

Clover in NZ Pastures for High Performance Beef farming

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“Clover is no longer important in New Zealand pastures”

- True or False ?

The importance of clover to the NZ economy

- Clover contributes \$3 billion to the NZ economy annually, through ...
 - fixed nitrogen
 - increased animal production
 - seed exports

The importance of clover to a beef farm

1. Fixing nitrogen

- clovers use *Rhizobium* bacterial association to fix atmospheric N
- 180-350 kgN/ha/year
- value of \$270-525/ha for a cost of just \$7/ha = very economic

The importance of clover to a beef farm

2. Benefit to pasture production

- adding clover to a ryegrass mix boosts total pasture production by 22% or 3150 kgDM/ha/yr
- worth on average \$300/ha/yr

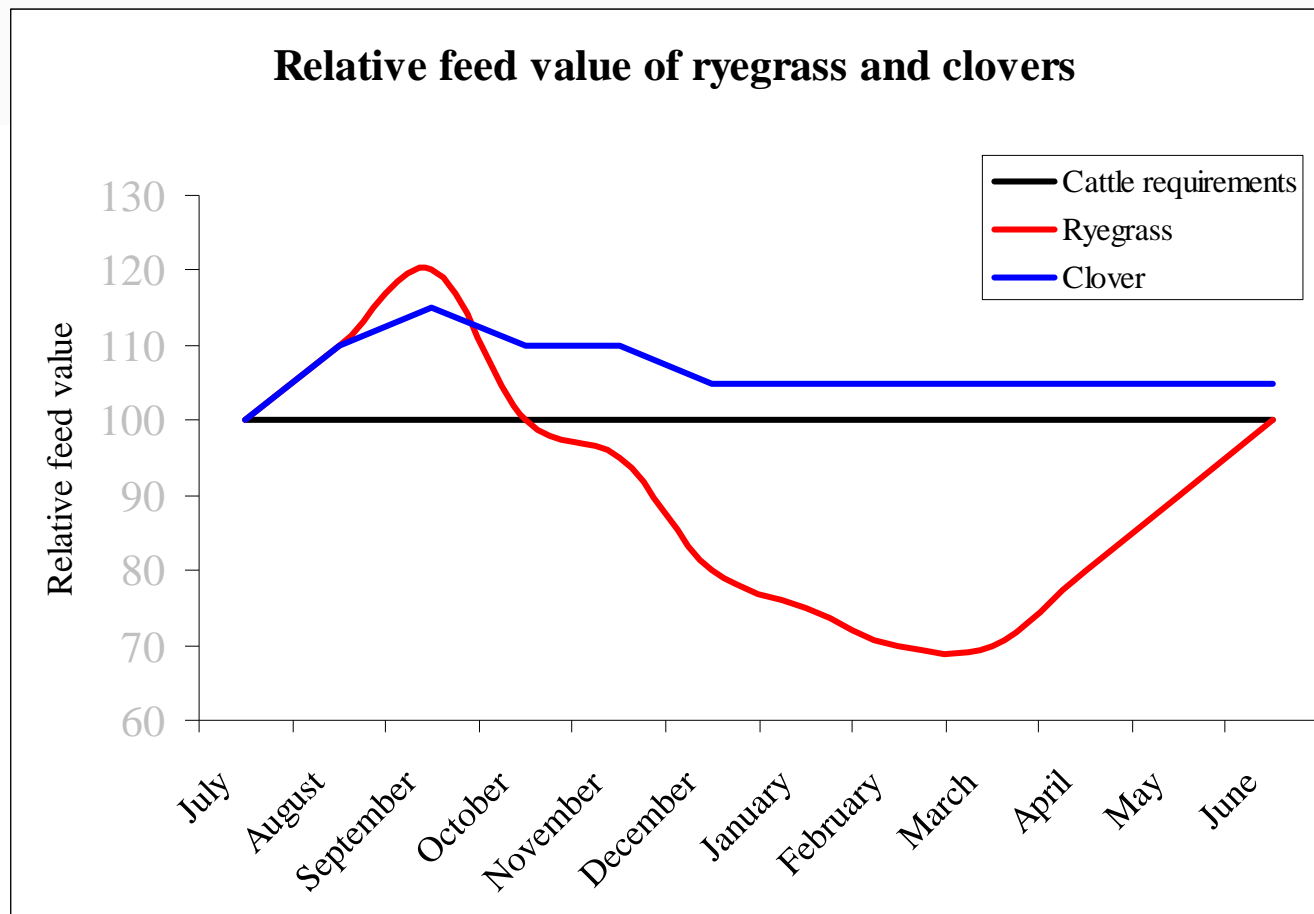
The importance of clover to a beef farm

3. Animal performance

– compared with ryegrass, clovers are:

- more palatable
- give higher intakes
- have higher protein
- higher carbohydrates
- more digestible
- less fibre

The importance of clover to a beef farm



The importance of clover to a beef farm

4. Animal performance

- faster LWG in beef animals
- LWG is one of the two main determinants of profitability on beef farms

Feeding

Changes when 0 to 50% white clover is offered an *ad lib* allowance (50 kg DM/cow/day). (Adapted from Harris *et al.* 1997).

	0% clover in pasture	% change at 50% clover
Crude protein (%)	14.3	29%
Estimated ME (MJ/kg DM)	9.5	11%
Herbage intake (kg DM/cow/day)	12.1	23%
Milk yield (litres/cow/day)	10.24	33%

