

Meadow-grasses (*Poa* spp.) & Bent grasses (*Agrostis* spp.)

Dr. Fionnuala O'Neill, MCIEEM
BEC Consultants Ltd.

 Botanical Society
of Britain & Ireland

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Photos: Fionnuala O'Neill/Rachel Merne

Irish Grasslands Project: An initiative of the BSBI

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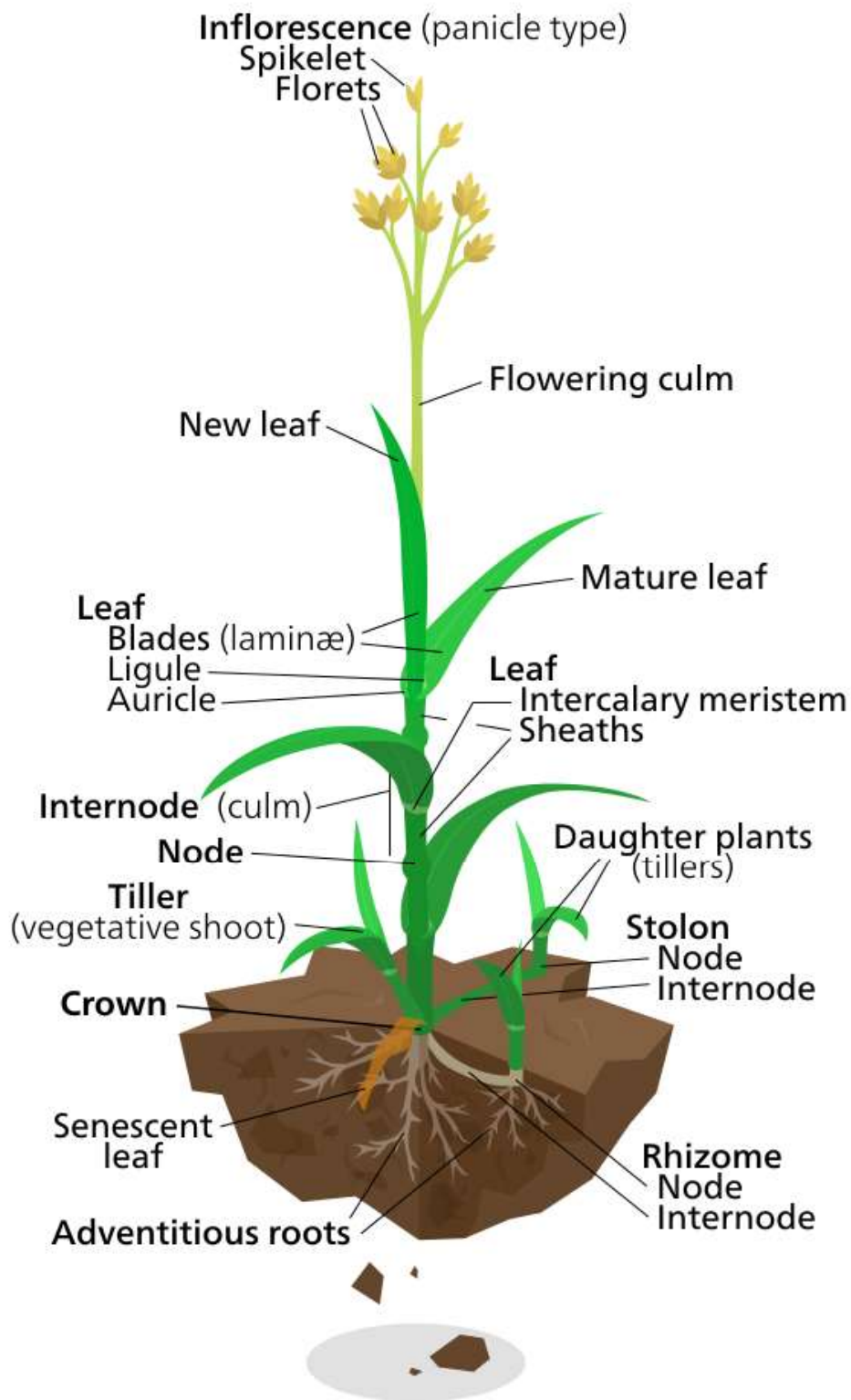
National Parks & Wildlife Service



**An Roinn Tithíochta,
Rialtais Áitiúil agus Oidhreachta**
Department of Housing,
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Today's Webinar

- Quick recap on structure of grasses
- Meadow-grasses – *Poa* spp.
 - Characteristics of the genus
 - What are the main species?
 - How do you distinguish them from each other?
- Bent grasses – *Agrostis* spp.
 - Characteristics of the genus
 - What are the main species?
 - How do you distinguish them from each other?



Structure of a typical grass plant

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

Grass leaf

- Two main parts:

– Blade (also called “Lamina”)

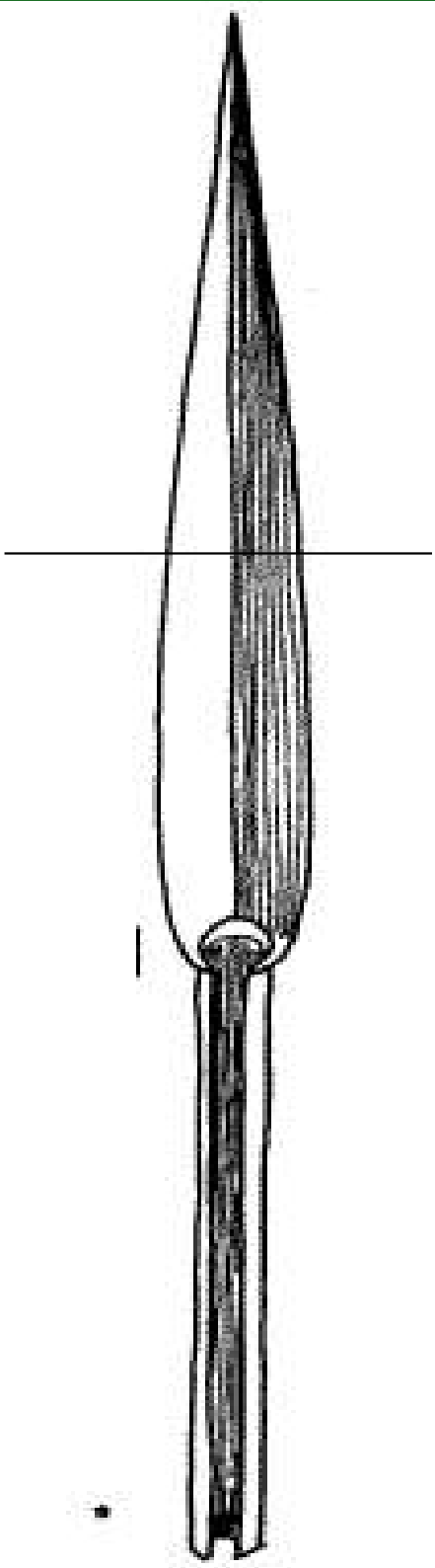
(further developments at junction between blade and sheath)

