ZIBELINE INTERNATIONAL™ PUBLISHING

Science Heritage Journal (GWS)

DOI: http://doi.org/10.26480/gws.01.2023.24.26

ISSN: 2521-0858 (Print)
ISSN: 2521-0866 (Online)
CODEN: SHJCAS

RESEARCH ARTICLE

GROWTH AND DEVELOPMENT RESPONSE OF GAZANIA *(GAZANIA RIGENS)* TO DIFFERENT SOURCES OF CROP RESIDUES AS GROWING MEDIA

Abdul Kareem[a*], Aneeq Ahmad[b], Muhammad Waqas[c]

[a]Department of Horticulture, Ghazi University, Dera Ghazi Khan
[b]Department of Horticulture Khwaja Fareed University of Engineering & information Technology, Rahim Yar Khan, Punjab
[c]Department of Plant protection, Ghazi University, Dera Ghazi Khan
[*]Corresponding Author Email: karimalayani@yahoo.com

ARTICLE DETAILS

Article History:

Received 19 June 2023
Revised 25 July 2023
Accepted 07 August 2023
Available online 10 August 2023

ABSTRACT

This study investigated effects of various crop residues on Gazania development and growth. A twenty-day pot research was conducted with transplant seedlings on various crop residues as media, including FYM+Silt (1:3), FYM+Silt (1:3) cockscomb and maize residues as treatment Silt as FYM+Silt control (1:3). Completely Randomized Design (RCBD) was applied to test the significance of the treatments and to compare them. The effectiveness data was. FYM+Silt (1:3) was noticeably better at competing with assessed crop residues. As a result, FYM+Silt (1:3) strongly influenced plant height (38.66 cm) with maximum number of leaves (392.00) and more number of branches (45.66) as the control. This result suggests that crop residues affect Gazania's growth and productivity somewhat positively. In the meantime, FYM+Silt (1:3) are good medium for gazania's growth performance.

KEYWORDS

Gazania (*Gazania rigens*). Residues, Maize Residues, Silt, FYM, Vegetative growth

1. INTRODUCTION

Gazania, sometimes referred to as treasure flower, is in the Asteraceae family's annual flower plant group and in the past a very attractive flower for domestic producers. Now widely grown as ornamental garden plants, it is low-growing, spreading, semi-hardy perennial, 50 cm (20 in.) tall and wide, brilliant yellow with blue-grey foliage, daisy-like composite flower heads all summer long. Gazania represents, in addition to other flower species, an important decorative flowering material for gardens, public greens and flower stands etc. (Ferrante et al., 2006; Vujošević et al., 2007).

To create a better condition for gazania performance it is necessary to provide enough food throughout the growing period. An increase in the stuffing and improvement of the physical-chemical properties of organic matter, residues returned as compost and act as a better soil environment and a surplus source of nitrogen and carbohydrates that enhance the growth of beneficial microorganisms (Zayed and Abdel-Motaalet, 2005; Ros et al., 2006; Bougnom et al., 2010). As a result, residues returned to soil as compost, resulting in increased soil enzyme activity by increasing the number of enzymes and their soil substrates (Ros et al., 2006).

With the benefits of soil fertility, microorganisms and enzymes, crop residues returned as compost which improves soil condition and increases root vigor and other physiological characteristics such as plant photosynthesis, chlorophyll content and carbohydrate content (Joshi et al., 2009; Yogev et al., 2009). In return, composted residue thus increased the growth rate, increased plant performance and increased crop quality and yield (Abdelhamid et al., 2004; Tejada and Gonzalez, 2006; Roca-Pérez et al., 2009).

We carried out this experiment in order to investigate the effect of these crop residues and their capacity for use in container production of floricultural crops, and to determine the most suitable medium for pot production of gazania.

