Introduction to Grass Identification

Botanical Society of Britain & Ireland

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Thanks to project supporters:

Today's Webinar

- Grasses – why do they matter?
- What do you need to ID them?
- Taking the dread out of grass ID
  - Overall structure of grasses
  - Characteristics of flowering head
  - Other characters that help with ID
- The top 20(-ish) grass species
- What's next for you? Going further with grasses

Grasses – why do they matter?

- Grass family (Poaceae) is fifth largest by species
- Most widespread plant type, globally
- Grasslands (where vegetation is dominated by grasses and herbaceous perennials)
  - Represent about one-third of all vegetation cover, 70% of world's agricultural land (cereal crops)
- Approx. 75-80% of Ireland is under grassland
  - Mostly improved agricultural grassland

Why learn to ID grasses?

- They're so important!
  - About 100 native, naturalised and alien grasses in Ireland, made up of over 40 genera
- Grass species are adapted to specific conditions
  - Soil type, moisture, etc. – determine dominant grass species
  - Grasses can tell you about the soil (moisture, nutrient status, pH, etc.), without testing

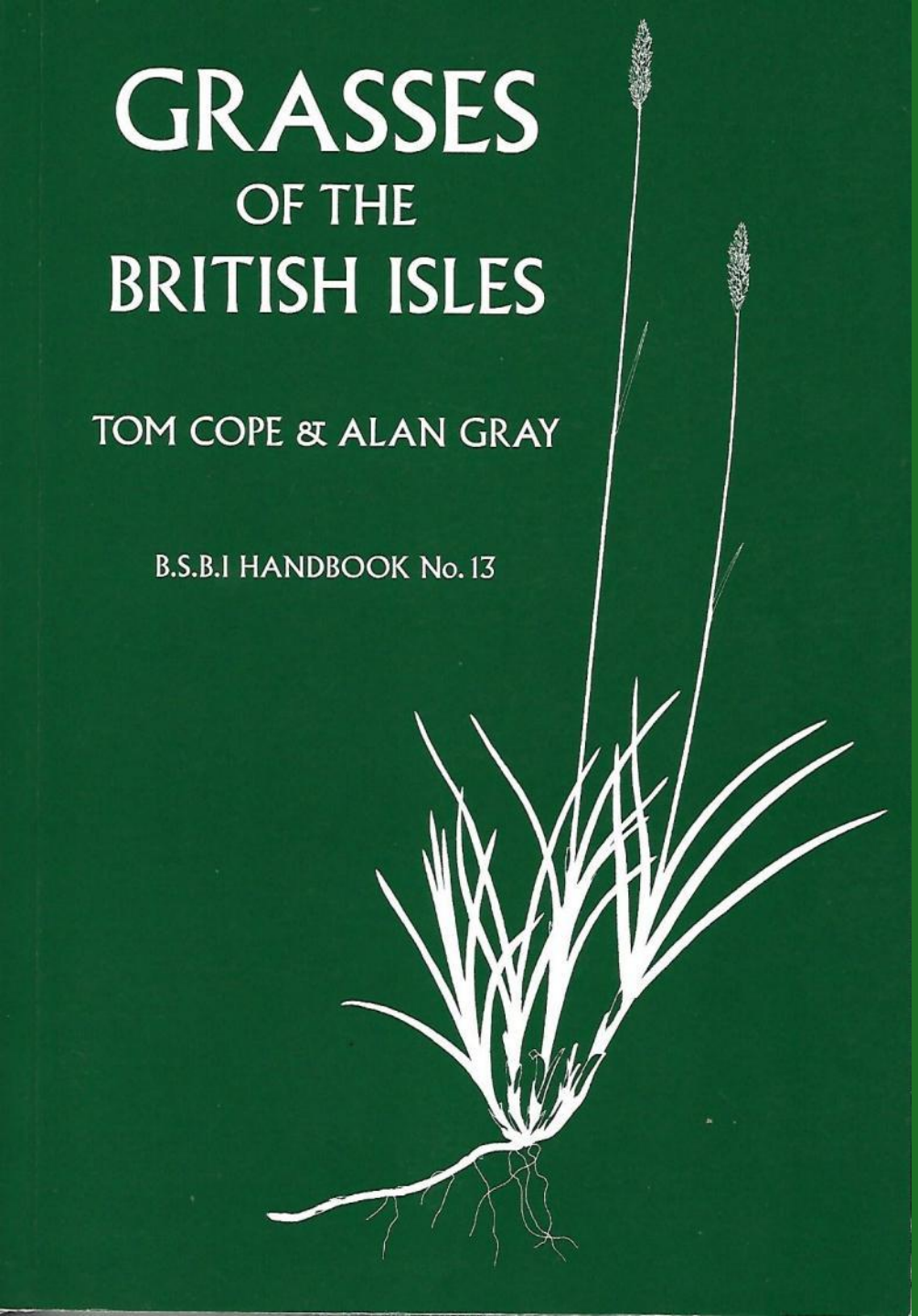
Importance of Grass identification

- Agricultural studies – soil, grazing pressure etc. affect grassland composition
  - Assists grassland managers, e.g. farmers
- Ecological studies
  - Helps identify habitats of conservation value
  - Cannot conserve if we don't know what we have!

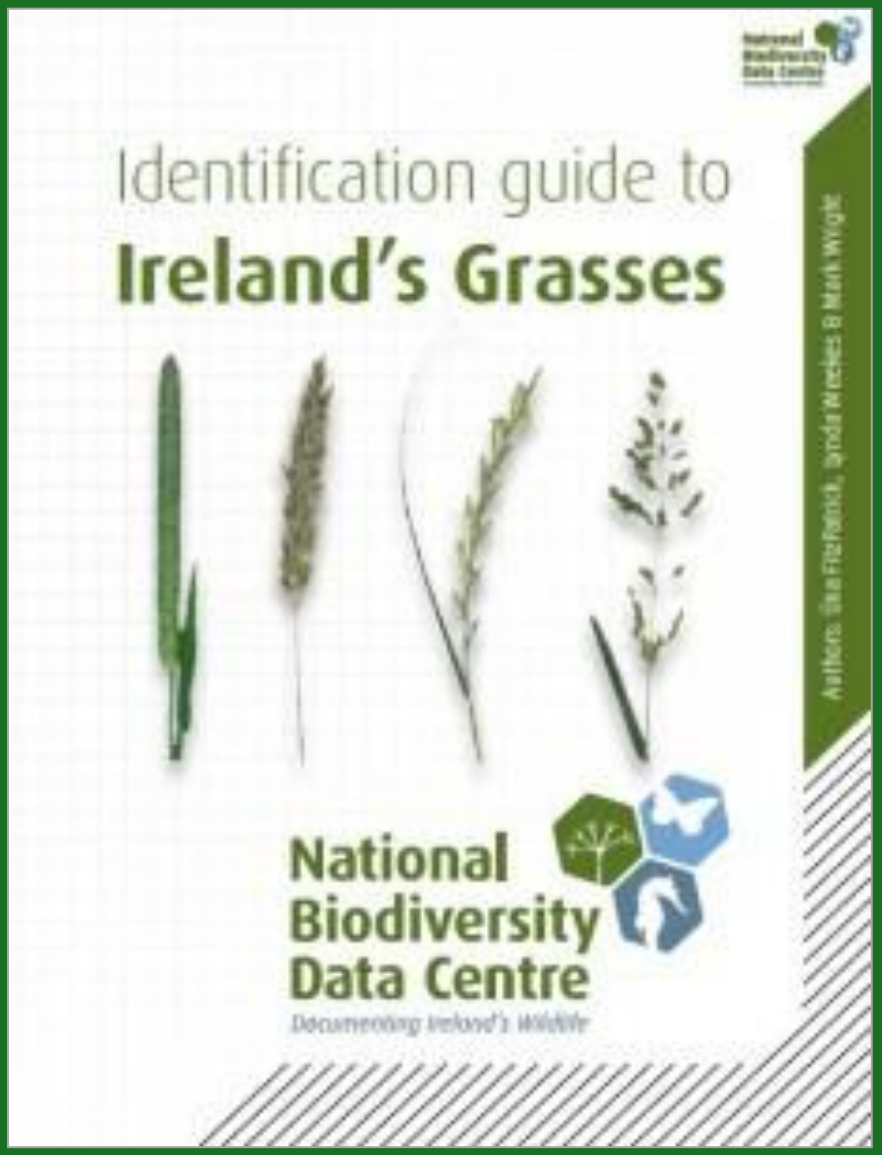
What do you need to ID them?

