

# PAPER POTS AS A SOLUTION FOR IMPROVED MECHANISED PLANTING

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ELLEPOT A/S



 **ELLEPOT<sup>®</sup>**  
SOUTH AFRICA

# ONE INTEGRATED PROPAGATION SYSTEM

WHAT IS ELLEPOT



ELLEPOT  
MACHINES



ELLEPOT PAPER



ELLEPOT TRAYS



ELLEPOT  
SERVICE





27 YEARS EXPERIENCE



120 COUNTRIES



5 BILLION ELLEPOTS PER  
YEAR

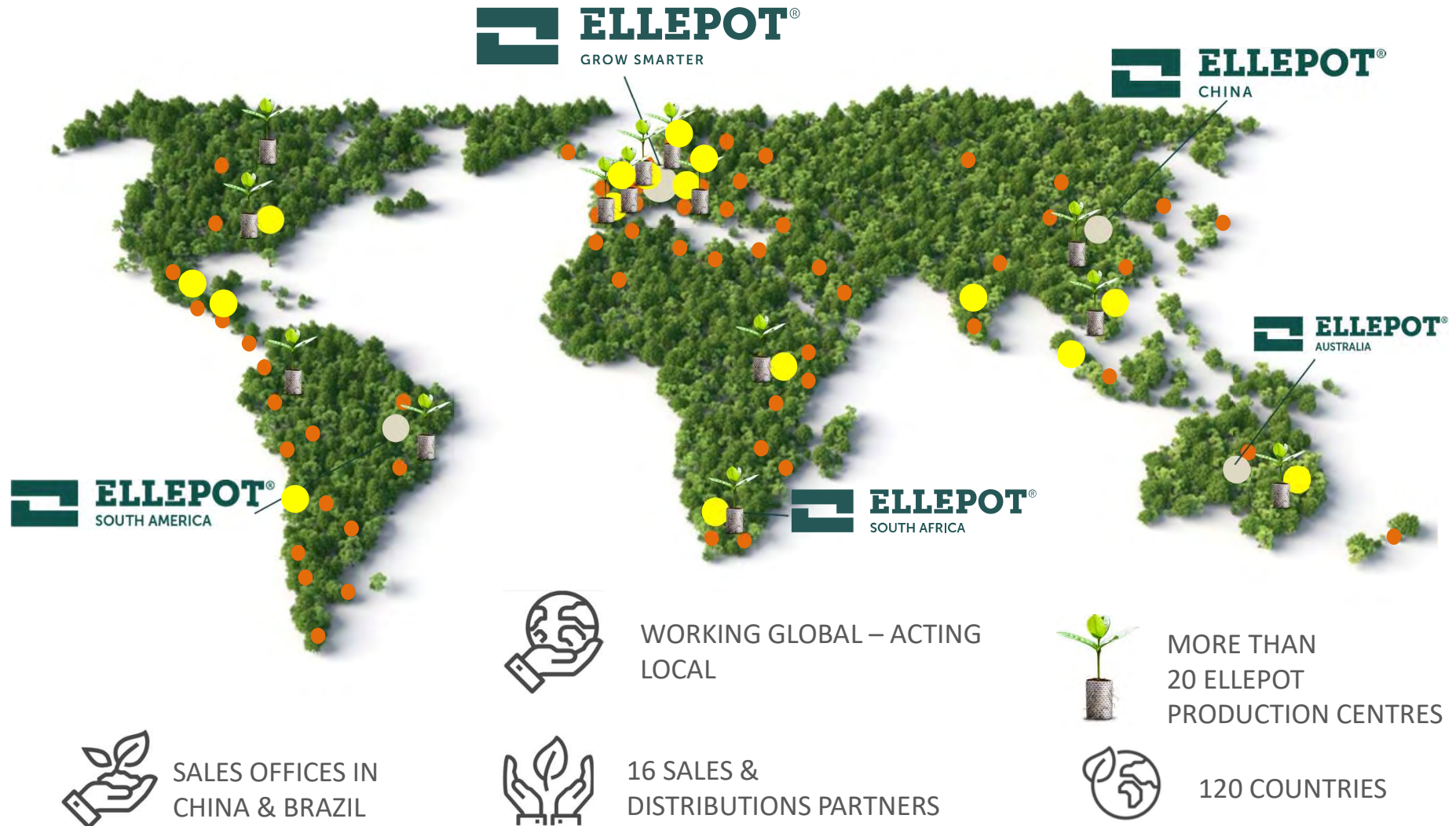
## INTRODUCTION TO ELLEPOT A/S

- Founded in 1993
- Head office with development, sales and production in Esbjerg, Denmark
- Exclusively focused on the Ellepot system and its values for our customers
- Market leader and one-stop supplier of an unique propagation system
- Ellepot Worldwide sales, distribution and service



# WORLD MAP OF ELLEPOT

CUSTOMERS IN MORE THAN 120 COUNTRIES



# KEY QUESTIONS?

## What are the key challenges with current planting system?

1. **Plant supply to the compartment/machine**
  1. Plant supply logistics to the field
  2. Handling of trays in field
2. **Extracting plants from the trays** – time consuming or difficult to automate
3. **Root damage** (due to extraction and when planted)
4. **Quality of establishment** (Transplant shock, mortalities, windthrow)



# KEY QUESTIONS?

## What is driving the change to mechanised planting?

- Increased cost and availability of manual labour
- Safety concerns and ergonomics
- Planting efficiency - Quality & Speed of planting
- Cost of plant material being deployed & availability





# KEY QUESTIONS?

**What plant specifications does effective mechanised planting require?**

- **Root quality & integrity**
- Uniform plant height & branching
- Uniform RCD/Sturdiness
- Good plant health



# WHY ARE PAPER POTS BETTER?

## 1) Stabilised Substrate

A stabilized substrate is a growing media that holds its shape/form without the aid of roots

