THE EFFECTS OF DAY AND NIGHT TEMPERATURE ON ZONAL GERANIUM FLOWER AND PEDUNCLE DRY WEIGHT

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One determinant of `flower quality' is flower dry weight. In general, as flower dry weight increases flower quality increases. During experiments on zonal geranium cv 'Veronica' this past spring we grew plants under 25 different day/night temperature combinations under an 8 hour photoperiod. Plant culture was described in the last issue of the bulletin (Erwin, 1991).

Earlier results showed that flower number per inflorescence increased linearly as the average daily temperature which zonal-geraniums were grown under decreased. For instance, flower number per inflorescence increased from 13 to 50 as the average daily temperature plants were grown under decreased from 86 to 54°F (Erwin, 1991).

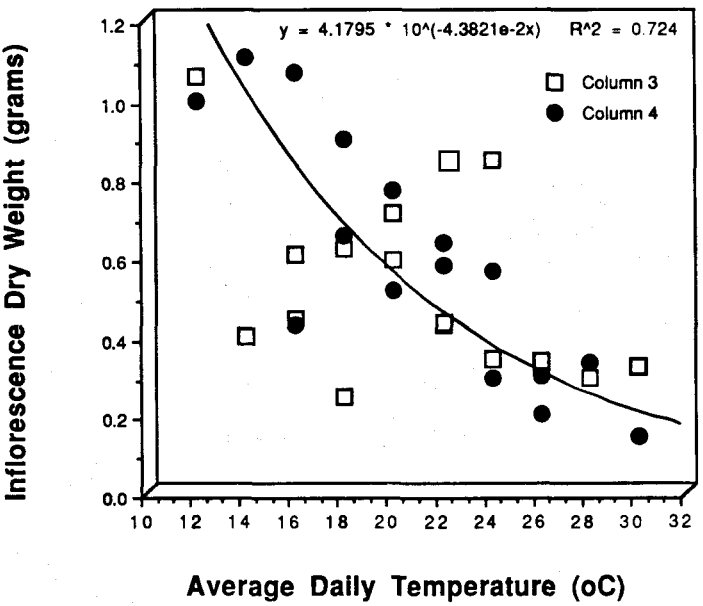

Figure 1. *The effect of average daily temperature on the inflorscence dry weight of zonal geranium cv `Veronica'.*

Table 1. *The effect of day temperature and night temperature on inflorescence, flower and peduncle dry weight of zonal geranium cv 'Veronica'.*

Night Temperature (°C)	Day Temperature (°C) 12	18	24	30
	Inflorescence Dry Weight (g)			
12	1.021	0.510	0.548	0.313
18	0.746	0.754	0.497	0.307
24	0.750	0.735	0.700	0.307
30	0.443	0.527	0.263	0.228
	Flower Dry Weight (g)			
12	0.020	0.017	0.016	0.014
18	0.019	0.019	0.022	0.020
24	0.024	0.017	0.028	0.033
30	0.014	0.015	0.013	0.018
	Peduncle Dry Weight (g)			
12	0.252	0.157	0.089	0.041
18	0.198	0.191	0.081	0.069
24	0.222	0.152	0.143	0.066
30	0.090	0.095	0.057	0.044

Inflorescence dry weight also increases as the average daily temperature plants are grown under decreases.

Data presented in Figure 1 shows that inflorescence dry weight also increases as the average daily temperature decreases when day and night temperatures are in between 54 and 86°F. For instance, inflorescence dry weight increased from 0.23 to 1.02 grams when plants were grown under a constant 86°F (30°C) and constant 54°F (12°C) environment, resectively (Table 1).

The increase in inflorescence dry weight was a result of an increase in flower number and not individual flower dry weight.

The increase in dry weight associated with the temperature reduction from 86 to 54°F translates into a 443% increase in inflorescence dry weight!

The increase in inflorescence dry weight was a result of an increase in flower number and not individual flower dry weight. (Figure 2, Table 1). Average daily temperature had no significant effect on individual flower dry weight within the temperature range studied.

Peduncle dry weight increased exponentially as temperature decreased from 86 to 54°F.

Peduncle dry weight increased exponentially as temperature decreased from 86 to 54°F (Figure 3, Table 1). Earlier research showed that peduncle length was a linear function of the difference between day and night temperature (day temp. minus night temp.) As the difference (DIF) between day and night temperature increased, peduncle length increased (Erwin, 1991). It is interesting that peduncle dry weight responded to average daily temperature and not to DIF. Although peduncle calibre was not measured directly, these data suggest that peduncle calibre must increase substantially at low average daily temperatures and DIF environments.

