Short Communication

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# Effect of biofertilizers and growing media on growth of air-layers of pomegranate (*Punica granatum)*

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Pomegranate (*Punica granatum* L.) is propagated through sexual and asexual means. Air-layering is most common and practical method of propagation. However, it is limited by variable success of air-layering. It is typically performed during rainy season, i.e. July and August, resulting in more successful rooting. There are different media like soil, sand, vermiculite, FYM, vermicompost, *etc* play an important role in the success of rooting or cutting. Biofertilizers enhance soil biological properties, phosphate solubility, and crop yield (Yosefi *et al*., 2011). Some bacteria supply plants with growth-promoting substances and play a significant role in phosphate solubilization (Abou-Aly *et al*., 2006). Looking the role of biofertilizers and growing media in growth of air-layers of pomegranate, and experiment was conducted.

The experiment was conducted at College of Horticulture, Sardarkrushinagar Dantiwada Agricultural University, Jagudan, Mehsana, Gujarat, during July 2021. The air-layering was performed on five years old pomegranate plants. The layers were detached from mother plants after 50-55 days from the date of operation when the adventitious roots were clearly visible. The randomized complete block design with factorial concept was used. There were ten treatment combinations having different biofertilizer and growing media, *viz*. $T_1$: Bio NPK consortium + soil + sand (1:1, v/v), $T_2$: Bio NPK consortium + soil + FYM (1:1, v/v), $T_3$: Bio NPK consortium + soil + vermicompost (1:1, v/v), $T_4$: Bio NPK consortium + soil + sand + FYM (1:1:1, v/v/v), $T_5$: Bio NPK consortium + soil + FYM + vermicompost (1:1:1, v/v/v), $T_6$: phosphate solubilizing bacteria (PSB) + soil + sand (1:1, v/v), $T_7$: phosphate solubilizing bacteria (PSB) + soil + FYM (1:1, v/v), $T_8$: phosphate solubilizing bacteria (PSB) + soil + vermicompost (1:1, v/v), $T_9$: phosphate solubilizing bacteria (PSB) + soil + sand + FYM (1:1:1, v/v/v) and $T_{10}$: phosphate solubilizing bacteria (PSB) + soil + FYM + vermicompost (1:1:1, v/v/v).

The mixtures of various growing media were filled in plastic polybags (10′ × 8′). Before planting, half of the bags were filled with mixtures, while other half were filled after placing air-layers in middle portion and compressed from the side for complete mixture contact and watered immediately using a watering cane. Each treatment was replicated three times with twenty air layers per replication, for a total of sixty air layers per treatment that are grown for seventy-five days. A sufficient number of air layers of uniform size were developed on mother plants.

During second week of October, rooted air layers were separated from mother plants and transplanted into polybags containing various growing media and biofertilizers. Need-based inter-culturing, hoeing and plant-protection measures were adopted for raising air-layers. Observations on number of new shoots, length of new shoot, length of layer, number of leaves and stem diameter were recorded at 60 and 75 DAP. Fresh and dry weight of shoot were recorded at 75 DAP. They were statistically analyzed.

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The maximum number of new shoots (4.47 and 4.63), length of new shoot (12.60 cm and 13.15 cm), length of layer (48.37 cm and 50.29 cm), number of leaves (106.08 and 116.04) and stem diameter (8.25 mm and 8.33 mm) were recorded at 60 and 75 days respectively after planting along with maximum fresh and dry weight of shoot (12.09 g and 3.01 g) at 75 days after planting were recorded in pomegranate layers planted in bio NPK consortium as compared to phosphorus solubilizing bacteria (PSB).

Rhizobacteria secretes plant growth promoting substance which is responsible for cell elongation and cell multiplication, resulting in increasing length of shoot (Sarita *et al.*, 2019). Maximum numbers of leaves in layers are due to enhanced availability of nutrients and released plant growth stimulating hormones by biofertilizers (Simpi, 2016).

The maximum number of new shoots (4.97 and 5.06), length of shoot (14.02 cm and 14.64 cm), length of layer (51.46 cm and 53.26 cm), number of leaves (110.64 and 121.27) and stem diameter (8.53 mm and 8.62 mm) at 60 and 75 DAP, respectively along with maximum fresh and dry weight of shoot (13.61 g and 3.55 g) at 75 DAP were noted in pomegranate layers planted in medium $G_5$ consisting soil + FYM + vermicompost (1:1:1, v/v/v).

Vermicompost promoted vegetative growth due to its high micronutrient content in rooting media (Kumar *et al*., 2015). A greater number of leaves due to improved soil texture, structure, porosity, water-holding capacity, the activity of beneficial soil microfauna and flora, maintained soil temperature and improved soil health and nutrient status of media. Better nutrient availability leads to a higher production of photosynthetically active leaves in these media, increasing an increase in stem diameter (Borah *et al*., 2008).

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The increase in number of new shoots might be due to optimum nitrogen uptake might have reduced the C: N ratio and thereby inducing buds in earlier days (Kumar and Ponnuswami, 2013). When biofertilizers are added to the media it increases rhizosphere activity and thereby better nutrient uptake Thus, bio NPK consortium and soil + FYM + vermicompost (1:1:1, v/v/v) were found to be superior for growth parameters of pomegranate air-layers in terms of shoot with gross return under net house condition.

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