International Journal of Biotechnology Research
Vol.11 No.2 July-December 2018

ISSN: 0974-6293

Effect of Nitrozen, Phosphorus and Potassium on Growth and Green Herb Yield of *Viola canescene*

DR. JAGMOHAN SINGH NEGI

Department of Chemistry, Kumaon University, L.S.M. Govt. Post Graduate College Pithoragarh, Uttrakhand, India E-mail address: drjsn@rediffmail.com

Viola canescene plant is a member of the Violaceae family and is an indigenous aromatic and medicinal plant of Mediterranean region. At present, it is cultivated the mild, temperate climates of Europe, Asia, North Africa, and America in a large scale due to its economic importance. However, it is commercially grown. The objective of this study was to examine the effects of different level of N, P and K on green herb yield and some herb chemical constituents (N, P, K) in order to recommend a reliable nutrient management for commercial growers. Results showed that, yield generally increase in accordance with the increases in N, P and K fertilizer rates.

Keywords: *Nitrogen(N) , Potassium(K), Viola canescene*

INTRODUCTION

Viola is a genus of flowering plants of family Violaceae. It is the largest genus in the family, containing between 525 abd 600 species. It is a nearly prostrate herb found in the Himalayas, from Kashmir to NE india at altitude of 1500-2400 m. Basically it is native to india, China and Bhutan. Its synonym is Viola serpens Well.ex Ging .var.canescensHook F. Engish, Viola canescens Wall. Ex Roxb .is called Himalayan White Violet because it is mostly associated with the Himalayan region. In Urdu, it is called *Banafshalayas* of Pakistan. In india It is called *Ratmundi* or *Vanaksha*, In Himalayan Pradesh, It is called *Gugluphul. Banasksha ,and Banfasa. In Uttarakhand, it is commonly* called *Vanfsa.* I Commonly it is called as Himalayan white violet. Violet *canescenst* has pale violet, often almost white, flowers ranging 1-1, 8 cm across, with ashort blunt is alhulnaqsha, bamasha, or sweet violet in Lesser Himaso called POregano (Origanum vulgare L.) belongs to the Lamiaceae family, which is indigenous to the Mediterranean region. It also is distributed and cultivated in many areas of the mild, temperate climtals are up to 1-5 cm long, Sepals are five innumber, Petls are up to 1.5 cm long, and about 4 mm broad, obovate, obtuse, upper two wedge – shaped, while two lateral ones are narrower and bearded at the base, marked with dark coloured streak .its lower most petals is shortest, patterned with dark coloured stripes. Usualy its Leaves are ovate-heart shaped to kindey shaped with a blunt up. Leaves arethikand hairy. Leavesstalks are also covered with hairs oriented towards base Stipuls are lance-shaped. Its Flowering time is March to june. *Viola canescens* Wall. ex Roxb ranges from March to June and it produces beautiful, small pale violet to white flowers during this period. The leaf paste of *V canescens* is used along with brown sugar mostly to care coith cinnamon, clove, and fennelis used to treat respiratory tract problems, The whole plant of *V. canescens* is used against malaria. In Uttarakhand, The extract of the whole plant is given for treatment of leucorrhoea, regulating menstruation, and headache. It is also given to treat bronchial asthma and cough and is also aphrodisiac. Paste of plant is externally applied on cuts, wounds, and boils as antiseptic. *V. canescens* is also used in Nepal as antipyretic, laxative for boils and leaves are emollient On the other hand, Karýk et al. (2007) indicated that the secondary metabolites specific to the aromatic and medicinal plants are mainly controlled genetically but are strongly affected by environmental influences. Moreover, balanced nutrition of the thyme plant has not been examined thoroughly

