ONION VARIETY TRIAL RESULTS

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The impetus for starting onion variety trials in southeast Georgia was initially to evaluated onion quality specifically the flavor and pungency of onions. Early Japanese overwintering onions had been introduced to the Vidalia onion growing area, which were initially thought to be too pungent to be Vidalia onions. The Georgia Department of Agrriculture was encouraged to insure all varieties grown in the Vidalia region were mild and would not hurt the industry's reputation. To this end, the Georgia Department of Agriculture adopted rules requiring the University of Georgia make recommendations for new varieties after three years of testing in trials. This process has been under way for several years.

Along with the information on pungency and taste, additional information was gathered that would be of interest to growers. This included performance parameters concerning yield, graded yield, disease resistance, growth and bulb characteristics. These trials were then undertaken to gather a wide array of information on onion variety performance.

Methods

Thirty-five varieties were entered in the trial in 2003-2004. Seed were sown on 15 Sept. 2003 in a high density planting (60 seed per linear foot) with a Monsem vacuum planter. Four rows were sown on beds prepared 6 feet on-centers. Transplants were similarly grown in 2005 and 2006 with seed sown on 21 Sept. 2004 and 19 Sept. 2005 for the 2005 and 2006 seasons, respectively. Plants were lifted, 50% of the tops removed, and transplanted to their final spacing on 17 Nov. 2003 for the 2003-2004 season. For the 2004-2005 and 2005-2006 seasons, onions were transplanted on 29-30 Nov. 2004 and 30 Nov. 2005, respectively. Final spacing consisted of 4 rows set on raised beds formed on 6-ft. centers. Rows were 12 inches apart with plants set 5.5 inches apart in-row. Fertilization, insect, disease, and weed control followed University of Georgia Cooperative Extension Service recommendations (Boyhan et al., 2001). Onions were irrigated as needed from a portable pipe overhead irrigation system.

The experimental design each year was a randomized complete block design with 4 replications. The experimental unit consisted of 35 feet of bed in 2003-2004 and 2004-2005 and 30 ft. of bed in 2005-2006. There was a 5 ft. in-row between plot buffer. The number of seedstems (flowering plants) and the number of plants that had more than one bulb (doubles) were counted for the entire 35 ft plot on 2 April 2004 and 11 April 2005, and the 30 ft plot on 30 March 2006.

In addition, the number of plants infected with center rot (*Pantoea ananatis*) were counted for each plot on 20 April 2005 for the 2004-2005 trial and a select number of varieties were evaluated on 26 April 2006 for the 2005-2006 trial.

Onion varieties in each trial were harvested when judged mature. For the 2003-2004 season, harvest began on 5 April 2004 and continued until 10 May 2004. There were 6 harvest dates, along with the two mentioned, included 12, 19, 26 April and 3 May 2004. Twenty-five feet of each plot was harvested on the dates indicated and left in the field for two days prior to clipping, bagging, and weighing. Onions harvested from 5-19 April 2004 were heat cured for 48 hours at 95° F. Onions harvested from 26 April to 10 May 2004 were not subjected to heat curing to minimize problems with warm weather bacterial diseases. Onions were handled in a similar fashion in 2005 and 2006. For the 2005 season, onions were harvested on 25 April, 2, 9, 16, and 23 May 2005 with onions harvested on the first two harvests subjected to heat curing for 24 hrs., while the later harvests were not to minimize the effects of warm weather bacterial diseases. For 2006, onions were harvested on 10, 17, 25 April, 1, and 4 May 2006 with all onions subject to heat curing at 95 deg. F. for 24 hrs.

Harvested onions from each plot were graded into jumbo ($\geq$ 3 inches) or medium ($\geq$ 2 inches and < 3 inches) sizes and weighed. Finally, a ten bulb sample of jumbo onions from each experimental unit was analyzed for pyruvate and soluble solids (Randle and Bussard, 1993).

Approximately 50 lbs. of onions from each experimental unit was placed in controlled atmosphere (CA) storage at the Vidalia Onion Research Laboratory in Tifton, GA. Storage conditions consisted of 5% CO_2, 3% O_2, 70% relative humidity, and 34 deg. F. All onion varieties from the 2004 trial were placed in CA storage on 19 May 2004 and removed on 6-7 Oct. 2004. For the 2005 season, onions were placed under these conditions as they matured. CA initiation dates were 3, 10, 18, 25 May 2005 and were removed from storage on 3 Oct. 2005.

In 2004, onions removed from CA, were evaluated into marketable and non-marketable onions and the percent marketable onions calculated. The marketable onions were re-evaluated 12 days after removal from CA storage and the percent marketable was again calculated based on pre-storage weight. In 2005, onions were evaluated for percent marketable onions as well as for weight loss in storage. They were re-evaluated after 14 days for percent weight loss based on post-storage weight and percent marketability based on pre-storage weight.

For the 2004 and 2005 trials, upon removal of onions from CA storage, a five bulb sample from each experimental unit was measured for its height and width. These measurements were made at the broadest point through the axis of the onion and at the broadest point perpendicular to this line. The average height and width were calculated for each experimental unit. Then the height/width ratio was calculated and the analyses were conducted on this figure. In addition, the onions were cut perpendicular to their axis and the number of centers were counted. The number of centers were averaged for 5 onions before analyses. For the 2006 trial these measurements were done before placement in CA storage.

ANOVA and Fisher's Protected Least Significant Difference (LSD) at $p=0.05$ with Bonferroni adjustment for five comparisons was calculated for each parameter. In addition, the coefficient of variation (CV) was calculated.

