E-ISSN: 2788-9270
P-ISSN: 2788-9262
www.pharmajournal.net
NJPS 2022; 2(1): 44-47
Received: 07-11-2021
Accepted: 20-12-2021

Rifat Bhat
Division of Fruit Science, Sher-e-Kashmir University of Agricultural Sciences & Technology of Kashmir, Shalimar-190025, Srinagar, Jammu & Kashmir, India

Corresponding Author:
Rifat Bhat
Division of Fruit Science, Sher-e-Kashmir University of Agricultural Sciences & Technology of Kashmir, Shalimar-190025, Srinagar, Jammu & Kashmir, India

Studies on integrated nutrient management in nectarine crop cv. Snow queen

Rifat Bhat

Abstract
The present investigation entitled, Studies on Integrated Nutrient Management in Nectarine crop cv. Snow queen, was carried out during the years 2018 and 2019 in experimental field of SKUAST-K, Shalimar. The experiment was laid out in Randomized Block Design with two replications and two plants per replication. Four year old nectarine plants cultivar snow queen were planted at a distance of 4x4 m. Integrated Nutrient Management were found to have a significant effect on, average fruit yield which was higher in nectarine trees treated with 75% NPK+50 ml PSB+50 ml VAM+3kg/tree vermicompost (T3) followed by 75% NPK+25ml PSB+25 ml VAM+1.5kg/tree vermicompost (T2)and lowest fruit yield was obtained with 25ml PSB+25 ml VAM+1.5kg/tree vermicompost (T6). Fruit length, fruit diameter and fruit weight were found highest with75% NPK+50 ml PSB+50 ml VAM+3kg/tree vermicompost (T3), however the fruits harvested from the trees treated with 25ml PSB+25 ml VAM+1.5kg/tree vermicompost (T6) were found smaller in size than control. Average fruit firmness was found highest with treatment (T3) and lowest with treatment (T6). TSS, Titrable acidity and Total sugars were found highest with treatment (T3) 75% NPK+50 ml PSB+50 ml VAM+3kg/tree vermicompost followed by 75% NPK+25ml PSB+25 ml VAM+1.5kg/tree vermicompost (T2)and lowest fruit yield was obtained with 25ml PSB+25 ml VAM+1.5kg/tree vermicompost (T6) treatment.

Keywords: Nectarine, integrated nutrient management, snow queen, yield, fruit quality

Introduction
India is having 2.27 per cent of the total land area, feeds more than 16 per cent of world population. Such a huge population magnifies the demand for more food from shrinking cultivated area which requires huge amount of fertilizers and other inputs. The chemical fertilizers have played a very significant role in intensive food production, which has brought many fold increase in production, but large scale use of chemical fertilizers causes problem of ground water and environmental pollution through leaching, volatilization, denitrification and wastage of nutrients. Indiscriminate use of chemicals contributed in loss of soil biological dynamism and productivity along with addition of salts to the soil. To revive the soil health an alternate source has become essential, so concept of biofertilizer came forward, which can be a good supplement for a chemical fertilizers. Biofertilizer or microbial inoculants plays a very significant role in improving soil fertility by fixing atmospheric nitrogen both in association with plant roots and without it, producing numerous plant growth regulators that protects plants from phytopathogens, improving soil structure and bio remediating the polluted soils by sequestering toxic heavy metal species They are environmental friendly playing a significant role in crop production. The integration of inorganic fertilizer with organic manures and biofertilizer can achieve the highest fruit yield with improved fruit quality and soil fertility status of fruit plants. The judicial use of inorganic inputs with biofertilizer is considered as the alternative source to meet the nutrient requirement of the crops. So keeping in view above points into consideration the present investigation was carried out at Shalimar Campus (SKUAST-K,) on “Studies on Integrated Nutrient Management in Nectarine Crop cv. Snow Queen.”