2. MATERIALS AND METHODS

2.1 Plant Material

The experiment was carried out during the winter of 2013 at Bahadur College of Agriculture sub campus BZU Multan. Gazania seeds were bought from a well-known seed agency, and nursery was raised in the silt-containing clay pots. Seedlings 20 days old were planted in 24 inch pots.

2.2 Crop Residues

The residues were derived from freshly harvested maize and cockscomb crops which were grown in pots. Pots were filled with manure from the farm yard and with silt (1:3).

2.3 The Experimental Layout

Under field conditions the experiment was conducted in the pots. A Completely Randomized Designs (RCBD) has been established, including Silt as control FYM+Silt (1:3) Maize crop rown residues and FYM+Silt (1:3) cockscomb grown residues, impacting agronomic characteristics of gazania flowers. Each treatment consisted of, in each replicate, five pots and repeated three times with 3 plants each pot. Observations were made on each plant and their averages for plant height (cm), total number of leaves, total number of branches, total number of flowers, fresh weight (g) and dry weight (g) were taken. At flowering stage, all of the parameter was recorded.

2.4 Data Analysis

Variance analysis for windows was performed using SPSS 10.0.5. The data collected for the plants' morphological traits were statistically analyzed

Quick Response Code	Access this article online	
	Website: www.jscienceheritage.com	**DOI:** 10.26480/gws.01.2023.24.26

Cite The Article: Abdul Kareem, Aneeq Ahmad, Muhammad Waqas (2023). Growth and Development Response of Gazania (Gazania Rigens) to Different Sources of Crop Residues as Growing Media. *Science Heritage Journal, 7(1): 24-26.*

using variance analysis (ANOVA) to check any differences between the means. The data were then subjected to a 5 percent probability level for determining differences between the treatments using LSD test.

3. Results and Discussions

In this study, considerable attention has been given to the effect of crop residues on gazania growth and performance. Here it discusses all the parameters:

3.1 Plant Height (cm)

Among the plant height treatments, the significant differences were noted that the silt (control) had plant height (28.66 cm) (Table1). FYM+Silt was observed to have the highest plant height (31 cm). The resulting crop residues were at par with comparative control. As regards the results, the use of control significantly increased the plant height of gazania compared to other treatments during experimentation. The possible reason for this may be the silt nutrition factor. The results are in accordance with those reported in calendula by (Sigedar et al., 1991), who obtained the highest spread of plants by applying various growing media. The findings are consistent with those reported by (Mokashi, 1988; Kareem, 2013).

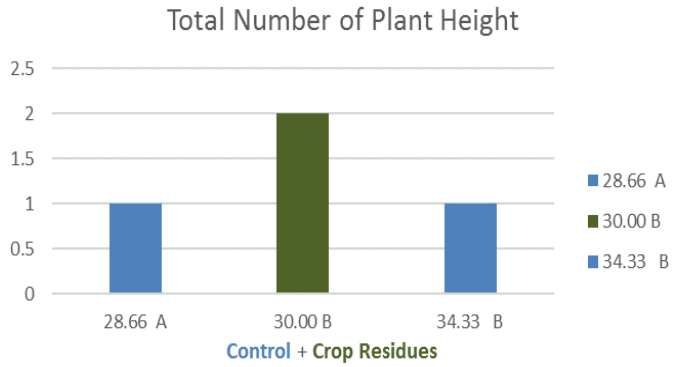
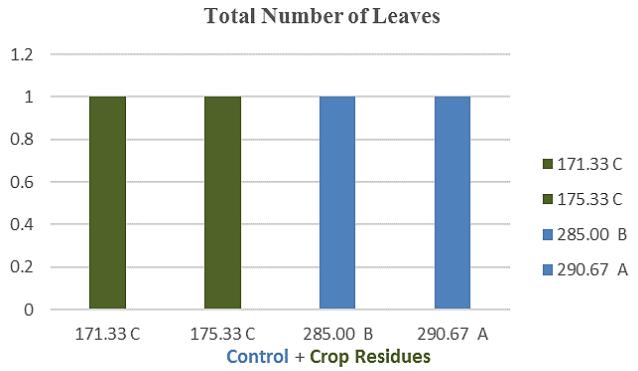


Table 1: Mean table for effect of different crop residues on physical indices of gazania.

