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**VEGETABLE  
RESEARCH RESULTS  
2004**

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## INTRODUCTION

This report summarizes the results of several vegetable studies conducted during 2004. We hope this type of information is of benefit to the vegetable industry in Ohio and the Great Lakes region. These reports are also available on the OSU Vegnet website at: <http://vegnet.osu.edu>. Your comments and suggestions for future efforts are always welcome.

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- *The Ohio Vegetable and Small Fruit Research and Development Program*
- *Mid-America Food Processors Association*

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- *BHN*
- *Seedway*
- *Johnny's Selected Seeds*
- *Meyer Seeds International*
- *Red Gold, Inc.*
- *Rick Callendar, OARDC Muck Crops Branch*

Special thanks and appreciation to Sean Mueller, Stan Gahn and the crew at the OARDC North Central Agricultural Research Station, Fremont, OH; and grower cooperators John and Joyce Brown, Brown's Family Farm Market, Hamilton, OH. Special thanks to Emily Calvert for her numerous volunteer hours assisting with fruit harvest and grading.

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## Fresh Market Plum Tomato Cultivar Evaluation

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**Introduction:** Plum tomatoes, once grown primarily for processing, are becoming more popular in the fresh market sector. New and old varieties, providing a variety of colors, were tested under northern Ohio growing conditions.

**Objectives:** To test fresh market plum tomato cultivars grown on raised beds using black plastic mulch and trickle irrigation for fresh market sales.

**Materials and Methods:** Nine cultivars of plum tomatoes were seeded into 200-cell plug trays on April 1, 2004, and grown to maturity in the greenhouse at the OARDC North Central Agricultural Research Station (NCARS) in Fremont, Ohio. Transplants were established in the field at NCARS on May 20, 2004 into raised beds with black plastic mulch and trickle irrigation. Raised beds were spaced 5 feet apart and plants were spaced 18 inches apart within the rows. Each cultivar was replicated 4 times. Drip irrigation was applied as needed throughout the growing season. Fruit was harvested three times on August 24, September 2, and September 16.

**Results and Discussion:** Yields ranged from 10.4 to 35.6 T/A for marketable fruit (Table 1). Top yielding varieties include 'Daquiri', 'BHN 411', 'BHN 410', 'Vita Gold' and 'Sunoma'. The lowest yielding variety was 'Elberta Peach', mainly due to the fact that many off-type fruits were contained in our packets, including varieties of different shapes and colors compared to 'Elberta Peach'. The only yellow variety, 'El Dorado', had inconsistent fruit shape and size, and many of the fruits were very soft and watery, indicating a very short shelf life. Significantly lower cull T/A fruits were seen in 'BHN 411', 'Plum Crimson' and 'Vita Gold'. 'Vita Gold' was the only orange fruit entry in this trial. There were no significant differences in average fruit size among any of the entries, however, the largest fruits were from 'BHN 410', 'BHN 411', 'BHN 685', and 'Sunoma'. The predominant disease problem throughout all varieties was anthracnose.

### Acknowledgements:

- Sincere thanks and appreciation to the *Ohio Vegetable Small Fruit Research and Development Program* for their financial support of this project.
- Thanks to *Sean Mueller, Stan Gahn and the summer crew at NCARS, and volunteer Emily Calvert* for their assistance.
- Our thanks and appreciation is extended to *BHN and Meyer Seeds International* for their seed donations for this project.

**Table 1. Plum tomato germplasm evaluation, Fremont, OH, 2004.**

<b>Cultivar</b>	<b>Seed Source</b>	<b>Fruit color</b>	<b>Marketable T/A</b>	<b>Cull T/A</b>	<b>Average Fruit Size (lbs)</b>	<b>Comments</b>
BHN 410	BHN	Red	28.9	4.9	0.19	Nice, uniform fruit & size
BHN 411	BHN	Red	33.1	2.2	0.18	Very uniform; good fruit size
BHN 685	BHN	Red	23.1	4.1	0.18	Uniform fruit & size
Daquiri	ST	Red	35.6	6.1	0.15	Top yielding; nice fruit
Elberta Peach	TGS	Orange/red striped with gold	10.4	6.2	0.17	Many off-type fruit in the mix; fruit is soft
Plum Crimson	Stokes	Red	23.0	2.4	0.16	Uniform shape & size
Vita Gold	TGS	Orange	27.7	2.0	0.14	Uniform shape & size; bright orange
Sunoma	Meyer Seed Int'l.	Red	26.1	3.9	0.19	Large, uniform fruit
El Dorado	Meyer Seed Int'l.	Yellow	21.3	4.7	0.14	Inconsistent shape and size; fruit very soft & watery
<b>LSD (0.05)</b>			<b>12.41</b>	<b>2.63</b>	<b>NS</b>	
<b>C.V.</b>			<b>40.4</b>	<b>54.2</b>	<b>17.6</b>	



## EVALUATION OF FRESH MARKET TOMATO CULTIVARS FOR SOUTHERN OHIO, 2004

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This cultivar trial evaluated 18 cultivars for their suitability in southern Ohio.

### **METHODS:**

Seeds were planted on 30<sup>th</sup> March into 98-cell trays containing a peat-vermiculite soilless mix. Cells were thinned as needed to 1 plant/cell. Transplants were set into raised beds (covered with black plastic mulch with trickle irrigation under the plastic) 18" apart in the row on Mat 18, 2004. Plots were ten feet long. Rows were 5 foot apart. Experimental design was randomized complete block with 4 replications. The field is located in southwestern Ohio, Butler County 84° 39' west by 39° 18' north and the soil is a Miami Silt Loam. Four hundred lbs of K<sub>2</sub>O was incorporated pre-plant. 157 units of N was applied through drip irrigation over the growing season. Weed control was accomplished using Treflan® (trifluralin) @ 2 pt/acre and Sencor® (metribuzin) @ 1 pt/acre. The standard commercial fungicide and insecticide program was followed, on a 7-10 day schedule. Harvest began on August 3 and final harvest was September 2, 2004

### **RESULTS:**

There was significant yield difference in total fruit number and total fruit weight, and fruit number and weight within fruit size class (small/medium and large), dependent on variety. Average weight of smalls ranged from 0.20 lbs for (2170) – 0.43 lbs for (Boy oh Boy) however the average weight of the majority of the smalls ranged from 0.29 lbs to 0.34 lbs. While all other varieties had more small fruit than medium or large, (Boy oh Boy) had as many medium fruit as small and twice as many large fruit as small fruit. There were no large for (2170). Total weight of tomatoes per plot ranged from a high of 54.9 pounds to a low of 19.3 pounds. This is equivalent to a high of 79,715 pounds per acre to a low of 28,023 pounds per acre. Yields were very good but as mentioned in the methods these are small plots. On a commercial scale yields are expected to be lower due to the management difficulty in thoroughly picking a large field compared to a small plot.

