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THE GROWTH PROMOTING EFFECT OF DAMINOZIDE (B₉) ON CASTOR

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Introduction

Daminozide, known commercially as Alar or SADH (Succinic acid-2, 2-dimethyl hydrozide), was introduced as a plant growth regulator.¹⁰ Daminozide is not an analogue of any known naturally occurring substance, but it shows competitive interaction with naturally occurring growth substances.⁶ The chemical is stable in aqueous solution, and originally it was developed to reduce the vegetative growth of flower crops.⁹ The present paper deals with the effect of daminozide on vegetative growth in castor.

Materials and Methods

The present experiment was conducted at The Agricultural Research Farm, R. B. S. College Bichpuri, Agra. Seeds of castor (*Ricinus communis* L. var. Aruna) were obtained from the Indian Agricultural Research Institute, New Delhi. Dry seeds were sown in a randomized row design block with a distance of 1 meter between rows and 1 meter between plants. Foliar sprays of aqueous solution of daminozide at 500, 1000 and 1500 ppm were made. Triton-x-114 at 0.1% was used as the wetting agent. Eight sprayings of each concentration were made in the morning hours on 10 plants at 4-5 leaf stage. The interval between sprays was 7 days. The first two treatments were made up to run off level using 50 ml solution for 10 plants. While, in the remaining six treatments the same plants were sprayed up to run off level with 100 ml of each concentration. Thus the total quantity of the chemical received by each plant was 35, 70 and 105 mg for 500, 1000 and 1500 ppm respectively. Five plants were sprayed with distilled water containing the wetting agent (Triton-x) to serve as control. Data on the

vegetative characters (plant height, leaf size and number of branches/plant) were obtained from treated and untreated plants and these were statistically analysed.

Results and Discussion

Plant height, number of lateral branches/plant and size of the leaves in daminozide-treated as well as untreated plants is given in Table 1.

It is evident from Table 1 that the plants treated with all the three concentrations of daminozide show an appreciable increase in plant height, number of branches/plant and leaf size. The maximum height (149.25 cm) is recorded in treatments with 1500 ppm as compared to 134.75 cm for control plants (Figs. 1 & 2). The present findings are quite interesting because earlier experiments with daminozide carried out by several investigators have indicated its growth retarding properties.^{3,7,9,12,13} From various experiments conducted, it has been suggested that the growth retarding nature of the chemical is due to its inhibitory effects on the biosynthesis of endogenous level of gibberellins.^{2,11} Lower concentrations of daminozide are also known to act as growth promoters in *Abelmoschus esculentus* L. MOENCH.¹⁰ Another interesting feature recorded during the course of the present investigation is the increase in the number of lateral branches per plant (Table 1). The plants treated with 1500 ppm eight times possess eight branches per plant as against 6.25 branches per untreated plant. On account of this the treated plants become much bushy in appearance. These findings are similar to those reported earlier.^{5,8} According to these research workers, daminozide treated plants become much bushy and compact, with dark green leaves.

The size of leaf in daminozide treated plants also increases significantly.

TABLE 1. Effect of daminozide (SADH) on vegetative characters in castor (*Ricinus communis* L.)

Character	Treatment concentration			
	500 ppm	1000 ppm	1500 ppm	Control
1. Plant height (cm)	145.80±18.92	145.00±12.80	149.25±8.46*	134.75±13.07
2. Leaf length (cm)	29.93± 0.65**	29.82± 0.69**	30.28±0.88**	27.59± 0.73
3. Leaf width (cm)	23.26± 1.11**	22.52± 0.89*	22.86±0.44**	20.17± 0.66
4. Number of branches/plant	7.40± 0.54*	7.25± 0.95	8.00±0.81*	6.25± 0.95

± Standard deviation.

* Significantly different from control at the 5%.

** Significantly different from control at the 1%.

In plants treated with 1500 ppm daminozide, the leaves are of largest size. Increases in leaf size in daminozide treated plants has also been earlier reported in *Gossypium hirsutum*^D and *Prunus communis*.⁴ It is concluded on the basis of the observations of the present authors that daminozide in castor functions as a growth promoter.

Summary

Effect of 500, 1000 and 1500 ppm daminozide (B₉) on vegetative growth of castor (*Ricinus communis* L. var. Aruna) was studied. All the foliar sprays made enhanced the growth of the plant in general. The plants treated with 1500 ppm daminozide showed maximum increase in plant height, number of branches per plant and leaf size. Thus daminozide, a growth retardant, in the concentrations applied has a growth promoting influence on castor.

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Literature Cited

1. BHATT, I. G. and A. R. S. NATHAN: Effect of cytoce, phosphon and B-Nine on growth and yield of cotton (*Gossypium hirsutum*). *Indian J. Plant Physiol.* XI (2): 225-230. 1968
2. CARCARON, M. R.: Gibberellins antagonistic and anti-gibberellins. In: Gibberellins and plant growth. Ed. H. N. KRISHNAMOORTHY. pp. 289-332. Wiley East Ltd., New Delhi. 1975
3. DIMISTROVSKI, T., B. RISTEVSKI, B. JORDANOVSKI and K. KRISTEVSKI: The effect of Alar-85 on vegetative and reproductive development in some apple cultivars. *Jugostovensko Vocarstvo* 10 (35/36): 29-30. 1976
4. GRIGGS, W. H. and B. T. IWAKIRI: Effect of succinic acid-2, 2-dimethyl hydrozide (Alar) sprays used to control growth in 'Bartlett' pear trees planted in hedgerows. *Proc. Amer. Soc. Hort. Sci.* 92: 155-166. 1986
5. GUPTA, S. and C. L. MADAN: Application of growth regulators like B. Nine, CCC and Morphactin to *Datura metel* L. *Indian Pharmacy* 38(2): 44-46. 1976
6. LOCKHART, J. A.: Kinetic studies of certain anti-gibberellins. *Plant Physiol.* 37: 759-764. 1962
7. MUKHERJEE, D. and T. K. BOSE: Comparative effects of B-Nine and CCC on

- some species of plants under compositae. *Plant Science*. 4: 95-100. 1972
8. NARANG, R.: Physiological studies on growth, flowering, fruit quality and yield in *Abelmoschus esculentus* (L) Moench with special reference to the effect of growth regulators. Thesis submitted for Ph. D. degree in Rohilkhand University, Bareilly. 1980
 9. MICKELL, L. G.: Plant growth regulator. *Chemicals and Engineer News* 56: 18-34. 1978
 10. RIDDLE, J. A., H. A. HAGEMAN and J. ANTHONY: Retardation of plant growth by a new group of chemicals. *Science*. 136: 191. 1962
 11. RUDICH, J., A. H. HELEVY and N. KEDAR: Interaction of gibberellin and SADH on growth and sex-expression of muskmelon. *J. Amer. Soc. Hort. Sci.* 35(4): 359-363. 1972
 12. SHUKLA, S. N. and M. N. TEWARI: Effect of alar on growth, fruit development and distribution of nitrogen and phosphorous in okra. *Indian J. Agric. Sci.* 44(2): 787-790. 1974
 13. STUART, N. W.: Initiation of floral buds in *Rhododendron* after application of growth retardants. *Science*. 134: 50-52. 1961
 14. YADAV, S.: Effect of some growth substances on *Abelmoschus esculentus* L. Moench. Thesis submitted for Ph. D. degree in Rohilkhand University Bareilly. unpublished. 1986

Legend for Plate

Fig. 1. Untreated plant.

Fig. 2. Plant treated with 1500 ppm.

