



The *science* of pruning

is there a science or
is it just an art?

Ambra Tosto



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What is pruning



“the art and science of cutting away a portion of the plant for horticultural purposes”

Ferree & Schupp (2003)

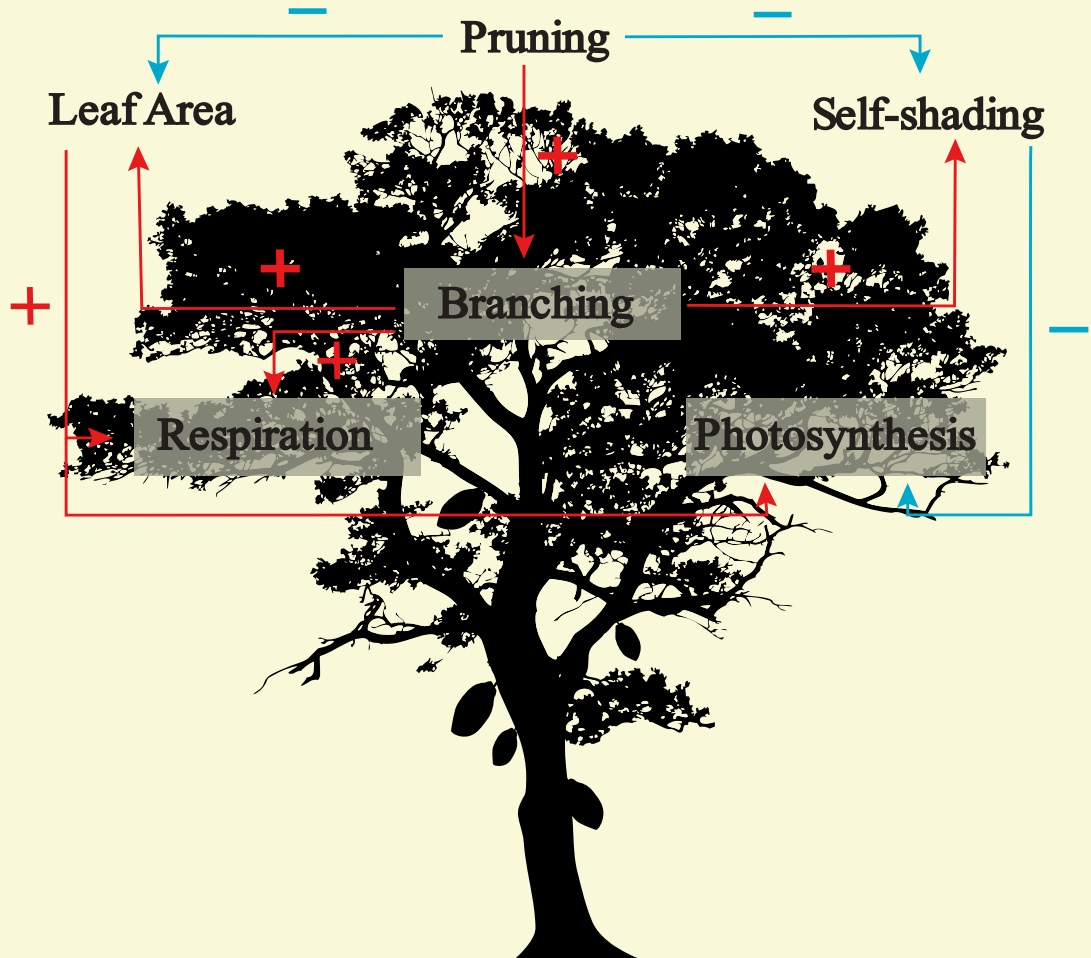


Why do we prune

- Create a strong and accesible branch framework
- Controlling tree size
- Maintaining structure
- Light penetration
- Facilitating spraying and harvesting
- Sanitation
- Controlling fruit quality



