

Has red clover a role in your beef production system?

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Improving N balance

- ✓ Reduce use of chemical N
- ✓ Reduce concentrate inputs
- ✓ Increase animal performance



Benefits for beef production systems

- ✓ Enhanced economic and environmental

The role of forage legumes

- Grazed or conserved
- Biological fixation (BNF) capability
- Support low N systems of higher:
 - Herbage production
 - Sward quality
 - Animal performance
- White and red clover most relevant to Irish systems

Red clover

Pros

- ✓ High BNF (>200 kg N/ha)
- ✓ High DM production (>15 t DM/ha)
- ✓ High intake potential
- ✓ High animal performance

Cons

- ✗ Grazing
- ✗ Poor persistence (3-4 years)
- ✗ 4-year break
- ✗ Difficult to ensile

Establishment

- UK Recommended List
 - Heading date
 - Ploidy
- Spring reseed
 - 20-22 kg/ha (3-4 kg/ac)
 - Sown with perennial ryegrass
- Grown in rotation
 - 4-year break

Recommended List of Red Clover Varieties 2022/2023

Good for cutting and finishing stock in the autumn.

Variety	Conservation management						Suitable for any farm ✓
	Yield of 1st cut in 1st harvest year <small>Average = 100 at 5.20t DM/ha</small>	Total annual yield <small>Average = 100 at 11.62t DM/ha</small>	Crude protein % in 1st cut of 1st harvest year	Crude protein % in 2nd cut of 2nd harvest year	Crude protein % in 2nd cut of 3rd harvest year	Ground cover % in 2nd cut of 3rd harvest year	
Diploids							
Merviot	112	96	17.1	19.3	19.0	47	✓
Lemmon	100	99	17.6	19.2	19.8	60	✓
AberClaret	98	104	17.0	18.2	18.7	59	✓
Harmonie	99	98	18.3	19.6	20.1	64	✓
Sinope	104	100	17.8	19.2	-	57	✓
Fearga	91	105	17.1	18.3	18.6	58	✓
Ganymed	104	106	16.5	18.1	19.0	60	✓
Tetraploids							
Amos	101	99	18.1	20.2	19.9	57	✓
Maro	101	96	18.0	19.5	19.7	50	✓
Atlantis	101	102	17.8	20.6	19.7	60	✓
Magellan	99	102	18.0	19.9	19.9	60	✓

Growth habit of red clover

Red clover



White clover





Management

- Multi-cut silage system
 - 3-cut (mid-May to September)
 - Infrequent cuts (6-8 week intervals)
 - Wilt but avoid leaf shatter (<48 hr)
- Avoid chemical N application!
 - Why?
 - Reduced clover content
 - Lower BNF
 - Reduced DM production
 - Reduce persistence

