Red Clover: Best practice, results & farmer experiences

AgriSearch NI
Driving Excellence & Innovation

AgriSearch NI

Equipping farmers to face future challenges

- An independent farmer-led levy body
- **STRATEGY:** Applying our knowledge, network and capabilities and working with others to turn scientific possibilities into sound farm practice
- Strong emphasis on-farm research and innovation

Why ZeroNsile?

- High quality silage is of great importance for livestock farmers
- Increased cost of manufactured fertilisers
- Fertiliser use accounts for ~20% of GHG emissions on NI livestock farms
- Plot and field studies at Hillsborough have shown that red clover based swards can give high DM yields with no N fertiliser.
- However, there has been a low uptake of this on commercial farms. Particularly in the west.

ZeroNsile

Making Silage without manufactured Nitrogen

- Twelve Farms were selected to trial red clover based swards
- Swards established on ten of the farms during 2023
- Tonight's webinar will report on the first full year of monitoring
- Project will continue monitoring these swards for at least another two years.

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ZeroNsile

AgriSearch & AFBI

5th March 2025

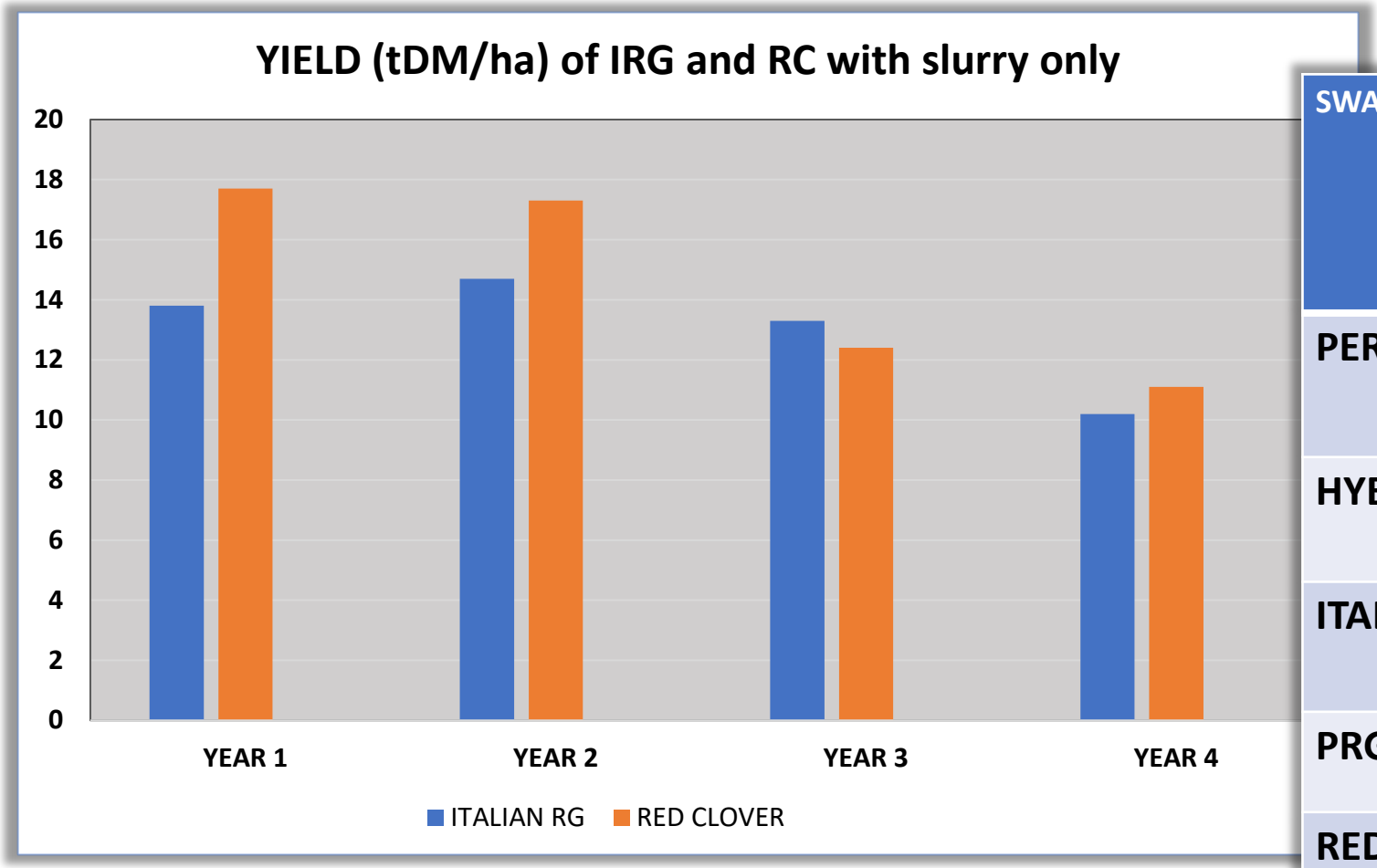
David Patterson

afbini.gov.uk

Background

- Need to reduce carbon footprint, N_2O emissions
- Erratic cost of fertiliser
- Investigate low N options for silage production
- Positive trials results BUT limited on-farm experience with growing and utilising red clover

Silage without Fertiliser?