- ID books
- Hand lens

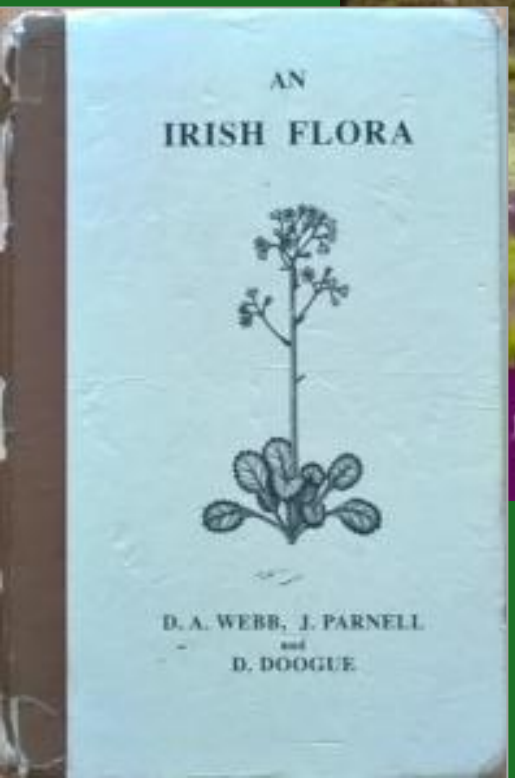
- Grasses. C.E. Hubbard. First published 1954, latest revised edition by J.C.E. Hubbard, 1984. Excellent drawings, has both vegetative and non-vegetative keys
- Great for a final confirmation of your specimen if you have identified it by other means and want a good description. The Key structure takes a bit of getting used to but rewards effort
- Taxonomically a bit out of date
- Out of print, second-hand only

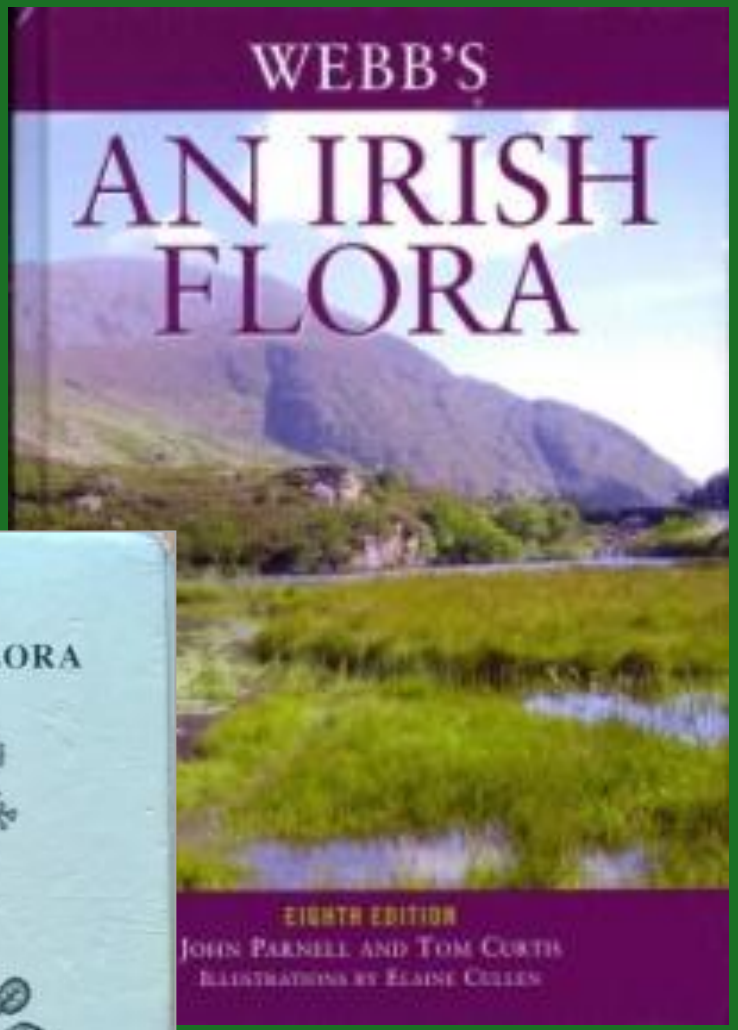


- BSBI handbooks available for different plant groups, complete with keys and diagrams
- Successor to Hubbard and rectifies some of its shortcomings
- Good clear diagrams, keys more logically arranged – groups more closely related species together



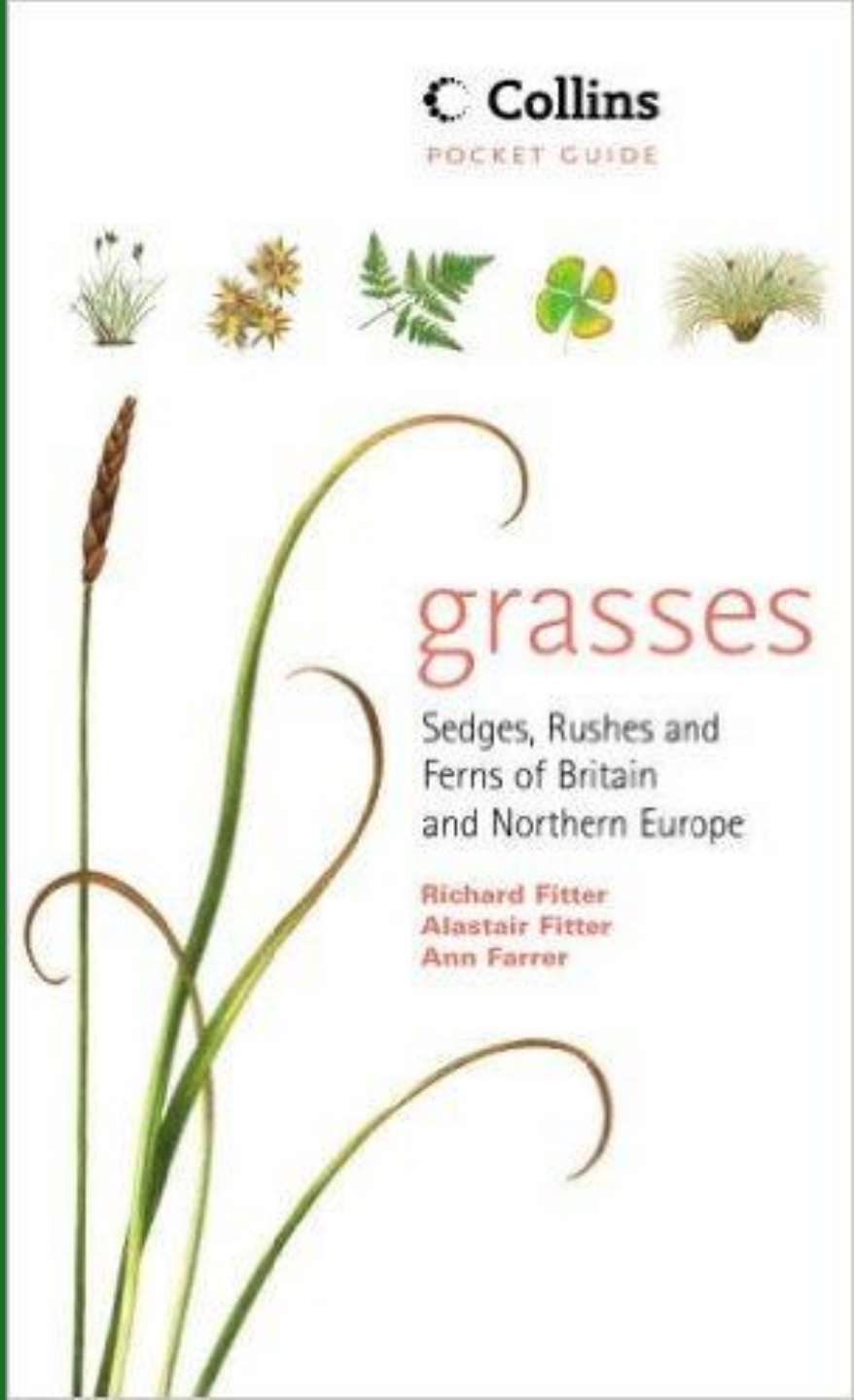
- Identification guide to Ireland's grasses
- Produced by the National Biodiversity Data Centre, Waterford. Very portable, useful guide to have as it covers the majority of the grasses that you're likely to come across in Ireland
- It groups species according to structural similarities for flowering specimens and also has a vegetative key

