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# Research

## Using plastic films to regulate perennial growth

by DR. SANDRA B. WILSON and DR. NIHAL C. RAJAPAKSE

Photoselective greenhouse polyethylene films are an alternative to chemical growth regulators. Previous research has shown that films dyed to absorb red wavelengths stimulate stem elongation, and films dyed to absorb far-red wavelengths reduce stem elongation.

At the University of Florida's Institute of Food and Agricultural Sciences Indian River Research & Education Center in Fort Pierce, we conducted a study to assess whether these films affected growth of the perennials golden shrimp plant (*Pachystachys lutea*); Persian-shield (*Strobilanthes dyerianus*); cat whiskers (*Orthosiphon stamineus*); Indigo Spires sage (*Salvia* × Indigo Spires); wine sage (*Salvia vanhoutteii*); zinnia (*Zinnia elegans*) cultivars 'Profusion Cherry', 'Old Mexico' and 'Isabellina'; and lisianthus (*Eustoma grandiflora*) cultivars 'Florida Blue', 'Florida Pink' and 'Florida Sky Blue' (Zone 9b; American Horticultural Society Heat Zone 9.) The films used in our study were manufactured by Mitsui Chemicals Inc. in Tokyo.

In 2000, we planted uniform plugs of each taxon into 1-gallon containers and placed pots into well-ventilated chambers covered with film, which absorbed either red or far-red light. Controls were covered with a clear polyethylene film. The chambers were left in a greenhouse for six weeks.

As we suspected, film that absorbed far-red light controlled plant elongation (see table, below). The most dramatic difference was observed with 'Isabellina'. This cultivar's controls grew an average 80.8 centimeters (cm) tall, while the ones grown under the film that absorbed far-red light grew an average of only 64.8 cm. Film that absorbed red light generally did not significantly stimulate elongation for most taxa, except for golden shrimp plant and 'Florida Pink'.

The number of days to first flower was comparable among all treatments. Leaf greenness was comparable for all taxa regardless of treatment. Plants grown under film that absorbed red light generally had greater leaf, stem and root dry weight than taxa under

film that absorbed far-red light. Average total leaf area was comparable for golden shrimp plant and for Persian-shield regardless of treatment, but cat whiskers grown under film that absorbed red light had a significantly greater average leaf area than those grown under film that absorbed far-red light.

Several plastic manufacturers produce film with spectral-distribution properties. How a plant responds to the film depends on individual species and cultivars.

Dr. Sandra B. Wilson is an assistant professor of environmental horticulture at University of Florida's Institute of Food and Agricultural Sciences Indian River Research & Education Center in Fort Pierce, and Dr. Nihal C. Rajapakse is a professor for the Department of Horticulture at Clemson University in Clemson, SC.

### Influence of polyethylene films on plant height and flowering

	Height (cm)			Days to first flower		
	Control film	Red-light absorbing film	Far-red absorbing film	Control film	Red-light absorbing film	Far-red absorbing film
Golden shrimp plant	30.1	32.8	27	38	38	38
Persian-shield	34.2	38.9	30.2	—	—	—
Cat whiskers	58.7	58.9	46.8	37	31	34
Indigo Spires sage	72.7	68.8	46.7	—	—	—
Wine sage	52	56.1	43	34	32	36
'Profusion Cherry' zinnia	19.6	18.7	15.2	36	34	35
'Old Mexico' zinnia	59.5	58.8	56.7	42	39	39
'Isabellina' zinnia	80.8	69.4	64.8	43	43	43
'Florida Blue' lisianthus	31.2	30.4	27.9	30	28	31
'Florida Pink' lisianthus	23.6	27.2	22.5	26	27	25
'Florida Sky Blue' lisianthus	26.7	28.1	23.4	30	30	32

