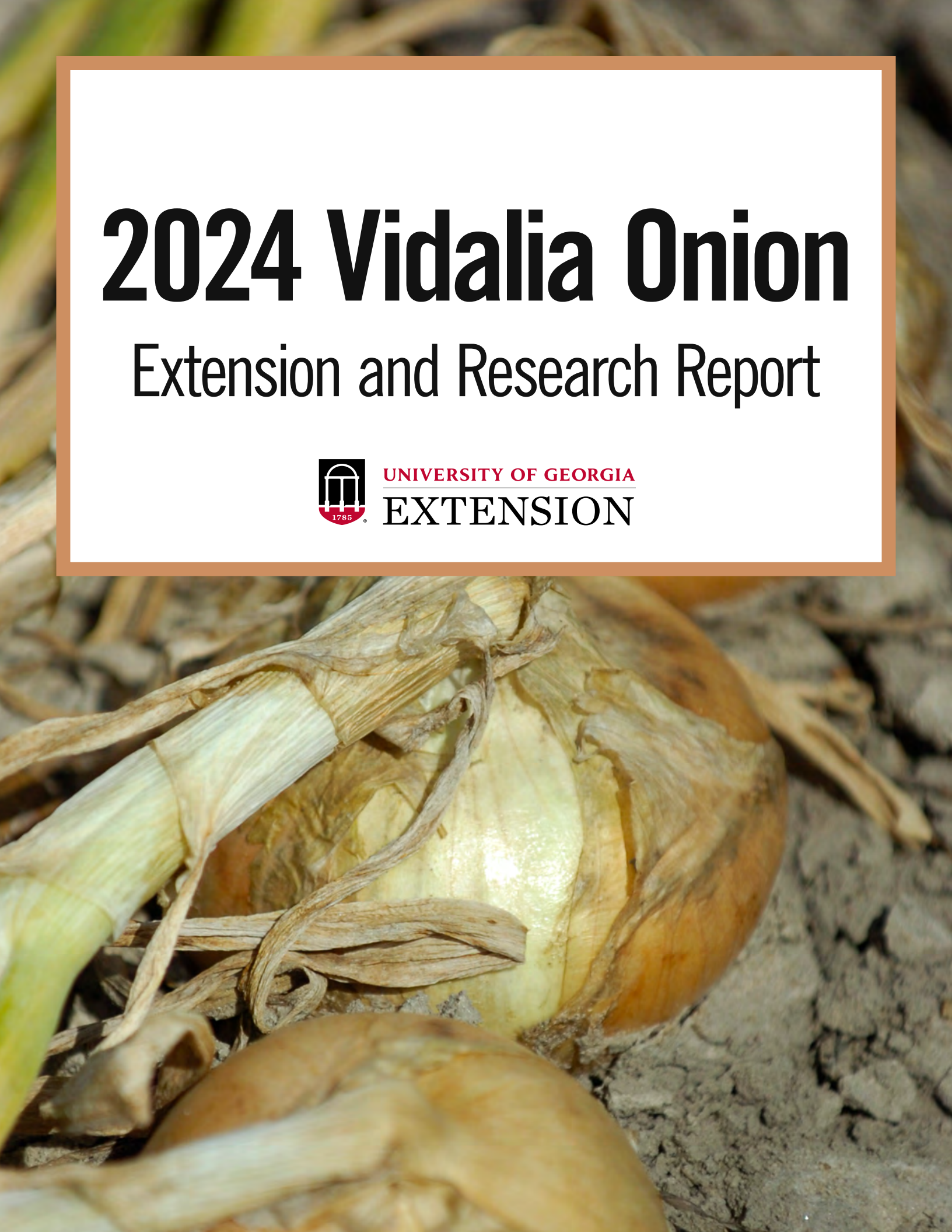

2024 Vidalia Onion

Extension and Research Report

UNIVERSITY OF GEORGIA
EXTENSION

2024 University of Georgia Vidalia Onion Extension and Research Report

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Vidalia Onion Extension and Research Report Contents

UGA Vidalia Onion Variety Trial 2021–2022 Crop Season

Chris Tyson, Ted McAvoy, Jason Edenfield, Aubrey Shirley, Derrick Brown, Denny Thigpen, Daniel Clark, Steven Powell, Savannah Tanner, and Ross Green

Introduction

The University of Georgia (UGA) evaluates short day onion varieties to determine their performance characteristics in standardized growing practices. Variety entries for the trial are submitted by participating seed companies. These trials are conducted at the Vidalia Onion and Vegetable Research Center (VOVRC) located in Lyons, GA.

Materials and Methods

There were 52 varieties entered into the 2021–2022 UGA onion variety trial. After seed entries were received, seedbeds were grown for transplant production by UGA staff at the research center. Preplant seedbed treatment included a 75 gallon per acre fumigation treatment of metam sodium for weed and disease suppression.

The seedbeds were planted on September 27, 2021, and the trial was transplanted on December 1, 2021. Upon harvest and grading, yield measurements were taken, and a sample of 10 jumbo onion bulbs per plot were sent to the UGA Crop Quality Laboratory in Athens, GA, to undergo flavor testing. Seedbed and trial fertility, as well as fungicide programs, are listed here.

Each plot was 20 ft long by 6 ft wide, containing 240 bulbs. Treatments were replicated four times, and each variety was harvested based on a committee decision of maturity. The transplant population for the trial was equivalent to 87,120 plants per acre.

Seedbed Fertility:

- 400 lb/acre of 10-10-10 applied Sept. 23, 2021 (preplant incorporated)
- 200 lb/acre of 10-10-10 applied Oct. 12, 2021
- 200 lb/acre of 10-10-10 applied Oct. 21, 2021
- 200 lb/acre of 10-10-10 applied Nov. 9, 2021
- 100 lb/acre of calcium nitrate applied Nov. 9, 2021

Total pounds/acre applied:
115.5 (N) – 100 (P) – 100 (K) – 120 (S)

Seedbed Pesticides Applied:

Date	Product Applied
Aug. 11, 2021	Vapam HL (75 gallons/acre)
Sept. 23, 2021	Lorsban (1 quart/acre) preplant incorporated
Sept. 28, 2021	Dacthal (4 pints/acre)
Oct. 29, 2021	Roper (3 lb/acre) + Kocide 3000 (0.75 lb/acre) + Lifegard WG (2 oz/acre)
Nov. 9, 2021	Roper (3 lb/acre) + Kocide 3000 (0.75 lb/acre) + Lifegard WG (2 oz/acre)

Trial Fertility:

- 150 lb/acre of 5-10-15 applied Dec. 15, 2021
- 300 lb/acre of 5-10-15 applied Jan. 6, 2022
- 500 lb/acre of 5-10-15 applied Jan. 27, 2022
- 215 lb/acre of calcium nitrate applied Feb. 16, 2022

Total pounds/acre applied:
80.825 (N) – 95 (P) – 142.5 (K) – 28.5 (S)

Note: Soil sample test results called for 125–150 lb/acre nitrogen, 60 lb/acre of phosphorus, 90 lb/acre of potash, and 40–60 lb/acre of sulfur. All fertilizer applications were applied with a First Products brand drop spreader. Two tons/acre of poultry litter was applied and incorporated to the fallow field in the late spring of 2021.

Fungicides Applied:

Date	Fungicide Applied
Jan. 7, 2022	Bravo (3 pints/acre) + Roper (3 lb/acre) + Kocide 3000 (0.75 lb/acre) + Merivon (11 oz/acre)
Jan. 14, 2022	Bravo (3 pint/acre) + Inspire Super (20 oz/acre)
Jan. 27, 2022	Bravo (3 pints/acre) + Pristine (18.5 oz/acre) + Magna-Bon (10 oz/acre)
Feb. 3, 2022	Quadris Top (14 oz/acre) + Kocide 3000 (1.5 lb/acre) + Roper (3 lb/acre)
Feb. 9, 2022	Omega 500 (1 pint/acre) + Miravis Prime (11.4 oz/acre)
Feb. 18, 2022	Bravo (3 pints/acre) + Kocide 3000 (1.5 lb/acre) + Merivon (11 oz/acre)
Feb. 23, 2022	Bravo (3 pints/acre) + Quadris Top (14 oz/acre) + Lifegard (2 oz/acre)
Mar. 4, 2022	Omega 500 (1 pint/acre) + Kocide 3000 (1.5 lb/acre)
Mar. 17, 2022	Miravis Prime (11.4 oz/acre) + Lifegard (2 oz/acre)

Insecticides Applied:

Date	Product Applied
Oct. 15, 2021	Lorsban (1 quart/acre)
Mar. 4, 2022	Radiant (10 oz/acre)
Mar. 17, 2022	Torac (24 oz/acre)

Herbicides Applied:

Date	Product Applied
Dec. 2, 2021	Goal 2XL (1 quart/acre) + Prowl (1 quart/acre)

Harvest Timing

Each variety was selected for harvest based upon signs of weak tops and/or adequately sized bulbs. A committee of Extension agents determined the harvest/pulling of varieties. Participating seed companies reserve the right to specify when or what characteristics determine the harvest of their variety. Varieties were clipped 7 days after their dig date. Growing degree days (GDDs) aid us in forecasting harvest maturity for onions. A base temperature of 50 °F is used in formulating GDDs accumulated.

Variety	Maturity	Planting date	Dig date	Days after transplanting to digging	GDD 50 °F base
Candy Ann, Candy Joy, Fast Track, Quick Start, DP 1407, Nunhems 1011	Very Early	Dec. 1, 2021	Mar. 29, 2022	118	888
Candy Kim, New Frontier, Early Sweet, Sakata 404, Dulciana, Vulkana, Vidora, OSYF12-7091, OSYF10-4021	Early	Dec. 1, 2021	Apr. 5, 2022	125	994
WI-129, Sweet Agent, Alba Blanca, Red Maiden, Pirate, Tania, Red Marvel, Red Sensation, Maragogi, 369, Timon, Sapelo, Rio Del Sol, Rio Dulce, Sofire, Plethora, Joelino, A1298	Medium	Dec. 1, 2021	Apr. 13, 2022	133	1103
Emmy 55843, Emy 55126, Emy 55455, Emy 55457, PRR, Sweet Magnolia, Century, Sweet Azalea, Alison, Lucille, White Phantom, GA Boy, White Gaspare, Superex, Mata Hari, Sivan	Med-Late	Dec. 1, 2021	Apr. 20, 2022	140	1209
Macon, Nunhems 5901, Chianti	Late	Dec. 1, 2021	Apr. 28, 2022	148	1358

Results and Discussion

The following tables show field weights, marketable yields, colossal yields, jumbo yields, medium yields, and cull yields. For additional information, please contact your Extension agent or the Vidalia Onion and Vegetable Research Center. We would like to thank the participating seed companies as well as the Vidalia Onion Committee for their support of this trial.

Variety Entries in the 2021—2022 Trial

Variety name	Company	Type	Maturity Class
Candy Ann*	Solar	Yellow Granex	Very Early
Candy Joy*	Solar	Yellow Granex	Very Early
Candy Kim*	Solar	Yellow Granex	Early
New Frontier*	Wannamaker	Yellow Granex	Early
WI-129*	Wannamaker	Yellow Granex	Medium
Fast Track*	Vilmorin-Mikado	Yellow Granex	Very Early
Quick Start*	Vilmorin-Mikado	Yellow Granex	Very Early
Emy 55126*	Emerald	Yellow Granex	Med-Late
Emy 55455*	Emerald	Yellow Granex	Med-Late
Emy 55457	Emerald	Yellow Granex	Med-Late
Emy 55843	Emerald	Yellow Granex	Med-Late
Sweet Agent*	Seminis	Yellow Granex	Medium
Century*	Seminis	Yellow Granex	Med-Late
PRR*	Seminis	Yellow Granex	Med-Late
Sweet Azalea*	Seminis	Yellow Granex	Med-Late
Sweet Magnolia*	Seminis	Yellow Granex	Med-Late
Maragogi	Bejo	Yellow Granex	Medium
Pirate*	Bejo	Yellow Granex	Medium
Tania*	Bejo	Yellow Granex	Medium
369*	Bejo	Yellow Granex	Medium
Alison*	Bejo	Yellow Granex	Med-Late
Macon*	Bejo	Yellow Granex	Late
DP 1407*	DP Seeds	Yellow Granex	Very Early
Early Sweet	DP Seeds	Yellow Granex	Early
Sapelo*	DP Seeds	Yellow Granex	Medium
Georgia Boy*	DP Seeds	Yellow Granex	Med-Late
Superex*	American Takii	Yellow Granex	Med-Late
Nunhems 1011	Nunhems	Yellow Granex	Very Early
Vidora*	Nunhems	Yellow Granex	Early
Plethora*	Nunhems	Yellow Granex	Medium
Nunhems 5901	Nunhems	Yellow Granex	Late
404	Sakata	Yellow Granex	Early
A1298	Hazera	Yellow Granex	Medium
OSYF10-4021	Crookham	Yellow Granex	Early
OSYF12-7091	Crookham	Yellow Granex	Early

*Official Vidalia approved variety for 2021–2022 season.

continued on next page

Variety name	Company	Type	Maturity Class
Timon	DP Seeds	Yellow Grano	Medium
Rio Del Sol	American Takii	Yellow Grano	Medium
Rio Dulce	American Takii	Yellow Grano	Medium
Dulciana	Nunhems	Yellow Grano	Early
Vulkana	Nunhems	Yellow Grano	Early
Joelino	Hazera	Yellow Grano	Medium
Alba Blanca	Seminis	White	Medium
White Phantom	DP Seeds	White	Med-Late
White Gaspare	DP Seeds	White	Med-Late
Sivan	Hazera	Pink/Red	Med-Late
Red Maiden	Seminis	Red	Medium
Red Marvel	Bejo	Red	Medium
Red Sensation	Bejo	Red	Medium
Lucille	DP Seeds	Red	Med-Late
Chianti	DP Seeds	Red	Late
Sofire	Nunhems	Red	Medium
Mata Hari	Nunhems	Red	Med-Late

*Official Vidalia approved variety for 2021–2022 season.

Table 1. Vidalia Onion Field Weight (40-lb Boxes Per Acre) Measured Before Grading.

Variety	40 lb boxes/acre	
Macon	1804	a
Sweet Magnolia	1717	ab
Superex	1713	ab
Sweet Azalea	1686	abc
5901	1682	abc
Century	1645	abcd
Alison	1627	bcde
EMY 55455	1620	bcde
EMY 55457	1591	bcde
Sweet Agent	1579	bcde
EMY 55843	1579	bcde
WI-129	1545	cde
GA Boy	1531	cde
Mata Hari	1521	cdef
PRR	1483	defg
Pirate	1472	efgh
Rio Dulce	1463	efgh
EMY 55126	1457	efgh
Alba Blanca	1432	efgh
Sofire	1432	efgh
Chianti	1428	efgh
Tania	1403	efghi
Lucille	1400	efghi
Plethora	1392	efghi
New Frontier	1361	efghi
369	1361	efghij

Variety	40 lb boxes/acre	
A1928	1352	fghij
Vidora	1351	fghij
Sivan	1350	fghij
Maragogi	1336	ghij
Rio Del Sol	1280	hij
Joelino	1271	hijk
Candy Kim	1213	ijkl
404	1213	ijkl
Early Sweet	1210	ijkl
Red Marvel	1200	ijkl
Timon	1198	ijkl
White Gaspare	1196	ijkl
Sapelo	1191	ijkl
Red Sensation	1176	ijkl
Red Maiden	1175	jkl
OSYF10-4021	1145	jkl
Vulkana	1133	jklm
Dulciana	1132	jklm
Fast Track	1116	jklm
Candy Ann	1101	jklm
1407	`099	jklm
OSYF12-07091	1089	klm
Quick Start	1052	lm
Candy Joy	1049	lm
1011	929	mn
White Phantom	859	n

Note. Letters that are the same between varieties indicate that those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 2. Vidalia Onion Marketable Yield (40-lb Boxes Per Acre) Measured After Grading.

Variety	Total yield 40 lb boxes/acre	
Macon	1740	a
5901	1627	ab
Superex	1620	ab
Sweet Magnolia	1604	ab
Sweet Azalea	1568	ab
EMY 55455	1538	b
Century	1528	b
EMY 55457	1511	bc
EMY 55843	1493	bcd
Alison	1488	bcd
Sweet Agent	1461	bcde
WI-129	1459	bcde
GA Boy	1454	bcde
Mata Hari	1451	bcde
Rio Dulce	1432	bcdef
Alba Blanca	1416	bcdef
Pirate	1411	bcdefg
EMY 55126	1395	bcdefg
Chianti	1388	bcdefg
Sofire	1368	bcdefg
PRR	1361	bcdefg
Plethora	1354	bcdefgh
Tania	1350	bcdefgh
369	1332	bcdefghi
Vidora	1311	defghi
Maragogi	1309	defghi
Lucille	1295	defghi
Sivan	1257	efghi
Rio Del Sol	1248	efghi
Joelino	1241	efghi
Timon	1193	fghij
New Frontier	1173	ghij
Red Sensation	1170	ghij
404	1148	hij
Red Maiden	1139	hij
White Gaspare	1121	hij
Red Marvel	1101	hijk
Candy Kim	1087	hijk
Vulkana	1079	hijk
Sapelo	1075	ijk
Dulciana	1075	ijk
Early Sweet	1069	ijk
Candy Ann	1048	ijk
Fast Track	1025	ijkl
OSYF10-4021	1021	ijkl
Candy Joy	987	jkl
1407	980	jkl
OSYF12-07091	964	jklm
Quick Start	914	klm
1011	830	lm
White Phantom	767	m

Note. Letters that are the same between varieties indicate that those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 3. Vidalia Onion Colossal Yield (40-lb Boxes Per Acre) Measured After Grading.

Variety	Total yield 40 lb boxes/acre	
Macon	517	a
Sweet Magnolia	309	b
Sweet Azalea	297	bc
Sweet Agent	270	bcd
Century	218	bcde
Superex	216	bcde
EMY 55126	196	bcde
EMY 55455	195	bcde
5901	172	cdef
GA Boy	149	defg
WI-129	157	defg
EMY 55457	141	efgh
EMY 55843	123	efgh
Alison	116	efgh
PRR	100	efgh
Lucille	100	efgh
Chianti	95	efgh
Pirate	93	efgh
Vidora	91	efgh
Red Sensation	73	efgh
Sofire	64	efgh
Mata Hari	63	efgh
OSYF10-4021	59	efgh
Maragogi	54	efgh
Plethora	50	efgh
Sivan	48	efgh
New Frontier	45	efgh
Rio Dulce	41	efgh
404	41	efgh
Early Sweet	34	efgh
Candy Kim	27	efgh
Quick Start	27	efgh
Rio Del Sol	27	efgh
Timon	25	efgh
369	24	ef
Joelino	23	fgh
OSYF12-07091	23	gh
1407	20	gh
A1298	20	gh
Sapelo	18	gh
Red Marvel	17	gh
White Phantom	14	gh
Tania	9	gh
Candy Ann	7	h
Fast Track	7	h
Alba Blanca	5	h
Red Maiden	5	h
White Gaspare	5	h
Candy Joy	2	h
Dulciana	0	h
Vulkana	0	h
1011	0	h

Note. Letters that are the same between varieties indicate that those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 4. Vidalia Onion Jumbo Yield (40-lb Boxes Per Acre) Measured After Grading.

Variety	Total yield 40 lb boxes/acre	
5901	1402	a
Superex	1388	ab
Rio Dulce	1359	ab
EMY 55843	1350	abc
Alba Blanca	1345	abc
Alison	1341	abc
EMY 55457	1329	abcd
Mata Hari	1327	abcd
Tania	1309	abcd
EMY 55455	1305	abcd
Century	1298	abcd
Pirate	1282	abcd
GA Boy	1266	abcde
WI-129	1259	abcde
Sweet Magnolia	1259	abcde
Plethora	1254	abcdef
Sweet Azalea	1252	abcdef
Sofire	1248	abcdef
Chianti	1223	abcdef
PRR	1216	abcdef
Maragogi	1212	abcdefg
369	1211	abcdefgh
A1298	1198	bcdefgh
Macon	1191	bcdefgh
EMY 55126	1143	cdefgh
Sweet Agent	1132	defgh
Lucille	1121	defgh
Vidora	1121	defgh
Joelino	1096	defghi
Rio Del Sol	1062	efghi
Sivan	1055	fghi
New Frontier	1039	fghi
Red Sensation	1014	fghij
Red Marvel	998	ghij
404	978	hij
Sapelo	966	hij
Red Maiden	957	hijk
Timon	954	hijkl
White Gaspare	942	hijkl
Candy Kim	939	hijkl
Vulkana	913	hijkl
Dulciana	912	hijkl
Fast Track	883	ijkl
Early Sweet	876	ijkl
Candy Ann	871	ijkl
OSYF10-4021	808	jkl
Candy Joy	785	mjkl
1407	774	mjkl
OSYF12-07091	762	mkl
Quick Start	726	ml
White Phantom	608	mn
1011	517	n

Note. Letters that are the same between varieties indicate that those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 5. Vidalia Onion Medium Yield (40-lb Boxes Per Acre) Measured After Grading.

Variety	Medium yield 40 lb boxes/acre	
1011	313	a
Timon	216	b
Candy Joy	200	b
1407	186	b
OSYF12-07091	179	b
Red Maiden	177	bc
White Gaspare	175	bc
Vulkana	171	bc
Candy Ann	170	bc
Dulciana	163	bc
Quick Start	161	bc
Early Sweet	159	bc
Rio Del Sol	159	bc
Sivan	154	bc
OSYF10-4021	154	bc
White Phantom	145	bcd
Fast Track	136	bcde
404	129	bcde
Joelino	123	bcdef
Candy Kim	120	bcdef
A1298	104	bcdef
Vidora	100	bcdef
369	94	bcdefg
Sapelo	93	cdefg
New Frontier	88	cdefg
Red Marvel	84	cdefg
Red Sensation	84	cdefg
Lucille	75	defg
Chianti	70	defg

Variety	Medium yield 40 lb boxes/acre	
Alba Blanca	66	efg
Mata Hari	60	efg
Sweet Agent	59	efg
Sofire	57	efg
EMY 55126	56	efg
5901	52	efg
Plethora	50	efg
PRR	45	fg
WI-129	43	fg
Maragogi	43	fg
EMY 55457	41	fg
EMY 55455	39	fg
Sweet Magnolia	36	fg
Pirate	36	fg
Tania	32	fg
Macon	32	fg
Alison	32	fg
Rio Dulce	32	fg
GA Boy	29	fg
EMY 55843	20	g
Sweet Azalea	18	g
Superex	16	g
Century	12	g

Note. Letters that are the same between varieties indicate that those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 6. Vidalia Onion Cull Weights (40-lb Boxes Per Acre) Measured After Grading.

Variety	Cull weights 40 lb boxes/acre	
New Frontier	188	a
Early Sweet	142	ab
Alison	142	ab
Quick Start	137	ab
Candy Kim	126	ab
OSYF12-07091	125	ab
OSYF10-4021	124	ab
PRR	121	ab
1407	119	ab
Sweet Agent	118	ab
Sweet Azalea	118	ab
Century	117	ab
Sweet Magnolia	113	ab
Sapelo	113	ab
Lucille	104	ab
1011	99	ab
Red Marvel	96	ab
Superex	93	ab
Sivan	93	ab
White Phantom	92	ab
Fast Track	91	ab
WI-129	86	ab
EMY 55455	82	ab
EMY 55457	81	ab
EMY 55843	78	ab
GA Boy	77	ab
White Gaspare	75	ab
Mata Hari	66	ab
404	65	ab
Macon	64	ab
Sofire	64	ab
EMY 55126	62	ab
Candy Joy	62	ab
Pirate	61	ab
Vulkana	57	ab
Dulciana	57	ab
Tania	56	ab
5901	56	ab
Candy Ann	53	ab
Chianti	40	ab
Vidora	40	ab
Red Maiden	36	ab
Plethora	34	ab
Joelino	34	ab
Rio Del Sol	32	ab
Rio Dulce	32	ab
A1298	29	ab
Maragogi	27	ab
369	25	ab
Alba Blanca	16	b
Timon	9	b
Red Senation	8	b

Note. Letters that are the same between varieties indicate that those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

UGA Variety Trial Quality Report 2021–2022 Crop Season

Jason Lessl, Daniel Jackson, Chris Tyson, Jason Edenfield, Ross Greene, Aubrey Shirley, Derrick Bowen, Denny Thigpen, Steven Powell, Savannah Tanner, Daniel Clark

Introduction

Each season the University of Georgia, Agricultural and Environmental Services Laboratories (AESL) evaluates the flavor-associated compounds in the short-day onions grown in the variety trial. These onion varieties are submitted by the participating seed companies, grown at the Vidalia Onion and Vegetable Research Center (VOVRC), and once they are harvested and dried, they are submitted to the AESL for analysis of the pungency- related compounds: pyruvic acid, lachrymatory factor (LF), and methyl thiosulfinates. Due to the association of Vidalia onions with low pungency and sweet flavor, this annual evaluation provides useful information about the relative flavor quality of these onion varieties. Furthermore, results are used to evaluate yellow Granex varieties before officially qualifying them to be grown as sweet Vidalia onions in the region.

This publication summarizes the flavor analysis results from the 2021–2022 growing season, as well as compares the performance of each variety over the past three growing seasons.

Materials and Methods

There were 53 onion varieties analyzed as part of the 2021–2022 variety trial. Each variety was grown at the VOVRC in quadruplicate plots. Harvested onions from each plot were dried and submitted to the lab individually. Cores taken from 10 onions within each replicate were composited and pressed to collect the onion juice, analyzed following procedures described in Kim et al. (2017).

