

# Kerr Center's

## 2011 Flour and Meal Corn Demonstration

George Kuepper, Horticulture Program Manager

Luke Freeman, Horticulture Program Assistant

### Background

In Carol Deppe's excellent book, *The Resilient Gardener*, she writes about corn as a key garden crop for the uncertain times we are entering.[1] Her approach to gardening sidesteps the mainstream focus on salad vegetables and fresh eating, to concentrate on growing storable starch- and protein-rich crops that can sustain individuals and families through hard times. These crops include potatoes, squash, and beans, as well as corn for meal and flour. Deppe doesn't disparage or discourage salad gardening. Rather, she calls attention to what was once a common purpose for home vegetable gardening - meeting our caloric needs. Until recently, America has seen several decades of relative climatic and economic stability. That situation seems to be changing - and with that, our approach to food gardening may also need changing.

### Corn for Flour and Meal

People grow many kinds of corn (*Zea mays*).[2] The vast plantings of corn that now occupy the prairie soils of the corn belt are mostly dent corn - destined to be feed for livestock, feedstock for ethanol production, or the source of high-fructose syrup, oil, and similar processed food ingredients.

There is also sweet corn - one of our most beloved fresh-eating vegetables. It occupies much less total acreage, though plantings can be large when the harvest is destined for canning factories or fresh chain store sales. Sweet corn is also a common feature of home and market gardens. Popcorn is a third common kind of corn. It is perhaps the most genetically primitive form of corn that is commonly grown. It can be easily grown, harvested, stored, and used by gardeners and small farmers.

But what of the corn used to make flour and meal for tortillas, cornbread, muffins, tamales, grits, and the host of other basic American and ethnic foods? Most of these foods are made from corn selected and grown specifically for these purposes. Some of the varieties are true flour corn, which has soft starch and is easy to grind. True flour

corns grow best in drier Western regions. The grain tends to mold in wet and humid climates. Other corns used to make flour and meal may be true dent or flint types that were selected for growing and milling characteristics either by traditional growers (Native Americans, gardeners, farmers, etc.) or by modern industry.

Heirloom seed companies now provide a wide selection of corn varieties suited to making meal and flour, and the different kinds of foods one might want to prepare from them. We chose to try four such varieties in a 2011 demonstration trial.

### **About the 2011 Demonstration**

We selected varieties based on information provided in sales literature the seed companies provided. We chose Virginia White Gourdseed, Hickory King, Santo Domingo Blue, and Texas Gourdseed. The descriptions that follow are adapted from information on the Southern Exposure Seed Exchange and Native Seeds/SEARCH websites, unless indicated otherwise. [3,4]



#### ***Virginia White Gourdseed***

Virginia White Gourdseed is a 125-day variety from Southern Exposure Seed Exchange. Gourdseed corns are forms of dent corn that were common in the old American South. Prior to the Civil War, they were the most widespread type of corn grown there. Generally, gourdseed corns do well in heavy clays, have fewer pests than sweet corn, and tolerate drought. Their texture is considered ideal for dumplings, flatbreads and puddings. [5]

The stalks of Virginia White Gourdseed are tall - 10' to 12' - with one or two ears each. The ears are described as short and fat, with large, long, white kernels that shell easily. Virginia White has good resistance to southern corn leaf blight. It is considered an original gourdseed type traceable back to the 1700s and Native American culture.



### *Hickory King*

Hickory King is a 110-day variety, also from Southern Exposure Seed Exchange. Hickory King is very popular in Virginia, but it is grown much more widely. George first heard of and grew it in North Central Arkansas in the early 1980s - before the modern heirloom seed movement became popular.

Hickory King has tall 12' stalks, each bearing two ears. Kernels are large, flat, and creamy white. The husk is tight, which aids resistance to corn earworm and rootworm beetles. It has good tolerance to both northern and southern corn leaf blights. Hickory King is considered excellent as a hominy corn, and for grits which are made from hominy. It is also considered good for flour, cornmeal, and fresh roasting.

### *Santo Domingo Blue*

Santo Domingo Blue is a true flour corn type. We purchased the seed from Native Seeds/SEARCH in Tucson, Arizona, after deciding we definitely wanted at least one variety with origins in, and adaptation to, the American Southwest. It has potential to produce big ears and, as its name indicates, the kernels are a deep blue. This variety comes from the Santo Domingo Pueblo in New Mexico.

### *Texas Gourdseed*

Texas Gourdseed, a 120-day variety, was also from Southern Exposure Seed Exchange. This variety was originally brought to south Texas by German farmers who migrated from Virginia, Kentucky, and Tennessee in the late 19th century. It was often used as feed to fatten turkeys as well as for food. Stalks reach 8' in height and typically have two ears that are easily shelled. It is susceptible to smut, however, as are many heirloom corn varieties. It is considered an excellent corn for making tortillas.