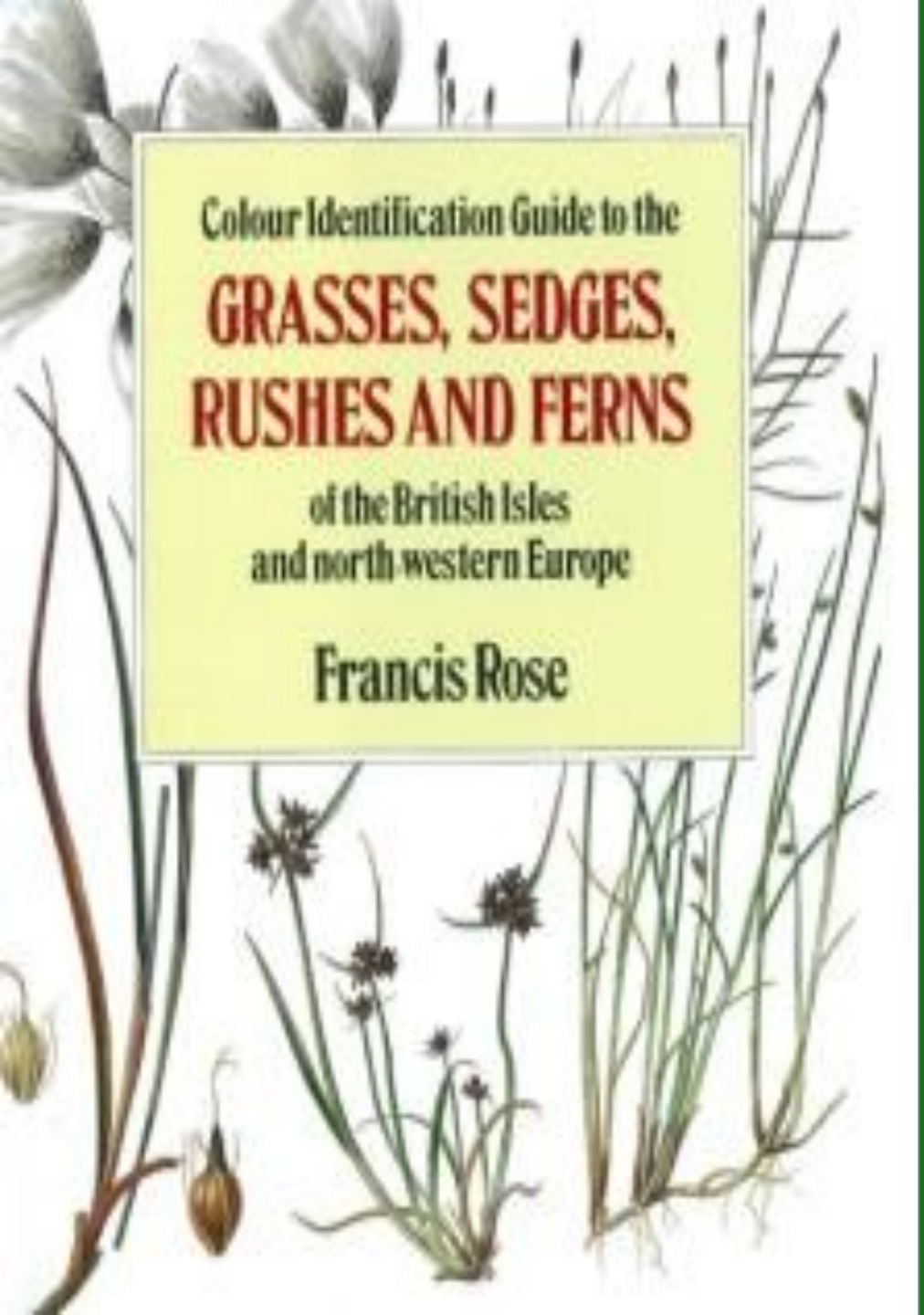




- An Irish Flora. D.A. Webb (*et al*.) – Various editions. 6th & 7th eds probably the best to use in the field but are out of print, only available second-hand
- 8th edition ("Webb's Irish Flora" by Parnell & Curtis) is the latest and most comprehensive but maybe too big for the field. Good section on keying out flowering grasses

- Grasses, Sedges, Rushes and Ferns of Britain and Northern Europe - Collins Pocket Guide. Fitter, Fitter & Farrer. (1984)
- Descriptions fairly brief but a good ID book for the field with good diagrams. Has a multi-access key at the front which can be useful





- Colour identification guide to the Grasses, Sedges, Rushes and Ferns of the British Isles and north-western Europe. Francis Rose. (1989)
- Excellent diagrams. Good descriptions. A4 hard-back, though, so not suitable for the field, but a good reference book to have on hand

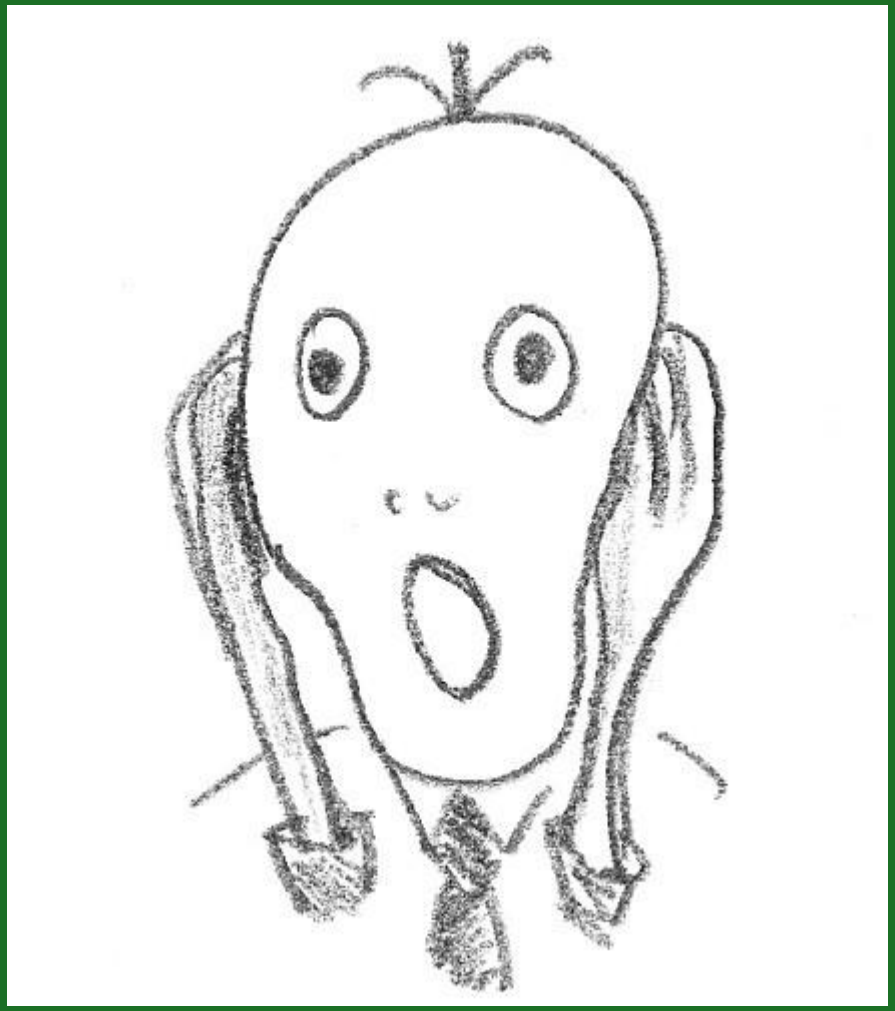
Hand lens (or magnifying glass)

- x 10
- x8/x15, x10/x20

Other essentials

- Enthusiasm!
- Patience…
- Perseverance

Why are Grasses FEARED *so much ?*



- **“THEY ALL LOOK ALIKE!”**

- Maybe – at first glance
- (But they don’t ALL look alike!)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phleum pratense
© 2004 pictured by antonie van den bos
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- “They all grow in together, it’s really hard to separate them”