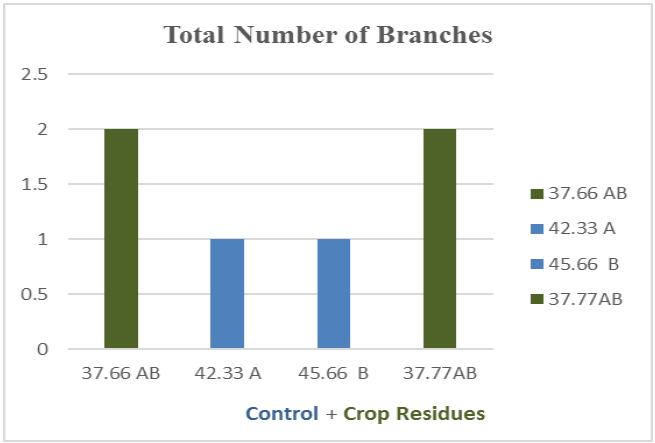
Media (1:3)	Plant height (cm)	Total leaf	Total branches	Total flower	Fresh Weight(g)	Dry weight (g)
Control						
Silt	28.66 A	285.00 B	45.66 B	32.00 A	73.46 A	21.33 B
FYM+Silt	34.33 B	290.67 A	42.33 A	38.00 B	78.90 A	26.66 A
Crop Residues						
Maize (FYM+Silt)	30.00 B	175.33 C	37.66 AB	22.33 BC	59.33 B	20.66 A
Cockscomb (FYM+Silt)	30.00 B	171.33 C	37.66 AB	17.66 C	55.33 C	21.00 A

3.2 Total number of leaves

Plants raised on silt produced the maximum number of leaves in FYM+Silt, 392,00 leaves and 302, respectively. More leaves can be of high silt nutritional status compared to maize and residues from cockscomb. Recent observed variations in the number of plants with leaves (Bi et al. 2010). It was hypothesised that the use of organic substrates could increase aeration which influences N mineralization (Succop and Newman, 2004). Silt's poor performance could also be a result of a deficiency in micronutrients, but this was not measured.



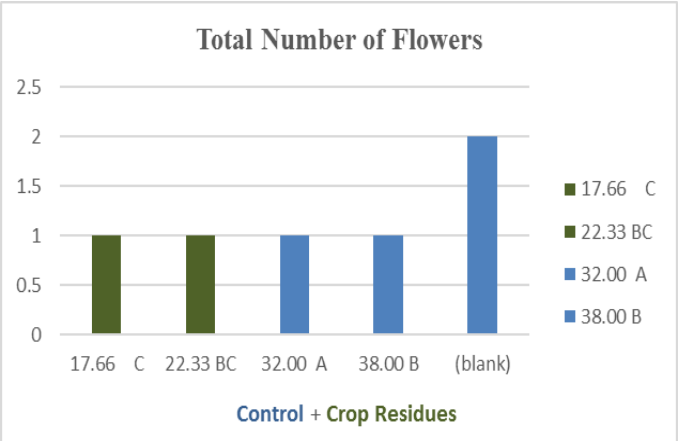
3.3 Total number of branches



Residues from crops do not have any significant effect on the number of branches per plant as shown in Table 1. The highest 45.66 branch numbers were found in silt, and the lowest branch numbers (33.33) were calculated in FYM+Silt. There was also a total number of leaves (37.66) in the comb and maize residues of the cocks, and less than control. This may also be due to the fertiliser and other factors added in residue increases during the crop. The other possibility may be the organic matter and media aeration which facilitated the root growth leading to more water and nutrient uptake.

