

Diversified Crops Report 13

Previously called "Other Crops Report"

from Experiment Station, HSPA
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Index Words: vegetables, variety, onion, broccoli, cauliflower, lettuce

VEGETABLE VARIETY TRIALS* **Kunia Substation, Hawaiian Sugar Planters' Association**

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SUMMARY

Sugarcane production has ceased in leeward Oahu and the land is increasingly being planted to vegetable crops. Since the HSPA Kunia Substation sits in the center of the new vegetable plantings, vegetable trials were conducted. The vegetables studied were broccoli, cauliflower, lettuce, and onion all of which are imported to Hawaii in large quantities. The trials were conducted on three or four planting dates. All the vegetable crops planted at Kunia grew well, but there were distinct differences in the performance of individual varieties at the different dates of planting. Six broccoli, two cauliflower, two lettuce varieties, and eight onion varieties were recommended based on yield and quality evaluations in the trials.

INTRODUCTION

Vegetable variety trials were conducted at the Hawaiian Sugar Planters' Association (HSPA) Kunia Substation as part of HSPA's vegetable crops program. The vegetables targeted for study are heavily imported into Hawaii and represent market opportunity for Hawaiian farmers. The objective of the vegetable trials was to generate current information about vegetable varieties suitable for production in central Oahu.

All trials were conducted at the HSPA Kunia Substation. The Substation is located in a rapidly developing area of vegetable crop production in central Oahu. Interpretation of the study results are based on the growing conditions found in the region.

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Hawaii Agriculture Research Center
Diversified Crops 13

KUNIA SUBSTATION CONDITIONS

Elevation: 250 ft. above sea level
Annual rainfall: 29 in. (ave.)
Soil type: Molokai silty clay loam (Oxisol)
Soil pH: 6.4 - 6.9
Ave. daytime temp.: 88°F (May through October)
80°F (November through April)
Ave. nighttime temp.: 77°F (May through October)
70°F (November through April)

TECHNICAL INFORMATION

Irrigation: drip
Experimental design: randomized complete block with 3 to 4 replications.
Planting method: lettuce, broccoli, and cauliflower transplanted to field from Speedling® trays; onions direct seeded.

In all cases, fertilization practices, weed, insect, and disease controls appropriate to each crop were used.

DATA PRESENTATION

Data in the tables are presented with statistical analyses. In some cases, an individual trial period has missing varieties. As the trials progressed more seed was received from the participating seed companies for testing. Poor seed germination and viability limited testing of certain varieties. In other instances seed was tested during specific seasons. Recommendations are based, in general, on overall performance as well as seasonal performance. For crop quality ratings based on a 1 to 5 scale, any number less than 4 was considered unmarketable. In all cases, availability of numbered varieties is unknown.

BROCCOLI VARIETY TRIALS

Summary

In the first two trials (Table 1), yield of all broccoli varieties tested was comparable to statewide yield averages for broccoli of 3,100 lb/A (Statistics of Hawaiian Agriculture, 1994). Cooler temperatures during November through March were helpful in producing good yields of high quality crops. In the last two trials, the high temperatures of the summer months at the Kunia Substation reduced yield and quality.

Generally, the highest yields were found for the later maturing hybrids and varieties. Late maturation became a problem in the warm growing period as the plants became more susceptible to insects (silverleaf whitefly, diamondback moth, imported cabbageworm, and aphids) and diseases. The results of this study indicate that, whenever possible, the best varieties and/or hybrids to use would be early maturing (less than 90 days from seed) varieties.

Recommended broccoli varieties

Cultivars and Hybrids

Sprinter (early)

Galleon (early)

Marathon (cool season/late)

Packman (warm season/early)

Captain (warm season/early)

Major (warm season/early)

Supplier

Sakata Seed America, Inc.

Petoseed Co., Inc.

Sakata Seed America, Inc.

Petoseed Co., Inc.

Petoseed Co., Inc.

Petoseed Co., Inc.

