

The Effects of Night Temperatures on Rose Production

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Night temperatures ranging from 70 to 60°F and a CO₂ level of 1500 ppm. produced a large variability in the yield and quality of 'Forever Yours' and 'Love Affair' roses. The highest yields occurred between 63 and 67°F with a decrease in yield above and below those temperatures. The quality of both varieties was good at all temperatures except 60°F where the weight of 'Forever Yours' was above an acceptable level.

Methods

The rose varieties, 'Forever Yours' and 'Love Affair', with 'Cara Mia' as a buffer, were grown in four individual houses controlled at night temperatures of 60, 63, 67 and 70°F. Each house contained 24 plants of each variety. Since the purpose was to determine the best night temperature, the same level of CO₂, 1500 ppm, was injected into each of the houses. All houses were heated during the day to 70°F and were allowed to rise under solar heating to 78°F, at which point

¹Graduate Assistant, work supported by CFGA Rose Committee.

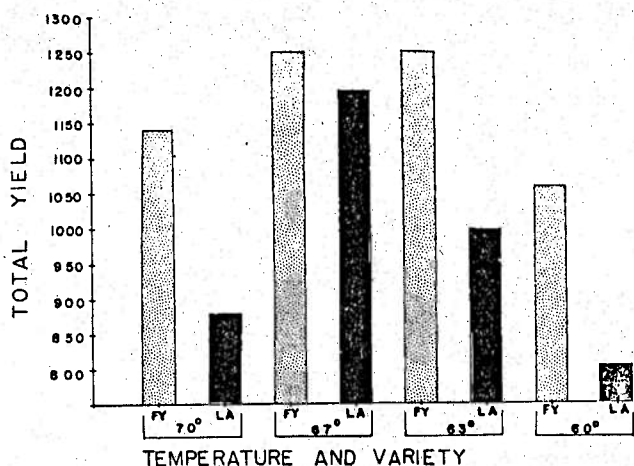


Fig. 1. Total Yield, from October 28, 1973 to June 1, 1974, of 'Forever Yours' (FY) and 'Love Affair' (LA) roses subjected to different night temperatures, 24 plants per treatment.

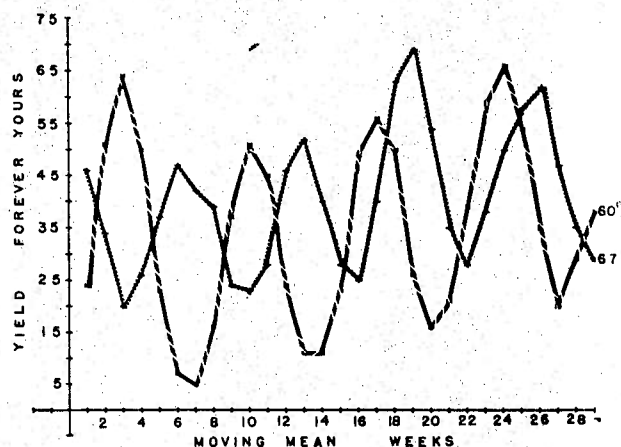


Fig. 2. Comparison of smoothed weekly production of 'Forever Yours' roses subjected to 60°F and 67°F night temperatures.

first-stage cooling started. From October 28, 1973, to June 1, 1974, the roses were cut and measured daily with records taken for the length and weight of each flower cut. (See CFGA Buls. 270 and 279 for additional experimental conditions and for other research previously reported.)

Results

Fig. 1 shows that total yields were affected by the night temperatures. The highest yields were at 63°F and 67°F, and the temperature extremes, 60 and 70°F, reduced the total yields. 'Forever Yours' outproduced 'Love Affair' at all four temperatures. But the least difference between 'Forever Yours' and 'Love Affair' occurred at 67°F.

A comparison of the weekly yields at 60 vs. 67°F is depicted in Fig. 2 by a plot showing production as a weekly moving mean. The 67°F treatment showed higher peak production than 60°F. The 60°F treatment had lower off-crop production, resulting in lower total production and increased time required for return to peak production. The treatments also showed a trend toward increased yield as the experimental period approached the spring and summer. It was noted that cooling fan time was so small, from October to the end of May, that the greenhouses could be considered as closed systems operated continuously at 1500 ppm during the daylight hours.

Stem length and weight were considered with yield in determining the effects of night temperature. Fig. 3 provides an indication of the differences in weight and length for the varieties at the different temperatures. Increased production tended to reduce the mean stem weight, but lower temperatures increased the stem weight. 'Forever Yours' had significantly heavier stems than 'Love Affair' at all temperatures (Fig. 3).

There was a slight difference between the lengths of 'Forever Yours' and 'Love Affair', 'Forever Yours' being longer at all temperatures.

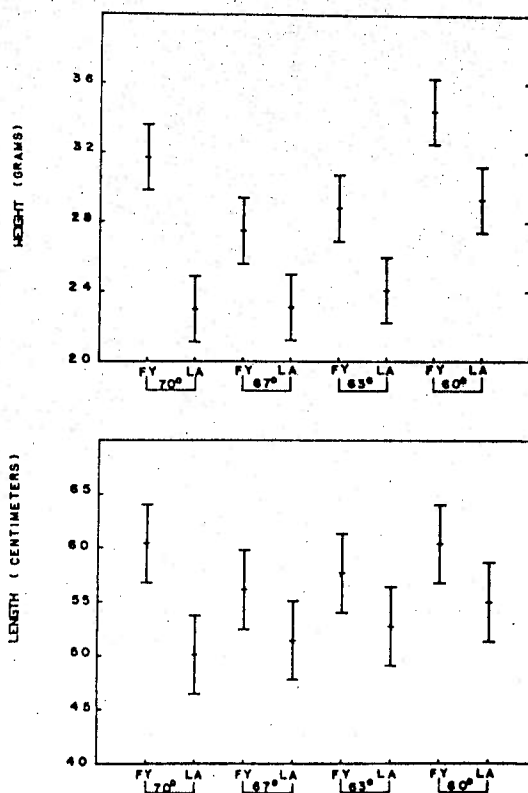


Fig. 3. Effects of night temperatures on the mean weight (upper) and length (lower) of 'Forever Yours' and 'Love Affair' roses. Vertical bars through each point are limits for a 95% confidence interval. That is, where the bars for two points being compared do not overlap, there is a 95% probability that the differences are real.