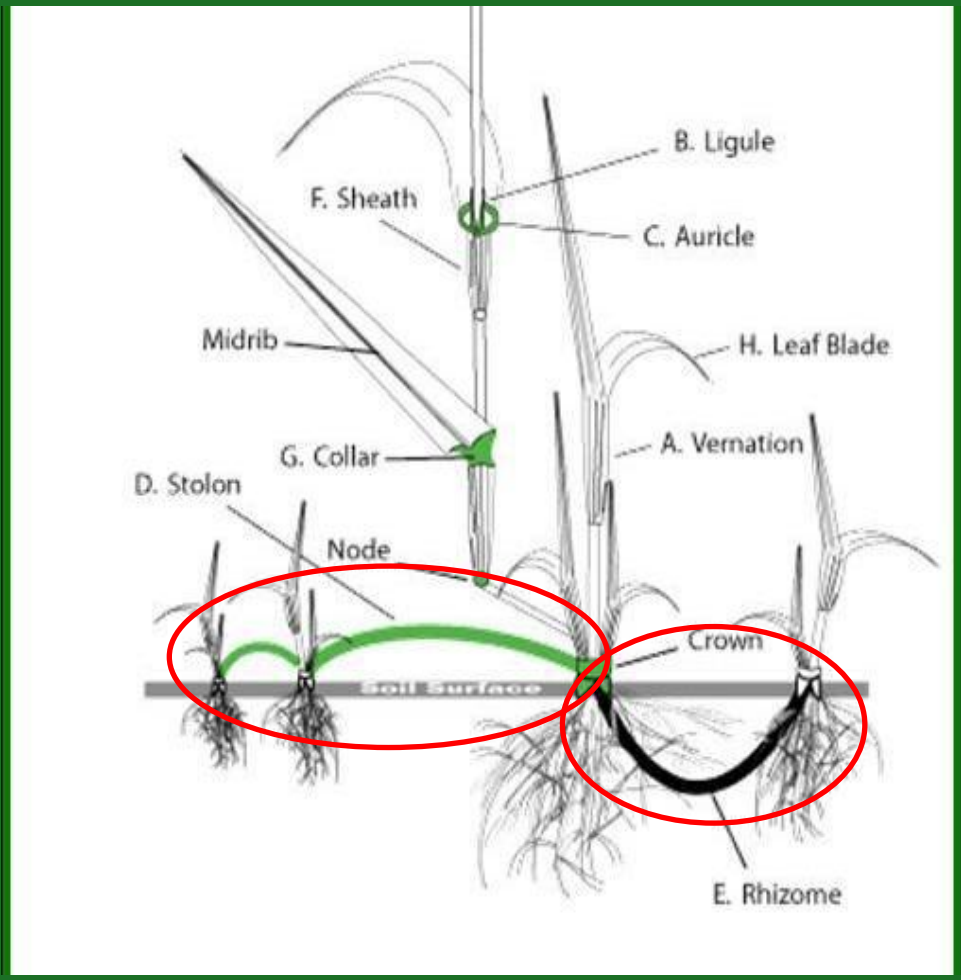
- True – but there can be differences in their growth form (or “habit”) that can help to distinguish one from another

←Creeping growth form

Tufted growth form →

Growth habit

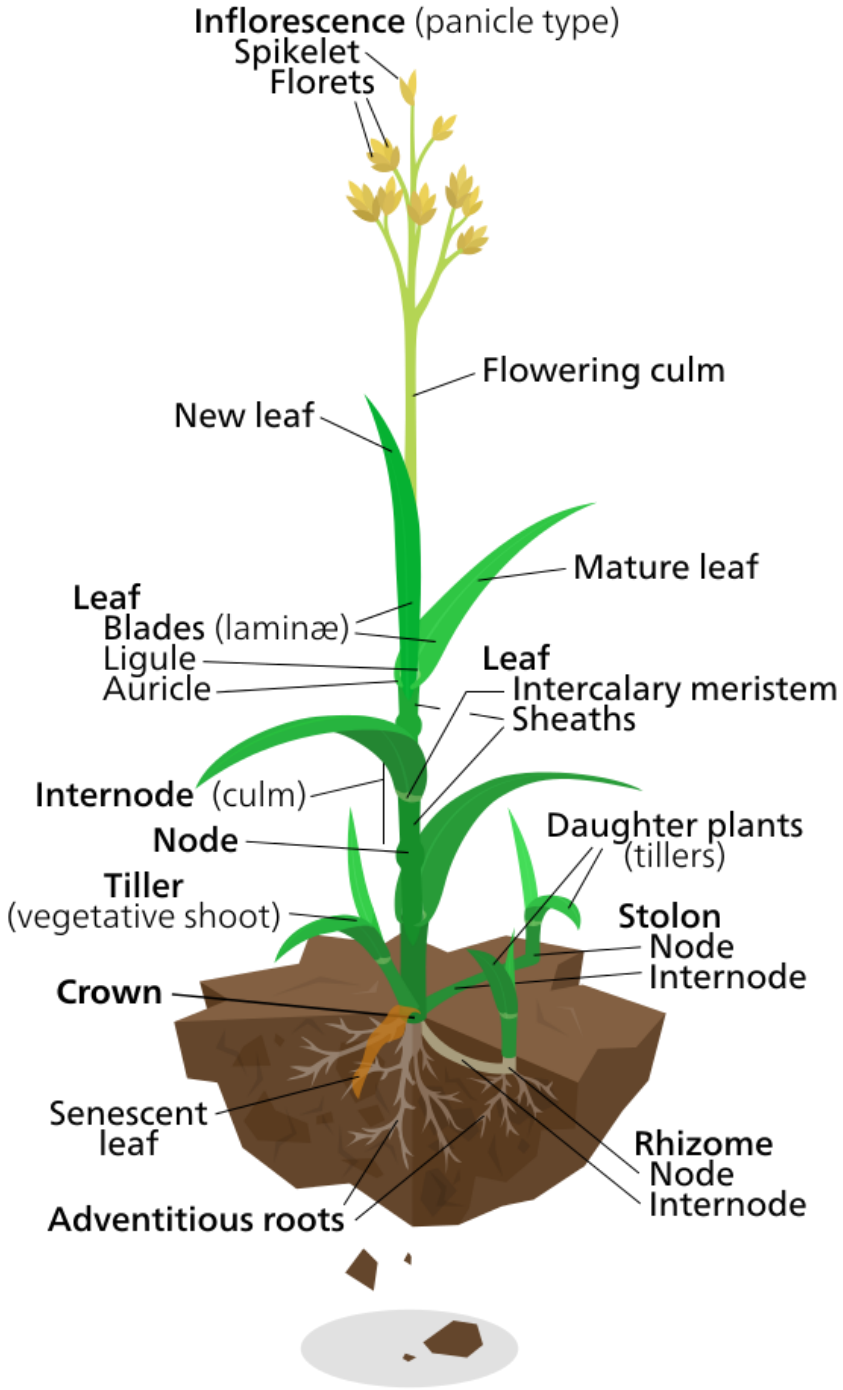
- Above-ground horizontal stems (**stolons**)
- Below-ground horizontal stems (**rhizomes**)
- Very short rhizomes = tufted plants



