# Cover Crops & Green Manures

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# Cover crops and green manures

- **Cover crops** are grown over a single winter period
  - Used to cover bare soil and stubbles left by previous crop

- **Cover crops** are not usually harvested like cash crops
  - Usually you destroy them e.g. with herbicide, rolling, ploughing or frost ahead of the new crop

- **Green manures** are a type of cover crop
  - Usually kept for longer periods, like a whole cropping year.
  - Often contain at least one legume species
    - allows it to fix nitrogen

- **Green manure** is typically incorporated into the field while still green

https://www.gov.uk/guidance/use-cover-crops-or-green-manure#about-cover-crops-and-green-manure

# Will focus on N-fixing crops

- **But …. mixing legumes with other species can certainly aid with**
  - SOM retention/increase; soil structure improvement; water relations; nutrient use efficiency

**Long term leys**

- Established for >1 year
- Commonly grass/clover mixtures to maximise N fixation and Organic Matter build up

**Overwinter**

- Sown in autumn – can limit use in Scotland
- Major use is to minimise N leaching but they can include legumes

**Summer**

- May be grown for whole season (April to Sep – or into following spring)
- Include legumes to provide N boost mid-rotation.

**Intercropping systems**

- Leys often established by undersowing them in preceding cereal crop
- Gives legume longer growth period and can help weed control

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# N-fixing crops

**Trials tested the following:-**

- Five, 3-way mixtures
- Mixtures contrast genetic and functional diversity
- Followed on in next season with spring barley overlaid on same sites

**Forage**
Lucerne LU
Red clover RC
White clover WC
Crimson clover CC
Black Medic BM

**Grain**
Beans BE
Lupin LN
Peas PE
Vetch WV

**Mixtures**

| | |
|---|---|
| A | RC / BM / LU |
| B | RC / WC / CC |
| C | WC / WV / PE |
| D | WC / WV / BE |
| E | WC / BM / WV |

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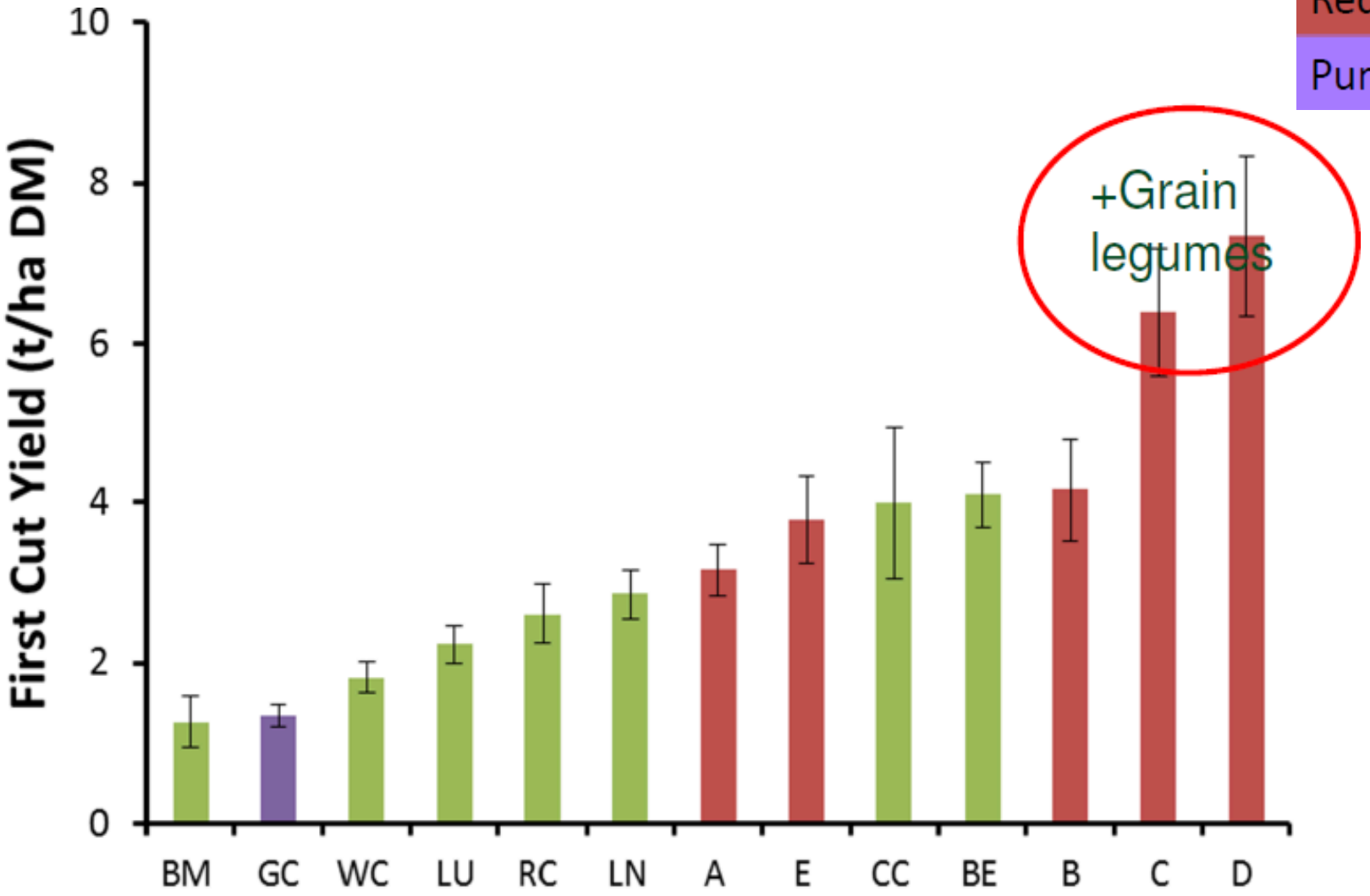
# Biomass

