

The effect of temperature on the length of wheat coleoptiles

B.J. Radford and R.G.H. Nielsen

Queensland Wheat Research Institute. Toowoomba. 4350

Queensland growers commonly obtain poor wheat establishment when they sow deeply in order to place seed into moist soil. Field emergence from depth has been positively correlated with coleoptile length (1), but coleoptile length is reduced by temperature extremes (2) and the use of semidwarf cultivars (l). The effect of temperature on the coleoptile length of local cultivars was examined under controlled environment conditions.

Methods

Seeds were sown 1.0 cm deep in 5 cm of steam-pasteurized, 50/50 sand-peatmoss mix in boxes measuring 45 x 43 x 15 cm. Seedlings were grown in the dark at six constant temperatures ranging from 10 to 35°C in a randomized block design with two replications. Temperature treatments were split into eight sub-treatments of cultivars Banks, Cook, Gatcher, Hartog, Kite, Oxley, Shortim and Spica. Rows of 20 seeds of each cultivar were arranged at random within the boxes. Experiments were continued until primary leaves had penetrated the coleoptiles. Germinated seedlings were removed and coleoptile lengths measured.

Results and Discussion

The effect of temperature on the coleoptile length of four cultivars is shown in figure 1. Coleoptiles were shorter at higher temperatures.

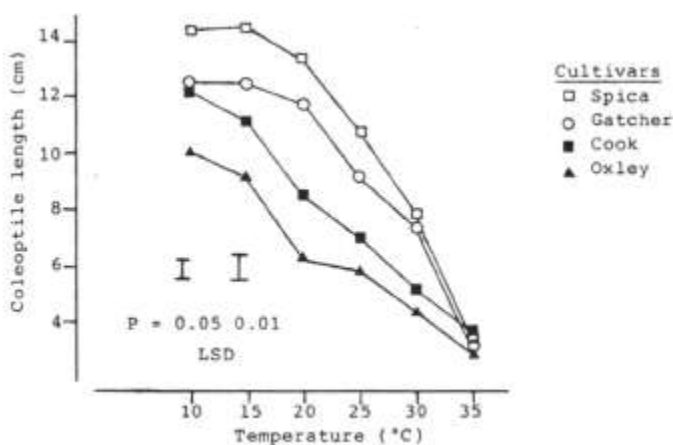


Figure 1. Effect of temperature on the final coleoptile length of four wheat cultivars.

Mean coleoptile length was greatest in Spica and least in Oxley. Within the semidwarf group, Cook had the longest coleoptiles. There was a significant temperature x cultivar interaction ($P < 0.01$), all cultivars having similar coleoptile lengths at 35°C.

These temperature and cultivar effects are likely to be important in commercial practice, especially in early sowings in the northern wheatbelt of Australia.

1. When, B.R. 1976. *Aust. J. Exp. Agric. Anim. Husb.* 16: 411-416.
2. Burleigh, J.R., Allan, R.E. and Vogel, O.A. 1964. *Agron. J.* 56: 523-524.

