Saxifraga hirculus in Scotland

Aline Finger, Royal Botanic Garden Edinburgh

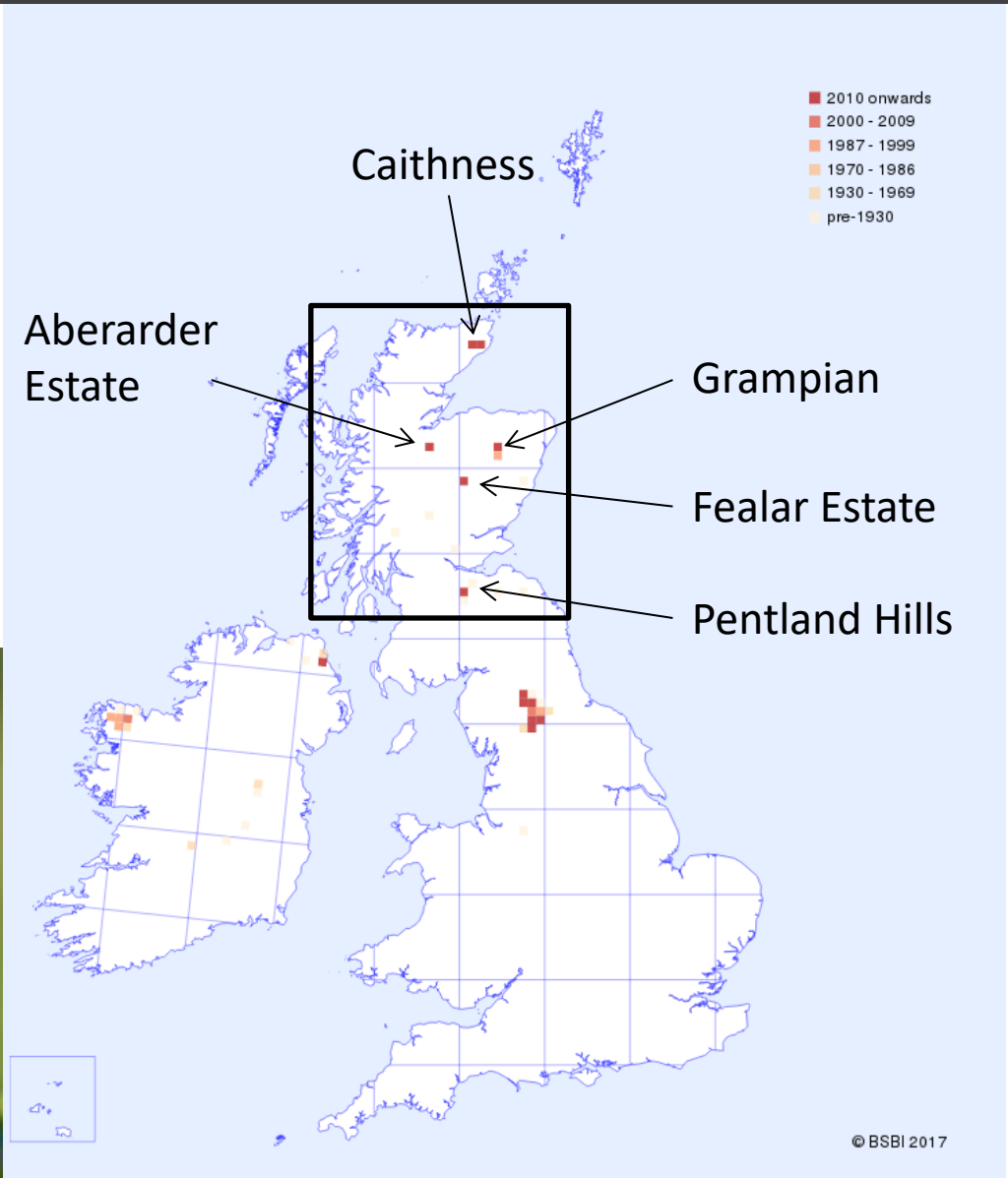
Royal Botanic Garden Edinburgh

Scottish Natural Heritage
Dualchas Nàdair na h-Alba
All of nature for all of Scotland
Nàdar air fad airson Alba air fad

