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# Effect of different levels of vermicompost on growth characteristics and flowering geranium

**Shirin Borji[1], Mohsen Khodadadi[2] and Hamid Reza Mobasser[3*]**

1- MSc student, Department of Horticultural Science, Science and Research Branch, Islamic Azad University, Zahedan, Iran
2- Department of Horticultural Science, Science and Research Branch, Islamic Azad University, Zahedan, Iran
3- Department of Agronomy, Zahedan Islamic Azad University, Zahedan, Iran

***Corresponding author*:** Hamid Reza Mobasser

**ABSTRACT:** Floriculture and ornamental plants in the country in terms of having the perfect climatic conditions is of utmost importance. Therefore, the present study was to investigate the effect of different doses of vermicompost on the growth characteristics of three species of geranium done. During the experiment, traits such as stem diameter, percent leaf nitrogen, bulk density, true- examined. The aim of this experiment was to examine the effects of vermicompost fertilizer to reduce the use of chemical fertilizers and fertilizer system with less. Results showed that 50 % of vermicompost fertilizer treatments better effects than other treatments on growth and flowering characteristics is cranesbill. After 50% vermicompost fertilizer treatments, the treatment effect of 70% better than other treatments on growth and flowering characteristics of the geranium plant.

***Keywords:*** geranium, vermicompost, growth.

## INTRODUCTION

In recent years, increasing consumer concern about issues such as food quality, environmental safety and soil conservation has led to a substantial increase in the use of sustainable agricultural practices. Sustainable agriculture can be defined as a set of practices that conserve resources and the environment without compromising human needs, and the use of organic fertilizers such as animal manure has been indicated as one of its main pillars (Tilman, 2002). The use of organic matter such as animal manures, human waste, food wastes, yard wastes, sewage sludge and composts has long been recognized in agriculture as beneficial for plant growth and yield and the maintenance of soil fertility. The new approaches to the use of organic amendments in farming have proven to be effective means of improving soil structure, enhancing soil fertility and increasing crop yields. Organic matters are excellent source of plant-available nutrients and their addition to soil could maintain high microbial populations and activities (Patil, 1998; Zende, 1998). The results of several long-term studies have shown that the addition of compost improves soil physical properties by decreasing bulk density and increasing the soil water holding capacity (Weber, 2007). Moreover, in comparison with mineral fertilizers, compost produces significantly greater increases in soil organic carbon and some plant nutrients (García-Gil, 2000, Bulluck, 2002, Nardi, 2004, Weber, 2007). Long-term beneficial effects of composted materials are also observed in soil humic substances (due to an increase in the complexity of their molecular structure, which increases the humic/fulvic acid ratio), as well as in soil sorption properties (with increased cation exchange capacity and base saturation) (Weber, 2007). Bevacqua and Mellano, (1993) reported that compost-treated soils had lower pH and increased levels of organic matter, primary nutrients, and soluble salts. In crop studies, Bryan and Lance, (1991) found that tomatoes grown in compost-amended soils yielded more. Maynard, (1993) also reported increases in fruit yield of compost-amended plants compared with those growing in soil alone. Other benefits from the use of compost include the possible reduction of hazards from nitrate leaching into groundwater compared to those from inorganically fertilized controls (Maynard, 1989). As a result of the different processes involved in the production of compost and vermicompost, they exhibit different

physical and chemical characteristics that affect soil properties and plant growth in diverse ways. Vermicomposting generally converts organic matter to a more uniform size, which gives the final substrate a characteristic earthy appearance, whereas the material resulting from composting usually has a more heterogeneous appearance (Ndegwa and Thompson, 2001; Tognetti, 2005).

## MATERIALS AND METHODS

Greenhouse experiment in 2012, located in the vanguard of latitude 50 degrees, 11 minutes north of Karaj Hisarak and longitude 35 degrees 31 minutes east, with an altitude of 1360 meters above sea level, was carried out. Factors investigated in this study include different levels of vermicompost (A), which includes the following levels: Vermicompost zero control (a1), 25% vermicompost (a2), 50% vermicompost (a3), 75% vermicompost (a4), 100% vermicompost (a5). Factor species (B) in three levels: normal geranium (Pelargonium zonal) (b1), geranium torpedo (Pelargonium grandiflorum) (b2), geranium screws (Pelargonium peltatum) (b3). In this experiment, a total of 15 treatments and four replications. This test pots with a diameter of 10 cm height and 20 respectively. After preparing the litter pots on the first factor acting to transfer Nsha'hay geranium pots is 25 days. During the period of growth and flowering of measures such as irrigation, nutrition and weeds (as hand weeding) were performed. Greenhouses for plant growth temperature of 18 ° C per day geranium about 15 ° C at night during the experiment were set. During the experimental period the plants were irrigated based on the estimated percentage of field capacity equally. During the experiment, plants were irrigated based on the estimated percentage of field capacity equally. Substrate physical properties such as bulk density and true density were measured. Since the bed material at the time of planting until the pot was filled with medium height reduction of the pot at the end of the bed as a backdrop was also investigated.

