TRICKY & OVERLOOKED GRASSES

and how useful are side-by-side synopses
to VC recorders to help their recorders learn their plants ?

Some excerpts from Essex Botany Nos: 1-13

Ken Adams 2022

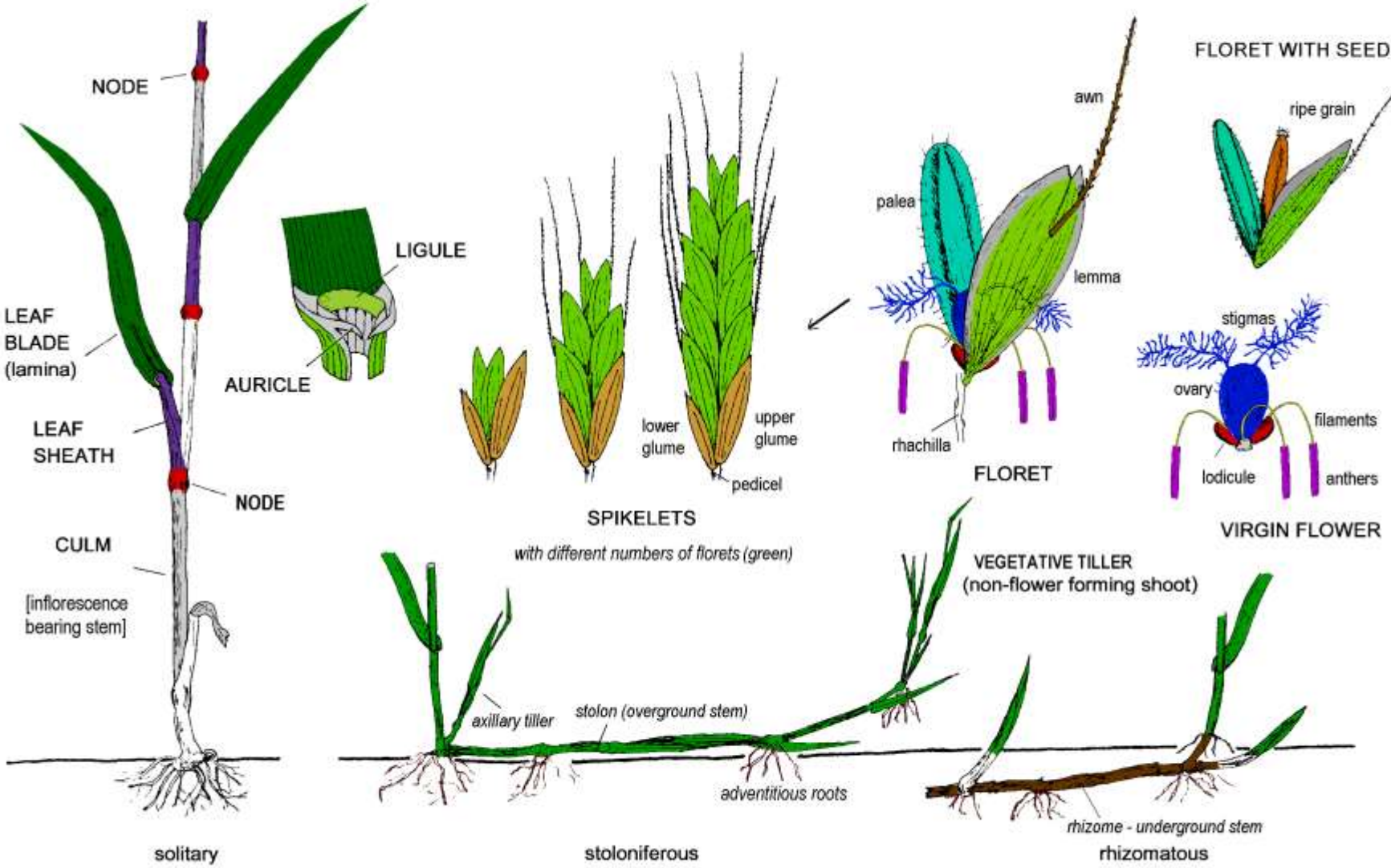
GRASS IDENTIFICATION

A KEY TO GRASS GENERA

BASED ON SPIKELETS & LIGULES

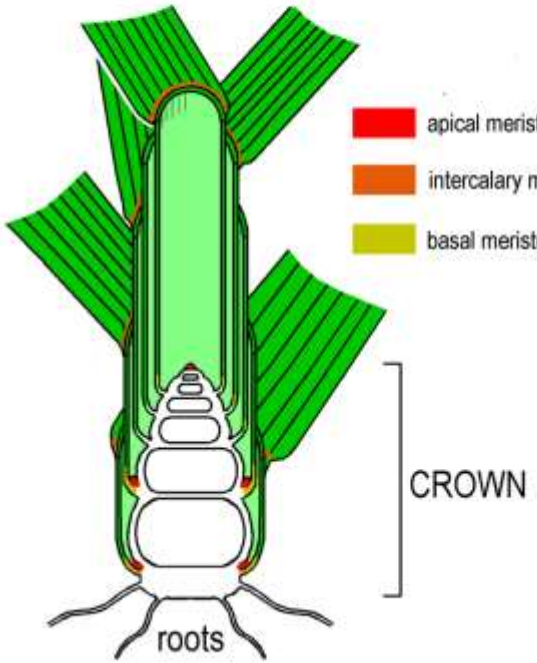
ESSEX BOTANY No: 13. 2018.

GRASS STRUCTURE



GLOSSARY

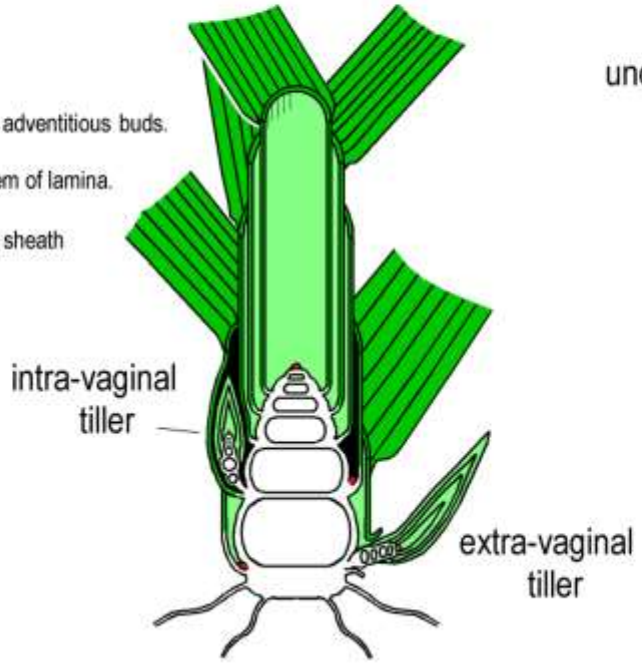
ANATOMY OF GRASS GROWTH



The apical meristem buds off cells downwards that differentiate alternately into solid segments bearing leaf primordia and hollow internodes, the latter remaining tightly compressed unless triggered into extension growth to form a culm [a flowering stem].

The meristems at the base of the laminas and those at the base of the sheaths enable these organs to be regenerated if the laminas or sheaths are cut off by mowing or grazing.

The CROWN remains at the base of the vegetative tiller and can regenerate it from its apical and lateral buds. Once committed to a culm tiller it is carried aloft and cannot regenerate a culm if cut off.

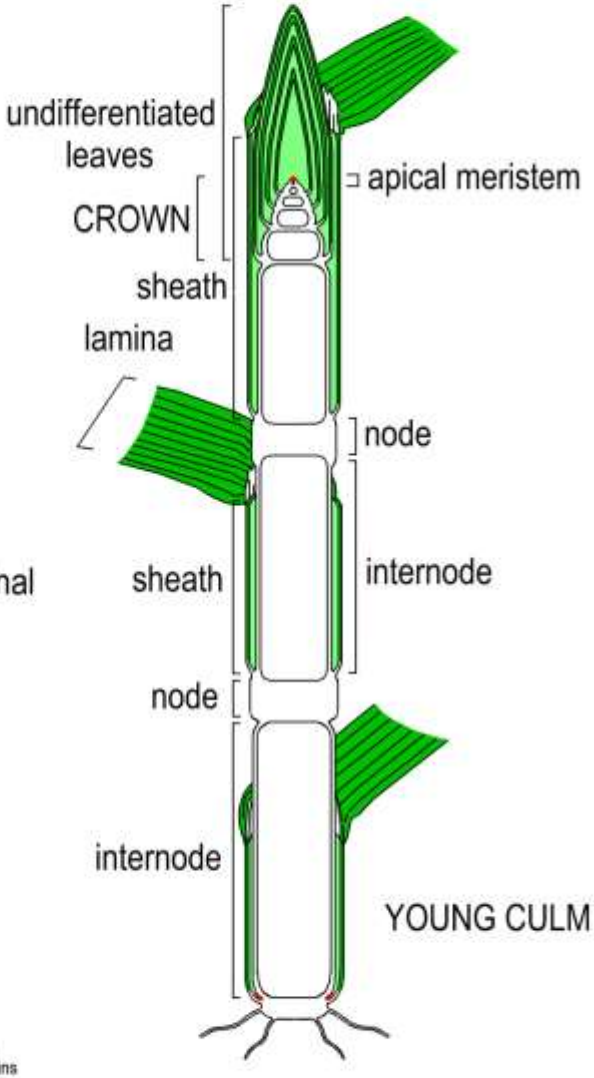


An intra-vaginal tiller arises from an adventitious bud in the axil of a sheath without puncturing it.

An extra-vaginal tiller arises from an adventitious bud that grows out horizontally breaking through one or more existing sheaths.

To an agronomist a 'tiller' is a grass plant arising from a crown, hence vegetative and culm tiller. Also in a stricter sense a side shoot arising from a lateral bud, the usage of the term more familiar to a botanist.

[Cereals are rolled after germination with heavy cast-iron rollers to damage the apical cell of the crown, and induce several lateral culm tillers to emerge, each developing a head of grain. Plant breeders are now developing new strains with less apical dominance so the plants now develop 4-5 tillers on their own].



Spikelet Gizz

Species numbers: native (alien)

Poa
Meadow-grasses
12 (3)

Puccinellia
Salt-marsh grasses
4

Glyceria
Sweet-grasses
5 (1)

Anisantha
Bromes
1(6)

Bromus
Bromes
4 (11)

Festuca
Fescues (perennial)
10 (3)

Vulpia
Fescues (annual)
4 (3)

Cynosurus
Dog's-tails
1 (1)

Agrostis
Bents
6 (5)

Arrhenatherum
False-oat grass
1

Trisetum
Yellow-oat grass
1

Avena
Oats
(6)

Holcus
Soft-grasses
2

Hordeum
Barleys
3 (7)

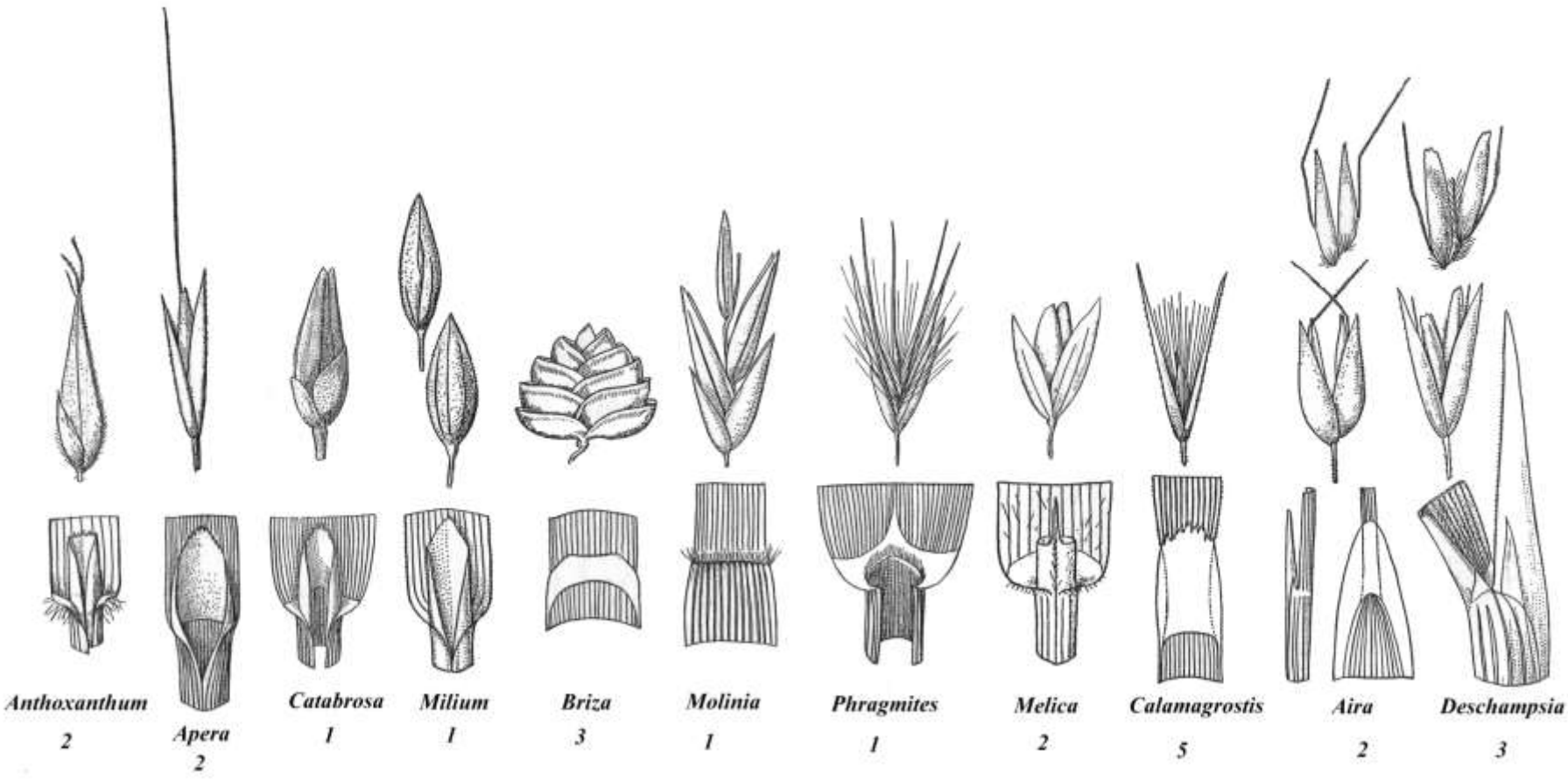
Phleum
Cat's-tails
5

Alopecurus
Fox-tails
6

Drawings sketched by Charles Hubbard © & redrawn by Joan Sampson.