Results and Discussion

The following tables compare the concentrations of flavor-associated compounds in onions grown as a part of the 2021–2022 variety trial. It should be noted that as the three measured parameters decrease, the onions are considered to have a more superior flavor quality. In this year's trials, the pyruvic acid (pungency) content ranged from 3.7–7.4 µmol/ml, which is an increase of 32% compared to the past two growing seasons. Lachrymatory factor ranged from 2.9–6.7 µmol/ml, which was an increase of 43% compared to past two seasons. Finally, methyl thiosulfinates ranged from 8.0–42 nmol/ml, which was a slight increase of 8% compared with the past two growing season. Overall, the pungency of the variety trial onions was approximately 30% higher as compared to the past two seasons. This could be attributed to the hotter, drier growing season. The cumulative variety flavor quality rankings are also provided below for this year's data along with the average rating of yellow Granex onion varieties grown over the past three seasons. For additional information regarding the performance of a given variety, please contact your Extension agent or the Vidalia Onion and Vegetable Research Center. We would like to thank the participating seed companies as well as the Vidalia Onion Committee for their support of this trial.

References

Kim, H.-Y., Jackson, D., Adhikari, K., Riner, C., & Sanchez-Brambila, G. (2017). Relationship between consumer acceptability and pungency-related flavor compounds of Vidalia onions. *Journal of Food Science, 82*(10), 2396–2402. https://doi.org/10.1111/1750-3841.13915

Table 1. Pungency (Pyruvic Acid) Content in Onions in the 2021–2022 Variety Trial.

Variety	Pyruvic ccid µmole/g	
New Frontier	3.8	a
Candy Kim	4.0	ab
Vidora	4.2	abc
WI-129	4.3	abc
Plethora	4.5	abcd
Sweet Magnolia	4.5	abcd
White Phantom	4.6	abcde
Sivan	4.6	abcde
Sweet Agent	4.7	abcde
Candy Joy	4.7	abcde
Red Sensation	4.7	abcde
Sweet Azalea	4.8	abcde
GA Boy	4.8	abcde
Sofire	4.9	abcde
Fast Track	5.0	abcde
Vulkana	5.0	abcde
DP 1407	5.0	abcde
NUN 5901	5.1	abcdef
Macon	5.1	abcdef
Maragogi	5.2	abcdef
Alison	5.2	abcdefg
Quick Start	5.2	abcdefg
Dulciana	5.2	abcdefg
Candy Ann	5.3	abcdefg
White Gaspare	5.3	abcdefg
OSYF12-7091	5.3	abcdefg
Superex	5.3	abcdefg
OSYF10-4021	5.4	abcdefg
369	5.4	abcdefg
Chianti	5.4	abcdefg
Red Marvel	5.4	abcdefg
Pirate	5.4	abcdefg
Early Sweet	5.4	abcdefg
404	5.5	abcdefg
EMY 55457	5.6	abcdefg
EMY 55455	5.6	abcdefg
NUN 1011	5.6	abcdefg
EMY 55126	5.7	abcdefg
Rio Dulce	5.7	abcdefg
Alba Blanca	5.8	abcdefg
Tania	5.9	bcdefg
Century	5.9	bcdefg
Rio Del Sol	6.0	bcdefg
A1298	6.1	bcdefg
PRR	6.2	cdefg
Mata Hari	6.2	cdefg
Red Maiden	6.3	cdefg
Timon	6.4	defg
Lucille	6.5	defg
Sapelo	6.6	efg
EMY 55843	7.2	fg
Joelino	7.4	g

Note. Similar letters between varieties indicate those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 2. Onion Lachrymatory Factor (Propanethial S-Oxide) Content in the 2021–2022 Variety Trial.

Variety	Lachrymatory factor µmole/g	
Candy Kim	2.9	a
Plethora	3.1	ab
Red Marvel	3.3	abc
Sweet Magnolia	3.3	abc
Sivan	3.3	abc
Sweet Azalea	3.6	abcd
Chianti	3.6	abcde
Red Sensation	3.6	abcde
Rio Dulce	3.7	abcdef
New Frontier	3.9	abcdef
Superex	3.9	abcdef
Sweet Agent	3.9	abcdef
Candy Joy	3.9	abcdef
Rio Del Sol	4.0	abcdef
Century	4.1	abcdefg
Macon	4.1	abcdefg
Maragogi	4.3	abcdefg
White Gaspare	4.3	abcdefg
White Phantom	4.3	abcdefg
Sapelo	4.3	abcdefg
NUN 5901	4.4	abcdefg
Quick Start	4.4	abcdefg
Fast Track	4.4	abcdefg
Candy Ann	4.4	abcdefg
Sofire	4.6	abcdefg
DP 1407	4.6	abcdefg
OSYF10-4021	4.6	abcdefg
Vidora	4.6	abcdefg
Timon	4.7	abcdefg
Vulkana	4.9	abcdefg
PRR	4.9	abcdefg
EMY 55126	5.0	abcdefg
Early Sweet	5.0	abcdefg
NUN 1011	5.1	abcdefg

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Variety	Lachrymatory factor µmole/g	
Dulciana	5.2	abcdefg
Mata Hari	5.2	abcdefg
EMY 55455	5.2	abcdefg
Alba Blanca	5.2	abcdefg
OSYF12-7091	5.2	abcdefg
A1298	5.3	abcdefg
Tania	5.4	abcdefg
Alison	5.4	abcdefg
WI-129	5.6	bcdefg
404	5.7	cdefg
EMY 55457	6.1	defg
369	6.1	defg
Joelino	6.2	defg
GA Boy	6.2	defg
Pirate	6.3	efg
EMY 55843	6.5	fg
Red Maiden	6.7	g
Lucille	6.8	g

Note. Similar letters between varieties indicate those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 3. Methyl Thiosulfinate Content in Onions in the 2021–2022 Variety Trial.

Variety	Methyl thiosulfinates nmole/g	
EMY 55457	7.8	a
EMY 55455	8.8	ab
Century	9.0	ab
Sweet Azalea	9.2	ab
369	9.9	ab
PRR	11.2	abc
Red Sensation	11.5	abc
Plethora	11.6	abc
Tania	11.9	abc
Sweet Magnolia	12.9	abcd
EMY 55126	13.3	abcd
Dulciana	13.5	abcd
Alison	14.0	abcd
Maragogi	14.3	abcd
A1298	14.5	abcd
NUN 5901	14.6	abcd
Red Marvel	14.9	abcd
Sivan	15.3	abcd
Red Maiden	15.9	abcde
Superex	16.2	abcde
Macon	18.1	abcdef
EMY 55843	19.7	abcdef
WI-129	19.7	abcdef
Rio Del Sol	20.1	abcdef
Sweet Agent	21.3	abcdefg
GA Boy	22.1	abcdefg
Rio Dulce	22.4	abcdefg
Pirate	22.8	abcdefg
White Gaspare	22.9	abcdefg
NUN 1011	23.5	abcdefg
Alba Blanca	23.8	abcdefg
Timon	24.6	abcdefg
Mata Hari	25.4	abcdefg
Lucille	25.8	abcdefg
Vulkana	26.7	abcdefg
White Phantom	27.1	abcdefg
OSYF10-4021	28.7	abcdefg
New Frontier	29.8	bcdefg
Fast Track	30.2	bcdefg
Vidora	30.5	bcdefg
Sofire	30.5	bcdefg
DP 1407	30.9	bcdefg
Candy Kim	31.2	bcdefg
Joelino	31.8	bcdefg
Sapelo	33.4	cdefg
OSYF12-7091	34.5	defg
Chianti	35.3	defg
Quick Start	37.4	efg
Early Sweet	38.0	efg
404	38.4	efg
Candy Joy	41.3	fg
Candy Ann	42.2	g

Note. Similar letters between varieties indicate those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 4. Overall Flavor Quality Ranking of the 2021–2022 Variety Trials.

Variety	Rank
Plethora	1
Candy Kim	2(t)
Sweet Azalea	2(t)
Sivan	4(t)
Sweet Magnolia	4(t)
Red Sensation	6
Red Marvel	7
New Frontier	8
Emy 55455	9
Century	10(t)
Maragogi	10(t)
Vidora	10(t)
Alison	13(t)
Dulciana	13(t)
Emy 55126	13(t)
Emy 55457	13(t)
Nunhems 5901	13(t)
Superex	13(t)
Sweet Agent	13(t)
Tania	13(t)
WI-129	13(t)
369	22(t)
Macon	22(t)
PRR	22(t)
Sofire	22(t)
Vulkana	22(t)
White Phantom	22(t)

Variety	Rank
A1298	28(t)
DP 1407	28(t)
Fast Track	28(t)
Rio Del Sol	28(t)
Rio Dulce	28(t)
Alba Blanca	33(t)
Chianti	33(t)
Nunhems 1011	33(t)
OSYF10-4021	33(t)
White Gaspare	33(t)
Georgia Boy	38
Candy Joy	39(t)
Mata Hari	39(t)
OSYF12-7091	41(t)
Timon	41(t)
Early Sweet	43(t)
Pirate	43(t)
Quick Start	43(t)
404	46
Candy Ann	47(t)
Red Maiden	47(t)
Sapelo	47(t)
Lucille	50
Emy 55843	51(t)
Joelino	51(t)

(t) tied

Table 5. Overall Flavor Quality Ranking of Yellow Variety Trial Onions Harvested in 2021–2022.

Variety	Rank
Sweet Magnolia	1
Sweet Azalea	2
Plethora	3
Emy 55457	4
Century	5
Superex	6
Alison	7
Sweet Agent	8(t)
Vidora	8(t)
Macon	10
Emy 55126	11
Emy 55455	12
Georgia Boy	13(t)
New Frontier	13(t)
WI-129	13(t)

Variety	Rank
PRR	16
Candy Kim	17(t)
Tania	17(t)
Pirate	19
Candy Joy	20
Fast Track	21
Candy Ann	22
Quick Start	23
Sapelo	24

(t) tied

UGA Vidalia Onion Variety Trial 2022–2023 Crop Season

Chris Tyson, Jason Edenfield, Aubrey Shirley, Derrick Bowen, Denny Thigpen, Daniel Clark, Steven Powell, Savannah Tanner, Ross Greene, Lauren Stanley, Daniel Jackson, and Shane Curry

Introduction

The University of Georgia (UGA) evaluates short day onion varieties to determine their performance characteristics in standardized growing practices. Variety entries for the trial are submitted by participating seed companies. These trials are conducted at the Vidalia Onion and Vegetable Research Center (VOVRC) located in Lyons, GA.

Materials and Methods

There were 50 varieties entered into the 2022–2023 UGA onion variety trial. After seed entries were received, seedbeds were grown for transplant production by UGA staff at the VOVRC. Pre-plant seedbed treatment included a 75 gallon per acre fumigation treatment of metam sodium for weed and disease suppression.

The seedbeds were planted on September 20, 2022, and the trial was transplanted on December 6, 2022. Yield measurements were taken upon harvest and grading and a 10-bulb sample of jumbo onions per plot was sent to the UGA Crop Quality Laboratory in Athens, GA to undergo flavor testing. Seedbed and trial fertility, as well as fungicide programs, are listed below. The trial evaluates each variety replication in a 20 ft long by 6 ft wide plot that contains 240 bulbs. Each variety was replicated four times and harvested based on a committee decision of maturity. The transplant population for the trial was equivalent to 87,120 plants per acre.

Seedbed Fertility:

- 400 lb/acre of 10-10-10 applied September 19, 2022 (preplant incorporated)
- 200 lb/acre of 10-10-10 applied Oct. 3, 2022
- 200 lb/acre of 10-10-10 applied Oct. 20, 2022
- 200 lb/acre of 10-10-10 applied Oct. 31, 2022

Total pounds/acre applied:
100 (N) – 100 (P) – 100 (K) – 120 (S)

Note: All fertilizer applications were applied with a First Products brand drop spreader.

Seedbed Pesticides Applied:

Date	Product Applied
Aug. 11, 2022	Vapam HL (75 gal/acre)
Sept. 19, 2022	Diazinon AG500 (4 qt/acre) preplant incorporated
Oct. 31, 2022	Roper (3 lb/acre) + Kocide 3000 (0.75 lb/acre) + Lifegard WG (2 oz/acre)
Nov. 9, 2022	Roper (3 lb/acre) + Kocide 3000 (0.75 lb/acre) + Lifegard WG (2 oz/acre)

Trial Fertility:

- 200 lb/acre of 5-10-15 applied Dec. 13, 2022
- 300 lb/acre of 6-6-18 applied Jan. 6, 2023
- 500 lb/acre of 5-10-15 applied Jan. 25, 2023
- 150 lb/acre of calcium nitrate applied Feb. 9, 2023
- 150 lb/acre of calcium nitrate applied Feb. 22, 2023

Total pounds/acre applied:
99.5 (N) – 88 (P) – 159 (K) – 88.5 (S)

Note: Soil sample test results called for 125–150 lb/acre nitrogen, 60 lb/acre of phosphorus, 90 lb/acre of potash, and 40–60 lb/acre of sulfur. All fertilizer applications applied with a First Products brand drop spreader.

Fungicides Applied:

Date	Fungicide Applied
Jan. 11, 2023	Fontelis (24 oz/acre) + Quadris Top (14 oz/acre) + Badge SC (16 oz/acre)
Feb. 6, 2023	Omega 500 (16 oz/acre) + Pristine (18.5 oz/acre) + Bravo (32 oz/acre)
Feb. 16, 2023	Luna Flex (14 oz/acre)
Feb. 23, 2023	Miravis Prime (11.4 oz/acre) + Inspire Super (20 oz/acre)
Mar. 8, 2023	Omega 500 (16 oz/acre) + Badge (16 oz/acre)
Mar. 15, 2023	Miravis Prime (11.4 oz/acre) + Orondis Ultra (6 oz/acre) + Badge SC (16 oz/acre) + Lifegard WG (2 oz/acre)
Mar. 22, 2023	Omega 500 (16 oz/acre) + Badge SC (16 oz/acre) + Lifegard WG (2 oz/acre)
Mar. 30, 2023	Quadris Top (14 oz/acre) + Badge SC (16 oz/acre) + Lifegard WG (2 oz/acre)

Insecticides Applied:

Date	Product Applied
Oct. 15, 2022	Diazinon AG500 (4 qt/acre) preplant incorporated
Feb. 23, 2023	Radiant (10 oz/acre)
Mar. 15, 2023	Torac (24 oz/acre)
Mar. 22, 2023	Radiant (10 oz/acre)
Mar. 30, 2023	Torac (24 oz/acre)

Herbicides Applied:

Date	Product Applied
Dec. 6, 2022	Goal 2XL (1 quart/acre) + Prowl (1 qt/acre)

Harvest Timing

Each variety was selected for harvest based upon signs of weak tops and/or adequately sized bulbs. A committee of Extension agents determined the harvest/pulling of varieties.

Participating seed companies reserve the right to specify when or what characteristics determine the harvest of their variety.

Varieties were clipped 7 days after their dig date. Growing degree days (GDDs) aid us in forecasting harvest maturity for onions. A base temperature of 50 °F is used in formulating GDDs accumulated.

Variety	Maturity	Planting date	Dig date	Days after transplanting to digging	GDD 50 °F base
Candy Ann, Candy Joy, Candy Kim, Fast Track, Quick STart, DP 1407, Nunhems 1011, Vidora, OSYF12-7091	Early	Dec. 6, 2022	Apr. 17, 2023	132	1255
Red Maiden, Sweet Agent, Monjablanca, Red Sensation, Maragogi, Sapelo, Early Sweet, SON-404Y, Vulkana, A1298, OSYF10-4021	Early-Med	Dec. 6, 2022	Apr. 24, 2023	139	1381
Sweet Azalea, Century, 369, Tania, 380, Red Marvel, Rio Dulce, Superex, XON-300&, XON-106Y, Plethora, Sofire, Dulciana	Main	Dec. 6, 2022	May 1, 2023	146	1508
EMY 55457, EMY 55126, EMY 55455, EMY 37357, EMY 55178, Alba Blanca, Sweet Magnolia, Macon, GA Boy, Chianti, Rio Del Sol, Nun 1014 (formerly 5901), Mata Hari, A1926, Miss Scarlet, 10256, Gilmore 26	Main-Late	Dec. 6, 2022	May 8, 2023	153	1630

Stand Losses from Early Season Freeze

A notable weather event during the 2022–2023 onion season was the hard freeze that occurred in late December 2022. From December 23–30, 2022 temperatures fell below freezing each night. During that time period, the coldest temperatures occurred on the night of December 24, dipping into the middle to upper teens. The UGA weather station located at Stanley Farms in Toombs County, GA, recorded a low that evening of 16.4 °F, with temperatures below freezing for over 24 continuous hours.

Table 1. Daily Maximum and Minimum Temperatures Recorded at UGA Weather Station in December 2022.

Date	Maximum Temperature (°F)	Minimum Temperature (°F)
December 22	48.7	41.9
December 23	53.7	22.8
December 24	31.7	16.4
December 25	43	21.4
December 26	48.8	20.9
December 27	56	25.5
December 28	63.1	29.1
December 29	71.1	36.9
December 30	74.8	53.4

These freezing temperatures occurred less than 3 weeks after transplanting the variety trial. As a result, many of the small transplants were especially susceptible to cold injury. Stand loss occurred in all varieties, with some varieties suffering from significant stand loss. Stand counts were taken on February 15, 2023, with the assistance of local county extension agents. The table below shows the average percent stand among varieties in the trial.

Table 2. Average Percent Stand in the Vidalia Onion Variety Trial as Recorded on February 15, 2023.

Variety	% Stand	
OSYF12-7091	86	a
1011	85	a
SON-404Y	79	ab
OSYF10-4021	75	abc
1407	74	abc
Red Sensation	73	abcd
A1298	73	abcd
Maragogi	73	abcd
XON-106Y	72	abcd
EMY 57357	71	abcde
Early Sweet	70	abcdef
Candy Kim	68	abcdefg
XON-300Y	68	abcdefg
Chianti	67	abcdefgh
Quick Start	65	abcdefghi
Superex	64	abcdefghi
Red Maiden	64	abcdefghi
A1926	60	abcdefghij
Vidora	60	abcdefghijk
Rio Del Sol	58	bcdefghijk
Candy Joy	57	bcdefghijk
EMY 55455	56	bcdefghijkl
Rio Dulce	56	bcdefghijkl
Gilmore 26	53	bcdefghijkl
Sofire	53	bcdefghijkl
Candy Ann	52	bcdefghijklm
mata Hari	51	cdefghijklmn
Sapelo	51	cdefghijklmn

Variety	% Stand	
10256	49	cdefghijklmno
Monjablanca	47	defghijklmno
Fast Track	45	efghijklmno
Tania	45	efghijklmnop
Miss Scarlet	45	efghijklmnop
Sweet Agent	44	fghijklmnop
Century	43	ghijklmnop
1014	43	ghijklmnop
EMY 55126	40	hijklmnop
369	40	ijklmnopq
Plethora	36	jklmnopqr
Sweet Azalea	33	klmnopqr
GA Boy	30	lmnopqr
Macon	29	lmnopqr
EMY 55178	26	mnopqr
Dulciana	25	mnopqr
380	24	nopqr
Red Marvel	23	opqr
Vulkana	18	pqr
Alba Blanca	13	qr
EMY 55457	12	r
Sweet Magnolia	10	r

*Letters that are the same btween varieties indicate that those varieties are not significantly different according to Turkey test ($p \leq 0.05$).

Results and Discussion

The following tables show field weights, marketable yields, colossal yields, jumbo yields, medium yields, and cull yield. For additional information regarding the performance of a given variety, please contact your Extension agent or the Vidalia Onion and Vegetable Research Center. We would like to thank the participating seed companies as well as the Vidalia Onion Committee for their support of this trial.

Variety Entries in the 2022–2023 Trial

Variety name	Company	Type	Maturity Class
Candy Kim*	Solar	Yellow Granex	Early
Candy Ann*	Solar	Yellow Granex	Early
Candy Joy*	Solar	Yellow Granex	Early
Fast Track*	Vilmorin-Mikado	Yellow Granex	Early
Quick Start*	Vilmorin-Mikado	Yellow Granex	Early
EMY 55455*	Emerald	Yellow Granex	Main-Late
EMY 55126*	Emerald	Yellow Granex	Main-Late
EMY 55457*	Emerald	Yellow Granex	Main-Late
EMY 55178	Emerald	Yellow Granex	Main-Late
Sweet Agent*	Seminis	Yellow Granex	Early-Med
Sweet Magnolia*	Seminis	Yellow Granex	Early-Med
Century*	Seminis	Yellow Granex	Main
Sweet Azalea*	Seminis	Yellow Granex	Main
Macon*	Bejo	Yellow Granex	Main-Late
Tania*	Bejo	Yellow Granex	Main
369*	Bejo	Yellow Granex	Main
Maragogi	Bejo	Yellow Granex	Early-Med
Sapelo*	DP Seeds	Yellow Granex	Early-Med
Georgia Boy*	DP Seeds	Yellow Granex	Main-Late
DP 1407*	DP Seeds	Yellow Granex	Early
Early Sweet	DP Seeds	Yellow Granex	Early-Med
Superex*	American Takii	Yellow Granex	Main
SON-404Y	Sakata	Yellow Granex	Early-Med
XON-300Y	Sakata	Yellow Granex	Main
XON-106Y	Sakata	Yellow Granex	Main
Vidora*	Nunhems	Yellow Granex	Early
Plethora*	Nunhems	Yellow Granex	Main
Nunhems 1014	Nunhems	Yellow Granex	Main-Late
Nunhems 1011	Nunhems	Yellow Granex	Early
A1298	Hazera	Yellow Granex	Early-Med
A1926	Hazera	Yellow Granex	Main-Late
10256	Hazera	Yellow Granex	Main-Late
OSYF12-7091	Crookham	Yellow Granex	Early
OSYF10-4021	Crookham	Yellow Granex	Early-Med
Gilmore 26*	Pike's Seed	Yellow Granex	Main-Late
Rio Del Sol	American Takii	Yellow Grano	Main-Late
Rio Dulce	American Takii	Yellow Grano	Main
Dulciana	Nunhems	Yellow Grano	Main
Vulkana	Nunhems	Yellow Grano	Early-Med

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Variety name	Company	Type	Maturity Class
380	Bejo	Yellow Grano	Main
Alba Blanca	Seminis	White	Main-Late
Monjablanca	Bejo	White	Early-Med
EMY 55357	Emerald	Red	Main-Late
Miss Scarlet	Hazera	Red	Main-Late
Red Maiden	Seminis	Red	Early-Med
Red Marvel	Bejo	Red	Main
Red Sensation	Bejo	Red	Early-Med
Chianti	DP Seeds	Red	Main-Late
Sofire	Nunhems	Red	Main
Mata Hari	DP Seeds	Red	Main-Late

*Official Vidalia approved variety for 2022–2023 season.

Table 3. Vidalia Onion Field Weight (40-lb Boxes Per Acre) Measured Before Grading.

Variety	40 lb boxes/acre	
SON-404Y	1656	a
XON-106Y	1572	ab
A1298	1561	ab
OSYF10-4021	1553	abc
Early Sweet	1546	abcd
Superex	1542	abcd
Maragogi	1523	abcde
Chianti	1479	abcde
Mata Hari	1454	abcdef
Red Sensation	1384	abcdef
XON-300Y	1359	abcdefg
EMY 55455	1352	abcdefg
1011	1339	abcdefgh
1407	1337	abcdefgh
Gilmore 26	1335	abcdefgh
Rio Dulce	1299	abcdefgh
Sofire	1283	abcdefghi
A1926	1261	abcdefghi
Rio Del Sol	1229	abcdefghi
OSYF12-7091	1192	abcdefghij
Miss Scarlet	1151	abcdefghij
Sweet Agent	1130	abdefghij
1014	1123	abcdefghij
EMY 57357	1078	bcdefghijk
Candy Kim	1071	bcdefghijk
Vidora	1069	bcdefghijk
Quick Start	1057	bcdefghijk
10256	1049	bcdefghijk
Red Maiden	1041	bcdefghijk
Monjablanca	1007	cedfghijkl
Tania	1001	defghijkl
Sapelo	995	defghijkl
369	973	efghijkl
Candy Joy	908	fghijkl
Century	901	fghijkl
Candy Ann	886	fghijklm
EMY 55126	877	fghijklm
Fast Track	826	ghijklmn
Plethora	816	ghijklmn
Macon	794	hijklmn
380	746	ijklmn
EMY 55178	734	ijklmn
Sweet Azalea	657	jklmn
Dulciana	656	jklmn
Alba Blanca	558	jklmn
Red Marvel	556	klmn
GA Boy	484	lmn
Vulkana	348	mn
EMY 55457	316	n
Sweet Magnolia	250	n

Note. Letters that are the same between varieties indicate that those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 4. Vidalia Onion Marketable Yield (40-lb Boxes Per Acre) Measured After Grading.

Variety	Total yield 40 lb boxes/acre	
A1298	1427	a
SON-404Y	1384	ab
Mata Hari	1304	abc
1011	1286	abc
Red Sensation	1261	abc
Chianti	1261	abc
Early Sweet	1243	abcd
Maragogi	1241	abcd
Sofire	1177	abcde
Rio Dulce	1053	abcdef
1407	1041	abcdef
A1926	1035	abcdef
OSYF12-7091	1032	abcdef
Superex	1001	abcdef
OSYF10-4021	976	abcdefg
Rio Del Sol	957	bcdefgh
Red Maiden	951	bcdefgh
Vidora	904	cdefghi
Miss Scarlet	901	cdefghi
EMY 57357	898	cdefghi
EMY 55455	889	cdefghi
XON-106Y	889	cdefghi
Candy Kim	839	cdefghij
Gilmore 26	792	defghijk
Monjablanca	755	efghijkl
1014	746	efghijkl
10256	746	efghijkl
Sapelo	728	efghijkl
Tania	724	efghijkl
Candy Joy	717	efghijkl
Quick Start	687	fghijkl
369	667	fghijklm
Candy Ann	658	fghijklm
Fast Track	651	fghijklmn
EMY 55178	533	ghijklmno
EMY 55126	517	ghijklmno
Sweet Agent	491	ijklmno
XON-300Y	476	ijklmno
Macon	456	ijklmno
Red Marvel	438	ijklmno
380	406	jklmno
Dulciana	361	klmno
Century	358	klmno
Plethora	349	klmno
Vulkana	299	lmno
Alba Blanca	268	mno
Sweet Azalea	218	mno
EMY 55457	186	no
GA Boy	166	o
Sweet Magnolia	54	o

Note. Letters that are the same between varieties indicate that those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 5. Vidalia Onion Colossal Yield (40-lb Boxes Per Acre) Measured After Grading.

