RECENT SEED PROCESSING MACHINERY AND TECHNIQUES

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Material Produced by International Forest Seed Company:

A. WIREBOUND PALLET BOXES for handling, shipping and storing cones prior to processing.

One man with lift truck using a single container, combines handling, shipping and storage. Reduces cost of all three and increases capabilities for handling a larger volume in a shorter period of time in less space, and decreases storage risk.

Slides:

1. Transporting empty boxes in pickup truck to collection sites prior to harvest.
2. Transporting empty boxes and lift truck to collection sites for handling filled boxes.
3. Twenty bushels of loblolly cones.
4. Transporting box of cones to loading site on a 3-point hitch from tractor.
5. Loading 40 foot flatbed truck with 1,000 bushels of cones.
6. Transporting 1,000 bushels of cones.
7. Cone storage in wirebound boxes.

B. CONE DRYING TRAYS for a dry kiln to dry small lots of cones as well as large ones, and maintaining the identity without contamination.

One man with lift truck using the tray system eliminates dry kiln building, conveyors, and lessens cleanup. Drying capacity can be quickly increased or decreased; trays are interchangeable and portable.

Slides:

8. Cones emptied from boxes with rotating fork positioner.
9. Drying tray being filled with 6 bushels of cones.
10. Transporting tray to dryer.
11. Trays being stacked for drying.
12. Eight stacks of drying trays drying 288 bushels of cones.
13. Overall dryer with heating system.
14. Heater assembly.
15. Cones being removed from drying trays by rotating fork positioner.

C. SEED PROCESSING PLANT. The quality of the seed is decisive to efficient utilization of modern methods of seedling production. This is particularly true with respect to containerized seedlings. The advanced seed processing method make it possible to extract high quality seeds from a given seed lot. The objective of these processing methods is to achieve the highest possible purity and germination, as well as suitable moisture content.

A high degree of purity is necessary in mechanized methods of seeding, since good sowing results depend on the use of seed which is free from wings and foreign matter. A combined process of screening and wet dewinging insures that the seeds are processed without being damaged.

High germination is another vital factor in the effort to make plant production more effective. The aim is that every seed will result in a satisfactory seedling. For this reason, empty and defective seeds must be removed. The grading of seed according to size and specific gravity makes it possible to remove inferior seeds and thus increase the relative germination of a seed lot.

A correct moisture content during the storage period is decisive to the germination of the seed.

Slides:

16. Overall view of seed processing plant.
17. Continuous flow tumbler for extracting seeds with variable speed and tilt controls.
18. Scalping. Foreign matter is removed from the seed lot by screening or sieving, depending on the tree species.
19. Wet Dewinging. The wings are removed from the seed which, for most species, is achieved by supplying water to the seed lot in a rotating drum.
20. Removal of seeds from wet dewinger.
21. Liquid Separator and Dryer. Foreign matter of the same size and shape as the seed is separated out in a turbulent flow of liquid.
22. Vibrator-Conveyor-Feeder between liquid separator and seed dryer.
23. Drying. A continuously operating dryer reduces the moisture content of the seed to a suitable level generally 6%) by means of cool air with an extremely low moisture content.
24. Size Separation. Screens are used to separate the seed into four fractions.
25. Vacuum aspirator for specific gravity separations. The weight of the embryo and endosperm of different seeds varies within a given fraction.
26. Size and Specific Gravity Separation. The separation process divides the seed lot into five fractions, A-E. Fractions A,B and C contain only seeds with well-developed embryos and endosperms, while fractions D and E contain seeds with no, or poorly developed, embryos and endosperms. Fractions A-C differ with respect to the size of the seeds.

If the seeds are separated, the positive correlation between seed size and seedling development can be exploited to obtain more homogeneous seedling stock.

Materials Produced by Crippen Manufacturing Company, Inc.:

#1- Wall mounted fan unit w/pipes connected to the PS-C424 seed cleaner. One pipe connected to "upper air" separation at the hopper, the other pipe connected to the "lower air" separation following the screen separations. Air equalizer valves in fan unit allow equal air in both pipes. Red hand cranks on side of machine control "dampers" which allow just right amount of air to make proper separation, without lifting good seeds.

#2- Crippen Model PS-C424 seed cleaner. Has 4 screens 24x36 plus 2 air separations. All spouts self cleaning. Roll-feed hopper and adjustable speed screen shake. Screen cleaning brushes under all screens. Machine can be built with spouts to either RH or LH side, or combination of both (preferably all spouts to the same side).

#3- PS-C424 Upper air liftings during "scalping" operation ahead of dewinging.

#4- PS-C424 upper sample lower air liftings, lower sample cleaned seed from the machine.

#5- PS-C424, screening thru No. 3 screen.

#6- Model WD-930, air lifting by aspirator unit following dewinging operation. Amount of air lift is adjustable, so no good seed is lifted out by the air.

#7- Model PS-C424, sample of air lifting from both upper and lower airflues. This material is the very lightest of wing particles, etc., that carried out thru the fan unit.

#8- WD-930 Wet Dewinger: air lifting by aspirator unit. This is same as slide #8, except sample #10 was taken outside the building where the .light material settled in a pile. This material was too light to settle in the "check chamber" at the machine.

#9 Cleaned loblolly seed: Scalped (on PS-C424), thru Dry Dewinger, thru wet dewinger, followed by PS-C424 cleaner.

#10- Model DD-960 Dry Dewinger: This material was lifted by the aspirator unit on the machine following the dewinging action. This material settles in the "check chamber".

#11- WD-930 Wet Dewinger: Aspirator liftings that settle in "check chamber".

#12- Longleaf pine- before any cleaning.

#13- Georgia Kraft, Eatonton, Ga processing plant, showing Model PS-C424 on the left (also used for scalping operation), Model WD-930 in the center, and Model DD-960 Dry Dewinger on the right. Aspirator fan units are all wall mounted behind the machines.

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#14- Model WD-930 Wet Dewinger fan unit and "check chamber". Aspiration occurs as the seed moves out the discharge end of the dewinging chamber. Amount of air lift is adjustable.

#15- Dry Dewinger DD-960 -operational diagram.

#16- Wet dewinger WD-960 -operational diagram.

#17- Tree seed cleaner PS-CA24 -operational diagram.

#18- Tree seed scalper PS-5324 -operational diagram.

Further information is provided in the proceedings of the Small Lot Forest Seed Processing Workshop. Edited by Earl Belcher: July 1978. 156 pages.