# Conifer Seed:
## Obtaining, Treating, Preparing and Sowing

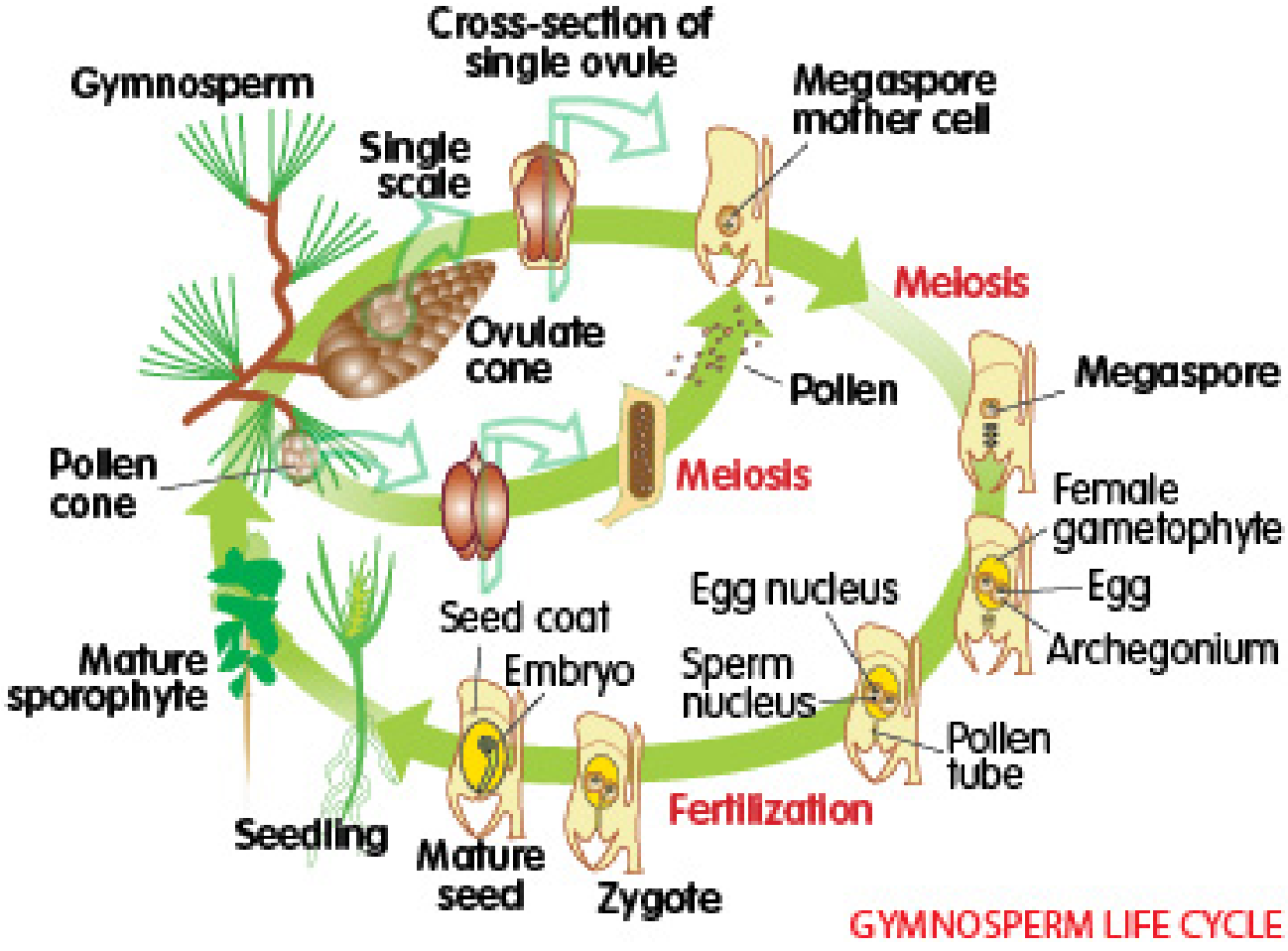
September 11, 2015

Steve Smith
Southern Regeneration
Weyerhaeuser Company

# Outline

- Today's emphasis: loblolly pine (Pinus taeda)
- Background / germination
- General discussion for each section – *obtaining, preparing, treating and sowing*
- Discuss key biology, key planning and basic points
- Operational setting
- Get off to a good start… adhere to process basics
- Planning: *By failing to prepare, you are preparing to fail* – Benjamin Franklin

