

Residual effect of tillage, organics and seeding method on yield and nutrient uptake by safflower under sorghum-safflower cropping system

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ABSTRACT

The residual effect of different tillage and organics on yield and nutrient uptake and seeding method of succeeding crop was studied in field. Tillage organics showed significant residual effect on safflower. Direct seeding also showed significant and positive effect on safflower. Tillage with tractor plough (T₃), PMC @ 5 mg ha⁻¹ (A₂) and pulverization by rotavation (P₂) and direct seeding method (S₂) recorded maximum grain and straw yield of safflower. Similar trend was observed with respect to N, P and K uptake by grain and straw of safflower.

Key words : Tillage, Organics, Residual effect, Seeding method, Safflower

INTRODUCTION

The cropping system research was mostly focused on evaluation efficient crops and their varieties for specific agro-ecological units. In semi-arid tropics, the cropping systems in vogue are sequential, relay, ratoon and intercropping. Kanwar (1994) described the guidelines for potential cropping systems based on rainfall, broad soil group and effective growing period where sequential cropping is a viable and profitable proposition for 750-1000 mm rainfall region under vertisols and associated soil with 25-30 weeks effective growing period and cotton and sorghum as major crops of region. Sorghum-safflower are though recommended sequential cropping systems for vertisols and associated soils, no soil nutrient management models are developed through integrated plant nutrient supply, use of crop residues, press mud compost and soil mechanization. Considering these referred gaps in soil-nutrient availability, soil tillage and organic research, the present investigation was undertaken; as such type of information is scarcely available in the literature.

MATERIALS AND METHODS

A field experiment was conducted at Agronomy farm, Marathwada Agricultural University, Parbhani during 1998-99 and 1999-2000 using *Kharif* sorghum and succeeding rain fed safflower. The experimental soil had pH (7.97), EC (0.38 dsm⁻¹), organic carbon (4.2 gkg⁻¹), available nitrogen (196.0 kg ha⁻¹), available phosphorus (12.78 kg ha⁻¹) and available potassium (356.68 kg ha⁻¹). The tillage treatments consisted of tillage with low weight wooden plough (T₁), tillage with heavy weight mould board

plough (T₂) and tillage with tractor plough (T₃). The organic amendment treatments, consisting of control (A₁) and application of 5 Mgha⁻¹ press mud compost (A₂) and farm yard manure (A₃), two levels of pulverization (P₁-two harrowing and P₂- one rotavation) and seeding method of safflower consisting of two harrowing after harvest of sorghum (S₁) and direct seeding of safflower (S₂). The experiment was laid out in FRBD with thirty six-treatment combination replicated four times. The tillage, organics and pulverization treatments were applied to *Kharif* sorghum. On the same site, safflower was grown after harvest of sorghum in *Rabi* season consisting of two treatments of seeding method (two harrowing after harvest of sorghum and direct seeding of safflower). The recommended doses of N, P and K were applied to safflower. The fertilizers used were urea, single super phosphate and murate of potash. The safflower cultivars sharda was sown after *Kharif* sorghum. Grain and straw yields were recorded from each plot at harvest. The plant samples were collected after harvest of safflower and analyzed for N, P and K content by standard methods (Piper, 1966 and Jackson, 1973).

RESULTS AND DISCUSSION

The results obtained from the present investigation are summarized below :

Grain and straw yield :

The data on grain and straw yield of safflower as influenced by residual effect various tillage and organic amendment treatments applied to *Kharif* sorghum and

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