The germination requirements of seeds of the rare Hamersley *Lepidium catapycnon* (Brassicaceae)

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Seed Collection

Three collections of *Lepidium catapycnon* seed from Mt. Whaleback were sent to the Department of Conservation and Land Management's Threatened Flora Seed Centre in Perth for viability testing and storage. Material from the two early collections (24/09/99 and 21/10/99) was either aborted or immature and no good seed was found. Material from the later collection on 16/11/99 contained good seed that was used in viability trials and for long term storage (Figure 1).

Figure 1: *Lepidium catapycnon* mature seed and pod.

Seed Germination

The author had no previous experience with the germination of species in this genus and a number of publications on seed germination were consulted. One reference suggested heat treatment (Ralph 1994), another mentioned that reasonable results should be achieved at temperature of 12-20°C (Ralph 1997), another reported that all seeds of *Lepidium* showed deep dormancy, with a requirement for after-ripening (Ellis *et al.* 1985). It was decided to try a range of treatments and a control (no treatment at two temperature regimes) for the initial viability testing of the *L. catapycnon* seed (Table 1). All trials were conducted in temperature and light controlled incubation cabinets in 90mm glass Petrie dishes on a .75% (w/v) agar solution. A 12-hour photoperiod was used for all treatments and the control. Each treatment consisted of two replicates of 50 seed. Petrie dishes were checked twice weekly and germination was determined by radicle emergence.

Table 1: Treatments and percent germination for seed of *Lepidium catapycnon*, Mt. Whaleback.

Treatment	Temperature	Germination (%)
Control 1	15°C	18%
GA_3	15°C	89%
Control 2	25°/10°C	0%
GA_3	25°/10°C	89%
Heat	25°/10°C	0%
Heat + GA_3	25°/10°C	0%

The results of these preliminary tests indicate that fresh seed of *L. catapycnon* is dormant under basic conditions of light, moisture and temperature, but is highly viable when germinated in the presence of the growth hormone Gibberellic Acid as GA_3. Maximum germination (89%) occurred within 5 weeks under these conditions.

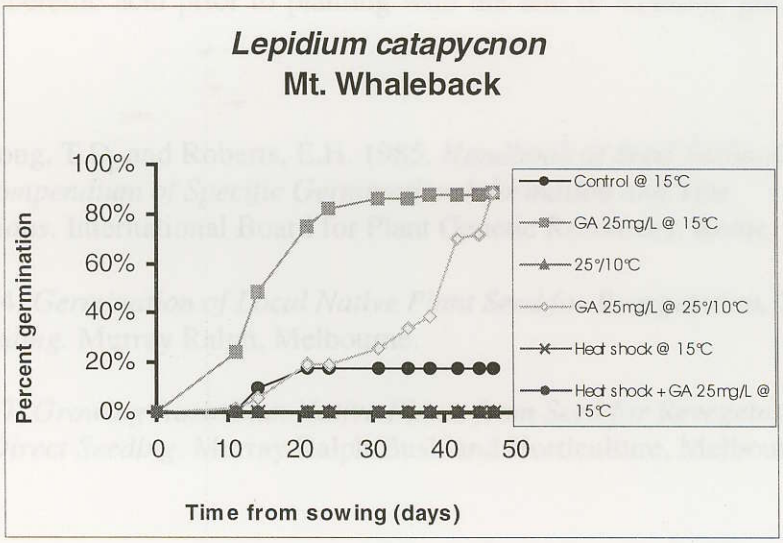

Figure 1: Percent germination over time in days for seed of *L. catapycnon* under 6 trial conditions.

In the presence of GA_3 lower temperatures hasten germination, with higher/ alternating temperatures providing a lag time of at least 10 days before first germination (Figure 1). Negligible germination occurred in the control treatment at 15°C and no germination in the control treatment at the alternating temperatures of 25°/10°C. The use of GA_3 to overcome this dormancy may indicate a requirement for after-ripening. Heat treatment (near boiling water poured over seed and allowed to cool for two hours) is damaging to seed with no germination following this treatment. Germination trials were concluded after 47 days. It is possible that further germination would occur within several of the treatments if trials were left to continue for longer.

Seed Storage

Seed was cleaned from pods and counted prior to moisture content reduction and storage. Seed was placed in sealed paper bags in a temperature and humidity controlled room (15°Celsius and 15% relative humidity) for up to 8 weeks prior to hermetically sealing in laminated foil bags and freezing at –20°C. Approximately 7866 seeds (22.25grams) were stored in this manner, with 6 samples of 100 seed each also frozen. These samples will be used to test the viability of the seed after 1-, 5- then 10-year intervals to ensure that the conditions under which the seeds are stored is optimal. It is expected that under these conditions seeds would remain viable for many hundreds of years.

Recommendations for Rehabilitation

Laboratory seed germination trials highlighted the need for growth hormones to promote maximum germination of freshly collected seed. The requirement for GA_3 to promote germination may be due to dormancy mechanisms in seeds that require an after-ripening period (for example several months in dry storage to allow seeds to synthesise the naturally occurring growth hormones of their own accord). It would not be possible to conduct broad scale rehabilitation of *L. catapycnon* using the same methods as used in the laboratory. If seeds were collected during the fruiting season, and stored at ambient temperatures for several months prior to seeding (or planting in a nursery), it is possible that any after-ripening requirements may be satisfied with a resultant high percent germination in the field. Failing that, it should be possible to soak fresh seeds in a 25mg/L solution of gibberellic acid prior to planting with the aim of attaining good germination results.

References

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