– Sheath

collar region |

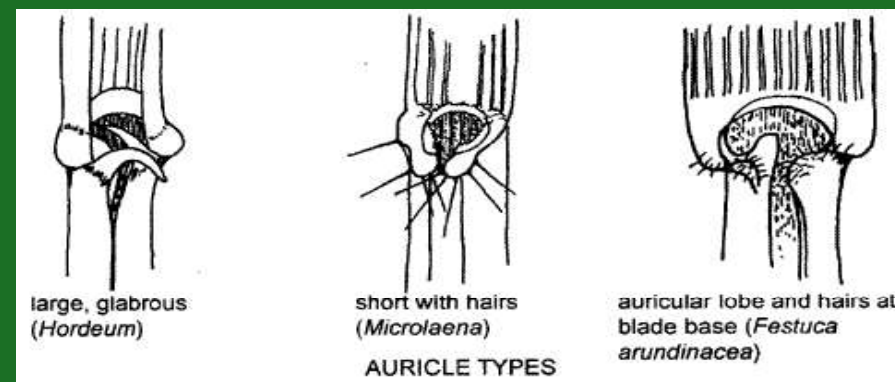
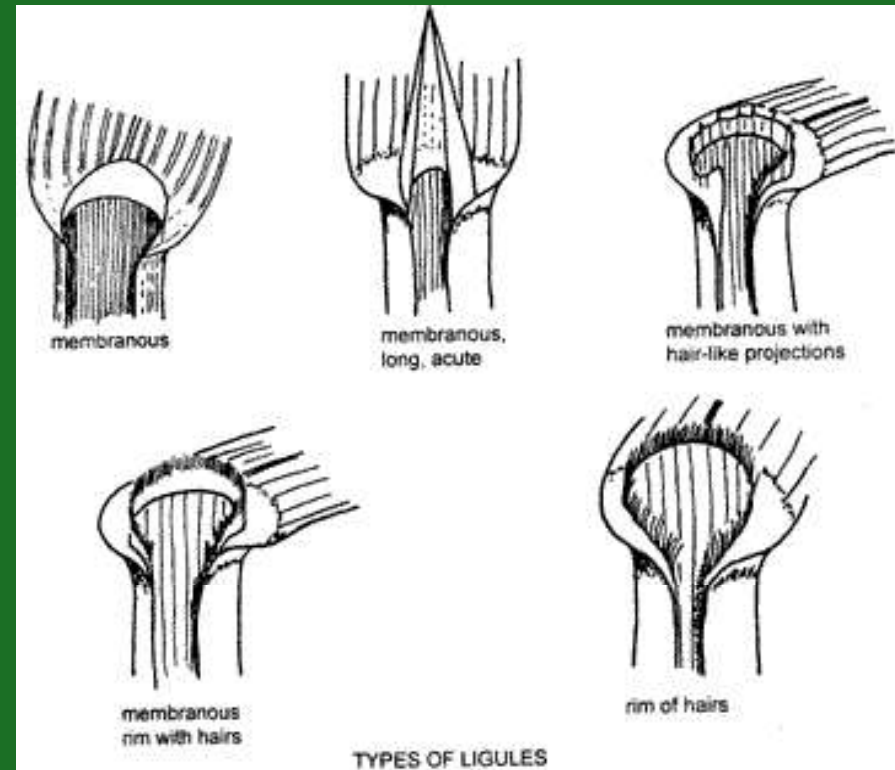
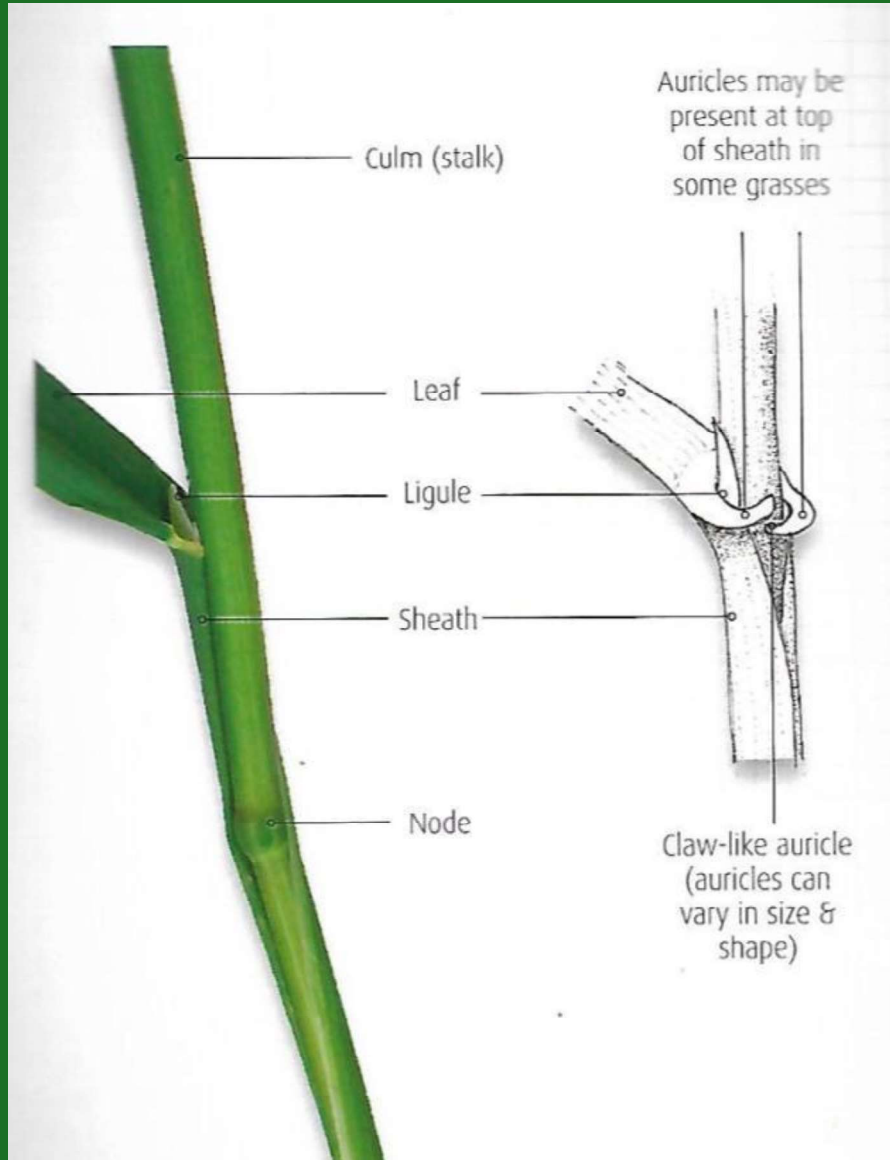


Does the leaf taper gradually?



- If you're not sure, fold the leaf over in half to see if the upper third of the leaf is the same width as the lower

Ligules and Auricles

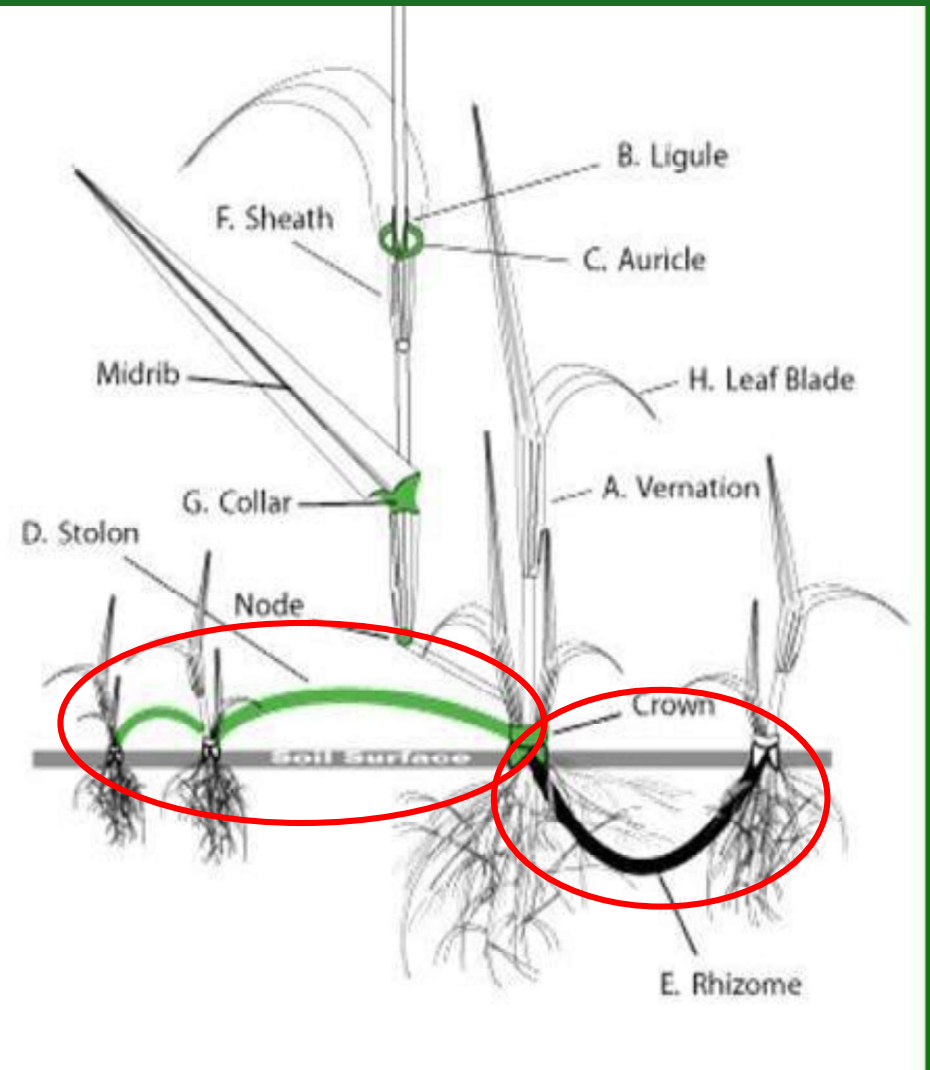


Ligules – A warning

- Ligules on flowering shoots are usually longer than those on vegetative shoots
- Make sure you know which type your key is referring to!
 - e.g. if using a vegetative key, only look at ligules on non-flowering shoots
 - if using a key to flowering grasses, check the 2nd or 3rd ligule from the top of the flowering shoot

Vegetative spread

- Above-ground horizontal stems (**stolons**)
- Below-ground horizontal stems (**rhizomes**)
- Very short rhizomes = tufted plants
- Long rhizomes give rise to large patches of grass, e.g. *Holcus mollis* – Creeping Soft-grass





← Creeping habit



Tufted habit →

Stolons in *Agrostis stolonifera*



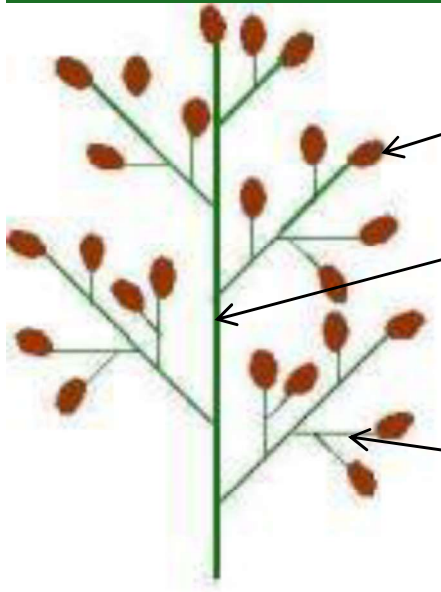
Photo: Fionnuala O'Neill

Structure of grasses:

Reproductive (i.e. flower head)

- Inflorescence: In *Poa* and *Agrostis* the flowering head is a loose **panicle** which bears many **spikelets**
- Each spikelet is held on a **pedicel** (stalk) and consists of:
 - Lower (outer) and Upper (inner) **glumes** – protect developing spikelet
 - One or many **florets** = Flower + 2 bracts
 - 2 bracts
 - **Lemma** (larger, outer: curved or keeled)
 - **Palea** (smaller, inner, 2 margins reflexed inwards, flattened on the back)
 - Flower
 - Stamens (anther + filament)
 - Pistil (Stigma + style + ovary)
 - 2 lodicules (remnants of sepals/petals)

Structure of the panicle (e.g. *Holcus lanatus*)



