Internat. J. Agric. Sci. Vol.4 No.1 January, 2008 : 73-78

Correlation with climatic factors and regression models on yield of *rabi* sunflower (*Helianthus annuus* L.)

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ABSTRACT

The field experiment was conducted for five years on sunflower by using four different sowing windows to study the relationship between weather parameters and yield in rabi season. The minimum temperature had highly significant positive association with grain yield at all the phonological phases. However, pan evaporation had significant negative association with grain yield at emergence to 4th leaf (P_1), 4th leaf to button (P_2) and hard dough to physiological maturity (P_6) stage. Relative humidity had significant positive association with grain yield at 4th leaf to 50 % flowering (P_2, P_3) stage. Bright sunshine had significant positive association with grain yield. Significant negative association with grain yield by pan evaporation indicates that at early growth stages rabi sunflower not favour moisture stress condition. Significant positive association with grain yield at all stages of growth by minimum temperature indicates rabi sunflower responds well to the low temperature condition throughout growth period.. The crop sown at MW 36 (first fortnight of September) and hybrid MSFH-17 produced maximum grain yield and total monetary returns. The Stepwise multiple regression model of different phenophasewise weather parameters with yield of Rabi sunflower sown in MW 36 is Yield = 134.2301 -99.6017 X_1 – 45.8576 X_2 – 2.0473 X_3 + 30.2477 X_4 r^2 = 0.95 and the Stepwise multiple regression model of different phenophasewise weather parameters with yield of Rabi sunflower for hybrid MSFH-17 is Yield = -2710.4106 + 86.3693 X_1 +20.2087 X_2 + 76.8775 X_3 r^2 = 0.75. However, the weather parameter influence their contribution and performance of rabi sunflower crop sown at different dates of sowing were assessed and the model on combined effect was developed using stepwise multiple regression for predicting grain yield as Yield = -3015.2008 + 54.9388 X_1 +0.4848 X_2 +50.8648 X_3 +4.3952 X_4 +26.8468 X_5 +19.0967 X_6 -24.4833 X_7 r^2 = 0.70

Key words : Sunflower, Weather parameter, Correlation, Stepwise regression.

INTRODUCTION

Sunflower crop has wider plasticity for adoption to varying agro- ecological conditions. Though the crop is native of warm climate, it is well adopted to tropical environment. In India, the major reason for rapid expansion of area under sunflower in a short period is its wider adaptability and profitability that either fitted well within the existing cropping patterns or replaced the uneconomical crops of the region (Ujjinaiah *et al*., 1994) Sunflower is one of the fastest growing oilseed crops in India. Presently, India has fourth largest area under sunflower (2.1 million ha) in the world. Its share in the world production is about five per cent. (1.2 million tones) and accounts for ten per cent of the world area. Recently, it is widely cultivated in drought prone area due to it's short duration, late season planting, remunerative prices and suitability in all seasons (Hegde and Dinesh kumar, 2003) using this concept, the experiment on crop weather relationship was conducted by keeping this views in mind that, possibility of growing sunflower under aberrant weather situation and to study the effect of weather parameters on the crop growth and development of sunflower.

MATERIALS AND METHODS

The experiment was carried out for five years during the rainy season from 1999 to 2004 at Dry farming Research Station, Solapur (17^{0}41' N 75^{0}41'E and 486 m MSL) on medium black soil (60 cm soil depth) The sole *rabi* crop was sown in four different dates of sowing along with two genotypes. The sowing dates are S1 (MW 36), S2 (MW 38), S3 (MW 40) and S4 (MW 42) and the genotypes under investigation was V1 (SS-56) and V2 (MSFH- 17). The experiment was laid out in split plot design with four replications. The soil of the Experimental site was low in organic carbon (0.34%) medium in phosphorus (17.7 kg ha^{-1}) and high in potash content (542 kg ha^{-1}) with neutral pH (7.1). The crop was fertilized with 50:25:0 kg NPK ha^{-1}. All the agronomic practices recommended by MPKV, Rahuri (MS) were adopted to

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