Green – single legume species

Red – 3-component mixtures

Purple – ryegrass/clover

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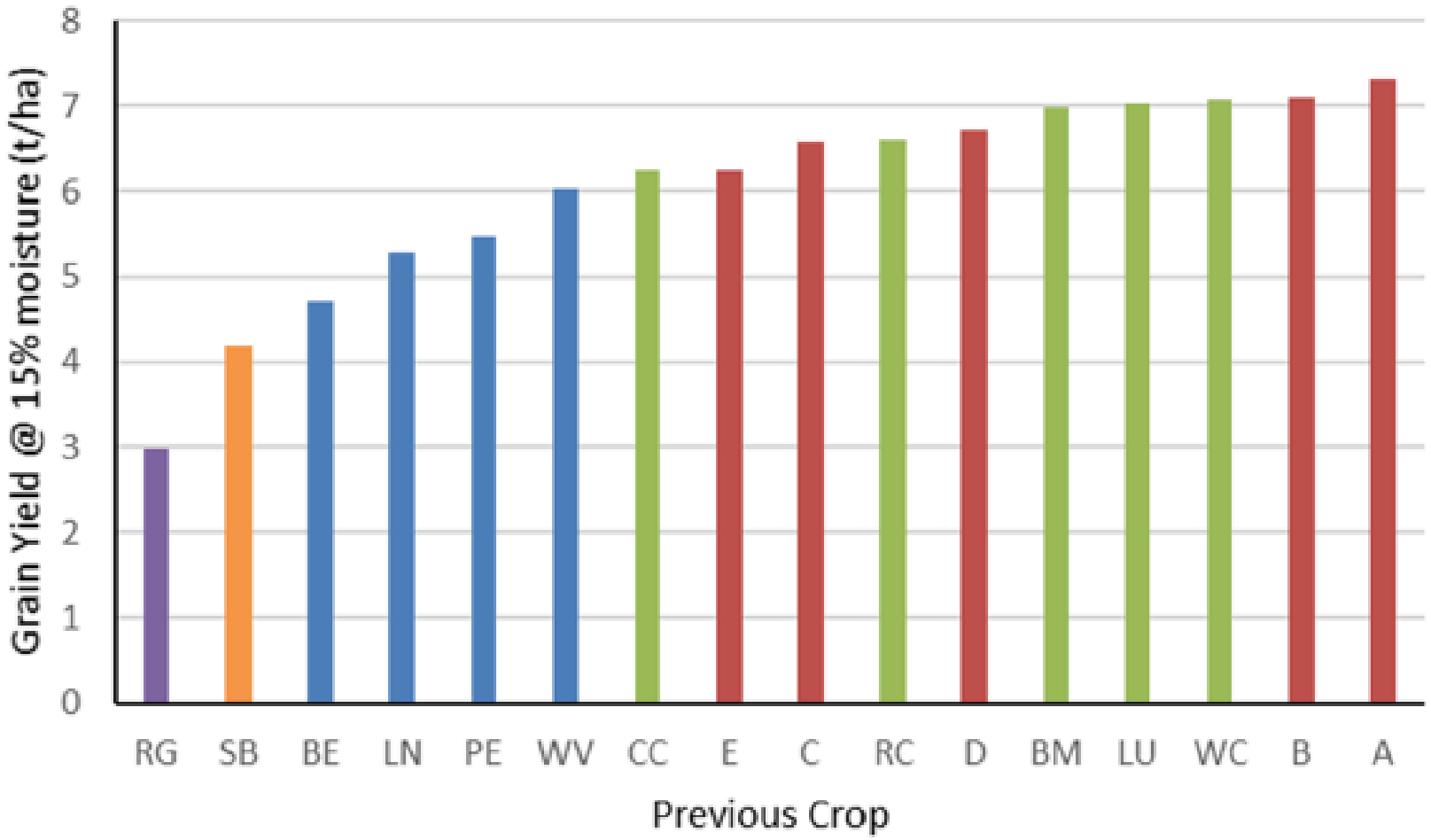
# Spring barley grain yield (t/ha)
# - as following crop (zero N applied)