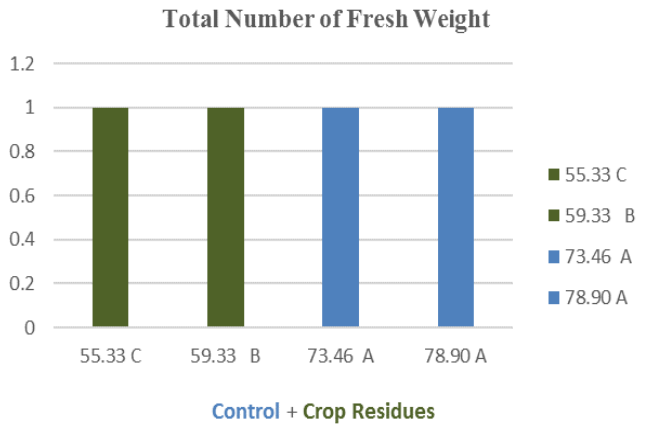
3.4 Total Number of Flowers

Significant positive results were found in silt lower numbers (17.66) for the results of total number of flowers in gazania crop greater number of flowers (39.00) were found in cockscomb residues. Residues from crops contain additional organic and mineral nutrition which has been found to increase both the number of flowers and the concentration of essential oil (Berimavandi et al., 2011).



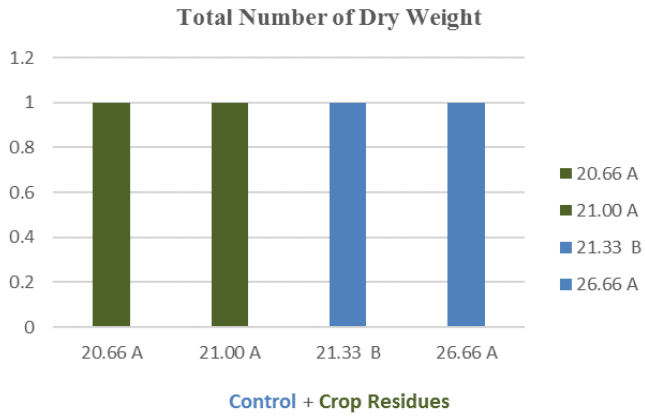
3.5 Fresh Weight (g)

A variation in plant fresh weight was observed among the residues and the control differences were statistically significant as shown in Table 1, fresh weight was significantly increased in silt (79.46 g) and residues of FYM+Silt while the lowest fresh weight was recorded in (44.33 g) residues of Cockscomb. There is a significant positive relationship between the total inorganic lag N of the residues and the final plant biomass; this could be attributed to the organic matter and the N becoming available for the crop (Fornes et al., 2007; Warner and Erwin, 2005).



3.6 Dry weight (g)

Results from Table 1 show that silt had a substantial increase in leaf weight of 14.66 g of dry weight compared to crop residues of 14.66 g, 25.66 g, 25.00 g respectively. The reason may be that nutritional element improves vegetative growth and increases the number of leaves (Table 1), in which photosynthetic productivity (organic content) and the production of carbohydrates increases.



4. Conclusion

Various crop residues have significantly positive effects on gazania's morphological characters. Recommended use of FYM+Silt (1:3) to improve biomass and flowers. Significantly affected plant height, total number of leaves, total number of branches and total number of flowers, fresh weight and dry weight, using FYM+Silt (1:3) Furthermore, statistically significant differences between control and crop residues were observed in all parameters. Different silt may be used for commercial purposes to improve the quality of gazania flowers.

References

Abdelhamid, M.T., Horiuchi, T., Oba, S. 2004. Composting of rice straw with oilseed rape cake and poultry manure and its effects on faba bean (Vicia faba L.) growth and soil properties. Bioresource Technology. 93, 183-189.