Genera with branched panicles that have morphologically unique spikelets and/or ligules.

[numbers refer to the number of species in each genus in the UK flora.]



Drawings sketched by Charles Hubbard© & redrawn by Joan Sampson.

BEGINNER'S KEY TO GRASS GENERA

(this key is designed to be used in conjunction with GRASSES by C.E. & J.C.E. Hubbard 3rd edition 1984 (still in print).

ISBN 978-0-14-013227-4

[Devised by Ken Adams and tested against 8 cohorts of FSC students]

How to use the key. If a statement fits, move to the number indicated, if not try the one in brackets.

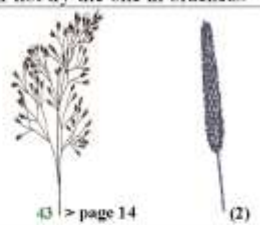
Inflorescence Terms:

Panicle = branched inflorescence, with main axis, side branches and branchlets [left]

Raceme = unbranched inflorescence with spikelets stalked directly to main axis

Spike = unbranched inflorescence bearing stalkless spikelets

Spike-like = resembling a true spike, applied to dense racemes and panicles [right]



1 Flower head an open panicle with spikelets on long clearly visible stalks ..... 43 **or (2)**

43 > page 14 (2)

2 Flowering stem (culm) terminated by one dense elongated cluster of spikelets, the spikelets appearing to be stalkless or only with very short stalks (pedicels) and attached directly to the main unbranched axis..... **5 or (3)**

3 Flowering stem culminating in a bunch of several finger-like clusters of stalkless spikelets..... **10 or (4)**

4 Flower head a dense spike-like panicle with one or more spikelets on short branches **18**

5 Flower head single, dense cylindrical, spike-like, with many spikelets arising from and crowded evenly all round the main axis (not just on one or two sides)..... **8 (6)**

8

6 Flower head with spikelets arising in one or more rows on just one side of the axis..... **12 (7)**

7 Flower head with spikelets arising on just two sides of the axis..... **28**

8 Spikelets rough with large pointed glumes that completely enclose the rest of the spikelet and have fringes of stiff hairs. Lemmas awnless. Spikelets detach when ripe leaving glumes attached to the axis ..... try *Phleum* Cat's tails **or (9)**

two common mesotrophic grassland species **p.314 - 324 (Hubbard)**

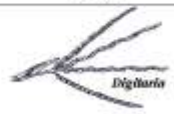
9 Spikelets soft, lemmas usually awned, glumes never awned, large, with fringes of soft hairs, and falling with the ripe spikelets ..... try *Alopecurus* Foxtails **or (26)**

spikelets of three species of *Alopecurus*

three common grassland/wetland and several rarer species

p. 325 - 335 (Hubbard)

10 Finger-like clusters of spikelets attached near to each other at base, spreading out like fingers..... try *Digitaria* and *Cynodon* **or (11)**



Digitaria

alien grasses of waste ground, roadsides, alleyways and (Cynodon) sandy shores **p. 368 - 371**
p. 360 - 361

11 Finger-like clusters of spikelets attached with noticeable gaps at base..... try *Spartina* and *Echinochloa*

Spartina

maritime mud flats (S) waste ground, alleyways, roadsides - bird seed aliens (E) **p. 351 - 359**
p. 362 - 363

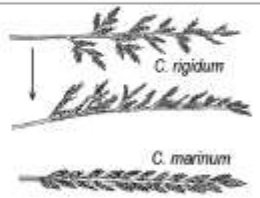
12 Flower head a spike with dense clusters of spikelets tending to one side of the main axis. Spikelets rough, in pairs, and consisting of two kinds, outer feather-like sterile spikelets consisting of c.18 long narrow awned-bracts, obscuring normal inner ones..... try *Cynosurus* Dog's tails **or (13)**

species – one rare alien the other common grassland **p. 216 - 219**

13 Spikelets, of just one kind arising from one side of the axis in dense spike-like panicles, 2-10 flowered, the lemmas all with long terminal awns, but glumes unawned or with only very short awns... ..... try *Vulpia* Annual Fescues **or (14)**

4 species **p. 154 - 161**

14 Annuals with 4-12 flowered ovoid spikelets of just one kind in two rows, singly or in small clusters on short branches, tending to one side of the axis ..... try *Catapodium* Fern Grasses **or (15)**



1 common inland species, 1 local coastal species. **p. 204 -207**

15 Perennial, flower head a spike with single-flowered, long narrow spikelets, awned at the tip, and in two rows on one side of the axis .....try *Nardus stricta* Hard grass **or (16)**

common, acid heathland **p. 342 - 343**

16 Annual, spikelets fairly fat, one flowered, and in two overlapping rows on one side of the axis forming a spike-like raceme.....try *Mibora minima* Early Sand-grass **or (17)**

very local, sandy soils by the sea and a few garden centres **p. 336 - 337**

17 Annual, spikelets 2-6 flowered, alternating on one side of main axis ..... try *Vulpia unilateralis* Matgrass fescue.

[= *Narduru maritimus*]

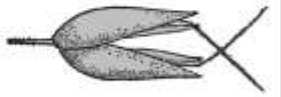
rare, scattered in dry grassland over chalk or limestone **p. 162 - 163**

18 Spikelets 3-12 per inflorescence, plump, purplish or green, 6-12mm long, in narrow spike-like panicles, arranged all round the axis, ligule just a line of hairs, with tufts of hairs on either side..... try *Danthonia decumbens* Heath Grass **or (19)**

[= *Sieglingia decumbens*]

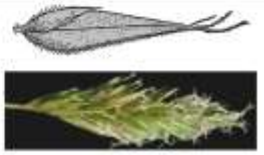
common acid heathland **p. 350 - 351**

19 Spikelets crowded, more than 12 per narrow oblong spike-like panicle, each up to 3.5mm long, two-flowered, both lemmas with bent awn, and with tufts of hairs at the base..... try *Aira praecox* Early Hair-grass **or (20)**



small, tufted, early flowering, common heathland **p. 258 - 259**

20 Spikelets numerous, compressed, hairy, long tapering, in loose spike-like panicle, lower glume half the length of the upper which completely encloses the florets, 3 florets, two barren and consisting of lemmas only, the third bisexual. All three bear median inserted awns, lvs. smell of vanilla (coumarin) when crushed, and have tufts of hairs either side of blade/sheath junction..... try *Anthoxanthum* Vernal Grasses **or (21)**



one common grassland and one rare arable alien species **p. 266 - 269**

21 Flower head a dense yellowish green oval to fat-cylindrical spike-like panicle, 1.0-3.5cm diam. and covered with long bristles arising from the apex of rounded, notched rough surfaced glumes of one-flowered spikelets.....try *Polypogon monspeliensis* Annual Beard-grass **or (22)**

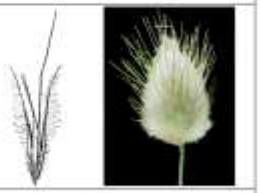
rare coastal annual of damp brackish hollows in S and SE England

p.308 - 309

22 Flower head a dense white fluffy 'bunnys-tail' of large numbers of spikelets, glumes and lemmas tapering to long bristles, and both covered with fluffy hairs, lemmas also awned from the back ..... try *Lagurus ovatus* Hare's-tail **or (23)**

sporadic alien casual of waste ground and road verges

p.323 - 313



23 Spikelets densely packed in large numbers to form a tapered cylindrical panicle, spikelets long pointed and nit-like, some with long, fine bent awns..... try *Gastridium ventricosum* Nit Grass **or (24)**

rare arable alien/possible native particularly on calcareous soils

p.310 - 311

24 Spikelets 2-4 flowered with short hairy stalks, densely clustered and flattened in narrow spike-like panicle, glumes and lemmas with thin shining margins, not awned, leaves with several parallel grooves, whole plant downy.....try *Koeleria* Crested Hair-grass and Somerset Grass **or (25)**

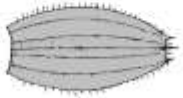
(C) widespread in dry calcareous grasslands (S) limestone in N. Somerset.

p.241 - 243

25 Spikelets 2-3 flowered, densely clustered in ovoid, shining, bluish-violet spike-like 1-3cm long panicle, lemmas truncate with 5 nerves that project into short awns.....try *Sesleria caerulea* Blue Moon-grass

a northern grass of limestone and calcareous mica-schists

p.226 - 227



26 Spikelets one to two flowered, with one or more long bristles arising just below the spikelets.....try *Setaria* Bristle-grasses **or (27)**

5 alien grasses of waste ground, arable fields, pavement cracks Grain and bird seed origins.

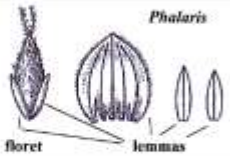
p.364 - 367

bristles on two species of *Setaria*

27 Spikelets one flowered with three lemmas enclosed by the glumes, one normal, two vestigial and sterile, no bristles arising below the spikelets.....try *Phalaris* Canary grasses

1 common aquatic native and 5 aliens that are sometimes cultivated for bird seed, otherwise as naturalised weeds.

p.271 - 273



28 Inflorescence with one or two rows of spikelets attached by short stalks on two opposite sides of the main axis..... **30 or (29)**

29 Inflorescence unbranched with spikelets attached in two opposite rows directly to the main axis (no stalks) or in clusters of 2-3 on a common short stalk **31**

30 Spikelets arranged singly, spaced out, inflorescence a spike-like raceme..... try *Brachypodium* and x *Festulolium*

one common woodland/hedgerow and one chalk grassland species (B) one common and two rare grassland *Festuca* x *Lolium* hybrids (x F)

p.81 - 91
p.146 - 147

31 Spikelets attached singly to the main axis of the spike or raceme.....**33 or (32)**

32 Spikelets attached in clusters of twos or threes to the main axis.....**35**

33 Spikelets one flowered and sunken in hollows in the thickened jointed axis of cylindrical spikes.....try *Parapholis* Sea Hard-grasses **or (34)**

2 saltmarsh species, 1 common, the other local

p.338 - 341

34 Spikelets two or more flowered and pressed against the main axis or sticking out but not sunken in hollows..... **37**

35 Spikelets stalkless, clustered in pairs, alternating on opposite sides of the main axis and 3-6 flowered .....try *Leymus arenarius* Lyme Grass **or (36)**

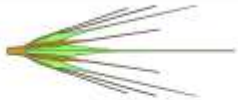
local on coastal dunes

p.104 - 105

36 Spikelets clustered in threes, outer spikelets (usually) sterile, central spikelet 1 (rarely 2) flowered.....try *Hordeum* and *Hordelymus* Barleys

3 native and several casual species of *Hordeum*, one native species of *Hordelymus* [calcareous woodland]

p.106 - 113



37 Spike with spikelets attached by their narrow edges to the main axis with the upper glume external and the inner glume abutting the main axis or absent. **39 or (38)**

38 Spike with spikelets attached by their broad edges on to the main axis.....**41**

39 Inner glumes absent except at apex of spike..... try *Lolium* Rye Grasses **or (40)**

1 very common native, 1 common introduced fodder species and 2 rare casuals

p.143 - 153

40 Inner glumes all present.....try x *Festulolium*

4 representatives, 1 local and 3 rare

p.146 - 147

41 Perennials, grain tightly enclosed between lemma and palea..... try *Elymus* and *Elytrigia* Couches and Twitch **or (42)**

1 local woodland species (*Elymus*), and 3 *Elytrigia* species, 2 coastal, 1 widespread

p. 92 - 103

42 Annuals, grain free from lemma and palea *Triticum* (cultivated wheats)

p. 442

43 Spikelets dumpy, nodding with florets arranged almost horizontally, and glumes hooded..... try *Briza* Quaking Grasses **or (44)**

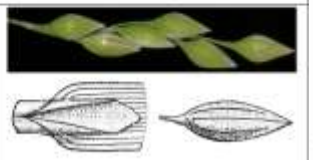
one common native on calcareous soils, two aliens

p.208 - 213

44 Vanilla scented when crushed, rhizomatous perennial reminiscent of *Briza*, with fat dumpy, shiny spikelets, golden-brown with a greenish purple base, 3-flowered, borne on loose open panicle.
Lemmas with hairy margins.....try *Hierochloe odorata* Holy Grass **or (45)**
a rare northern aquatic grass **p.264 - 265**

45 Spikelets elliptic, solitary or paired, nodding, glumes flushed with purple, spikelet axis terminated by unique club-shaped mass formed from 2-3 sterile lemmas, lodicules united.....try *Melica* Melick Grasses **or (46)**
2 native woodland species **p.222 - 225**

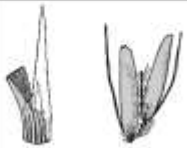
46 Perennial woodland grass with open whorled panicles and unique fat, pointed-elliptic spikelets, florets completely enclosed by the greenish/purple glumes .....try *Milium effusum* Wood Millet **or (47)**
one native species, common in moderately dense woodland **p.274 - 275**



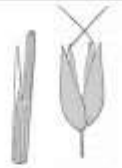
47 Densely tufted perennial with spikelets in dense globular one-sided masses, virtually stalkless, each with 2-5 flowers..... try *Dactylis* Cocksfoots **or (48)**
one common grassland native, and one very rare woodland alien **p.214 - 215**

48 Annuals with open much branched whorled panicles, with glumes longer than the rest of the 1-flowered spikelets, the lemma bearing a very long terminal awn .....try *Apera* Silky-bents **or (49)**
one rare casual (except in Essex as common arable pest), one Breckland rarity, casual elsewhere. **p.288 - 291**

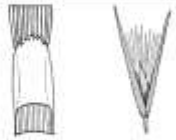
49 Tall perennial grasses with tufts of hairs at base of spikelets, glumes longer than the rest of the spikelets, lemmas with bent basal awns, and long pointed membranous ligules.....**51 or (50)**



