

EFFECTS OF LOW TEMPERATURES AND LIGHT ON GERMINATION OF 12 UPLAND RICE CULTIVARS

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Low temperatures limit productivity of rice *Oryza sativa* L. and affect growth and development especially in sensitive varieties. This applies also to germination (Bubieva, 1985). Moreover the quantity, spectrum and daily duration of light may also affect the germination of rice seeds.

Eleven cultivars of the Facagro family and cultivar V.O. 46 were screened and ranked according to their degree of tolerance to cold during germination. In a first series of experiments screening was done using metal bars to obtain a gradient of temperatures. Samples were positioned on the bars on locations corresponding to 10°, 13°, 16°, 19°, 22°, 25°, 28°, 31°, 34° and 35°C. The experiments were conducted in the light and the temperatures were constant through time.

In a second series of experiments observations were done in light or darkness using incubators set at constant temperature (11°C or 25°C) or at 11°C night / 25°C day. In all cases the experimental units were made of 25 seeds and there were 336 of these units for all the experiments together.

Results confirmed the dependence of germination on temperature and cultivars (Bertin et al., 1996).

At temperatures less than 25°C the seeds showed various degrees of thermodormancy. Indeed rates of germination varied from 0 to 99% according to temperature and cultivar. The corresponding variation was 12 to 2 d for latent time and time taken to reach a plateau in the germination curve was 79 to 194 h. At these temperatures light induced photodormancy and germination rate was reduced 5 to 100% according to temperature and cultivar.

At temperatures above 25°C seed photosensitivity was not observed but the effects of temperature and cultivar remained marked. Germination rate and rapidity of germination increased with the increment of temperature up to 35°C. A further increase of 2°C reduced the germination rate 12 to 24% and delayed the plateau by 10 h. Latent time was reduced from 12 to 1 d according to cultivar with temperatures increased up to 31°C. Beyond this temperature latent time was constant. This suggests that the inhibition time of rice seeds can't be shorter than 1 d whatever the temperature and the cultivar.

Grouping of cultivars according to the degree of tolerance of their seeds during germination evaluated on the basis of these trials gave the following results: highly tolerant Facagro 441, 234, 46, 908a and V.O. 46, moderately tolerant Facagro 71, 911, 59 and low tolerant Facagro 430, 57, 53 18.

References

- Bertin P., Kinet J.M. & Bouharmont J. (1996). *Euphytica* **89**, 201-210.
Bubieva L.I. (1985). *Plant Breeding Abstracts*. **55**(11), 957.