

Effect of tillage and organic amendments on moisture conservation, moisture use efficiency and economics of sorghum under rainfed conditions

A.L. DHAMAK*, P.N. KARANJIKAR¹, S.B. JADHAV², P.R. AMBEGAONKAR AND R.B. DESHMUKH³
Department of Soil Science and Agricultural Chemistry, College of Agriculture, Ambajogai, BEED (M.S.) INDIA

ABSTRACT

A field experiment was conducted for two consecutive years to see the effect of various tillage practices and organic amendments on moisture status, moisture use efficiency, yield and gross monetary returns of sorghum under rainfed conditions on vertisols. Three tillage systems (low weight wooden plough, high weight mould board plough and tractor plough), three organic amendments level (No FYM/PMC, PMC @ 5 Mgha⁻¹ and FYM 5 Mgha⁻¹) and two pulverization treatments (two harrowings and one rotavation). Data showed a significant effect of deep tillage, press mud compost and rotavation on moisture status, moisture use efficiency, yield and economics of sorghum. The highest moisture conservation, moisture use efficiency, plant height, yield and net return were noted with tractor plough, press mud compost and pulverization by rotavation and lowest in case of low weight wooden plough, No FYM/PMC and pulverization by harrowings.

Key words : Tillage, Organic amendments, Pulverization, Economics, Moisture content

INTRODUCTION

Sorghum is the most widely grown cereal crop in arid and semiarid area of India. Sorghum successfully grown where rainfall during growing season exceeds 500mm. In Maharashtra, it is well adopted to annual rainfall of 500-1150 mm and best suited to medium black soil.

The farmer manages soil through tillage for loosening compacted soil for improving water infiltration, breaking hard pans to a depth of 30-50 cm, for facilitating root growth for good crop establishment and water use efficiency (Anonymous, 1997), destroying weeds, incorporating residues and amendments into soil (Prihar, 1990). Successful tillage systems and practices of amending the soil by organics have been developed specially for moisture conservation in the rainfed areas (Gill and Akhtar, 2002).

The present investigation was planned to determine the effect of different tillage systems in combination with organic amendments on soil moisture status, moisture use efficiency and economics of sorghum under rainfed conditions.

MATERIALS AND METHODS

A field experiment was conducted to evaluate the effect of different tillage systems and organic amendments on moisture conservation and economics of sorghum under rainfed conditions, at Agronomy farm, Marathwada Agricultural University, Parbhani (M.S.).

Three tillage systems (T₁- tillage with low weight wooden plough, T₂- tillage with heavy weight mould board plough and T₃- tillage with tractor plough), three levels of organic amendments (A₁- No FYM/PMC, A₂-PMC @ 5 Mgha⁻¹ and FYM 5 Mgha⁻¹) and two pulverization treatments (P₁-two harrowing and P₂-one rotavation) were used. The experiment was laid out in a factorial randomized design with four replications. The recommended doses of N,P and K were applied to soil in different plots. The soil of experimental field was clayey in texture with bulk density of 1.32 Mg M⁻³, alkaline in reaction (pH-7.97) with normal EC of 0.38 dsm⁻¹, calcareous in nature, medium in organic carbon (4.2 gkg⁻¹), low in available nitrogen (196 kgha⁻¹), medium in available phosphorus (12.78 kgha⁻¹) and high in available potassium (356.68 kgha⁻¹). The soil moisture content in soil profile (15 cm depth interval) was recorded at sowing, flowering and harvest of crop as per method described by Singh (1980). The data regarding plant height, moisture use efficiency and yield was recorded and analyzed statistically. Economics was also calculated of each year.

RESULTS AND DISCUSSION

The results obtained from the present investigation are summarized below :

Moisture content:

The moisture content of soil was significantly

* Author for correspondence.

¹Department of Agronomy, College of Agriculture, Ambajogai, BEED (M.S.)

²Department of Agricultural Engineering, College of Agriculture, Ambajogai, BEED (M.S.)

³College of Agriculture, Ambajogai, BEED (M.S.)