50 Small annual grasses with tufts of hairs at base of spikelets, glumes longer than the rest of the spikelets, lemmas with bent basal awns, and long pointed ligules..... try *Aira* Hair-grasses [Group One] **or (57)**
2 native species **p.256 - 259**



51 Perennials with large moderately loose panicles, tufts of long hairs at base of spikelets, glumes longer than the rest of the spikelets, but ligules short and blunt to rounded..... try *Calamagrostis* Small-reeds **or (52)**
4 native species, 3 in bogs, marshes and damp woods, and 1 forming pure stands in dry Breckland sands. **p.276 - 283**



52 Leaves with flat or tightly rolled blades, panicles loose, glumes delicate and shining, lemmas with bent and twisted awns arising from the back ..... try *Deschampsia* Hair-grasses [Group Two] **or (53)**
2 common native species, 1 alpine, 1 uncommon in peaty bogs. **p.246 - 253**

Deschampsia cespitosa

53 Leaves flat or loosely inrolled. Tall, robust, tufted plant with dense cylindrical, purplish panicle, pointed at both ends and up to 25cm x 3cm, anthers sterile..... try x *Calammophila baltica* Purple Marram or (54)
Very rare, East Anglian coast, Holy Island and Ross Links (S. Cheviot). **p.284 - 285**

54 Leaves with tightly rolled blades 55

55 Tall plant to 1.2m, leaves tightly rolled to 90cm long, panicle, dense cylindrical, pointed at both ends, up to 2.5cms diam. and 20 cm long, anthers fertile.....try *Ammophila arenaria* Marram Grass or (56)
common rhizomatous sand dune plant, often planted to stabilize dunes. **p.286 - 287**

56 Shorter plant, with bristle-like, tightly-rolled leaves only 0.5mm wide, lemmas bearing unique club-ended awns .....try *Corynephorus canescens* Grey Hair-grass
a rare grass of coastal sand dune in Norfolk, Suffolk and Channel Islands **p.254 - 265**

57 Ligule a line of hairs .....59 or (58)

58 Ligule membranous 61

59 Tufted perennial forming high tussocks, ligule just a line of stiff hairs, lowest internode club-shaped and white in colour, spikelets loosely 1-4 flowered with purple anthers .....try *Molinia caerulea* Purple Moor-grass or (60)
one species, common, moorland. **p.348 - 349**

60 Robust perennial to 3m high, with leaves 20-60cm x 10-30mm, ligule a line of stiff hairs, inflorescence a fluffy head up to 40cm, spikelet axes with long hairs.....try *Phragmites australis* Common Reed
one species, common aquatic grass forming extensive reed beds **p.346 - 347**

61 Grasses with compressed, triangular, Oat-like spikelets, with one or more long bent awns, ovary hairy.....63 or (62)

62 Ovary not hairy, but spikelets Oat-like, 5-7mm, yellowish in colour tinged with purple, ...try *Trisetum flavescens* Yellow Oat-grass or (66)
common, grassland, particularly on calareous soils **p.244 - 245**

63 Annuals with pendulous spikelets, in the range 17-32mm long, and two long bent awns per spikelet (N.B. *Avena sativa* can be awnless).....try *Avena* Oats or (64)

3 introduced species, including 2 cultivated as cereals p.234 - 239

64 Perennials, with hairy rachis and rachilla, 2-6 flowered, all lemmas with bent awn arising from the back..... try *Helictotrichon* Oat-grasses or (65)

2 common species of calcareous grassland generally, but rare in the south east p.228 - 231

65 Perennial, similar to *Helictotrichon*, but usually only 2-flowered and only the lower lemma with an awn (i.e. spikelet only has single awn) .....try *Arrhenatherum elatius* False Oat-grass

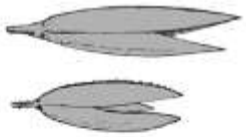
a very common grass of verges, waste ground and grassland p.232 - 233

66 Spikelets not triangular or Oat-like, ovary glabrous or if hairy hairs confined to a separate appendage on top of the ovary 67

67 Spikelets either without awns, or awns projecting less than half the length of the spikelet..... 68 or (76)

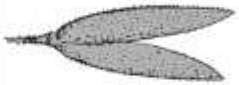
68 Annuals or perennials with multiply-branched, whorled open panicles bearing numerous small 1-flowered spikelets (to 3.5mm long) with narrow mostly sub-equal glumes that are longer than the rest of the spikelet, awns if present, borne by the lemmas and equalling or only slightly exceeding the spikelet.....try *Agrostis* Bent Grasses or (69)

6 native grassland and wayside species, and at least 5 alien species p.292 - 305



69 Similar to *Agrostis*, but with very dense panicles crowded with spikelets (1.2-1.7mm long) right to the base of the branches, and glumes markedly scabrid (x20 lens).....try *Polypogon viridis* Water Bent or (70)

a recent colonist now abundant at base of walls in towns and on waste ground p.304 - 305

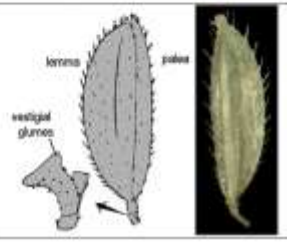


70 Glumes longer than, and enclosing spikelets, spikelets larger (4-6mm long), compressed, glumes thin and papery, panicle dense, whitish-grey to pink.....try *Holcus* Yorkshire Fog & Creeping Soft-grass or (71)

2 common grassland species p.260 - 263

71 Tall perennial with rough yellowish-green spiny-margined leaves, 5-10mm wide, inflorescence a loose whorled panicle with rows of flattened 4-5mm rice-like, lop-sided spikelets at the ends of and on just one side of the branches, seldom fully emerging from its leaf sheath in this country. Glumes missing..... try *Leersia oryzoides* Cut Grass or Rice Grass or (72)

a very rare southern grass of brooks and streams from Dorset to Hants, Sussex and Surrey p.344 - 345



72 Spikelets ovate to oblong in loose whorled panicles, glumes and lemmas unawned, ovate, keeled on the back and shortly pointed, lodicules two.....try *Poa* Meadow-grasses

7 common grassland, waste ground and woodland, and 7 rare species p.164 - 193

73 Spikelets and panicles similar to *Poa* but spikelets more oblong and glumes plus lemmas rounded on the back (unkeeled), and more rounded apically, lodicules two, leaf sheaths open.....try *Puccinellia* Salt-marsh Grasses or (74)

grasses of salt marshes and brackish mud, 5 species p.194 - 203

74 Spikelets similar to *Puccinellia*, but longer, with more florets, lodicules fused together and leaf sheaths tubular almost to the apex, [though may split open later] glumes ovoid, rounded/shortly pointed at apex .....try *Glyceria* Sweet-grasses or (75)

three common species and one hybrid, freshwater streams, rivers, ponds and ditches p.114 - 123

75 Creeping stoloniferous *Poa*-like perennial with loose panicles of alternating half-whorls each of 3-5 semi-erect branches bearing clusters of 3-5mm, 1-3 flowered spikelets. Glumes rounded, membranous, tinged with green and purple and very short compared with the florets....try *Catabrosa aquatica* Water Whorl-grass or (76)

now a rare grass of cattle trampled margins of streams and ponds p. 220 - 221

76 Spikelets with awned lemmas, annuals to biennials, without sterile shoots, or rhizomes at flowering time, ovary with hairy terminal appendage. Bromes [sections one and two] ..... 78 or (77)

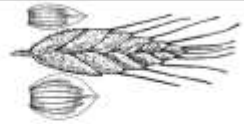
77 Spikelets with or without awned lemmas, perennials with sterile shoots, and often rhizomes at flowering time, ovary with or without hairy terminal appendage .....80 or (89)

78 Spikelets long-awned and wedge-shaped, including the awns appearing widest at their tips, glumes subulate to narrowly lanceolate, lower with 1-3 veins. Palea keeled and hairy, ...try *Anisantha* Bromes [section one] or (79)

one common native and 5 alien casuals p.60 - 67

79 Spikelets awned with shortly to narrowly ovoid spikelets, tapering towards the apex, glumes ovate, shortly pointed, lower with 3-7 veins...try *Bromus* Bromes [section two]

3 native grassland, 6 casual aliens of arable and waste ground p.74 - 87



80 Perennials, with spikelets < 15mm (excluding awns), narrowed to apex, lemmas < 9mm, ovary without hairy terminal appendage, but apex of ovary/grain hairy in a few species..... Fescues [section one] 84 or (81)

81 Tufted perennials without rhizomes, spikelets similar to *Bromus* but lemmas markedly keeled and flattened, ovary with hairy terminal appendage, spikelets >15mm lemmas >9mm .....try *Ceratochloa* Bromes [section three] or (82)

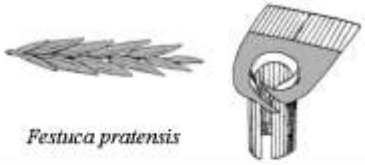
5 alien casual/naturalized species p. 71 bottom of page

82 Perennials with long or short rhizomes, spikelets narrowly oblong, >15mm (excluding awns), some species with, some without awns, glumes lanceolate, lower 1-3 veined, lemmas >8mm ovary with hairy terminal appendage ..try *Bromopsis* Bromes [section four] or (83)

2 natives woodland, 1 native chalk grassland, 1 naturalized species p.68 - 73

83 Leaf blades of both tillers and culms flat, 3 to 8mm or more wide,
and with long pointed auricles,
apex of ovary/grain without hairs……try *Festuca* [Fescues Section One = *Schedonorus*]

2 common grassland species, 1 woodland and shady hedgerows. p.140 - 145



Festuca pratensis

84 Leaf blades of both tillers and culms flat, 4-14mm wide, but without auricles
apex of ovary/grain hairy……try *Festuca altissima* Reed or Wood Fescue or (85)

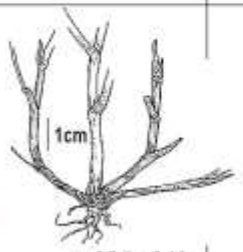
rare damp woods, N W Britain, E. Sussex and S W Ireland. p.124 - 125

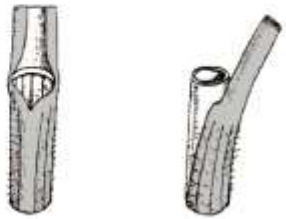
85 Perennials with leaf blades of tillers bristle-like, but those of culms flat
apex of ovary/grain hairy ….try *Festuca heterophylla* Various-leaved Fescue **or** (86)

thinly scattered introduction, mainly in woodland p.132 - 133

86 Perennials with leaf blades of tillers folded longitudinally and bristle-like (or sometmes flat),
culm leaves flat (or sometimes bristle-like),
apex of ovary/grain without hairs. ….try *Festuca* [Fescues Sections Two and Three] 87

87 Young tiller leaves with cylindrical sheaths, edges fused almost to top,
new tillers tend to cut horizontally through old sheaths (extravaginal),
auricles vestigial *Festuca* [Fescues Section Two - *rubra* aggregate] or (88)

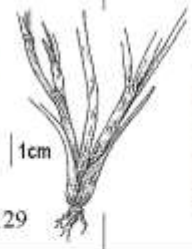




1 widely distributed species, 1 on coastal shingle, 9 subspecies between them p. 134 - 141

Tiller diagrams, modified from Stace et al, 1992. Watsonia 19: 107-112. (with permission).

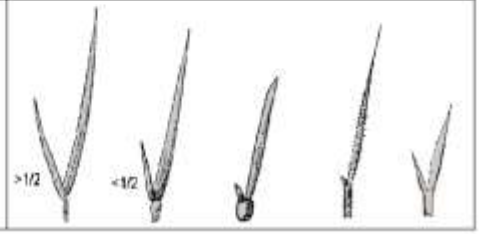
88 Young tiller leaves with spirally inserted sheaths, with edges overlapping,
all tillers arising upwards inside existing sheaths without perforating them (intravaginal)
auricles small but pointed..... *Festuca* [Fescues Section Three - *ovina* aggregate]



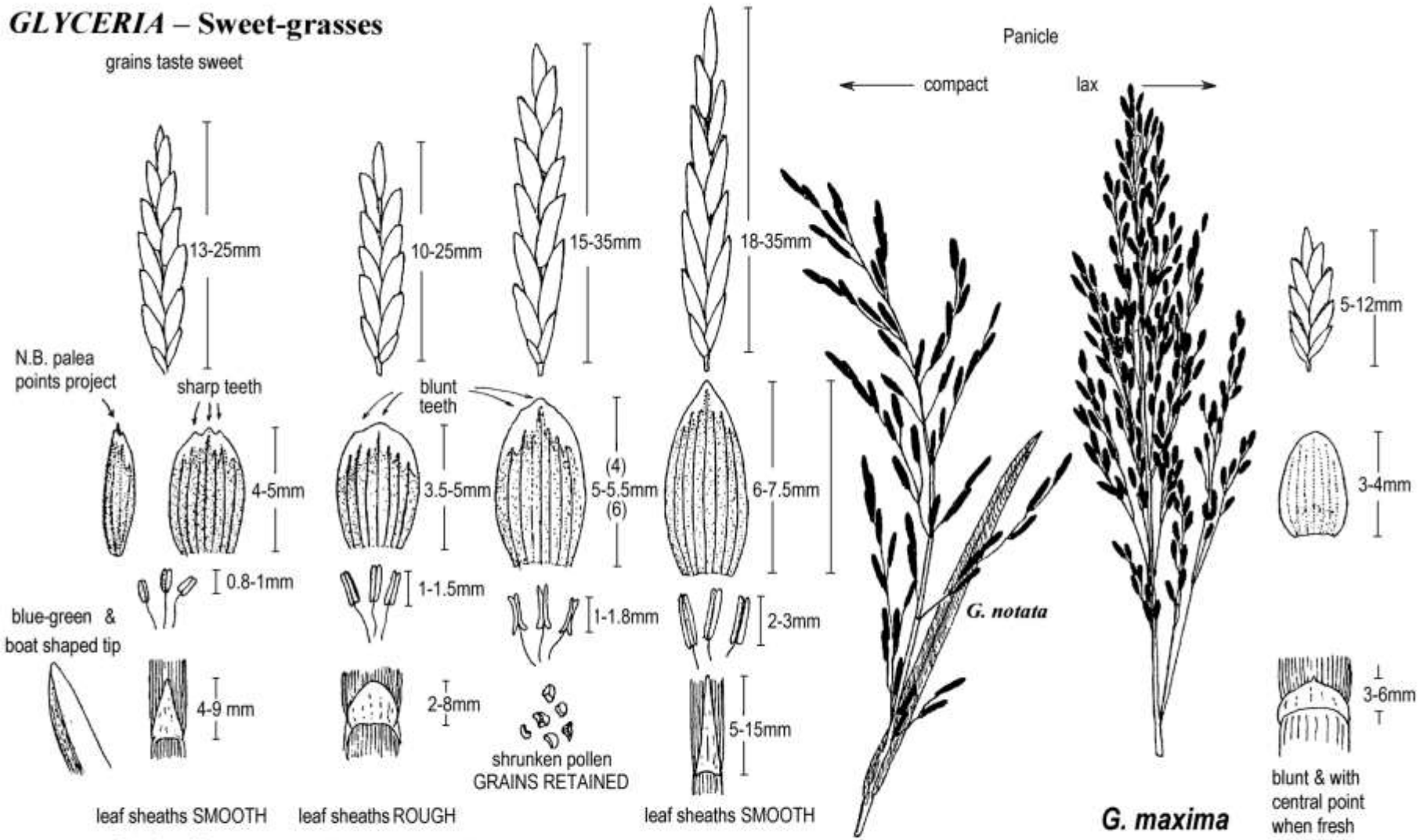
2 common species, 4 rare natives, 1 alien.
Festuca ovina p. 126 - 129