Variety	Total yield 40 lb boxes/acre	
Mata Hari	662	a
Sofire	599	ab
SON-404Y	581	abc
Miss Scarlet	556	abcd
Rio Dulce	547	abcde
Chianti	542	abcde
Early Sweet	524	abcdef
EMY 55455	501	abcdefg
1014	429	abcdefgh
Superex	424	abcdefgh
Maragogi	417	abcdefgh
Gilmore 26	413	abcdefghi
EMY 55178	408	abcdefghi
OSYF10-4021	408	abcdefghi
Rio Del Sol	404	abcdefghi
A1926	395	abcdefghi
XON-106Y	395	abcdefghi
1407	347	bcdefghij
Tania	331	bcdefghijk
Macon	329	cdefghijk
Vidora	320	cdefghijkl
Sweet Agent	315	cdefghijklm
380	290	defghijklmn
Red Sensation	284	efghijklmn
369	256	fghijklmn
EMY 55126	250	ghijklmn
Monjablanca	238	ghijklmn
Quick Start	238	ghijklmn

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Variety	Total yield 40 lb boxes/acre	
A1298	222	hijklmn
Red Marvel	220	hijklmn
Fast Track	209	hijklmn
Century	195	hijklmn
10256	191	hijlkmn
Candy Ann	188	hijklmn
Candy Kim	177	hijklmn
Plethora	175	hijklmn
Sapelo	172	hijklmn
Dulciana	166	hijklmn
XON-300Y	161	hijklmn
Candy Joy	147	ijklmn
Red Maiden	120	jklmn
EMY 55457	111	jklmn
GA Boy	109	jklmn
1011	86	jklmn
Sweet Azalea	73	klmn
Vulkana	52	lmn
OSYF12-7091	50	mn
Alba Blanca	45	mn
EMY 57357	41	n
Sweet Magnolia	30	n

Note. Letters that are the same between varieties indicate that those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 6. Vidalia Onion Jumbo Yield (40-lb Boxes Per Acre) Measured After Grading.

Variety	Total yield 40 lb boxes/acre	
1011	1164	a
A1298	1162	a
Red Sensation	912	ab
OSFY12-7091	898	ab
Maragogi	796	bv
EMY 57357	792	bv
Red Maiden	771	bv
SON-404Y	767	bc
Early Sweet	681	bcd
1407	669	bcd
Chianti	667	bcd
Mata Hari	617	bcde
A1296	608	bcde
Candy Kim	603	bcde
Superex	565	cdef
Vidora	558	cdefg
Sofire	551	cdefg
10256	538	cdefgh
Candy Joy	522	cdefgh
OSYF10-4021	522	cdefgh
Rio Del Sol	515	cdefgh
Sapelo	515	cdefgh
Monjablanca	492	cdefghi
Rio Dulce	483	cdefghi
XON-106Y	472	cdefghij
Candy Ann	431	defghijk
Quick Start	424	defghijk
Fast Track	402	defghijk
369	392	defghijkl
Tania	381	defghijklm
EMY 55455	370	defghijklmn
Gilmore 26	363	defghijklmn
Miss Scarlet	324	efghijklmn
1014	295	efghijklmn
XON-300Y	290	efghijklmn
EMY 55126	256	fghijklmn
Vulkana	231	ghijklmn
Alba Blanca	213	ghijklmn
Red Marvel	211	hijklmn
Dulciana	179	ijklmn
Plethora	166	ijklmn
Sweet Agent	166	ijklmn
Century	157	jklmn
Sweet Azalea	136	klmn
Macon	125	klmn
EMY 55178	116	klmn
380	113	lmn
EMY 55457	70	lmn
GA Boy	54	mn
Sweet Magnolia	24	n

Note. Letters that are the same between varieties indicate that those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 7. Vidalia Onion Medium Yield (40-lb Boxes Per Acre) Measured After Grading.

Variety	Medium yield 40 lb boxes/acre	
OSYF12-7091	84	a
EMY 57357	66	ab
Red Sensation	66	ab
Candy Kim	59	abc
Red Maiden	59	abc
Chianti	52	abcd
Candy Joy	48	bcde
OSYF10-4021	45	bcdef
A1298	43	bcdefg
Fast Track	41	bcdefgh
Sapelo	41	bcdefgh
Early Sweet	39	bcdefghi
Rio Del Sol	39	bcdefghi
Candy Ann	39	bcdefghi
1011	36	bcdefghij
SON-404Y	36	bcdefghij
A1926	32	bcdefghij
Maragogi	27	cdefghij
Sofire	27	cdefghij
Vidora	26	cdefghij
Quick Start	25	cdefghij
1407	25	cdefghij
Monjablanca	25	cdefghij
XON-300Y	25	cdefghij
Mata Hari	24	cdefghij
1014	23	defghij
Rio Dulce	23	defghij
XON-106Y	23	defghij
Miss Scarlet	20	defghij
10256	18	defghij
369	18	defghij
EMY 55455	18	defghij
Dulciana	16	efghij
Vulkana	16	efghij
Gilmore 26	16	efghij
EMY 55126	11	fghij
Superex	11	fghij
Tania	11	fghij
Sweet Agent	10	ghij
Alba Blanca	9	ghij
EMY 55178	9	ghij
Plethora	9	ghij
Sweet Azalea	9	ghij
Century	7	hij
Red Marvel	7	hij
EMY 55457	5	ij
380	2	j
GA Boy	2	j
Macon	2	j
Sweet Magnolia	0	j

Note. Letters that are the same between varieties indicate that those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 8. Vidalia Onion Cull Weights (40-lb Boxes Per Acre) Measured After Grading.

Variety	Cull weights 40 lb boxes/acre	
XON-300Y	883	a
XON-106Y	683	ab
Sweet Agent	639	abc
OSYF10-4021	577	abcd
Gilmore 26	543	bcde
Century	542	bcde
Superex	541	bcde
Plethora	466	bcdef
EMY 55455	463	bcdef
Sweet Azalea	439	bcdefg
1014	377	bcdefgh
Quick Start	370	bcdefghi
EMY 55126	360	cdefghij
380	340	cdefghij
Macon	338	cdefghij
GA Boy	319	cdefghij
369	306	defghij
10256	303	defghij
Early Sweet	303	defghij
1407	296	defghij
Dulciana	295	defghij
Alba Blanca	290	defghij
Maragogi	282	defghij
Tania	277	defghij
SON-404Y	272	defghij
Rio Del Sol	271	defghij
Sapelo	267	defghij
Monjablanca	252	efghij
Miss Scarlet	251	efghij
Rio Dulce	246	efghij
Candy Kim	231	efghij
Candy Ann	228	efghij
A1926	227	efghij
Chianti	218	fghij
EMY 55178	201	fghij
Sweet Magnolia	195	fghij
Candy Joy	191	fghij
EMY 57357	179	fghij
Fast Track	175	fghij
Vidora	164	fghij
OSYF12-7091	160	fghij
Mata Hari	150	fghij
A1298	134	ghij
EMY 55457	130	ghij
Red Sensation	123	ghij
Red Marvel	118	hij
Sofire	105	hij
Red Maiden	91	hij
1011	52	ij
Vulkana	49	j

Note. Letters that are the same between varieties indicate that those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 9. Onion 3-Year Average Marketable Yield (40 Lb-Boxes Per Acre) Measured After Grading.

Variety	40 lb boxes/acre
Mata Hari	1330
Superex	1256
Rio Dulce	1210
EMY 55455	1194
Maragogi	1186
Macon	1175
Rio Del Sol	1173
Red Sensation	1149
Vidora	1099
Sofire	1074
1011	1066
EMY 55457	1034
Sweet Azalea	1007
Tania	1002
EMY 55126	992
GA Boy	955
Sweet Magnolia	953
Plethora	953
Red Maiden	933
1407	933
Sapelo	909
Candy Kim	909
Sweet Agent	885
Century	873
Candy Ann	818
Fast Track	783
Dulciana	780
Candy Joy	779
Quick Start	731
Vulkana	595

Note. Only varieties entered into the trial in the last 5 consecutive years were included.

Table 10. Onion 5-Year Average Marketable Yield (40 Lb-Boxer Per Acre) Measured After Grading.

Variety	40 lb boxes/acre
Mata Hari	1069
Macon	986
EMY 55455	978
Sofire	977
Vidora	961
Red Sensation	913
1407	891
Sweet Magnolia	848
Sweet Azalea	837
Sweet Agent	834
Candy Ann	821
Candy Kim	809
Century	806
Plethora	801
Fast Track	799
Dulciana	787
Sapelo	783
Quick Start	774
Candy Joy	770
EMY 55126	729
Tania	674
Vulkana	638

Note. Only varieties entered into the trial in the last 5 consecutive years were included.

UGA Variety Trial Quality Report 2022–2023 Crop Season

Jason Lessl, Daniel Jackson, Chris Tyson, Jason Edenfield, Derrick Bowen Aubrey Shirley, Anthony Bateman, Denny Thigpen, Steven Powell, Savannah Tanner, Shane Curry, Lauren Stanley, and Ross Greene

Introduction

Each season the University of Georgia, Agricultural and Environmental Services Laboratories (AESL) evaluates the flavor-associated compounds in the short-day onions grown in the variety trial. These onion varieties are submitted by the participating seed companies, grown at the Vidalia Onion and Vegetable Research Center (VOVRC), and once they are harvested and dried, they are submitted to the AESL for analysis of the pungency- related compounds: pyruvic acid, lachrymatory factor (LF), and methyl thiosulfinates. Due to the association of Vidalia onions with low pungency and sweet flavor, this annual evaluation provides useful information about the relative flavor quality of these onion varieties. Furthermore, results are used to evaluate yellow Granex varieties before officially qualifying them to be grown as sweet Vidalia onions in the region.

This publication summarizes the flavor analysis results from the 2022–2023 growing season, as well as compares the performance of each variety over the past three growing seasons.

Materials and Methods

There were 50 onion varieties analyzed as part of the 2022–2023 variety trial. Each variety was grown at the VOVRC in quadruplicate plots. Harvested onions from each plot were dried and submitted to the lab individually. Cores taken from 10 onions within each replicate were composited and pressed to collect the onion juice, analyzed following procedures described in Kim et al. (2017).

Results and Discussion

The following tables compare the concentrations of flavor-associated compounds in onions grown as a part of the 2022–2023 variety trial. It should be noted that as the three measured parameters decrease, the onions are considered to have a superior flavor quality. In this year's trials, the pyruvic acid (pungency) content ranged from 3.6–6.0 µmol/ml, which is a decrease of 13% compared to the past growing season. Lachrymatory factor ranged from 2.2–4.8 µmol/ml, which was a decrease of 32.5% compared to the last season. Finally, methyl thiosulfinates ranged from 3.1–18.1 nmol/ml which was a slight increase of 8% compared with the past two growing seasons. Overall, the flavor quality of the variety trial onions was significantly improved as compared to the past few seasons. This could be attributed to the wetter growing season, which may have leached more sulfur after bulb initiation. The cumulative variety flavor quality rankings are also provided below for this year's data, along with the average rating of yellow Granex onion varieties grown over the past three seasons. For additional information regarding the performance of a given variety, please contact your Extension agent or the Vidalia Onion and Vegetable Research Center. We would like to thank the participating seed companies as well as the Vidalia Onion Committee for their support of this trial.

References

Kim, H.-Y., Jackson, D., Adhikari, K., Riner, C., & Sanchez-Brambila, G. (2017). Relationship between consumer acceptability and pungency-related flavor compounds of Vidalia onions. *Journal of Food Science, 82*(10), 2396–2402. https://doi.org/10.1111/1750-3841.13915

Table 1. Pungency (Pyruvic Acid) Content in Onions Submitted to UGA AESL in the 2022–23 Variety Trial.

Variety	Pyruvic Acid (µmole/g)	
Red Marvel	3.6	a
Red Sensation	3.8	ab
XON-300Y	3.9	abc
Chianti	4.1	abcd
Rio Dulce	4.1	abcd
NUN 1014	4.3	abcde
EMY 55178	4.3	abcde
Sofire	4.3	abcde
XON-106Y	4.3	abcde
Vidora	4.4	abcde
Rio Del Sol	4.4	abcdef
Plethora	4.4	abcdef
1011	4.4	abcdef

table continued on next page

Variety	Pyruvic Acid (µmole/g)	
Mata Hari	4.5	abcdef
Gilmore 26	4.5	abcdef
Superex	4.5	abcdef
Candy Joy	4.5	abcdef
Alba Blanca	4.5	abcdef
EMY 55457	4.5	abcdef
Fast Track	4.5	abcdef
Quick Start	4.6	abcdef
Sweet Magnolia	4.6	abcdefg
SON-404Y	4.6	abcdefg
1407	4.6	abcdefg
Macon	4.6	abcdefg
Sweet Azalea	4.7	abcdefg
Miss Scarlet	4.7	abcdefg
Candy Kim	4.8	abcdefg
Early Sweet	4.8	abcdefg
Dulciana	4.8	abcdefg
OSYF12-7091	4.9	abcdefg
Monja Blanca	4.9	abcdefg
A1926	4.9	abcdefg
GA Boy	4.9	abcdefg
Sweet Agent	4.9	abcdefg
EMY 55126	4.9	abcdefg
Candy Ann	4.9	abcdefg
Century	5.1	bcdefg
EMY 55455	5.1	bcdefg
Sapelo	5.1	bcdefg
OSYF10-4021	5.3	cdefg
Maragogi	5.4	cdefg
Red Maiden	5.4	defg
369	5.4	defg
EMY 57357	5.5	defg
A1298	5.7	efg
380	5.7	efg
Vulkana	5.8	efg
10256	5.8	fg
Tania	6.0	g

Table 2. Onion Lachrymatory Factor (Propanethial S-Oxide) Content in the 2022–2023 Variety Trial.

Variety	Lachrymatory factor µmole/g	
Sweet Magnolia	2.2	a
Red Sensation	2.3	a
Alba Blanca	2.7	ab
Rio Dulce	2.7	ab
Candy Joy	2.7	abc
Sweet Agent	2.7	abcd
Red Marvel	2.8	abcd
EMY 55457	2.8	abcd
Plethora	2.8	abcd
OSYF12-7091	2.9	abcd
Sweet Azalea	2.9	abcd
Candy Kim	2.9	abcd
Monja Blanca	2.9	abcd
Quick Start	3.0	abcd
Fast Track	3.0	abcd
XON-106Y	3.1	abcde
Gilmore 26	3.1	abcde
Chianti	3.1	abcde
Dulciana	3.1	abcde
NUN 1014	3.1	abcde
10256	3.1	abcde
Mata Hari	3.1	abcdef
Red Maiden	3.2	abcdef
Rio Del Sol	3.2	abcdef
380	3.2	abcdef
1011	3.2	abcdef
EMY 55178	3.2	abcdef
Candy Ann	3.3	abcdef
XON-300Y	3.3	abcdef
Vidora	3.4	abcdefg
EMY 57357	3.4	abcdefg
Sofire	3.5	abcdefg
Superex	3.5	abcdefg
1407	3.5	abcdefg
Century	3.5	abcdefg
SON-404Y	3.5	abcdefg
Macon	3.6	abcdefg
Vulkana	3.7	abcdefg
Miss Scarlet	3.7	abcdefg
Early Sweet	3.7	abcdefg
Tania	3.7	abcdefg
369	4.0	bcdefg
EMY 55126	4.1	bcdefg
A1298	4.1	bcdefg
A1926	4.2	cdefg
OSYF10-4021	4.2	defg
GA Boy	4.2	defg
Maragogi	4.5	efg
EMY 55455	4.5	fg
Sapelo	4.8	g

Note. Similar letters between varieties indicate those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 3. Methyl Thiosulfinate Content in Onions in the 2022–2023 Variety Trial.

Variety	Methyl thiosulfinates nmole/g	
Rio Del Sol	3.1	a
Gilmore 26	3.5	ab
NUN 1014	4.9	abc
Sweet Azalea	5.6	abc
Rio Dulce	6.2	abc
Chianti	6.4	abc
Century	6.8	abcd
Macon	6.9	abcd
Sweet Magnolia	6.2	abcde
Dulciana	7.1	abcde
Vidora	7.2	abcde
EMY 55126	7.3	abcde
Red Maiden	7.6	abcde
EMY 55457	7.6	abcde
EMY 55178	7.7	abcdef
380	7.7	abcdef
GA Boy	7.7	abcdef
1011	7.8	abcdef
Tania	7.9	abcdef
Fast Track	8.2	abcdef
EMY 55455	8.3	abcdef
A1926	8.3	abcdef
369	8.3	abcdef
XON-106Y	8.4	abcdef
Plethora	8.5	abcdef
SON-404Y	8.5	abcdef
XON-300Y	8.5	abcdef
Vulkana	9.1	abcdefg
A1298	9.1	abcdefg
Alba Blanca	9.3	abcdefg
Candy Kim	9.3	abcdefg
Superex	9.4	abcdefg
Miss Scarlet	9.7	abcdefg
1407	9.9	abcdefg
Sofire	10.0	abcdefg
Quick Start	10.2	abcdefg
Sapelo	10.2	abcdefg
Candy Joy	10.4	abcdefg
Maragogi	10.4	abcdefg
Candy Ann	10.6	abcdefg
Red Sensation	11.6	abcdefg
10256	11.7	abcdefg
Early Sweet	11.9	abcdefg
Monja Blanca	12.5	bcdefg
OSYF10-4021	13.7	cdefg
Sweet Agent	13.9	cdefg
Mata Hari	16.3	defg
Red Marvel	16.1	efg
OSYF12-7091	16.8	fg
EMY 57357	18.1	g

Note. Similar letters between varieties indicate those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 4. Overall Flavor Quality Ranking of the 2022–2023 Variety Trial Onions.

Variety	Rank
Red Sensation	1
Sweet Magnolia	2 (t)
Rio Dulce	2 (t)
Chianti	4
Rio Del Sol	5 (t)
Gilmore 26	5 (t)
NUN 1014	5 (t)
Sweet Azalea	8
XON-300Y	9
Alba Blanca	10 (t)
EMY 55457	10 (t)
Plethora	10 (t)
Red Marvel	10 (t)
Dulciana	10 (t)
1011	15 (t)
Candy Joy	15 (t)
Fast Track	15 (t)
EMY 55178	15 (t)
Vidora	15 (t)
XON-106Y	15 (t)
Macon	21 (t)
Quick Start	21 (t)
Candy Kim	21 (t)
Century	21 (t)
Sweet Agent	25 (t)
Monja Blanca	25 (t)
Red Maiden	27 (t)
Candy Ann	27 (t)
EMY 55126	27 (t)
Sofire	27 (t)
SON-404Y	27 (t)
1407	32 (t)
Miss Scarlet	32 (t)
Early Sweet	32 (t)
Superex	32 (t)
380	36 (t)
GA Boy	36 (t)
A1296	36 (t)
OSYF12-7091	39 (t)
mata Hari	39 (t)
369	39 (t)
10256	42 (t)
A1298	42 (t)
Tania	42 (t)
EMY 55455	42 (t)
Vulkana	42 (t)
OSYF10-4021	47
Sapelo	48 (t)
Maragogi	48 (t)
EMY 57357	50

(t) tied

Table 5. Overall Flavor Quality Ranking of Yellow Variety Trial Onions Harvested in 2022–2023.

Variety	Rank
Sweet Magnolia	1
Sweet Azalea	2 (t)
Plethora	2 (t)
EMY 55455	4 (t)
Maragogi	4 (t)
Century	6 (t)
Tania	6 (t)
Superex	6 (t)
Candy Kim	9 (t)
Vidora	9 (t)
EMY 55126	9 (t)
Macon	9 (t)
Sweet Agent	9 (t)
EMY 55457	9 (t)
GA Boy	9 (t)
Sapelo	16
Fast Track	17
Candy Joy	18
Candy Ann	19

(t) tied

UGA Vidalia Onion Variety Trial 2023–2024 Crop Season

Chris Tyson, Jason Edenfield, Aubrey Shirley, Derrick Bowen, Denny Thigpen, Chase Watts, Nick Ray, Steven Powell, Savannah Tanner, Ross Greene, Lauren Stanley, Daniel Jackson, Ted McAvoy, Manisha Kumari, and Jason Lessl

Introduction

The University of Georgia (UGA) evaluates short day onion varieties to determine their performance characteristics in standardized growing practices. Variety entries for the trial are submitted by participating seed companies. These trials are conducted at the Vidalia Onion and Vegetable Research Center (VOVRC) located in Lyons, GA.

Materials and Methods

There were 53 varieties entered into the 2023–2024 UGA onion variety trial. After seed entries were received, seedbeds were grown for transplant production by UGA staff at the VOVRC. Pre-plant seedbed treatment included a 75-gallon per acre fumigation treatment of metam sodium for weed and disease suppression. The seedbeds were planted on September 20, 2023, and the trial was transplanted on December 6, 2023. Upon harvest and grading, yield measurements are taken, and a 10-bulb sample of jumbo onions per plot is sent to the UGA Crop Quality Laboratory in Athens, GA, to undergo flavor testing. Seedbed and trial fertility, as well as fungicide programs, are listed below. The trial evaluates each variety replication in a 20-ft long by 6-ft wide plot containing 240 bulbs. Each variety was replicated four times and harvested based on a committee decision of maturity. The transplant population for the trial was equivalent to 87,120 plants per acre.

Seedbed Fertility:

- 500 lb/acre of 5-10-15 applied September 5, 2023 (preplant incorporated)
- 200 lb/acre of 5-10-15 applied Oct. 30, 2023
- 200 lb/acre of 5-10-15 applied Nov. 6, 2023
- 200 lb/acre of 5-10-15 applied Nov. 17, 2023

Total pounds/acre applied:
55 (N) – 110 (P) – 165 (K) – 33 (S) - 99 (Ca)

Note: All fertilizer applications were applied with a First Products brand drop spreader.

Seedbed Pesticides Applied:

Date	Product Applied
Aug. 9, 2023	Vapam HL (75 gal/acre)
Sept. 19, 2023	Diazinon AG500 (4 quart/acre) preplant incorporated
Oct. 24, 2023	Badge SC (1 pint/acre)
Nov. 10, 2023	Badge SC (1 pint/acre)
Nov. 17, 2023	Badge SC (1 pint/acre) + Fontelis (24 oz/acre)
Nov. 21, 2023	Badge SC (1 pint/acre) + Fontelis (24 oz/acre)
Dec. 4, 2023	Nordox (1.75 lb/acre)

Trial Fertility:

- 150 lb/acre of 5-10-15 applied Dec. 14, 2023
- 300 lb/acre of 5-10-15 applied Jan. 2, 2024
- 300 lb/acre of 5-10-15 applied Jan. 18, 2024
- 300 lb/acre of 5-10-15 applied Jan. 30, 2024
- 150 lb/acre of calcium nitrate applied Feb. 15, 2024
- 150 lb/acre of calcium nitrate applied Feb. 26, 2024

Total pounds/acre applied:
99 (N) – 105 (P) – 157.5 (K) – 31.5 (S) - 151.5 (Ca)

Note: Soil sample test results called for 125–150 lb/acre nitrogen, 60 lb/acre of phosphorus, 90 lb/acre of potash, and 40–60 lb/acre of sulfur. All fertilizer applications applied with a First Products brand drop spreader.

Fungicides Applied:

Date	Fungicide Applied
Jan. 18, 2024	Rampart (2 quart/acre) + Quadris Top (14 oz/acre)
Jan. 29, 2024	Rampart (2 quart/acre) + Luna Flex (14 oz/acre)
Feb. 8, 2024	Bravo (1 quart/acre) + Inspire Super (20 oz/acre)
Feb. 21, 2024	Bravo (1 quart/acre) + Omega 500 (16 oz/acre)
Feb. 29, 2024	Bravo (1 quart/acre) + Fontelis (24 oz/acre) + Badge SC (1 pint/acre)
Mar. 15, 2024	Bravo (1 quart/acre) + Omega 500 (16 oz/acre) + Badge SC (1 pint/acre)
Mar. 21, 2024	Luna Flex (14 oz/acre) + Badge SC (1 pint/acre)

Herbicides Applied:

Date	Product Applied
Dec. 7, 2023	Goal 2XL (1 quart/acre) + Prowl (1 quart/acre)

Harvest Timing

Each variety was selected for harvest based upon signs of weak tops and/or adequately sized bulbs. A committee of Extension agents determined the harvest/pulling of varieties. Participating seed companies reserve the right to specify when or what characteristics determine the harvest of their variety. Varieties were clipped 7 days after their dig date. Growing degree days (GDDs) aid us in forecasting harvest maturity for onions. A base temperature of 50 °F is used in formulating GDDs accumulated.

Variety	Maturity	Planting date	Dig date	Days after transplanting to digging	GDD 50 °F base
Candy Joy, Candy Ann, SS4001, Fast Track	Very Early	Dec. 6, 2023	Apr. 2, 2024	118	740
Candy Kim, SS4002, 1407, Early Sweet, Vidora, 1011	Early	Dec. 6, 2023	Apr. 8, 2024	124	797
Sweet Agent, XON-404Y, XON-300Y, OSYF10-4021, OSYF12-7091, OSYF22-4022, AG 3310	Early-Main	Dec. 6, 2023	Apr. 15, 2024	131	923
Red Maiden, Tania, Red Duke, Maragogi, 380, Sweet Tule, 369, Sapelo, Rio Del Sol, Rio Dulce, XON-106&, Plethora, Dulciana, Sofire, 10258	Main	Dec. 6, 2023	Apr. 22, 2024	138	1068
Copada, Reforma, EMY 55457, Sweet Magnolia, Century, Sweet Azalea, Red Halen, Monjablanca, Macon, Chianti, GA Boy, Superex, Mata Hari, 1014, Torro Rosso, Joelino, A2801, A2849, A2290, A2800, Gilmore 26	Late	Dec. 6, 2023	Apr. 29, 2024	145	1197

Results and Discussion

The following tables show field weights, marketable yields, colossal yields, jumbo yields, medium yields, and cull yield. For additional information regarding the performance of a given variety, please contact your Extension agent or the Vidalia Onion and Vegetable Research Center. We would like to thank the participating seed companies as well as the Vidalia Onion Committee for their support of this trial.