Clover is no longer important in New Zealand pastures.

- True or False ?

False!

Main clover species used:

- White clover
 - perennial
 - spreads/survives through branching stolons
 - peak growth in spring, will grow in summer/autumn if enough moisture
 - shallow-rooted and poor drought tolerance



Main clover species used

- Red clover
 - perennial
 - deeper rooted, but no stolons
 - shorter-lived than white
 - twice as productive in summer





Main clover species used

- Subterranean clover
 - annual clover
 - good persistence and production in summer-dry regions
 - good winter production





Main clover species used

- Strawberry clover
 - perennial
 - tolerates wider range of soils
wet, lower fertility
 - more drought tolerant than
white
 - no bloat



How much clover should pastures have?

- 50% + ideally
- 20-30% more realistic over long term
- most pastures are 8-15%

How to achieve 20-30% clover in pastures?

1. Good establishment
2. Good management of existing pastures



How to achieve 20-30% clover in pastures?

1. Good establishment - focus on the clover and not ryegrass

- correct soil drainage/fertility before planting
- plant early when soils warm
- shallow sowing (10 mm)

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How to achieve 20-30% clover in pastures?

1. Good establishment - focus on the clover and not ryegrass

- control insects (slugs, springtails, grass grub, porina)
- don't sow high rates of ryegrass
- consider other grasses (e.g. tall fescue)
- graze carefully in first year

