stock, observed over a 3-yr period and the inability to store pollen. High levels (400 ppm) of GA_3 also resulted in significantly more inflorescences per plant allowing more efficient use of greenhouse space.

Present research concerning effect of environment on *in vivo* pollen germination is providing information beneficial to seed production. Preliminary data indicate that high (100%) relative humidity around the spadix for 24 hr immediately following pollination improves pollen germination. Flowers are wrapped in a wet paper towel and enclosed in a plastic bag after pollination to provide the high relative humidity. This method has proven essential for seed production in *Dieffenbachia* (5). However, data also show that not all *Aglaonema* may require high humidity for optimum seed set. However, until studies are completed, all freshly pollinated flowers are bagged as a normal part of our pollination procedure.

Aglaonema species previously used in breeding lacked petiole variegation and had relatively minor differences in foliar variegation. Recent exploration in the Philippine Islands (1, 2) has uncovered several plants which have novel foliar variegation patterns and petiole coloration. Several plants have russett, bright pink or mottled pink petioles, whereas others have large leaves or unique variegation patterns. Unfortunately, no one plant combines all these desirable characteristics; hybridization will be necessary to develop plants with optimum commercial value. Several of these accessions have proven to be fertile and cross compatible. Currently, seeds from crosses involving these plants and others in our collection are nearing maturity—hopefully several desirable seedlings will appear among the F_1 hybrids. Particularly encouraging are genetic data concerning inheritance of foliar variegation from previous crosses in which the foliar variegation patterns from 3 *Aglaonema* species proved to be controlled by a single dominant gene (4). Combining selected foliar variegation patterns with the pink petioled types may be relatively easy once enough hybrids have been produced to allow segregation and selection.

Aglaonema Breeding—Future

Aglaonema hybrids of the future will be distinctly different from the popular commercial cultivars grown today. More brightly colored plants with pink petioles and some even with wine-red leaves or veins are possibilities. Plant size and shape will be more variable allowing a broader spectrum of indoor use. This should be possible without losing their natural tolerance to the low light and humidity levels often encountered under interior conditions. Learning more about *Aglaonema* genetics will make it possible to narrow the selection of parents to produce the types of seedlings desired. The favorable effects of GA_3 on flowering and high humidity on seed set will help to make this goal reachable in the next few years.

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SEED YIELD AND QUALITY OF NINE FLORIDA TOMATO CULTIVARS[1]

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Abstract. **Fruit and seed yield were determined for 9 tomato cultivars (8 new releases and a standard) from field trials. In general, the 6 fresh market cultivars produced more fruit, higher seed weight per plant, and lower weight of seed per kg of fruit than the 3 ornamental cultivars. Percent germination with and without previous accelerated aging was also determined for both field-replicated trials as well as bulk seed lots of these cultivars. Cultivars 'Burgis,' 'Florida Lanai,' and 'Hayslip' had significantly higher germination with and without previous accelerated aging than other cultivars (including the standard cultivar, 'Walter'). Using bulk seed lots, emergence, standard germination, and accelerated aging, tests were performed for the same cultivars. 'Burgis,' 'Florida Lanai,' and 'Hayslip' once again possessed higher germination. Analysis among the different seed tests revealed that the highest correlation coefficient was between emergence and normal germination with previous accelerated aging.**

Before release of new cultivars of any crop, the cultivar's inherent ability to produce high quality seed which will germinate and emerge should be characterized. This furnishes important information to growers and seedsmen for production and management decisions.

The purpose of this study was to characterize the seed production potential and seed quality among 8 new tomato releases (2, 3, 4, 5, 6, 7, 12) and to determine if the accelerated aging test, which evaluates seed vigor (11), may give a better indication of a cultivar's ability to emerge than the standard germination test.