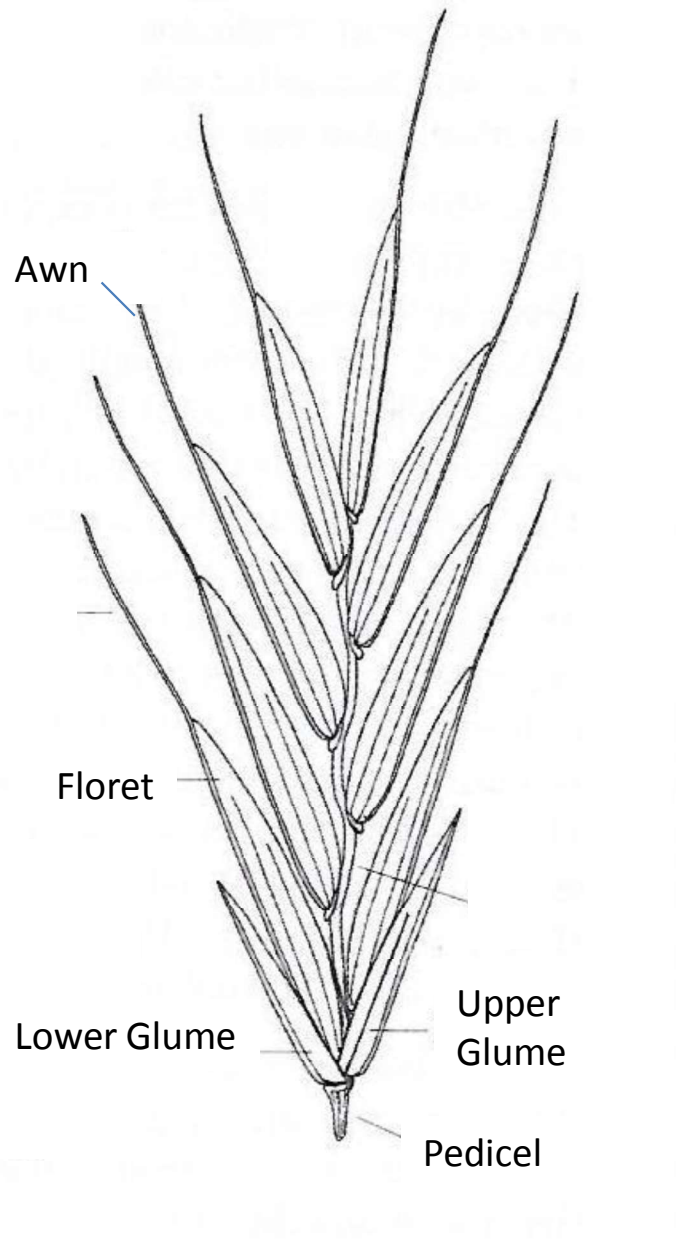
Spikelet

Rachis of inflorescence

Spikelet of *Poa* and
Agrostis spp. is attached
to rachis via tiny stalk
(pedicel)



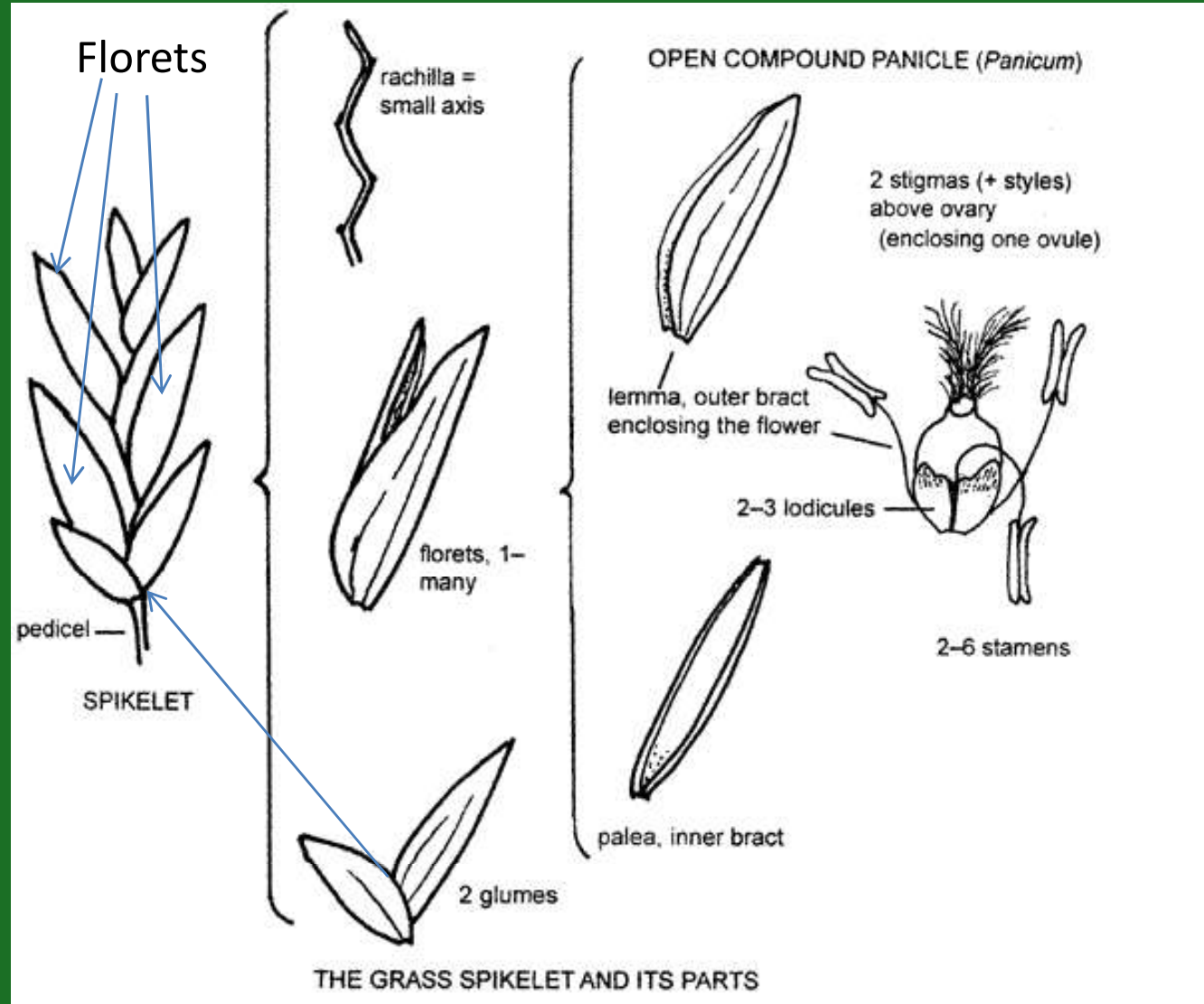
The Spikelet



The Spikelet

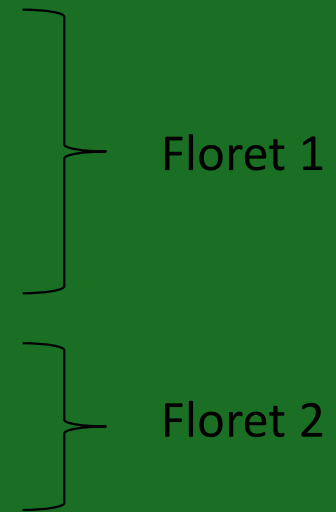
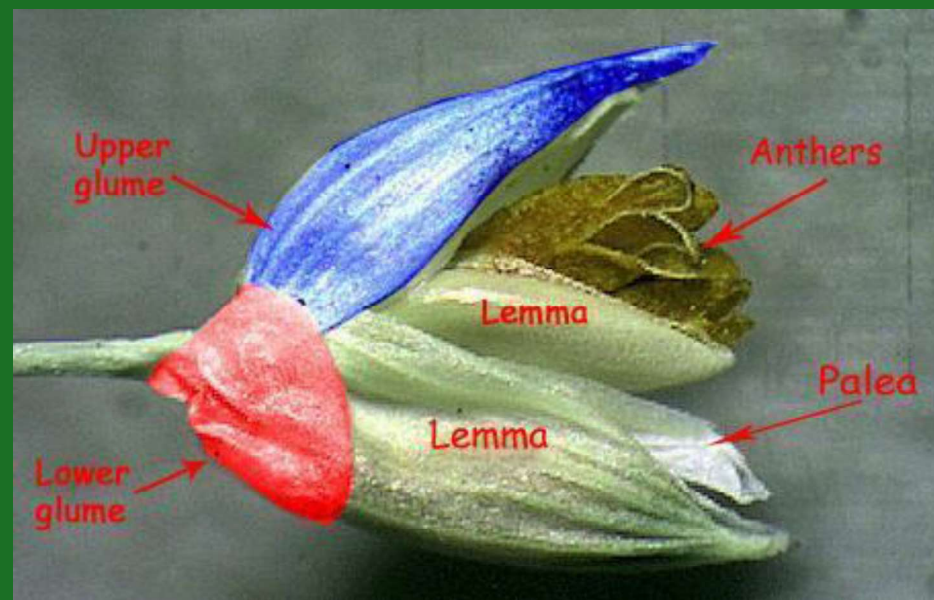


Walter Obermayer



Spikelet structure

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



Things to check in the spikelet

- How many florets are there?
 - e.g. *Agrostis* = 1 floret per spikelet, *Poa* = 2 or more
- Glumes (base of spikelet): are they the same size, sub-equal or different sizes?
- How many veins on each of the glumes? How many veins on the lemma?
- Is there an awn? If so, where?
 - Glume or lemma?
 - Arising from the tip or from down the back?
 - Is it straight or bent?

Bent grasses (*Agrostis* spp.)



