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Short Communication

Correlation between weather parameters and seed yield of soybean (*Glycine max* (L.) *Merr.*) genotypes

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The economic yield of any crop is a complex entity governed by several intrinsic and extrinsic strongly interwoven natural processes. It varies widely in response to subtle environmental fluctuations as the potential productivity of a crop generally depends on conservation of solar energy through photosynthesis when other limiting factors are absent. The growth pattern of soybean during vegetative phase show an initial slow growth corresponding to the lag phase at the seedling stage. This follows a rapid elongation of stem owing to the intensive meristematic activity and this represents the natural growth. The complex relationships of several macrometeorological parameters occuring within the vegetative period determine the seed yield of soybean (Monteith *et al.*, 1989). It was still uncertainty as to which weather element pricipally determines the very large differences in productivity between soybean stands grown at different sites and in different seasons in semi-arid tropics particularly during thee vegetative phase. So, the present investigation was executed.

The field investigation was carried out at the Student's Farm, College of Agriculture, Acharya N.G. Ranga Agricultural University, Rajendranagar during *rabi* 1996 and 1997, summer 1997 and *kharif* 1997 seasons in alfisol having a pH 7.25 and electrical conductivity 0.13 dSm^{-1}. The soil was low in available nitrogen (150 kg ha^{-1}) medium in phosphours (40kg $P_2O_5ha^{-1}$) and available potassium (210 kg K_2Oha^{-1}). The treatments comprised testing of five soybean genotypes at different times of sowing commencing from 15 October at 20 days interval upto 14 December in *rabi* season during 1996 and 1997. These genotypes were also tested for their performance to 4 different sowing dates on 5 and 25 January, 14 February and 6 March in summer 1997. In the *kharif* season, sowing date comparisons were made for genotypic responses to 5 and 25 June, 15 July and 14 August 1997. The 20 treatment combinations were tested in 3 replications in every season. The layout was a randomised block design with 5 x 4 factorial analysis. The plot size was 5.5 m x 3.3 m with spacing of 30 x 10 cm. The field was kept fallow one season before the soybean crop was sown. The crop was kept completely free from diseases.

The relationship of different macrometerological factors during vegetative phase of soybean crop (Table 1)

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Table 1: Correlation coefficients between weather parameters during vegatative phase and seed yield of soybean genotypes

Genotypes	MAT	MIT	RH 1	RH 2	SS	MT	GDD	HTU
MACS-201	-0.6202**	0.0557	0.4052*	0.6724**	-0.6602**	-0.2628	-0-2257	-0.7466**
MACS-58	-0.5894**	0.0855	0.4010*	0.6754**	-0.6614**	-0.2103	-0.1876	-0.7535**
PK-472	-0.5404**	0.0761	0.4244**	0.6542**	-0.1920	-0.1920	-0.1782	-0.7404**
MACS-13	-0.5552**	0.0845	0.4908**	0.6803**	-0.6622	-0.2111	-0.1854	-0.7566**
MACS-330	-0.3948*	0.2256	0.2762**	0.5167**	-0.6596**	-0.0407	-0.0054	-0.5124**

MAT- maximum temperature; MIT- minimum temperature; RH1- morning relative himidity; RH2- afternoon relative himidity; SS- sunshine hours; GDD- growing degree days; HTU- heliothermal unit.

revealed that all the five genotypes were extremely sensitive to maximum temperature of over 36°C. The negative influence of high air temperature during vegetative growth period of soybean on seed yield was significant while the influence of minimum temperature during vegetative stage was not significant.The mean temperature (>31°C) had negative association with yield but was weak for all genotypes. Within the linear range of phenological response (10-36°C) the mean temperature value sufficiently reflected the effect of the maximum and minimum temperature in this study.

The relative humidity both in the morning (73 per cent) as well as in the evening (39 per cent) invariably maintained a positive and significant correlation with seed yield of MACS-201, MACS-58, PK-472 and MACS-13. The evening relative humidity was significant during this phase. The positive genotypic resopnses of soybean crop of evening relative humidity have also been demonstrated by Kane *et al.* (1997). All the five genotypes recorded negative and significant association with sunshine hours (9.2 hours) and heliothermal units during this phase. This negative influence was, in general reverse in magnitude. The correlation coefficients were high between sunshine and yield. The growing degree days are negatively correlated with seed yield of all the five genotypes. But these associations are weak. The relative performance of soybean in different seasons of a year and its negative correlations to sunshine have also been widely studied by Dhingra *et al.* (1995).

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