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Methods and Materials

Nine varieties of tomato listed in Table 1 were germinated in wood flats containing SAF-T-Blast® (Use of a trade name or proprietary product does not constitute an endorsement of the product by the University of Florida and is solely used for the convenience of the reader), a processed spent coal product, transplanted to Speedling® trays with 2.54 x 2.54 cm cells and grown to 6 wk of age prior to field transplanting. Field plants in the fall of 1980 were grown on raised beds of Myakka fine sand, fertilized at 1400 kg/ha of 18-0-25-2 fertilizer distributed in two bands 45.7 cm apart and 112 kg/ha each of 18-0-25-2, Uramite® (33% N), and superphosphate (0-20-0) containing 40 kg/metric ton of fritted micronutrients FN (503) broadcast in the center of the bed and mulched with 1.25 mil black plastic (9). Plants were set in single rows in the bed middle spaced 45.7 cm apart. Beds were spaced on 1.37 m centers with irrigation ditches every 7 rows. This arrangement resulted in 2950 m of bed per hectare. Each experimental unit contained 5 plants and was replicated 4 times. Standard pesticides were applied on demand as recommended for insect and disease control. Fruit were harvested 3 times, counted, weighed, and seeds extracted and processed by standard recommended procedures.

Table 1. The influence of variety on the mean yield of fruit and seed per plant and the grams of seed per kilogram of fresh fruit.

Cultivar	Fruit/ plant (kg)	Seed/ plant (g)	Seed/ fresh fruit (g/kg)
'Florida Basket'	0.73 d[z]	2.45 de	3.33 ab
'Florida Lanai'	0.80 d	3.49 cd	4.34 a
'Florida Petite'	0.48 d	0.88 e	1.83 c
'Burgis'	3.74 ab	5.04 bc	1.35 cd
'Hayslip'	3.13 bc	4.35 bcd	1.39 cd
'Florida 1A'	3.92 a	5.13 bc	1.31 cd
'Florida 1B'	4.21 a	3.97 bcd	0.94 d
'Florida 1C'	4.40 a	9.35 a	2.12 bc
'Walter'	3.90 a	6.05 ab	1.55 cd

[z]Mean separation in columns by Duncan Multiple Range Test, 5% level.

Field Replicated Seed Test. For the standard test, 4 samples of 50 seeds from each of 4 replications were germinated in a rolled towel test at 25°C for 7 days. Seeds in each lot which germinated normally (1) or which had visible radicle growth were expressed as percent normal germination or percent total germination, respectively.

For the accelerated aging test, 100 seeds from each replication were placed in an uncovered 100 x 15 mm Petri dish inside a covered 150 x 25 mm Petri dish containing 20 ml of deionized water. Petri dishes were then exposed to a 40°C, 100% relative humidity environment for 72 hr. After aging, seeds were germinated as described previously. Percent normal germination and percent total germination were transformed using arcsine square root for analysis of variance.

Bulk Seed Tests. Four samples of 50 seeds from bulk seed lots of an additional field planting were accelerated aged and germinated as described above. Four samples of 50 seeds were also germinated as described previously, without accelerated aging. For the emergence test, 2 samples of 100 seeds from each bulk seed lot were planted in wood flats, 6.25 mm deep, containing finely ground gravel. The flats were well-watered and placed in an environmental chamber at 25°C and 80% relative humidity. Emergence counts were made 8 days after planting.

Percent emergence, percent normal germination, and percent total germination were transformed using the arcsine square root for correlation analysis.

Results and Discussion

The 6 fresh-market commercial cultivars produced significantly more fruit and seed weight per plant and lower weight of seed per kilogram of fruit than the 3 ornamental cultivars (Table 1). On fresh fruit weight basis, 'Hayslip' was the lowest yielding commercial cultivar. This is partially attributed to the fact that 'Hayslip' matured a few days later than the other cultivars and had medium sized fruit, whereas the 'Florida 1A, B, and C' series are larger fruited cultivars. 'Florida 1C' produced the greatest weight of seeds per plant of any of the large fruit commercial types, followed by 'Walter', 'Florida 1A', 'Burgis', 'Hayslip', and 'Florida 1B', in that order. Also, 'Florida 1C' produced the greatest weight of seed per pound of fresh fruit of any of the large fruit varieties, followed by 'Walter', 'Hayslip', 'Burgis', 'Florida 1A', and 'Florida 1B', respectively. The high seed weight ratios of 'Florida 1C' is attributed to its relatively small fruit size compared to the other fresh market cultivars.

