

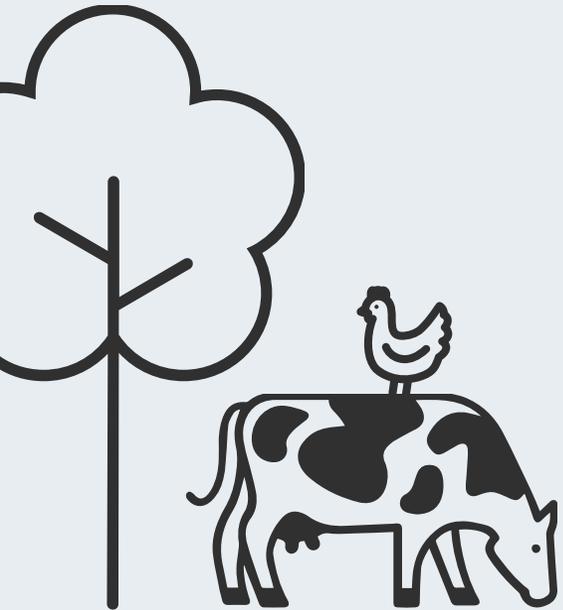


MIXED

EFFICIENT AND RESILIENT
MIXED FARMING & AGROFORESTRY

Sheep grazing winter cereals: impact on crop production

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David Lawson, Christine Watson



2.4a sheep grazing winter cereals
Network Theme 1
NW Europe



2.4b animal welfare and
environmental impact of
pigs/willow
Network Theme 1
N Europe



2.4c Conservation
agriculture in Agro-
forest-pastoral systems
Network Theme 2
SW Europe

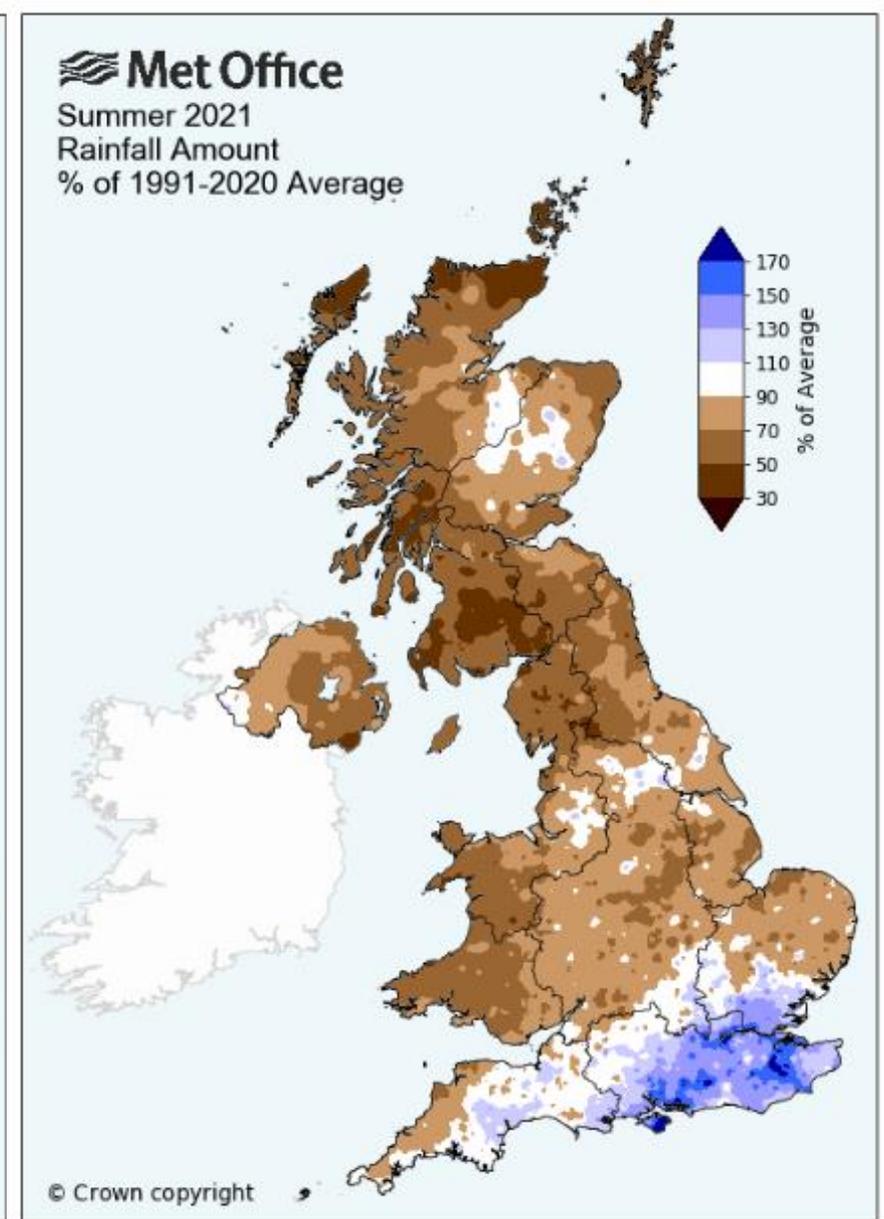
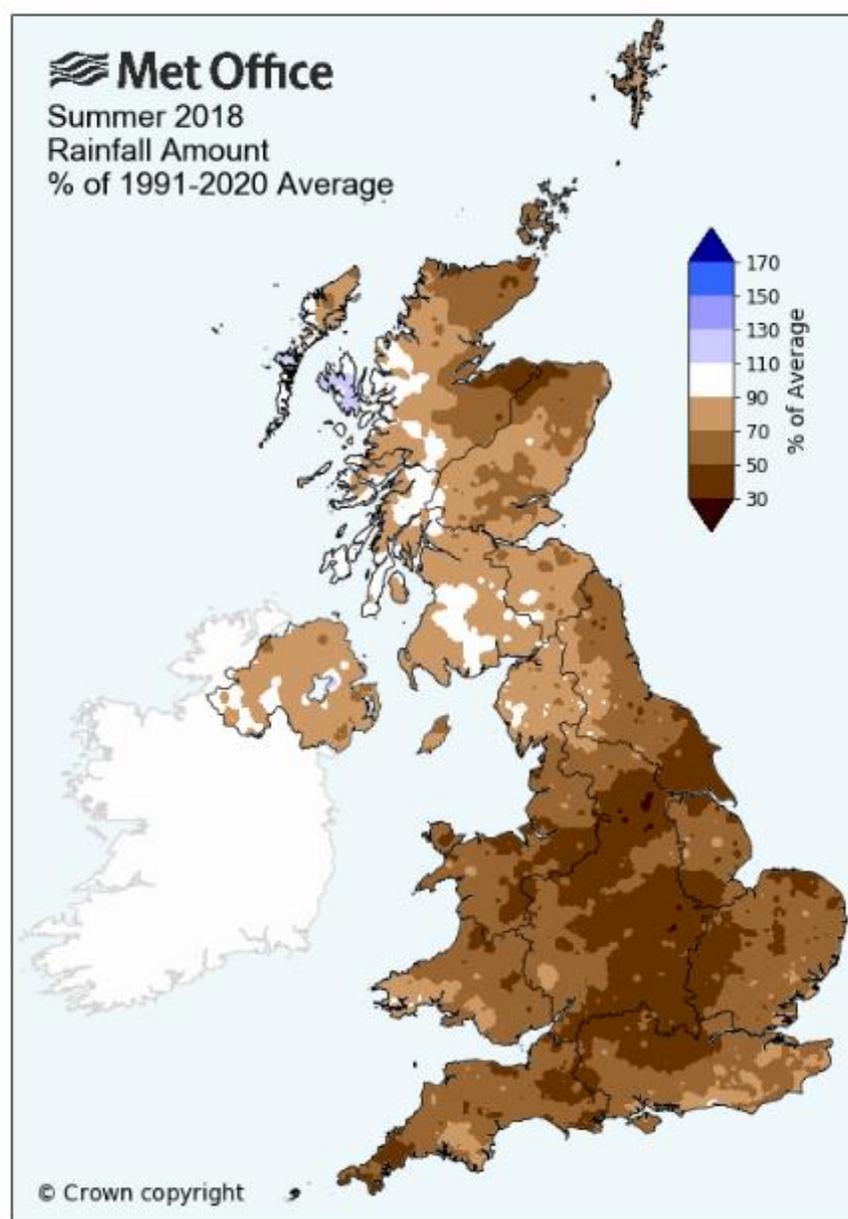


