

UGA Onion Variety Trial Report 2021 – 2022 Crop Season

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Introduction

The University of Georgia 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, Georgia.

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 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 27, 2021 and the trial was transplanted on December 1, 2021. 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, Georgia, 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 foot long by 6 foot 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:

400 lb/A 10-10-10 applied September 23, 2021 (preplant incorporated)
200 lb/A of 10-10-10 applied October 12, 2021
200 lb/A of 10-10-10 applied October 21, 2021
200 lb/A of 10-10-10 applied November 9, 2021
100 lb/A of calcium nitrate applied November 9, 2021
Total lbs/A applied: 115.5 (N) – 100 (P) – 100 (K) – 120 (S)

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

Seedbed Pesticides Applied:

<u>Date</u>	<u>Product Applied</u>
August 11, 2021	Vapam HL (75 gal/A)
September 23, 2021	Lorsban (1 qt/A) preplant incorporated
September 28, 2021	Dacthal (4 pt/A)
October 29, 2021	Roper (3 lb/A) + Kocide 3000 (.75 lb/A) + Lifegard WG (2 oz/A)
November 9, 2021	Roper (3 lb/A) + Kocide 3000 (.75 lb/A) + Lifegard WG (2 oz/A)

Trial Fertility:

150 lb/A of 5-10-15 applied December 15, 2021
300 lb/A of 5-10-15 applied January 6, 2022
500 lb/A of 5-10-15 applied January 27, 2022
215 lb/A of calcium nitrate applied February 16, 2022
Total lbs/A applied: 80.825 (N) – 95 (P) – 142.5(K) – 28.5 (S)

**Note: Soil sample test results called for 125 -150 lb/A nitrogen, 60 lb/A of phosphorus, 90 lb/A of potash, and 40 – 60 lb/A of sulfur. All fertilizer applications applied with a First Products brand drop spreader. 2 tons/A of poultry litter was applied and incorporated to the fallow field in the late spring of 2021.*

Fungicides Applied:

<u>Date</u>	<u>Fungicide Applied</u>
January 7, 2022	Bravo (3 pt/A) + Roper (3 lb/A) + Kocide 3000 (.75 lb/A) + Merivon (11 oz/A)
January 14, 2022	Bravo (3 pt/A) + Inspire Super (20 oz/A)
January 27, 2022	Bravo (3 pt/A) + Pristine (18.5 oz/A) + Magna-Bon (10 oz/A)
February 3, 2022	Quadris Top (14 oz/A) + Kocide 3000 (1.5 lb/A) + Roper (3 lb/A)
February 9, 2022	Omega 500 (1 pt/A) + Miravis Prime (11.4 oz/A)
February 18, 2022	Bravo (3 pt/A) + Kocide 3000 (1.5 lb/A) + Merivon (11 oz/A)
February 23, 2022	Bravo (3 pt/A) + Quadris Top (14 oz/A) + Lifegard (2 oz/A)
March 4, 2022	Omega 500 (1 pt/A) + Kocide 3000 (1.5 lb/A)
March 17, 2022	Miravis Prime (11.4 oz/A) + Lifegard (2 oz/A)

Insecticides Applied:

<u>Date</u>	<u>Product Applied</u>
October 15, 2021	Lorsban (1 qt/A)
March 4, 2022	Radiant (10 oz/A)
March 17, 2022	Torac (24 oz/A)

Herbicides Applied:

<u>Date</u>	<u>Product Applied</u>
December 2, 2021	Goal 2XL (1 qt/A) + Prowl (1 qt/A)

