



Tropentag, October 9-11, 2007, Witzenhausen

“Utilisation of diversity in land use systems:  
Sustainable and organic approaches to meet human needs”

## Effect of Nitrogen Rate and Seed Density on Safflower (*Carthamus tinctorius* L.) under Low-Input Farming System

ELFADL ELFADL

*University of Hohenheim, Crop Production Institute, Germany*

### Abstract

Today's agricultural production depends heavily on in-organic inputs which result in direct negative environmental effects. To have a sustainable agricultural production, agronomists have proposed several systems such as low-input and organic farming systems. It is necessary to develop a recommendation programme that adjust N- rate and seed density to crop requirements. To investigate the effect of nitrogen fertilisation and crop density on yield, yield components, oil content and growth characteristics of safflower, three accessions (Sabina, Saffire, BS-62915), three N-rates (0-40-80 kg ha<sup>-1</sup>) and three crop densities (50-100-150 seeds m<sup>-2</sup>) were used. The experiment was carried out at two different locations (Germany-Ihinger Hof, Switzerland-Wil) for two seasons using a 4-replicated split-plot design. N-fertiliser was applied at rosette stage. Statistically, the nitrogen rate did not have a significant impact on all investigated traits. This may be interpreted as ability of safflower to use residual soil-N efficiently. Nitrogen rate effect on yield considerably varied across years. Hence, spatial and temporal variability should be considered for optimum N-rate. Seed density had a significant effect on seedlings m<sup>-2</sup>, crop canopy, days to maturity, plant height, plants m<sup>-2</sup>, yield, seeds/plant, heads/plant, branches/plant and oil yield. Low seed density (50 seeds m<sup>-2</sup>) had significantly the highest seeds/head, heads/plant and branches/plant. Effect of seed density was not significant for oil, biomass yield, harvest index and seeds/m<sup>2</sup>. These results explained that safflower is a "plastic" crop, able to compensate for low plant density. Density of 100 seeds m<sup>-2</sup> with application of 40 kg N ha<sup>-1</sup> could be recommended as a rational agronomic package for production of optimum oil yield.

**Keywords:** Low input system, nitrogen fertiliser, safflower, seeds density, oil seed