International Archive of Applied Sciences and Technology
Int. Arch. App. Sci. Technol; Vol 10 [3] September 2019 : 32-35
© 2019 Society of Education, India
[ISO9001: 2008 Certified Organization]
www.soeagra.com/iaast.html

IAAST
ONLINE ISSN 2277- 1565
PRINT ISSN 0976 - 4828

CODEN: IAASCA ORIGINAL ARTICLE

DOI: .10.15515/iaast.0976-4828.10.3.3235

To study the Response of bio regulators on yield attributes and yield of hybrid rice

Nirmal Kumar*, S. P. Kushwaha Balwan Singh and Deepak Kumar Rawat
CSAUAT, Kanpur U.P.
Correspondence- nirmal10081@gmail.com *

ABSTRACT
The growth regulators have not only provided a useful tool to agriculturists for modifying plant growth as well, but have also been helpful in overcoming practical agriculturists for modifying plant growth as well, but have also been helpful in overcoming practical agricultural problem in areas, where genetic or other manipulation have not been possible.
Key word*- growth regulators, agriculturalgenetic*

Received 12.02.2019 Revised 12.04.2019 Accepted 01.05.2019

CITATION OF THIS ARTICLE
N Kumar, S. P. Kushwaha, B Singh and D K Rawat.To study the Response of bio regulators on yield attributes and yield of hybrid rice. Int. Arch. App. Sci. Technol; Vol 10 [3] September 2019 : 32-35

INTRODUCTION

Bio-regulators play a pivotal role in regulating the plant growth. Hormones play an important role inactivating or in activating the gene expressions both in plants and animals thus, the chemical growth regulators have now added a new dimension to the possibility of modifying plant growth development and metabolism. In principle, the availability of exogenous growth regulators to modify plant growth offers great opportunity. Again the high activity of hormones at low concentrations offers favourable cost consideration in their use. These regulators control the activities of plants, not due to their exclusive presence or absence of one or the other hormone but because of the balance between two or more substances. So, it has become essential to study the relationship in a11 its details between endogenous levels of hormones and its external application. Thus, they have been used for a wide range of purposes, such as breaking of dormancy problems in seeds or accelerating seedling growth, hastening and increasing rooting of cuttings in several vegetative propagated plant, altering the branches, pattern of leaf shape, hastening and increasing flowering and fruiting overcoming incompatibilities and others.

MATERIAL AND METHODS

Site of the experiment:-

The field experiment was conducted at Students Instructions Farm of Chandra Shekhar Azad University of Agriculture and Technology, Kanpur during *Kharif* 2017 in field no. 5. The farm is situated at the left side of the Grand Trunk Road about one Kilometer from the college of Agriculture Campus Kanpur situated in which is ganegatic plain of Uttar Pradesh. The field is irrigated by farm tube well.

The experiment was laid out in randomized block design with three replications. The plot size (3.5 rows, 3 meter long) 3.5 x 3 m and the spacing was 22.5 cm x 10 cm (row x plant). The experimental field was properly leveled followed by preparatory irrigation afterward at optimum tilth, the field was ploughed and layout was done as per programme. Nitrogen, phosphorus and potash were applied in the form of urea, super phosphate and muriate of potash, respectively. Calculated dose of each fertilizer was applied to respective plot in the

ratio of nitrogen 120 Kg/ha, phosphorus 60 Kg/ha and potash 50 Kg/ha, respectively. The foliar application of different treatments T1-control, T2 - IAA 25 ppm, T3 - IAA 50 ppm, T4 - Kinetin 5 ppm, T5 - kinetin 10 ppm, T6 - Triacontanol 1 ppm, T7-Triacontanol 2 ppm, T8 - Alar 50 ppm and T9 - Alar 100ppm. Growth parameters viz. plant height, number of tillers hill-1 and dry biomass plant-1, Leaves / plant, Leaf area / plant, Dry matter production / plant 6. Relative growth rate (RGR), Days to flowering, Days to maturity and chlorophyll intensity. All the data on growth metabolism, yield and yield contributory characters were statistically analyzed by the method suggested by Fisher [13] .

RESULT AND DISCUSSION

Number of panicles per plant

The all bio-regulators treatment significantly increased the number of panicles per plant in comparison to control during the year of experimentation. It being highest in plants treated with IAA 50 ppm closely followed by triacontanol 1 ppm, kinetin 5ppm and alar 100 ppm treated plant also produced significantly maximum number of panicles per plant than those received under other growth regulators application which produced significantly inferior response in comparison to both the doses of IAA described above. Alar 50 ppm was proved less effective in this regard (table-1)

LENGTH OF PANICLE:-

All the growth regulators, have increased the panicle length significantly, during the year. IAA 50 ppm produced the longest panicle (27.34 cm) which was followed by triacontanol 1ppm (26.00 cm) as compared to control (23.340 cm). Whereas, Alar 100 ppm recorded the lowest panicle length (25.45 cm), though, it proved slightly superior to control (23.45 cm).

