

THE NURSERY MANAGEMENT INFORMATION SYSTEM (NMIS) AT J. HERBERT STONE NURSERY USING MS ACCESS[®]

DAVID B. DAVIS

David B. Davis is Operations Analyst, USDA Forest Service, J. Herbert Stone Nursery, 2606 Old Stage Road, Central Point, OR 97502; telephone: 541.858.6180; email: dbdavis@fs.fed.us

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Abstract

The Nursery Management Information System (NMIS) was designed in the 1970s to support the nursery program at 9 USDA Forest Service nurseries by tracking the seed collection and storage, sowing of seed, culturing of seedlings to specific size criteria, seedling inventory, seedling lifting, grading and culling, packing of seedlings for storage, and shipment and distribution of seedlings to Forests and Districts for planting. NMIS consists of a source (seed) subsystem and a product (seedling) subsystem. The product subsystem works with both bareroot and container products without a need for separate forms and reports for each. Currently an Oracle[®] version of the source subsystem is in use at 5 of the 6 remaining Forest Service nurseries and 1 seed extractory. J. Herbert Stone Nursery has been using a MS Access[®] version of NMIS since October 2000.

Key Words

Seed inventory, seed testing, sowing calculations, seedling inventory, plant inventory, packing, shipping

INTRODUCTION

J Herbert Stone Nursery is in southwestern Oregon near the city of Medford. It produces conifer seedlings and other plant materials for publicly owned lands only. The major clients are the USDA Forest Service, the USDI Bureau of Land Management, and the USDI Bureau of Indian Affairs. The capacity is approximately 24 million bareroot plants per year. More than 340 million plants have been shipped since 1979 to planting sites throughout Oregon, Washington, California, Arizona, Idaho, and Montana. J Herbert Stone Nursery began using the MS Access[®] version of NMIS with the source subsystem in October 2000 and the plant subsystem in December 2000 for entering sowing requests and doing sowing calculations. The lifting, packing, shipping, and billing portions of the product subsystem were used for the first time in January 2002.

NURSERY MANAGEMENT INFORMATION SYSTEM

NMIS consists of a source subsystem for managing and maintaining source material for products and a products subsystem for managing and maintaining

product inventories. Source was originally developed as a means of tracking cones received through processing seed. Source now includes seed as well as other types of plant propagation materials. Products traditionally meant conifer seedlings, but now include plants and seed of native non-conifer seedlings, forbs, sedges, and grasses. NMIS maintains inventories of lots by location, number and type of containers, and density per container. This system allows for tracking a lot even when it might currently be partly in a seedbed, partly in pre-pack storage and partly packed for shipment. NMIS does not require separate subsystems for bareroot and traditional container products by treating all growing containers, both seedbed and traditional greenhouse containers, the same.

Source Subsystem

The source subsystem includes reproductive structure receiving and processing; seed testing; storage; inventory, withdrawals, and shipping; and billing.

Reproductive Structure Receiving and

Processing—Plant reproductive material received for processing can be logged in when received, allowing yield calculations when processing is complete. Each

step of processing can be tracked by activity (extraction, scalping, and so on) and a charge by activity or hourly rate tracked.

Seed Testing—Initial seed testing is performed prior to storage. Germination retesting cycles are defined by species in NMIS to ensure that up-to-date germination information is available for sowing calculations. Each test result remains as new tests are performed, allowing for review of germination history for a seedlot.

Storage—Multiple storage locations are allowed as needed for a seedlot.

Inventory, Withdrawals, and Shipping—Activities can be entered using a ticket form to allow for efficiency of data entry. Tickets also allow documents for seed shipment or retest requests to be produced as soon as the activity data is entered. Information needed for billing, such as client and job code, is entered for activities that require billing.

Billing—Reports for billing can be created as needed using the information entered along with the activity amount.

PRODUCT SUBSYSTEM

The product subsystem includes sowing requests; sowing calculations; sowing; culturing; inventory; ordering; processing; billing; and processing contractor payment.

Sowing Requests—Sowing requests (Agreements) are received from clients and entered into NMIS using the appropriate species product. Each agreement can have multiple job codes for purchase of source material. Multiple agreements from a single source lot can be grouped together into a single Seedling Lot (Agreement Lot) as appropriate.

