

NURSERY STOCK GRADING & PACKING OF SOUTHERN PINE -  
THE WEIGHING METHOD VERSUS ACTUAL SEEDLING COUNTING

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It is assumed that grading and culling pine seedling stock is a necessary requirement. Most tree planters are of the opinion that there is no time during the actual machine planting job to eliminate cull seedlings without interrupting the desired spacing standards. Culling inferior seedlings from the seedling beds in the field just prior to lifting season is not practical. If a very low residual cull factor is desired in the finished lot, the work can be done more effectively and at least as cheaply in the grading shed by the line workers. Supervision of culling the shed is significantly more efficient than roguing in the nursery beds.

The grading standards referred to in the following report are similar to P. C. Wakeley's "Specifications of morphological grades of uninjured 1-year-old southern pine seedlings" and the more recent Texas Forest Service modifications.

The first large scale seedling weight-counting at Hauss Nursery was done during the 1969-1970 shipping season when 28,786,000 seedlings were packed. The change from actually counting 100% of the seedlings shipped was made in November 1969 because of the shortage of labor and due to the need to reduce shipping costs to compensate for wage increases. Salaries and wage rates increased while seedling prices remained the same.

The procedure for weight-counting briefly follows: When a given lot entered the grading shed, the line workers were instructed to grade and carefully count seedlings for a few minutes--sufficient time for the scales operator and another work to record the various weights of at least 20 groups of "250" seedlings and determine the average weight. As soon as this average weight figure per "250" was established, the line graders discontinued counting, the scales operator began weighing graded seedlings, and the control worker went into action. This person, an experienced grader and counter, continuously intercepted weighed groups of "250" seedlings and inspected them carefully. They were re-graded and counted and the total number of plantable and cull seedlings found were recorded on a specially prepared tally sheet. This sheet was kept for later reference and was useful in determining a trend in quantities varying from the desired 250 total. This control worker had the responsibility of directing the scales operator to increase or decrease the

average weight figure used as soon as a trend in variance became evident. Full understanding and cooperation between the scales operator and the control inspector was essential. The seedlings handled at the control station were usually packed separately and amounted to approximately 18 M per day. A new average weight per "250" seedling group was determined as each change in seedling lots (identified by ownership, species and seed-size) was made.

The most important prerequisites to reasonably accurate weight-counting are uniform bed density and seedling size. This may be accomplished by carefully managed fertilization, fumigation when necessary, sowing sized seed lots with complete data, and accurate calibration of the seeder. Regardless of the two methods used, really accurate work and high production by all workers concerned requires dedicated supervision.

The advantages to the weight-counting method are:

Speed and consequent cost reduction.

Increased daily out-put to meet shipping schedule demands.

Fewer line workers required.

The opportunity to increase culling accuracy.

5. Permits further improvements, such as automatic electrically controlled weighing.

6. Higher morale among line graders.

The disadvantages to weight-counting are:

Occasional less accurate counts depending on quantity shipped. (The smaller the lot to be counted the less chance to attain accuracy.)

Some individual tree planters refuse to believe that reasonable accuracy may be attained by the weight-count method.

COMPARISONS OF ACCURACY - GRADING & COUNTING VERSUS GRADING & WEIGHING

TABLE SHOWING AVERAGE NUMBER OF TOTAL (ALL GRADES) SLASH AND LOBLOLLY PINE SEEDLINGS PER GROUP OF "250" SEEDLINGS PACKED & SHIPPED

| YEAR      | GRADING & COUNTING          |                                | GRADING & WEIGHING WITH CONSTANT WEIGHT CONTROL |                                |
|-----------|-----------------------------|--------------------------------|---|--------------------------------|
|           | AVG. NUMBER PER "250" GROUP | TOTAL NUMBER SAMPLES INSPECTED | AVG. NUMBER PER "250" GROUP                     | TOTAL NUMBER SAMPLES INSPECTED |
| 1971-1972 | -                           | -                              | 255.9   | 3,569                          |
| 1969-1970 | -                           | -                              | 255.0   | 2,041                          |
| 1968-1969 | 252.7                       | 435                            | -   | -                              |
| 1965-1966 | 251.7                       | 264                            | -   | -                              |
| 1964-1965 | 251.7                       | 289                            | -   | -                              |
| 1963-1964 | 250.3                       | 513                            | -   | -                              |
| 1962-1963 | 252.9                       | 495                            | -   | -                              |
| 1961-1962 | 253.3                       | 433                            | -   | -                              |