Seed source

Cultivars and Hybrids

Shogun, Sprinter, Marathon, Ninja,
Arcadia, Emerald City, Sultan, Legend,
Patriot

Big Sur, Florette

Zeus

Buccaneer, Galleon, PS 50585, Viking,
Liberty, Captain, Major, Packman,
Republic, PS 18690

Seed Company

Sakata Seed America, Inc.

18095 Serene Dr.

P. O. Box 880

Morgan Hill, CA 95038-0880

(408) 778-7758

Asgrow Seed Co.

7000 Portage Rd.

Kalamazoo, MI 49001

(616) 385-6695

Lockhart Seeds, Inc.

3 North Wilson Way

P. O. Box 1361

Stockton, CA 95201

(209) 466-4401

Petoseed Co., Inc.

P. O. Box 4206

Saticoy, CA 93007-4206

(805) 647-1188

Hawaii Agriculture Research Center
Diversified Crops 13

TABLE 1.

Yield and quality of broccoli cultivars and hybrids tested at the HSPA Kunia Substation.

Variety	2 Sept. 94 to 3 Feb. 95		10 Nov. 94 to 3 Mar 95		25 Feb. to 29 June 95		2 May to 11 Sept. 95	
	Yield** lb/A	Quality* (1 - 5) ^a	Yield** lb/A	Quality* (1 - 5) ^a	Yield* lb/A	Quality* (1 - 5) ^a	Yield lb/A	Quality* (1 - 5) ^a
Zeus	2951a	4.0abc	5200abc	4.4abc	3783a	3.4abc	3250	3.4cd
Sprinter	3939ab	4.7abc	3770a	4.3ab	2392a	4.0abc	3276	4.1de
Ninja	3991ab	3.8ab	5980bcd	4.4abc	2392a	3.4abc	3406	2.4ab
Big Sur	4381ab	4.0abc	6240bcd	4.6abcd	3276a	3.6abc	4121	3.6cde
Arcadia	4680ab	4.2abc	5889abc	4.3ab	3549a	3.6abc	3341	3.6cde
Emerald	5031ab	3.9ab	8060def	4.8bcd	3575a	3.5abc	2990	3.5cde
City								
Florette	5551ab	4.5abc	4901abc	4.1a	3341a	3.5abc	4186	3.6cde
Legend	6409ab	4.5abc	4810ab	4.3ab	3575a	4.1abc	3757	3.1bc
Sultan	7189bc	4.7bc	5850abc	5.0d	2392a	3.8abc	3185	3.7cde
Patriot	10231cd	3.6a	9139f	4.3ab	5902ab	3.1a		
Shogun	10959d	3.7a	7020cdef	4.3ab	4355ab	3.7abc		
Marathon	11479d	4.9c	9061f	4.9cd	5954ab	3.4abc		
PS50585			4979abc	4.6abc	3250a	4.3c	2951	3.8cde
Galleon			5031abc	4.8bcd	2678a	4.2bc	2730	3.9cde
Buccanee			5369abc	4.7bcd	5655ab	4.4c	3770	3.8cde
r								
Liberty			8320ef	4.6abcd	7904b	3.2ab	3705	2.0a
Viking			8359ef	4.9cd	5057ab	4.4c	2301	2.9bc
Captain							3731	4.5e
Major							3549	4.5e
Packman							3380	4.1de
PS18690							3731	4.1de
Republic							4264	3.3bcd
							n.s.	

Means within a column followed by the same letter are not significantly different by Duncan's Multiple Range Test at $**P = 0.01$ and $*P = 0.05$; n.s. = not significantly different.

^aHead quality graded on a 1 to 5 scale with 1 = poor and 5 = excellent.

CAULIFLOWER VARIETY TRIALS

Summary

Cauliflower was more sensitive to warm temperatures than broccoli at the Kunia location and yield and quality results were more variable (Table 2). The highest yields were experienced with the late maturing cultivars and hybrids. Yields of some varieties approached the statewide average of 12,000 lb/A (Statistics of Hawaiian Agriculture, 1994) but the quality was not acceptable. Early maturing varieties like '45 Day' and 'White Corona' produced very small heads which were unmarketable but had nice shape and color. These single serving size cauliflowers may have niche market appeal for gourmet restaurants.