Materials and Methods
Research location and climate
The investigations were carried out at the Experimental Farm of Division of Fruit Science, SKUAST-Kashmir, during the years 2018 and 2019 on nectarine cv. Snow queen. Here the climate is temperate cum Mediterranean and of continental type. Winter is severe extending over 100days from the middle of December to March, during which the temperature often

goes below the freezing point and the whole valley remains covered with snow. The valley is marked by extreme of temperature, ranging from a maximum of 35^0C in summer to a minimum of -10^0C in winter. The annual mean temperature is 15^0C. The climate is cold and rainfall is optimum, well distributed about 80 cm per annum, mostly in the form of snow during winter (Anonymous, 2018-19) [1]. So an experiment was laid out in a randomized block design with seven treatment combinations. There were two replications and 2 plants per replication.

Yield and fruit characteristics

During these two years fruit yield was calculated by weighing all the fruits harvested individually from each experimental tree and average yield was expressed as kg/tree. Data on yield parameters were recorded as percent fruit set and fruit retention of each experimental plot calculated at fruit let stage by using the formula suggested by Westwood (1993) [10]. Fruit length and fruit diameter were measured by vernier caliper and fruit firmness was measured with pressure penetrometer. Fruit weight was determined by individually weighing the fruits obtained from each experimental plant on a common monopan balance and the average weight was recorded by using the procedure given by Rangana (1986). SSC was measured with the help of Zeiss hand refractometer. Titrable acidity was determined by titration method and values were expressed as percentage of malic acid (Rangana, 1986). Total sugars were determined by Lane and Eynan method (A.O.A.C., 1984). The data obtained was subjected to the statistical analysis in S-plus software.

Fig 1: Flowering and Fruiting of Nectarine CV Snow Queen

Results and Discussion

Fruit Yield and Fruit characteristics

Data on yield parameters like per cent fruit set, fruit retention, and fruit yield was found higher in nectarine trees treated with75% NPK+50 ml PSB+50 ml VAM+3kg/tree vermicompost (T3) followed by 75% NPK+25ml PSB+25 ml VAM+1.5kg/tree vermicompost (T2)and lowest yield parameters were obtained with 25ml PSB+25 ml VAM+1.5kg/tree vermicompost (T6). Frulength and fruit diameter were found highest with treatment (T3) 75% NPK+50 ml PSB+50 ml VAM+3kg/tree vermicompost and lowest with (T6) 25ml PSB+25 ml VAM+1.5kg/tree vermicompost. Fruit weight was found lowest with (T6) treatment while highest was found with treatment (T3). Average fruit firmness was found highest with75% NPK+50 ml PSB+50 ml VAM+3kg/tree vermicompost (T3) followed by 75% NPK+25ml PSB+25 ml VAM+1.5kg/tree vermicompost (T2)and lowest was obtained with 25ml PSB+25 ml VAM+1.5kg/tree vermicompost (T6). Chemical characteristics of nectarine fruits like TSS, Titrable acidity and Total sugars were found highest with with75% NPK+50 ml PSB+50 ml VAM+3kg/tree vermicompost (T3) and lowest with 25ml PSB+25 ml VAM+1.5kg/tree vermicompost (T6).

Discussion

Flowering parameters

Percent fruit set and fruit retention

Percent fruit set and fruit retention was recorded maximum in T_3 (with75% NPK+50 ml PSB+50 ml VAM+3kg/tree vermicompost) and minimum was noticed in T_6 (25 ml VAM+1.5kg/tree vermicompost). These results are in line with. Goswami *et al.* (2015) who reported that maximum fruit set was found in rainy season of Guava (83.33%) than winter crop (34.32% as Guava under this experiment was treated with the application of 225 g N2O, 195 g P2O5 and 150 g K2O along with 50 kg FYM enriched with 250g *Azospirillum per* tree per year.

Treatment T3: 75% NPK+50 ml PSB+50 ml VAM+3kg/tree vermicompost.