Stolons in *Agrostis stolonifera*

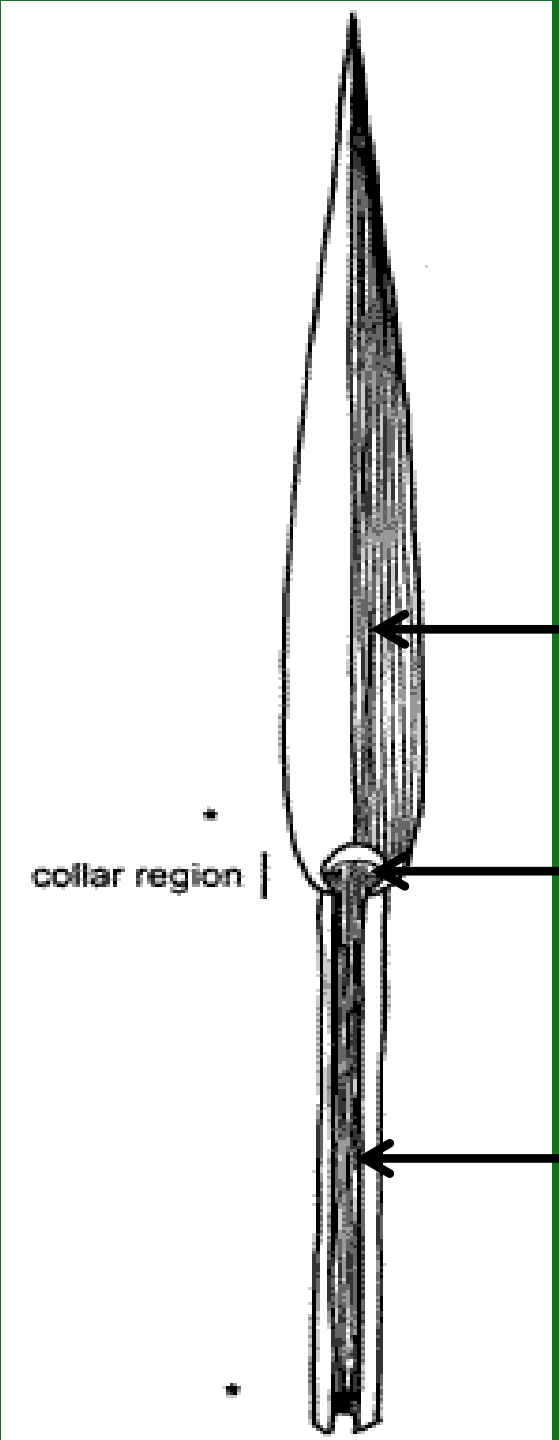
- **“All the easy-to-ID bits get eaten or cut”**

- Unfortunately, yes! The secret to their success – they can withstand constant grazing and mowing
- But: Lots of vegetative characters that help to ID them all year round, even when flowers not present (Lynda Weekes – next 2 Webinars)



Deconstructing Grasses

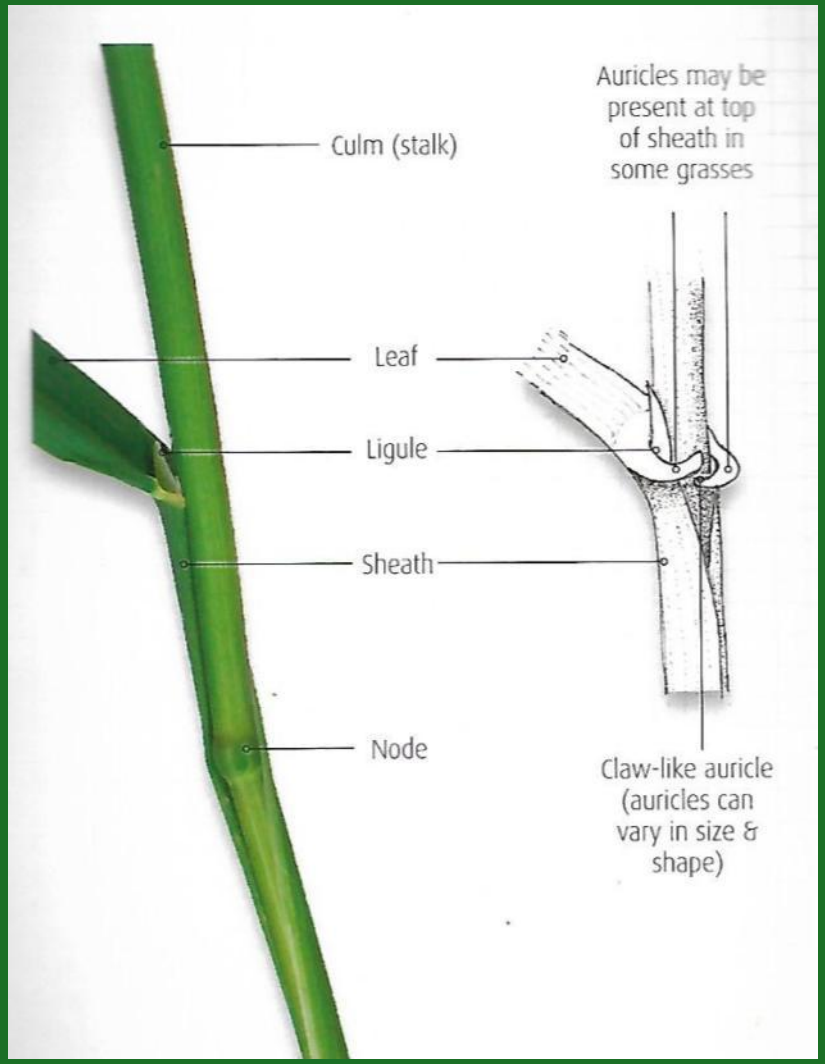
- Non-flowering shoot – *roots, stem, leaves*
- Leaves attach to stem at *node* (bulge)
- Flowering head "*Inflorescence*" – arises from top of shoot



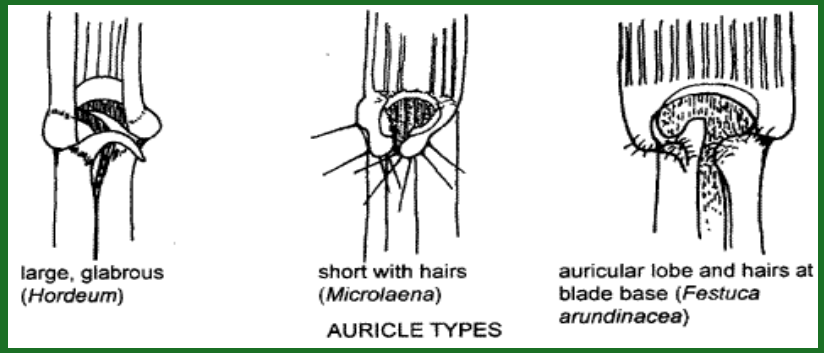
Grass leaf

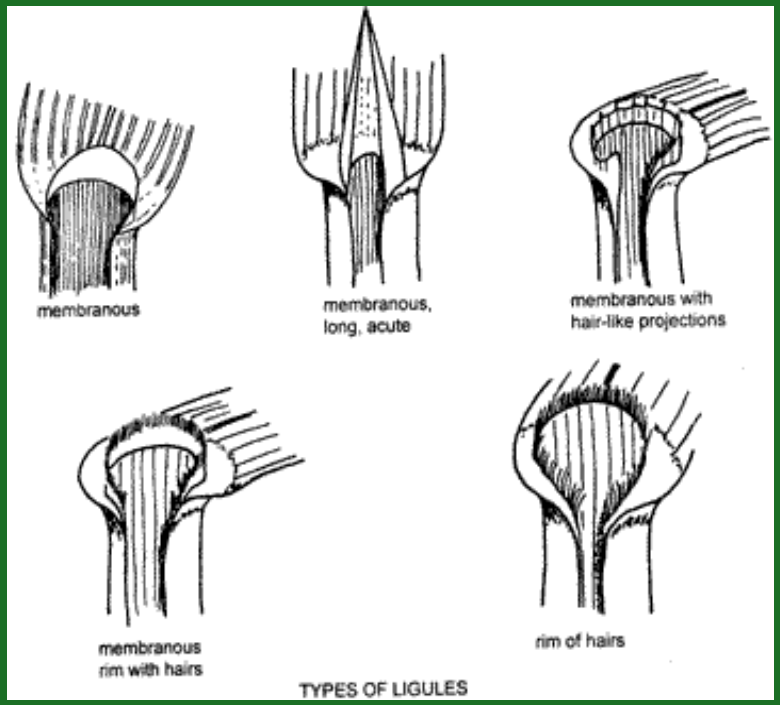
- Two main parts:
  - Blade (also called “Lamina”)
  - Further developments where leaf blade joins the sheath!
  - Sheath

Ligules and Auricles



From NBDC's "Identification guide to Ireland's grasses"

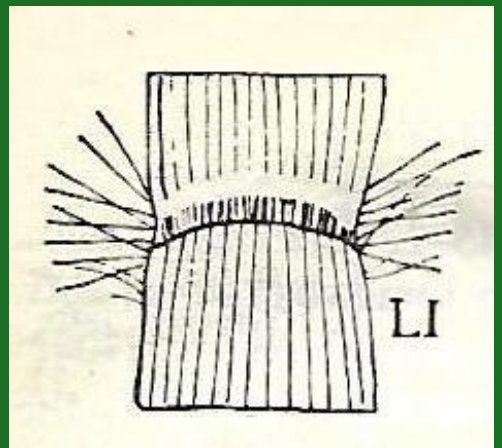




http://www.fog.org.au/grasses_of_nsw/grasses_of_nsw.htm

Only four grass species in Ireland with ligule a fringe of hairs

- Heath-grass *Danthonia decumbens*
- Purple Moor-grass *Molinia caerulea*
- Common Cord-grass *Spartina anglica*
- Common Reed *Phragmites australis*