SWARD TYPE	4 YEAR YIELD AVERAGE (tDM/ha)	% Difference (Relative to PRG)
PERENNIAL RG	10.1	
HYBRID RG	11.8	+17%
ITALIAN RG	13.0	+29%
PRG/WHITE	12.6	+25%
RED CLOVER	14.6	+45%

Source: low input forages for ruminant production systems. Dale et al (2011)

Establishment

- sward kill, plough/disc/power harrow cultivations, surface seeding
- fine, firm fertile seedbed
- do not sow too deep:– 5-10mm max
- 500 000 seeds per kg (x3 of WC)
- less suited to stitching in than WC - distribution
- less tolerant of fertiliser N than WC
- warm soil temperature required (8_0C) late April/early May – late June
- mixture: 9kg grass & 4kg red/acre

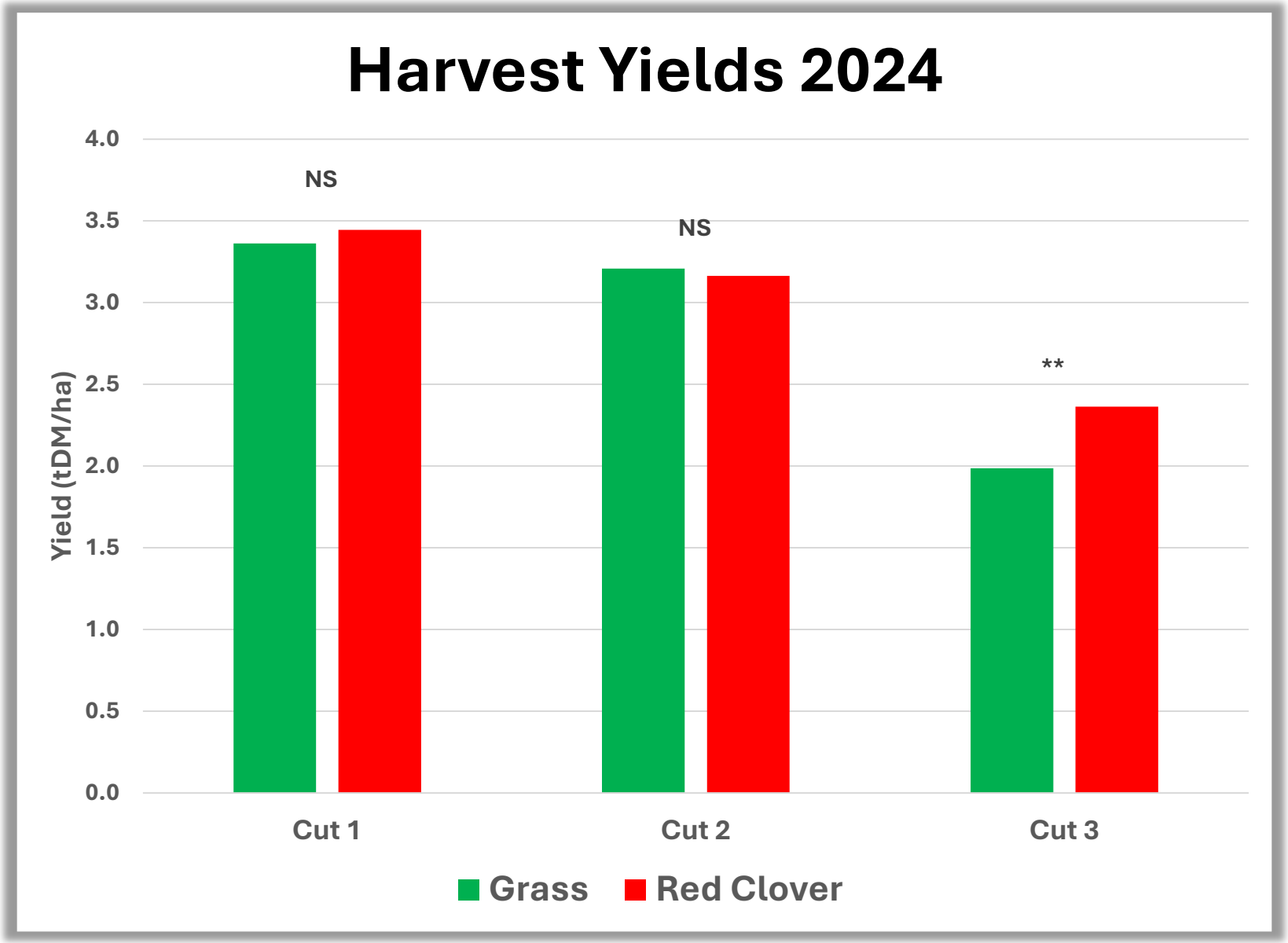
  monoculture: 6kg red/acre
- hybrid and tetraploid PRGs
- soil pH to 6.5 – n.b. not just for the soil

