The Pharma Innovation Journal 2021; 10(9): 1711-1713

www.ThePharmaJournal.com

The Pharma Innovation

**ISSN (E): 2277- 7695**
**ISSN (P): 2349-8242**
**NAAS Rating: 5.23**
TPI 2021; 10(9): 1711-1713
© 2021 TPI
www.thepharmajournal.com
Received: 13-07-2021
Accepted: 29-08-2021

**Suraboina Himabindu**
M.Sc. Scholar, Department of Agronomy, NAI, SHUATS, Prayagraj, Uttar Pradesh, India

**Rajesh Singh**
Assistant Professor, Department of Agronomy, NAI, SHUATS, Prayagraj, Uttar Pradesh, Uttar Pradesh, India

**Corresponding Author:**
**Suraboina Himabindu**
M.Sc. Scholar, Department of Agronomy, NAI, SHUATS, Prayagraj, Uttar Pradesh, India

# Response of row arrangement and PGR's on growth of linseed (*Linum usitatissimum*)

**Suraboina Himabindu and Rajesh Singh**

**Abstract**
A field experimental study was conducted during *rabi* season of 2020 at Crop Research, Department of Agronomy, SHUATS, Prayagraj (U.P). The soil of experiment plot was sandy loam in texture, nearly neutral in soil reaction of pH - 6.9, low in organic carbon - 0.91%, available N - 301.26 kg/ha, available P - 37.23 kg/ha and available K - 271.47 kg/ha. Totally, nine treatments were developed with two spacings (20 cm x 5 cm and 30 cm x 5 cm) and two plant growth regulators (Gibberellic acid at 125 ppm and 250 ppm; Indole acetic acid at 1 ppm and 3 ppm) and one control plot. Based on the treatments, the experiment was carried out in a randomized block design and were replicated thrice. The results defined that plant height (52.25 cm), dry weight per plant (8.93 g) and seed yield (1.48 t/ha) was attained higher with combination of 20 cm x 5 cm spacing with gibberellic acid at 250 ppm. However, crop growth rate (10.31 g/m$^2$/day) was obtained maximum values in 30 cm x 5 cm + $GA_3$ at 250 ppm and relative growth rate (0.0160 g/g/day) was in 30 cm x 5 cm + IAA at 3 ppm, respectively.

**Keywords:** Gibberellic acid, growth, indole acetic acid, linseed

## Introduction
Linseed also called as flax, is commonly named as Alashi/ Alsi. *Usitatissimum* means 'most useful'. It is known as Agasi in Kannada, Javas or Alashi in Marathi, Alsi in Hindi and Ousahalu in Telugu. It is a self-pollinated crop mostly adapted to temperate climates of the world and is a native to the region from Eastern Mediterranean to India. Linseed was widely cultivated in ancient Ethiopia and ancient Egypt. Linseed is basically an industrial oilseed crop and every part is endowed with commercial and medicinal importance. It contains about 33-45% oil. Its oil is suitable for human consumption which is used as a nutritional supplement. Tolerant to both biotic and abiotic stresses which is an important feature of this crop. Because of this property, the survival and cultivation of linseed is prevailing in wide range of tropical, sub-tropical and temperate regions. Flax indeed has various benefits with seed used for industrial, food and feed purposes.

It is well known fact that inter and intra row spacing plays a crutial role in production of crops. Spacing is dependent upon the growth of a particular crop variety in a given agro-climatic condition. Adequate spacing ensures better crop growth and improves the yield and quality of crops (Chaudhary, 2013) [1] and depends on the crop nature, growth habitat, and environment.

Gibberellic acid is generally used plant growth regulators and recently Indole acetic acid are new emerging plant growth regulators. In oilseed crops, PGR's perform significant responses on crop growth and yield. Plant growth regulators can be successfully working to enhance the yield in the economically important oil seed crops (Rastogi *et al.*, 2013) [7]. IAA has been found to increase the plant height, number of leaves per plant, pod size with consequent enhancement of karnel yield in groundnut (Lee, 1990) [5]. It also increases the flowering, fruit setting, dry weight of crops (Gurdev and Saxena, 1991) [3].

Keeping the above facts in view, the present experimentation was laid to find the response of linseed to different spacings and PGR's under eastern Uttar Pradesh condition.

