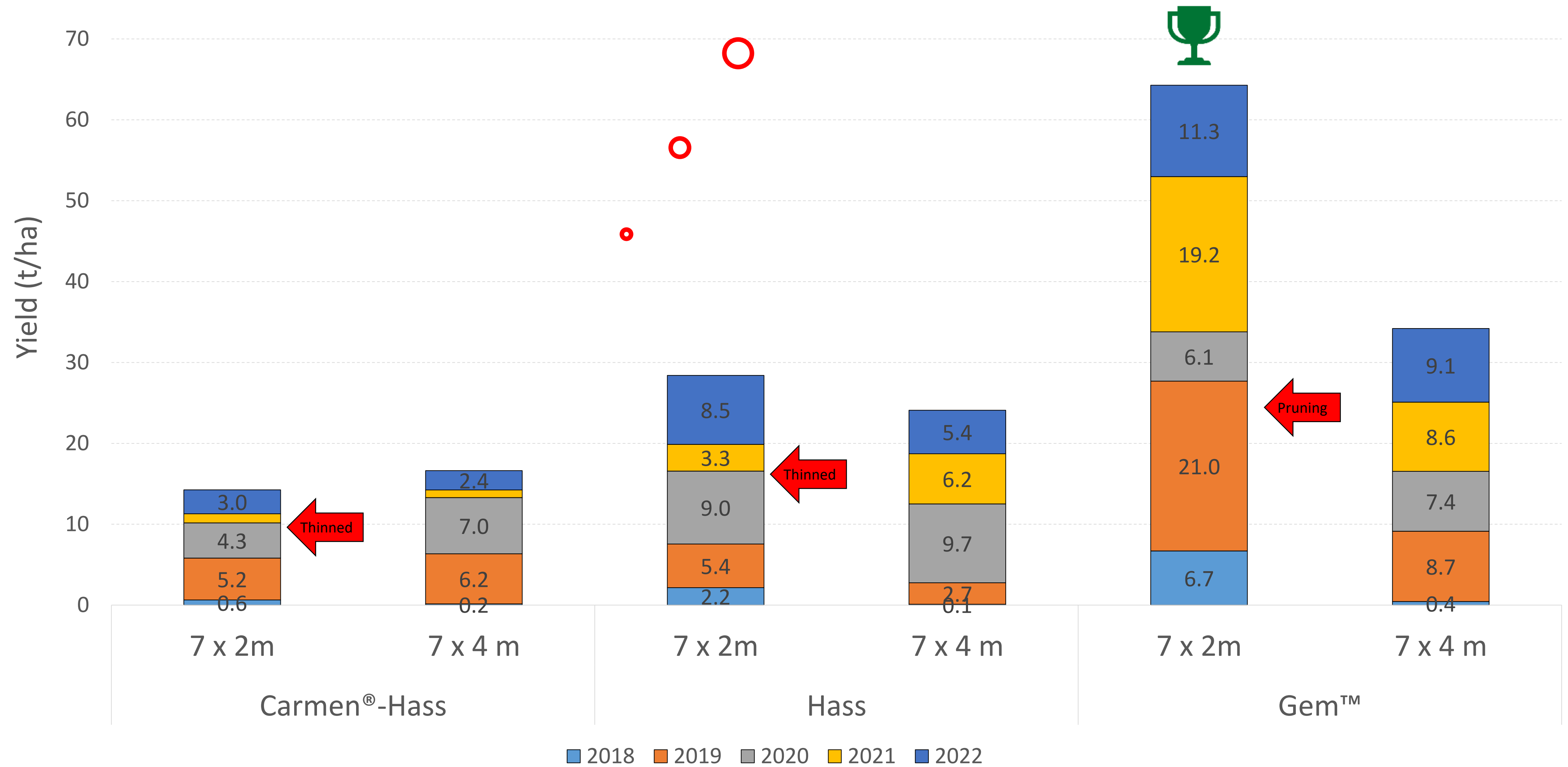
Production: kg/tree

Hail:
Nov 2021



Production: ton/ha

Hail:
Nov 2021



September 2019

September 2020

September 2021

Gem
(7m x 4m)



Gem
(7m x 2m)





