International Journal of Chemical Studies

P-ISSN: 2349–8528
E-ISSN: 2321–4902
IJCS 2019; 7(6): 2188-2189

Received: 19-09-2019
Accepted: 21-10-2019

SV Mane
Department of Agronomy, Post Graduate Institute, Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra, India

Dr. AV Solanke
Department of Agronomy, Post Graduate Institute, Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra, India

JB Dhangada
Department of Agronomy, Post Graduate Institute, Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra, India

Corresponding Author:
SV Mane
Department of Agronomy, Post Graduate Institute, Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra, India

Effect of yield target nutrient management on growth in *rabi* maize

SV Mane, Dr. AV Solanke and JB Dhangada

Abstract
An experiment was conducted on clay loam soil of Western Ghat region to study the Effect of yield target nutrient management in *rabi* maize during *rabi* 2016 and 2017 at Post Graduate Research Farm, Mahatma Phule Krishi Vidyapeeth, Rahuri, Ahmednagar (M.S.). The experiment was laid out in randomized block design with nine replication. The treatments consists of T_1-Absoulte control; T2-GRDF (120:60:40,kg N ,P_2O_5, K_2O ha^{-1}); T3- Fertilizer dose as per STCR equation (80 q ha^{-1} yield target); T4- Fertilizer dose as per STCR equation (90 q ha^{-1} yield target); T5- Fertilizer dose as per STCR equation (100 q ha^{-1} yield target). All the growth parameters noticed significantly higher when crop was fertilized with STCR equation (100 q ha^{-1} yield target) during both the years.

Keywords: Maize, STCR equation, growth

Introduction
Maize (*Zea mays* L.) is one of the most important cereal food crop grown in India. It ranks third position among the cereal crops after wheat and rice. Globally, maize is known as "Queen of cereals" because it has the highest genetic yield potential among the cereals. In India, maize is grown over an area of 8.38 million ha with annual production of 21.76 million tones with an average productivity of 2476 kg ha^{-1} during 2016 (Anon, 2017) [1]. In addition to staple food for human being and quality feed for cattle's, maize serves as a basic raw material as an ingredient to several industrial products such as starch, oil, protein, alcoholic beverages, food sweeteners, pharmaceutical, cosmetic, film, textile, gum, package and paper industries etc.

Since maize is an exhaustive crop, the nutrient requirement cannot be supplied only through native nutrient reserves; the additional nutrients can be met by fertilizer application. In maize yield is low due to imbalanced application of fertilizers. The recommendation of a fertilizer dose is a challenge to scientists as it should meet both nutrient demand of crop and sustain the production system.

Application of imbalanced and/or excessive nutrients led to declining nutrient-use efficiency making fertilizer consumption uneconomical and producing adverse effects on atmosphere (Aulakh and Adhya, 2005) [2] and groundwater quality (Aulakh *et al*. 2009) [3] causing health hazards and climate change.

The soil test crop response (STCR) are cost effective and plant need based approaches. The STCR approach provide principles and tools for supplying crop nutrients as and when needed to achieve higher yield. The STCR approach not specifically aim to either reduce or increase fertilizer use. Instead, they aim to apply nutrients at optimal rates and time to achieve higher yield and high efficiency of nutrient use by the crop, leading to more net returns per unit of fertilizer invested.

Material and Methods
The field experiment on Maize (*Zea mays* L.) was conducted during *rabi* season of 2016 and 2017 at the Post Graduate Institute Research Farm, Mahatma Phule Krishi Vidyapeeth, Rahuri, Dist. Ahmednagar (M.S.). The soil of experimental plot was clay loam in texture and alkaline in reaction (pH 8.17) with organic carbon (0.57 %). It was low in available nitrogen (123.48 kg ha^{-1}) and medium in available phosphorus (15.64 kg ha^{-1}) and very high in available potassium (380.80 kg ha^{-1}). The experiment was laid out in randomized block design with nine replication. The treatments consists of T_1-Absoulte control; T_2- GRDF (120:60:40, kg N, P_2O_5, K_2O ha^{-1}); T3- Fertilizer dose as per STCR equation (80 q ha^{-1} yield target); T4-Fertilizer dose

as per STCR equation (90 q ha^{-1} yield target); T5- Fertilizer dose as per STCR equation (100 q ha^{-1} yield target) The gross plot size was 3.60 m X 4.00 m and net plot sizes was 2.40 m X 3.20 m. The crop was sown at spacing of 60 cm X 20 cm. Healthy, unbroken and well developed seeds of maize of variety Rajarshee were treated with fungicide and inoculated with bio fertilizer (PSB and KSB @ 25 g kg^{-1} seeds) before sowing of the seeds. The periodical growth observations were recorded at an interval of 30 days and crop was harvested at physiological maturity and data on yield were recorded.