NUMBER OF GRAINS PER PANICLE:-

It is evident from the table- 1 that all growth regulators treatment significantly increased the number of seeds produced per plant as compared to control during the year of experimentation. Among then IAA 50 ppm gave the highest increase in number of seed/panicle than remaining all other treatment. Similarly, IAA 25 ppm also produced maximum number of seeds per panicle closely followed by triacontanol 1 ppm, however, the response of triacontanol 1 ppm, is higher than its upper dose and on the other hand higher concentration of triacontanol 2 ppm, proved to be less effective than its lower one.

Table; 1 Effect of bio-regulators on yield and its contributing characters

Treatment	Number of panicle/ plant	Length of panicles (cm)	Number of grain panicles
T_1 control	8.08	23.34	123.36
T_2 IAA25 ppm	11.70	26.30	132.11
T_3 IAA 50 ppm	11.45	27.33	133.38
T_4 Kinetin 5 ppm	9.88	25.68	129.47
T_5 kinetin 10 ppm	9.55	25.44	128.33
T_6Triacontanol 1ppm	10.37	26.00	131.66
T_7Triacontanol 2ppm	9.67	25.51	130.00
T_8 Alar 50ppm	9.74	25.33	126.44
T_9 Alar 100 ppm	9.92	25.45	127.64
SE±(d)	0.30	0.651	0.912
CD at 5%	0.642	1.392	1.951

GRAIN YIELD PER PLANT

Result of the (table-1) revealed that the growth regulators tried in different concentrations proved significantly effective in increasing seed yield per plant during the year of experimentation. The highest seed yield (34.95) per plant was recorded in IAA 50 ppm which was closely followed by IAA 25 ppm (32.975g) and the lowest was recorded in control (27.825g). Among the different chemicals applied, alar 50 ppm recorded minimum (30.455g) seed yield per plant, though it was significantly superior to control. The effect of IAA was more pronounced than that of triacontanol, kinetin and alar

STRAW YIELD PER PLANT

Result of table-2 indicated that all the growth regulators tried in different concentrations proved significantly effective in increasing straw yield per plant during the year of experimentation. The highest straw yield (31.93g) per plant was recorded in IAA 50 ppm which was closely followed by IAA 25 ppm and the lowest in control (28.62g) among the different chemical, alar 50 ppm recorded minimum increase (28.83g) in straw yield per plant. Though it was significantly superior to control. It was also noted that the effect of IAA was more pronounced than that of kinetin, triacontanol and alar.

Table: 2-Effect of bio-regulators on yield and its contributing characters

Treatment	Grain weight/ plant (g)	Straw weight/ plant (g)	1000 grain weight (g)	Yield (kg/ha)
T_1 control	27.825	28.62	24.12	7571.42
T_2 IAA25 ppm	32.975	31.59	26.07	8428.00
T_3 IAA 50 ppm	34.955	31.93	27.02	8600.02
T_4 Kinetin 5 ppm	31.925	29.67	25.38	8206.92
T_5 kinetin 10 ppm	31.715	28.70	24.83	8079.04
T_6Triacontanol 1 ppm	32.642	30.22	26.09	8342.98
T_7Triacontanol 2ppm	32.380	29.32	25.55	8233.32
T_8 Alar 50ppm	30.455	29.44	24.83	7686.18
T_9 Alar 100 ppm	31.30	28.83	25.22	7980.96
SE±(d)	0.197	0.32	0.432	59.826
CD at 5%	0.422	0.684	0.923	127.917

1000 GRAIN WEIGHT

The bio regulator treatment, exerted significant influence on 1000 seed weight over control during the year (Table-2) Among all the bio regulator treatment, IAA 50 ppm produced highest test weight closely followed by IAA 25 ppm, triacontanol 1 ppm, and alar 100 ppm respectively. On the other hand, the minimum 1000 seed weight in the treated was found in Alar 50 ppm (24.83g)

GRAIN YIELD (Kg/ha)

It is indicated from table-2 that the hormonal treatment showed considerable response on seed yield of rice. Significantly maximum
seed yield was recorded with IAA 50 ppm (8600.00 kg/ha) and IAA 25 ppm(8428.00kg/ha) closely followed by triacontanol 1ppm kinetin and Alar 100 ppm On the other hand, minimum seed yield was obtained by the treatment of alar 50 ppm and maximum from IAA 25 ppm among those treatment .

PRODUCTIVITY

It is evident from the values mentioned in table-3 that the productivity was markedly influenced by hormonal treatment during the year. The maximum rice productivity (8600.00Kg/grain/ day/ha) was recorded under IAA 50 ppm treatment. Minimum productivity of alar 50ppm (7686.18 kg, grain/ha) All the bio regulator treatment showed higher productivity than control.

Table-3 Effect of bio regulator on productivity Kg hectare and harvest index percent.