Variety Entries in the 2021-2022 UGA Onion Variety Trial

<u>Variety Name</u>	<u>Company</u>	<u>Type</u>	<u>Maturity Class</u>
Candy Kim*	Solar	Yellow Granex	Early
Candy Ann*	Solar	Yellow Granex	Very Early
Candy Joy*	Solar	Yellow Granex	Very 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 55455*	Emerald	Yellow Granex	Med-Late
Emy 55126*	Emerald	Yellow Granex	Med-Late
Emy 55843	Emerald	Yellow Granex	Med-Late
Emy 55457	Emerald	Yellow Granex	Med-Late
PRR*	Seminis	Yellow Granex	Med-Late
Sweet Agent*	Seminis	Yellow Granex	Medium
Sweet Magnolia*	Seminis	Yellow Granex	Med-Late
Century*	Seminis	Yellow Granex	Med-Late
Sweet Azalea*	Seminis	Yellow Granex	Med-Late
Macon*	Bejo	Yellow Granex	Late
Pirate*	Bejo	Yellow Granex	Medium
Tania*	Bejo	Yellow Granex	Medium
Alison*	Bejo	Yellow Granex	Med-Late
369*	Bejo	Yellow Granex	Medium
Maragogi	Bejo	Yellow Granex	Medium
Sapelo*	DP Seeds	Yellow Granex	Medium
Georgia Boy*	DP Seeds	Yellow Granex	Med-Late
DP 1407*	DP Seeds	Yellow Granex	Very Early
Early Sweet	DP Seeds	Yellow Granex	Early
Superex*	American Takii	Yellow Granex	Med-Late
Vidora*	Nunhems	Yellow Granex	Early
Plethora*	Nunhems	Yellow Granex	Medium
Nunhems 5901	Nunhems	Yellow Granex	Late
Nunhems 1011	Nunhems	Yellow Granex	Very Early
404	Sakata	Yellow Granex	Early
A1298	Hazera	Yellow Granex	Medium
OSYF12-7091	Crookham	Yellow Granex	Early
OSYF10-4021	Crookham	Yellow Granex	Early
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

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 (GDD) aid us in forecasting harvest maturity for onions. A base temperature of 50°F is used in formulating GDD's accumulated.

Variety	Maturity	Planting Date	Dig Date	Days After Transplanting to Digging	GDD Accumulation 50°F Base
Candy Ann, Candy Joy, Fast Track, Quick Start, DP 1407, Nunhems 1011	Very Early	December 1, 2021	March 29, 2022	118	888
Candy Kim, New Frontier, Early Sweet, Sakata 404, Dulciana, Vulkana, Vidora, OSYF12-7091, OSYF10-4021	Early	December 1, 2021	April 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	December 1, 2021	April 13, 2022	133	1103
Emy 55843, Emy 55126, Emy 55455, Emy 55457, PRR, Sweet Magnolia, Century, Sweet Azalea, Alison, Lucille, White Phantom, GA Boy, White Gaspere, Superex, Mata Hari, Sivan	Med-Late	December 1, 2021	April 20, 2022	140	1209
Macon, Nunhems 5901, Chianti	Late	December 1, 2021	April 28, 2022	148	1358

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.

Table 1. Vidalia Onion **Field Weights** (40 lb. boxes/acre) measured **before** grading.

<u>Variety</u>	<u>lbs/plot</u>	<u>40 lbs boxes/A</u>		<u>Variety</u>	<u>lbs/plot</u>	<u>40 lbs boxes/A</u>	
Macon	198.75	1804	a	A1298	149	1352	fghij
Sweet Magnolia	189.25	1717	ab	Vidora	148.87	1351	fghij
Superex	188.75	1713	ab	Sivan	148.75	1350	fghij
Sweet Azalea	185.75	1686	abc	Maragogi	147.25	1336	ghij
5901	185.37	1682	abc	Rio Del Sol	141	1280	hij
Century	181.25	1645	abcd	Joelino	140.1	1271	hijk
Alison	179.25	1627	bcde	Candy Kim	133.62	1213	ijkl
EMY 55455	178.5	1620	bcde	404	133.62	1213	ijkl
EMY 55457	175.37	1591	bcde	Early Sweet	133.37	1210	ijkl
Sweet Agent	174	1579	bcde	Red Marvel	132.24	1200	ijkl
EMY 55843	173.12	1571	bcde	Timon	132.05	1198	ijkl
WI-129	170.25	1545	cde	White Gaspere	131.75	1196	ijkl
GA Boy	168.75	1531	cde	Sapelo	131.25	1191	ijkl
Mata Hari	167.57	1521	cdef	Red Sensation	129.64	1176	ijkl
PRR	163.37	1483	defg	Red Maiden	129.5	1175	jkl
Pirate	162.25	1472	efgh	OSYF10-4021	126.12	1145	jkl
Rio Dulce	161.25	1463	efgh	Vulkana	124.8	1133	jklm
EMY 55126	160.57	1457	efgh	Dulciana	124.75	1132	jklm
Alba Blanca	157.75	1432	efgh	Fast Track	123	1116	jklm
Sofire	157.75	1432	efgh	Candy Ann	121.37	1101	jklm
Chianti	157.37	1428	efgh	1407	121.12	1099	jklm
Tania	154.6	1403	efghi	OSYF12-07091	120	1089	klm
Lucille	154.25	1400	efghi	Quick Start	115.87	1052	lm
Plethora	153.4	1392	efghi	Candy Joy	115.62	1049	lm
New Frontier	150	1361	efghi	1011	102.37	929	mn
369	149.99	1361	efghij	White Phantom	94.625	859	n