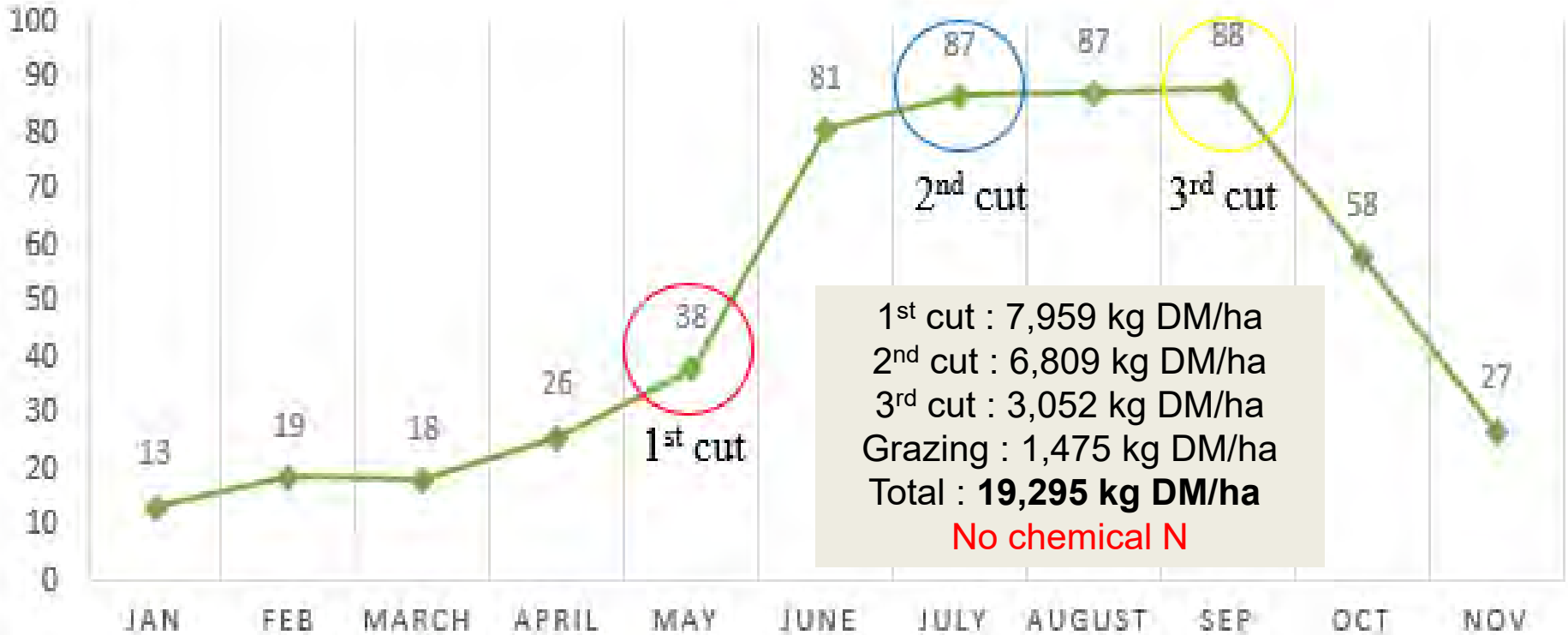
Herbage production

- Stable yields of >15 t DM/ha over multiple years

Harvest		PRG+RC (kg DM/ha)	PRG (kg DM/ha)
Cut 1		6 364	6 683
Cut 2	(0 kg N/ha)	4 459	3 610 (412 kg N/ha)
Cut 3		3 847	3 222
Cut 4		1 115	2 183
Total		15 785	15 698

(Clavin et al., 2017)

2022 red clover performance



Feeding value

- Red clover/grass silage has increased intake potential
- Chemical and morphological characteristics support increased DMI and animal performance
- Crude feed values underestimate performance potential

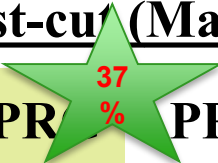
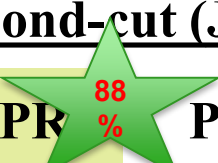
Digestibility

- Higher red clover content reduces silage digestibility
 - Erect growth habit requires substantial stem
 - Contains high ratio of indigestible fibre
 - However, digestion rate of fibre is faster
 - Smaller particle size in the rumen
 - Combined these characteristics increase rate of passage and reduce rumen fill
- } VS grass

Protein

- Dietary N concentration and intake increase with rising red clover content of silages
- Lower degradability of red clover silage proteins
 - Protective mechanisms reduce protein degradability
 - » Silo and rumen
- Crude protein levels may appear low under zero N application

2022 red clover feeding value

Feed value	<u>First-cut (May)</u>		<u>Second-cut (July)</u>	
	RC+PR  37%	PRG	RC+PR  88%	PRG
Dry matter digestibility (DMD %)	75.9	71.2	65.3	76.6
Organic matter digestibility (OMD %)	75.1	70.1	62.9	75.5
Neutral detergent fibre (NDF %)	59.5	61.7	47.6	53.0
Crude protein (CP %)	12.5	14.0	16.7	13.9
Ash (%)	8.8	10.2	10.0	9.6

Animal performance

- Increased DMI leads to higher animal performance despite often lower digestibility
 - Weanlings: +0.3 kg ADG +2 kg DMI/day vs grass silage of similar digestibility
 - Finishing: At 12% difference in digestibility, intake increased by 1.7 kg to support the same ADG
- Where is the response greatest from red clover silages? (first winter or finishing)



Relative cost of grass and red clover-grass silage

	Grass silage 2-cut system	Red clover silage 3-cut system	Red clover silage 3-cut system - all slurry
	€/bale (€ t DM)	€/bale (€ t DM)	€/bale (€ t DM)
Fertiliser (incl. spreading)	€11.89 (€59)	€7.1 (€34)	€4.1 (€20)
Harvesting costs (incl. plastic)	€24.48 (€122)	€5.40	€8.40
Other (feeding, herbicides etc.)	€2.49 (€12)	€ (€4)	€ (€)
Fixed costs (reseeding/facilities)	€2.77 (€14)	€4.78 (€23)	€4.78 (€23)
Total costs (excl. land charge)	€41.6 (€208)	€38.3 (€184)	€35.3 (€170)
<i>Sensitivity analysis</i>			
25 % change in fert price (+/-)	€2.1 (€10)	€1.1 (€6)	€0.0 (€0)
4-year to 6-year persistency for RC		€-2.1 (€-11)	€-2.0 (€-11)

Current research

New Teagasc research investigating the potential of red clover across Irish beef and dairy systems

Agronomy

- » Variety evaluation
- » N application
- » DM production
- » Persistency

Feeding value

- Intake
- Performance
- Conversion efficiency
- NUE

Farm system

- ❖ N Balance
- ❖ Economic
- ❖ Environmental
- ❖ Relative feed costs

Conclusions

- Opportunity to reduce dependence on chemical N
 - Fixing between 200-300 kg N/ha
- Potential for improved animal performance?
- Does it suit your farm system?
 - Increased management
 - Silage production
 - Drier soils
- Lower cost of production
 - Yield, persistence, fertiliser price



Thank you!

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