Results and Discussion

'XON-303Y' from Sakata Seed had the highest field weight at 1,235 50-lb bags per acre in the 2003-04 trial (Table 1). The graded yield (jumbos & mediums) for 'XON-303Y' was only 65% of the field yield. The highest yielding variety for jumbo yields was 'WI-3115' with 1,005 50-lb bags per acre. 'WI-3115' had 86% of its field yield marketable.

Seedstems or flowering in onions is considered undesirable. Under normal conditions onions are biennial, forming a bulb the first year, in which energy is stored to produce a flower or scape the second year. This can be short-circuited, however, if the plant has reached sufficient biomass (about the 10 leaf stage) followed by cool temperatures. These conditions can occur in southeast Georgia during early spring resulting in large numbers of seedstems. It is also known that variety plays an important role in seedstem formation. In some years there can be many seedstems across most varieties, while in other years only a few varieties will exhibit this trait.

Seedstems were particularly problematic in 2004 because of cool temperatures in March followed by warmer temperatures. Doubles are also affected by environmental factors particularly, it is believed, by adverse growing conditions that may affect the growing point resulting in more than one bulb developing. Seedstems ranged from 0-123 per plot with 'Sweet Vidalia' having the largest number of seedstems and 'XON-303Y' having none. For doubles the range was 1-112 per plot. D. Palmer Seed had many of their entries with high numbers of doubles. 'Pegasus', 'Century', 'Exp. Yel. Granex 15094' and 'SRO 1001' all averaged 1 double per plot.

Pyruvate analysis ranged from 3.0-4.6 umol/gfw which is within the expected range for Vidalia onions. Soluble solids which is the percent sugar ranged from 7.6-10.2.

Overall the onions stored very well this year unlike the previous year when none of the onions had greater than 25% marketable onions after removal from CA storage. The percent marketable onions ranged from 64% to 93% marketable for '606DY' and 'Mr. Buck', respectively (Table 2). 'Mr. Buck' did not differ significantly from 'Savannah Sweet' with 86% marketable or any other onions with greater percent marketable onions after removal from CA storage. Maturity class was not a factor in percent marketable onions with early, mid-season, and late onions present in the entire range of percent marketable onions.

After 12 days at ambient temperature the percent marketable onions ranged from 16% for 'Yellow Granex 15085' to 67% for 'SSC 33076' and 'SSC 1600'. Overall, there was a 34% drop in marketable onions during the 12 days after removal from CA storage.

Overall the trial went very well in 2004 with few problems. We did have greater than average seedstems and doubles due to cool weather in March.

In conclusion, there are differences between varieties for CA storability, but these differences are difficult to characterize for consistency from one year to the next. In light of the results from 2003 where all of the entries did poorly in CA, there must be some other factors that play a primary role in storability. Overall, the major reason for onions being unmarketable after CA storage is Botrytis neck rot, which is acquired in the field, but it is unknown why this disease is more severe in some years and not in others. In addition, there is no practical way to detect this pathogen once it has gained entry to the

onion. Such onions will appear sound when placed in CA, but will subsequently develop disease symptoms rendering the onion unmarketable.

The number of onion centers in 2004 for the most part averaged below 2.0 for the varieties tested. There were a few exceptions including; 'XON-202Y', 'Ohoopee Sweet', 'Southern Honey', 'DPSX 1290', 'Mr. Buck', and 'Sweet Vidalia', all of which averaged 2 or more centers per onion.

The height/width ratio ranged from 0.6-0.9 for the tested onions. None of the onions were above 1.0, nor were there any with a height/width ratio of 1.0. Several had height/width ratios of 0.9 including 'XON-303Y', 'Yellow Granex 34140', and 'Ohoopee Sweet'. Based on this study, these specific varieties would be good candidates for use in processing onion rings.

For the 2004-2005 season, nine companies submitted onion seed for evaluation in the trial. Florida Seed had the fewest number of entries with two while Dessert Seed and Seminis Seed had the most with eight entries each. There were a total of 49 entries in the trial (Table 3).

This year the number of doubles ranged from 0 for variety 1200 to 118 for 'Southern Belle' (Table 3). Both 'Sweet Advantage' and 'Southern Belle' had about one-third of their onions double. 'Sweet Melody', 'WI-129', 'WI-3115', and 'Nirvana' also had high incidences of doubles with about 20% doubling.

The 2004-05 season had few seedstems across most varieties. 'Sweet Vidalia' had the most with an average of 20 seedstems/plot. Along with 'Sweet Vidalia' variety SSC 6372 F_1 also had a relatively high number of seedstems with 17. Compared to the previous year this was a relatively light year for seedstems. In the 2003-04 season, there were 7 out of 34 entries with 90 or more seedstems per plot.

Center-rot is a bacterial disease of onions in which the center most recently mature leaf is infected which can destroy the entire bulb. Relatively warm temperatures during bulb formation favor development of this disease. This is a newly described disease for the Vidalia onion area. The incidence of center-rot will vary from year to year based on environmental conditions that favor development. The 2004-05 season was a relatively mild year for center-rot incidence. Incidence ranged from 0 to just under 4 plants per plot infected. Although there were statistical differences in incidence at this low a rate it is unclear if these differences actually represent varietal differences.

Total or field yields ranged from 570 50-lb bags per acre for variety 34140 to 1,233 50-lb bags for 'SR1001'. Total yield is a good indicator of the potential for a particular variety, but does not always translate into an overall good variety because of unacceptable losses in the grading process. For a variety to be considered a good yielder it should consistently have high jumbo yields which generally command the highest prices in the market. The jumbo yields in this trial ranged from 356 to 971 50-lb bags per acre. The highest jumbo yielding variety was 33076, which did not differ from the 9 next highest yielding varieties. Medium yields often are inversely correlated with jumbo yields. In other words, poorly performing varieties will often have the highest medium yields.