89 Annuals, lemmas with long terminal awns, without hairy appendages to the ovaries,
Glumes very unequal, lower mostly < 3/4 length of upper, leaf blades flat,
sheaths spirally inserted, with edges overlapping ..... *Vulpia* (annual Fescues)
[*Festuca ovina* may key out here but it is perennial and has folded leaf blades]

4 natives, one achaeophyte



GLYCERIA – Sweet-grasses



G. declinata
Glaucous Sweet-grass

G. notata
Plicate Sweet-grass
(G. plicata)

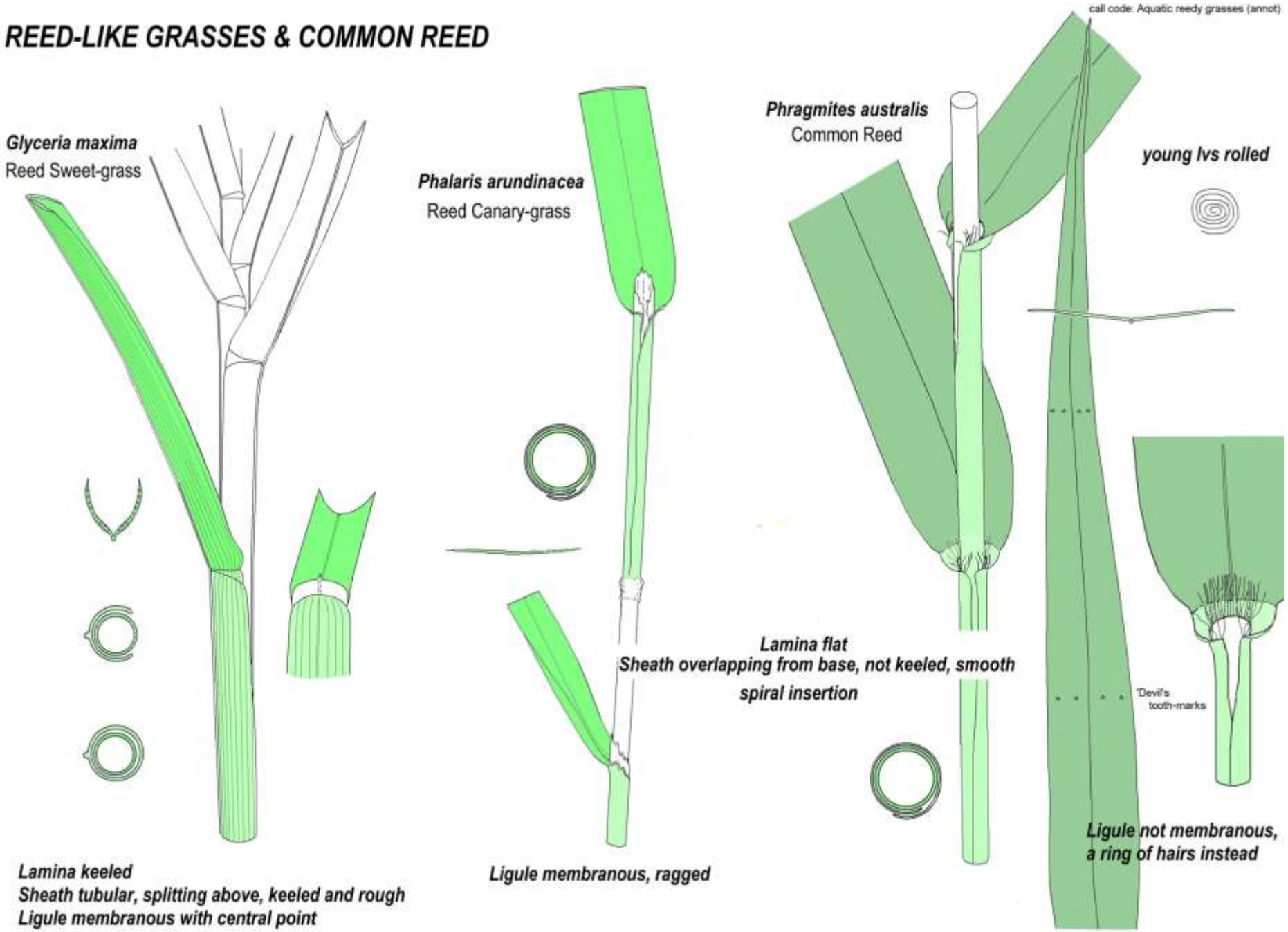
G. x pedicellata
Hybrid Sweet-grass

G. fluitans
Floating Sweet-grass
has been used to make a sweet bread

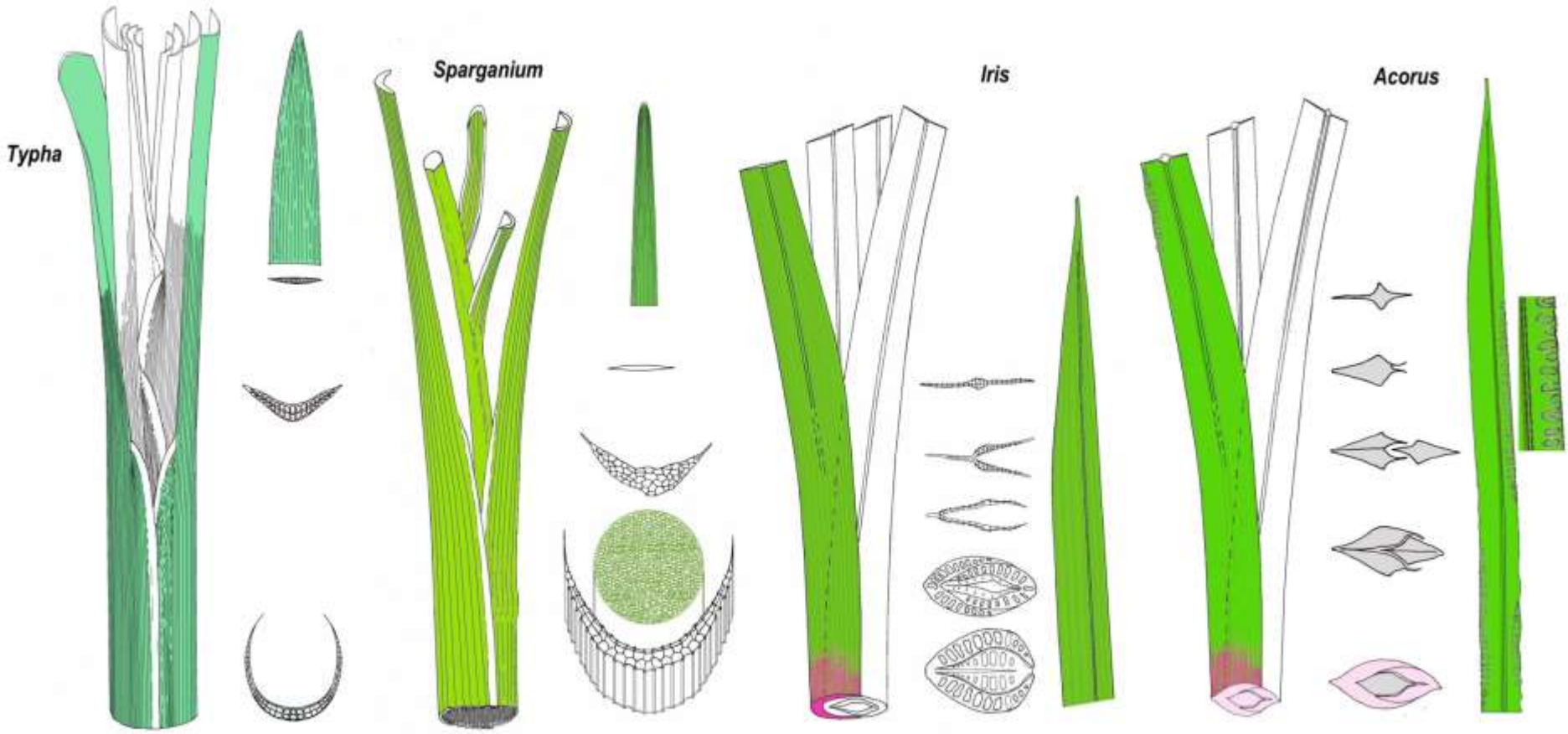
G. maxima
Reed Sweet-grass

call code: GLYCERIA KEY.bmp

REED-LIKE GRASSES & COMMON REED



REEDY LOOKALIKES ONE

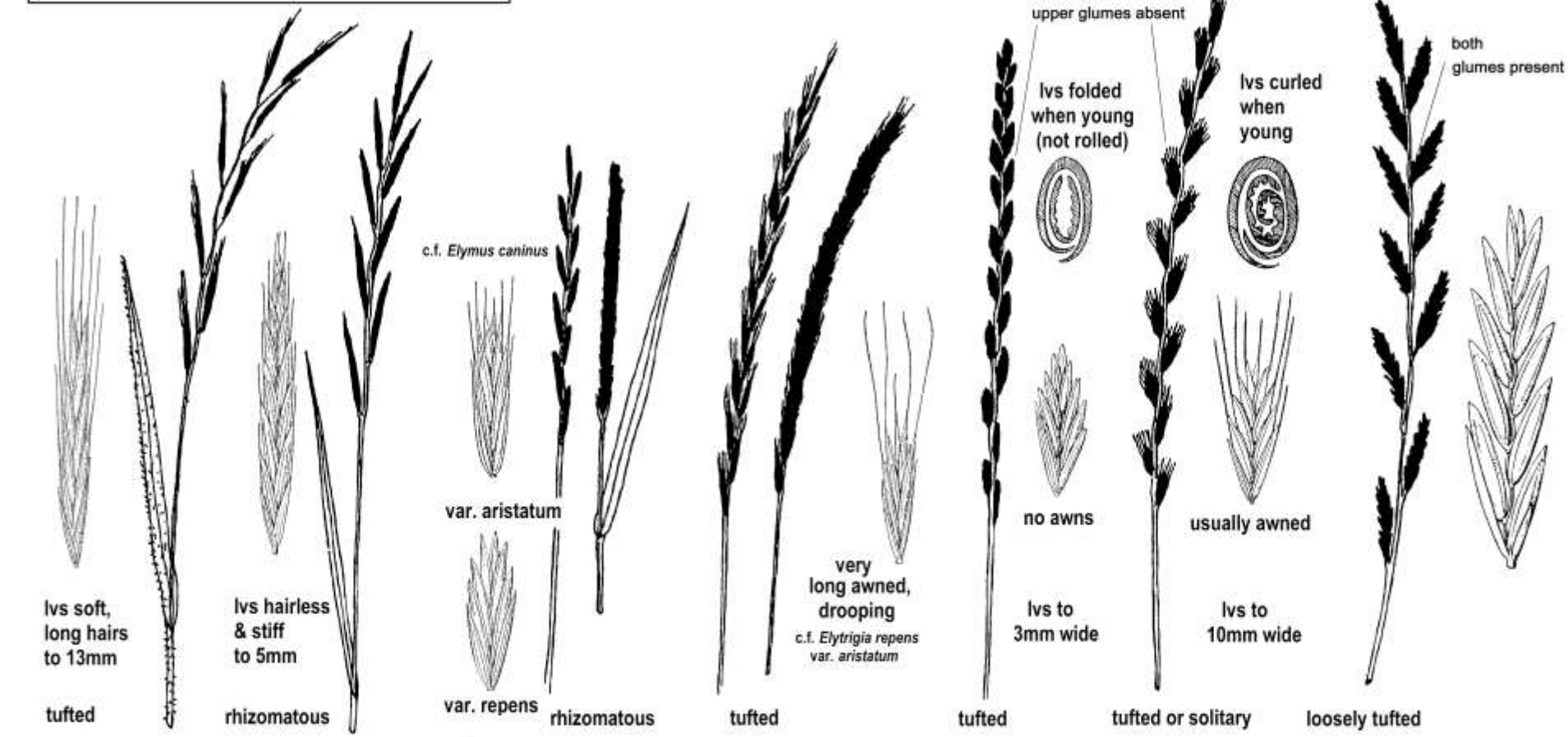


Reed Mace [BulRush]	Bur-Reed	Iris or Flag	Sweet Flag

GRASSES WITH SPIKES: 1

spikes side on to axis

spikes edge on to axis



Brachypodium sylvaticum

common, woodland, shaded lanes

Brachypodium pinnatum

common. chalk grassland

Elytrigia repens

common. arable land

