IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)
An International Open Access, Peer-reviewed, Refereed Journal

FERTILIZER APPLICATION AND NON-CONVENTIONAL WEED MANAGEMENT IN MEWAR UNIVERSITY

Gautam Singh Dhaked[1]

Research Scholar (Agriculture), Mewar University, Gangrar, Chittorgarh

Rabindra Kumar [2]

Assistant Professor (Agriculture), Mewar University, Gangrar, Chittorgarh

Dr. Vikas Tomar [3]

Professor (Agriculture), Mewar University, Gangrar, Chittorgarh

ABSTRACT

Maize is India's third-largest cereal after rice and wheat, which makes almost 9% of the domestic food basket. It also serves as the raw material for the industry for starch production in textiles, pharmaceutical and cosmetic industries, high quality maize oil, protection, alcohotic drinking, food sweeteners and others, aside from the Man's staple food and animal and high quality feed. In over 3000 products it is used as an ingredient. The growth rate for maize (4.5 percent) has been satisfactory and the largest among food grains. Since 1970, area, maize productivity and production has increased by 36, 148 and 80% respectively and by in 2019–20, 7.89 metres ha. 18.54 metres ha. 2350 kg/ha. Maize is also grown for other purposes, such as QPM, malnutrition and quality nutrition, sweet maize and other table products, such as pickles, soups, maize pakora, kheer, etc., soup and other sweet maize.

Keywords: Maize, QPM

INTRODUCTION

Corn, leaves and stalks, tassels and cob are largely produced as food or feed crops throughout the globe, and each part of the corn crop has an economical value, and wide range of food or other non food products is produced for each part. Maize (Zea mays L.) Maize can fabricate the financial item at various phases of its lifetime that presumably can't coordinate with other cereal harvests Maize (Zea mays L.)In her vegetative stages Maize can be used in the form of a nourishing green fodder: it can be used as a baby maize, in its silking stage a nutritious plant and prematurely harvested as green cups, a nutritious vegetable/snack that is finally used as a grain that has a variety after maturity. Commercial maize cultivation was used for cereals in the past, but farmers began to grow for different purposes following production of their various economic products. Maize is also very complex and diverse in genetic engineering and has developed to various maize types such as sweet maize, pop-corn, protein quality, high-oil maize, waxy maize, etc. Among all few maize types, such as quality protein maize, sweet maize and popcorn are highly acceptable to consumers, resulting in research and development investment and commercial production. Therefore, for the specific purposes but other than grain, different cultivating kinds of maize are known as maize specialty, quality maize with protein, sweet maize, popcorn or cultivation of different types of maize. The investment in the field of maize research and development, as well as a large number of quality products, is available elsewhere in the United States in order to produce high performance single crucible maize specialty hybrids. Indeed, until recently India imported specialty maize from other countries such as candy, popcorn, and baby maize to meet domestic demand, mainlyin order to fulfil increasing urban requirements for specialty maize. However, even in small towns and cities, a day's specialty corn is becoming increasingly popular. By realising that specialty maize is increasingly popular, India has recently launched research into specialty maize, which has led to the development in 2005 and 2011, in particular, of some good specialty maize hybrids, such as HM 4 from babe corn and HSC 1 from sweet maize. In addition, several multinational seed companies are also selling the Indian market for their seed of maize hybrids. Due to its increasing popularity in urban and semi-urban areas and because the public and private research organisations also have specialty maize hybrids available, India's ranchers, particularly ranchers living in and around urban areas (peri-metropolitan) can improve their farming productivity by development of a forte. The achievement of business corn creation in pre-metropolitan regions relies upon a business opportunity for the merchandise to be sold. For the persistent stockpile of value maize, keeping up value strength in the long haul and furthermore guaranteeing an ensured return for ranchers, a drawn-out arrangement between makers and providers, i.e., ranchers and purchasers is fundamental. A drawn-out arrangement is fundamental in such manner. The interest for strength maize is expanding worldwide and India as of late began trading child maize and sweet maize to different nations. However, the economy and production technology for maize should be understood in addition to the assured market before a large-scale commercial cultivation of maize for increased, long-term and assured agricultural profitability is undertaken. This article aims to provide a brief understanding of maize production technology and its profitability, particularly in peripheral urban agriculture.