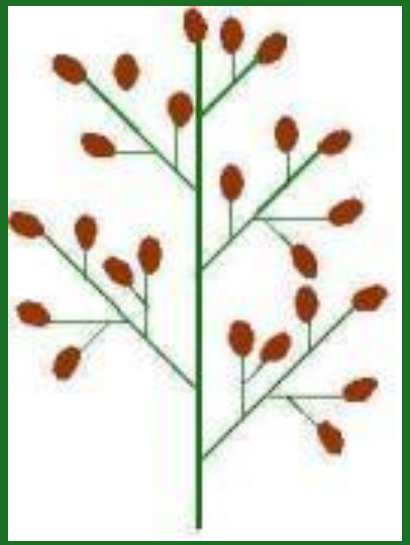
- The leaves may have hairs on the leaf blades and/or sheaths

The Flowering Head

- Two main types:
  1. Spike, e.g. Perennial Rye-grass (*Lolium perenne*), Meadow Foxtail (*Alopecurus pratensis*)

The Flowering Head

2. Panicle, e.g. Yorkshire-fog (*Holcus lanatus*), Creeping Bent (*Agrostis stolonifera*)



The Flowering Head

- Is the inflorescence one-sided? (has it an obvious back and front?)
- e.g. Cock's-foot (*Dactylis glomerata*)

- Crested Dog’s-tail (*Cynosurus cristatus*)

Deconstructing the Inflorescence

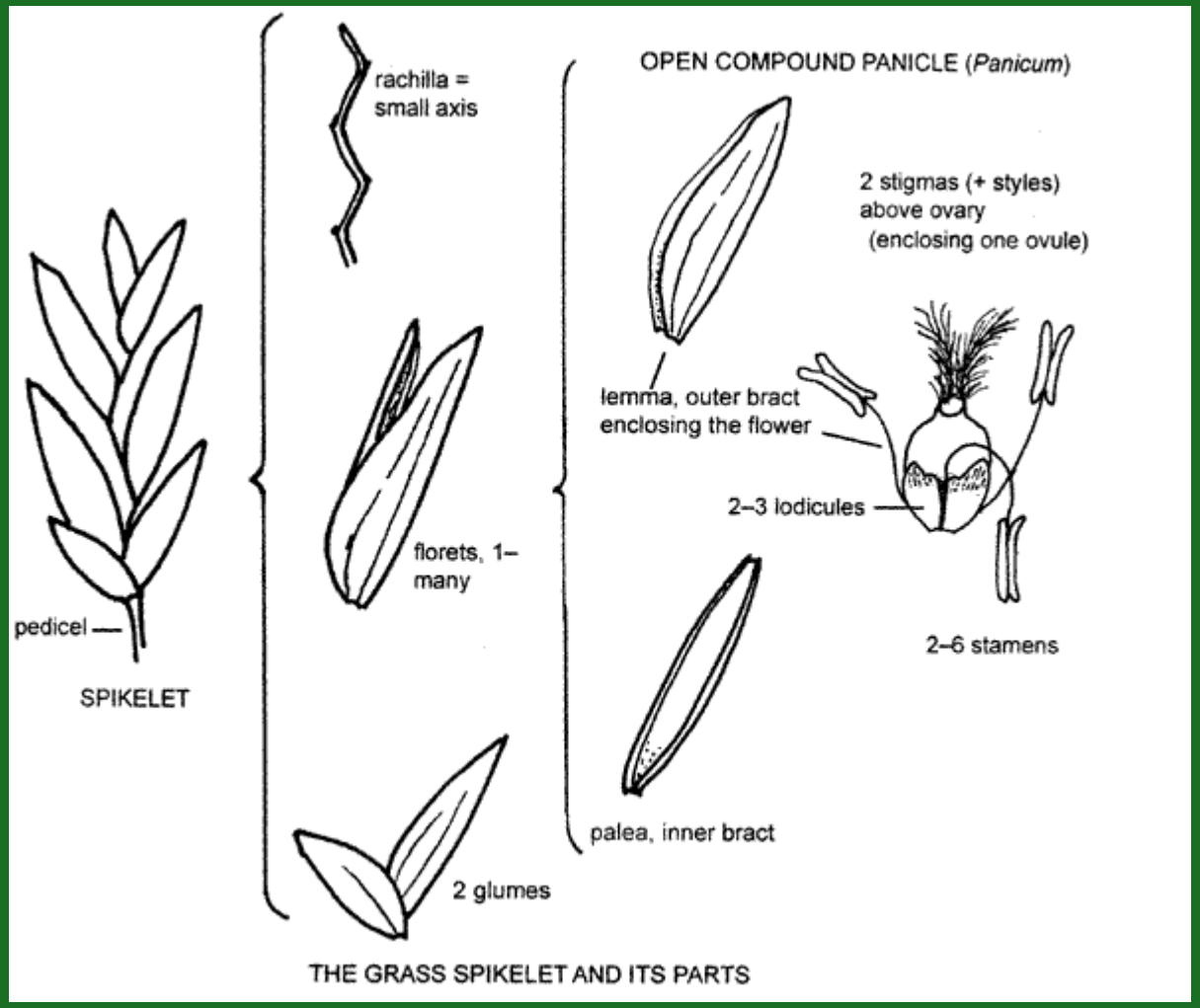
Spikelet

Rachis of inflorescence

Spikelet may be attached to rachis via tiny stalk (pedicel)…

…or spikelets may be sessile (unstalked)

The Spikelet

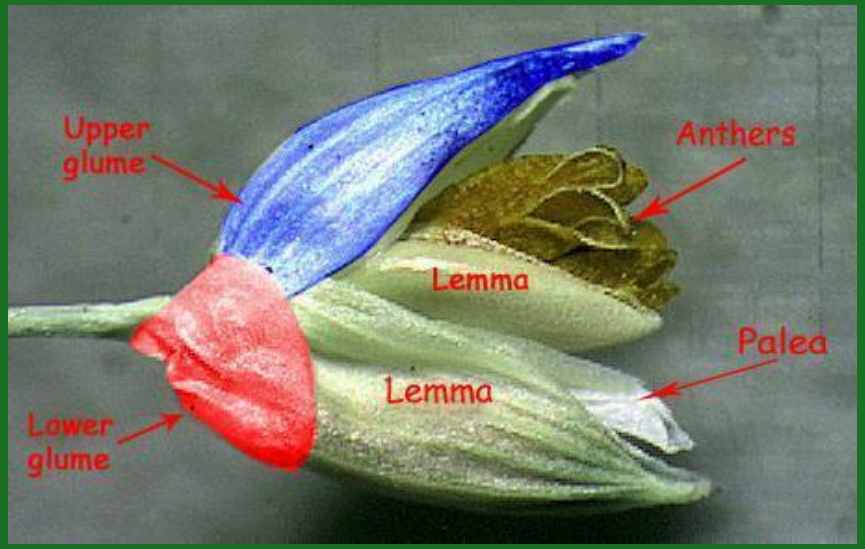


From BSBI Handbook 13 “Grasses”

http://www.fog.org.au/grasses_of_nsw/grasses_of_nsw.htm

Spikelet structure

- One or more florets in a spikelet
- Spikelet is surrounded by two leaf-like glumes



What about Awns?

- Bristle, present in some grasses
  - Can be very long, e.g. Wall Barley
  - Can be fairly short, e.g. Red Fescue
  - Can be absent
- Present on Glumes or Lemmas
- From the tip, or from part-way down the back
- Can be straight or bent

False Oat-grass (*Arrhenatherum elatius*):
Awn long, bent, arises part way down back of lemma

Red Fescue (*Festuca rubra*):
Awn short, straight, arises from tip of lemma

Other characters to help with ID

- Ligule, Auricle
- Leaf shape
- Leaf tip
- Leaf sheath
- Presence of hairs
- Leaves folded or rolled in shoot
- Growth habit (creeping, tufted)
- WHERE IS IT GROWING? (i.e. HABITAT)

Wet, heathy habitat?


By the sea?

Saltmarsh?

In a limestone area?