### **WEATHER CONDITION:**

With cooler temperatures and periods of heavy rainfall throughout the growing season, fruit was slow to mature. This may have explained the high number of small to medium fruit on many of the cultivars we looked at this growing season.

**Yields From Fresh Market Tomato Evaluation: 2004**

<u>Cultivar</u>	<u>Seed Source</u>	<u>Total Fruit</u>	<u>Total Lbs.</u>	<u>Average Fruit Wt</u>	<u>Lbs./acre</u>	<u>25 lb. Boxes/acre</u>
2170	SW	263.30	54.90	0.20	79715.41	3188.62
BHN 665	BHN	121.30	46.70	0.40	67808.92	2712.36
STM 0227	Meyer	99.30	44.10	0.50	64033.69	2561.35
STM 5206	Meyer	98.00	40.70	0.40	59096.85	2363.87
Mnt. Fresh	SW	88.00	40.50	0.50	58806.45	2352.26
Boy oh Boy	Meyer	44.70	37.80	0.80	54886.02	2195.44
Amelia	SW	84.70	36.40	0.40	52853.20	2114.13
Florida 47	SW	91.30	36.00	0.40	52272.40	2090.90
Robusta	Meyer	96.70	35.40	0.40	51401.19	2056.05
BHN 589	BHN	71.70	33.80	0.50	49077.97	1963.12
BHN 601	BHN	87.00	31.40	0.40	45593.15	1823.73
4 Beef Maestro	Meyer	90.70	29.40	0.30	42689.12	1707.56
Mnt. Crest	SW	78.30	28.90	0.40	41963.12	1678.52
Taste Master	Meyer	71.30	26.70	0.40	38768.69	1550.75
Jubilation	Meyer	70.30	26.10	0.40	37897.49	1515.90
R454	Meyer	60.30	26.00	0.40	37752.29	1510.09
Sunchief	SW	54.70	23.50	0.40	34122.26	1364.89
Fabulous	SW	44.00	19.30	0.40	28023.81	1120.95

- The authors wish to thank the *Ohio Vegetable and Small Fruit Research and Development Program* for providing funding and *Brown's Family Farm* for providing space and for pesticide applications.
- Special appreciation to *Seedway, BHN, and Meyer Seeds International* for their seed donations for this project

## **Effect of Plug Tray Cell Size on Maturity of Processing Tomatoes – 2004**

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and  
OSU/OARDC North Central Agricultural Research Station, Fremont, OH

**Objectives:** Processing tomato fruit maturity depends on several factors such as growing conditions and cultivar selection. Plug tray cell size (and volume) may also affect final yield as well as earliness. The objective of this study was to compare 3 cell sizes and two cultivars of processing tomatoes to determine the effect of cell size on processing tomato seedling development, maturity and earliness.

**Materials and Methods:** Cultivars ‘O7983’ and ‘RG611’ were seeded into 200, 288 and 338 deep cell plug trays on April 1, 2004. Plants were grown in the North Central Agricultural Research Station (NCARS) greenhouse, Fremont, Ohio. Plants were established in the field at NCARS on May 28 into raised beds spaced 5’ apart. Row lengths were 25’ long and replicated 4 times. Within row plant spacing was 12” apart. Plots were mechanically harvested on September 16. Marketable red fruit, green fruit and culled fruit weights were recorded. Average fruit size was determined from 50 fruit from each plot.

**Results:** Red marketable T/A was higher in ‘RG611’ than ‘O7983’. Both cultivars showed no differences in yield, percent red fruit and average fruit size within the 3 cell sizes. There were significant differences between the two cultivars for red, green and cull T/A. Percent red fruit at harvest ranged from 79 to 83%. This study showed no differences in yield or earliness in the three cell sizes for both cultivars.

### **Acknowledgement:**

- Thanks and appreciation to Mid-America Food Processors Association for their financial support of this project.
- Special thanks to Sean Mueller, Stan Gahn and the summer crew at the North Central Agricultural Research Station for their help with planting, plot maintenance and harvesting.
- Thanks to Red Gold, Inc., for providing seed and plug trays for this project.

**Table 1. Final yield, percent red fruit at harvest and average fruit size for tomato cell size study, Fremont, OH, 2004.**

<b>Cultivar</b>	<b>Cell Size</b>	<b>Red T/A</b>	<b>Green T/A</b>	<b>Culls T/A</b>	<b>Percent Red Fruit</b>	<b>Average Fruit Size (lbs)</b>
611	200	27.8	3.3	2.9	82	0.14
611	288	26.7	3.1	2.5	83	0.15
611	338D	26.7	3.6	2.4	82	0.14
7983	200	22.5	1.6	4.5	79	0.15
7983	288	23.5	1.4	4.3	80	0.15
7983	388D	21.6	1.2	3.7	81	0.15
LSD (0.05)		2.89	1.43	1.20	NS	NS
C.V.		12.0	56.0	32.3	4.5	5.7

## Sweet Corn Seed Treatment and Seedling Establishment Trial – 2004

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### Objective:

Ten seed treatment combinations plus an untreated control were tested on two cultivars of sweet corn (*sh*<sub>2</sub> ‘How Sweet It Is’ and *se* ‘July Gold’) to determine the best seed treatments for optimum stand establishment.

### Materials and Methods:

Plots were established at the North Central Agricultural Research Station (NCARS) near Fremont, Ohio on April 28, 2004. Four replications of 100 seeds were planted in rows spaced 30” apart with 4-5” between seeds. Each cultivar was planted in a randomized block design. Soil type was Colwood fine sandy loam. Soil temperature at a 2” depth at planting was 56°F. When plants reached at least the 5-6 leaf stage stand counts were taken to determine effective seed treatments for optimum sweet corn stand establishment. Laboratory cold tests (50°F for 7 days, then 77°F for 4 days) were also performed on each seedlot.