Materials and Methods

SOIL CHARACTERISTICS

pH

The pH of the soil is measured by pH. We weigh 12,5 g of ground first and add 25 ml of distilled water in a 150 ml flask/beaker. We stir 4 times in half an hour at least after that. Remove the solution and measure the pH using a pH metre after half an hour. The pH value of the soil on which the test is carried out was 7.8.

ELECTRIC CONDUCTIVITY (EC)

With the help of the EC metre, the electric conductance is measured. First, the weighing of 10 g of soil and adding 50 ml of distilled water. The solution is removed 4-5 times continuously and then the EC is measured with an EC metre. **8**

Fertilizers and manure application

A recommended dose of each plot was applied to organic, inorganic, nanoparticles and biopharmaceutical products, as a function of the treatment details. After sowing the crop, the entire dose of fertilisers was applied to the soil.

SOIL TEXTURE

The hydrometer method has determined the mechanical composition of the experimental soil, i.e. sand, silt and clay particle proportions. The USDA suggested textural triangle determined soil texture .The soil texture for the experiment is sandy loam.

TOTAL ORGANIC CARBON

The Walkley-Black method for wet oxidation is based on organic carbon soil organic carbon .Weigh 2 g in soil and mix it correctly with a 250 ml conical bottle and 10 ml of solution 1N $K_2Cr_2O_7$ after adding an H_2So_4 concentrated of 20 ml. Sometimes leave the flask to stay cool. Stir and stir in 2 g of fluoride powder and 100 ml of water. Add 10 drops of an indicator of diphenyl amine that gives the violet suction colour. Titrate the content of the sulphate solution of ferrous ammonia. When titrate colour, the content with a sulphate solution of ferrous ammonium. The point is the end if the header colour changes from purple to green light. We then note the olume of the iron ammonium sulphate solution. The available organic carbon is .50g/kg-1

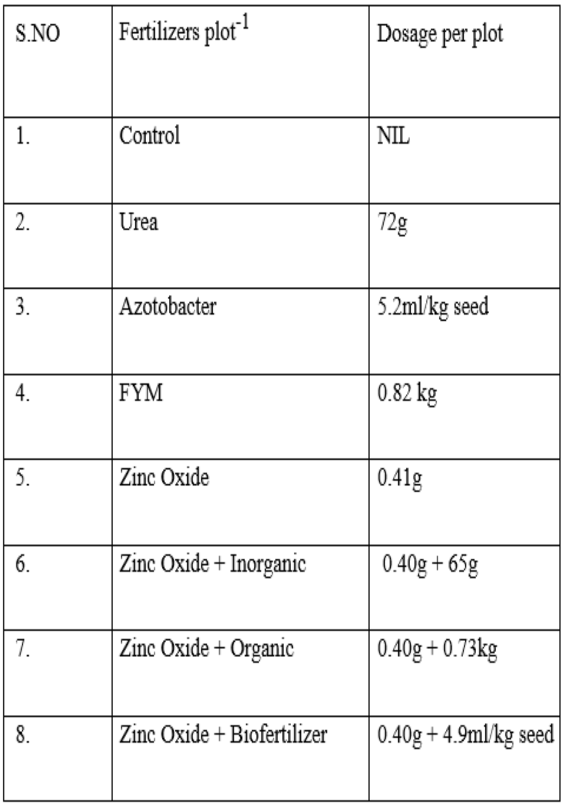
NITROGEN AVAILABLE

Soil available nitrogen. The ammonical nitrate is 45 mg/kg and nitrate nitrogen is 28 mg/kg.