Recommended cauliflower varieties

Cultivars and Hybrids

Minuteman (tolerates heat/early)

Candid Charm (cool season/late)

Supplier

Petoseed Co., Inc.

Sakata Seed America, Inc.

Seed source

Cultivars and Hybrids

White Corona, Majestic, Candid Charm,

Milkyway, Cashmere

Seed Company

Sakata Seed America, Inc.

18095 Serene Dr.

P. O. Box 880

Morgan Hill, CA 95038-0880

(408) 778-7758

White Cloud

Asgrow Seed Co.

7000 Portage Rd.

Kalamazoo, MI 49001

(616) 385-6695

45 Day

Lockhart Seeds, Inc.

3 North Wilson Way

P. O. Box 1361

Stockton, CA 95201

(209) 466-4401

Guardian, Minuteman, Early Dawn,

Sentinel, Lara, Fremont, Rushmore,

Ravela, PSX 533990, PSX 516189

Petoseed Co., Inc.

P. O. Box 4206

Saticoy, CA 93007-4206

(805) 647-1188

Hawaii Agriculture Research Center
Diversified Crops 13

TABLE 2.

Yield and quality of cauliflower cultivars and hybrids tested at the HSPA Kunia Substation.

Variety	2 Sept. 94 to 3 Feb. 95		10 Nov. 94 to 3 Mar 95		25 Feb. to 29 June 95		2 May to 11 Sept. 95	
	Yield** lb/A	Quality** (1 - 5) ^a	Yield** lb/A	Quality** (1 - 5) ^a	Yield** lb/A	Quality** (1 - 5) ^a	Yield* lb/A	Quality** (1 - 5) ^a
45 Day	2431a	1.0a	2041a	2.9b	1261ab	1.5abc	1183a	1.0a
White Corona	3419a	1.8b	4680ab	2.0a	923a	1.4ab	1534a	1.3ab
Pua Kea	3861a	1.6ab			1508ab	1.0a	4134ab	1.8b
Majestic	8970b	3.7c	8099abc	4.0cde	2041ab	1.4abc	7137bcd	3.4cd
Milkyway	10491bc	3.8c	10270bcd	3.9cde	8606abc	2.9cde	10595cd	3.0c
White Cloud	11531bc	3.0c	10309bcd	3.8cd	10933abc	1.7abc		
Cashmere	15119c	3.7c	12870cde	4.3cdef	10179abc	3.5de		
Candid	15509c	4.8d	14690de	4.6ef	9568abc	3.9de		
Charm								
Sentinel			8021abc	4.1cdef	8151abc	3.3de		
Guardian			9399bcd	3.7c	15834bc	2.5abcd		
Early Dawn			15301de	4.5def	6968abc	2.8bcde	8424bcd	2.0b
Minuteman			17160e	4.8f	9542abc	4.2e	11986d	4.1e
Lara					11583abc	2.7bcde		
PSX533990					18577c	3.2de		
Ravela							4589ab	3.0c
Rushmore							4875ab	3.0c
Fremont							6226abc	3.8de
PSX5161889						7735bcd	2.0b	

Means within a column followed by the same letter are not significantly different by Duncan's Multiple Range Test at $**P = 0.01$ and $*P = 0.05$; n.s. = not significantly different.

^aHead quality graded on a 1 to 5 scale with 1 = poor and 5 = excellent.

LETTUCE VARIETY TRIALS

Summary

Head lettuce is usually marketed as number of heads per box. Yield (weight) is not as critical as quality. The quality of the head lettuce produced at Kunia was generally unmarketable (Table 3). However, one selection, PS 33189, performed consistently well throughout the trials. Only during the hottest period (the 4th trial) was yield per acre reduced substantially but quality was unaffected.

In the leaf lettuce trial, Green Mignonette (Manoa lettuce) produced low yields and low quality. The best lettuce in this trial was a red leaf variety called 'Vulcan.' This variety had consistently good quality throughout the year.

Recommended lettuce varieties

<u>Varieties</u>	<u>Supplier</u>
PS 33189 (head/iceberg lettuce)	Petoseed Co., Inc.
Vulcan (red leaf lettuce)	Sakata Seed America, Inc.

