

Influence of temperature on duration of tillering in lowland rice varieties*

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ABSTRACT

Field experiment was conducted to assess the impact of temperature on duration of tillering in certain popular lowland rice varieties grown in Andhra Pradesh. This experiment was carried out at the Agricultural Research Institute Farm, Rajendranagar, Hyderabad during *kharif* and *rabi* seasons of 1994-95 and *kharif* season of 1995. Results revealed that temperature prevailing during tillering period controlled its duration - increasing with decreasing temperature and vice versa. A daily mean temperature exceeding 26°C restricted the duration of tillering period to 5 weeks after planting and the duration increased even upto 8 weeks after planting with decreasing temperature over of 25.8 - 22.9°C.

Key words : Temperature, Tillering, Lowland rice.

Among the yield components of rice, tillers account for 61% of production. Tiller production is an integrated effect of climate, variety and nutrition. Takahashi et al (1955) observed that the thermal regime period controls the duration of tillering. Several workers reported that tiller production attains the peak value about a month after transplantation and decreases thereafter (Matsushima 1957, Ishizuka and Tanaka 1963). Temperature is an important weather parameter which decides the duration of tillering and tiller production and ultimately the final grain yield of rice. Keeping the above in view, a field experiment was conducted with an objective to study the impact of temperature on tillering duration.

MATERIALS AND METHODS

Field investigation was conducted at

the Agricultural Research Institute Farm, Rajendranagar, Hyderabad during *kharif* and *rabi* seasons of 1994-95 and *kharif* season of 1995 in clay loam soil to assess the impact of temperature on duration of tillering in lowland rice varieties. The experiment was laid out in a randomised block design with factorial concept, replicated thrice. The treatments comprised of three plantings with three varieties having different durations (Sambamahsuri (V_1) = 150 days, Rajavadlu (V_2) - 135 days and Tellahamsa (V_3) - 110 days), during both the years. Dates of planting were D_1 -13.07.94, D_2 -27.07.94, D_3 -13.08.94, D_4 -11.01.95, D_5 -25.01.95, D_6 -04.02.95, D_7 -10.07.95, D_8 -25.07.95 and D_9 -12.08.95. Same set of package of practices locally recommended were adopted during both the years of study. Tiller counts were

recorded at weekly intervals from second

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week after transplanting to 50% flowering stage. The meteorological data recorded at class A observatory located in the farm area were collected. Growing degree days were calculated by using 10°C as base temperature.

RESULTS AND DISCUSSION

The period taken from transplantation to maximum tillering stage along with corresponding means of temperatures are presented in Table-1. The data revealed that in *kharif* plantings of both the years, the maximum tillering stage was attained by 32-36 days after planting in all the three varieties under study. In case of *rabi* plantings this period increased to 55, 48 & 46 days after planting with mean temperature decreasing over a range of 22.9°C to 25.8°C. Further the data revealed that the temperature

differences in *kharif* plantings of both years were minimum (26.2°C to 27.1°C) and so the maximum tillering was attained 5 weeks after planting. As a result of decrease in mean temperature in *rabi* from 22.9°C and 25.8°C, the duration extended upto 7 & 8 weeks after planting. These findings are in confirmation with Takahashi *et al.* (1955). Further it was observed that whenever the mean temperature exceeded 26°C, the tiller production stopped abruptly by 5th week after planting and whenever it fell below 26°C, the duration of tillering increased to 7-8 weeks after planting. This clearly indicated that temperature has an influence on duration of tillering ($r = -0.91^{**}$). No change was observed in the number of weeks taken to attain maximum tillering stage among the three different varieties, as also reported by Yogeswara Rao (1981).

Table 1 : Effect of temperature on duration of tillering and accumulated degree days.

Planting	Date of		Daily mean temperature from T-MT	Duration in days T-MT	Duration in weeks T-MT	Degree days T-MT
	T	MT				
D ₁	13/07	15/08	26.7	34	5	567
D ₂	27/07	30/08	26.3	35	5	569
D ₃	13/08	13/09	26.2	32	5	517
D ₄	11/01	06/03	22.9	55	8	707
D ₅	25/01	13/03	24.2	48	7	683
D ₆	04/02	21/03	25.8	46	7	725
D ₇	10/07	14/08	26.5	36	5	593
D ₈	25/07	28/08	27.1	35	5	599
D ₉	13/08	17/09	26.7	36	5	602
Mean						618 ± 54

T : Transplanting; MT : Maximum tillering stage

Degree Days

The studies (Table-1) clearly indicated that the duration of tillering after transplantation widely varied from 32 to 55 days in different plantings. Even though there was a difference of 23 days in duration to attain maximum tillering stage among the plantings; in terms of degree days, the differences were minimum and all the three varieties maximum tillering stage by turn of 618 ± 54 degree days, a fairly constant value.

It is summarised that the temperature has a profound influence on duration of tillering. Daily mean temperature exceeding 26°C during period of tillering restricted the durations to 5 weeks after planting where as the temperature in the range 25.8 to 22.9°C increased the duration upto 8 weeks. The period taken to attain maximum tillering stage can be predicted by using degree day concept.

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