- Paper pot manufacturing process
- Benefit to nursery & field





# WHY ARE PAPER POTS BETTER?

## NURSERY AUTOMATION



AUTOMATIC STICKING



TRANSPLANTING



AUTOMATIC STICKING



SELECTION LINE

# WHY ARE PAPER POTS BETTER?

## NURSERY AUTOMATION



**ELLEPOT®**  
GROW SMARTER

23-10-2020

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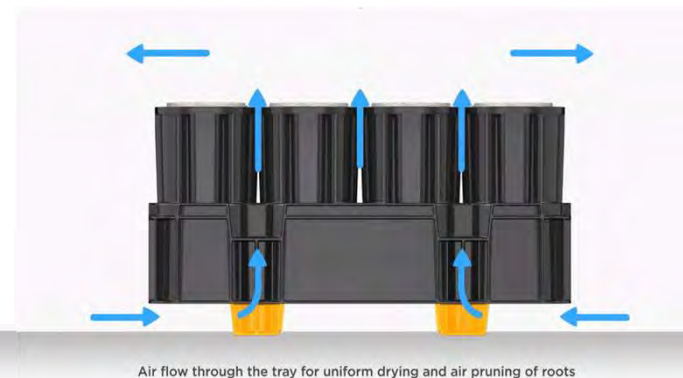
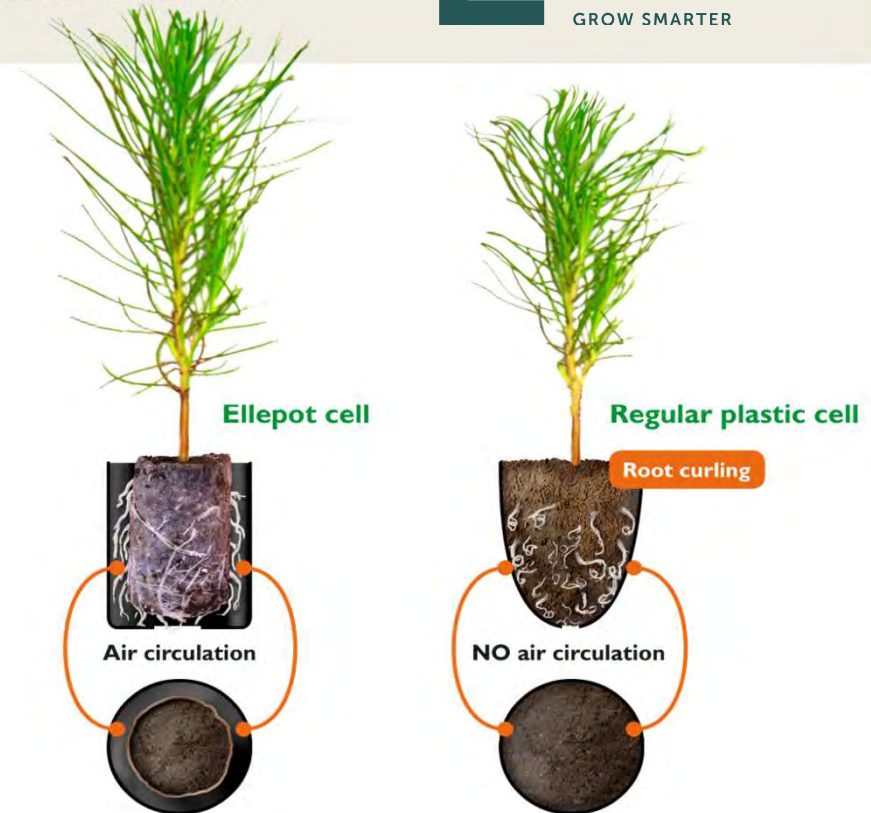
# WHY ARE PAPER POTS BETTER?



## Root Aeration Status

- **Air-Circulation** - Microclimate around the paper pot
- **Drainage** – space between tray and paper wall promotes wet/dry cycles and fast drainage of excess moisture

= Better field establishment



Air flow through the tray for uniform drying and air pruning of roots

# AIR CIRCULATION

SURFACE AREA IS VITAL = BEST ROOT DEVELOPMENT

## Drying down patterns

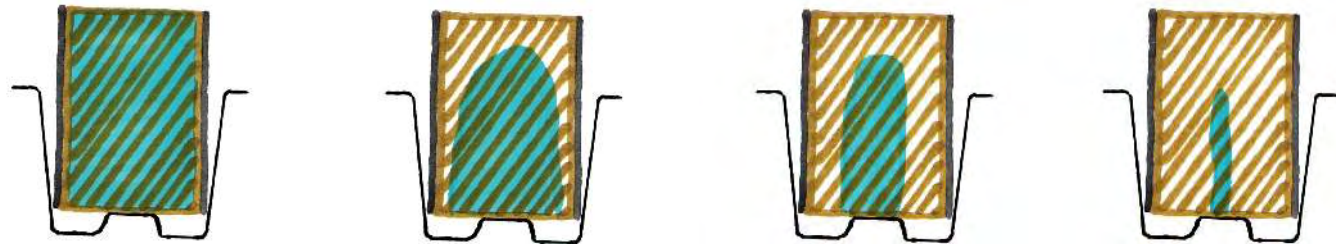
Loose filled tray



Ellepot in tray



New Ellepot Flex  
In Ellepot Airtray





# WHY ARE PAPER POTS BETTER?

## Air Pruning

- Air Pruning is the drying-off of root tips exposed to air

## Benefits of Air-pruning

- Air pruning breaks root tip (basal) dominance
- Promotes root initiation/secondary root formation
- Produces a root system that better resembles a direct sown seed in soil – improved root architecture
- Healthier roots (oxygen supply)