Photo: Rachel Merne

Agrostis spp.

- Includes some VERY common species
- Very variable genus – variations even within species
- One floret per spikelet
- Gives plants a delicate, feathery appearance
- ... Also makes it difficult to see floret details!

Vegetative characteristics of *Agrostis* spp.

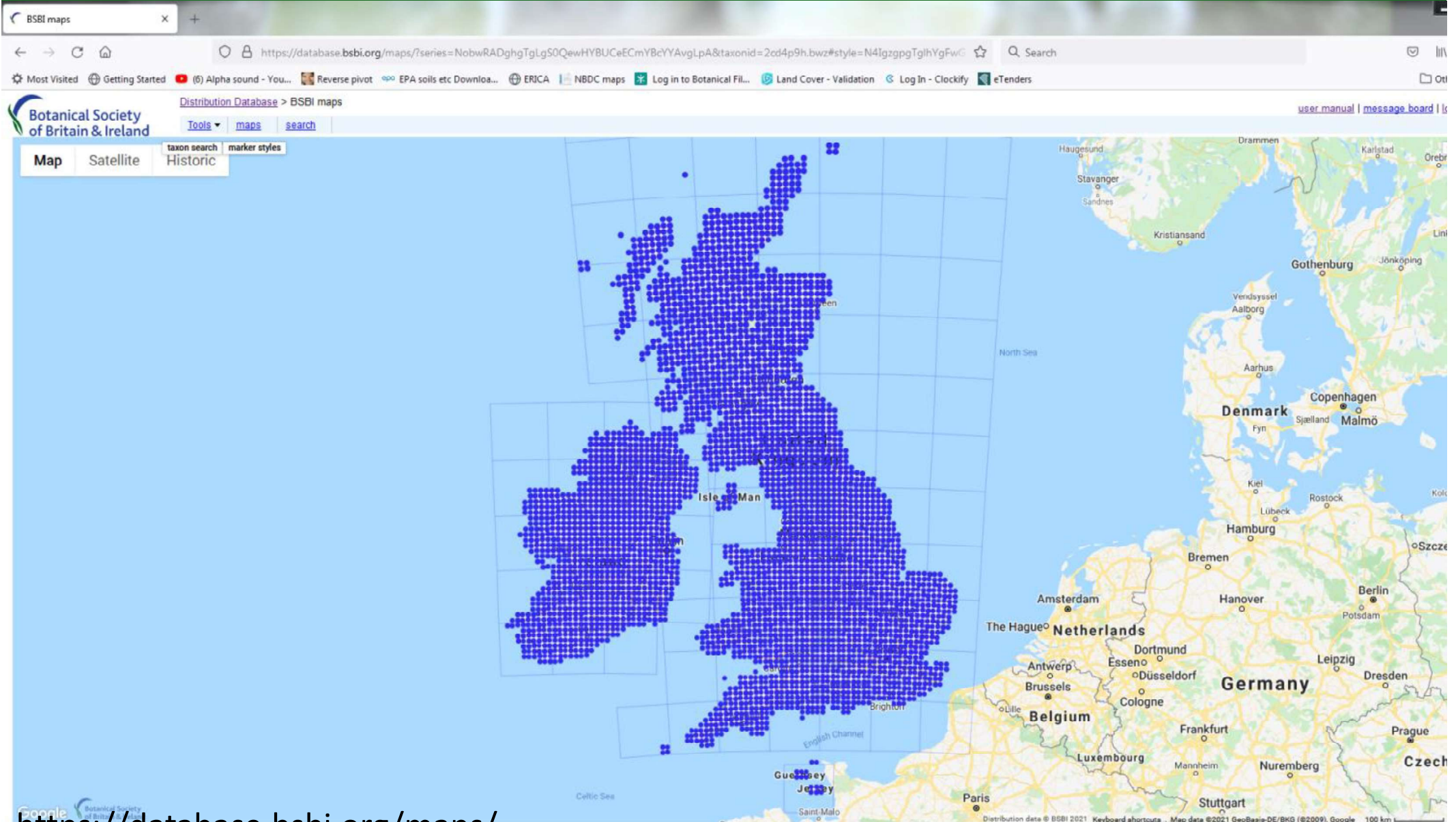
- Flat, finely tapering leaves, sometimes more bristle-like (e.g. *A. vinealis*)
- Shoot rounded, not flattened
- Youngest leaf rolled in the shoot
- Leaves hairless
- Ligules from short and blunt to long and pointed
- Auricles absent
- Leaves ribbed (some more strongly than others)

Agrostis species in Ireland

Common Name	Scientific Name	No. of records in NBDC*
Creeping Bent	<i>Agrostis stolonifera</i>	11,634
Common Bent	<i>Agrostis capillaris</i>	7,380
Velvet Bent	<i>Agrostis canina sensu stricto</i> (= <i>A. canina</i> ssp. <i>canina</i>)	2,472
Brown Bent	<i>Agrostis vinealis</i> (= <i>A. canina</i> ssp. <i>montana</i>)	529
Black Bent	<i>Agrostis gigantea</i>	119
Rough Bent	<i>Agrostis scabra</i>	1

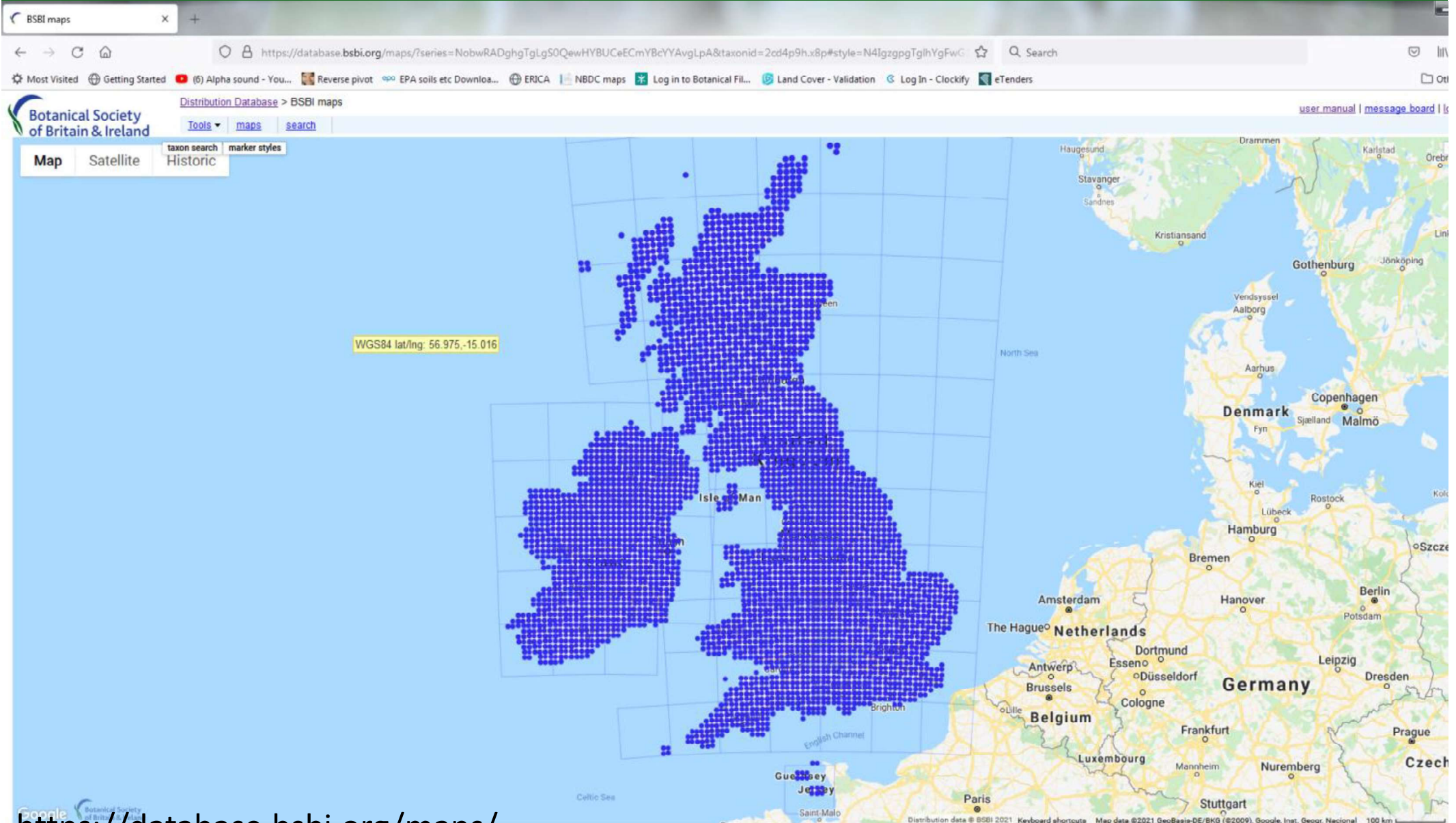
* National Biodiversity Data Centre: <https://maps.biodiversityireland.ie>