Fig 2: Treatment (T3)

Control

Fig 3: Control, Treatment (T1)

Yield Parameter

Fruit yield was recorded maximum in T_3 (with75% NPK+50 ml PSB+50 ml VAM+3kg/tree vermicompost) and minimum was recorded in T_6 (25 ml VAM+1.5kg/tree vermicompost). This might be due to better nutrient availability in T3 which in turn increased the flower primordial, carbohydrates and nutrients essential to promote flowering and fruit retention in plants which ultimately lead to increase in nectarine fruit yield. These results are in line with Thakur and Thakur (2014) and Singh *et al.* (2012) who reported maximum fruit yield per plant of Aonla with the standard doze of NPK + FYM and with the integrated nutrient management of Plum.

Physical parameters

Yield attributes of fruit viz; fruit length, fruit diameter and fruit weight were recorded maximum by the application of treatment T_3 with (75% NPK+50 ml PSB+50 ml VAM+3kg/tree vermicompost) and minimum was recorded in T_6 (25 ml VAM+1.5kg/tree vermicompost). These results are in congruence with Sharma *et al*., (2008) [11].

Maximum fruit firmness (8.91 kg/cm^2) was recorded in T_6 (25 ml VAM+1.5kg/tree vermicompost). while lowest firmness (8.36kg/cm^2) was observed in T_3 (75% NPK+50 ml PSB+50 ml VAM+3kg/tree vermicompost). Larger fruits tend to be softer than smaller fruits. This influence of size on firmness is generally thought to be a consequence of differences in cell expansion. Large fruits tend to have large cell size thus large cell vacuole exhibits less cell to cell contact and more air spaces. Both larger cells and air spaces provide more stress to cell walls resulting in less firm fruits. Stern (2008) [12] supported the findings that firmness is less in large fruits because of loss of cell to cell adhesion. These results are in line with Singh *et al*., 2008 and Mandeep *et al*., 2013 [8].

Fig 4: Treatment (T3)

75% NPK+50 ml PSB+50 ml VAM+3kg/tree vermicompost

Fig 5: Treatment (T2)

75% NPK+25ml PSB+25 ml VAM+1.5kg/tree vermicompost

Fig 6: Treatment (T5)

50% NPK+50 ml PSB+50 ml VAM+3kg/tree vermicompost

Fig 7: Control, Treatment (T1)

Control

Chemical parameters

Soluble Solids Content

Maximum SSC (11.84%) was recorded in T_3 and minimum was observed in T_7 (10.17%). The improvement in fruit TSS is because of balanced and enhanced supply of macro and micro nutrients. Increased SSC could be due to beneficial effect on total leaf area of the plant which reflected in more carbohydrates production through photosynthesis process. These results are in conformity with. Fawzi *et al*., (2010) [3] who reported that organic and biological nitrogen fertilization have given the highest TSS, total sugars, reducing and non-reducing sugars content and lowest acidity in Pear cv Le-conte.

Total sugars

Maximum total sugars (9.16%) was recorded in T_3(75% NPK+50 ml PSB+50 ml VAM+3kg/tree vermicompost) treatment, while minimum total sugars (8.14%) was recorded in fruits harvested from trees under T_6 (25 ml VAM+1.5kg/tree vermicompost) treatment. Increased total sugars content may be due to increased rate of absorption of macro and micro nutrients available in balanced dose and also application of vermicompost which may have exerted regulatory role as an important factor in affecting the quality of fruits. *Azotobacter* and PSB inoculation also resulted in overall increase in fruit quality which can be explained in a way that *Azotobacter* and PSB contribute up to 20-30% N and 25-50% P2O5 in soil, respectively. These results are in congruence with Mandeep *et al*., 2013 [8].