Establishment

Weed control

- ideal: clean ground in previous years with dedicated herbicides and land rotation
- post emergence sprays: new *ProClova* only after first winter (chickweed, docks - not nettles, thistles – 8’C & before flowering)
- always check label for clover safe
- chickweed & annual weeds in reseed: one or two ‘fast’ grazings normally controls
- alternatives: spot spraying

1st cut 8th-30th May
2nd cut 10th June - 30th July
3rd cut 17th July - 28th August



Nitrogen Use 2024

fertiliser N & slurry N

	Cut 1		Cut 2		Whole season		ratio
	Grass	Red Clover	Grass	Red Clover	Grass	Red Clover	
N applied	85	37	79	24	216	95	X 2.3

GRASS

First cut
2000gal/ac slurry
267kg/ha 22-0-14-3

Second cut
3000gal/ac
187kg/ha 32-0-10-3

Third cut
2500 gal/ac
174kg/ha 32-0-10-3

Supplies

Avail N	257kg/ha
Avail P_2O_5	100
Avail K_2O	265

RED CLOVER

First cut
3000gal/ac slurry

Second cut
1000gal/ac

Third cut
2500 gal/ac

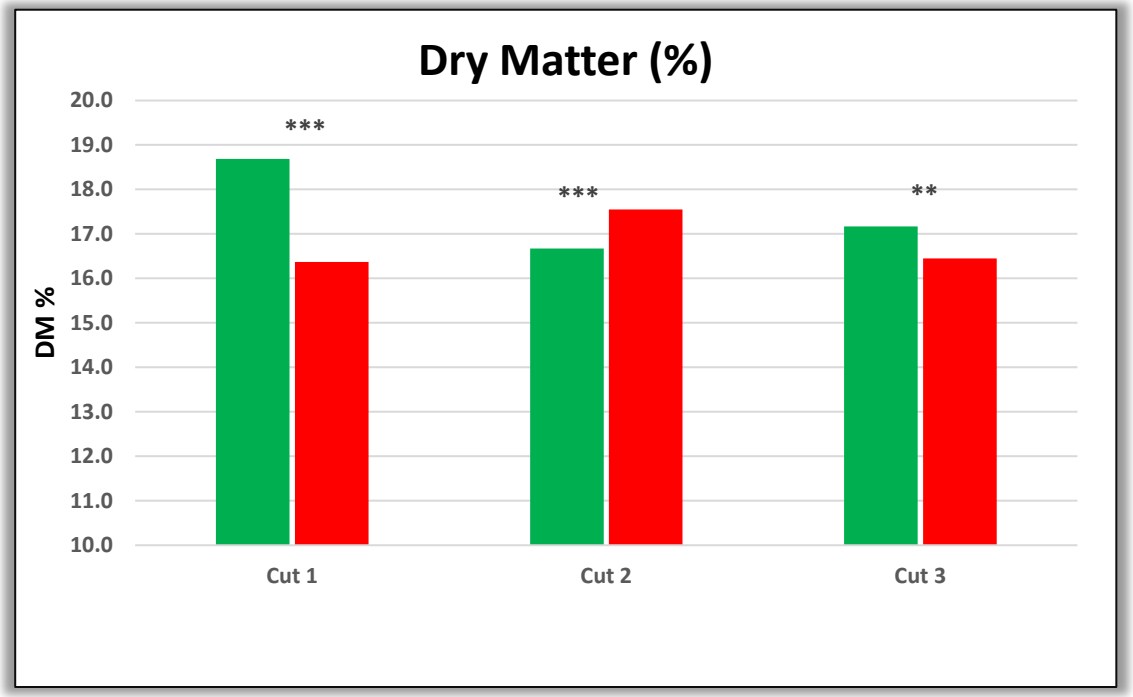
Supplies

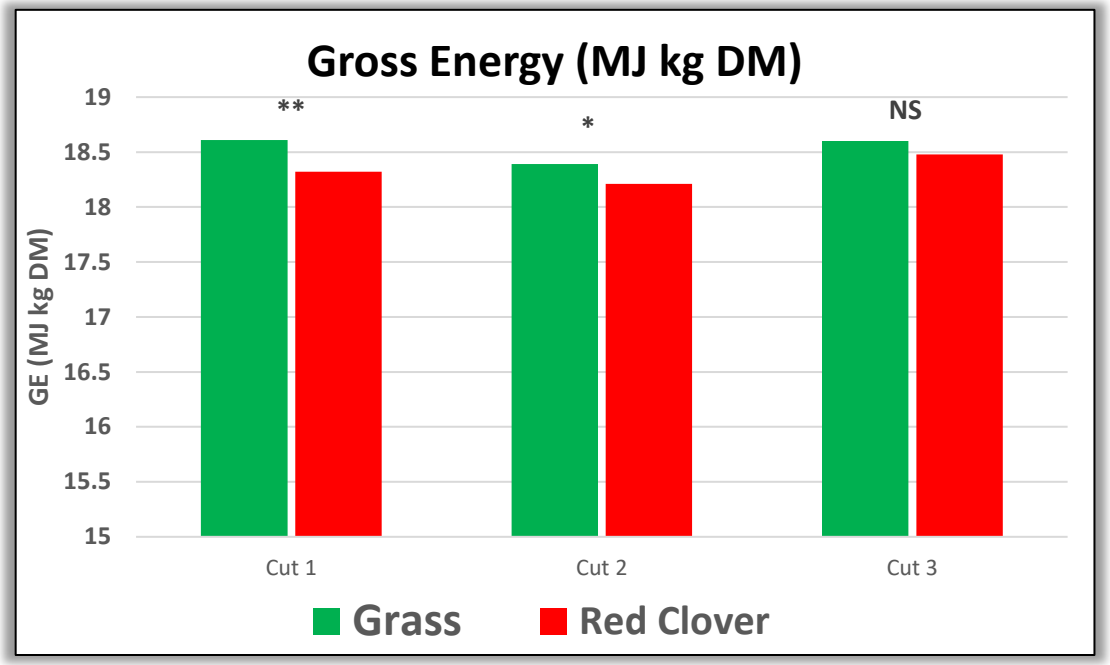
Avail N	76 kg/ha
Avail P_2O_5	87
Avail K_2O	167