* 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/acre) measured after grading.

<u>Variety</u>	<u>lbs/plot</u>	<u>40 lbs bag/A</u>		<u>Variety</u>	<u>lbs/plot</u>	<u>40 lbs bag/A</u>	
Macon	191.75	1740	a	Maragogi	144.25	1309	defghi
5901	179.25	1627	ab	Lucille	142.75	1295	defghi
Superex	178.5	1620	ab	Sivan	138.5	1257	efghi
Sweet Magnolia	176.75	1604	ab	Rio Del Sol	137.5	1248	efghi
Sweet Azalea	172.75	1568	ab	Joelino	136.78	1241	efghi
EMY 55455	169.5	1538	b	Timon	131.44	1193	fghij
Century	168.38	1528	b	New Frontier	129.25	1173	ghij
EMY 55457	166.5	1511	bc	Red Sensation	128.95	1170	ghij
EMY 55843	164.5	1493	bcd	404	126.5	1148	hij
Alison	164	1488	bcd	Red Maiden	125.5	1139	hij
Sweet Agent	161	1461	bcde	White Gaspare	123.5	1121	hij
WI-129	160.75	1459	bcde	Red Marvel	121.28	1101	hijk
GA Boy	160.25	1454	bcde	Candy Kim	119.75	1087	hijk
Mata Hari	159.94	1451	bcde	Vulkana	118.94	1079	hijk
Rio Dulce	157.75	1432	bcdef	Sapelo	118.75	1078	ijk
Alba Blanca	156	1416	bcdef	Dulciana	118.5	1075	ijk
Pirate	155.5	1411	bcdefg	Early Sweet	117.75	1069	ijk
EMY 55126	153.76	1395	bcdefg	Candy Ann	115.5	1048	ijk
Chianti	153	1388	bcdefg	Fast Track	113	1025	ijkl
Sofire	150.75	1368	bcdefg	OSYF10-4021	112.5	1021	ijkl
PRR	150	1361	bcdefg	Candy Joy	108.75	987	jkl
Plethora	149.22	1354	bcdefgh	1407	108	980	jkl
Tania	148.78	1350	bcdefgh	OSYF12-07091	106.25	964	jklm
369	146.73	1332	bcdefghi	Quick Start	100.75	914	klm
A1298	145.75	1323	cdefghi	1011	91.5	830	lm
Vidora	144.5	1311	defghi	White Phantom	84.5	767	m

* 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/acre) measured after grading.

<u>Variety</u>	<u>lbs/plot</u>	<u>40 lb boxes/A</u>		<u>Variety</u>	<u>lbs/plot</u>	<u>40 lb boxes/A</u>	
Macon	57	517	a	New Frontier	5	45	efgh
Sweet Magnolia	34	309	b	Rio Dulce	4.5	41	efgh
Sweet Azalea	32.75	297	bc	404	4.5	41	efgh
Sweet Agent	29.75	270	bcd	Early Sweet	3.75	34	efgh
Century	24	218	bcde	Candy Kim	3	27	efgh
Superex	23.75	216	bcde	Quick Start	3	27	efgh
EMY 55126	21.5906	196	bcde	Rio Del Sol	3	27	efgh
EMY 55455	21.5	195	bcde	Timon	2.7758	25	efgh
5901	19	172	cdef	369	2.6834	24	efgh
GA Boy	17.5	159	defg	Joelino	2.5442	23	fgh
WI-129	17.25	157	defg	OSYF12-07091	2.5	23	gh
EMY 55457	15.5	141	efgh	1407	2.25	20	gh
EMY 55843	13.5	123	efgh	A1298	2.25	20	gh
Alison	12.75	116	efgh	Sapelo	2	18	gh
PRR	11	100	efgh	Red Marvel	1.8922	17	gh
Lucille	11	100	efgh	White Phantom	1.5	14	gh
Chianti	10.5	95	efgh	Tania	1.0442	9	gh
Pirate	10.25	93	efgh	Candy Ann	0.75	7	h
Vidora	10	91	efgh	Fast Track	0.75	7	h
Red Sensation	8.0034	73	efgh	Alba Blanca	0.5	5	h
Sofire	7	64	efgh	Red Maiden	0.5	5	h
Mata Hari	6.8922	63	efgh	White Gaspare	0.5	5	h
OSYF10-4021	6.5	59	efgh	Candy Joy	0.25	2	h
Maragogi	6	54	efgh	Dulciana	0	0	h
Plethora	5.4558	50	efgh	Vulkana	0	0	h
Sivan	5.25	48	efgh	1011	0	0	h