Agrostis stolonifera – Creeping Bent



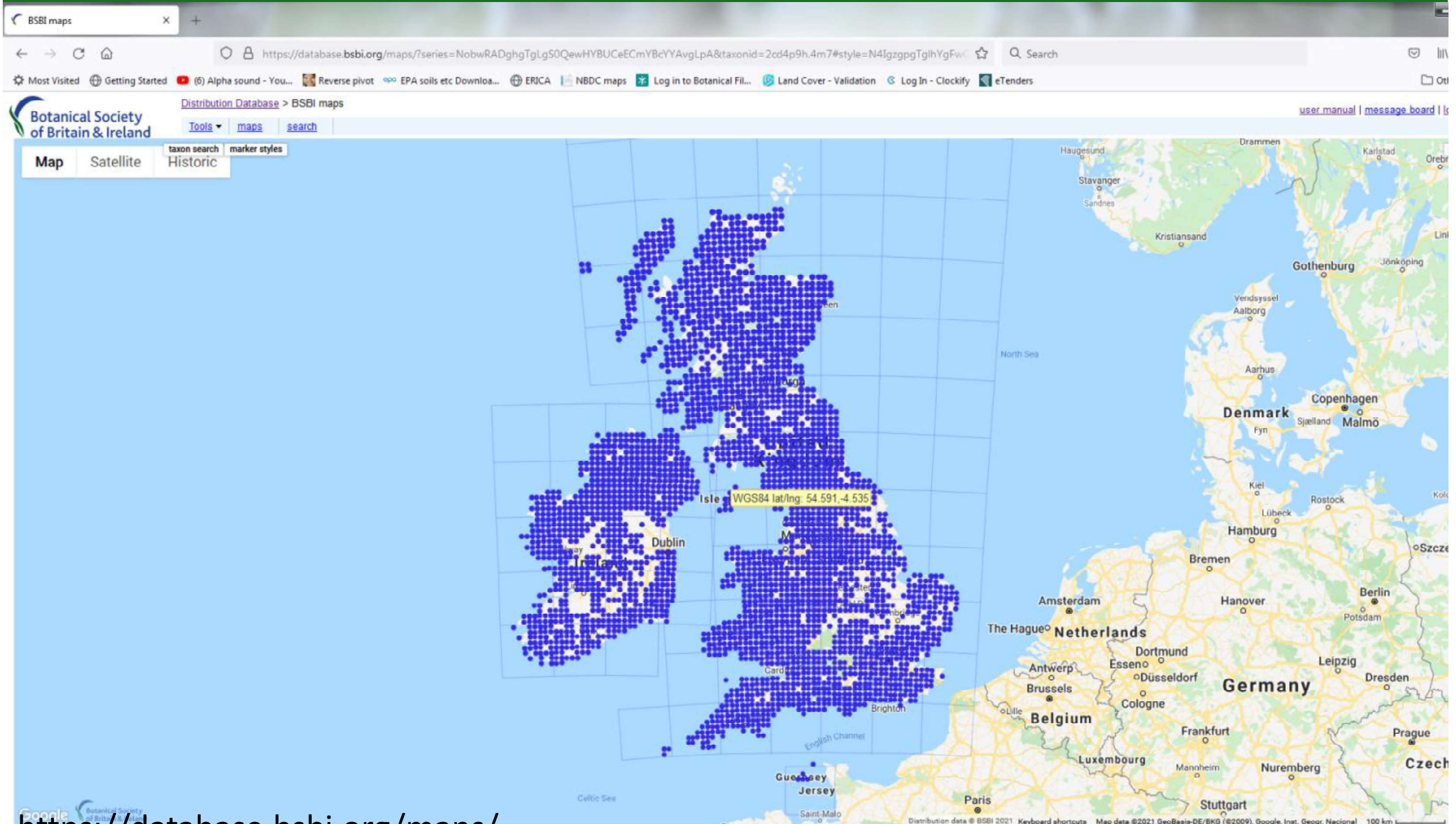
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Agrostis capillaris – Common Bent



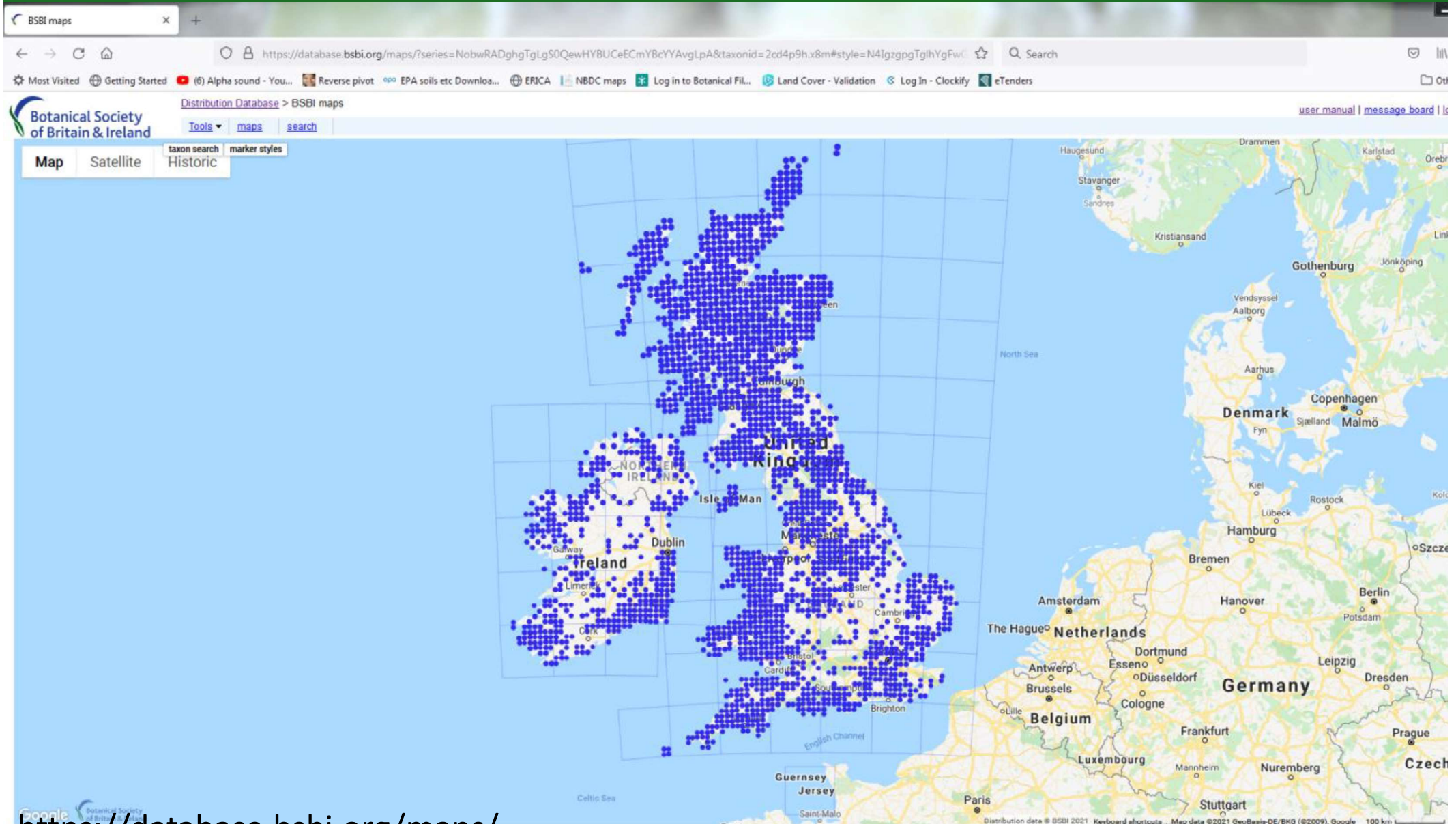
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Agrostis canina – Velvet Bent



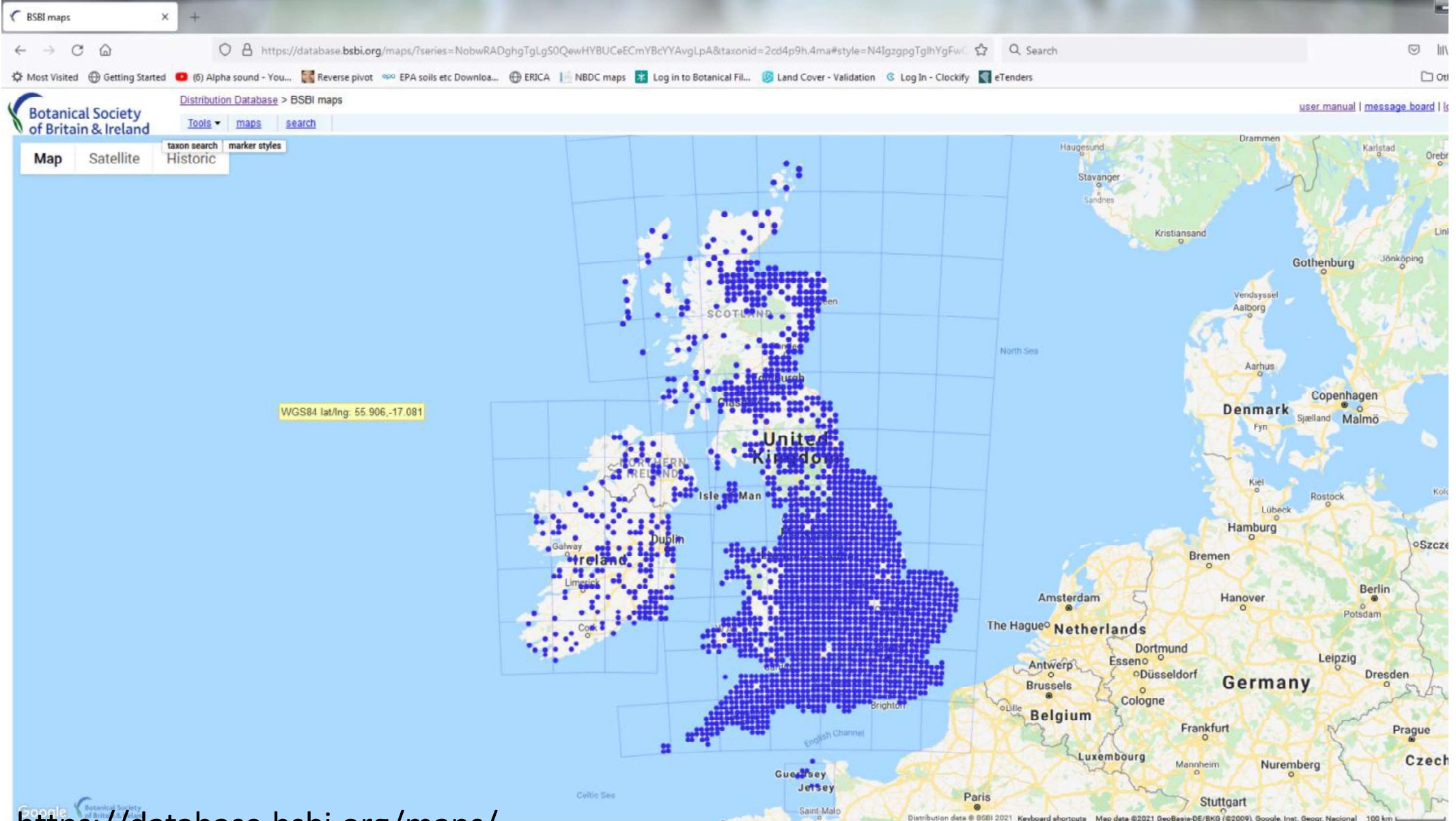
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Agrostis vinealis – Brown Bent