Distribution and ecology

Scotland

- 5 known areas
- 17 populations
- Formerly near sea level
- Present: 300-650m



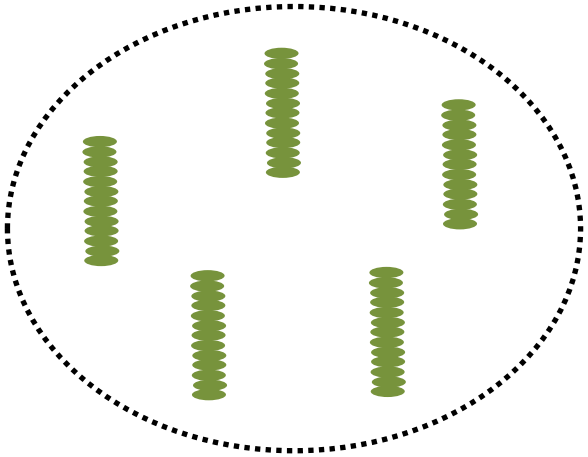
How much clonal reproduction?

Saxifraga hirculus

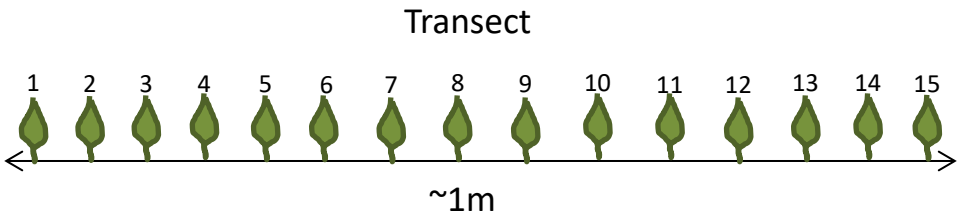
- Perennial
- 5-30cm
- Insect pollinated
- Wet, base-rich flushes and mires
- Strong declines up to 1930

