Available online at http://www.journalijdr.com

IJDR

International Journal of
DEVELOPMENT RESEARCH

ISSN: 2230-9926

International Journal of Development Research
Vol. 1, Issue, 04, pp.005-007, April, 2011

Full Length Review Article

INFLUENCE OF ORGANIC MANURES, CONSORTIUM BIOFERTILIZER AND BIOSTIMULANTS ON GROWTH AMBRETTE (*ABELMOSCHUS MOSCHATUS MEDIC.*)

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ARTICLE INFO

Article History:

Received 24th January, 2011
Received in revised form
09th February, 2011
Accepted 18th March, 2011
Published online 15th April, 2011

Keywords:

Ambrette,
Biostamulant, Consortium,
Biofertilizer,

ABSTRACT

The present study was conducted at the Department of Horticulture, Faculty of Agriculture, Annamalai University, Annmalainagar, Tamil Nadu During 2009-11. The experiment consisted of different combinations of organic manures *viz.,* Farmyard manure 37.5 t ha^{-1}, vermicompost @ 7.5 t ha^{-1}, pressmud @ 37.5 t ha^{-1} and consortium biofertilizers @ 2 kg ha^{-1} as soil application and biostimulants *viz.,* panchakavya 3 %, humic acid 0.2 %, effective microbial inoculants 1: 1000 as foliar application. The experiment was laid out in Randomized Block Design with 13 treatment combinations in three replications. Significant effects due to vermicompost and FYM were found in all the growth and yield attributes. Highest influence on growth parameters *viz.,* plant height, number of branches, number of leaves and plant spread were registered in the treatment that received vermicompost 7.5 t ha^{-1} combined with consortium biofertilizer @ 2 kg ha^{-1} and panchakavya 3 %. With regard to the other growth parameters *viz.,* stem girth, internodal length and dry matter production were recorded the highest in the same treatment.

INTRODUCTION

Ambrette *(Abelmoschus moschatus* Medic.) is an important medicinal as well as an aromatic plant, which is a tropical weedy shrub native to India valued for its scented seed. It is universally known as 'Ambrette' and the oil extracted from seed is called 'Ambrette oil, it is also known as 'Musk mallow'. In tamil it is called as Varttilai kasthuri (Krishnamurthy, 1993). It is grown extensively in the Deccan peninsula and in the foot hills of Himalayas. The seeds of ambrette are extensively used in perfumery, since their aroma is similar to that of musk and are also used to impart a musky perfume to sachets and hair powders etc., which can serve as a highly useful base for preparing high-quality perfumes, scents and cosmetics. The ambrette oil of commerce blends excellently with many other essential oils including rose, neroli and sandal wood oil. Ambrette oil in the form of extract can be used in creams, lipsticks, cosmetic powder and soaps. Another major utilization of ambrette seeds is in the manufacture of "zarda", a flavoured chewing tobacco. In the Arabian Peninsula, the seeds are also used to flavour coffee (Misra and Mitra, 1971).

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In addition to their pleasant taste and flavour, the seeds posses several medicinal properties and the roots and leaves are also used for medicinal purposes. Seeds are used as aphrodisiac, diuretic, constipating, antispasmodic, stomachic, stimulant, carminative and coolant. They allays Thrist and check vomiting and cure diseases due to "kapha" and "vatha" and are useful in treating intestinal disorders, dyspepsia, urinary discharge, hysteria and skin diseases like itch and leucoderma. The leaves and roots of the plants are recommended for the cure of gonorrhea, flu and asthma. The seeds have absorbant capacity and inactivate snake venom.

