Effect of varying crop population on lentil and weed growth

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Previous work at Lincoln College has shown lentils can produce high yields in Canterbury. However, the crop is very susceptible to weeds and farmers often lose their crops to weed infestations (1). An experiment was sown in late spring at five populations to examine the competitive effects of these populations on both lentil and weed dry matter production and lentil seed yield.

Methods

On October 14, Titore and Primera lentils were sown in a Templeton silt loam soil. Populations were 100, 200, 300, 400 and 500 plants/m2. Cyanazine at 1.5 kg ai/ha was applied 3 days after sowing for weed control. Plots were irrigated once on September 30, with approximately 60 mm of water. At ten-day intervals, two 0.1 m^2 quadrats were cut to determine lentil dry matter accumulation. On December 21, an evaluation of weed and lentil dry matter was made using one 0.1 m^2 quadrat in the weediest part of each plot. This sample was dissected into weed and lentil dry matter. Final yields were established by 3.0 m^2 harvests on January 16 and 17 for Titore plots and February 15 and 16 for Primera plots.

Results and discussion

The 1988-89 season was the driest on record. Total rainfall from October 1 until January 31 was only 119 mm (long term average 219 mm). Despite this, seed yields were high at a maximum of 229 g/m^2. These yields are higher than those reported by (2) of 1.5 t/ha and 0.8 t/ha for a September and October sowing respectively.

The higher seed yields at high populations were due to increased amounts of intercepted photosynthetically active radiation (PAR). Measurements of intercepted radiation showed that as early as December 5, higher populations intercepted significantly more PAR than did lower populations. At 100 plants/m^2 only 26% of incident PAR was intercepted while at populations of 300 plants/m2 and above, more than 50% of incident PAR was intercepted. These findings agree with those of (3) who showed that early sowings yielded more than later sowings due to increased radiation interception.

The weed/lentil dry matter results were similar to those for seed yield. At the higher populations, lentil growth helped to significantly decrease weed growth. This was probably due to the earlier canopy closure in the higher populations. While canopy closure was never complete, by December 16 populations of 300 plants/m^2 were intercepting only 39% of PAR. When leaf senescence began, all populations were intercepting approximately 60% of PAR. The larger seeded Primera also proved somewhat more competitive than did Titore.

These results indicate that late sowing can produce good seed yields. Furthermore, while farmers are advised to sow lentils in weed-free paddocks, high populations of 300 plants/m^2 are effective in helping control weeds.

1. Jermyn, W.A., Goulden, D.S., Lancaster, I.M., Banfield, R.A. (1981).Proc. Agron. Soc. N.Z. 11, 77-81.

2. McKenzie, B.A., Sherrell, C., Gallagher, J.N., Hill, G.D. (1985). Proc. Agron. Soc. N.Z. 15, 47-50.

3. McKenzie, B.A. (1987). Ph.D. thesis, Lincoln College, University of Canterbury.