Ecology of pruning



Cocoa pruning in manuals

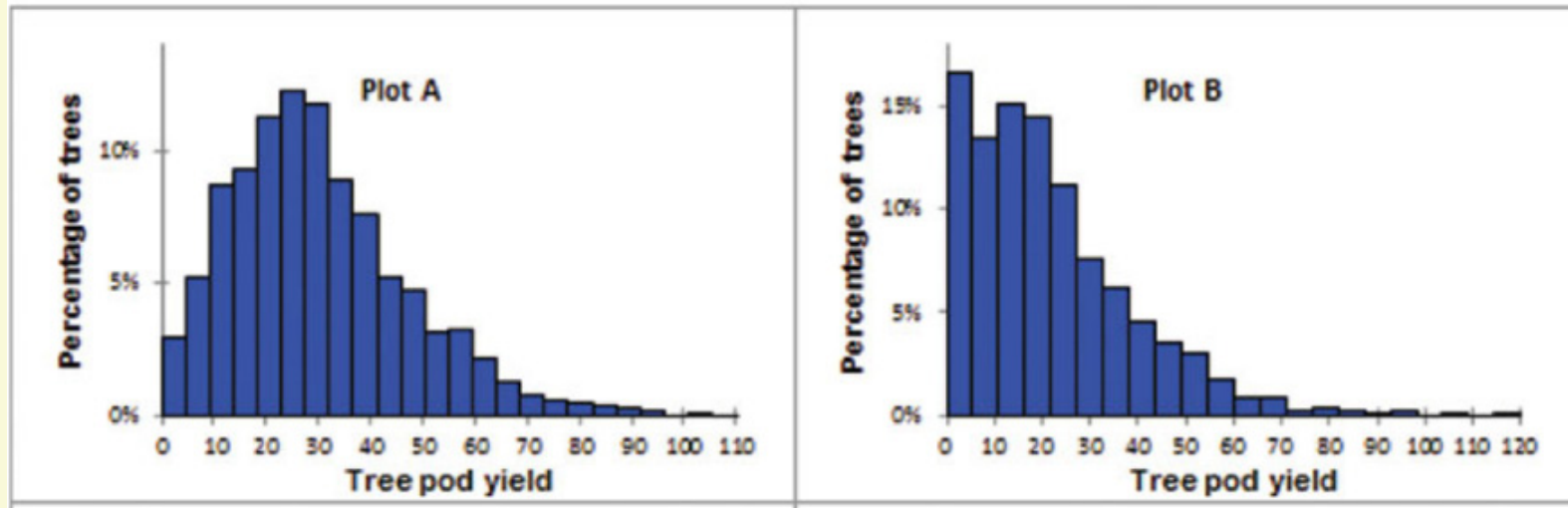
STRUCTURAL PRUNING			
Manual	Source	Time of the year	Aims
<i>A Guide to cocoa cultivation (1987)</i>	Cocoa Research Institute of Ghana (CRIG) (Opoku-Ameyaw et al., 1987)	Before onset of rain	Facilitate activity. Improve air circulation and light penetration.
<i>Discovery learning about cocoa (2003)</i>	CABI bioscience (Vos et al., 2003)	Before onset of rain	Increasing number of pods. Facilitate activities
<i>Good agricultural practices for sustainable cocoa production (2011)</i>	IITA (David, 2011)	Before onset of rain	Increasing number of pods. Facilitate activity
<i>Climate-Smart Agriculture in Cocoa (2018)</i>	World cocoa foundation (Mireille Dohmen et al., 2018)	After rain start	Improve air circulation and light penetration. Nutrient partition to growth and pods. Reduced heat trapping
<i>Managing Soils for Increased Productivity and Decreased Deforestation in Cocoa (2020)</i>	IITA(IITA, 2020)	Before onset of rain	Improve soil fertility. Avoid wasting soil nutrient. Pod increment of 15-25%. Facilitate activities