Berimavandi AR, Hashemabadi D, Ghaziani MVF, Kaviani B. 2011. Effects of plant density and sowing date on the growth, flowering and quantity of essential oil of Calendula officinalis L. J Med Plants Res 5 (20):5110-5115

Bi, G.H., Evans W.B., Spiers JM, Witcher A.L. 2010. Effects of Organic and Inorganic Fertilizers on Marigold Growth and Flowering. Hortscience 45 (9):1373-1377.

Bougnom, B. P., Knapp, B. A., Elhottová, D., Koubová, A., Etoa, F.X., Insam, H. 2010. Designer compost with biomass ashes for ameliorating acid tropical soils, Effects on the soil microbiota. Applied Soil Ecology. 45, 319-324.

Ferrante , A., Mensual i- Sodi , A., S e r r a , G., Togn o n i, T. 2006. Evaluation of postproduction performance of Salvia splendens potted plants for interiors use.Acta Horts(ISHS) 723:415-420

Fornes, F., Belda RM, Carrion C, Noguera V, Garcia-Agustin P, Abad M. 2007. Pre-conditioning ornamental plants to drought by means of saline water irrigation as related to salinity tolerance. Scientia Horticulturae 113 (1):52-59.

Joshi, D., Hooda, K.S., Bhatt, J.C., Mina, B.L., Gupta, H.S. 2009. Suppressive effects of composts on soil-borne and foliar diseases of French bean in the field in the western Indian Himalayas. Crop Protection. 28, 608-615.

Kareem, A., Khan M. A., Rehman, S.U., Irfan A. 2013. Different Corm Sizes Affect Performance of Gladiolus grandiflorus cvs. Red Majesty and Early Yellow. Advances in Zoology and Botany 1(4): 86-91.

Mokashi, V.A. 1988. Effect of plant density and level of nitrogen and phosphorous on growth and flower yield of gaillardia (*Gaillardia pulchella* Foug.) Cv. Kanabargi local. M.Sc. (Agri) Thesis, Univ. Agric. Sci. Bangalore.

Roca-Pérez, L., Martínez, C., Marcilla, P., Boluda, R. 2009. Composting rice straw with sewage sludge and compost effects on the soil-plant system. Chemosphere. 75, 781-787.

Ros, M., Pascual, J.A., Garcia, C., Hernandez, M.T., Insam, H. 2006. Hydrolase activities, microbial biomass and bacterial community in a soil after long-term amendment with different composts. Soil Biology and Biochemistry. 38, 3443-3452.

Sigedar, P.D., Anserwadekar KW, Rodge BM. 1991. Effect of different levels of nitrogen, phosphorous and potassium on growth and yield of Calendula officinalis Linn. S Indian Horti. 39: 308 -311.

Succop, C.E., Newman S.E. 2004. Organic fertilization of fresh market sweet basil in a greenhouse. Hort. Technology. 14 (2):235-239.

Tejada, M., Gonzalez, J.L. 2006. Crushed cotton gin compost on soil biological properties and rice yield. European Journal of Agronomy. 25, 22-29.

Vuj o š evi ć , A., Lakić , N., Lazarević S., Beatović D., Jelačić S. 2007a. Effect of aplication of natural biostimulators and slow disintergrating fertilizer in commercial production on Begonia (Begonia semperflorens L.) seedlings, Journal of Agricultural Sciences. Belgrade, Vol.52 , No 1 (in print)

Warner, R.M., Erwin J.E. 2005. Prolonged high temperature exposure and daily light integral impact growth and flowering of five herbaceous ornamental species. Journal of the American Society for Horticultural Science 130 (3): 319-325

Yogev, A., Raviv, M., Kritzman, G., Hadar, Y., Cohen, R., Kirshner, B., Katan, J. 2009. Suppression of bacterial canker of tomato by composts. Crop Protection. 28, 97-103.

Zayed, G., Abdel-Motaal, H. 2005. Bio-active composts from rice straw enriched with rock phosphate and their effect on the phosphorous nutrition and microbial community in rhizosphere of cowpea. Bioresource Technology. 96, 929-935.