Seed source

<u>Varieties</u>	<u>Seed Company</u>
Aquarius, Vulcan	Sakata Seed America, Inc. 18095 Serene Dr. P. O. Box 880 Morgan Hill, CA 95038-0880 (408) 778-7758
Daybreak, Empire, Patriot, Niner	Asgrow Seed Co. 7000 Portage Rd. Kalamazoo, MI 49001 (616) 385-6695
Okayama Salad	Lockhart Seeds, Inc. 3 North Wilson Way P. O. Box 1361 Stockton, CA 95201 (209) 466-4401
Bullseye, Target, Impact, PS 33189	Petoseed Co., Inc. P. O. Box 4206 Saticoy, CA 93007-4206 (805) 647-1188
El Dorado, Ithaca, Summertime	Champion Seed Co. 529 Mercury Lane Brea, CA 92621 (805) 397-5717
Tania, Green Towers	Harris Moran Seed Co. 4511 Willow Rd. Suite 3 Pleasanton, CA (510) 416-8400

Hawaii Agriculture Research Center
Diversified Crops 13

TABLE 3.

Yield and quality of head and leaf lettuce varieties tested at the HSPA Kunia Substation.

Head lettuce	2 Sept. to 29 Nov. 94		10 Nov. 94 to 16 Feb. 95		17 Feb. to 22 May 95		2 May to 31 July 95	
	Yield	Quality* *	Yield**	Quality* *	Yield	Quality* *	Yield*	Quality* *
Variety	lb/A	(1 - 5) ^a	lb/A	(1 - 5) ^a	lb/A	(1 - 5) ^a	lb/A	(1 - 5) ^a
Ithaca	4940	2.7a	3159a	2.0a	5967	1.3a		
Summertime	5200	3.7ab	5759ab	3.5abcd	6188	2.7b	4420ab	2.0ab
Empire	5330	4.0bc	5590ab	3.8bcd			3302a	2.5ab
Niner	5460	4.7bc	6760ab	4.3cd	7358	3.3bc	3263a	2.7ab
Daybreak	5720	4.3bc	5629ab	3.5abcd	6747	3.0bc	4368ab	2.5ab
Patriot	5980	5.0c	8840abc	4.2bcd	7423	2.8bc	3978ab	3.2abc
El Dorado	6500	4.8bc	5161ab	2.0b	7826	2.8bc	3471a	2.0ab
Bullseye			6799ab	2.7ab	7618	3.0bc	3393a	2.3ab
Impact			9269bc	3.2abc	8593	4.0cd	5161b	1.7a
Target			10491b	3.8bcd	8281	3.7bcd	4485ab	2.2ab
PS33189			^c 12610c	5.0d	8840	4.7d	4446ab	4.2c
	n.s.				n.s.			

Leaf lettuce	2 Sept. to 29 Nov. 94		10 Nov. 94 to 16 Feb. 95		17 Feb. to 22 May 95		2 May to 31 July 95	
	Yield	Quality* *	Yield**	Quality	Yield	Quality* *	Yield**	Quality* *
Variety	lb/A	(1 - 5) ^a	lb/A	(1 - 5) ^a	lb/A	(1 - 5) ^a	lb/A	(1 - 5) ^a
Green	1820	3.3a			2119	3.3a	1599a	2.8a
Mignonette								
Vulcan	1950	4.9b	6201b	5.0	2977	5.0c	2470ab	4.5b
Aquarius	2080	5.0b	5109b	5.0	3250	4.4bc	2483ab	3.8ab
Okayama	2210	4.7b	2730a	4.8			1651a	3.2a
Salad								
Tania					2665	4.2b	1989ab	2.8a
Green					11557	3.2a	3224b	2.7a
Towers								
	n.s.		n.s.		n.s.			

Means within a column followed by the same letter are not significantly different by Duncan's Multiple Range Test at $**P = 0.01$ and $*P = 0.05$; n.s. = not significantly different.

^aHead quality graded on a 1 to 5 scale with 1 = poor and 5 = excellent.

