https://doi.org/10.29321/MAJ.10.A03661

Time of Sowing and its Effect on Two Medium Duration Varieties of Paddy

by

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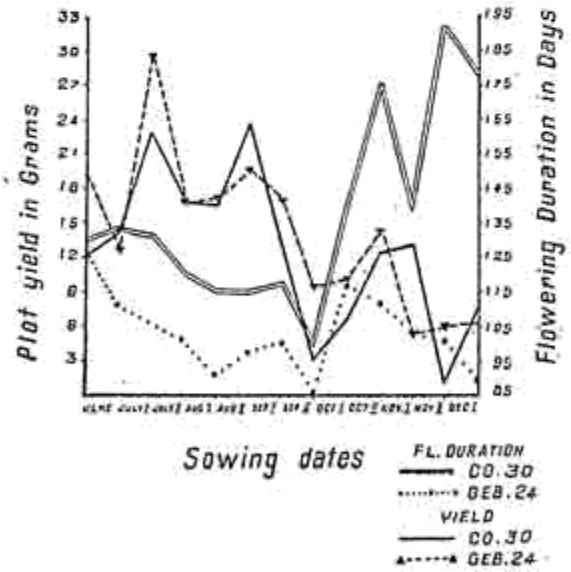
Introduction : Both the Scientists and the ryots have recognised for a long time the restrictive iufluence of season and have classified the varieties of paddy accordingly. They also found to their discomfiture that a slight change or delay due to unavoidable reasons in the normal growing season adversely affected the growth and yield. This deleterious effect is chiefly ascribed to the change in environment, as the genetic potentialities of the varieties remained the same. In this paper an attempt has been made to evaluate the effect of environment as expressed by daylength and temperature, on yield, duration and other agronomic traits like tillering, height, panicle and grain characters by delaying the time of sowing.

Effect of Sowing Date on Plot Yield and FL. Duration



Review of Literature : The time of sowing and transplanting exert a great influence on the behaviour of the crop. Ramiah (1938) stated that varieties of rice change their character completely, when grown under different tracts and climatic conditions or when grown in the season other than the usual. Apart from their effect on growth and yield the seasonal effect is more pronounced in duration. Sen and Roy (1964) noticed that the

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duration in *Aman* varieties was progressively decreasing with sowing dates. Alam and Saran (1938) reported that the increase in the daylength delay flowering while a decrease hastens it. Sarkar and Parija (1945), Saran (1950), Ghose and Shastri (1954) and Misra (1956) on working in detail about the effect of length of the day on fl wering duration under controlled conditions, have established different degrees of responses in rice varieties. The photoperiodic effect is also expressed in other plant characters. Kerling (1948) and Coolhaas and Wormer (1953) (Quoted by Sircar, 1957) working on photomorphogenesis have reported changes in leaf number, length of panicle, plant height and grain yield. Sircar (1957) has pointed out the importance of temperature and its interaction with day length. Kar (1946) found that warm temperature associated with short day length was inducive to earliness, while lower temperature and long day increased flowering duration. Venkataraman (1964) studied the thermo-photosensitivity of the paddy plant under field condition and found that flowering duration of paddy varieties varied with the time of planting, all of them being weather bound.

Materials and Methods: The two medium duration strains Co. 30 and GEB. 24 were selected for the study as they were reported to be photosensitive. Sowings were taken up on the same day for both the varieties at fortnightly intervals commencing from 15th June 1963 and continued up to 15th December, 1963. An observational trial was laid out with a plot size of 4' x 10' and transplanting was done 35 days after sowing adopting the spacing of 6" between rows and 6" between plants. Normal manurial schedule was adopted. Fifteen plants were selected at random and observations were recorded on height and tillering at maturity, panicle length, number of grains per panicle, 1000 grain weight and plot yields. The flowering date was reckoned as number of days from sowing to the day on which 75 per cent of the plants flowered. Natural day length and temperature variations were obtained from the observatory 1408' altitude 11°N latitude and 70°E longitude, only a mile away from the Farm.

Total hours of bright sun-shine and mean temperature available during the entire period of the crop from sowing to harvest were taken up to study their effects on yield while to evaluate their effects on duration the total hours of bright sun-shine, and mean temperature were calculated up to the date of flowering for each variety. The data collected on the yield attributes were analysed statistically to measure their variability. Correlation between such of the characters that showed significant differences due to time of sowing were worked out. Using conventional Gauss multipliers by Doolittle's solution, partial correlation and coefficient of determinations were calculated in the method suggested by Goulden (1959).

