University of Hawaii • College of Tropical Agriculture and Human Resources

Project Report

Sweet Onion Variety Trials, Kula, Maui 1997 & 1998 Results

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Introduction

Sweet onion variety trials were conducted in Kula, Maui to identify varieties with improved horticultural traits and yields, for possible replacement of standard varieties grown in Kula, Maui. The trials were conducted during the Spring (Feb. to June) 1997, Fall (July to Nov.) 1997, and Spring 1998 at the Univ. of Hawaii Kula Ag Park (1200 ft) and Pulehu (2000 ft elevation) sub-station. Objectives included evaluation of superior cultivars in terms of yields and horticultural traits and for evaluation of tolerance to major pests and diseases (esp. pink root and fusarium basal plate rot).

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Robert Paull (Post-Harvest), UH Manoa, tel. 808-956-7369, fax 808-956-3542, paull@hawaii.edu Sweet Onion Variety Trial Robin Shimabuku, Hector Valenzuela, and Mike Austin UHM-CES, Horticulture, and HARC Table 1. Yield of sweet onions grown at UH Kula substation, Feb-May 1997..

Cultivar	Bulb	Grade A	Grade A overall wt	Bulk wt	wt Gr. A	wt Gr. A	Grade A	Grade A Off-grade Grade A	Grade A	Bulk wt
	weight	wt/bulb	wt/bulb per 100 ft	per Acre	per 100 ft	per Acre	No.	No.	(% of tot)	100 bulbs
	(lbs/bulb) (lbs)	(lbs) ((lbs)	(lbs)	(lbs)	(lbs)	(per 400)	(per 400) (per 400)	(by no)	(lbs)
Granex 429 0.73a	9 0.73a	0.69a	109.50	23761.50	25.06	5437.56	92	288	24.21	78.7a
Pegasus	0.58b	0.56b	87.00	18879.00	49.82	10811.71	242	166	59.31	62.7b
Mercedes	0.56bc	0.57b	84.00	18228.00	75.24	16327.08	352	48	88.00	60.6bc
SSC-6200	0.54cd	0.57b	81.00	17577.00	28.00	6076.27	131	269	32.75	56.3bcde
Mr max	0.54cd	0.55b	81.00	17577.00	66.00	14322.00	320	80	80.00	59.4bcd
Rio zorro	0.54cd	0.55b	81.00	17577.00	63.16	13705.90	307	94	76.56	55bcde
Encino	0.53d	0.58b	79.50	17251.50	54.38	11799.38	250	150	62.50	56.7bcde
Regency	0.5e	0.51c	75.00	16275.00	30.60	6640.20	160	240	40.00	54.7bcde
Monsoon	0.49e	0.5cd	73.50	15949.50	65.44	14199.94	349	51	87.25	51.2def
yel. granex	< 0.48ef	0.48cde	72.00	15624.00	53.71	11655.50	373	127	74.60	52.4cdef
RCS-1903	0.47efg	0.46ef	70.50	15298.50	69.09	13169.73	289	111	72.25	50.3def
RCS-1004	0.45ghi	0.47def	67.50	14647.50	47.94	10402.98	272	128	68.00	55bcde
Daybreak	0.44ghi	0.48cde	66.00	14322.00	46.37	10061.53	246	136	64.40	45.2f
Riobravo	0.43hi	0.44f	64.50	13996.50	32.34	7017.78	196	204	49.00	47.5ef
Savannah	0.42i	0.45f	63.00	13671.00	56.19	12194.04	333	67	83.25	45.5f
Experimen	it: Two mon	th old seed	Experiment: Two month old seedlings transplanted Feb. 12, 1997. Bulbs were weighted on May 29, 1997. The experimental	anted Feb. 1	2, 1997. Bulb	s were weight	ed on May	29, 1997.	The experi-	nental
design con	sisted of for	ir rows per	design consisted of four rows per variety with 65-plants per row. Each treatment (variety) was replicated four times. Plant spac-	65-plants pe	er row. Each tu	reatment (vari	lety) was re	eplicated for	ur times. P	ant spac-
ing was 12	ing was 12 inches between double rows and	veen doubl	e rows and 8.	inches betwe	8 inches between plants in the rows.	the rows.				
Data analy	vsis: Numbe	rs followed	Data analysis: Numbers followed by the same letter within each column are not statistically different according to Duncan's	: letter within	n each colum	n are not stati	istically dif	fferent acco	ording to D	uncan's
New multi	ole range tea	st at a 95%	New multiple range test at a 95% confidence level (P<0.05)	evel (P<0.05)						
Yields: Yie.	lds per 100	ft row base	Yields: Yields per 100 ft row based on 8 inch spacing between plants in-the-row. Per acre yields estimated based on 32,500	spacing betw	een plants in	-the-row. Per a	acre yields	estimated l	based on 3.	2,500
plants/Acr	e (2 ft rows,	, 21,700 ft-	plants/Acre (2 ft rows, 21,700 ft-rows per acre and 8 inch spacing between plants in-the-row)	and 8 inch	spacing betwe	en plants in-t	he-row).	(
Seed Sour	ce: Maui Sw	eet Standa	Seed Source: Maui Sweet Standards: Yellow Granex F1, Granex 429 (Asgrow); Petoseed: Savannah Sweet, Mercedes; Asgrow:	ranex F1, Gr	anex 429 (As	grow); Petosee	ed: Savanna	ah Sweet, M	lercedes; A	sgrow:
Pegasus, El	ncino; Kio Ci	olorado: Ki	Pegasus, Encino; <i>Kio Colorado</i> : Kio Bravo, Mr. Max, Kio Zorro, KCS-1004, KCS-1903, Sweet Sunrise; Shamrock Seed: Daybreak,	Max, Kio Zori	co, KCS-1004,	KCS-1903, SW	eet Sunrise	Shamrock	s Seed: Day	oreak,

SCC-6200, Regency.

