

Seed Dormancy in Rice

BY

M. F. CHANDRARATNA, L. H. FERNANDO, AND C. WATTEGEDERA

PRECISE information on varietal differences in seed dormancy is necessary for the efficient organisation of issues of seed paddy to growers. The exact nature of these varietal differences has, hitherto, been obscure, although it has been generally realized that the dormancy of a variety bears some relation to its flowering duration ; late varieties were believed to possess pronounced dormancy.

Chandraratna (1952) recognized three main factors in the age expression of a rice variety, viz., its minimum flowering duration, its optimum photoperiod and its photoperiod sensitivity, and he showed that a complete characterisation of the flowering response of a variety was possible in terms of these three components. It was evident from a scrutiny of available information that varietal differences in the minimum flowering duration and in the optimum photoperiod were not associated with dormancy differences. The relation of photoperiod sensitivity to seed dormancy warranted detailed investigation.

MATERIAL AND METHODS

Twenty-three varieties were tested for dormancy. Most of the material was indigenous to Ceylon and consisted mainly of pure lines under issue by the Department of Agriculture, Ceylon. Fourteen of the Ceylon strains were period-fixed pure lines with a sowing-to-flowering interval not exceeding three months. The other five Ceylon varieties were date-fixed and were late. The three Burmese pure lines included in the test were early when sown in Ceylon in the *maha* (North-East monsoon season) and exhibited marked sensitivity to the photoperiod. The Indian pure line tested, Ptb 16, was late and highly sensitive.

The germination tests were set down at the Rice Research Station, Batalagoda in March, 1952, immediately after the harvest of the seed, and repeated at weekly intervals till the curve of percentage germination reached its peak. The weekly test of each variety consisted of three replicates ; one hundred seeds sown and maintained moist in an unglazed clay dish constituted a replicate. The air temperature during the tests ranged from a minimum of 21° to a maximum of 32°.

RESULTS

The germination percentages of the twenty-three varieties at weekly intervals after harvest are presented in Table 1 ; the figures are 3-replicate averages of the numbers of seeds germinated after eight days. Extrusion of the radicle was considered evidence of germination.

The dormancy of a sample of seed can be assumed to have completely expired only when the rise in percentage germination ceases. The seed left ungerminated when the curve flattens may be considered defective. Seed paddy issued by the Department of Agriculture, Ceylon, carries a guarantee of over 80 per cent. germination, and it was found convenient for purposes of the present investigation to consider the attainment of this figure as marking the expiry of the period of dormancy. The date of harvest provides a measure of the average date of maturity of the sample. The interval between the harvest date and the date of over 80 per cent. germination is the estimate of the period of dormancy of the varieties recorded in Table 1.

The *maha* (North-East monsoon) season has a shorter average length of natural day than the *yala* (South West monsoon) season. The shortest day in *maha* approximated 11.7 hours. The longest day in *yala* is about 12.5 hours. Only period-fixed varieties are grown in both seasons. The growing of date-fixed varieties is restricted to the *maha* season. The last column of the table indicates the degree of sensitivity of the varieties to the photoperiod.

The curves of percentage germination of the varieties, Wannu Dahanala 101, Mawi B-11 and HMC-12 are given in Fig. 1.

DISCUSSION

All the varieties tested except *Wannu Dahanala* 101 show recognizable dormancy. In the group of varieties listed as relatively insensitive to photoperiod, however, the period of dormancy does not appear to exceed six weeks. In the highly sensitive group, on the other hand, the period of dormancy is, in no instance, less than six weeks; indeed, except in *Molagusamba* g-18, dormancy exceeds six weeks. The results presented in Table 1 suggest that the seed dormancy of a variety may be a function of its photoperiod sensitivity. The results obtained by workers in Indonesia are in agreement with this suggestion; the *bulu* varieties possess no dormancy, but the *tjereh* varieties do. The *tjerehs* are appreciably sensitive to the photoperiod, and the *bulus* are conspicuously insensitive.

The survival value of dormancy and of its absence calls for comment. The seed of a sensitive variety which exhibits no dormancy would germinate at a time when the natural photoperiod would inhibit flowering. The possession of dormancy prevents germination in a sensitive variety till favourable photoperiods supervene. On the other hand, dormancy is disadvantageous to an insensitive variety grown in both seasons.

SUMMARY

The results of germination tests conducted at the Rice Research Station, Batalagoda, with twenty-three varieties of rice suggest that seed dormancy is related to photoperiod sensitivity. Dormancy is more marked in the highly sensitive varieties.

LITERATURE

Chandraratne M. F. "Photoperiod Effects on the Flowering of Tropical Rices" 1952 — Trop. Agricst. 108 4-10.