Acidity

Maximum total acidity (0.64%) was recorded in treatment T_6, while minimum total acidity (0.52%) was recorded in fruits harvested from trees under T_3 treatment. The reduction in acidity might be due to more accumulation of sugars in the fruit. Similar results were obtained by Mustaffa *et al*. (2004) [9] in banana and Sharma *et al*. (2008) [11] in pomegranate.

Conclusion

Thus from the present study, it may be concluded that application of Treatment T3 75% NPK+50 ml PSB+50gVAM+3kg/tree vermicompost was found superior than the other treatments with respect to improvement in important attributes contributing towards the better fruit tree yield and physical quality of fruit. As far as chemical quality of fruit was concerned, the same treatment proved most effective.

Table 1: Effect of integrated nutrient management on Percent fruit set (%), fruit retention (%) and yield of nectarine cv. Snow Queen during 2017 and 2018

Treatments		Percent fruit set (%)		Fruit Retention (%)		Yield (kg/Plant)	
		2017	2018	2017	2018	2017	2018
T1	Control (100% NPK)	81.06	81.63	60.14	60.38	16.48	17.43
T2	75% NPK+25ml PSB+25 ml VAM+1.5kg/tree vermicompost	82.11	82.52	66.32	66.65	18.43	19.22
T3	75% NPK+50 ml PSB+50 ml VAM+3kg/tree vermicompost	83.18	83.84	68.37	68.72	18.79	20.85
T4	50% NPK+25ml PSB+25 ml VAM+1.5kg/tree vermicompost	78.25	78.37	57.19	57.41	13.32	14.07
T5	50% NPK+50ml PSB+50 ml VAM+3kg/tree vermicompost	79.55	79.71	58.26	58.52	14.74	15.53
T6	25ml PSB+25 ml VAM+1.5kg/tree vermicompost	75.32	75.51	53.62	53.74	12.07	13.18
T7	50ml PSB+50 ml VAM+3kg/tree vermicompost	76.21	76.47	55.47	55.69	12.74	14.12
CD ($p \leq 0.05$)		1.54	1.33	1.35	1.30	1.68	1.24

Table 2: Effect of integrated nutrient management on fruit length (cm), fruit breadth (cm), fruit weight (gm) and fruit firmness (Kg/cm^2) of nectarine cv. Snow Queen during 2017 and 2018

Treatments		Fruit Length (cm)		Fruit Breadth (cm)		Fruit Weigh (gm)		Fruit Firmness(Kg/cm2)	
		2017	2018	2017	2018	2017	2018	2017	2018
T1	Control (100% NPK)	4.51	4.49	4.34	4.31	65.04	64.67	8.53	8.56
T2	75% NPK+25ml PSB+25 ml VAM+1.5kg/tree vermicompost	4.61	4.60	4.44	4.42	66.56	66.19	8.45	8.47
T3	75% NPK+50 ml PSB+50 ml VAM+3kg/tree vermicompost	4.71	4.70	4.54	4.52	68.41	68.04	8.36	8.38
T4	50% NPK+25ml PSB+25 ml VAM+1.5kg/tree vermicompost	4.27	4.25	4.10	4.07	56.07	55.70	8.75	8.76
T5	50% NPK+50ml PSB+50 ml VAM+3kg/tree vermicompost	4.32	4.30	4.15	4.12	57.31	56.82	8.68	8.69
T6	25ml PSB+25 ml VAM+1.5kg/tree vermicompost	4.11	4.08	3.94	3.90	53.83	53.46	8.91	8.89
T7	50ml PSB+50 ml VAM+3kg/tree vermicompost	4.21	4.18	4.04	4.02	52.21	51.84	8.86	8.85
CD ($p \leq 0.05$)		0.14	0.13	0.12	0.11	2.55	1.53	0.10	0.12

Table 3: Effect of integrated nutrient management on soluble solids concentration, SSC (%), Titrable Acidity (%), SSC/Acidity Ratio and Total Sugars (%) of nectarine cv. Snow Queen during 2017 and 2018