2.4d Impact of
hedgerows on arable
productivity
Network Theme 3
E Europe



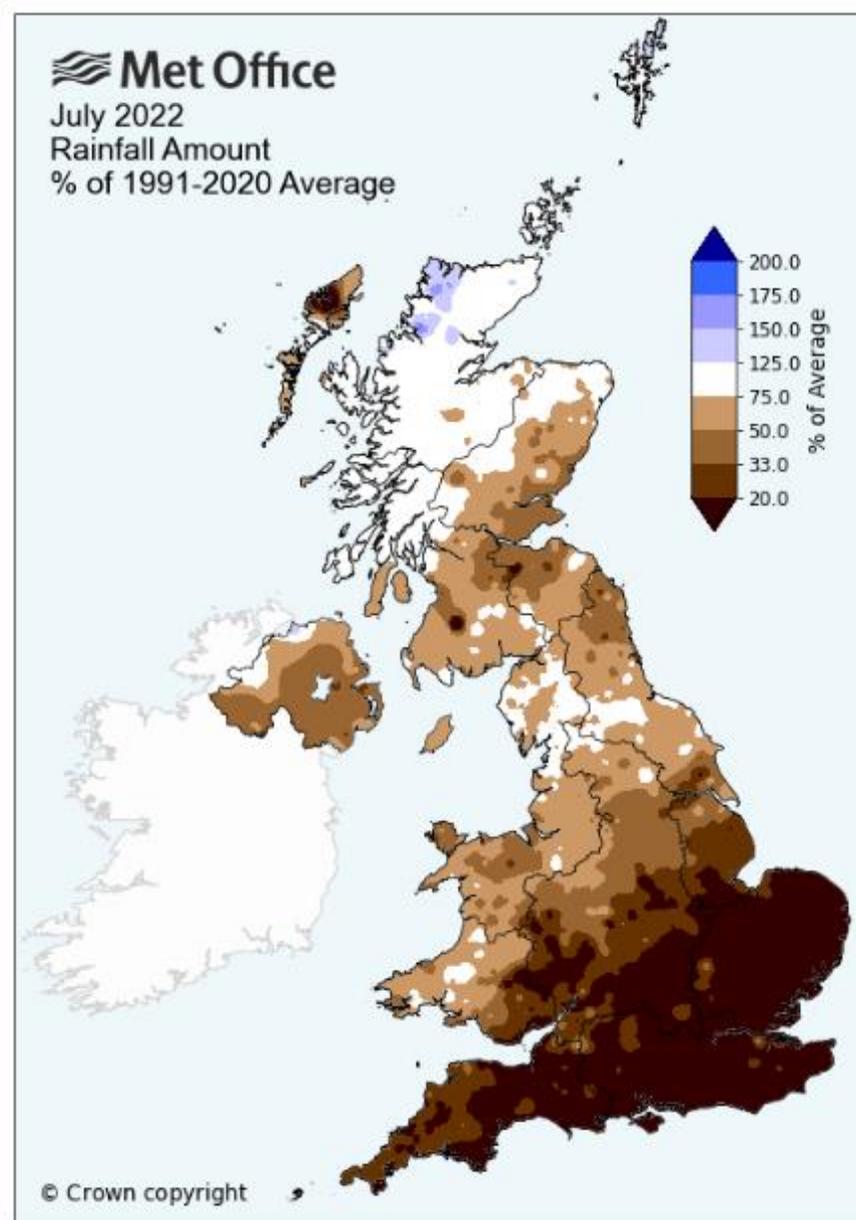
Background

- Forage shortage
- Grazing winter cereals



Background

- Forage shortage
- Grazing winter cereals



Sheep grazing winter cereals for winter fodder and soil quality



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- **Hypothesis:** Grazing of winter cereals can provide a valuable late winter feed source for ruminants, as well as maintain acceptable grain and straw yields



