Kerr Center's 2012 Sweet Potato Variety Trial

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KERR CENTER FOR SUSTAINABLE AGRICULTURE
POTEAU, OKLAHOMA
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Kerr Center for Sustainable Agriculture, Poteau, Oklahoma

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Hand-digging and harvesting the 2012 Trial. Pictured: Administrative Assistant Hannah Daniels

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Background

In 2010 the Kerr Center received a Specialty Crop Grant from the USDA Agricultural Marketing Service (AMS), through the State of Oklahoma, for a three-year project investigating and demonstrating small-scale heirloom sweet potato growing. Among our goals was identification of suitable heirloom varieties for southeastern Oklahoma growing conditions.

The findings from our first two trial seasons are available as *Heirloom Sweet Potato Varieties: A Preliminary Look in 2010 and Kerr Center's 2011 Sweet Potato Variety Trial*. Both can be found on the Kerr Center website at www.kerrcenter.com.

We continued to evaluate heirloom varieties in 2012 with another replicated variety trial. This is our report on that trial.

About the 2012 Trial

We located the 2012 sweet potato trial at the Cannon Horticulture Project site 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. This is not considered good soil for sweet potatoes; they do best in light, well-drained sandy loams. However, the Cannon site has organic matter levels around 3.1% and excellent pH that ranges 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.

Prior to sweet potatoes, the trial plot was planted to a winter cover crop of grain rye, and crimson and arrow leaf clovers. The previous crop in 2011 was a blend of annual sorghums, with a small amount of buckwheat, grown as green fallow. Field preparation began in early April by mowing the winter cover crop and disking twice. On May 10, planting ridges were prepared first by rototilling, using a BCS-mounted tiller. It was followed by ridge construction using a Hoss Wheel Hoe, mounted with hilling plows. Ridge spacing was 48 inches.

We transplanted the entire trial of twelve varieties on May 24. Each plot was 20 feet long, with 20 plants per plot and one-foot spacing between plants. The plots were replicated three times.

Beginning with the date of transplanting, we provided supplemental drip irrigation throughout the season as needed. None of the varieties showed particular heat stress; no foliar diseases were observed, and though there was some damage by striped blister beetles, it was not significant. Weeds were managed by a single cultivation on June 6 using wheel hoes. On June 7, the inter-row areas were seeded to buckwheat as living mulch to suppress weeds and attract beneficial insects. No additional weed control was required.

We hand-dug the roots on October 2 and 3. Marketable roots from all varieties were cured, and weighed.

About Okinawa Purple

We did a separate evaluation for a variety named Okinawa Purple. We grew this cultivar the previous two years and experienced failure each time. Our third attempt was due to the interesting market potential purple and other colored sweet potatoes appear to have in specialty markets.

Since we learned that Okinawa Purple requires a longer growing season than the other varieties we evaluate, it was planted in a single replication on May 29, on a planting ridge adjacent to the main trial. We harvested Okinawa Purple on October 24. This time yields were sufficient to allow us to include this variety in the summaries that follow.

Yield Performance Summary

The results of our field trial are presented in the table that follows. The varieties are listed by relative yield performance. Since we did not grade our roots at harvest, we do not report actual yields. To estimate performance relative to conventional expectations, we looked to several qualified sources. In one reference, Oklahoma State University reports that sweet potatoes should yield between 290 and 580 bushels; another suggests 300 bushels of #1 grade potatoes qualifies as a good yield.[1,2] The University of Missouri suggests a yield of 400 bushels is respectable, but does not specify grade.[3] The University of California recorded average yields over three years of 420 bushels, grade not specified.[4] Finally, a 1980 version of Knott's Handbook reports average U.S. yields of roughly 210 bushels, with good yields closer to 365 bushels.[5]

Based on this information, we are satisfied that our top yielding varieties - Beauregard, Cordner's Red, Molokai Purple, Alabama Purple, and Resisto - provided good commercial yields. All other varieties grown in this trial, excluding Georgia Red and Okinawa Purple, delivered yields that might still meet commercial expectations.

