

Research Paper

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## Water requirement, water use efficiency, consumptive use, and yield and quality parameters of Linseed (*Linum usitatissimum* L.) varieties as influenced by fertility levels, irrigation scheduling

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**ABSTRACT :** A field experiment was conducted at Agricultural Research Station Ummedganj, Kota, to find out the effect of fertility levels and irrigation schedules on linseed varieties on vertisols of south-eastern Rajasthan during the year 2000-01 and 2001-02. on the basis of two years experimentation, result revealed that variety Meera consistently recorded significantly higher seed (15.39 qha<sup>-1</sup>), straw (20.33 qha<sup>-1</sup>), biological yield (35.72 qha<sup>-1</sup>), net monetary return (14620/ha) and B: C ratio (1.61) as compared to variety Rashmi in linseed. Though the highest seed, straw and biological yield was recorded with IW/CPE ratio of 0.7 but it was found statistically at par with IW/CPE ratio of 0.5. Linseed variety Meera showed significantly higher water use efficiency (7.81kgha<sup>-1</sup> mm) as compare to Rashmi (7.11kgha<sup>-1</sup> mm). The crop under influence of fertility level 80 kg N + 30 kg P<sub>2</sub>O<sub>5</sub>ha<sup>-1</sup> recorded higher water use efficiency (8.81 kgha<sup>-1</sup> mm). The mean increase in water use efficiency at 80 kg N + 30 kg P<sub>2</sub>O<sub>5</sub>ha<sup>-1</sup> was 20.62 and 87.84 per cent higher over 40 kg N + 30 kg P<sub>2</sub>O<sub>5</sub>ha<sup>-1</sup> and control, respectively.

**Key Words :** Linseed, Nitrogen, Phosphorus, Potassium, Uptake

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Among the oil seed crops grown during *Rabi*, linseed is next in importance to rapeseed and mustard in area as well as production. This crop is often grown on marginal and sub marginal. Mostly on rainfed soil as pure or mixed or intercrop. The main reason for low yield appears to be low soil moisture and nutrient status. Particularly at different crop stages. Since the crop is mostly grown on conserved soil moisture where application of nutrient is almost negligible. Recently, several high yielding varieties of the crop have been released which produce seed yield more than 20 qha<sup>-1</sup>. Thus, these varieties have turned this crop into a highly remunerative crop. Among the agronomic practices known to augment the crop yield, moisture supply is of vital importance. Water deficits can however, reduce yield seriously if they occur at certain periods during the growth of the crop (Gopalkrishan *et al.*, 1996). Nitrogen is an important constituent of protein, enzymes and chlorophyll and is involved in all processes associated protoplasm, enzymatic reactions and photosynthesis. Nitrogen plays a major role in early establishment of leaf area, increasing

photosynthesis and root development to enable more efficient use of water.

Application of phosphorus gives superior quality of seed, help in photosynthesis, respiration, protein synthesis, lipids, sugar and other essential compounds. Phosphorus involve in energy transfer reaction. ATP to NADP. Linseed crop responded to phosphorus application up to 30kg P<sub>2</sub>O<sub>5</sub>ha<sup>-1</sup> (Agarwal *et al.*, 1999). In the light of above context, this crop has great potential for improvement on vertisols of South-eastern Rajasthan under irrigated conditions.

### RESEARCH PROCEDURE

The field experiment was at Agricultural Research Station Ummedganj, Kota, during *Rabi* season 2000-01 and 2001-02 under irrigated conditions. The soil of experiment site was clay loam pH 7.73 and electrical conductivity 0.30 dSm<sup>-1</sup>. The available organic carbon 5.69g kg<sup>-1</sup>, N, P and K status being medium 368.35, 23.90 and 3111.39kgha<sup>-1</sup>, respectively. The