Table 2. (Jrading (pe	srcentage b	Table 2. Grading (percentage by number) of	of sweet onic	on varietie	s grown at	UH Kula sı	ubstation,]	sweet onion varieties grown at UH Kula substation, FebMay 1997.	.260	
Cultivar	Grade A	Decay	split	misshapen	small	white	doubles	purple	indent.	sun burn	Coeff.
	(percent)	(percent)	(percent)	(percent)	(percent)	(percent)	(percent)	(percent)	(percent)	(percent)	Variation
RCS-1004	68.00	1.50	9.25	12.75	0.75	0.00	7.50	0.00	0.00	0.25	36.30
RCS-1903	72.25	4.00	14.50	6.50	1.00	0.00	1.00	0.75	0.00	0.00	33.30
SSC-6200	32.75	0.50	22.50	24.25	1.75	0.00	18.25	0.00	0.00	0.00	37.00
Daybreak	64.40	1.83	7.07	8.12	13.87	0.00	4.71	0.00	0.00	0.00	51.10
Encino	62.50	3.75	1.25	22.50	6.25	0.00	3.75	0.00	0.00	0.00	39.80
Granex 429	24.21	2.11	14.47	3.16	4.21	0.00	50.79	1.05	0.00	0.00	42.30
Mercedes	88.00	1.50	0.75	4.75	1.50	0.25	2.25	1.00	0.00	0.00	30.29
Monsoon	87.25	1.50	3.00	3.50	4.00	0.00	0.75	0.00	0.00	0.00	38.40
Mr. Max	80.00	2.50	9.50	2.50	0.50	0.00	4.50	0.00	0.25	0.25	31.70
Pegasus	59.17	3.42	6.11	2.20	0.73	0.00	28.12	0.24	0.00	0.00	33.00
Regency	40.00	2.25	7.75	5.00	2.25	0.00	42.75	0.00	0.00	0.00	36.40
Rio Bravo	67.00	19.75	6.75	1.00	1.75	0.00	1.50	0.25	1.75	0.25	36.20
Rio Zorro	76.56	1.50	4.49	5.74	4.49	0.00	7.23	0.00	0.00	0.00	38.40
Savannah	83.00	2.25	2.75	1.75	6.25	0.00	1.50	0.25	0.00	2.25	36.60
Y. Granex	74.80	3.20	8.60	3.20	1.00	1.80	4.20	2.80	0.00	0.40	38.80
Average	65.33	3.44	7.92	7.13	3.35	0.14	11.92	0.42	0.13	0.23	37.31
Sampling: Grade A:	For each v Varieties w	variety 400 ith highest	Sampling: For each variety 400 bulbs (about Grade A: Varieties with highest percentage of	out 265 ft len 2 of Grade A	gth row) v fruit inclu	vere indivi ded Merce	dually weig des, Monso	ghed and c on, Mr. Mi	265 ft length row) were individually weighed and classified as Grade f Grade A fruit included Mercedes, Monsoon, Mr. Max, and Savannah.	265 ft length row) were individually weighed and classified as Grade A or off-grade. Grade A fruit included Mercedes, Monsoon, Mr. Max, and Savannah.	off-grade.
Split and	o bravo na(doubles: E	a a nign in Iigh incide:	Decay: No bravo had a high incidence of decay. Split and doubles: High incidence shown by Gr	decay. bv Granex 4	29. Regend	zv, SSC-62(00. RCS-19	03. Varieti	es with the	ay. Granex 429, Regency, SSC-6200, RCS-1903. Varieties with the earliest maturity	turity
(and thus Misshape	harvested and sma	too late in 11 bulbs:]	this experir High incide	(and thus harvested too late in this experiment) may have shown the highest numbers of splits and doubles. Misshapen and small bulbs: High incidence of misshapen bulbs was shown by SSC-6200, Encino, and RCS-1004; Daybreak	avé shown apen bulk	the highes is was shor	t numbers wn by SSC	of splits al- 6200, Enc	nd doubles.	CS-1004; Da	ybreak
had a high Ruth unife	n incidence	had a high incidence of small bulbs. Bulb uniformity (low Coefficient of	ulbs. nt of variat	had a high incidence of small bulbs. Bulb uniformity (low Coefficient of variation): High bulb uniformity was shown by Mercedes Mr. Max. and Degasus The	1h miforr	nity was sh	M vy uwor	erredes N	lr Max an	ή Ροσαειις Τ	e de
Sweet Oni	Sweet Onion Variety Trial	ety Trial								1 - 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2

Sweet Onion Variety Trial Robin Shimabuku, Hector Valenzuela, and Mike Austin UHM-CES, Horticulture, and HARC Robin Shimabuku, Hector Valenzuela, and Mike Austin

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Table 3. Yield of sweet onions grown at UH Pulehu Substation, Maui, Feb-June 1997.

Bulk wt 100 bulbs (lbs)	46.5f 61.0a 58.7abc 57.8abc 59.3ab 49.5ef 50.3def 46.6f 60.5a 56.7abc 53.3cde 53.3cde 54.2abcd 54.2abcd
Off-Grade Grade A No. (% of tot) (per 400) (by no.)	66.00 96.50 56.50 75.75 73.75 58.00 73.75 59.50 73.75 78.25 78.25 78.25 77.50 77.50 77.50 89.25
Off-Grade No. (per 400)	$\begin{array}{c} 136\\174\\174\\87\\87\\180\\130\\120\\88\\130\\120\\87\\130\\120\\87\\130\\120\\87\\130\\120\\120\\120\\120\\120\\120\\120\\120\\120\\12$
Grade A No. per 400)	264 303 303 352 303 352 202 202 202 202 202 202 357 302 357
Wt Gr. A Grade A (per Acre No. N (1bs) (per 400) (9667.35 18846.45 18846.45 10850.54 14054.28 17472.84 12722.98 7890.12 11461.67 9629.92 10025.40 12523.61 11164.65 13516.39 15977.98
wt Gr.A per 100 ft (lbs)	$\begin{array}{c} 44.55\\ 86.85\\ 50.00\\ 64.77\\ 80.52\\ 580.52\\ 580.52\\ 580.52\\ 51.45\\ 51.45\\ 51.45\\ 51.45\\ 51.45\\ 51.45\end{array}$
Bulk wt. per Acre (Ibs)	$\begin{array}{c} 15298.50\\ 19204.50\\ 18879.00\\ 17902.50\\ 19204.50\\ 16275.00\\ 15949.50\\ 14322.00\\ 14322.00\\ 19530.00\\ 18228.00\\ 17577.00\\$
Bulb GradeA Overall wt veight wt/bulb per 100 ft lbs/bulb) (lbs) (lbs)	70.50 88.50 87.00 82.50 82.50 88.50 73.50 66.00 66.00 66.00 84.00 81.00 81.00 82.50
GradeA wt/bulb] (lbs)	0.45h 0.6ab 0.59abc 0.57cde 0.61a 0.53f 0.48g 0.48g 0.48g 0.48b 0.48g 0.48g 0.49g 0.57abcd 0.57abcd 0.57abcd 0.55ef
Bulb weight (lbs/bulb)	0.47e 0.59a 0.58ab 0.55c 0.59a 0.59a 0.59a 0.49de 0.49de 0.49de 0.44f 0.56c 0.54c 0.54c 0.54c 0.54c 0.54c 0.55c
Cultivar	Mercedes SSC-6200 Mr Max Rio Zorro Encino Regency Monsoon Yell. granex RCS-1903 RCS-1004 Daybreak Rio Bravo Savannah

design consisted of four rows per variety with 65-plants per row. Each treatment (variety) was replicated four times. Plant Experiment: Two-month old seedlings transplanted Feb. 12, 1997. Bulbs were weighed on June 16, 1997. The experimental spacing was 12 inches between double rows and 8 inches between plants in the row.

Data analysis: Numbers followed by the same letter within each column are not statistically different according to Duncan's New multiple range test at a 95% confidence level (P<0.05).

Yields: Yield per 100 ft row based on 8-inch spacing between plants in-the-row. Per acre yields estimated based on 32,500 plants/Acre (2 ft rows, 21,700 ft-rows per acre and 8-inch spacing between plants in-the-row). Seed source: *Maui sweet standards*: Yellow Granex F1, Granex 429 (Asgrow); *Petoseed*: Savannah Sweet, Mercedes; Asgrow: Pegasus, Encino; *Rio Colorado*: Rio Bravo, Mr. Max, Rio Zorro, RCS-1004, RCS-1903, Sweet Sunrise; *Shamrock Seed*: Daybreak, SCC-6200, Regency.

ortic	UHM-CES, Horticulture, a	and HARC	La conton varia	a avovo	+11H Pulahu	enh-etation	Mani Foh.	-Luna 1907	
Grade A Decay		Split	cultivar Grade A Decay Split Misshapen Small White Doubles Purple I221	small	White	Doubles	, maul, reu- Purple	June 1997.	Sunburn
3.00	_	8.75	12.00	2.00	0.00	6.50	0.00	0.00	0.25
15.75	D	19.75	4.25	1.25	3.00	0.50	0.00	0.00	0.50
0.25		14.75	17.25	1.25	0.00	10.0	0.00	0.00	0.00
0.75		7.00	12.25	8.50	0.00	1.25	0.00	0.00	0.00
1.00		4.25	15.50	5.25	0.00	0.00	0.00	0.00	0.00
3.50		34.25	9.25	0.50	0.00	6.25	0.25	0.00	0.00
0.00	_	0.25	0.50	1.50	0.25	0.75	0.00	0.25	0.00
2.25		2.75	12.75	1.50	0.25	1.75	0.00	0.25	0.00
10.00	0	9.50	2.75	0.50	0.00	1.50	0.00	0.00	0.00
10.0	0	16.25	2.75	2.00	0.00	3.00	0.00	0.00	0.00
3.00		20.75	8.75	4.00	0.00	13.2	0.00	0.25	0.25
7.25		9.75	2.25	0.50	0.25	3.00	0.25	0.50	0.75
2.25		2.75	5.00	1.75	0.00	0.25	0.00	0.00	0.00
5.50	_	2.00	1.75	0.50	0.00	0.75	0.00	0.25	0.00
6.75		24.75	5.50	0.25	1.25	10.2	2.75	0.00	0.00

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Sweet Onion Variety Trial

Coeff.