Methods

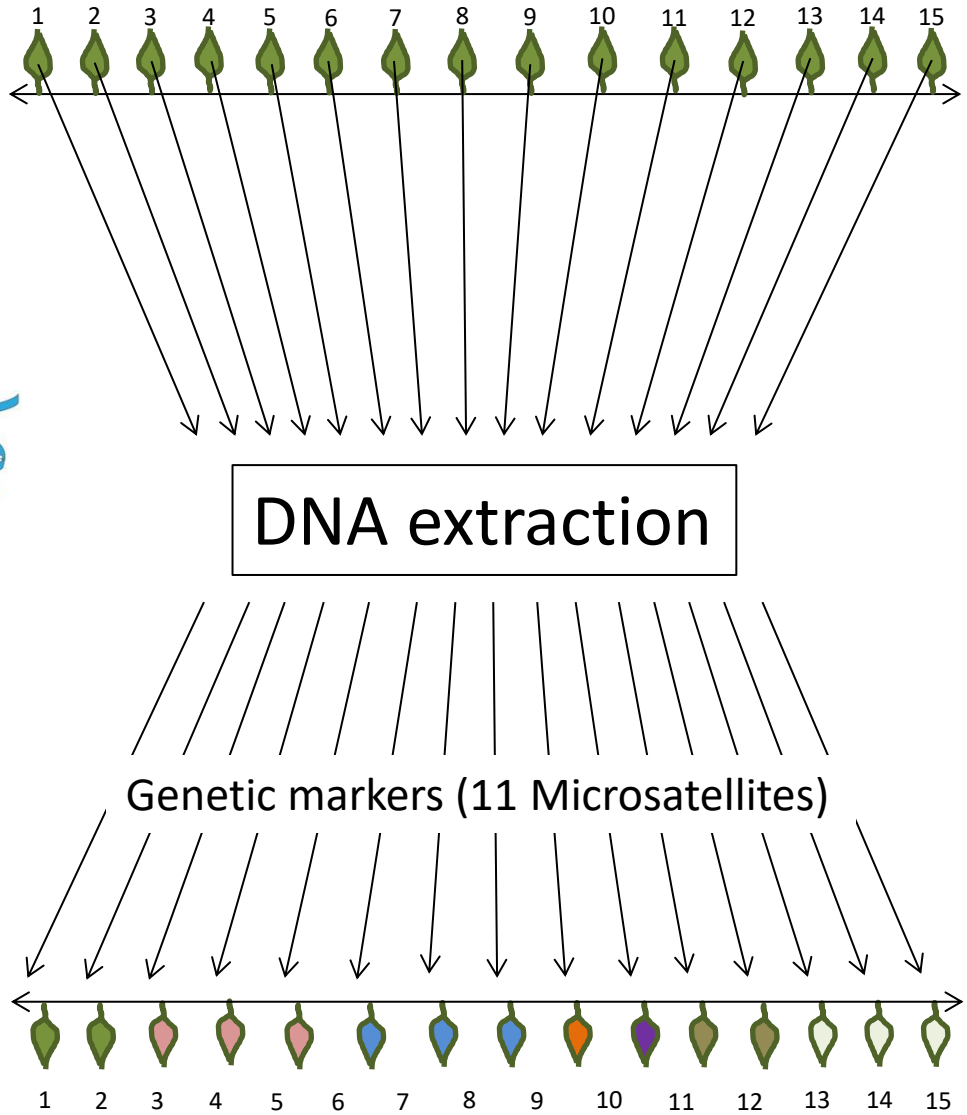
- In each populations leaves have been samples along transects distributed as evenly as possible.

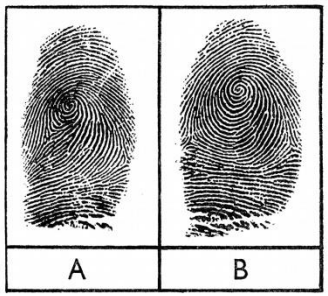


- Each transect was about 1m long and 15 leaves have been sampled at 5-10cm intervals.