Treatment	Productivity	Harvest index
T_1 control	75.71	44.82
T_2 IAA25 ppm	84.28	45.85
T_3 IAA 50 ppm	86.00	45.49
T_4 Kinetin 5 ppm	81.42	46.80
T_5 kinetin 10 ppm	80.85	46.60
T_6Triacontanol 1 ppm	83.42	46.20
T_7Triacontanol 2ppm	82.66	45.90
T_8 Alar 50ppm	76.86	46.72
T_9 Alar 100 ppm	79.80	46.90

HARVEST INDEX

The harvest Index is the proportionate partitioning of the Photosynthate between the organ of economic yield e.g. the panicle in paddy. The total amount of dry matter produced were converted into grain as indicated by harvest index values. Mostly all the plant growth regulator made considerable increase in harvest index value over control during the year of experimentation. The plants treated with IAA 50 ppm showed higher harvest index value in comparison to control, suggesting maximum translocation efficiency. The minimum harvest index was recorded under the control treatment.

CONCLUSION

Various Yield parameters like number of panicle per plant, number of grains per panicle, panicle length and grain weight per panicle and 1000 grain weight were statistically influenced by foliar spraying of growth regulators. All the yield attributing characters were found to be maximum under the treatment of IAA 50 ppm, closely followed by triacontanol 1 ppm. Overall production of grain yield per hectare was significantly influenced by the application of bio-regulators. The highest seed yield 8600 Kg/ha was recorded with IAA 50 ppm as against 7576 kg/ha in control. Triacontanol 1ppm recorded next highest average seed yield 8342 Kg/ha.

REFERENCES

1. A.O.A.C. (1970).Official methods of analysis of the association of official Agricultural Chemists, 11thEdn.
2. Ahmed, F.A., El Desoki, E.R. Kobeasy, M.E. and El Lethy, S.R. (2001).Effect of some herbicides and growth regulators on wheat crop characters 5 protein content and amino acids .*Bulletin of the National Research Centre (Cairo)* ,26 (4) : 467 — 481.
3. Akbari, G.A., Arab, S.M., Alikhani, H.A., Allahbadi. I. and Arzanesh, M.H. (2007).Isolation and selection of indigenous Azospirillum spp. and the IAA of superior strain effects on wheat roots .World *J. Agri. Sci.* (3): 523 — 529.
4. Aldesuquy, H.S. (2000). Effect of indo1-3y1 acetic acid on photo synthetic characteristics of wheat flag leaf during grain filling.*Photo Synthetica.*38 (1): 135-141.
5. Arai-Sanoh Yumiko, Takai Toshiyuki , Yoshinaga Satoshi, Hiroshi Nakano, Mikiko Kojima, Hitoshi Sakakibara, Motohiko Kondo &YusakuUga(2014). Deep rooting conferred by *DEEPER ROOTING 1* enhances rice yield in paddy fields. *Scientific Reports* 4, Article number: 5563.
6. Arora,N., Kaur B., Singh, P. and Parmar, U.(1998). Effect of IAA and cycocel on yield contributing parameters of chickpea (Ciceraritinum L.)*Annual.Agril. Res.,* 19(3), 279-281.
7. Aziz Robina, Shahbaz M andAshraf M (2013). Influence of foliar application of triacontanol on growth attributes, gas exchange and chlorophyll fluorescence in sunflower (*helianthus annuus*L.) under saline stress *Pak. J. Bot., 45(6): 1913-1918.*
8. Barbieri , P. and Galli , E. (1993). Effect on wheat root development of inoculation with an *Azospirillum brasilence.Research in Microbiology*, 144 (1) : 69 75 .
9. Fisher, R.A. (1937). Statistical analysis, Oliver Boyed hand on and Edinburg.
10. Gerasenkova, NA, Shatilova, Ti, KarpileukorGP,andSemko, VT. (1998). Effect of agricultural back ground on ground on grain quality of winter wheat CV. Irma and its bread making properties. IzivstiyaTimiryazevskai- Se skokhozyaistvenhaiAkademit(2) : 50-57.
11. Jaya Ram, K.M. and N. Nellakandom (2000).Effect plant growth Regulators on detached leaf senescence of hybrid rice plant Physiol. Communi4: 14-17.
12. Kaya, C., Tuna, A.L. and Okant, A.M. (2010).Effect of foliar applied Kinetin and Indole acetic acid on maize plants grown under saline Agric.For.34: 529 - 538. Conditions.
13. Kumar Arun M.B., Vakeswaran V. and Krishnasamy V. (2005).Enhancement of synthetic seed conversion to seedlings in hybrid rice, *Plant Cell Tiss Organ Cult* 81:97–100.
14. Pal. D, Mallick S, Ghosh R. K, P. Pal, Tzudir L And Barui K. (2009). Efficacy of *Triacontano*l on the growth and yield of rice crop in inceptisol of West Bengal*Journal of Crop and Weed,* 5(2): 128-130.
15. Pandey, A.K., Tripathi, R.S. and Yadav, R.S. (2001).Effect of certain growth regulators on growth, yield and quality of rice (*Oryzasativa*L.)*Indian. J. Agril. Res*. 35(2):118-120.
16. Rukssz and Michalek, W. (2004).Effect of foliar application of phytohormones on barley yielding. Annals Univ. Mariae Curie Sklodowska .SectioE , Agri.,59 (4) : 1543 1548 .
17. STUTI and ARUN KUMAR (2013). Comparative Studies on the Effect of Some Growth Regulators on Growth, Yield and Quality of Paddy (Oryzasativa L.) Indian J AgricBiochem 26 (2), 202-203.