

RESEARCH ARTICLE :

Impacts of nutrient management and chlormequat application on economics of maize

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SUMMARY : The field experiment was conducted during *Kharif* season of 2013-2014 on field No.10 of Agronomy farm, College of Agriculture, Nagpur. The experiment was laid out in Split plot design with twelve treatment combinations comprising three levels of nutrient management viz., N₁-100% RDF (120:60:30 NPK kg ha⁻¹), N₂-125% RDF (150:75:37.5 NPK kg ha⁻¹) and N₃-150% RDF (180:90:45 NPK kg ha⁻¹) and four foliar applications of chlormequat viz., C₀ (No application), C₁ (500 ppm), C₂ (750 ppm) and C₃ (1000 ppm) concentrations, forming 12 treatment combinations replicated three times. Application of 150% RDF and 1000 ppm chlormequat application to maize crop recorded highest gross monetary as well as net monetary return and B: C ratio.

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KEY WORDS :

Maize, Nutrient management, Chlormequat, economics

BACKGROUND AND OBJECTIVES

Maize (*Zea mays* L.) is one of the most versatile emerging crop having wider adaptability under varied agro- climatic conditions. Globally, maize is known as “Queen of cereals” because it has the highest genetic yield potential among the cereals. Primary centre of origin of maize is considered to be the central America and Mexico. Its introduction in India probably occurred in the beginning of the 17th century during the early days of the east India company (Singh, 1999).

Paradkor and Sharma (1994) reported the highest average gross monetary, net monetary and B:C ratio fertilize with 150, 75

and 60 NPK kg ha⁻¹, respectively.

Ashoka *et al.* (2009) revealed that application RDF along with micronutrient combined with vermicompost significantly higher gross monetary return (88,651 Rs. ha⁻¹), net monetary return (68,702 Rs.ha⁻¹) and B:C ratio (3.85) was recorded.

Chaudhary *et al.* (2013) conducted the field experiment during rainy season of 2010 and 2011 at Udaipur to ascertain suitable nitrogen levels (125, 150 and 175 kg N ha⁻¹) and appropriate schedule of nitrogen application (3, 4 and 5 splits) for quality protein maize. The application of 175 kg ha⁻¹ significantly increased GMR, NMR and B:C ratio and economically profitable compare to other treatments.

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Generally maize is cultivated with traditional package of practice and inadequate use of inputs. Particularly the inadequate use of nutrients is an important factor limiting the full expression of maize yield potential. Intensive crop cultivation requires use of chemical fertilizer however, fertilizers are not only in short supply but also expensive. Therefore, current trend is to explore the effectiveness of chemical fertilizers. Accordingly to test the performance the yield potential of maize crop with nutrient management and chlormequat application individually and combination of both.

RESOURCES AND METHODS

The field experiment was conducted in field No.15 at Agronomy farm, college of Agriculture, Nagpur during *Kharif* season of 2013-2014. The topography of experimental site was fairly uniform and leveled. The soil analyzed in experimental site have loamy clayey in texture, medium in nitrogen content (250.60 kg ha⁻¹), low in phosphorus (19.32 kg ha⁻¹) and rich in potash (409.42 kg ha⁻¹) and soil reaction was slightly alkaline (pH 7.70) in nature.

The experiment was laid out in Split plot design with twelve treatment combinations comprising three levels of nutrient management viz., N₁-100% RDF (120:60:30 NPK kg ha⁻¹), N₂-125% RDF (150:75:37.5 NPK kg ha⁻¹)

and N₃-150% RDF (180:90:45 NPK kg ha⁻¹) and four foliar applications of chlormequat viz., C₀(No application), C₁ (500 ppm), C₂ (750 ppm) and C₃ (1000 ppm) concentrations.

The gross plot size was 4.2 m x 5.4 m and net plot size was 3.0 m x 4.2 m. The economics studies of gross monetary return, net monetary return and Benefit:Cost ratio.

OBSERVATIONS AND ANALYSIS

The results obtained from the present study as well as discussions have been summarized under following heads:

Economics studies: Gross monetary return, Net monetary return and Benefit:Cost ratio.