BULB ONION VARIETY TRIALS

Summary

Results of the bulb onion variety trials conducted at HSPA's Kunia Substation are presented in Tables 4 to 8. All onions were direct seeded.

Growing conditions in Hawaii make it possible to grow only short day length or medium day length bulbing onions. This means that bulbs are produced in response to short days that are lengthening and are best planted between September and March. Generally, short day bulbing types produce sweet onions that do not store well at ambient temperatures. The objective of the HSPA trial was to evaluate appropriate varieties for Hawaii's day length conditions. Of particular interest was the possibility of pungent, hard, and dry storage onions appropriate for shipping. This was done by determining storage capability at air temperature after the bulbs were harvested. Additionally, three planting dates were chosen to determine if there was some advantage in reducing days to harvest by planting at a particular time. At the suggestion of the seed company, the varieties Rio Estrella, Rio Solo, RCSX 1818, and RCSX 1908 were planted only in the third planting.

Our results indicated that the best planting period for direct seeded onions was on 6 October 1994. Onions planted on 15 September 1994 were ready for harvest at the same time as the October planting. Onions planted on 3 November 1994 were also ready for harvest at the same time as the September and October plantings but the November planting suffered more disease problems (rot) than the previous two. All onions were harvested within the first three weeks of April 1995.

All SR and RCSX numbered varieties were experimental material provided by Sunseeds (SR) and Rio Colorado Seeds, Inc. (RCSX). These onions were very pungent with the greatest storage capabilities but had highly variable yields. Current availability of seed of the experimental varieties is unknown. This information can be obtained by directly contacting the seed companies.

Hawaii Agriculture Research Center
Diversified Crops 13

Recommended onion varieties

Sweet Onion Varieties*

	<u>Supplier</u>
Sweet Dixie	Rio Colorado Seeds, Inc.
SupereX (good storage qualities)	Lockhart Seeds, Inc.
Rio Ringo	Rio Colorado Seeds, Inc.
Rio Bravo	Rio Colorado Seeds, Inc.
Rio Zorro	Rio Colorado Seeds, Inc.
Sunex-1502	Sunseeds

Red Onion Varieties

Rojo	Sunseeds
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Storage (pungent) Varieties

SR 2115	Sunseeds
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*The average marketable yield of the sweet onion varieties were comparable to the statewide average of 12,000 lb/A and much greater than the Oahu average of 6,000 lb/A (Statistics of Hawaiian Agriculture, 1994).

Seed source

Variety

	<u>Seed Company</u>
RCSX 1003-1, RCSX 1004, RCSX 1032, RCSX 1038-1, RCSX 1015-1, RCSX 1818, RCSX 1908, Texas Grano 502, Ringer Grano, Sweet Dixie, Rio Bravo, Rio Solo, Rio Zorro, Rio Estrella, Rio Ringo	Rio Colorado Seeds, Inc. 3239 Shafter Rd. Bakersfield, CA 93313 (805) 836-9883
SR 2033, SR 2115, SR 2361, SR 2054, SR 2357, SR 2356, Gold Rush, Gran Prix, Sunex-1502, Henry's Special, Dehydrator #3, Primero-C, Rojo, Red Creole, Cimarron	Sunseeds 2050 Bennett Rd. El Centro, CA 92243-9563 (619) 352-2081
SupereX, Red Creole	Lockhart Seeds, Inc. 3 North Wilson Way P. O. Box 1362 Stockton, CA 95201 (209) 466-4401

Hawaii Agriculture Research Center
Diversified Crops 13

TABLE 4.

Average onion yield (lb/A), by planting date, at the HSPA Kunia Substation.

