Comparative Effect of Different Treatments in Field Pea (*Pisum sativum L.*)

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Authors’ contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

A field study was conducted to investigate the various treatments that effect on growth and yield of field pea in RBD (Randomized block design) at Sam Higginbottom University of Agriculture Technology and Science, Prayagraj, Uttar Pradesh during march to May in 2020. The trail consists of 13 treatments combinations. The field pea varieties were used were IPF429. The treatments included T₀- control, T₁, T₂, T₃, -Gibberellic acid, T₄, T₅, T₆ - Neem leaf extract, T₇, T₈, T₉-ZnSo₄, T₁₀, T₁₁, T₁₂ - Naphthalene acetic acid(NAA). All Ten parameters treated with Ga₃ shows good results in Yield and shows maximum in field emergence, plant height, Days to 50% flowering, Number of pods, Seed yield per plot, Biological Yield and Harvest index. T₀ (Un primed) shows lowest of all treatments. Hence, priming with Gibberellic acid could recommended for pre sowing treatment for field pea.

Keywords: Neem leaf extract; GA3; NAA; ZnSo₄; RBD; field pea.

1. INTRODUCTION

Field pea is scientifically called as *Pisum sativum* and chromosomal number is (2n=14). Pea is one of the leading vegetable crop in world of the temperate and sub-tropical areas [1-6]. It is a nutritious protein crop that contain 1.8 g fat, 62.1 g carbohydrates, 22.5 g protein, 4.8 mg of iron. It is grown under sandy loamy soil with pH 5.5 to 6.5. Green peas used as consuming purpose and
dried peas used as sowing. Uttar Pradesh stand first in field pea production and followed by Punjab in India. It also plays an major role in sustainable farming system due to its fossil energy besides ability to symbiotically fix atmospheric nitrogen [7-12].

In India, Total pulse production is 25.23 M tonnes (2017-18) total area under pea production is 9.01 lakh ha and total production of 8.49 lakh tons were recorded. In India Uttar Pradesh ranked first both in area and production (37.90% and 41.58%) followed by Madhya Pradesh (38.67% and 32.98%) and Jharkhand (3.80% and 4.85%). In case of productivity Rajasthan holds first rank (1867 kg/ha) followed by Punjab (1297 kg/ha) and Jharkhand (1203 kg/ha). The lowest production was observed in Maharashtra (390 kg/ha) followed by Chhattisgarh (437 kg/ha).

3. RESULTS AND DISCUSSION

The results are provided in the below table indicate that the significant effect of various treatments on growth and yield of field pea under various parameters.

3.1 Field Emergence (%)

In among all the treatments the highest was recorded in gibberellic acid with T3 treatments. In field emergence (%) the highest was recorded in treatment (T3-GA3 @ 100 ppm for 10hrs) (94.93) and followed by (T5-Neem leaf extract 5% for 10 hrs) (90.01). The lowest was recorded in control (T0) (83.01).

3.2 Plant Height 30(cm)

In among all the treatments the highest was recorded in gibberellic acid with T3 treatments. In plant height the highest was recorded in treatment (T3-GA3 @ 100 ppm for 10 hrs) (32.1) and followed by (T5-neem leaf extract 5% for 10 hrs) (30.5). The lowest was recorded in control (T0) (24.4).

3.3 Plant Height 60(cm)

In among all the treatments the highest was recorded in gibberellic acid with T3 treatments. In plant height the highest was recorded in treatment (T3-GA3 @ 100 ppm for 10 hrs) (75.2) and followed by (T5-neem leaf extract 5% for 10 hrs) (72.6). The lowest was recorded in control (T0) (57.9).
Table 1. Mean performance of field pea