Results from germination and accelerated aging tests of seeds from field replicated plots, revealed a lower percent normal germination than percent total germination (Table 2). Mean percent normal germination and mean percent total germination were reduced by 29% and 19%, respectively, in the accelerated aging test as compared to the standard germination test.

Table 2. Means of normal germination and total germination obtained from the standard germination test (GT) and accelerated aging (AA) test for seed of field-replicated tomato cultivars.

Cultivar	Normal germination		Total germination	
	GT	AA	GT	AA
	(%)			
'Florida Basket'	60.9 b[z]	50.5 c	73.0 b	61.0 c
'Florida Lanai'	92.6 a	76.0 ab	95.6 a	86.2 a
'Florida Petite'	72.3 b	50.5 c	78.2 b	61.0 c
'Burgis'	94.2 a	77.8 a	94.9 a	84.8 ab
'Hayslip'	94.2 a	74.7 ab	96.3 a	87.5 a
'Florida 1A'	62.2 b	49.5 c	71.6 b	59.0 c
'Florida 1B'	74.2 b	54.0 bc	81.9 b	64.8 bc
'Florida 1C'	64.9 b	39.8 c	72.9 b	50.0 c
'Walter'	75.2 b	44.0 c	80.1 b	58.0 c
Mean	76.3	54.3	82.7	67.3

[z]Mean separation in columns by Duncan Multiple Range Test, 5% level.

'Burgis', 'Florida Lanai', and 'Hayslip' had significantly higher percent normal germination and percent total germination than other cultivars in the standard germination test. In the accelerated aging test, 'Burgis', 'Florida Lanai', and 'Hayslip' had significantly higher percent normal germination and percent total germination than other cultivars except 'Florida 1B.'

Results of previous accelerated aging tests have demonstrated positive correlations with seed vigor for other crop species (8). If this same relationship can be assumed to be true with tomatoes, then the cultivars possessing the highest normal germination in the standard germination test 'Burgis,' 'Florida Lanai', and 'Hayslip') also possess the highest vigor since they had the highest scores in the accelerated aging test. In this study cultivar differences in germination and vigor are assumed to be inherent since all were grown under the same environmental conditions.

Emergence, standard germination, and accelerated aging tests were performed on bulk seed lots of these tomato cultivars (Table 3). Results for normal germination and total

Table 3. Means and standard errors for percent emergence, percent normal germination, and percent total germination obtained from the germination test (GT) and the accelerated aging test (AA) for bulk seed of tomato cultivars.

Cultivar	Emergence	Normal germination		Total germination	
		GT	AA	GT	AA
		........%			
'Florida Basket'	74.7 ± 7.4	92.0 ± 0.0	83.0 ± 4.1	94.0 ± 1.2	86.0 ± 3.7
'Florida Lanai'	85.7 ± 2.4	94.0 ± 2.1	89.0 ± 3.0	95.5 ± 2.1	90.0 ± 2.4
'Florida Petite'	70.5 ± 4.3	84.0 ± 2.7	64.7 ± 6.9	90.0 ± 3.5	68.7 ± 7.1
'Burgis'	81.3 ± 4.1	97.0 ± 1.9	65.0 ± 4.7	98.5 ± 1.5	67.0 ± 5.4
'Hayslip'	67.7 ± 6.4	93.5 ± 1.2	69.5 ± 5.0	98.5 ± 1.0	75.5 ± 3.9
'Florida 1A'	61.7 ± 2.3	74.0 ± 3.6	51.5 ± 6.7	83.5 ± 5.5	56.0 ± 3.7
'Florida 1B'	70.7 ± 2.3	90.5 ± 2.1	70.2 ± 1.7	94.5 ± 1.7	82.7 ± 3.1
'Florida 1C'	81.3 ± 0.3	82.5 ± 4.3	70.5 ± 2.9	87.0 ± 4.4	75.0 ± 2.4
'Walter'	52.3 ± 3.8	43.0 ± 6.4	24.0 ± 8.5	52.5 ± 8.1	33.0 ± 8.3
Mean	71.8 ± 3.5	83.4 ± 5.6	65.3 ± 6.3	88.2 ± 4.8	70.4 ± 5.8
't' value for GT vs AA		6.59**[z]		5.97**	

