Lucerne taproot biomass affected early-spring canopy expansion

- Crops with limited taproot biomass produced smaller leaves in early-spring.
- Smaller leaves reduced radiation interception and consequently shoot yield.

![Graph showing shoot yield against intercepted PAR of lucerne crops.](image1)

**Background**
- Shoot yield is linearly related to radiation interception which is a function of canopy expansion.
- Low levels of taproot biomass reduce lucerne yield.
- How do root reserve levels affect lucerne shoot yield in early spring?

![Image of lucerne crops](image2)

**Materials and methods**
- Lucerne crops were grazed frequently (28-day cycle) or infrequently (42-day cycle).
- Taproot biomass was 3t/ha in the 42-day crop but reduced by 30% in the 28-day crop.
- Shoot yield and light interception were measured weekly in each crop at Canterbury, New Zealand.
- The area of fully expanded leaves at each individual node position was measured from node 1 (base) to the most recent node (top).

**Results**
- Crops had similar shoot RUE of 1.64 g DM/MJ PAR (Figure 1).
- Accumulated radiation was ~40% lower in crops grazed at 28-day intervals (Figure 1).
- Lower radiation interception was caused by smaller primary and axillary leaves (Figure 2).
- Compared with the 42-day crop, the area of the largest leaf ($Y_L$, mm²/node) of the 28-day crop was reduced to 62% in primary nodes and 25% in axillary nodes (Figure 2).

![Graph showing total leaf area at each main-stem node position on 1 Oct 03.](image3)

**Conclusions**
- Limited root reserves reduced crop canopy expansion in early-spring.
- Crop yield reduction was caused by smaller individual leaves at each node position.