Pyruvate analyses ranged from 2.9 to 5.1 um/gfw. The highest pyruvate valued varieties did not differ statistically from half of the listed varieties. Three-quarters of the entries did not differ as to sugar content, which ranged from 7.8-12.3%.

During the 2004-05 season, weight loss in CA storage ranged from 3.3% for 'Serengeti' to 13.6% for 'HSX-61304 F_1' (Table 4). Seventeen of the entries lost 5% or less in storage. The percent marketable onions after 4.5 months of storage ranged from 44-95%. There were 23 varieties that had 70% or better marketable onions after removal from storage. The average for all the varieties was 69% marketable, which would be considered good. There were, however, several entries that had less than 60% marketable onions upon removal from storage and included 'Var. No. 15082', 'WI-609', 'FS 2011', 'WI-3115', 'Sugar Belle', 'Century', 'SSC-1600', and 'HSX-61304 F_1'. Several of these varieties would be considered very early maturing and so are unlikely to be stored under CA conditions.

Varieties were held at ambient conditions for two weeks after removal from CA storage and re-evaluated. The weight loss among these bulbs ranged 0.6% to 3.4%. Varieties with less than 1% weight loss during these two weeks included 'EX 07542007', 'EX 07542008', 'Georgia Boy', 'Mr. Buck', 'WI-102', 'Var. No. 15082', 'XON 303Y', and 'Var. No. 105101'. In addition, the percent marketability after two weeks, based on pre-storage weights, was also noted. This ranged from 9% for 'HSX-61304 F_1' to 65% for 'Sweet Vidalia' and 'Serengeti'. An additional third to two thirds of onions were lost among the varieties in this trial during this two week period. This rapid loss in marketability among onions removed from CA storage has been seen in past studies. Grocery stores and consumers should be counseled to keep these onions under refrigeration as much as possible after removal from CA storage to prevent rapid loss.

The height/width ratio among these varieties ranged from 0.5 for 'SSC-1600' to 1.1 for 'Ohoopee Sweet' (Table 4). Varieties with a height/width ratio greater than one would be considered unsuitable as a Vidalia onion. Several varieties had height/width ratios at or near one including 'HSX-18201 F_1', 'Serengeti', 'Gobi', '1200', 'XON 303Y', and 'Var. No. 34140'.

Finally, the number of centers among these varieties ranged from 1.0 to 2.7. Along with 'SSC-1600' with 2.7 centers, there were 11 entries that averaged 2.0 or more centers per bulb.

With the exception of weight loss after two weeks at ambient temperatures all the CVs were within an acceptable range for an experiment of this type.

For the 2005-06 trial, the 42 entries in the trial represent 11 different onion seed companies. The number of doubles averaged from about 1-38 (Table 5). This contrasts to the 2004-05 season where doubles ranged from 0-118. The five varieties with the highest number of doubles were 'Sapelo Sweet', 'WI-129', 'WI-131', 'Georgia Boy', and 'Granex Yellow PRR'. Twenty-seven of the entries averaged less than 10 doubles per plot. The average number of seedstems ranged from approximately 0-15 with only 'Granex Yellow PRR' having average number of seedstems in double digits.

These entries can be separated into three maturity classes of early, mid-season, and late-season varieties. Early season entries were harvested on 10 and 17 April 2006, while mid-season varieties were harvested on 25 April and 1 May 2006. Finally, late season entries were harvested on 4 May 2006. Late season varieties have been plagued with bacterial diseases putatively identified as sour skin and slippery skin. This is reflected in the percent marketable onions with the early and mid-season varieties averaging 69% and 73%, respectively, while the late season varieties averaged only 48%.

Among the 21 varieties that were evaluated for center-rot the incidence range averaged 5.3-30.5. The lowest incidence occurred with 'Mr. Buck', 'Miss Megan', 'Georgia Boy', and 'Yel. Granex 114101'. Overall the incidence of center rot was much higher in 2006 compared to 2005.

Overall yields were very good in 2006 with an overall total yield average of 1,082 50-lb bags/acre compared to only 893 50-lb bags/acre in 2005. The total yield range was 536-1,279 50-lb bags/acre. On the low end was 'XP-Red', which had very poor stand in the plots due to late seeding on the plantbeds resulting in very low yields. The highest yielding entry for total yield was 'DY 606' at 1,279 50-lb bags/acre, which was not statistically different from the next 25 entries in descending order for total yield. Jumbo yields ranged from 242-955 50-lb bags/acre with the highest yield from 'Yellow Granex 129101', which did not differ from the next 28 in descending order for jumbo yields. Medium yield was very low for all of the entries, which probably reflects the overall excellent yields in the 2005-2006 season.

Pyruvate ranged from 2.8-6.3 um/gfw with an average of 4.5 um/gfw which was higher than for 2005 where onions averaged 3.8 um/gfw (Table 6). The lowest entry this year was 'DY 72766' with 2.8 um/gfw, which did not differ from the next 8 lowest entries for pyruvate. Sugar content ranged from 7.8-11.6% with 'Ohoopee Sweet' having the highest sugar content.

The bulb height/width ratio ranged from 0.62 for 'Granex Yellow PRR' to 1.00 for 'Yel. Granex 126101'. Varieties with height/width ratios closer to one are better for processing into onion rings. Although there were no entries with height/width ratios over one, such varieties would be considered unacceptable for the Vidalia onion industry. The number of centers was also evaluated in this trial and ranged from 1.0-2.1. Varieties that average one or near one for centers are also considered better candidates for processing into onion rings.