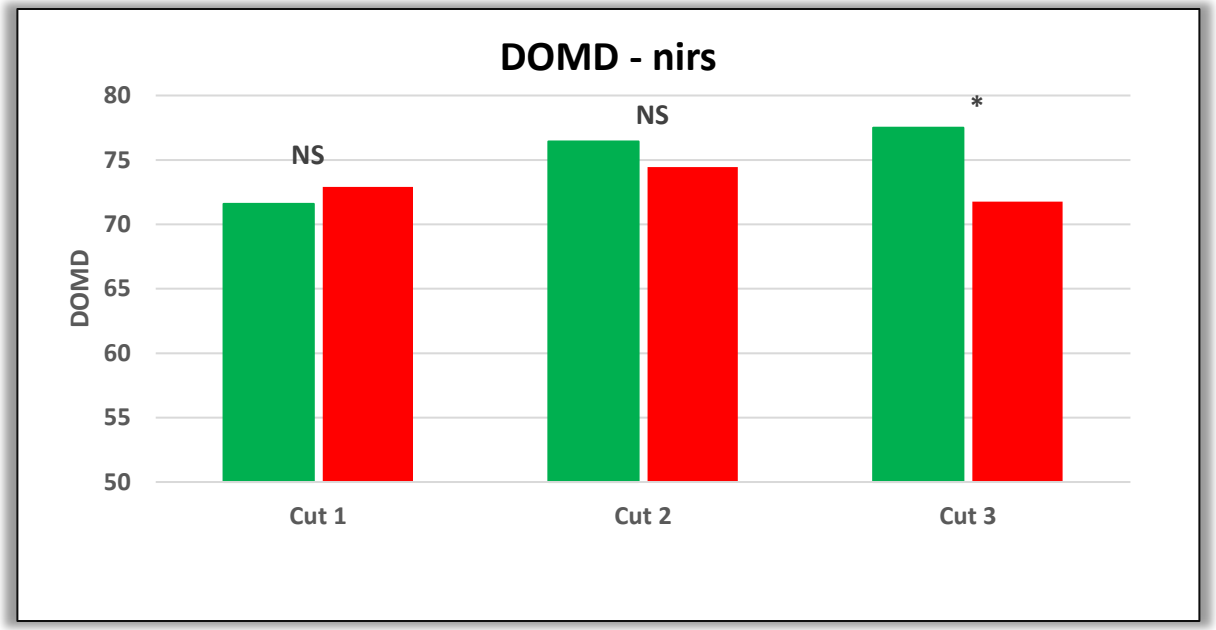
10tDM/ha
Crop Requirement

N	0
P_2O_5	90 (2+)
K_2O	200 (2+)