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Purple – ryegrass

Orange – Spring Barley

Blue – grain legume species

Green – forage legume species

Red – 3 legumes mixtures

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# Rye-vetch cover crop

- Autumn established field trials at Aberdeen
  - Basic seed rates 91 kg $ha^{-1}$ rye & 65 kg $ha^{-1}$ vetch
    - plant populations of 220 plants $m^{-2}$ and 12 plants $m^{-2}$ respectively
  - Two rye/vetch mixtures
    - 60/40 and 80/20
    - and their sole crops
  - Repeated over two growing seasons
  - Zero N applied, P & K, but no other inputs

- Investigate multifunctionality by either ploughing in the spring or making whole crop silage in mid-season

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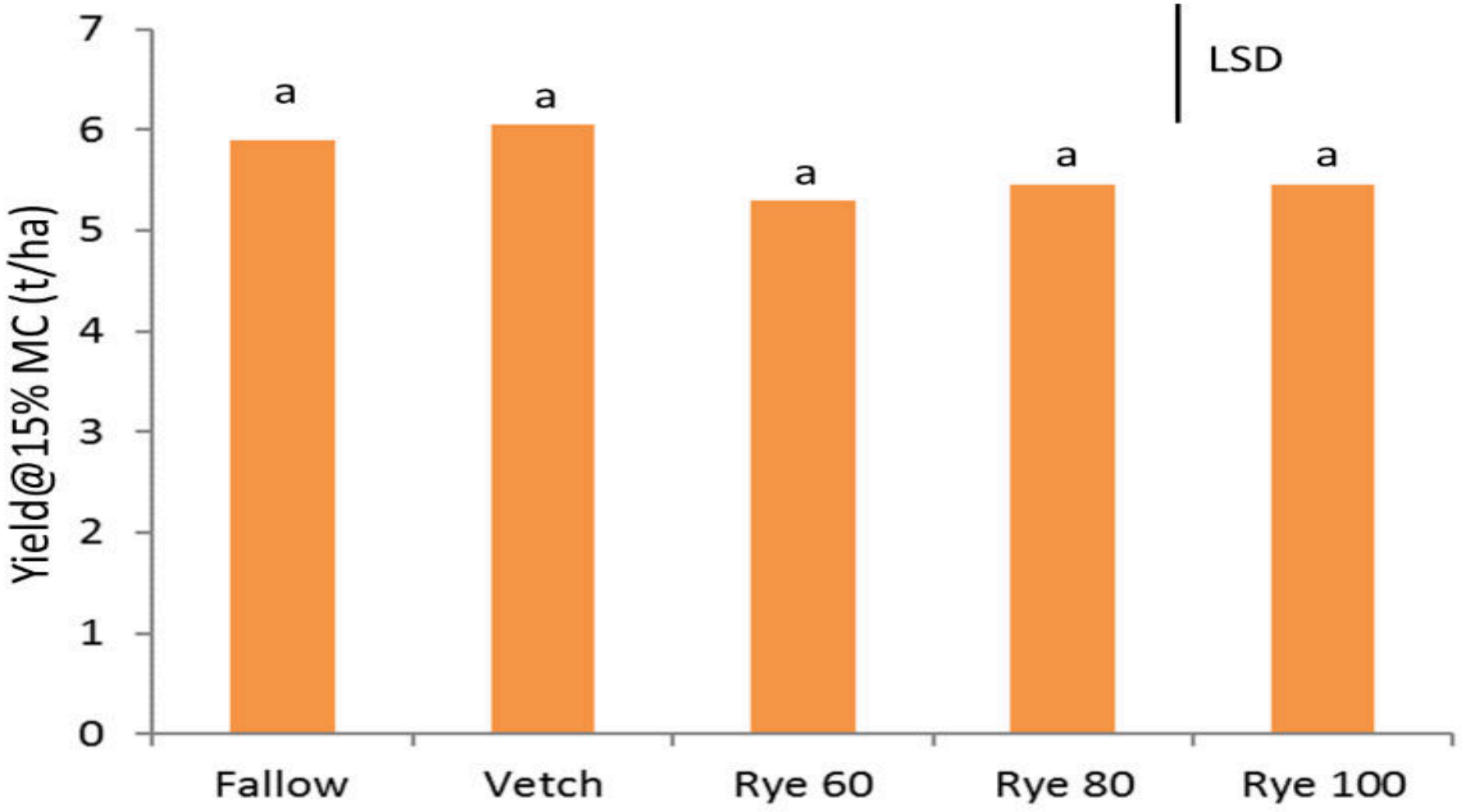
# Spring barley yield - after spring incorporation …