### Results and Discussion:

Emergence of the *se* cultivar ‘July Gold’ was lowest in the untreated check plots and all seed treatment combinations resulted in significantly higher emergence values. The emergence range in Fremont was 35% to 74% (Table 1).

There were no significant differences among any of the treatments of *sh*<sub>2</sub> cultivar ‘How Sweet It Is’ (Table 1). Emergence of ‘How Sweet It Is’ ranged from 60% to 82%.

This project was part of a multi-location trial organized by the Seed Treatment Committee of the International Sweet Corn Development Association, a non-profit research organization. The information generated from this study will be of value to sweet corn producers, industry personnel, consultants, farm advisers, extension plant pathologists and others interested in identifying the best performing seed treatments for optimum stand establishment.

Laboratory cold tests were conducted in the Seed Biology Lab, OSU, Columbus, Ohio. Percent emergence ranged from 62% to 90% for ‘July Gold’ and from 55% to 82% for ‘How Sweet It Is’. Untreated checks in both cultivars were significantly lower than any of the seed treatment combinations.

### Acknowledgements:

We would like to thank the *Ohio Vegetable and Small Fruit Research and Development Program* for their financial support of this research.

**Table 1. Sweet Corn Seed Treatment and Seedling Establishment Trial - 2004  
North Central Ag Research Station, Fremont, OH**

<u>Treatment</u>	<u>Rate</u>	'How Sweet		COLD TEST RESULTS	
		'July Gold' (se) -----% stand-----	It Is' (sh2)	'July Gold' (se) -----% emergence-----	'How Sweet It Is' (sh2)
Untreated check		35	77	62	55
Captan 400	3.00 fl oz/cwt	57	77	85	82
Thiram 42S	2.50 fl oz/cwt				
Allegiance FL	0.75 fl oz/cwt				
Captan 400	3.00 fl oz/cwt	64	60	85	79
Thiram 42S	2.50 fl oz/cwt				
Allegiance FL	0.75 fl oz/cwt				
Thiophanate-Methyl FL	4.20 fl oz/cwt				
Captan 400	3.00 fl oz/cwt	59	65	90	78
Thiram 42S	2.50 fl oz/cwt				
Allegiance FL	0.75 fl oz/cwt				
L1226-A1	150 ppm				
Captan 400	3.00 fl oz/cwt	59	73	84	74
Thiram 42S	2.50 fl oz/cwt				
Allegiance FL	0.75 fl oz/cwt				
Poncho 600	0.25 mg Al/seed				
Captan 400	3.00 fl oz/cwt	56	82	84	75
Thiram 42S	2.50 fl oz/cwt				
Allegiance FL	0.75 fl oz/cwt				
Raxil 2.6	75 ppm				
Apron XL 3 LS	0.19 fl oz/cwt	52	81	83	78
Maxim 4 FS	0.08 fl oz/cwt				
Divident Xtreme 0.96 FS	2.00 fl oz/cwt				
Maxim 4 FS	0.08 fl oz/cwt	55	65	76	79
Apron XL 3 LS	0.32 fl oz/cwt				
Dynasty 0.83 FS	0.15 fl oz/cwt				
Apron XL 3 LS	0.19 fl oz/cwt	66	82	76	78
Dynasty 0.83 FS	0.15 fl oz/cwt				
Maxim 4 FS	0.08 fl oz/cwt				
Divident Xtreme 0.96 FS	2.00 fl oz/cwt				
Apron XL 3 LS	0.32 fl oz/cwt	50	76	83	76
Maxim 4 FS	0.08 fl oz/cwt				
Dynasty 0.83 FS	0.15 fl oz/cwt				
Cruiser 5 FS	0.125 mg Al/seed				
Apron XL 3 LS	0.19 fl oz/cwt	74	63	83	76
Maxim 4 FS	0.08 fl oz/cwt				
Dynasty 0.83 FS	0.15 fl oz/cwt				
Divident Xtreme 0.96 FS	2.00 fl oz/cwt				
Cruiser 5 FS	0.125 mg Al/seed				
LSD (0.05)		14.5	NS	5.7	8.7
CV		22.7	20.9	9.8	11.6

## **Effects of water availability during seed development in lettuce**

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Among the factors affecting germinability of a seed lot are the environmental conditions under which the seeds are produced. There are several reports indicating that differences in temperature, water availability and day length during seed development affect its quality, especially dormancy and germinability under sub-optimal conditions. With the objective of getting a better understanding of the effects that those factors have on seed quality, and the physiological mechanisms that would be involved, a series of experiments are currently being performed. This is a summary of the first season, in which we evaluated the effects of water availability in lettuce seed production.

Seeds of cv. 'Tango' were produced in a greenhouse under one of two treatments: i) wet (watering volume equivalent to evapotranspired volume), and ii) dry (watering volume ~ 54% of wet treatment). Figure 1 shows the weight and water content of the lettuce seeds during their development. Both treatments presented similar curves of development, with physiological maturity around 12 days after flowering. However, the dry treatments produced heavier seeds than the wet treatment. Table 1 presents different parameters of plant growth, and seed yield and quality. The dry treatment produced significantly shorter plants, and plants with fewer but heavier seeds. There were no differences in seed germination with light at 20, 25 and 30°C; in all cases it was close to 100%. However, a drastic reduction in germination was observed when seeds were placed in dark conditions, which was more severe at higher temperatures. Seeds from the dry treatment tended to be less affected by dark than seeds from the wet treatment. Germination after accelerated aging and saturated salt accelerated aging (in both cases: 41°C, three days, then seven days at 20°C) was not greatly affected, and seed from both treatments presented a similar response. Germination of seed from both treatments was affected by reduced water potential (PEG solutions), with a slight difference in favor of the wet treatment (Figure 2). In both treatments germination decreased at increased levels of exogenous ABA concentration, however seeds from the dry treatments were more sensitive to this compound (Figure 3). Our first year results indicated that water availability during seed development not only affected lettuce seed yield and individual weight, but also seed germinability under sub-optimal conditions. Currently, additional evaluations and experiments are being conducted to determine possible mechanisms for the differences observed.