Treatments		Soluble solids concentration, SSC (%)		Titrable Acidity (%)		SSC/Acidity Ratio		Total Sugars (%)	
		2017	2018	2017	2018	2017	2018	2017	2018
T1	Control (100% NPK)	11.11	11.16	0.55	0.54	20.21	20.56	8.85	8.88
T2	75% NPK+25ml PSB+25 ml VAM+1.5kg/tree vermicompost	11.33	11.44	0.53	0.52	21.25	22.02	8.98	9.01
T3	75% NPK+50 ml PSB+50 ml VAM+3kg/tree vermicompost	11.76	11.84	0.52	0.51	22.61	23.21	9.16	9.18
T4	50% NPK+25ml PSB+25 ml VAM+1.5kg/tree vermicompost	10.47	10.52	0.61	0.60	17.27	17.54	8.41	8.42
T5	50% NPK+50ml PSB+50 ml VAM+3kg/tree vermicompost	10.79	10.82	0.59	0.58	18.19	18.57	8.52	8.54
T6	25ml PSB+25 ml VAM+1.5kg/tree vermicompost	10.32	10.35	0.64	0.63	16.21	16.53	8.14	8.16
T7	50ml PSB+50 ml VAM+3kg/tree vermicompost	10.01	10.17	0.63	0.62	15.89	16.40	8.22	8.26
CD ($p \leq 0.05$)		0.23	0.31	0.02	0.04	0.61	0.88	0.11	0.12

References

1. Anonymous. Production and area statements for 2018-19. Department of Horticulture, Govt. of Jammu and Kashmir, India. 2018-19.
2. AOAC. Methods of analysis. 4th Edition. Association of Official and Agricultural Chemists, Washington, DC 20044. 1984**.**
3. Fawzi MIF, Shahin FM, Elham Daood A, Kandil EA. Effect of organic and biofertilizers and magnesium sulphate on growth yield, chemical composition and fruit quality of "Le-Conte" pear tree. Nature and Science. 2010;8(12):273-280.
4. Goswami AK, Lal S, Thakare M, Pratibha Mishra DS, Kumar R. Studies on integrated nutrient management on yield and quality of guava cv. Pant Prabhat. Indian Journal Horticulture. 2015;72:139-142.
5. Rangana S. Handbook of analysis and quality control for fruit and vegetable products. (2nd Edition). Late McGrew Hill Publishing Co., New Delhi, 1986,pp. 190-210.
6. Singh AK, Singh S, Rao VVA. Influence of organic and inorganic nutrient sources on soil source on soil properties and quality of aonla in hot semi-arid ecosystem. Indian Journal of Horticulture. 2012;69:50-54.
7. Thakur N, Thakur BS. Studies on the effect of integrated nutrient management on growth and yield of plum cv. Santa Rosa. The Asian Journal of Horticulture. 2014;9:112-115.
8. Mandeep KB, Rajesh T, Kumawat BR. Effect of integrated nutrient management on physico- chemical parameters of guava under Malwa plateau conditions of Madya Pradesh. Ann. Pl. Soil Res. 2013;15(1):47-49.
9. Mustaffa MM, Kumar V, Tanuja Priya B, Dhanasekhar D. Influence of organic manure on growth and yield of banana. International congress on Musa: Harnessing research to improve livelihoods, Penang, Malaysia. 2004;214:65-66.
10. Westwood MN. Temperate Zone Pomology. (Ed. H. Freeman and Company). San Francisco, 1993, p. 523.
11. Sharma N, Singh NV, Maity A. Effect of organic and bio fertilizers to improve yield and quality of pomegranate. Prog. Hort. 2008;46(2):184-201.
12. Stern RA. Increasing fruit size of 'Spadona' and 'Coscia' (Pyrus communis) pears in a warm climate with plant growth regulators. Acta Horticulturae. 2008;800:155-162.