 $\begin{array}{c} 1.50\\ 1.50\\ 0.50\\ 2.00\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.25\\ 0.25\end{array}$ 2.08 0.50 **12.75** 2.75 2.75 8.75 2.25 2.25 1.75 1.75 7.50 0.25 2.75 9.50 16.25 9.75 9.75 2.75 2.75 2.75 11.83 **0.00** 2.25 10.00 3.00 7.25 5.50 6.75 4.75 88.00 69.13 **89.25** 48.50

Average

32.27

0.12

0.10

0.22

3.93

0.33

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Cultivar	Soluble Solids (%)	Soluble Solids (%) Soluble Solids (%)	Pungency	Pungency	sugar/pung.	sugar/pung.
	low-elevation	high elevation	low-elevation	High elevation	low-elev.	high-elev.
				4.6 (2)	1.37 (1)	1.76 (1)
Pegasus	8.6 (1)	8.7 (1)	7.2 (4)	(6.0(8))	1.19 (2)	1.45(6)
Mr. Max	7.8 (5)	8.0 (5)	7.0 (3)	5.2 (3)	1.11 (3)	1.54(5)
RCS-1004	7.6 (7)	7.5 (8)	6.9 (2)	4.4 (1)	1.10(4)	1.70 (2)
Granex-429	8.2 (3)	8.1(4)	7.5 (6)	6.3 (9)	1.09(5)	1.29(11)
Mercedes	8.3 (2)	_	7.9 (8)	6.8(10)	1.05(6)	1.24(13)
SSC-6200	7.8 (5)	7.5 (8)	7.3 (5)	4.6 (2)	1.07(7)	1.63 (3)
Regency	7.8 (5)	7.6 (7)	7.5 (6)	5.6 (5)	1.04(8)	1.36 (8)
Rio Bravo	7.6 (7)		7.5 (6)	5.7 (6)	1.01(9)	1.35(9)
Monsoon	7.1 (11)		7.2 (4)	5.8 (7)	0.99(10)	1.40(7)
Yellow Granex	7.3 (10)	8.6 (2)	7.6 (7)	5.5(4)	0.96(11)	1.56(4)
Rio Zorro	7.7 (6)	7.5 (8)	8.4 (9)	5.6 (5)	0.92(12)	1.34(10)
Sav. Sweet	7.4 (9)	7.6 (7)	8.2 (10)	5.9(7)	0.90(13)	1.29(11)
Encino	7.4 (9)	7.7 (6)	8.8 (11)	(6.9(10))	0.84(14)	1.12(14)
Daybreak	7.5 (8)	8.0 (5)	9.3 (12)	6.3 (9)	0.81 (15)	1.27 (12)
Notes:						

Table 5. Pungency and soluble solid levels of sweet onion varieties, Kula, Spring 1997 (Ranking in parenthesis, the higher the better).

NULES:

umoles pyruvic acid per gram fresh weight (a value about half of the values shown here). The lower value for pyruvic acid, the less pungent. Pungency values expressed as µmoles pyruvic acid per ml of onion juice. This should not be confused with the other method of expression Values less than 7-8 can be regarded as non-pungent.

Soluble Solids (TSS), is a rough measure of sweetness. The higher the value, the better. Overall results are expressed as sugar/pungency ratio,

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Sweet Onion Variety Trial, Kula Ag Park, Fall 1997	Sobin Shimabuku, Hector Valenzuela, and Mike Austin	IHM-CES, Horticulture, HARC, and DOA
0	Shi	CES,
veet	bin	-M-
Sw	Rc	U

Table 1. Yield of intermediate sweet onions grown at Kula Ag Park, Fall (July-Nov), 1997.

Grade A Bulk wt (% of tot) 100 bulbs (by no.) (1bs)	70.00 34.25 55.75 60.25 56.75 56.75 36.50 38.10 38.10 25.55 59.25 59.25 27.01 23.01	Experiment. The experimental design consisted of four rows per variety with 65-plants per row. Each treatment (variety) was replicated four times. Plant spacing was 12 inches between double rows and 8 inches between plants in the row. Data analysis: Numbers followed by the same letter within each column are not statistically different according to Duncan's
Off-Grade No. (9 (per 400)	120 120 177 177 173 173 173 173 173 163 163 163 163 163 163 163 163 163 16	isted of four rows per variety with 05-plants per row. Each treatment (12 inches between double rows and 8 inches between plants in the row. me letter within each column are not statistically different according to
Wt Gr. A Grade A ber Acre No. (lbs) (per 400)	222 222 222 222 222 101 152 101 237 237 237 237 237 237 237 237 237 237	plants per nches bety tatistically
Wt Gr. A per Acre (lbs)	$\begin{array}{c} 16177.35\\ 6577.54\\ 11795.31\\ 11570.71\\ 10529.11\\ 10529.11\\ 4109.44\\ 5702.76\\ 6820.00\\ 4897.15\\ 9447.64\\ 8100.07\\ 3252.39\\ 2607.29\\ 2471.77\\ $	ety with 65- rows and 8 i mn are not s
wt Gr.A per 100 ft (lbs)	$\begin{array}{c} 74.55\\ 30.31\\ 54.36\\ 54.36\\ 53.32\\ 53.32\\ 18.94\\ 18.94\\ 18.94\\ 18.94\\ 112.02\\ 11.39\\ 112.02\\ 11$	ows per vari /een double in each colui
Bulk wt. per Acre (Ibs)	$\begin{array}{c} 23436.00\\ 20506.50\\ 19855.50\\ 19855.50\\ 17577.00\\ 17577.00\\ 17577.00\\ 17577.00\\ 17577.00\\ 17577.00\\ 17577.00\\ 17577.00\\ 17577.00\\ 17577.00\\ 17577.00\\ 17577.00\\ 10090.50\\ 11067.00\\ 11067.00\\ 10090.50\end{array}$	ed of four re inches betw e letter withi
Grade A Overall wt vt/bulb per 100 ft (lbs/blb) (lbs)	$\begin{array}{c} 108.00\\ 94.50\\ 91.50\\ 84.00\\ 81.00\\ 78.00\\ 78.00\\ 778.00\\ 778.00\\ 778.00\\ 778.00\\ 778.00\\ 778.00\\ 78$	ign consist ing was 12 v the same
Grade A Overall w wt/bulb per 100 ft (lbs/blb) (lbs)	0.59bc 0.65b 0.59bc 0.57cd 0.57cd 0.54cd 0.58cd 0.58cd 0.58cd 0.58cd 0.58cd 0.58cd 0.58cd 0.58cd 0.58cd 0.58cd 0.58cd 0.59bc 0.59bc 0.59bc 0.59bc 0.59bc 0.59bc 0.53bb 0.530bc	mental des Plant spac followed b
Bulb weight (lbs/bulb)	$\begin{array}{c} 0.63b \\ 0.61b \\ 0.56c \\ 0.54cd \\ 0.54cd \\ 0.52d \\ 0.52d \\ 0.52d \\ 0.52d \\ 0.52d \\ 0.52d \\ 0.38e \\ 0.31g \\ 0.31g \\ 0.31g \\ \end{array}$	eriment:. The experimental design cons replicated four times. Plant spacing was a analysis: Numbers followed by the sai
Cultivar	pegasus evita sw. sunrise DPS-1001 DPS-1001 DPS-1067 sw. magnolia grano 1015 r. selecto DPS-1057 r. selecto DPS-1057 r. selecto DPS-1057 redbone ar. sunset sw. honey RCS-1938	Experiment: replicated Data analysi

Yields: Yield per 100 ft rows, 21,700 ft-rows per acre and 8-inch spacing between plants in-the-row. In the-row.