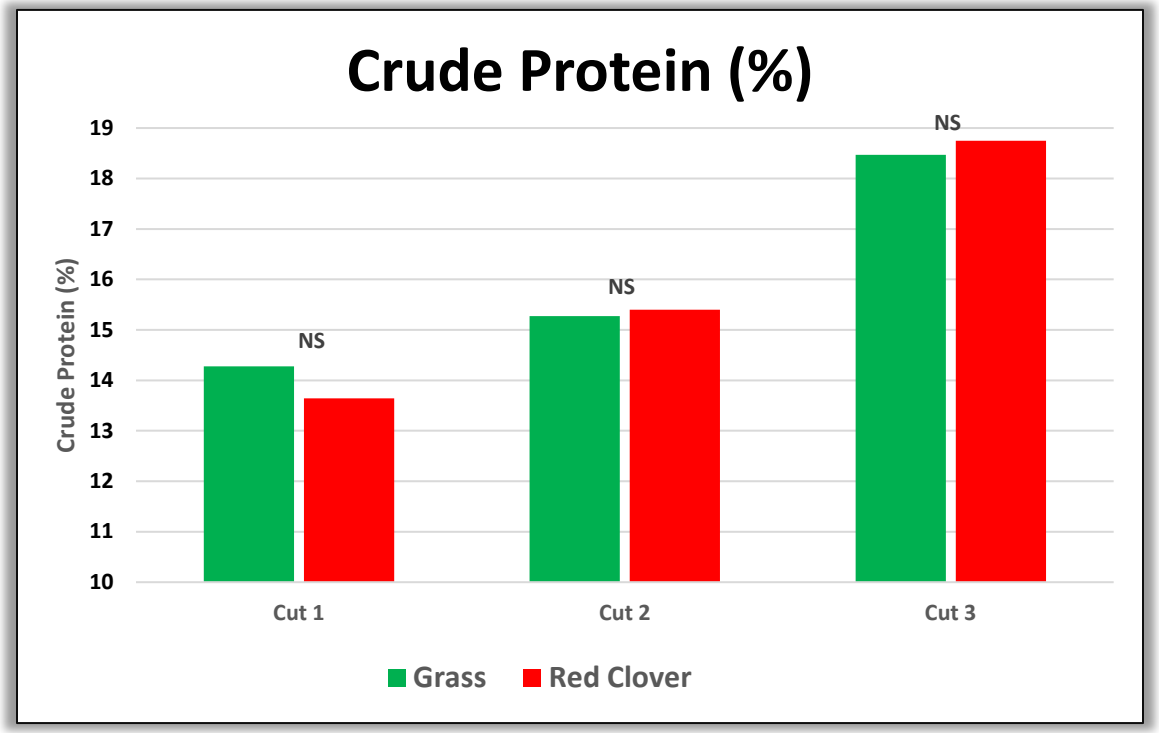
Herbage Quality – pre mowing

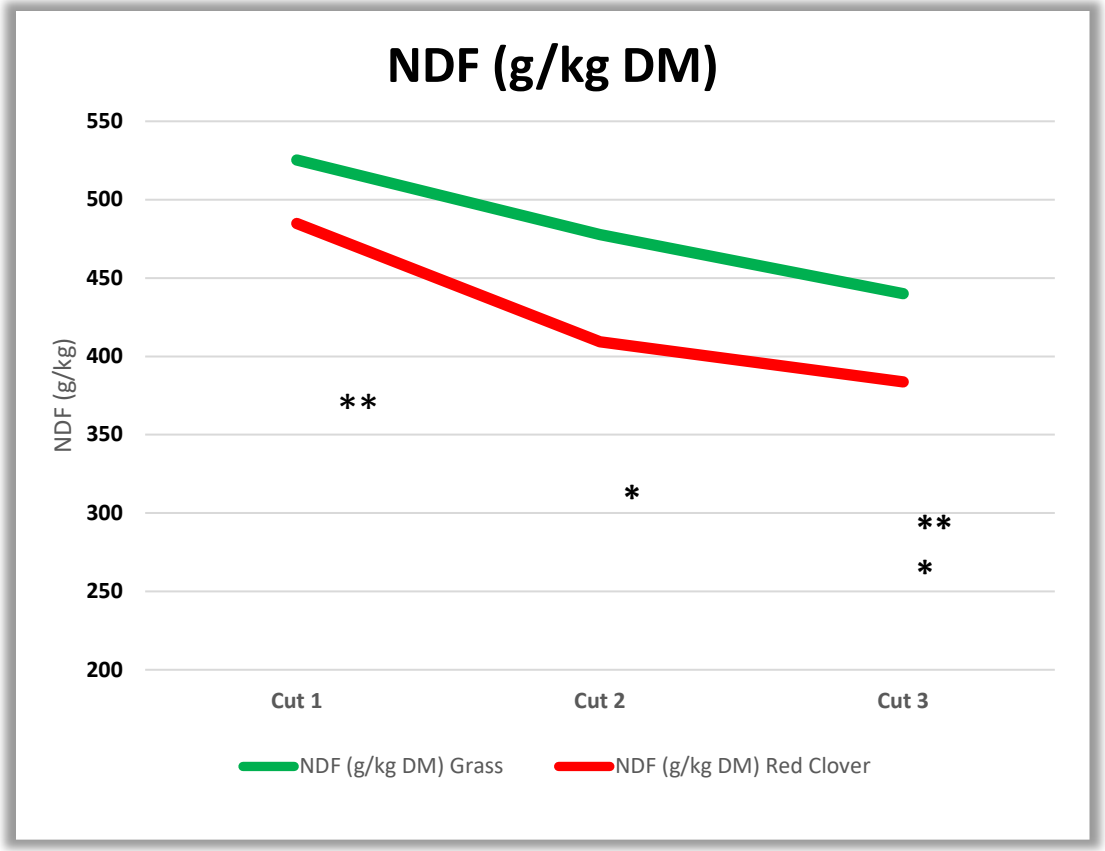






Herbage Quality





NDF= cell wall (cellulose, lignin, hemicellulose, pectin)

Silage Quality

- DM 25 – 32%
- pH 4-4.2
- CP 10-16%
- ME 10.8-11.9
- Ammonia 5-7
- Ash 9.3-10.4

- First cut mid- late May (when 50% flower buds present)
- Avoid crown damage (eg traffic, rolling)
- Mowing: Do not scalp (normal 5-6cm)
- Allow to flower once per year – aids persistency
- Graze or zero graze autumn re-growth
- Wilt to 35%DM plus additive(nb more active PPO enzyme)
- Leave in swath – one tedding - wilt 36-48hrs – minimize leaf loss!

