

Seed Laboratory Computerization: A Database for the Forest Tree Seed Industry¹

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Abstract.--Recent computerization of the Oregon State University Seed Testing Laboratory has created a large, expanding database. The computer system and benefits of the resulting database to the forest industry are discussed.

INTRODUCTION

In 1984 the Oregon State University Seed Testing Laboratory began to look at computers to replace their aging mechanical card/tape system of recording and storing data.

A Masters candidate (Alberto Maristany) was hired on a half-time basis to design, develop and implement a computer system to meet the needs of the laboratory. His copyrighted programs were named Seed-Lab and have application for use in any seed laboratory. More complete details of his work may be found in a paper by Maristany and Danielson (1986).

The purpose of this paper is to describe the computer system and benefits it may have for the forest tree seed and nursery industries.

SYSTEM

Figure 1 is a schematic showing the flow of samples through the lab and the flow of information through the system of networked computers.

Samples are received in the entering room. Information pertaining to the samples (i.e. kind of seed, lot number, etc.) is entered into the computer system at this point and is stored on the hard disk of the central file server. Laboratory cards are generated

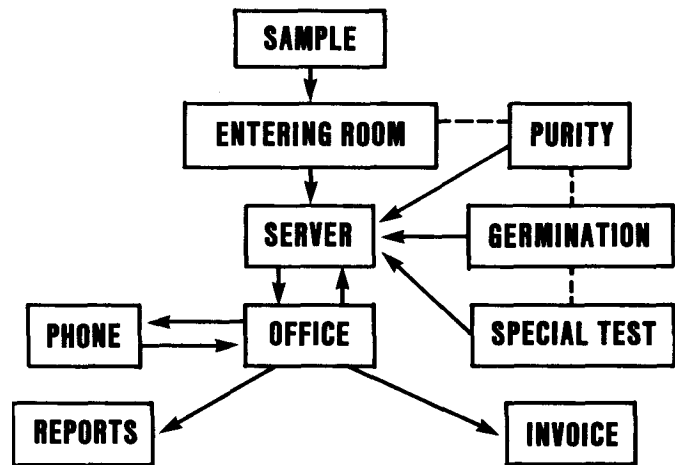


Figure 1.--Diagram showing flow of samples and information through the Seed Lab and computer system.

for internal use by analysts to record their results. Samples then move to purity, germination, or special testing for various quality tests. Results of these tests are entered into the computer where they are stored in the file server and reports are generated in the office. Data on the reports is checked against information on the lab card before reports are mailed. Billing is conducted once a month using a billing program which gathers information on individual customers and prints an invoice listing, date of sample receipt, test number, lot number, kind of seed, tests requested, test charges, past due and total amount due. Incoming telephone calls requesting information on completed tests or tests in progress are handled in the office by accessing the file server which provides the necessary information.

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Key data stored upon sample entry includes: the assigned laboratory number, kind of seed, customer sending the seed, lot number, size of lot, seed zone, elevation, and tests requested.

Record and system security is accomplished by two file servers, one of which serves as a backup in event of failure of the main server. File servers are protected from loss of power by an uninterruptible power supply unit (UPS). Data that cannot be held in the file server because of lack of space is archived to tape.

BENEFITS

The computer system just described results in more uniform reports, which are generated faster and contain fewer errors. This results in less fatigue to office personnel, has resulted in less staff and frees them to concentrate on other jobs. Telephone inquiries about status of test results are now handled more accurately and quickly. The monthly billing can now be done in a few hours compared to several days under the old system.

However, the main benefits to the forest industry may relate to the ever expanding database being created and the information it can supply to seedsmen, nurserymen, geneticists, seed technologists, and various researchers.

To maximize use of this database will require planning and close cooperation with all segments of the industry. For instance, if it is deemed desirable to include information about seed vigor on seed germination reports, lot numbers will have to be standardized to insure that vigor results can be sorted by as many factors as possible (i.e. seed kind, seed zone, elevation, year of collection, etc.). The areas described below are examples of how information in the database can be used.

Germination

Seed Vigor

Seed vigor is an indicator of seed quality used for many species. It is particularly useful whenever rapid, uniform emergence is desired, which is certainly the case with the production of conifer seedlings.

Germination values, described by Czabator (1962), combine speed of germination and completeness of germination and can be used to evaluate seed vigor. Currently, germination reports issued by the OSU Seed Laboratory provide all the information needed for calculating germination values (also called germination rates or germination rate indexes).

These values could easily be included on the germination report.

For them to be meaningful, however, would require: 1) the development of germination values for each species (i.e. Douglas fir, Ponderosa pine, etc.); 2) controlled field plantings of the same seed lots tested for vigor to correlate laboratory and field results; 3) a grouping of germination values into high, medium, and low vigor classifications; and, 4) sufficient testing over several years, seed zones, elevations, etc, to validate conclusions.

Quality Guidelines

By analyzing germination data, categories of germination could be developed which would be useful in marketing as well as being useful to seedsmen making decisions about seed storage and to nurserymen for determining seed sowing rates.

Again, categories of low, medium, and high germination values could be developed for each species and further broken down by seed zone and elevation.

Research

Data gleaned from the computers could be used by seed technologists to identify species needing research to enhance germination. For instance, the study of the sporadic germination response of White fir (Abies concolor) may be facilitated by utilizing information from the proposed database. Pregermination treatments, such as the length of stratification, could also be better evaluated utilizing the database. Information gained from such studies would be useful to seedsmen, nurserymen, and seed laboratories.

Other Seed Quality Factors

We have spoken about the value of a germination database. However, similar data could be collected on purity, seed moisture content, seed weight, X-ray, and the various quick tests such as tetrazolium and hydrogen peroxide. Correlations between any of these could be run to monitor their validity or to aide in a larger research effort.

CONCLUSIONS

Information about many quality factors is readily available at the Oregon State University Seed Testing Laboratory. With their recent change to computers, this information can be viewed as an expanding database which may have potential uses to many persons associated with the testing of conifer seed. To maximize use of this information, planning

should begin now with input from all interested persons.

LITERATURE CITED

Czabator, F.J. 1962. Germination value: An index combining speed and completeness of pine seed germination. Forest Sci. 8: 386-396.

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