Variety Entries in the 2023—2024 Trial

Variety name	Company	Type
Candy Kim	Solar	Yellow Granex
Candy Ann	Solar	Yellow Granex
Candy Joy	Solar	Yellow Granex
SS 4001	Solar	Yellow Granex
SS 4002	Solar	Yellow Granex
Fast Track	Vilmorin-Mikado	Yellow Granex
EMY 55455 'Reforma'	Emerald	Yellow Granex
EMY 55126 'Copada'	Emerald	Yellow Granex
EMY 55457	Emerald	Yellow Granex
Sweet Agent	Seminis	Yellow Granex
Sweet Magnolia	Seminis	Yellow Granex
Century	Seminis	Yellow Granex
Sweet Azalea	Seminis	Yellow Granex
Macon	Bejo	Yellow Granex
Tania	Bejo	Yellow Granex
369	Bejo	Yellow Granex
Sweet Tule	Bejo	Yellow Granex
Maragogi	Bejo	Yellow Granex
Sapelo	DP Seeds	Yellow Granex
Georgia Boy	DP Seeds	Yellow Granex
DP 1407	DP Seeds	Yellow Granex
Early Sweet	DP Seeds	Yellow Granex
Superex	American Takii	Yellow Granex
XON-404Y	Sakata	Yellow Granex
XON-300Y	Sakata	Yellow Granex
XON-106Y	Sakata	Yellow Granex

Variety name	Company	Type
Vidora	Nunhems	Yellow Granex
Plethora	Nunhems	Yellow Granex
Nunhems 1014	Nunhems	Yellow Granex
Nunhems 1011	Nunhems	Yellow Granex
10258	Hazera	Yellow Granex
A2801	Hazera	Yellow Granex
A2849	Hazera	Yellow Granex
A2290	Hazera	Yellow Granex
A2800	Hazera	Yellow Granex
OSYF12-7091	Crookham	Yellow Granex
OSYF10-4021	Crookham	Yellow Granex
OSYF22-4022	Crookham	Yellow Granex
GIlmore 26	Pike's Seed	Yellow Granex
AG-3310	Amerigrow	Yellow Granex
Rio Del Sol	American Takii	Yellow Grano
Rio Dulce	American Takii	Yellow Grano
Dulciana	Nunhems	Yellow Grano
Joelino	Hazera	Yellow Grano
380	Bejo	Yellow Grano
Monjablanca	Bejo	White
Red Halen	Seminis	Red
Red Maiden	Seminis	Red
Red Duke	Bejo	Red
Chianti	DP Seeds	Red
Sofire	Nunhems	Red
Mata Hari	Nunhems	Red
Torro Rosso	Hazera	Red

Table 1. Vidalia Onion Field Weight (40-lb Boxes Per Acre) Measured Before Grading.

Variety	40 lb boxes/acre	
Sweet Magnolia	1868.32	a
1014	1800.25	ab
Reforma	1760.55	abc
Joelino	1724.25	abcd
XON-106Y	1701.56	abcde
Century	1697.03	abcdef
Macon	1683.41	abcdefg
Tania	1678.88	abcdefgh
Monjablanca	1665.26	abcdefghi
Georgia Boy	1649.38	abcdefghij
Sweet Azalea	1636.9	abcdefghij
AG-3310	1630.1	abcdefghij
Torro Rosso	1628.96	abcdefghij
Sweet Agent	1619.89	abcdefghijk

Variety	40 lb boxes/acre	
Red Halen	1618.75	abcdefghijk
Superex	1600.6	bcdefghijk
Maragogi	1581.32	bcdefghijkl
Rio Dulce	1565.44	bcdefghijkl
A2849	1562.03	bcdefghijkl
10258	1541.62	bcdefghijklm
Dulciana	1529.14	cdefghijklmn
EMY 55457	1525.73	cdefghijklmno
A2290	1503.05	cdefghijklmno
Sweet Tule	1500.78	defghijklmno
OSYF22-4022	1486.03	defghijklmno
369	1484.9	defghijklmno
Chianti	1479.23	defghijklmno
Red Duke	1471.28	defghijklmno

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Variety	40 lb boxes/acre	
A2800	1467.88	defghijklmno
Mata Hari	1467.88	defghijklmno
A2801	1458.81	efghijklmno
Gilmore 26	1438.39	fghijklmnop
Sapelo	1438.39	fghijklmnop
XON-300Y	1437.25	ghijklmnop
Plethora	1429.99	ghijklmnop
380	1423.64	hijklmnop
OSYF10-4021	1417.97	ijklmnop1
Copada	1415.7	ijklmnopq
Sofire	1410.03	ijklmnopq
SON-404Y	1405.49	jklmnopq
Candy Kim	1399.82	jklmnopq
Rio Del Sol	1361.25	klmnopq
OSYF12-7091	1329.49	lmnopqr
1407	1296.59	mnopqr
SS4402	1280.71	nopqr
Red Maiden	1275.04	nopqr
Vidora	1272.77	nopqr
Early Sweet	1268.23	opqr
1011	1189.96	pqr
Candy Ann	1161.6	qr
Candy Joy	1159.33	qr
SS4001	1089	r
Fast Track	1074.25	r

Note. Letters that are the same between varieties indicate that those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 2. Vidalia Onion Marketable Yield (40-lb Boxes Per Acre) Measured After Grading.

Variety	Total yield 40 lb boxes/acre	
1014	1549.56	a
Rio Dulce	1458.81	ab
AG-3310	1454.27	abc
Maragogi	1454.27	abc
Tania	1417.97	abcd
Dulciana	1395.28	abcde
Sweet Agent	1383.94	abcdef
Red Duke	1379.4	abcdef
Torro Rosso	1356.71	abcdefg
Macon	1345.37	abcdefgh
Sofire	1338.56	abcdefghi
OSYF22-4022	1315.88	abcdefghij
369	1297.73	abcdefghijk
Sweet Tule	1293.19	abcdefghijk
XON-106Y	1281.84	abcdefghijk
Rio Del Sol	1272.77	abcdefghijk
380	1270.5	abcdefghijk
Red Halen	1265.96	abcdefghijk
Candy Kim	1250.08	abcdefghijkl
XON-300Y	1238.74	abcdefghijklm
SON-404Y	1234.2	abcdefghijklm
Vidora	1172.94	bcdefghijklmn
Chianti	1170.68	bcdefghijklmn
Red Maiden	1170.68	bcdefghijklmn
10258	1159.33	bcdefghijklmn
Mata Hari	1141.18	bcdefghijklmn
Reforma	1136.64	cdefghijklmn
Plethora	1123.03	defghijklmn
Monjablanca	1123.03	defghijlkmn
1407	1120.76	defghijklmn
1011	1118.49	defghijklmn
OSYF10-4021	1098.08	efghijklmn
OSYF12-7091	1077.66	efghijklmn
Candy Ann	1068.58	fghijklmno
Early Sweet	1068.58	fghijklmno
Joelino	1052.7	ghijklmno
Copada	1045.89	ghijklmno
Georgia Boy	1027.74	hijklmno
EMY 55457	1020.94	ijklmno
Superex	1016.4	jklmno
A2800	993.71	klmno
SS4402	993.71	klmno
A2849	986.91	klmno
Candy Joy	941.53	lmno
Gilmore 26	941.53	lmno
SS4001	941.53	lmno
Century	941.53	lmno
Sweet Magnolia	939.26	lmno
Fast Track	936.99	lmno
Sapelo	927.92	mno
A2801	927.92	mno
A2290	880.28	no
Sweet Azalea	750.96	o

Note. Letters that are the same between varieties indicate that those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 3. Vidalia Onion Colossal Yield (40-lb Boxes Per Acre) Measured After Grading.

Variety	Total yield 40 lb boxes/acre	
XON-106Y	327.08	a
1014	308.55	ab
Sweet Agent	308.55	ab
Reforma	294.94	ab
AG-3310	285.86	ab
Sweet Magnolia	283.59	ab
Macon	276.79	abc
Century	240.49	abcd
Torro Rosso	226.88	bcde
Joelino	222.34	bcdef
EMY 55457	220.07	bcdef
Sweet Azalea	217.8	bcdef
Red Halen	195.11	bcdefg
Georgia Boy	192.84	bcdefgh
Tania	172.43	bcdefghi
Monjablanca	142.93	bcdefghij
OSYF10-4021	142.93	cdefghijk
Superex	138.39	cdefghijk
OSYF22-4022	136.13	defghijk
SON-404Y	129.32	defghijk
Copada	127.05	defghijk
XON-300Y	124.78	defghijk
Chianti	111.17	defghijk
A2849	108.9	defghijk
Dulciana	102.09	defghijk
Maragogi	99.83	efghijk
1407	93.02	efghijk
Candy Kim	93.02	efghijk
A2290	88.48	efghijk
Rio Dulce	83.94	fghijk
10258	79.41	ghijk
Plethora	77.14	hijk
Rio Del Sol	77.14	hijk
Red Duke	74.87	hijk
SS4402	70.33	hijk
OSYF12-7091	68.06	hijk
Gilmore 26	65.79	hijk
Mata Hari	65.79	hijk
Sapelo	63.53	hijk
Sofire	63.53	hijk
Vidora	61.26	hijk
380	61.26	hijk
Early Sweet	54.45	ijk
Sweet Tule	47.64	jk
369	45.38	jk
A2801	45.38	jk
A2800	40.84	jk
Candy Joy	31.76	k
SS4001	24.96	k
Red Maiden	18.15	k
Candy Ann	15.88	k
Fast Track	11.34	k
1011	4.54	k

Note. Letters that are the same between varieties indicate that those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 4. Vidalia Onion Jumbo Yield (40-lb Boxes Per Acre) Measured After Grading.

Variety	Total yield 40 lb boxes/acre	
Maragogi	1338.56	a
Rio Dulce	1336.29	a
Red Duke	1256.89	ab
1014	1229.66	ab
Sofire	1222.86	abc
369	1220.59	abcd
Sweet Tule	1216.05	abcd
Tania	1206.98	abcd
Dulciana	1204.71	abcde
AG-3310	1138.91	abcdef
380	1134.38	abcdef
OSYF22-4022	1132.11	abcdef
Torro Rosso	1107.15	abcdefg
Candy Kim	1102.61	abcdefgh
XON-300Y	1068.58	abcdefghi
10258	1068.58	abcdefghi
Macon	1048.16	abcdefghij
Vidora	1043.63	bcdefghij
Sweet Agent	1043.63	bcdefghij
1011	1041.36	bcdefghij
SON-404Y	1039.09	bcdefghij
Rio Del Sol	1027.74	bcdefghij
Red Maiden	1025.48	bcdefghij
Mata Hari	1020.94	bcdefghij
Plethora	1014.13	bcdefghij
Chianti	1005.06	bcdefghij
Red Halen	998.25	bcdefghij
1407	936.99	cdefghijk
A2800	934.73	cdefghijk
Monjablanca	930.19	defghijk

table continued on next page

Variety	Total yield 40 lb boxes/acre	
Candy Ann	930.19	defghijk
Early Sweet	914.31	efghijk
OSYF10-4021	909.77	fghijk
OXYF12-7091	907.5	fghijk
XON-106Y	896.16	fghijk
Copada	884.81	fghijk
A2801	868.93	fghijk
A2849	868.93	fghijk
GIlmore 26	868.93	fghijk
Superex	857.59	fghijk
SS4402	850.78	fghijk
Reforma	837.17	ghijk
Sapelo	828.09	ghijk
Joelino	816.75	ghijk
Georgia Boy	812.21	hijk
EMY 55457	791.79	ijkl
Candy Joy	791.79	ijkl
SS4001	789.53	ijkl
Fast Track	778.18	ijkl
A2290	773.64	jkl
Century	685.16	kl
Sweet Magnolia	648.86	kl
Sweet Azalea	515.01	l

Note. Letters that are the same between varieties indicate that those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 5. Vidalia Onion Medium Yield (40-lb Boxes Per Acre) Measured After Grading.

Variety	Medium yield 40 lb boxes/acre	
Rio Del Sol	167.89	a
Fast Track	147.47	ab
Red Maiden	127.05	abc
SS4001	127.05	abc
Candy Ann	122.51	abcd
Candy Joy	117.98	abcd
OSYF12-7091	102.09	bcde
Early Sweet	99.83	bcde
1407	90.75	bcdef
Dulciana	88.48	cdefg
380	74.87	cdefgh
1011	72.6	cdefghi
SS4402	72.6	cdefghi
Vidora	68.06	defghij
SON-404Y	65.79	defghijk
Mata Hari	54.45	efghijkl
Candy Kim	54.45	efghijkl
Chianti	54.45	efghijkl
Sofire	52.18	efghijkl
Red Halen	49.91	efghijkl
OSYF22-4022	47.64	efghijkl
Red Duke	47.64	efghijkl
XON-300Y	45.38	efghijkl
OSYF10-4021	45.38	efghijkl
Rio Dulce	38.57	fghijkl
Sapelo	36.3	fghijkl
Copada	34.03	fghijkl
Plethora	31.76	ghijkl
369	31.76	ghijkl
Sweet Agent	31.76	ghijkl
AG-3310	29.49	hijkl
Sweet Tule	29.49	hijkl
Torro Rosso	22.69	hijkl
Monjablanca	20.42	hijkl
Georgia Boy	20.42	hijkl
Macon	20.42	hijkl
Superex	20.42	hijkl
Tania	18.15	hijkl
A2800	18.15	hijkl
A2290	18.15	hijkl
Century	15.88	ijkl
Maragogi	15.88	ijkl
Sweet Azalea	15.88	ijkl
Joelino	13.61	jkl
A2801	13.61	jkl
XON 106Y	13.61	jkl
1014	11.34	jkl
10258	11.34	jkl
EMY 55457	9.08	kl
A2849	9.08	kl
Gilmore 26	6.81	l
Sweet Magnolia	6.81	l
Reforma	4.54	l

Note. Letters that are the same between varieties indicate that those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 6. Vidalia Onion Cull Weights (40-lb Boxes Per Acre) Measured After Grading.

Variety	Cull weights 40 lb boxes/acre	
Sweet Magnolia	929.05	a
Sweet Azalea	885.95	ab
Century	755.49	abc
Joelino	671.55	bcd
Reforma	623.91	cde
A2290	622.77	cde
Georgia Boy	621.64	cde
Superex	584.2	cdef
A2849	575.13	cdefg
Monjablanca	542.23	cdefgh
A2801	530.89	cdefghi
Sapelo	510.47	defghij
EMY 55457	504.8	defghij
Gilmore 26	496.86	defghijk
A2800	474.17	defghijkl
XON 106Y	419.72	efghijklm
10258	382.28	fghijklmn
Copada	369.81	fghijklmno
Red Halen	352.79	ghijklmnop
Macon	338.04	hijklmnop
Mata Hari	326.7	hijklmnopq
OSYF10-4021	319.89	hijklmnopqr
Chianti	308.55	ijklmnopqrs
Plethora	306.96	ijklmnopqrs
SS4402	287	jklmnopqrst
Torro Rosso	272.25	klmnopqrst
Tania	260.91	lmnopqrst
OSYF12-7091	251.83	lmnopqrst
1014	250.7	lmnopqrst
Sweet Agent	235.95	mnopqrst
Candy Joy	217.8	mnopqrst
Sweet Tule	207.59	mnopqrst
Early Sweet	199.65	mnopqrst
XON-300Y	198.52	mnopqrst
369	187.17	nopqrst
1407	175.83	nopqrst
AG-3310	175.83	nopqrst
SON-404Y	171.29	nopqrst
OSYF22-4022	170.16	nopqrst
380	153.14	opqrst
Candy Kim	149.74	opqrst
SS4001	147.47	opqrst
Fast Track	137.26	pqrst
Dulciana	133.86	pqrst
Maragogi	127.05	pqrst
Rio Dulce	106.63	qrst
Red Maiden	104.36	qrst
Vidora	99.83	qrst
Candy Ann	93.02	rst
Red Duke	91.88	st
Rio Del Sol	88.48	st
Sofire	71.47	t
1011	71.47	t

Note. Letters that are the same between varieties indicate that those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

UGA Variety Trial Quality Report 2023–2024 Crop Season

Jason Lessl, Daniel Jackson, Chris Tyson, Jason Edenfield, Derrick Bowen, Aubrey Shirley, Anthony Bateman, Denny Thigpen, Steven Powell, Savannah Tanner, Shane Curry, Lauren Stanley, and Ross Greene

Introduction

Each season the UGA, Agricultural and Environmental Services Laboratories (AESL) evaluates the flavor-associated compounds in the short-day onions grown in the variety trial. These onion varieties are submitted by the participating seed companies, grown at the Vidalia Onion and Vegetable Research Center, and once harvested and dried, are submitted to the AESL for analysis of the pungency-related compounds: pyruvic acid, lachrymatory factor (LF), and methyl thiosulfinates.

Due to the association of Vidalia onions with low pungency and sweet flavor, this annual evaluation provides useful information about the relative flavor quality of these onion varieties. Furthermore, results are used to evaluate Yellow Granex varieties before officially qualifying them to be grown as sweet Vidalia onions in the region.

This publication summarizes the flavor analysis results from the 2023–2024 growing season, as well as comparing the performance of each variety over the past three growing seasons.

Materials and Methods

There were 53 onion varieties analyzed as part of the 2023–2024 variety trial. Each variety was grown at the research center in quadruplicate plots. Harvested onions from each plot were graded, dried, and submitted to the lab individually. Cores taken from 10 onions within each replicate were composited and pressed to collect the onion juice, which was analyzed following procedures described in Kim et al. (2017).

Results and Discussion

The following tables compare the concentrations of flavor-associated compounds in onions grown as a part of the 2023–2024 variety trial. It should be noted that as the three measured parameters decrease, the onions are considered to have a superior flavor quality. In this year's Yellow Granex variety trials, the pyruvic acid (pungency) content ranged from 2.5–6.0 µmol/ml, which is a decrease of 12% compared to the past two growing seasons. Lachrymatory factor ranged from 0.5–2.1 µmol/ml, which was a decrease of 83% compared to the last two seasons. Finally, methyl thiosulfinates ranged from 2.7–16.6 nmol/ml which was a decrease of 79% compared to the previous growing seasons.

Overall, the flavor quality of the variety trial onions was significantly improved as compared to the past two seasons. This could be attributed to the increased rainfall prior to bulb initiation, which may have leached more sulfur from the soil. This year's data on the cumulative variety flavor quality rankings are also provided along with the average rating of Yellow Granex onion varieties grown over the past three seasons.

For additional information regarding the performance of a given variety, please contact your Extension agent or the Vidalia Onion and Vegetable Research Center. We would like to thank the participating seed companies as well as the Vidalia Onion Committee for their support of this trial.

References

Kim, H.-Y., Jackson, D., Adhikari, K., Riner, C., & Sanchez-Brambila, G. (2017). Relationship between consumer acceptability and pungency-related flavor compounds of Vidalia onions. *Journal of Food Science, 82*(10), 2396–2402. https://doi.org/10.1111/1750-3841.13915

Table 1. Pungency (Pyruvic Acid) Content in Onions in the 2023–2024 Variety Trial.

Variety	Pyruvic ccid µmole/g	
Gilmore 26	2.5	a
SS4402	3.2	ab
A2801	3.3	abc
Sweet Azalea	3.7	abcd
Macon	3.7	abcd
A2800	3.7	abcd
SS4001	3.4	abcd
Sweet Magnolia	3.8	abcd
1407	3.8	abcd
Candy Ann	3.9	abcde
Red Duke	3.9	abcde
1014[b]	4.0	abcdef
Candy Kim	4.0	abcdef
Sweet Agent	4.1	abcdef
XON-404Y	4.1	abcdefg
Maragogi	4.2	abcdefg
Plethora	4.2	abcdefg
Fast Track	4.3	abcdefg
Torro Rosso	4.3	bcdefg
XON 106Y	4.3	bcdefg
Sapelo	4.4	bcdefg
AG-3310	4.4	bcdefg
OSYF22-4022	4.4	bcdefg
Sweet Tule	4.4	bcdefg
1011	4.5	bcdefg
Red Maiden	4.5	bcdefg
Reforma[c]	4.5	bcdefg
Candy Joy	4.6	bcdefg
Red Halen	4.6	bcdefg
Monja blanca	4.6	bcdefg
XON-300Y	4.7	bcdefg
369	4.7	bcdefg
Copada[d]	4.7	bcdefg
OSYF12-7091	4.7	bcdefg
Vidora	4.7	bcdefg
A2849	4.7	bcdefg
Tania	4.8	bcdefg
EMY 55457	4.8	bcdefg
Early Sweet	4.9	bcdefg
Superex	4.9	bcdefg
Chianti	5.0	bcdefg
Georgia Boy	5.0	cdefg
Mata Hari	5.1	cdefg
Century	5.2	defg
OSYF10-4201	5.3	defg
Rio Dulce	5.4	def
Dulciana	5.5	defg
Joelino	5.7	efg
10258[e]	5.7	efg
Rio Del Sol	5.8	fg
Sofire	5.9	g
380	6.0	g

Note. Similar letters between varieties indicate those varieties are not significantly different according to Tukey test ($p \leq 0.05$).
[b] formerly 5901
[c] formerly EMY 55455
[d] formerly EMY 55126
[e] formerly A1298

Table 2. Onion Lachrymatory Factor (Propanethial S-Oxide) Content in Onions in the 2023–2024 Variety Trial.

Variety	Lachrymatory factor µmole/g	
Gilmore 26	0.5	a
SS402	0.7	ab
Fast Track	0.7	ab
A2801	0.7	abc
Sweet Agent	0.7	abc
1407	0.8	abcd
Red Duke	0.8	abcd
Tania	0.9	abcde
A2800	0.9	abcde
Vidora	0.9	abcdef
Candy Kim	0.9	abcdef
Candy Ann	0.9	abcdef
1011	0.9	abcdef
Candy Joy	1.0	abcdef
Early Sweet	1.0	abcdef
Red Maiden	1.0	abcdef
1014[b]	1.0	abcdef
SS4001	1.0	abcdef
Maragogi	1.1	abcdef
OSYF12-7091	1.1	abcdef
Macon	1.1	abcdef
A2290	1.1	abcdef
OSYF10-4021	1.2	abcdefg
A2849	1.2	abcdefg
Superex	1.2	abcdefg
Dulciana	1.2	abcdefg
Sweet Magnolia	1.3	abcdefg
OSYF22-4022	1.3	abcdefg
369	1.3	abcdefg

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Variety	Lachrymatory factor µmole/g	
AG-3310	1.3	abcdefg
Plethora	1.3	abcdefg
10258[c]	1.3	abcdefg
EMY 55457	1.3	abcdefg
Sweet Azalea	1.3	abcdefg
Monja blanca	1.3	abcdefg
XON-404Y	1.4	abcdefg
Chianti	1.4	abcdefg
XON-300Y	1.4	abcdefg
Torro Rosso	1.5	bcdefg
Mata Hari	1.5	bcdefg
Sweet Tule	1.5	bcdefg
Red Halen	1.5	bcdefg
Joelino	1.5	bcdefg
XON 106Y	1.5	bcdefg
Sofire	1.5	bcdefg
Rio Dulce	1.5	cdefg
Copada[d]	1.7	defg
Reforma[e]	1.7	defg
Sapelo	1.8	efg
Georgia Boy	1.8	efg
380	1.8	fg
Century	1.8	fg
Rio Del Sol	2.1	g

Note. Similar letters between varieties indicate those varieties are not significantly different according to Tukey test ($p \leq 0.05$).
[b] formerly 5901
[c] formerly A1298
[d] formerly EMY 55126
[e] formerly EMY 55455

Table 3. Methyl Thiosulfinate Content in Onions in the 2023–2024 Variety Trial.

Variety	Methyl thiosulfinates nmole/g	
Gilmore 26	2.7	a
A2801	3.2	a
SS4402	4	ab
SS4001	4.3	ab
A2800	4.4	av
Vidora	4.4	av
Georgia Boy	4.8	abc
A2849	4.8	abc
EMY 55457	5.5	abcd
Candy Kim	5.5	abcd
1407	5.7	abcde
Superex	5.8	abcde
Sweet Azalea	5.8	abcde
Early Sweet	5.9	abcdef
A2290	6.3	abcdef
Plethora	6.4	abcdef
Tania	6.5	abcdef
1014[b]	7.0	sbcdef
Red Duke	7.0	abcdef
Maragogi	7.0	abcdef
Red Maiden	7.2	abcdefg
1011	7.6	abcdefg
Sweet Agent	7.8	abcdefg
Reforma[c]	7.8	abcdefg
Candy Ann	7.9	abcdefg
Copada[d]	8.1	abcdefg
Sweet Magnolia	8.1	abcdefg
Candy Joy	8.2	abcdefg
Sweet Tule	8.2	abcdefg
10258[e]	8.5	abcdefg
Rio Del Sol	8.6	abcdefg
Red Halen	8.9	abcdefg
Dulciana	8.9	abcdefg
Rio Dulce	8.9	abcdefg
369	9.1	abcdefg
AG-3310	9.2	abcdefg
Torro Rosso	9.2	abcdefg
Century	9.7	abcdefg
Fast Track	9.8	abcdefg
Mata Hari	10.4	abcdefg
Chianti	10.9	abcdefg
Sapelo	11.9	abcdefg
XON-300Y	11.9	abcdefg
Monja blanca	12.0	abcdefg
Macon	13.0	bcdefg
Sofire	13.3	bcdefg
380	13.5	bcdefg
Joelino	14.3	cdefg
OSYF10-4201	14.9	defg
XON 106Y	15.2	efg
XON-404Y	15.4	fg
OSYF22-4022	15.4	fg
OSYF12-7091	16.6	g

Note. Similar letters between varieties indicate those varieties are not significantly different according to Tukey test ($p \leq 0.05$).
[b] formerly 5901
[c] formerly EMY 55455
[d] formerly EMY 55126
[e] formerly A1298

Table 4. Overall Flavor Quality Ranking of the 2023–2024 Variety Trial Onions.

