

## HEAT UNIT EFFICIENCY IN PEARL MILLET

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### ABSTRACT

Field experiments were conducted on pearl millet crop sown at different dates of sowing at Dry Farming Research Station, Solapur during the year 1988 to 1992. Data revealed that the heat unit efficiency was higher in early sown than later sown, crop. The dry matter production was decreased with delay in sowing. Seed yield had positive and significant association with heat unit efficiency. This study also suggest that heat unit efficiency can be used as a measure of crop efficiency for use under varying agroecological situations.

**KEY WORDS :** Pearl Millet, Heat Unit Efficiency

Crop production mainly depends upon the climatic requirements of the particular crop. Temperature has been known to effect the adaptability of crop (Wallis *et al.*, 1980). Crop productivity is also inhibited at temperature higher than optimum. Balkrishnan and Natarajaratnam (1986) calculated the heat unit efficiency for red gram and compared the performance of varieties sown under different dates with respect of utilisation of heat in terms of degree days during the crop growth. This kind of approach in pearl millet has not been attempted, particularly under dryland conditions. Therefore, an attempt was made to correlate the grain yield with different dates of sowing of pearl millet crop by assuming the growing degree days.

### MATERIALS AND METHODS

Field experiments were conducted at the Dry farming Research Station, Solapur. (17° 41' N, 75° 44' E and altitude 479 m) in *kharif* season for five successive years from 1988. to 1992 on shallow black soil (30 cm depth). The treatment consisted of three sowing dates at 15 days interval and replicated three times. The crop was fertilized with 50 kg N and 25 kg P<sub>2</sub> O<sub>5</sub>/ha at sowing. The daily meteorological data were recorded from Agrometeorological observatory located at the Research Station. The total dry matter production (DMP) and the grain yield were recorded at harvest. Growing degree days (GDD) or the effective heat unit (Iwata, 1984) and heat unit efficiency (HUE) (Rajput, 1980). were calculated.

### RESULTS AND DISCUSSION

The highest DMP was recorded in sowing date

In general, the DMP was decreased with delay in sowing. This is because of the available soil moisture was more during early sown crop and it attributed full utilisation of rain water right from its sowing and also favourable climatic conditions. Similar observations were also reported by Chandrasagar *et al.*, (1985). However, this kind of trend was not observed in the case of grain yield. Though the early sown crop (S<sub>1</sub>) produced more dry matter due to its more vegetative growth, its conversion into grain yield was low which resulted in somewhat less grain yield than second date of sowing. When comparison between S<sub>1</sub> and S<sub>3</sub> was made, the S<sub>1</sub> gave better grain yield than S<sub>3</sub>. Thus the second sowing date S<sub>2</sub> *i.e.* (crop sown last week of June to first week of July) is appropriate sowing time for pearl millet for better grain yield. The HUE of DMP ranged from 0.244 to 0.452 and that of grain yield ranged form 0.03 to 0.128. The highest HUE was recorded from early sown crop than later sown crop. The HUE as a function of temperature utilisation for productivity depends upon duration, ability to accumulate dry matter and the climatic conditions prevailed during the cropping season (Uchijma, 1975).

The cumulative GDD from sowing to harvest varied in different sowing dates depending upon their duration. In general, early sown crop required more period to mature because of more available soil moisture. In case of late sown crop, plants matured earlier due to moisture stress and hence plants completed their life cycle in short period and hence they received less amount of thermal energy due to low temperature. Correlation of HUE of dry matter with seed yield revealed that the association was found to be positively si

**Table 1.** Heat unit efficiency of pearl millet as influenced by different sowing dates

Year	Sowing date	Dry matter (g/m <sup>2</sup> )	Grain yield (g/m <sup>2</sup> )	Heat unit efficiency			Duration (Days)
				GDD	Dry matter	Grain	
1988	S <sub>1</sub> (22-6)	613.7	112.5	1932	0.318	0.058	94
	S <sub>2</sub> (08-07)	876.4	169.9	1937	0.311	0.088	92
	S <sub>3</sub> (21-07)	751.4	128.9	1978	0.380	0.065	91
1989	S <sub>1</sub> (10-07)	658.6	234.0	1992	0.451	0.117	92
	S <sub>2</sub> (26-07)	650.6	180.0	1913	0.332	0.094	90
	S <sub>3</sub> (09-08)	635.00	114.0	1884	0.337	0.061	87
1990	S <sub>1</sub> (08-06)	726.9	203.6	2114	0.421	0.096	90
	S <sub>2</sub> (23-06)	671.9	219.3	2080	0.352	0.105	89
	S <sub>3</sub> (08-07)	583.2	160.9	2091	0.412	0.077	90
1991	S <sub>1</sub> (11-06)	784.0	241.2	1883	0.416	0.128	86
	S <sub>2</sub> (26-06)	627.7	220.5	1761	0.356	0.125	81
	S <sub>3</sub> (15-07)	463.2	54.1	1756	0.264	0.031	80
1992	S <sub>1</sub> (24-06)	784.0	158.8	2202	0.356	0.072	93
	S <sub>2</sub> (09-07)	731.2	240.8	2018	0.362	0.119	86
	S <sub>3</sub> (24-07)	467.5	72.8	1918	0.244	0.038	83
Mean	S <sub>1</sub>	713.4	190.0	2025	0.352	0.094	91
	S <sub>2</sub>	711.6	205.9	1942	0.366	0.106	88
	S <sub>3</sub>	580.1	106.1	1925	0.301	0.055	86

GDD : Growing degree days

like pearl millet should be sown early immediately after receipt of sufficient rains (in last week of June or 1st week of July) for accumulating more GDD for better production of grain yield under dryland conditions.

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## GROWTH CHARACTERS IN TUBE-ROSE

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#### ABSTRACT

To study the effect of three levels of nitrogen (N) (0.40 and 80 g/m<sup>2</sup>) and three levels of phosphorus (P) (0.150 and 300 g/m<sup>2</sup>) involving four varieties of tuberose, viz single, double, semidouble and variegated, experiments were conducted in 1990-91 and 1991-92. Application of highest dose of P contributed maximum plant height, while, N did not respond to this character. N and P applications were also not found effective for other vegetative attributes as compared to interaction application. Interaction influence of these nutrients in these strains was found to be very effective for almost all the growth characters except diameter of leaf. But the combined application of both the nutrients was not beneficial in the present set of material.

**KEY WORDS :** Tuberose, Nutritional Treatment, Cutflower.