Location of experiment in Scotland



UK

maproom.net



**Aberdeen
(experimental
location)**

Edinburgh



MIXED
FARMING &
AGROFORESTRY SYSTEMS

ing from the
research and
innovation programme under grant agreement
No 862357



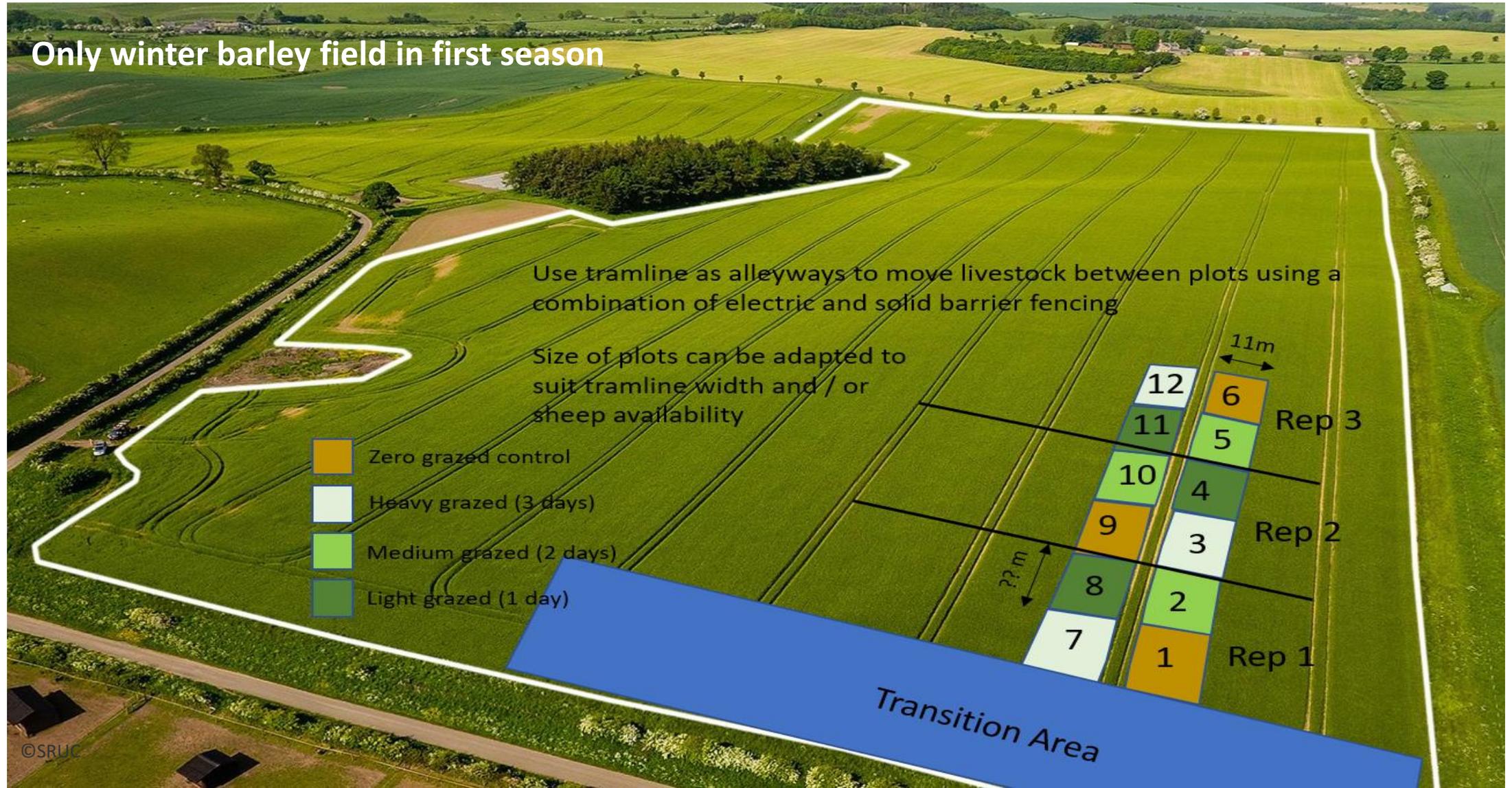


Winter Grazing of Cereals

- Biomass
 - days grazing
 - feed value
- Crop
 - Production
 - Yield
 - Quality
- Soil

Replicated plot grazing experiment (schematic)

Only winter barley field in first season



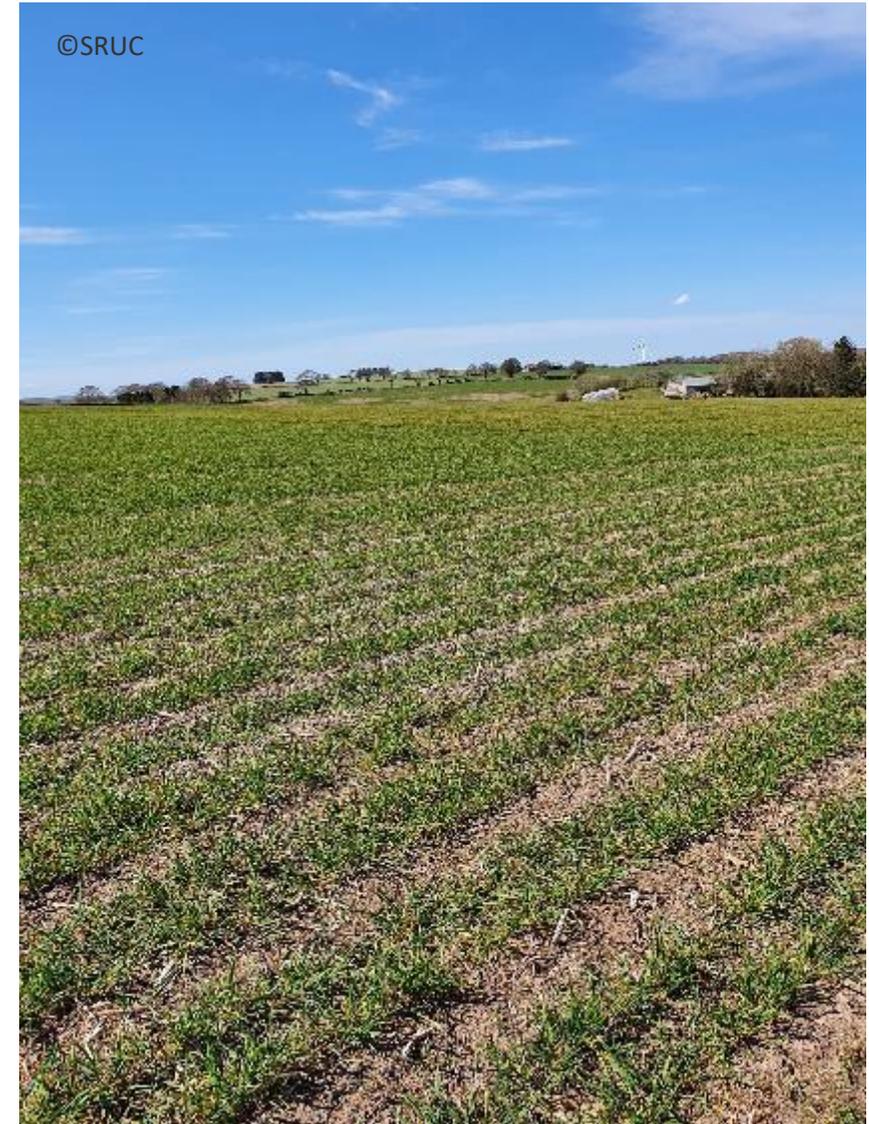
Experiment

2020/2021

- Winter barley & winter wheat
 - Biomass and feed quality assessed
- Winter barley – grazed & yield information