Finally the CVs had relatively low percentages in most cases and are typical of a field experiment. In conclusion, this year was very good for onions with optimum conditions for high yields, low disease, and environmental conditions ideal for onion production.

Citations

Boyhan, G.E., D.M. Granberry, and W.T. Kelley. 2001. Onion Production Guide Univ. of Ga. Bul. No. 1198.

Randle, W.M. and M.L. Bussard. 1993. Streamlining onion pungency analyses. HortScience. 28: 60.

Table 1. Vidalia Onion Variety Trial 2003-2004.

Entry	Company	Evaluated 4/2/04 Doubles	Evaluated 4/2/04 Seedstems	Harvest Date	Field Weight (50-lb bags/Acre)	Jumbos (50-lb bags/Acre)	Mediums (50-lb bags/Acre)	Pyruvate (um/gfw)	Soluble Solids (%)
XON-303Y	Sakata	4	0	5/10/04	1235	787	10	4.5	7.7
Exp. Yel. Granex 15082	Dessert Seed	4	10	5/10/04	1229	623	7	3.7	8.2
SRO 1001	Sunseeds	1	11	5/10/04	1206	758	8	3.0	8.1
Century	Seminis	1	4	5/10/04	1198	638	4	3.9	8.6
WI-3115	Wannamaker	20	3	4/12/04	1174	1005	8	3.4	8.2
XON-204Y	Sakata	9	21	5/3/04	1164	785	10	4.3	9.2
WI-609	Wannamaker	19	9	4/19/04	1149	677	8	3.0	8.7
Exp. Yel. Granex 15094	Dessert Seed	1	21	5/10/04	1101	485	8	3.7	8.4
DPS 1318	D. Palmer Seed	35	48	5/10/04	1060	536	16	3.5	8.5
Ohoopee Sweet	D. Palmer Seed	91	90	5/10/04	1043	426	26	4.3	8.6
Southern Honey	D. Palmer Seed	112	121	5/10/04	981	417	31	3.4	8.9
Pegasus	Seminis	1	12	5/10/04	979	329	6	4.2	9.0
XON-202Y (99C 5092)	Sakata	3	11	5/10/04	976	426	10	3.8	8.5
XON-203Y (01ZG 5034)	Sakata	5	60	4/26/04	929	683	10	3.6	9.0
Rosali (Red)	Bejo	44	29	5/10/04	923	374	22	3.4	9.1
Granex EM90	Clifton Seed	2	61	5/10/04	918	414	5	4.1	8.1
Exp. Yel. Granex 15085	Dessert Seed	2	109	5/10/04	917	356	8	3.4	7.6
SSC-1600	Shamrock	8	9	4/12/04	916	767	16	4.0	10.0
WI-129	Wannamaker	39	12	4/5/04	908	704	39	3.8	8.4
SSC 1535	Shamrock	8	7	4/12/04	899	781	26	4.2	10.0
606DY	Shaddy	4	4	4/5/04	878	683	21	3.8	8.3
SSC 33076	Shamrock	3	3	4/5/04	858	778	22	3.6	8.5

Sapelo Sweet	D. Palmer Seed	58	45	5/3/04	857	566	21	4.3	8.9
DPSX 1290	D. Palmer Seed	55	108	5/10/04	810	342	15	3.5	8.9
72766DY	Shaddy	20	5	4/5/04	804	742	27	3.6	8.5
Cyclops	Seminis	4	18	5/3/04	801	443	14	3.6	8.6
Mr Buck	D. Palmer Seed	19	52	5/3/04	800	391	19	4.5	8.7
Georgia Boy	D. Palmer Seed	99	91	5/3/04	754	339	42		
Granex 33	Seminis	3	35	5/3/04	734	371	12	4.6	8.8
Exp. Yel. Granex 34140	Dessert Seed	2	55	5/10/04	702	391	19	4.0	7.8
Savannah Sweet	Seminis	12	38	5/3/04	699	391	21	4.3	8.1
Granex Yellow PRR	Seminis	5	38	5/3/04	678	419	19	4.1	9.3
SSC 6371 F1 (Sugar Belle)	Shamrock	5	4	4/19/04	631	463	18	4.3	10.2
SSC 6372 F1	Shamrock	12	97	5/3/04	564	313	8	4.2	10.1
Sweet Vidalia	Sunseeds	24	123	5/3/04	433	199	22	3.5	8.1
	CV	32%	28%		15%	26%	53%	12%	5%
	Fisher's Protected LSD (p=0.05) w/Bonferroni adj.	5	8		252	259	16	0.8	0.8

Table 2. Controlled atmosphere storage results, number of bulb center, and height/width ratio, 2004.