Seed Source: Petoseed: Chula vista, Linda vista; Rio Colorado: RCS 1938, Rio Selecto; Palmer: Sweet Magnolia, Arizona Sunset, DPS 1067, DPS 1057, DPS 1001; Asgrow- Pegasus.

Sweet Onion Variety Trial, Kula Ag Park, Fall 1997 Robin Shimabuku, Hector Valenzuela, and Mike Austin UHM-CES, Horticulture, HARC, and DOA

	Coeff.	Variation	38.40	33.30	45.70	47.00	43.30	46.50	59.60	82.50	51.10	48.10	49.10	49.40	57.40	67.80	42.90
97.	indent.	(percent)	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.25	0.25	0.00	0.00	0.25	2.09	0.34	0.28
ırk, Fall 19	Color	(percent)	0.00	0.00	0.25	0.00	0.00	0.22	0.25	1.25	0.00	0.00	0.75	0.00	1.05	0.34	0.28
Ŧ		(bei			25.25												
eties grown a	Small	(percent)	3.00	0.25	5.75	8.50	3.75	4.22	10.75	5.50	6.25	10.50	9.50	13.00	16.75	17.85	27.84
eet onion vari	Split Misshapen Small	(percent)	16.75	8.25	1.50	8.00	21.25	9.33	23.00	4.00	12.25	40.50	20.50	11.50	3.40	5.05	3.69
mber) of sw	Split	(percent)	2.00	3.75	22.00	6.25	4.00	6.00	16.75	11.00	17.50	11.75	4.00	3.75	11.26	3.37	5.68
ntage by nu	Decay	(percent)	14.00	15.00	11.00	6.25	8.50	14.44	10.00	22.25	4.25	11.25	8.50	7.25	9.42	44.78	37.22
ding (percer	Grade A	(percent)	63.75	70.00	34.25	55.75								59.25	26.44	20.54	21.88
Table 2. Grading (per	Cultivar		ch. vista	lin. vista	pegasus	evita	sw. sunrise	DPS-1001	DPS-1067	Sw. magnolia	Grano 1015	r. selecto	DPS-1057	redbone	ar. sunset	sw. honey	RCS-1938

Bulb uniformity (shown by low Coefficient of Variation): High bulb uniformity was shown by linda vista and chula vista. The poorest (lowest) uniformity shown by sweet magnolia, and sweet honey.

Seed Source: Petoseed: Chula vista, Linda vista; Rio Colorado: RCS 1938, Rio Selecto; Palmer: Sweet Magnolia, Arizona Sunset,

Sweet Onion Variety Trial, Pulehu, Fall 1997 Robin Shimabuku, Hector Valenzuela, and Mike Austin UHM-CES, Horticulture, HARC, and DOA Table 3. Yield of intermediate day sweet onions grown at the UH Pulehu Substation, Fall 1997.

		Vari
Grade A (% of tot) (lbs)	$\begin{array}{c} 27.67\\ 25.67\\ 16.67\\ 16.67\\ 15.33\\ 15.33\\ 15.33\\ 15.33\\ 33.00\\ 33.00\\ 33.33\\ 23.33\\ \end{array}$	35.00 19.50 treatment (
Wt Gr. A Grade A Off-Grade Grade A per Acre No. No. (% of tot) (lbs) (by no.) (lbs)	217 223 250 254 254 170 170 134 230	195 161 row, Fach :
Grade A No.	83 50 50 77 71 66 71 70 71 70 70 71 70 70 70 70 70 70 70 70 70 70 70 70 70	105 39 nlants ner
Wt Gr. A per Acre (Ibs)	5133.14 4762.07 2712.50 2441.25 5538.38 1896.58 1896.58 1846.67 5077.80 4044.34 3759.53 2582.30	3645.60 1586.81 atv with 65-
wt Gr.A per 100 ft (lbs)		39.00 8463.00 16.80 3645.60 105 195 35.00 30.00 6510.00 7.31 1586.81 39 161 19.50 esion consisted of four rows ner variety with 65-plants ner row. Each treatment (
Bulk wt. per Acre (lbs)	$\begin{array}{c} 15298.50\\ 18228.00\\ 14647.50\\ 14647.50\\ 13020.00\\ 12043.50\\ 8137.50\\ 11067.00\\ 10090.50\\ 10090.50\\ 9114.00\\ 9114.00\\ \end{array}$	8463.00 6510.00 d of four re
Grade A Overall wt vt/bulb per 100 ft (lbs/blb) (lbs)	$\begin{array}{c} 70.50\\ 84.00\\ 67.50\\ 67.50\\ 60.00\\ 55.50\\ 51.00\\ 46.50\\ 46.50\\ 42.00\end{array}$	39.00 30.00 ion consiste
Grade A wt/bulb_p (lbs/blb)	0.57a 0.57a 0.5b 0.45bc 0.41cd 0.41cd 0.38de 0.37def 0.35ef 0.35ef 0.35ef 0.34ef	0.32f 0.25g mental des
Bulb weight (lbs/bulb)		0.26f 0.2g The exneri
Cultivar	l. vista grano 1015 DPS-1067 r. selecto sw. magnolia pegasus sw. sunrise DPS-1001 DPS-1057 ar. sunset	redbone 0.26f 0.32f RCS-1938 0.2g 0.25g Experiment: The experimental d

Data analysis: Numbers followed by the same letter within each column are not statistically different according to Duncan's Experiment. The experimental design consisted of tour rows per variety with 65-plants per row. Each treatment (variety) was replicated three times. Plant spacing was 12 inches between double rows and 8 inches between plants in the row. New multiple range test at a 95% confidence level (P<0.05).

Yields: Yield per 100 ft row based on 8-inch spacing between plants in-the-row. Per acre yields estimated based on 32,500 plants/Acre (2 ft rows, 21,700 ft-rows per acre and 8-inch spacing between plants in-the-row). Seed Source: Petoseed: Chula vista, Linda vista; Rio Colorado: RCS 1938, Rio Selecto; Palmer: Sweet Magnolia, Arizona Sunset, DPS 1067, DPS 1057, DPS 1001; Asgrow- Pegasus

Robin Shimabuku, Hector Valenzuela, and Mike Austin UHM-CES, Horticulture, HARC, and DOA Sweet Onion Variety Trial, Pulehu, Fall 1997

Coeff. Table 4. Grading (percentage by number) of sweet onion varieties grown at the UH Pulehu Sub-Station, Fall 1997. indent. Doubles Color Small Misshapen Split Grade A Decay Cultivar

Variation	39.1	29.7	50.7	54.8	36.2	47.5	55.4	48.3	49.8	46.1	44.4	43.8	43.2	45.12
(percent)	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
(percent)	0.00	0.00	0.00	0.33	1.50	0.33	0.00	0.00	0.00	0.50	0.33	1.00	0.00	0.29
(percent)	5.67	1.67	8.33	16.67	1.00	14.33	19.33	3.33	3.50	13.50	24.33	10.33	0.00	8.86
(percent)	6.00	1.00	13.00	11.67	5.00	17.00	0.00	19.00	21.50	17.50	22.00	24.33	29.00	13.57
(percent)	13.33	7.67	20.33	4.00	7.00	0.33	10.67	0.67	1.00	9.00	0.33	5.00	1.50	5.77
(percent)	14.67	13.00	13.67	21.00	18.00	20.67	17.00	7.67	11.00	8.50	16.00	10.67	12.50	13.49
(percent)	33.00	50.67	28.00	29.67	26.00	32.00	37.67	26.00	27.50	18.00	13.67	13.67	37.50	30.60
(percent)	27.33	25.67			41.50			43.33	35.50	33.00	23.33	35.00	19.50	27.40
d)		l. vista	grano 1015	DPS-1067	r. selecto	sw. magnolia	pegasus	sw. sunrise	DPS-1001	DPS-1057	ar. sunset	redbone	RCS-1938	Average