2021/2022

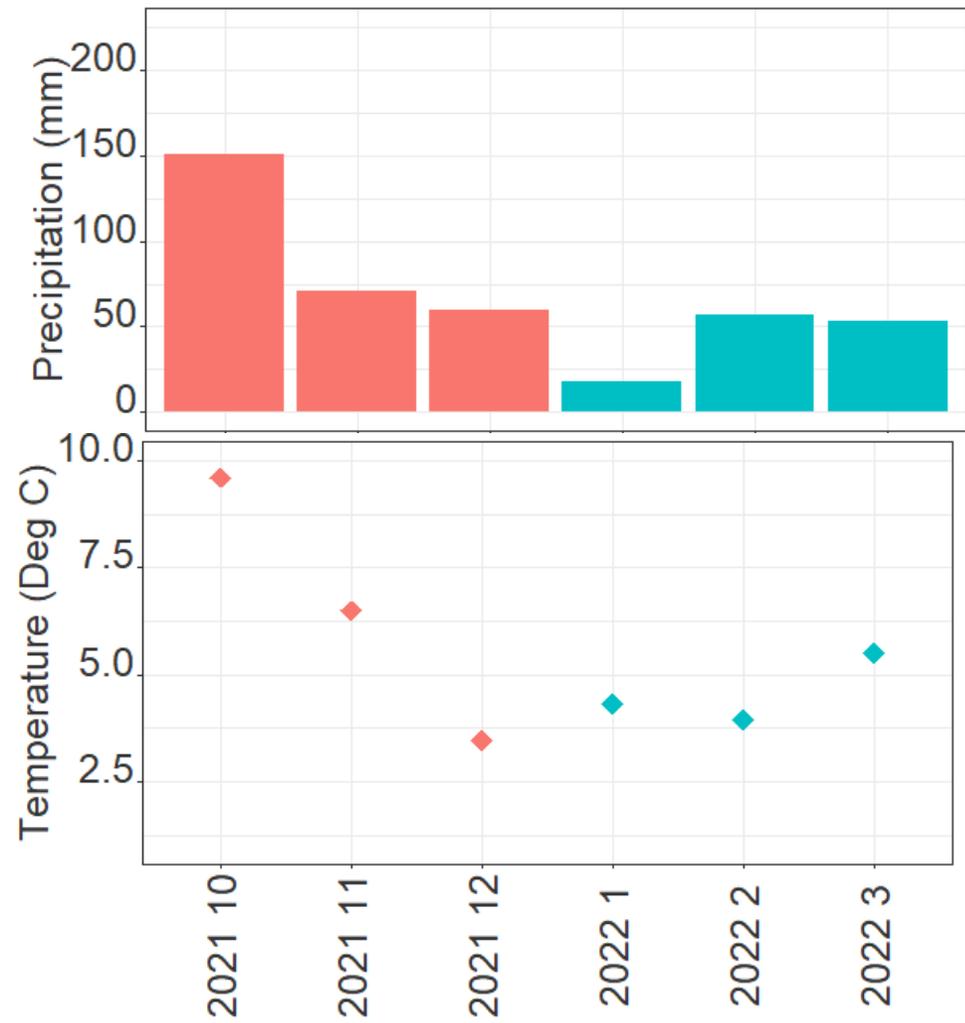
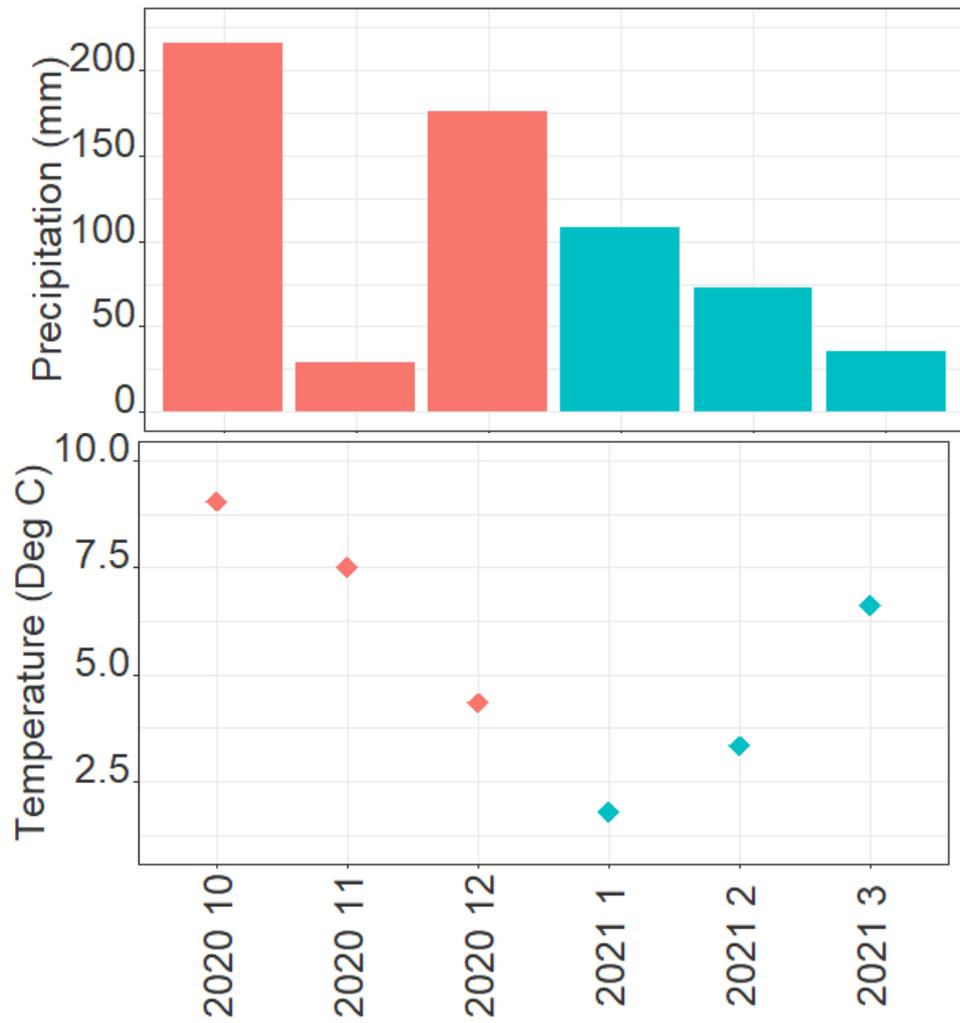
- Winter wheat
 - biomass