Result and Discussion: The sowings were initiated much earlier than the normal sowing time of the two varieties and continued till the tail end of winter to give enough margin to estimate the effect of both early and late sowings.

The duration follow a definite downward trend and reach the lowest at the 8th sowing. Then the duration gets lengthened with further sowings as evident from the graph. This is corraborated by earlier findings of Ramiah (1937). Venkatraman (1964) reported similar delayed flowering on either side of the critical planting which was the minimum. The differences between sowing times were significant in the case of plot yields and duration in Co. 30 and GEB. 24. This is in conformity with the findings of RoyAdair (1940) and Sircar (1957). With regards to number of grains per panicle though the differences between sowings were significant they did not fall into any pattern with the yield trend. The other yield components like height, tillers, panicle length and 1000 grain weight did not show any significant variation due to the sowing time. This is in contrast to the view of Sircar (1957) who has stated that the lengthening of the photoperiod increased plant height and panicle length. But it may be due to the fact that those studies were done under artificial conditions using different varieties. It must be made clear at the outset that any study of this type under nature's sway would not even approximate to perfection as Best (1959) pointed out while reviewing, as there are too many specific and non-specific factors acting upon it. A correct perspective is possible only under controlled conditions.

Duration and yield were the two important factors that showed the definite change due to the time of sowing besides they were also significantly correlated with each other in both the varieties. In each variety the extend of direct and partial correlations with environment separately for duration and yield were calculated. The particulars are given in Table 1.

TABLE 1. *Correlation and partial correlation studies*

Particulars	Co. 30			GEB. 24		
	Correlation	Partial correlation	R^2	Correlation	Partial correlation	R^2
Between F_1 duration and day length	+ 0·9649†	+ 0·9348†		+ 0·3427^{NS}	+ 0·3943^{NS}	
Between F_1 duration and temperature	+ 0·9261†	+ 0·8597†	0·9821	+ 0·5121^{NS}	+ 0·2137^{NS}	0·1571 (16%)
Between temperature and day length	+ 0·8288†	.....		+ 0·6124*	.....	

TABLE 1. *(Contd.)*

Particulars	Co. 30			GEB. 24		
	Correlation	Partial correlation	R^2	Correlation	Partial correlation	R^2
Between yield and day length	-0.5520^{NS}	-0.6022^{*}		$-0.8702^{\dagger}$	$-0.9016^{\dagger}$	
Between yield and temperature	-0.1338^{NS}	-0.5181^{NS}	0.4885	-0.3080^{NS}	-0.5931^{*}	0.8427 (84%)
Between temperature and day length (upto harvest time)	$+0.7533^{\dagger}$	.....		$+0.6979^{*}$	.....	
Between duration and yied	$+0.0434^{\dagger}$	.....		$+0.6592^{*}$	.....	

† = Significant at P = 0·05 level.
* = Significant at P = 0·01 level.
NS = Not significant.

It was observed that these varieties differ markedly in their response to light and temperature. The correlations between temperature and light were positive and significant.

In the case of Co. 30 the correlation between duration and both light and temperature were very highly significant. Partial correlations also indicated the strength of their influence on duration with day length influencing the duration more than the temperature. The high coefficient of determination obtained emphasise the strength of their association while plot yield was negatively correlated to both temperature and light. The day length seems to affect the yield more than the temperature as partial correlation coefficient for temperature was not significant. The coefficient of determination was 0·4885 and indicate the possibility that the other factors influencing the yield trend.

Similarly the plot yield in GEB. 24 was negatively correlated with both the light and temperature. Here again length of day played the more important role than the temperature, as evidenced from the partial correlation coefficients. On the other hand the high percentage of determination denotes lesser contribution of the other factors. The correlation between duration and both the light and temperature was not significant, with very low value of coefficient of determination.

Summary and Conclusion : The effect of time of sowing on duration, yield and the other yield components were studied with the reference to day length and temperature. The influence was predominant on plot yield and flowering duration in the two varieties, but the varieties differ in their degree of sensitivity. Different levels of association in the two varieties

between yield and duration on the one hand and light and temperature on the other have been established. However, there is no significant variation in the yield components except in number of grains per panicle due to the time of sowing. The two varieties recorded low yields and the flowering was also delayed, perceptably so in Co. 30 when sown after September under Coimbatore conditions. It was also found that the highest yield was obtained when sown in later half of August in the case of Co. 30 and middle of July in GEB. 24.

The authors are thankful to the Agricultural Meteorologist for permitting to use the weather data. The authors wish to record their thanks to Thiru Ayyaswamy, Statistical Assistant for the help rendered.

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