

COOL AND DARK REQUIREMENTS FOR GERMINATION OF DARNEL (*LOLIUM TEMULENTUM* L.) AND IMPLICATIONS FOR WEED CONTROL

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Abstract. Wheat contaminated with darnel can be rejected by buyers of Australian wheat. We studied the controls of seed dormancy of darnel to determine whether they are a cause of the difficulties in managing the weed. Seed harvested in 1988 from Lake Grace (300km Southeast from Perth, WA) was used in these studies. Germination tests were in constant temperature cabinets at 10°C or 20°C ($\pm 1^\circ\text{C}$). Light treatments were provided by fluorescent tubes (3-6W m⁻² Sylvania GroLux) within the cabinets which were left on for 24 hours each day. Twenty seeds were placed on filter paper moistened with water \pm gibberellic acid (GA₃ as the potassium salt, 1 or 10mM acid equivalent) in covered petrie dishes and replicated four times for each treatment. Each day seeds with shoots > 5mm were counted as germinated.

Germination was highest, 100%, in cool (10°C) dark conditions; warm temperatures (20°C) and light both had inhibitory effects on germination, e.g. germination was $\leq 2\%$ in the light at 20°C. The optimal requirement for germination of cool, dark conditions could not be satisfied unless the seed was imbibed. Exposures, in the dark, to warm temperatures within a diurnal fluctuation of warm and cool temperatures did not negate the stimulus of the cool temperature-exposure. Gibberellic acid, 10mM, removed, largely, the inhibitory effects of light and warm temperatures on germination; this result was not obtained with 1 mM GA₃.

These results showed that germination will be low and protracted unless the seed is covered with moist soil and seed temperatures are about 10°C, at least for part of the day. Consequently, pre-seeding cultural and herbicide treatments may not have sufficient residual effects to prevent later invasions from seeds that germinate when winter temperatures drop low enough eventually to stimulate germination. These conditions for late, protracted germination would be enhanced by early sowing with minimum tillage. The weed may not be a problem in warmer regions where cool temperatures arrive late in the life of the crop. Some regions may have a variable problem with the weed that will depend upon whether the break of the season is warm or cool.