Weed Management Control methods

Weeds are a significant problem in crop production and their management in modern agriculture is crucial to avoid yield losses and ensure food security. Intensive agricultural practices, changing climate, and natural disasters affect weed dynamics and that requires a change in weed management protocols. The existing manual control options are no longer viable because of labor shortages; chemical control options are limited by ecodegradation, health hazards, and development of herbicide resistance in weeds. We are therefore reviewing some potential nonconventional weed management strategies for modern agriculture that are viable, feasible, and efficient. Improvement in tillage regimes has long been identified as an impressive weed-control measure. Harvest weed seed control and seed predation have been shown as potential tools for reducing weed emergence and seed bank reserves. Development in the field of allelopathy for weed management has led to new techniques for weed control. The remarkable role of biotechnological advancements in developing herbicide-resistant crops, bioherbicides, and harnessing the allelopathic potential of crops is also worth mentioning in a modern weed management program. Thermal weed management has also been observed as a useful technique, especially under conservation agriculture systems. Last, precision weed management has been elaborated with sufficient details. The role of remote sensing, modeling, and robotics as an integral part of precision weed management has been highlighted in a realistic manner. All these strategies are viable for today's agriculture; however, site-specific selection and the use of right combinations will be the key to success. No single strategy is perfect, and therefore an integrated approach may provide better results. Future research is needed to explore the potential of these strategies and to optimize them on technological and cultural bases. The adoption of such methods may improve the efficiency of cropping systems under sustainable and conservation practices.

Table 1 Recommendation for Fertilizersa



S.NO	Fertilizers plot^{-1}	Dosage per plot
1.	Control	NIL
2.	Urea	72g
3.	Azotobacter	5.2ml/kg seed
4.	FYM	0.82 kg
5.	Zinc Oxide	0.41g
6.	Zinc Oxide + Inorganic	0.40g + 65g
7.	Zinc Oxide + Organic	0.40g + 0.73kg
8.	Zinc Oxide + Biofertilizer	0.40g + 4.9ml/kg seed

index of harvest

The harvest index was obtained through the division of the economic return by the total organic yield and the percentage was given .

$$\textbf{Harvest index (\%)} = \frac{\textbf{Economic yield (kg ha}^{-1}\textbf{)..}}{\textbf{Biological,yield (kg ha}^{-1}\textbf{)}} \times$$

RESULTS AND DISCUSSION

ACCUMULATION OF DRY MATTER

During the development periods of 30.60 and 90 DAS cultivation dry matter was collected from maize.

30 DAS

(Zinc Oxide.0.42 g) shows the highest log dry matter of 29.67 g/plant T0 (untreated) and the lowest log dry matter of 30 DAS 20.87 g/plant T0. T2 (zinc oxides @ 5 ml kg-1 g), T3 (FYM @ 0.83 g), T5 (zinc oxide @ 0.42 g + urea @ 70 g), T7 (zinc oxide @ 0.83 g), zinc oxide @ 0.42 g + Azotobacter microbes @ 5 ml kg-1 seeds), T8 (zinc oxide @ 0.83 g), zinc oxide @ 0.42 g + Azotobacter microbes @

60 Das

(ZnO @ 0.42 g) 102.10 g T5 + urea @ 70 g) depicts the plant's highest dry matter accumulation. + g. urea Plant T0-1 holds the record for accumulating the least amount of dry matter, with a weight of 75.54 g. T2 (Azotobacter @ 5 ml kg-1 seed), T3 (FYYM @ 0, 83 g), T4 (Dry matter design) Zinc oxide @ 0.40 g), T6 (zinc oxide @ 0.42 g + FYM @ 0.83 g) and T7 (zinc oxide @ 0.42 g + Azotobacter @ 5 ml seeds kg-1)

90 Das

At 90 DAS T5 (urea @ 70 g), Plant-1 gathered the most dry matter, a total of 241.51 g. At T0, the least amount of dry matter was collected, which was 1. (untreated). T1 (urea @ 70 g), T2 (zinc oxide @ 5 ml), 221.11 g, 202.41 g, 228.51 g, 192.41 g, 219.08 g, and T1 (urea @ 70 g).

