

Original Research Article

Effect of Different Nitrogenous Fertilizers on Economics of Custard Apple (*Annona squamosa* L.)

Ankita A. Solanke*, A.S. Kadam, S.S. Digrase and M.T. Chavan

Department of Horticulture, College of Agriculture, Latur
Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani
Parbhani-431402, Dist- Parbhani, M.S., India

*Corresponding author

ABSTRACT

An experiment was conducted to evaluate the “Effect of different nitrogenous fertilizers on growth, yield and quality of Custard apple (*Annona squamosa* L.)” at the Demonstration-cum-Research Farm, Manjra, KVK, Latur during 2018-19. The experiment was carried out on the 8 years old Balanagar Custard apple with seven different sources of nitrogenous fertilizers viz. Urea (T₁), Ammonium sulphate (T₂), Sodium nitrate (T₃), Ammonium chloride (T₄), Neem coated urea (T₅), Calcium ammonium nitrate (T₆) and Calcium nitrate (T₇) as treatments and replicated thrice and laid out in RBD. The maximum increase in plant height (0.96 m, 53.03%), stem girth (6.43 cm, 48.56%), plant spread (1.82 m², 96.80% East-West and 1.92 m², 96.96% North- South) and plant volume (3.80 m³, 376.23%) were recorded with the N application through neem coated urea per tree (T₅) and it was closely followed by the application of N through ammonium sulphate (T₂). The minimum number of days (39.33) required for flowering, days required for fruit set (22.33) and days required from fruit set to maturity (71.67) were recorded with the application of N through ammonium sulphate (T₂). Yield and yield contributing characters were viz. total number of fruits per tree (93.00), number of marketable fruits per tree (89.00), total yield (21.15 kg/tree and 8.46 t/ha) and marketable yield (20.24 kg/tree and 8.10 t/ha) were recorded with the N application through ammonium sulphate (T₂).

Keywords

Custard apple, nitrogenous fertilizers, Neem coated urea, marketable fruits

Introduction

Custard apple (*Annona squamosa* L.) is a delicious and important fruit crop which is cultivated in tropical and subtropical climate. It comes under family Annonaceae and native of the West Indies and cultivated since early times throughout Central America to Southern Mexico (Popenoe, 1974). The fruit is also popularly known as “Sugar apple”, “Monkey fruit” and “Sweetsop”. Custard apple is an important dry land fruit crop of India. Custard apple has slightly granular,

creamy, yellow or white sweet pulp with good flavour and low acidity, thus it is considering the sweetest fruits among other annonas (Annon, 1990). Its diploid chromosome number is 2n=14. This crop is becoming popular and commercial now-a-days. Productivity of custard apple is very low. Low productivity is due to imbalanced nutrition, incidence of pest and diseases and lack of adoption of advanced technology or improved production techniques. The low productivity of custard apple is mainly due to

less adoption of improved technology in respect of planting system, nutrition, plant protection etc. The information on utility of these nitrogenous fertilizers in fruit crops is very scanty. Under prevailing conditions it is the need of the day to generate the information on effectiveness and economics of available nitrogenous fertilizers in dry land fruit crop like custard apple. Hence, the present investigation entitled “Effect of different nitrogenous fertilizers on growth, yield and quality of custard apple (*Annona squamosa* L.)” is planned.

Materials and Methods

An experiment was conducted at the Demonstration-cum-Research Farm, Manjra, KVK, Latur during 2018-19. The experiment was carried out on the 8 years old Balanagar Custard apple with seven different sources of nitrogenous fertilizers viz. Urea (T₁), Ammonium sulphate (T₂), Sodium nitrate (T₃), Ammonium chloride (T₄), Neem coated urea (T₅), Calcium ammonium nitrate (T₆) and Calcium nitrate (T₇) as treatments and replicated thrice and laid out in RBD. The experiment was conducted in a well established orchard of eight years age Balanagar custard apple trees planted at 5.0 x 5.0 m spacing.

The FYM @ 20 kg/tree was applied in first week of June 2018. The recommended dose of fertilizers for custard apple as per the recommendation of V.N.M.K.V, Parbhani is 250 g N: 125 g P₂O₅: 125 g K₂O per tree and half dose of N through different sources as per treatments viz; Urea, Neem coated urea, Ammonium sulphate, Calcium nitrate was applied as per the treatments on 11/06/2018 along with full dose of phosphorus and potash. The remaining half dose of nitrogen as per the treatments was applied during fruit development stage on 10/08/2018.

Results and Discussions

The data clearly showed that, the different aspects studied under economics of cultivation of custard apple under influence of application of different treatments of nitrogenous fertilizers indicated that, these aspects have shown significant influence. The maximum cost of cultivation of custard apple was (Rs.1,43,330/ha) with the application of nitrogen through sodium nitrate (T₃), which was followed with the application of nitrogen through ammonium sulphate (T₂), while, the lowest (Rs.1,05,253/ha) cost of cultivation was recorded with the nitrogen application through urea (T₁). The highest gross monetary returns (Rs.4,04,800/ha), net monetary returns (Rs.2,75,334/ha) and B: C ratio 3.12 was recorded with the application of N through ammonium sulphate (T₂), and it was closely followed by N application through neem coated urea (T₅) and N application through urea (T₁). These treatments have produced comparative similar results in terms of B: C ratio. The treatment of application of N through sodium nitrate (T₃), has resulted in production of lowest (1.30) B: C ratio in comparison with other sources of nitrogen tried.

