Improving environmental outcomes

Pasture

Grow & Utilise

Every farm is unique, and so too is every plan to minimise environmental impact. Strategies that work for you may not work for your neighbour, and vice versa. With pastures, however, science has shown us even small changes can make a big difference.

Grow in winter

The wet winter-spring period is the main risk time for nitrogen leaching, so the more winter growth in the system, the more soil nitrogen is taken up. Modern plant breeding has really helped here - today's perennial ryegrasses grow 20-30% more winter DM than their 20-year-old predecessors. To soak up even more winter nitrogen, sow the highest yielding Italian or annual ryegrass (e.g. *Tabu+* or *Hogan*) or cereal (e.g. *Hattrick* oats).

Cover up

Nothing loses soil nitrogen in winter like bare ground. Post autumn or winter crops, sow *Catch-crop+* (a mix of oats and Italian ryegrass) to help catch any excess nitrogen before it has a chance to leach. Don't wait til the whole paddock is bare – sow half as soon as the crop is grazed. Earlier sowing gives much better yield and nitrogen uptake. (See *Catch-crop+*)

Min till

It means more careful weed and pest control, but establishing new pasture through minimum tillage releases less nitrogen than cultivation, and also uses less diesel. Long term it is better for soil structure too.

Graze higher

Grazing at higher covers means we capture more of the sun's energy. Typical diploid ryegrass pastures are grazed at around 2 - 2.5 leaves/tiller because this is the easiest way to maintain good residuals.

Mix it up

Plantain and chicory can help reduce nitrogen leaching over diploid perennial ryegrass, because they contain more water than diploid perennial ryegrass, and thus dilute the nitrogen content of urine. Tetraploid ryegrasses also have potential here, for the same reason, plus they persist better and are easier to manage, boosting productivity in many farm systems.

Captain CS plantain mitigates N in several ways.

Tetraploid/diploid mix pastures like *4front/Array* change the equation, as they hold feed quality longer, and still graze well at higher covers. For example, using tetraploid-based pastures, Lincoln University Dairy Farm was able to delay grazing to 2.5-3 leaves per tiller (or 3500-3600 kg DM/ha).

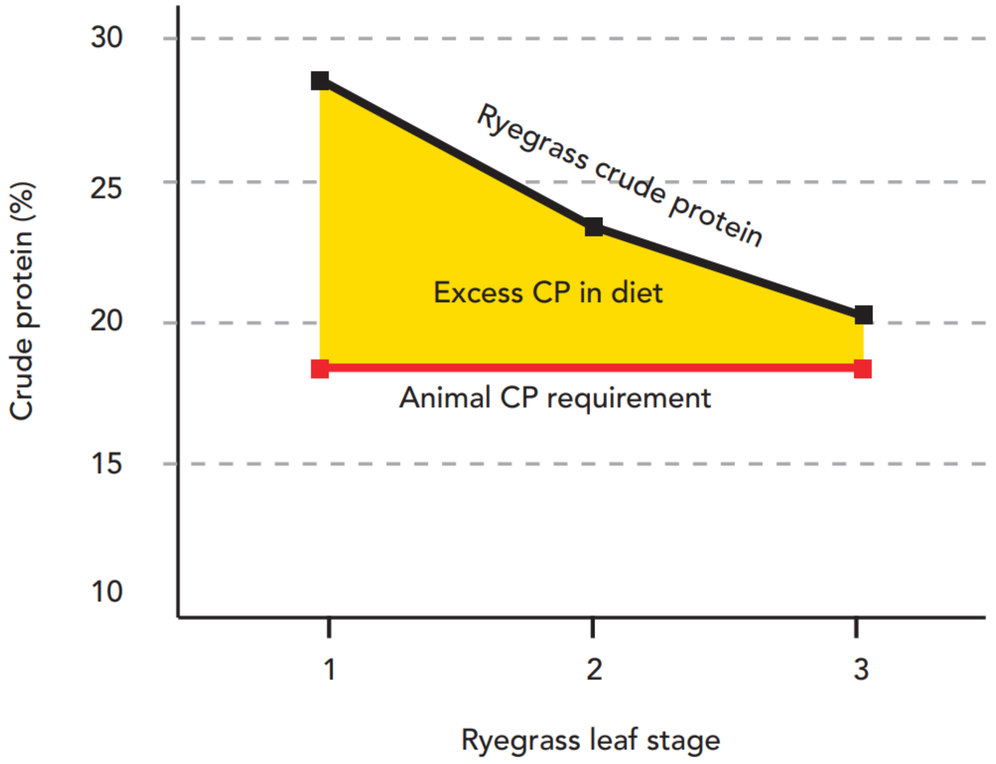
That sounds like a small change, but it compounds to return big dividends, because a ryegrass plant's fastest growth comes with the third leaf. This comprises 40-45% of the total growth available and can mean growing +1.2 DM/ha/year for the same nutrient supply.

Better balanced grass

Alternatively you could grow the same amount of DM for 100 kg/ha less nitrogen fertiliser (based on a growth response of 12 kg DM/kg N).

Grazing higher also improves pasture nutrient balance. As ryegrass grows, its crude protein (CP) or nitrogen level drops (see below). Lactating animals need about 18% CP in their diet, so a pasture with 22% protein at that time supplies 4% too much. This excess protein, excreted as urine and dung, is what causes problems with nitrogen loading of soils. Grazing 0.5 leaf/tiller later may reduce CP by 1.5%, dropping excess protein by over 30%. Currently this effect is not recognised in Overseer. Hopefully it will be in time, as it is significant.

Crude protein (CP) in ryegrass at each leaf stage vs requirement of lactating animal



Break later

On dairy farms, use 24 hour grazing to give cows a new paddock in the afternoon. Cows eat about 70% of their intake in the first half of the grazing. Putting them into a new paddock when ryegrass carbohydrate levels are highest and protein levels are lowest in the late afternoon means they consume less nitrogen. 24 hour grazing has no effect on cow production compared with 12 hour grazing (and is easier with half as many stock shifting decisions too!)

Feed more efficiently

Raising animal intakes puts more energy into animal production and less into maintenance. Lincoln University Dairy Farm is a great example of this principle in action.

It went from 680 cows to 560 cows, but maintained similar MS production, using tetraploid/diploid ryegrass pastures with higher ME and palatability than straight diploids to help increase cow intake. Putting more feed into milk production and less into cow maintenance also lightens the farm's environmental footprint. Plus, fewer replacement heifers are needed, further improving environmental performance.

The same principles hold for breeding ewes, cows or finishing stock. Higher production per animal or faster growth rates mean greater efficiency and a lower environmental footprint.

Fix for free

Legume-rich pastures need less artificial nitrogen fertiliser. Use high performance red, white and annual clovers, as they fix 25 kg atmospheric N/ha for every tonne of DM grown (and improve animal performance too).

High performance clovers - like Ruru - help cut the need for artificial N fertiliser.

Prevent pugging

Compacted, waterlogged soils release more greenhouse gases than soils with healthy structure. They are more prone to runoff and soil loss, with overland flow of sediment, phosphorus (P) and faecal material to waterways. They need more tractor work for seedbed preparation and sowing, and more fertiliser to ensure growth of subsequent crop or grass growth.

Reduce bare soil

Soil bared out by over-grazing is at higher risk of erosion than soil protected by pasture plants, even on flat land. Maintaining vegetative ground cover through pasture maintains and improves soil organic matter and structure, and enhances biological activity.