"Don't rush your drains!"

Drainage and rush control

FARM ADVISORY SERVICE

Kilmore Hall
1st February 2018

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Agenda

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- Chairman; Trevor Polley
- Guest speakers;
- Gavin Elrick
- Ewen Campbell
- Helen Bibby

- Thanks to Kilmore Village Hall
  and Glenfeochan Estate.

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Annual rainfall since 1910

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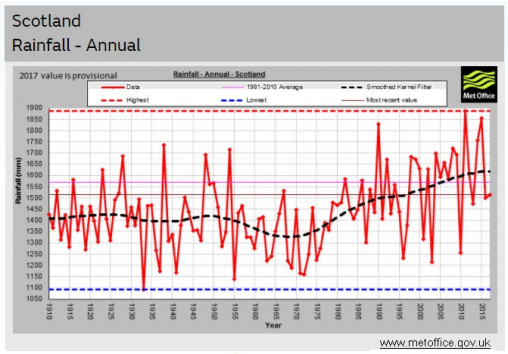

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Wet wet wet…

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Rushes

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Management of common or soft rush, *Juncus effusus*.

- Cool, wet climate
- Rhizome root system
- ~8,500 seeds/plant
- Seeds viable < 60 yrs.
- *effusus* means spreading
- Tolerate ph range 3 - 7

Agricultural value

- Little feed value
- 15% rushes in productive grass sward could reduce output by 1.25 t DM/ha/yr.
- Silage quality reduced (affects consolidation)
- Could affect payment region classification?

Key factors

- Low pH. (reduced competition from sward)
- Poaching
- Winter kill/gaps
- Too much slurry in winter
- No control of rush seed heads

Aim of control

- Improve productivity (more grass, more livestock)
- Improve/maintain wader habitat
- Reduce cost of grassland management (reseed & weed control)
- Pride

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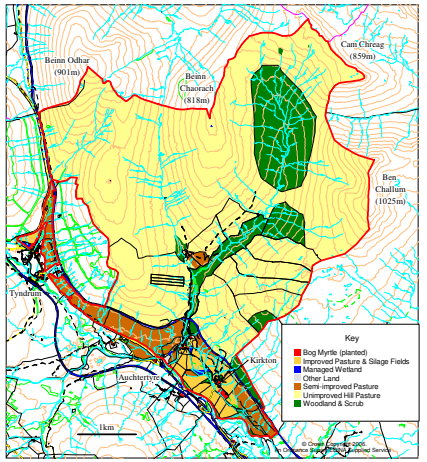
SRUC Hill & Mountain Research Centre