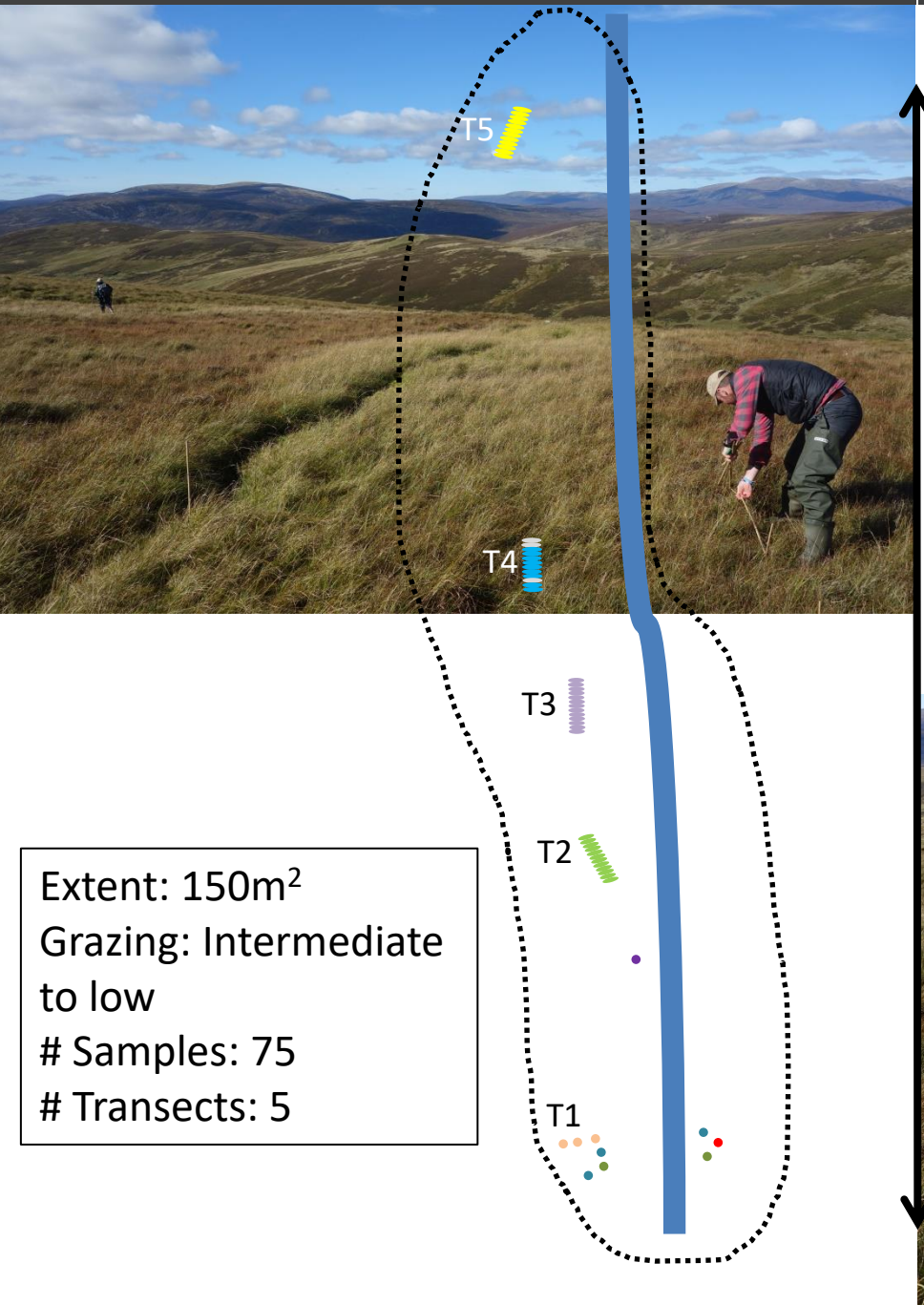


Methods


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
DNA extraction
Genetic markers (11 Microsatellites)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Genetic Fingerprinting