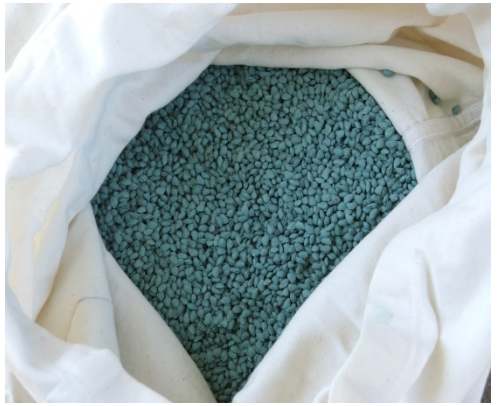
# Background – Loblolly Pine Seed



# Cycle in Pictures


Year 2

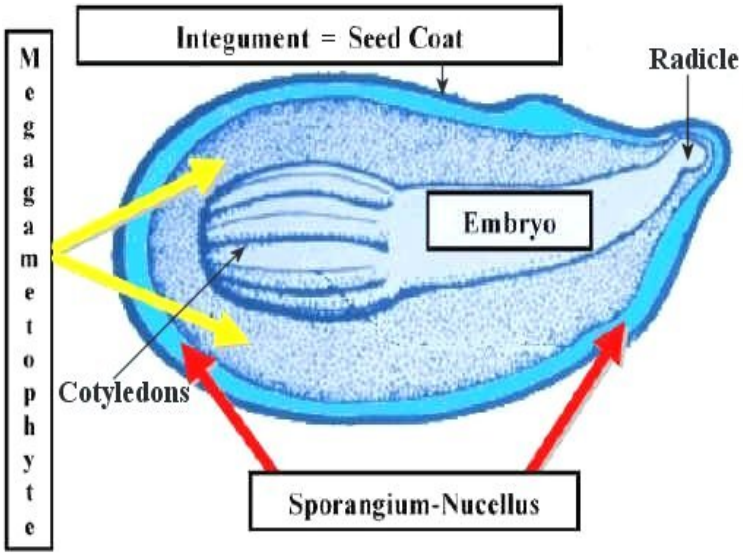
Year 3 or beyond



# Pine Seed Germination

- Orthodox seed – wide range of wet / dry cycles
- Germination processes – (1) imbibition or uptake of water, (2) mobilization and use of food reserves, (3) growth;  2 & 3 concurrent
- Food reserves = Proteins, lipids, starches stored in female megagametophyte
- Germination requirements – light, temperature, moisture

**Conifer Seed Diagram**




Embryo = ~15% of total seed weight (male component)

# Obtaining Seed

# Obtaining Seed

***General Info***

- *100-400 cones/bushel*
- *Variable yield (lbs/bushel) – 0.4 to 2.7 lbs/bu*
- *Highly variable seed size – 9,000 to 30,000 seed/lb*

**Biology**

- Flowering set in July-August
- Maternal variability
- Fertilization, cone elongation, seed development in Year 2
- Cone maturation drives seed yield per cone (cone opening); not necessarily germination

# Obtaining Seed

**Activity**

- Orchard management
  - Fertilization
  - Insect control
- Cone inventory
- Cone harvest
- Cone transportation
- Cone processing
- Seed processing
- Seed testing
- Seed inventory / storage

**Planning**

- Sales demand?
- Quantity needed?
- Retention strategy?
- Future cone crop?
- Safety considerations?
- Quality / basics?
- Timing?
- Resource planning?
  - Cones / Seed
- Logistics?
- Contingencies?