Table 5. Pungency	and soluble solid levels	s of sweet onion variet	Table 5. Pungency and soluble solid levels of sweet onion varieties, Kula, Fall 1997 (Ranking in parenthesis, the higher the better).	nking in parenthesis, t	the higher the better).	
Cultivar	Soluble Solids (%) Solu	Soluble Solids (%)	Pungency	Pungency	sugar/pung. low-elev.	sugar/pung. high-elev.
Pegasus	7.2 (3)	6.6 (2)	4.6 (1)	5.3 (7)	1.57 (1)	1.25 (5)
So. Honey	6.3 (8)	6.4 (3)	5.2 (2)	2.1 (1)	1.21 (2)	3.05 (1)
Evita	8.3 (1)	8.2 (1)	7.0 (8)	7.5 (12)	1.19 (3)	1.09(9)
Red Bone	5.8(10)	5.4(9)	5.9 (3)	5.8 (8)	0.98(4)	0.93(10)
RCS-1938	6.5 (7)	5.9 (6)	6.7 (6)	4.1 (4)	0.97 (5)	1.44(4)
Sw. Magnolia	6.3 (8)	6.6 (2)	6.6 (5)	7.1 (11)	0.95 (6)	0.93(10)
DPS-1001	5.8(10)	5.1 (11)	6.3(4)	2.5 (2)	0.92(7)	2.04 (2)
Sw. Sunrise	6.2 (9)	5.7 (7)	6.8 (7)	6.2 (9)	0.91(8)	0.92(11)
DPS-1057	6.7 (6)	5.7 (7)	7.5 (10)	6.9(10)	0.89(9)	0.83(13)
Chula Vista	6.3 (8)	5.1 (11)	7.2 (9)	2.6 (3)	0.88(10)	1.96 (3)
Linda Vista	6.5 (7)	5.6 (8)	8.2 (11)	4.6(6)	0.79(11)	1.22(6)
Granex-1015	7.1(4)	6.1 (5)	9.1 (12)	7.6 (13)	0.78(12)	0.80(14)
DPS-1067	7.0 (5)	6.3 (4)	9.4 (13)	5.3 (7)	0.74(13)	1.19(7)
Arizona Suns.	7.8 (2)	6.6 (2)	11.3 (14)	7.8 (14)	0.69(14)	0.85 (12)
Rio Selecto	NA	5.2 (10)	NA	4.4 (5)	NA	1.18(8)

Notes:

pyruvic acid per gram fresh weight (a value about half of the values shown here). The lower value for pyruvic acid, the less pungent. Values less than 7-8 can be regarded as non-pungent. Soluble Soluble Solids (TSS), is a rough measure of sweetness. The higher the value, the better. Overall results are expressed as sugar/pungency ratio, with Pungency values expressed as umoles pyruvic acid per ml of onion juice. This should not be confused with the other method of expression umoles

Sweet Onion Variety Trial, UH Kula Ag Park, Spring 1998 Robin Shimabuku, Hector Valenzuela, and Bob Osgood UHM-CES, Horticulture, HARC, and DOA Table 1. Yield of intermediate sweet onions grown at the UH Kula Ag Park, Spring (March to June) 1998.

Bulk wt 100 bulbs (lbs)							
e Grade A (% of tot) 1 (by no.)							
Off-Grade No. ((per 400)			46.5b		1		
ade A C Jo. r 400) (88.7		Ĩ		
Gr. Pei	16	$\frac{4}{4}$	45	34 4	20	67	61
Wt Gr. A Grade A per Acre No. (Ibs) (per 400)	384	356	355	166	380	333	339
wt Gr.A per 100 ft (lbs)	.0b 15,624b	.0b 14,774b	51.2c 13,288c	.2c 12,427c	.1d 11,750d	.7d 10,568d	.4e 09,655e
Bulk wt. per Acre (Ibs)	•	Ŭ	Č			N	V
Grade A Overall wt vt/bulb per 100 ft (lbs/blb) (lbs)	75.0b 16,275	76.5b	5c 60.0bc13,020bc	70.5c	57.0d	60.0d	52.5e
Grade wt/bu (lbs/h		0.5	0.46c	0.4(0.38	0.3	0.3
Bulb weight (lbs/bulb)		0.51b	0.40 bc	0.47c	0.38d	0.40d	0.35e
Cultivar		Sw. Sunrise	Mr. Max	Rio Bravo	Monsoon	Savannah	Eureka

Data analysis: Numbers followed by the same letter within each column are not statistically different according to Duncan's **Experiment**. The experimental design consisted of four rows per variety with 65-plants per row. Each treatment (variety) was replicated four times. Plant spacing was 12 inches between double rows and 8 inches between plants in the row. New multiple range test at a 95% confidence level (P<0.05).

Yields: Yield per 100 ft row based on 8-inch spacing between plants in-the-row. Per acre yields estimated based on 32,500 plants/Acre (2 ft rows, 21,700 ft-rows per acre and 8-inch spacing between plants in-the-row).

Seed Source: Petoseed: Chula vista; Rio Colorado: Rio Bravo

Sweet Onion Variety Trial Robin Shimabuku, Hector Valenzuela, and Bob Osgood UHM-CES, UHM Horticulture Dept, and HARC. Table 2. Grading (percentage by number) of sweet onion varieties grown at the UH Kula Ag Park, Maui, March-June 1998.

THUR 2. UTHUR (PUTCUTHER D) THURDED		igo ny mampo		of sweet officer variances grown at the off main right and, plant, plant, plant 1770.		1 2v7 minu 110	M 17, M 14 11 11	ז אוואן זיזא ז	
Cultivar tion Grade A	Grade A (percent) All bulbs	Decay (percent)	Split (percent)	Misshapen (percent)	Small (percent)	Doubles (percent)	Color (percent)	Coeff. Variation	Coeff. Varia-
Eureka Mercedes Monsoon Mr. Max Rio Bravo Savannah Sw. Sunrise	84.75 96.00 95.00 88.75 83.00 83.25 89.00	3.25 1.25 1.50 6.00 5.00 2.50	1.50 0.75 1.50 3.75 10.50 6.50 2.75	5.25 2.00 1.75 1.00 0.75 3.00	2.50 0.00 0.50 0.50 1.25	2.50 0.00 0.25 0.00 0.00 0.50 0.50	$\begin{array}{c} 0.25 \\ 0.00 \\ 0.00 \\ 0.00 \\ 0.00 \\ 0.75 \\ 1.00 \end{array}$	50.5 29.3 37.1 36.8 39.4 41.3	49.9a 29.1b 37.5ab 36.3b 35.7b 40.5ab 41.6ab
Average	88.97	3.31	3.84	2.38	0.78	0.47	0.25	38.16	