Variety	9/15/94 Planting*	10/6/94 Planting**	11/3/94 Planting**
RCSX 1032-1	3727a	14733abcd	693ab
RCSX 1015-1	4333a	16727abcd	0a
SR 2357	4333a	3727a	11960cde
Primero-C	4420a	8060abcd	3727abc
SR2361	5633ab	3467a	260a
Red Creole	6327ab	7193abc	5633abc
Dehydrator #3	6760ab	7540abc	2947abc
SR 2054	6933abc	5200abc	260a
SR 2356	7367abc	7627abcd	867abc
RCSX 1003-1	8060abcd	25827d	1993abc
Ringer Grano	8060abcd	20540bcd	10573abcde
Gold Rush	8493abcd	10660abcd	9273abcde
Rio Bravo	8493abcd	20973cd	14213de
Texas Grano 502	9533abcd	14387abcd	8927abcde
Cimarron	9793abcd	12567abcd	5893abc
RCSX 1004	9793abcd	9360abcd	3293abc
SR 2115	9793abcd	4160ab	10400abcde
Gran Prix	9793abcd	16900abcd	11093bcde
Henry's Special	10227abcd	7973abcd	7367abcde
Rio Ringo	10573abcd	21580cd	14820e
SR 2033	10660abcd	3727a	10660abcde
Sunex-1502	11180abcd	22013d	11440bcde
Superex	13867bcd	11180abcd	9100abcde
RCSX 1038-1	14560bcd	16033abcd	0a
Rojo	14733cd	13520abcd	10573abcde
Rio Zorro	15253cd	19760abcd	6760abcd
Sweet Dixie	16033d	16640abcd	10227abcde
Rio Estrella			6933abcd
RCSX 1908			7193abcd
Rio Solo			9013abcde
RCSX 1818			11700cde

Means within a column followed by the same letter are not significantly different by Fisher's Protected Least Significant Difference at * $P = 0.05$ and ** $P = 0.01$.

Hawaii Agriculture Research Center
Diversified Crops 13

TABLE 5.

Average marketable onion yield (lb/A), by planting date, at the HSPA Kunia Substation.

Variety	9/15/94 Planting*	10/6/94 Planting**	11/3/94 Planting*
RCSX 1032-1	3033ab	11700abcd	0a
RCSX 1015-1	3727ab	15427abcd	0a
SR 2357	867a	2167ab	5633abc
Primero-C	2600ab	3727ab	607a
SR2361	2167ab	1560a	0a
Red Creole	2947ab	1733a	1993ab
Dehydrator #3	4420ab	4333abc	867a
SR 2054	3033ab	3727abc	0a
SR 2356	3467ab	4333abc	0a
RCSX 1003-1	6067abc	25567d	1733ab
Ringer Grano	5893ab	15947abcd	7540bc
Gold Rush	5720ab	6760abc	6327abc
Rio Bravo	5720ab	15080abcd	8667bc
Texas Grano 502	5893abc	10573abcd	5373abc
Cimarron	7280abc	8927abc	3293ab
RCSX 1004	7367abc	5200abc	3293ab
SR 2115	7367abc	2427ab	6760abc
Gran Prix	6847abc	12827abcd	7800bc
Henry's Special	7973abc	5633abc	5547abc
Rio Ringo	8667abc	19327cd	11787c
SR 2033	9100abc	2167ab	5027abc
Sunex-1502	8753abc	17593bcd	7800bc
Superex	10660bc	8840abc	8147bc
RCSX 1038-1	13260c	13433abcd	0a
Rojo	12827c	10487abcd	6933abc
Rio Zorro	13780c	16900abcd	4160ab
Sweet Dixie	14560c	13867abcd	7713bc
Rio Estrella			5113abc
RCSX 1908			4940ab
Rio Solo			6760abc
RCSX 1818			8060bc

Means within a column followed by the same letter are not significantly different by Fisher's Protected Least Significant Difference at * $P = 0.05$ and ** $P = 0.01$.

Hawaii Agriculture Research Center
Diversified Crops 13

TABLE 6.

Average number of marketable onions, by planting date, at the HSPA Kunia Substation.