VARIETY	YIELD ASSESSMENT
Beauregard	Very High
Cordner's Red	Very High
Molokai Purple	High
Alabama Purple	High
Resisto	High
Red Resisto	Moderately High
Allgold	Moderately High
Arkansas Red	Moderately High
Norton	Moderately High
White Triumph	Moderate
Oklahoma Heirloom	Moderate
Georgia Red	Low
Okinawa Purple	Low

Taste Testing

Yield is not the only factor to consider when assessing the potential of heirloom varieties. Flavor is equally important. Just as there is great variation in yield, flavor and texture can vary greatly. Taste, however, is very personal and subjective, and can be influenced by subtle factors such as physical appearance and presentation. This might explain why white sweet potatoes were not rated well in our taste test, though some people particularly like the flavor of these dry, sweet varieties.

Kerr Center staff served as evaluators for this taste test. The results are shown in the table that follows.

RANK	TASTE	TEXTURE
1	Resisto	Resisto
2	Allgold	Allgold
3	Beauregard	Oklahoma Heirloom
4	Georgia Red	Beauregard
5	Cordner's Red	Norton
6	Oklahoma Heirloom	Georgia Red
7	Okinawa Purple	Cordner's Red
8	Arkansas Red	Red Resisto
9	Red Resisto	Okinawa Purple
10	Norton	Arkansas Red
11	White Triumph	Alabama Purple
12	Alabama Purple	White Triumph
13	Molokai Purple	Molokai Purple

Cultivar Descriptions

The following descriptions are compiled from catalogs and sales literature provided by Duck Creek Farm, George's Plant Farm, and Sand Hill Preservation Center, and from publications by Oklahoma State University, the University of Arkansas, and other extension services. We have added our own observations

Photos were all taken by Luke at the end of the 2012 season, following curing. They are representative of each variety's general size and shape, though there was often considerable variation within a single cultivar.

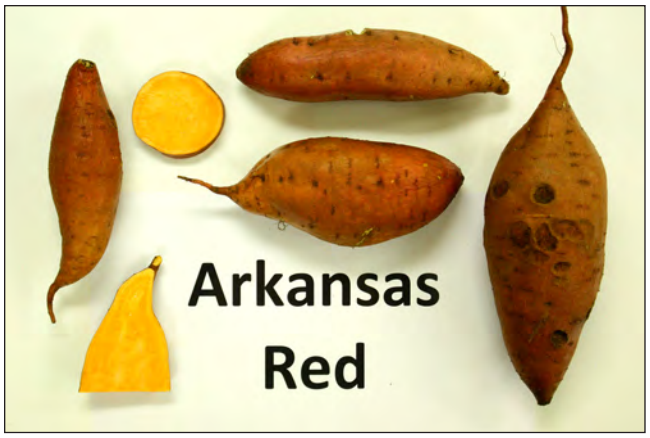
Taste-test at Kerr Center. Foreground: Liz Speake, Business Manager. Will Lathrop, Cattle Manager, at the end of the table.

Alabama Purple (aka Purple Delight)

Alabama Purple is called Purple Delight in some catalogs. It was a high yielder in our trial and grew beautiful medium to large roots. The roots are long to oblong, with smooth, dark purple skin and deep purple flesh. Despite its gorgeous appearance and heavy yield, this variety has an unappealing flavor when baked.

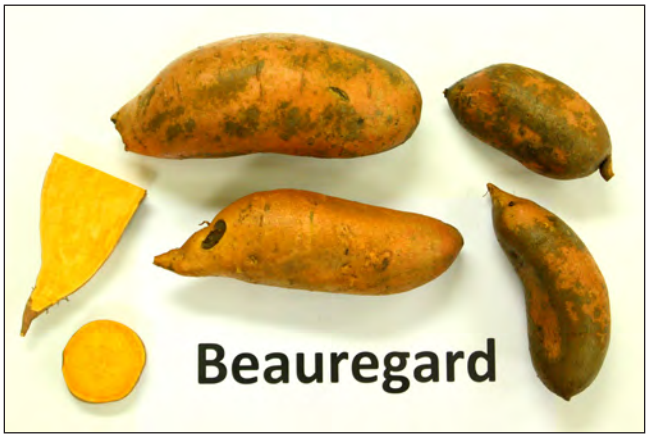
Allgold

90 Days. Allgold was developed by Oklahoma State University in 1952 for resistance to internal cork and soil rot. It is reputed to be a heavy-yielding variety, though it performed only moderately well in our field trial. Allgold has medium to large roots that are long to oblong, with golden-brown skin and cream-orange flesh. It features high levels of vitamin C, vitamin A, and carotene, and was a favorite in our taste test.