Sweet On Robin Shii UHM-CES, Table 3. Y 1998. Cultivar bulbs bulbs bulbs Sw. Sunrise Rio Bravo Eureka Savannah Mr. Max Monsoon Experiment was replicat	Sweet Onion Variety Trial, URobin Shimabuku, Hector ValenzUHM-CES, Horticulture, HARC, arUHM-CES, Horticulture, HARC, ar1998.Table 3. Yield of intermediate sw1998.CultivarBulbGrade ANulbs(Ibs/bulb)(Ibs/bulb)(Ibs/bulb)(Ibs/bulb)(Ibs/bulb)(Ibs/bulb)Monson0.57b0.57bSw. Sunrise0.57b0.57cSavannah0.52c0.53dMonsoon0.45d0.52c0.54dMonsoon0.45d0.54dMonsoon0.45d0.52cMonsoon0.45d0.52cMonsoon0.45d0.54dSaveriment: The experimental designwas replicated four times. Plant spacing	ion Variety Trial, UH nabuku, Hector Valenzu Horticulture, HARC, and eld of intermediate swee Bulb Grade A Overa weight wt/bulb per 10 (lbs/bulb) (lbs/blb) (lbs (lbs/bulb) (lbs/blb) (lbs 0.57b 0.57c 85.5b 0.47d 0.47e 70.5d 0.52c 0.53d 78.0c 0.46d 0.46e 67.5d 0.46d 0.46e 67.5d 0.46e 67.5d d four times. Plant spacing v	Sweet Onion Variety Trial, UH Pulehu SubstatioRobin Shimabuku, Hector Valenzuela, and Mike AustinUHM-CES, Horticulture, HARC, and DOATable 3. Yield of intermediate sweet onions grown at th1998.CultivarBulbGrade A Overall wtBulk wt.wt Grweightwt/bulbwtbulbs(Ibs/bulb) <td< th=""><th>ehu Sul nd Mike Der Acre (lbs) (lbs) (lbs) (lbs) (lbs) (lbs) (d 44 88d 44 88d 44 88d 44 88d 44 5(7d 5(7d 5(</th><th>Sweet Onion Variety Trial, UH Pulehu Substation, Spring 1998Robin Shimabuku, Hector Valenzuela, and Mike AustinUHM-CES, Horticulture, HARC, and DOAUHM-CES, Horticulture, HARC, and DOATable 3. Yield of intermediate sweet onions grown at the UH Pulehu Substation, Spring (March to June)1998.CultivarBulbGrade A Overall wtBulk wt.Weightwt/bulb per 100 ftper A00ftMbbs(Ibs/blb)(Ibs/blb)(Ibs)(Ibs/blb)(Ibs)(Ibs/bulb)(Ibs)(</th><th>n, Spring 19 he UH Pulehu 3 he UH Pulehu 3 0 ft per Acre s) (1bs) 17,655ab 840b 338 840b 338 265c 286 441e 273 404d 234 326d 235 953e 278 953e 278 953e 278 953e 278</th><th>98 Substation, Grade A O No. (per 400) (₁ (per 400) (₁ 32 91.3 127 68.2 127 68.2 154 60.3 165 58.7 102 73.1 102 73.1</th><th> 98 Substation, Spring (March 1 Substation, Spring (March 1 No. No. (% of tot) No. No. (% of tot) (per 400) (per 400) (by no.) 345 43 88.9 61.5a 32 91.3 55.1ab 127 68.2 45.3d 138 9.61.5a 102 73.1 43.4d </th><th>ring 1998 Pulehu Substation, Spring (March to June) Wt Gr. A Grade A Off-Grade Grade A Bulk wt per Acre No. (% of tot) 100 (Ibs) (per 400) (per 400) (by no.) (Ibs) (Ibs) 234 154 60.3 55.1ab 233 127 68.2 45.3d 234 154 60.3 55.0bc 235 165 58.7 48.0cd 238 102 73.1 43.4d 278 102 73.1 43.4d</th><th> June) June) Bulk wt 100 (1bs) (1bs) xariety) </th></td<>	ehu Sul nd Mike Der Acre (lbs) (lbs) (lbs) (lbs) (lbs) (lbs) (d 44 88d 44 88d 44 88d 44 88d 44 5(7d 5(7d 5(Sweet Onion Variety Trial, UH Pulehu Substation, Spring 1998Robin Shimabuku, Hector Valenzuela, and Mike AustinUHM-CES, Horticulture, HARC, and DOAUHM-CES, Horticulture, HARC, and DOATable 3. Yield of intermediate sweet onions grown at the UH Pulehu Substation, Spring (March to June)1998.CultivarBulbGrade A Overall wtBulk wt.Weightwt/bulb per 100 ftper A00ftMbbs(Ibs/blb)(Ibs/blb)(Ibs)(Ibs/blb)(Ibs)(Ibs/bulb)(Ibs)(n, Spring 19 he UH Pulehu 3 he UH Pulehu 3 0 ft per Acre s) (1bs) 17,655ab 840b 338 840b 338 265c 286 441e 273 404d 234 326d 235 953e 278 953e 278 953e 278 953e 278	98 Substation, Grade A O No. (per 400) (₁ (per 400) (₁ 32 91.3 127 68.2 127 68.2 154 60.3 165 58.7 102 73.1 102 73.1	 98 Substation, Spring (March 1 Substation, Spring (March 1 No. No. (% of tot) No. No. (% of tot) (per 400) (per 400) (by no.) 345 43 88.9 61.5a 32 91.3 55.1ab 127 68.2 45.3d 138 9.61.5a 102 73.1 43.4d 	ring 1998 Pulehu Substation, Spring (March to June) Wt Gr. A Grade A Off-Grade Grade A Bulk wt per Acre No. (% of tot) 100 (Ibs) (per 400) (per 400) (by no.) (Ibs) (Ibs) 234 154 60.3 55.1ab 233 127 68.2 45.3d 234 154 60.3 55.0bc 235 165 58.7 48.0cd 238 102 73.1 43.4d 278 102 73.1 43.4d	 June) June) Bulk wt 100 (1bs) (1bs) xariety)
UHM-CES,	Horticult	ure, HARC	c, and DOA							
Table 3. Y 1998. Cultivar	ield of int Bulb weight	ermediate Grade A wt/bulb 1	e sweet oni Overall wt per 100 ft	ons gro Bulk wt. per Acre	wn at the UH wt Gr.A per 100 ft	[Pulehu ! Wt Gr. A per Acre	Substatio Grade A No.	n, Spring Off-Grade No.	(March to Grade A (% of tot)	June) Bulk wt 100
saina	(lbs/bulb)	(lbs/blb)		(lbs)	(lbs)		(per 400)	(per 400)	(by no.)	(lbs)
Sw. Sunrise Rio Bravo Eureka Savannah Mr. Max Monsoon	0.59b 0.57b 0.47d 0.52c 0.46d 0.46d	0.60b 8 0.57c 8 0.57c 8 0.53d 7 0.53d 7 0.53d 7 0.54d 6	88.5b 19,20- 88.5b 19,20- 85.5b 18,55 70.5d 15,298 78.0c 16,928 57.5d 14,97		1.3ab 17 2.2b 17,840b 2.1c 13,265c 8.1e 10,444e 7.5d 10,404d 7.5d 10,326d 0.4e 10,953e	,655ab 338 286 273 273 235 235 235			5 1.5 a	
Experiment was replicat Data analys	The exper ed four time sis: Number	imental des es. Plant spe s followed 1	sign consiste acing was 12 by the same	d of four inches be letter with	Experiment. The experimental design consisted of four rows per variety with 65-plants per row. Each treatment (v was replicated four times. Plant spacing was 12 inches between double rows and 8 inches between plants in the row. Data analysis: Numbers followed by the same letter within each column are not statistically different according to Dimension Non-multiple rows and 0.005.	ty with 65- rows and 8 in are not	plants per inches bet statistically	row. Each ween plant / different	treatment (s in the row according t	variety) /. 0

Duncan's New multiple range test at a 95% confidence level (P<0.05). Yields: Yield per 100 ft row based on 8-inch spacing between plants in-the-row. Per acre yields estimated based on 32,500 plants/Acre (2 ft rows, 21,700 ft-rows per acre and 8-inch spacing between plants in-the-row). Seed Source: Petoseed: Chula vista; Rio Colorado: Rio Bravo

Sweet Onion Variety Trial
Robin Shimabuku, Hector Valenzuela, and Bob Osgood
UHM-CES, UHM Horticulture Dept, and HARC.

Table 4. Grading (percentage by number) of sweet onion varieties grown at the UH Pulehu sub-station, Maui, March-June 1998.