		Marketable			
		4.5 months after CA storage	12 days out of storage		
Entry	Company	(%)		No. centers/bulb	Height/width ratio
WI-129	Wannamaker	87%	46%	1.1	0.8
WI-3115	Wannamaker	86%	49%	1.3	0.7
WI-609	Wannamaker	78%	49%	1.3	0.7
Savannah Sweet	Seminis	86%	57%	1.9	0.7
Granex 33	Seminis	84%	56%	1.6	0.7
Pegasus	Seminis	74%	39%	1.3	0.7
Century	Seminis	74%	41%	1.6	0.7
Cyclops	Seminis	73%	46%	1.6	0.7
Granex Yellow PRR	Seminis	91%	55%	1.7	0.6
SRO 1001	Sunseeds	71%	44%	1.1	0.7
XON-202Y (99C 5092)	Sakata	77%	40%	2.2	0.6
XON-203Y (01ZG 5034)	Sakata	84%	60%	1.4	0.7
XON-204Y	Sakata	89%	61%	1.7	0.7
XON-303Y	Sakata	78%	44%	1.7	0.9
Exp. Yellow Granex 34140	Dessert Seed	86%	45%	1.7	0.9
Exp. Yellow Granex 15085	Dessert Seed	69%	16%	1.4	0.7
Exp. Yellow Granex 15094	Dessert Seed	80%	42%	1.5	0.7
Exp. Yellow Granex 15082	Dessert Seed	76%	37%	1.8	0.7
72766DY	Shaddy	93%	63%	1.0	0.7
606DY	Shaddy	64%	21%	1.1	0.7
Ohoopee Sweet	D. Palmer Seed	88%	49%	2.4	0.9
Southern Honey	D. Palmer Seed	82%	35%	2.1	0.7
DPSX 1290	D. Palmer Seed	74%	33%	2.6	0.7
Georgia Boy	D. Palmer Seed	92%	64%	1.5	0.7

Sapelo Sweet	D. Palmer Seed	83%	62%	1.8	0.7
Mr Buck	D. Palmer Seed	93%	59%	2.4	0.6
Granex EM90	Clifton Seed	77%	33%	1.9	0.6
SSC 6372 F1	Shamrock	87%	61%	1.5	0.7
SSC-1600	Shamrock	91%	67%	1.4	0.5
SSC 6371 F1 (Sugar Belle)	Shamrock	84%	61%	1.6	0.6
SSC 1535	Shamrock	87%	54%	1.4	0.5
Rosali (Red)	Bejo	84%	45%	1.3	0.8
Sweet Vidalia	Sunseeds	79%	37%	2.0	0.7
SSC 33076	Shamrock	93%	67%	1.2	0.7
DPS 1318	D. Palmer Seed	84%	49%	1.7	0.8
	CV	14%	16%	11%	7%
	Fisher's Protected LSD (p=0.05) w/Bonferroni adj.	8%	5%	0.1	0.1

Table 3. Vidalia onion variety trial, 2004-2005.

Entry	Company	April 11, 2005 Doubles (#/plot)	April 11, 2005 Seedstems (#/plot)	April 20, 2005 Center Rot (#/plot)	Harvest Date	Field Yield (50lb bags/acre)	Jumbos (50lb bags/acre)	Mediums (50lb bags/acre)	Pyruvate (um/gfw)	Sugar (%)
FS 2005	Florida Seed	36	2	0.9	4/25/05	995	743	35	3.6	8.8
FS 2011	Florida Seed	17	1	2.3	4/25/05	1054	898	25	3.2	7.8
33076	Shamrock Seed Co.	26	2	1.9	4/25/05	1096	971	30	3.5	8.7
SSC-1535	Shamrock Seed Co.	27	1	1.1	4/25/05	917	800	40	3.6	9.0
SSC-1600	Shamrock Seed Co.	38	1	0.6	4/25/05	736	545	60	3.8	10.1
Sugar Belle	Shamrock Seed Co.	30	2	0.4	4/25/05	903	694	60	3.5	9.6
SSC 6372 F1	Shamrock Seed Co.	31	17	2.6	5/2/05	795	605	100	3.5	11.2
XON 303Y	Sakata Seed	19	0	0.2	5/16/05	887	747	40	5.1	11.5
XON-403Y	Sakata Seed	6	0	0.4	5/16/05	1128	706	28	3.9	10.4
XON-204Y	Sakata Seed	10	0	0.7	5/9/05	1114	846	20	4.4	9.9
Sweet Jasper	Sakata Seed	6	3	0.4	5/16/05	749	452	40	3.5	9.8
Var. No. 15094	Dessert Seed LLC	8	11	0.6	5/16/05	751	585	29	3.4	9.7
Var. No. 108101	Dessert Seed LLC	10	1	0.8	5/16/05	927	666	24	5.1	12.2
Var. No. 15082	Dessert Seed LLC	21	1	1.7	5/16/05	942	615	27	4.1	9.8
Var. No. 34140	Dessert Seed LLC	4	1	0.2	5/16/05	570	385	34	3.7	9.5
Var. No. 15085	Dessert Seed LLC	3	3	0.4	5/16/05	765	547	30	4.0	11.3
Var. No. 128101	Dessert Seed LLC	6	7	1.2	5/16/05	900	551	23	3.1	9.7
Var. No. 114101	Dessert Seed LLC	4	4	1.1	5/23/05	812	493	13	3.6	9.0
Var. No. 105101	Dessert Seed LLC	1	3	2.1	5/9/05	637	531	28	3.7	10.0
WI-102	Wannamaker Seeds	36	1	1.5	4/25/05	1208	842	37	3.5	8.8
WI-129	Wannamaker Seeds	62	3	0.7	4/25/05	1175	929	37	4.0	11.1
WI-131	Wannamaker Seeds	14	2	0.8	4/25/05	1093	942	24	3.4	8.3
WI-609	Wannamaker Seeds	36	4	0.4	4/25/05	1060	875	26	2.9	8.1
WI-3115	Wannamaker Seeds	65	4	1.1	4/25/05	1190	944	31	3.3	8.4
EX 07542008	Seminis	34	0	2.8	5/9/05	834	575	55	4.4	12.3
EX 07542007	Seminis	7	0	0.6	5/9/05	836	648	28	3.3	9.5
Granex 33	Seminis	20	3	1.9	5/16/05	893	557	46	4.1	8.8