# WHY ARE PAPER POTS BETTER?

## Benefits of Air-pruning

- Concentrates plant energy on roots and not shoot growth (better leaf:root ratio)
- Higher roots consolidate more container volume (better container utilization)
- Develops large quantity of active young roots that quickly capture the pit
- 20% Gain in RCD
- Up to 300% more secondary roots

Air pruned roots maintain root integrity during planting process



# WHY ARE PAPER POTS BETTER?

## 3) Density

Paper pots have a higher density/weight than standard loose filled plugs

- Media is subjected to vacuum and compressed within the paper pot
- Easier to handle
- Some mechanised planters use gravity to feed the planting head
- Same principle applies with the planting tubes



# WHY ARE PAPER POTS BETTER?

## 4) Water holding capacity

The higher density medium provides a higher water holding capacity

- Less water stress
- Less transplant shock
- Greater affinity for water once planted (important for high clay soils)





# WHAT ARE THE OUTCOMES?

## Less mechanical damage at planting

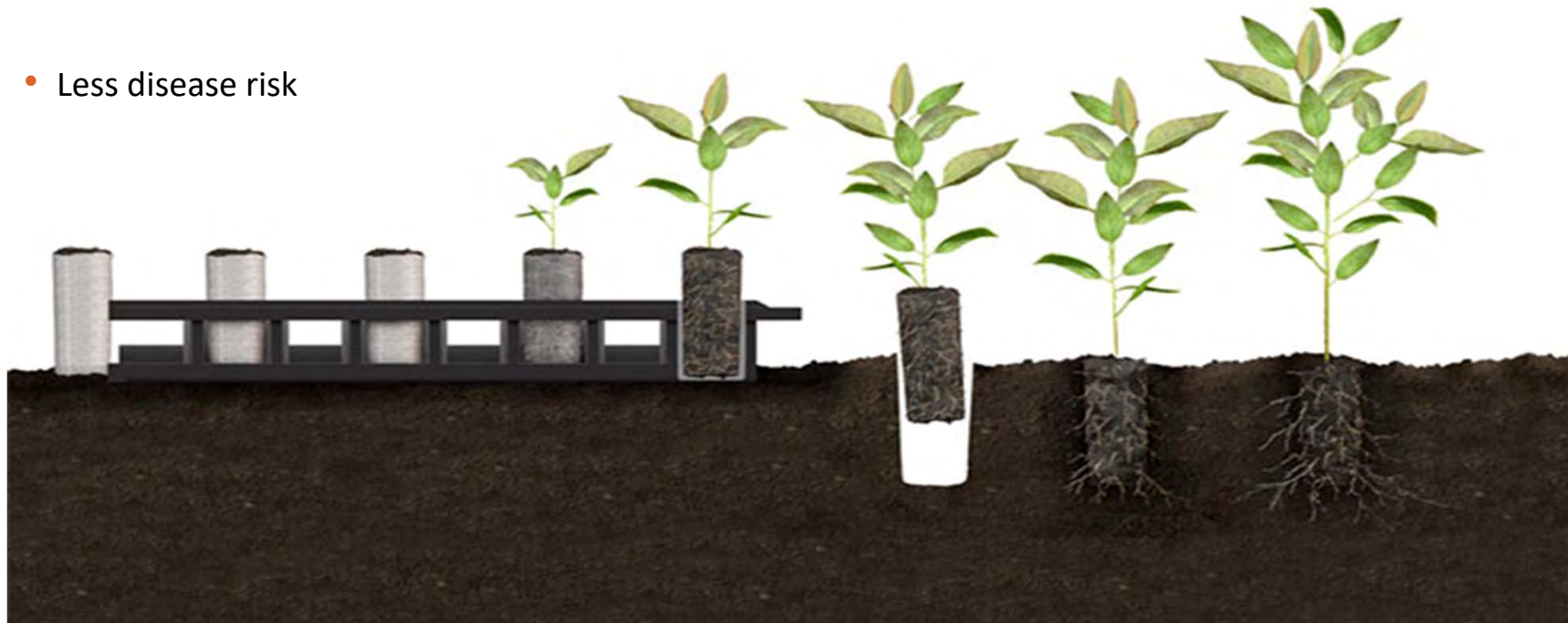
- **Less root damage at planting due to extraction from tubes**
  - Plant losses incurred as a result of extracting plants from inserts can be as high as 10%
- **Less root damage by the machines**
  - Plants can get clogged/tangled in the feeder tubes of the machines – this is less likely to happen with paper pots
  - The root ball of a paper pot is more likely to hold its shape and form when being handled and fed through the machine
  - Tall plants pose a problem for mechanical planters, paper pots can be transplanted at a younger age due to a better developed root system
- **Less predisposed to J-rooting**