Coeff. Variation All bulbs	37.0ab 32.4ab	29.30 31.7b	40.8a	34.9ab	33.3ab	34.3ab	
Coeff. Variation Grade A	32.4	2/.8 31.5	35.8	34.3	34.0	36.3	33.16
Color (percent)	0.00	0.00	0.25	0.75	1.03	0.75	0.44
Doubles (percent)	2.50	0.26 0.26	8.75	1.00	0.77	0.00	1.76
Small (percent)	0.75	0.26 0.26	0.25	0.00	0.26	0.00	0.22
Misshapen (percent)	4.75	4.12 8.16	1.00	1.00	0.77	4.25	3.69
Split (percent)	2.75	0.26 5.79	15.75	14.00	14.43	3.75	8.00
Decay (percent)	21.00	61.6 12.37	15.25	11.75	22.42	6.75	11.99
Grade A (percent)	68.25 00.00	88.92 73.16	58.75	71.50	60.31	84.50	73.89
Cultivar	Eureka	Mercedes Monsoon	Mr. Max	Rio Bravo	Savannah	Sw. Sunrise	Average

Sampling: For each variety 400 bulbs (100 per rep.) were individually weighed and classified as Grade A or off-grade. Duncan's New multiple range test at a 95% confidence level (P<0.05). Block mean values were used to statistically Data analysis: Numbers followed by the same letter within each column are not statistically different according to

Decay: Eureka and Savannah Sweet had high decay rates, while Chula Vista and Mercedes had low decay rates. analyse the coefficient of variation data.

Splits & doubles: Mr. Max, Rio Bravo, and Savannah Sweet had higher incidence of splits, while Mr. Max also had higher incidence of doubles.

Bulb Uniformity: (shown by low Coefficient of Variation, lower is better): High bulb uniformity was shown by Mercedes and Monsoon.

Maui Onion TSS & Pungency Evaluation 1997 August 12 (Report)

Total Soluble Solids (%)

Cultivar	1997 June	1997 July
	Low Elevation	<u>High Elevation</u>
Mr. Max	7.8 + 0.4	8.0 + 0.8
Rio Bravo	7.6 + 0.6*	7.7 + 0.4
Mercedes	8.3 + 0.5	8.4 + 0.4
Savannah Sweet	7.4 + 0.2	7.6 + 0.4
RCS-1903	8.1 + 0.4	8.1 + 0.5
SSC-6200	7.8 + 0.4	7.5 + 0.6
Monsoon	7.1 + 0.4	8.1 + 0.6
Daybreak	7.5 + 0.5	8.0 + 0.1
Yellow Granex	7.3 + 0.4	8.6 + 0.8
Pegasus	8.6 + 0.4*	8.7 + 0.5*
Granex-429	$8.2 + 0.4^*$	8.1 + 0.5 *
Encino	7.4.+ 0.5	77+04
Regency	7.8 + 0.5	7.6 + 0.4
RCS-1004	7.6 + 0.2	7.5 + 0.3
Rio Zorro	7.7 + 0.5	7.5 + 0.3

* Some rotting bulbs.

**note: + = ±

Comments on pungency analysis The 1998 January 06 data agrees with published values for the same varieties. The pungency values are expressed as

 $\ensuremath{\mu moles}$ pyruvic acid per ml of onion juice. This should not be confused with the

other method of expression. pmoles pyruvic acid per gram fresh weigh The

latter will give a lower value (about half). The lower the value of pyruv acid, the

less pungent. Values less than 7 or 8 can be regarded as non-pungent. Soluble

solids (TSS) is a rough measure of sweetness. The higher value, the b $\boldsymbol{\varepsilon}$ ter. In the

current results, there is little difference between the different cultivars The

results are then expressed as sugar/pungency, higher ration being swenon

pungent onions.

Pungency (µmoles / ml)

Cultivar	1997 June LowElevation	1997 July <u>High Elevation</u>
Mr. Max	7.0	5.2
Rio Bravo	7.5	5.7
Mercedes	7.9	6.8
Savannah Sw	eet 8.2	5.9
RCS-1903	5.9	4.6
SSC-6200	7.3	4.6
Monsoon	7.2	5.8
Daybreak	9.3	6.3
YellowGrane	x 7.6	5.5
Pegasus	7.2	6.0
Granex-429	7.5	6.3
Encino	8.8	6.9
Regency	7.5	5.6
RCS-1004	6.9	4.4
Rio Zorro	8.4	5.6
Mean	7.6	5.7

Maui Onion TSS & Pungency Evaluation 1998 January 06

Total Soluble Solids (%)

Cultivar	Low Elevation	10 1997 December 11 <u>High Elevation</u>
Linda Vista	6.5 + 0.4	5.6 + 0.7
Sweet Magnolia	6.3 + 0.1	6.6 + 0.9
Evita	8.3 + 0.3	8.2 + 0.8
Red Bone	5.8 + 0.2	5.4 + 0.5
RCS-1938	6.5 + 0.3	5.9 + 0.5
Arizona Sunset	7.8 + 0.4	6.6 + 0.4
DPS-1057	6.7 + 0.4	5.7 + 0.6
Sweet Sunrise	6.2 + 0.3	5.7 + 0.4
Southern Honey	6.3 + 0.7	6.4 + 0.2
DPS-1001	5.8 + 0.2	5.1 + 0.6
Pegasus	7.2 + 0.6	6.6 + 0.7
Granex-1015	7.1 +.0.2	6.1 + 1.1
DPS-1067	7.0 + 0.3	6.3 + 0.3
Chula Vista	6.3 + 0.4	5.1 + 0.2
Rio Selecto	_	5.2 + 0.4

****note:** + = ±

Cultivar 1	997 December 10	
Linda Vista	LowElevation 8.2 + 2.4	High Elevation 4.6 + 2.9
Sweet Magnolia	6.6 + 1.9	7.1 + 3.5
Evita	7.0 + 2.0	7.5 + 2.8
RedBone	5.9 + 2.7	5.8 + 4.1
RCS-1938	6.7 + 4.5	4.1 + 0.7
Arizona Sunset	11.3 + 1.6	7.8 + 2.1
DPS-1057	7.5 + 1.0	6.9 + 3.4
SweetSunrise	6.8 + 0.7	6.2 + 0.8
Southern Honey	5.2 + 2.9	2.1 + 1.5
DPS-1001	6.3 + 1.3	2.5 + 1.3
Pegasus	4.6 + 2.5	5.3 + 1.7
Granex-1015	9.1 + 2.4	7.6 + 2.0
DPS-1067	9.4 + 1.7	5.3 + 0.5
ChulaVista	7.2 + 1.6	2.6 + 1.8
Rio Selecto	_	4.4 + 0.8

Pungency (µmoles Pyruvate ml -') + SD

****note:** + = ±

Table 1. Pungency and soluble solids content (SSC) of onion cultivars grown at two elevations on the island of Maui in spring 1998.

	Low elevation	n (1400 ft.)	<u>High elevati</u>	<u>on (2100 ft.)</u>
	Pungency	SSC	Pungency	SSC
<u>Cultivar</u>	<u>(µm PA/gfw)</u>	<u>(%)</u>	<u>(µm PA/gfw)</u>	<u>(%)</u>
Mercedes	5.45 + 0.45	8.9 + 0.3	4.93 + 0.54	7.0 + 0.7
Savannah Sweet	5.32 + 0.49	7.7 + 0.3	4.90 + 0.28	6.5 + 0.5
Monsoon	5.20 + 0.90	7.9 + 0.3	5.57 +.41	6.6 + 0.6
Eureka	5.11 + 0.83	9.5 + 0.4	6.09 + 0.71	8.4 + 0.7
MrMax	4.78 + 0.35	8.6 + 0.2	5.02 + 0.61	7.6 + 0.4
Rio Bravo	4.72 + 0.04	8.2 + 0.6	5.02 + 1.00	8.2 + 0.3
Sweet Sunrise	4.66 + 0.54	7.8 + 0.2	4.40 + 0.75	6.8 + 0.4
ChulaVista	4.52 + 0.22	7.5 + 0.2	4.80 + 0.43	6.3 + 0.3

****note:** + = ±

Pungency is expressed as μ moles pyruvic acid (PA) per gram fresh weight i standard deviation. There were 4 replications, and composite samples were taken from 5 bulbs per replication. Soluble solids content (ISD) was measured using a refractometer.