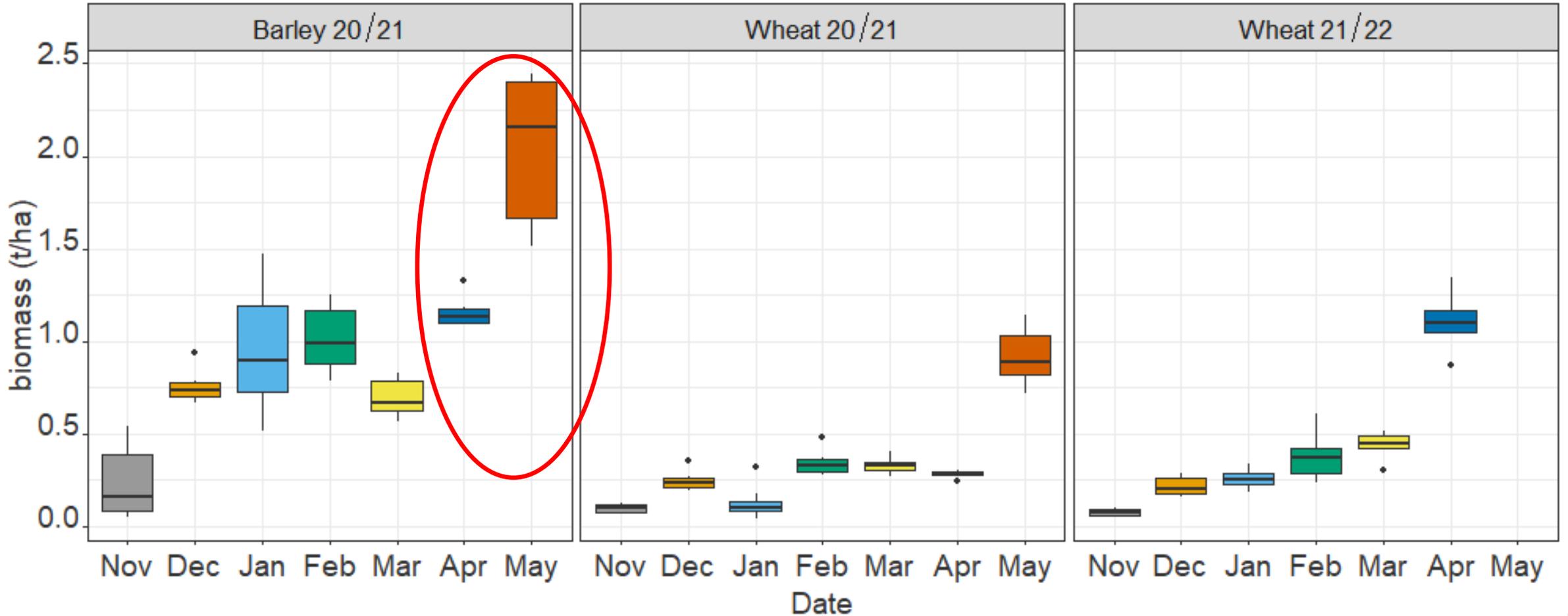
Winter Barley Grazing Experiment - Grazed mid March

- Plot areas calculated to allow grazing for 5 sheep for 3 days maximum
 - Based on a 70kg sheep and DM intake of 1.1kg / day
- 3 day grazed treatment not done as insufficient forage
- Agronomy of the whole field – including trial area – the same

