POTLATCH'S REPORTING SYSTEM FOR TRACKING SEEDLING CROPS FROM REQUISITION TO PLANTATION

Presented by Rich Schaefer for Paul Gravelle
Potlatch Corporation Lewiston, Idaho

The Potlatch greenhouse facility in Lewiston, Idaho, is growing over 1.6 million containerized seedlings in annual crops for the company's artificial regeneration program.

It quickly became apparent, after the first crop produced in 1977, that keeping track of the seedlings on paper was a task for the computer rather than for the feeble mind of man. Our forestry management is organized into eight districts, each with a district forester having responsibility of managing over 70,000 acres. Due to the varied land forms and site productivity in northern Idaho, the foresters must have a wide range of species, seed sources, and seedling sizes from which to prescribe the establishment of plantations. And, they must react to harvest plan changes which affect planting plans, varying the numbers or even seed sources from their original plan. To provide a reliable source of information on the status of seedling orders and inventories, we turned quickly to our IBM 370 computer for help.

Over the past three years, we have developed a reporting system called SEEDREP to handle seedling requisitions, stratification orders, sowing plans, seedling inventories, seedling allocations, shipping plans, as-planted summaries, and seed inventories. The SEEDREP program, written in FORTRAN language, produces five types of reports from a series of data files built from key punch entries at various times as the crop progresses. I will now describe to you each of the reports and also perform a test. While SEEDREP was not designed to induce the diurnal dormancy response in humans, there is historical evidence to suggest that this may occur. Under the assumption that all individuals present are currently under maximum potential to assimilate an irrigation of verbal nutrients, a post-presentation sample will be taken to determine degree of dormancy induced. Mild headbobbing will constitute an active status; total immobility will signal arrival of deep dormancy.

I will now describe each of the five reports. SEEDLING

REQUISITION DATA SUMMARY REPORT

The district foresters submit their seedling requisitions by early October each year so the seed stratification plans can be made for the crop sowing operation the following spring. Requisition forms are filled out for each plantation scheduled for planting 12 to 18 months in the future. The information is coded and then run, by the silviculture coordinator, in an

initial report to show how the total requisition package matches to available greenhouse capacity. Several editions of the report are produced during this iterative process of solidifying a plantation plan. The purpose of the report is to organize and summarize seedling request information and to compute total seedlings requested. The input data are:

Setting Number and District
Project Name
Township, Range, Section
Total Project Acreage
Designation and Acreage of Sub-units (stands)
Elevation
Site Preparation Code
Slope Percent and Aspect
Site Class
Habitat Type
Seedling Spacing in Feet
Estimated Percent Plantability
Species and Plug Size Requested
Seed Source Name and Number Requested Planting
Season and Pull-and-Wrap Designation

The report's output consists of a project-by-project list of the above input data along with:

- Net Seedlings per Acre
- Number of Seedlings Requested
- Number of Approximate Styroblocks Required
- Change Code from Previous Edition
- Total Acres
- Total Seedlings by Project (more than one species, size, or spacing may be requested)
- A summary table showing total seedlings, cavities, and blocks requested by species and plug size
  - Total Pull-and-Wrap Seedlings Requested

STRATIFICATION/SOWING ORDER REPORT

As soon as the Requisition Report is firmed up by Operations in October, the seedling production supervisor prepares encoding forms for the Stratification/Sowing Order Report. The purpose of this report is to combine the requisition data with seed and sowing inputs for computation of totals by seed source.

The input data are:

a. From Seed Inventory Records:

Species
Seed Lot Number and Seed Lot Name
Percent Germination Seed Size
Category Number of Seeds per Pound

Number of Pounds of Seed in Inventory
Number of Seeds per Cavity to Sow

b. From the Requisition Report:

Project Name
Stand Designation
Plug Size
Number of Seedlings Assigned from Requisition

c. From Sowing Plans:

Percent Oversow
Sowing Code
Number of Blocks Actually Sown

Output: The report is printed with the above data and the following computed values:

a. Before Stratification and Sowing:

Number of Cavities to Sow
Number of Styroblocks to Sow Number of
Pounds of Seed to Sow Number of Tables to
Sow Running Balance, Pounds of Seed
Sub-totals by Seed Size within seed lot
Crop Total for seedlings assigned, cavities, blocks, pounds, and tables to sow

The Requisition and the Stratification Reports are then used together to solidify a final edition on each. Changes are quickly entered for revised reports, and the final editions of each are good plans from which seed stratification orders can be communicated to the seed processors and from which site preparation and planting plans can proceed.

