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Effect of tillage and weed management practices on performance of maize-sunflower

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ABSTRACT

Field experiment was conducted during *kharif* and *rabi* seasons of 2005-2006 to study the growth and productivity in maize-sunflower cropping system as influenced by tillage and weed management methods. The result revealed that growth attributes *viz.*, plant height and dry matter production were increased by continuous conventional tillage with hand weeding on 20 and 40 DAS. Similarly yield attributes and yield were also significantly higher with continuous conventional tillage with hand weeding on 20 and 40 DAS.

Key words : Tillage, Growth, Yield, Maize, Sunflower.

INTRODUCTION

Intense weed competition is one of the major constraints in productivity of crops. Weeds constitute a major component among the bottlenecks for successful crop production. Tillage helps in controlling weeds by burying the weed seeds and emerged weed seedlings leaving a rough surface to hinder weed seed germination and expose underground parts of perennial weeds leading to desiccation. Adoption of conservation tillage practices can lead to shifts in weed communities. Weed management techniques like manual and herbicidal methods are found to be effective in controlling different groups of weeds in cropped fields. Maize is the third most important cereal grain crop in India after wheat and rice. As the crop is heavily fertilized and sparsely grown, severe weed infestation is experienced, resulting in drastic reduction of grain yield.

Yield losses due to weeds varied from 28 to 93 per cent depending on the type of weed flora and their intensity, stage, nature and duration of crop-weed competition (Sharma and Thakur, 1998). Sunflower is an important oil seed crop of India. Wide row spacing and slow initial growth of sunflower provide enough room for weeds to establish and to take advantage of slower initial growth of the crop. Uninhibited growth of weeds cause enormous loss of nutrients which in turn reduce the yield of sunflower up to 64 per cent (Legha *et al*., 1992). Cropping system influences the weed control as it results in weed population shifts due to various practices *viz.*, land preparation, organic and fertilizer nutrient application and herbicidal application or other means of weed management.

The information on the influence of tillage and different weed management methods on the productivity of crops in a system and their interactive effects on the cropping system productivity are seldom available. Hence, a field experiment was programmed to develop information on efficient and economic tillage and weed management methods for maize-sunflower cropping system under irrigated conditions.

MATERIALS AND METHODS

Field experiment was conducted at Tamil Nadu Agricultural University, Coimbatore during *kharif* and *rabi* seasons of 2005 and 2006 to study crop growth and productivity in maize – sunflower cropping system as influenced by tillage and weed management methods. The experiments were laid out in split plot design with four replications. Main plot treatment consisted of four tillage methods *viz.*, zero tillage- zero tillage, zero tillage-conventional tillage, conventional tillage - zero tillage and conventional tillage - conventional tillage for maize-sunflower cropping system. Three weed management methods *viz.*, hand weeding on 20 and 40 DAS, pre-emergence herbicide (atrazine 0.5 kg ha^{-1} for maize and pendimethalin 1.0 kg ha^{-1} for sunflower) application followed by hand weeding on 40 DAS, along with an unweeded check for both the crops consisted the sub plot treatments. The first crop of maize was raised during *kharif* (June-Sep) 2005 and 2006 and the second crop of sunflower during *rabi* (Oct-Dec) 2005 and 2006. Maize variety Co-1 with duration of 105-110 days and sunflower variety Co-4 with duration of 85-90 days were selected for the study. In zero tillage the seeds are dibbled in the stubbles of the previous crop without any tillage or soil disturbance, except that which is necessary to place the seeds at the desired depth. One mould board plough / disc plough was given as the primary tillage operation

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