

Progress Report

# New Tropical Ginger Cut Flowers

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The objective of this research is to manipulate the flowering of two tropical ginger species in order to produce inflorescences out of their normal season of bloom. This is the third report since the award was granted in summer 2007.

### Objectives:

The objectives of the first year of work were to acquire and root the propagules, initiate photoperiod treatments, and evaluate the growth and flowering behavior of two tropical ginger species, *Etilingera corneri* and *Zingiber spectabile*. In the second year, we are attempting to manipulate flowering based on photoperiod treatments initiated during the first year.

### Progress:

Single rhizome pieces of both species that developed shoots were potted up in January 2008. It was unknown whether floral initiation would begin during this period as the plants were still acquiring a leafy canopy to support floral shoot production. Fifteen pots of each ginger were placed under 16 hour long days (400 W HPS lamps extended day length to 11:00 pm) in a greenhouse upon potting while another 15 of each were placed in a saranhouse under natural day conditions (day length ranged from 11 hours at planting to 13.5 hours on June 21). On April 20, 2008, 5 plants from both sets were subjected to 9 weeks of short days (9 hr) under a black plastic tent, while another 5 plants were transferred between long days and natural day conditions at the same time. All plants were provided natural long day conditions from June 20, 2008. On August 18, 2008, four plants of each species representing natural day length (2 plants each) or previous short day lengths (2 plants each) were placed on wheeled carts and moved into darkened reefers (night temperature 80 F) to provide 15 hour long nights (9 hr short days) for a period of 8 weeks (ending October 17 when natural day lengths were less than 12 hr). Long days were imposed on all plants in this group via 400 W HPS lamps using a 4-hour night interruption from 10 pm to 2 am beginning November 1, 2008. Figure 1 is a representation of this complicated shifting of plants.

The University of Hawaii began renovating their saranhouse and glasshouse facilities during summer 2008, necessitating the relocation of two-thirds of the plant materials. During this move on October 2, 2008, the group of plants that had been given long day conditions were stressed by a combination of high sunlight conditions and a misdirected irrigation system, and the *Etilingera corneri* plants lost most of their leaves and some shoots, rendering them unusable for the rest of the year. While they are now recovering, they are unlikely to contribute useful data. The equivalent *Zingiber* plants fared better, but acceptance of the renovated facilities has delayed our capacity to provide lights to this group of plants. The third group of plants has remained under 30% saran shade and natural day length conditions ranging from the natural long days of

summer (maximum of 13.8 hr) through natural winter short days (minimum of 10.8 hr).

### *Zingiber spectabile*

As of the end of June, one plant under the continuous natural day, saranhouse conditions had begun to elongate 4 floral spikes, eventually producing 5 inflorescences in about 30-35 days from emergence (See box marked with + in Figure 1), but no floral spikes were evident on any of the other 29 plants. By way of comparison, *Zingiber spectabile* plants at the Lyon Arboretum were just beginning to elongate floral spikes in mid-June and were in full flower in August and September.

The plants that had been provided natural short days from planting followed by 9 weeks of short days from April 20 to June 21, followed by natural long days began to push inflorescence stalks in late August and early September, reaching their maximum lengths of about 20-21 inches about 4 weeks later in early October (See blocks marked with \* in Figure 1). Three of four plants subjected to SD August 18 – October 17 were among the plants that flowered. One of four plants given LD from planting to April 20, followed by SD from April 20 to June 21 and natural day lengths thereafter produced flowers.

### *Etilingera corneri*

No floral stalks have emerged on any plants from any combination of photoperiod treatments

### **Discussion:**

We do not know whether the *Etilingera* gingers respond to short day lengths to initiate flowers or whether the onset of long days is the trigger since there has been no flowering yet. Evaluation of responses to the different photoperiod sequences this fall and winter may shed more light on their response.

