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AET : PET in relation with sunflower

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ABSTRACT

To study the relationship between grain yield and AET:PET ratio *i.e.* weekly moisture adequacy index (MAI) in *kharif* season an experiment was conducted for five years on sunflower by using four different sowing windows. In correlation studies the grain yield of the crop sown in MW 28 (9-15 July) showed positive and significant correlation with MAI at button stage and 50 % flowering to soft dough stage. This indicated that button and 50 % flowering stage was more sensitive in relation to MAI with grain yield. In correlation studies 50 % flowering to soft dough stage was found more sensitive in relation to weather parameters with grain yield. In regression studies, it was observed that wind speed, afternoon relative humidity and pan evaporation regressed positively with grain yield and minimum temperature regressed negatively with grain yield. The crop sown at MW 28 (9-15 July) 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 *kharif* sunflower sown in MW 28 is Yield = 9592.1149 + 69.30 X_1 -214.98 X_2 -1.34 X_3 -339.62 X_4, r^2 = 0.99 and the Stepwise multiple regression model of different phenophasewise weather parameters with yield of *kharif* sunflower for hybrid MSFH-17 is Yield = 1076.2805 + 1.95 X_1 – 100.20 X_2 + 1.68 X_3 +14.34 X_4 + 7.71 X_5, r^2 = 0.87. However, the weather parameter influence their contribution and performance of *kharif* 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 = 2743.9965 + 49.3091X_1 -120.3659X_2 +11.0559X_3 -103.7084 X_4 r^2 = 0.70

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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 (Hegade and Kumar, 2003). Possibility of growing sunflower under aberrant weather situation and to study the effect of moisture adequacy index (MAI) on the crop growth and development of sunflower.

METHODOLOGY

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 *kharif* crop was sown at four different dates along with two genotypes. The sowing dates were S_1 (MW 28), S_2 (MW 30), S_3 (MW 32) and S_4 (MW 34) and the genotypes under investigation were V_1 (SS-56) and V_2 (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}.

The phenophasewise correlation of yield with weather parameters were performed separately according to methodology described by Snedecor and Cocheron (1967.) whereas, the stepwise regression analysis among the weather parameters at different phenophases which showed significant correlation with yield were entered in this analysis to derive prediction models separately. However, only the best suit equations of correlation and regression are elaborated in this paper.

In the year 1999, 2000, 2001, 2002 and 2004, the precipitation was 511.5 mm, 630.6 mm, 600.2 mm, 644.3 mm and 638.4 mm in 40, 46, 37, 49 and 43 days, respectively. This precipitation was deficit by 29 %, 13 %, 17 %, 11 % and 12 % than normal during these years, respectively. The rainfall was highly inadequate with high degree of uneven distribution. The year 2003 was the agricultural drought year, where 351 mm rainfall received in 25 days which was 52 % deficit than the normal.

During the period of experimentation *i.e.* 1999-2004, the onset of rainy season was timely in between MW 22 to 24. However, sowing of *kharif* crops and different crop growth was adversely affected due to intermittent