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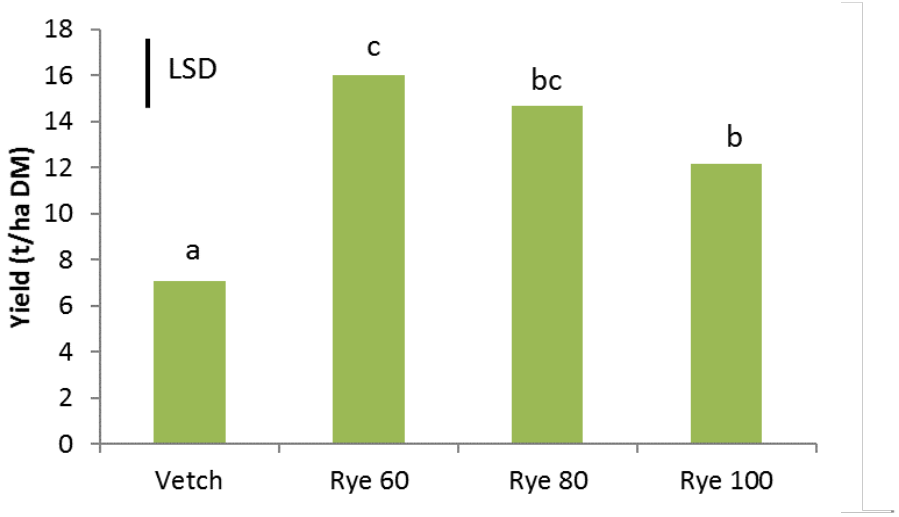
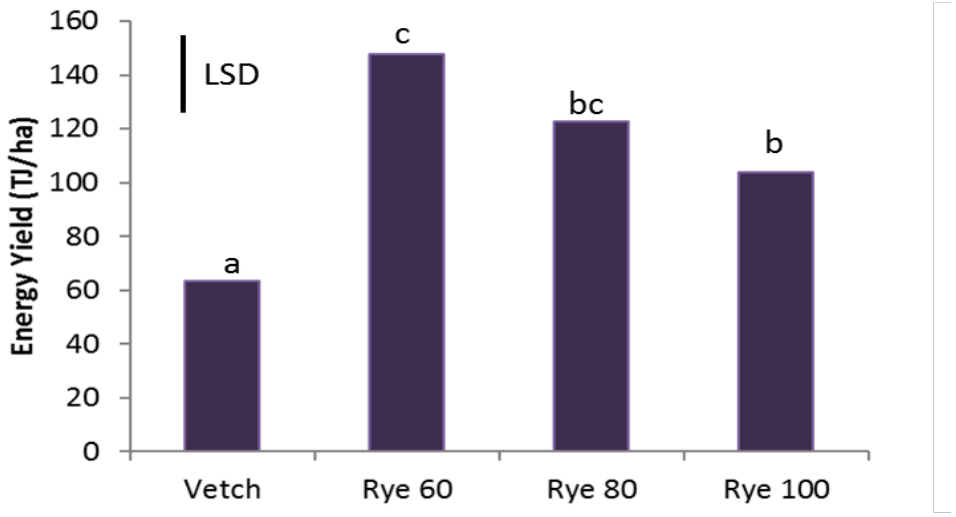
