

## Floret sterility in rice as influenced by low Temperatures

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Floret sterility is one of the most serious problems affecting rice yield in N.S.W. Yield reductions of up to 40% have been attributed to sterility. This has been associated with low night temperatures around flowering (1). The yield depression is usually more severe in late-maturing cultivars and in the southern part of the N.S.W. rice-growing area. An experiment was undertaken to investigate the stages of floret development most sensitive to low temperatures.

### Methods

Cultivars Inga and Calrose were grown at temperatures of 28°/20° in temperature controlled glasshouse chambers until panicle initiation. At various stages between panicle initiation and heading, plants were exposed to six different day/night temperature regimes (28°/20°, 28°/12°, 24°/12°, 24°/8°, 20°/8° and 12°/12°) for four days and then transferred back to 28°/20°. Pollen development was assessed using the auricle distance as the criterion. Concurrent observations had established a close correlation between pollen development and the distance between the last two auricles.

### Results and Discussion

Both day and night temperatures were important in determining the amount of damage produced by low temperatures. High day temperatures were able to alleviate the damaging effects of low night temperatures. No sterility was induced by night temperatures of 8° when day temperatures were maintained at 24°. However, when day temperatures were reduced to 20° some sterility was induced in the cultivar Inga.

The stage most sensitive to low temperature damage was the early microspore stage of pollen development. Exposure of florets to 12° for four days reduced fertility from 87% to 51%. Pollen development was much more tolerant of low temperatures on either side of this stage. Another stage sensitive to low temperatures occurred during anthesis, although damage at this time was not as great as at the early microspore stage.

**Table 1. Floret fertility (% of control) of Calrose and Inga rice subjected to cold treatment (4 days at 12°) during the early pollen microspore stage or at anthesis.**

	Early Microspore	Anthesis
Calrose	62	79
Inga	41	72

Cultivars differed in their response to low temperatures at these critical stages. This suggests that manipulation of cultivar resistance and date of flowering will be the important methods of alleviating this problem in N.S.W.

1. Boerema, E.B. 1974. *Il Riso* 23:385-397.