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Research Article

Influence of integrated nutrient management on yield, soil fertility status and changes in soil microbial population in soybean (*Glycine max*) - safflower (*Carthamus tingtrous*) sequence cropping

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Abstract : To study the effect of various fertilizer doses and FYM in soybean-safflower cropping system on soil properties, yield and soil microbial population the soil samples were drawn from the Research farm, Marathwada Agricultural University, Parbhani with an objective to study changes in soil quality and crop productivity under soybean safflower cropping system included with various combinations of N, P, K, Zn, S fertilizers with or without FYM treatments. Results from the study showed that significantly highest grain yield of soybean (28.47 q ha^{-1}) and safflower (16..33 q ha^{-1}) was noted in the treatment receiving 150 per cent NPK dose and it was at par with treatment receiving 100 per cent NPK with farmyard manure. The highest productivity was obtained when FYM @10 Mg ha^{-1} was applied along with 100 per cent NPK, indicating that NPK fertilizers alone did not provide adequate and balance nutrition to realise the potential yield of the crop. It was also observed that after harvest of 2nd trial application of farmyard manure with RDF increased the soil available N (240.52 kg ha^{-1}), P (18.51 kg ha^{-1}) K (795.44 kg ha $^{-1}$) content as compared to the initial value of experimental field. There was overall increase in the soil bacterial, actinomycetes and fungal population in treatment receiving FYM @ 10 Mg ha^{-1} alone or with chemical fertilizers and which were decreased in treatment receiving super optimal dose of chemical fertilize (150 % NPK) .

Key Words : Recommended dose of fertilizer, Soybean, Safflower, Farmyard manure, Yield, Microbial population, Soil properties

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INTRODUCTION

Oilseeds are energy rich crops, hence, the requirement of major nutrients including secondary and micronutrient is high. But the productivity of oilseeds (935 kg ha^{-1}) is still low as oilseeds are cultivated largely under rainfed (75.67%) area and under energy starved condition. Several long term fertilizers experiments in the country demonstrate that the use of NPK fertilizer alone leads to emergence of micro nutrient deficiencies, while integrated use of organics and inorganics sources of nutrients sustains crop productivity and improves soil health under most cropping systems (Tiwari, 2002). Normally soybean and safflower are grown as major *Kharif* and *Rabi* crops, respectively in the Marathwada region. Among the factors responsible for low productivity, inadequate fertilizer use and emergence of multiple-nutrient deficiencies due to poor recycling of organic sources and unbalanced use of fertilizer particularly micro-nutrient are important. Site specific nutrient management (SSNM) is gaining popularity of late due to its superiority over blanket nutrient recommendations as it takes into account site, season and crop growth variability to take crop decision. This approach enables farmers to apply the right amount of nutrients at the right time. Nutrient application thus matches the crop demands, thereby

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