# WHAT ARE THE OUTCOMES?

## Efficiency gains & Logistics

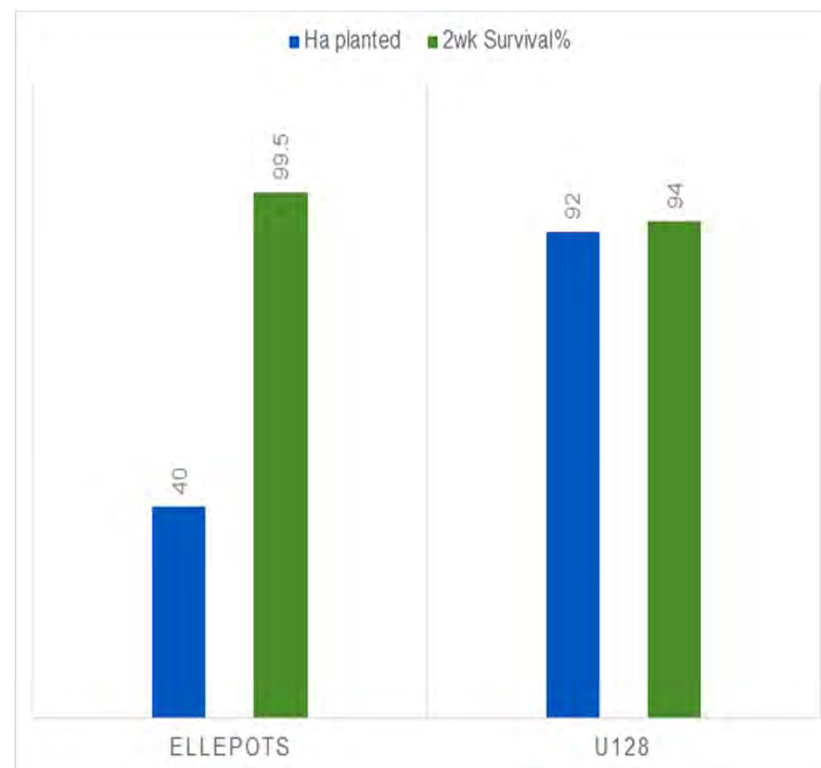
- Easier handling for the roadside unpacking team as no insert extraction required
- Gain is approximately 2 hours/ha, potential is to reduce the size of the roadside team
- Returning inserts to the holding nursery no longer required
- Less disease risk



