

# Productivity of Forage Crop Maize under Different Cultivation Practices

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**Abstract:** *Maize (Zea mays. L.) belongs to family is one of the important forage crop used in Marathwada. During the piece of work the effect of different cultivation methods on growth performance of forage crop Maize was studied. Cultivation practices utilized were Mulching, Raised bed, Shed nets, Ridges and furrows along with control. These four treatments were carried out along with three replicates. Mulching produced the tallest plant, along with highest number of leaves per plant. These plants were emerged out early with 100% rate of seed germination. Control showed poor performance. Thus it could be concluded that, mulching method is best for the production of forage crop maize in rain feed area of Marathwada.*

**Keywords:** Maize, Mulching, Shed net, Raised bed, Furrow and Ridge

## 1. Introduction

Maize (*Zea- mays*) is one of the most important, high yielding forage crops supporting the livelihood of million people across the world. It is a cheap form of starch and is a major energy source for animal feed (ICAR, 2006). Maize also known as corn is the world's third most important grain crop after rice and wheat (ICAR, 2006). It is widely grown for food, feed, and fuel, and optimal yield will be required to meet increasing demand due to world population growth and increased fodder usage. Maize can be grown on wide variety of soil but performs best on well drained deep loams and silt loam containing adequate organic matter and available nutrients (Nasir, M., 2000). It is necessarily that the pH of the soil does not deviate from the range 7.5 to 8.5 (Molatud, R.L. and L. K. Marige , 2009).

Maize plants particularly of the seedling stage are susceptible to salinity and 90% relatively of 1.8dsm-1 (Aikinss, H. M; & Joseph,2006). Maize is also sensitive to water logging. Accordingly, provision of adequate drainage is essential for economic production. Maize seed germinate 4-5 days after sowing under warm, moist conditions. When temperature is less than optimum, 14 to 16 days may be necessary for emergence of seedlings (Alessi;J. and J.F.Power,1971).

In Marathwada, maize is produced for consumption both for human and livestock. The green leaves and stalks are used to feed domestic animals. One of the problems experienced by the farmers is lodging. In dense population most plants remain barren; ear and ear size remains smaller, crop become susceptible to lodging, disease and pest, while plant population at sub-optimum level resulted lower yield per unit area (ICAR, 2006 ). High plant population leads to lodging of maize plants (Aikinss, H. M; & Joseph, 2006). Present study was under taken to determine the effect of cultivation practices on growth performance of maize.

Secondly temperature changes in the field can be reflected in rapid transpiration and these results in scarcity of water. Aurangabad features a semiarid climate (Alessi, J. and J.F.Power, 1771). Annual mean temperatures in Aurangabad range from 17 to 33 °C, with the most comfortable time to

visit in the winter – October to February Most of the rainfall occurs in the monsoon season from June to September. Average annual rainfall is 710 mm. The city is often cloudy during the monsoon season and the cloud cover may remain together for days. Hence conditions are suitable for the growth of maize.

The present experiments were conducted to investigate effect of different planting methods on growth of forage crop maize. Keeping in a view above facts a study has been designed with following objectives:

- 1) To determine percentage of germination and time taken for germinate by maize seeds during different cultivation practices.
- 2) To investigate impact of different cultivation method on performance of yield.

## 2. Material and Methods

### 2.1 Experimental site

The experiments were conducted in Botanical garden in the Botany Department of Marathwada University Aurangabad and at the village Revgaon of district Jalna.

### 2.2. Experimental Design and treatment

The experiment was carried out in a Randomized complete block design (RCBD) with three replicates. The size of each individual plot was  $1.5 \times 2.1 M^2 = 3.15 M^2$ . The distance between plots, plant, rows, and blocks would be 70cm, 30cm, 70cm, and 1m respectively. Treatments were assigned randomly to each plot and each treatment appeared only once in each block. The experiments were conducted using different cultivation methods viz. Mulching, Shed net, Raised bed, Furrow and Ridge along with three replicates.

### 2.3 Data collection

Data were collected on the following parameters:

- 1) Height of plant after 15 days and after 30 days
- 2) Fresh weight of plant after 30days.

