

Tillage and sowing depth affect pleiochaeta root rot and lupin establishment

M. Sweetingham, M. Dracup, R. Belford, A. Pelham and E.R. Harvey

Department of Agriculture, Baron-Hay Court, South Perth, WA 6151

Pleiochaeta setosa is the fungus responsible for brown spot and *Pleiochaeta* root rot (PRR) of lupins (1). Both diseases can severely reduce establishment and plant vigour. Root infection is initiated by spores produced on leaf litter of previous lupin crops which become concentrated in the surface few centimetres of soil. In direct drilled crops deeper sowing can reduce PRR as the roots avoid the zone of concentrated spores (2). This study investigated the effect of pre-seeding tillage operations and sowing depth on PRR, establishment and plant vigour.

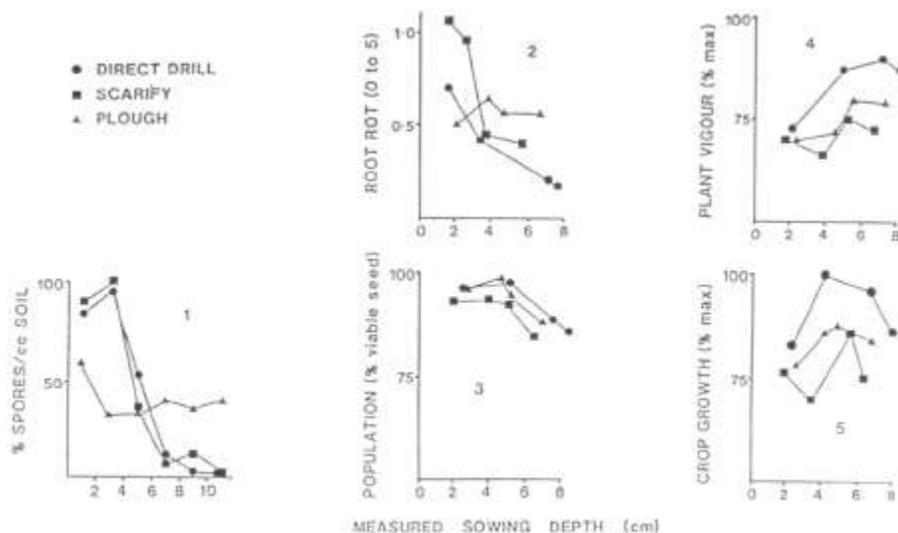
Methods

Narrow leafed lupins (*Lupinus angustifolius* L.) cv. Gungurru were sown at Wongan Hills Research Station in 1988 on a yellow loamy sand (Uc 5.22) site which had been in a lupin-wheat (1:1) rotation for several cycles. The experiment was sown with a combine (56 viable seeds/m²) at target sowing depths of 2, 4, 6 and 8 cm either (i) with no tillage (direct drill), (ii) 1 day after scarifying to 12 cm or (iii) 1 day after disc ploughing to 12 cm. *P. setosa* spore concentrations were determined immediately after sowing using a modified soil dilution plate technique. Root rot severity (scale of 0 - 5) was assessed at 28 days. Plant population (% viable seeds) and dry matter (g / m² and g/ plant) were measured 24 days (4 - 6 leaves) and 39 days (7 - 10 leaves) after sowing. Values for the two dates were averaged.

Results and discussion

The spore profile was disturbed least by direct drilling. Ploughing distributed a lot of surface spores deeper into the profile while scarifying caused much less spore burial

(Fig. 1). Root rot decreased with depth of seeding for the direct drilled and scarified treatments. However, deeper sowing did not reduce infection in the ploughed treatment (Fig. 2) due to the presence of spores deeper in the profile. Deeper sowing clearly reduced emergence (Fig. 3). Plant vigour was greatest in the direct drilled treatment and increased with sowing depth from 2 to 7cm (Fig.4), reflecting reduced root rot. Crop growth appeared optimum at sowing depths of 4 to 5 cm with direct drilling (Fig. 5).



2. Sweetingham, M.W. (1986) WADA Farmnote 43/87, Agdex 161/633.