



ORIGINAL RESEARCH PAPER

Agricultural Science

ROLE OF GROWTH REGULATORS ON GROWTH AND YIELD TRAITS OF ONION

KEY WORDS: bulb, growth regulators, growth, onion and yield traits

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ABSTRACT

Application of Indole butyric acid (IBA) and gibberellic acid increased the root number, root length, plant height, number of leaves, bulb length, bulb diameter, average bulb weight and bulb yield. Application of IBA increased the root number and root length compared to the other treatments. The bulb yield is enhanced by GA3 and IBA @ 100 ppm concentration

INTRODUCTION

Onion (*Allium cepa* L.) belongs to the family *Alliaceae*. The onion has been cultivated since for 4700 years or more and does not exist as a wild species. Onion was probably first domesticated in the mountainous regions of Turkmenistan and North Iran bordering the ancient advanced civilization of the Near East (Sumerian). It is used as salad, cooked vegetable in preparation of pickles, dehydrate white & yellow onion for preparation of flour, flakes, paste etc. It is rich in major minerals (Ca, P, and Fe), carbohydrates, protein, dietary fibre and vitamins (B and C). Onion is also known to possess several medicinal and therapeutic properties. Growth regulators like IBA, IAA and GA3 with different concentrations shows a vital role in enhancing yield and quality of onion. So evaluating the role of growth regulators on onion was prime objective.

METHODOLOGY

The field experiment on evaluation of onion (*Allium cepa* L.) was conducted at college of Horticulture, Bagalkot. Seedlings

were transplanted in rows spaced at 15 cm and 10 cm from plant to plant. Other cultivation practiced was as per package of practice in onion cultivation. Nine treatments of treated seeds were sown in RBD with 3 replications and plot size of 2.50 m x 2.50 m and spacing with 15cm x 10 cm. Five representative plants were selected randomly from each genotype and were tagged for identification. Average from these five plants was worked out for the statistical computation.

Treatments: T1 ---control

- T2----Root treatment + foliar application of IAA @100ppm
- T3---Root treatment + foliar application of IAA @200ppm
- T4----Root treatment + foliar application of IBA @100ppm
- T5----Root treatment + foliar application of IBA @200ppm
- T6----Root treatment + foliar application of GA3 @100ppm
- T7----Root treatment + foliar application of GA3 @200ppm
- T8----foliar application of MH @1000ppm
- T9----Root treatment + foliar application of Humic acid

Table 1. Effect of different treatments on growth and yield of onion

S.No	Treatment	Root number	Root length (cm)	Plant height (cm)	No. of leaves	Bulb length (cm)	Bulb diameter (cm)	Bulb weight (g)	Bulb weight / Plot (kg)	Bulb Yield /ha (ton)
1	T1 Control	40.12	10.01	34.60	6.33	3.88	3.71	49.84	4.11	7.47
2	T2 IAA 100ppm	43.15	10.24	42.46	8.40	4.28	4.16	58.41	5.01	9.58
3	T3 IAA 200ppm	44.21	10.55	41.65	8.70	4.89	4.64	66.94	5.27	9.57
4	T4 IBA 100ppm	45.35	10.89	45.74	9.00	5.03	4.82	74.05	7.25	13.06
5	T5 IBA 200ppm	46.21	11.68	43.36	7.86	4.65	4.50	63.22	5.87	11.66
6	T6 GA 3 100ppm	42.46	10.25	47.16	8.86	4.88	4.70	72.98	7.38	13.42
7	T7 GA 3 200ppm	42.69	10.99	40.22	6.66	4.59	4.49	60.27	5.43	10.87
8	T8 MH 1000ppm	41.01	10.11	38.38	6.33	4.05	3.94	52.57	5.01	9.11
9	T9 Humic acid	43.25	10.98	39.51	6.80	4.113	3.71	52.01	5.12	9.30
	CV	5.124	4.128	4.754	7.168	4.105	9.047	4.191	19.37	19.62
	SEm	0.726	0.405	1.60	0.425	0.177	0.325	2.093	0.883	1.637
	L.S.D @5%	1.445	0.705	3.405	0.905	0.373	0.677	4.437	1.879	3.471

RESULTS AND DISCUSSION

The experimental results (Table 1.) revealed that significantly the root length and root numbers were found maximum in the treatment T 5 (IBA 200ppm) followed by T4 (IBA 100ppm) , T 7 (GA 3 100ppm) and T 9 (Humic acid). This enhancement is mainly due to the effect of these growth regulators on root initiation and rapid root growth. Similarly, plant height was found maximum in treatment T6 (GA 3 100ppm) 47.16 cm followed by T4 (IBA 100ppm) with 45.74 cm while lowest in T 1 (Control) with 34.60 cm. Number of leaves were noticed maximum in T4 9.00 followed by T 6, T 3, T 2 while minimum in T1 (Control) and T8 (MH 1000ppm) with 6.33. This increase in plant height and number of leaves is mainly due to the cell division, cell elongation. Bulb length was noticed maximum in T4 (IBA 100ppm) with 5.03 cm while minimum in T1 (Control)

with 3.88 cm. Bulb diameter was recorded highest in T4 (IBA 100ppm) with 4.82 cm and lowest in T1 (Control) and T9 (Humic acid) with 3.71 cm, which could be due to the rapid cell division and elongation leading to longer bulb formation. Results of the present investigation were also in confirmatory with the findings of Bahadur *et al.*, (2001), Govind *et al.* (2015). Bulb weight is an important trait and it was found maximum in T4 (IBA 100ppm) with 74.05 g, while minimum weight was noticed in T1 (Control) with 49.84 g. in the same way, Bulb weight/ plot was recorded maximum in T6 (GA 3 100ppm) with 7.38 kg followed by T4 (IBA 100ppm) with 7.25 kg. Finally, total bulb yield / hectare was found maximum in T6 (GA 3 100ppm) with 13.42 tonnes followed by T4 (IBA 100ppm) with 7.25 tonnes while minimum in T1 (Control) . Mode of application had influence, root application followed

by foliar spray was the best application method to obtain bulb and yield enhancement in onion. The increase in the bulb yield mainly attributed to more number of leaves and higher dry matter accumulation. Manipulation of source and sink relationship through the above treatments may be the reason for yield improvement. Higher yield in onion has so far been achieved mainly through the judicious applications of various plant growth regulators. The results of the present investigation are in accordance with the observations of Tiwari *et al.* (2001), Islam *et al.* (2007).

CONCLUSION

Onion is one of the most important crops; there is necessity to increase the yield and quality of onion. Application growth regulators at appropriate concentrations increase the plant height, number of leaves, diameter, bulb yield and total yield of onion. From the study it is concluded that, among the nine treatments of growth regulators with onion tested for their performance for various growth and yield traits, treatment T4 IBA 100ppm and T6 GA 3 100 ppm concentrations showed considerable improve in growth and yield traits, so further it could be used as source for further crop improvement programme.

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