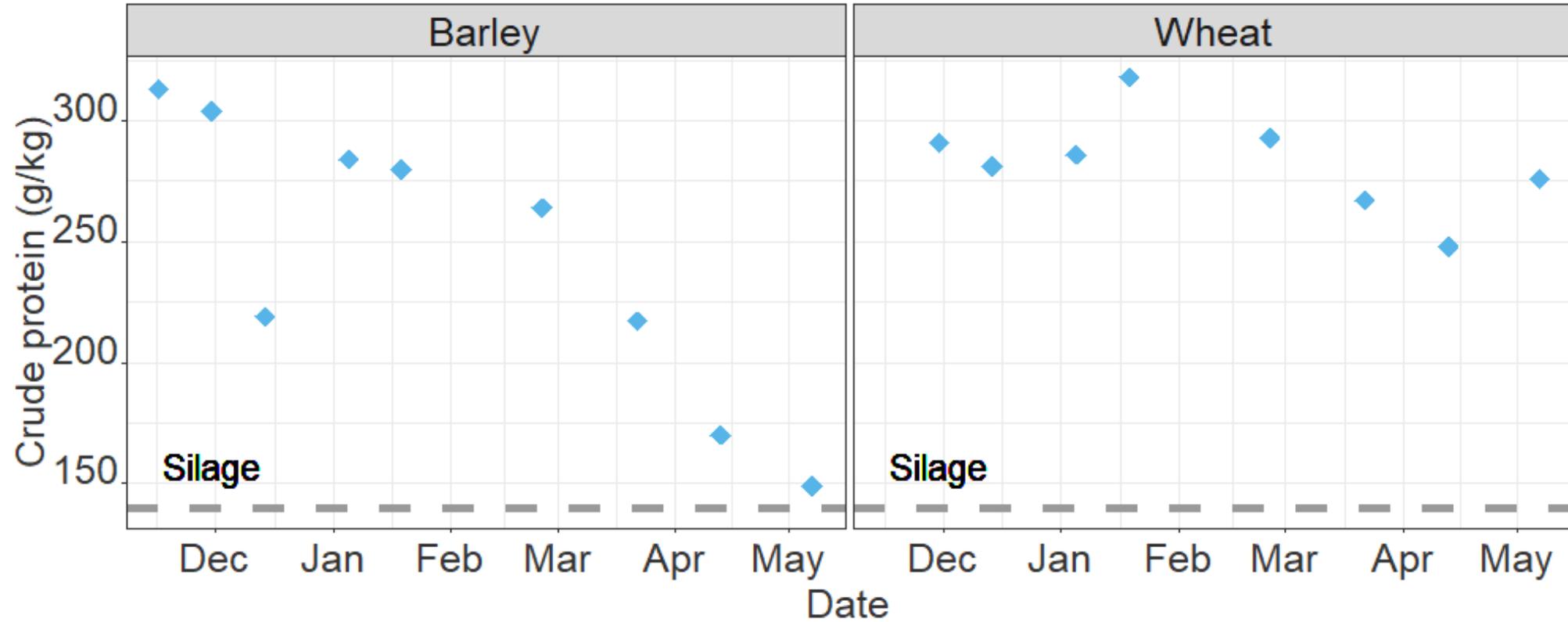




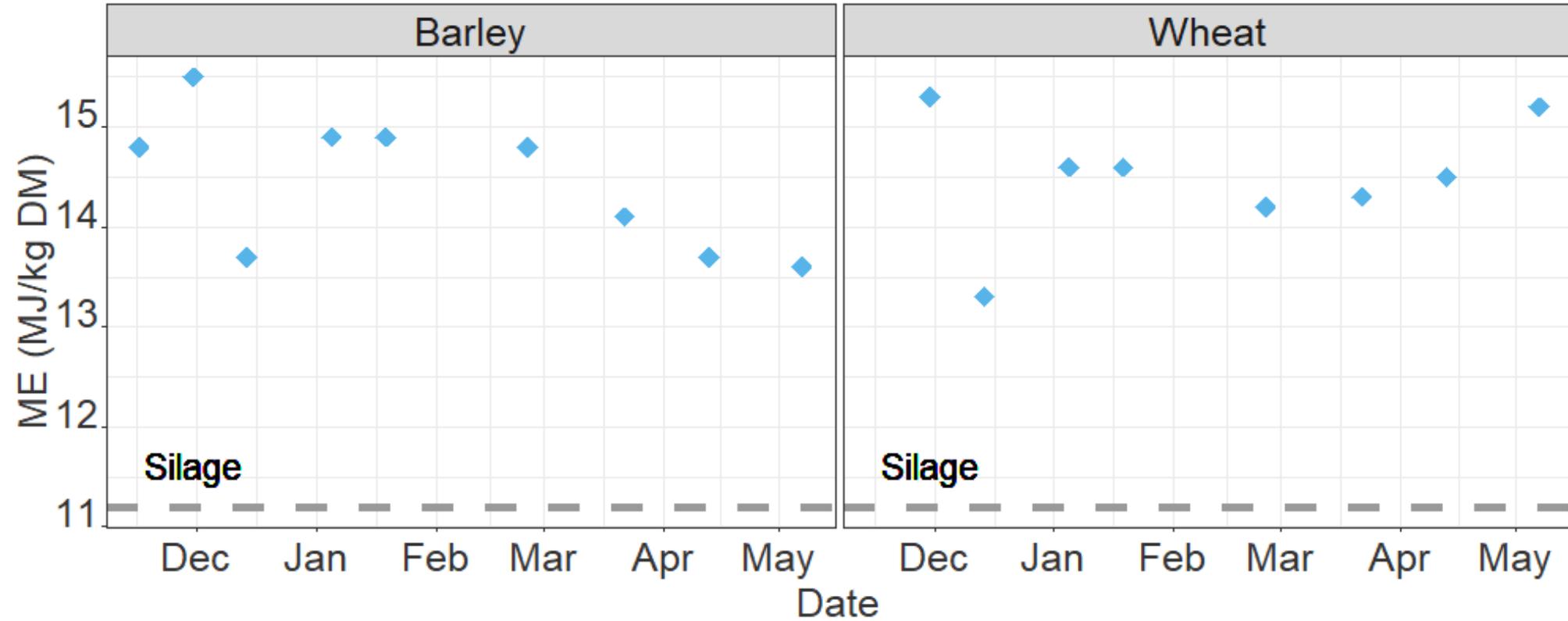
Biomass availability



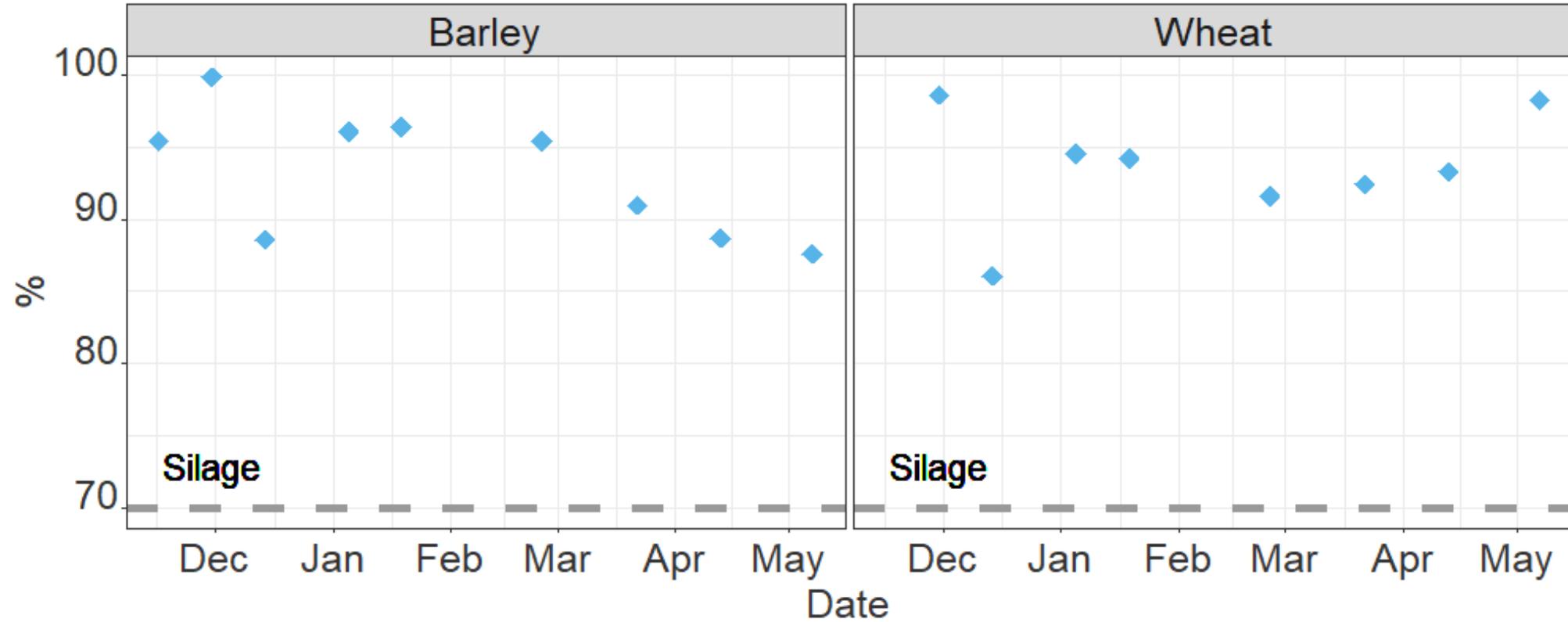
Feed Value – Crude Protein