Variety	9/15/94 Planting*	10/6/94 Planting**	11/3/94 Planting**
RCSX 1032-1	6067abc	21667bcde	0a
RCSX 1015-1	6067abc	17333abcde	0a
SR 2357	2600a	6933abc	13867bc
Primero-C	6933abc	9273abcd	1993a
SR2361	4333ab	1733a	0a
Red Creole	8667abcd	4333a	5460ab
Dehydrator #3	8927abcd	10400abcd	1993a
SR 2054	7800abcd	8667abcd	0a
SR 2356	8667abcd	11267abcde	0a
RCSX 1003-1	11267abcde	29467e	5200ab
Ringer Grano	10660abcd	21667bcde	12740bc
Gold Rush	12740abcde	11527abcde	13260bc
Rio Bravo	11873abcde	26867e	19327c
Texas Grano 502	13000abcde	16467abcde	11007abc
Cimarron	11007abcd	11873abcde	5460ab
RCSX 1004	13000abcde	11267abcde	8667abc
SR 2115	14733bcde	6067ab	12133bc
Gran Prix	12740abcde	19673bcde	14993bc
Henry's Special	14733bcde	10400abcd	9793abc
Rio Ringo	16207cde	23140de	18460c
SR 2033	16467cde	6067ab	11267abc
Sunex-1502	15860cde	25393e	14473bc
Superex	21667e	15600abcde	14127bc
RCSX 1038-1	23400e	17333abcde	0a
Rojo	19673e	16467abcde	13260bc
Rio Zorro	20193e	22533cde	8407ab
Sweet Dixie	18200de	21060bcde	13000bc
Rio Estrella			8927abc
RCSX 1908			8407ab
Rio Solo			11873bc
RCSX 1818			12393bc

Means within a column followed by the same letter are not significantly different by Fisher's Protected Least Significant Difference at * $P = 0.10$ and ** $P = 0.05$.

Hawaii Agriculture Research Center
Diversified Crops 13

TABLE 7.

Overall average onion yield, marketable yield, and number of marketable bulbs at the HSPA Kunia Substation.

Variety	Yield (lb/A)*	Marketable Yield (lb/A)**	#Marketable/A**
RCSX 1032-1	6384abcde	4911abcde	9244abcdef
RCSX 1015-1	7020abcdef	6384abcde	7800abcde
SR 2357	6673abcde	2889abc	7800abcde
Primer-C	5402abc	2311ab	6066abc
SR2361	3120a	1242a	2022a
Red Creole	6384abcde	2224ab	6153abc
Dehydrator #3	5749abcd	3206abcd	7106abcd
SR 2054	4131ab	2253ab	5489ab
SR 2356	5287abc	2600ab	6644abcd
RCSX 1003-1	11960cdefghi	11122cde	15311bcdef
Ringer Grano	13057efghi	9793bcde	15022bcdef
Gold Rush	9475abcdefghi	6269abcde	12509abcdef
Rio Bravo	14559ghi	9822bcde	19355f
Texas Grano 502	10949bcdefghi	7742abcde	13491bcdef
Cimarron	9417abcdefghi	6500abcde	9446abcdef
RCSX 1004	7482abcdefg	5286abcde	10978abcdef
SR 2115	8117abcdefgh	5518abcde	10977abcdef
Gran Prix	12595defghi	9158abcde	15802bcdef
Henry's Special	8522abcdefgh	6384abcde	11642abcdef
Rio Ringo	15657i	13260e	19269f
SR 2033	8349abcdefgh	5431abcde	11267abcdef
Sunex-1502	14877hi	11382de	18575ef
Superex	11382cdefghi	9215abcde	17131cdef
RCSX 1038-1	10197abcdefghi	8897abcde	13577bcdef
Rojo	12942efghi	10082bcde	16466bcdef
Rio Zorro	13924fghi	11613de	17044cdef
Sweet Dixie	143000ghi	12046e	17420def

Means within a column followed by the same letter are not significantly different by Fisher's Protected Least Significant Difference at * $P = 0.05$ and ** $P = 0.01$.

Hawaii Agriculture Research Center
Diversified Crops 13

TABLE 8.

Effect of planting date on average onion yield at the the HSPA Kunia Substation.

Date planted	Yield (lb/A)**	Marketable Yield (lb/A)**	#Marketable/A**
15 Sept. 1994	9212a	6866ab	12499b
6 Oct. 1994	12669b	9639b	14980b
3 Nov. 1994	6776a	4333a	8477a

Means within a column followed by the same letter are not significantly different by Fisher's Protected Least Significant Difference at $**P = 0.01$.