Sowing Calculations—Sowing calculations are done for Agreement Lots. The sowing calculation form allows entry of multiple nursery factors for both the amount of plants and number of containers. NMIS uses standard calculations (seed test data X nursery factors) to determine the amount of seed to withdraw for a desired amount of plants. NMIS does not need a separate process for bareroot and container plants. The bareroot seedbed is defined, as are all greenhouse containers, by size and number of cells per container. All growing containers are defined in NMIS in advance so that, at the time of calculation for a seedbed, the container is defined as one foot of seedbed (4 ft² [0.37 m²]) having 4 cells (1 ft² [0.09 m²] each) with the desired gross density per cell set during the calculation. For seedbeds, this is typically

around 20. A styrofoam block container with 198 cells, which would have a predefined number of cells per container of 198, would typically be 1.

Sowing—Sowing calibration data is entered into NMIS and loaded into a Husky Hunter 16[®] data recorder for use during sowing. Seed arrives in the field with a bar coded tag which is read with a bar code reader. The data recorder displays the settings for the seed drill. Sowing locations are entered as sowing takes place. At the end of the day, the data recorder is downloaded into NMIS and a daily sowing report created.

Culturing—Culturing information can be entered in NMIS by either lot or location. This allows for tracking treatments to a single lot or part of a lot while also being able to track treatments made to large areas with many lots. Treatments can also be tracked to provide a treatment history of an area.

Inventory—Inventory information is loaded into the data recorder. A lot can be called up by reading the bar code on the tag at the end of the lot or entered by hand. The starting distance, number of plots, and distance between plots is displayed. Inventory counts and, if needed, sizes are entered and either an inventory or a request for more plots is displayed. At the end of the day, the data recorder is downloaded to NMIS and a daily inventory checklist is produced.

Ordering—Orders for packing are entered with client, client contacts, grading specifications, special services, job codes, and amount of request. Multiple orders with different processing specs may be placed for each lot. Orders for partial lots are subtracted from the total inventory remaining and updated on the order form. Orders cannot be placed for a lot with no inventory remaining. Lifting request forms are produced for use during lifting. After an order is entered, an order confirmation report is sent to the client for review. When all orders have been entered, a surplus for sale report is created.

Processing—Processing includes lifting/extraction; pre-pack storage; grading and packing; quality monitoring; and storage/shipping.

Lifting/Extraction—The lifting request report is provided to the supervisor responsible for lifting or extraction of seedlings. It includes locations and how many feet or containers are required to meet the ordered total from each lot. In the case of bareroot plants, the number of feet, and number and type of field container is entered into the data recorder. The data recorder is downloaded into NMIS at the end of each day. This information is compared with the information from the pre-pack storage. After

differences are resolved, the data is processed into NMIS.

Pre-pack Storage—For bareroot seedlings, the number and type of field containers received for pre-pack storage is entered into a data recorder. The data recorder is downloaded into NMIS at the end of each day.

Grading and Packing—Processing order forms are created after lifting and pre-pack data is processed for lots lifted. These forms include the number of field containers in storage, date lifted, client contacts, grading specifications, special services, and amount to pack. Packing labels are created from NMIS for each order on an as-needed basis during packing. Packing information is currently entered by hand into NMIS.

Quality Monitoring—Samples are taken during grading and entered into a data recorder using a bar code reader. At the end of each day, the data recorder is downloaded to NMIS and daily quality monitoring reports by lot, summarized for each grading table, are created. The quality monitoring information is currently used as part of the processing contractor payment.

Storage/Shipping—Storage locations, number of containers, and amount per container can be entered into NMIS. Shipping data is entered into a shipping ticket form recording number of containers (usually

bags or boxes) and amount per container. A shipping document is generated directly from this form.

Billing—Billing is done using information entered earlier. At the time of shipment, all information needed to produce a bill has been entered. A billing review report is created and, after review, a bill is created.

Processing Contractor Payment—J Herbert Stone Nursery uses private contractors to do lifting and packing. All of the information needed to produce a contract payment is included with the lifting and the packing data entry, allowing a contract payment to be made almost as soon as the daily work is completed.

SUMMARY

NMIS has expanded greatly in scope since it was developed for bareroot conifer nurseries in the 1970s. It can track and maintain inventories of source material. It can track and maintain product inventories from sowing request to billing. The decision to create a version using MS Access® required some compromises with what was available using Oracle®. The advantage of the version in use at J Herbert Stone Nursery since October 2000 has been that it could be done without Oracle® programmer assistance, and forms and reports are easy to create and modify.