International Journal of Chemical Studies

P-ISSN: 2349–8528
E-ISSN: 2321–4902
IJCS 2017; 5(6): 458-459

Received: 01-09-2017
Accepted: 05-10-2017

Roopali Patel
College of agriculture, RVSKVV Gwalior, Madhya Pradesh, India

BS Tomar
College of agriculture, RVSKVV Gwalior, Madhya Pradesh, India

Rashid Khan
Rajasthan College of Agriculture, MPUAT Udaipur, Rajasthan, India

Komal Yadav
College of agriculture, RVSKVV Gwalior, Madhya Pradesh, India

Correspondence
Roopali Patel
College of agriculture, RVSKVV Gwalior, Madhya Pradesh, India

Response of Radish (*Raphanus sativus* L.) to different concentration of Gibberellic acid

Roopali Patel, BS Tomar, Rashid Khan and Komal Yadav

Abstract
The present investigation was conducted at College of Agriculture Gwalior to study the effect of different concentration of gibberellic acid (GA_3), sprayed on radish crop. Three concentrations of gibberellic acid (5 ppm, 10 ppm and 20 ppm) were sprayed on radish to study the response of radish to gibberellic acid. It was concluded that GA3, sprayed at 20 ppm resulted in significantly increased fresh weight of leaves, fresh weight of roots, root diameter and yield of radish.

Keywords: Radish, Gibberellic acid, *Raphanus sativus*

Introduction
Radish (*Raphanus sativus* L.) is the most important root crop cultivated in India and high value nutritive root crop containing vitamins C 15-40 mg/100 g of edible portion and supplies a variety of minerals and vitamins. In addition to high nutrient contents per 100 g edible portion as 94.4 g moisture, 0.7 g protein, 0.1 g fat, 0.8 g fibre, 3.4 g carbohydrate and 0.6 g minerals. One of the developments in the field of agriculture science has been the use of growth regulators, which has brought about a sort of revolution in growing of some horticultural crops. Radish being short duration crop, judicious and proper use of plant growth regulator (GA_3) is very essential to get maximum and excellent root quality and yield. The effect of gibberellic acid on stem elongation has been seen in terms of elongation of internodes which is the result of cell division and cell elongation. Gibberellins are one of main regulator of plant growth and development and they normally act by signaling the removal of protein that repressed growth, thus promoting cell proliferation and elongation. Exogenously plant height and, subsequently, enhanced dry weight (Hooley, 1994) [5].

Materials and Methods
The present experiment was conducted at research farm of college of agriculture Gwalior. The experiment comprises with three treatment of gibbrelic acid (GA_3) (10, 15 and 20 PPM) with tree replication and randomized block design. The observations were recorded for fresh leaves weight (g), fresh root weight (g), root diameter (cm) and yield per hectare (q/hac.) from five randomly selected plants from each replication. All the agronomic operations were practices as per recommended and treatments were applied on time. The data on various crop characters were subjected to statistical analysis by adopting appropriate method of analysis of variance as described by Fisher (1958) [2].

Results
The fresh weight of leaves per plant was recorded from 10 Randomly selected plants in a plot and the mean data are given in Table 1. All the treatments influenced significantly to fresh weight of leaves. Fresh weight of leaves per plant was maximum 220.56 g with application of 20 PPM GA_3. This was significantly superior over other levels of gibberellic acid.
The data (table 1) in respect of fresh weight of root reveled that it was significantly influenced by different concentration of GA_3. The fresh weight of root was influenced by gibberellic acid significantly. The fresh weight was increased with increment of concentration of GA_3. The maximum fresh weight was observed in application of 20 PPM concentration of GA_3 (294.55 g) followed by 10 PPM (268.57 g) and 5 PPM (222.87 g). The root fresh weight is brought about by the combination of three major factors namely cell division, cell expansion and dry matter accumulation in these expanding cells.

GA3 effect the cell of seedlings, through the reduction of the duration required for cell cycle by 30% and it does so primarily by reducing the length of G_1 by 30% and that of S by 36%. The fresh weight of root was increased as the GA_3 rate increased, since this hormone is well known to be a growth facilitating substances which is implicated in cell division and expansion (Hopkins, 1999) [6].

Responses of root diameter to GA_3 application (table 1) displayed that substantial increases in root diameter were coincide with the increasingly rates of GA3. The maximum diameter was recorded by 20 PPM GA_3 (5.96 cm) which, were followed by 10 PPM (5.92 cm) and 5PPM (5.54 cm) respectively. Radish root swollen is accomplished through combination of cell division and expansion in the several xylem rings. Xylem parenchyma cells in the root epicotyls undergo the swollen developments. Virtually the paradox appearance of swollen root xylem is resembled to that of seasonal growth rings in tree xylem. Additional super numerary cambia are also formed in quick succession. Consequently, a bit of only a few millimeters diameter may contain all the annular zone of growth (Hayward, 1938) [4]. Storage root formation results from the activity of secondary cambia, whose initiation is dependent upon a supply of sucrose and growth regulators from the shoots. However, the subsequent processes of cell expansion and growth also require a trigger, whose nature has not yet identified (Wien, 1999) [7].

The data (Table 1) in respect of yield of radish reveled that yield was significantly influenced by all the concentrations of gibbrellic acid. The result revealed that yield of radish was increased with the increment in concentration of Gibbrellic Acid. The maximum yield (536.66 q/ha) were observed under the 20 PPM concentration of Gibbrellic acid. It was statistically superior over both other concentration which is 10 PPM and 5PPM. The similar result pertaining to effect of GA_3 on yield and yield attributes of radish were obtained by Dhariwal (2005) [1] and Ganpathi *et al.* (2008) [3].

Table 1: Effect of GA_3 on fresh weight of leaves, fresh weight of roots, diameter of roots and yield of radish.

Gibberellic acid	Fresh weight of leaves (g)	Fresh weight of roots (g)	Diameter of roots (cm)	Yield (q/hac.)
5 ppm	178.33	222.87	5.54	457.55
10 ppm	184.89	268.57	5.92	502.47
20 ppm	220.56	294.55	5.96	536.66
SE (m) ±	8.47	12.99	0.07	11.736
C.D. (at 5%)	25.39	38.95	0.23	35.186

References

1. Dhariwal KS. Effect of plant growth regulator on growth and yield of Radish (*Raphsnus sativus* L.) Var. Japanese white. M.Sc. (Ag) Thesis, JNKVV, Collage of Agriculture, Gwalior, 2005.
2. Fisher RA. Skeleton Analysis of Variance Book "Design of Experiment, 1958.
3. Ganpathi M, Hiremath SM, Uppar DS, Cheeti MB, Koti RV. Influnces of oragnics, plant growth regulator and micronutrient on yield and yield component in carrot. Int. J PI. Sci. 2008; 3(2):342-344.
4. Hayward HE. The structure of economic plants. Macmillan, New York, 1938.
5. Hooley R. Gibberellins: perception, transduction and re-sponses. Plant Mol. Biol. 1994; 26:1529-1555
6. Hopkins WG. Introduction to plant physiology. Second Ed. John Wiley & Sons, IMC New York, 1999, 310-365.
7. Wien HC. The physiology of vegetable crops. AB International, 1999, 552-574.