Kirkton & Auchtertyre Farms, Crianlarich, Perthshire

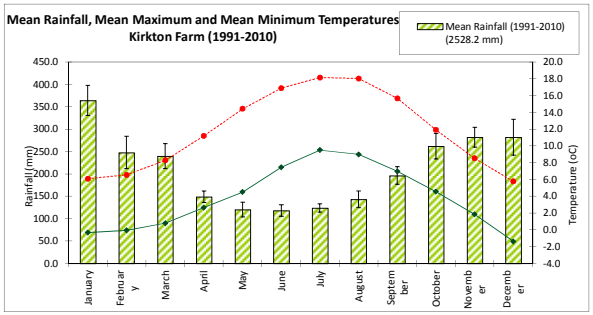
SRUC Hill & Mountain Research Centre



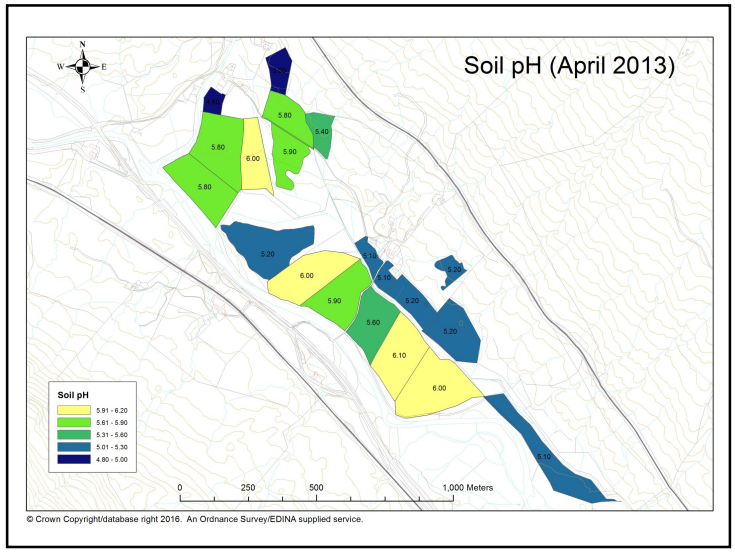
Land-use

- Total Area = 2225 ha
- 74 ha improved pasture
- 153 ha semi-improved pasture
- 1677 ha unimproved hill pasture (predominantly grassland)
- 307 ha woodland & scrub
- 1150 ewes (Scottish Black-face, Lleyn)
- Former RSS (water margin) and CPS (wetland, scrub, grassland management)
- Former LMC (footpath)

Climate



- Average rainfall at Kirkton over last 20 years was 2528mm, just under 100 inches.


