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Physiological variation in growth and yield of *Rabi*-sorghum genotypes

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ABSTRACT

A field experiment was conducted in Medium block soils at Regional Agricultural Research Station, Bijapur, University of Agricultural Sciences, Dharwad (Karnataka) during *Rabi* season 2006-07. Among the genotypes RSLG 1119, RSLG871, RSV 423, and Maulee have given higher yields compared to other genotypes. The factors that favoured the higher yields were leaf area index, chlorophyll content, relative water content, and panicle dry weight. The production of dry matter alone donot help in realizing the higher yield. In case of higher yielder there was a efficient dry matter production as well as translocation from source to sink. Less number of factors in moderate and only few factors have favoured the low yielders. It was observed that the differential performance of genotypes were due to difference in dry matter partitioning efficiency.

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Key words : Sorghum, Dry matter production, Harvest index, Relative water content

INTRODUCTION

Sorghum [*Sorghum bicolar* (L.) Moench] is a globally important cereal crop. It is grown next to wheat, rice and maize. It has wider adoptability and is being grown in Africa, America, Asia and other parts of the globe. Among the crops, since the sorghum stands first to give more yield even under moisture stress conditions, it is a crop for dry regions and scanty rainfall area.

Rabi Sorghum is grown in parts of Maharashtra, Karnataka and Andhra Pradesh during *Rabi* season, the crop experiences a complex stress situation such as increasing temperature, hot and dry winds after anthesis, reducing or depleting soil moisture in the season. Since, the degree of stress tolerance varies with genotypes, some are very well adopted to dry conditions than others (Bapat *et al.*, 1975). An effort was made to assess the performance of various genotypes in terms of their various growth, physiological and yield parameters under receding soil moisture conditions in shallow soils.

MATERIALS AND METHODS

A field experiment was conducted in medium soils at Regional Agricultural Research Station, Bijapur, University of Agricultural Sciences, Dharwad (Karnataka) during *Rabi* season of 2006-07. The experiment was laid out in a Randomized Block Design (RBD) with three replications. The genotypes used were RSLG1119, RSLG871, RSV423, PVR616, PVR617, IS23399, PVR624, SSV84, CRS9, CRS10, CRS11, SPV1546, Maulee (C), M35-1(C), and CSV216R (C),.The seeds were hand dibbled at the spacing of 60 cm x 15 cm during fourth week of September. The plot size was 13.5m^2. The inputs, fertilizer dose and plant protection measures were followed as per the recommended practices.

The observations recorded were plant height at maturity, days to 50 per cent flowering, days to physiological maturity, Leaf area index(LAI) at 50 per cent flowering, leaf and stem dry weight at 50 per cent flowering and at maturity, total chlorophyll, chlorophyll stability index, relative water content (RWC), total biomass, yield and yield components. The LAI was computed by adopting the formula given by Stickler (1961). The relative water content by using the formula given by Barss and Weatherly (1962).

RESULTS AND DISCUSSION

The production of total biomass and its translocation towards sink are vital in realizing the higher yield. This biomass production is governed by leaf characters such as LAI, presence of functional mesophyll tissue particularly after anthesis and relative water content (RWC) of leaves. LAI indicates an area available for interception of light energy. The leaf dry weight indicates the amount of mesophyll available for carbon assimilation. The homeostasis of a leaf is maintained by relative water content. If the LAI is higher leaf weight and RWC the biomass production and its translocation towards sink will be high. The total biomass at the maturity indicates the potential of genotype to harvest solar energy. There was increase in total biomass in all the genotypes as the crop

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