COOPERATIVE EXTENSION UNIVERSITY OF CALIFORNIA

FLOWER AND NURSERY REPORT

FOR COMMERCIAL GROWERS

HOW EFFECTIVE ARE FLUORESCENT LAMPS FOR A CHRYSANTHEMUM NIGHT BREAK?

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Some growers have modified their night lighting system for chrysanthemums from the usual incandescent lamps to fluorescent lamps. This change was prompted by a visit to a chrysanthemum grower in Ohio who has successfully used pink fluorescent lamps for over 20 years. Preliminary experiments conducted at University of California, Davis, using fluorescent lamps were not all conclusive owing to some equipment failures. However, in all these experiments, cool white fluorescent lamps were more effective than pink fluorescent lamps for preventing flower bud initiation in 'Albatross.' This cultivar was chosen because it was found to require the highest light intensity for bud inhibition among all cultivars grown in California.

LIGHTING STUDY

An experiment was set up at Pajaro Valley Greenhouses in Watsonville with unrooted chrysanthemum cuttings donated by Yoder Brothers of Salinas. On September 25, 1975, the cuttings were placed in a rooting medium based on 50 percent mushroom compost, 30 percent sawdust, and 20 percent sand, and were widely spaced to avoid shading the plants.

A single lamp was placed parallel to the rows of plants, 5 feet above the first row. The plants were illuminated on the top but from only one side to determine the effective distance of each light source. The lights were turned on each night from 10 p.m. to 2 a.m. from September 25 until October 30. A control group was not lighted.

The flower buds formed were examined on November 20, three weeks after the lights were turned off, using the control plants as a standard for maximum development. The location on the bench (the distance from the light source) where the plants had flower buds the same size as the short-day controls was considered the maximum horizontal distance for effective inhibition of flowering (see table).

For 'Albatross,' the maximum effective distance was 49 inches with both cool white and pink fluorescent but 0 inches with the Gro-Lux®. Buds on 'Albatross' directly under the Gro-Lux® (5 feet above the plants) were as far advanced as those on short-day control plants. 'Rivalry' was also budded directly under the Gro-Lux®, but the effective distance for either cool white or pink lamps was 69 inches.

'Dignity,' requiring the least light for flower inhibition, had the greatest effective distances. In this case, the 40-watt incandescent lamp was not as effective as either the 40-watt pink or cool white fluorescent lamps. Of course, the most effective source was the 100-watt incandescent lamps, but the input wattage was also 2½ times as great as that for the others used.

CONCLUSION

Based on the cultivars tested, one would have to conclude that the 40-watt cool white and pink lamps are more effective than the 40-watt incandescent lamp. In two cases—'Dignity' and 'May Shoesmith'—the cool white was more effective than the pink lamps. However, the results were *not* sufficiently different to warrant recommending the removal of incandescent lamps and replacing them with fluorescent lamps.

As a result of this experiment and others at Davis (not reported here), we advise that growers delay changing their lighting system from incandescent to new fluorescent sources until current research with incandescent lamps is completed. We

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believe that then we can present the computations required to make comparisons between energy savings and capital outlay for new fluorescent installations.

Clearly, however, Gro-Lux® lamps offer no advantage over cool white lamps, and Gro-Lux® were the most costly lamps tested in this experiment. If a grower already has a fluorescent lamp installation, cool white lamps would be the best to use because of the effective distance, and because they are among the least costly lamps available.

We are continuing to conduct experiments on 'Albatross,' but we are concentrating on incandescent lamps, because we believe that the incandescent lamp wattage can be reduced to conserve energy and still be effective. Certainly, using incandescent lamps with cyclical lighting would save more input energy than using 40-watt fluorescent lamps continuously for a 4-hour period each night. This does not take into consideration the added capital outlay for installation of a fluorescent light system.

MAXIMUM EFFECTIVE DISTANCE OF LAMPS FOR INHIBITING FLOWER BUD INITIATION OF FIVE CHRYSANTHEMUM CULTIVARS*

Night break treatment (wattage and lamp)	Chrysanthemum cultivar				
	Albatross	Dignity	May Shoesmith	Good News	Rivalry
	inches (measured horizontally)				
100 W incandescent	69	123	109	75	63
40 W incandescent	23	49	63	43	35
40 W Gro-Lux®	0	55	49	43	0
40 W pink	49	89	75	55	69
40 W cool white	49	115	89	55	69

* A single lamp without a reflector was placed 5 feet above the first row of plants to inhibit flower bud formation. Flower bud size under each lamp was compared with the short-day control 21 days after termination of the night break treatment.

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