Cocoa pruning in scientific literature

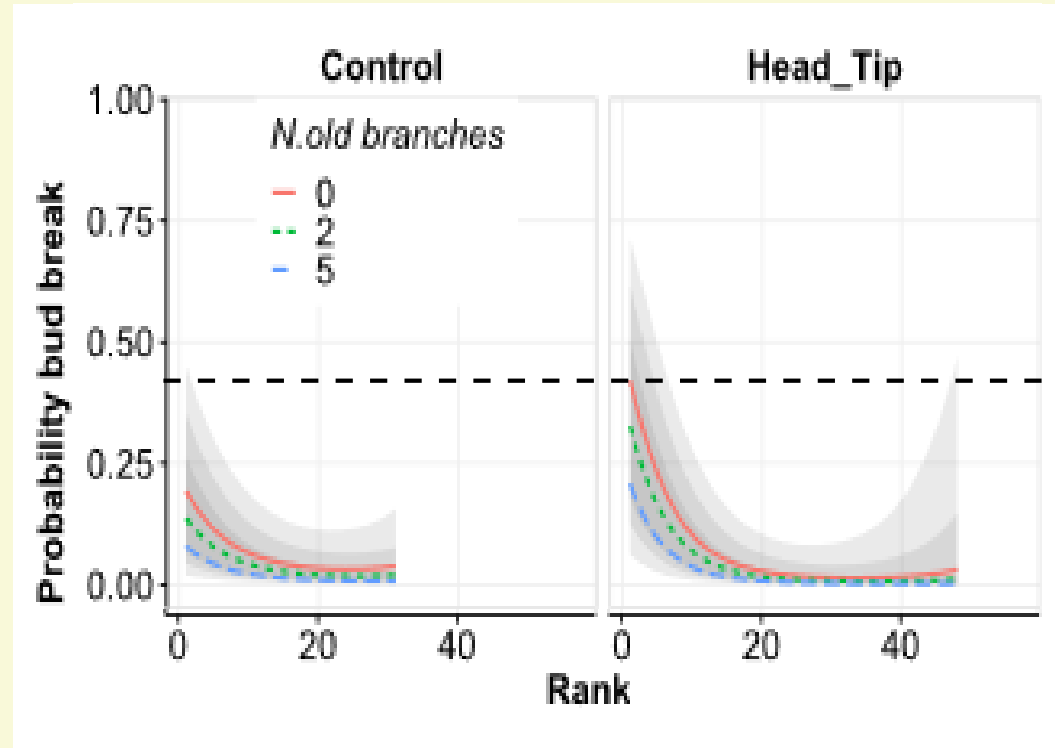
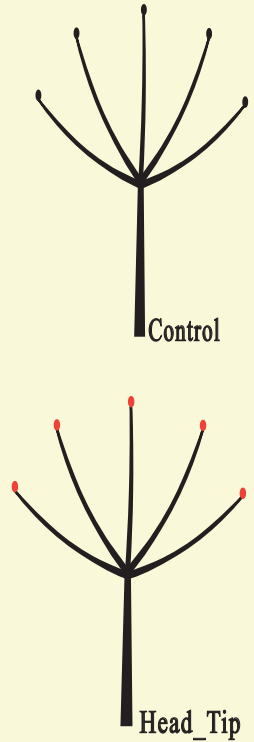
Pruning Effect on Yield	References
Positive	Laossi et al. (2022), Vega et al. (2021)
Positive for light or medium pruning	Balasinha (2007), Laiva-Rojas et al. (2019), Govendaraj & Jancirani (2017)
No effect	<u>Ampofo</u> (1986)
Negative	Thomas & <u>Balasinha</u> (1992)
Negative/positive depending on stage	Bonaparte (1966), KAU (1992)

