IJRD International Journal of Research & Development Organisation

ISSN: 2455-7668

Journal of Agricultural and Research

EFFICACY OF DIFFERENT LEVELS OF VERMILIQUER ON YIELD ATTRIBUTES OF POTTED MARIGOLD IN BHARATPUR, CHITWAN.

Shrestha, B.[1*]

[1] * Author, Bishal Shrestha, Assistant Professor, Department of Horticulture, Agriculture and Forestry University, Nepal. shrbishal.afu@gmail.com

ABSTRACT

A pot culture experiment was conducted in Complete Randomized Design with four replications to assess the efficacy of different doses of vermiliquer on yield attributes of African marigold. Marigold planted in earthern pots were drenched with five different levels of vermiliquer i.e. Control, 25%, 50%, 75% and 100% vermiliquer at the rate of 150 ml/pot/week for five weeks. Study revealed that vermiliquer enhanced the yield characteristic of marigold. The maximum fresh weight of flower as well as dry weight was observed at 50 percent vermiliquer application followed by 75 percent vermiliquer application which was at par with 25 percent vermiliquer. Similarly the highest number of flower bud on marigold plant was found at 50 percent vermiliquer application (16) which was followed by 75 percent and 25 % vermiliquer application (14, 12) respectively which gave highest yield of flower per plant at the treatment of 50% vermiliquer application.

Key words: Vermiliquer, drenching, efficacy, yield

1. INTRODUCTION

Vermiliquer, a liquid leachate collected after passing water through the column where earthworms, vermicompost and organic matter are kept. The collected liquid can be drenched or used as foliar spray. Vermiliquer consist of excretory and secretory product of earthworm along with micronutrient, sugars, amino acids and phenols (Ismail, 1997, Ansari, 2008).Vermicompost, the solid form may be difficult for some plants in absorbing nutrients, unlike that vermiliquer facilitates the plants in speedy absorption of nutrients and results in increased plant immune power. The increase in level of beneficial microorganism in soil by vermiliquer promotes the enzymatic degradation of phosphorous compound occurring naturally in soil making it easier to be used by plant for their growth and development (Trivedi and Bhatt, 2006).

Marigold (*Tagetes erecta* L.) is the commercially exploited flowers of family compositae. Broadly marigold is divided into 2 groups i.e. African marigold (*Tagetes erecta* Linn.) and French marigold (*Tagetes patula* Linn). The African marigold flowers are primarily used in Nepalese context in decoration of houses stalls etc in several social and religious functions.

The area under marigold have been stagnant over many years in Nepal and many constraints including unavailability of inorganic fertilizers for its commercial cultivation has also

been one of the bottleneck in modern floriculture business of Nepal. Thus the use of vermi products in this crop can also provide additional advantage. Thus the two way advantage can be obtained by utilizing the biodegradable solid wastage for the preparation of vermi products and again using these products in crop production. Thus this chain may be a milestone in the development of organic agriculture in Nepal.

2. MATERIALS AND METHODS

A pot experiment was conducted in complete randomized design with four replication in 2014 to assess the efficacy of different doses of vermiliquer on the growth, quality and yield characteristics of African marigold. In each treatment of a replication 5 plants were planted in separate pots as sample plants. The data from each sample plants were taken and analyzed. In parameter weight of flower the weight of each flower on a plant was taken and averaged. Marigold planted in earthern pots were drenched with five different levels of vermiliquer i.e. Control, 25%, 50%, 75% and 100% vermiliquer at the rate of 150 ml/pot/week for five weeks. In control water was used for drenching. Different yield parameters (fresh weight and dry weight of flower, number of flower bud and yield per plant) were taken during the study period.

The parameters were recorded and analyzed by using the ANOVA procedure described by Gomez and Gomez (1984). When the F-test indicated statistical significance at the P = 0.01 and P = 0.05 level, the Duncan's Multiple Range Test was used to compare the difference of the means by using M-Stat.

3. RESULT AND DISCUSSION

Effect on yield attributes.

3.1 Fresh and dry weight of flower.

The experiment revealed the fact that the doses of vermiliquer had significant effect on the weight of flower of marigold. The maximum fresh weight of flower (32 gm) was observed at 50 percent vermiliquer application followed by 75 percent vermiliquer application (25 gm) which was at par with 25 percent vermiliquer (22 gm) (Table 1). The minimum fresh weight of flower (18 gm) was observed in 100 percent vermiliquer application which was at par with control treatment (18 gm). Similarly, significantly higher dry weight of flower (4.6 gm) was recorded at 50 percent vermiliquer application (Table 1). The dry weight of flower produced by other treatments was at par.

Table 1. Weight of flower as influenced by different levels of vermiliquer in potted marigold at Bharatpur, Chitwan, Nepal, 2014

Treatments	Weight of flower (gm)	
	Fresh	Dry
Control	18[c]	2.5[b]
25% vermiliquer	22[bc]	3.2[b]
50% vermiliquer	32[a]	4.6[a]
75%verminiquor	25[b]	2.9[b]
100%vermiliquer	18[c]	2.6[b]
LSD	4.66*	0.68**
SEM(±)	1.513	0.22
CV (%)	12.53	13.87
Grand mean	24.15	3.175

Means followed by common letter (s) within column are non – significantly different based on DMRT at P = 0.05. NS-Non significant. SEm-Standard Error of Mean. CV-Coefficient of Variation

A positive correlation between plant fresh weight and N uptake by plants explains yield response to vermiliquer across treatments. Enhanced overall root development accompanied with better nutrient uptake by vermiliquer treated plants compared to control plants suggests that improved root growth or nutrient uptake per unit root is one of the mechanisms involved in plant growth stimulation and flowering. According to (Xue *et al.*, 2001; Ingham, 2005a), soluble mineral nutrients and microbial by products in vermiliquer can enhance nutrient uptake from the soil and increase foliar uptake of nutrients by plants. Arancon *et al.* (2007) also reported that humic, fulvic and other organic acids extracted or produced by microorganisms in vermicompost tea could promote plant growth and flowering.

