

Ross Andrew S, CRIS AD 421 Dec 2003-12-28
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for ROSS, A. S. by Project Number

Project Number: ORE00141
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Development of Wheat Varieties with Enhanced End-Product Suitability

Investigators: Ross, A. S.

Performing Department: Crop and Soil Science -- 6365

Start Date: 10/01/2002 Termination Date: 09/30/2007
Reporting period: 01/01/2003 to 12/31/2003
Report has not yet been submitted to CRIS.

Progress Report:

This year the OSU wheat Quality program has been involved in 5 major research and development ventures. These ventures were; -effects wheat flour proteins in noodlemaking -effects of wheat flour soluble fiber components in noodlemaking -genetic screening of wheat tissue for presence or absence of genes coding for key starch synthetic enzymes -commencement of the Oregon Wheat Quality Evaluation program - commencement of research into starch protein interactions in noodlemaking. The results of the work on wheat flour proteins in noodlemaking showed a hierarchy of effects, with the amount of protein in flour dominating the composition of protein in flour in determining cooked noodle hardness. This is important information. It allows breeders to target flour protein compositions suited for breadmaking without excessive concern about effects in noodlemaking. This information was passed on to, and utilized by the OSU breeding program in 2003. The data is also a key pilot data to be used in a collaborative application for federal funding for a detailed extension of this work. The work on wheat flour soluble fiber components in noodlemaking is yet ongoing. However, preliminary results show that in soft wheat flours, soluble fiber components have little effect at a functional or end-use level. This will allow further reduction in soluble fiber levels in soft wheat flours, which is beneficial in cookie applications, without detrimentally affecting the noodlemaking potential of the same wheats. There was other progress. Key extraction and characterization methodologies for wheat flour soluble fiber components were optimized in this project. In addition, incidental results highlighted a potential screening method relating flour proteins to cooked noodle texture, which may be applied in breeding. Attempts to screen wheats supplied by Washington State Univ. for presence or absence of genes coding for key starch synthetic enzymes using novel genetic techniques

has failed to yield the anticipated results. This screening was to be a key part of a project on starch protein interactions in noodlemaking that commenced activity in November 2003. More time consuming, but reliable screening methods, which the genetic screening was poised to replace, are now being applied. The aim is to identify wheat with divergent starch properties in otherwise genetically identical backgrounds. This material could provide a powerful research tool to quantify the relative effects of starch and protein in noodlemaking. This key knowledge is not yet available in the literature. The Oregon Wheat Quality Evaluation Program commenced. The program functions in collaboration with the USDA Western Wheat Quality Lab, the Oregon Wheat Commission and the OSU wheat breeding program. It is anticipated that this will become a perpetual venture. This year the program published 2 Preferred Variety Lists for Oregon covering winter and spring planted wheats using data supplied by the USDA Western Wheat Quality Lab. Future plans include funding for OSU to complement and improve the testing methods currently applied to rank wheat varieties in the PNW.

Publications:

Ross A. S., J. B. Ohm, T. Simpson. 2003. Preferred Wheat Varieties Lists for Oregon: Soft White Winter and White Club Wheats. Oregon Wheat Growers League Newsletter, September 2003.

http://cropandsoil.oregonstate.edu/wheat/reports/preferred_wheat_var03.pdf

Ross A. S., J. B. Ohm, T. Simpson. 2003. Preferred Wheat Varieties Lists for Oregon: Soft White Spring Wheats. 2003.

http://cropandsoil.oregonstate.edu/wheat/reports/preferred_spring_wheat_var03.pdf

Ong Y.L., 2003. Effects of Gluten Composition and Molecular Weight Distribution on the Noodle Making Potential of Hard White Wheats. Thesis for BS in Bioresource Research, Oregon State Univ.

Impact:

Specific information on the influence of protein composition on noodlemaking has been incorporated into the selection protocols of the OSU breeding program. In particular the selection of parental material in the hard white development program. The information was crucial in the retooling of the hard white germplasm base to incorporate the market demand for dual purpose bread and noodle type hard white wheats. The provision of Preferred Variety Lists for Oregon has had a major impact on the industry. It has generated vital discussion on wheat quality issues and given clear guidance to growers about what varieties to grow in order to improve the overall quality of the Oregon wheat crop for the export market. The other research has been impactful on the OSU Wheat Quality Program; -generating standardized methods, -finalizing the commissioning of the new equipment, -providing pilot data for new grant applications, -providing new research ideas, -and providing rich opportunities, which are being exploited, to generate and nurture valuable research collaborations, especially within the PNW.