International Journal of Agriculture Sciences
ISSN: 0975-3710&E-ISSN: 0975-9107, Volume 9, Issue 9, 2017, pp.-3966-3967.
Available online at http://www.bioinfopublication.org/jouarchive.php?opt=&jouid=BPJ0000217

Research Article

EFFECT OF SPLIT APPLICATION OF NITROGEN IN *KHARIF* MAIZE (*Zea mays L.*)

VERMA LALITA*, ASEWAR B.V. AND KUMAR PRADEEP

Department of Agronomy, Vasantrao Naik Marathwada Agricultural University, Parbhani, Maharashtra, 431402, India
*Corresponding Author: Email-lalitav43@gmail.com

Received: February 03, 2017; Revised: February 11, 2017; Accepted: February 12, 2017; Published: February 24, 2017

Abstract- The field experiment was conducted at Cotton Research Station, Vasantrao Naik Marathwada Krishi Vidyapeeth, *Parbhani*. Dist. Parbhani during *Kharif* season of 2015 to study the "Effect of split application of nitrogen on growth and yield of *kharif* maize (Zea mays L)". The experiment was laid out in randomized block design with three replications. The treatment details of experiment factor comprised seven split application of nitrogen treatments *viz.,* 100% Nitrogen at sowing (T_1), 75%N at sowing +25%N at 30 DAS (T_2), 50%N at sowing +50% N at 30 DAS(days after sowing)(T_3) , 25% N at sowing +75%N at 30 DAS(T_4), 25%N at sowing +50% N at 30 DAS + 25% at 60 DAS (T_5), 33%N at sowing + 33%N at 30 DAS + 33% at 60 DAS (T_6) and 25% N at sowing + 25%N at 30 DAS+25% at 60DAS +25% N at 60 DAS (T_7). The results revealed that the growth attributes, yield contributing characters, grain yield, and fodder yield of maize are higher in treatment T6 *(33%N at sowing + 33%N at 30 DAS + 33% at 60 DAS).*

Keywords- Maize, Nitrogen Use Efficiency, Split Application.

Citation: Verma Lalita, et al., (2017) Effect of Split Application of Nitrogen in *Kharif* Maize (*Zea mays L.*). International Journal of Agriculture Sciences, ISSN: 0975-3710 & E-ISSN: 0975-9107, Volume 9, Issue 9, pp.-3966-3967.

Academic Editor / Reviewer: Donald Sangma

Introduction

Maize (*Zea mays* L) is one of the most versatile emerging crops having wider adaptability under varied agro-climatic conditions and successful cultivation in diverse seasons and ecologies for various purposes. India ranks sixth in area and third in production and productivity among cereal crops. The acreage for India are 9.43 million hectares, 24.35 million tonnes production and 2337 kg/ha is the productivity and for Maharashtra, 0.58 million hectares area, 1.15 million tonnes production and productivity 2066 kg/ha [1].

Split application of nitrogen is one of the methods to improve nitrogen use by the crop while reducing the nutrient loss through leaching and volatilization [2]. It improves the maize grain yield and increased the economic benefit from increased grain yield. Splitting nitrogen applications can have significant benefits if environmental conditions lead to poor nitrogen availability later in the growing season. Keeping this view in consideration, the experiment is planned [3,4].

Material and Methods

Randomized block design with seven different treatments of splits of nitrogen fertilizer application were evaluated i. e. 100% Nitrogen at sowing (T_1), 75%N at sowing +25%N at 30 DAS (T_2), 50%N at sowing +50% N at 30 DAS (T_3) , *25% N at sowing +75%N at 30 DAS* (T_4), 25%N at sowing +50% N at 30 DAS + 25% at 60 DAS (T_5), *33%N at sowing + 33%N at 30 DAS + 33% at 60 DAS* (T_6) and 25% N at sowing + 25%N at 30 DAS+ 25% at 60DAS +25% N at 60 DAS (T_7). The gross and net plot sizes were 6.0m X 5.4 m and 4.8 m X 4.6 m, respectively. The soil pH was 8.25, available P (Olsen) of 12.2kg/ha, total nitrogen 165.9kg/ha and available K was 387.30 kg/ha. In each plot maize was planted at inter and intra row spacing of 60 cm and 30 cm, respectively. The yield attributing and yield data was collected and analysed.