Soil pH (April 2013)
Soil pH
5.91 - 6.20
5.61 - 5.90
5.31 - 5.60
5.01 - 5.30
4.80 - 5.00
0
250
500
1,000 Meters
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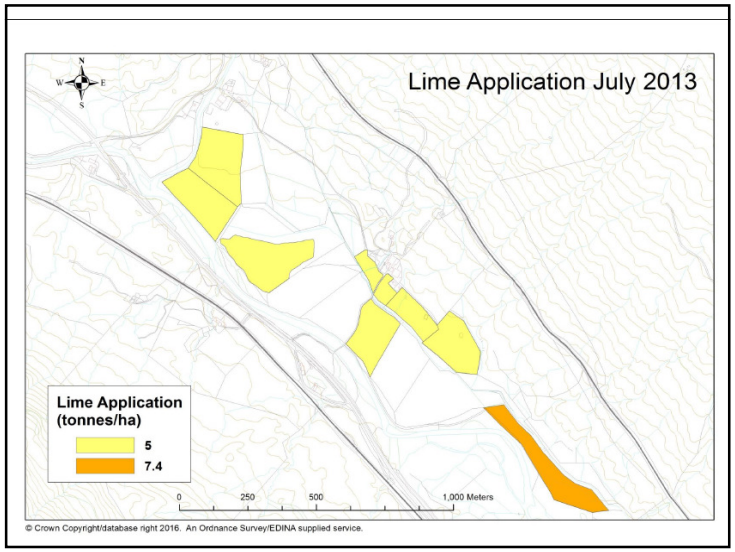
Lime Application July 2013
Lime Application (tonnes/ha)
5
7.4
0
250
500
1,000 Meters
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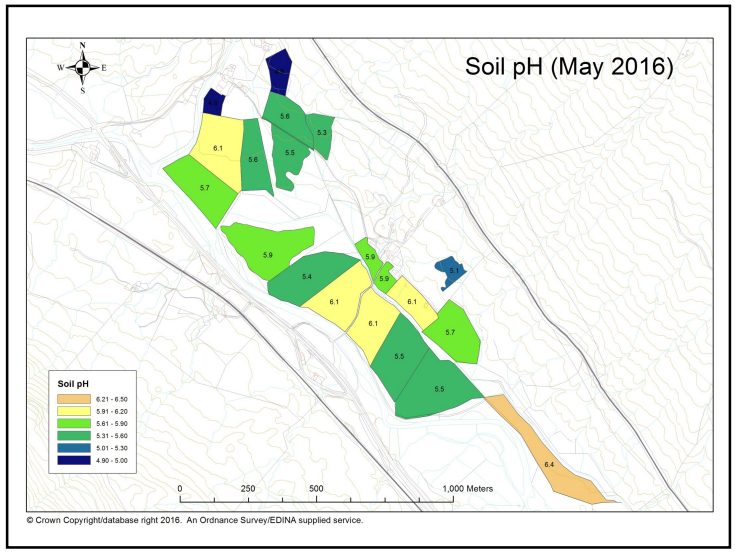
Soil pH (May 2016)
Soil pH
6.21 - 6.50
5.91 - 6.20
5.61 - 5.90
5.31 - 5.60
5.01 - 5.30
4.90 - 5.00
0
250
500
1,000 Meters
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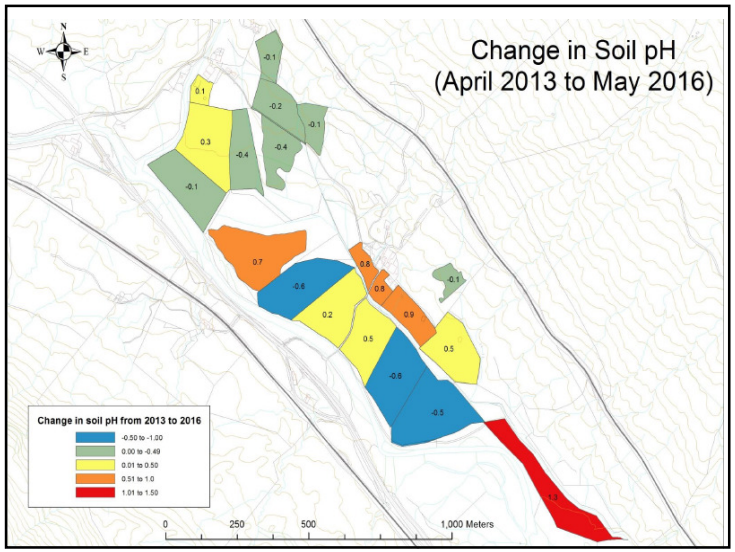
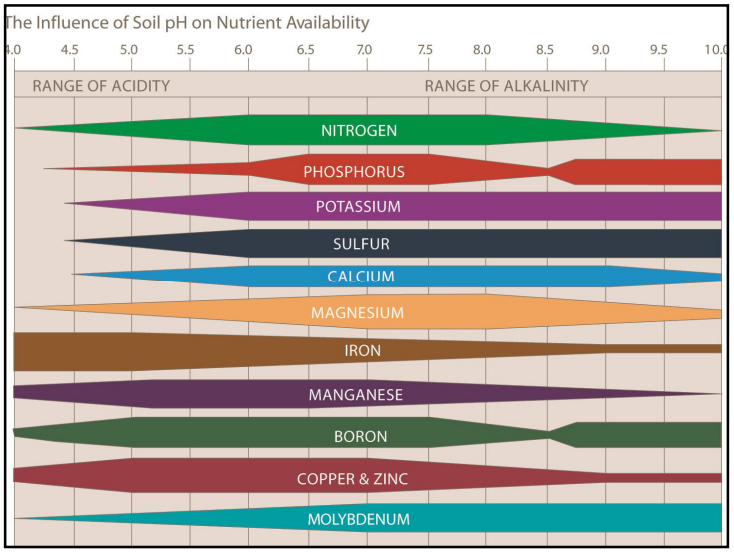

Change in Soil pH
(April 2013 to May 2016)
Change in soil pH from 2013 to 2016
-0.50 to -1.00
0.00 to -0.49
0.01 to 0.50
0.51 to 1.0
1.01 to 1.50
0
250
500
1,000 Meters