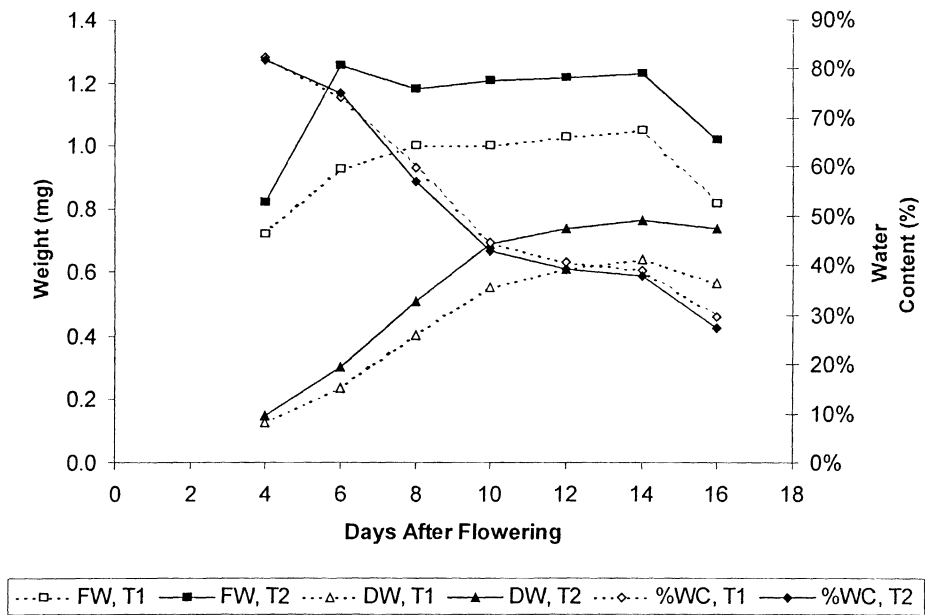


Figure 1. Weight and water content of lettuce seed during development. T1: wet treatment, T2: dry treatment, FW: fresh weight, DW: dry weight.



Table 1. Parameters of lettuce plant growth, seed yield and seed quality.

Parameter	Wet	Dry	% dry respect to wet
<b>Growth</b>			
Plant height (cm)	121.4	109.7	90%
Plant dry weight (g)	92.42	70.6	76%
<b>Seed Yield</b>			
Seeds per flower (number)	19.4	17.7	91%
Number of seeds per plant	8210.4	5586.4	68%
Total seed per plant (g)	5.7	4.6	81%
Seed weight (mg)	0.694	0.828	119%
<b>Seed germination</b>			
At 20°C – light (%)	100.0	99.5	100%
At 25°C – light (%)	99.0	99.5	100%
At 30°C – light (%)	98.5	97.5	99%
At 20°C – dark (%)	10.3	19.3	187%
At 25°C – dark (%)	3.5	5.5	157%
At 30°C – dark (%)	0.0	0.0	100%
After AA <sup>1</sup> , at 20°C-light (%)	97.0	97.0	100%
After SSAA <sup>2</sup> , at 20°C-light (%)	99.0	99.0	100%

1: Accelerated aging (AA) at 41°C, 72 hr

2: Saturated salt accelerated aging (SSAA) at 41°C, 72 hr using a NaCl saturated solution

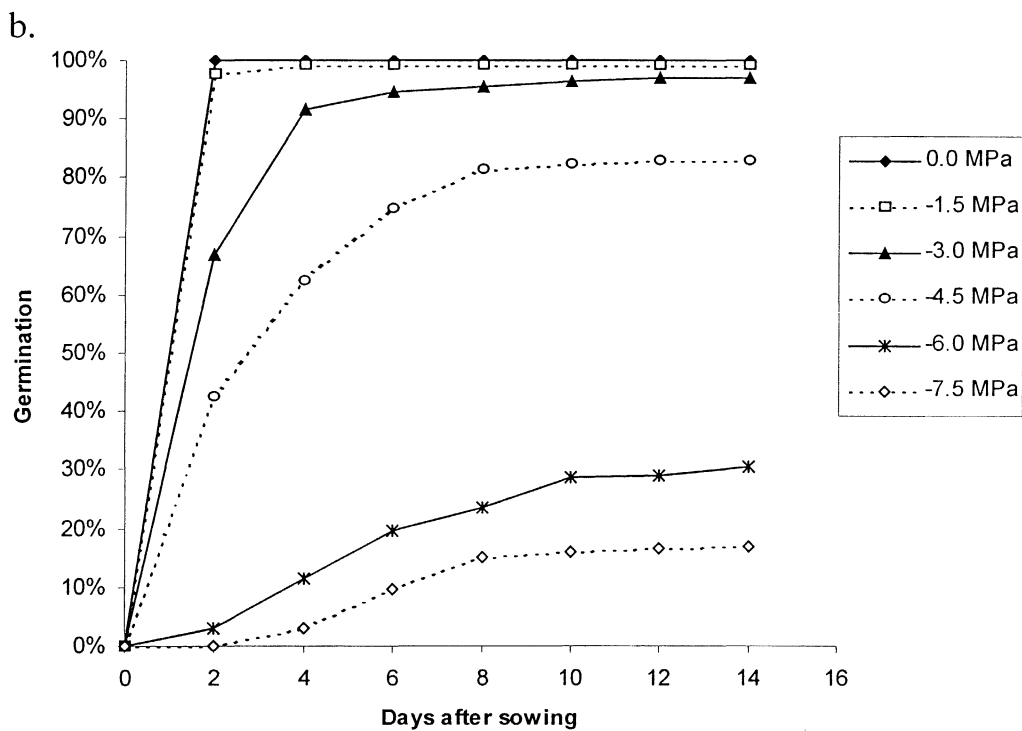
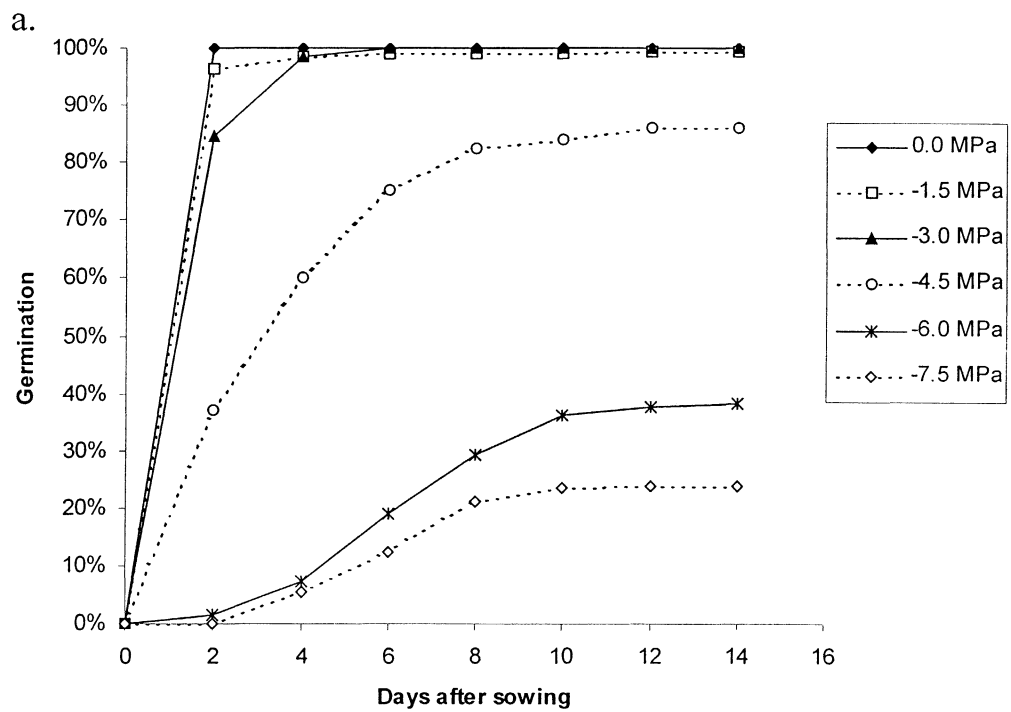