MATERIALS AND METHODS

Investigation was carried out to find out the "Influence of organic manure and biostimulants on growth and yield of ambrette *(Abelmoschus moschatus* Medic.)" in the vegetable unit, Department of Horticulture, Faculty of Agriculture, Annamalai University during 2010-11. The main field was ploughed three times and brought to a fine tilth and divided into plots of size $4m^2$. Seeds were soaked in water for 12 hours before sowing. Two to three seeds per hill were sown at a depth of 1 cm at a spacing of 60 x 60 cm and covered with sand. The plots were immediatly irrigated. The required quantity of organic manures *viz.,* farmyard manure,

vermicompost and pressrnud were incorporated at the time of last ploughing as per the treatment The consortium biofertilizer @ 2 Kg ha'[1] each was applied ten days after the incorporation of organic manures. The bistimulants *viz.,* panchakavya 3%, humic acid 0.2% and effective microorganisms 1: 1000 dilution was applied as per the treatment schedule to the crop. They were applied in three sprays at rortnight intervals. The crop was irrigated once in five to six days interval during the initial stages and once in eight to nine days at later stages depending upon the soil moisture availability and climate conditions.

RESEARCH AND FINDINGS

The results of the present investigation showed that combined application of organic manures along with foliar application of panchakavya and humic acid markedly influenced the growth characters of ambrette. Plant growth characters showed a progressive increase with applied nutrients in general. In the present study application of vermicompost @ 37.5 t ha^{-1} + consortium biofertilizer @ 2 kg ha^{-1} panchakavya 3 per cent recorded greater plant height (Fig.l), more number of branches and leaves and higher internodal length, leaf area and plant spread, followed by vermicompost @ 37,5 t ha^{-1} consortium biofertilizer @ 2 kg ha^{-1} + humic acid 0.2 per cent while the least values were observed in the control.

also due to higher P fertilization by a symbiotic mycorrhizal association as reported by Kale *et al.* (1987). Incorporation of vermicompost promotes the lush growth of plants which may be due to the presence of plant growth promoters like auxins and cytokinins, which are responsible for the cell division and cell elongation as observed by Radha *et al* (1986). Furthermore, Chaudhary *et al.* (2004) also reported that vermicompost contains biologically active substances such as plant growth regulators which enhances sufficient quantity of nutrient flow in the plant system, thereby, stimulating the auxiliary buds and leading to increase in plant height and number of branches, number of leaves, internodal length, stem girth, leaf area and plant spread were greatly influenced by the combined application of vermicompost @ 7.5 t ha^{-1} + consortium biofertilizer @ 2 kg + panchakavya 3 per cent.

The increase in growth parameters are also due to the application of biofertilizers in the present study. Biofertilizers have come into existence as low cost input in medicinal plants growing which helps to get higher profit. *Azospirillum* inoculation is not only increases the yield, but also it saves nitrogen upto 20 to 40 per cent of recommended dose ($Subbaiah_r$-1991). The phosphobacteria is responsible for solubilising the bound phosphate in soil to the plant available form.

Influence of organic manures, biofertilizers and biostimulants on growth parameters in ambrette