Variety	Rank
Gilmore 26	1
SS402	2
A2801	3
A2800	4
SS4401	5
1407	6
Red Duke	7
Fast Track	8 (t)
Candy Kim	8 (t)
Sweet Agent	8 (t)
Sweet Azalea	8 (t)
Vidora	8 (t)
A2290	13
Macon	14 (t)
Candy Ann	14 (t)
A2849	14 (t)
1014[b]	14 (t)
Sweet Magnolia	14 (t)
EMY 55457	19 (t)
Maragogi	19 (t)
Tania	19 (t)
Early Sweet	22 (t)
Superex	22 (t)
Plethora	22 (t)
Candy Joy	25 (t)
Red Maiden	25 (t)
1011	25 (t)
369	28 (t)
Monja blanca	28 (t)

Variety	Rank
XON-300Y	28 (t)
AG-3310	28 (t)
Chianti	28 (t)
Torro Rosso	33 (t)
Sweet Tule	33 (t)
Red Halen	33 (t)
Georgia Boy	33 (t)
Dulciana	37 (t)
Mata Hari	37 (t)
10258[c]	39 (t)
Copada[d]	39 (t)
Reforma[e]	39 (t)
XON-404Y	42 (t)
Sapelo	42 (t)
Rio Dulce	42 (t)
OSYF22-4022	45 (t)
OSYF12-7091	45 (t)
OSYF10-4021	45 (t)
XON 106Y	45 (t)
Joelino	49
Sofire	50 (t)
Century	50 (t)
Rio Del Sol	50 (t)
380	53

Ranked on lowest pyruvic acid, lachrymatory factor, and methyl thiosulfinates.
[b] formerly 5901
[c] formerly A1298
[d] formerly EMY 55126
[e] formerly EMY 55455
(t) tied

Table 5. Overall Flavor Quality Ranking of Yellow Variety Trial Onions Harvested in 2022–2024.

Variety	Rank
Candy Kim	1 (t)
Maragogi	1 (t)
Tania	3
Emy 55457	4 (t)
Plethora	4 (t)
Sweet Azalea	4 (t)
Reforma[a]	5 (t)
Sweet Agent	5 (t)
Vidora	9 (t)
Sweet Magnola	9 (t)
Superex	9 (t)
Macon	9 (t)
Fast Track	9 (t)

Variety	Rank
Georgia Boy	14 (t)
Copada[b]	14 (t)
Candy Ann	16 (t)
Sapelo	16 (t)
Century	18 (t)
EMY 55457	18 (t)
Candy Joy	20

Ranked in order of lowest overall pyruvic acid, lachrymatory factor, and methyl thiosulfinates. Only Yellow Granex varieties were included in the table.
[a] formerly EMY 55455
[b] formerly EMY 55126

UGA Vidalia Onion Variety Trial 2024–2025 Crop Season

Chris Tyson, Jason Edenfield, Aubrey Shirley, Derrick Bowen, Denny Thigpen, Chase Watts, Nick Ray, Steven Powell, Savannah Tanner, Ross Greene, Lauren Stanley, Daniel Jackson, Ted McAvoy, Manisha Kumari, and Jason Lessl

Introduction

The University of Georgia (UGA) evaluates short day onion varieties to determine their performance characteristics in standardized growing practices. Variety entries for the trial are submitted by participating seed companies. These trials are conducted at the Vidalia Onion and Vegetable Research Center (VOVRC) located in Lyons, GA.

Materials and Methods

There were 49 varieties entered into the 2024–2025 UGA onion variety trial. After seed entries were received, seedbeds were grown for transplant production by UGA staff at the VOVRC. Pre-plant seedbed treatment included a 75-gallon per acre fumigation treatment of metam sodium for weed and disease suppression. The seedbeds were planted on September 23, 2024, and the trial was transplanted on November 19, 2024. Upon harvest and grading, yield measurements are taken, and a 10-bulb sample of jumbo onions per plot is sent to the UGA Crop Quality Laboratory in Athens, GA to undergo flavor testing. Seedbed and trial fertility, as well as fungicide programs, are listed below. The trial evaluates each variety replication in a 20 ft long by 6 ft wide plot containing 240 bulbs. Each variety was replicated four times and harvested based on a committee decision of maturity. The transplant population for the trial was equivalent to 87,120 plants per acre.

Seedbed Fertility:

- 700 lb/acre of 5-10-15 applied Sept. 5, 2024 (preplant incorporated)
- 100 lb/acre of 5-10-15 applied Oct. 10, 2024
- 100 lb/acre of 5-10-15 applied Oct. 17, 2024
- 200 lb/acre of 5-10-15 applied Nov. 21, 2024

Total pounds/acre applied:
57.5 (N) – 115 (P) – 172.5 (K) – 80.5 (S) - 103.5 (Ca)

Note: All fertilizer applications were applied with a First Products brand drop spreader.

Seedbed Pesticides Applied:

Date	Product Applied
Aug. 9, 2024	Vapam HL (75 gal/acre)
Oct. 24, 2024	Badge SC (1 pt/acre)
Nov. 10, 2024	Badge SC (1 pt/acre)
Nov. 17, 2024	Badge SC (1 pt/acre) + Fontelis (24 oz/acre)
Nov. 21, 2024	Badge SC (1 pt/acre) + Fontelis (24 oz/acre)

Trial Fertility:

- 200 lb/acre of 5-10-15 applied Nov. 21, 2024
- 200 lb/acre of 5-10-15 applied Dec. 2, 2024
- 400 lb/acre of 5-10-15 applied Jan. 9, 2025
- 400 lb/acre of 5-10-15 applied Jan. 30, 2025
- 150 lb/acre of calcium nitrate applied Feb. 15, 2025
- 150 lb/acre of calcium nitrate applied Feb. 26, 2025

Total pounds/acre applied:
106.5 (N) – 120 (P) – 180 (K) – 84 (S) - 165 (Ca)

Note: Soil sample test results called for 125–150 lb/acre nitrogen, 60 lb/acre of phosphorus, 90 lb/acre of potash, and 40–60 lb/acre of sulfur. All fertilizer applications applied with a First Products brand drop spreader.

Fungicides Applied:

Date	Fungicide Applied
Jan. 5, 2025	Fontelis (24 oz/acre) + Badge SC (1 pt/acre)
Jan. 12, 2025	Rampart (2 qt/acre) + Bravo (1 qt/acre)
Jan. 19, 2025	Badge SC (1 pt/acre) + Miravis Prime (11.4 oz/acre)
Feb. 7, 2025	Inspire Super (20 oz/acre) + Badge SC (1 pt/acre)
Feb. 12, 2025	Luna Flex (14 oz/acre) + Lifegard (2 oz/acre)
Feb. 24, 2025	Omega 500 (16 oz/acre) + Badge SC (1 pt/acre)
Mar. 3, 2025	Miravis Prime (11.4 oz)
Mar. 11, 2025	Luna Flex (14 oz/acre) + Badge SC (1 pt/acre)
Mar. 18, 2025	Inspire Super (20 oz/acre) + Lifegard (2 oz/acre) + Badge SC (1 pt/acre)
Mar. 24, 2025	Fontelis (24 oz/acre) + Badge SC (1 pt/acre) + Lifegard (2 oz/acre)

Insecticides Applied:

Date	Product Applied
Mar. 3, 2025	Torac (24 oz/acre)
Mar. 18, 2025	Torac (24 oz/acre)
Mar. 24, 2025	Exirel (20.5 oz/acre)

Herbicides Applied:

Date	Product Applied
Nov. 25, 2024	Goal 2XL (1 quart/acre) + Prowl (1 quart/acre)

Harvest Timing

Each variety was selected for harvest based upon signs of weak tops and/or adequately sized bulbs. A committee of Extension agents determined the harvest/pulling of varieties. Participating seed companies reserve the right to specify when or what characteristics determine the harvest of their variety. Varieties were clipped 7 days after their dig date. Growing degree days (GDDs) aid us in forecasting harvest maturity for onions. A base temperature of 50 °F is used in formulating GDDs accumulated.

Variety	Maturity	Planting date	Dig date	Days after transplanting to digging	GDD 50 °F base
Candy Joy (Lot #24-2010-24A), Candy Joy (Lot#24-1099-24) Candy Ann, Fast Track, 1407, Vidora	Very Early	Nov. 19, 2024	Apr. 1, 2025	133	869
Candy Kim, Early Sweet, 1011, 404Y, OSYF10-4021, OSYF12-7091, OSYF22-4022, OSYF 23-5082, OSYF23-5084, AG 3310, Naranco	Early	Nov. 19, 2024	Apr. 8, 2025	140	1026
Sapelo, 106Y, 300Y, 10258, 1015, Maragogi, Dulciana, Plethora	Early-Main	Nov. 19, 2024	Apr. 15, 2025	147	1117
Reforma, Copada, Century, Sweet Magnolia, Sweet Azalea, Red Maiden, Red Halen, Alba Blanca, Chianti, GA Boy, Superex, Rio Dulce, Rio Del Sol, Tania, 369, Tacoma, Sofire, EMY 55186	Main	Nov. 19, 2024	Apr. 22, 2025	154	1259
Macon, 1014, A2801, A2290, Gilmore 26, Ms. Scarlett	Late	Nov. 19, 2024	Apr. 29, 2025	161	1421

Results and Discussion

The following tables show field weights, marketable yields, colossal yields, jumbo yields, medium yields, and cull yield. For additional information regarding the performance of a given variety, please contact your Extension agent or the Vidalia Onion and Vegetable Research Center. We would like to thank the participating seed companies as well as the Vidalia Onion Committee for their support of this trial.

Variety Entries in the 2024—2025 Trial

Variety name	Company	Type
Candy Kim	Solar	Yellow Granex
Candy Ann	Solar	Yellow Granex
Candy Joy (Lot # 24- 2010-24A)	Solar	Yellow Granex
Candy Joy (Lot #24-1099-24)	Solar	Yellow Granex
Fast Track	Vilmorin-Mikado	Yellow Granex

table continued on next page

Variety name	Company	Type
EMY 55455 ‘Reforma’	Emerald	Yellow Granex
EMY 55126 ‘Copada’	Emerald	Yellow Granex
EMY 55186	Emerald	Yellow Granex
Sweet Magnolia	Seminis	Yellow Granex
Century	Seminis	Yellow Granex
Sweet Azalea	Seminis	Yellow Granex
Macon	Bejo	Yellow Granex
Tania	Bejo	Yellow Granex
369	Bejo	Yellow Granex
Maragogi	Bejo	Yellow Granex
Sapelo	DP Seeds	Yellow Granex
Georgia Boy	DP Seeds	Yellow Granex
DP 1407	DP Seeds	Yellow Granex
Early Sweet	DP Seeds	Yellow Granex
Superex	American Takii	Yellow Granex
XON-404Y	Sakata	Yellow Granex
XON-300Y	Sakata	Yellow Granex
XON-106Y	Sakata	Yellow Granex
Vidora	Nunhems	Yellow Granex
Plethora	Nunhems	Yellow Granex
Nunhems 1014	Nunhems	Yellow Granex
Nunhems 1011	Nunhems	Yellow Granex
Nunhems 1015	Nunhems	Yellow Granex
10258	Hazera	Yellow Granex
A2801	Hazera	Yellow Granex
A2290	Hazera	Yellow Granex
OSYF23- 5084	Crookham	Yellow Granex
OSYF23- 5082	Crookham	Yellow Granex
OSYF12- 7091	Crookham	Yellow Granex
OSYF10- 4021	Crookham	Yellow Granex
OSYF22- 4022	Crookham	Yellow Granex
Gilmore 26	Pike’s Seed	Yellow Granex
AG-3310	Amerigrow	Yellow Granex
Rio Del Sol	American Takii	Yellow Grano
Rio Dulce	American Takii	Yellow Grano
Dulciana	Nunhems	Yellow Grano
Tacoma	Bejo	Yellow Grano
Naranco	Bejo	Yellow Grano
Ms. Scarlett	Hazera	Red
Red Halen	Seminis	Red
Red Maiden	Seminis	Red
Chianti	DP Seeds	Red
Sofire	Nunhems	Red
Alba Blanca	Seminis	White

Table 1. Vidalia Onion Field Weight (40-lb Boxes Per Acre) Measured Before Grading.

Variety	40 lb boxes/acre	
1014	1847.9	a
Tacoma	1798	ab
369	1733.3	abc
Tania	1691.4	abcd
Ms. Scarlett	1647.1	abcde
Sweet Magnolia	1604	abcdef
Macon	1579.1	bcdefg
Alba Blanca	1564.3	bcdefgh
GA Boy	1554.1	bcdefgh
1015	1545	cdefgh
Rio Dulce	1537.1	cdefghi
Superex	1530.3	cdefghij
Reforma (EMY 55455)	1491.7	cdefghijk
XON 300Y	1496.2	cdefghijk
Century	1481.5	defghijk
Early Sweet	1466.8	defghijk
OSYF23-5084	1477	defghijk
XON 106Y	1479.2	defghijk
Candy Kim	1452	defghijkl
Sofire	1452	defghijkl
1011	1430.5	efghijklm
Gilmore 26	1425.9	efghijklm
Red Halen	1422.5	efghijklm
EMY 55186	1412.3	efghijklmn
AG-3310	1369.2	fghijklmno
Maragogi	1362.4	fghijklmno
Naranco	1369.2	fghijklmno
OSYF23-5082	1361.3	fghijklmno
Sweet Azalea	1395.3	fghijklmno
Copada (EMY 55126)	1348.8	ghijklmno
A2290	1338.6	ghijklmnop
Candy Ann	1315.9	hijklmnopq
10258 (formerly A1298)	1289.8	ijklmnopq
Plethora	1293.2	ijklmnopq
Fast Track	1283	jklmnopq
Rio Del Sol	1283	jklmnopq
1407	1260.3	klmnopq
Dulciana	1270.5	klmnopq
OSYF22-4022	1277.3	klmnopq
Red Maiden	1246.7	klmnopq
Vidora	1249	klmnopq
A2801	1204.7	lmnopq
OSYF10-4021	1207	lmnopq
Candy Joy (Lot # 24-2010-24A)	1188.8	mnopq
SON-404Y	1191.1	mnopq
Chianti	1165	nopq
Sapelo	1152.5	opq
OSYF12-7091	1094.7	pq
Candy Joy (Lot # 24-1099-24)	1085.6	q

Note. Letters that are the same between varieties indicate that those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 2. Vidalia Onion Marketable Yield (40-lb Boxes Per Acre) Measured After Grading.

Variety	Total yield 40 lb boxes/acre	
1014	1613.1	a
Tacoma	1599.5	a
Ms. Scarlett	1481.5	ab
XON 106Y	1452	abc
369	1427	abcd
1011	1386.2	abcde
Candy Kim	1383.9	abcde
Macon	1356.7	abcde
Rio Dulce	1383.9	abcde
Sofire	1379.4	abcde
Tania	1386.2	abcde
Early Sweet	1343.1	abcdef
AG-3310	1270.5	abcdefg
Maragogi	1300	abcdefg
OSYF23-5084	1275	abcdefg
XON 300Y	1302.3	abcdefg
1015	1204.7	bcdefgh
Candy Ann	1197.9	bcdefgh
Dulciana	1202.4	bcdefgh
EMY 55186	1209.2	bcdefgh
Naranco	1197.9	bcdefgh
OSYF23-5082	1218.3	bcdefgh
Plethora	1220.6	bcdefgh
Reforma (EMY 55455)	1218.3	bcdefgh

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Variety	Total yield 40 lb boxes/acre	
10258 (formerly A1298)	1188.8	bcdefghi
Century	1123	bcdefghi
Fast Track	1163.9	bcdefghi
OSYF22-4022	1143.5	bcdefghi
Red Halen	1132.1	bcdefghi
Rio Del Sol	1159.3	bcdefghi
Superex	1145.7	bcdefghi
Vidora	1132.1	bcdefghi
SON-404Y	1109.4	cdefghij
Copada (EMY 55126)	1095.8	cdefghijk
Candy Joy (Lot # 24- 2010-24A)	1079.9	defghijk
Sapelo	1084.5	defghijk
1407	1064	efghijk
Gilmore 26	1055	efghijk
OSYF10-4021	1045.9	efghijk
Candy Joy (Lot # 24-1099-24)	986.9	fghijk
Sweet Magnolia	989.2	fghijk
OSYF12-7091	966.5	ghijk
GA Boy	898.4	hijkl
Red Maiden	871.2	hijkl
A2801	837.2	ijkl
Chianti	837.2	ijkl
A2290	762.3	jkl
Alba Blanca	741.9	kl
Sweet Azalea	599	l

Note. Letters that are the same between varieties indicate that those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 3. Vidalia Onion Colossal Yield (40-lb Boxes Per Acre) Measured After Grading.

Variety	Total yield 40 lb boxes/acre	
1014	487.8	a
Macon	487.8	a
Ms. Scarlett	446.9	ab
Tacoma	417.5	abc
Tania	383.4	abcd
Superex	301.7	abcde
Gilmore 26	283.6	abcdef
XON 106Y	276.8	bcdefg
Rio Dulce	254.1	bcdefgh
Rio Del Sol	249.6	bcdefghi
XON 300Y	231.4	cdefghij
Reforma (EMY 55455)	215.5	cdefghijk
Sweet Magnolia	220.1	cdefghijk
369	186	defghijk
A2290	192.8	defghijk
Copada (EMY 55126)	188.3	defghijk
A2801	167.9	efghijk
AG-3310	118	efghijk
Candy Kim	108.9	efghijk
Century	167.9	efghijk
Early Sweet	93	efghijk
EMY 55186	138.4	efghijk
GA Boy	163.4	efghijk
OSYF23-5084	118	efghijk
Sofire	163.4	efghijk
Sweet Azalea	95.3	efghijk
Candy Ann	83.9	fghijk
Naranco	90.8	fghijk
Red Halen	79.4	fghijk
OSYF23-5082	72.6	ghijk
Dulciana	54.5	hijk
OSYF10-4021	56.7	hijk
Plethora	56.7	hijk
Sapelo	52.2	hijk
Fast Track	40.8	ijk
Maragogi	43.1	ijk
OSYF22-4022	43.1	ijk
1011	29.5	jk
1015	29.5	jk
1407	36.3	jk
Alba Blanca	29.5	jk
Candy Joy (Lot # 24- 1099-24)	27.2	jk
Candy Joy (Lot # 24- 2010-24A)	34	jk
Chianti	38.6	jk
OSYF12-7091	25	jk
SON-404Y	22.7	jk
Vidora	36.3	jk
10258 (formerly A1298)	13.6	k
Red Maiden	11.3	k

Note. Letters that are the same between varieties indicate that those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 4. Vidalia Onion Jumbo Yield (40-lb Boxes Per Acre) Measured After Grading.

Variety	Total yield 40 lb boxes/acre	
1011	1293.2	a
369	1220.6	ab
Candy Kim	1218.3	abc
Early Sweet	1197.9	abcd
Maragogi	1184.3	abcde
Sofire	1184.3	abcde
Tacoma	1163.9	abcdef
XON 106Y	1157.1	abcdef
1015	1136.6	abcdefg
10258 (formerly A1298)	1136.6	abcdefg
OSYF23- 5084	1118.5	abcdefg
Plethora	1129.8	abcdefg
1014	1104.9	abcdefgh
AG-3310	1095.8	abcdefgh
OSYF23- 5082	1086.7	abcdefgh
Rio Dulce	1107.2	abcdefgh
Candy Ann	1050.4	abcdefghi
Fast Track	1052.7	abcdefghi
Dulciana	1045.9	abcdefghij
EMY 55186	1036.8	abcdefghij
Naranco	1034.6	abcdefghij
OSYF22- 4022	1043.6	abcdefghij
Vidora	1032.3	abcdefghij
XON 300Y	1045.9	abcdefghij
Ms. Scarlett	1005.1	abcdefghijk
Red Halen	998.3	abcdefghijk
SON-404Y	998.3	abcdefghijk
Reforma (EMY 55455)	962	abcdefghijk l
Sapelo	962	abcdefghijk l
Tania	977.8	abcdefghijk l
1407	948.3	bcdefghijkl
Candy Joy (Lot # 24- 2010-24A)	937	bcdefghijkl
Century	918.8	bcdefghijkl
OSYF10- 4021	903	bcdefghijkl
Rio Del Sol	887.1	cdefghijkl
Copada (EMY 55126)	868.9	defghijklm
Candy Joy (Lot # 24-1099-24)	862.1	efghijklm
Macon	844	fghijklm
OSYF12- 7091	814.5	ghijklm
Superex	821.3	ghijklm
Red Maiden	782.7	hijklmn
Chianti	744.2	ijklmn
Gilmore 26	753.2	ijklmn
Sweet Magnolia	751	ijklmn
GA Boy	714.7	jklmn
Alba Blanca	694.2	klmn
A2801	648.9	lmn
A2290	551.3	mn
Sweet Azalea	465.1	n

Note. Letters that are the same between varieties indicate that those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 5. Vidalia Onion Medium Yield (40-lb Boxes Per Acre) Measured After Grading.

Variety	Medium yield 40 lb boxes/acre	
OSYF12-7091	127.1	a
Candy Joy (Lot # 24-2010-24A)	108.9	ab
Dulciana	102.1	ab
Candy Joy (Lot # 24-1099-24)	97.6	abc
OSYF10-4021	86.2	abcd
SON-404Y	88.5	abcd
1407	79.4	abcde
Fast Track	70.3	abcde f
Maragogi	72.6	abcde f
Naranco	72.6	abcde f
Red Maiden	77.1	abcde f
Sapelo	70.3	abcde f
1011	63.5	bcdef
AG-3310	56.7	bcdef
Candy Ann	63.5	bcdef
Candy Kim	56.7	bcdef
Chianti	54.5	bcdef
Early Sweet	52.2	bcdef
OSYF22-4022	56.7	bcdef
OSYF23-5082	59	bcdef
Red Halen	54.5	bcdef
Vidora	63.5	bcdef
1015	38.6	cdef
10258 (formerly A1298)	38.6	cdef
Copada (EMY 55126)	38.6	cdef
OSYF23-5084	38.6	cdef
Reforma (EMY 55455)	40.8	cdef
Sweet Azalea	38.6	cdef

table continued on next page

Variety	Medium yield 40 lb boxes/acre	
Century	36.3	def
EMY 55186	34	def
Ms. Scarlett	29.5	def
Plethora	34	def
Sofire	31.8	def
369	20.4	ef
1014	20.4	ef
A2801	20.4	ef
GA Boy	20.4	ef
Macon	25	ef
Rio Del Sol	22.7	ef
Rio Dulce	22.7	ef

Variety	Medium yield 40 lb boxes/acre	
Superex	22.7	ef
Tania	25	ef
XON 300Y	25	ef
A2290	18.2	f
Alba Blanca	18.2	f
Gilmore 26	18.2	f
Sweet Magnolia	18.2	f
Tacoma	18.2	f
XON 106Y	18.2	f

Note. Letters that are the same between varieties indicate that those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 6. Vidalia Onion Cull Weights (40-lb Boxes Per Acre) Measured After Grading.

Variety	Cull weights 40 lb boxes/acre	
Alba Blanca	822.4	a
Sweet Azalea	796.3	a
GA Boy	655.7	ab
Sweet Magnolia	614.8	abc
A2290	576.3	abcd
Red Maiden	375.5	bcde
Superex	384.6	bcde
A2801	367.5	bcdef
Gilmore 26	370.9	bcdef
Century	358.5	cdefg
1015	340.3	cdefgh
Chianti	327.8	cdefgh i
369	306.3	defghi j
Red Halen	290.4	defghi j
Tania	305.1	defghi j
1014	234.8	efghij
1407	196.2	efghij
10258 (formerly A1298)	101	efghij
AG-3310	98.7	efghij
Candy Ann	118	efghij
Candy Joy (Lot # 24-1099-24)	98.7	efghij
Candy Joy (Lot # 24-2010-24A)	108.9	efghij
Copada (EMY 55126)	253	efghij
Early Sweet	123.6	efghij
EMY 55186	203.1	efghij
Fast Track	119.1	efghij

Variety	Cull weights 40 lb boxes/acre	
Macon	222.3	efghij
Ms. Scarlett	165.6	efghij
Naranco	171.3	efghij
OSYF10-4021	161.1	efghij
OSYF12-7091	128.2	efghij
OSYF22-4022	133.9	efghij
OSYF23-5082	142.9	efghij
OSYF23-5084	201.9	efghij
Reforma (EMY 55455)	273.4	efghij
Rio Del Sol	123.6	efghij
Rio Dulce	153.1	efghij
Tacoma	198.5	efghij
Vidora	116.8	efghij
XON 300Y	194	efghij
SON-404Y	81.7	fghij
Plethora	72.6	ghij
Sofire	72.6	ghij
Candy Kim	68.1	hij
Dulciana	68.1	hij
Maragogi	62.4	hij
Sapelo	68.1	hij
1011	44.2	ij
XON 106Y	27.2	j

Note. Letters that are the same between varieties indicate that those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 7. Percent Colossal Size of Total Marketable Yield Measured After Grading.