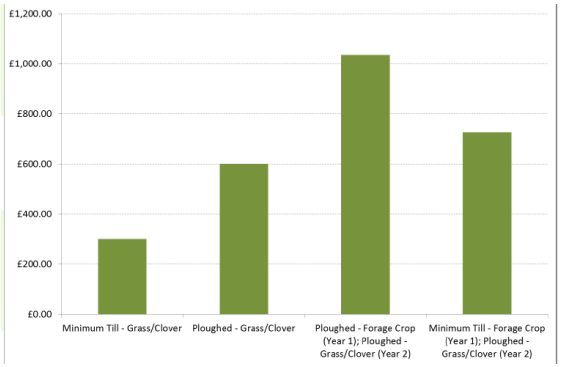


Soil pH

Field ID	Field Name	Area (ha)	Soil pH - April 2013	Lime application (tonnes/ha) - July 2013	Soil pH - May 2016	pH Change (2013-2016)	Lime application (tonnes/ha) - August 2016
1	McLeans (improved)	1.09	5.0		4.9	-0.1	5.0
2	Shed Field	0.57	4.8		4.9	0.1	
3	Upper March Park	2.01	5.8		5.6	-0.2	5.0
4	Re-seed	3.78	5.8	5.0	6.1	0.3	
5	4 Acre	2.25	6.0		5.6	-0.4	5.0
6	Lower March Park	1.98*	5.9		5.5	-0.4	5.0
7	Graveyard Park North	1.12*	5.4		5.3	-0.1	
8	8 Acre	3.28	5.8	5.0	5.7	-0.1	5.0
9	Auchtertyre Big Meadow	4.13	5.2	5.0	5.9	0.7	2.5
10	Woodside Park	3.63	6.0		5.4	-0.6	5.0
11	Office Field	0.68	5.1	5.0	5.9	0.8	
12	Ford Field	3.10	5.9		6.1	0.2	
13	Bungalow Field	0.54	5.1	5.0	5.9	0.8	
14	Roadside Field	2.79	5.6	5.0	6.1	0.5	
15	Bog Myrtle Field	1.63	5.2	5.0	6.1	0.9	
16	Stone Park	0.68*	5.2		5.1	-0.1	
17	Trials Field	3.56	6.1		5.5	-0.6	5.0
18	Hump Field	2.85	5.2	5.0	5.7	0.5	
19	Kirkton Big Meadow	4.42	6.0		5.5	-0.5	5.0**
20	Down East	3.58	5.1	7.4	6.4	1.3	

*Improved area only (i.e. area where lime and fertilizer could be applied)
**The southern half of the Kirkton Big Meadow had conventional ground limestone applied at 5.0 tonnes/ha while the northern half of the field had prilled lime applied at 0.36 tonnes/ha

Cost to establish new sward



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June 2012, 100 year storm

Other Management - Sward Lifting & Rush Control

FIELD NAME	YEAR	MANAGEMENT
Re-seed	2013	• Opico grassland sub-soiler/sward-lifter used to relieve compaction (northern half of field only)
Down East	2013	• Rush control using an ATV mounted Logic weed-wiper - glyphosate applied in spring 2013 during a spell of dry, warm and calm weather; ground lime applied in 2013 at 7.4 tonnes/ha (soil pH increased from 5.1 in 2013 to 6.4 in 2016). • Opico grassland sub-soiler/sward-lifter used to relieve compaction • Continued rush-control using a tractor mounted topper
Roadside Field	2014	• Opico grassland sub-soiler/sward-lifter used to relieve compaction
Auchtertyre Big Meadow	2014	• Opico grassland sub-soiler/sward-lifter used to relieve compaction
Gosdens	2015	• Rush-control using a tractor mounted topper (August 2015, October 2015 and May 2016). • Prilled lime applied in August 2015 at 350kg/ha

Rush Control

- Good organic, free-draining soil with no compaction issues and a pH of 5.5
- Rushes topped for the first time in August 2015
- Prilled lime applied at 350kg/ha in August 2015
- Rushes topped again in October 2015, and May 2016