Figure 2. Germination of lettuce seed from the watered (a) and dry (b) treatments, at different water potential (PEG solutions), at 20°C with light.

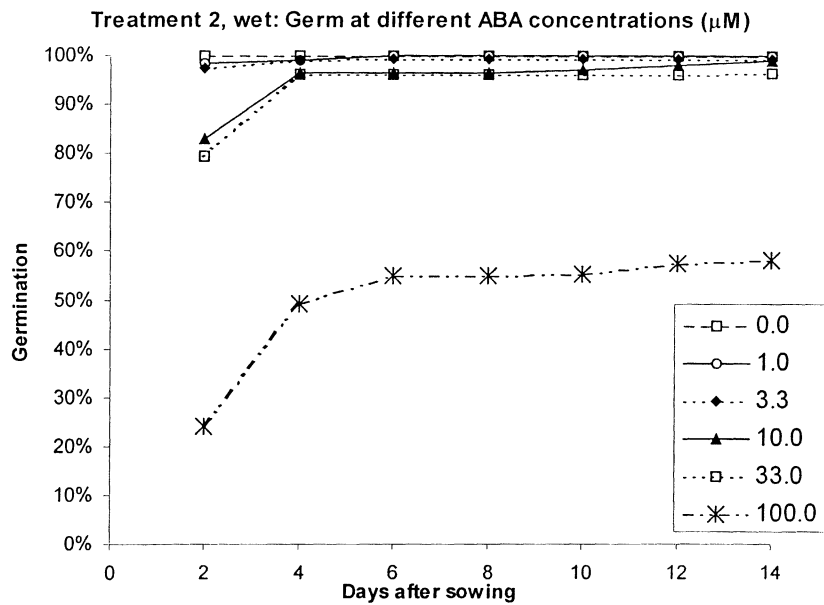
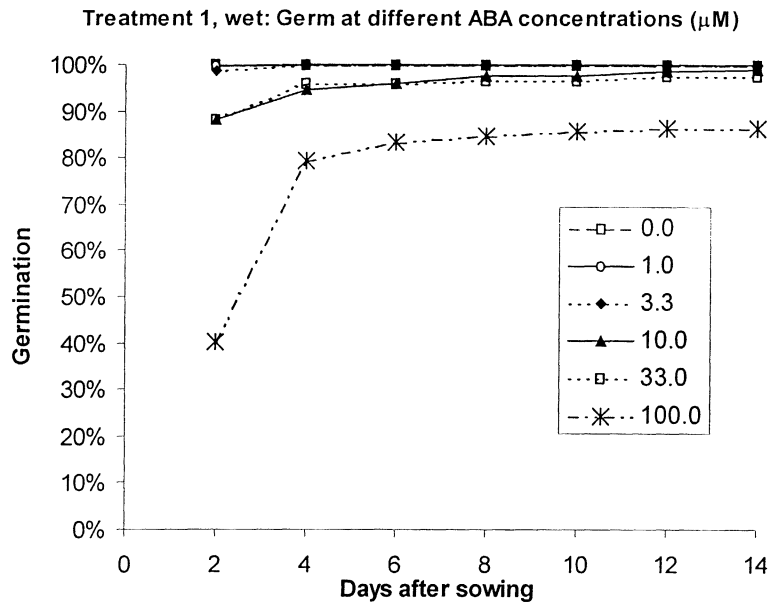


Figure 3. Germination of lettuce seed from both treatments at different ABA concentrations ( $\mu\text{M}$ ), at  $20^{\circ}\text{C}$  with light.

## **Vegetable Seed Vigor Assessment Using Computer Imaging, Plug Tray and Field Establishment – 2004**

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**Objective:** To compare the Ohio State University Seed Vigor Imaging System (SVIS) results for vigor ranking among seed lots to results from plug tray seedling establishment.

