

Some preliminary results on the response of field grown lupins, during a period of soil water depletion

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Lupin cropping is extending into the drier parts of the wheatbelt of Western Australia, so that a study of their water relations is relevant. In this report, leaf water potentials of lines of *Lupinus angustifolius* cv Yandee and the selection known as Ritsons, and *L. cosentinii* cv Erregulla, are compared during a period of rapid drying at maximum leaf area. This was part of a comprehensive study on water use of three lines of lupins under natural rainfall.

Methods

The three lines were sown at three densities on 14 June 1983, into a deep, yellow, loamy sand at Wongan Hills Research Station (31°S, 117°E). Data for the 20 pl m⁻² sowing of Ritsons and Erregulla are presented.

Leaf area index was determined from regular sampling.

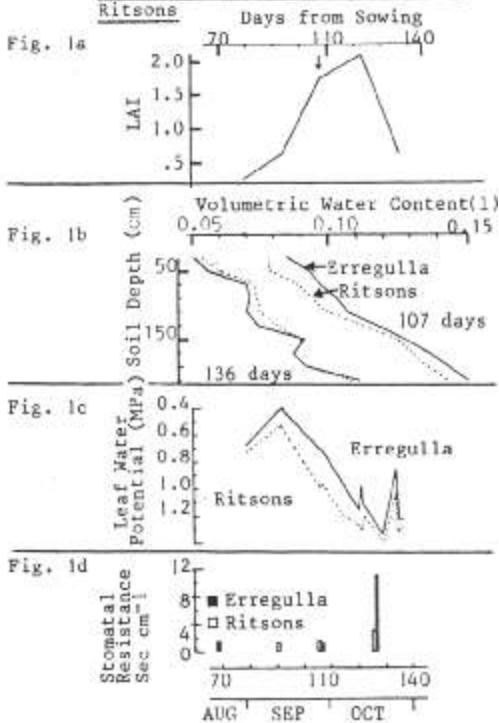
Soil water profiles were measured every two weeks at 0.2m intervals with a neutron moisture meter. At 107 days there was an increase in the rate of soil water depletion, and measurements were taken weekly thereafter.

Mid-day leaf water potentials were measured regularly after anthesis. Stomatal resistance was determined with a diffusion porometer. (Data supplied by I.N. Baxter, W.A.D.A.)

Results and Discussion

There was no significant difference in the LAI of Erregulla and Ritsons (Fig. 1a).

Fig. 1 Cultivar characteristics and soil water profiles for Erregulla and Ritsons



Soil water profiles at 107 and 136 days show there was substantial drying during October; at 107 days the Erregulla profile was wetter than Ritsons (Fig. 1b). As the two profiles at 48 days were similar, it would appear that Ritsons had used more water than Erregulla in the previous 56 days. By 136 the profiles were again similar.

Leaf water potentials T_1 between 79 and 136 days were consistently higher in Erregulla and this could be due to more available water.

The largest difference in soil water profiles coincides with the time of greatest difference in T_1 at 107 days (Fig. 1c).

Stomatal resistance did not differ between the two lines, until 126 days, when the value in Erregulla was three times that of Ritsons (Fig. 1d).

While leaf area development in both lines was similar, there appears to be a difference in the extraction pattern of soil water and in leaf water potential that is not reflected in stomatal resistance until about 126 days. This suggests a degree of osmotic adjustment in one line and not the other; this requires further investigation.