## Material and Methods
The experiment was laid out during *rabi*, 2020 at Crop Research Farm, Department of Agronomy, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj (U.P.) which is located at 25$^0$ 24' 42'' N latitude, 81$^0$ 50' 56'' E longitude and 98 m altitude above the mean Sealevel. The experiment consisted of nine treatments which were replicated thrice in a randomized block design with two spacings *viz.* 20 cm x 5 cm, 30 cm x 5 cm and two PGR's *viz.* $GA_3$ (125 and 250 ppm), IAA (1 and 3 ppm)

and one control plot separately. The treatment combinations which are $T_1$: 20 cm x 5 cm + $GA_3$ at 125 ppm, $T_2$: 30 cm x 5 cm + $GA_3$ at 125 ppm, $T_3$: 20 cm x 5 cm + $GA_3$ at 250 ppm, $T_4$: 30 cm x 5 cm + $GA_3$ at 250 ppm, $T_5$: 20 cm x 5 cm + IAA at 1 ppm, $T_6$: 30 cm x 5 cm + IAA at 1 ppm, $T_7$: 20 cm x 5 cm + IAA at 3 ppm, $T_8$: 30 cm x 5 cm + IAA at 3 ppm and $T_9$: control. Fertilizers were applied as band placement for which 4-5 cm deep furrows were made along the seed rows with hand hoe. The nutrient sources were Urea, SSP and MOP to fulfill the requirement of nitrogen, phosphorus and potassium and foliar sprays of PGR's were given at 30 DAS. Irrigation was based on the necessity and at the time of sowing. The growth attributes *viz.* plant height, dry weight, CGR and RGR were recorded with standard basis of observation. The data was analysed statistically by using analysis of variance as applicable in Randomized Block Design (Gomez and Gomez, 1984) [2].

## Results and Discussion

### Growth attributes

The data indicated that in Table 1, significantly higher plant height (52.25 cm) was recorded in 20 cm x 5 cm + $GA_3$ at 250 ppm and at par values was noticed in the treatment 30 cm x 5 cm + $GA_3$ at 250 ppm (51.78 cm), respectively. It might be due to unavailability of sufficient space and sunlight made the plant longer in search of sunlight, which make the plant longer in narrow spaced crops. Also along with $GA_3$ which stimulate organ growth through enhancement of cell elongation and cell division by inducing mitotic division and auxin positively influence $GA_3$, to promote cell elongation and increase plant length. Saied *et al.* (2018) also observed that mixture of more than one growth hormone increased plant height (8.3%).

The data pertaining that in Table 1 about dry weight of linseed with significant difference among treatments where there was significantly higher dry weight in treatment 20 cm x 5 cm + $GA_3$ at 250 ppm with 8.93 g. Treatments such as 30 cm x 5 cm + $GA_3$ at 250 ppm, 20 cm x 5 cm + IAA at 3 ppm and 30 cm x 5 cm + IAA at 3 ppm (8.58, 8.27 and 8.11 g) were for statistically at par. The significant improvement in the dry weight of plant seems to be due to profused branches indicating the ability of plant to generate leaf area continuously for longer period and also foliar application of $GA_3$ at 250 ppm might be due to $GA_3$ which enhanced the source-sink relationship in the plant and induced photo-assimilate translocation in the plant. Khan and Khan (2016) [4] also reported applications of IAA on soybean increased stem and total dry weight, respectively.

The data presented in Table 1 indicated that crop growth rate recorded maximum values in 30 cm x 5 cm + $GA_3$ at 250 ppm (10.31 g/m$^2$/day). At early stage CGR increased might be due to active contribution of leaves in photosynthesis. At initial period, the dry matter accumulation was higher. Senescence of leaves caused decline in crop growth rate. An increase in CGR with the application of $GA_3$ (250 ppm) sprayed at flower initiation stage was observed by Ramesh and Ram Prasad (2013) [6].

The data presented in Table 1 indicated that 30 cm x 5 cm + IAA at 3 ppm treatment combination recorded highest relative growth rate (0.0160 g/g/day). $GA_3$ enhanced source and sink relationship and transformation of photosynthates very effectively and obviously more accumulation of dry weight were produced resulting in higher relative growth rate. Similar result was also given by Khan and khan (2016) [4] who studied on soybean and observed that $GA_3$ and IAA increases the growth parameters like AGR, NAR, RGR and CGR than rest of treatments.