Variety	% Colossal	
Macon	35.3	a
1014	30.2	ab
Ms. Scarlett	30.1	ab
A2290	26.5	abc
Gilmore 26	27.5	abc
Tania	26.8	abc
Tacoma	26.1	abcd
Superex	25.5	abcde
GA Boy	25.3	abcdef
Rio Del Sol	21.6	abcdefg
Sweet Magnolia	21.6	abcdefg
A2801	19.6	abcdefgh
Copada (EMY 55126)	17	abcdefgh
Reforma (EMY 55455)	17.5	abcdefgh
Rio Dulce	18.1	abcdefgh
XON 106Y	18.8	abcdefgh
XON 300Y	17.7	abcdefgh
369	12.8	bcdefgh
Century	14.7	bcdefgh
Sofire	11.9	bcdefgh
Sweet Azalea	16.1	bcdefgh
AG-3310	9.4	cdefgh
EMY 55186	11.4	cdefgh
OSYF23-5084	9.2	cdefgh
Candy Kim	7.9	defgh
Naranco	7.5	efgh
Early Sweet	6.9	fgh
Red Halen	7	fgh
1407	3.3	gh
Alba Blanca	4.1	gh
Candy Ann	6.5	gh
Candy Joy (Lot # 24-2010- 24A)	3.1	gh
Chianti	4.7	gh
Dulciana	4.5	gh
Fast Track	3.4	gh
Maragogi	3.4	gh
OSYF10-4021	5.4	gh
OSYF22-4022	3.8	gh
OSYF23-5082	5.8	gh
Plethora	4.7	gh
Sapelo	4.8	gh
Vidora	3.1	gh
1011	2.1	h
1015	2.5	h
10258 (formerly A1298)	1.2	h
Candy Joy (Lot # 24-1099-24)	2.7	h
OSYF12-7091	2.5	h
Red Maiden	1.3	h
SON-404Y	2	h

Note. Letters that are the same between varieties indicate that those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 8. Percent Jumbo Size of Total Marketable Yield Measured After Grading.

Variety	% Jumbo	
10258 (formerly A1298)	95.5	a
1011	93.4	ab
1015	94.3	ab
Alba Blanca	93.1	ab
Plethora	92.6	ab
Fast Track	90.5	abc
Maragogi	91.1	abc
OSYF22-4022	91.3	abc
Vidora	91.2	abc
Red Maiden	89.8	abcd
SON-404Y	89.9	abcd
1407	89.2	abcde
Candy Ann	88.1	abcde
Candy Kim	88	abcde
Chianti	88.8	abcde
Early Sweet	89.2	abcde
OSYF23-5082	89.3	abcde
OSYF23-5084	87.8	abcde
Red Halen	88	abcde
Sapelo	88.7	abcde
Candy Joy (Lot # 24-1099-24)	87.3	abcdef
Candy Joy (Lot # 24-2010-24A)	86.8	abcdef
Dulciana	86.9	abcdef
AG-3310	86.1	abcdefg
Century	82	abcdefg
EMY 55186	85.8	abcdefg
Naranco	86.2	abcdefg
OSYF10-4021	86.3	abcdefg
OSYF12-7091	84.3	abcdefg
Sofire	85.7	abcdefg
A2801	78.1	abcdefgh
Copada (EMY 55126)	79.5	abcdefgh

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Variety	% Jumbo	
Reforma (EMY 55455)	79.1	abcdefgh
Rio Del Sol	76.7	abcdefgh
Rio Dulce	80.3	abcdefgh
Sweet Azalea	77.5	abcdefgh
XON 106Y	79.9	abcdefgh
XON 300Y	80.4	abcdefgh
Sweet Magnolia	76.6	bcdefgh
Superex	72.5	cdefgh
Tacoma	72.7	cdefgh

Variety	% Jumbo	
A2290	71.1	defgh
GA Boy	71.6	defgh
Tania	71.4	defgh
Gilmore 26	70.9	efgh
1014	68.6	fgh
Ms. Scarlett	67.9	gh
Macon	62.8	h

Note. Letters that are the same between varieties indicate that those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 9. Percent Medium Size of Total Marketable Yield Measured After Grading.

Variety	% Medium	
OSYF12-7091	13.2	a
Candy Joy (Lot # 24-1099-24)	9.9	ab
Candy Joy (Lot # 24-2010- 24A)	10.1	ab
Red Maiden	8.8	abc
Dulciana	8.7	abcd
OSYF10-4021	8.3	abcde
SON-404Y	8.2	abcdef
1407	7.5	bcdefg
Chianti	6.6	bcdefgh
Candy Ann	5.4	bcdefgh i
Fast Track	6.1	bcdefgh i
Maragogi	5.6	bcdefgh i
Naranco	6.3	bcdefgh i
OSYF22-4022	4.9	bcdefgh i
OSYF23-5082	4.9	bcdefgh i
Red Halen	4.9	bcdefgh i
Sapelo	6.5	bcdefgh i
Sweet Azalea	6.4	bcdefgh i
Vidora	5.7	bcdefgh i
1011	4.5	cdefghi
AG-3310	4.5	cdefghi
Candy Kim	4.1	cdefghi
Copada (EMY 55126)	3.5	cdefghi
Early Sweet	3.9	cdefghi
10258 (formerly A1298)	3.3	defghi
Century	3.3	defghi

Variety	% Medium	
Reforma (EMY 55455)	3.4	defghi
1015	3.2	efghi
Alba Blanca	2.9	efghi
GA Boy	3.1	efghi
OSYF23-5084	3.1	efghi
EMY 55186	2.8	fghi
A2290	2.3	ghi
A2801	2.3	ghi
Plethora	2.7	ghi
Sofire	2.4	ghi
369	1.4	hi
1014	1.2	hi
Gilmore 26	1.6	hi
Macon	1.9	hi
Ms. Scarlett	2	hi
Rio Del Sol	1.8	hi
Rio Dulce	1.6	hi
Superex	2	hi
Sweet Magnolia	1.8	hi
Tania	1.8	hi
XON 106Y	1.3	hi
XON 300Y	1.9	hi
Tacoma	1.1	i

Note. Letters that are the same between varieties indicate that those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 10. Percent Culls of Total Field Weights Measured After Grading.

Variety	% Culls	
Alba Blanca	52.9	a
Sweet Azalea	56.9	a
A2290	42.9	ab
GA Boy	41.7	ab
Sweet Magnolia	38.6	abc
A2801	29.9	bcd
Red Maiden	30.1	bcd
Chianti	28.5	bcde
Gilmore 26	26.1	bcdef
Superex	25.2	bcdefg
Century	24.3	bcdefgh
1015	22	cdefghi
Red Halen	20.5	cdefghi j
369	17.8	defghij
1014	12.9	defghij
1407	15.6	defghij
Copada (EMY 55126)	18.9	defghij
EMY 55186	14.4	defghij
Macon	14.3	defghij
Naranco	12.5	defghij
OSYF10- 4021	13.2	defghij
OSYF12- 7091	11.7	defghij
OSYF23- 5084	13.7	defghij
Reforma (EMY 55455)	18.3	defghij
Tacoma	11	defghij
Tania	18.3	defghij
XON 300Y	13	defghij
Ms. Scarlett	9.9	efghij
OSYF22- 4022	10.5	efghij
OSYF23- 5082	10.6	efghij
Rio Del Sol	10.4	efghij
Rio Dulce	10	efghij
Vidora	9.3	efghij
10258 (formerly A1298)	7.8	fghij
AG-3310	7.3	fghij
Candy Ann	8.8	fghij
Candy Joy (Lot # 24-1099-24)	9.1	fghij
Candy Joy (Lot # 24-2010-24A)	9.2	fghij
Early Sweet	8.4	fghij
Fast Track	9.3	fghij
SON-404Y	6.9	ghij
Dulciana	5.3	hij
Plethora	5.6	hij
Sapelo	6	hij
1011	3.1	ij
Candy Kim	4.7	ij
Maragogi	4.5	ij
Sofire	5	ij
XON 106Y	1.9	j

Note. Letters that are the same between varieties indicate that those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

UGA Variety Trial Quality Report 2024–2025 Crop Season

Jason Lessl, Daniel Jackson, Chris Tyson, Jason Edenfield, Derrick Bowen, Aubrey Shirley, Chase Watts, Nick Ray, Steven Powell, Savannah Tanner, Ross Greene, and Eric Melby

Introduction

Each season the University of Georgia, Agricultural and Environmental Services Laboratories (AESL) evaluates the flavor-associated compounds in the short-day onions grown in the variety trial. These onion varieties are submitted by the participating seed companies, grown at the Vidalia Onion and Vegetable Research Center (VOVRC), and once they are harvested and dried, they are submitted to the AESL for analysis of the pungency- related compounds: pyruvic acid, lachrymatory factor (LF), and methyl thiosulfinates.

Due to the association of Vidalia onions with low pungency and sweet flavor, this annual evaluation provides useful information about the relative flavor quality of these onion varieties. Furthermore, results are used to evaluate yellow Granex varieties before officially qualifying them to be grown as sweet Vidalia onions in the region.

This publication summarizes the flavor analysis results from the 2024–2025 growing season, as well as compares the performance of each variety over the past three growing seasons.

Materials and Methods

There were 49 onion varieties analyzed as part of the 2024–2025 variety trial. Each variety was grown at the VOVRC in quadruplicate plots. Harvested onions from each plot were dried and submitted to the lab individually. Cores taken from 10 onions within each replicate were composited and pressed to collect the onion juice, analyzed following procedures described in Kim et al. (2017).

Results and Discussion

The following tables compare the concentrations of flavor-associated compounds in onions grown as a part of the 2024–2025 variety trial. It should be noted that as the three measured parameters decrease, onions are considered to have a superior flavor quality. In this year's yellow Granex variety trials, the pyruvic acid (pungency) content ranged from 2.4–6.0 µmol/ml, which is consistent with the overall pungency measured in the past two growing seasons. Lachrymatory factor ranged from 0.55–2.29 µmol/ml, which was a decrease of 39% compared to the last two seasons. Finally, methyl thiosulfinates ranged from 3.6–21.4 nmol/ml which was a slight increase of 24% compared to the previous two growing seasons. Overall, the flavor quality of the variety trial onions was consistent with the past two growing seasons. The cumulative variety flavor quality rankings are also provided below for this year's data along with the average rating of yellow Granex onion varieties grown over the past three seasons. For additional information regarding the performance of a given variety, please contact your Extension agent or the VOVCR. We would like to thank the participating seed companies as well as the Vidalia Onion Committee for their support of this trial.

References

Kim, H.-Y., Jackson, D., Adhikari, K., Riner, C., & Sanchez-Brambila, G. (2017). Relationship between consumer acceptability and pungency-related flavor compounds of Vidalia onions. *Journal of Food Science, 82*(10), 2396–2402. https://doi.org/10.1111/1750-3841.13915

Table 1. Pungency (Pyruvic Acid) Content in Onions submitted to the UGA AESL for the 2024–2025 Variety Trial.

Variety	Pyruvic Acid (µmole/g)	
Gilmore 26	2.43	a
A2801	2.89	ab
Candy Joy, Lot #24- 1099-24	3.90	abc
Fast Track	4.08	bcd
Sweet Magnolia	4.33	bcde
Candy Joy, Lot # 24-2010-24A	4.42	cdef
AG3310	4.44	cdef
Candy Ann	4.44	cdef
Vidora	4.59	cdefg
A2290	4.66	cdefg
OSYF23-5082	4.74	cdefg
1014	4.75	cdefg
OSYF12-7091	4.76	cdefg
Plethora	4.78	cdefg
1407	4.83	cdefg
OSYF10-4021	4.83	cdefg
Superex	4.83	cdefg
OSYF22-4022	4.85	cdefg
Sweet Azalea	4.86	cdefg
Reforma	4.88	cdefg
NUN 1011	4.91	cdefg
Candy Kim	4.93	cdefg
Early Sweet	4.95	cdefg
Macon	4.97	cdefg
Rio Dulce	5.00	cdefg
404Y	5.08	cdefg
Dulciana	5.08	cdefg
Chianti	5.09	cdefg
369	5.16	cdefg
Red Maiden	5.19	cdefg
Emy 55186	5.22	cdefg
Sapelo	5.22	cdefg
Century	5.24	cdefg
Naranco	5.24	cdefg
Georgia Boy	5.39	defg
Tania	5.41	defg
Red Scarlet	5.45	defg
300Y	5.48	defg
OSYF23-5084	5.48	defg
Red Halen	5.58	efg
Alba Blanca	5.60	efg
Maragogi	5.64	efg
Tacoma	5.65	efg
10258	5.73	efg
Copada	5.78	efg
Sofire	5.79	fg
Rio Del Sol	5.84	fg
106Y	5.93	g
1015	6.00	g

Note. Similar letters between varieties indicate those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 2. Onion Lachrymatory Factor (Propanethial S-Oxide) Content in the 2024–2025 Variety Trial.

Variety	Lachrymatory factor µmole/g	
Gilmore 26	0.55	a
A2801	0.56	a
Plethora	0.78	ab
A2290	0.98	abc
1014	1.09	abc
300Y	1.12	abcd
Dulciana	1.14	abcd
Fast Track	1.15	abcd
Sweet Magnolia	1.23	abcde
Macon	1.28	abcde
Candy Joy, Lot #24-1099-24	1.28	abcde
Emy 55186	1.29	abcde
Maragogi	1.29	abcde
Chianti	1.30	abcdef
Rio Dulce	1.30	abcdef
369	1.33	abcdef
Red Scarlet	1.34	abcdef
OSYF12-7091	1.35	abcdef
Sofire	1.38	bcdef
Tacoma	1.38	bcdef
Sweet Azalea	1.41	bcdef
Candy Ann	1.42	bcdef
10258	1.44	bcdef
AG3310	1.44	bcdef
OSYF10-4021	1.47	bcdef
Superex	1.48	bcdefg
Tania	1.49	bcdefg
OSYF23-5082	1.50	bcdefg

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Variety	Lachrymatory factor µmole/g	
Vidora	1.50	bcdefg
Red Maiden	1.52	bcdefg
Candy Joy, Lot # 24-2010-24A	1.57	bcdefg
1015	1.62	cdefg
1407	1.62	cdefg
Naranco	1.62	cdefg
404Y	1.63	cdefg
Red Halen	1.64	cdefg
Early Sweet	1.64	cdefg
Century	1.68	cdefg
Georgia Boy	1.71	cdefg
Reforma	1.71	cdefg
NUN 1011	1.71	cdefg
106Y	1.71	cdefg
Sapelo	1.72	cdefg
Rio Del Sol	1.74	cdefg
OSYF22-4022	1.77	cdefg
Candy Kim	1.90	defg
OSYF23-5084	1.96	efg
Alba Blanca	2.09	fg
Copada	2.29	g

Note. Similar letters between varieties indicate those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 3. Methyl Thiosulfinate Content in Onions in the 2024–2025 Variety Trial.

Variety	Methyl thiosulfinates nmole/g	
A2801	3.63	a
Sweet Magnolia	3.98	a
Gilmore 26	5.00	ab
Sweet Azalea	5.15	abc
Century	5.93	abc
1014	7.33	abcd
Rio Dulce	7.35	abcd
Plethora	7.50	abcd
Superex	7.58	abcd
A2290	7.63	abcd
AG3310	7.90	bcd
Rio Del Sol	8.28	bcd
Dulciana	8.58	bcde
369	8.98	bcde
Tacoma	9.00	bcde
Tania	9.03	bcde
NUN 1011	9.15	bcde
Emy 55186	9.28	bcde
Maragogi	9.45	bcde
Copada	9.90	bcde
Red Maiden	9.93	bcdef
Macon	9.98	bcdef
Georgia Boy	10.35	bcdef
10258	10.48	cdef
Vidora	10.65	cdef
Reforma	10.85	cdef
Fast Track	10.98	cdef
Candy Ann	11.68	cdef
OSYF10-4021	12.83	cdef
Candy Kim	13.37	cdef
1015	13.43	cdef
106Y	13.73	cdef
Early Sweet	13.83	cdef
Sofire	14.15	cdef
Candy Joy, Lot #24- 1099-24	14.88	cdef
Candy Joy, Lot # 24-2010-24A	15.28	cdef
Sapelo	15.73	defg
1407	15.73	defg
Red Scarlet	16.45	defg
OSYF23-5082	16.85	defg
Alba Blanca	17.60	efg
300Y	18.15	efg
404Y	18.45	efg
Chianti	18.68	fg
Red Halen	20.95	fg
OSYF22-4022	20.98	g
OSYF23-5084	21.00	g
OSYF12-7091	21.43	g
Naranco	22.20	g

Note. Similar letters between varieties indicate those varieties are not significantly different according to Tukey test ($p \leq 0.05$).

Table 4. Overall Flavor Quality Ranking of the 2024–2025 Variety Trial Onions.

Variety	Rank
A2801	1 (t)
Gilmore	1 (t)
Sweet Magnolia	3
Plethora	4
1014	5 (t)
A2290	5 (t)
Candy Joy, Lot #24- 1099-24	5 (t)
Fast Track	8
Dulciana	9 (t)
Rio Dulce	9 (t)
Sweet Azalea	9 (t)
AG3310	12 (t)
Emy 55186	12 (t)
Superex	12 (t)
369	15 (t)
Century	15 (t)
Macon	15 (t)
Maragogi	18
Candy Ann	19 (t)
Tania	19 (t)
NUN 1011	21 (t)
OSYF10-4021	21 (t)
Red Maiden	21 (t)
Tacoma	21 (t)
300Y	25 (t)
Vidora	25 (t)

Variety	Rank
10258	27 (t)
Candy Joy Lot # 24- 2010-24A	27 (t)
Chianti	27 (t)
Early Sweet	27 (t)
Georgia Boy	27 (t)
Red Scarlet	27 (t)
Reforma	27 (t)
Rio Del Sol	27 (t)
Candy Kim	35 (t)
OSYF23-5082	35 (t)
Sofire	35 (t)
1407	38 (t)
OSYF12-7091	38 (t)
Sapelo	38 (t)
404Y	41
1015	42 (t)
106Y	42 (t)
Copada	42 (t)
Naranco	45 (t)
OSYF22-4022	45 (t)
Red Halen	47
Alba Blanca	48 (t)
OSYF23-5084	48 (t)

(t) tied

Table 5. Overall Flavor Quality Ranking of Yellow Variety Trial Onions Harvested in 2024–2025.

Variety	Rank
Gilmore 26	1
Maragogi	2
Tania	3
Fast Track	4 (t)
Sweet Magnolia	4 (t)
Plethora	6
1407	7 (t)
Superex	7 (t)
Candy Ann	9 (t)
Candy Joy	9 (t)
Macon	9 (t)
NUN 1014	9 (t)
Sweet Azalea	9 (t)
OSYF10-4021	14
Vidora	15

Variety	Rank
10258	16 (t)
Candy Kim	16 (t)
Early Sweet	16 (t)
Reforma	16 (t)
Georgia Boy	20 (t)
Sapelo	20 (t)
NUN 1011	22
Century	23
OSYF12-7091	24 (t)
SON-300Y	24 (t)
Copada	26 (t)
SON-404Y	26 (t)
SON-106Y	28

(t) tied

Qualitative and Quantitative Analysis of Bare-Root Vidalia Onion Hand Transplanting

Luan Oliveira, Regimar dos Santos, and Chris Tyson

Overview

A current shared issue among onion growers is the hand labor prices and labor shortage. The difficulty of field activities in inclement weather conditions and requiring hard physical labor is a strain for producers to find labor.

One of the clearest indicators of the scarcity of farm labor is the fact that the number of H-2A positions (foreign labor) requested and approved has increased in the past 17 years, from just over 48,000 positions certified in fiscal year 2005 to around 371,000 in 2022. The H-2A Temporary Agricultural Program is a program that provides legal means to bring foreign-born workers to the United States to perform seasonal farm labor temporarily for a period up to 10 months (Economic Research Service, 2025).

In the U.S., the total average of foreign-born agricultural workers is 75%. Moreover, approximately 80% of the positions are employed in fruit and tree nut, vegetable, and greenhouse production. Most of these jobs were concentrated in California, Georgia, Florida, and Washington in 2022 (Economic Research Service, 2025).

The minimum wage for H-2A workers has increased by nearly 19% in the past 4 years in the state of Georgia and 25% in California in the same time frame. In addition, employers must pay for paperwork processing and provide transportation and housing for the employees, which raises the cost even more. Currently, the average U.S. farm wage ($16.62) makes agricultural jobs look less attractive economically when compared to the nonfarm average wage ($27.56; Economic Research Service, 2025).

Another potential issue, often invisible, arises from the variability between workers on hand-performed tasks such as transplanting. Usually, there is a high number of individuals (50–100 people) working in the fields during transplanting activity. Each person has their own method of transplanting seedlings, which can potentially affect aspects such as timing and depth.

The objectives with this work were to quantify the efficiency of field workers in transplanting Vidalia onions at an approximate population of 95,000 seedlings per acre and to verify the consistency of transplanting between them regarding seedling deposition.

Preliminary Results

Speed of Hand Transplanting

To gather answers on how hand-labored transplanting relates to onion marketable yield, the Precision Horticulture Lab at the University of Georgia, along with UGA county Extension agents, evaluated transplanting uniformity among different individuals. A trial was set to measure the time 25 different field workers would take to transplant two rows on a half bed that was 15 ft long.

The results shown in Figure 1 are from a commercial field near Glennville, GA, where 70 field workers were transplanting onions. The results showed that the transplanting time varies between individuals. On average, it would take an estimated 26 hr for one person to transplant 1 acre (43,560 sq ft). However, this is considering the general average of all field workers.

If considering only the 10 fastest field workers, the time to transplant 1 acre decreased to about 20 hr per individual. If considering the 10 slowest field workers, the time needed to transplant an acre increases to about 34 hr.

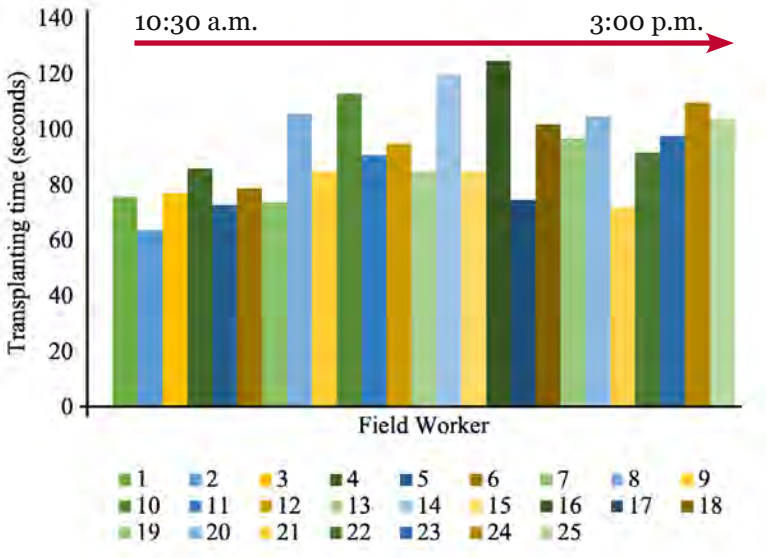

Figure 1. Time to Transplant Two 15-ft Rows. Each field worker is indicated by a different color bar.

Figure 1 also shows a trend of transplanting time increasing from morning to afternoon, which means that the evaluated field workers could not keep the same transplanting pace throughout the day. The average time in the morning for each worker to transplant 15 ft was 75 s compared to 95 s in the afternoon.

Hand Transplanting Plant Population Results

Figure 2 shows the number of seedlings transplanted in each 10-ft plot. Each colored bar represents two random field workers. The lowest number came from workers 1 and 2 (122 plants), which brings the population per acre down to about 88,000 plants per acre. The target population for this field was 100,000 plants per acre (140 seedlings per 10-ft plot). The plant populations transplanted by Workers 3 and 4, 5 and 6, and 7 and 8 were nearer to the target (about 100,000).

Consistency of Hand Transplanting

In addition to the time measurement, four random 10-ft, four-row plots transplanted by eight random field workers were measured for the quality of transplanting. We measured plant population, the number of onion seedlings completely lying on the ground (Figure 3A), partially transplanted seedlings (Figure 3B), and multiple-transplanted seedlings (Figure 3C) for each field worker. Multiple transplanted seedlings represent two or more seedlings transplanted in the same furrow.

Figure 4 shows the results for the quality assessment in which each colored bar represents two random field workers. The average percentage of plants lying on the ground of all eight field workers was 7.3%. Taking into consideration the average population of 135 plants per 10-ft bed for all four measured plots, at every 10-ft plot there were, on average, about five plants left on the ground after transplanting (7%). If considering Workers 1 and 2 only, there were about nine plants lying on the ground at every 10 ft (11% of the population). On the other hand, if considering Workers 3 and 4 only, an average of about three plants were left lying on the ground (4%).

The partially transplanted seedlings average for all four plots was about 8%. If considering the highest percentage of partially transplanted seedlings, Workers

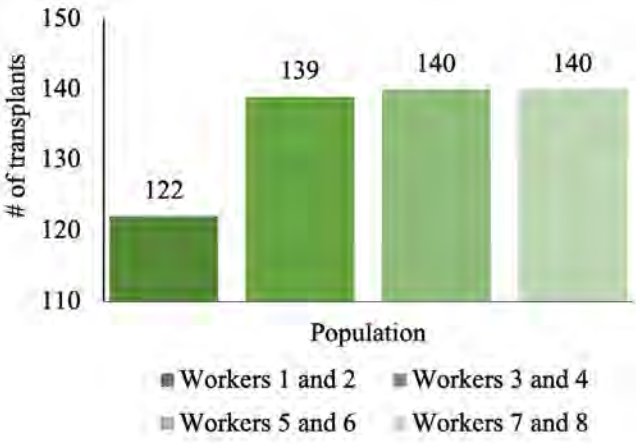

Figure 2. Number of Plants Transplanted in 10-Ft Onion Bed Plots.

