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Gaurav Goyal

M.Sc. Agriculture
(Horticulture-Floriculture and
Landscape Architecture)
Student, Mata Gujri College,
Fatehgarh Sahib, Punjab, India

Jujhar Singh

Assistant Professor,
Department of Agriculture,
Mata Gujri College, Fatehgarh
Sahib, Punjab, India

Effect of different biofertilizer and their combinations on growth and flowering of bedded petunia (*Petunia hybrida*) var. Red Scarlet

Gaurav Goyal and Jujhar Singh

Abstract

The present research "Effect of biofertilizer on *Petunia (Petunia hybrida)* var. Red scarlet" was carried out at Experimental Farm, Department of Agriculture, Mata Gujri College, Fatehgarh Sahib, Punjab during winter season of 2022-2023. The experiment was laid out in randomized block design with seven treatments and treatments were replicated thrice, such as (T₁) control, (T₂) Azotobacter (30 g), (T₃) Acetobacter (30 g), (T₄) PSB (30 g), (T₅) Azotobacter (30 g) + Acetobacter (30 g), (T₆) Azotobacter (30 g) + PSB (30 g) and (T₇) Acetobacter (30 g) + PSB (30 g). It can be concluded that application of Acetobacter (30 g) + PSB (30 g). Show positive result on growth and flowering of bedded *Petunia*. Observations were recorded for growth and for flowering parameters. Among all treatments vegetative parameters such as plant height, leaf length, number of leaves per plant were maximum in (T₇) Acetobacter (30 g) + PSB (30 g) at 60 and 90 DAS. Number of leaves per stem is maximum in (Acetobacter 30 g) at 60 and 90 DAS. Stem length is maximum (11.36 cm) in (T₆) at 60 DAS and (26.60 cm) at 90 DAS in (T₇), number of stem per plant is maximum in (T₆) at 60 and 90 DAS. in flowering parameters maximum number of flowers per stem (5.06), no. of flowers per plant (17.71), flower diameter (5.15), days taken to flower opening (92.22) and duration of flowering (52.36) found best in Acetobacter (30 g) + PSB (30 g). Increases plant height (8.62 cm), leaf length (6.21 cm), No. Of leaves per plant (43.16) at (60 Days). Plant height (26.61 cm), Leaf length (6.87 cm), No. Of leaves per plant (87.12), Stem length (26.60), flower opening (92.22 days), no. Of flowers per stem (5.06), no. Of flowers per plant (17.71), flower diameter (5.15 cm) and duration of flowering (52.6 cm) at (90 days) was observed maximum.

Keywords: Biofertilizer, growth, flowering, *Petunia hybrida*

Introduction

Petunia is a genus of flowering plants with 20 species that are native to South America. The name of the well-known flower with the same name comes from the French, who borrowed the term *petun*, which means "tobacco," from a Tupi-Guarani language. The majority of the *petunia* hybrids (also known as *petunia atkinsiana*) species found in gardens is hybrids. For good reason, *petunias* are among the most well-liked flowering annuals.

In temperate climate, *petunias*, which are Solanaceae family members, are planted as annual bedding and container plants. (Gulser, 2019)^[3]. According to Gerats and Strommer (2009)^[5], *Petunias* are gorgeous, long-flowering annual plants that produce single, double, tiny, or large blooms in vibrant hues. It works well as a potted, border, or bed plant (Dubey *et al.*, 2013)^[2]. *Petunias* are the most well-known bedding plants in the world due to their variety of hues (Kessler, 1998)^[7]. More than 400 *petunia* cultivars are planted in the USA (Kessler, 1998)^[7].

Materials and Methods

The experiment was laid out in Randomized Block Design (RBD) with three replications and seven treatments. There were 21 experimental plots. The treatments comprise T₁ i.e. control, T₂ i.e. Azotobacter (30 gm), T₃ i.e. Acetobacter (30 gm), T₄ i.e. PSB (30 gm), T₅ i.e. Azotobacter (30 gm) + Acetobacter (30 gm), T₆ i.e. Azotobacter (30 gm) + PSB (30 gm) and T₇ i.e. Acetobacter (30 gm) + PSB (30 gm). The biofertilizers were applied to the plants prior weighing 30 gms each on weighing scale. The azotobacter (30 gms), Acetobacter (30 gms) and PSB (30 gms) were weighed and then mix with vermicompost for application to the growing crop *Petunia*.