Feed Value – ME



Feed Value – D Value



17 March



Zero

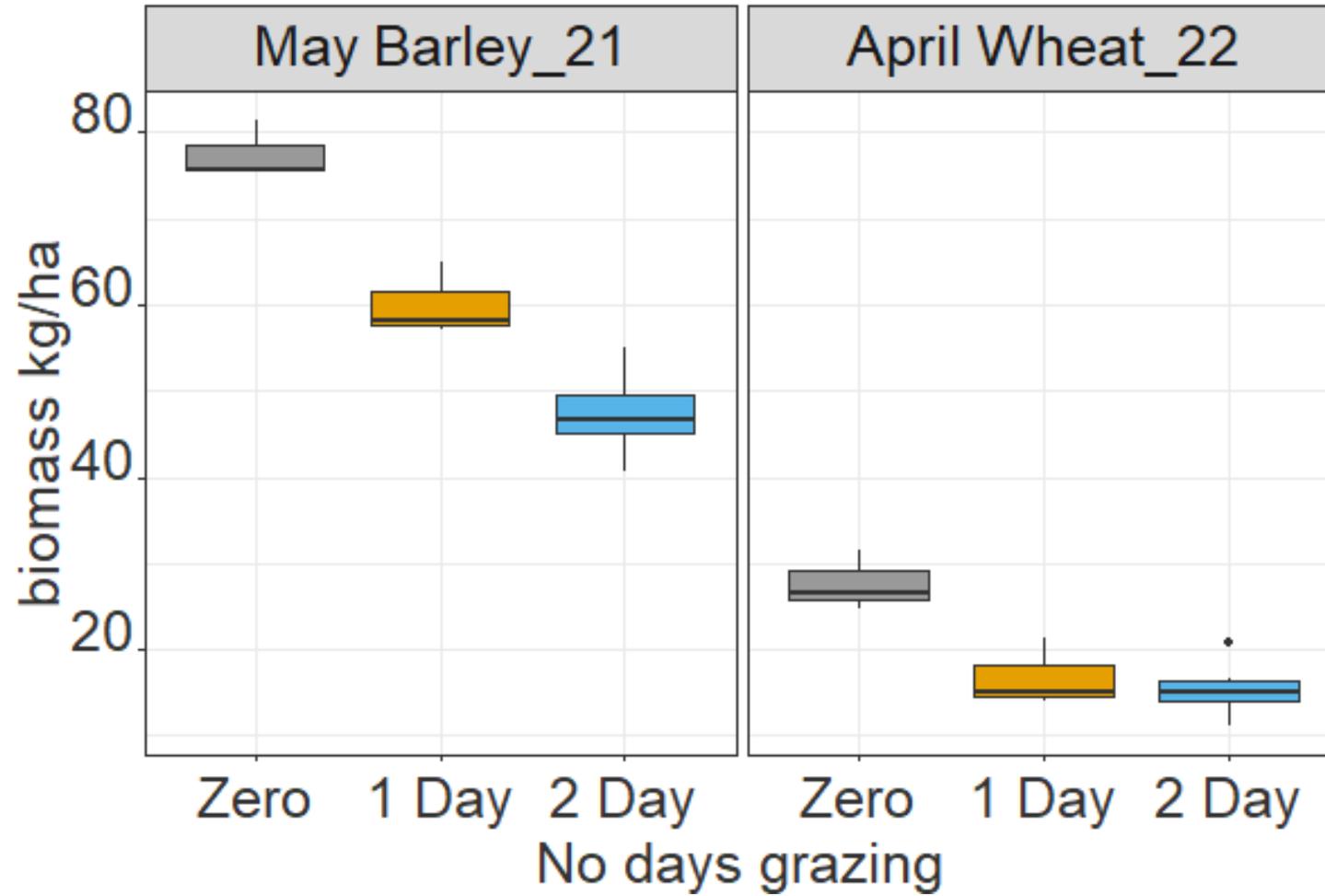


1 day

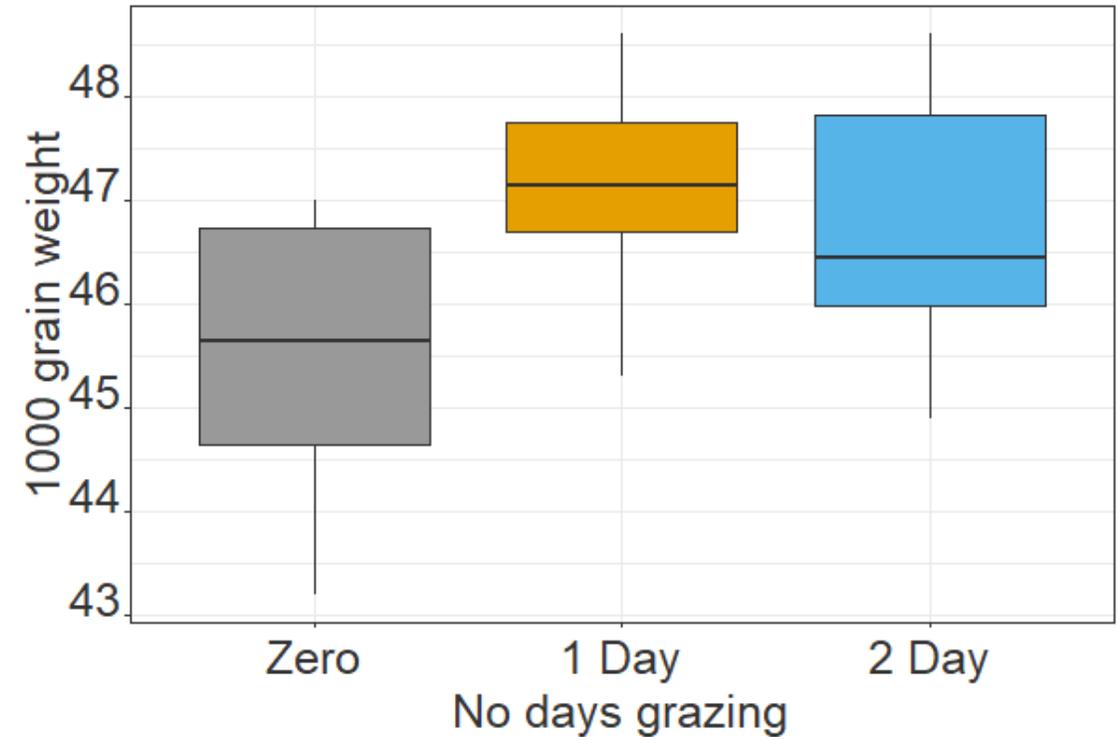
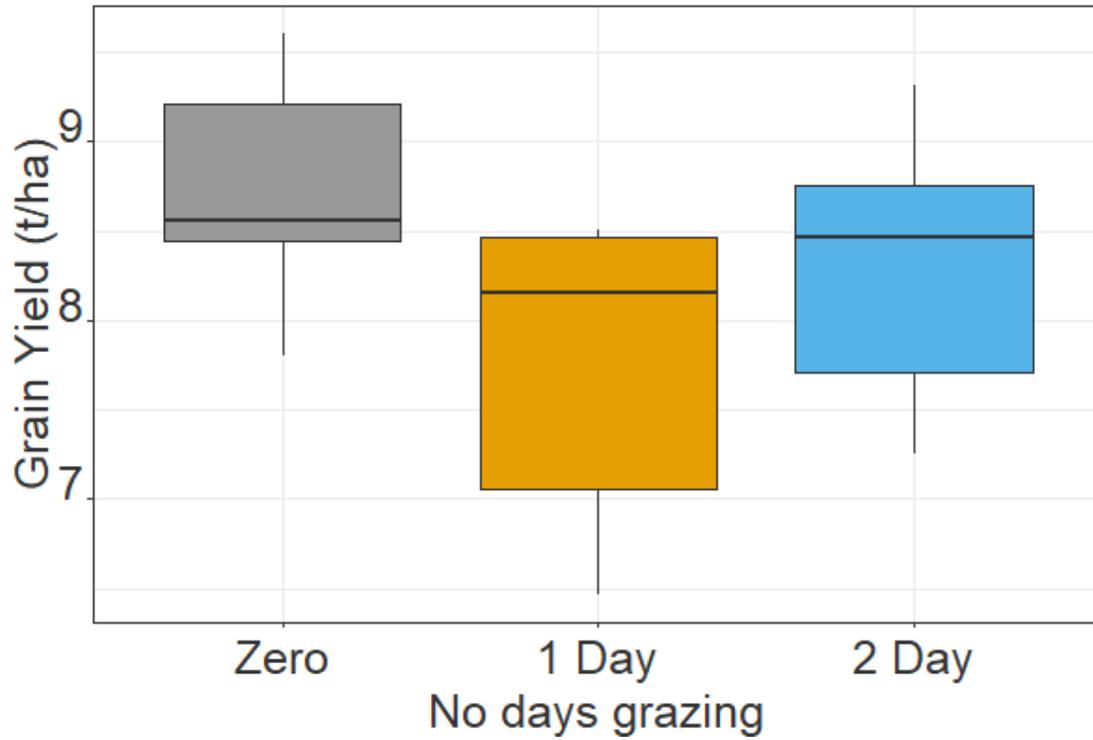


