Table 1. Bomb Pressure Readings of Cotton Leaves for Three Irrigation Treatments

Irrigation Treatment	Irrigation Date*		Estimated Bomb Pressures 50% AWU	65% AWU	80% AWU
				(bars)	
3.5" at 50% AWU	6/28		18.3		
(Stem growth 67.9mm^2)	7/9		21.0		
(Yield 19.5 lb/plot)*	7/21		22.8		
	8/16		19.0		
5" at 65% AWU	6/24		21.6	21.9	
(Stem growth 68.8mm^2)	7/12		18.7	22.6	
(Yield 18.9 lb/plot)*	7/29		19.7	23.3	
	8/19		19.0	22.2	
6" at 80% AWU	7/6		19.5	21.8	22
(Stem growth 63.6mm^2)	7/30		20.0	21.2	24
(Yield 15.3 lb/plot)*		$\bar{x}$	20.0	22.2	23

*The available-water-used percentages, irrigation dates, and yield data were furnished by Loyd Patterson from an Iowa State Irrigation Plan at the Phoenix Farm under the direction of D.R. Buxton, R.E. Briggs, and B.B. Taylor at the University of Arizona, Tucson.

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EFFECTS OF SPACING AND HUMIDITY ON FRUITING AND SHEDDING

Gene Guinn

Close spacing tends to decrease relative fruitfulness, i.e., fruiting is limited more than vegetative growth. One possibility is that roots play a role in fruiting and that close spacing limits root development because the lower leaves, which supply photosynthate to roots, are heavily shaded. We also thought that humidity might affect the size of root systems. Therefore, a test was conducted in growth chambers to determine the effects of spacing and humidity on vegetative growth, fruiting, and shedding. One growth chamber was operated at low (30 to 50%) and the other at high (75 to 85%) relative humidity. Two spacings were used, four plants/square foot (close) and one plant per square foot (wide). The DPL 16 plants were cultured in nutrient solutions. Plants were harvested soon after the first blooms appeared.

Close spacing greatly decreased the number of fruiting positions formed and greatly increased shedding (Table 1). In general, plants in the high humidity chamber produced fewer fruiting positions and shed more than those in the low humidity chamber. However, neither humidity nor spacing had a consistent effect on the leaf to root ratio. It, therefore, appears unlikely that the beneficial effects of wide spacing and low humidity were mediated through relatively greater root development.

Table 1. Influence of spacing and humidity on fruiting and shedding.*

	Close spaced		Wide spaced	
	Interior	Border	Interior	Border
		Low humidity		
Squares	4.00	9.00	36.7	44.3
Blooms	0	0.42	1.67	2.33
Bolls	0	0	0.33	1.67
Sheds	8.00	6.92	6.00	1.33
Total fruiting positions	12.00	16.33	44.7	49.7
Percent shed	66.7%	42.3%	13.4%	2.7%
		High humidity		
Squares	2.83	10.42	23.33	35.67
Blooms	0	0.25	0.67	1.67
Bolls	0	0	0.33	0
Sheds	7.92	7.33	13.33	5.00
Total fruiting positions	10.75	18.00	37.67	42.33
Percent shed	73.6%	40.7%	35.4%	11.8%

*Data are averages of 12 plants for close-spaced and 3 plants for wide-spaced plants.

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EFFECTS OF SUPPLEMENTAL LIGHTING ON FRUITING OF CLOSE-SPACED PLANTS

Gene Guinn

One possible reason for relatively poor fruiting of close-spaced plants is that self-shading decreases photosynthesis and, thus, limits the amount of sugars and other substances necessary for fruiting. A greenhouse test was conducted to determine the effects of supplemental lighting.

Hopicala plants were cultured in nutrient solutions at a density of four plants/sq. ft. Two 40-watt fluorescent lamps were suspended in the middle of the plant canopy of one group of plants. The lights were switched off at night. Plants were harvested shortly after they started blooming.

Supplemental lighting improved fruiting performance slightly (Table 2). The differences were not great, but neighter was the amount of added light.

Table 2. Fresh weights and fruiting characteristics of close-spaced plants with and without supplemental light in the middle of the plant canopy.*

	Control	Light
Number of shed positions	13.2	11.5
Squares	8.6	8.9
Bolls	0.46	0.96
Boll weight	0.84 g	5.76 g
Wt. of stems plus leaves	207 g	210 g

*The data are per plant averages for 24 interior plants in each treatment.