Effect of nutrient management :

The data presented in Table 1 revealed that treatment N₃ i.e. 150% RDF recorded significantly more gross monetary return (Rs. 57305.00 ha⁻¹) over 100% RDF (Rs. 48036.92 ha⁻¹). However, 125% RDF (Rs. 54301.92 ha⁻¹) was at par with 150% RDF. Least gross monetary return was noticed in 100% RDF.

Application of 150% RDF recorded highest net monetary return (Rs. 31392.17 ha⁻¹) which was found significantly more over application of 100% RDF (Rs.

Table 1: Mean cost of cultivation, gross monetary returns (GMR), net monetary returns (NMR) and benefit cost (B:C) ratio as influenced by various treatments

Treatments	Cost of cultivation (Rs. ha ⁻¹)	GMR (Rs. ha ⁻¹)	NMR (Rs. ha ⁻¹)	B : C ratio
Nutrient Management (N)				
N ₁ (100% RDF)	22860	48036.92	25259.50	2.10
N ₂ (125% RDF)	23749	54301.92	28793.83	2.28
N ₃ (150% RDF)	24740	57305.00	31392.17	2.31
S.E. ±	-	1097.37	1399.78	-
C.D. (P=0.05)	-	3266.56	4159.13	-
Chlormequat Application (C)				
C ₀ No application	22730	46561.44	26663.11	2.04
C ₁ Chlormequat at 500 ppm	23480	53406.56	27648.78	2.27
C ₂ Chlormequat at 750 ppm	24230	55659.33	28301.56	2.29
C ₃ Chlormequat at 1000 ppm	24695	57231.11	31313.89	2.31
S.E. ±	-	1783.22	898.68	-
C.D. (P=0.05)	-	5298.41	2670.20	-
Interaction (N x C)				
S.E. ±	-	3088.62	1556.55	-
C.D. (P=0.05)	-	NS	NS	-
G M	23783	53241.61	28481.83	2.22

NS=Non-significant

25259.50 ha⁻¹) but it was at par with application of 125% RDF (Rs. 28793.83 ha⁻¹). Recording of higher GMR and NMR with application of 150% RDF treatment of nutrient management was correlated to the high yield values compared to 100% RDF and 125% RDF due to better growth and yield attributes of maize.

Higher B:C ratio of 2.31 was recorded with 150% RDF and was followed by 125% RDF (2.28). These findings are in accordance with the findings of Ashoka *et al.* (2009); Bisht (2012) and Paradkar and Sharma (1994).

Effect of chlormequat application :

Perusal of data in Table 2 clearly revealed that significantly more gross monetary return (Rs. 57231.11 ha⁻¹), net monetary return (Rs. 31313.89 ha⁻¹) and B:C ratio (2.31) was observed with application of 1000 ppm chlormequat over no application of chlormequat.

Application of 1000 ppm chlormequat recorded significant more gross monetary returns (Rs. 57231.11 ha⁻¹) over no application of chlormequat (Rs. 46561.44 ha⁻¹). However it was at par with 500 ppm (Rs. 53406.56 ha⁻¹) and 750 ppm (Rs. 55659.33 ha⁻¹) of chlormequat application. Net monetary return was significantly more in treatment of 1000 ppm chlormequat (Rs. 31313.89 ha⁻¹) over no application chlormequat (Rs. 26663.11 ha⁻¹). However, 500 ppm (Rs. 27648.78 ha⁻¹) and 750 ppm (Rs. 28301.56 ha⁻¹) were at par with 1000 ppm.

Application of 1000 ppm chlormequat registered higher B:C ratio (2.31). Next in order was 750 ppm (2.29) of chlormequat application. This might be attributed to the mode of action of chlormequat at higher concentration to produce the pronounced favorable effects on

development of maize crop on account of increase in yield attributes and finally the yield which maximizes the profit in comparison to the cost incurred.

Interaction effects :

The interaction effect between nutrient management and chlormequat application in respect of gross monetary return and net monetary return were found to be non-significant.

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