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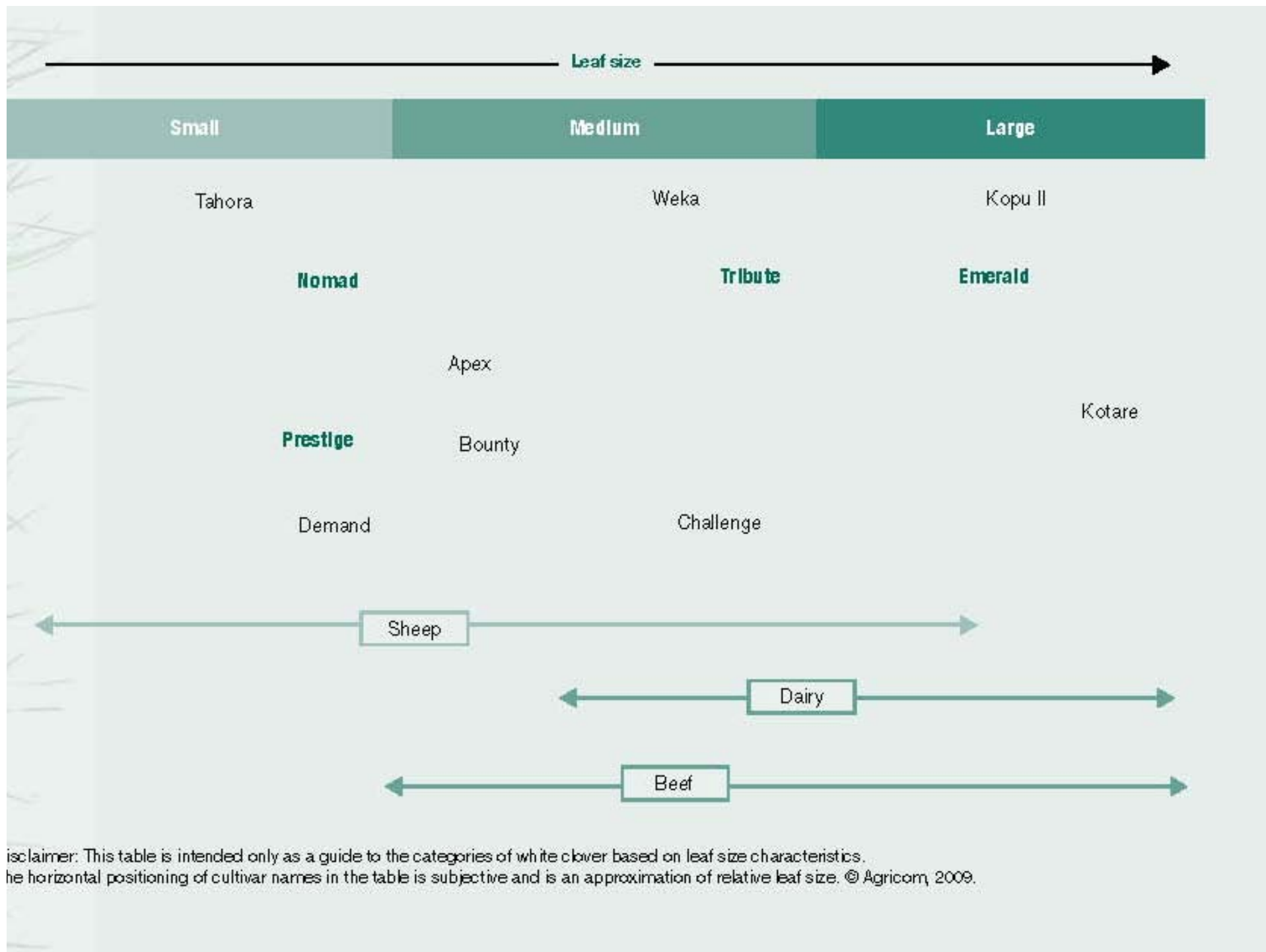


Which clover cultivars?

1. White clover

See next page

White clover breeding has improved genetics 1.5% per year - farmers can only capture this by re-cloving.



Which clover cultivars?

2. Red clover

- Sensation and Colenso are different to other cultivars in that they have lower formononetin levels, so can safely be used with breeding sheep.
- Both these cultivars have high production and good persistence, with growth earlier in spring than other cultivars.

Which clover cultivars?

3. Subterranean clover

- Denmark – a mid-late cultivars ideally suited to NZ conditions

What sowing rate?

- Best way to increase clover content in new pasture is to reduce ryegrass sowing rate

-12 kg/ha ryegrass will give better clover establishment than 20.

What sowing rate?

- Coated clover gives less seeds/kg, so sowing rates should be increased by 75%
 - e.g. 3 kg bare seed = 5.3 kg coated seed

What sowing rate?

- Inoculation is not necessary as most soils have high levels of rhizobia present

What sowing rate?

- White clover

-3 kg/ha tradition - 4-5 kg/ha?



