Pasture Quality: Plant Deconstruction

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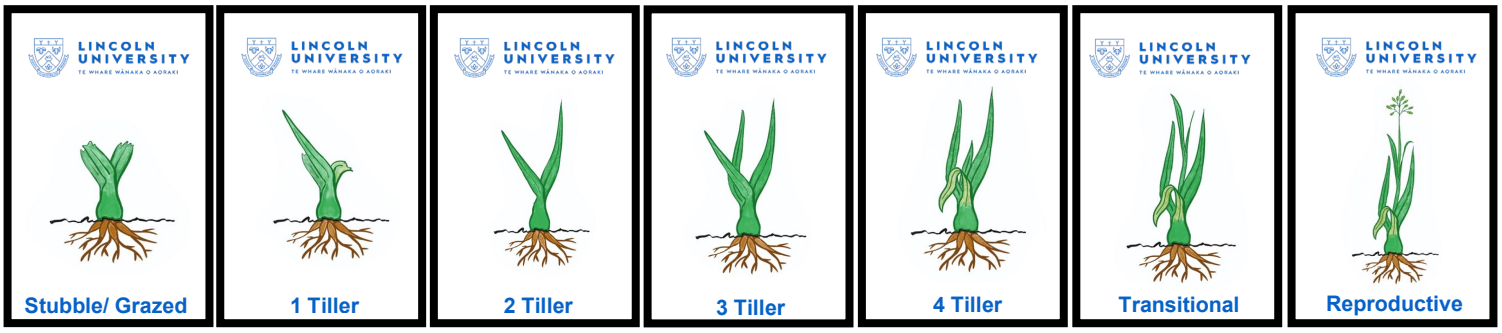
This activity explores the different stages of ryegrass growth and how more plant material is not equal to high quality feed. You can feel and see the difference in feed quality as the plants mature and grow, so you will use this textural analysis to deconstruct the plant into different categories.

Most New Zealand pastures consist of 60% - 70% ryegrass with the remainder often being clover. There are many different varieties of ryegrass that can suit different climates or farming operations, with more varieties under development. It is estimated that over 90% of pasture funding goes into ryegrass development in 2025.

Ideally ryegrass you want to graze ryegrass to optimise feed quality, quantity, and plant persistence (lifespan).

Figure 1: Stages of ryegrass growth



Ryegrass Quality: Plant deconstruction.

1) You should have 3-4 punnets of ryegrass, or you have foraged ryegrass samples (with the roots attached). You can hunt for pasture in different stages around the school but be mindful that samples may not be of the same variety and may not have grown in the same type of soil. Samples should be at different growth stages: 1 tiller, 2 tiller, 3 tiller, 4 tiller, transitional or reproductive.

2) You should carefully remove the soil from the plant roots. You can use a bucket of water to rinse the plant roots, so no soil remains. Use paper towels to gently dry the water off the samples.

3) Draw a straight horizontal line on a piece of paper or place a straight string on along the table and then place one plant sample of each different stage on the line. The line should be between the nodes and the roots (the line is representing the soil horizon). Then add a ruler on the vertical axis and record the height of the ryegrass and the depth of the roots. Take a picture of the plants lined up.

4) You will also be taking weight measurements of the different parts (roots, green growth, old growth) of each plant. Why is percentage weight rather than weight be a better measurement for feed availability and plant health.

5) Weigh each individual plant and record it in the table below. Dismantle each plant into the following four categories…
   - green soft leaves,
   - yellow, dying and dead material,
   - tough and fibrous (the nodes and reproductive stems),
   - roots

6) Weigh the different parts of each sample and record the result on the table. After weighing all the parts of the plant, you can calculate the weight percentages.

Plant (Stage)	Total Plant Weight	Root Weight	Green Leaf Weight	Fibrous Material Weight	Dead Material Weight
1 Tiller					
Percentage	100%				
2 Tiller					
Percentage	100%				
3 Tiller					
Percentage	100%				
4 Tiller					
Percentage	100%				
Transitional					
Percentage	100%				
Reproductive					
Percentage	100%				

7) Created a percentage bar graph either on paper or in Excel.

8) Discuss and answer the following questions.

   a) Explain what part of the plant is the most beneficial for animals and weight gain?

   b) What stage of ryegrass growth provides the most nutritious feed for animals?

   c) What 3 important roles do roots have in plant health?