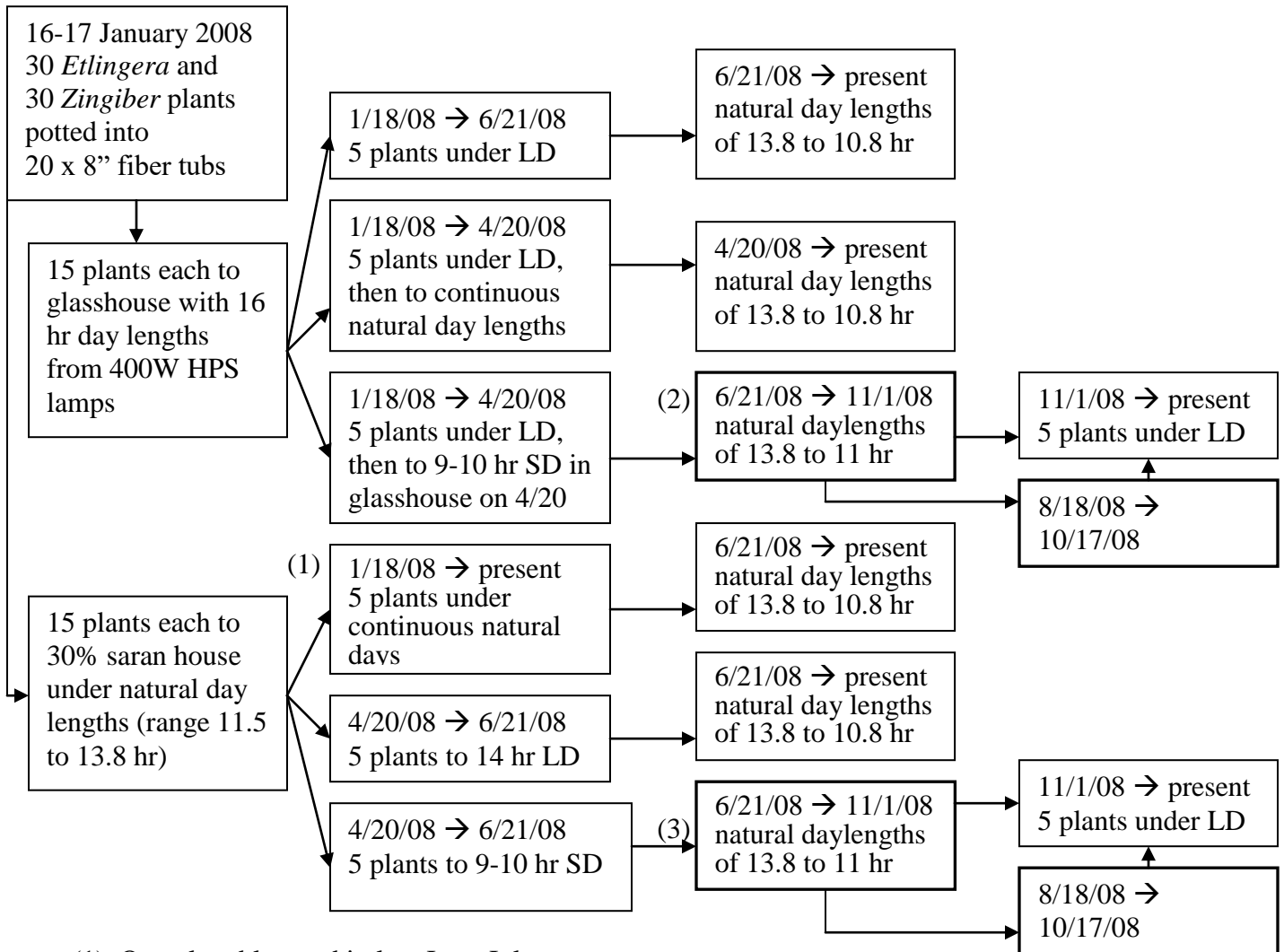
*Zingiber spectabile* does not flower during the short days of winter and begins to show inflorescence spikes around the end of June in Hawaii, about 13 weeks after natural short days would be considered to have ended.

The single *Z. spectabile* plant that showed floral spike development for us last summer was under natural day length conditions and was at about the same stage of development as the plants in the ground at the Lyon Arboretum. It is puzzling, however, that the other 4 plants given identical conditions did not show floral spike development. The marked flowering response that followed SD lasting until the start of summer followed by natural LD conditions suggests that the LD triggered flowering. The LD begun in November 2008 have not been going long enough at the time of this report to provide additional support for this tentative conclusion. It would be expected that 8 plants given SD from mid-August to mid-October and natural SD (a total of 10 weeks of SD) until LD were initiated November 1st might respond with early out-of-season flowering but at 8 weeks of LD, no floral spikes were yet evident.

**The next 6 month's work:**

The evaluation of long days imposed during winter's short days on flowering will be compared to natural day flowering time. Inflorescences will be cut and evaluated for their keeping life and to determine whether benzyladenine can extend the useful keeping life. Inflorescences will be obtained from the Lyon Arboretum for this work.

Figure 1. Sequence of photoperiod treatments applied to *Etilingera corneri* and *Zingiber spectabile* plants. Blocks represent units of 5 plants each unless otherwise noted.



- (1) One plant bloomed in late June-July
- (2) One plant on SD cart bloomed in Sept.-Oct.
- (3) All 5 plants bloomed in Sept.-Oct.



Carts used to wheel plants into darkened chamber for short days.



*Z. spectabile* inflorescence is shorter than “in the wild” at the Lyon Arboretum. Bracts redden with age.



The cones of bracts for *Z. spectabile* can range up to 8-9 inches on established plants at the Lyon Arboretum.