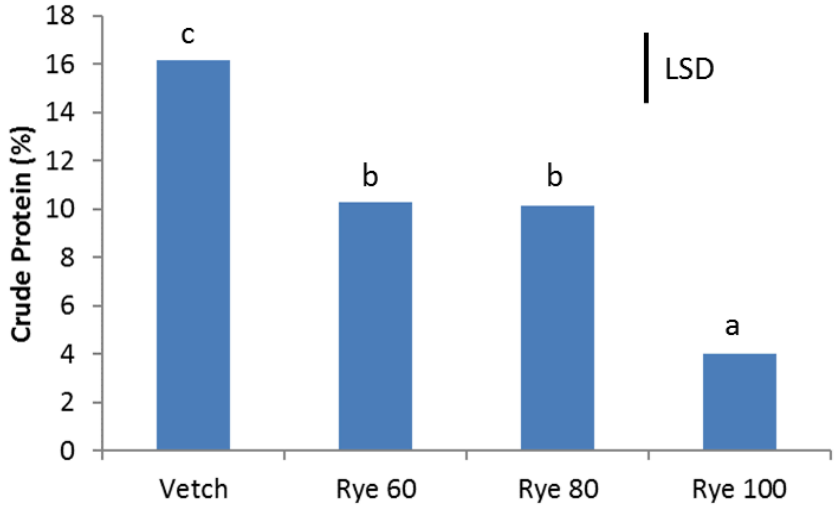
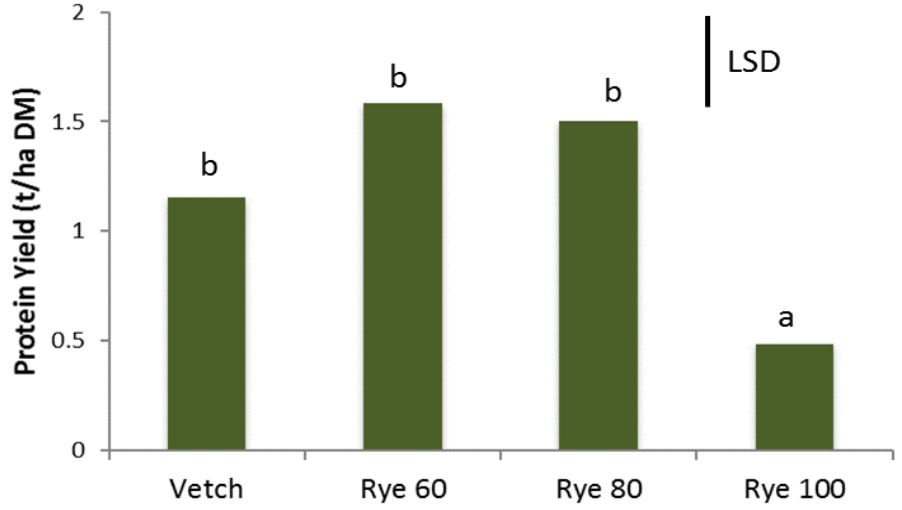
# ... or taken onto silage – yield, ME and protein