3.2 Number of flower bud and yield of flower.

The effect of different doses of vermiliquer on number of flower bud of potted marigold was found highly significant ($p<0.01$). The highest number of flower bud on marigold plant was found at 50 percent vermiliquer application (16) which was at par with 75 percent (14) (Table 2).

The lowest number of flower bud on potted marigold plant (7) was recorded at 100 percent vermiliquer application which was at par with control (9) (Table 2).

Table 2. Effects of different doses of vermiliquer on number of flower bud and yield per plant of potted marigold at Bharatpur, Chitwan, Nepal, 2014

Treatments	Number of flower bud	Yield per plant (gm.)
Control	9^{c}	162^{c}
25% vermiliquer	12^{b}	264^{b}
50% vermiliquer	16^{a}	512^{a}
75%vermiliquer	14^{ab}	350^{b}
100%vermiliquer	7^{c}	126^{c}
LSD	2.415**	87.13**
SEM(±)	0.78	28.28
CV (%)	12.15	17.68
Grand mean	12.90	319.85

Means followed by common letter (s) within column are non – significantly different based on DMRT at P = 0.05. NS-Non significant. SEm-Standard Error of Mean. CV-Coefficient of Variation

The yield of flower per plant of marigold was also found significantly ($p<0.01$) (Appendix 15) affected by the doses of vermiliquer, where the highest flower yield per plant (512 gm.) was found with 50 percent vermiliquer application followed by 75 percent(350gm) which was at par with 25% of vermiliquer application (264 gm) (Table 2). The lowest yield of flower per plant (126gm) was recorded at 100 percent vermiliquer application which was at par with control treatment (162 gm).

The vermiliquer effect on crop yield was attributed largely to additional mineral nutrient uptake by plants. Various experimental evidences indicated that applications of water-based compost and vermicompost extract improved plant health, yield and nutritional quality (Elad and Shtienberg, 1994; Scheuerell and Mahaffee, 2002; Welke, 2005; Edwards *et al.*, 2006)..

Sivasubramanian and Ganeshkumar (1998/99) also found similar result who observed the highest mean number of flowers produced per plant (28) and maximum mean weight (168.30 g) of marigold with vermiwash treatment (168.30 g).

CONCLUSION:

Vermiliquer supplied a considerable amount of soluble N to each plant compared to control. A positive correlation between plant fresh weight and N uptake by plants explains yield response to vermiliquer across treatments. The best yield response was observed with 50% of vermiliquer, indicating that the increased overall root development may have contributed to better nutrient uptake and increased leaf area where as plant growth was obtained higher in case of application of 75% of vermiliquer. This study confirmed that vermiliquer can positively influence plant growth, quality and yield. However the higher concentration beyond the critical level (75%) showed consistently adverse effect on growth and development of marigold plant.

REFERENCES:

1. Ansari, A. A. 2008. Effect of Vermicompost and Vermiwash on the productivity of Spinach, *Spinacia oleracea*, Onion *Allium cepa* and Potato *Solanum tuberosum*. World Journal of Agricultural Sciences, IDOSI Publications 4(5): 554-557
2. Arancon, N. Q., C. A. Edwards and P. Bierman. 2006. Influences of vermicomposts on field strawberries: Part 2. Effect on soil microbiological and chemical properties. *Bioresoure Technology* 97: 831–840.
3. Edwards., C.A., N. Q. Arancon and S. Greytak. 2006. Effects of vermicompost teas on plant growth and disease. BioCycle 47: 28-31.
4. Elad, Y. and D. Shtienberg. 1994. Effect of compost water extracts on grey mould (Botrytis cinerea). Crop Prot. 13: 109-114.
5. Ingham, E. R. 2005a. The Compost Tea Brewing Manual; Latest Methods and Research. Soil Food Web Inc., Corvallis
6. Ismail, S. A. 1997. Vermicology. The Biology of Earthworms. Orient Longman Press, Hyderabad. 92p
7. Scheuerell., S. J. and W. F. Mahaffee. 2002. Compost tea: Principles and prospects for plant disease control. Comp. Sci. Util. 10, 313-338.

8. Sivasubramanian, K. and M. Ganeshkumar. 2004. Influence of vermiwash on the biological productivity of marigold. Madras Agriculture journal 2004. 91: 221–225.
9. Trivedi, R. and S. A. Bhatt. 2006. Phosphatase activity in semi- arid soils of Pathan. Asian Journal of Microbiology, Biotechnology and Environmental Science 8: 303-305.
10. Welke, S. E. 2005. The Effect of Compost Extract on the Yield of Strawberries and the Severity of *Botrytis cinerea*. Journal of Sustainable Agriculture 25: 57-68.
11. Xu, H. L., X. Wang and J. Wang. 2001. Effect of a Microbial Inoculant on Stomatal Response of Maize Leaves. Journal of Crop Production: agricultural management in global context 3: 235-243.