The effect of seeding time and density on lupin growth and yield

K.A. Boundy, T.G. Reeves, and H.D. Brooke

Department of Agriculture, Victoria, Rutherglen Research Institute.

In southern Australia, optimum grain yields of narrow-leafed lupins (Lupinus angustifolius) have been achieved from seeding rates of 70 - 100 kg/ha (generally 30 - 40 plants/m²).

There are no Australian data published on Mediterranean white lupins (L.albus) although New Zealand results indicate optimum seeding rates of up to 300 kg/ha (90 plants/m²)(1). In this field study we considered the effect of seeding time and density on growth and yield of both species.

Methods

In three successive years, 1977-9, lupins were sown at monthly intervals beginning in either April or May, at seeding rates from 50 - 190 kg/ha for Uniharvest (UH) and from 90 - 340 kg/ha for Hamburg (HB). We used recommended weed control and fertilizer applications in replicated field plots, and measured plant density, dry matter production and grain yield. Data were subjected to multiple regression analysis. Differences described are significant at the 5% level.

Results and Discussion

Rainfall for the growing season during 1977, 1978 and 1979 was 274mm, 586mm, and 488mm respectively, compared with the average expected 380mm.

In 1977, there were no dry matter or grain yield increases for UH and HB above plant populations of 80/m², whereas in 1978 and 1979 maximum yields of foliage and grain were not reached at the range of densities used in the experiment.

From these data optimum populations are 34 plants/m² for UH and 45 plants/m² for HB at current (March '82) seed costs and grain prices. (i.e., 70, 150 kg/ha respectively for seed of 80% germination).

Increased seeding rate can compensate for later seeding. For example, in 1978 and 1979 similar yields were obtained by seeding 118 kg/ha HB in May, as from seeding HB at 100 kg/ha in April. This effect was less pronounced for UH.

Results confirmed earlier work (2, 3) that UH is best sown in early April and HB in mid - late April. Later sowing depressed grain and dry matter yields more in the dry year (1977) than in average or wet years (1978-9). There were no yield interactions between cultivar and sowing time in 1977. However, production of dry matter and grain was depressed more for HB than UH with later sowings in 1978-9. Although plant density influenced absolute yield, it had no effect on the rate of yield loss with later sowings.

The effects of seeding time and density on nitrogen fixation and subsequent wheat production were also examined. Preliminary results indicate that dry matter and grain yield differences in the lupin crop (as discussed) were not reflected in subsequent wheat production.

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3. Boundy, K.A., Reeves, T.G., and Brooke, H.D. 1982. Aust. J. Exp. Agric. Anim. Husb. 22: 76-82.