Heterogeneity of cocoa fields



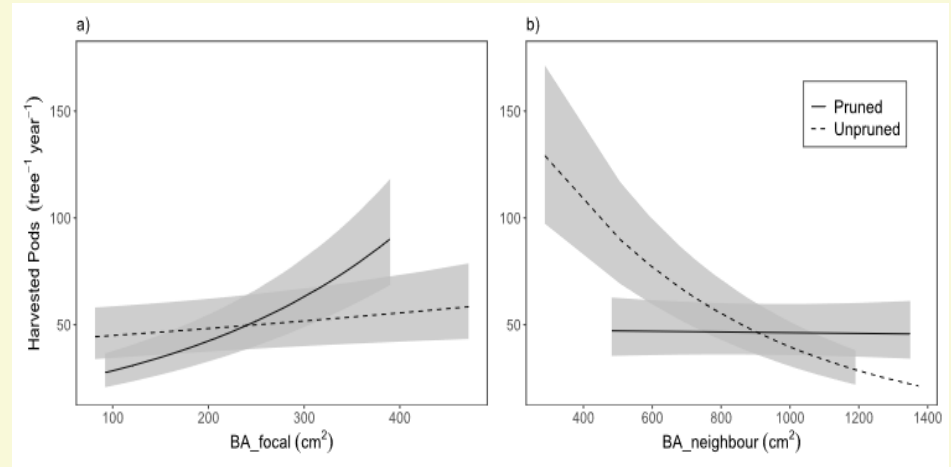
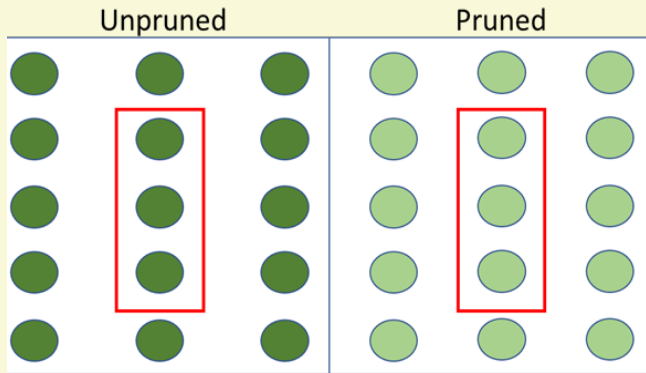
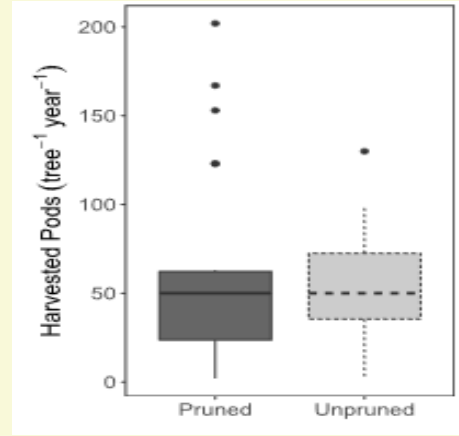
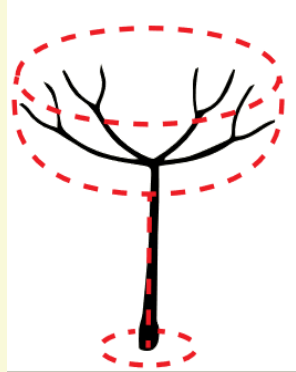
Wibaux et al. (2018)