TABLE SHOWING 2 OF THE 13 SEEDLING LOTS "WEIGH" COUNTED, 1971-1972 SHIPMENTS

LOT "A": MOST ACCURATELY WEIGHED ACCORDING TO INSPECTION DATA

LOT "B":L EAST ACCURATELY WEIGHED ACCORDING TO INSPECTION DATA

|   | LOT "A"   | LOT "B"   |
|---|-----------|-----------|
| SPECIES:  | LOBLOLLY  | SLASH     |
| TOTAL NUMBER SEEDLINGS SHIPPED:                       | 2,231,000 | 1,917,500 |
| NUMBER OF "250" GROUPS RE-GRADED & COUNTED:           | 350       | 283       |
| NUMBER OF SEEDLINGS IN GROUPS SAMPLED -               |           |           |
| PLANTABLE:  | 87,524    | 71,693    |
| TOTAL ALL GRADES:                                     | 89,438    | 73,159    |
| AVERAGE NUMBER OF PLANTABLES PER "250" SAMPLE:        | 250.1     | 253.3     |
| AVERAGE NUMBER OF TOTAL (GROSS) SEEDLINGS PER "250":  | 255.5     | 258.3     |
| TOTAL NUMBER "250" GROUPS WEIGHED IN ENTIRE SHIPMENT: | 8,924     | 4,006     |
| OVER-RUN PER "250" GROUP:                             | 0.1       | 3.3       |
| UNDER-RUN PER "250"GROUP:                             | -         | -         |
| SHIPPING TOTAL ALJUSTMENT -                           |           |           |
| NUMBER OF "250" GROUPS X OVER-RUN OR UNDER-RUN:       | 892       | 25,311    |
| ADJUSTED TOTAL OF PLANTABLE SEEDLINGS SHIPPED:        | 2,232,000 | 1,943,000 |

COMPARISONS OF ACCURACY - GRADING & COUNTING VERSUS GRADING & WEIGHING

TABLE SHOWING AVERAGE NUMBER OF PLANTABLE GRADES SLASH & LOBLOLLY PINE SEEDLINGS PER GROUP OF "250" SEEDLINGS PACKED & SHIPPED

| YEAR      | GRADING & COUNTING          |                                | GRADING AND WEIGHING WITH CONSTANT WEIGHT CONTROL |                                |
|-----------|-----------------------------|--------------------------------|---|--------------------------------|
|           | AVG. NUMBER PER "250" GROUP | TOTAL NUMBER SAMPLES INSPECTED | AVG. NUMBER PER "250" GROUP                       | TOTAL NUMBER SAMPLES INSPECTED |
| 1971-1972 | -                           | -                              | 250.2   | 3,569                          |
| 1969-1970 | -                           | -                              | 248.2   | 2,041                          |
| 1968-1969 | 247.7                       | 435                            | -   | -                              |
| 1965-1966 | 250.0                       | 264                            | -   | -                              |
| 1964-1965 | 247.4                       | 289                            | -   | -                              |
| 1963-1964 | 246.6                       | 513                            | -   | -                              |
| 1962-1963 | 248.8                       | 495                            | -   | -                              |
| 1961-1962 | 250.0                       | 433                            | -   | -                              |

COMPARISONS OF SEEDLING PRODUCTION

|                    |   |           |
|--------------------|---|-----------|
| GRADING & COUNTING | - | 1968-1969 |
| GRADING & WEIGHING | - | 1969-1970 |
| GRADING & WEIGHING | - | 1971-1972 |

| COMPARISONS  | GRADING & COUNTING<br>IN SHED                               | GRADING & WEIGHING IN<br>SHED WITH CONSTANT<br>WEIGHT CONTROL                                  |
|--|---|--|
| AVERAGE PRODUCTION<br>FOR THE SHIPPING SEASON  | 3,500 Plantable Seedlings<br>Per Hour Per Grader            | 5,000 Plantable Seedlings<br>Per Hour Per Grader   |
| TOTAL SALARIES & WAGES:<br>LIFTING, GRADING, COUNTING,<br>PACKING, & SHIPPING<br><br>1968-1969 | \$28,250.00<br><br>\$1.11 Per M for 25,518,000<br>Seedlings | -  |
| TOTAL SALARIES & WAGES:<br>LIFTING, GRADING, WEIGHING,<br>PACKING, & SHIPPING<br><br>1969-1970 | -   | \$28,606.00 (Includes 10%<br>Salary Increase)<br><br>\$0.99 Per M for 28,786,000<br>Seedlings  |
| TOTAL SALARIES & WAGES:<br>LIFTING, GRADING, WEIGHING,<br>PACKING, & SHIPPING<br><br>1971-1972 | -   | \$27,008.70 (Includes<br>Additional 11%<br>Salary Increase)<br><br>\$1.13 Per M for 24,006,000 |