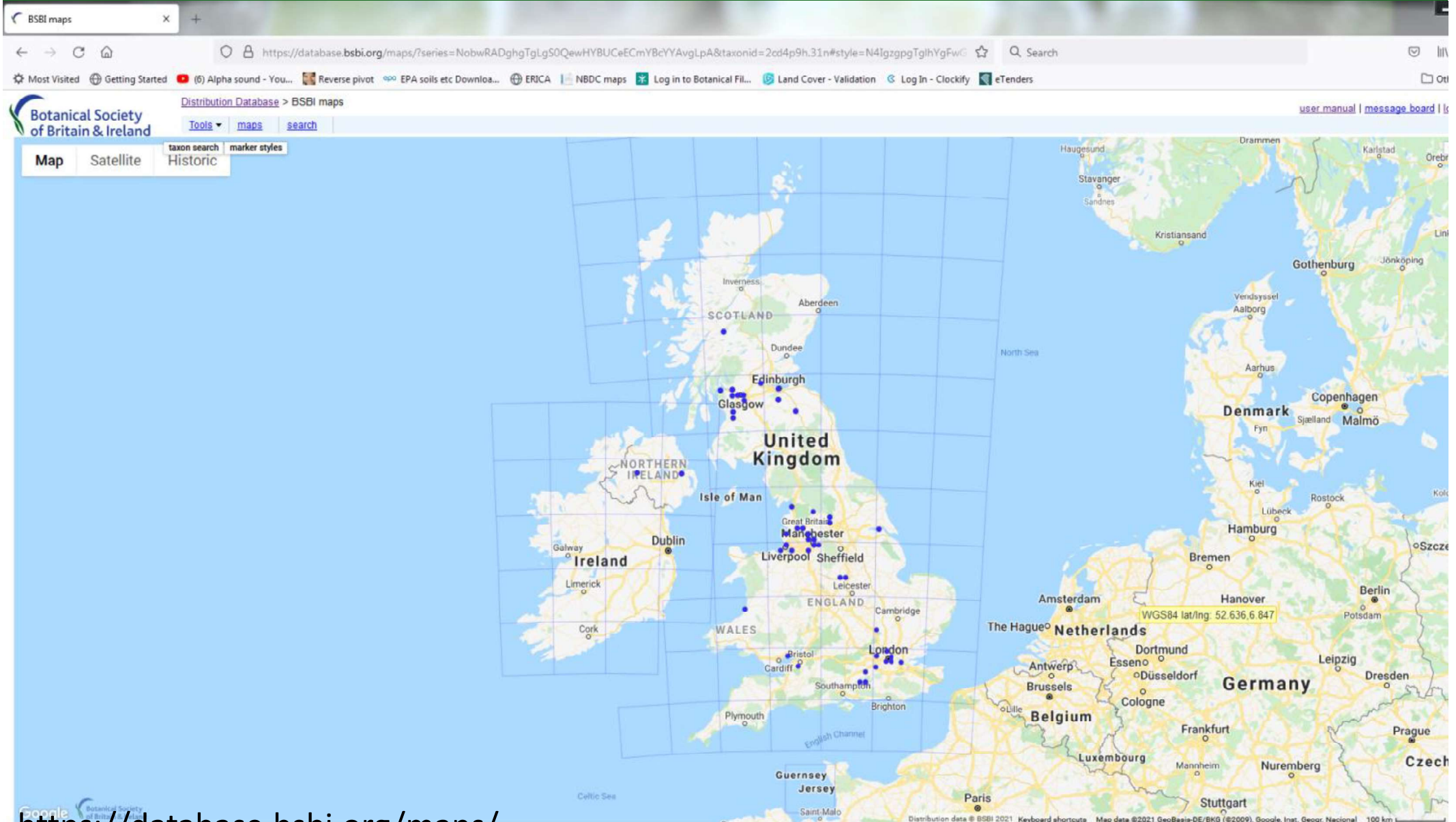
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Agrostis gigantea – Black Bent



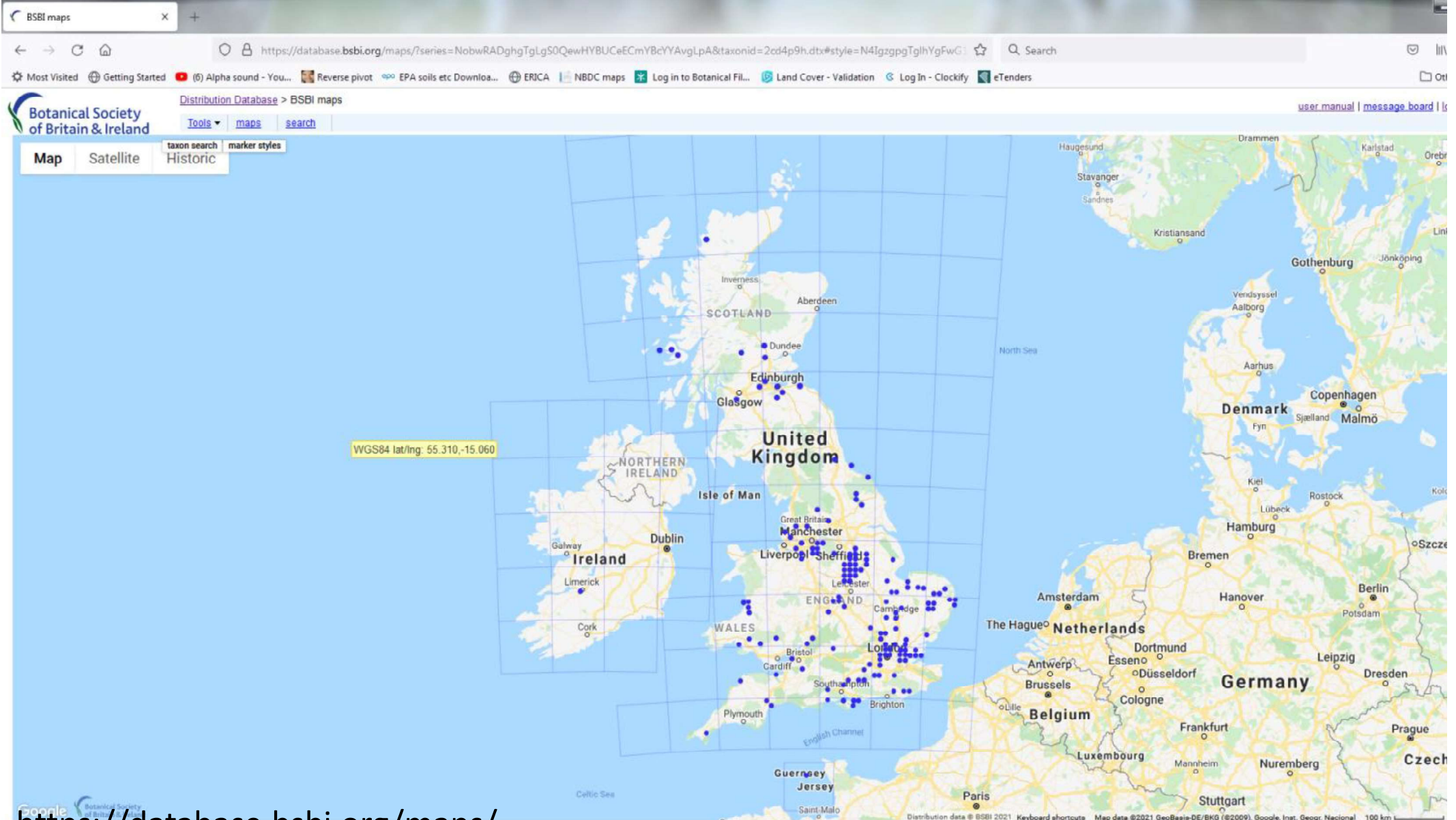
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Agrostis scabra – Rough Bent



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Agrostis castellana – Highland Bent