Summary After Year 1

- **Red clover swards yield similar to grass-only plus fertilizer N**

&

- **Similar herbage quality**

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ZeroNsile

Francis McDonnell
Dromore, Co.Tyrone

Preparation

- Soil sampled

	Size (Ha)	P	K	Mg	Ph
RC	2.545	2-	0	2	5.8
Control	2.2	2+	0	2	5.7

- Chose a mix to suit our land – heavy clay running into peat moss
- Sprayed off the weeds – mainly docks
- Covered with farmyard manure & slurry
- Weather intervened

Seed Chosen

Barenbrug Late Heading Version (with Timothy)

Barenbrug		AHDB Data			Teagasc Data				
Late Heading Version (with Timothy)	**Seed Weights**	**Heading Date (AHDB)**	**Total Grazing Yield** (% of 9.64t DM/ha) (% of 11.69t for RC) (% of 4.13t for WC)	**Grazing D-Value (Midsummer)**	**Heading Date (Teagasc)**	**PPI**	**Grazing Utilisation**	**Total Yield (t/DM)**	**Mean DMD (g/kg)**
Baronaise (Timothy)	1.0Kg	13-Jun	101	74.4					
Gracehill (Late Tetraploid PRG)	4.0Kg	02-Jun	104	76.9	04-Jun	241	**	11.31	840.9
Glenarm (Late Diploid PRG)	2.5Kg	04-Jun	98	76.8					
Ballyvoy (Late Diploid PRG)	3.0Kg	02-Jun	100	77.5	03-Jun	186	*	10.97	843.1
Ostro (Red Clover)	3.5Kg								
Barblanca (Large Leaf White Clover)	1.0Kg	LS 1118mm2	112	8 GC			LS 0.76	104.7	49.3%
	15Kg/acre								

Challenges

- Getting the phosphate and potash levels improved
- Killing the weeds before sowing
- Weather – other priorities like silage slurry and fertiliser
- Preparation of seed bed
- Sowing – needed a man with a seeder who could handle clover

Dates

- Sowed 26th June 2024
- White is the dead weeds – layin the score over the winter

Dates

- 11th July 2024

Dates

- 19th July 2024

Dates

- Received 1 light application of slurry approx. 1000 Gallons/acre
- Mowed 1st September – light crop to tidy it up

Dates

- Baled 2nd September
- 21 Bales
- Don’t stack them!

Dates

- Got grazed by sheep over the winter
- Received Slurry on 3rd March with the pipe
- Approx 2000 Gallons/acre

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ZeroNsile

Andrew Crawford
Beragh, Co.Tyrone

Establishment

- Fields soil sampled

	Size (Ha)	P	K	Mg	Ph
RC	4	2-	1	3	6.3
Control	4.516	2-	1	3	6

- Seed Chosen

Germinal Seed Mix

		AHDB Data			Teagasc Data				
Germinal	**Seed Weights**	**Heading Date (AHDB)**	**Total Grazing Yield** (% of 9.64t DM/ha) (% of 11.69t for RC) (% of 4.13t for WC)	**Grazing D-Value (Midsummer)**	**Heading Date (Teagasc)**	**PPI**	**Grazing Utilisation**	**Total Yield (t/DM)**	**Mean DMD (g/kg)**
AberZeus (Intermediate Diploid PRG)	3.0Kg	27-May	104	78.10					
AberWolf (Intermediate Diploid PRG)	2.0Kg	28-May	100	77.90	30-May	209	**	11.12	840.9
AberGain PRG (Late Tetraploid PRG)	3.0Kg	05-Jun	103	77.60	04-Jun	241	****	11.20	852.0
AberClaret (Red Clover)	3.0Kg		104	59% GC					
Alice (Large Leaf White Clover)	1.0Kg	*LS 122% (%*Gr. Huia)*	*102.00*	*(Data from NI 2016 Recommended List)*			LS 0.73	100.00	49%
	12Kg/acre								

Results to date

2024	DM%	ASH%	Gross Energy	Crude Protein	WSC	D-Value	ME
Red Clover (1st Cut)	15.6	7.0	18.4	12.8	18.2	68.3	10.9
Control (1st Cut)	15.1	6.8	18.7	14.8	17.9	72.3	11.6
Red Clover (2nd Cut)	16	8.5	18.2	14.3	17.9	76.7	12.3
Control (2nd Cut)	16.6	6.6	18.3	11.9	22.6	81.5	13
Red Clover (3rd Cut)	16.6	8.5	18.6	15.9	14.8	73.1	11.7
Control (3rd Cut)	18.5	6.7	18.5	11.3	27.8	83.3	13.3

Challenges

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Clover Establishment at CAFRE

Robert Patterson
CAFRE Forage Technologist

Aim – Cafre Farm Estate

- Target white clover establishment in 25% of the grazing platforms (Dairy Centre and Beef & Sheep Centre) over a four-year period.