that the T4 has a significant 1% effect on dry matter accumulation. Zinc oxide treatment of 0.42g at 30 DAS of planting revealed the plant-1dry matter development, which had a significant effect. At 1% of plant-1 amassing, T5 exhibited significant effects in the development period of 60 and 90 DAS of plant-1. The capacity of maize in dry matter has a beneficial effect, together with ZnO and N at 0,42 g and 70 g, respectively. The majority of the dry stuff has formed. In 30 DAS seed, T6 and T1 exhibit no significant difference, while T2 and T7 have a little checked differentiation. T5 has a higher level of pertinence than the other 60 and 90 DAS medications. In 60 DAS, there is a small checked difference between T4 and T6.

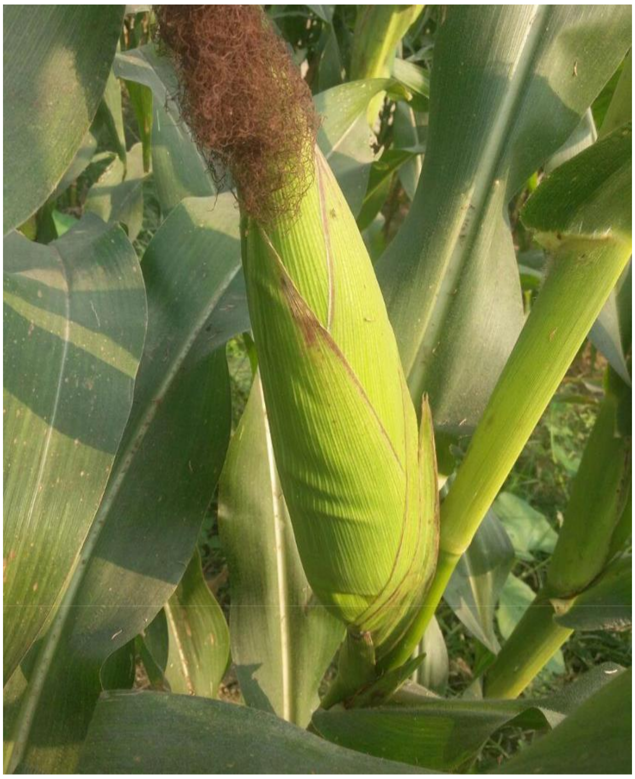


Figure: Cob in a plant

Table 1: At 30 DAS, 60 DAS, and 90 DAS, the effect of various plant height treatments

Symbol	Treatment	Plant height (cm)		
		30 day	60 day	90 day
T_{00}	No treatment	37.43±1.61	63.01±2.31	159.21±1.58
T_{01}	Inorganic (Urea)	39.96±0.44	70.87±3.96	165.10±3.38
T_{02}	Azotobacter	38.81±1.11	74.04±1.22	166.10±2.10
T_{03}	Organic (FYM)	37.09±0.38	68.84±1.95	160.55±2.39
T_{04}	ZnO (Nanoparticles)	36.30±0.37	69.87±1.52	162.10±2.02
T_{05}	ZnO + Inorganic	41.40±0.48	76.22±0.80	168.99±2.31
T_{06}	ZnO + Organic	37.61±0.38	68.40±3.43	159.66±1.32
T_{07}	ZnO + Azotobacter	37.71±0.37	68.27±0.37	166.77±2.78
	S.Em.±	1.03	2.30	1.58
	CD at 5%	3.15	7.00	4.83
	Significance	*	*	**

At a 1% chance level, this is significant.
At a 5% probability level, this is significant.