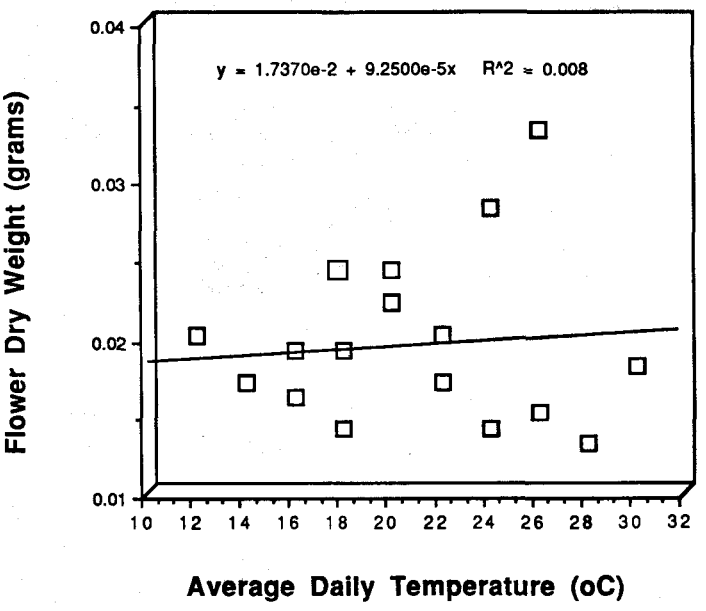

Figure 2. *Response of flower dry weight to average daily temperature on zonal geranium cv 'Veronica'.*

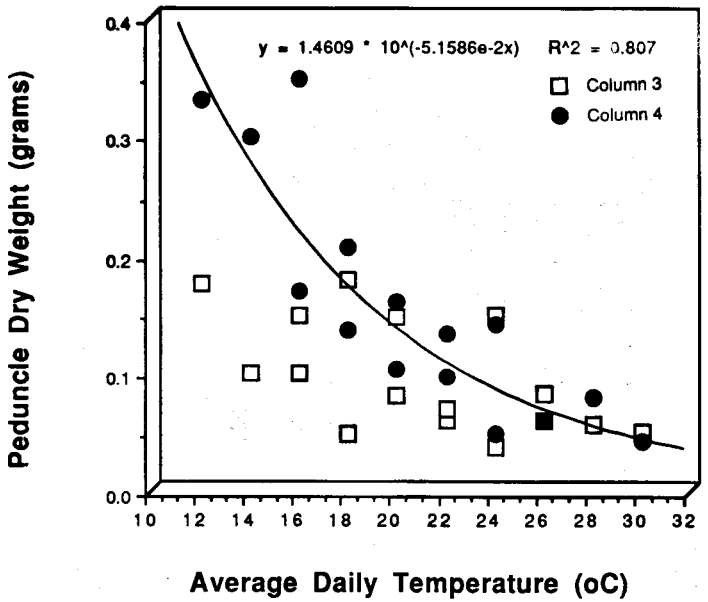

Figure 3. *The effect of average daily temperature on the peduncle dry weight on zonal geranium cv 'Veronica'.*

Our data suggest that flower quality increases as the average daily temperature which plants are grown under decreases to at least 54°F. Research by Pytlinski and Krug (1989) suggested plant quality was best when day temperatures were less than night temperatures. We feel that this is the case only when the average daily temperatures which the plants are grown under are also low.

The economics of utilizing this information will be grower dependent. Clearly, higher plant qualities are obtained when average daily temperatures are cool. However, the slowing of the development rate may limit application of cool growing temperatures to improve plant quality. These data do suggest that flower development in outdoor beds is probably limited by high average daily temperatures which reduce flower number per inflorescence, inflorescence dry weight and the overall plant appearance of the zonal geranium.

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Literature Cited

Erwin, J.E. 1991. The effect of day and night temperature on zonal geranium flower development. Minn. Flow. Growers Assoc. Bull., 40(2):16-19.

Pytlinski, J. and H. Krug. 1989. Modelling *Pelargonium zonale* response to various day and night temperatures. Acta Hort., 248:75-84.