Arkansas Red

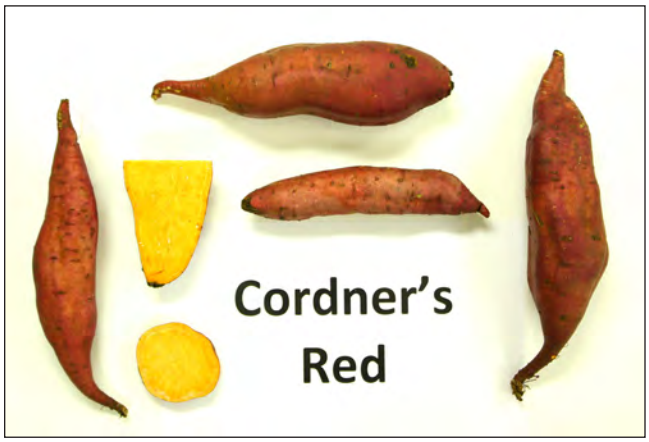
90 Days. Arkansas Red produces small to medium size sweet potatoes that are long to oblong, with red-brown skin and cream-orange flesh. It is reported to be a high yielder, but our yields were moderately low. We also observed a high occurrence of soft rot and white grub damage with this variety.



Beauregard

90 Days. Bred at the Louisiana Agriculture Experiment Station in Baton Rouge, Beauregard is known for its high yield of marketable roots. It is a contemporary cultivar and should not be considered as an heirloom. We grew Beauregard primarily for the purpose of providing a market standard for measuring heirloom performance. There was little surprise, then, when it proved our highest-yielding test variety.

Beauregard produces medium to large roots. If left in the ground too long, they can grow very large. Skin color is reddish-brown, with cream-orange flesh. The splotchy skin color visible in the photograph was possibly due to our soil type. Beauregard was bred for resistance to fusarium wilt and soil rot, though we did notice some cases of soft rot and insect damage. Beauregard has a uniform color and consistency when baked. It scored high in our taste test.

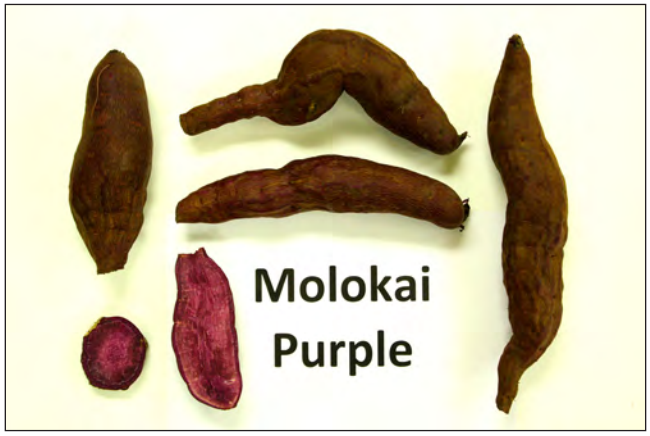


Cordner's Red

90 Days. Cordner's Red was developed in Oklahoma from the breeding material of Dr. H. B. Cordner. It produces long, lumpy, medium-size roots with dark red skin and cream-orange flesh. The variety grows as a compact, bush type plant, which makes it well suited for small gardens. Despite its compact growth, Cordner's Red was a heavy producer in our variety trial. It also did well in our taste test, but is reputed to do poorly in storage.