**Methods and Materials:** Seedlings of cucumber, fresh market tomatoes, collards and India Mustard were scanned after 3-4 days, depending on the crop, using an inverted computer scanner. Scans of seed lots are then analyzed for vigor ranking using software being developed at Ohio State University. The software provides a vigor ranking (0-1000 scale) based on seedling vigor and uniformity. Seed lots were also either seeded into 200-cell plug trays or direct seeded in the field, depending on whether the crop is direct seeded or transplanted for establishment. After several weeks, stand counts were taken and compared to the analyzed seedling scans to determine if the SVIS vigor rankings will accurately determine a seed lots performance in the greenhouse and/or field setting. Tomato seed lots ('Florida 7514' and 'Florida 47') were seeded into plug trays on April 1, 2004 and grown in the North Central Agricultural Research Station (NCARS) greenhouse, Fremont, Ohio. Final plug tray stands were counted on May 20, 2004.

Collard ('Champ and 'Flash') and mustard ('Southern Giant Curled') seed lots were seeded into 200-cell plug trays on April 29, 2004. Each cultivar was seeded in four replications of 100 seeds each. All transplants were grown at the NCARS greenhouse, Fremont, Ohio. Stand counts were taken on May 27.

Cucumber ('Straight Eight' and 'Vlasset T') seed lots were direct seeded into the field at NCARS on June 22, 2004 into flat ground. Rows were spaced 30" apart with 6 seeds planted per foot of row. Rows were 25' long. Both cultivars were replicated four times. Final stand counts were taken on July 8.

### **Results and Discussion:**

Values obtained from the SVIS system using scanned seedlings correlate well with field and plug tray emergence for collards and cucumbers (Table 1). In comparing the two lots of cucumbers and collards, the lower plug tray or field emergence values match with the lower vigor index ratings obtained with the SVIS system. On tomatoes, the opposite results were noted. Although 'Florida 7514' had a slightly higher plug tray emergence compared to 'Florida 47', the SVIS system indicated seedlings for 'Florida 47' had a higher vigor rating. Visually, after 4 days, the 'Florida 47' seedlings were much longer compared to the 'Florida 7514' seed lot. Differences in emergence and growth rate in the two seed lots after 4 days showed many seeds not germinated and shorter seedlings in the 'Florida 7514' seed lot despite the final plug tray emergence of 91%.

For each new crop tested with the SVIS system, manual adjustments to the software are needed to detect smaller, thinner seedlings.

**Table 1. Results of SVIS system for vigor ranking and stand counts from plug tray or field establishment, 2004.**

Crop	Cultivar	SVIS value	Plug tray* or directed seeded** --% emergence--
Tomato	Florida 7514	500	91*
Tomato	Florida 47	747	87*
Collard	Champ	572	91*
Collard	Flash	735	95*
India Mustard	Southern Giant Curled	792	95*
Cucumber	Straight Eight	845	83**
Cucumber	Vlasset T	911	91**

**Acknowledgements:**

- Special thanks and appreciate to the *Ohio Vegetable and Small Fruit Research and Development Program* for their financial support of this project
- Thanks to *Rick Callendar*, OSU/OARDC Muck Crops Branch for supplying collard and mustard seed lots and for consultation regarding this project.

## Evaluation of Specialty Vegetable Crops and New Cultivars – 2004

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### Objectives:

- 1). To test ten new crops in Ohio for yield and fruit/plant characteristics focusing on the Asian and Latino markets.
- 2). To test 5 newly released cultivars to evaluate fruit characteristics and yield potential under Ohio growing conditions.

### Methods and Materials:

The following ten specialty crops were tested at the North Central Agricultural Research Station (NCARS), in Fremont Ohio:

‘Purple Jalapeno’ jalapeno pepper  
‘Jaloro’ yellow jalapeno pepper  
‘Tiburón’ ancho pepper  
‘San Martín Hybrid’ ancho pepper  
‘Pingtung Long’ Asian eggplant  
‘Thai Green’ Asian eggplant  
‘Big Chili’ chili pepper  
‘Sun Jewel’ Asian melon  
‘Cucamelon’ cucumber  
‘Kakai’ pumpkin

Pepper and eggplant varieties were seeded into 200-cell plug trays on April 1, 2004. Transplants were grown in the NCARS greenhouse in Fremont. Crops were established in the field on raised beds with black plastic mulch and trickle irrigation on May 25, 2004. All crops were replicated 4 times. Raised beds were spaced 5’ apart with an in-row plant spacing of 18 inches.

Asian melons and pumpkin were seeded on May 5, 2004 into 50-cell plug trays. Pumpkins and melons were established in the field on June 21 into flat ground with black plastic mulch. Rows were spaced 7.5 feet apart with in row plant spacing of 3 feet. Pumpkins were reseeded directly in the field on July 2, 2004, due to poor germination from the first planting.

The following new cultivar releases were also tested at NCARS during the 2004 growing season:

‘Pink Beauty’ tomato  
‘Revolution’ bell pepper  
‘Bonbon’ buttercup squash  
‘JSS Butternut F1’ butternut squash  
‘JWS 6858 F1’ butternut squash

Tomato and bell pepper cultivars were seeded into 200-cell plug trays on April 1, 2004. They were established in the field on May 25, 2004 into raised beds with black plastic mulch and trickle irrigation. Rows were spaced 5 feet apart with in-row plant spacing of 18 inches.

Squash varieties were seeded on May 5 into 50-cell plug trays. They were established in the field on June 21 into flat ground with black plastic mulch. Rows were spaced 7.5 feet apart with in-row plant spacing of 3 feet.

Pictures of all cultivars tested will be available winter 2004 on the OSU VegNet Website at <http://vegnet.osu.edu>.

## **Results and Discussion:**

### **New /Specialty Crops (Table 1)**

'Purple Jalapeno': Fruit was harvested 3 times on August 24, September 9 and September 16. Average fruit size was .06 lbs. Marketable yield was 7.4 T/A with 0.2 T/A culled fruit. Fruit is dark purple before turning red when fully mature and has the same heat level as standard green jalapenos. Attractive color for use in salsas and for pickling.

'Jaloro': this first true yellow jalapeno pepper is bright yellow then matures to orange and then red. This cultivar was developed at the Texas Agricultural Extension Service. Peppers have the same heat level as regular green jalapenos. Plants are resistant to six viruses that threaten peppers. Fruits were harvest twice on September 2 and September 16. Average fruit size was .06 lbs. Marketable T/A was 14.4 T/A with 1.4 T/A culled fruit. Nice specialty pepper edible in the yellow, orange or red stages of maturity.

