

Effects of Experimental Growth Regulators on Seed  
Germination at Low Temperature

J. M. Nelson and G. C. Sharples

Stands of cotton can be greatly reduced when temperatures under 20°C occur at planting time. One method of promoting cottonseed germination at low temperatures that has shown promise is to treat seed with growth regulators. Our work has involved testing many different growth regulating or suspected growth regulating chemicals to determine their effectiveness in overcoming low and high temperature stress during seed germination. In tests with cucumbers and tomatoes, several experimental chemicals have increased the rate and percentage of germination at low temperatures. The chemicals showing activity at low temperatures were tested on seeds of several other warm season crops, including cotton, that are planted when soil temperatures may be cool.

In the cotton tests, seeds of two varieties were treated with nine experimental growth regulating chemicals provided by Velsicol Chemical Corporation. Chemicals were applied to the seed at a rate of 200 ppm by weight using methanol as the carrier. Four of the chemicals were tested at rates of 20, 200 and 2000 ppm by weight to determine if there was a concentration effect. All germination tests were conducted in incubators at 10°C (50°F). Results of the tests are shown in Tables 1 and 2. None of the chemicals tested increased the rate or percentage of cottonseed germination at 10°C.

Table 1. Effect of Experimental Growth Regulators  
on Germination of PS-5 and DPL-61 Seed at 10°C

Treatment <sup>1/</sup>	Pima S-5			DPL-61		
	10	16	23	10	16	20
	% Germination					
Control	12 cd <sup>2/</sup>	46 c	52 ef	23 cde	32 bc	46 f
Methanol Control	13 d	38 c	42 d	26 de	43 e	44 ef
LCS 983	5 ab	13 a	21 a	17 bc	34 bcd	40 cdef
LCS 978	3 a	18 ab	26 ab	21 cd	32 bc	36 bcde
LCS 988	5 abc	14 a	30 b	11 ab	26 ab	30 abc
LCS 981	4 a	16 ab	31 bc	12 ab	28 abc	31 abcd
LCS 980	5 ab	25 b	39 cd	9 a	21 a	24 a
VCS 684	6 abc	22 ab	40 d	11 ab	28 ab	30 ab
KCS 21619	17 d	43 c	57 f	22 cde	37 cde	40 ef
PCS 1375	15 d	38 c	47 de	18 bc	33 bcd	34 bcde
KCS 21623	11 bcd	40 c	43 d	29 e	41 de	42 ef

<sup>1/</sup> Treatments were replicated 4 times. Chemicals were applied 200 ppm to seed weight. Chemicals were dissolved in methanol and then applied to dry seed. After treatment with chemicals, seeds were air dried. Growth regulators are coded Velsicol experimental chemicals.

<sup>2/</sup> Means in columns followed by the same letter are not significantly different at the 5% level according to Duncan's Multiple Range Test.

Table 2. Effect of Growth Regulator Concentration on Germination of DPL-61 Seed at 10°C

Growth Regulator <sup>1/</sup>	Concentration	Days		
		8	11	17
		% Germination		
Control		14 d <sup>2/</sup>	23 cd	43 ef
Methanol Control		22 e	29 d	45 f
KCS 21619	20	6 abc	15 abc	23 bc
KCS 21619	200	2 a	9 a	16 ab
KCS 21619	2000	5 ab	8 a	19 ab
KCS 21623	20	5 ab	8 a	13 a
KCS 21623	200	5 ab	11 a	22 abc
KCS 21623	2000	8 abcd	21 bcd	29 cd
PCS 1375	20	12 cd	22 cd	28 cd
PCS 1375	200	10 bcd	16 abc	23 bc
PCS 1375	2000	6 abc	13 ab	23 bc
LCS 983	20	4 ab	16 abc	31 cd
LCS 983	200	10 bcd	16 abc	35 de
LCS 983	2000	14 d	26 d	36 de

<sup>1/</sup>Treatments were replicated 4 times. Chemicals were applied at 20, 200 and 2000 ppm to seed weight. Chemicals were dissolved in methanol and then applied to dry seed. After treatment with chemicals, seeds were air dried. Growth regulators are coded Velsicol experimental chemicals.

<sup>2/</sup>Means in columns followed by the same letter are not significantly different at the 5% level according to Duncan's Multiple Range test.