Treatments	Plant Height (cm) 150 days	Stem Girth (cm) 150 days	No. of branches plant^{-1} 150 days	Internodal Length (cm) 150 days	Plant spread East – West (cm) 150 days	Plant spread North South (cm) 150 days	No. of leaves plant^{-1} 150 days	Leaf area (sq. cm) 150 days	1st Flowering	50% flowering
T_1 – FYM 37.5 t + CBF 2 kg	83.97	4.29	13.36	4.49	29.84	40.03	49.66	239.56	84.33	99.33
T_2 – VC 7.5 t + CBF 2 kg	87.45	4.71	14.65	4.78	31.26	41.67	53.84	249.36	82.66	97.66
T_3 – PM 37.5 t + CBF 2 kg	80.41	3.83	12.07	4.21	28.38	38.44	45.48	227.96	85.99	101.00
T_4 – FYM + CBF 2 kg + PK 3 %	108.25	7.04	19.72	6.27	39.26	49.08	74.09	297.38	77.99	92.99
T_5 – FYM + CBF 2 kg + HA 0.2 %	104.77	6.65	18.44	6.00	37.87	47.38	69.91	286.59	79.66	94.66
T_6 – FYM + CBF 2 kg + EM 1:1000 dilution	94.05	5.43	16.99	5.22	33.64	44.02	59.88	263.80	80.99	95.99
T_7 – VC + CBF 2 kg + PK 3%	120.91	7.90	22.24	6.82	42.01	52.42	82.45	317.95	72.00	87.00
T_8 – VC + CBF 2 kg + HA 0.2%	116.23	7.52	21.00	6.55	40.64	50.80	78.27	307.27	73.66	88.66
T_9 – VC + CBF 2 kg + EM 1:1000 dilution	102.59	6.41	18.18	5.84	36.89	46.94	67.93	282.61	76.33	92.66
T_{10} – PM + CBF 2 kg + PK 3%	100.16	6.15	17.80	5.66	36.00	46.36	65.90	278.56	75.33	90.33
T_{11} – PM + CBF 2 kg + HA 0.2%	96.91	5.69	16.55	5.37	34.64	44.67	61.72	267.91	76.66	92.00
T_{12} – PM + CBF 2 kg + EM 1:1000 dilution	91.20	5.14	15.92	5.06	632.64	43.35	58.02	259.91	80.33	95.33
T_{13} – Control	75.84	2.88	10.79	3.94	26.96	36.65	41.30	217.38	87.66	102.66
S.Ed	1.89	0.14	0.41	0.11	0.62	0.56	1.49	3.27	0.48	0.55
CD (P = 0.05)	3.79	0.28	0.82	0.22	1.42	1.11	2.99	6.54	0.96	1.10

The results of the present study are in agreement with the findings of Paturde *et al.* (2002) in safed musli, Cynthia Staryln Emily (2003) in ashwagandha and Kanimozhi (2004) in brahmi. In the present study the increase of growth parameters are due to the application of organic manure. Organic manures improved the soil physical conditions and promote microbial and soil organic matter, which inturn produce organic acids, which inhibits enzymes, particularly IAA oxidase, resulting in enhancing the promotive effect of auxin-IAA which has direct effect on plant growth (Leopold, 1974). The increase in growth parameters due to the application of vermicompost may be due to the presence of growth substances (Gavirilov, 1962), nitrogen fixers (Loquet *et al.,* 1977), other essential nutrients (Bano *et al,* 1987) and

In recent years, It has been realized that higher yields per heactare can be obtained with optimum doses of inorganic nutrients combined with application of organic nutrients and biofertilizers (Rana, 2004). Application of biostimulans as foliar spray for medicinal plant has shown tremendous improvement in growth, yield and quality. When crop is raised with combination of organic manures and biostimulants, the crop keep good health and show a remarkable degree of yield, quality and reduce the use of chemical fertilizers to a considerable level. In the present study, the plants treated with panchakavya recorded the highest growth parameters when compared to other biostimulants used. This could be due to the application of panchakavya is a fermented organic manure in which the presence of growth regulatory substances such as

IAA, GA and cytokinin, essential plant micro and macro nutrients, naturally occurring, beneficial, effective microorganisms (EMO) predominantly lactic acid bacteria, yeast, actinomycetes, photosynthetic bacteria and certain fungi has been confirmed by Somasundaram *et.al* (2004). Further, they also suggested that beneficial and proven biofertilizers such as *Azotobacter, Azospirillum* and phos-phobacteria and plant protection substances like Pseudomonas and saphropytic yeasts detected in panchakavya can be attributed to its efficacy as organic foliar nutrient that might have in turn, stimulated the growth, resulting in increased plant height, number of branches, internodal length, number of leaves and leaf area. Another reason for the enhanced growth in the best treatment could be due to the fact that the chemolithic autotrophic nitrifiers in panchakavya contributed to vegetative growth directly and indirectly by increasing the ammonium uptake, thus enhancing the total N supply (Papen *et al.* 2002) leading to increased growth parameters. The beneficial effect of panchakavya on the morphological attributes was also reported by Selvaraj *et al.* (2003 a&b) in rosemary and thyme, Kanimozhi (2003) and Bharathi (2004) in medicinal coleus and Sanjutha *et al* (2008) in Kalmegh.