THE CRITICAL PERIOD OF CROP-WEED COMPETITION

The critical crop growth stages considers as the most vulnerable period for crop-weed competition, during which crop must be weed free in order to prevent yield losses. Earlier studies observed that the critical period of weed control in maize ranges from 7 to 56 days after seedling emergence. Other studies also reported the critical period usually corresponds for maize up to 8–10 leaf stages. Wider canopy spacing and slow-growing nature of the maize crop should control weeds in first till 21–28 days after sowing for free from crop-weed competition and it was also suggested that if the weeds are not control within the critical crop growth stages, the yield losses may occur 30–100%,.Weed species, densities, and their interactions influence maize yield loss . Weed plants compete with maize for their essential growth resources like water, nutrients, space etc. which ultimately reduce the yield up to 65% when weeds control measure was not performed at critical crop growth stages . While, some problematic weeds species as they are similar in nature and life cycle of maize are difficult to control. Massinga et al., reported that the yield reduction in maize could be 91% by competition if more than eight amaranth (Amaranthus palmeri S. Wats) plants per meter row length.

CONCLUSION

1. A successful application of integrated weed management (IWM) system in maize requires full exploitation of research knowledge acquired from the long-term experiments.

2. The crop rotates even doubly as maize and winter wheat, reduced the biomass of weaven when used with the recommended herbicide usage and at half its recommended rate compared to maize cultivated in a single-crop crop.Six years of long-term experimentation have shown that the greatest effect on weed biology, respective 92.1 percent and 92.2 percent, is maize — to winter wheat — to winter and maize — to winter wheat and the recommended herbicide rate.

3. The most effective non-chemical weed control method is conventional laying. In the case of the use of reduced tillage or no layer in long-term experiments, higher amounts of herbicides were necessary, in particular where permanent prevalence was observed.

REFERENCES

1. Alm, D. M., Wan, L. M. and Stollere, W. (2000). Weed suppression for weed management in corn (*Zea mays*) and soybean (*Glycine max*) production systems. *Weed Technol*. **14** : 713-17.

2. Audi Reddy, D. Ramamoorthy, K. and Kandaswamy,O.S. (2004). Integrated weed management in rabi maize and its residual effect on succeeding groundnut. Andhra. Agric.J., 51(3&4):517-521Audi Reddy, D. Ramamoorthy, K. and Kandaswamy,O.S. (2004). Integrated weed management in rabi maize and its residual effect on succeeding groundnut. Andhra. Agric.J., 51(3&4):517-521.

3. Walia ,U.S.Surjit Singh and Butasingh. (2007).Integrated control of hardy weeds in Maize (ZeamaysL.).Indian. J. Weed. Sci., 39(1&2):17-20.

4. Tripathi,A.K.K.Tewari,A.N. and Prasad,A.(2003). Integrated weed management in rainy season maize In Central Uttarpradesh . Indian. J. Weed. Sci., 37(3&4):269-270.

5. Adnan M, Zahir S, Fahad S, Arif M, Mukhtar A, Imtiaz AK, Ishaq AM, Abdul B, Hidayat U, Muhammad A, Inayat-Ur R, Saud S, Muhammad ZI, Yousaf J, Amanullah Hafiz MH, Wajid N (2018) Phosphate-solubilizing bacteria nullify the antagonistic effect of soil calcification on bioavailability of phosphorus in alkaline soils. Sci Rep 8:4339.

6. Akram R, Turan V, Hammad HM, Ahmad S, Hussain S, Hasnain A, Maqbool MM, Rehmani MIA, Rasool A, Masood N, Mahmood F, Mubeen M, Sultana SR, Fahad S, Amanet K, Saleem M, Abbas Y, Akhtar HM, Waseem F, Murtaza R, Amin A, Zahoor SA, ul Din MS, Nasim W (2018a) Fate of organic and inorganic pollutants in paddy soils. In: Hashmi MZ, Varma A (eds) Environmental pollution of paddy soils, Soil biology. Springer, Cham, pp 197-214

