

Effects of sowing rate and cultivar on lucerne dry matter yield and weed infestation during establishment

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Plant population density is considered to be a key factor for lucerne dry matter yields and enhancing the total nitrogen contribution by lucerne to crop rotations. There is also a possibility of lower sowing rates of lucerne leading to greater infestation of weeds. Lucerne varieties have different seedling vigours, and may vary in their resistance to weed infestation. It is therefore important to study the impact of sowing rates and lucerne cultivars on lucerne dry matter yield and weed infestation.

Methods

An on-farm trial of dryland lucerne varieties was sown during the first week of June 1998 near Duri, NSW. The soil was a dark greyish brown, medium-heavy clay with a pH of 7.3 (1:5 CaCl₂). The experiment was conducted in a split-plot design accommodating six sowing rates (2, 4, 6, 8, 10 and 12 kg/ha) in main plots and four lucerne varieties (Aquarius, Genesis, Aurora and line Y8622) in sub-plots. Each treatment was replicated 3 times. All

plots were harvested 160 days after sowing, and lucerne plants were separated from weed plants. Weeds included both grasses and broadleaf weeds.

Results and discussion

Continuous wet conditions during germination, seedling and early vegetative stages induced *Phytophthora* root rot disease (PRR) and wide-spread seedling mortality. The highly PRR-resistant variety, Aquarius, showed the greatest seedling survival under these conditions. Results indicated a positive correlation between dry matter yield and seedling density ($r = 0.91$). Dry matter production of lucerne varieties Aurora, Genesis and Y8622 increased with increasing seeding densities up to 10 kg/ha compared with up to 8 kg/ha in Aquarius (Figure 1). Aquarius yielded more than all other varieties at all seeding densities. The persistence and dry matter production of these plots will be monitored during the coming three years. This will help to clarify the impact of seeding densities on dry matter produc-

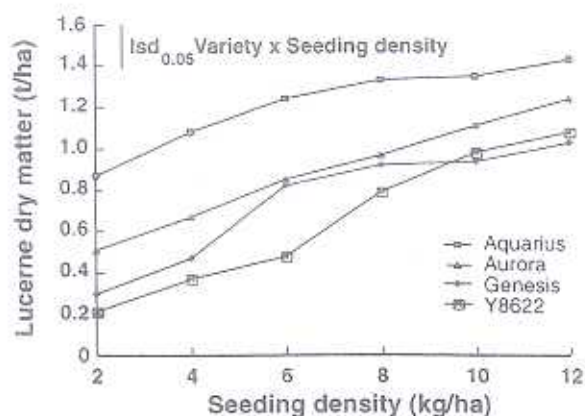


Figure 1. Effect of seeding density on dry matter yield of 4 lucerne varieties at first cutting.

tion and total nitrogen contributions by different lucerne varieties.

Early results also suggest that reduced level of weed infestation was associated with greater lucerne

seedling densities ($r^2 = 0.76$). Weed dry matter per hectare decreased markedly as lucerne sowing rates increased from 2 to 10 kg/ha. Dry matter of weeds was lower in plots of Aquarius compared with other varieties. Aquarius had greater seedling vigour and higher plant populations due to better root rot resistance and therefore increased competitiveness against weeds. Results indicated that lower lucerne sowing rates in other varieties allowed weeds to better utilise nutrients and moisture from the soil, and perhaps further reduce lucerne densities. This may have critical implications for weed control and herbicide usage in lucerne rotations.

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