[z]**Denotes significance at the 1% level of probability.

Table 4. Correlation coefficients between germination, accelerated aging (AA), and emergence test results for bulk seed of tomato cultivars.

	Normal germination	Accelerated aging: Total germination	Accelerated aging: Normal germination	Emergence
Total germination	.99**[z]	.78*	.80**	.73 *
Normal germination		.83**	.85**	.81**
AA-Total germination			.98**	.87**
AA-Normal germination				.91**

[z]*,** Significant at the 5% and 1% probability level, respectively.

germination percentages were higher for the bulk seeds than for the seeds from field-replicated plots (Tables 2 and 3). Results of the accelerated aging test (Table 3) were significantly lower than results for the germination test. Percent normal germination and percent total germination were reduced by 22% and 20%, respectively. Mean percent emergence of the tomato cultivars was lower than mean percent normal germination from the standard germination test, but similar to mean normal germination from the accelerated aging test. Similar to the results from field replicated plots, bulk seed normal germination and total germination percentages of 'Burgis,' 'Florida Lanai,' and 'Hayslip' were higher than for other cultivars.

Correlation coefficients between the results of the emergence, standard germination and accelerated aging tests (Table 4) were all significant. The highest correlation between emergence results and other laboratory indices was with germination in the accelerated aging test ($r = 0.91^{**}$). The lowest correlation was obtained with viable seed percentage from the germination test ($r = 0.73^{*}$). Results from correlation analyses reveal that the accelerated aging test gives a better indication of emergence than the germination test. Such results have not been reported previously for seed of these tomato cultivars, but has been shown to be true for soybean seed (10).

These results indicate that there are indeed differences among these newly released cultivars in seed production and seed quality. Ornamental cultivars produce fewer seeds than the jointed or jointless fresh market cultivars. Results from one year's data indicate possible differences in seed quality among cultivars of every tomato type. However, these differences among cultivars do not indicate that any cultivar possesses poor seed quality. In fact, all cultivars possessed seed quality equal to the control, 'Walter'. Growers and seedsmen interested in producing and marketing seeds of these cultivars should be aware of the differences reported.

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INFLUENCE OF GROWTH REGULATORS, TEMPERATURE, AND RED LIGHT ON SPROUT PRODUCTION OF THREE SWEET POTATO (IPOMOEA BATATAS (L) LAM.) CULTIVARS

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Additional index words. Red light, proximal dominance, sprout initiation.

Abstract. **Roots of 3 sweet potato (Ipomoea batatas (L.) Lam.) cultivars 'Julian,' 'Tuskegee 100' and 'Jewel' were treated with different growth regulators, 2 temperature regimes and red light in an attempt to reduce proximal dominance and increase sprout production. Ethephon, gibberellic acid (GA_3), and thiourea separately or in combination were superior to kinetin (KN), benzyladenine (BA) and succinic acid (SA) in advancing sprouting date, increasing shoot number and length. Temperature effect ranked second in increasing sprout production followed by light treatment. 'Jewel' responded more favorably to the different treatments than 'Tuskegee 100'. 'Julian' was a sparse plant producer and was the least responsive to the above treatments.**