7. Akram R, Turan V, Wahid A, Ijaz M, Shahid MA, Kaleem S, Hafeez A, Maqbool MM, Chaudhary HJ, Munis MFH, Mubeen M, Sadiq N, Murtaza R, Kazmi DH, Ali S, Khan N, Sultana SR, Fahad S, Amin A, Nasim W (2018b) Paddy land pollutants and their role in climate change. In: Hashmi MZ, Varma A (eds) Environmental pollution of paddy soils, Soil biology. Springer, Cham, pp 113-124

8. Arndt C, Bacou M (2000) Economy-wide effects of climate variability and climate

prediction in Mozambique. Am J Agric Econ 82:750-754

9. Aziz K, Daniel KYT, Fazal M, Muhammad ZA, Farooq S, Fan W, Fahad S, Ruiyang Z (2017) Nitrogen nutrition in cotton and control strategies for greenhouse gas emissions: a review. Environ Sci Pollut Res 24:23471-23487. https://doi.org/10.1007/s11356-017-0131-

10. Bandara JS, Cai Y (2014) The impact of climate change on food crop productivity, food prices and food security in South Asia. Econ Anal Policy 44:451-465

11. Chen G, Kong X, Gan Y, Zhang R, Feng F, Yu A (2018) Enhancing the systems productivity and water use efficiency through coordinated soil water sharing and compensation in strip- intercropping. Sci Rep 8:10494

12. Debaeke P, Aboudrare A (2004) Adaptation of crop management to water-limited environments. Eur J Agron 21:433-446

13. Duran-Encalada JA, Paucar-Caceres A, Bandala ER, Wright GH (2017) The impact of global climate change on water quantity and quality : a system dynamics approach to the US - Mexican transborder region. Eur J Oper Res 256:567-581

14. Easterling WE, Aggarwal PK, Batima P, Brander KM, Erda L, Howden SM, Kirilenko A, Morton J, Soussana J-F, Schmidhuber J, Tubiello FN (2007) Food, fibre and forest products. In: Parry ML, Canziani OF, Palutikof JP, van der Linden PJ, Hanson CE (eds) Climate change 2007: impacts, adaptation and vulnerability. Contribution of working group II to the fourth assessment report of the intergovernmental panel on climate change, Cambridge University Press, Cambridge, UK, pp 273-313

15. Evans RG, Sadler EJ (2008) Methods and technologies to improve efficiency of water use. Water Resour Res

16. Fahad S, Bano A (2012) Effect of salicylic acid on physiological and biochemical characterization of maize grown in saline area. Pak J Bot 44:1433-1438

17. Fahad S, Chen Y, Saud S, Wang K, Xiong D, Chen C, Wu C, Shah F, Nie L, Huang J (2013) Ultraviolet radiation effect on photosynthetic pigments, biochemical attributes, antioxidant enzyme activity and hormonal contents of wheat. J Food Agric Environ 11(3&4):1635-1641

18. Fahad S, Hussain S, Bano A, Saud S, Hassan S, Shan D, Khan FA, Khan F, Chen Y, Wu C, Tabassum MA, Chun MX, Afzal M, Jan A, Jan MT, Huang J (2014a) Potential role of phytohormones and plant growth-promoting rhizobacteria in abiotic stresses: consequences for changing environment. Environ Sci Pollut Res 22(7):4907-4921. https://doi.org/10.1007/s11356-014-3754-2

19. Fahad S, Hussain S, Matloob A, Khan FA, Khaliq A, Saud S, Hassan S, Shan D, Khan F, Ullah N, Faiq M, Khan MR, Tareen AK, Khan A, Ullah A, Ullah N, Huang J (2014b) Phytohormones and plant responses to salinity stress: a review. Plant Growth Regul 75(2):391-404. https://doi.org/10.1007/s10725-014-0013-y

20. Fahad S, Hussain S, Saud S, Tanveer M, Bajwa AA, Hassan S, Shah AN, Ullah A, Wu C, Khan FA, Shah F, Ullah S, Chen Y, Huang J (2015a) A biochar application protects rice pollen from high-temperature stress. Plant PhysiolBiochem 96:281-287