ETPMC News

The ETPMC News is a publication of the USDA/ Natural Resources Conservation Service East Texas Plant Materials Center

Spring Edition- May 2011

Field Day Scheduled

Mark your calendars, the East Texas Plant Materials Center (ETPMC) will be hosting a field day and luncheon on Tuesday, May 24, 2011. Field day events will include field and facilty tours, concurrent break out sessions, and the dedication of the new greenhouse /seed lab building. For more information, please contact the ETPMC. We hope to see you there.

New Earth Team Volunteers

New Earth Team Volunteers: from left; Heath Badders and Paul Gray.

The ETPMC welcomes two new Earth Team volunteers, Paul Gray and Heath Badders. Paul earned a Masters Degree in Biology from Stephen F. Austin State University (SFASU) in 2010. His thesis included studying leaf morphology and rust resistance of accessions in Alan's indiangrass study. (Additional information about the study is found in another article in this newsletter.) Heath is currently enrolled at SFASU and is pursuing a Bachelor's degree in Forestry. He became interested in volunteering after attending a SFASU Forestry Soils lab tour of the Center.

Greenhouse Construction

Construction continues on a new greenhouse/seed lab structure to replace the ETPMC's aging, 50 plus year old greenhouse. The greenhouse is nearly complete. The seed lab is currently being finished on the inside, and installation of benches, fume hood, and island are expected soon. A dedication ceremony will be held during the field day on May 24th in appreciation of the first Board of Directors for their vision and service in establishing the East Texas Plant Materials Center.

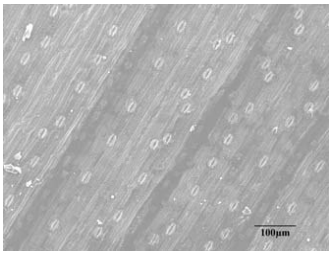
Workers hanging finishing trim on the seed lab.

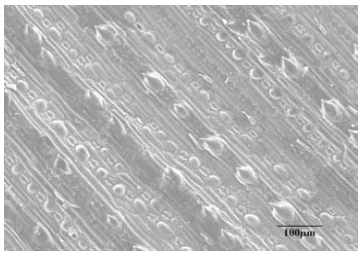
Rust Resistant Indiangrass

Paul Gray, Stephen F. Austin State University, recently finished his thesis, **Investigations of Morphological Differences Leading to Rust Resistance in Indiangrass**, under the leadership of Dr. Jo Taylor. His work focused on an Indiangrass evaluation being conducted by the ETPMC that was selected visually for its lack of infection from the fungal pathogens that cause rust infections in grasses. Paul used electron microscopy to compare leaf surface morphology of the top performing plants in the evaluation to released varieties 'Lometa', 'Osage', and 'Rumsey'. Previous work has shown 'Rumsey' to be susceptible to rust infection while 'Osage' and 'Lometa' demonstrate some resistance. Paul was able to isolate multiple morphological features that contributed to the pathogen's ability to infect the host plant. Microscopic, thorn like projections, seen in the below right micrograph, were one such feature that aided fungal spore attachment to the leaf surface. Plants with smooth leaf morphology, micrograph below left, exhibited much less infection. Paul's work provided the ETPMC with valuable quantitative data to support visual observations and qualitative data collected on the study.

Resistant selection of Indiangrass (please note this image was taken the same day as the image below)

Rust susceptible selection used as a control and disease spreader in the evaluation.





The Garden Patch

Open pollinated and Hybrid Seed

Garden plants are either open pollinated or hybrids. Open pollinated plants reproduce by cross pollination between two plants (by wind, insects or water) or self pollination in which the male and female flower parts are on the same plant. For example, beets, carrots, and corn are cross pollinating and beans, lettuce, and peas are self pollinating. Until the advent of hybrids, garden plant varieties were open pollinated. For gardeners who like to save seed, self pollinating plants produce seed true to the parent plant. The phenomenon of hybrid vigor or heterosis (where the offspring of two plants is larger and more vigorous than its best parent) was noticed in tobacco plants in the middle 1700's. However, there was no explanation as to how the phenomenon happened. In the 1860's, Gregor

Front cover of Philip's seed Annual -1901 (NAL Special Collections)

Mendel conducted studies on pea genetics and plant inheritance. Unfortunately, he was not able to pursue his work further and the information was lost for nearly fifty years. Then in 1904, four years after the rediscovery of Mendel's experiments, Dr. G.H. Schull, a geneticist, began to experiment with corn. He found a decline in vigor of self pollinated (inbred) lines of corn. When the inbred lines were crossed with each other, vigor was restored. In 1909, he outlined a procedure for developing inbred lines and crossing those lines to produce productive single cross hybrids. Single cross hybrids exhibit desirable attributes from two parent plants. Nine years later Dr. D.F. Jones developed a procedure known as a double cross. This breeding technique uses four inbred lines (for example A, B, D, and E). The inbred lines are crossed in pairs to produce two single crosses **(A x B) = C** and **(D x E) = F**, which were then crossed to produce the double cross hybrid **(C x F) = G**. With the ability to take desirable traits, such as yield or disease resistance, from different parent lines and eventually combine them in vigorous offspring, plant breeders possessed a powerful tool to apply to other garden plants.

Today, for a company to sell seed as hybrid the parent plants must be known and their pollination controlled. Just a glance at seed catalogs shows they are chock full of hybrid seed varieties. However, hybrid seed are usually more expensive than open pollinated seed. The difference comes from the cost of maintaining parent breeding lines, breeding nurseries, and seed harvest and processing.

So, which is better for your garden; open pollinated or hybrid varieties? The debate will continue as long as people plant seeds and grow gardens. The simple answer is what varieties grow well in your garden and catches your interest and taste buds.

References for this article:

J.M. Poehlman. 1979. Breeding Field Crops. 2nd ed. AVI Publishing Co., Inc. Westport, Connecticut.
National Gardening Association – http://www.garden.org

Next Issue: "I have this old seed…"

Who We Are

The USDA Natural Resources Conservation Service (NRCS) collects, selects and releases plants and develops plant technology to address our nation's most critical soil and water problems through the agency's Plant Materials Program. The East Texas Plant Materials Center in Nacogdoches, Texas serves east Texas, western Louisiana, southwest Arkansas, and southeast Oklahoma. The Plant Materials Center is a partnership between the NRCS, US Forest Service, Stephen F. Austin State University, and Soil and Water Conservation Districts in east Texas and western Louisiana.

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