until recently. It is claimed that in order to achieve standard crops and standard quality oil yields, the commercial thyme growers need to practice well managed cultivated production systems (Bayram, 2003). In this regard, the significance of N fertilization is related (Ceylan, 1996) to visible emphasis of N on vegetative growth and to herbage area increase which directly increases the total oil yield. Baranauskiene et al. (2003) state the disadvantages of excess N fertilization which often results with high leaf NO3 concentrations. Palada et al. (1998) recommended 50 to 150 kg ha-1 N for *O. vulgare* L. as a concluding remark to his N fertilization testing. The same author also reports the beneficial effects of cow manure and urea as N sources (Palada et al., 1995) which are generally practiced in two splits; in spring and after the first harvest. However, not much information is found on the efficient use of P and K fertilizers. Some growers apply P and K during the soil preparation in spring in the form of compound fertilizers. Ateia et al. (2009) claimed that the mixture of compost + sheep manure applied at 3:1 ratio give high essential oil yields. The content of essential oils and their composition are affected by different factors, including genetic makeup (Muzik *et al.*, 1989) and cultivation conditions, such climate, habitat, harvesting time, water stress, and the use of fertilizer (Min *et al.*, 2005; and Stute, 2006). The improvement of plant nutrition can contribute to increased resistance and production.

Plate 11: *Viola canescens* at study plot

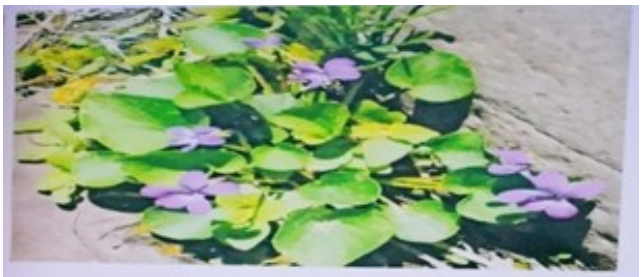

Plate 3: *Viola canescens* plant

MATERIALS AND METHODS

Experiments were conducted on "Effect of different level of nitrogen pho sphorus and potassium on growth and yield of some medicinal plants of kumaun Himalaya during year of 2012-13 and 2013-14 plot /pots were selected on botanical garden LSM GOVT. PG College Pithoragarh (Uttarakhand)India.Seed or one-month-old respectively.The data of this study showed that N ,P and K fertilizations positively affect the developments in *Viola canescene*, its yield as well as its quality as a medicinal and herbaceous plant. Among many plant growth factors, the nutritional requirements of the crops are considered to be the most important factor. It is well known that P is an essential element in reproductive and vegetative growth and flower number can increase by the increased P applications Phosphorus also has many other cellular functions in plants and affects the primary and secondary metabolites. Therefore, P fertilization in medicinal herbs is strongly recommended especially in cites with low available soil P. seedling or small size plant will be selected for cultivation. The net plot size will be kept at 1.35*1.00m. twenty seven treatment combinations of fertilizers would be consisted with three levels nitrogen (0,74,149 kg./ha.). Three levels of phosphorus (0,124,249 kg./ha.) and three level of potassium (0,74,149 kg./ha.). Nitrogen will be supplied by urea, single super phosphate and murate of potash respectively. The hole quantity of phosphorus half of potash and nitrogen was applied at the time of planting the rest half dose of nitrogen and potash was given one month after planting. The observation on plant growth, yield per The observation on plant growth, yield per hectare, leaf area index, rhizome yield will be recorded. Profitwould be examined and production will be popularized among local youth.

RESULTS AND DISCUSSION

Green herb yields were found generally higher in the second year of the experiment in all of the treatments. Each year, yield response to the enhanced, K and P fertilizations were found positive and statistically significant at 1% level. The interaction effect of N, P and K fertilizations on yield was not found significant in the first year where as was determined significant in the hectare, leaf area index, rhizome yield will be recorded. Profit would be examined and production will be popularized among local youth. higher. On the way hand, in the first and second years of this study, statistically significant interaction effects of N, P and K fertilizations were determined on the N, P and k contents of the herb second year (Table 2). In this context,the highest yield was obtained in the highest rate of N (149 Kg urea /ha.) P (124 kg phosphorus/ha.) and K (149 kg potash/ha.) also fertilizations. Nutrient elements (N, P and K) of the green herb were also analyzed in both of the study years. Results of the statistical analyses showed that the herb N, P and K contentswere significantl. V. Canescens is an important medicinal plant which is mostly used in the traditional medicinalsystem for cough cold, flu fever and malaria and is also given as anticancerous drug. The result of field experiments were conducted at Pandey Gaon near P.G college, Pithoragarh, (Uttarakhand) India During yearof 2012-2013 and 2013-14 are discussed in this paper.