Candy	Seminis	15	0	1.7	5/2/05	689	528	62	3.0	9.2
Pegasus	Seminis	2	1	0.6	5/23/05	886	641	22	3.6	9.6
Granex Yellow PRR	Seminis	4	2	0.9	5/16/05	686	388	33	4.3	10.1
Century	Seminis	9	1	2.7	5/16/05	969	632	24	3.5	9.6
Savannah Sweet	Seminis	4	3	0.9	5/16/05	858	650	30	3.1	8.5
HSX-18201 F-1	Hortag Seed	35	7	2.6	5/16/05	816	531	65	3.8	9.7
HSX-19406 F-1	Hortag Seed	16	10	2.1	5/16/05	743	387	45	3.4	9.1
HSX-61304 F-1	Hortag Seed	11	9	3.3	5/23/05	882	356	28	4.0	9.3
Georgia Boy	D. Palmer Seed	23	3	1.1	5/9/05	848	652	46	3.9	9.9
DPS 1290	D. Palmer Seed	43	7	0.2	5/16/05	1035	729	51	3.7	9.5
Ohoopee Sweet	D. Palmer Seed	38	0	1.9	5/9/05	755	540	63	4.8	11.0
Mr. Buck	D. Palmer Seed	11	4	1.9	5/9/05	807	576	129	3.9	10.0
Southern Belle	D. Palmer Seed	118	4	1.5	5/2/05	812	497	214	3.8	10.6
Sweet Advantage	D. Palmer Seed	102	1	0.0	5/2/05	727	409	217	4.5	11.6
Sapelo Sweet	D. Palmer Seed	42	3	0.4	5/16/05	862	582	49	4.2	10.2
SR1001	Nunhems	10	1	1.2	5/16/05	1233	636	19	3.6	9.6
Sweet Melody	Nunhems	59	6	0.6	5/9/05	814	556	60	3.8	10.1
Nirvana	Nunhems	68	1	1.3	5/2/05	798	553	148	4.6	11.5
Sweet Vidalia	Nunhems	34	20	1.2	5/9/05	858	595	29	3.8	10.1
1200	Nunhems	0	0	1.1	5/9/05	1032	912	9	4.6	11.8
Serengeti 1202	Nunhems	2	0	1.2	5/9/05	802	753	32	3.0	9.6
Gobi 1201	Nunhems	3	0	3.7	5/9/05	894	549	47	3.8	8.7
	CV	18%	33%	38%		14%	17%	60%	19%	18%
	Fisher's Protected LSD (p=0.05) w/Bonferroni adj.	2	1	0.3		230	252	55	1.3	3.3

Table 4. Evaluation of onion variety storability and bulb characteristics, 2005.

No.	Entry	Source	After 4.5 months of CA storage		2 weeks after removal from storage		Height/Width Ratio	Number of Centers
			Weight Loss (%)	Marketable	Weight loss (%)	Marketable		
1	FS 2005	Florida Seed	5.1	65	1.1	34	0.8	1.7
2	FS 2011	Florida Seed	4.7	57	1.2	25	0.8	1.8
3	33076	Shamrock Seed Co.	5.2	64	1.3	35	0.7	1.7
4	SSC-1535	Shamrock Seed Co.	5.0	62	1.9	24	0.6	1.7
5	SSC-1600	Shamrock Seed Co.	5.8	46	1.6	22	0.5	2.7
6	Sugar Belle (SSC 6371 F_1)	Shamrock Seed Co.	6.3	47	2.0	17	0.6	1.7
7	SSC 6372 F_1	Shamrock Seed Co.	4.3	70	1.2	43	0.7	1.7
8	XON 303Y	Sakata Seed	5.6	63	0.9	29	0.9	1.5
9	XON-403Y	Sakata Seed	5.5	62	1.8	28	0.8	2.4
10	XON-204Y	Sakata Seed	3.9	75	1.4	42	0.8	1.9
11	XON-202Y	Sakata Seed	8.7	66	2.4	22	0.7	2.2
12	Var. No. 15094	Dessert Seed LLC	6.1	76	2.3	34	0.7	1.3
13	Var. No. 108101	Dessert Seed LLC	6.5	61	1.0	19	0.8	1.9
14	Var. No. 15082	Dessert Seed LLC	7.9	59	0.9	33	0.8	2.0
15	Var. No. 34140	Dessert Seed LLC	6.7	74	1.8	41	0.9	2.1
16	Var. No. 15085	Dessert Seed LLC	6.1	73	3.1	30	0.7	1.1
17	Var. No. 128101	Dessert Seed LLC	6.0	73	2.3	37	0.6	1.6
18	Var. No. 114101	Dessert Seed LLC	10.4	63	2.5	19	0.7	2.0
19	Var. No. 105101	Dessert Seed LLC	5.5	95	0.9	59	0.7	1.5
20	WI-102	Wannamaker Seeds	4.9	74	0.8	35	0.7	1.5
21	WI-129	Wannamaker Seeds	5.3	68	1.4	35	0.7	1.4
22	WI-131	Wannamaker Seeds	4.2	66	1.8	28	0.8	1.7
23	WI-609	Wannamaker Seeds	4.9	57	1.4	24	0.7	1.6
24	WI-3115	Wannamaker Seeds	5.7	52	3.4	24	0.8	1.5
25	EX 07542008	Seminis	7.6	83	0.6	57	0.8	1.1
26	EX 07542007	Seminis	4.4	81	0.6	53	0.7	1.2
27	Granex 33	Seminis	6.6	63	1.5	29	0.8	1.9

