VERNALIZATION—II

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THERE have been described in this Journal (Vol. LXXXIII, No. 6, December, 1934) experiments carried out at Peradeniya on the effect of vernalization on rice. Small but significant differences resulted from pretreatment of seed, and it was suggested, in attempting to account for the smallness of the effect, that perhaps the temperature factor was not at the optimum value. Further experiments have now been carried out in which that suggestion has been put into effect.

In the first field experiment, all treated seed was vernalized at the same (laboratory) temperature, but for different periods of time. In the experiment now recorded, all treatments have been vernalized for the same period of 6 days (that period having produced the greatest effect) but at different temperatures. As before, the seeds were sown, after treatment, in plots of 144 plants, spaced 6 inches apart both ways. The plots were replicated 6 times and were arranged in the form of a Latin Square. The treatments were

(A) Sown dry

(B) Seed soaked for 24 hours, then germinated in an open porous dish

(C) Seed soaked for 24 hours, then kept under pressure (village method) for 6 days

(D) Seed soaked for 24 hours, then vernalized for 6 days at laboratory temperature (approximately 25° C.)

(E) Seed soaked for 24 hours, then vernalized for 6 days at 30° C.

(F) Seed soaked for 24 hours, then vernalized for 6 days at 35° C.

TABLE I

VERNALIZATION IN FIELD—YALA 1935

Treatment	Mean number of days from sowing to flowering — Replication						Total	Mean
	a	b	c	d	e	f		
A	129·8	129·1	124·2	124·7	124·6	125·4	757·8	126·3
B	124·8	121·7	122·9	122·2	121·7	121·3	734·6	122·4
C	121·6	123·0	121·1	119·4	124·0	123·0	732·1	122·0
D	122·9	119·0	123·6	119·7	120·8	122·9	728·9	121·5
E	119·7	122·2	120·1	120·6	117·6	120·2	720·4	120·1
F	123·5	119·9	118·9	120·8	118·8	117·9	719·8	120·0
Total	742·3	734·9	730·8	727·4	727·5	730·7	4,393·6	122·0

TABLE II

ANALYSIS OF VARIANCE

	Degrees of freedom	Sum of squares	Mean spuare	Standard deviation	Log_e standard deviation	
Rows	5	26·435				
Columns	5	51·775				Standard deviation of a single plot is 1·092 days, of a group of 6 plots 2·674 days.
Treatments	5	160·832	32·1664	5·672	1·7356	
Error	20	23·845	1·192	1·092	0 0881	
Total	35	262·8			z=1·6475	

$N_1 = 5$, $N_2 = 20$ 1% point is 0·7058: z is significant

All treatments were sown on the 13th April, 1935. The diagram reproduced below shows the layout of the experiment, with the mean number of days from sowing to flowering inserted for each plot.

F	**E**	**B**	**A**	**C**	**D**	
123·5	119·7	124·8	129·8	121·6	122·9	742·3
A	**F**	**C**	**E**	**D**	**B**	
129·1	119·9	123·0	122·2	119·0	121·7	734·9
E	**C**	**D**	**B**	**F**	**A**	
120·1	121·1	123·6	122·9	118·9	124·2	730·8
B	**D**	**E**	**F**	**A**	**C**	
122·2	119·7	120·6	120·8	124·7	119·4	727·4
D	**A**	**F**	**C**	**B**	**E**	
120·8	124·6	118·8	124·0	121·7	117·6	727·5
C	**B**	**A**	**D**	**E**	**F**	
123·0	121·3	125·4	122·9	120·2	117·9	730·7
738·7	726·3	736·2	742·6	726·1	723·7	4393·6

The results are tabulated in table I and the analysis of variance is given in table II. The differences between treatments are significant: the standard error of a group of 6 plots is 2·674 days, so that differences between treatment totals of more than 8·022 days are significant. On this basis, and taking the seed sown dry as the control, a significant shortening of the period between sowing and flowering has been obtained with all the treated seed. This result agrees closely with that obtained in the previous trial. There the seed germinated in an open dish and that vernalized for 6 days showed a significant shortening: here, (where all the vernalized seed received 6 days' pretreatment) the result has been the same with the addition of the seed treated by the village method, which corresponds closely to vernalization for 6 days, and which did not differ significantly from that method in the last trial. If we take the village method as control, significant shortening has been obtained with both lots of seed that were vernalized at higher temperatures. The effect of temperature is therefore a significant one, but again the difference is only of mathematical significance, and has no practical value.

SUMMARY

Experiments on vernalization of rice have been continued, the pretreated seed being vernalized for 6 days at different temperatures. Previous results have been confirmed, that a significant shortening of the period from sowing to flowering can be obtained by vernalizing the seed for 6 days, and that the method of pretreating seed commonly used by the Ceylon cultivator produces a similar effect. A further significant shortening of the preflowering period has been obtained by carrying out the vernalization at temperatures of 30° and 35° C., but the effect is too small to be of practical value.