There were no significant differences in pungency among varieties at the low elevation site (p=0.05). At the high elevation site, only Eureka and Sweet Sunrise were significantly different.

Sweet Onion Varieties:

- Asgrow Seed Company P.O Box 5038 Salinas, CA 93915 (405) 424-6905; also see Chesmore & Rupp Seeds.
 - *Granex 429: Short-day hybrid with deep, near globe shape, medium to jumbo size bulbs with sweet mild flesh. Susceptible to pink root.
 - **Encino**: A short-day, grano shaped yellow skinned onion that can produce jumbo to colossal sized bulbs with a high percentage of single centers, and few splits or doubles. Pink root resistant and adapted for south Texas and northeast Mexico.
 - **Pegasus**: A light yellow skinned hybrid with sweet white flesh, high sugars and low pungency. Vigorous growth, good uniformity, classic granex shape, produces a higher percent of single centers than most granex hybrids.
- Petoseed 1905 Lirio Street P.O. Box 4206 Saticoy, CA 93007-4206 (805) 647-1188, also sold through Champion, Green Barn & Rupp Seeds.
 - **Mercedes**: A hybid that was developed for the tropics and has early maturity, excellent uniformity and very mild white flesh. It has a tight neck that enables the large-jumbo size, globe -shaped bulbs to dry and cure quickly. The hard, firm bulbs are resistant to bruising and retain their golden yellow scale. Good tolerance/resistance to pink root.
 - **Monsoon**: Open-pollinated, main season maturity, deep grano shape straw yellow scale and white flesh. A high quality large-jumbo size grano type with a mild flavor, refined neck and good scale retention.
 - Savanna Sweet: This very early and highly adaptable short-day granex-type hybrid onion was bred for Southeast conditions. The white flesh has a mild flavor and high yield potential of medium-large uniform bulbs that are thick-flat in shape with small necks that cure throroughly and quickly. Bulbs have golden yellow scales with excellent retention.
 - *Yellow Granex Hybrid: Short-day, medium-large size, deep flattened globe shape early maturing onion with very mild white flesh and thin yellow scales. Uniform, high quality Granex.

Rio Colorado Seeds: 4701 Gila Ridge Rd., Yuma, AZ 85365, Sold through Champion Seeds
Mr.Max: Yellow hybrid short-day Granex, early maturity, Deep Mod. Granex shape and short storage. Moderately tolerant to Pink Root, good bolt resistance.
Rio Bravo: Early maturing, Deep Mod. Granex shape, yellow hybrid short-day Granex. Moderately tolerant to Pink Root, good bolt resistance.
Rio Zorro: Early maturing, flattened globe shape, yellow hybrid short day Grano. Developed for an early yellow in Mexico and very tolerant to Pink Root Fungus.
RCS1004: Early maturity, good Pink Root tolerance RCS1903: Sweet Vidalia variety that produces high percentage of jumbo sized onions

Shamrock Seed Co., Inc. 3 Harris Place, Salinas, CA 93901, 408-771-1500 FAX 408-771-1517 Daybreak: A grano onion with a uniform, deep globe-grano-shaped bulbs that have attractive light yellow scales and mild pungency. A high yielding variety that produces a large percentage of single-centered jumbo bulbs and have very strong pink root and bolting tolerance.

Regency: Early maturity, moderate Pink Root resistance, does well in tropics. **SSC 6200**: Early maturing, grano-globe shape, mild, high single centered with moderate Pink Root and good bolting tolerance.

Wholesalers: Champion, 714-529-0702; Chesmore, 800-383-0865; Rupp, 419-337-1841; Green Barn, 800-882-7552

*Industry Standards

Onion Variety Trial, Pulehu Sub-Station 1984

Conducted by: Ted Hori, CES County Extension Agent Report: June 6, 1984

Seedlings transplanted on Feb. 14 Harvested on May 29. The plots were 1.5 by 40 ft, with 7 rows per plot. The seedlings were planted 6 inches apart.

The four Grano varieties seemed to have a milder flavor than the old Granos. These varieties have a light yellow scale (skin) like thr Granex. They are global in shape and have relatively heavy bulbs.

The Colossal is more oblong than global. The flavor varies from person to person, mild to hot. The yield is slightly better than the Granex.

Textar is flat and resembles Granex in appearance. It is also mild in flavor. This variety gave the second best yield.

Variety	Large ¹	Medium	Off-grade	Culls	Total	Yield
	No./Wt/%	No./Wt/%	No./Wt/%	No./Wt/%	No./Wt/%	per
Acre ²						
Greater Yield of	f Large Bulbs					
Grano 1015Y	62/61.5/89	8/3.8/11	-	-	70/65.3	47.409
Grano 1030Y	57/47/62	16/7.2/26	4/2.8/5	-	77/57	41,382
Yellow Granex	57/44.7/86	4.1/1.3/6	5/3.5/8	15/9.8	66/59.5	35,937
Lower Yield of	Large Bulbs					
Grano 1025Y	48/41/62	20/9.8/26	9/4.8/12	-	77/55.6	40,366
Textar	47/39.8/59	20/10.2/25	12/10.1/15	-	80/60.3	43,778
Grano 1105Y	45/38/57	29/11.5/37	5/4.8/6	3/1	79/54.3	39,422
Colossal	43/33.5/54	28/12.7/35	5/5.3/6	_	80/52.5	38,115

Table 1. Yield of sweet onions grown at the Pulehu Sub-station Feb.-May, 1994 (yield in pounds).

¹Note: Yield Per Row; ²Estimated yield per Acre

Seed Source: Granos: Asgrow; Colossal (PRR, PVP, #7900076) and Textar F1: Arco (Atlanta Richmond Co.)

BULB ONION FIELD DAY

Waikele Farms, Inc. March 29, 1997

Site Data

- Location: Kunia, Oahu, Hawaii
- Soil pH: 6.7
- Ave. annual rainfall: 30 in.
- Elevation: 600 ft. above sea level

Cultural Data

- Direct seeded w/tractor mounted Gramore seeder using pelleted seed; 1st seeded 10/ 31/96 - 11/4/96; 2nd seeded 11/27/96

- Fertilizer, 10-30-10, preplant incorporated at 800 lbs. per acre
- Weed control, stale seedbed with Gramoxone, pre-emergent with Dacthal after onion; seeding, post-emergent weed control with Goal
- Insect control, 2 applications of Warrior and 1 application of Lannate for onion thrips
- Disease control, 2 applications of Kocide for bacterial leaf streak
- Irrigation, solid set overhead sprinkler irrigation

Project Objective

Onion production on former sugarcane land for import replacement of bulb onions.

Project Scope

• 89% of Hawaii's onion consumption is imported

• A potential exists for cultivation of up to 700 acres for import replacement as well as additional production for the export market. Favorable economies of scale would make this possible

• Need to identify the appropriate hard, dry pungent onions for storage to allow industry to develop and move forward

Project Outcome

• Rio Zorro from Rio Colorado seed identified as a candidate hard, dry onion for commercial production

• Winter onion production in central Oahu is complicated by untimely, heavy rainfall (normal annual rainfall = 30 in., rainfall at Waikele Farms onion site, since 11/5/96 = 65 in.)

Variety Color Coding

Blue = 1015 (beds 1 - 44, 159 - 185); Red = Rio Zorro (beds 45 - 113); Green = Texas Grano 502 (beds 114 - 147); Yellow = 33Y (beds 186 -220), White = Sweet Sunrise (221 -257); Yellow & Black = Rio Bravo (258 - 318).