The Stratification/Sowing Order report is then used to plan sowing operations. After sowing is completed, the inevitable changes are made to produce an updated, As-Sown record. Included on this edition is a record of blocks actually sown. This is the link to the next report, Seedling Inventory.

SEEDLING INVENTORY REPORT

After germination has ceased and the crop is up and growing - about the first week of June - an initial crop inventory is taken through sampling procedures to determine percent-filled cavities. Sampling statistics (mean empty cavities per sample, and standard deviation) are generated on a hand calculator, then the information is coded for keypunch into the computer data file.

The input data for the Inventory Report are:

Species and Plug Size
Seed Lot Number and Name
Optional Identifier Subscripts on Seed Lot
Seed Size Category
Number of Blocks per Table
Number of Blocks Sown (from As-Sown report)
House Location
Number of Seedlings Assigned (from As-Sown report)
Sample Size
Sampling Unit
Sample Mean Empty Cavities (per sampling unit)
Sample Standard Deviation

The output report arranges the data by species and plug size, then by seed lot. The input data are listed along with the following computed values:

Number of Tables Sown
Number of Cavities Sown
Seedling Inventory
% Difference Inventory from Assigned
Mean Z Filled Cavities
95% Confidence Interval of Mean % Filled
Sub-Totals by Species/Size Group
Crop Totals of Tables, Blocks, Cavities, Seedlings
Overall % Difference of Inventory from Assigned
Overall % Filled Cavities
Summary Totals of Seedlings and Blocks by Species and Size

A second inventory sample in late summer produces a revised inventory report useful for refining planting plans. In this sample, only the pullable seedlings are counted.

ALLOCATION/SHIPPING ORDER

To summarize to this point, we have proceeded through seedling requisitioning, stratification ordering, sowing planning and completion, and crop inventorying. The problem of planning and tracking seedlings to their destination is handled by the fourth report, the Seedling Allocation/Shipping Order. The silvicultural coordinator transfers data from the Requisition Report and the Inventory Report onto encoding sheets in order to produce a report showing where the seedlings are destined. Input data are:

Forest District
Project Name
Total Seedlings Requested
Seed Lot Number, Name and Seed Size Identifier
Species and Plug Size

Pull-and-Wrap Identifier, if applicable
Blocks Alloted
Percent Filled and Plantable
Planting Season

The printout shows the above, ordered by district and planting project, and also includes these computed values:

Number of Seedlings to Ship
Number of Boxes to Ship
Number of Seedlings per Full Box (for contract planting payment determination)
Number Seedlings Difference from Requested
Percent Difference from Requested
Sub-Totals by Project
Crop Totals: Seedlings Requested, Blocks Alloted, Seedlings to Ship, Boxes to Ship, Number and Percent Difference from Request

From this report (and its several revisions as those inevitable changes crop up) shipping orders are made to cold storage and to plantation sites. After planting, a final As-Planted report is run for the records.

SEED INVENTORY REPORT

The final report, generated by the SEEDREP program, is the Seed Inventory Report which helps us keep track of currently about 300 seed lot/size units. This report is updated once a year in early summer after the recent As-Sown report is run and after all seed processing information is in from the previous year's cone collection. The input data are:

Species
Seed Lot Number and Name
Logging Unit
Township, Range, and Section Collected
Elevation Collected
Percent Germination (test results)
Seed Size Designation
Number of Seeds Per Pound
Pounds of Seed in Inventory
Remarks

The printout is a list of this inventory data and also has:

Sequential Reference Number for Each Lot by Species
Approximate Acres Equivalent for Each Seed Lot Inventory
Sub-Totals by Species
Totals for Pounds and Acres-Equivalent
Summary Totals showing inventory pounds and acres by species, by elevational zone, and by logging unit.

This Seed Inventory table closes the circle. From it, the district foresters plan cone collections and seedling requisitions for the next crop.

Well, that's a brief look at Potlatch's reporting system for tracking seedling crops, for those of you whose heroic efforts prevented the onset of dormancy. I'm sure you are all much more aware than I concerning the special problem that you nurserymen and women have in preventing premature dormancy.

In closing, I am not going to follow up on that audience reaction test, but I do want to emphasize a few points. Our use of SEEDREP has eliminated a lot of errors and time from the tedious hand calculations and summaries we used to do. We feel the detail of the SEEDREP report is necessary for cost-effective management of our seedling production facility and regeneration program. The reports I described allow us to track our seedling crop at all stages and keep everyone informed of changes which are an inevitable part of this business. The reports help us maintain flexibility in our planning. If you don't have a computerized system, you should start one. They are excellent management tools, totally adaptable to individual nursery operations and expandable to whatever level of sophistication desired.