

# To Formulate a Proportionate Dose of Earthworm Compost for Dianthus, Celosia and Gaillardia

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**Abstract**—Vermicompost prepared from farm yard manure (FYM) by employing earthworms was mixed with soil in different proportions and applied to garden plants *Dianthus*, *Celosia* and *Gaillardia* to see the effects of most appropriate treatment for maximum yield in terms of number of flowers and vegetative growth of plant. The experiment was carried out for a period of four months from September, 2014 to December, 2014. Twelve plants of each genus were selected and divided into two sets, each set comprising of plants treated as replicates and received different treatments varying from F1 to F6. All the plants were allowed to grow in similar environmental conditions. For maximum yield of *Dianthus* F4 (600g vermicompost + 1900g soil) and of *Celosia* and *Gaillardia* F5 (800g vermicompost+ 1700g soil) was observed revealing F4 as the most appropriate treatments for maximum produce of *Dianthus* and F5 for *Celosia* and *Gaillardia*.

## 1. INTRODUCTION

The green revolution in India in 1906 was a mixed blessing. Ambitious use of agrochemicals boosted food production but also destroyed the agricultural ecosystem. The adverse impacts of indiscriminate and injudicious use of fertilizers and pesticides in Indian agriculture were realized late by Indian farmers and agricultural scientists and now they are anxious to find economically cheaper and ecologically safer alternatives to agrochemicals [10] Even the methods of agrochemical use were not sustainable.

Vermicompost and vermicast are the main organic minerals, showing to mitigate the disastrous consequences of agrochemicals. The quality and value of agricultural organic soil amendments are measured in terms of their contributions on nutrient supplies and soil fertility [2]. Moreover, organic manure is easily available to the farmers and is cost effective as compared to that of inorganic fertilizers [1]

The process of creating worm castings is probably the most efficient means of recycling kitchen and yard wastes at the same time improving the yield of plant products. While the castings are concentrated and rich in Nitrogen, Phosphorus and Potassium [4,5] they are gentle enough to be applied in direct contact to sensitive plants without fear of burning. Worm castings also supply essential macro nutrients along with a range of micronutrients and trace elements [3] and are

loaded with beneficial soil microbes that will help restore life and health of depleted and worn out garden soils.

Vermicompost is organic biologic manure obtained by passing semi decayed organic material through the digestive tract of earthworm species and its disposal from their body. Vermicompost is finely divided mature peat like material that is produced by a non thermophylic process involving interactions between earthworms and microorganisms [6].

## 2. MATERIALS AND METHODS

The experiments were conducted in the Botanical garden, Gargi College. The experiments were carried out for a period of four months from September, 2014 to December, 2014 to see the impacts of vermicompost prepared from cow dung, 12 plants of each crop were selected and divided into six sets (F1 to F6), each set comprising of two replications. Each set was provided with a different dose of biofertilizer. First treatment is comprised of control having no addition of compost.

Subsequent treatments were prepared with proportions shown in table 1. The pots used for experiments were filled with equal amount of soil in all the treatments and replications. All the plants were allowed to grow in similar environmental conditions.

Total yield of crops in terms of number of flowers and heights of plants were estimated. Data was analyzed and results were drawn in terms of most appropriate treatment for maximum yield in terms of height of plant and number of flowers.

**Table 1: Mixture set for *Dianthus*, *Celosia* and *Gaillardia***

Treatments	Soil (g)	Vermicompost Percentage
F1	2500	0
F2	2300	8
F3	2100	16
F4	1900	24
F5	1700	32
F6	1500	40

### 3. RESULTS AND DISCUSSION

The application of vermicompost on garden plants *Dianthus*, *Celosia* and *Gaillardia* in present studies revealed that the most appropriate treatments for maximum yield in terms of number of flowers and vegetative growth of the plants including stem height are F4, F5 and F5 respectively as compared to control F1 and other treatments mentioned (Fig. 3-5)

Maximum number of flowers of *Dianthus* were obtained in F4 treatment (Vermicompost is 24% w.r.t. soil). Yield in terms of number of flowers is same for treatments F2 (Vermicompost is 8%), F3 (Vermicompost is 16%) and F5 (Vermicompost is 32%). Number of flowers obtained with F1 were comparatively lesser. For F6 (Vermicompost is 40%), the number of flowers are still lesser than control which is not a suitable proportion for the plant growth also (Plate1)

Maximum number of flowers of *Celosia* and *Gaillardia* were obtained with F5 (Fig. 1 and 2). For *Celosia* no inflorescence was seen till the end of September. F5 proved to be the most appropriate and recommended treatment as inflorescence appeared in first week of October and the produce obtained was also highest.