A
B

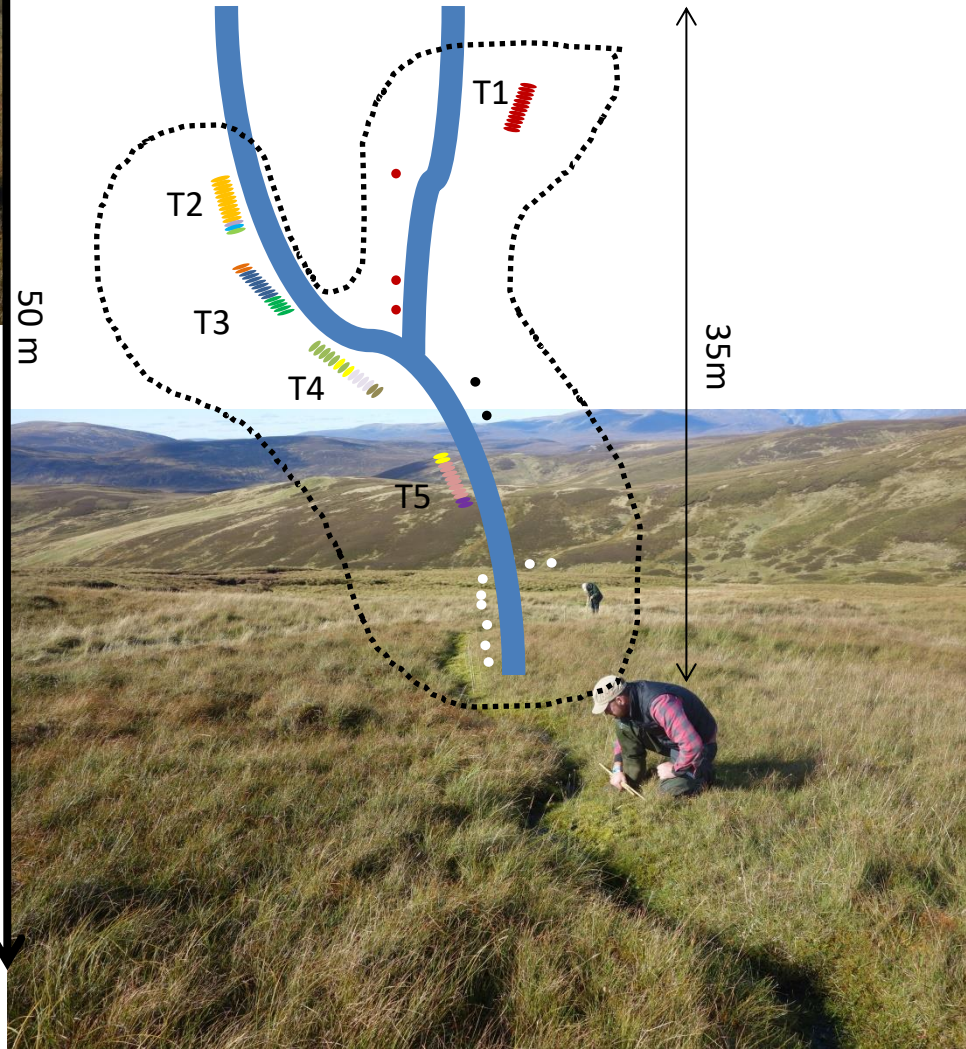
Fealar Estate: Flush 1



Extent: 150m^2
Grazing: Intermediate to low
Samples: 75
Transects: 5

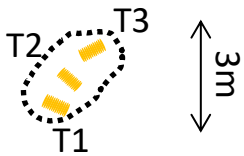
Fealar Estate: Flush 2

Extent: 120m^2
Grazing: Intermediate to low
Samples: 90
Transects: 5

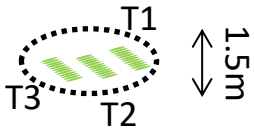


Pentland Hills: 1.1 Flush A

Extent: 9m^2
Grazing: Intermediate to strong
Samples: 52
Transects: 3