* 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/acre) measured after grading.

<u>Variety</u>	<u>lbs/plot</u>	<u>40 lbs boxes/A</u>		<u>Variety</u>	<u>lbs/plot</u>	<u>40 lbs boxes/A</u>	
5901	154.5	1402	a	Lucille	123.5	1121	defgh
Superex	153	1388	ab	Vidora	123.5	1121	defgh
Rio Dulce	149.75	1359	ab	Joelino	120.77	1096	defghi
EMY 55843	148.75	1350	abc	Rio Del Sol	117	1062	efghi
Alba Blanca	148.25	1345	abc	Sivan	116.25	1055	fghi
Alison	147.75	1341	abc	New Frontier	114.5	1039	fghi
EMY 55457	146.5	1329	abcd	Red Sensation	111.79	1014	fghij
Mata Hari	146.27	1327	abcd	Red Marvel	109.94	998	ghij
Tania	144.27	1309	abcd	404	107.75	978	hij
EMY 55455	143.75	1305	abcd	Sapelo	106.5	966	hij
Century	143	1298	abcd	Red Maiden	105.5	957	hijk
Pirate	141.25	1282	abcd	Timon	105.12	954	hijkl
GA Boy	139.5	1266	abcd	White Gaspare	103.75	942	hijkl
WI-129	138.75	1259	abcde	Candy Kim	103.5	939	hijkl
Sweet Magnolia	138.75	1259	abcde	Vulkana	100.62	913	hijkl
Plethora	138.23	1254	abcdef	Dulciana	100.5	912	hijkl
Sweet Azalea	138	1252	abcdef	Fast Track	97.25	883	ijkl
Sofire	137.5	1248	abcdef	Early Sweet	96.5	876	ijkl
Chianti	134.75	1223	abcdef	Candy Ann	96	871	ijkl
PRR	134	1216	abcdef	OSYF10-4021	89	808	jkl
Maragogi	133.5	1212	abcdefg	Candy Joy	86.5	785	mjkl
369	133.39	1211	abcdefgh	1407	85.25	774	mjkl
A1298	132	1198	bcdefgh	OSYF12-07091	84	762	mkl
Macon	131.25	1191	bcdefgh	Quick Start	80	726	ml
EMY 55126	125.98	1143	cdefgh	White Phantom	67	608	mn
Sweet Agent	124.75	1132	defgh	1011	57	517	n

* 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/acre) measured after grading.