'Tiburón': this poblano pepper (also referred to as fresh ancho pepper) produces conical or truncated shaped dark green to black peppers that have indented shoulders. When the green pods are used fresh (poblano) they can be roasted and peeled and preserved by canning or freezing. Fresh green poblanos can also be stuffed and baked (chile rellenos). When the fruits are allowed to further mature to red or dark red, they are typically dried (ancho) and ground into chili powder and used in Mexican sauces called moles. This variety has a medium heat rating and thick walls. 'Tiburón' has heavy foliage providing a good canopy cover which helps eliminate sunscald on fruits. Fruits were harvested on August 24 and September 16. Marketable yield was 15.2 T/A with 1.3 T/A culled fruit. Average marketable fruit size was 0.25 lb.

'San Martin Hybrid': this new variety is also a poblano when harvested green, turning to an ancho when allowed to turn dark red and is dried. Plants were harvested twice on August 24 and September 16. Marketable yield was 14.1 T/A with 0.8 T/A of culled fruit. Average marketable fruit size was 0.22 lb.

'Big Chili II': This Anaheim chili pepper is mildly hot, measuring 7" long. Fruits can be harvested green or mature red. Its shape is the traditional semi-flattened traditional Anaheim shape. Plants are strong and tall enough to hold the fruit upright and off the ground. Plants were harvested once on September 16. Marketable yield was 15.5 T/A with 2.0 T/A culled fruit.

‘Pingtung Long’: this Asian eggplant has dark, shiny lavender skin. Fruits average 12 inches in length and up to 2 inches in diameter. Fruits are straight or slightly curved. Wind scarring from the leaves was the major problem with this crop, typically of most eggplant varieties. Fruits were harvest three times on August 10 and 24, and September 2. Marketable yield was 3.9 T/A with an average fruit size of 0.33 lbs. There was 2.3 T/A of culled fruit, mainly from severe wind scarring. Fruits have a mild, non-bitter flavor.

‘Thai Green’: this Asian eggplant has light green skin and is used extensively in Thai cuisines. Fruits measure up to 12 inches long and have a thin tender skin that does not need peeling. Plants were harvested 3 times on August 24, September 2 and 16. Marketable yield was 8.2 T/A with an average fruit size of 0.36 lbs. Culled fruit, due mostly to wind scarring damage was 3.7 T/A.

‘Sun Jewel’: this unusual Asian specialty melon is oblong and bright yellow with shallow white sutures. Flesh is white, sweet and crisp when ripe. Vines are vigorous and lush. At maturity, melons easily slip off the vines. Fruit is approximately 7-8 inches long and 3-4 inches in diameter. Fruits were harvested twice on August 16 and August 24. Average fruit weight was 1.6 lbs each. Marketable yield was 8.7 T/A with 3.8 T/A of culled fruit mainly due to ground rot or splitting due to recent heavy rainfall between harvests.

‘Kakai’: this ornamental pumpkin is orange with dark green/black stripes. Vines are bush-type and compact. This variety is known for its unusual large, hullless seeds, which can be eaten fresh or roasted. ‘Kakai’ is a variety of the Austrian type pumpkins grown for pumpkin seed oil. This is a novelty item that works well with other fall decorations. We reseeded this variety due to poor germination from the first planting. Seeds we received were not treated. However, treated/film-coated seed is available in larger quantities. Average fruit weight was 8.7 lbs. Due to reseeded on July 2, all fruits were not fully orange and striped at harvest on October 4, but all vines were killed due to frost. Marketable yield was 9.3 T/A with 0.5 T/A culled fruit due to ground rot.

‘Cucamelon’: very unusual miniature cucumber that looks like a miniature watermelon but has the taste of a cucumber. Skin is white with green striping. Fruit develop on lacy, lush vines that require trellising to keep developing fruit off the ground and to aid in harvesting. These “cherry” size cucumbers are edible and require no peeling. Novelty item to add to salads or to vegetable trays. Tiny fruit measure 1” x .5”. Prolific plants with numerous fruits. Yield from three trellised plants weighed 12.6 lbs. Plant spacing in row was 3’ between plants, but we recommend at least 5-6 feet between plants.

### **New Cultivar Releases (Table 2)**

‘Pink Beauty’: this fresh market tomato has pinkish/red skin 6-7 oz. fruit on large indeterminate vines. Good tomato flavor and uniform fruit size. There were no disease problems with this variety. Fruits were harvested 3 times on August 24, September 2 and 16. Marketable yield was 30.9 T/A with 7.2 T/A culled fruit. Nice addition to fresh market sales.



‘Revolution’: this 4-lobed bell pepper had excellent fruit set, especially early in the season. Fruits are green that mature to red. Large, blocky thick walled, firm peppers were harvested three times on August 10 and 24, and September 16. Average fruit weight was 0.66 lbs. Marketable yield was 11.9 T/A with 1.9 T/A culled fruit mainly due to blossom end rot and sunscald. No virus, bacterial spot or phytophthora problems were seen in this variety.

‘Bonbon’: One single rep observation of this buttercup squash was planted in 2004. This variety is newly released and was bred by Rob Johnston, Jr., Johnny’s Selected Seeds. Dark green smooth skin with a gray button at the base of the fruit. Bright, deep orange, thick flesh is smooth and sweet. Consistent fruit size. Vigorous vine growth. Plants were harvested on September 9. Average marketable fruit size was 3.8 lbs. Marketable yield was 15.3 T/A with 1.7 T/A culled fruit.

‘JSS Butternut F1’: One single rep observation of this butternut squash was planted. This winter squash had vigorous vine growth. Fruits have dark beige skin and bright orange flesh. Average fruit weight was 2.0 lbs. Marketable yield was 11.1 T/A with 3.5 T/A culled fruit mainly due to cracked or rotted fruit.

‘JWS 6858 F1’: One single rep observation of this cultivar was planted in 2004. This squash is very similar to ‘JSS Butternut F1’ with a slightly larger average fruit size of 2.4 lbs. Fruit has beige skin with bright orange flesh. Vigorous vine growth. Marketable yield was 12.4 T/A with 3.1 T/A culled fruit due to rotten or cracked fruit.