## RESULTS AND DISCUSSION

### *Plant height*

Analysis of variance showed a significant effect on the rate of consumption of vermicompost% probability level height was geranium species. Species and species interaction effect of vermicompost on plant height was not significant. Results showed that 50% of mean zero and 100% vermicompost most effective treatments of vermicompost had the least effect on plant height compared to the other treatments. Different species mean that there was any difference between the heights of three species of geranium.

### *Stem diameter*

Analysis of variance showed a significant effect on the rate of consumption of vermicompost% probability level geranium species found on stem diameter. Species and species interaction effect of vermicompost on plant stem diameter were not significant. Comparison results showed that treatment with 50% vermicompost and 75% vermicompost greatest impact on plant stem diameter compared with other treatments. Zero treatments, no significant difference was observed between 25 and 100% vermicompost.

### *Stem dry weight*

Analysis of variance showed a significant effect on the rate of consumption of vermicompost% probability level on shoot dry weight was geranium species. Species and species interaction effect of vermicompost on shoot dry weight was not significant. Comparison results showed that 50 and 75% vermicompost greatest effect on stem dry weight compared to the other treatments.

Table 1. Analysis of variance of the studied traits

| S.o.v | df | Plant height | Stem diameter | Stem dry weight | Stem wet weight | Root dry weight | Root wet weight | leaf nitrogen (%) |
|---|---|---|---|---|---|---|---|---|
| R | 3 | $^{ns}$23.372 | $^{ns}$24.3 | $^{ns}$32.0 | $^{*}$20.15 | $^{ns}$06.0 | $^{ns}$77.0 | $^{**}$16.0 |
| Species | 2 | $^{ns}$15.92 | $^{ns}$82.2 | $^{ns}$25.0 | $^{*}$71.12 | $^{ns}$07.0 | $^{ns}$51.0 | $^{**}$19.0 |
| Vermicompost | 4 | $^{**}$44.2239 | $^{**}$72.41 | $^{**}$10.1 | $^{**}$72.13 | $^{*}$07.0 | $^{**}$83.27 | $^{**}$17.0 |
| Species* Vermicompost | 8 | $^{ns}$81.45 | $^{ns}$25.1 | $^{ns}$27.0 | $^{ns}$73.2 | $^{ns}$02.0 | $^{ns}$12.5 | $^{ns}$00.0 |
| Error | 42 | 03.153 | 34.2 | 25.0 | 56.3 | 02.0 | 73.2 | 01.0 |
| C.V | 59 | $^{ns}$23.372 | $^{ns}$24.3 | $^{ns}$32.0 | $^{*}$20.15 | $^{ns}$06.0 | $^{ns}$77.0 | $^{**}$16.0 |

*, **, ns: significant at p<0.05 and p<0.01 and non-significant, respectively

### *Root dry weight*

Analysis of variance showed a significant effect on the rate of vermicompost consumption level of five percent of the dry weight of roots was geranium species. Effect of interaction rate of vermicompost on root dry weight was

not significant. Comparison results showed that treatment with 50% vermicompost had the greatest root dry weight compared to the other treatments. Treatments of zero, 25, 75 and 100% vermicompost were no significant difference.

***The true the specific gravity***

Analysis of variance showed that the use of vermicompost, worm compost and strain rate effects as well as interaction between the real the specific gravity is not significant.

***Soil bulk density***

Analysis of variance showed that the use of vermicompost, worm compost rates in effect as well as the interaction of the Soil bulk density was not significant.

***Stem wet weight***

Analysis of variance showed a significant effect on the rate of consumption of vermicompost% probability level has a wet stem geranium species. Any effect on shoot fresh weight was significant at the five percent level, but the interaction and the amount of vermicompost on shoot fresh weight was not significant. Results showed that treatment with 50% vermicompost mean maximum and zero percent vermicompost treatment than other treatments have had the lowest shoot fresh weight. Species geranium comparison shows that the most common species and geranium bolt stem fresh weight was minimal.

***Leaf nitrogen (%)***

Analysis of variance showed a significant effect on the rate of consumption of vermicompost % probability level is the amount of leaf nitrogen species geranium. Any effect on the amount of nitrogen in leaves % probability level was significant. The results of data analysis showed that the interaction rate of vermicompost and nitrogen content of the leaves was not significant .Comparison results showed that treatment with 100% vermicompost had the highest rate of leaf nitrogen than other treatments. Between zero and 25% treatments and a significant difference was observed between 50 and 75 % vermicompost. Geranium species comparison showed that the average maximum and minimum leaf nitrogen was geranium screws. Results show that in 50% vermicompost fertilizer treatments better effect than other treatments on growth and flowering characteristics is cranesbill. Studies showed that vermicompost through increased water retention, nutrient supply and production of plant hormones that corrective effect on seed germination; it can have a positive effect on plant growth.

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