### 3. Result and Discussion

Plant growth refers to irreversible increase in organ or whole plant size (length, area, volume and weight), while plant development refers to processes related to cell differentiation, organ initiation, member appearance, and extends to plant senescence (Streck et al., 2003). During the present investigation various cultivation methods were employed for growth of maize viz. Mulching, Raised bed, Shed nets, Ridges and furrows along with control. It was recorded that, using mulching method heights of the plants recorded were 29.5 cm., 28.8 cm and 30.3 cm. Using other methods recorded heights of the plants were less compare to the mulching method after 15 days. The average heights recorded was 29.53333 cm. Heights were recorded after 30 days which were 48.5, 50 And 47.8. The average heights recorded was 48.7666 cm. Secondly average fresh weights of the plants recorded were 266 with mulching, 87.00 gms with raised seed beds, 120.0 with net and 92.00 with furrows

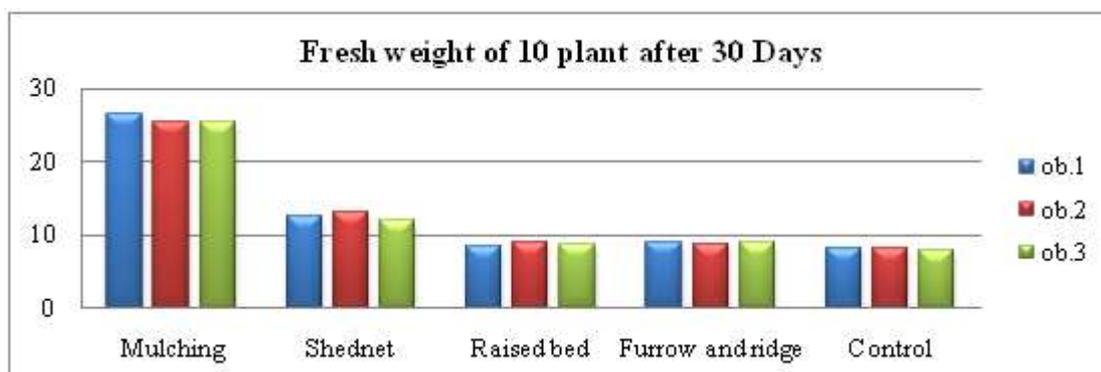
and rows. The value of control recorded was 80.00. (Table.1- 2)

**Table 1:** Height of plant after 15 and 30 days (In cm)

Cultivation method	After 15 Days				After 30Days			
	Obs.1	Obs.2	Obs.3	Average	Obs.1	Obs.2	Obs.3	Average
Mulching	29.5	28.8	30.3	29.53333	48.5	50	47.8	48.76666
Raised bed	18.3	19.7	20.5	19.5	29	28.5	29	28.83333
Shed net	18.8	17.6	19.5	18.63333	35.4	36.2	34.6	35.4
Furrow and ridge	19.4	18.5	19	18.96667	38.2	34.5	37	36.56667
Control	15.6	14.4	13.2	14.43333	30.1	29.3	31.2	30.2

**Table 2:** Fresh weight of 10 plants after 30 days (In gms.)

Cultivation method	Obs.1	Obs.2	Obs.3	Average
Mulching	266.60	258.00	268.00	264.2
Raised bed	86.	89	87	87.33333
Shed net	121	113	126	120.00
Furrow and ridge	91	89	98	92.66667
Control	83	81	78	80.66667



**Graph:** Effect of different cultivation methods on fresh weight of Maize

From the recorded results it could be stated that, mulching is best method for the growth of the plants compare to other methods like raised seed beds, shed nets and furrows and ridges. Due to application of this method, moisture could be held up in the soil which has been covered with plastic sheet. Secondly temperature is the governing factor which is sufficient for germination. This favours the growth of roots. Roots are the main organs for the absorption of the nutrients from the soil. Hence healthy growth of seedlings and crop takes place. Maize (*Zea mays* L.) development is primarily driven by temperature, with air temperature being theoretical to enhance maize development from emergence to physiological maturity (Cutforth and Shaykewich, 1990). Muchow (1990) showed that seed growth may be directly influenced by air temperature. Different sowing dates might cause favorable environmental conditions from emergence to seed filling. Fischer (1985) showed that the thermal time requirement needed by a specific growth stage is more or less constant.

Marathwada is rain feed area where only kharif crops could be grown. Hence there is severe deficit of forage crops. Unless and until you don't have green forage for cattle's there maintenance is obscure. One could have to adopt such novel techniques in scarcity of water.

### 4. Conclusions

The growth performance of maize is greatly affected by the different cultivation practices. From the recorded result it could be concluded that, mulching method for plantation of forage crop is better than other methods. This method is viable as requirement of water is less and productivity is more. Thus, for similar agro ecologies of Marathwada, this mulching method recommended for higher yield of forage crop.

### 5. Acknowledgement

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