Proximal dominance of sweet potato roots is considered a problem of economic importance. It is the inhibition of shoots except at the proximal end of the root, which imposes undesirable limitation on the vegetative reproduction of this crop, and an increase in production cost. The reproduction potential of roots is presumably related to proximal dominance, which in turn is affected by the genetic make-up of the cultivar. Proximal dominance in sweet potato may be viewed as similar to apical dominance in potato tubers of *Solanum tuberosum* L. (2). Different cultivars show wide variation in the degree of proximal dominance and, subsequently, the degree of earliness or lateness of sprouting as well as total sprout production (6, 7, 16). There have been many attempts to increase sprout production of sweet potato through the reduction or elimination of proximal dominance. Root sectioning, (1, 12, 13, 17, 18, 19), planting in heated beds (2, 10, 17, 18), chemicals or growth regulators treatment (4, 5, 11, 20), and variation in light quality (3) have been investigated in an effort to enhance sprouting or reduce proximal dominance in sweet potato as well as other crops. This study was undertaken to examine the influence of several plant growth regulators, bed temperature, and red light on sprout production of roots of 3 sweet potato cultivars.

Materials and Methods

The roots of 3 sweet potato (*Ipomoea batatas* (L.) Lam.) cultivars 'Julian,' 'Tuskegee 100' and 'Jewel' were cured at 26-32°C for 10 days after harvest, then were stored at 13°C until used. Three locations within the greenhouse were identified as blocks. Within each location 96 uniform roots of each of the 3 cultivars were randomly assigned to 8 groups. Seven groups were soaked for 24 hr each in a different solution of the following growth regulators or combination: 1000 ppm GA_3, 1000 ppm ethephon, 20,000 ppm thiourea, GA_3 + ethephon + thiourea (1:1:1 v/v), 5 ppm KN, 5 ppm BA, and 0.008 ppm SA. The eighth group was used as a control.

After the soaking period, one half of the roots received overhead illumination from three incandescent and 4 Grolux® flourescent lamps directed through a custom made red filter to give a light spectrum extending from 580 to 700 mm with a maximum at 625 mm and a photon flux density of 300 $\mu E/m^2/sec$. Following the illumination period of 24 hr, the roots were treated with two fungicides and placed in heated or unheated sprouting media. The average maximum temperature at about 10 cm depth in the heated sawdust sprouting media was maintained at 35 ± 1°C by electric heating cables. In the unheated beds, the average maximum temperature was 21 ± 1°C. Sprouting recording began 1 wk after bedding and continued for 8 wk when the experiment was terminated.

Results and Discussion

Effects on 'Julian' sweet potato. Growth regulators increased significantly the number of sprouts of 'Julian' sweet potato (Table 1). Ethephon, GA_3, and thiourea separately or in combination were more enhancing to sprout production than KN, BA, or SA. In most cases heated beds also increased significantly the rate of sprouting compared to unheated beds. In general the increases in number of sprouts were 33 and 25% for roots treated with or without red light, respectively. The shoots developed in heated beds were 23% taller than similar ones developed from roots in unheated beds. This is in agreement with previous reports in which heated beds at 38-42°C increased sprouting of different sweet potato cultivars (10, 15, 17). Regardless of the growth regulators treatments the increase in sprouting of roots exposed for 24 hr to red light irradiation prior to planting in heated beds was 159% compared to control plants. However, the increase was more obvious under heated than unheated beds.

Effects on 'Tuckegee 100' sweet potato. 'Tuskegee 100' sweet potato responded favorably to growth regulators, temperature and red light treatments (Table 2). Growth regulators induced 86.0 and 62.5% increases over control in sprout production of the roots treated with red light and planted in heated or unheated beds, respectively. Under the same conditions, GA_3, ethephon and thiourea, separately or in combination were markedly superior in increasing the number and the length of sprouts over KN, BA, or SA. Roots exposed to red light for 24 hr prior to bedding showed 7.7