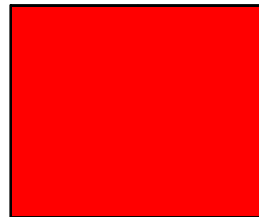
What sowing rate?

- Relative seed sizes

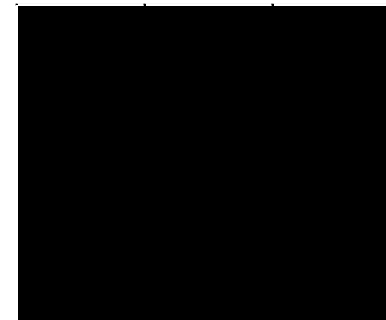
White clover



Red clover



Sub clover



What sowing rate?

- Red clover

- larger seed than white clover

- 5 kg/ha diploids

- 7 kg/ha tetraploid

- farmers have often been advised to sow low rates, resulting in disappointing performance.

What sowing rate?

- Subterranean clover
 - very large seed, farmers usually sow too light
 - 7-10 kg/ha (12-17 if coated)

Maintaining clover

- Constant interaction between clover and ryegrass, competing for light and soil moisture.
 - Sheep will selectively graze clover.

Maintaining clover

- Why is clover good for 2 years then seems to lose vigour?
 - White clover seedlings have taproots = greater growth & strength



First 1-2 years

Very few nodal roots on branches



Courtesy Dr John Brock.

Strong central taproot system

Maintaining clover

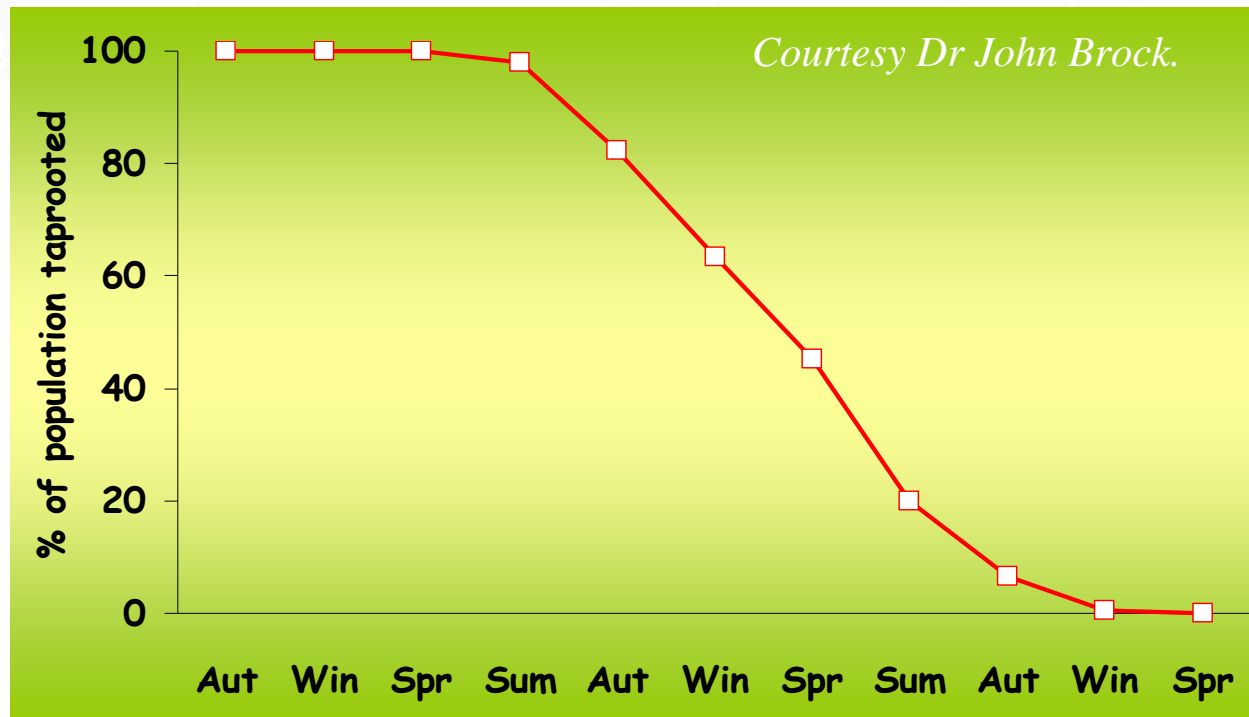
Why is clover good for 2 years then seems to lose vigour?