Corresponding Author:

Gaurav Goyal

M.Sc. Agriculture
(Horticulture-Floriculture and
Landscape Architecture)
Student, Mata Gujri College,
Fatehgarh Sahib, Punjab, India

Result and Discussion

Plant height and stem length (cm)

From result it is clear that maximum plant height as well as stem length at 90 days was found in T₇ (Acetobacter + PSB) which was 26.61 cm and 26.60 cm. Acetobacter and PSB increase plant height because Acetobacter fix nitrogen in plants and nitrogen is responsible for promoting vegetative growth of plants by forming amino acids in plants. PSB provide immobilised phosphorus to plants and phosphorus is responsible for transfer of sugar and starches and nutrient movement of plants. Darandale (2022) ^[1] also observed maximum plant height of sugarcane in combination of PSB and Acetobacter. The result of stem length is closely related with Mahata *et al.*, 2006 ^[4].

Number of leaves per plant

It is clear from result that maximum number of leaves were found in T₇ (Acetobacter + PSB) which were 87.12 at 90 days after transplanting. Acetobacter is nitrogen fixing bacteria and nitrogen promote photosynthesis and formation of amino acids in plants. PSB provide immobilised phosphorus to plants and phosphorus is responsible for transfer of sugar. Darandale (2022) ^[1] also found maximum number of leaves in plants treated with Acetobacter and PSB along with FYM.

Days taken to flowering

Early flowering was noticed in T₆ i.e., Azotobacter and PSB which takes 77.33 days. This is because Azotobacter and PSB is responsible for acceleration of inflorescence in plants. Tripathi *et al.*, (2014) ^[6] reported early flowering of strawberry after applying Azotobacter and PSB. Shukla *et al.*,

(2009) ^[5] also reported early flowering in tomato after applying Azotobacter and PSB.

Number of flowers per plant and per stem

Maximum number of flowers per plant as well as flowers per stem were observed in T₇ i.e., Acetobacter + PSB which were 17.71 flowers per plant and 5.06 flowers per stem. Acetobacter and PSB increase number of flowers because it is responsible to provide available nutrients to plants. Where proteins and sugars are increased in plants; then number of flowers also increased. This result is closely related with Mahata *et al.*, (2006) ^[4] and Darandale (2022) ^[1].

Diameter of flowers (cm)

It is clear from experimental result that, maximum diameter of flowers was observed in T₇ i.e., Acetobacter + PSB. Acetobacter and PSB increase diameter of flowers because it is responsible to provide available nutrients to plants. Application of acetobacter promote formation of proteins in plants. Phosphorus is responsible for transfer of sugar. When proteins and sugars are increased in plants then diameter of flower also increased. This result is closely related with Mahata *et al.*, (2016) ^[4].

Duration of flowering

It is clear from experimental result that, maximum duration of flowering was observed in T₇ i.e., Acetobacter + PSB. Similar trend was followed as when proteins and sugars are increased in plants then flowering duration will also be increased. This result is closely related with Mahata *et al.*, (2016) ^[4].

Table 1: Effect of different biofertilizer and their combinations on growth and flowering parameters of plant

Treatments	Plant height (cm)	Stem length (cm)	Number of leaves per plant	Days taken to flowering	Number of flowers per stem	Number of flowers per plant	Diameter of flower	Duration of flowering
T ₁	13.35	10.88	37074	77.33	1.95	9.01	3.58	36.89
T ₂	15.15	12.97	38085	90.25	2.52	9.73	3.81	45.22
T ₃	15.24	13.56	54.35	88.97	2.39	12.77	3.81	45.83
T ₄	17.72	15.70	50.98	87.22	2.37	9.44	3.75	47.19
T ₅	15.74	14.16	49.95	83.80	2.83	9.27	3.89	50.36
T ₆	23.96	21.36	74.60	86.86	2.64	13.68	3.71	47.17
T ₇	26.61	26.60	87.12	92.22	5.06	17.71	5.15	52.36
S.Em±	1.31	1.48	6.26	2.43	0.44	2.05	0.23	2.69
CD	4.02	4.57	19.29	7.50	1.34	6.32	0.71	8.29

Conclusions

From the above findings it can be concluded that Azotobacter (30 gm) + PSB (30 gm) found most desirable in almost all the parameters. So, Azotobacter (30 gm) + PSB (30 gm) can be recommended for the production of bedded petunia.

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