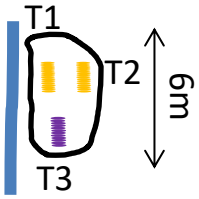


Pentland Hills: 1.5 Flush E



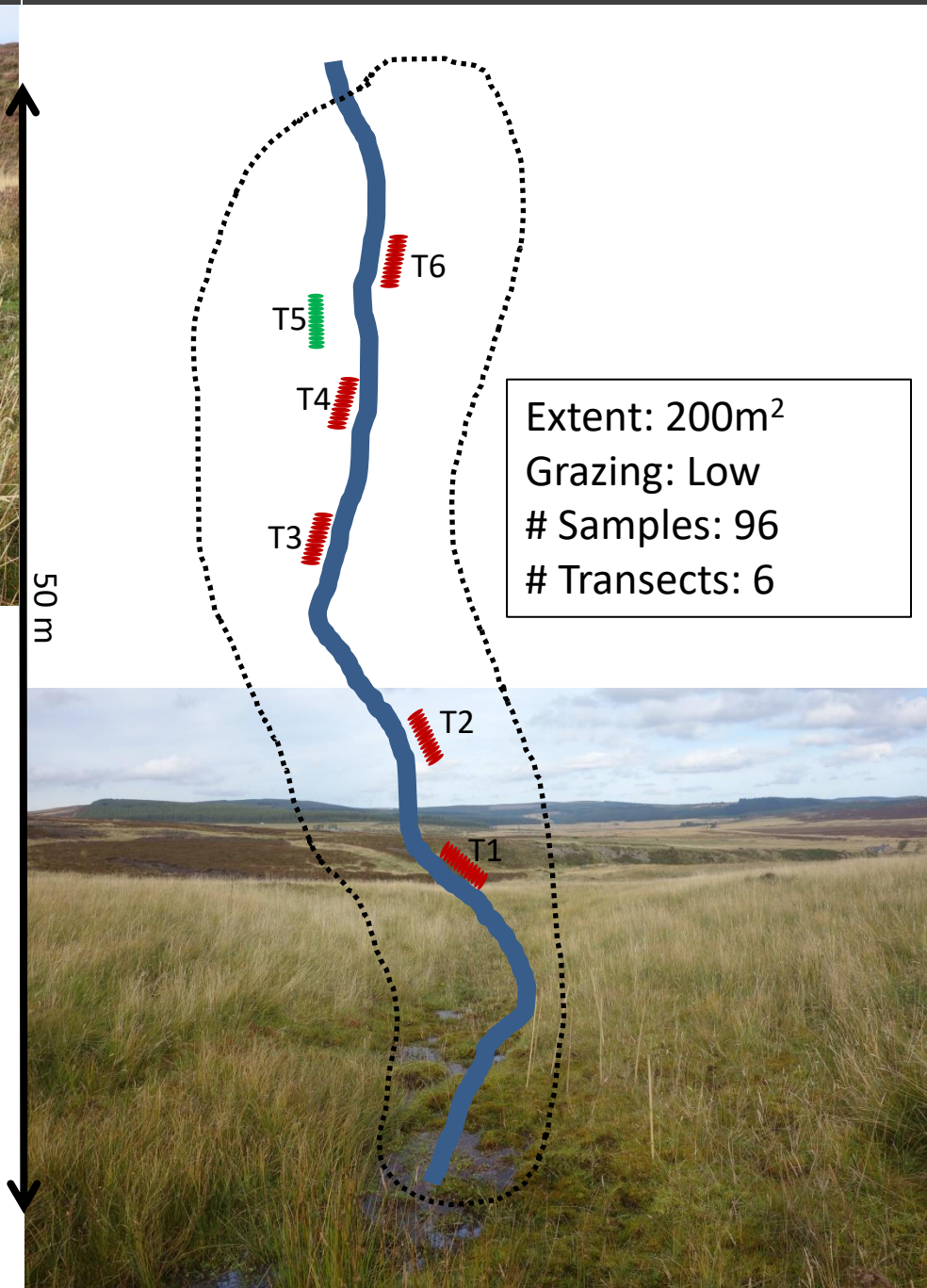
Extent: 4m^2
Grazing: Intermediate
Samples: 36
Transects: 3

Grampian: Cabrach



Extent: 6m^2
Grazing: Low
Samples: 45
Transects: 3

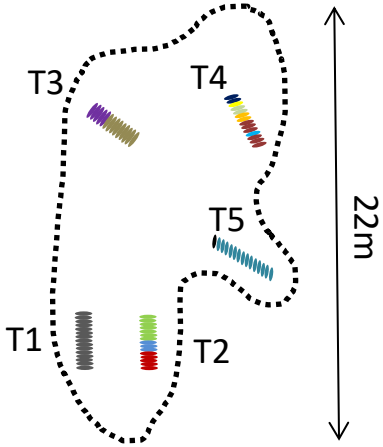
Grampian: Silverford



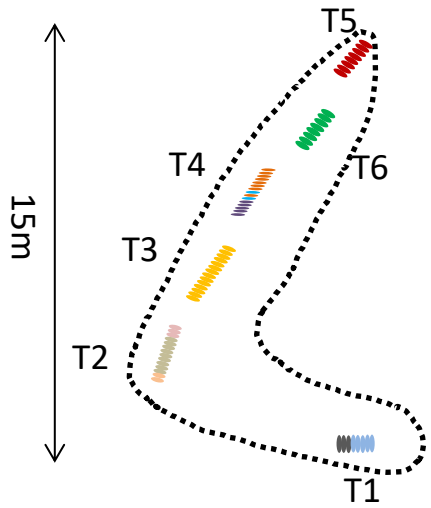
Extent: 200m^2
Grazing: Low
Samples: 96
Transects: 6