Conclusion

Among the different treatments that tested T_7 (VC + CBF 2 kg + PK 3%) recorded the highest growth parameters of ambrette.

REFERENCES

Bano, K., R.D. Kale and G.N. Gajanan. 1987. Culturing of earthworms *Eudrillus eguemae* for cast production and assessment of worm cast as Biofertilizer. J. Soil Bilo. Ecol., 7: 98-105.

Bharathi, M. 2004. Effect of soil and foliar application of organic manures on medicinal coleus *(Coleus forskohlii* Briq.). M.Sc. (Ag.) Hort. Thesis, Annamalai University, Annnamalai nagar.

Choudhary, D.R., S.C. Bhandari and L.M. Shukla. 2004. Role of vermicompost in sustainable agriculture- A review. Agric. Rev., 25(1) : 29-39.

Cynthia Starlyn Emily, A. 2003. Standardization of organic production of package for *Withania somnifera* Dunal. M.Sc. (Hort.) Thesis, Tamil Nadu Agricultural University, Coimbatore

Gavirilov, K. 1962. Role of earthworms in the enrichment of soil by biologically active substances. Veprosy Ekologil Vysshavya Shkola, Mosow, 7 : 3

Kale, R.D., K. Bano, M.N. Sreenivas and D.J. Bagyaraj. 1987. Influence of worm cast (Vee Comp.E. UAS- 83) an the growth and mycorrhizae colonization of two ornamental plants. South Indian hort., 35 : 433-437

Kanimozhi, B. 2004. Effect of organic manures and biostimulantson Productivity and quality of Brahmi *(Bacopa monnieri L.)* M.Sc. (Hort.)Thesis, Tamilnadu Agricultural University, Coimbatore-3, India.

Krishnamurty, T. 1993. Minot forest products of India. Oxford and IBH Publishing co. Pvt. Ltd. New Delhi.

Loquet, M., T.Bhatnagar, M.S. Bouche and J, Rouelle. 1977. Estimation of the ecological influence of earthworms on microorganism. Pedobiologia, 17: 400-417.

Misra, G. and C.R. Mitra. 1971. Muskdana Tatha Uska Udyog, Vogyan pragati., 3(2) : 113-115.

Papen, H., A. Gebler, E. Zumbusch and H. Rennenheg, 2002 chemolitho autotropic nitrifies in the phyllosphere of a spruce ecosystem receiving high bniterigen input. Curr. Microbial, 44:56-60.

Patrude, J.T., S.G Wankhade, P.P. Khode, P.U. Chatol, D.D. Deo and S.S. Bhuyar. 2002. Effect of organic manures and plant population on yield of safed musli (Chlorophytum borivilianum) Agric. Sci. Digest., 22(1): 51-52.

Radha, A., R.D. Kale and Kubra Bano. 1986. Field trials with vermicompost on organic fertilizer in: Proceedings in national seminar on organic wast utilization II. Worms and vermicomposting (ed.,) Desh, M.C., B. K. Senapali, P.C. Mishra, pp.164-170.

Rana, M.K. 2004. OPrganic farming: A friendly vegetable production system. Hasryana J, Hort. Sci., 33(1&2): 87-97.

Selvaraj, N., B. Ramaraj, K. Devarajan, N. Seenivasan, V. Thirumal murugan and I. Karthikeyan. 2002b. Effect of organic forming on growth and yield of thyme. Proc. National seminar on Population and Utilization of medicinal Plants, ANnamalai University, Annamalai nagar, p.63.

Sridhar, T. 2003. Effect of Bioregulators on bleak nightshade (*Solanum nigrum* L.) M.Sc (Hort,) Thesis, Tamilnadu Agricultural University, Coimbatore.

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