Elymus caninus

local, woodland margins

Elymus
Agropyron
old generic names

Lolium perenne

common, grassland paths & tracks

'King' of the grasses re: nutrtional value

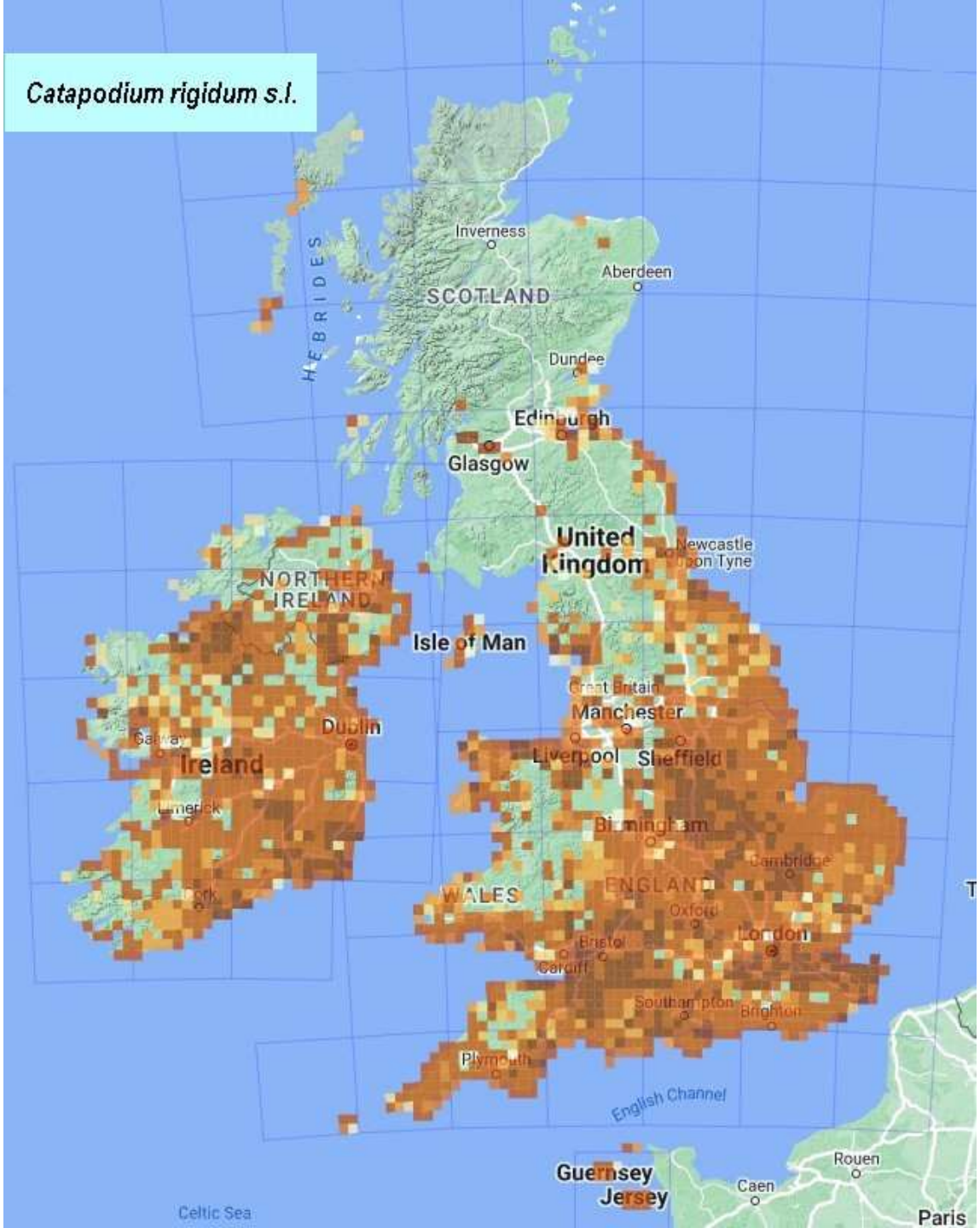
Lolium multiflorum

common sown hay/pasture grass

x Festulolium loliaceum

frequent, grassland

commonly occurring sterile hybrid between *L. perenne* & *Festuca pratensis*


Catapodium rigidum s.l.
Inverness
Aberdeen
SCOTLAND
HEBRIDES
Dundee
Edinburgh
Glasgow
United Kingdom
Newcastle upon Tyne
NORTHERN IRELAND
Isle of Man
Great Britain
Manchester
Dublin
Ireland
Liverpool
Sheffield
Limerick
Birmingham
Cambridge
WALES
ENGLAND
Oxford
London
Bristol
Cardiff
Southampton
Brighton
Plymouth
English Channel
Guernsey
Jersey
Rouen
Caen
Paris
Celtic Sea

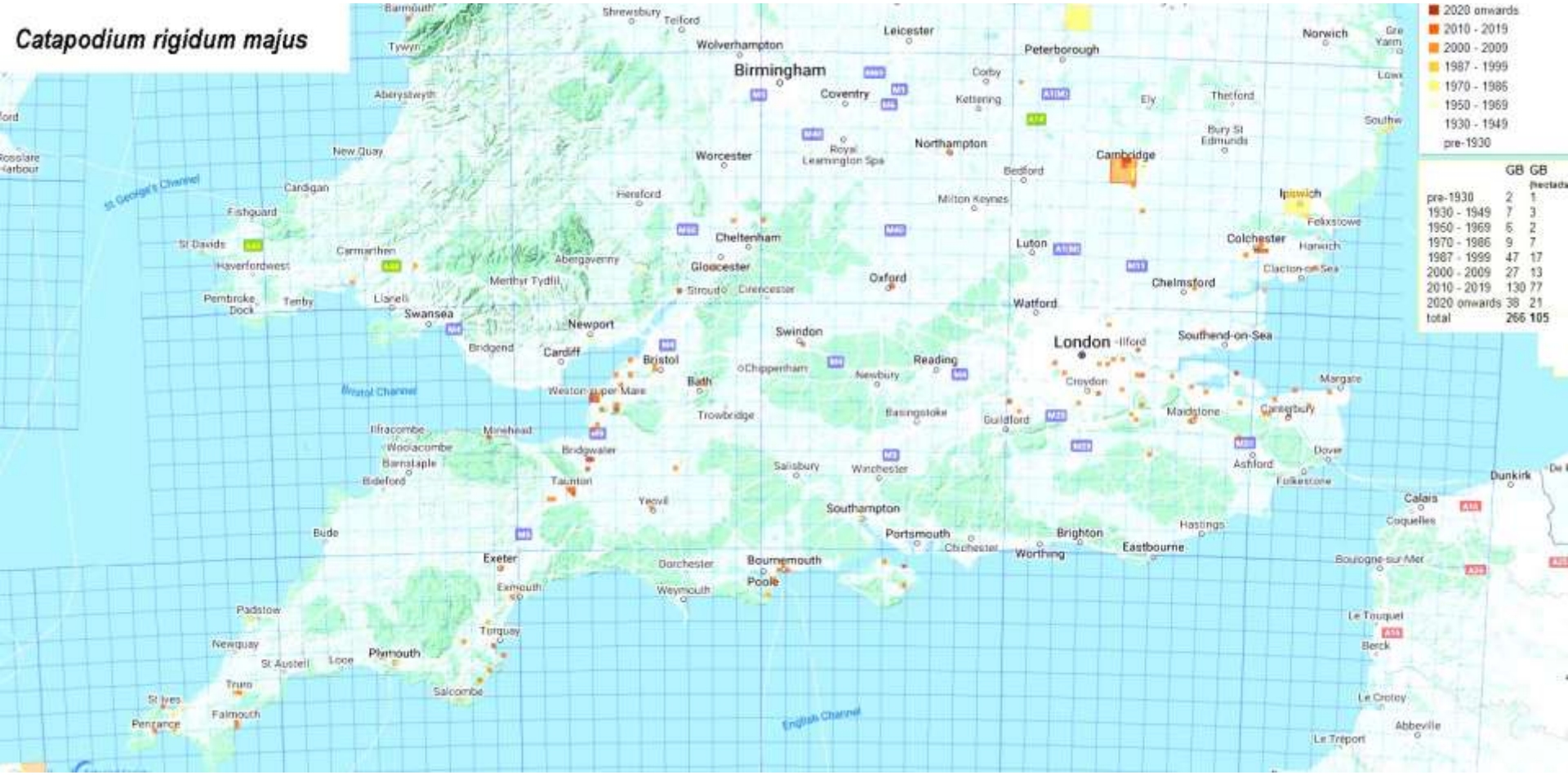
Panicle flat
2D
To 4(8)cm

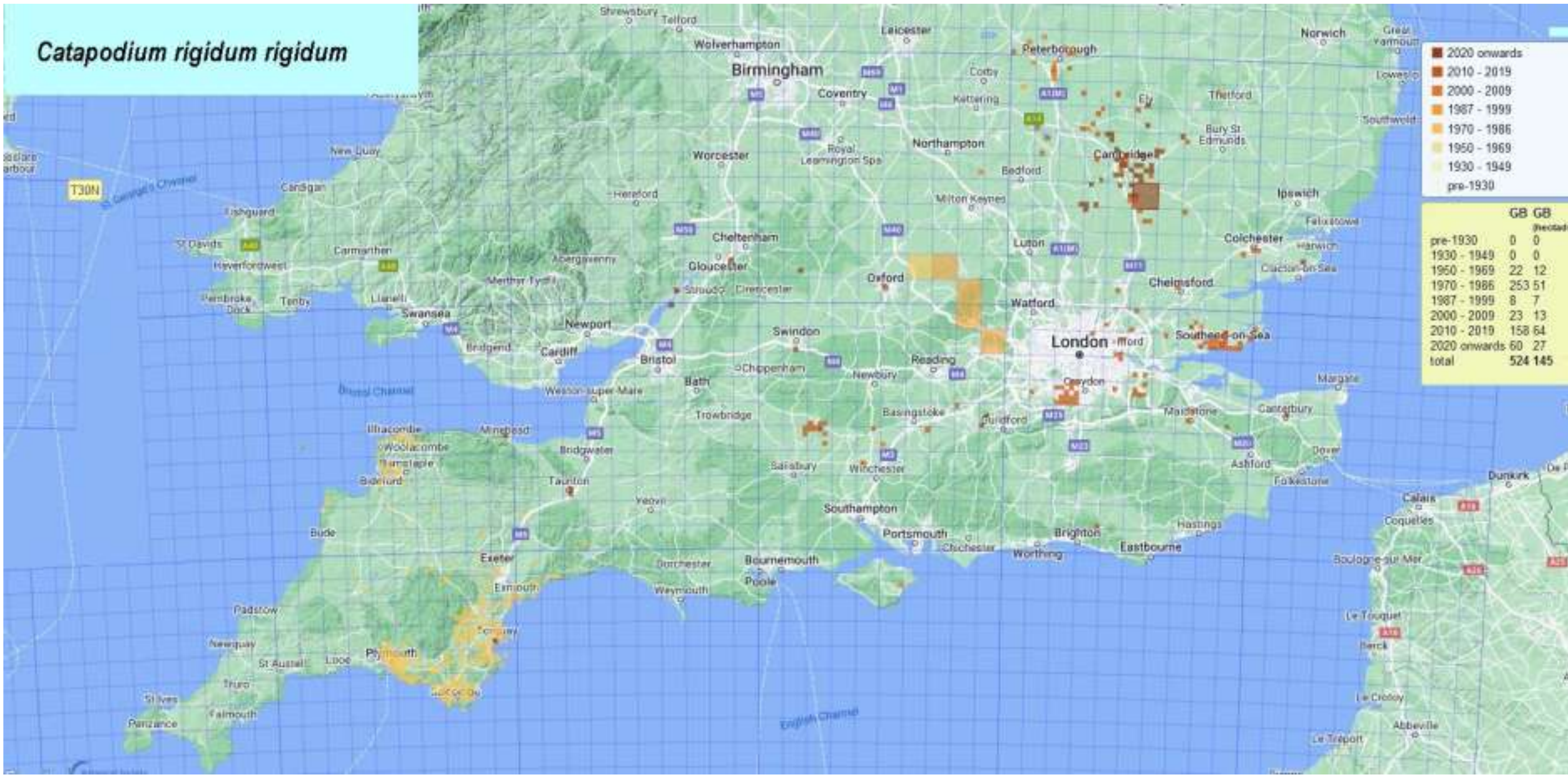
rigidum

Panicle branches
2-D but
rotated 90^{o}
panicle to 13cm

majus

A Mediterranean grass - Prior to c. 2000 only in Southern Ireland, Channel and Scilly Isles – now spreading rapidly in Southern England.