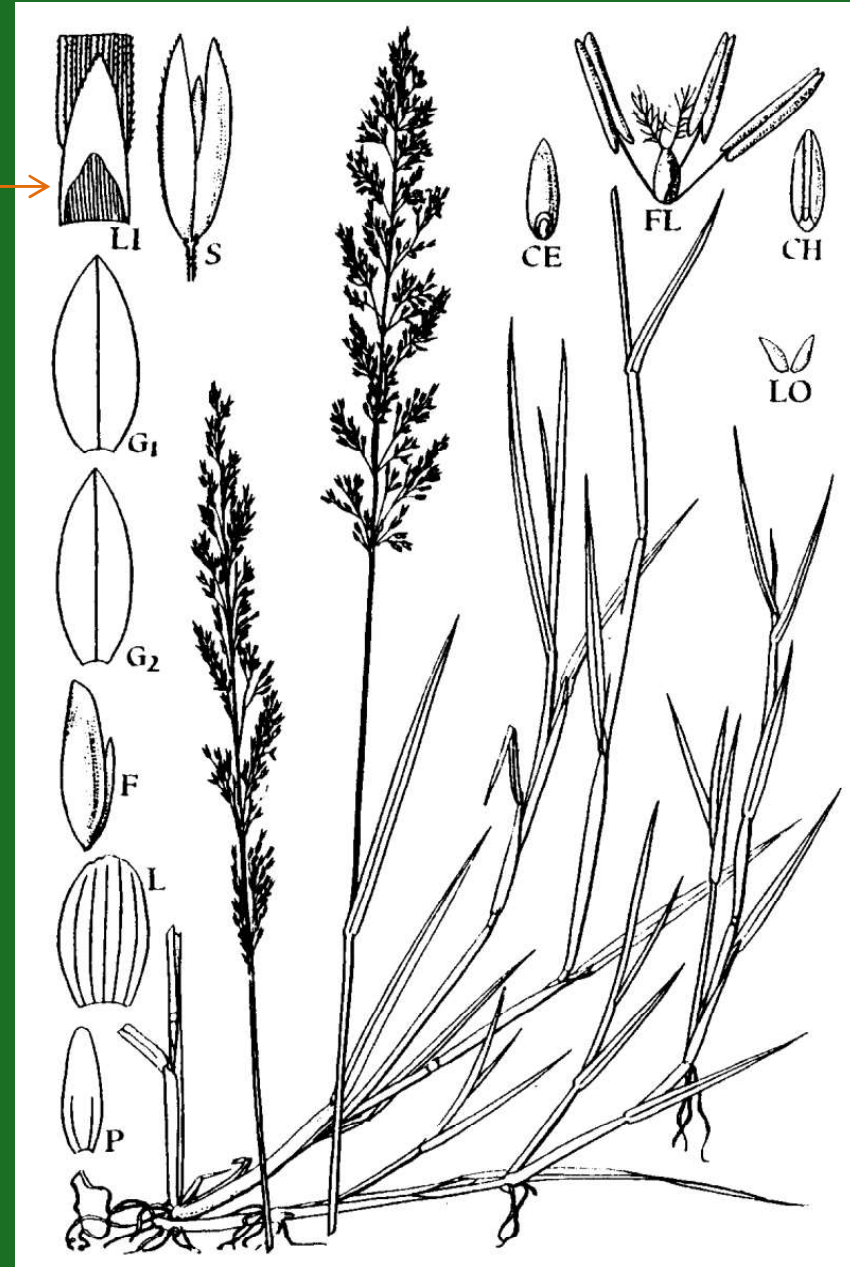


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Agrostis stolonifera - Creeping Bent



Ligule may be more truncate and ragged than this



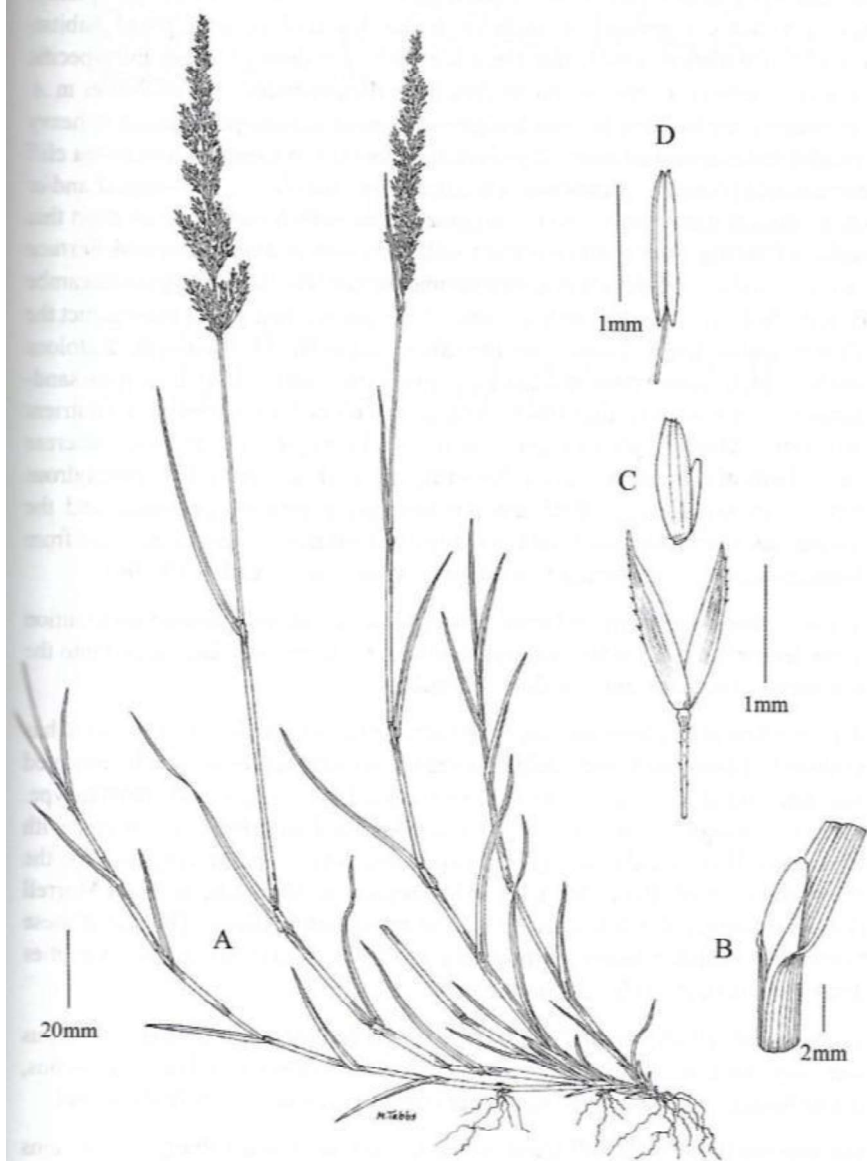
A. stolonifera in inundation grassland: Often a mono-specific sward or with, e.g. *Glyceria fluitans* or *Persicaria amphibia*



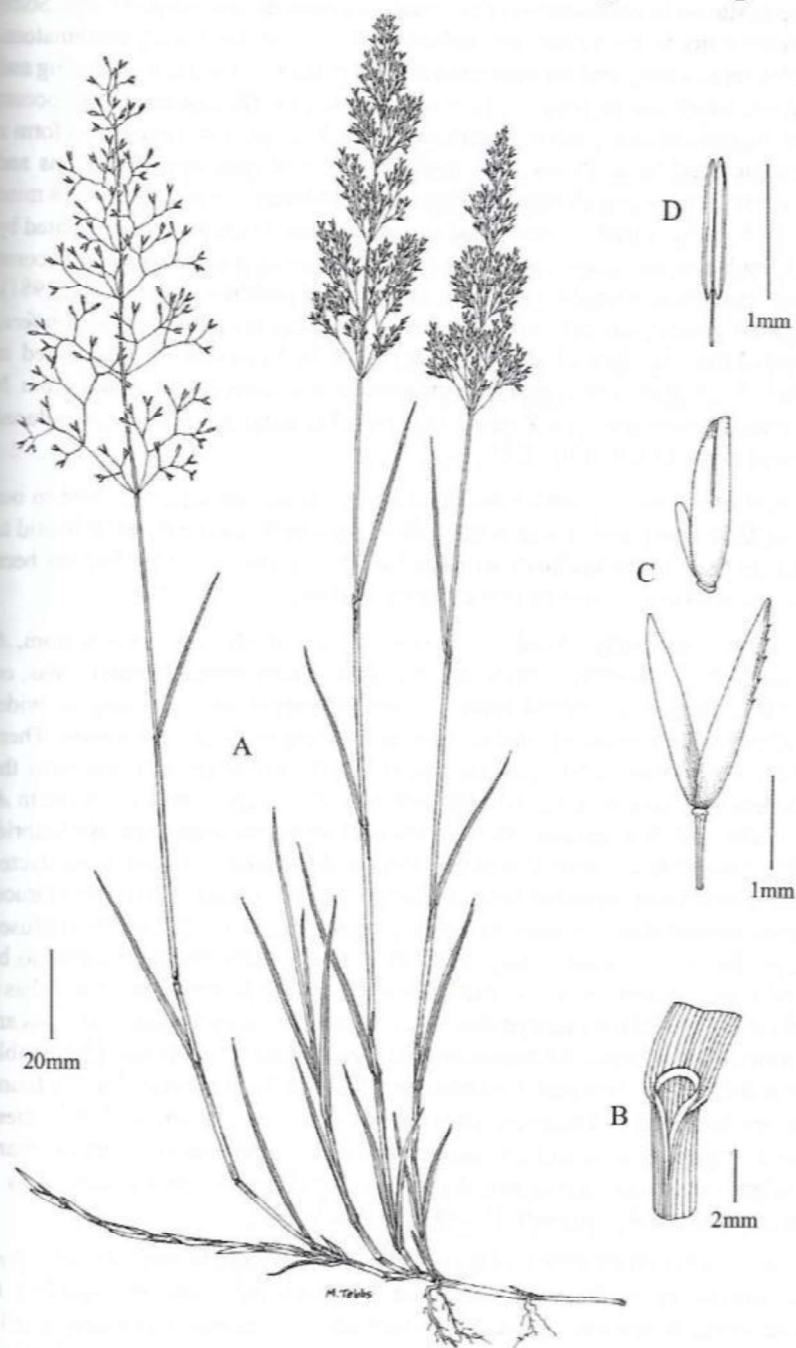
Agrostis capillaris – Common Bent



- Inflorescence usually very fine and delicate
- Very open panicle
- Favours dry, acidic conditions
- Leaves may be soft or stiff
- Tufted, spreads by short rhizomes, sometimes by stolons



Agrostis stolonifera: A, habit; B, ligule; C, spikelet with floret detached from glumes; D, anther.