| S.no | Treatment | Field Emergence percent | Plant height 30 cm | Plant height 60 cm | Days to 50% Flowering | Number of pods | Seed yield | Biological yield | Harvest index |
|------|-----------|-------------------------|-------------------|-------------------|-----------------------|----------------|------------|-----------------|--------------|
| 1    | T0        | 83.01                   | 24.4              | 57.9              | 48.9                  | 11.4           | 140.09    | 258.48          | 61.02        |
| 2    | T1        | 88.35                   | 25.8              | 66.2              | 44.1                  | 12.3           | 448.74    | 585.52          | 61.23        |
| 3    | T2        | 86.55                   | 28.1              | 68.1              | 44.3                  | 13.4           | 369.16    | 490.11          | 65.2         |
| 4    | T3        | **94.93**               | **32.1**          | **75.2**          | **39.8**              | **15.5**       | **691.71**| **811.33**      | **67.76**    |
| 5    | T4        | 88.34                   | 27.6              | 68.4              | 42.4                  | 13.0           | 462.99    | 573.33          | 62.10        |
| 6    | T5        | 90.10                   | 30.5              | 72.6              | 42.0                  | 14.1           | 470.41    | 590.95          | 65.25        |
| 7    | T6        | 86.50                   | 26.4              | 72.4              | 42.3                  | 12.8           | 450.92    | 581.72          | 64.26        |
| 8    | T7        | 83.98                   | 28.3              | 70.2              | 43.0                  | 13.4           | 347.21    | 467.54          | 64.22        |
| 9    | T8        | 85.75                   | 27.7              | 69.1              | 44.3                  | 12.4           | 345.95    | 458.02          | 61.98        |
| 10   | T9        | 87.97                   | 28.5              | 66.9              | 45.4                  | 13.3           | 394.59    | 499.98          | 66.57        |
| 11   | T10       | 88.90                   | 28.1              | 71.1              | 45.2                  | 13.2           | 398.21    | 504.38          | 64.50        |
| 12   | T11       | 84.19                   | 28.2              | 64.6              | 45.0                  | 13.7           | 299.41    | 415.37          | 61.40        |
| 13   | T12       | 86.79                   | 28.6              | 69.8              | 45.3                  | 14.7           | 366.78    | 490.49          | 67.66        |
| Grand Mean |     | **87.33**               | **28.1**          | **68.6**          | **43.9**              | **13.3**       | **398.93**| **517.48**      | **64.10**    |

CD@ 5% | SE(m) | SE(d) | CV
---|---|---|---
3.63 | 1.23 | 1.74 | 2.45
0.9 | 0.3 | 0.4 | 1.9
4.76 | 1.63 | 2.30 | 4.11
3.06 | 1.05 | 1.48 | 4.13
0.63 | 0.21 | 0.30 | 2.80
218.38 | 74.78 | 105.76 | 32.47
217.38 | 74.44 | 105.28 | 24.91
6.24 | 2.13 | 3.02 | 6.24

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3.4 Days to 50% Flowering

In among all the treatments the highest was recorded in gibberellic acid with T3 treatments. In plant height the highest was recorded in treatment (T3-GA3 @ 100 ppm for 10 hrs) (39.3) and followed by (T3-neem leaf extract 5% for 10 hrs) (42.0). The lowest was recorded in control (T0) (48.9).

3.5 Number of Pods

In among all the treatments the highest was recorded in gibberellic acid with T3 treatments. In plant height the highest was recorded in treatment (T3-GA3 @ 100 ppm for 10 hrs) (15.5) and followed by (T3-neem leaf extract 5% for 10 hrs) (14.1). The lowest was recorded in control (T0) (11.4).

3.6 Seed Yield

In among all the treatments the highest was recorded in gibberellic acid with T3 treatments. In plant height the highest was recorded in treatment (T3-GA3 @ 100 ppm for 10 hrs) (691.71) and followed by (T3-neem leaf extract 5% for 10 hrs) (470.41). The lowest was recorded in control (T0) (140.09).

3.7 Biological Yield

In among all the treatments the highest was recorded in gibberellic acid with T3 treatments. In plant height the highest was recorded in treatment (T3-GA3 @ 100 ppm for 10 hrs) (811.33) and followed by (T3-neem leaf extract 5% for 10 hrs) (590.95). The lowest was recorded in control (T0) (258.48).

3.8 Harvest Index

In among all the treatments the highest was recorded in gibberellic acid with T3 treatments. In plant height the highest was recorded in treatment (T3-GA3 @ 100 ppm for 10 hrs) (67.76) and followed by (T3-neem leaf extract 5% for 10 hrs) (65.25). The lowest was recorded in control (T0) (61.02).

4. CONCLUSION

On the basis of field trail conducted that we found that seed treatment with the application of T3-GA3 @ 100 ppm for 10 hrs was identified as best treatment in field conditions among all treatments and followed by T3 neem leaf extract for 5% 10 hrs. whereas control (T0) seeds showed lowest readings among all parameters in field pea Finally we concluded that not only GA3 showed good result but also neem leaf extract showed best result on growth and yield parameters. If we implement GA3 and neem leaf extract it gives good results in field conditions as well as in lab conditions and it is also eco-friendly to use.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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