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Effect of Pre-monsoon Sowing, Depth of Seed Placement and Seed Hardening on Total Drymatter Production, Growth and Yield Components of Rainfed Sorghum*

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A field experiment was laid out at Tamil Nadu Agricultural University during the south-west and north-east monsoon seasons of 1979-80 Premonsoon sowing, depth of seed placement at 5.0 cm and 10% KH_2PO_4 seed treatment recorded maximum DMP and also favourably influence the maximum production.

The future of agricultural development lies in the arid and semi-arid lands. There is a well recognised and urgent need for developing viable dryland technology for increasing agricultural production in areas of low rainfall. Sowing the crop in anticipation of rainfall resulted in better utilization of precipitation (Anon., 1971). Also placing the seed little deeper (Rangasami Ayyangar, 1931) and hardening of seeds (Chinoy, 1947; Karivaratharaju *et al.*, 1973) would facilitate better crop stand and performance.

MATERIAL AND METHODS

The experiment was under taken at Tamil Nadu Agricultural University, Coimbatore, in the south-west (SW) (June-September) and north-east (NE) (October-January) monsoon seasons of 1979-80. under rainfed conditions in split plot design with three replications. Time of sowing and depth of seed placement were alloted to the main plots and seed hardening to sub plots. The treatments were (a) time of sowing: (i) sowing 20 days before the normal onset of the monsoon (T_1) (ii) sowing 10 days before the normal onset of monsoon (T_2) and (iii) sowing with the onset of monsoon (T_3) (b) depth of seed placement: (i) 2.5 cm (D_1) (ii) 5.0 cm (D_2) (iii) 7.5 cm (D_3) and (c) Seed hardening: (i) soaking seed in 10 per cent KH_2PO_4 (S_1) (ii) water soaking (S_2) (iii) no seed treatment (S_0).

By analysing the meteorological records of the University campus the normal onset of monsoons was assessed to be in the second week of July for SW monsoon and third week of October for NE monsoon season. Accordingly the time of sowing was fixed. The varieties chosen were Co. 21 for SW monsoon season and Co. 22 for NE moonsoon season.

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RESULTS AND DISCUSSION

In the SW monsoon the rainfall was erratic with a prolonged drought from second week of August. In the NE monsoon season the rainfall was 147 per cent above normal. There was no drought in this season.

The treatments had a significant influence on the DMP (Table 1) there was a prolonged drought in the SW monsoon season and hence the crop sown in 20 and 10 days in anticipation produced greater DM than the crop sown on normal date. The early sown crop was able to eacape the drought at its critical stage. In the NE monsoon season continuous rain resulted in flooding the field and the crops sown in 20 and 10 days in anticipation of monsoon resulted in higher dry matter production than the crop sown on normal date.

Depth of seed placement produced considerable variation in DMP in the SW monsoon season because of the drought that occurred in late August and early September, 1979. Crop sown at 5.0 cm depth produced more DM than sown at 7.5 cm depth. Crop sown at 2.5 cm depth was the lowest in order Sowing at 5.0 cm depth probably helped the plant to put forth major portion of its root system in deep layers of soil thereby making it possible to utilize the soil moisture more throughly (Rangasami Ayyangar, 1931). But in the NE monsoon season there was no significant influence and all depths behaved similarly. Seed treatment with KH_2PO_4 increased the DMP over other two seed treatments in both the seasons. But water soaking was beneficial only in the SW monsoon season. Hardening the seed with KH_2PO_4 probably improved the vigour and increased the drought tolerance of the crop.

In both the seasons advance sowing significantly improved the growth components like plant height (Table 1) and LAI (Table 1) and also yield components like earhead length (Table 2) five hundred grain weight (Table 2). earhead weight, earhead width and number of panicles per plot. In the SW monsoon season in advance sowing the crop escaped drought at its critical phase while the crop sown on normal date was at pre-flowering stage and was seriously affected by drought. In the NE monsoon season the advance sowing due to its early establishment less affected by water stagnation.