We located the demonstration planting at the Cannon Horticulture Project on the Kerr Center Ranch. The Project was established in the fall of 2007 and achieved certified organic status in June 2011. The Cannon site features a loam soil with moderately poor drainage. It has organic matter levels around 3.1% and a pH ranging from 6.6 to 7.0. While native phosphorus and potassium levels on these soils are low, compost applications in 2009 improved the phosphorus status considerably, and potassium moderately. The previous crop in 2010 was a blend of annual sorghums, with a small amount of buckwheat and southern peas, as green fallow. It was followed by a winter cover crop of grain rye and crimson clover.

Varieties were arranged in five-row blocks, with a 3' row spacing. There was no replication of plots. The first planting of all varieties was done on April 5. Cold, wet weather followed. Heavy rains washed out portions of all blocks, and on May 10, "skips" were replanted by hand.

Weed control was done with wheel hoes and hand-hoeing. No attempt was made to manage other pests. Irrigation was provided through drip tape. Harvest of all varieties was done on August 22.



*Luke discusses the flour corn demonstration at a Kerr Center field day.*

## **Results and Discussion**

The 2011 season began with heavy April rains that washed out much of the first planting and necessitating considerable re-planting. This was followed quickly by extreme heat and drought that lasted through the remainder of the summer. Thanks to drip irrigation, we were able to supply the plants with enough water to reduce drought stress. Irrigation, however, did little to counter the effects of high temperatures on seed set.

Temperature effects on seed set are twofold. Temperatures in excess of 95 degrees can desiccate exposed silks, especially when relative humidity is low. Likewise, temperatures in the mid-90s, accompanied by low humidity, will damage pollen grains. When the temperature exceeds 100 degrees, the pollen may simply be killed. Fortunately, pollen shed usually occurs during early to mid-morning hours prior to temperature extremes (in *most* years, that is). Also, pollen matures over time, so there is a fresh shedding of grains every day. [6]

Because of the extreme weather, corn yields of *all* four varieties were very low; practically speaking, the term “crop failure” would have been apt. Still, Charles Dickens’ line “It was the best of times, it was the worst of times...” could well describe our situation. As growers, we lamented the fact that harvests were meager. As practical researchers, however, we had the opportunity to experience and study the kind of natural stress-test most of us have not seen before - one that can sort out winners from losers and highlight the truly survivable and resilient selections.

While all varieties produced a few barely harvestable ears, Texas Gourdseed was actually head-and-shoulders better, though its yield was still quite low. That hardly makes for a glowing recommendation, but it *is* encouraging. In 2012 Luke will plant a “three-sisters” demonstration trial featuring heirloom corn, bean, and squash varieties. He will definitely use Texas Gourdseed corn for that planting.

## About the Three Sisters

*According to Iroquois legend, corn, beans, and squash are three inseparable sisters who only grow and thrive together. This tradition of interplanting corn, beans and squash in the same mounds, widespread among Native American farming societies, is a sophisticated, sustainable system that provided long-term soil fertility and a healthy diet for generations. [7]*

## Acknowledgments

*We want to acknowledge Kerr Center's Livestock Team - Mary Penick, Andy Makovy, and Erin Campbell-Craven - for assistance in maintaining the flour corn plot.*

## End Notes

1. Deppe, Carol. 2010. *The Resilient Gardener*. Chelsea Green Publishing, White River Junction, VT. 350 p.
2. Brown, W.L., and L.L. Darrah. 1985. Origin, Adaptation, and Types of Corn *In: The National Corn Handbook*. NCH-10. Iowa Cooperative Extension Service, Ames, IA.  
<http://corn.agronomy.wisc.edu/Management/pdfs/NCH10.pdf>
3. Southern Exposure Seed Exchange, P.O. Box 460, Mineral, VA 23117; Email: [gardens@southernexposure.com](mailto:gardens@southernexposure.com); Tel: 540.894.9480; Fax: 540.894.9481;  
<http://www.southernexposure.com/>
4. Native Seeds/SEARCH, 3061 N. Campbell Ave., Tucson, AZ 85719; Tel: 520.622.5561; Fax: 520.622.5591; <http://www.nativeseeds.org/>
5. Weaver, William Woys. 2008. Gourdseed corn. *Mother Earth News*. October–November.  
<http://www.motherearthnews.com/Real-Food/2008-10-01/Gourdseed-Corn.aspx>
6. Nielsen, R.L., No date. Drought and Heat Stress Effects on Corn Pollination. Agronomy Department, Purdue University, West Lafayette, IN.  
<http://www.agry.purdue.edu/ext/corn/pubs/corn-07.htm>
7. Formiga, Alice. 2012. Celebrate the Three Sisters: Corn, Beans and Squash. *Renee's Garden*.  
<http://www.reneesgarden.com/articles/3sisters.html>



Kerr Center for Sustainable Agriculture

P.O. Box 588

Poteau, OK 74953

Phone: 918.647.9123

Fax: 918.647.8712

[mailbox@kerrcenter.com](mailto:mailbox@kerrcenter.com)

[www.kerrcenter.com](http://www.kerrcenter.com)

Copyright © 2013