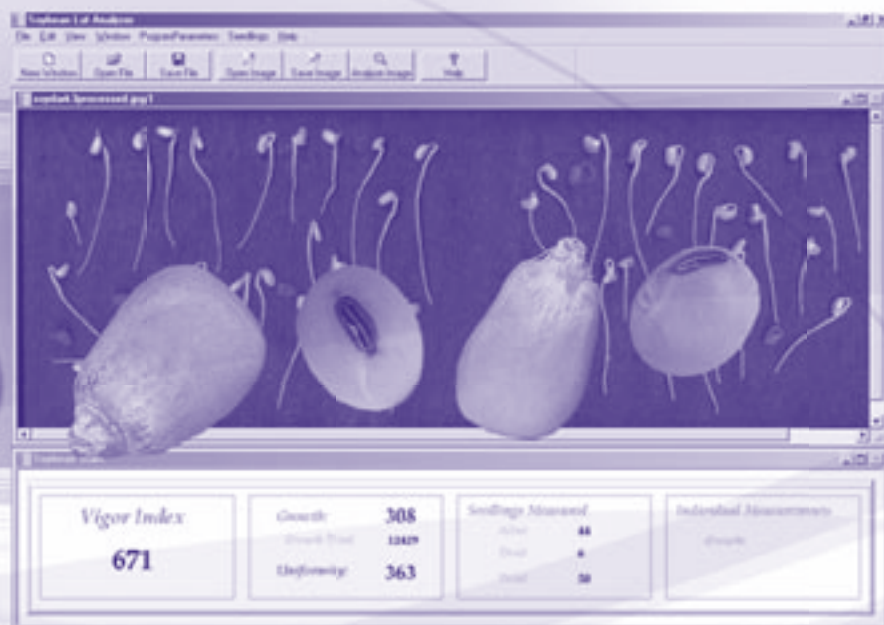**Ohio Agricultural Research and Development Center**
College of Food, Agricultural, and Environmental Sciences

OARDC Research Enhancement Competitive Grants Program

SEEDS

Seeds 25

Computer Imaging to Determine Seed Quality and Performance

Miller B. McDonald, Horticulture and Crop Science
Mark A. Bennett, Horticulture and Crop Science
Peter P. Ling, Food, Agricultural, and Biological Engineering
Kikuo Fujimura, Computer Science and Engineering

Seed quality and viability are the first and most important factors to seed producers, wholesalers, farmers, and consumers at the local garden center. All of these people are increasingly demanding 100% germination from their seed — because without germination, there is nothing.

Row crop and plug producers not only expect each seed in the seed lot to germinate but also to germinate rapidly and to perform uniformly — an aspect of seed performance called seed vigor. Seed vigor is defined as the rapid and uniform emergence and development of normal seedlings under a wide range of field conditions. In addition, the use of seed enhancements — coatings, biologicals, and priming — requires the identification of the best seed lots and places the highest premium on seeds with the highest vigor.

Currently, seed analysts conduct seed vigor tests. This is time consuming, labor intensive, and expensive. The evaluations are subjective, and the results can vary from laboratory to laboratory, leaving consumers with unreliable information to determine the worth of seed.

OBJECTIVES

The main objectives of this project were to apply computer-imaging technology to seed-quality analysis, thereby eliminating subjectivity in test results, and to work toward an industry standard for seed germination and vigor tests.

CHALLENGES

Standardizing germination conditions was an essential first step toward obtaining reproducible results. Once this was accomplished, an image-capture device with high resolution and consistent reliability was identified. Specific software had to be developed that could process the image and provide reproducible data related to the speed and uniformity of seedling growth in the seed lot.

ACHIEVEMENTS

Working together, this interdisciplinary team collectively developed an automated seed-vigor assessment system (or seed-vigor imaging system) that promises to make a significant contribution to the seed industry. The automated seed-vigor assessment system reduces the time — from seven days to three — and eliminates the associated expense and subjectivity of human analysis. Furthermore, the automated seed-vigor assessment system is affordable and within reach of anyone.

THE FUTURE

The initial research funded by the Research Enhancement Competitive Grants Program (RECGP) has been used to obtain additional funding by the American Seed Research Foundation in the amount of $45,000. This funding will allow further research and development of this technology and will focus on adding refinements to the system, including a greater number of seed types to be tested as well as looking at seed purity and other germination analysis.

A patent application has been filed by Ohio State University's Office for Technology Licensing. The system is currently available for commercial license. This technology is being licensed to three companies, and additional licensees are being sought.

Further information on the Seed Vigor Imaging System can be obtained at:
http://www.cis.ohio-state.edu/~fujimura/seed/.

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