Result and discussion

Effect of yield target nutrient management on growth parameters of maize

The data presented in Table 1 showed that application of Fertilizer dose as per STCR equation (100 q ha^{-1} yield target) to *rabi* maize recorded maximum plant height at the time of harvest. The higher plant height in Fertilizer dose as per STCR equation (100 q ha^{-1} yield target) might be due to the more nutrient availability under integrated nutrient management which ultimately shows the effect on the height of plant similar, results was found Verma *et al.* (2006) [8], Kolawole and Joyce (2009) [5]. The results observed under number of functional leaves per plant, leaf area per plant was significantly maximum with fertilizer dose as per STCR equation (100 q ha^{-1} yield target) to *rabi* maize during 2016 and 2017 might be due to adequate and balanced nutrient supply to the crop at right time of crop requirement similar, results found under Saraswathi *et al.* (2015), Deewan *et al.* (2017) [4] and Desai *et al.* (2017).

Effect of various nutrient sources on dry matter of *rabi* maize

The different nutrient sources affected the dry matter accumulation significantly at all the growth stages during both year of experiment. At harvest, treatment T_5: Fertilizer dose as per STCR equation (100 q ha^{-1}target yield) recorded significantly highest dry matter per plant (349.53 g and 351.81 g) than rest of the treatment during both the year of crop, whereas lowest dry matter was recorded under treatment without any nutrient sources (T_1 :Absolute control) this might be due to more leaf area exposed to sunlight with which rapid photosynthetic rate helped to accumulation of higher dry matter in plant similar results found in Verma *et al.*, (2006) [8], Patra and Biswas (2009) [7], Nagavani and Subbian (2014) [6] and Vikram *et al.*, (2015) [9].

Table 1: Effect of yield target based nutrient management in *rabi* maize at harvest

T. No.	Treatments	Plant height (cm)		Number of leaves $plant^{-1}$		Leaf area $plant^{-1}$ (dm^2)		Dry matter $plant^{-1}$ (g)	
		2016	2017	2016	2017	2016	2017	2016	2017
T_1:	Absolute Control	165.09	162.94	3.11	2.92	19.57	19.35	303.24	301.82
T_2:	GRDF(120:60:40, kg N, P_2O_5, K_2O ha^{-1})	186.68	187.08	3.22	3.74	21.31	22.23	320.81	324.08
T_3:	Fertilizer dose as per STCR equation (80 q ha^{-1} target yield)	188.34	189.40	4.44	4.92	22.37	23.20	344.97	347.63
T_4:	Fertilizer dose as per STCR equation (90 q ha^{-1} target yield)	190.05	191.74	4.92	5.40	24.16	25.12	383.60	387.06
T_5:	Fertilizer dose as per STCR equation (100 q ha^{-1} target yield)	194.51	195.31	5.55	6.03	26.58	27.14	395.35	398.46
	S. Em. ±	0.61	0.70	0.34	0.24	0.31	0.19	1.38	1.06
	C.D. at 5 %	1.76	2.01	0.98	0.69	0.90	0.56	3.96	3.04
	General mean	184.93	185.45	4.25	4.60	22.80	23.41	349.59	351.81

References

1. Anonymous. Pocket Book on Agricultural Statistics. Director of Economics and Statistics, Department of Agriculture and Cooperation, Govt. of India, New Delhi, 2017, 15-27.
2. Aulakh MS, Adhya TK. Impact of agricultural acticities on emission of greenhouse gases- Indian perspective. In International conference on soil, water and environment quality-Issues and strategies held at New Delhi, 2005, 319-335.
3. Aulakh MS, Khurana MPS, Singh D. Water pollution related to agricultural, industrial and urban activities, and its effects on food chain: case stdies from Punjab. Journal of New seeds. 2009; 10:112-137.
4. Deewan P, Mundra SL, Singh D, Meena M, Verma R, Sharma NK. Effect of weed and nutrient management on growth, productivity and protein content of quality protein maize. Journal of Pharmacognosy and Phytochemistry. 2017; 6(1):271-274.
5. Kolawole EL, Joyce EL. The performance of *Zea mays* as influenced by NPK fertilizer application. Journal of Natural Sciences. Biology and Medicine. 2009; 1(1):59-62.
6. Nagavani AV, Subbian P. Productivity and economics of hybrid maize as influenced by integrated nutrient management. Current Biotica. 2014; 7(4):283-293.
7. Patra PS, Biswas S. Integrated nutrient management on growth, yield and economics of maize (*Zea mays* L.) under terai region. Journal of Crop and Weed. 2009; 5(1):130-133.
8. Verma A, Nepalia V, Kanthaliya PC. Effect of integrated nutrient supply on growth, yield and nutrient uptake by maize (*Zea mays* L.)-wheat (Triticum aestivum) cropping system. Indian Journal of Agronomy. 2006; 51(1):3-6.
9. Vikaram AP, Biradar DP, Umesh MR, Basavanneppa MA, Narayana Rao K. Effect of nutrient management techniques on growth, yield and economics of hybrid maize in vertisols. Karnataka Journal of Agriculture Science. 2015; 28(4):477-481.