# Harvest

- Loblolly cone harvest begins in late September through early October; activity typically takes 3-4 weeks
- Manage schedule by cone maturation (water displacement method)
- Maintain genetic identity

# Harvest

- Mix of burlap bags and plastic crates
- Operational controlled cross production (CMP) harvested and handled similar to open pollinated crop – both family and bulk lots
- Utilize an after-ripening period of 4-6 weeks – increase yields

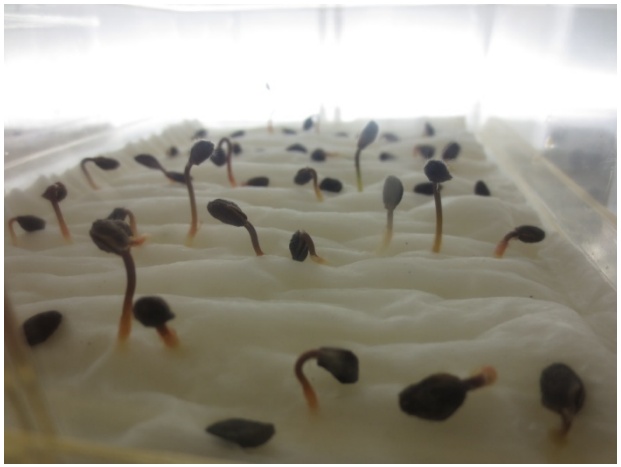
# Processing

- Maintain genetic identity
- Utilize both internal processing and external processing vendors
- Use forced heated air kiln to enhance natural cone opening
- Tumble to separate seed / wing from cone
- Use water floatation to clean / upgrade seedlot

# Processing

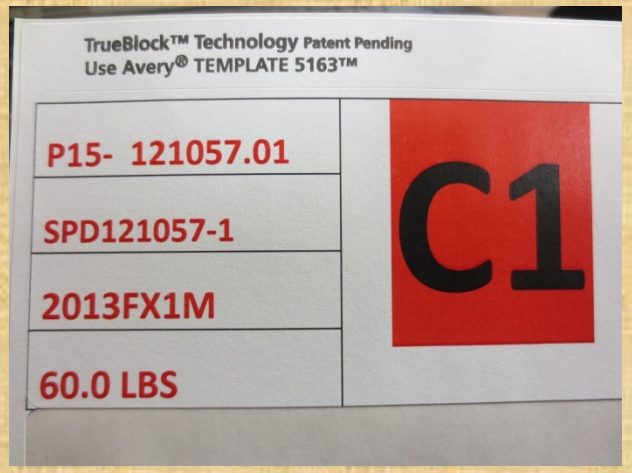
- Optimal cone opening – influenced by variety of factors (year-to-year)
- Case-hardening
- Dewing, remove trash (needles, cone parts), sizing
- Dry end product (seed) to a storable moisture content of 6-9%

# Obtaining Seed




5-1043
11 11

# Preparing Seed




# Preparing Seed


## Biology

- Cool moist stratification used to break seed dormancy
- Mimic natural habitat to stimulate seed germination

## *General Info*

- *Dry weight to wet ratio of ~1.20*
- *100,000 packable trees = ~8 lbs of seed*

# Preparing Seed

- What's the plan?
- Use of seed lot statistics to generate viables/lb
- Apply loss factor to calculated seed need – use of historical data (seed source and nursery experience)
- Timing – stratification length
- Seed handling
- Sanitation
- Overnight soak, drain, bag
- Recordkeeping
- Maintain storage temperature