Results & Discussion

Significantly higher grain yield (2950 kg ha^{-1}) was recorded under treatment (T_6) *33%N at sowing + 33%N at 30 DAS + 33% at 60 DAS* than rest of the treatments, but it was found to be at par with treatment (T_5)i.e. 25%N at sowing +50% N at 30 DAS + 25% at 60 DAS by recording(2753 kg ha^{-1}), (T_7) 25% N at sowing + 25%N at 30 DAS+25% at 60 DAS +25% N at 75 DAS by recording (2599 kg ha^{-1}). The results revealed that application of nitrogen in three splits i. e. 33% nitrogen at the time of sowing, 33% at 30 DAS (knee height) and 33% nitrogen at the 60 DAS (tasseling stage) recorded highest grain yield and stover yield. The lowest grain and stover yield was recorded under treatments (T_1) 100% Nitrogen at sowing. Split application of nitrogen i. e. *33% Nat sowing + 33%N at 30 DAS + 33% at 60 DAS* gave significantly highest gross and net monetary returns.

Treatments	Grain yield kgha^{-1}	Stover yield kgha^{-1}	GMR Rs ha^{-1}	NMR Rs ha^{-1}
T1 –100% Nitrogen at sowing	2073	4592	36133	17449
T2 –75%N at sowing +25%N at 30 DAS	2206	5365	9408	20364
T3 – 50%N at sowing +50% N at 30 DAS	2296	5367	40582	21358
T4 – *25% N at sowing +75%N at 30 DAS*	2303	5427	40793	21389
T5 –25%N at sowing +50% N at 30 DAS + 25% at 60 DAS	2753	5774	47337	27213
T6 – *33%N at sowing + 33%N at 30 DAS + 33% at 60 DAS*	2950	6332	51014	30530
T7 – 25% N at sowing + 25%N at 30 DAS+25% at 60DAS +25% N at 75 DAS	2599	5599	44985	26221
SE(m)	149	218	2141	`1127
CD at 5%	458	671	6588	3468

Conclusion

Split application of nitrogen i.e. 33%N at sowing + 33%N at 30 DAS + 33% at

60 DAS) recorded highest grain yield (2950 kg ha^{-1}), net monetary returns (30530 ₹ ha^{-1}) and benefit cost ratio (2.49) which was followed by Split application of nitrogen with T_5 i.e. (25%N at sowing +50% N at 30 DAS + 25% at 60 DAS) recorded highest grain yield (2753 kg ha^{-1}), net monetary returns (27213 ₹ ha^{-1}).

Acknowledgements
The author would like to acknowledge the staff of Regional Library, Agricultural of Collage, Vasantrao Naik Marathwada Agricultural University for their assistance during the collection of the literature. The authors wish to thank the following colleague for their invaluable contributions to this project. Mr. Vijaykumar (Entomologist), Ms. Shilashinde (Agronomist).

Conflict of Interest: None declared

References

[1] Indiastat.com
[2] Tolessa D., Gemechu G. and Melakeselam L. (1994) Response of Maize to Split Application of Nitrogen Fertilizer at Bako. In: CSSE (Crop Science Society of Ethiopia). Sebil. Proceedings of the Sixth Annual Conference, *Addis Abeba, Ethiopia,* 6, 56-60.
[3] Hatfield J.L. and Prueger J.H. (2004) Nitrogen Over-use, Underuse, and Efficiency."New directions for a diverse planet". Proceedings of the 4th International Crop Science Congress, Brisbane, Australia, 21- 29.
[4] Muthukumar V.B., Velayudham K. and Thavaprakaash N. (2007) *J. Agron.,* 6(1), 2008- 211.