<u>Variety</u>	<u>lbs/plot</u>	<u>40 lbs bag/A</u>		<u>Variety</u>	<u>lbs/plot</u>	<u>40 lbs bag/A</u>	
1011	34.5	313	a	1011	34.5	313	a
Timon	23.8016	216	b	Timon	23.8016	216	b
Candy Joy	22	200	b	Candy Joy	22	200	b
1407	20.5	186	b	1407	20.5	186	b
OSYF12-07091	19.75	179	b	OSYF12-07091	19.75	179	b
Red Maiden	19.5	177	bc	Red Maiden	19.5	177	bc
White Gaspare	19.25	175	bc	White Gaspare	19.25	175	bc
Vulkana	18.8016	171	bc	Vulkana	18.8016	171	bc
Candy Ann	18.75	170	bc	Candy Ann	18.75	170	bc
Dulciana	18	163	bc	Dulciana	18	163	bc
Quick Start	17.75	161	bc	Quick Start	17.75	161	bc
Early Sweet	17.5	159	bc	Early Sweet	17.5	159	bc
Rio Del Sol	17.5	159	bc	Rio Del Sol	17.5	159	bc
Sivan	17	154	bc	Sivan	17	154	bc
OSYF10-4021	17	154	bc	OSYF10-4021	17	154	bc
White Phantom	16	145	bcd	White Phantom	16	145	bcd
Fast Track	15	136	bcde	Fast Track	15	136	bcde
404	14.25	129	bcde	404	14.25	129	bcde
Joelino	13.5339	123	bcdef	Joelino	13.5339	123	bcdef
Candy Kim	13.25	120	bcdef	Candy Kim	13.25	120	bcdef
A1298	11.5	104	bcdef	A1298	11.5	104	bcdef
Vidora	11	100	bcdef	Vidora	11	100	bcdef
369	10.4087	94	bcdefg	369	10.4087	94	bcdefg
Sapelo	10.25	93	cdefg	Sapelo	10.25	93	cdefg
New Frontier	9.75	88	cdefg	New Frontier	9.75	88	cdefg
Red Marvel	9.3067	84	cdefg	Red Marvel	9.3067	84	cdefg
Red Sensation	9.2443	84	cdefg	Red Sensation	9.2443	84	cdefg

* 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/acre) measured after grading.

<u>Variety</u>	<u>lbs/plot</u>	<u>40 lbs bag/A</u>		<u>Variety</u>	<u>lbs/plot</u>	<u>40 lbs bag/A</u>	
New Frontier	20.75	188	a	White Gaspare	8.25	75	ab
Early Sweet	15.625	142	ab	Mata Hari	7.2884	66	ab
Alison	15.25	138	ab	404	7.125	65	ab
Quick Start	15.125	137	ab	Macon	7	64	ab
Candy Kim	13.875	126	ab	Sofire	7	64	ab
OSYF12-07091	13.75	125	ab	EMY 55126	6.8751	62	ab
OSYF10-4021	13.625	124	ab	Candy Joy	6.875	62	ab
PRR	13.375	121	ab	Pirate	6.75	61	ab
1407	13.125	119	ab	Vulkana	6.2547	57	ab
Sweet Agent	13	118	ab	Dulciana	6.25	57	ab
Sweet Azalea	13	118	ab	Tania	6.208	56	ab
Century	12.875	117	ab	5901	6.125	56	ab
Sweet Magnolia	12.5	113	ab	Candy Ann	5.875	53	ab
Sapelo	12.5	113	ab	Chianti	4.375	40	ab
Lucille	11.5	104	ab	Vidora	4.375	40	ab
1011	10.875	99	ab	Red Maiden	4	36	ab
Red Marvel	10.6218	96	ab	Plethora	3.792	34	ab
Superex	10.25	93	ab	Joelino	3.708	34	ab
Sivan	10.25	93	ab	Rio Del Sol	3.5	32	ab
White Phantom	10.125	92	ab	Rio Dulce	3.5	32	ab
Fast Track	10	91	ab	A1298	3.25	29	ab
WI-129	9.5	86	ab	Maragogi	3	27	ab
EMY 55455	9	82	ab	369	2.7092	25	ab
EMY 55457	8.875	81	ab	Alba Blanca	1.75	16	b
EMY 55843	8.625	78	ab	Timon	1.0047	9	b
GA Boy	8.5	77	ab	Red Sensation	0.922	8	b

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

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Introduction

Each season the University of Georgia, Agricultural and Environmental Services Laboratories 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 harvested and dried, submitted to the Agricultural and Environmental Services Laboratories for analysis of the pungency-related compounds; pyruvic acid, lachrymatory factor (LF), and methyl thiosulfinates. Due to 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

Fifty-two onion varieties were 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.* 2017¹.

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 $\mu\text{mol/mL}$, which is a increase of 32% compared to the past two growing seasons. Lachrymatory factor ranged from 2.9-6.7 $\mu\text{mol/mL}$, 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 were 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

¹Kim H, 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.

Table 1. Pungency (pyruvic acid) content in onions submitted to the UGA Agricultural & Environmental Services Labs as a part of the 2021-2022 variety trial.