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# AgroDiversity toolbox


Select Language

AgroDiversity Toolbox

**Subsidiary Crop Database**

Home

List of scientific names

List of common nam

Decision Support Tool

Toolbox Home

The purpose of the database is to make available the results of the OSCAR subsidiary crop screening and that of other screening programmes. Therefore, it contains mainly information on less familiar species, often not cultivated, comprising both species which showed good potential as subsidiary crops as well as those revealed not to be promising candidates.

The database allows the user to select a species from lists of the scientific names (comprising the most important synonyms) as well as common names in several languages. More advanced search comprises selection according to several agronomic traits and adaptation to environmental conditions.

The output comprises:

- Lists of all common and scientific names
- Brief descriptions of the species, their natural occurrence, current uses and observation made during the screening experiments.
- A list of all the field experiments in which the respective species has been tested, with reports on the results available to download.
- A list of the main characteristics of each species, summarising all available evaluation results and all tested accessions
- A list of the main characteristics of the single accessions, summarizing all available evaluation results

Beside the new species, data on more familiar species have been included as reference, though not all of them were included in the screening trials.

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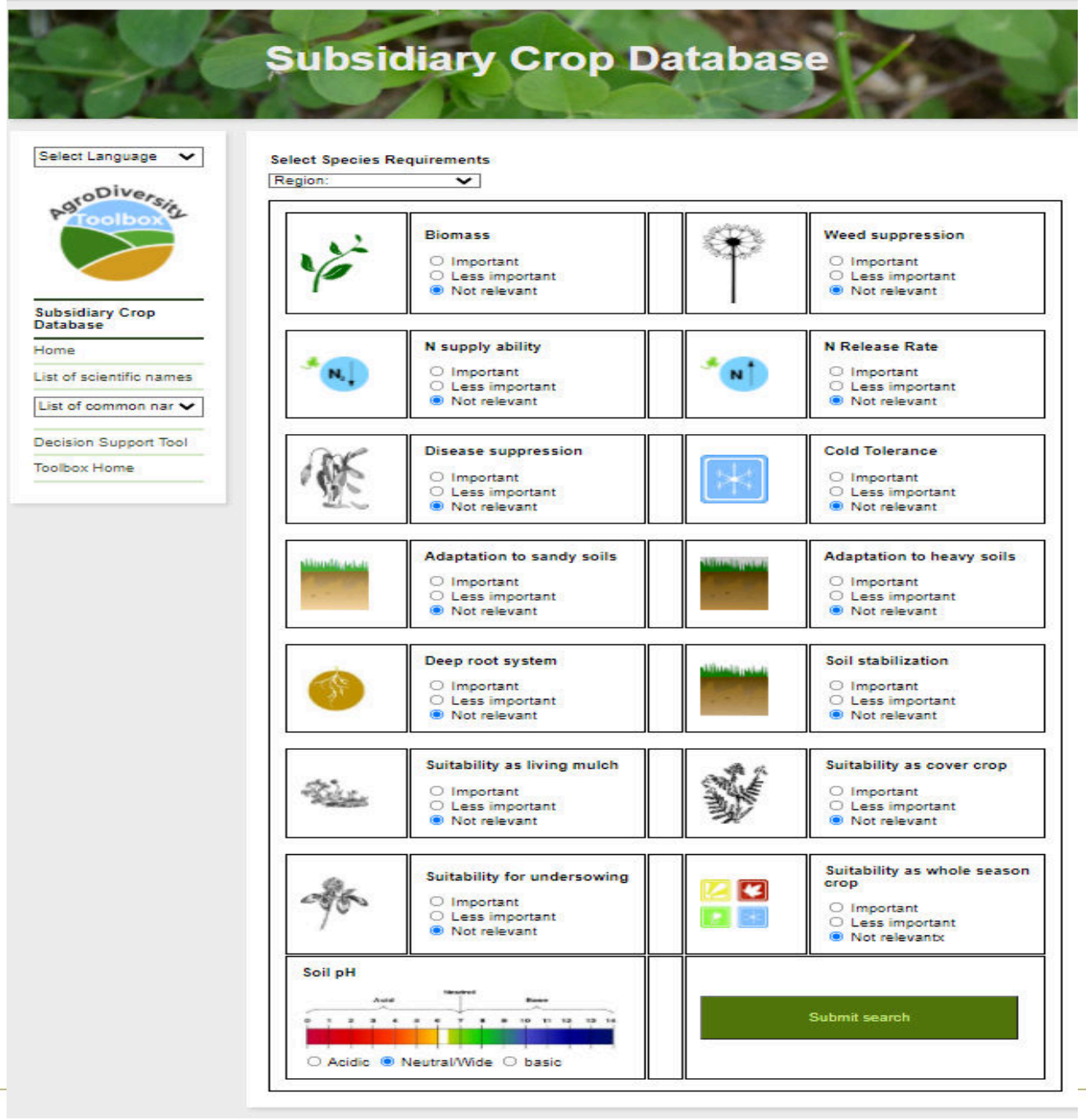