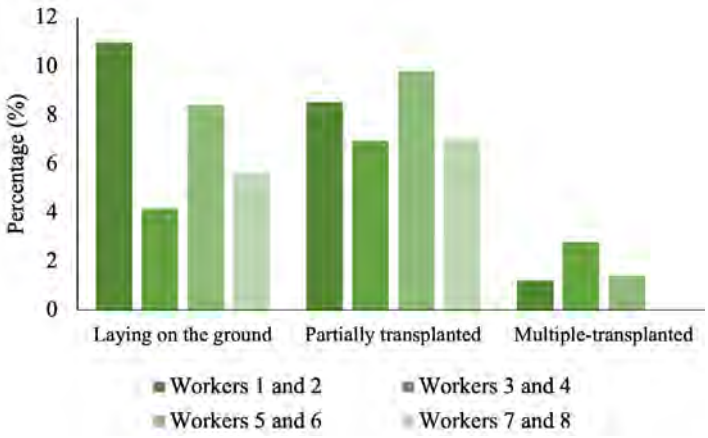

Figure 4. Percentage of Seedlings Lying on the Ground, Partially Transplanted, and Double Transplanted.

Figure 3. Visual Examples of Onion Transplanting Inconsistencies. Seedlings (A) lying on the ground, (B) partially transplanted, and (C) multiple transplanted. Multiple transplanted seedlings represent two or more seedlings transplanted in the same furrow.

5 and 6 had the highest number (10%). Workers 1 and 2, 3 and 4, and 7 and 8 had similar numbers of partially transplanted seedlings. A low percentage of multiple-transplanted seedlings was found for all teams.

This lack of uniformity in the transplanting process could negatively impact the quality of stand uniformity, potentially leading to a decrease in yield and variability in bulb size.

Conclusion

In this preliminary study there was a notable variation in transplanting speed among workers, with faster workers being able to transplant an acre significantly quicker than slower workers. However, efficiency decreases over the course of the day, possibly because of fatigue.

The quality of transplanting varied widely among field workers, with issues such as seedlings lying on the ground, partially transplanted seedlings, and multiple seedlings in a single furrow. These inconsistencies can negatively impact plant population and uniformity.

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Impacts of Inconsistencies on Bare Root Vidalia Onion Hand Transplanting

Luan Oliveira, Regimar dos Santos, and Chris Tyson

Overview

Approximately 10,000 acres of Vidalia onions are grown each year in Georgia with a farm gate value of $168 million, making the crop very important for the state's economy (Center for Agribusiness and Economic Development, 2022). Despite the large area and value, Vidalia onion production requires a significant amount of manual labor since transplanting and harvesting are performed primarily by hand. With hand labor being performed simultaneously by several field workers, there could be some inconsistencies among them. These inconsistencies could be related to how deep the seedlings are getting transplanted, which could lead to poor root-to-soil contact and potential yield decrease.

To measure the impact of possible hand transplanting inconsistencies, an experiment was conducted at the UGA Vidalia Onion and Vegetable Research Center in Lyons, GA. The treatments were designed to replicate previously seen field situations. A 10-ft bed was hand transplanted simulating onions well transplanted, partially transplanted, lying on the ground, and multiple transplanted. A list of treatments is shown below, and Figure 1 shows the visual examples of inconsistencies in seedling transplanting.

- Treatment 1: 25% of seedlings lying on the ground.
- Treatment 2: 25% of seedlings partially transplanted.
- Treatment 3: Control (100% of seedlings properly transplanted).
- Treatment 4: 25% of multiple transplanted seedlings. Multiple transplanted seedlings represent two or more seedlings transplanted in the same furrow.
- Treatment 5: 100% of seedlings lying on the ground (to measure mortality).

Results

Plant growth was measured by the number of leaves per plant, and plant mortality was determined by the bulb population.

The best results for leaf number were observed in Treatment 3 with an average of 7.33 leaves per plant, statistically differing from all the other treatments (Figure 2). Treatments 1, 2, and 4 showed no statistical difference among them, although the lowest number of leaves among them was presented by T1 (5.98).

All treatments differed from Treatment 5, which had the lowest number of leaves, with an average of 4.6 leaves per plant.

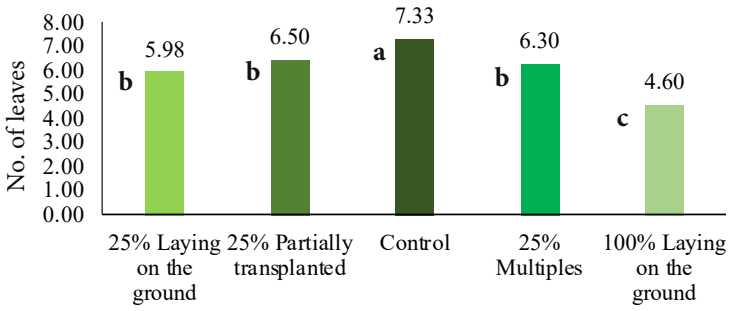

Figure 2. Average Number of Leaves per Plant. Means followed by the same letter within a column are not significantly different according to the Scott-Knott test at a 5% probability level.

Figure 1. Visual Examples of Onion Transplanting Inconsistencies. Seedlings (A) lying on the ground, (B) partially transplanted, and (C) multiple transplanted. *Multiple transplanted seedlings represent two or more seedlings transplanted in the same furrow.

The highest population was observed in T4 (Figure 3) as expected (144.75), since this treatment received more than one seedling in 25% of the furrows. T3 (properly transplanted seedlings) showed a final count of 113 plants (right on the target population). T1 (25% lying on the ground) and T5 (100% laying on the ground) had populations of around 95 plants, representing a 16% mortality rate when compared to the control treatment.

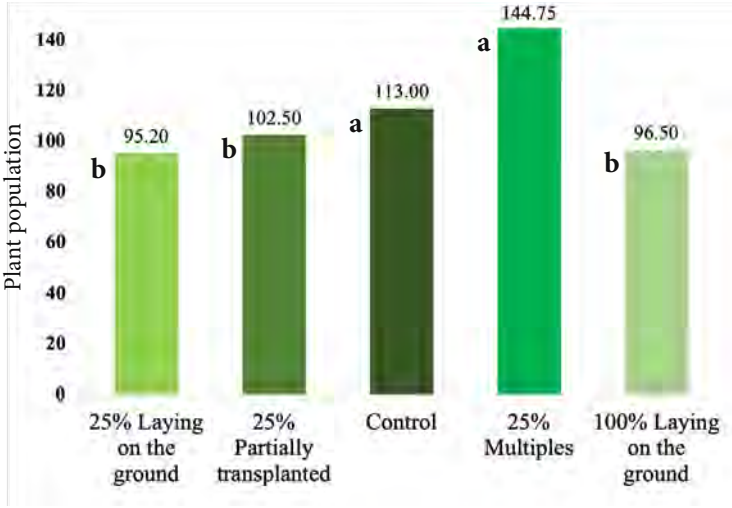

Figure 3. Final Bulb Population. Means followed by the same letter within a column are not significantly different according to the Scott-Knott test at a 5% probability level.

The observed results in the treatments with seedlings lying on the ground was expected, as seedlings with exposed roots are sensitive to abiotic factors. These factors include water loss to the atmosphere because of sun exposure, difficulty in obtaining water and nutrients from the soil during the post-transplant period, and an increased likelihood of insect attacks and fungal and bacterial diseases.

The yield from each treatment is shown on Table 1. As expected, the higher yield was found where the most onion seedlings were transplanted, at the 25% multiples treatment. The second highest yield was observed at the properly transplanted treatment. The two lowest yields were observed at the treatments where seedlings were left on the ground. There was a significant difference of about 10,000 lb when comparing properly transplanted seedlings to the 25% lying on the ground treatment and about 4,000 lb when comparing properly transplanted seedlings with seedlings that were partially transplanted.

Table 1. Onion Total Yield in Pounds Per Acre.

Treatment	Yield, lb/acre
25% lying on ground	28,115 b
25% partially transplanted	44,104.5 ab
Properly transplanted	48,460.5 a
25% multiples	51,183 a
100% lying on the ground	15,790.5 c

Means followed by the same letter within a column are not significantly different according to the Scott-Knott test at a 5% probability level.

Figure 4 shows the size grading for each treatment. Results show that the higher percentage of jumbo Vidalia onions was found when the seedlings were properly transplanted all the time (88.4%). The results also show that even though there was a higher population found at the treatment with 25% multiple seedings transplanted, the percentage of jumbo onions was lower.

There was a high concentration of medium onions at the 100% lying on the ground treatment, which shows that even though the population was lower, the plants didn't have enough vigor to swell the bulbs. This also could correlate to the lack of leaves.

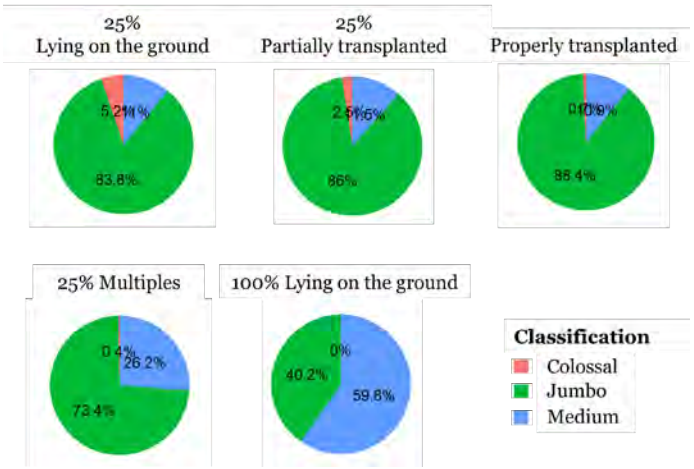

Figure 4. Size Grading for Multiple Onion Transplanting Treatments.

During the grading operation, we also found that there were several onion bulbs smaller than a medium, which passed through the grading machine (the grading machine used only grades medium, jumbo, and colossal). Figure 5 shows that on the treatments where seedlings were left lying on the ground, the bulb

swelling was lower, resulting in smaller bulbs (1 to 2¼ in.); 24.6% of the medium bulbs were considered small on the 100% lying on the ground treatment, and 11.8% on the 25% lying on the ground treatment.

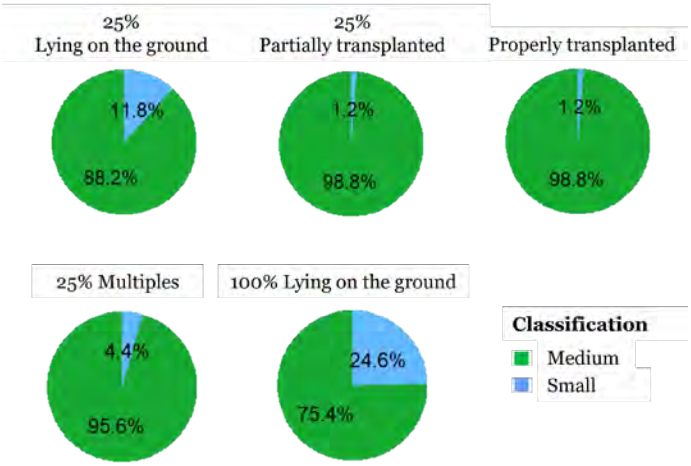

Figure 5. Grading for Medium Onion Bulbs.

Conclusion

Properly transplanted seedlings showed the best growth and yield, with the highest leaf count and bulb population. Treatments simulating poor transplanting conditions (e.g., seedlings lying on the ground) showed reduced growth, higher mortality rates, and lower yields. The yield difference between properly transplanted seedlings and those lying on the ground was significant, underscoring the importance of transplanting quality. Properly transplanted seedlings also showed the most uniformity on onion size.

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Irrigation and Nitrogen Fertilizer Strategies for Vidalia Onion Production

Hanna de Jesus, Bhabesh Dutta, and Timothy Coolong

Introduction

Recent studies on fertilizer requirements for Vidalia onions have demonstrated the potential to reduce recommended nitrogen (N) fertilizer rates without affecting yields. Furthermore, understanding N requirements of onions at different growing stages is crucial to adequately manage N fertilizer applications and enhance fertilizer use while minimizing nutrient losses. In this study, the fertilizer N use efficiency (FNUE) of onions was investigated. The goal is to create a guideline for the timing and rate of N fertilizer applications to help onion growers in Georgia make fertilizer management decisions.

Material and Methods

Field experiments were conducted in 2021 and 2022 at the UGA Vidalia Onion and Vegetable Research Center located in Lyons, GA. Vidalia onions (cv. Vidora) were transplanted on Dec. 10, 2020, and Dec. 7, 2021. Onions were grown using standard spacing practices. Experimental plots were 20 ft long with 10-ft buffers between plots within each bed. Crop management practices associated with soil preparation, transplanting, and management of pests, weeds, and diseases followed UGA recommendations.

Treatments consisted of five ^{15}N fertilizer application timings (see Table 1): transplanting (^{15}NT), vegetative growth (^{15}NV), bulb initiation (^{15}NBI), bulb swelling (^{15}NBS), and prematuration (^{15}NBM). We used ^{15}N ammonium nitrate ($^{15}NH_4{}^{15}NO_3$), which is a stable isotope of N that can be traced in our samples and used to determine the crop N uptake from applied fertilizer. The ^{15}N was applied in each application-timing treatment at a rate of 21 lb N/acre for a total of 105 lb N/acre. Plots receiving the ^{15}N fertilizer also received 21 lb/acre of unlabeled (regular ammonium nitrate) fertilizer in the other four applications. For example, when ^{15}N fertilizer was applied at transplanting, the next four application timings received unlabeled N fertilizer.

Onions were harvested on April 20, 2021 (131 DAT), and April 19, 2022 (133 DAT; Table 2), then cured and graded according to USDA standards. Statistical analyses were performed to compare the marketable yield and bulb size distribution, the amount of N in the plant derived from fertilizer (Ndff), N leaching, and fertilizer N use efficiency (FNUE) among treatments

Results

Marketable yields of onions were significantly higher in 2022, with 1,303 40-lb bags/acre, compared to 1,101 40-lb bags/acre in 2021 (Table 3). In both years, FNUE was significantly different among application timing treatments (Table 4). In 2021, the FNUE when N was applied at transplant was only 8.87%. When N was applied at vegetative growth and bulb initiation stages, FNUE increased, but less than 40% of the N fertilizer applied was taken up by the plant. At bulb swelling and bulb maturation, FNUE was significantly higher, with over 90% of the N fertilizer applied being taken by the plant. In 2022, the N use was significantly lower at transplant (25.22%) compared to N applied at vegetative growth, bulb initiation, and bulb swelling. When applied at bulb maturation, the FNUE decreased (53.34%).

Conclusion

The application of N fertilizer right after transplant is inefficient, since only a small portion of what is applied is being used by the plant, while most of the N is being leached. In 2021, the excessive rainfall in the first half of the onion season favored N loss; consequently, most of the N accumulated in the plant came from the last two N fertilizer applications. In 2022, targeting the periods of heavy vegetative growth and bulb initiation was most efficient in providing N fertilizer for onion plants. However, as bulbs mature and senesce, they take up less fertility, so part of the N applied at bulb maturity was not used by the plant.

Table 1. Fertilizer N Application Rates and Timing.

Treatments	N rate (lb/acre)					
	N_T	N_V	N_{BI}	N_{BS}	N_{BM}	Total N
^{15}NT	21*	21	21	21	21	105
$^{15}N_V$	21	21*	21	21	21	105
$^{15}N_{BI}$	21	21	21*	21	21	105
$^{15}N_{BS}$	21	21	21	21*	21	105
$^{15}N_{BM}$	21	21	21	21	21*	105

*The time **^{15}N** fertilizer is being applied; N_T = N applied at transplanting; N_V = N applied at vegetative stage; N_{BI} = N applied at bulb initiation; N_{BS} = N applied bulb swelling; N_{BM} = N applied at prematuration.

Table 2. Time of Fertilizer N Application and Harvest in 2021 and 2022 on Days After Transplanting (DAT).

Year	Days after transplanting (DAT)					
	^{15}NT	$^{15}N_V$	$^{15}N_{BI}$	$^{15}N_{BS}$	$^{15}N_{BM}$	Harvest
2021	5	27	49	78	99	131
2022	9	30	57	78	99	133

N_T = N applied at transplanting; N_V = N applied at vegetative stage; N_{BI} = N applied at bulb initiation; N_{BS} = N applied bulb swelling; N_{BM} = N applied at prematuration.

Table 3. Total Marketable Yield and Bulb Size Distribution of Onions Harvested in 2021 and 2022.

Year	Yield, 40-lb bags/acre				
	Marketable	Colossal	Jumbo	Medium	Culls
2021	1101 b	2 b	932 b	167 a	30 b
2022	1303 a	229 a	1027 a	46 b	103 a

*Values followed by the same letters indicate no significant difference by the Tukey test ($p < 0.05$). N_T = N applied at transplanting; N_V = N applied at vegetative stage; N_{BI} = N applied at bulb initiation; N_{BS} = N applied bulb swelling; N_{BM} = N applied at prematuration.

Table 4. Effects of Application Timing Treatments on the ^{15}N Derived From Fertilizer, N Leached, and FNUE in 2021 and 2022.

Treatment	Ndff (lb/acre ^{15}N)				N leached (lb/acre)	FNUE (%)
	Bulbs	Leaves	Roots	Total plant		
2021						
$^{15}N_T$	1.03 c*	0.81 d	0.02 c	1.86 c	16.12 a	8.87 c
$^{15}N_V$	3.01 bc	2.50 c	0.04 bc	5.54 b	12.5 b	26.38 b
$^{15}N_{BI}$	4.17 b	3.20 c	0.04 bc	7.41 b	10.66 b	35.28 b
$^{15}N_{BS}$	10.48 a	11.53 a	0.07 a	22.08 a	0.00 d	105.16 a
$^{15}N_{BM}$	11.38 a	8.92 b	0.05 ab	20.34 a	0.00 c	96.87 a
2022						
$^{15}N_T$	4.12 b	1.14 b	0.03 a	5.30 b	11.13 a	25.22 b
$^{15}N_V$	12.63 ab	3.18 a	0.09 a	15.91 ab	1.75 ab	75.74 ab
$^{15}N_{BI}$	18.04 a	3.52 a	0.07 a	21.63 a	0.00 b	103.02 a
$^{15}N_{BS}$	13.72 ab	2.53 ab	0.05 a	16.30 ab	1.02 ab	77.64 ab
$^{15}N_{BM}$	9.78 ab	1.38 b	0.04 a	11.20 ab	6.29 ab	53.34 ab

*Values followed by the same letters indicate no significant difference by the Tukey test ($p < 0.05$) among N fertilizer timing treatments within a year. N_T = N applied at transplanting; N_V = N applied at vegetative stage; N_{BI} = N applied at bulb initiation; N_{BS} = N applied bulb swelling; N_{BM} = N applied at prematuration.

Survey of Soil Characteristics and Soil Sulfur Content Across the Vidalia Onion Production Region: Implications for Sweet Onion Production

Daniel Jackson, Jason Lessl, Matthew Levi, and Chris Tyson

Introduction

Previous research has shown that variability in soil characteristics within fields directly relates to the flavor profile of Vidalia onions produced. Several factors have been identified that play a role in this process, including sulfur fertility, soil clay content, depth to the claypan, soil pH, and organic matter content. Each of these characteristics affects sulfur availability within the rooting zone.

While the link between these individual attributes and onion flavor appears to be straightforward, a substantial degree of variability exists among these characteristics across the Vidalia production region, which complicates our ability to predict onion flavor based on specific soil conditions. This study seeks to understand the extent of variability in soil properties across the Vidalia production region, and how those differences are related to onion yield and pungency.

Material and Methods

In 2023, 97 soil and onion samples were collected from 13 fields distributed across the Vidalia region (representing six counties). Each sample represented approximately 10 acres, translating to roughly 10% of the industry. Sampling locations were selected to represent the relative distribution in soil types in the region. At each location, soil profiles were described and photographed, foliar samples were collected for nutrient analysis, onion bulbs were sampled for yield and flavor profile, and soil samples were collected at multiple depths for analysis of organic matter, texture, pH, and plant available and total nutrient content.

The study was repeated in 2024, with 117 samples collected from 17 fields representing approximately an additional 1,000 acres, along with resampling about 200 acres from the 2023 season to quantify any seasonal variability in the data.

Results

While typically very sandy, soils within the Vidalia onion region can be highly diverse, as illustrated in the photos in Figure 1. The most common soil in the region is the Tifton series, which is generally characterized by a sandy loam surface horizon above a claypan that normally begins at a depth of 8–20 in. and has abundant ironstones within the upper soil horizons. However, even within the same soil series classification, differences in surface texture, claypan depth, and the size and abundance of ironstones can greatly influence water and nutrient availability.

Other soils identified were extremely sandy and contained no claypan within the upper 50–60 in. of soil, while soils from low-lying areas often drained poorly and had a very shallow water table (see grey-colored subsurface horizon soils in Figure 1). These factors influence how onions access water and nutrients.

Figure 1. Variability and Diversity of Soil Profiles Across the Vidalia Region.

As shown in Table 1, fertilization rates, claypan depths, and onion yield and pungency were highly variable across the growing region in both the 2023 and 2024 seasons. Particularly dramatic were the differences in fertilization rates, where reported sulfur fertility rates differed by 72 lb/acre in 2023 and 95 lb/acre in 2024, and nitrogen rates varied by 91 lb/acre in 2023 and 86 lb/acre in 2024. Claypan depth was also highly variable, ranging from extremely shallow (1 in. for two samples in 2024) to over 50 in. Onion pungency was highly irregular in both seasons; some onions were exceptionally mild while others were relatively pungent. Onion lachrymatory factor was substantially lower in 2024 compared to 2023, which is likely climate-related.

Table 1. Important Production Characteristics Observed Across the Vidalia Onion Growing Region During the 2023 and 2024 Growing Seasons.

Year	Value level	S applied (lb/acre)	N applied (lb/acre)	Yield (g/bulb)	Claypan depth (in.)	Pyruvic acid (µmol/ml)	Lachrymatory factor (µmol/ml)
2023	Min	26	75	27	7	2.8	0.5
	Average	63	113	238	19	4.6	2.9
	Max	98	166	437	> 50	7.2	6.8
2024	Min	44	62	112	1	2.8	0.4
	Average	65	113	221	15	4.7	0.8
	Max	139	148	318	> 50	6.5	1.3

Variety selection is known to be an important contributor to onion pungency, and that was supported by this study. Despite some variation, pyruvic acid content was generally lower in some varieties, like Vidora, compared to other varieties like Tania (see Figure 2).

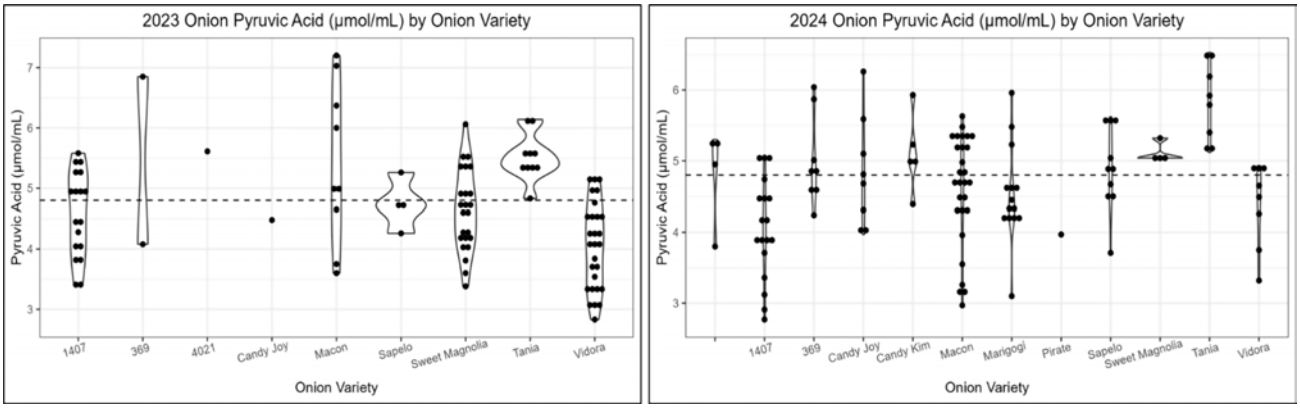

Figure 2. Range of Pyruvic Acid Values Measured in 2023 and 2024 Based on Onion Variety. The dashed line indicates the consumer acceptability threshold, where pyruvic acid values under the line would be considered acceptable to most consumers.

We know from many previous studies that onion pungency and sulfur fertility are tightly linked, and higher sulfur-fertilizer application rates produce more pungent onions. However, in both the 2023 and 2024 growing seasons, onion flavor profile was not related to the amount of reported sulfur in the grower's fertility program (Figure 3). This indicates that sulfur fertilization rates alone are not determining onion pungency in the Vidalia region.

While 2023's values were not quite statistically significant ($p = 0.078$), in the 2024 season, onion flavor—as measured by pyruvic acid, onion lachrymatory factor, and methyl thiosulfinates—was highly negatively related to soil claypan depth, indicating that onions grown on soils with a deep claypan were generally milder in flavor (Figure 4).

As Figure 5 demonstrates, onion pungency was somewhat variable based on soil type, but soil series classification alone is not enough to predict onion pungency. For example, the most common soil type sampled was the Tifton soil series, which produced both extremely mild and more pungent onions.

Conclusion

Onion pungency is complex and is determined by a combination of many factors, including onion variety, soil characteristics, weather conditions, and the grower's cultural practices, including their fertility program. While soil characteristics, like claypan depth, clearly play a major role in onion productivity and flavor profile, soil series classification alone is not sufficient to describe how soil characteristics influence onion yield and pungency. Further research is needed to determine the interactions and contributions among these factors toward onion pungency.