Topper at work

Topped section, cut close to the ground

Chemical Control

Die-back of rushes following weed-wiping with glyphosate

- ATV mounted Logic weed-wiper was used on another rush infested pasture
- Weed-wiped with glyphosate in spring 2013, during a spell of dry, warm and calm weather
- Weed wiping was very successful
- Lime applied in 2013 at 7.4 tonnes/ha (Soil pH increased from 5.1 in 2013 to 6.4 in 2016)
- Grass-Clover 'rejuvenator' mix stitched into the existing sward with a Moore Uni-drill in 2013
- Sward lifter used to relieve compaction
- Silage taken from this field in July 2016
- Rushes beginning to appear again

Summary of management options

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- Reduce conditions suitable for rushes and increase vigour & competition from grass
- Ditches & drainage
- Lime
- Phosphate & potash
- Topping

Chemical

- Weed wiper – Glyphosate
- Spray – MCPA, 2,4-D

- Operator needs certificate of competence
- Pesticide storage & records

Weed wiper

- Low volume of herbicide used
- Inexpensive glyphosate (while available)
- Targets tall vegetation and avoids aquatic & non-target sward
- Can be towed by ATV/Quad
- No spray drift
- Broad weather window for use.

Mowing

- Management to prevent rushes getting too dense and some sward retained.
- Mow twice. May/June before rush seeds & again in 4 – 8 weeks, however;
- Ground nesting birds, 1st Aug >
- Flail mower breaks up rushes.
- Disc/drum leaves a mulch.
- Winter bedding?

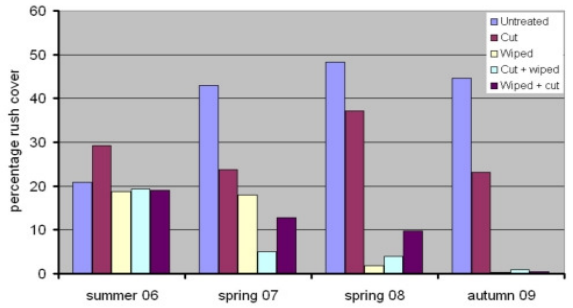
Cutting/wiping combinations?

- AFBI* (Fermanagh) experimented with cutting/wiping combinations;

1. Untreated control
2. Cutting mid-May
3. Weed-wipe mid-May
4. Cutting (May) & weed-wipe mid-July
5. Weed-wipe (May) & cut mid-July

* Ref: Weed-wiper - a very effective tool for rush control (2010) P Mercer, J Morgan, M Flexen. Agri-Food & Biosciences Institute

Cutting/wiping combinations?



Result

- Annual weed-wiping gave good control
- Mowing had little lasting control
- Cutting/wiping combos *detrimental* to sward.
  After mowing the wiper boom needed to be lowered to make contact with the new, shorter rush growth and also made contact with taller sward. This caused bare patches which were taken over by moss.
- So only mow if rushes too tall & dense to wipe
- Otherwise wasting time, effort, fuel.

Cost effectiveness

- BASIS project (2015) measuring efficiency of long-term control;

	Work rate ha/hr	Labour cost/ha	Chemical cost /ha	Cost/ha	Efficiency	Actual cost/ha control
Mowing	1.6	9.38	0	9.38	0.05	187.50
Wiping	2	7.50	6.6	14.10	0.75	18.80
Spray	4.2	3.57	11.34	14.91	0.8	18.64

- 2015 rates. Labour @ £15/hr. Fuel & machinery costs not included

Other considerations

- Deep ploughing (30 – 35 cm) (bury the seeds deep. Depth of soil & plough set-up right. Seeds viable 60 years)
- Oversowing i.e. not creating a rush seedbed
- Reseed – new grass varieties
- Follow-up with good grassland/grazing management
- Manage for biodiversity

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Thank You

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