

Interdepartmental Graduate
Program in Plant
Breeding and Genetics

Symposium 2007

**USE OF WILD
GERMPLASM
IN CROP
IMPROVEMENT**



Friday, December 14, 2007
9:00 a.m. - 4:00 p.m.
A155 Plant and Soil Sciences Bldg

Contact Information:

Poster Session

A poster session will be held at 12:00 noon in the Plant and Soil Sciences Conservatory. Program participants who wish to present a research poster (4'X 4') are invited to do so. Graduate students and faculty associated with the Plant Breeding & Genetics Program are particularly encouraged to participate.

Participation

The Symposium is open to MSU faculty, staff, and students, as well as members of the East Lansing/Lansing community and researchers from neighboring institutions. There is no registration fee or requirement for preregistration.

Dr. James Kelly
Department of Crop & Soil Sciences
kellyj@msu.edu
355-0271 x1181

Rita House
Department of Horticulture
house@msu.edu
355-5191 x1324

Symposium website:
<http://www.hrt.msu.edu/pbgp/symposium.html>

Dr. David Spooner
USDA-ARS, WI

Dr. David Spooner is a professor in the department of horticulture at the University of Wisconsin and a botanist for the USDA, ARS; Vegetable Crops Research Unit. His research focuses on investigating the species boundaries and phylogenetic relationships of wild and cultivated potatoes (*Solanum* sect. *Petota*) and tomatoes (*Solanum* sect. *Lycopersicon*) using comparative morphology, DNA markers (nuclear and chloroplast RFLPs, AFLP) and DNA sequence analysis. His research in wild potatoes has shown that many previously accepted species are not clearly defined and that the number of wild potato species divisions needs to be reduced. Dr. Spooner has also studied the use of taxonomy as a predictor of frost tolerance and white mold resistance in wild potatoes. He has made numerous trips to collect wild potato and tomato germplasm in many countries in Central and South America included Guatemala, Honduras, Nicaragua, Chile, Peru, Mexico, Argentina, Ecuador, Columbia, Venezuela, Bolivia, and Costa Rica. Dr. Spooner also maintains a herbarium of the NRSP-6 potato collections at Sturgeon Bay, WI. This herbarium is devoted entirely to wild and cultivated potatoes and includes over 14,000 herbarium sheets.

Joseph Tychonievich

Dr. Eileen Kabelka
University of Florida

Dr. Eileen Kabelka obtained her B.S. in Horticulture and her M.S. in Plant Breeding and Genetics at Michigan State University where she worked on viral resistances in cucumber. Her PhD, at Ohio State University, involved integrating useful wild germplasm into elite tomato lines and her Postdoctoral work at the University of Illinois, utilized molecular approaches to identify and map useful genes from exotic soybean germplasm. She is currently an associate professor at the University of Florida in the Horticultural Sciences Department where she has been since 2004. Her present research, a combination of her previous experiences, focuses on the development of new cucurbit varieties for use by private industry and public breeders of summer and winter squash. In order to achieve this goal her team has employed a combination of traditional and molecular techniques. Using these tools, useful genes from wild and exotic germplasm are identified and mapped to integrate useful traits into elite cultivars. Her most recent efforts have been in stacking disease resistance traits while improving fruit quality.

Rachel Naegele

Symposium Schedule

- 9:15 a.m.** Opening Remarks
Dr. Kim Wilcox
Provost, Michigan State University
- 9:30** **Dr. David Spooner**
Testing the Utility of Taxonomic Classifications - an Example in Potato
- 10:30** Coffee Break
A246 PSSB
- 11:00** **Dr. Eileen Kabelka**
Utilizing Wild and Exotic Germplasm for Crop Improvement
- 12:00 p.m.** Poster Session
Conservatory
- 12:30** **Lunch with Students, Speakers and Hosts**
Conservatory
- 1:30** **Dr. Jeff Maughan**
Development and Application of Molecular Tools for the Improvement of Andean Pseudocereal Crops (Quinoa and Amaranth)
- 2:30** **Dr. Tom Osborn**
Insights and Innovations from Wide Crosses'
- 3:30** **Discussion - Wrap up**
- 8:00** **Social evening - TBA**

Dr. Jeff Maughan
Brigham Young University

Dr. Jeff Maughan is an associate professor in the department of Plant and Wildlife Sciences at Brigham Young University. His research team focuses on developing molecular techniques to advance breeding in quinoa and amaranth. Quinoa is not only remarkably well-adapted to harsh environmental conditions, such as drought stress, alkaline soil, and high altitudes, but the grain also contains high levels of high-quality protein. His group created the first BAC library with the 9X genome coverage of quinoa, and identified a homologue of the 11S seed storage globulin protein in quinoa seeds. Grain amaranths have excellent features in the quantity and quality of their seed proteins. The *Amaranthus* genus also includes some of the most damaging weed species with resistance to herbicide. His research team constructed the first amaranth BAC library with 10X genome coverage, and characterized acetolactate synthase (ALS) and protoporphyrinogen (PPO) genes in grain amaranth *A. hypochondriacu*, conferring susceptibility to their targeted-herbicides. By analyzing the BAC library, his group developed the first large-scale microsatellite markers for grain amaranths.

Lingxia Sun

Dr. Thomas Osborn
Seminis Vegetable Seeds Inc.

Dr. Thomas Osborn is the Director of Genetic Resources Development at Seminis Vegetable Seeds Inc., Woodland, California. He was the former Rothermel-Bascom Professor in the Department of Agronomy at University of Wisconsin-Madison. While at the University of Wisconsin, Dr. Osborn focused his research on molecular breeding and genetic analysis of *Brassica* crops and alfalfa (*Medicago sativa*). He developed RFLP and SSR markers and constructed genetic maps of these crops. To improve yield in canola (*B. napus*), he evaluated a range of unadapted *B. napus* germplasm from Europe to China and identified QTL for higher seed yield. In alfalfa, he used novel germplasm to increase chances of combining favorable alleles at many loci. His other research interests include a study of how plant genomes evolve after polyploidization. He used *B. napus* polyploids to monitor gene expression by using AFLP-cDNA and microarray analyses and to study DNA structure by using DNA methylation assays. His current research focuses on innovations in wild crosses directed at vegetable improvement.

Kaori Ando