Catapodium rigidum rigidum
2020 onwards
2010 - 2019
2000 - 2009
1987 - 1999
1970 - 1986
1950 - 1969
1930 - 1949
pre-1930
GB GB (hectads)
pre-1930 0 0
1930 - 1949 0 0
1950 - 1969 22 12
1970 - 1986 253 51
1987 - 1999 8 7
2000 - 2009 23 13
2010 - 2019 158 64
2020 onwards 60 27
total 524 145
Birmingham
Coventry
Northampton
Peterborough
Norwich
Cambridge
Ipswich
Colchester
Chelmsford
Oxford
Cheltenham
Gloucester
Swansea
Cardiff
Newport
Bristol
Bath
Swindon
Reading
Watford
London
Croydon
Southend-on-Sea
Margate
Canterbury
Maidstone
Ashford
Dover
Salisbury
Winchester
Southampton
Portsmouth
Brighton
Eastbourne
Bournemouth
Poole
Exeter
Exmouth
Taunton
Plymouth
Torquay
Bude
Padstow
Penzance
Falmouth
Calais
Dunkirk
Boulogne-sur-Mer
English Channel
Bristol Channel

ALOPECURUS

pratensis

myosuroides

geniculatus

aequalis

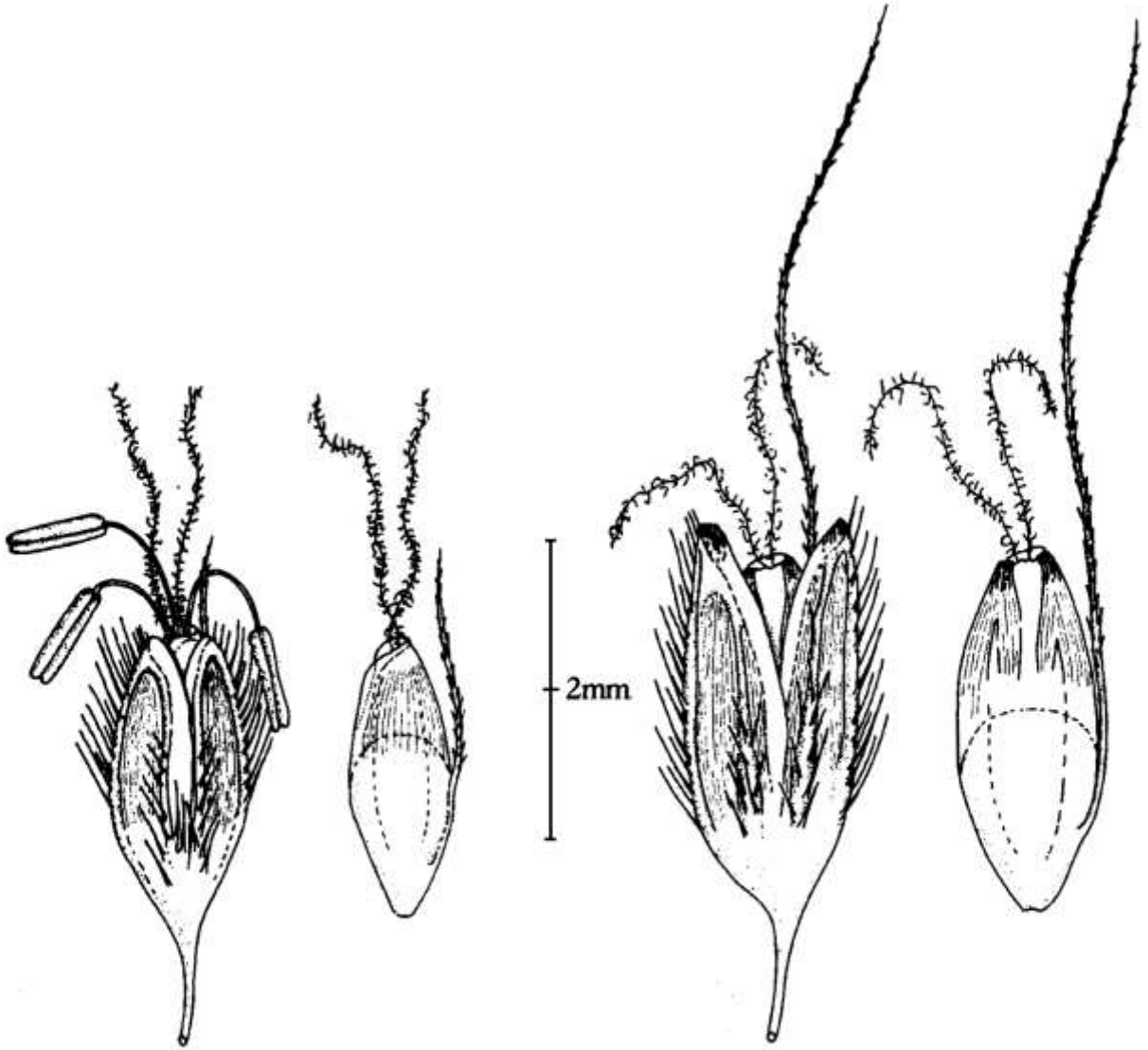
GENICULATUS

aequalis is over-recorded by inexperienced botanists

geniculatus - prostrate base – kneed
fresh anthers lilac above white below >>>> dull orange on dehiscence

aequalis - prostrate base – kneed
fresh anthers bright orange above white below >>>> dull orange on dehiscence

CHECK LENGTH OF AWN



Spikelets of ***A. aequalis*** (left) and ***A. geniculatus*** (right). Scale 2mm. Except for the first drawing anthers omitted for clarity. The paired glumes are keeled and fused below; and the spikelets are compressed, lying face-on to the flower spike. The lemma is wrapped around the flower and the awn is attached to its keel. The awn in *A. aequalis* may be difficult to see in an intact spikelet and should not be confused with the fluffy stigmas or remnant stamen filaments.

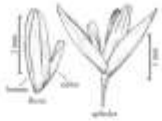
Foto 6 z 7

Alopecurus geniculatus

Vytvořeno pomocí *Highslide JS*

Agrostis stolonifera

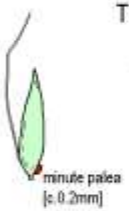
AGROSTIS [lemmas - in grey, paleas in red]



single flowered

Call code: AGROSTIS KEY(2).tif
KJA revised 2022

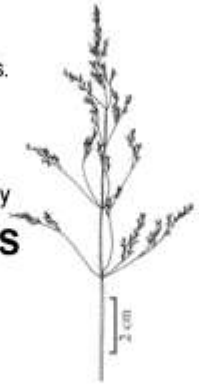
1 Flowers with minute (vestigeal) paleas, ligules of FLOWERING stems ACUTE, awn usually PRESENT from base of lemma, (rarely 0). Panicle open or closed after anthesis. Primary panicle naked below.



The ***A. canina*** complex:

A. canina - Damp acid grassland and bogs, flowers early, NEVER any rhizomes, but produces tufts of proliferating shoots from nodes of fine white floppy stolons. Rare in SE. **S**

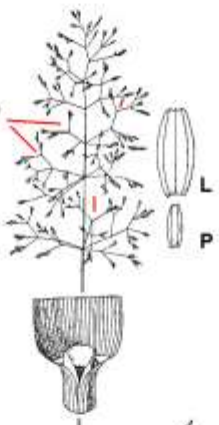
A. vinealis (= montana) - Dry acid heathland and grassland, flowers late, rhizomes PRESENT but never any STOLONS. **R**

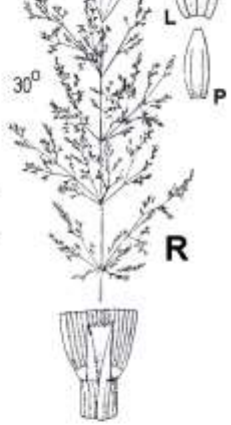


2 Flowers with well developed paleas, ligules of FLOWERING stems TRUNCATE. awn usually ABSENT. Panicle OPEN after anthesis.

A. capillaris (= tenuis) - STERILE shoot ligules WIDER than long, RHIZOMES and STOLONS present, lemma awn usually 0, or rarely arising ON BACK OF LEMMA. Panicle branches SMOOTH or only thinly scabrid. 2ndary panicle branches diverge at 90° at anthesis. Terminal spikelet lemmas glabrous. **R + S**

A. gigantea - STERILE shoot ligules LONGER than wide, RHIZOMES present but NEVER stolons, lemma awn usually 0, or rarely SUBAPICAL. Panicle shoots SCABRID. 2ndary panicle branches diverge at c.30° at anthesis.



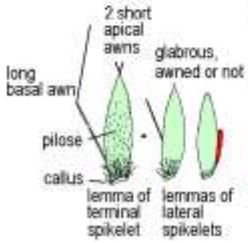


Panicle CLOSED after anthesis:

A. stolonifera - stout stolons present but NEVER has rhizomes, awn usually 0, or if rarely then SUBAPICAL, and not exceeding the glumes, primary panicle branches bearing spikelets to the base. Lemma callus glabrous. Terminal spikelet lemmas glabrous.

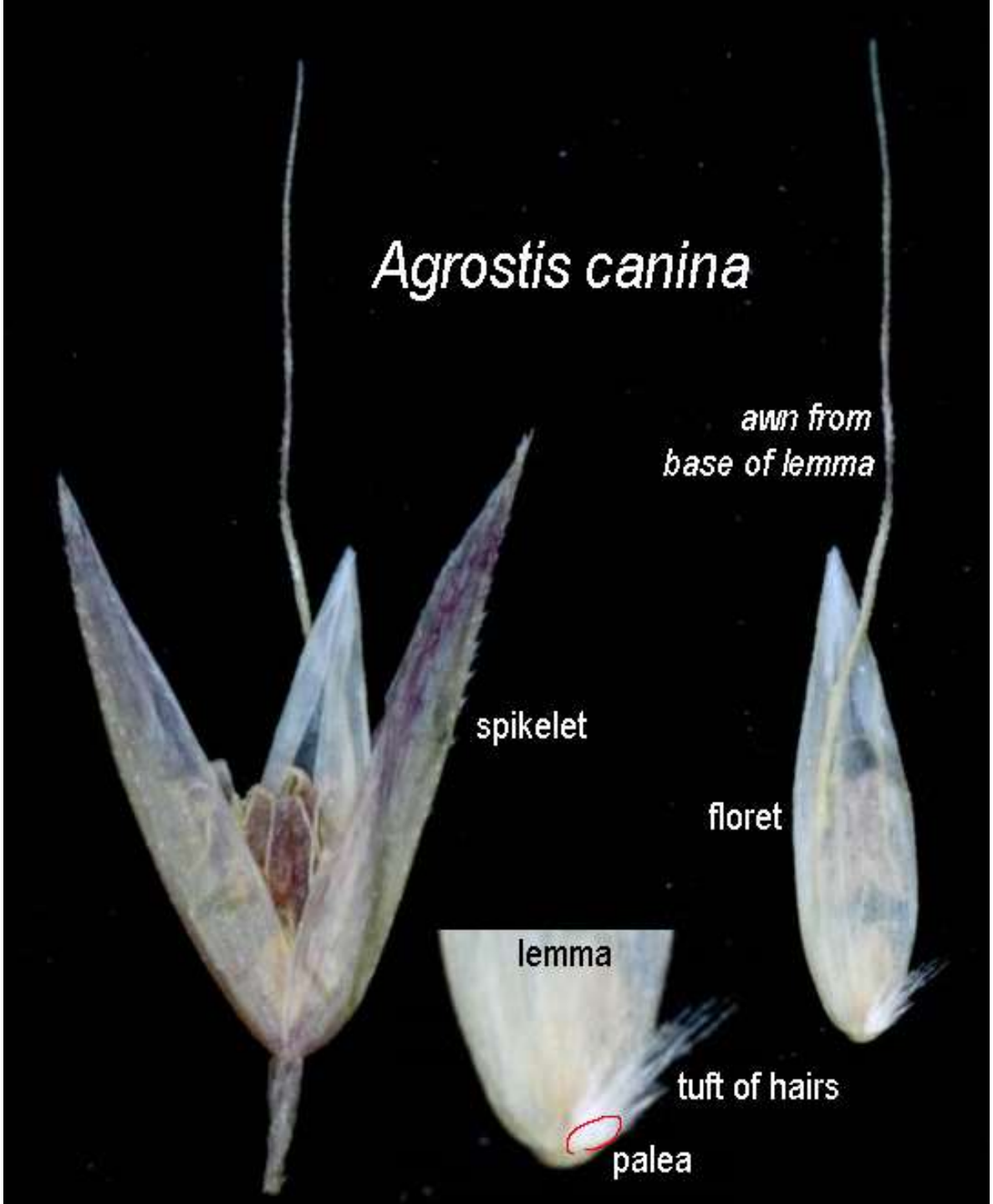
var. stolonifera forms close matted turf

var. palustris 1-2m loose sprawling stolons and extensive inflorescence



* figure produced by Arthur Chater

A. castellana - rhizomes present but NEVER has STOLONS, awn 0, or from base of lemma, usually a graded series with awn to 5mm in distal spikelets. Terminal spikelet lemma pilose. Primary panicle naked below, lemmas with shortly bearded callus (0.3-0.6mm).


Agrostis canina
awn from
base of lemma
spikelet
floret
lemma
tuft of hairs
palea

Agrostis canina

AGROSTIS CANINA

One meter high plants growing up through a bramble bush with vertical stolons elevating a flowering culm


Agrostis vinealis (montana)

AGROSTIS [lemmas - in grey, paleas in red]

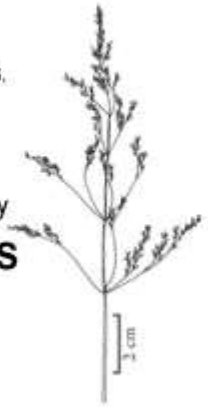
Call code: AGROSTIS KEY(2).tif
KJA revised 2022

1 Flowers with minute (vestigeal) paleas, ligules of FLOWERING stems ACUTE, awn usually PRESENT from base of lemma, (rarely 0). Panicle open or closed after anthesis. Primary panicle naked below.

The ***A. canina*** complex:

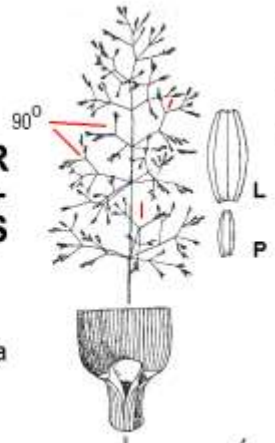
A. canina - Damp acid grassland and bogs, flowers early, NEVER any rhizomes, but produces tufts of proliferating shoots from nodes of fine white floppy stolons. Rare in SE. **S**

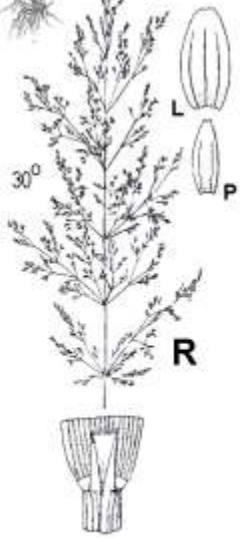
A. vinealis (= montana) - Dry acid heathland and grassland, flowers late, rhizomes PRESENT but never any STOLONS. **R**



2 Flowers with well developed paleas, ligules of FLOWERING stems TRUNCATE. awn usually ABSENT. Panicle OPEN after anthesis.

A. capillaris (= tenuis) - STERILE shoot ligules WIDER than long, RHIZOMES and STOLONS present, lemma awn usually 0, or rarely arising ON BACK OF LEMMA. Panicle branches SMOOTH or only thinly scabrid. 2ndary panicle branches diverge at 90° at anthesis. Terminal spikelet lemmas glabrous. **R + S**





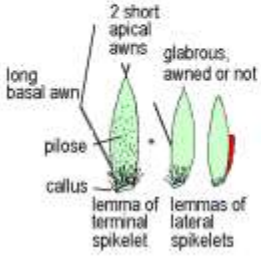
A. gigantea - STERILE shoot ligules LONGER than wide, RHIZOMES present but NEVER stolons, lemma awn usually 0, or rarely SUBAPICAL. Panicle shoots SCABRID. 2ndary panicle branches diverge at c.30° at anthesis.