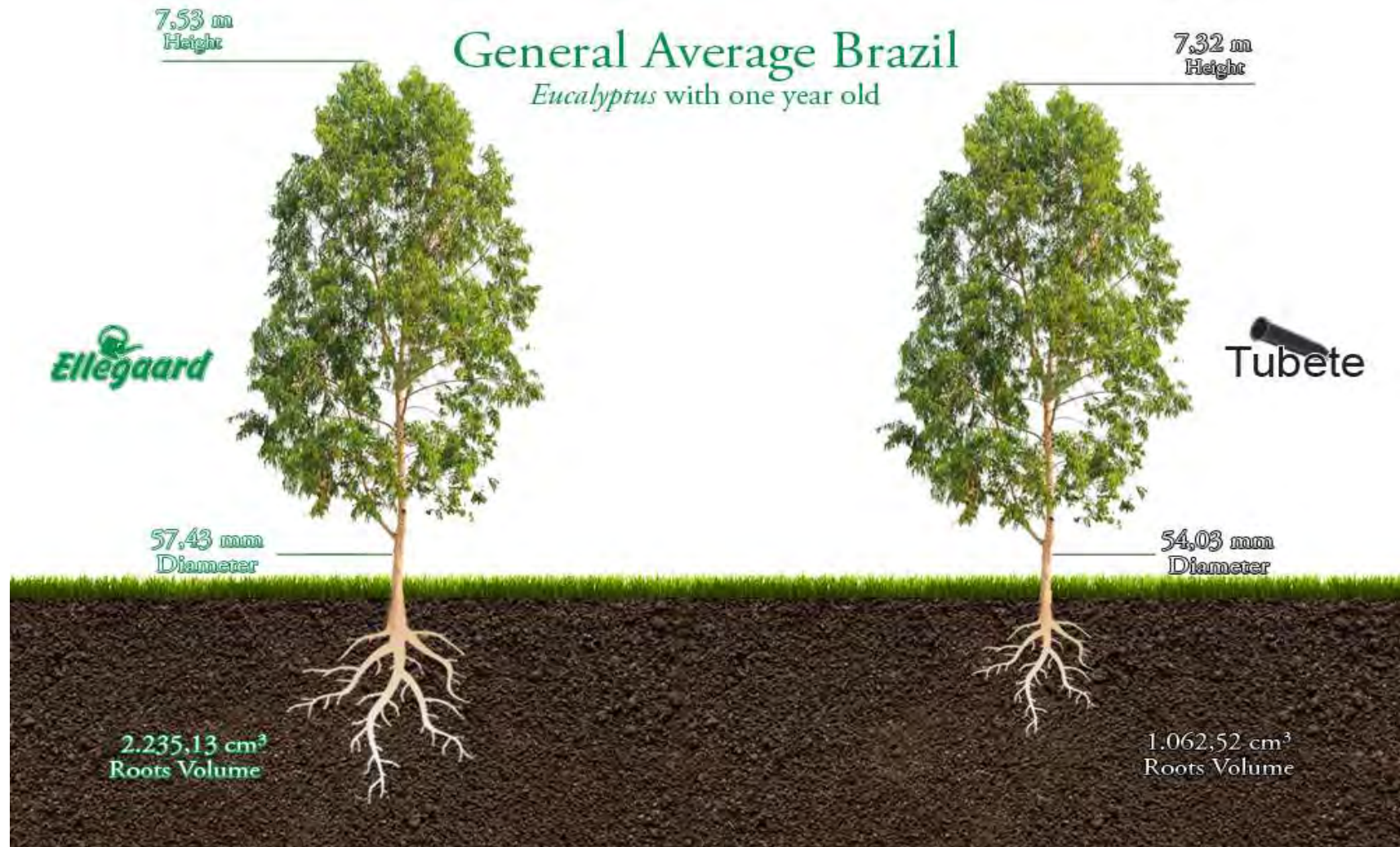
# WHAT ARE THE OUTCOMES?

## Yield gains - Field?

- Growth differences observed range from no difference when planting conditions are ideal, to 30% Biomass gain on harsh sites
- Better survival – survival gain ranges from 5-8%, depending on site and planting conditions
- These gains are likely to be amplified by mechanised planting
- Climate change is reducing the planting window, paper pots extend the planting season (machine efficiency)



# WHY ARE PAPER POTS BETTER?





# FUTURE CONSIDERATIONS?

## Plant Quality Index (PQI)

- Need to develop new PQI's and procedures for mechanised planting
- Breeding selection based on mechanised planting?



## Plant Supply Logistics

- Dispatch - Trays versus Rolls (Rocamboles)
- Templates for planting machines? Transplanters at nursery?
- Holding Nurseries versus JIT Delivery
- Supply of plants to mechanised planters? Drone supply?



# THANK YOU

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