- Est. white clover in grazing swards at 30% content.

- Reduce chemical Nitrogen input.

- Maintain grass DM/ha production.

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Establishing Clover

- Soil temperature
- Soil moisture
- Timing – daylight hours
- Minimise weed competition
- Field specific plan – Nutrients Action Plan
- Record fertiliser use and grass growth

Selection Process

- Soil pH status (>6.3)
- Soil P & K Indices (>2+)
- Prevalence of weeds in the existing sward
- History of sprays applied
- Sward composition
- Performance of existing sward (T DM/ha/year)
- Amount of Nitrogen kg/ha received

Establishment Method - Overseeding

1. Remove grass DM (<1500 kg DM/ha)
2. Minimal soil disturbance
3. Granulated lime and P&K fertiliser applied
4. Broadcast/slit seeding – 2.5 kg/ac
5. Roll the seedbed

Sward post pre-mowing and grazing

Sowing white clover with grass harrow

Establishment Method
Full Reseed

1. Spray off existing sward
2. Surface cultivation
3. Consolidation of seed bed
4. Granulated lime and P&K fertiliser applied
5. Broadcast sow seed mix
6. Roll the seedbed

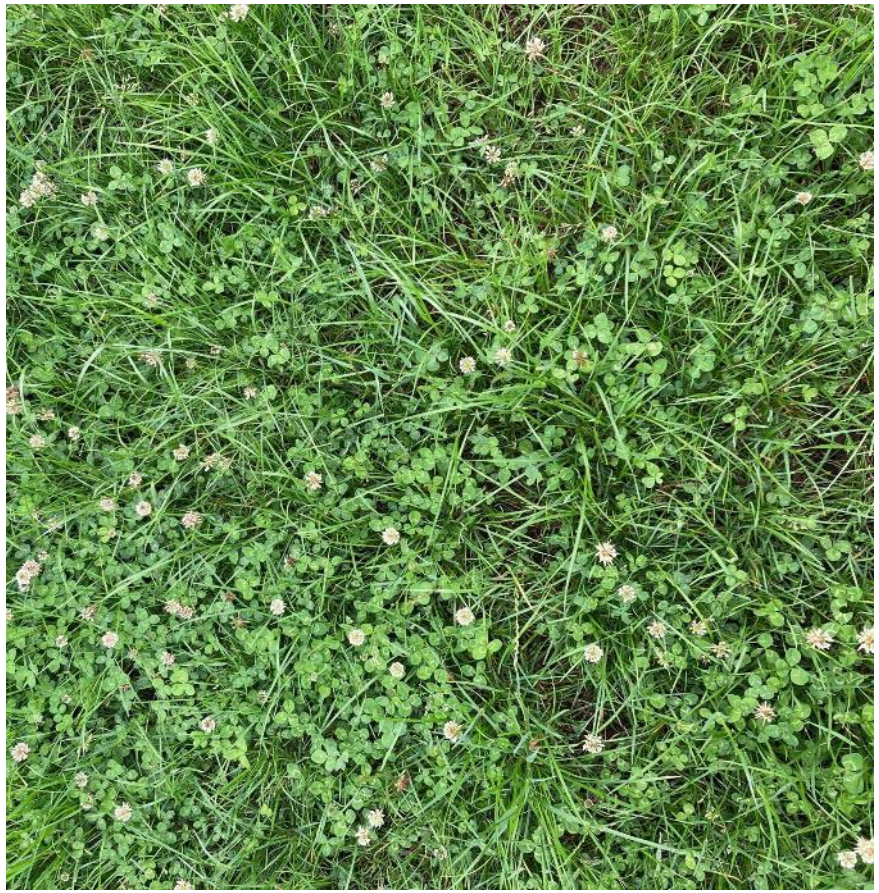
Post Sowing Management

- Graze 18 – 21 days post sowing (2,600 – 2,800 Kg DM/ha)
- Graze tightly (1,500 Kg DM/ha residual)
- ½ rate N application following 2nd grazing (12 kg N/ha)
- Grazed tightly at final grazing (mid – late Nov)
- Up to 60 kg N/ha over 2 applications in early spring