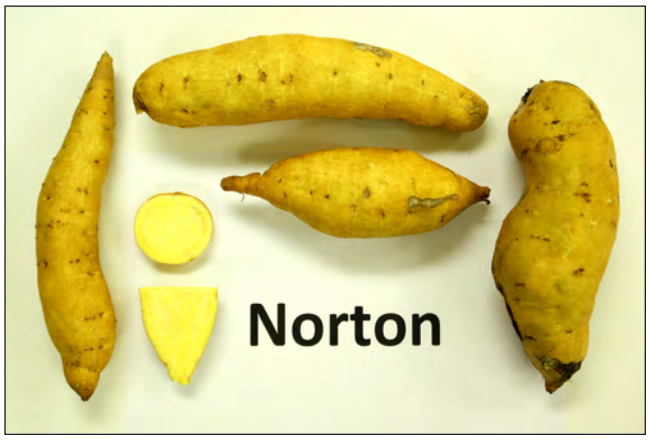
Georgia Red

110-140 Days. Georgia Red produces small to medium size roots that are round to oblong, with red-brown skin and cream-orange flesh. It grows vigorous vines and is reported to set above average yields. However, it performed poorly for us. This variety might have benefited from more time in the ground than 128 days - the time we gave it. Georgia Red was a favorite in our taste test. It has excellent keeping quality.



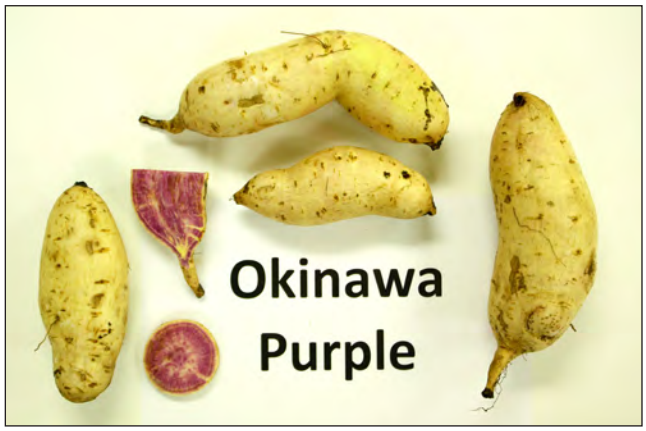
Molokai Purple

Molokai Purple produces small to medium size roots with dark purple skin and deep purple flesh. They are long, veined, and rough-skinned, giving them an unsightly appearance, despite the beautiful purple color. Though Molokai Purple is a heavy producer, its rather ugly appearance and poor ranking in our taste test make us reluctant to recommend the variety.



Norton

Norton is an old heirloom variety that predates 1850. It produces medium to large roots that range from long and skinny to thick and blocky. It has golden-brown skin and cream-colored flesh that is sweet and dry when cooked. Norton's flavor can be compared to Nancy Hall, another white sweet potato. Norton performed poorly in the field trial and suffered considerable white grub damage.



Okinawa Purple

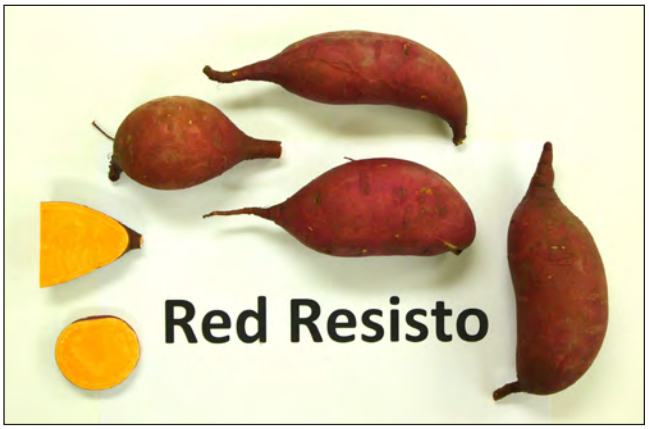
140 Days. Okinawa Purple is a late season Asian type sweet potato, also called "Okinawan." It produces roots with purple and cream marbled flesh and cream colored skin. Okinawa Purple is dry and sweet when cooked and its flesh turns bright purple. Special health benefits have been attributed to this sweet potato, including its contribution to the longevity of women living on the island of Okinawa.[6] This reputation and its

beautiful coloration have led to growing consumer interest.

Okinawa Purple requires a full 140 days to set decent sized roots. As mentioned earlier, we tried growing this variety in 2010 and 2011 without success, ostensibly because we did not allow enough time in the ground. We obtained a moderate yield in 2012, but encountered some challenges during harvest. Okinawa Purple sets roots in a wide band of soil, which necessitates extra time and care in digging. We estimate that it took about four times as long to harvest Okinawa Purple as compared to other varieties. But considering its market appeal and potential for premium pricing, this variety might be worth the extra effort.

