

Original Research Article

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## Strawberry Runner Production Enhanced by Plant Growth Promoting Rhizobacteria

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### ABSTRACT

The present experiment was conducted at Hi-tech greenhouse of Precision farming development center of the Department of Horticulture, CCS Haryana Agricultural University, Hisar (Haryana) during the year 2016-17 and 2017-18. Strawberry plants were inoculated with different strains of *Pseudomonas* and plants inoculated with *Pseudomonas* strains fertilized with 75% RDF. It was observed that maximum number of runner per plant was recorded in plants fertilized with 100% RDF, however number of runner per plant increased with the application of rhizobacterial strains as compared to control, i.e., 75% RDF. The highest number of runners per plant was obtained from the plants fertilized with treatment PS<sub>0</sub>: 100% RDF (5.80 and 7.50), followed by the treatment PS<sub>10</sub>: 75% RDF + CP109 (4.25 and 7.00), while the minimum number of runners per plant was recorded under the control treatment PS<sub>0</sub>: 75% RDF (3.00 and 4.25) during the year 2016-17 and 2017-18, respectively.

#### Keywords

Strawberry, *Pseudomonas* strains, Runners

#### Article Info

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### Introduction

Strawberry (*Fragaria × ananassa* Duch.) belonging to the family Rosaceae is known as one of the most attractive, delicious and refreshing fruits of the world and occupies an important place among the orchard plants. Strawberry can be successfully grown in plains as well as in hills up to an elevation of 3000 meters above mean sea level in humid or dry regions. In India, the cultivated area under strawberry mainly located in Maharashtra, Himachal Pradesh, Uttar Pradesh, Haryana and the Nilgiri hills is nearly 1,000 ha with a

production of 5,000 tonne, and in Haryana, it is around 150 ha with a production of 2,010 tonne. Hisar and Bhiwani districts of Haryana have emerged as a hub of strawberry in Northern India and the second largest producer of exotic fruit after Mahabaleshwar in Maharashtra (Rao and Saxena, 2017). In this area, strawberry cultivation is picking up fast due to availability of its market in Delhi and its quick considerable income and nutritional values.

The continuous increases in its cultivation acreage should be concomitant with the

development of new production practice (Anuradha *et al.*, 2013). Strawberry is conventionally propagated by runners. Although propagation by runners retains all the characters of the parent but viral diseases are also transmitted through runners especially when parent material is infected. Biofertilizers, more appropriately called microbial inoculants, are the preparations containing live or latent cells of efficient strains of microorganisms. These biofertilizers are a cost effective renewable energy source and play a crucial role in reducing the inorganic fertilizer application and at the same time increasing the quality and yield of flowers besides maintaining soil fertility.

Some of the plant bio-regulators are synthesized endogenously but occasionally needed to be supplemented exogenously for additional stimulus in short duration crops like strawberry that require quick response for increased the runner production. The formation of healthy runners and higher rates of multiplication is one of the pre-requisite of an economically viable propagation. Keeping this in view, the present investigation was undertaken with the objective: Inoculation response of *Pseudomonas* strains on runner production of strawberry.

## Materials and Methods

The experiment was conducted at Hi-tech greenhouse of Precision farming development centre of the Department of Horticulture, CCS Haryana Agricultural University, Hisar (Haryana) situated at 215.2 m above sea level with co-ordinates of 29°10' N latitude and 75° 46' E longitudes during the year 2016-17 and 2017-18. The strawberry cultivar Chandler was chosen for experiment with eleven treatments and four replications. *Pseudomonas* strains were procured from the Department of Microbiology Biocontrol lab. Eleven treatments PS<sub>0</sub> to PS<sub>10</sub> and PS<sub>0</sub>100% RDF and other treatments plants inoculated with *Pseudomonas* strains fertilized with 75% RDF. 5 ml of each strain was taken and inoculated each plants near to root periphery region of plants after the transplanting of strawberry plants when their root established properly.

## Results and Discussion

The data pertaining to number of runners per plant have been presented in Table 1. Different strains of *Pseudomonas* with 75% RDF significantly affected the number of runners per plant in strawberry.

**Table.1** Effect of *Pseudomonas* strains on number of runners per plant in strawberry

Treatments	2016-17	2017-18	Pooled mean
<b>PS<sub>0</sub>: 100% RDF</b>	5.80	7.50	6.65
<b>PS<sub>1</sub>: 75% RDF (control)</b>	3.00	4.25	3.63
<b>PS<sub>2</sub>: 75% RDF + HMM65 (<i>Pseudomonas</i> control)</b>	3.00	4.25	3.63
<b>PS<sub>3</sub>: 75% RDF + HMM92</b>	3.25	4.50	3.88
<b>PS<sub>4</sub>: 75% RDF + JMM15</b>	3.50	4.25	3.88
<b>PS<sub>5</sub>: 75% RDF + JMM19</b>	3.50	5.00	4.25
<b>PS<sub>6</sub>: 75% RDF + HMM57</b>	4.00	5.50	4.75
<b>PS<sub>7</sub>: 75% RDF + WHA87</b>	3.75	6.00	4.88
<b>PS<sub>8</sub>: 75% RDF + CPS67</b>	4.00	6.50	5.25
<b>PS<sub>9</sub>: 75% RDF + MHA75</b>	4.25	6.75	5.50
<b>PS<sub>10</sub>: 75% RDF + CP109</b>	4.25	7.00	5.63
<b>CD at 5% level of significance</b>	<b>0.23</b>	<b>0.28</b>	<b>0.24</b>

The highest number of runners per plant was obtained from the plants fertilized with treatment PS<sub>0</sub>: 100% RDF (5.80 and 7.50), followed by the treatment PS<sub>10</sub>: 75% RDF + CP109 (4.25 and 7.00), while the minimum number of runners per plant was recorded under the control treatment PS<sub>0</sub>: 75% RDF (3.00 and 4.25) during the year 2016-17 and 2017-18, respectively.

The present results are in line with the findings of Tripathi *et al.*, (2015) who reported that increased number of runner per plant might be due to increased growth of plant, which accumulated more photosynthates, therefore, increased the number of runners per plant in strawberry and similar results were reported by Pirlak and Kose (2009) and Gupta and Tripathi (2012).

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