- White clover seedlings have taproots = greater growth & strength
- taproots die 1-2.5 years after sowing

Taproot death & plant break up

- About 1 year after sowing, taproots begin dying .

- By 2.5 years



- About 1 year after sowing, taproots begin dying .
- By 2.5 years all taproots are dead.

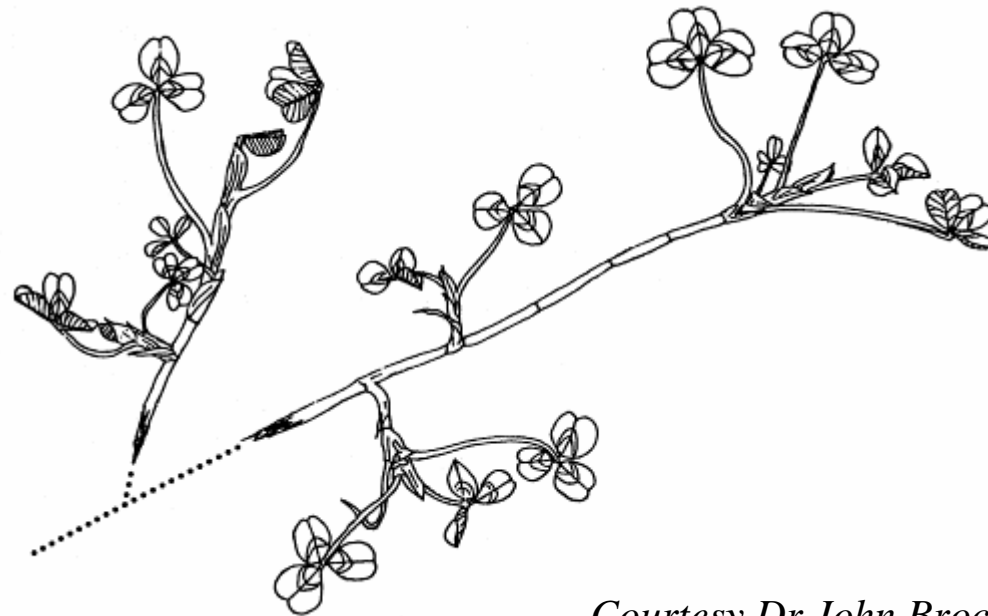
Maintaining clover

- Why is clover good for 2 years then seems to lose vigour?
 - White clover seedlings have taproots = greater growth & strength
 - taproots die 1-2.5 years after sowing
 - roots from stolon nodes are shallow and small
 - ryegrass has more competitive edge