The effect of depth of seed placement was significant only in SW monsoon season. Crops sown at 5 0 cm depth was significantly improved the growth and yield components. This was probably because deeper sown plants had the initial advantage of utilizing the moisture from the deeper layers of the soil and was less subject to fast depleting surface moisture. But there was no significant difference in the NE monsoon season due to depth of sowing.

Hardening with KH_2PO_4 resulted in significantly improved growth and yield attributed in both the seasons. But the effect was more in SW monsoon. season. Hardening with water was significantly superior to no seed treatment in SW monsoon season but this differerce

was not seen in the NE monsoon season. This indicates that water soaking might provide some protection against moisture stress and effect of water soaking could be seen only if there is a pronounced moisture stress as in the case of SW monsoon season. The effect of KH_2PO_4 soaking in the NE monsoon where there was no noticeable water stress might be due to the supply of a starter doze of P and K resulting in early vigour and better growth of crop (Rhind 1949).

Sowing 10-20 days in advance produced higher grain yield in both the seasons and sowing at 5.0 cm depth produced higher grain yield in SW monsoon season. But there was no difference in grain yield in NE monsoon season due to depth of sowing. Seed hardening with 10 per cent KH_2PO_4 resulted in higher grain production than water soaking and the seed treatment in both seasons. But the effect was more in SW monsoon season.

Summarising, it can be stated that sowing 10 to 20 days in anticipation of monsoon rains, placing the seed at 5.0 cm depth and treating the seed with 10 per cent KH_2PO_4 would facilitate better crop stand and performance both in years of sub-normal and excess rains.

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TABLE 1 DMP (kg/ha) -- Plant height (cm) and LAI

Treatments	DMP		Plant height		LAI	
	SW	NE	SW	NE	SW	NE
T_1	10005	9415	140.0	119.9	6.83	4.45
T_2	8700	7949	124.0	114.9	5.74	4.00
T_3	8238	6868	105.0	109.2	4.57	3.72
$S.E_D$	198	132	4 4	4.8	0.21	0.21
C.D. (P=0.05)	420	280	9.4	10.2	0.46	0.46
D_1	8532	8295	114.5	116.9	5.82	4.14
D_2	9354	7966	128.8	114.1	5.82	3.99
D_3	9007	7971	125.8	113.1	5.53	4.03
$S.E_D$	198	132	4.4	4.8	0.21	0.21
C.D. (P=0.05)	420	280	9.4	N.S.	N.S.	N.S.
S_1	9178	8210	127.2	116.7	5.89	4.20
S_2	8970	8001	123.1	113.9	5.70	4.00
S_3	8795	8020	118.8	113.5	5.57	3.97
$S.E_D$	97.5	48	1.2	1.3	0.01	0.07
C.D. (P=0.05)	198	97	2.5	2.7	0.03	0.14

Interactions not significant

TABLE 2 Earhead length (cm), 500 grain weight (g) and Grain yield (kg/ha)

Treatments	Earhead length		500 grain Wt.		Grain yield	
	SW	NE	SW	NE	SW	NE
T_1	18.88	25.95	11.79	11 84	1685	1633
T_2	15.74	25.08	11.51	11.66	1440	1537
T_3	12.80	21 44	11.10	10.81	1154	1149
$S.E_D$	1.15	0.52	0.19	0.09	69	76
C.D. (P=0.05)	2.44	1.74	0 39	0.21	147	160
D_1	14.78	24 48	11.22	11.47	1282	1454
D_2	16.51	24 08	11.62	11.41	1574	1430
D_3	16.15	23.91	11.56	11.42	1524	1434
$S.E_D$	1.15	0.52	0.19	0 09	69	76
C.D. (P=0.05)	N.S.	N.S.	0 39	N.S.	147	N.S.
S_1	16.39	24.61	11.62	11.54	1502	1456
S_2	15.79	24.03	11.44	11.40	1402	1433
S_3	15.24	23·83	11.36	11.36	1375	1431
$S.E_D$	0.27	0 277	0 04	0.04	24	11
C.D. (P=0 05)	0.55	0.55	0 09	0 09	49	22

Interactions not significant