Panicle CLOSED after anthesis:

A. stolonifera - stout stolons present but NEVER has rhizomes, awn usually 0, or if rarely then SUBAPICAL, and not exceeding the glumes, primary panicle branches bearing spikelets to the base. Lemma callus glabrous. Terminal spikelet lemmas glabrous.

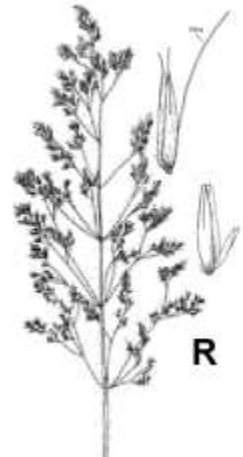
var. stolonifera
forms close matted turf

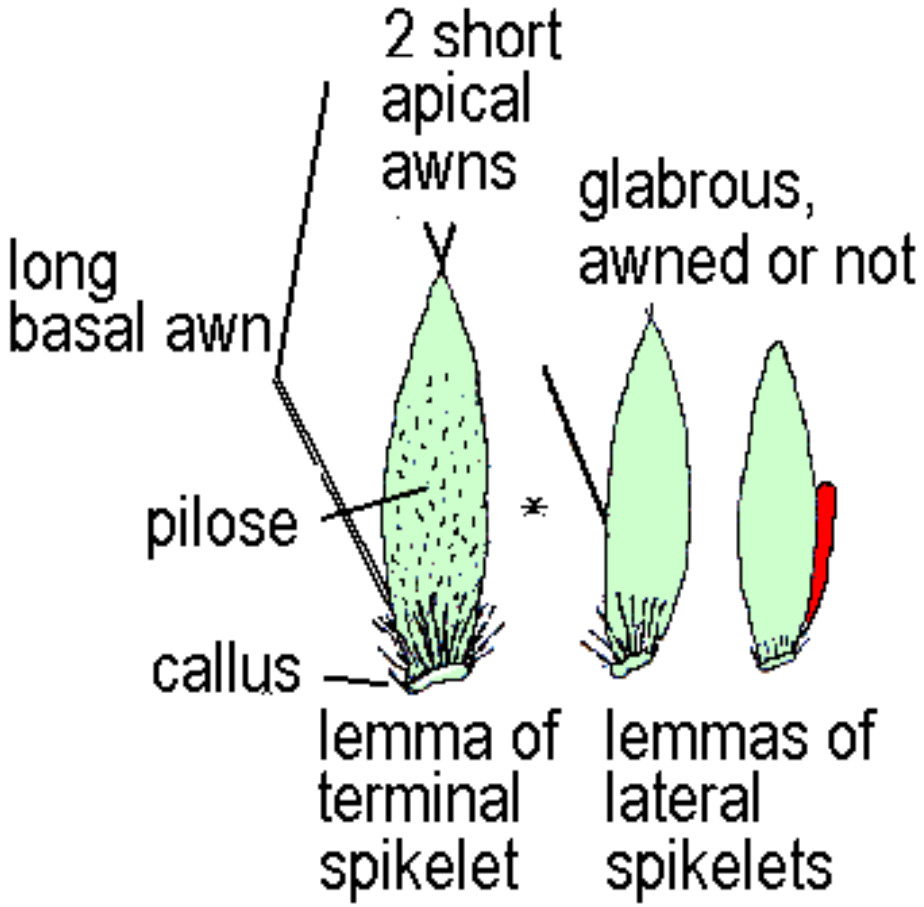
var. palustris
1-2m loose sprawling stolons and extensive inflorescence



* figure produced by Arthur Chater

A. castellana - rhizomes present but NEVER has STOLONS, awn 0, or from base of lemma, usually a graded series with awn to 5mm in distal spikelets. Terminal spikelet lemma pilose. Primary panicle naked below, lemmas with shortly bearded callus (0.3-0.6mm).





A. castellana

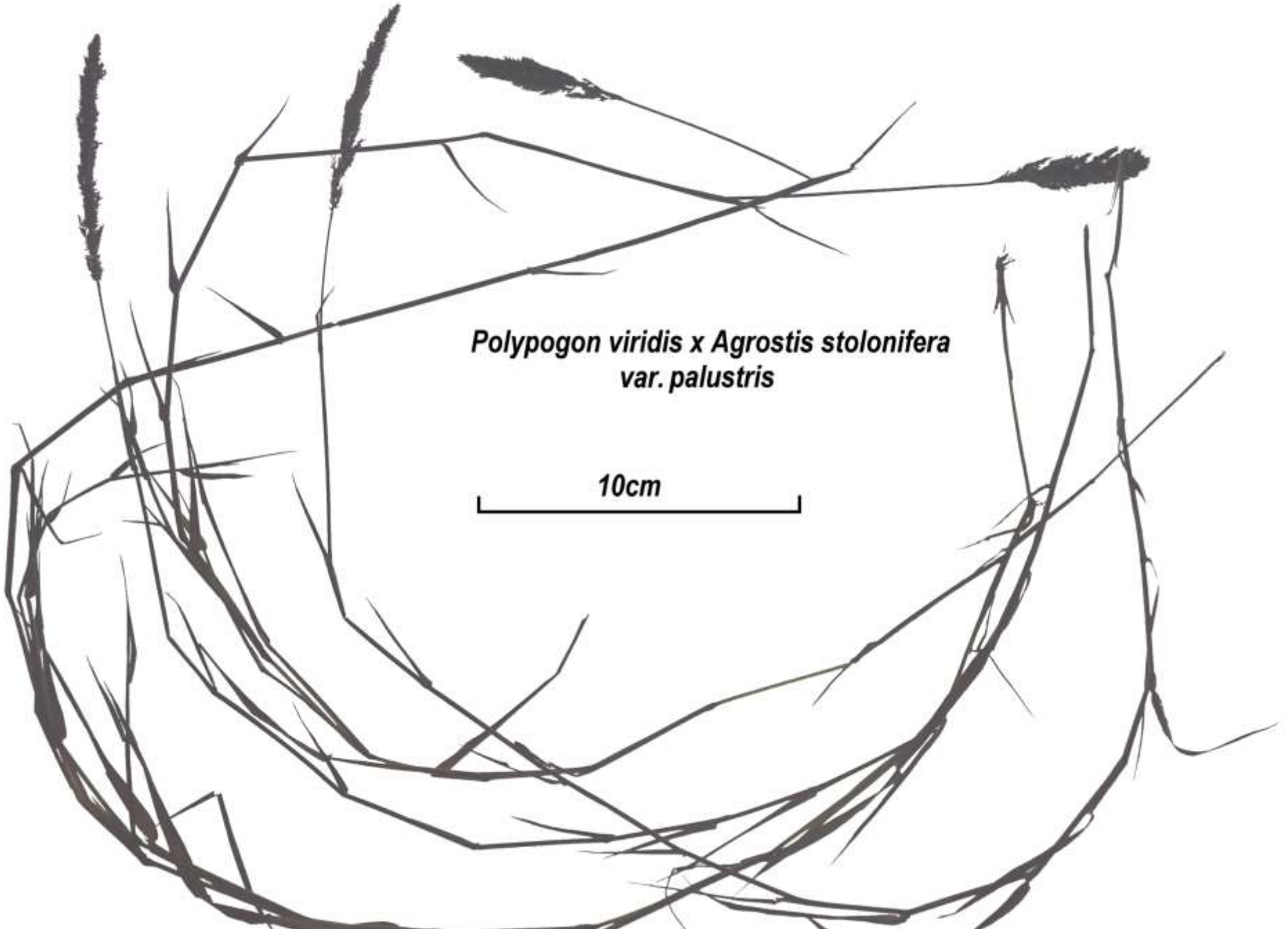
* figure produced by Arthur Chater

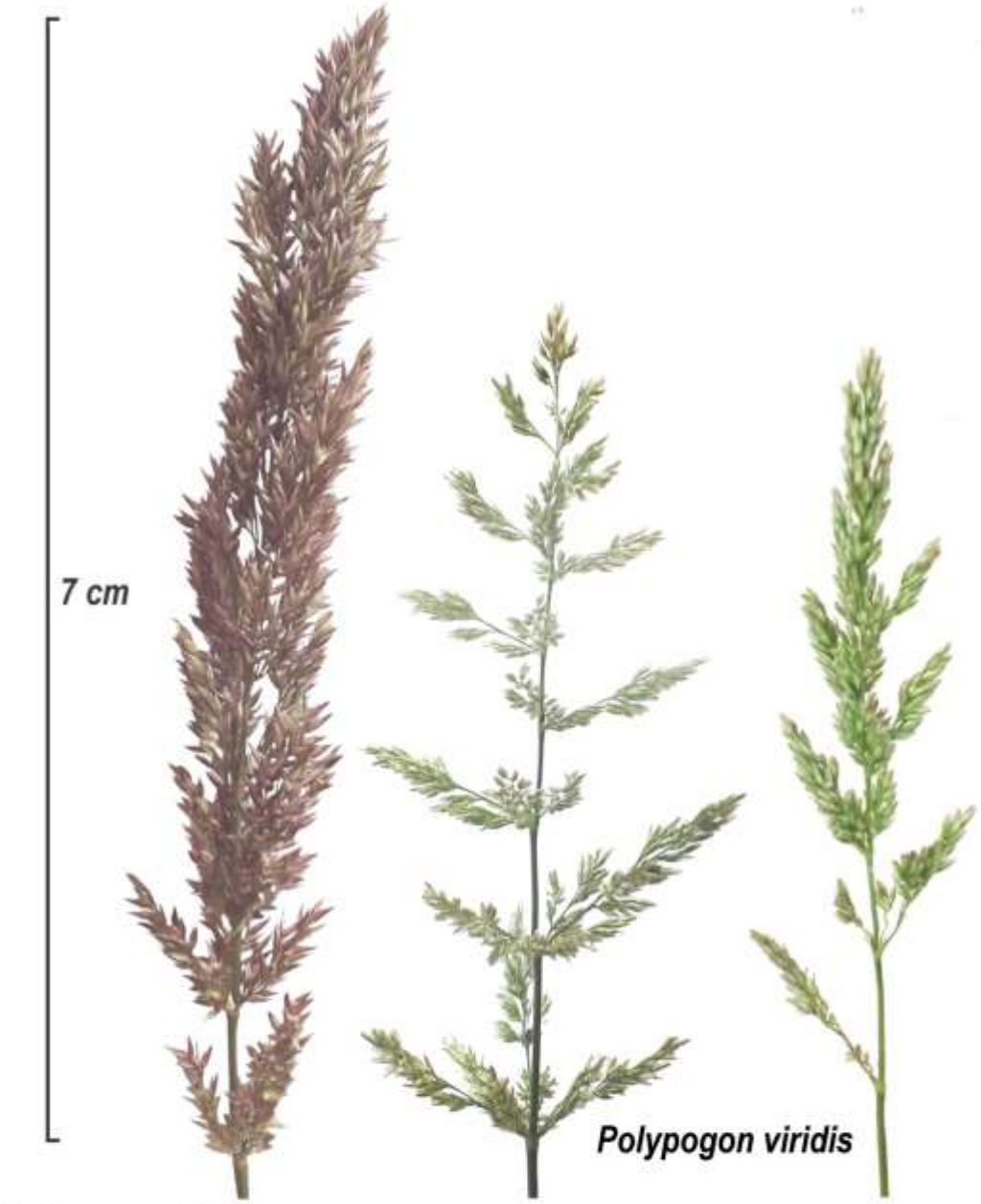

Agrostis castellana
basal tuft


Polypogon viridis
(Agrostis semiverticilliata)

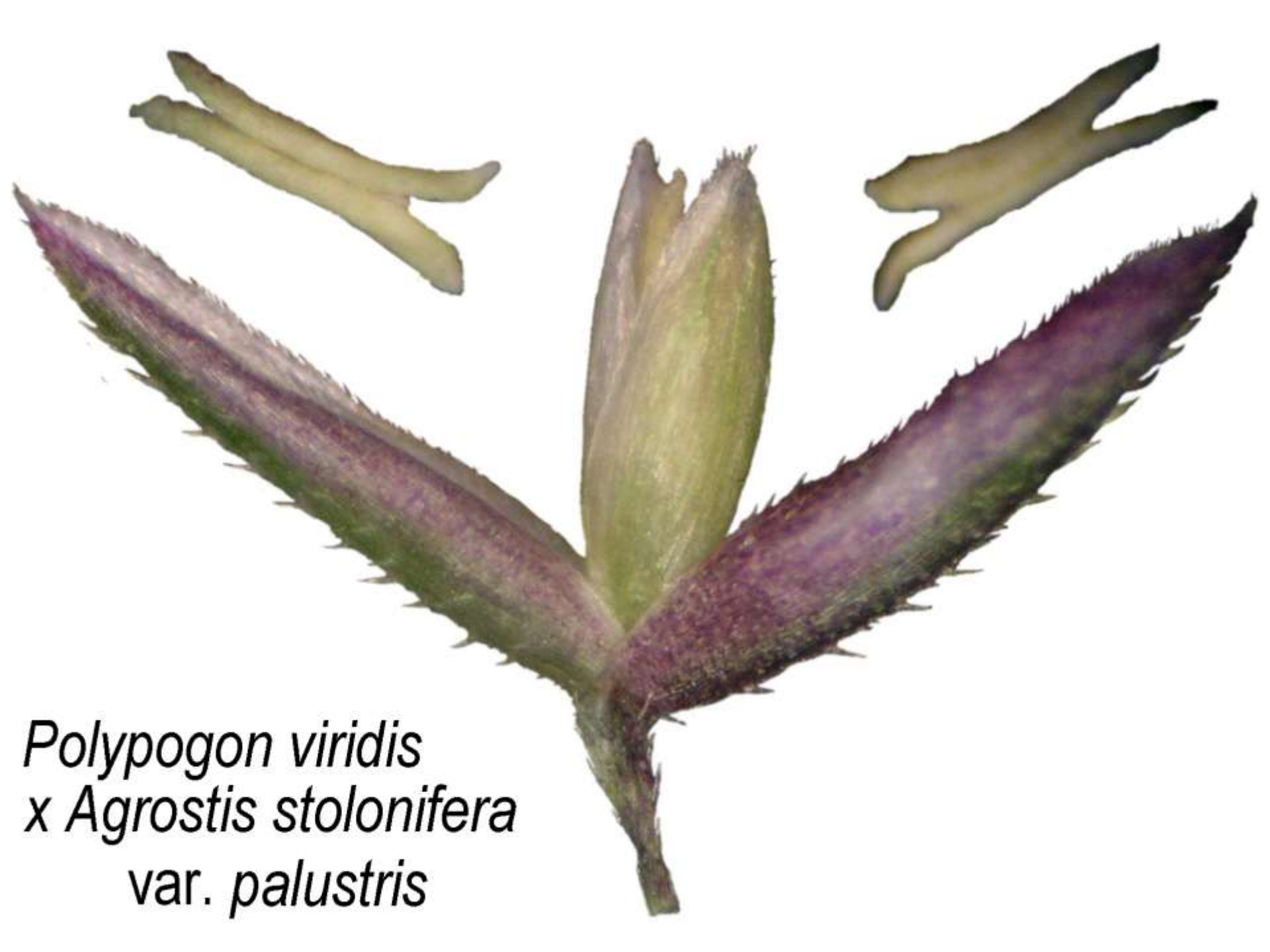
Polypogon viridis spikelet
(Agrostis semiverticilliata)