Manipulation to increase yield &/control growth



Materials & Methods



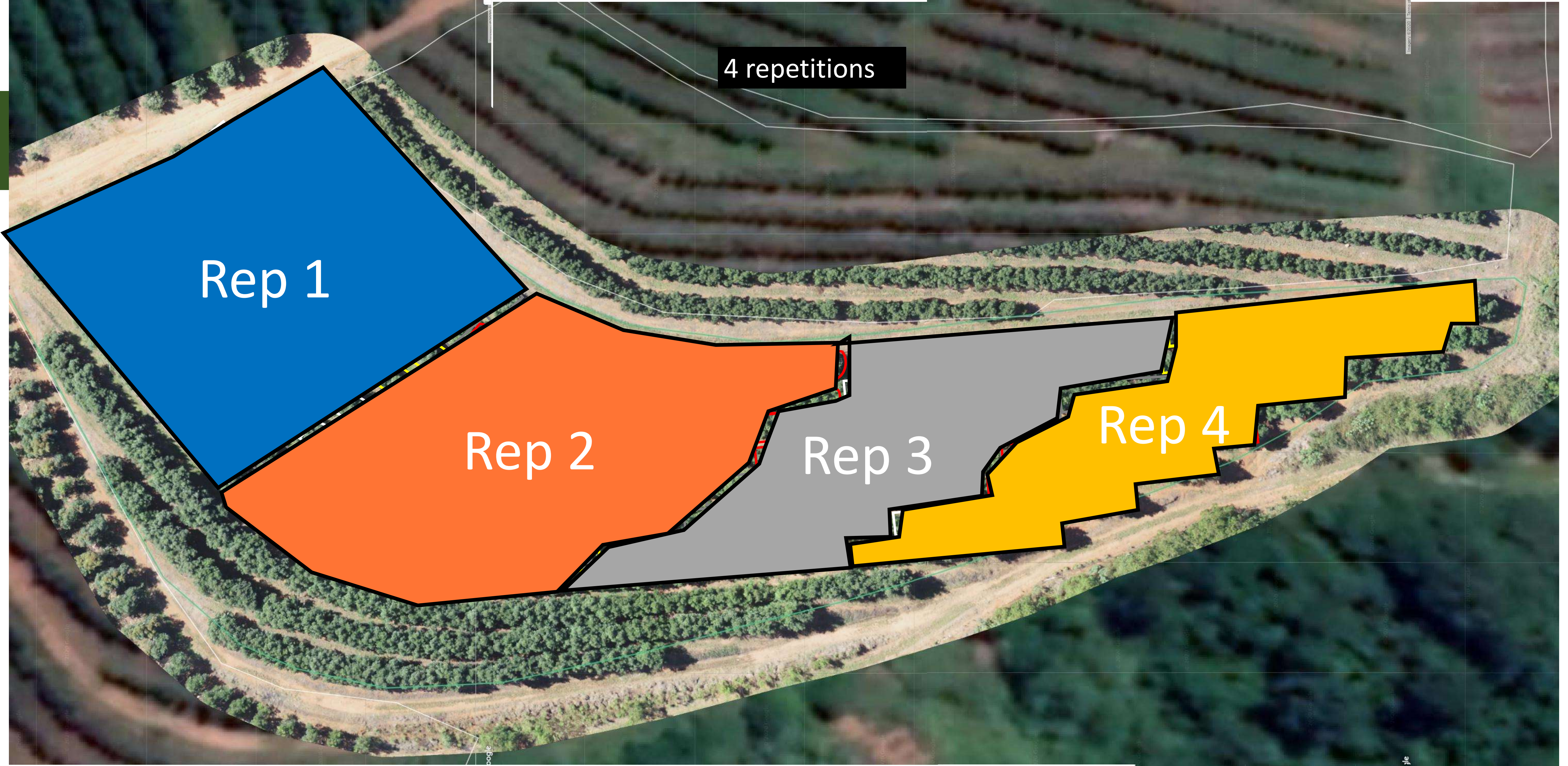
- 7x2m Hass
- Four treatments were evaluated:
 - Treatment 1: Untreated control (Pruning only)
 - Treatment 2: PGR
 - Treatment 3: PGR + Cincture
 - Treatment 4: Cincture
- PGR: December 2018
 - To control the summer vegetative growth flush Jan/Feb 2019
 - Paclobutrazol
 - Applied at 2%
 - Soil drench
- Cincture: April 2019
 - To enhance the 2019 flowering and subsequent 2020 crop
 - Pruning saw cut
 - Main stem with one smaller branch left as a breather branch