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

**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 onions submitted to the UGA Agricultural & Environmental Services Labs as a part of the 2021-2022 variety trial.

Variety	Lachrymatory Factor ($\mu\text{mole/g}$)		Variety	Lachrymatory Factor ($\mu\text{mole/g}$)	
Candy Kim	2.9	a	OSYF10-4021	4.6	abcdefg
Plethora	3.1	ab	Vidora	4.6	abcdefg
Red Marvel	3.3	abc	Timon	4.7	abcdefg
Sweet Magnolia	3.3	abc	Vulkana	4.9	abcdefg
Sivan	3.3	abc	PRR	4.9	abcdefg
Sweet Azalea	3.6	abcd	EMY 55126	5.0	abcdefg
Chianti	3.6	abcde	Early Sweet	5.0	abcdefg
Red Sensation	3.6	abcde	NUN 1011	5.1	abcdefg
Rio Dulce	3.7	abcdef	Dulciana	5.2	abcdefg
New Frontier	3.9	abcdef	Mata Hari	5.2	abcdefg
Superex	3.9	abcdef	EMY 55455	5.2	abcdefg
Sweet Agent	3.9	abcdef	Alba Blanca	5.2	abcdefg
Candy Joy	3.9	abcdef	OSYF12-7091	5.2	abcdefg
Rio Del Sol	4.0	abcdef	A1298	5.3	abcdefg
Century	4.1	abcdefg	Tania	5.4	abcdefg
Macon	4.1	abcdefg	Alison	5.4	abcdefg
Maragogi	4.3	abcdefg	WI-129	5.6	bcdefg
White Gaspare	4.3	abcdefg	404	5.7	cdefg
White Phantom	4.3	abcdefg	EMY 55457	6.1	defg
Sapelo	4.3	abcdefg	369	6.1	defg
NUN 5901	4.4	abcdefg	Joelino	6.2	defg
Quick Start	4.4	abcdefg	GA Boy	6.2	defg
Fast Track	4.4	abcdefg	Pirate	6.3	efg
Candy Ann	4.4	abcdefg	EMY 55843	6.5	fg
Sofire	4.6	abcdefg	Red Maiden	6.7	g
DP 1407	4.6	abcdefg	Lucille	6.8	g

**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 submitted to the UGA Agricultural & Environmental Services Labs as a part of the 2021-2022 variety trial.

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

*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 trial onions ranked on lowest Pyruvic acid, Lachrymatory factor, and Methyl Thiosulfinates.

Variety	Rank	Variety	Rank
Plethora	1	White Phantom	22(t)
Candy Kim	2(t)	A1298	28(t)
Sweet Azalea	2(t)	DP 1407	28(t)
Sivan	4(t)	Fast Track	28(t)
Sweet Magnolia	4(t)	Rio Del Sol	28(t)
Red Sensation	6	Rio Dulce	28(t)
Red Marvel	7	Alba Blanca	33(t)
New Frontier	8	Chianti	33(t)
Emy 55455	9	Nunhems 1011	33(t)
Century	10(t)	OSYF10-4021	33(t)
Maragogi	10(t)	White Gaspare	33(t)
Vidora	10(t)	Georgia Boy	38
Alison	13(t)	Candy Joy	39(t)
Dulciana	13(t)	Mata Hari	39(t)
Emy 55126	13(t)	OSYF12-7091	41(t)
Emy 55457	13(t)	Timon	41(t)
Nunhems 5901	13(t)	Early Sweet	43(t)
Superex	13(t)	Pirate	43(t)
Sweet Agent	13(t)	Quick Start	43(t)
Tania	13(t)	404	46
WI-129	13(t)	Candy Ann	47(t)
369	22(t)	Red Maiden	47(t)
Macon	22(t)	Sapelo	47(t)
PRR	22(t)	Lucille	50
Sofire	22(t)	Emy 55843	51(t)
Vulkana	22(t)	Joelino	51(t)

Table 5. Overall flavor quality ranking of yellow variety trial onions grown in three consecutive years (2019-2022) ranked in order of lowest overall Pyruvic acid, Lachrymatory factor, and Methyl Thiosulfinates. Only those yellow Granex varieties with data from the past three consecutive growing seasons were included in the table.

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)
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