The data presented in Table 1, indicated that significantly higher seed yield (1.48 t/ha) was obtained with application of 20 cm x 5 cm + $GA_3$ at 250 ppm where30 cm x 5 cm + $GA_3$ at 250 ppm (1.39 t/ha) found at par. Application of $GA_3$ at 150 ppm significantly reported higher seed yield in the genotype followed by $GA_3$ at 100 ppm and $GA_3$ at 200 ppm, respectively which was reported by Khan and khan (2016) [4].

**Table 1:** Response of row arrangement and PGR's on growth attributing parameters of linseed at harvest

| Treatments | Plant height (cm) | Dry weight (g) | CGR (100 DAS-at harvest) | RGR (100 DAS-at harvest) | Seed yield (t/ha) |
|---|---|---|---|---|---|
| 20 cm x 5 cm + $GA_3$ at 125 ppm | 47.09 | 7.77 | 8.56 | 0.0143 | 1.30 |
| 30 cm x 5 cm + $GA_3$ at 125 ppm | 46.65 | 7.18 | 7.16 | 0.0130 | 1.24 |
| 20 cm x 5 cm + $GA_3$ at 250 ppm | 52.25 | 8.93 | 9.01 | 0.0128 | 1.48 |
| 30 cm x 5 cm + $GA_3$ at 250 ppm | 51.78 | 8.58 | 10.31 | 0.0159 | 1.39 |
| 20 cm x 5 cm + IAA at 1 ppm | 49.41 | 7.51 | 7.42 | 0.0126 | 1.30 |
| 30 cm x 5 cm + IAA at 1 ppm | 47.41 | 7.25 | 7.35 | 0.0130 | 1.27 |
| 20 cm x 5 cm + IAA at 3 ppm | 49.85 | 8.27 | 8.41 | 0.0132 | 1.36 |
| 30 cm x 5 cm + IAA at 3 ppm | 49.45 | 8.11 | 9.89 | 0.0160 | 1.35 |
| Control | 45.00 | 7.06 | 7.06 | 0.0120 | 1.19 |
| S.Em+ | 0.69 | 0.33 | 2.09 | 0.0031 | 0.03 |
| CD (P=0.05) | 2.07 | 0.99 | - | - | 0.10 |

## Conclusion

Based on the findings it is concluded that optimum spacing and application of plant growth regulators such as gibberellic acid is found more helpful for growth of linseed under Eastern U.P.

## Acknowledgement

The authors are grateful to Department of Agronomy, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj - 211007, Uttar Pradesh, for providing us necessary facilities to undertake the research study.

## References

1. Chaudhary SR. Effect of row spacing and irrigation scheduling based on IW/CPE ratio on linseed (*Linum usitatissimum* L.) under South Gujarat condition. M.Sc. (Agri.) thesis submitted to Navsari Agricultural University 2013.
2. Gomez KA, Gomez AA. Statics Producers for Agriculture Research 1984.
3. Gurdev S, Saxena OP. Seed treatments with bioregulators in relation to wheat productivity. In New Trends in Plant Physiology, Proceedings of National Symposium on Growth and Differentiation in Plants, New Delhi, India

1991,201-210.
4. Khan R, Khan N. Effect of plant growth regulators on physio-logical and biochemical parameters in soybean (*Glycine max* (L.) Merrill.). M.Sc. (Ag.) *Thesis*, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani 2016,103p.
5. Lee HS. Effects of pre-sowing seed treatments with $GA_3$ and IAA on flowering and yield components in groundnuts. Korean J. Crop Sci 1990;35:1-9.
6. Ramesh R, Ramprasad E. Effect of plant growth regulators on morphological, physiological and biochemical parameters of soybean (*Glycine max* l. Merrill). Helix 2013;6:441-447.
7. Rastogi A, Siddiqui A, Mishra BK, Srivastava M, Pandey R, Misra P *et al*. Effect of auxin and gibberellic acid on growth and yield components of linseed (*Linum usitatissimum* L.). Crop Breeding and Applied Biotechnology 2013;13:136-143.
8. Saied MA, Mondal MMA, Md SR, Md AM. Foliar application of GABA improve growth and yield of mustard. MOJ Current Research and Reviews 2018;1(3):119-122.