Clover seedlings at the first grazing

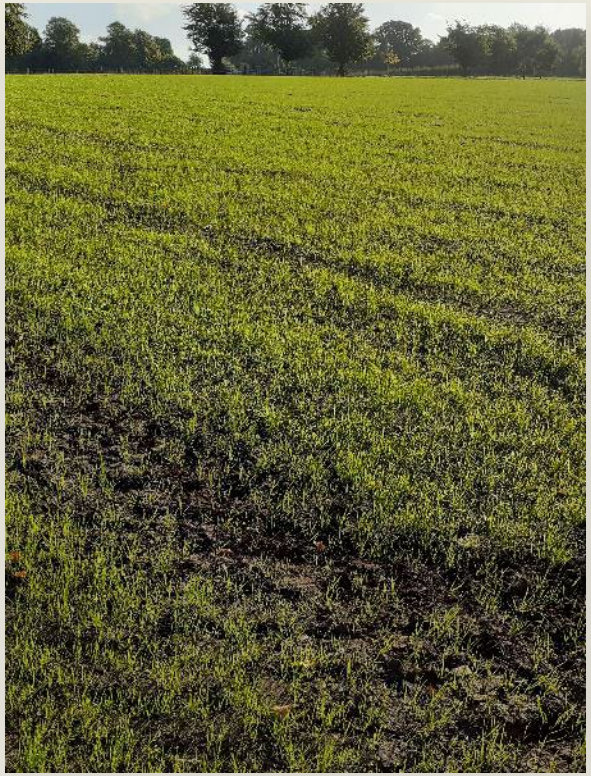
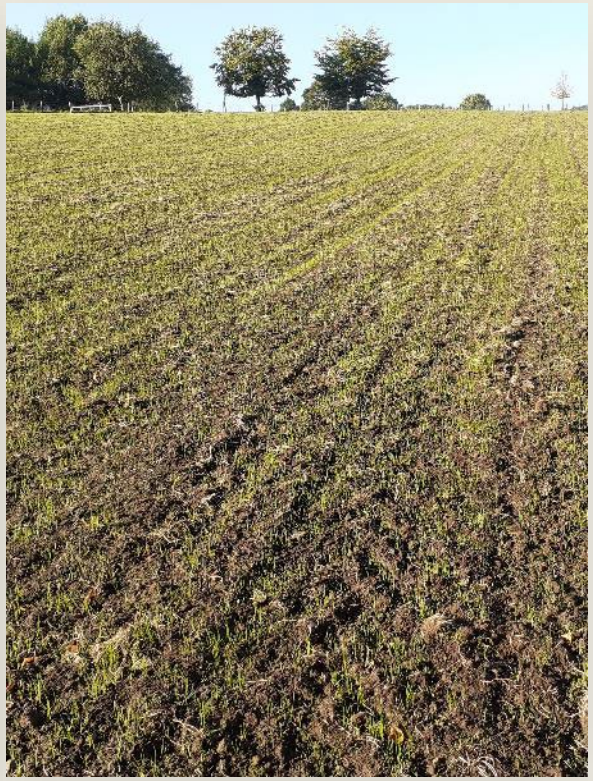
Full reseed seedlings

Performance



Full reseed method - Limitations

Full Reseed – Autumn 2024

Key Challenges

- Establishment: Oversowing vs cultivation
- Selection criteria
- Sowing Timing
- Post sowing grazing’s
- N application timing’s/rates
- Weed control
- Bloat control
- Farm demand during establishment (T DM/ha)

Red Clover

- Full sward reseed May 2023
- 3 applications of cattle slurry in 2024

  (2,000 gal/ac x3)
- No chemical fertiliser
- 36-hour wilting

Cut Date	Yield Bales /ac	DM%
10th May	5.7	33
26th Jun	5.4	25
14th Aug	4.9	30

Red Clover – Silage Quality

	DM%	ME	CP%	D-Value
1st cut	32.1	10.4	16.2	65.2
2nd cut	26.0	10.8	12.3	67.7
3rd cut	26.4	10.7	22.5	67.2

- 11 dairy bred beef animals were finished on red clover silage successfully.

- Plans to incorporate more red clover silage swards at the dairy centre for the dairy herd.

Farm walks on Red Clover taking place in early June

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High Output Dairy Systems: Profit from Performance

Conference

Tuesday 15th April 2025

Armagh City Hotel

AgriSearch NI

Driving Excellence & Innovation

High Output Dairy Systems – Profit from Performance

Time	Topic	Speaker
10.00	Registration & Tea / Coffee	
10.30	Welcome & Introduction	Prof. Gerry Boyle
Session 1 - Breeding, Fertility and Performance in High Output Systems Chair Mark Little		
10.45	Achieving High Output – How the Casey Farm System Works	Conor Casey
11.15	Dairy Breeding Strategy at Huddlestone Farm	Keith Gue
11.45	The high-yielding cow a metabolic athlete	Nial O'Boyle
12.15	Q&A with speakers	Chair: Mark Little
12.45	Lunch	
Session 2 - Optimising Animal Performance and Mineral Nutrition Chair Ian McCluggage		
1.45	Achieving High Output – How the Beckett Farm System Works	Claire Beckett
2.15	Optimising Mineral Nutrition in High Output Herds	Peter Bone
2.45	Q&A with speakers	Chair: Ian McCluggage
3.15	**Session 3 - High Output Herds – Future Research Needs** (All speakers in round table discussion)	Chair: Gary Thompson
3.35	Conference Close	Prof. Gerry Boyle

UK DAIRY Carbon Network

- Defra funded three-year project
- Bringing together farmers from across the UK to explore and implement practical solutions for reducing greenhouse gas emissions.
- AgriSearch are currently recruiting 20 dairy farms for the Northern Ireland farm network (56 across the UK in total)
- Applications are now open (closing on 31st March)
- Information webinar on 18th March
- Further information can be found on the AgriSearch website www.agrisearch.org

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