28	Candy	Seminis	3.8	61	1.4	27	0.8	1.6
29	Pegasus	Seminis	9.2	65	2.2	23	0.7	1.6
30	Granex Yellow PRR	Seminis	7.2	71	1.8	32	0.7	2.2
31	Century	Seminis	7.7	47	1.9	13	0.7	1.6
32	Savannah Sweet	Seminis	6.5	68	1.7	27	0.8	1.8
33	HSX-18201 F-1	Hortag Seed	6.6	73	1.7	28	1.0	1.5
34	HSX-19406 F-1	Hortag Seed	8.1	65	1.7	18	0.7	1.8
35	HSX-61304 F-1	Hortag Seed	13.6	44	1.6	9	0.8	1.6
36	Georgia Boy	D. Palmer Seed	5.8	85	0.7	59	0.7	2.2
37	DPS 1290	D. Palmer Seed	6.9	68	2.3	24	0.7	1.8
38	Ohoopee Sweet	D. Palmer Seed	4.4	83	1.2	57	1.1	2.4
39	Mr. Buck	D. Palmer Seed	4.2	87	0.8	62	0.7	2.4
40	Southern Belle	D. Palmer Seed	4.2	78	1.5	58	0.8	1.9
41	Sweet Advantage	D. Palmer Seed	4.2	72	1.8	48	0.7	1.6
42	Sapelo Sweet	D. Palmer Seed	5.4	77	2.0	38	0.8	1.9
43	SR1001	Nunhems	6.7	66	1.7	34	0.7	1.4
44	Sweet Melody	Nunhems	4.5	88	1.5	61	0.7	1.7
45	Nirvana	Nunhems	4.0	74	1.5	48	0.7	2.0
46	Sweet Vidalia	Nunhems	4.5	92	1.4	65	0.7	2.0
47	1200	Nunhems	6.6	68	2.9	35	0.9	1.0
48	Serengeti 1202	Nunhems	3.3	85	1.1	65	1.0	1.1
49	Gobi 1201	Nunhems	5.8	83	1.6	55	1.0	1.1
		CV	26%	18%	71%	35%	14%	23%
		Fisher's Protected LSD (p=0.05) w/Bonferroni adj.	2.8	23	NS	23	0.2	0.7

Table 5. Evaluation of Vidalia onion varieties for doubles, seedstems, disease, and yield, 2005-2006.

				Counted on					
				3/30/06		4/26/06			
No.	Entry	Company	Harvest Date	Doubles (No./plot)	Seedstems (No./plot)	Center-Rot (Pantoea) (No./plot)	Field Yield (50 lb bag/acre)	Jumbos (50 lb bag/acre)	Mediums (50 lb bag/acre)
1	FS 2005	Solar Seed	04/10/06	16.3	0.5		976	744	28
2	FS 2011	Solar Seed	04/17/06	13.1	4.4		1192	945	11
3	Sapelo Sweet	D. Palmer Seed	04/25/06	38.2	2.7		1004	741	22
4	Georgia Boy	D. Palmer Seed	05/01/06	32.4	0.6	7.1	1149	827	7
5	Ohoopee Sweet	D. Palmer Seed	05/01/06	5.7	0.0	9.7	1000	665	9
6	Mr. Buck	D. Palmer Seed	05/01/06	3.7	0.4	5.3	1014	835	8
7	Miss Megan (DPS 1290)	D. Palmer Seed	05/04/06	5.1	0.6	6.8	1090	625	6
8	Yel. Granex 15082	Dessert Seed	04/25/06	6.1	3.2		1078	817	6
9	Yel. Granex 108101	Dessert Seed	05/04/06	2.8	1.9	12.2	1090	837	4
10	Yel. Granex 15094	Dessert Seed	05/04/06	6.3	9.7	28.2	1137	686	4
11	Yel. Granex 105101	Dessert Seed	05/01/06	3.7	3.6	22.0	1073	922	4
12	Yel. Granex 126101	Dessert Seed	05/01/06	2.5	4.7	14.7	1028	612	3
13	Yel. Granex 129101	Dessert Seed	05/01/06	3.1	2.4	13.5	1141	955	4
14	Yel. Granex 114101	Dessert Seed	05/01/06	5.4	2.5	8.9	1131	738	4
15	Yel. Granex 15085	Dessert Seed	04/25/06	2.1	2.6		916	815	4
16	Caramelo (SRO 1000)	Nunhems	05/01/06	5.8	0.2	16.8	1051	792	6
17	Sweet Vidalia	Nunhems	04/25/06	18.2	9.1		1253	868	3
18	Sweet Caroline (SXO 1001)	Nunhems	05/04/06	3.2	0.2	18.9	1215	353	1
19	Nirvana	Nunhems	04/25/06	3.5	0.0		1268	883	1
20	HSX-61304	Hortag Seed	05/04/06	3.2	1.2	22.0	954	342	7
21	Sweet Jasper (XON-202Y)	Sakata Seed	05/04/06	5.4	3.2	18.8	1228	559	1