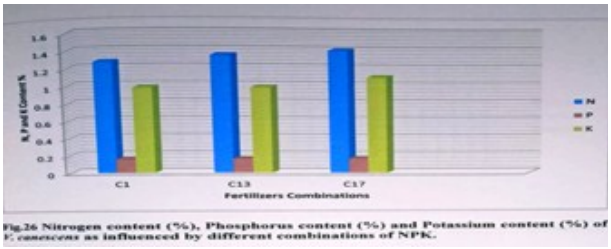

Fig.26 Nitrogen content (%), Phosphorus content (%) and Potassium content (%) of V. canescens as influenced by different combinations of NPK.

Table.1 Soil Properties of Experimental Site

Site	Colour (dry)	elevation	Soil text	Particle-size distribution(%)			Ph (1:2.5)	Org carbon Kg^{-1}	Cec Cmo (p+) Kg^{-1}
				Sand (2.0-0.05 mm)	silt (0.05-0.002 mm)	Clay (<0.002 mm)			
Pandy Gaon L.S.M.G.P.G.C. Pithoragarh,Uttarakhand	Olive yellow	1497	silt	7.5	68.8	23.4	5.8	14.6	9.2

Table.2 Effect of N, K and P Fertilization on Green Herb Yield (kg/ha.) for 2012 and 2013 Seasons

Combination no.	First season (2011)	Second season (2012)
C1	15400	16700
C2	15000	17300
C3	16400	18500
C4	16000	19700
Mean	16240	18140

C1=control,C2=N(150 kg/ha.)+P(250 kg/ha.)+K(75 kg/ha),C3=N(75 kg/ha.)+P(0 kg/ha.)+K(75 kg/ha.) and C4=N(150 kg/ha.)+P(125kg/ha.)+K(150 kg/ha.)

Table.3 Effect of N, P And K Fertilization on N, P and K Conent (%) For2012 and 2013 Seasons

	%					
Combination no.	N		P		K	
	First season(2012)	Second season (2013)	First season(2012)	Second season (2013)	First season(2012)	Second season(2013)
C1	1.824	1.824	0.251	0.251	1.071	1.071
C2	1.827	1.829	0.257	0.267	1.139	1.164
C3	1.829	1.831	0.251	0.251	1.179	1.189
C4	1.832	1.836	0.261	0.271	1.199	1.224
Mean	1.828	1.830	0.255	0.260	1.147	1.162

C1=control,C2=N(150 kg/ha.)+P(250 kg/ha.)+K(75 kg/ha),C3=N(75 kg/ha.)+P(0 kg/ha.)+K(75 kg/ha.) and C4=N(150 kg/ha.)+P(125kg/ha.)+K(150 kg/ha.)

Similarly, it is also very well known that K fertilizers improve growth parameters and yield quality (Mengel and Kirkby, 2001). Potassium fertilizers proved its role in plant metabolism, carbohydrate synthesis, water transport in xylem, cell elongation. Singh (2001) reported that addition of K resulted with higher herb yields.In this current study, green herb yield, some of the herb nutrient elements like N, P, K positively responded toN, P and K fertilizer treatments. The highest herbal yield was determined in 149 kg urea/ ha.+1 24 kg phosphorus/ ha.+149 kg potash/ha. treatment in both of the study seasons. It is worth reporting that this specified highest yield obtained from the 150kg urea/ ha.+ 124 kg phosphorus/ ha. +149kg potash /ha.The present study can be concluded that if the herb yield evaluated and weighed and

Acknowledgment

The author is grateful to Dr. R. S. Adhikari, and Dr.Kamlesh Bhakuni the head of department of Botany,L.S.M.G.P.G.C. Pithoragarh