Learn more and stay up to date at our project website: https://aesl.ces.uga.edu/OnionMapping

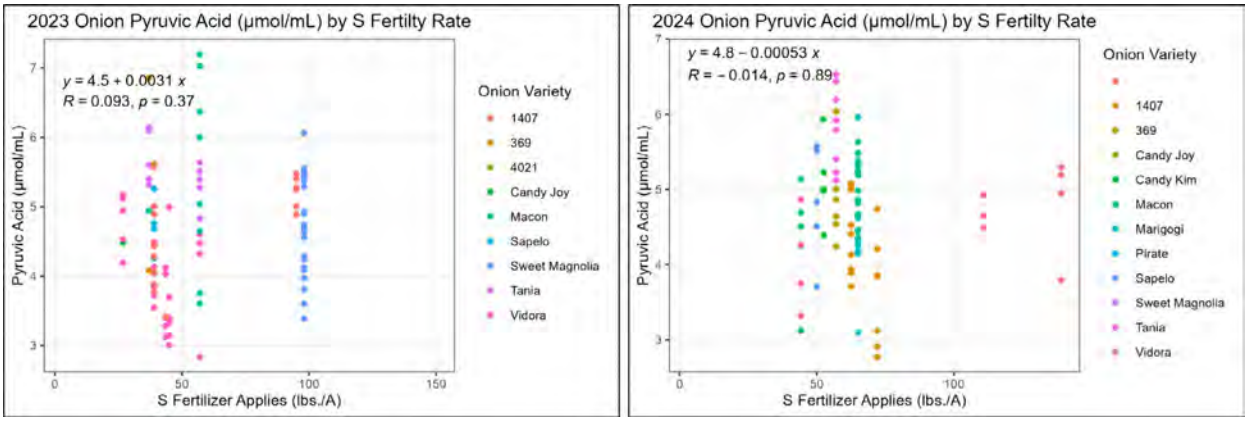

Figure 3. Relationship Between Grower-Reported Sulfur Application Rates and Onion Pyruvic Acid Values. Pyruvic acid values were measured during the 2023 and 2024 growing seasons.

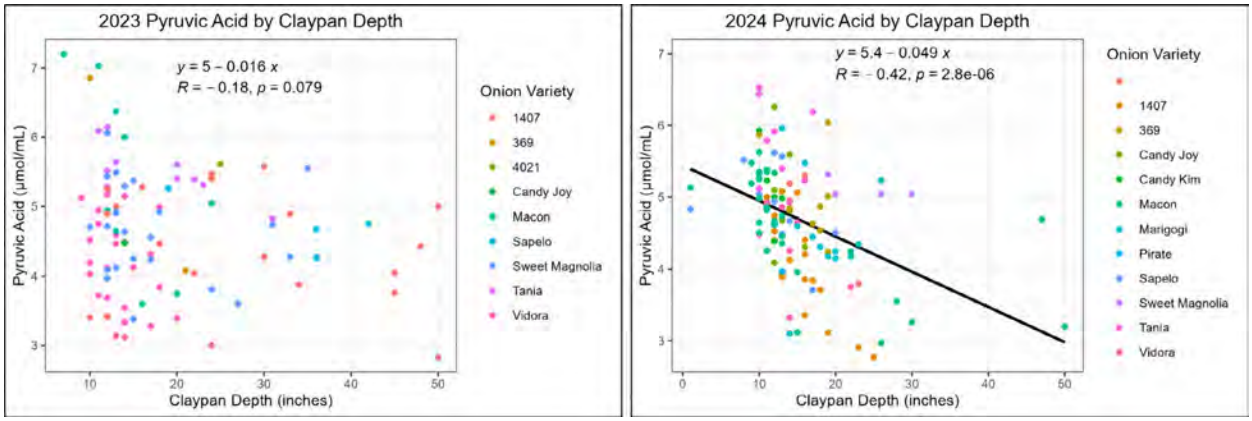

Figure 4. Relationship Between the Depth of the Claypan (Within the Soil Profile) and Onion Pyruvic Acid Values. Pyruvic acid values were measured during the 2023 and 2024 growing seasons.

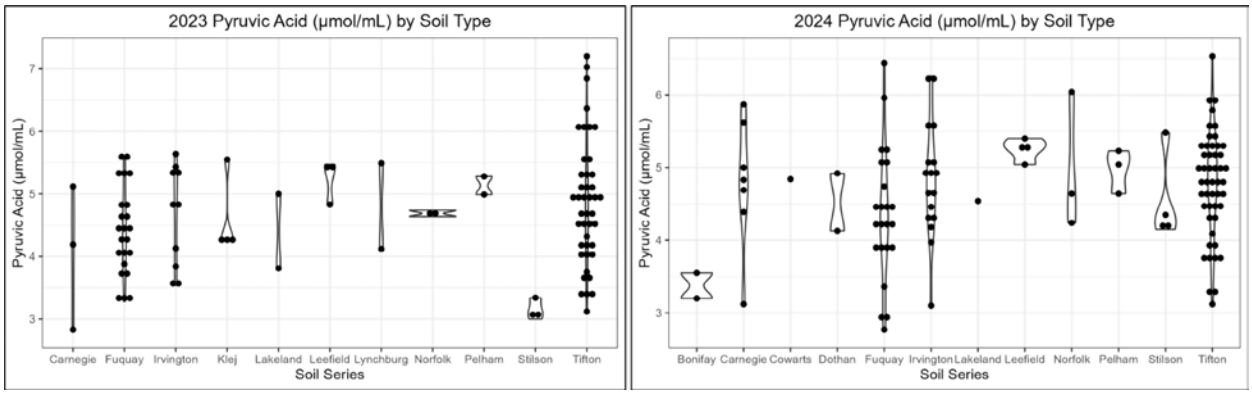

Figure 5. Range in Pyruvic Acid Values Measured in 2023 and 2024 Based on Soil Series Classifications.

Determining the Relative Sulfur Uptake Potential of Soil Horizons in the Vidalia Region

Daniel Jackson, Jason Lessl, Matthew Levi, Tim Coolong, and Chris Tyson

Introduction

Sulfur (S) availability is closely associated with onion pungency. Previous research identified that sulfur is accumulating in the soils of the Vidalia onion region, particularly in the subsurface claypans. The depth of the claypan appears to play an important role in the ability of onions to access these subsurface S deposits. When S is contained in relatively shallow claypans (less than 12 in.), it is easily accessible to plant roots, but a claypan deeper than 18 in. appears to be relatively inaccessible for much of the growing season.

This study seeks to determine the relative availability of sulfur from various soil profile depths by growing onions on raised beds with differing depths to the claypan and varying S content.

Material and Methods

'Sapelo Sweet' and 'Plethora' onion varieties were grown on 21 raised beds at the Vidalia Onion and Vegetable Research Center during the 2022, 2023, and 2024 growing seasons. Raised beds (4 ft wide x 6 ft long x 30 in. deep) were constructed using pressure-treated lumber. Beds were filled with topsoil (A horizon) and claypan (Bt horizon) soils to differing depths using soil collected from an area of uncultivated land (Tifton soil series) at the research center.

Soil profiles in the raised beds were constructed such that the claypan began at depths of 6, 12, or 18 in., or no claypan (24 in. topsoil) for the control. Gypsum (calcium sulfate) was spiked into the soil of the claypan layers prior to each season to produce low- and high-sulfur treatments.

The data collected included foliar nutrients, which were analyzed every 2 weeks between bulb expansion and maturity, plant available and total nutrients within each soil layer, depth of root penetration in the soil profile, both total plant and bulb yield, and concentrations of flavor-associated compounds in onion bulbs.

Results

In 2022 and 2023, the soil claypan represented a significant barrier to onion root penetration (Figure 2 and Table 1). The 2022 season was an unusually hot and dry year, particularly in the last few weeks prior to harvest, when plant growth and bulb expansion are the greatest. As a result, onions grown on beds with relatively shallow claypans (6 or 12 in.) had decreased water availability, which negatively affected yields.

Neither claypan depth nor S application rate was associated with onion pungency in 2022, with pyruvic acid measurements ranging from 3.2–4.1 µmol/ml, all of which would be considered mild-flavored.

Irrigation frequency was increased in 2023, and while rooting depth was still statistically different among treatments, root penetration was deeper overall, and no differences were seen in yield among treatments. Onion pyruvic acid content was also lower in 2023 compared to 2022, suggesting the

Figure 1. Onions Growing in the Raised Beds and Filled With Varying Claypan Horizon Depths and Sulfur Content, March 17, 2022.

higher irrigation may have leached more S from the rooting zone, or the cooler temperatures may have resulted in lower S uptake. Onion pungency was not statistically different among the treatments in 2023.

Soil moisture sensors installed during the 2024 season revealed the raised beds were drying much quicker than soil in neighboring field plots, and irrigation frequency was increased. As a result of increased irrigation, no differences were seen in onion rooting depth among treatments, as roots were able to penetrate the claypan under adequate soil moisture.

No differences in yield were observed for 'Sapelo Sweet', while for 'Plethora', the 6-in. claypan with low-S treatment produced significantly lower yields than the 12-in. claypan with high-S treatment.

Unlike previous seasons, the pyruvic acid content was different among the treatments, with the 'Sapelo Sweet' onions grown on the control treatment beds (with 24 in. of topsoil) having lower pungency than onions under 6-in. low-S, 6-in. high-S, and 12-in. high-S treatments.

Foliar S concentrations were highly variable based on timing of sample collection in all three growing seasons (Figure 4; data from 2022 and 2023 are not shown). In both the 2023 and 2024 seasons, onions grown on high-S treatments accumulated more S than the low-S and control treatments. These differences were first observed in late March to early April each season, suggesting that throughout the bulb expansion and maturation period, onions are able to accumulate nutrients contained within claypans as deep as 18 in.

Figure 2. Onion Roots Extended to Differing Depths Within the Soil Profile Based on Claypan Depth at Harvest (May 9, 2022). A) 6-in. claypan, B) 12-in. claypan, C) 18-in. claypan, and D) control containing no claypan.

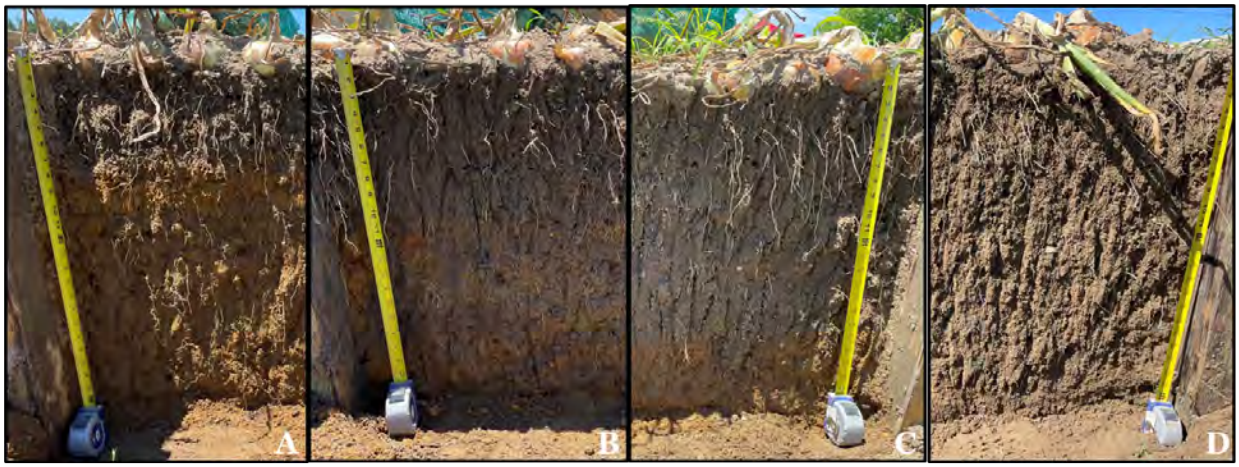

Figure 3. Onion Roots At Harvest for the 2024 Growing Season (May 16, 2024). The roots can be seen penetrating deep within the soil profiles for all treatments: A) 6-in. claypan, B) 12-in. claypan, C) 18-in. claypan, and D) the control containing no claypan.

Conclusion

Claypan depth plays a significant role in the availability of water and nutrients within the soil profile. Under a water deficit, the claypan acts as an impenetrable layer preventing further root penetration. This restriction of water and nutrients can affect onion yield and nutrient status. Under adequate soil moisture, onion roots are able to penetrate deep within the soil profile and access the water and nutrients contained within the claypan layer.

Onion yields are stabilized across claypan depths under these free-moisture conditions; however, onion pungency becomes a factor—increased S availability, combined with genetic and other environmental factors, can result in higher onion pungency.

Table 1. Onion Rooting Depth†, Bulb Weight, and Pyruvic Acid Content by Treatment Over Three Growing Seasons.

Onion Variety	Treatment[1]	Rooting depth (in.)			Bulb weight (g)			Pyruvic acid (µmol/g)		
		2022	2023	2024	2022	2023	2024	2022	2023	2024
'Sapelo Sweet'	6-in. low S	8.0 b[2]	12.3 c	14.0	178 d	251	349	3.3	2.8	3.8 a
	6-in. high S	8.7 ab	12.7 bc	16.0	168 cd	242	423	4.2	2.7	3.9 a
	12-in. low S	15.3 ab	14.3 abc	14.3	196 bcd	300	370	3.6	2.9	3.1 ab
	12-in. high S	11.7 ab	12.7 bc	17.3	205 bcd	273	372	3.6	3.3	3.9 a
	18-in. low S	16.0 a	17.7 ab	16.7	232 abc	282	393	4.0	3.2	2.9 ab
	18-in. high S	15.7 ab	15.7 abc	15.3	250 ab	311	384	3.5	3.0	3.5 ab
	Control	14.0 ab	19.3 a	17.7	274 a	251	391	4.0	2.9	2.6 b
	p-value	< 0.05	< 0.05	0.48	< 0.05	0.10	0.4	0.67	0.74	< 0.05
'Plethora'	6-in. low S	98.0 ab	14.0 a	15.3	226 bc	335	384 b	3.2	2.5	2.6
	6-in. high S	8.3 b	13.7 a	15.3	195 c	320	480 ab	3.7	2.6	2.9
	12-in. low S	11.0 ab	14.0 a	16.0	250 bc	331	431 ab	3.5	2.2	2.7
	12-in. high S	11.3 ab	14.3 a	18.7	235 bc	346	508 a	3.9	1.8	2.9
	18-in. low S	14.3 ab	18.7 a	17.3	293 ab	282	397 ab	3.7	3.4	2.7
	18-in. high S	16.0 a	16.7 a	15.7	268 abc	261	484 ab	4.0	2.5	2.6
	Control	14.3 ab	18.7 a	16.7	341 a	311	402 ab	4.1	1.9	2.3
	p-value	< 0.05	< 0.05	0.33	< 0.05	0.48	< 0.05	0.84	0.56	0.30

† Onion rooting depth was estimated by the maximum depth of the majority of roots.
[1]Treatment denotes the depth of the claypan (soil Bt horizon) and the sulfur application rate. For example, the 12-in., high-S treatment had a claypan at a depth of 12 in. in the soil profile that was treated with a high rate of sulfur.
[2]Means followed by the same letter in each column are not significantly different according to Tukey's HSD at $p < 0.05$.

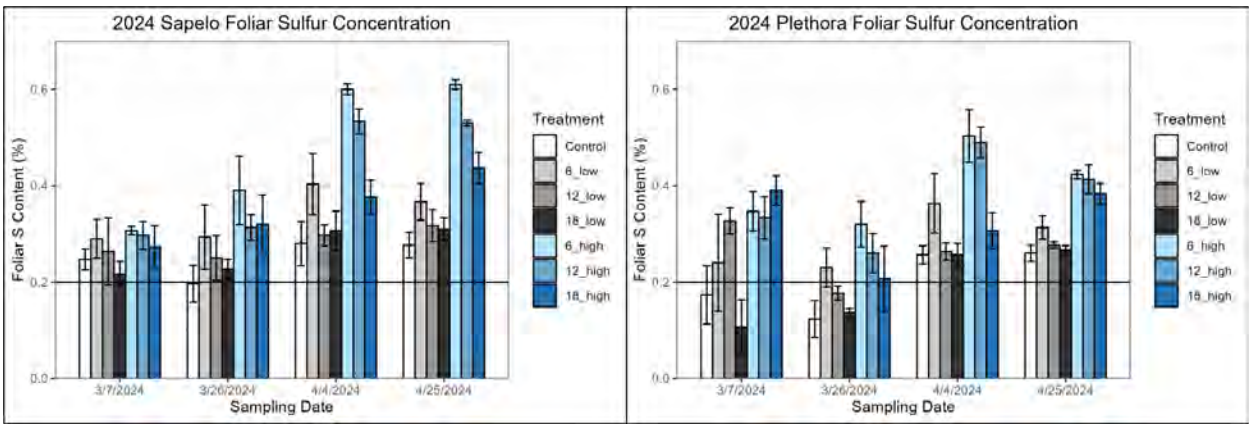

Figure 4. Foliar Sulfur Concentrations Measured During the 2024 Growing Season.

Vidalia Onion Yield as Influenced by Biodegradable Mulch and Cultivar

Juan Carlos Diaz-Perez and Chris Tyson

Objective

This study aimed to determine the effect of biodegradable mulch on Vidalia onion bulb yield in three sweet onion cultivars.

Material and Methods

The experiment was conducted at the University of Georgia Vidalia Onion and Vegetable Research Center near Reidsville, GA, and at the Horticulture Farm on UGA's Tifton campus in the winter of 2021–2022. Two weeks before planting, the soil received the equivalen of 150 lb/acre of nitrogen (N) from chicken manure. Onion seedlings were transplanted on Dec. 16, 2021. Plants were grown on beds (6 ft center to center) with four rows (7 in. apart) and an in-row plant spacing of 5 in. Beds were uncovered or covered with film mulch. There were two lines of drip tape per bed.

The experimental design was a randomized complete block with four replications. There were nine treatment combinations (three mulches with three cultivars). Mulch treatments were black plastic mulch, biodegradable mulch, and bare soil. The cultivars evaluated were 'Candy Joy', 'Macon', and 'Vidora'.

Plants were harvested when about 30% of the plant necks had collapsed (tops down). Onions were graded into marketable and unmarketable according to USDA grading standards. The bulb numbers and weights were recorded. After grading, a subsample of 10 marketable bulbs per replication was used to determine soluble solids content (SSC), dry matter content, and pungency (measured as pyruvate concentration). Total phenols were determined to measure antioxidant capacity (expressed as gallic acid equivalents.

Results

Location

Marketable and total-bulb number and yields, percentage of marketable bulbs, and bulb weight were higher in Reidsville than in Tifton, while cull yield was higher in Tifton than in Reidsville (Table 1).

The incidence of doubles was higher in Reidsville than in Tifton, while sour-skin incidence was the highest in Tifton. Leaf N was higher, while phosphorus (P) and potassium (K) were lower in Tifton than in Reidsville (Table 2). Bulb SSC, total phenols, and pungency were higher in Reidsville than in Tifton (Table 3).

Mulch

Plastic mulch had the highest weed control, followed by biodegradable mulch. Marketable yield, total yield, and individual bulb weight were highest on plastic mulch and lowest in bare soil (Table 1). Cull yield and the incidence of bulb sour skin were the highest on plastic mulch. Leaf nutrients were unaffected by mulch treatments, except for manganese (Mn), which was reduced in bare soil (Table 2). Bulb SSC was the highest on biodegradable mulch and the lowest on plastic mulch (Table 3).

Cultivar

Marketable yield was highest in 'Macon' and lowest in 'Candy Joy' (Table 1). There were no leaf nutrient differences among cultivars (Table 2). Bulb SSC was highest in 'Macon' and lowest in 'Vidora', while the dry matter was lowest in 'Macon' (Table 3). 'Macon' also had the highest total phenols and pungency

Conclusion

Marketable and total yields and bulb size were the highest on plastic mulch. Onion yield was the highest on plastic mulch. Plants on biodegradable mulch had higher yields and lower weed pressure than those in bare soil. The reduced weed pressure in the plastic mulch plots may partially explain the enhanced bulb yields. Among cultivars, marketable bulb yields were the highest in 'Macon' and the lowest in 'Candy Joy'.

Table 1. Bulb Onion Yields as Influenced by Mulch and Cultivar. Data from Tifton and Reidsville, GA, winter of 2021–2022.

Variables	Marketable			Bulb weight (lb)	Total		Cull		Doubles (%)	Sour skin (%)
	Bulb No. (bulb/ acre)	Yield (lb/acre)	(%)		Bulb No. (bulb/ acre)	Yield (lb/acre)	Bulb No. (bulb/ acre)	Yield (lb/acre)		
Location										
Tifton	30295 b[z]	18978 b	54 b	0.54 b	54872 b	23817 b	24578 a	4839 a	0.22 b	3.5 a
Reidsville	57907 a	44556 a	85 a	0.76 a	68588 a	46391 a	10681 b	1835 b	0.43 a	1.5 b
Mulch										
Bare soil	37937 b	24242 c	62 b	0.55 c	57869 c	26664 c	19932	2421 b	0.31	0.6 b
Biodegradable	45173 a	32238 b	73 a	0.66 b	61361 b	34973 b	16188	2736 b	0.20	1.7 b
Plastic	48813 a	38573 a	73 a	0.73 a	65847 a	43558 a	17034	4986 a	0.45	5.3 a
Cultivar										
Candy Joy	36088 b	16985 c	55 b	0.41 c	62155 ab	20503 c	26067 a	3519	0.84 a	0.1 b
Macon	49596 a	44648 a	76 a	0.86 a	63559 a	48346 a	13964 b	3698	0.03 b	4.2 a
Vidora	45709 a	32520 b	76 a	0.67 b	59290 b	35385 b	13499 b	2865	0.11 b	3.1 a
Significance										
Location (L)	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.041	0.028
Mulch (M)	0.0005	< 0.0001	0.010	< 0.0001	< 0.0001	< 0.0001	0.253	0.010	0.103	0.0003
LxM	0.164	0.363	0.108	0.573	0.156	0.729	0.457	0.139	0.837	0.109
Cultivar (C)	0.0002	< 0.0001	< 0.0001	< 0.0001	0.020	< 0.0001	< 0.0001	0.587	< 0.0001	0.002
LxC	0.306	0.093	0.095	0.732	0.807	0.408	0.312	0.014	0.003	0.011
MxC	0.438	0.735	0.647	0.379	0.147	0.467	0.940	0.643	0.061	0.065
LxMxC	0.984	0.830	0.572	0.659	0.426	0.915	0.536	0.312	0.775	0.159

[z]Means followed by the same letter are not significantly different based on Fisher's protected least significant difference test at 95% confidence.

Table 2. Leaf Mineral Nutrients as Influenced by Mulch and Cultivar. Data from Tifton and Reidsville, GA, winter of 2021–2022.

Variables	N	P	K	Ca	Mg	S	B	Cu	Fe	Mn	Zn
Location											
Tifton	1.85 a[z]	0.16 b	1.76 b	0.75 b	0.13	0.20 b	9.5 b	3.4 b	1046	159 a	44.4 a
Reidsville	1.60 b	0.31 a	2.34 a	0.87 a	0.13	0.23 a	14.7 a	72.0 a	1166	76 b	18.6 b
Mulch											
Bare soil	1.67	0.23	1.90	0.82	0.13	0.19 b	11.7	34.0	1041	86 b	27.8
Biodegradable	1.68	0.25	2.14	0.80	0.13	0.22 a	12.4	38.6	1172	135 a	33.2
Plastic	1.83	0.23	2.11	0.81	0.13	0.23 a	12.2	40.5	1104	132 a	33.4
Cultivar											
Candy Joy	1.74	0.22 b	1.99	0.85	0.14	0.22	11.4 b	35.1	994	114	32.5
Macon	1.71	0.25 a	2.13	0.76	0.13	0.21	13.0 a	40.0	1151	124	33.1
Vidora	1.73	0.23 b	2.03	0.82	0.13	0.21	11.9 b	38.0	1172	114	28.8
Significance											
Location (L)	0.006	< 0.0001	< 0.0001	0.001	0.373	0.008	< 0.0001	< 0.0001	0.229	< 0.0001	< 0.0001
Mulch (M)	0.219	0.234	0.053	0.892	0.943	0.001	0.431	0.118	0.556	0.001	0.065
LxM	0.176	0.452	0.102	0.996	0.763	0.010	0.951	0.126	0.664	0.006	0.163
Cultivar (C)	0.973	0.043	0.352	0.091	0.214	0.482	0.012	0.294	0.281	0.690	0.223
LxC	0.273	0.753	0.176	0.376	0.287	0.194	0.225	0.282	0.937	0.846	0.313
MxC	0.864	0.844	0.969	0.426	0.570	0.813	0.539	0.738	0.757	0.565	0.816
LxMxC	0.790	0.697	0.972	0.542	0.868	0.976	0.786	0.731	0.257	0.652	0.780

[z]Means followed by the same letter are not significantly different based on Fisher's protected least significant difference test at 95% confidence.

Table 3. Quality of Sweet Onion as Influenced by Mulch and Cultivar. Data from Tifton and Reidsville, GA, winter of 2021–2022.

Variables	SSC (%)	Dry matter (%)	Total phenols (gallic acid equiv.mg·L-1)	Pyruvate (µM)
Location				
Tifton	8.8 b[z]	11.6	286 b	1.20 b
Reidsville	8.9 a	12.1	529 a	1.88 a
Mulch				
Bare soil	8.9 b	12.0	414	1.57
Biodegradable	9.1 a	11.8	403	1.55
Plastic	8.6 c	11.7	399	1.48
Cultivar				
Candy Joy	9.1 b	12.2 a	331 c	1.24 b
Macon	9.5 a	10.8 b	464 a	1.99 a
Vidora	7.9 c	12.5 a	419 b	1.36 b
Significance				
Location (L)	0.050	0.091	< 0.0001	< 0.0001
Mulch (M)	< 0.0001	0.553	0.231	0.611
LxM	0.092	0.912	0.872	0.001
Cultivar (C)	< 0.0001	< 0.0001	< 0.0001	< 0.0001
LxC	< 0.0001	0.574	0.050	0.006
MxC	< 0.0001	0.172	0.725	0.019
LxMxC	< 0.0001	0.064	0.661	0.016

[z]Means followed by the same letter are not significantly different based on Fisher's protected least significant difference test at 95% confidence.

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