2 day

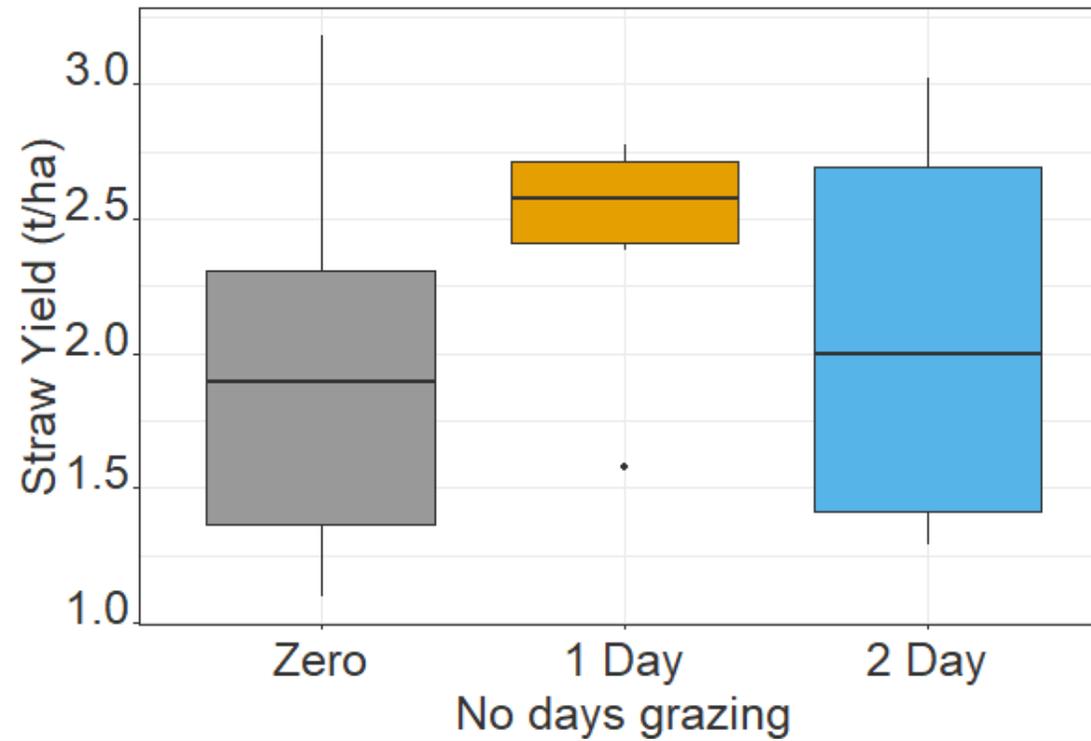
Biomass after grazing



Impact on yield Winter barley 2021



Impact on yield Winter barley 2021



Assessment of crop & soil post grazing

- No clear influence on tillering, disease and weed pressure, key developmental dates
- No clear influence on soil “health” after harvest
- e.g. VESS, worms

Structure quality	Size and appearance of aggregates	Visual porosity and roots	Appearance after break-up: various soils	Appearance after break-up: same soil different stage	Classifying feature	Appearance and description of natural or reduced fragment of 10 cm diameter
Soil Fraine Aggregates readily crumble with fingers	Mostly $1-5$ mm after clumping	Highly porous Roots throughout the soil			Fine aggregate	1.00 The action of breaking the block is enough to reveal them. Large aggregates are composed of smaller ones, held by roots.
Soil Inflat Aggregates easy to break with one hand	A mixture of porous, rounded aggregates from 2mm to 7 mm. Fat clasts present	Most aggregates are porous Roots throughout the soil			High aggregate porosity	2.00 Aggregates when shattered are rounded, very fragile, crumble very easily and are highly porous.
Soil Fine Most aggregates break with one hand	A mixture of porous aggregates from 2mm to 10 mm. Less than 50% are $1-5$ mm. Some angular non-porous aggregate (stone) may be present	Macropores and cracks present Porosity and roots both within aggregates			Low aggregate porosity	4.00 Aggregate fragments are easy to obtain. They have low visible porosity and are rounded. Roots usually grow through the aggregates.
Soil Compact Requires considerable effort to break aggregates with one hand	Mostly large > 10 mm and sub-angular non-porous. Macroscopically also porous, less than 30% are $1-7$ mm	Few macropores and cracks All roots are clustered in macropores and around aggregates			Clotted structure	5.00 Aggregate fragments are less to obtain when soil is wet. In some shapes which are very sharp-edged and show cracks internally.
Soil Very compact Effort to break up	Mostly large > 10 mm, very few $1-7$ mm, angular and non-porous	Very low porosity. Macropores may be present. May contain anaerobic zones. Few roots, if any, and restricted to cracks			Crystalline compact	6.00 Aggregate fragments are easy to obtain when soil is wet, although considerable force may be needed. No pores or cracks are visible usually.

Conclusions

- No clear impact on soil
- Feed value of the winter cereals higher than silage or hay
- Yields not significantly affected



THANK YOU!



Scottish Government
Riaghaltas na h-Alba
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