Agrostis capillaris: A, habit; B, ligule; C, spikelet with floret detached from glumes; D, anther.

Agrostis stolonifera vs. *A. capillaris*



Agrostis stolonifera

- Stolons; purplish leaf sheaths; medium ligule with a point, often ragged
- Often in damp or inundated habitats, but grows pretty much everywhere
- Inflorescence contracts after flowering



Agrostis capillaris

- Stolons or rhizomes; short ligule, not pointed, "flat cap"
- Favours drier habitats, espec. poor, acidic soils
- Inflorescence usually more delicate than *A. stolonifera* and remains open after flowering

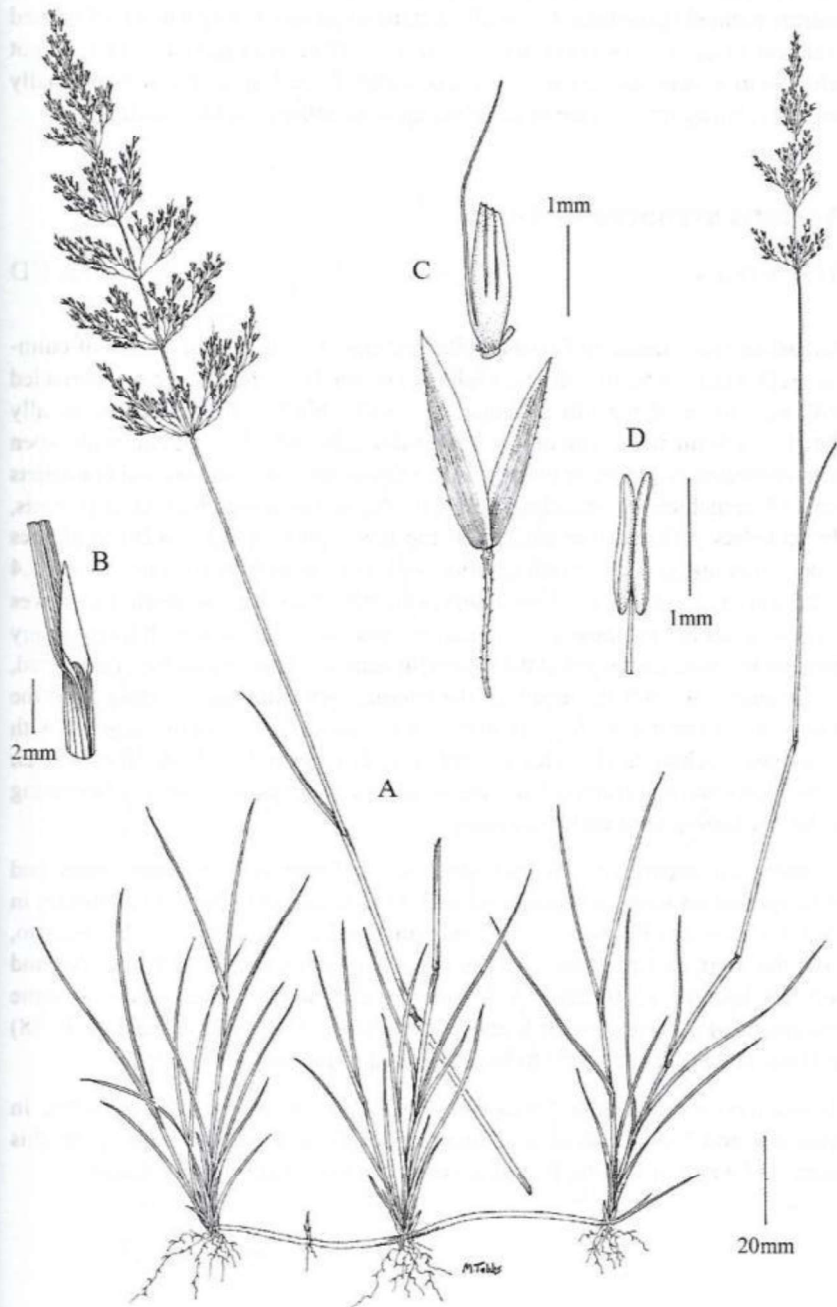
Agrostis canina – Velvet Bent

- Long, pointed ligule (2-4mm)
- Tufted, with slender creeping stolons
- Leaves bright green (or grey-green)
- Leaves soft and narrow, 1-3 mm wide
- Lemma may have awn (variable)
- Favours damp or wet places; can be locally abundant, forming soft carpet

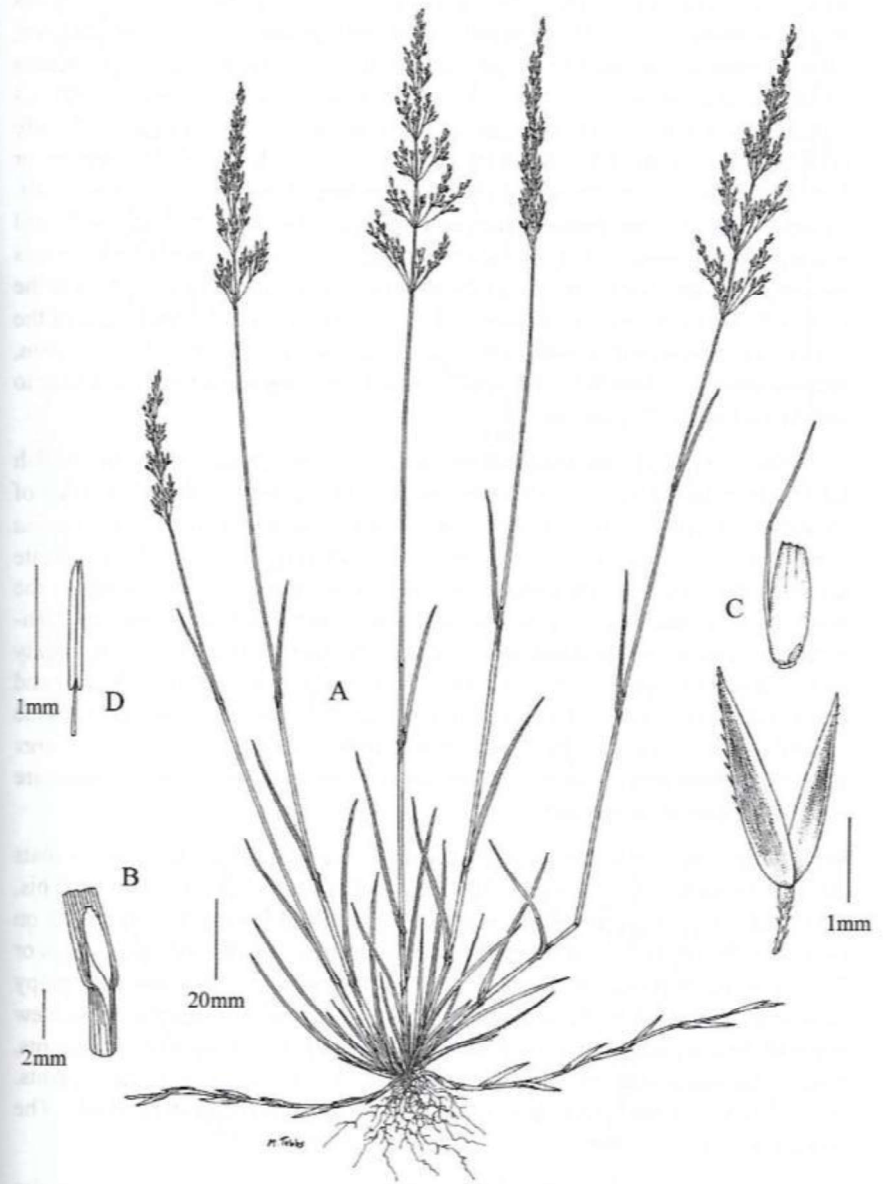
Agrostis vinealis – Brown Bent

- Long, pointed ligule (1-5 mm)
- Densely tufted, spreads via scaly underground rhizomes
- Leaves green (or grey-green)
- Leaves stiff and narrow, 1-3 mm wide
- Lemma may have awn (variable)
- Favours dry habitats (acid or calcareous)

- *A. vinealis* formerly known as *A. canina* spp.
montana
- Probably under-recorded as often overlooked



Agrostis canina: A, habit; B, ligule; C, spikelet with floret detached from glumes; D, anther.



Agrostis vinealis: A, habit; B, ligule; C, spikelet with floret detached from glumes; D, anther.

Agrostis canina vs. *Agrostis vinealis*

- Habitat
 - *A. canina* – generally wet places
 - *A. vinealis* – generally dry places
- Leaves
 - *A. canina* – leaf blades limp, cover area like a soft green carpet
 - *A. vinealis* leaves are firm
- Post-flowering inflorescence
 - *A. canina* inflorescence usually stays open
 - *A. vinealis* inflorescence usually contracts

Agrostis canina vs. *Agrostis vinealis*

- Upper glume
 - *A. canina* only has 1 vein
 - *A. vinealis* may have 3 veins: 1 long central vein + 2 short side veins

Image acknowledgements

Line drawings from BSBI Handbook no. 13 “Grasses of the British Isles” by T. Cope & A. Gray (2009)

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Go raibh míle maith agaibh!
Thank you!



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