22	Ponderosa (XON 303Y)	Sakata Seed	05/01/06	7.3	0.6		1063	558	3
23	XON-403Y	Sakata Seed	05/01/06	12.5	1.5	19.4	1208	768	3
24	XON-203Y	Sakata Seed	04/25/06	9.9	1.6		1146	873	1
25	XON-204Y	Sakata Seed	04/25/06	4.5	1.8		1046	767	3
26	WI-129	Wannamaker	04/17/06	36.5	1.0		1216	711	6
27	WI-131	Wannamaker	04/17/06	32.8	3.3		1163	765	17
28	DY 606	Shaddy	04/17/06	13.4	0.4		1279	643	2
29	DY 72766	Shaddy	04/10/06	16.0	3.4		1051	824	18
30	SSC 1535 F1	Shamrock	04/17/06	24.8	0.8		918	559	17
31	Honeycomb (SSC 6372)	Shamrock	04/17/06	12.1	2.5		814	507	42
32	Honeybee (SSC 33076)	Shamrock	04/10/06	21.1	2.1		1155	878	7
33	Sugar Belle	Shamrock	04/25/06	10.7	1.4		995	694	1
34	J 3001	Bejo Seed	04/25/06	2.6	2.0		1104	784	1
35	J 3002	Bejo Seed	05/04/06	1.7	0.0	30.5	1055	242	1
36	Granex Yellow PRR	Seminis	05/01/06	29.6	14.9	29.3	1037	738	12
37	XP 07542007	Seminis	04/25/06	9.3	0.7		976	705	5
38	Pegasus	Seminis	05/04/06	3.1	4.1	30.4	1110	396	1
39	Granex 33	Seminis	05/04/06	8.1	1.6	23.2	1147	413	1
40	Century	Seminis	05/04/06	2.0	1.1	23.1	1259	375	3
41	Savannah Sweet	Seminis	05/01/06	1.3	0.4	30.3	1162	866	2
42	XP Red	Seminis	05/04/06	1.8	0.0		536	460	26
		Coefficient of Variation		28%	34%	26%	11%	23%	90%
		Fisher's Protected LSD (p=0.05) w/Bonferroni adj.		2.0	0.4	3.7	227	299	13

Table 6. Variety evaluation for pyruvate, sugar, height/width ratio, and bulb centers.

No.	Entry	Company	Pyruvate (umoles/gfw)	Sugar (%)	Height/Width Ratio	Centers (No./bulb)
1	FS 2005	Solar Seed	2.9	8.6	0.84	1.3
2	FS 2011	Solar Seed	3.3	7.8	0.80	1.6
3	Sapelo Sweet	D. Palmer Seed	4.9	9.7	0.74	1.2
4	Georgia Boy	D. Palmer Seed	5.1	9.9	0.75	1.4
5	Ohoopee Sweet	D. Palmer Seed	6.3	11.6	0.84	2.0
6	Mr. Buck	D. Palmer Seed	5.2	9.7	0.73	2.1
7	Miss Megan (DPS 1290)	D. Palmer Seed	4.9	9.5	0.74	1.6
8	Yel. Granex 15082	Dessert Seed	5.7	9.0	0.67	1.0
9	Yel. Granex 108101	Dessert Seed	5.0	9.7	0.70	1.6
10	Yel. Granex 15094	Dessert Seed	4.7	9.3	0.68	1.3
11	Yel. Granex 105101	Dessert Seed	4.5	9.4	0.65	1.4
12	Yel. Granex 126101	Dessert Seed	4.5	9.2	1.00	1.7
13	Yel. Granex 129101	Dessert Seed	4.4	8.7	0.69	1.2
14	Yel. Granex 114101	Dessert Seed	5.0	8.7	0.77	1.3
15	Yel. Granex 15085	Dessert Seed	4.2	8.5	0.71	1.1
16	Caramelo (SRO 1000)	Nunhems	4.4	9.1	0.66	1.3
17	Sweet Vidalia	Nunhems	4.9	9.5	0.66	1.2
18	Sweet Caroline (SXO 1001)	Nunhems	4.3	9.4	0.63	1.1
19	Nirvana	Nunhems	4.6	9.5	0.77	1.0
20	HSX-61304	Hortag Seed	5.4	9.5	0.66	2.0
21	Sweet Jasper (XON-202Y)	Sakata Seed	4.0	10.5	0.69	2.0
22	Ponderosa (XON 303Y)	Sakata Seed	6.0	8.5	0.79	1.4
23	XON-403Y	Sakata Seed	4.8	8.4	0.77	1.6
24	XON-203Y	Sakata Seed	4.2	8.5	0.72	1.4
25	XON-204Y	Sakata Seed	4.9	9.2	0.77	1.8

26	WI-129	Wannamaker	3.0	8.6	0.84	1.3
27	WI-131	Wannamaker	3.2	7.9	0.85	1.3
28	DY 606	Shaddy	3.0	7.8	0.85	1.1
29	DY 72766	Shaddy	2.8	8.7	0.79	1.2
30	SSC 1535 F_1	Shamrock	3.5	9.7	0.64	1.3
31	Honeycomb (SSC 6372)	Shamrock	3.5	9.7	0.72	1.2
32	Honeybee (SSC 33076)	Shamrock	3.8	8.6	0.76	1.0
33	Sugar Belle	Shamrock	5.4	9.2	0.67	1.6
34	J 3001	Bejo Seed	4.9	8.8	0.72	1.3
35	J 3002	Bejo Seed	4.7	9.6	0.66	1.7
36	Granex Yellow PRR	Seminis	5.1	9.7	0.62	1.8
37	XP 07542007	Seminis	4.6	9.5	0.73	1.1
38	Pegasus	Seminis	4.6	9.5	0.65	1.5
39	Granex 33	Seminis	5.2	9.9	0.69	1.9
40	Century	Seminis	3.8	9.4	0.68	1.4
41	Savannah Sweet	Seminis	4.9	8.3	0.73	2.1
42	XP Red	Seminis	5.2	11.5	0.78	1.3
		Coefficient of Variation	15%	8%	6%	21%
		Fisher's Protected LSD (p=0.05) w/Bonferroni adj.	1.2	1.4	0.08	0.5