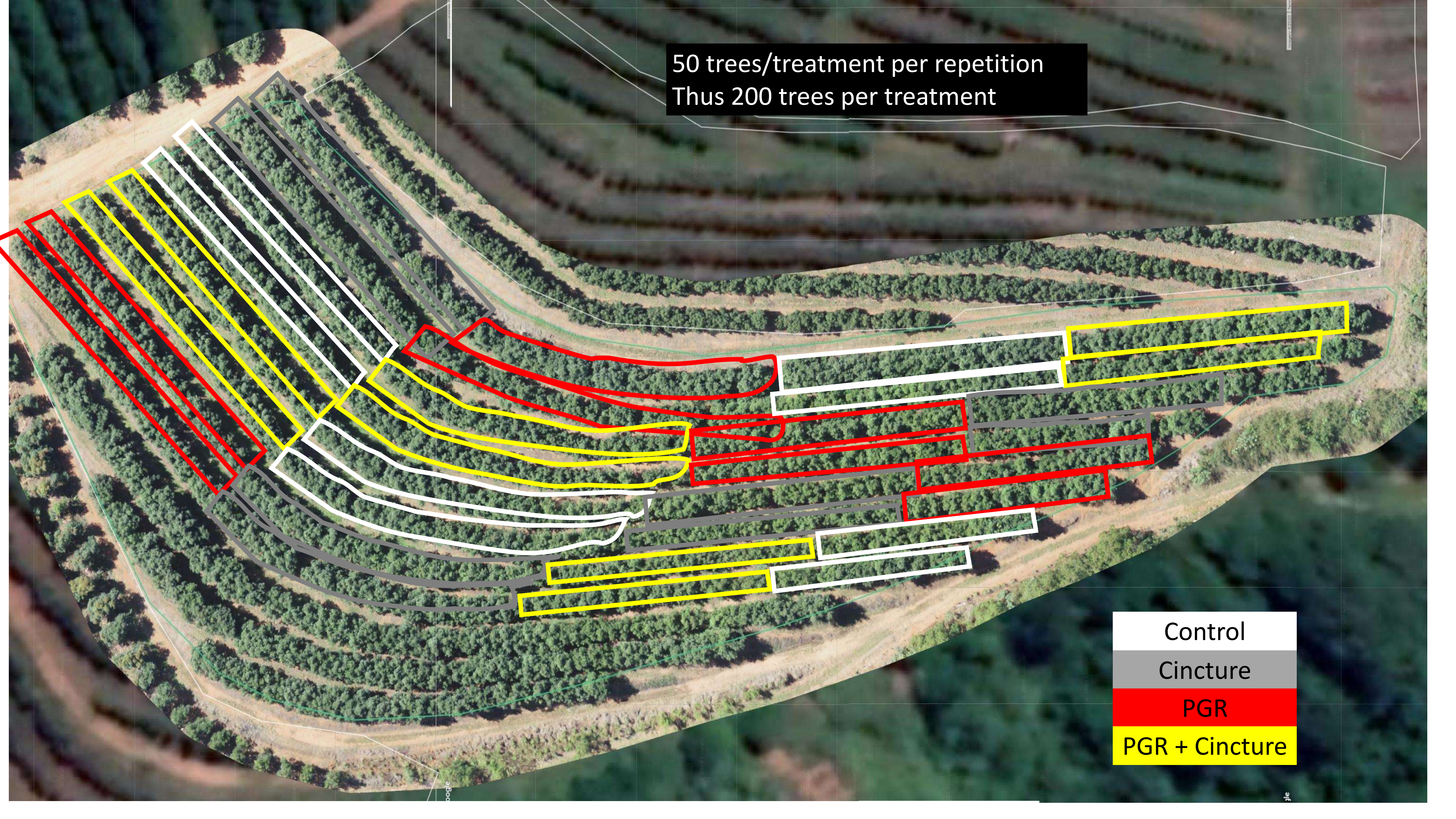
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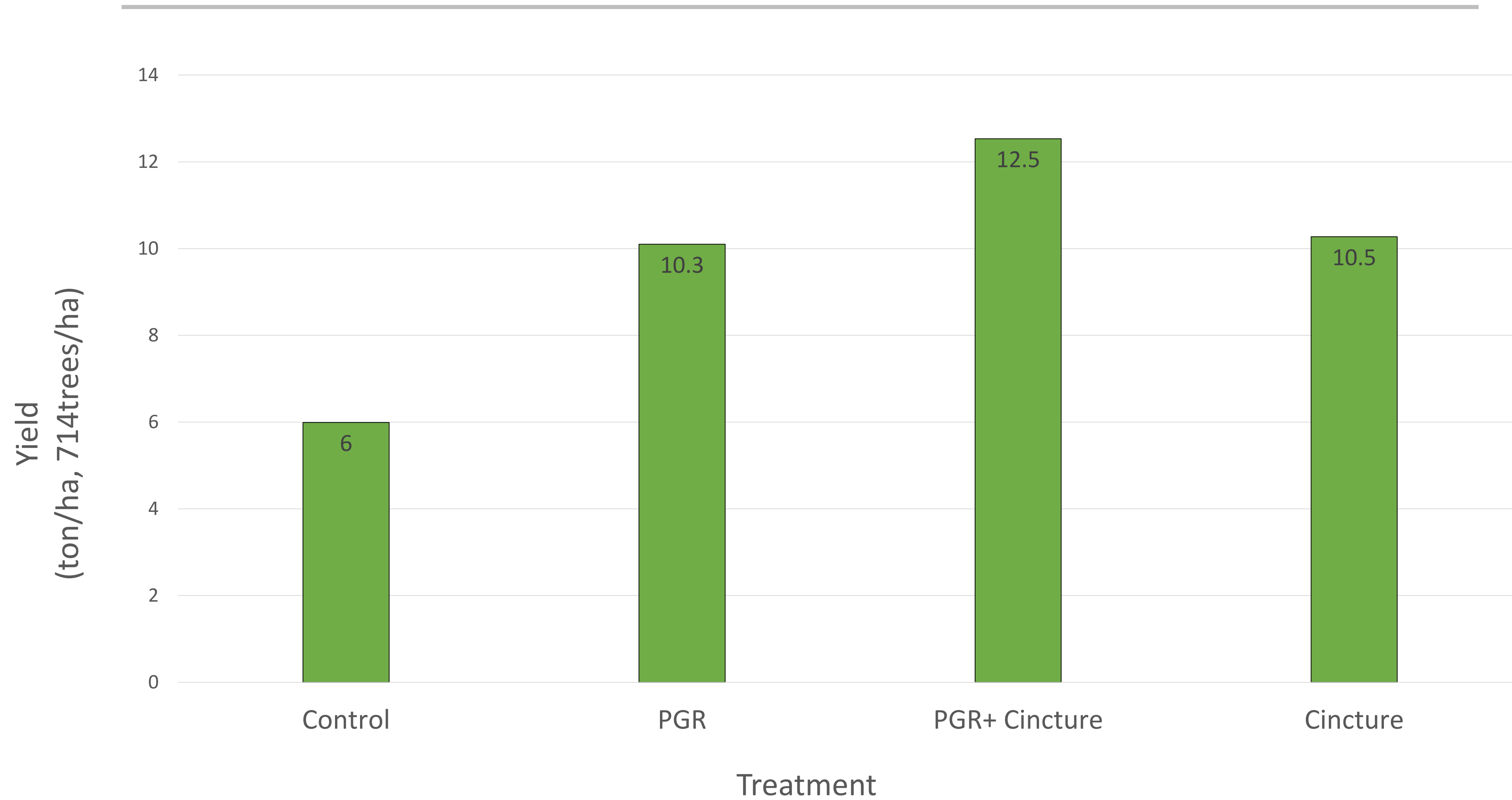


50 trees/treatment per repetition
Thus 200 trees per treatment



Control
Cincture
PGR
PGR + Cincture

Hass manipulation trial: Yield (ton/ha)



Conclusions



- The Gem™ cultivar is the top producer in the planting and is best suited for the higher density planting of 7x2m
- 7x2m Gem™ trees continued to produce as well (or better) than the 7x4m Gem™ trees after 4 seasons with none to minimal management/manipulation inputs
- Carmen®-Hass and Hass trees planted at 7x2m becomes less productive from the 2'nd and 3'rd season when compared to the 7x4m planting
- Manipulation with PGR's and cincturing improved the yield of the overcrowded Hass
- Manipulation started timeously can possibly keep Hass and Carmen®-Hass trees productive for another season or two, before thinning is required.

Acknowledgements



- **WiT Research team**
 - Stefan Köhne, Theo Bekker
- **WiT Kiaat team**
 - Suzan, Julia, Pontsho, Eliya, Josias
 - Avhankhangwi, Dawid, Rootstock team
- **WiT Maintenance team**
 - Takalani and team
- **WFE Production team:**
 - Phillip, Tendani, Malesa, Alpheus, Malatji
- **Packhouses: TFP and Westfalia**
 - Wilson, Elijah





Thank you for your attention!