http://vm193-134.its.uni-kassel.de/toolbox/DST.php?language=English

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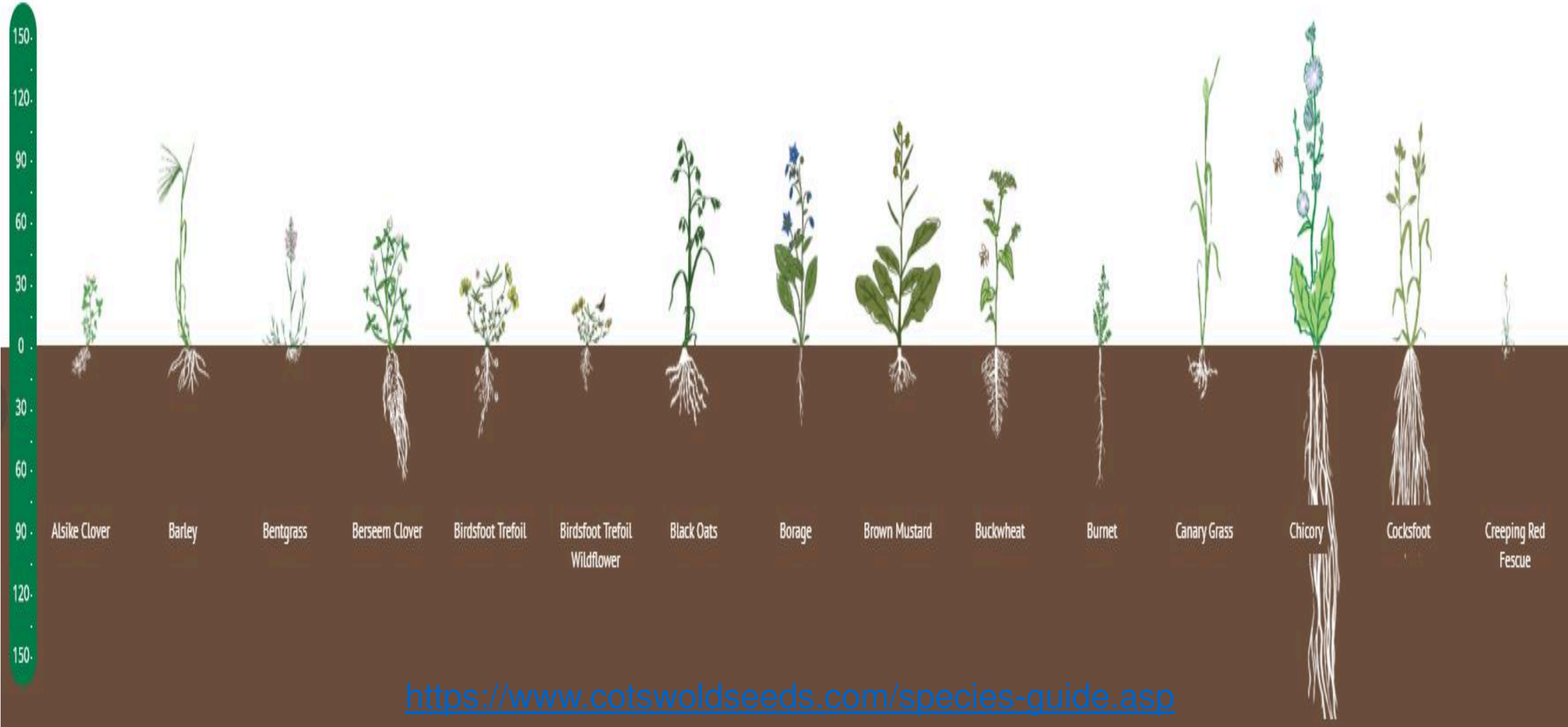
# Cotswold Seeds




https://www.cotswoldseeds.com/species-guide.asp

# A few pointers – cover crops / green manures

- Try and use at various points within the rotation
  - Not just a “one hit wonder”
- Attention to detail
  - Choose crop species / mixes to match your desired objectives and manage accordingly
- Timely termination
  - Allow sufficient time for residues to break down so as not to negatively impact management / success of following crop
- Consider impact of herbicides
  - Some cover crop / green manure species sensitive to herbicides applied to previous crop
- Don’t plant too late in the autumn
  - Small seeded species less likely to succeed in Scotland

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# Thanks for your attention


- Thanks to many SRUC colleagues
- … and thanks to Scottish Government (RESAS) and EU ReMIX, EU Legumes Translated and Loirston Trust for financially supporting this work


Legumes Translated

The Scottish Government
Riaghaltas na h-Alba

Mains of Loirston Charitable Trust

ReMIX
Species mixtures for redesigning European cropping systems

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