**Table 1. New/specialty crops grown at NCARS, Fremont, OH, in 2004.**

<b>Crop</b>	<b>Cultivar</b>	<b>Seed Source</b>	<b>Days to Maturity</b>	<b>Marketable T/A</b>	<b>Cull T/A</b>
Jalapeno Pepper	‘Purple Jalapeno	Tomato Growers Supply	75	7.9	0.2
Jalapeno Pepper	‘Jaloro’	Tomato Growers Supply	70	14.4	1.4
Poblano/Ancho pepper	‘Tiburón’	Johnny’s	65 gr/85 red	15.2	1.3
Poblano/Ancho pepper	‘San Martin Hybrid’	Tomato Growers Supply	75	14.1	0.8
Anaheim chili pepper	‘Big Chili II’	Johnny’s	70 gr/90 red	15.5	2.0
Asian eggplant	‘Pingtung Long’	Seed Savers Exchange	65-75	3.9	2.3
Asian eggplant	‘Thai Green’	Seed Savers Exchange	70-80	8.2	3.7
Asian melon	‘Sun Jewel’	Johnny’s	68	8.7	3.8
Pumpkin	‘Kakai’	Johnny’s	100	9.3	0.5
Cucumber	‘Cucamelon’	Underwood Gardens	80	*12.6 lbs from 3 plants	*0.01 from 3 plants

**Table 2. New cultivars tested at NCARS, Fremont, OH, in 2004.**

<b>Crop</b>	<b>Cultivar</b>	<b>Seed Source</b>	<b>Days to Maturity</b>	<b>Marketable T/A</b>	<b>Cull T/A</b>
Tomato	'Pink Beauty'	Johnny's	74	30.9	7.2
Bell Pepper	'Revolution'	Stokes	75	11.9	1.9
Buttercup Squash	'Bonbon'	Johnny's	95		
Butternut Squash	'JSS Butternut F1'	Johnny's	-	11.1	3.5
Butternut Squash	'JWS 6858 F1'	Johnny's	-	12.4	3.1

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## Seedling Vigor Index Values Following Various Vegetable Seed Treatments

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**Objective:** to subject vegetable seed lots to treatments of HCl, hot water, chlorox, sonication, microwave, and hydrostatic pressure (HP) to see their effect on seedling vigor.

**Materials and Methods:** Seedlots of summer squash, buttercup squash and spaghetti squash were treated with HCl, hot water, chlorox, sonication, microwave, and 4 treatments of hydrostatic pressure.

Seedlots of tomato, collards and India mustard were treated with hot water, HCl, chlorox, microwave and sonication treatments.

Treated seeds were then allowed to germinate for 2-4 days (depending on the crop). Seedlings were scanned using the OSU Seed Biology Seedling Vigor Imaging System (SVIS), which calculated a SVIS index comprised of seedling growth and uniformity ratings.

**Results:** Summer squash and spaghetti squash seedlots showed seeds were destroyed with HP treatments of 33 MPA and 400 MPA for three minutes. Buttercup squash seeds were destroyed with HP at 33 MPA for three minutes with H<sub>2</sub>O and HP at 400 MPA for 3 minutes with H<sub>2</sub>O (Table 1).

Tomato seedlots were not affected with the sonicated, microwave, hot water, HCl or chlorox treatments as measured by SVIS (Table 2). However, India mustard seedlots were destroyed with the HCl seed treatments, and the collards ('Florida Broadleaf') were severely weakened by HCl treatment (Table 2).

Table 1. Seed treatments and seedling vigor ratings for cucurbit (summer, butternut and spaghetti squash) seedlots.

**Cucurbits**

Variety	Treatment	Vigor Index
Summer squash	HCl (control)	638
Summer squash	Hot Water	551
Summer squash	Chlorox	531
Summer squash	Sonicated	510
Summer squash	Microwave	537
Summer squash	HP 33MPA 3min H2O	479
Summer squash	HP 33MPA 3min	0
Summer squash	HP 400MPA 3 min H2O	461
Summer squash	HP 400MPA 3 min	0
Buttercup	HCl (control)	706
Buttercup	Hot Water	598
Buttercup	Chlorox	575
Buttercup	Sonicated	583
Buttercup	Microwave	560
Buttercup	HP 33MPA 3min H2O	0
Buttercup	HP 33MPA 3min	528
Buttercup	HP 400MPA 3 min H2O	0
Buttercup	HP 400MPA 3 min	486
Spaghetti	HCl (control)	715
Spaghetti	Hot Water	698
Spaghetti	Chlorox	657
Spaghetti	Sonicated	693
Spaghetti	Microwave	618
Spaghetti	HP 33MPA 3min H2O	544
Spaghetti	HP 33MPA 3min	0
Spaghetti	HP 400MPA 3 min H2O	456
Spaghetti	HP 400MPA 3 min	0

Table 2. Seed treatments and seedling vigor ratings for tomato, India mustard and collard seedlots.

**Tomatoes**

Variety	Treatment	Vigor Index
Tomato lot# 258516	Control	458
Tomato lot# 258516	Sonicated	446
Tomato lot# 258516	Microwave	450
Tomato lot# 258516	Hot Water	462
Tomato lot# 258516	HCl	474
Tomato lot# 258516	Clorox	682
Tomato lot# P0125512041A	Control	641
Tomato lot# P0125512041A	Sonicated	658
Tomato lot# P0125512041A	Microwave	603
Tomato lot# P0125512041A	Hot Water	685
Tomato lot# P0125512041A	HCl	662
Tomato lot# P0125512041A	Clorox	663

**India Mustard**

Variety	Treatment	Vigor Index
Green Wave	Control	563
Green Wave	Sonicated	566
Green Wave	Microwave	543
Green Wave	Hot Water	523
Green Wave	HCl	0
Green Wave	Clorox	496
Southern Giant	Control	562
Southern Giant	Sonicated	554
Southern Giant	Microwave	541
Southern Giant	Hot Water	576
Southern Giant	HCl	0
Southern Giant	Clorox	544

**Collards**

Variety	Treatment	Vigor Index
Fla Broadleaf	Control	515
Fla Broadleaf	Sonicated	505
Fla Broadleaf	Microwave	501
Fla Broadleaf	Hot Water	562
Fla Broadleaf	HCl	130
Fla Broadleaf	Clorox	567

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