Caithness: 5.1 Munsary main colony

Extent: 175m^2
Grazing: Intermediate
Samples: 75
Transects: 5



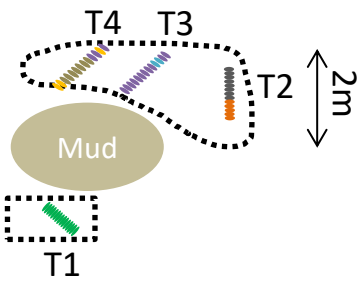
Caithness: 5.2 Munsary



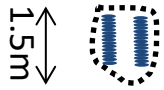
Extent: 45m^2
Grazing: Low
Samples: 75
Transects: 6

Caithness: 5.3 Munsary

Extent: 15m^2
Grazing: Strong
Samples: 60
Transects: 4



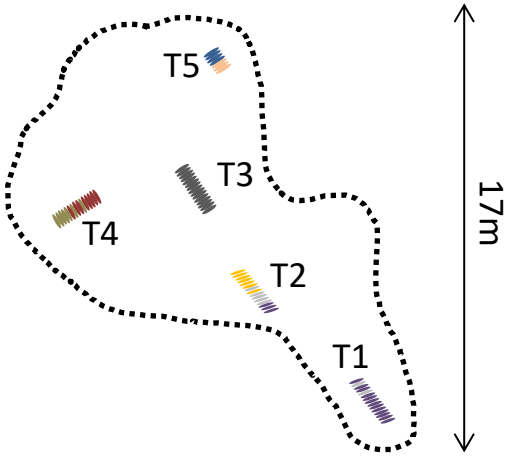
Caithness: 5.4 Munsary



Extent: 2m^2
Grazing: Strong
Samples: 30
Transects: 2

Aberarder: 4. Monoliath 1

Extent: 150m^2
Grazing: Strong
Samples: 81
Transects: 5



Results

Region	Population	Population size (m2)	# Transects	# Samples	# Genotypes	# Genotypes per transect
Pentlands	Flush A	9	4	51	1	1
	Flush E	4	3	33	1	1
	All			**84**	**2**	**1**
Fealar	Fealar 1	150	5	54	8	1.75
	Fealar 2	120	5	67	25	3.20
	All			**121**	**33**	**2.48**
Grampian	Cabrach	6	3	42	2	1
	Silverford	200	6	83	2	1
	All			**125**	**4**	**1**
Caithness	Munsary 1	175	5	74	15	3
	Munsary 2	45	6	67	12	2.17
	Munsary 3	15	4	57	10	2.75
	Munsary 4	2	2	30	1	1
	Loch Ruard 1	120	5	75	3	1
	Loch Ruard 2	25	3	41	8	2.67
	Loch Ruard 3	30	3	44	2	1
	All			**388**	**51**	**1.94**
Monoliath	Aberarder 1	150	5	67	9	2.2
	Aberarder 2	10	3	n/a	n/a	n/a
	All			**67**	**9**	**2.2**
	All			**785**	**99**	**1.77**

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Summary

- Clonal reproduction is high in Scottish *Saxifraga hirculus* populations
- Population size is not necessarily the best proxy to predict genotype diversity
- Even some small populations have high diversity and are thus important for conservation

Open questions

1. Why has the species declined?
2. What does the future look like?
3. How important is grazing and its control for conservation

Scottish Natural Heritage
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All of nature for all of Scotland
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Royal Botanic Garden Edinburgh

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Thanks!