Oklahoma Heirloom

Oklahoma Heirloom is a true heritage variety that can be traced to Ralph Mills of Beggs, Oklahoma. Mills has grown the variety for over 30 years after receiving it from a neighbor in Colgate. Oklahoma Heirloom may have originated from another heirloom variety called Mahan, which is similar in appearance. It has compact vines and produces roots in a cluster under the primary stem. The roots are medium to large, oblong, and feature orange-brown skin, with cream-orange flesh. Production is typically early and heavy and the roots keep well in storage. This variety performed poorly this year, but was one of the top yielders in our 2011 trial. Oklahoma Heirloom continues to be a favorite in our taste test.

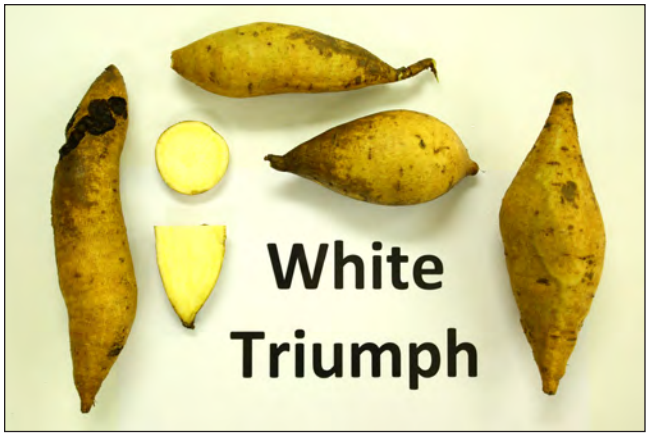


Red Resisto

90 Days. Red Resisto grows as a semi-bush type plant and readily flowers. It produces earlier and yields slightly better than Resisto, but cannot match Resisto's superb taste. Red Resisto grows small to medium size sweet potatoes that are round to oblong. It has a smooth, dark red skin and deep orange flesh.

Resisto

110 Days. Resisto, developed in South Carolina in 1983, was the best tasting sweet potato we grew this year. This variety grows vigorous vines and sets a good yield of small to medium size roots that are round to oblong. Resisto sweet potatoes have smooth, red-brown skin with deep-orange flesh. It is reported to have superior pest resistance and good storage quality.



White Triumph

90-120 Days. White Triumph produces small to medium size sweet potatoes that are long to oblong, with yellow-brown skin and cream colored flesh. We observed significant white grub damage to the roots and only obtained a light yield in the Kerr Center trial. As is common to most white sweet potatoes, White Triumph has a sweet flavor but very dry texture. This variety might also go by the name "White Yam."

Locating Planting Stock

DUCK CREEK FARMS
(Gary Schaum)
P.O. Box 303
Mounds, OK 74047
Tel: 918.827.6455
www.duckcreekfarms.com

Duck Creek Farms has served as our main source for planting stock for the 2010, 2011, and 2012 seasons. Exceptional selection of heritage varieties.

GEORGE'S PLANT FARM
1410 Public Wells Road
Martin, TN 38237-5618
Tel: 731.587.9477
www.tatorman.com

We have used George's plant farm mostly for popular contemporary varieties. However, they also stock several heirlooms. Slips are high quality and service is reliable.

SAND HILL PRESERVATION CENTER
1878 230th St.
Calamus, IA 52729-9659
Tel: 563.246.2299
www.sandhillpreservation.com

An excellent and extensive selection of heirloom varieties. As of the 2012 season, Sand Hill has certified organic stock available.

STEELE PLANT COMPANY
202 Collins St.
Gleason, TN 38229
Tel: 731.648.5476
www.sweetpotatoplant.com

A reputable source for new and other contemporary varieties. Also sells a few heirlooms.

NEW HOPE SEED CO.
P.O. Box 443
Bon Aqua, TN 37025
www.newhopeseed.com
Contemporary and heirloom varieties.