Frequency of Grass species in ISGS* plots across all grassland habitats

Species	No. of plots	% (4,479 plots)
Holcus lanatus	3,529	79
Anthoxanthum odoratum	3,169	71
Festuca rubra	2,593	58
Agrostis stolonifera	2,576	58
Agrostis capillaris	1,908	43
Cynosurus cristatus	1,572	35
Lolium perenne	946	21
Dactylis glomerata	930	21
Poa trivialis	754	17
Molinia caerulea	682	15
Agrostis canina	628	14
Poa pratensis	588	13
Briza media	569	13
Danthonia decumbens	493	11

Type “Irish Semi-natural Grasslands Survey” into Internet search engine

Caveat

- Doesn’t include some common species of grassy verges, e.g. False Oat-grass
- Doesn’t include common species of improved Amenity grassland, e.g. Annual Meadow-grass
- Doesn’t include species of sand dunes, salt marshes, etc.

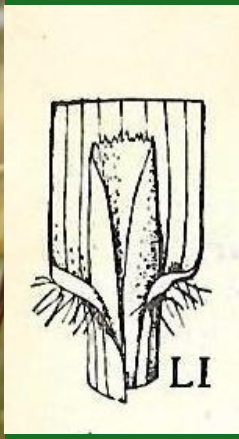
Yorkshire-fog *Holcus lanatus*

Age of an inflorescence may affect how it looks

Creeping Soft-grass *Holcus mollis*

"Hairy knees"

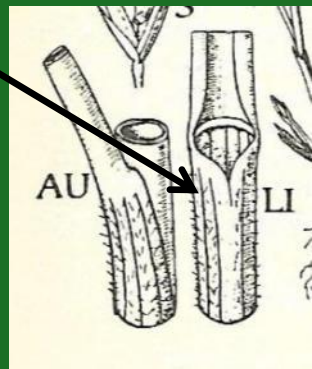
Sweet Vernal-grass
Anthoxanthum odoratum



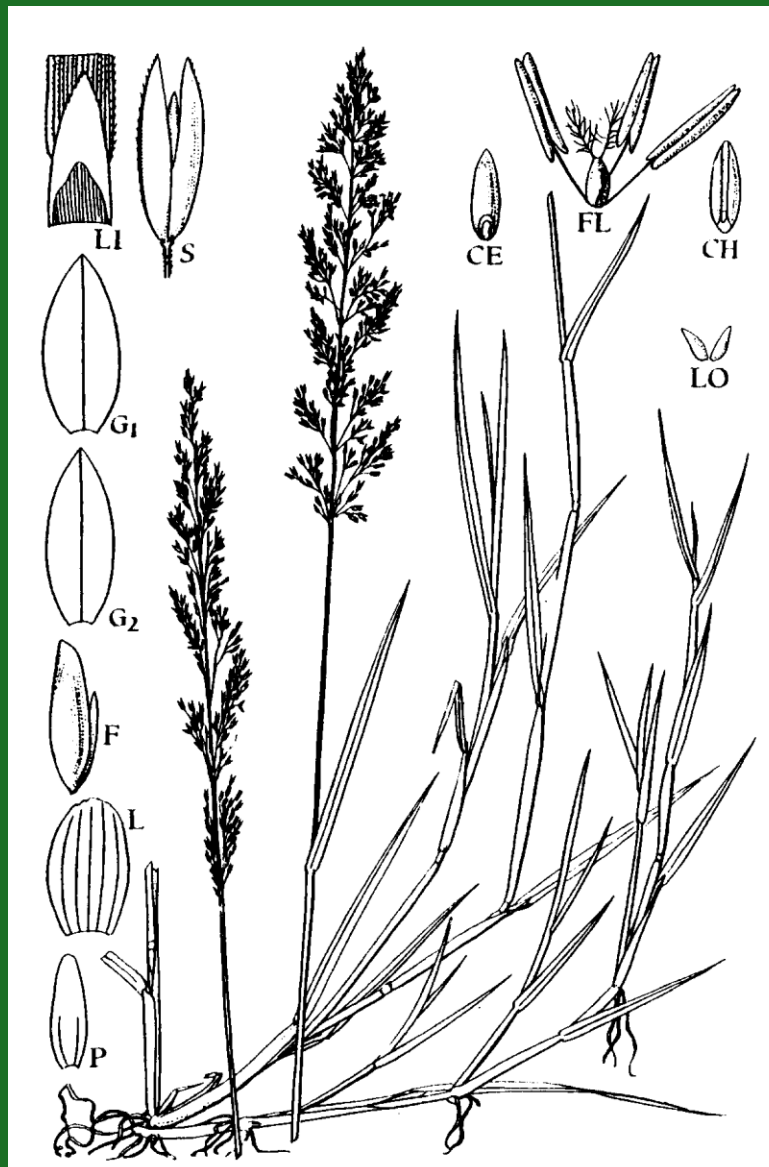
Early flowering (April/May)
"Bearded ligule" – hairs where ligule meets blade
Smells of new-mown hay when crushed or cut

Red fescue *Festuca rubra*

- Very narrow, bristle-like leaves
- Very common in lawn mixes
- Leaf sheath is closed (on vegetative shoot) and hairy
- Can form swathes on coastal headlands



Creeping Bent *Agrostis stolonifera*



Agrostis stolonifera, A. capillaris (Common Bent)

Agrostis stolonifera

Stolons, purplish leaf sheaths, medium ligule (0.5 cm), with a point.
Inflorescence contracts after flowering

Agrostis capillaris

Stolons or rhizomes. Short ligule, not pointed

Crested dog's tail *Cynosurus cristatus*

Very distinctive in flower
Quite generic when not in flower

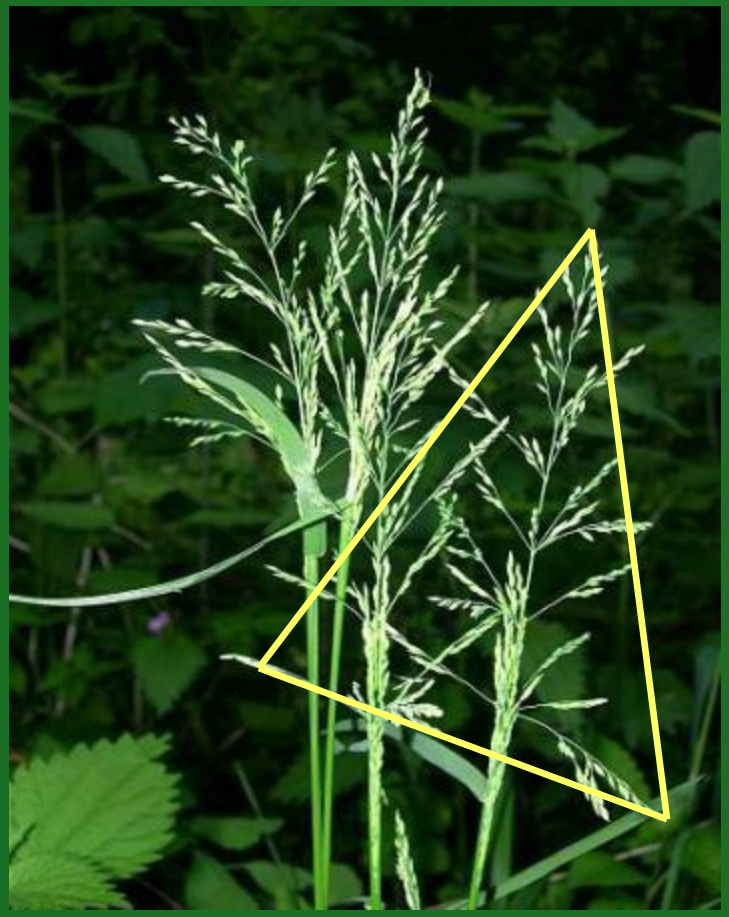
Perennial ryegrass *Lolium perenne*

Back of leaf is very **glossy** – gives shiny appearance to fields seeded with *Lolium*

Cock's-foot *Dactylis glomerata*

Forms tufts
Flattened shoot (leaves folded)
Long, pointed ligule

Rough meadow grass *Poa trivialis*



Triangular outline to inflorescence
Triangular , pointed ligule
Triangular leaf (tapering towards tip)

Leaf sheath colour

Poa trivialis sometimes develops purple colour on leaf sheaths, especially if recolonising bare ground

