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Gibberellic Acid (GA_3) Stimulates Flowering in *Caladium hortulanum* Birdsey[1]

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Caladiums are propagated vegetatively with viruses (8), nematodes (3), bacteria and fungi (2, 4) being problems associated with tuber production and subsequent pot culture. The potential for seed production (sexual propagation) to reduce these problems has been shown (1), but flowering is sporadic in most cultivars and definitive information is not available on length of time to flower, number of inflorescences produced per plant, and potential seed production.

Gibberellic acid has been used to stimulate or accelerate flowering of many plants (5, 6) and has been accepted as a general cultural practice for some floricultural crops (7). Preliminary studies using GA_3 to decrease sprouting time in caladiums (unpublished data) indicated a flowering response when caladium tubers were soaked in GA_3 solutions before forcing. The purpose of this study was to determine if GA_3 could be used to stimulate rapid and uniform flowering of caladiums.

Tubers of 'Carolyn Whorton' (Jumbo = 7.5 cm diameter), 'Candidum (No. 1 = 6.3 cm diameter), and 'Frieda Hemple' (No. = 5.4 cm diameter) which had been stored at 23º for about 2 months were used in this study. Four GA_3 concentrations (0, 250, 500, and 1000 mg/liter) and 5 tuber-soaking times (4, 8, 16, 32, or 64 hr) were combined in a 4 × 5 factorial experiment with each treatment combination replicated 10 times in a completely randomized design. Single tubers were planted in 11 or 15 cm pots with 5 peat : 3 builder's sand : 3 vermiculite : 1 perlite (by volume) medium amended with 1.1 kg/m^3 hydrated lime, 2.8 kg/m^3 dolomite, 1.1 kg/m^3 Perk (micro-element mix manufactured by Kerr-McGee Corp., Jacksonville, FL), 1.4 kg/m^3 superphosphate, and 4.8 kg/m^3 18N-2.6P-10K Osmocote. An additional check was added in which tubers were not soaked. Tubers were planted on March 4, 1977 with 19 $\pm$ 2ºC night and 24 + 6ºC day temperature. Number of days to flowering (opening of spathe) of the first inflorescence per plant and total number of inflorescences per plant were determined. Observations were made for pollen production and crosses using 'Frieda Hemple' as the seed parent were made to insure flowers formed were not sterile.

Tubers treated with GA_3 developed more inflorescences than those held in water but there were no differences among plant treated with various levels of GA_3 (Table 1). These observations were verified with F tests at the 5% level. Plants of all 3 cultivars responded similarly.

Polynomial equations were fitted to the data. Based on the results of the analysis of variance, it was found that, as is typical for caladium, the plant responses were not "well behaved" yielding relationships that were not biologically meaningful. The no-soak check generally failed to flower (mean inflorescences/plant were 0.2, 0.7, and 0.0 for 'Frieda Hemple', 'Candidum', and 'Carolyn Whorton', respectively). The effect of

soaking time on flowering was obtained by average across GA_3 treatments (Fig. 1) and indicated between 8 and 16 hr of soaking produced the greatest number of inflorescences/plant.

Mean number of days to flowering for each cultivar is presented in Table 1, excluding plants not flowering by the end of the test (120 days from planting). Plant which flowered did so uniformly between 55 and 75 days from planting, except for the 'Frieda Hemple' control which flowered in an average of 47 days.

Pollen was produced on inflorescences representing all treatments and successful crosses were made on at least one inflorescence from each treatment. Inflorescences were not adversely affected by GA_3 treatments. Studies on the effect of GA_3 on actively growing plants have been initiated so that flower production could be timed year around for breeding or seedling production practices. Anatomical and physiological studies are needed to determine whether GA_3 stimulates latent flower buds or initiates flower production. In either case, caladium flower production can be increased by soaking tubers in 250 mg/liter GA_3 for 8-16 hr at 23ºC.

Literature cited

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Table 1. Influence of Gibberellic acid (GA_3) on mean number of inflorescences and days to flowering (spadix opening) of 3 caladium cultivars.[z]

GA_3 concn (mg/liter)	No. inflorescences per plant	Days to flower[y]	Plants still vegetative at 120 days (%)
	Frieda Hemple		
0	0.2[x]	47	78
250	2.4	62	2
500	2.8	61	2
1000	2.7	61	2
	Carolyn Whorton		
0	1.0	66	40
250	3.1	65	2
500	3.5	64	0
1000	3.2	64	2
	Candidium		
0	1.9	65	6
250	3.1	64	0
500	2.9	63	4
1000	3.2	62	2

[z] Means represent plant averaged with soaking-time trts of 4, 8, 16, 32, and 64 hrs.
[y] Mean of plants flowering by 120 days.
[x] F tests at the 5% level were used to verify the observations that A) the mean at zero concn GA_3 differs from the other means and B) no differences exist among the means for 250, 500, or 1000 mg/liter GA_3.

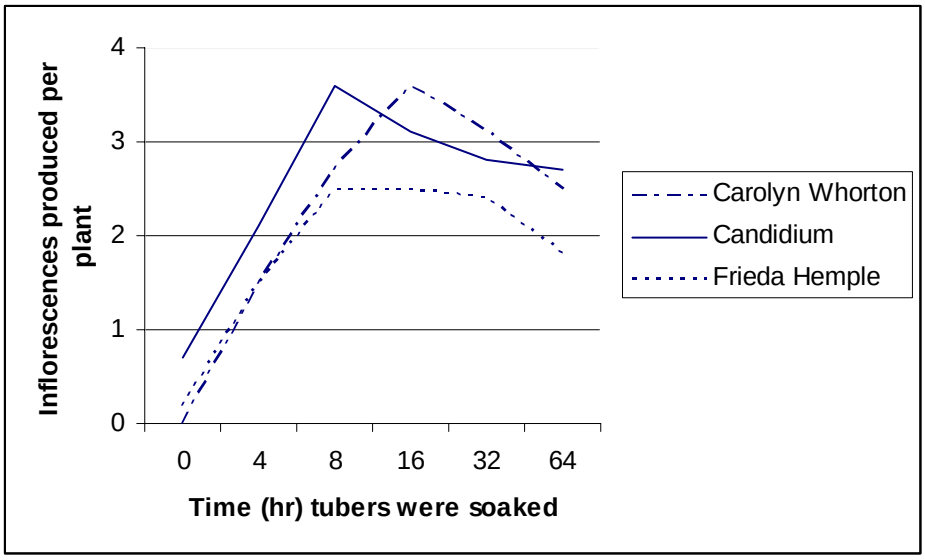

Fig. 1. Influence of soaking time on number of inflorescences produced per plant with three caladium cultivars. Plotted means represent the average of 40 plants soaked in 0, 250, and 1000 ppm GA_3.