Cocoa branching responses to pruning

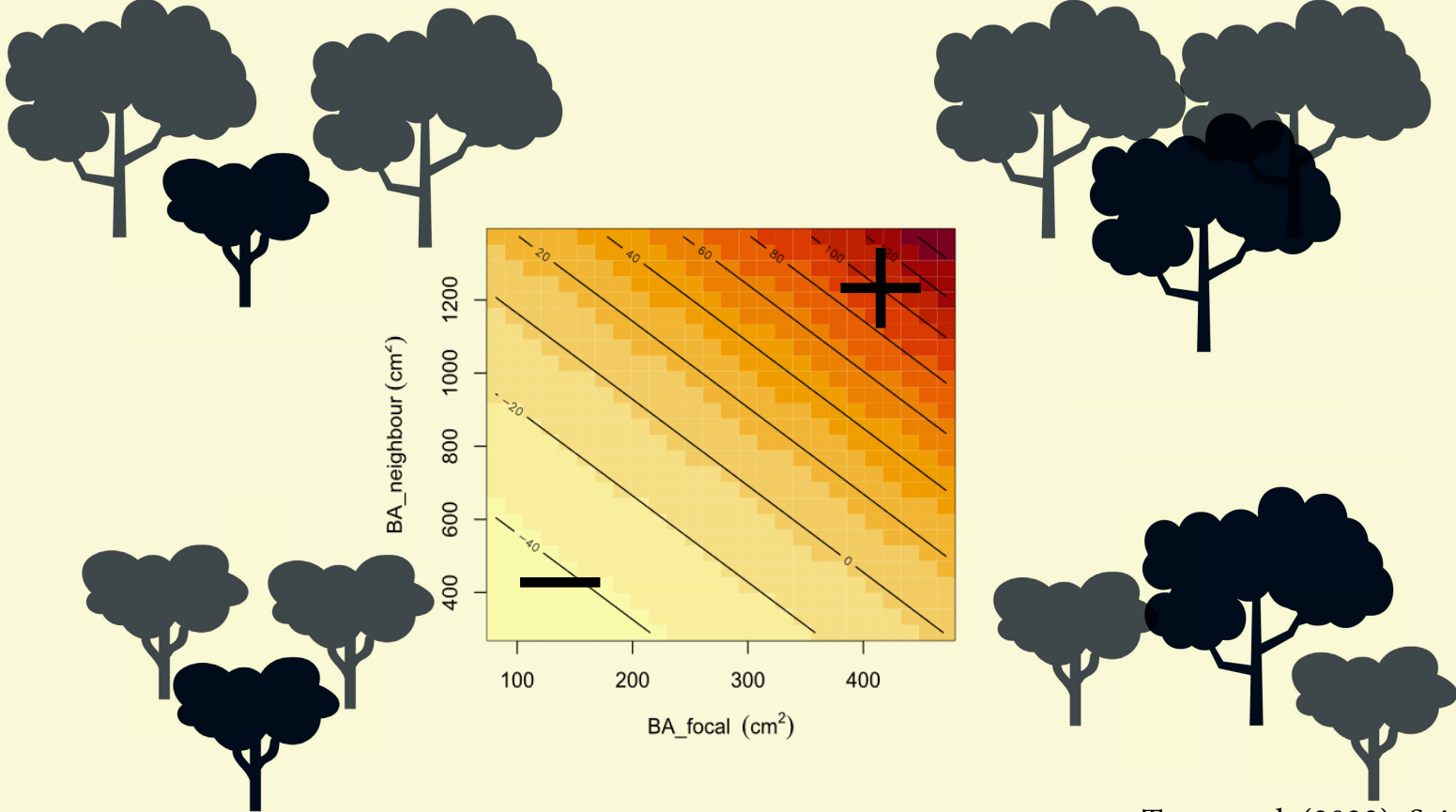


Pruning effect on pod production

Divo - Côte d'Ivoire
9 year old trees



Pruning effect on pod production



Implications, ideas and follow up reaserch

- Braching responses are difficult to predict
- Pruning to homogenize tree production across a field.
- Pruning as a tool for higher density planting.
- Tree to tree variability in a cocoa field needs to be taken into account in data analysis and when designing pruning interventions.
- On farm research in needed to identify guidelines for tree-size dependent pruning intervention.
- The nuanced effect of pruning on cocoa yield needs to be clearly comunicated to farmers.