References

1. Agnihotri P .Singh H.and Hussian T., 2012 " Patalbhuvneshwar : a newsacred grow from Kumaun Himalaya , " Current Science , vol 102 ,no.6,pp 890-831.
2. Abdul Baki , Anderson A., J.D .,1973 The challenges in cellular organelles for membrane related to vigour Seed science and Technology , 1:89-125 .
3. Alam Ghayur, Lucian Peppelenbos, "Cultivation of Medicinal Plants in Uttarakhand", Economic and Political Weekly, March 7, 2009
4. Bahekar S.and Kale R.,2013. " Herbal palant used for the treatment of malaria- a literature review, " Journal of Pharmacognosy and Phytochemistry , Vol, no.6,pp.141 146.
5. Belt J. Lengkeek A. and Van der Zant J., 2003 . Cultivating a healthy enterprice : developing a sustainable medicinal plant chain in Uttaranchal-India.KIT Publishers , Amsterdam . KIT Bulletin No .
6. Chun, S. Vattem, D.A. and Shetty, K. 2005. Phenolic antioxidants from clonal oregano (*Oreganum vulgare*) with antimicrobial activity against Helicobacter pylori. Process Biochemistry, 40 (2), 809-816.
7. Dhar U., 2002, Conservation implication of plant endemism in high altitude Himalaya. Current \
8. Dhar, U., Conservation implication of plant endemism in high altitude Himalaya. *Curr. Sci*., 2002, 82, 141–148.
9. Delfine S., Loreto F., Pinell P., Tognetti R., and 2005.Isoprenoids content and photosynthetic limitations in rosemary and spearmint plants under water stress. Agriculture Ecosystems and Environment, 106: 243-252.
10. Ezz El-Din A ., Hendawy S,P Aziz E.E ,. Omer E.A., 2010 En Hancing growth yield and essential oil careway plants by nitrogen and potassium fertilizers , International Journal Academic Research.2(3),192-197.
11. Fretz, T.A. 1976. Effect of photoperiod and nitrogen on the composition of Juniperus horizontalis Moench.cv plmosa. J. Am. Soc. Hortic. Sci., 101:611-613.
12. Fleisher, A. and Sneer, N. 1982. Oregano species and *Origanum* chemotypes. J. Sci. Food Agric., 33: 441-446.
13. Guenther, G. 1961.The essential oils VIII. Robert E.D. Nastrand Comp. Inc. Toronto, NewYork, London.
14. Nautiyal MC, Viany Prakash, Nautiyal BP (2002). Cultivation techniques of some high altitude medicinal herbs. Ann. For. 10: 62- 67.Mahendra Pal Singh, Dehdradun, 2004.
15. Palada MC, Crossman SMA, Kowalski JA (1995). Growth and yield response of thyme (*Thymus vulgaris* L.) to sources of nitrogen fertilizer. In Proceedingsof the Caribbean Food Crops Society.Shivkumar V, Anandlakshmi R, Warrier
16. Kala CP, Dhyani PP, Sajwan BS (2006). Developing the medicinal plants sector in northern India:Challenges an opportunities.J.Ethnobiol.Ethnomed. 2: 32.
17. Goliaris, A.H. Chatzopoulou, P.S. and Katsiotis,S.T. 2002. Production of new Greek oregano clones and analysis of their essential oil.J. herbs, Spices & medicinal plants, vol. 10(1): 29-35.
18. Ien, J.R. Ivanauskas, L. Janulis, V. and Tas, V.J. 2008. Composition and variability of phenolic compounds in Oroganum vulgare from Lithuania. Biologija,Vol. 54. Nr. 1. P. 45-49.
19. Jaloszynski, K. Figiel, A. and Wojdylo, A. 2008. Drying kinetics and antioxidant activity of oregano. Acta Agrophysica, 11 (1), 81-90.
20. Kala CP, Dhyani PP, Sajwan BS (2006). Developing the medicinal plants sector in northern India: Challenges andopportunities. J.Ethnobiol. Ethnomed. 2: 32. Nautiyal MC.
21. autiyal, M. C. and Nautiyal, B. P., In *Agrotechniques for High AltitudeMedicinal and Aromatic Plants*,Bishan Singh, Mahendra Pal Singh,Dehdradun, 2004. 20,
22. RR, Tigabu M, Oden PC,Vijayachandran SN, Geetha S, SinghBG (2006). Effect of presowingtreatments desiccation and storage conditions on germination of *Strychnos nux-vomica* seeds, avaluable medicinal. plant. NewForest32:121-131.