For *Gaillardia* flowering was delayed till third week of October for other treatments i.e.F1 and F3. The produce obtained with F4 and F6 was half of that with F5

The vegetative growth including height of the plants of *Dianthus* was seen with F4 and for *Celosia* and *Gaillardia* with F5 treatments.

Effect of earthworm castings on the growth and yield of wheat crop @ 1lb per 20lb of soil and 4lb per 20lb of the soil showed an increased yield of grains by 18% and 20% respectively [9].

Worm castings were found to have higher nutrient status than the corresponding surface soils. Rice grown on worm cast produced higher shoot dry weight than grown on surface soils [7].

Application of vermicompost @ 1t/ ha on groundnut resulted into higher net returns compared with the control (Malligawat et al, 2000). Bio humus produced by vermiculture resulted into an increased yield of celery by 150% and yield of turnips by 50%, compared to unfertilized controls [11]

Vermicompost application to *Capsicum annum* L. (cv Punjab Lal) showed maximum yield in terms of number of fruits, weight of fruits (g) and length of fruits (cm) with most appropriate treatment [4,5]

Similar results were shown by present studies on flowering plants which reported an increased yield of flowers and

vegetative growth in terms of stem height with application of appropriate dose.

These results are in compliance with maximum yield and for management of natural resources and residue for higher productivity and monetary results.

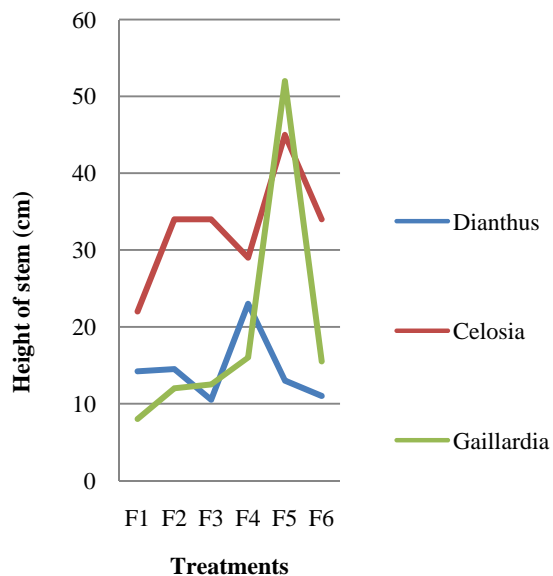


Fig. 1: Comparative account of height of stem (cm)

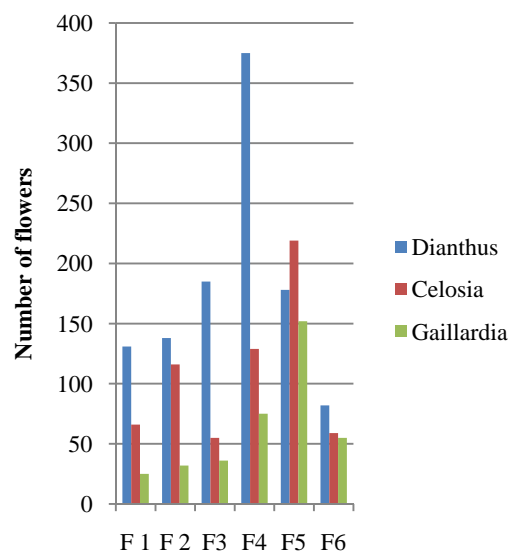


Fig. 2: Produce in terms of number of flowers



Fig. 3: Treatments for Dianthus



Fig. 5: Treatments for Gaillardia



Fig. 4: Treatments for Celosia

**Plate 1: Comparison of control and most appropriate dose for three plants**

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