

THE INFLUENCE OF CHLORMEQUAT ON GROWTH OF RAYA (*BRASSICA JUNCEA* L.)

M. Y. ASHRAF*, N. A. BAIG AND S. M. ALAM*

*Department of Botany,
University of Agriculture, Faisalabad, Pakistan.*

Abstract

Brassica juncea seeds soaked in 1000 ppm chlormequat solution for 6 h increased seed germination, number of branches, flowers, pods and yield, while pod length, pod diameter, seed per pod, seed weight and oil contents were nonsignificant. Number of plants lodged also significantly decreased where chlormequat was used.

Introduction

The growth retardant (2-chloroethyl) trimethylammonium chloride (chlormequat) has an inhibitory effect on plant growth (Farah, 1969; Skene, 1969). The reduction in growth is attributed to the inhibition of biosynthesis of gibberellins (Bode & Wile, 1984). Besides retardation of stem growth and leaf expansion (Farah, 1969; Nieden & Neumann, 1978) chlormequat shows a remarkable influence on numerous processes in cell metabolism (Graser, 1977). The present paper describes the effect of chlormequat on seed germination, growth and yield of *Brassica juncea* cvs. Poorbiryarya and Raya L-18.

Materials and Methods

Seeds of *Brassica juncea* cvs. Poorbiryarya and Raya L-18 soaked in distilled water and in 1000 ppm chlormequat solution for 6 h were sown in field. Seeds 40 g of each variety were sown in 3.5 x 2.5 m. plots, 10 rows in each with 6 replication in a split plot design. All cultural practices were maintained during growth. Observations based on 10 plant per plot were recorded on number of branches, flowers, pod and yield per plant. Fifty pods from each plot were selected randomly for pod length, diameter, number and weight of 1000 seeds, oil content was also determined. The number of plants lodged per plot were counted.

Results and Discussion

Chlormequat treatment increased the germination of seeds from 71.3 to 84.9% (Table 1). Number of branches, flower, pods and yield also significantly increased in

*Atomic Energy Agricultural Research Centre, Tando Jam.

Table 1. Effect of chlormequat on growth parameters of *Brassica juncea* L.

Treatment chlormequat	Varieties		Treatment Mean
	Poorbiraya	Raya L-18	
Germination (%)			
Control	71.0	71.7	71.3 b
1000 ppm	84.5	85.3	84.9 a
Variety Mean	77.6 b	78.5 a	
No. of branches/plant			
Control	6.8	7.0	6.9 b
1000 ppm	10.0	10.3	10.2 a
Variety Mean	8.4 a	8.7 a	
No. of flower/plant on main branch			
Control	39.7	40.7	40.2 b
1000 ppm	49.3	51.3	50.3 a
Variety Mean	44.5 b	40.0 a	
No. of pod/plant			
Control	419.7	421.8	420.8 b
1000 ppm	539.3	545.2	542.3 a
Variety Mean	479.5 b	483.5 a	
Pod length (cm)			
Control	5.6	5.8	5.7 a
1000 ppm	5.8	5.9	5.9 a
Variety Mean	5.7 a	5.9 a	
Pod diameter (cm)			
Control	0.54	0.56	0.55 a
1000 ppm	0.55	0.56	0.56 a
Variety Mean	0.55 a	0.56 a	

(Contd. Table 1)

Treatment chlormequat	Varieties		Treatment Mean
	Poorbiraya	Raya L-18	
No. of seed per pod			
Control	15.67	15.67	15.67 a
1000 ppm	16.0	15.83	15.92 a
Variety Mean	15.83 a	15.75 a	
1000 seed weight (g)			
Control	3.23	3.55	3.39 a
1000 ppm	3.24	3.53	3.38 a
Variety Mean	3.23 a	3.54 a	
Yield per plant (g)			
Control	20.15	20.65	20.40 b
1000 ppm	26.53	27.18	20.90 a
Variety Mean	23.34 b	23.92 a	
Oil content (%)			
Control	34.0	34.5	34.3 a
1000 ppm	34.2	34.8	34.5 a
Variety Mean	34.1 a	34.7 a	
No. of plants lodged/plot			
Control	38.5	39.17	38.83 a
1000 ppm	10.33	10.50	10.42 b
Variety Mean	24.42 a	24.83 a	

Any two means sharing same letters are nonsignificant at five percent level.

cv. Raya L-18 than Poorbiraya. The results indicate that chlormequat inhibited the effect of auxin in apical part of the plant, thus decreasing the apical dominance and stimulating the nodes and lateral branches (Bode & Wild, 1984). Chlormequat is reported to stimulate germination and flowering of geranium (Armitage, 1986).

Application of chlormequat did not effect pod length, diameter, number of seed per pod, seed weight and oil content. *B. juncea* cv. Raya L-18 showed greater yield than poorbiraya. In wheat chlormequat did not affect ear length, number of grain per ear and seed weight but it increased number of tiller per plant and prevented lodging (Farah, 1969). In the present study also chlormequat decreased lodging in *B. juncea* presumably due to reduction in plant height and increase in base diameter of the plants (Fraggatt *et. al.*, 1982, Farah, 1969, Bode & Wild, 1984).

References

- Armitage, M. A. 1986. Chlormequat induced early flowering of hybrid geranium. The influence of gibberellic acid. *Hort. Sci.*, 21: 116-118.
- Bode, J. and A. Wild. 1984. The influence of CCC on growth and photosynthetic metabolism of young wheat plants. *J. Plant Physiol.*, 116: 435-446.
- Farah, S. M. 1969. Effects of chlorocholin chloride and water regime on growth, yield and water use of spring wheat. *J. Exp. Bot.*, 20: 658-663.
- Fraggatt, P. J., W. D. Tomas and J. J. Batch. 1982. The value of lodging control in winter wheat as exemplified by the growth regulators. *Mono. Brit. Plant Growth Regulator Group* Np. 7: 71-81.
- Graser, H. 1977. *Biochemie and Physiologie der phytoeffektoren*. Verlag Chemie. Weinheim. New York.
- Nieden, U. and D. Naumann. 1978. Effects of CCC on chlorophyll content and ultrastructure of the plastids of *Pisum sativum*. *Biochem. Physiol. Pflanzen.*, 173:202-212.
- Skene, K. G. M. 1970. The relationship between the effects of CCC on root growth and cytokinin levels in the bleeding sap of *Vitis vinifera* L. *J. Exp. Bot.*, 21: 418-431.

(Received for publication 28 April 1986)