

## Effect of temperature on the germination of pasture species

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Recent research has evaluated alternatives to subterranean clover, *Trifolium subterraneum*, for the rice-pasture rotation (1). Agronomic knowledge of these alternatives in this environment is limited. Temperature is critical in determining the time and rate of germination of pasture seeds. This study examines temperature effects on the germination of 28 temperate pasture cultivars at temperatures typical of the Murrumbidgee Irrigation Areas in late summer (T1), early autumn (T2) and late autumn-early winter (T3). Germination response to temperature for most of these cultivars is previously undescribed.

### Methods

Pasture species included: *T.resupinatum*<sup>a</sup>, *T.balansae*<sup>b</sup>, *T.alexandrinum*<sup>c</sup>, *T.vesiculosum*<sup>d</sup>, *T.subterraneum*<sup>e</sup>, *T.repens*<sup>t</sup>, *T.pratense*<sup>g</sup>, *T.fragiferum*<sup>b</sup>, *Medicago saliva*<sup>l</sup>, *Lolium perenne*<sup>i</sup> and *Paspalum dilatatum*<sup>k</sup>. Commercial seed (3 replicates of 100 seeds) was germinated in petri dishes under controlled conditions at 3 temperature regimes (28/20°C(T1), 22/12°C(T2), 15/7°C(T3) 9 hours day/ 15 hours night). Germination (when radicle length exceeded seed diameter) was recorded daily for 14 days. Data were analysed by fitting a generalised linear model using the logit of the probability of germination ( $\text{logit}(rt) = \log(p/l-p)$ ) as a linear combination of variety, temperature and their combination (4).

### Results and discussion

Sixteen cultivars achieved >90% germination within 14 days at all temperatures, although some were slower at T3. Germination % of other cultivars was lower (<92%) at all temperatures and only 6 responded to temperature (Table 1). High temperatures (T1) reduced germination of Paradana<sup>b</sup>, Trikkala<sup>e</sup>, Haifa<sup>f</sup> and Kyambro<sup>a</sup>, but improved germination of Ellett<sup>l</sup> and *Paspalum*<sup>k</sup>. This agrees with earlier work (2,3) and using other cultivars.

**Table 1. Probability of germination (%) occurring by day 14 (standard errors in brackets).**

Temperature	Cultivar					
	Kyambro <sup>d</sup>	Paradana <sup>b</sup>	Trikkala <sup>e</sup>	Haifa <sup>f</sup>	Ellett <sup>l</sup>	<i>Paspalum</i> <sup>k</sup>
T1. 28/20°C	70 (3.6)	50 (3.9)	29 (3.5)	69 (3.6)	88 (2.5)	60 (3.8)
T2. 22/12°C	81 (3.0)	76 (3.3)	73 (3.4)	85 (2.8)	88 (2.5)	40 (3.8)
T3. 15/7°C	80 (3.1)	74 (3.0)	81 (3.0)	90 (2.3)	76 (3.3)	0 (0.5)

We conclude that, except for *Paspalum*, temperature should not generally limit pasture germination in southern NSW in March-April. However, establishing pastures in mid-February with irrigation may reduce germination of some cultivars (Paradana and Trikkala) due to high temperatures, while sowing during the lower temperatures of early winter will slow germination rates (O'Callaghan and Lattimore, unpublished data).

### References

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