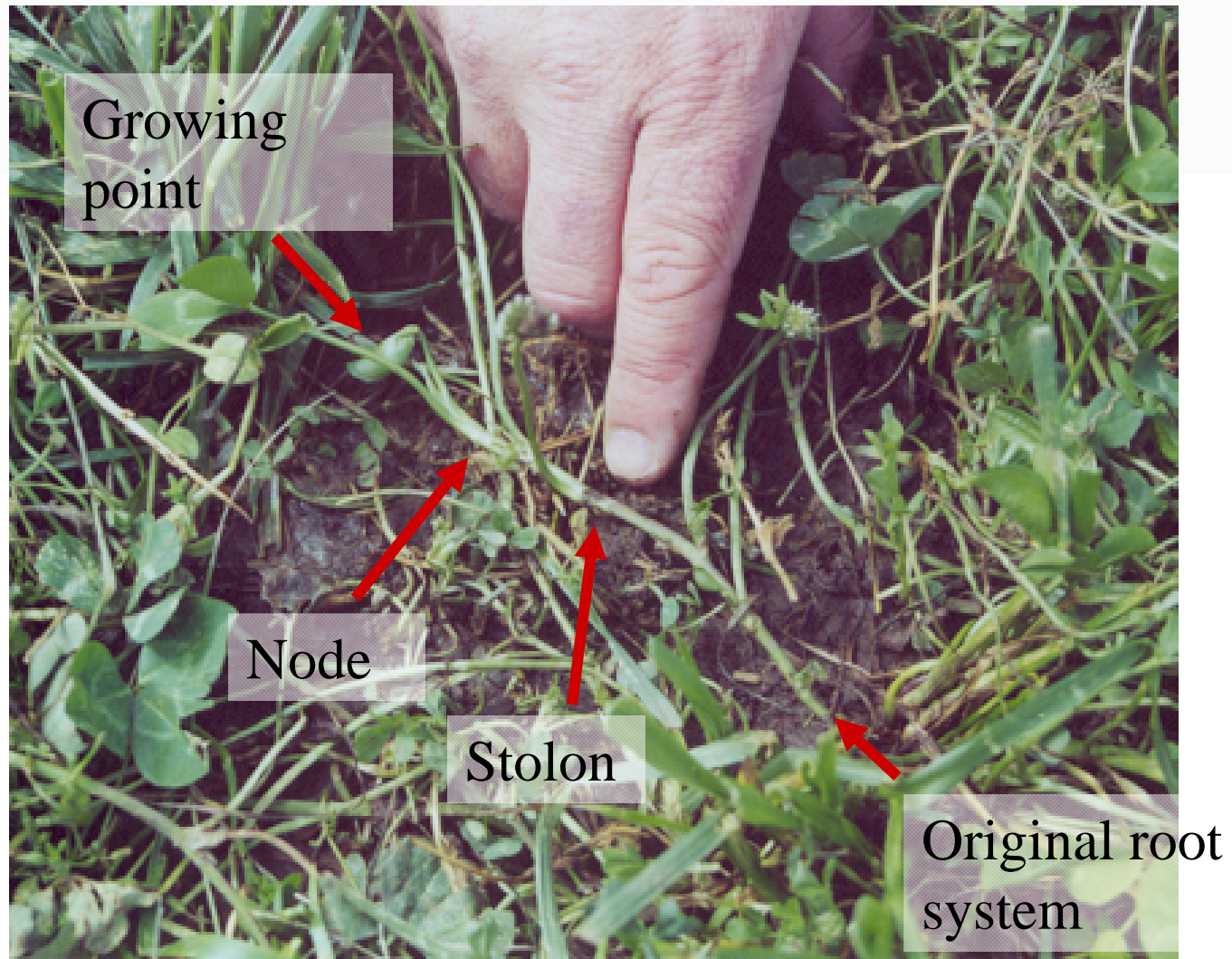


Clonal phase

- The normal status for white clover.



Courtesy Dr John Brock.



Maintaining clover

- Other factors that affect clover content
 - lack of summer rainfall
 - insect damage
 - pugging/treading damage
 - dense grasses
 - clover cultivar
 - nitrogen fertiliser use
 - soil fertility
 - ryegrass endophyte

Maintaining clover

- Spring pasture management is the main factor that farmers have control over
 - set-stocking or frequent grazing best for white clover, keep ryegrass covers low
 - select paddocks for priority spring control
 - rotate in summer/autumn
 - cattle look after clover better than sheep, cattle grazing in spring aids lamb growth in summer

Bloat

- Higher clover contents increase risk of bloat, but ...
 - cattle on constant feeding less prone
 - condition of ryegrass just as important (low fibre/high protein in spring)
 - to get high LWG in cattle, pastures must have clover
 - supply quality feed and control bloat with animal remedies



The future?

– continued plant breeding - better cultivars



Summary

- clovers are essential to high beef production
- farmers should focus on establishing clovers better, and take advantage of new cultivars
- management can improve long-term clover content in pastures

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