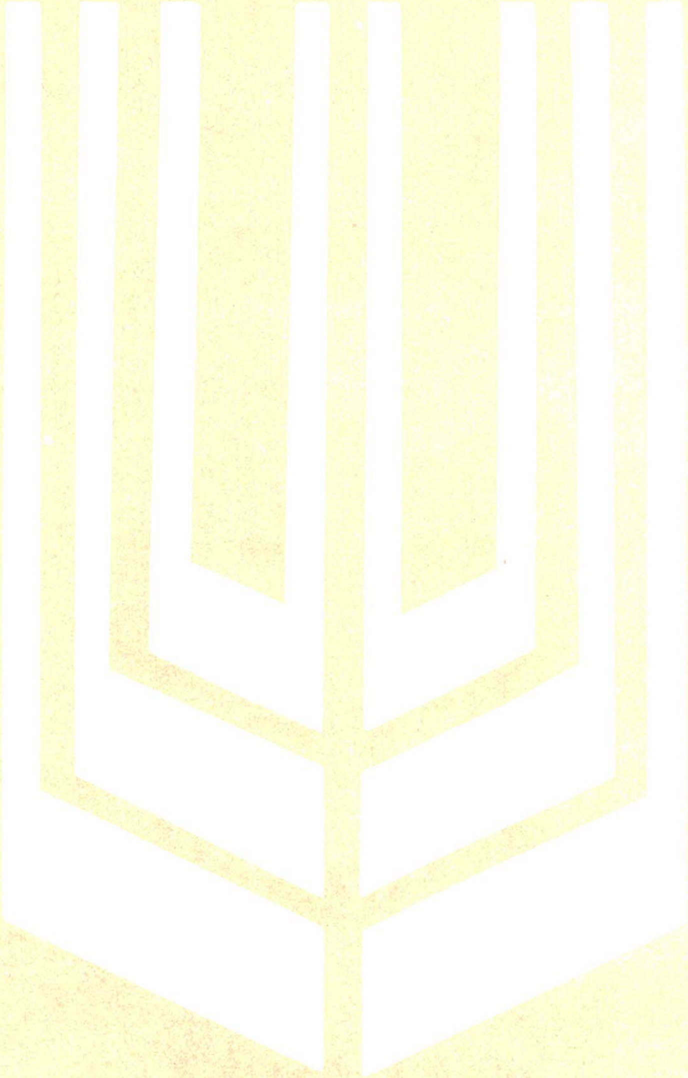
M. Feldman



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EFFECTS OF KINETIN ON VERNALIZATION AND SEEDLING HEIGHT IN WINTER WHEAT*

H. C. Sharma and B. S. Gill

ABSTRACT

Kinetin shortened the vernalization requirement of winter wheat cultivar Newton. The effect was operative after 20 days of cold treatment. Vernalization for 30 days with 50 ppm kinetin gave a higher rate of heading than did 40-day vernalization alone. However, kinetin retarded initial seedling growth.

Index words: *Triticum aestivum,* kinetin, cold treatment, vernalization, heading, height.

INTRODUCTION

The requirement of winter wheats for about six weeks of vernalization before they can flower hinders both genetic and breeding research. Several workers have tested various chemicals to shorten the vernalization period (see Barabás and Csepely, 1978). Kinetin was found effective in shortening vernalization of cultivar Sava (Barabás and Csepely, 1978; Csepely and Barabás, 1979). This communication reports the effect of kinetin on vernalization and seedling height of Newton winter wheat.

MATERIALS AND METHODS

The experiment began May 20, 1980. Seeds of *Triticum aestivum* L. cv. 'Newton' were pregerminated 24 hours on moist filter papers in petri dishes, then placed in a refrigerated chamber at 2 C for 0, 15, 20, 25, 30, 35 and 40 days. Twenty ml of 0, 5, 25, 50, 100 and 200 ppm kinetin in distilled water were used at each vernalization period. Two petri dishes, each containing 20 seeds, were used at each concentration of kinetin and at each vernalization period. Seedlings were later planted in a greenhouse with long day illumination under 26 C by day and 15 C at night. After planting in the greenhouse, seedling height at days 4 and 17 and number of leaves at day 4 were recorded. Heading was determined on the 80th day and headed plants were scored as vernalized.

RESULTS AND DISCUSSION

Our results confirm the findings of Barabás and Csepely (1978) and Csepely and Barabás (1979) that kinetin shortens the vernalization period of winter wheat. Rate of heading with 50 ppm kinetin + 30 day cold treatment was 11.7% higher than with 40 days cold treatment only (Table 1).

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*Contribution No. 81-140-j, Department of Plant Pathology, Kansas Agricultural Experiment Station, Manhattan 66506.

Table 1. Heading percentages, seedling heights and proportions of 4-day-old seedlings with second leaf at indicated levels of kinetin and cold treatment.

Vernalization (days)	Kinetin (ppm)	Heading (%)	Seedling height (cm)		Seedlings with second leaf at day 4 (%)
			Day 4	Day 17	
0	0	0.0	7.7	28.8	100
	5	0.0	5.9	24.8	55
	25	0.0	5.2	22.3	45
	50	0.0	5.2	22.5	30
	100	0.0	4.9	22.0	20
	200	0.0	4.8	23.2	20
15	0	0.0	7.7	28.0	100
	5	0.0	6.2	25.7	85
	25	0.0	4.5	22.3	10
	50	0.0	4.6	22.7	5
	100	0.0	4.5	19.8	5
	200	0.0	4.6	22.3	5
20	0	0.0	7.3	28.0	100
	5	0.0	6.3	24.8	95
	25	5.3	5.5	19.3	35
	50	15.0	5.1	20.0	10
	100	5.0	5.2	20.2	10
	200	0.0	4.7	16.2	25
25	0	0.0	7.5	19.3	100
	5	10.0	5.2	18.3	100
	25	10.0	3.9	17.5	60
	50	15.5	4.6	16.8	25
	100	15.0	4.5	16.2	35
	200	45.0	4.4	15.5	10
30	0	0.0	5.8	22.5	100
	5	10.0	3.8	19.5	35
	25	35.0	3.4	17.5	0
	50	66.7	3.6	16.5	0
	100	35.3	3.3	20.0	5
	200	29.4	3.3	17.5	0
35	0	40.0	7.5	28.2	100
	5	80.0	5.8	26.5	95
	25	90.0	5.0	22.5	30
	50	100.0	4.8	21.3	15
	100	94.7	4.7	20.0	20
	200	84.2	4.5	21.0	10
40	0	55.0	6.2	26.2	95
	5	90.0	4.7	24.5	45
	25	82.4	4.4	19.8	20
	50	72.2	4.7	22.8	15
	100	94.4	4.4	19.5	10
	200	88.9	4.5	19.0	5

Vernalization without kinetin was effective after 35 days; with kinetin, after 20 days. Responses were much higher with than without kinetin. We consider a cold treatment of 30 days with 50 ppm kinetin optimum. Since no vernalization occurred at any level of kinetin without cold treatment, kinetin does not replace cold treatment. Some minimum cold treatment is necessary before kinetin can be effective.

Kinetin reduced seedling height and growth with reduction in height as a function of kinetin concentration (Table 1). Of 280 seedlings treated with distilled water (0 ppm kinetin), 99.3% had two leaves at day 4. In contrast, only 28.3% of 1400 seedlings treated with kinetin had two leaves at day 4; the rest had only one. The proportion of seedlings with two leaves decreased as kinetin concentration increased.

REFERENCES

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