Not a very reliable character – other species also have purple sheaths

Annual meadow grass
Poa annua

Small, annual grass – usually dies back after flowering
Flowers more or less all year round
Likes trampled areas, e.g. paths, amenity grassland

Smooth meadow grass *Poa pratensis*

Purple Moor-grass *Molinia caerulea*

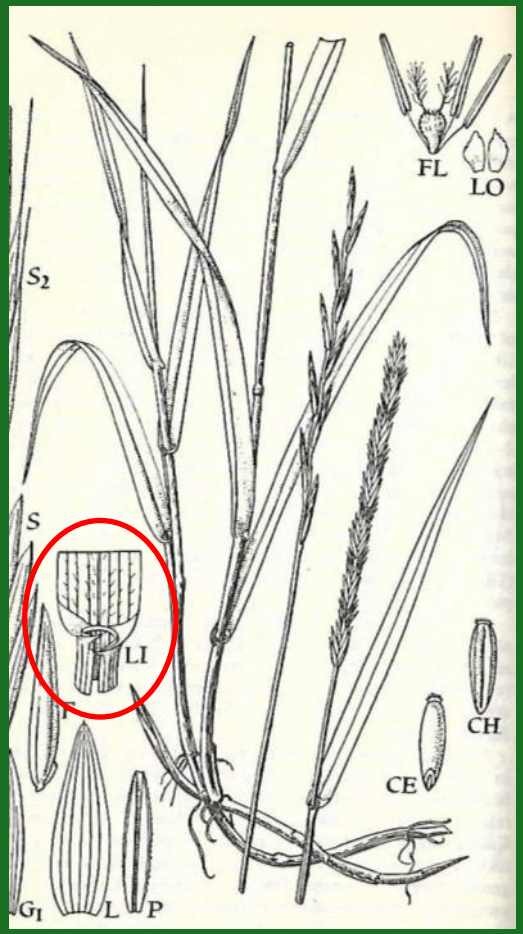
Deciduous – leaves all die back in winter
Forms tufts or tussocks
Leaves slightly hairy, **Ligule a fringe of hairs**

Quaking grass *Briza media*

Calcareous habitats
Easily knocked out by fertiliser, so it indicates good-quality semi-natural grassland

Very pretty! Other *Briza* species grown as ornamental grasses and used in flower arrangements

Couch grasses *Elymus (Elytrigia / Agropyron) repens, E. junceiformis*



Virtually no ligule

Large auricles clasping the stem

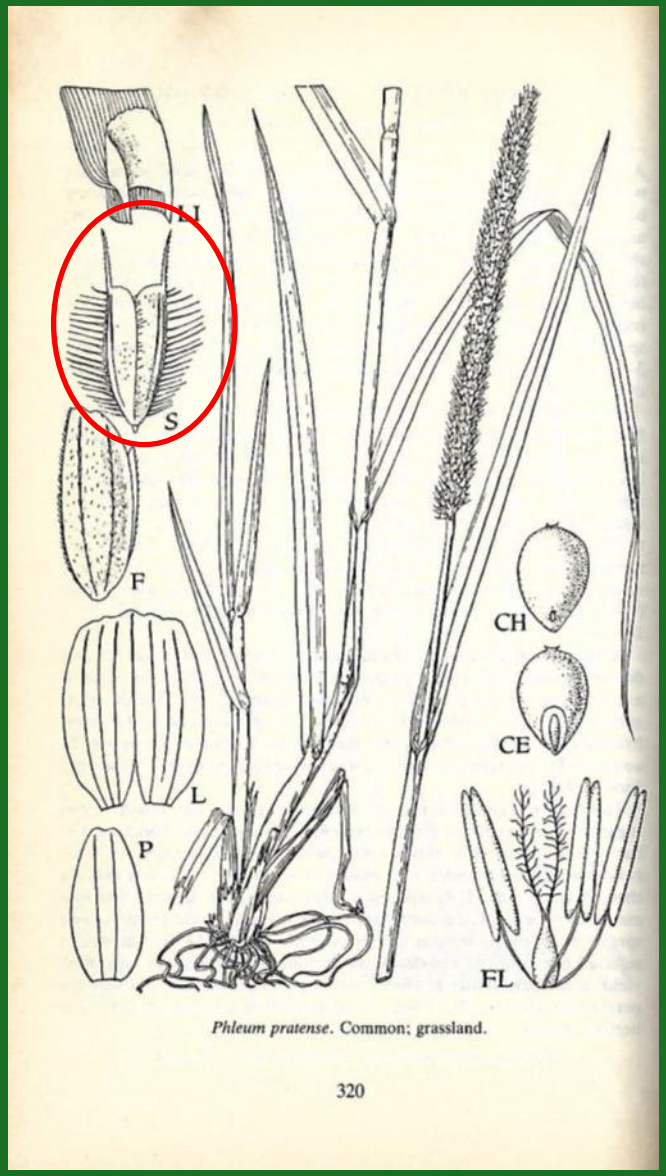
Spikelets are flat onto side of rachis, unlike *Lolium* spp.

Sand couch is greyish-green (waxy protection as it grows by the sea)

False Oat-grass *Arrhenatherum elatius*

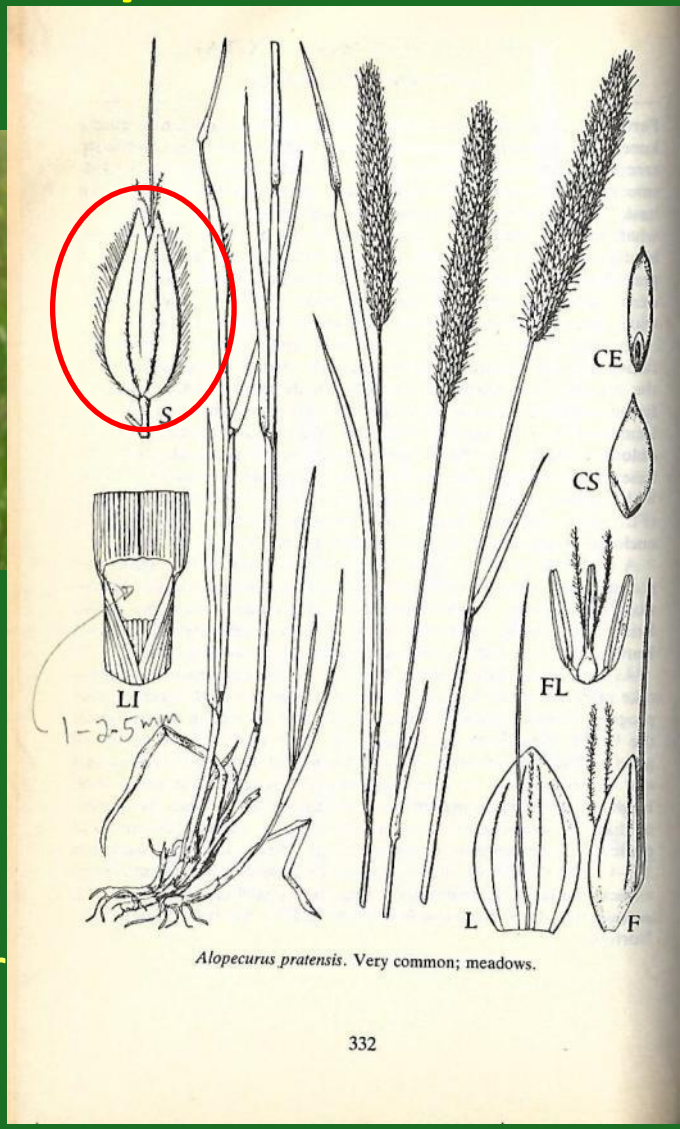
Large, tussocky grass – a strong competitor
Abandoned grassland, road verges, etc.
Very common, very visible, especially at this time of year

Timothy *Phleum pratense*



Meadow foxtail *Alopecurus pratensis*

Inflorescence is soft because of hairs; (Timothy's is rough)
Meadow Foxtail flowers early in year



Going further with Grasses

- Start with grasses you know!
- Initially – use of key and ID books
- Start small – get to know the common species really well
- Get used to looking for distinguishing features, e.g. bristle leaves, hairy plants, ligule composed of hairs, etc.
- Eventually: recognition

Going further with Grasses

- Vegetative ID: Lynda Weekes, next 2 Webinars
- Get out and start looking at grasses in flower NOW
- Get to know a botanist!
- Join BSBI, go out on the field outings

Míle buíochas
Thank you!

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