LEGGETT FARMING PARTNERSHIP
P.O. Box 376
Nashville, North Carolina 27856
Tel: 252.467.2776
Fax: 252.467.2777
www.leggettfarming.com

Covington and Beauregard varieties. Some stock is certified organic.

Acknowledgments

We want to acknowledge our 2012 student interns Katie Kilpatrick, Jacob Delahoussaye, and Rock Gremillion, for all their hard work on this project. Special thanks also goes to Kerr Center's Administrative Assistant Hannah Daniels, and former Kerr Center herdsman, Andy Makovy, for their assistance at harvest time and for moral support through a long, hot growing season.

End Notes

1. Brandenberger, Lynn, et al. No date. Oklahoman's Guide to Growing Fruits, Nuts, and Vegetables. Cooperative Extension, Oklahoma State University, Stillwater, OK. p. 126.

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3. Jett, Lewis W. 2006. Growing Sweet Potatoes in Missouri. Pub. G6368. University of Missouri Extension, Columbia, MO. 4 p.

4. May, Don, and Bob Scheurman. 1998. Sweet Potato Production in California. Pub. 7237. University of California Vegetable Research and Information Center. 2 p.

5. Lorenz, Oscar A., and Donald N. Maynard. 1980. Knott's Handbook for Vegetable Growers, 2nd ed. John Wiley & Sons, Inc., New York, NY. p. 300.

6. Anon. 2010. 5 superfoods to eat now. February 10. http://doctoroz.com/videos/5-superfoods-eat-now

About the Authors

George Kuepper is Sustainable Agriculture Specialist for the Kerr Center for Sustainable Agriculture. George has over 30 years of experience with sustainable and organic agriculture. He has worked mostly in the non-profit sector as a researcher, educator, producer, and consultant, including an earlier stint with the Kerr Center in the late 1980s. Before rejoining Kerr Center, he worked for NCAT (the National Center for Appropriate Technology) on the ATTRA Project and served as NCAT's Midwest Office Director in Lewis, Iowa. There he focused on organic agriculture, specializing in compliance, certification, and transition issues. George is currently responsible for developing Kerr Center's intern program, for reviving organic horticultural demonstrations on the ranch, and for reviewing and updating Kerr Center's technical publications and information packets.

His publications from his current stint at the Kerr Center include *Heirloom Vegetables, Genetic Diversity, and the Pursuit of Food Security* (along with an accompanying series of reports on variety trials of various heirloom crops); *A Brief Overview of the History and Philosophy of Organic Agriculture; Small Scale Organics: A Guidebook for the Non-certified Organic Grower;* and *Farm Made: A Guide to On-Farm Processing for Organic Producers.*

Luke Freeman was Horticulture Program Assistant at the Kerr Center from 2011 - 2013, after graduating from the University of Missouri. He earned a Bachelor of Science in Agriculture with an emphasis in sustainable agriculture. At the Kerr Center, Luke worked with George Kuepper to maintain and expand the horticultural programs on the farm. He was responsible for composting operations, developing a potting mix from on-farm materials, maintaining and gathering data from the heirloom vegetable field trials, beginning an heirloom seed-saving program, and assisting with farm tours.

Horticulture Projects at the Kerr Center

Horticultural crops are well suited to the small acreages so common in much of Oklahoma, and are ideal for value-added businesses and direct marketing. Finding the crops best adapted to Oklahoma climate and soils, as well as to the small farmer's wallet, has always been an important goal of the Kerr Center.

Heirloom Variety Trials

Since 2008 the center has been conducting trials of heirloom varieties of vegetables and sorghum. Heirloom varieties are what some call old-fashioned – non-hybrids. Some of these were developed in specific geographic locations and so are well adapted to specific climates. Sometimes these varieties offer greater disease resistance and sometimes better flavor. Often they come in a greater variety of colors and shapes.

In previous years, Kerr specialist David Redhage conducted several trials of traditional vegetable varieties. In 2008, the Kerr Center's School of Sustainability began a series of variety trials of different heirloom crops:

Season Crops Evaluated

2008	okra, sorghum
2009	squash, tomatoes
2010	sweet potatoes, tomatoes
2011	sweet potatoes
2012	sweet potatoes

Reports on the results of each of these variety trials are available free from www.kerrcenter.com.