In the present investigation, the beneficial effects of nitrogen application through ammonium sulphate on economics of custard apple was observed in terms of getting maximum gross returns, net returns and highest B: C ratio. This could be attributed to production of more yield of quality fruits obtained with the application of ammonium sulphate. The highest cost of cultivation (Rs.1,43,330/ha) was recorded with the application of nitrogen through sodium nitrate (T₃), could be attributed to high cost of fertilizer and more quantity requirements due to less nutrient content resulted in requiring the highest cost of cultivation for this treatment (Table 1–3).

Table.1 Treatment details

Treatment No.	Dose nitrogen/tree	Source of nitrogen
T ₁	250 g	Urea
T ₂	250 g	Ammonium sulphate
T ₃	250 g	Sodium nitrate
T ₄	250 g	Ammonium chloride
T ₅	250 g	Neem coated urea
T ₆	250 g	Calcium ammonium nitrate
T ₇	250 g	Calcium nitrate

Table.2 Chemical composition of nitrogenous fertilizers

Fertilizers	Nutrient contents		
	N (%)	P ₂ O ₅ (%)	K ₂ O (%)
Urea	46	-	-
Ammonium sulphate	21		
Sodium nitrate	16		
Ammonium chloride	26		-
Neem coated urea	46	16	
Calcium ammonium nitrate	20		60
Calcium nitrate	15		

Table.3 Influence of nitrogenous fertilizers on cost of cultivation of custard apple

Tr. No	Source of nitrogen	Cost of cultivation (Rs/ha)	Gross monetary returns (Rs/ha)	Net monetary returns (Rs/ha)	Benefit: cost ratio
T ₁	Urea	1,05,253	3,17,600	2,12,347	3.01
T ₂	Ammonium sulphate	1,29,466	4,04,800	2,75,334	3.12
T ₃	Sodium nitrate	1,43,330	1,86,600	43,270	1.30
T ₄	Ammonium chloride	1,23,171	2,07,000	83,829	1.68
T ₅	Neem coated urea	1,09,800	3,39,600	2,29,800	3.09
T ₆	Calcium ammonium nitrate	1,17,790	2,47,400	1,29,610	2.10
T ₇	Calcium nitrate	1,19,446	2,86,800	1,67,354	2.40

The lowest cost of cultivation was recorded in the treatment of nitrogen through urea (T₁). This could be attributed to the requirement of less quantity due to its high nutrient content and its lowest price as compared to the other sources of nitrogen under study. Similar results are also observed with the nitrogen application through neem coated urea (T₅). The treatments of nitrogen application through ammonium sulphate, through neem coated urea and urea has recorded comparatively superior values of B: C ratio (3.12, 3.09 and 3.01 respectively) and which are far better than the other treatments. The beneficial effects of application of ammonium sulphate as a source of nitrogen has been reported in date palm by Kassem (2012) and of neem coated urea in guava by Haral (2015), which supports the present findings.

References

- Anonymous. 1990. Utilization of tropical fruits and leaves, Food and Agriculture Organization, Food and nutrition paper, 47(7): 10-14.
- Anonymous. 2018. Krishi daianandini, VNMKV, Parbhani.
- Cavalcante, L.F., Pereira, W.E., Curvelo, C.R.S., Nascimento, J.A.M., Cavalcante, I.H.L. 2012. Estado nutricional de pinheira sob adubacao organic do solo. *Ciencia Agronomica*. 43 (3): 579-588.
- Chhonkar, P.K. 2008. Organic farming and its relevance in India, Organic agriculture. *Indian Society of Soil Science*, Jodhpur. Pp:5-33.
- Dhomane, P.A. and Kadam, A.S. 2013. Effect of different sources of nitrogen on growth, yield and quality of guava (*Psidium guajava* L.) Cv. Sardar. *Scholarly Journal of Agricultural Sci*, 3(7): 261-263.
- Gowarikar, V., Krishnamurty, V.N., Gowarikar, S. and Dhanorkar, M. 2005. The fertilizer encyclopedia Vasundhara Research and Publications (P) Ltd; Pune.
- Haral, B.R. 2015. Effect of different levels of nitrogenous fertilizers on growth, yield and quality of guava (*Psidium guajava* L.) Var. sardar. M.Sc. thesis submitted to VNMKV, Parbhani.
- Jackson, M.L. 1967. *Soil chemical analysis*, Prentice Hall of India Pvt. Ltd., New Delhi. pp 205.
- Jackson, M.L. 1973. *Soil chemical analysis*, Prentice Hall of India Pvt. Ltd., New Delhi. pp 498.
- Kassem, H.A. 2012. The response of date palm to soil fertilization. *Journal of Soil Science and Plant Nutrition*, 12 (1):45-58.
- Panase, V.G. and Sukhatme, P.V. 1985. *Statistical methods for agricultural workers*, ICAR, New Delhi.
- Pleguezuelo, C.R.R., Zuazo, V.H.D., Fernandez, J.L.M., Tarifa, D.F.2011.Descomposicion de hojarasca y reciclado del nitrogeno de tropicales y subtropicales en terrazas de cultivo en la costa de Granada. *Comunicata Scientiae.*, 2(1): 42-48.
- Popenoe, G. J., 1974. Status of annona cultural in South Florida. *Prop. Florida State. Hort. Society.*, 87:342-344.