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Research Paper :

Effect of organic mulches on soil moisture conservation and yield of *rabi* sorghum (M-35-1)

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ABSTRACT

The study was conducted at College of Agricultural Engineering and Technology, Marathwada Agricultural University, Parbhani during the year 2001-2002 in Randomized Block Design with five mulching treatments and four replications. The size of each plot was 6m X 4.5 m. Topography of the experimental plot was uniform and leveled. Parbhani has sub tropical climate with an average annual rainfall of 850 mm. The total soil moisture depletion from sowing to harvest at 15 cm, 30 cm and 45 cm soil depths was 9.14 %, 11.33 % and 11.92 %, respectively in *rabi* sorghum. Percentage increase in soil moisture in sugarcane trash mulch, wheat straw mulch, soybean straw mulch and interculturing operation over control (no mulch) was 28.19 %, 17.81 %, 12.26 % and 7.54 %, respectively. Average soil temperature observed in sugarcane trash mulch, wheat straw mulch, soybean straw mulch, Interculturing operation and Control (no mulch) was 19.58^{0}C, 20.04^{0}C, 20.37^{0}C, 20.73^{0}C and 21.33^{0}C, respectively. Increase in grain yield in sugarcane trash mulch, wheat straw mulch, soybean straw mulch and interculturing operation over control (no mulch) was 12.64 %, 9.06 %, 7.46 % and 3.74 %, respectively.

Key words : Organic mulch, Soil moisture, soil temperature and Grain yields.

Water is the most limiting natural resource in arid and semi-arid areas for the economic development of the country. In most of the areas the only water available is the rain that falls on the area, hence, for successful agriculture, proper utilization of water is very essential which means to increase the water use efficiency of a crop by adopting suitable water conservation measures. The water loss takes place in nature due to evaporation, transpiration and percolation. The percolation losses can be avoided by applying water to the plants properly. The evaporation loss may be minimized by the use of mulches, such as crop wastes, polythene plastics and chemicals. The transpiration losses can also be minimized to some extents by erecting tunnels over the crops.

Proper utilization of water is essential particularly in arid and semi arid areas. Mulching is an application of any plant residues or other materials for covering top soil surface for conserving soil moisture, reducing the runoff and thereby to control soil erosion, checking weed growth, improving soil temperature, modifying the micro environment of soil to meet the needs of seeds for their good germination and better growth of seedlings.

Irrigation water become scares in summer, which is a serious problem in these arid and semi arid areas. Many a times farmers loose the entire crop in *rabi* and summer season. A large scarcity areas exist in Maharashtra state. It is, therefore, necessary to minimize losses due to evaporation and transpiration to conserve the soil moisture. Evaporation is mainly due to the degree of saturation of soil surface, temperature of air and soil humidity and wind velocity. Several of these factors are greatly influenced only by vegetative cover. Therefore, to conserve the moisture in soil under such conditions, the effective way is to spread the mulches over the crop area or to erect the plastic tunnels over the crop. However, the farmers of this region are not adopting this mulch farming, which may be due to their lack of knowledge and / or may be due to insufficient research work done on the efficiency of the mulches and tunnels in increasing the water use efficiency.

METHODOLOGY

The study was conducted at College of Agricultural Engineering and Technology, Marathwada Agricultural University, Parbhani during the year 2001-2002 in Randomized Block Design with five mulching treatments and four replications. The total size of the experimental field was 26.7 m x 26.1 m. Whole plot was divided in to twenty plots and the size of each plot was 6 x 4.5 m. Topography of the experimental plot was uniform and leveled. The soil of the experimental plot was well drained with 75 cm depth. Parbhani has sub tropical climate with an average annual rainfall of 850 mm. The data in respect of physical and chemical properties of soil are given in