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PJBS

ISSN 1028-8880

Pakistan Journal of Biological Sciences

ANSInet
Asian Network for Scientific Information
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan

Pakistan Journal of Biological Sciences 3 (5): 810-811, 2000

Effect of Different Substrates on the Growth of *Phlox* drummondii

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Abstract: The growth of *Phlox drummondii* on different substrates (vegetable compost alone ml, vegetable compost + sand m2 (1:1), vegetable compost + compost + garden soil m3 (1:1) and vegetable compost + sand + garden soil m4 (1:1:1) was studied. The maximum number of days (32.67) to branching was recorded in substrate m4 while minimum number of days (26.0) to branching was noted in substrate m2. Maximum number of branches/plant (11.0) was noted in plants grown in substrate m2 while minimum number of branches/plant (.934) was recorded in substrate ml. Maximum number of leaves/plant (46.67) and minimum number of leaves/plant (39) was recorded in substrate m2 and substrate ml respectively. The plant height recorded in substrate m2 was maximum (16.0 cm) while that was minimum (10.87 cm) in substrate m4.

Keywords: m1.Vegetable compost alone, m2.Vegetable compost + Sand, m3.Vegetable compost + garden soil. m4.Vegetable compost + Sand + garden soil

Introduction

In order to utilize the vegetable waste, these can be collected and decomposed and so vegetable compost c an be formed which can be applied as a growth medium alone or in combinations with other media. Argo and Biernbaum (1995) noticed that media with a high water holding capacity required few irrigation and fertilizer applications than those with a low water holding. Further they recorded that media showed greatest differences in media nutrient concentrations between the top 25 cm (top-layer) and the remaining root medium within the same pot (root size).

Gupta *et al.* (1993) evaluated the nutritional value of vegetable wastes in India and their possible use as livestock feed. The wastes were fairly rich in protein but poor in soluble carbohydrates although comparatively rich in crude fibers. Products were rich in Ca but ranged from fair to poor in P.

Markovic *et al.* (1995) planted tomato and capsicum seedlings and obtained high quality seedlings using Zeoplant mixed with peat (2:1), with 70 percent peat + 30 percent manure (2:1) and with compost (2:1).

Minuto and Accati (1995) recorded that plant grow better on perlite than on the traditional compost soil:peat and leaf mould), producing more shoots and is being taller. Piccioni *et al.* (1995) reported that plants propagated from cuttings could be grown as well in medium composed of 50 percent composted urban waste as in the control medium (without the composted waste) and plants raised from seed were more sensitive to the presence of the composted waste specially if comprised more than 25 percent of the medium. Shanthi *et al.* (1993) used three species of earthworms, *pheretima posthuma*, *Eisenia* sp. and *Perionyx excanatus* in the degradation of vegetable wastes. Laboratory tests showed that *P. excavatus* was able to withstand greater ranges of moisture and temperature than other species and thus in more suited for use in vermicomposing. They also noticed that it is essential to mix stabilized waste or soil in unstable waste to provide a warm support material. According to Singh *et al.* (1995) the growth performance of plant was maximum in a treatment receiving 1:2 soil/compost mixture (v/v) followed by 1:1 and 1:05 soil/compost mixtures and the no compost (control).

Materials and Mathods

To study the effect of different substrate on the growth of *Phlox drummondii,* a research work was conducted at Ornamental Horticultural Nursery Farm, NWFP, Agricultural University, Peshawar in the year 1997.

The experiment was laid out in Randomized Complete Block Design, with four treatments and three replications. Total number of plastic bags were 48. Phlox seedlings were planted one in each plastic bag.

First vegetable compost was prepared by decomposing the undesirable parts of different vegetables like cauliflower, spinach, lettuce, potato, tomato, cucumber, turnip, okra, peas and squashes, in a pit. Their decomposition took about four months. After decomposition the compost was analyzed in the laboratory which showed that vegetable compost contains $CaCO_3$ = 17.75 percent, organic matter = 0.93 percent, nitrogen = 0.046 percent, phosphorus = 125.8 ppm, potassium = 540 ppm, TSS (Total soluble solids) = 0.96 percent, pH = 8.4.

Irrigation was applied uniformly during the research work and data was recorded on days to branching number of branch per plant, number of leaves per plant and plant height.

Results and Discussion.

The mean values for the number of days to branching revealed that maximum days (32.67) were taken by the *P. drummondii* to branching grown in treatment 4 (vegetable compost + Sand + garden soil) while minimum days (26) were taken in treatment 2 (vegetable compost + Sand).

The mean values for the number of branches per plant show that maximum number of branches per plant (II) was recorded in treatment 2 (vegetable compost + Sand) while minimum number of branches per plant (9.34) was recorded in treatment 1(vegetable compost alone). Similarly the mean value for number of leaves per plant show that maximum numbers of leaves per plant (46.67) was recorded in treatment 2 (vegetable compost + sand while minimum No. of leaves per plant (39) in treatment 1 (vegetable compost alone) likewise from the mean values for plant height (cm) it is obvious that the plant grown in treatment 2 attained maximum plant height (16 cm) where as plant height (10.83) was minimum in treatment 4 (Table 1).

The mean value for different parameters was maximum in substrate (vegetable compost + sand) this may be due to the fact the treatment was well aerated and well drained. Roots were easy to penetrate deeply and there was more absorption of nutrient, which increased the vegetative growth and so more number of leaves. The more number of leaves manufactured more photosynthate as a result, which increased plant height and produced more number of branches per plant.

Table 1: Effect of different substrates on number of days to branching of *Phlox drummondii*

Treatment/substrates	Days to branching	No. Of branches/plant	No.of leaves/plant	plant height
Vegetable compost	28.67 BC	9.34	39.0	14.34AB
Vegetable compost + Sand	26.00C	11.0	46.7	16.00A
Vegetable compost + Garden Soil	30.00AB	9.67	42.7	12.67
Vegetable + Sand + Garden soil	32.00A	10.0	41.3	10.87
Significant	*	NS	NS	*
Standard Deviation	1.70	1.80	9.28	1.30

The mean values followed by different letters are significantly different from one another. *Significance at $p < 0.05$ and NS denotes for not significant

Recommendation: The following recommendation can be made on the basis of research conducted. To protect the environment, vegetable waste should be collected and stored in a pit for the purpose of converting the nutrient contained in the residue in more readily available form instead of throwing openly in environment. The investigation revealed that vegetable compost + sand showed good performance.

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