# Treating Seed

# Treating Seed


- Thiram
- Bayleton ® 50 WSP
- Proline ® 480 SC

- Latex
- CF Clear

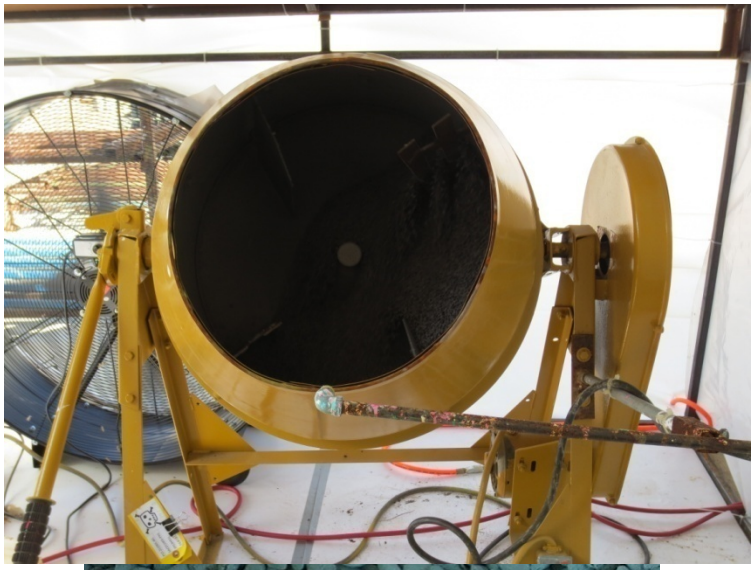
**USE PRECAUTIONS AND RESTRICTIONS**

When using formulations that do not contain dye, to comply with 40 CFR 153.155, all seed treated with an economic poison must be colored to distinguish and prevent subsequent inadvertent use as a food for man or feed for animals.

**For Treatment of Coniferous Seed**

**Damping-off protection:** Use 2 quarts of 42-S Thiram per 100 pounds of seed. Slowly add to the seed while turning in a tumbler such as a concrete mixer. Tumble seed for approximately 2 minutes and then spread coated seed on a screen to dry.

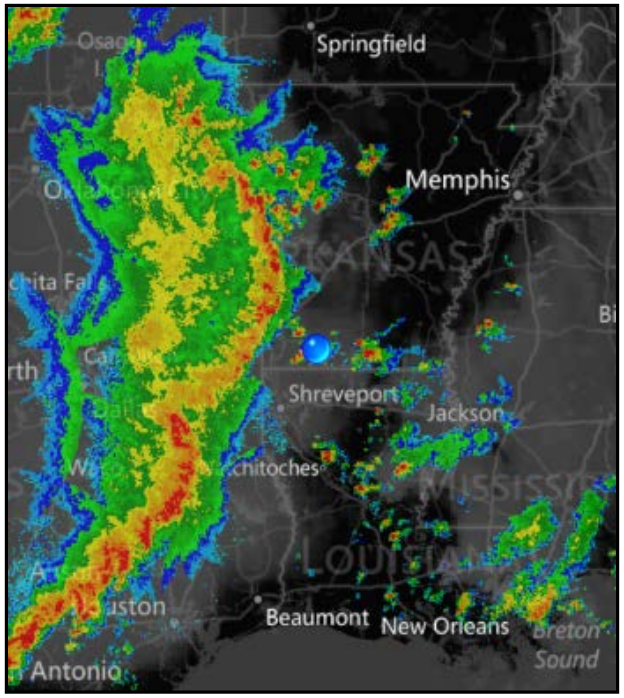
# Treating Seed



- Worker protection (WPS)
- Resources
- Weather – %RH
- Capacity – drying / chemical
- Labels / rates
- Application tracking
- Lot process control
- Genetic / seedlot integrity
- Recordkeeping
- Post-treatment storage
- Logistics

# Sowing Seed

# Sowing




- Fumigation
- Amendments
  - Pre-plant
  - OM%
- Tillage
- Irrigation prep
- Bed building
- Post-sow soil stabilization

- Planned growing density vs. sow density
- Sow production vs. available footage / trays

# Sowing



# Factors Influencing Germination

- Genetic (mechanical)
- Seed handling
- Stratification
- Seed treatment rates
- Sow timing
- Seed depth
- Seed coverage
- Soil stabilization
- Irrigation coverage
- Pesticides
- Heat-induced dormancy

- Pathogens
- Year-to-year variation
- Weather – temperature, wind, excessive rainfall

# Conclusion

- Cone to seed to sow activities –
    - Adhere to process basics
    - Requires detailed planning / execution
- Usually a combination of inputs or causes, not a single cause, contribute to a significant loss
- How will climate change influence cone maturation, seed viability and the nursery germination phase?

Contact:

Steve.Smith3@weyerhaeuser.com

# Discussion / Questions