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Influence of Potassium on the Rabi Sorghum Genotypes

Sorghum is one of the important food crops of India. The major sorghum growing states in India are Maharashtra, Karnataka, Tamil Nadu, Andhra Pradesh, Madhya Pradesh, Rajasthan and Gujarat. Karnataka stands second after Maharashtra in area and production. Nearly 65%of the total area is covered in *Rabi* season, which accounts for 44% of total sorghum production in the state. Promising genotypes developed have to be evaluated for their productivity under different soil and climatic conditions (Hunshal, 1978). Potassium is known to play role in a variety of environmental stresses (Tandon and Sehhon, 1988). Hitherto there was no response of *Rabi* sorghum to potash application in the transitional tract. Of late some response has been observed to potash application in few places. Continuous cropping over years might have depleted the potash reserve and resulted in good response to potash. This led us to evaluate the response of *Rabi* sorghum to potash application.

A field experiment was conducted at Main Agricultural Research Station, Dharwad, during *Rabi* season of 2000-01 to study the influence of potassium on *Rabi* sorghum genotypes. The treatments composed of three levels of potassium viz., 20,40, 60 kg/ha and control (0 K) and two genotypes, viz., CSH-15R and CSV-216R. The experiment was laid out in a two factorial randomized block design with three replications. The soil of experimental site had 7.96 pH, 0.58 % O.C, 170 kg ha^{-1} available N, 27 kg ha^{-1} available P_2O_5 and 303 kg ha^{-1} available K_2O.

Among the growth components, plant height was not influenced significantly by different K levels and also by genotypes. Number of days taken to 50% flowering was influenced significantly by K-levels. Higher K-levels recorded more number of days to 50% flowering (71.7) compared to other treatments. Between the genotypes tested, CSV-216R took significantly more days (75.1) to 50% flowering than CSH-15R. Combination of higher K-levels with CSV-216R took significantly more days (76.7) to 50 % flowering compared to other treatment combinations.

Among the yield components, mean ear weight and grain weight per ear were significantly influenced by K-levels. 40 kg K_2O ha^{-1} recorded significantly higher mean ear weight (70.3 g) than other treatments. Least mean ear weight (41.8 g) was recorded by control. Significantly higher grain weight per ear (43.5 g) than other treatments was also recorded with 40 kg K_2O ha^{-1}. These results are in conformity with that of Sarma and Shantakumari (1996). 1000 seed weight was not influenced significantly by different K-levels and genotypes. Fodder yield was not influenced significantly by different K-levels but was influenced significantly by genotypes. CSV-216R recorded significantly higher fodder yield (11.2 t/ha) over CSH-15R. Combination of 40 kg K_2O / ha with CSV-216R, produced significantly higher fodder yield (11.7 t/ha) than other treatment combinations. Similar findings were reported by Hiremath *et al.* (1977).

Grain yield was influenced significantly by different K-levels and genotypes. K_2O @ 40 kg /ha produced significantly higher grain yield (2.97 t/ha) than other treatments. Control plot recorded the lowest grain yield (2.36 t/ ha).Application of 60 Kg K_2O /ha reduced the sorghum yield significantly compared to 40 Kg K_2O /ha due to imbalance created in nutrition, which led to significant reduction in mean ear weight and grain weight per year. Between the genotypes tested, CSH-15R recorded significantly higher grain yield (3.0 t/ha) than CSV-216R. Similar findings were reported by Anuradha and Sarma (1990) and Sarma (1993). Interactions between K-levels and genotypes were not influenced significantly. From the results it may be inferred that *Rabi* sorghum has responded well up to 40 kg K_2O /ha. Hither to there was no recommendation of K for *rabi* sorghum in this tract.

Table 1. Performance of rabi sorghum genotypes to potassium application

Treatments	Plant height (cm)	Days to 50% flrg	Mean Ear Wt.(g)	Grain Wt/ear	1000 seed wt. (g)	Fodder yield (t/ha)	Grain yield (t/ha)
K-Level (kgha^{-1})							
K_0- 0	189.8	70.8	41.8	31.7	31.2	9.5	2.36
K_1-20	188.7	69.8	50.7	37.2	30.7	9.8	2.72
K_2-40	186.2	69.8	70.3	43.5	30.6	10.5	2.97
K_3-60	184.2	71.7	46.3	31.3	31.0	9.6	2.45
SEm±	4.0	0.31	2.25	2.15	0.17	0.34	0.13
CD@5%	Ns	0.9	6.8	6.53	NS	NS	0.39
Genotype (G)							
G_1-CSH-15R	185.8	66.0	52.3	37.6	31.1	8.5	3.00
G_2-CSV-216R	181.5	75.1	52.2	34.3	30.7	11.2	2.25
SEm±	2.83	0.22	1.60	1.53	0.12	0.24	0.09
CD@5%	NS	0.7	NS	NS	NS	0.7	0.28
Interactions (K X G)							
K_0G_1	186.0	67.3	42.7	33.3	31.4	7.2	2.55
K_0G_2	193.7	74.3	41.0	30.0	31.1	9.8	2.18
K_1G_1	190.7	65.3	50.7	36.3	30.9	8.5	3.13
K_1G_2	186.7	74.3	50.7	38.0	30.4	11.0	2.30
K_2G_1	185.7	64.7	68.0	47.3	30.5	9.4	3.39
K_2G_2	186.7	75.0	72.7	39.7	30.8	11.7	2.55
K_3G_1	181.0	66.7	48.0	33.3	31.4	8.9	2.92
K_3G_2	187.3	76.7	44.7	29.3	30.5	10.4	1.99
SEm±	5.66	0.44	3.2	3.05	0.24	0.48	0.18
CD@5%	NS	1.3	NS	NS	NS	1.4	NS

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