Polypogon viridis


Polypogon viridis x Agrostis stolonifera
var. palustris
10cm



Polypogon viridis x
Agrostis stolonifera var. palustris


Polypogon viridis
x Agrostis stolonifera
var. *palustris*

Polypogon viridis x Agrostis stolonifera var. palustris

Polypogon viridis

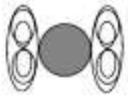

Polypogon monspeliensis

Polypogon monspeliensis
x Agrostis stolonifera

BROME GRASSES

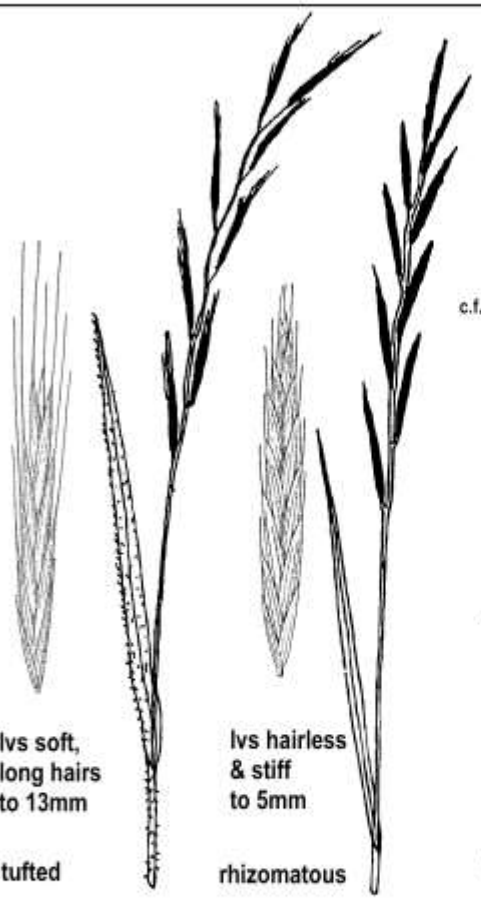
Brachypodium (perennial)
Anisantha (annual/biennial
Bromopsis (perennial)
Bromus (annual/biennial)
Ceratochloa (annual)

GRASSES WITH SPIKES: 1



spikes side on to axis

spikes edge on to axis

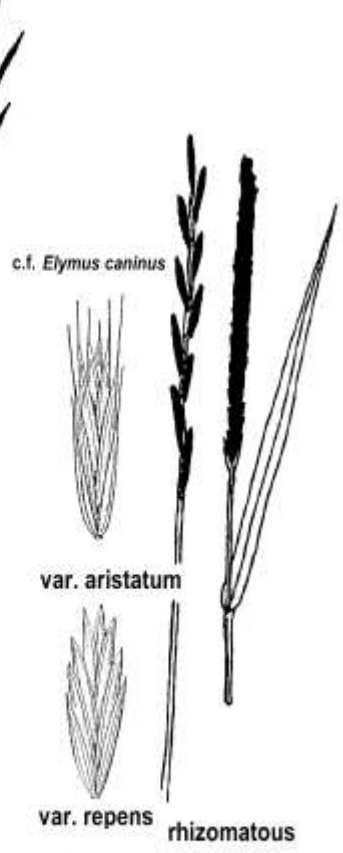


Brachypodium sylvaticum

common, woodland,
shaded lanes

Brachypodium pinnatum

common. chalk
grassland



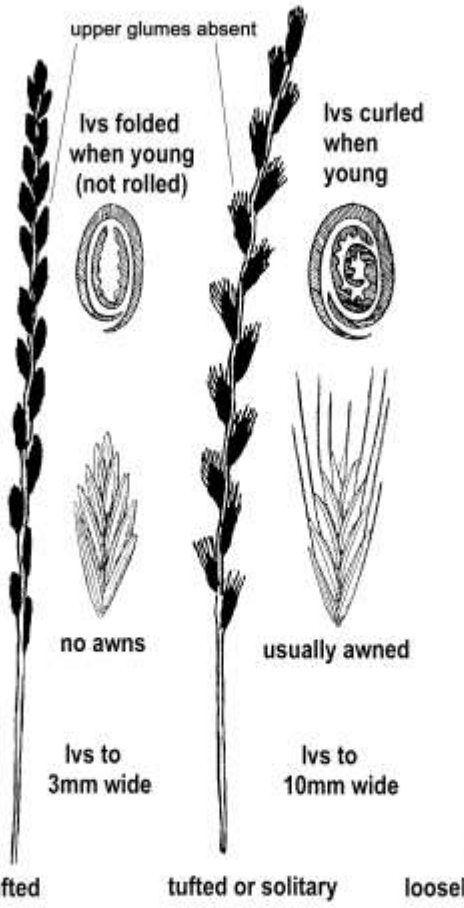
Elytrigia repens

common.
arable land

Elymus caninus

local, woodland
margins

Elymus
Agropyron
old generic names



Lolium perenne

common, grassland
paths & tracks

Lolium multiflorum

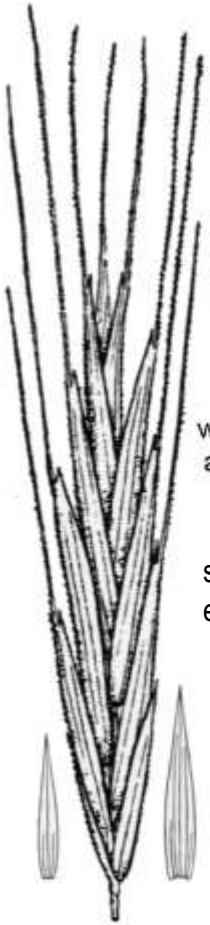
common sown
hay/pasture grass

'King' of the grasses
re: nutrtional value

x Festulolium loliaceum

frequent, grassland

commonly occurring
sterile hybrid between
L. perenne & *Festuca pratensis*



wedge-shaped and gaping at maturity

spikelets <15mm excluding awns..

Anisantha

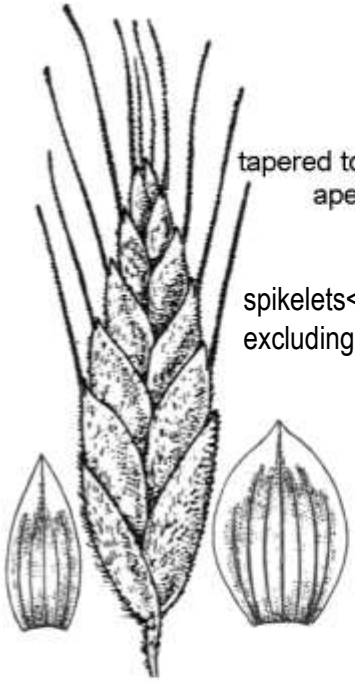
annual/biennial

parallel-sided at maturity

spikelets >15mm excluding awns.

Bromopsis

perennial

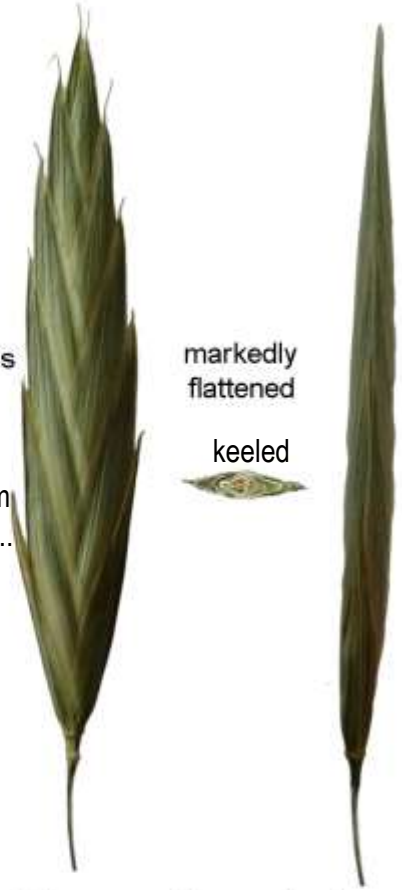


tapered towards apex

spikelets<15mm excluding awns..

Bromus

annual/biennial



markedly flattened

keeled

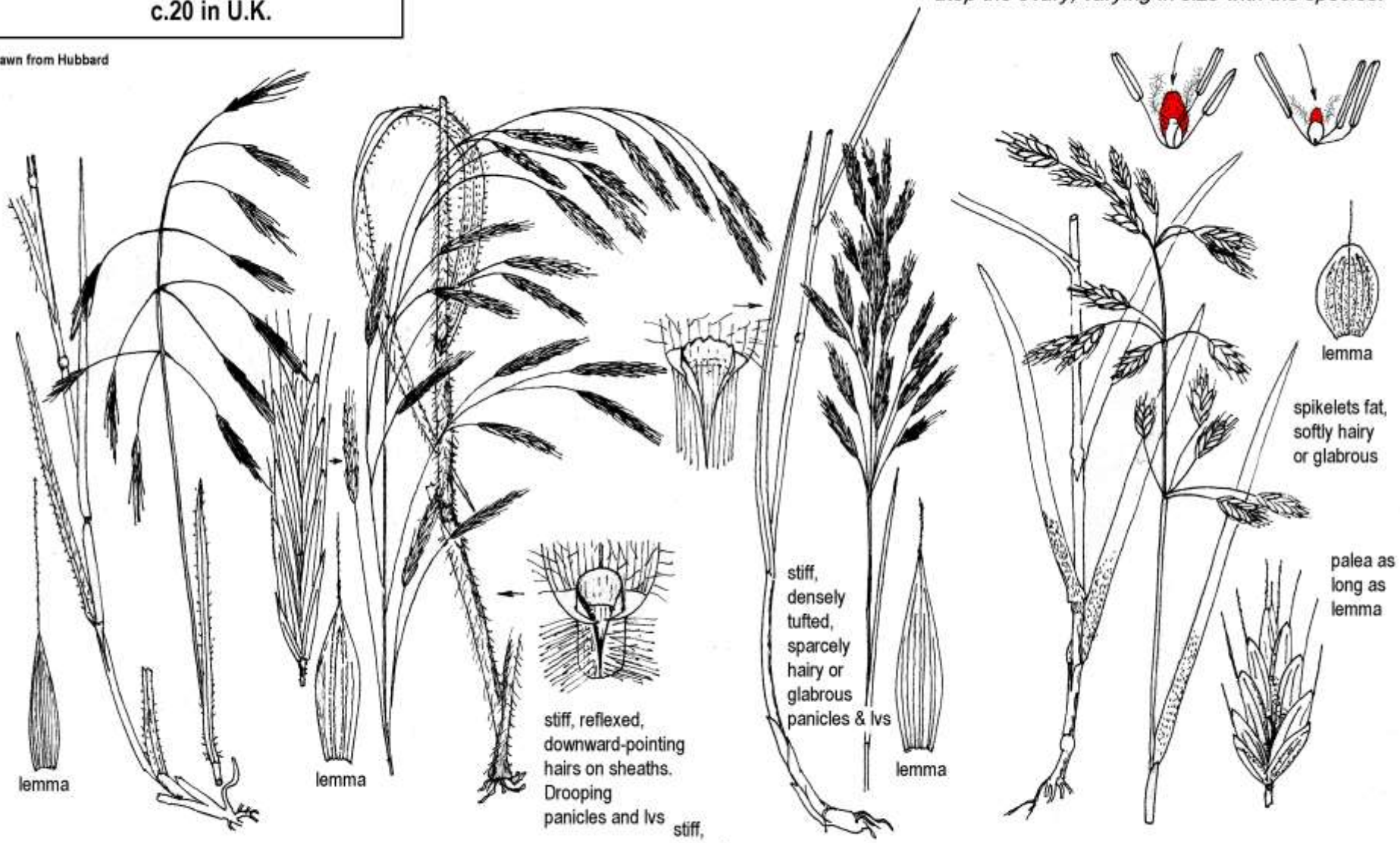
Ceratochloa

annual

BROMES: 1 **37 species in Europe c.20 in U.K.**

redrawn from Hubbard

the genera Anisantha, Bromopsis, Bromus and Brachypodium all have a small hairy appendage atop the ovary, varying in size with the species.



Anisantha (Bromus) sterilis
Barren Brome
common, waysides, hedgerows, field margins
[see also *A. diandra* - increasingly invasive in arable]

Bromopsis ramosa (Bromus ramosus)
Wood Brome
shady woodland, green rides

stiff, densely tufted, sparcely hairy or glabrous panicles and lvs

Bromopsis erecta (Bromus erectus)
Upright Brome
chalk grassland

Bromus secalinus
Rye Brome
now rare, but persistent in a few places - old wheat crop contaminant before grain cleaning

Call code: Brome1.bmp

ANISANTHA

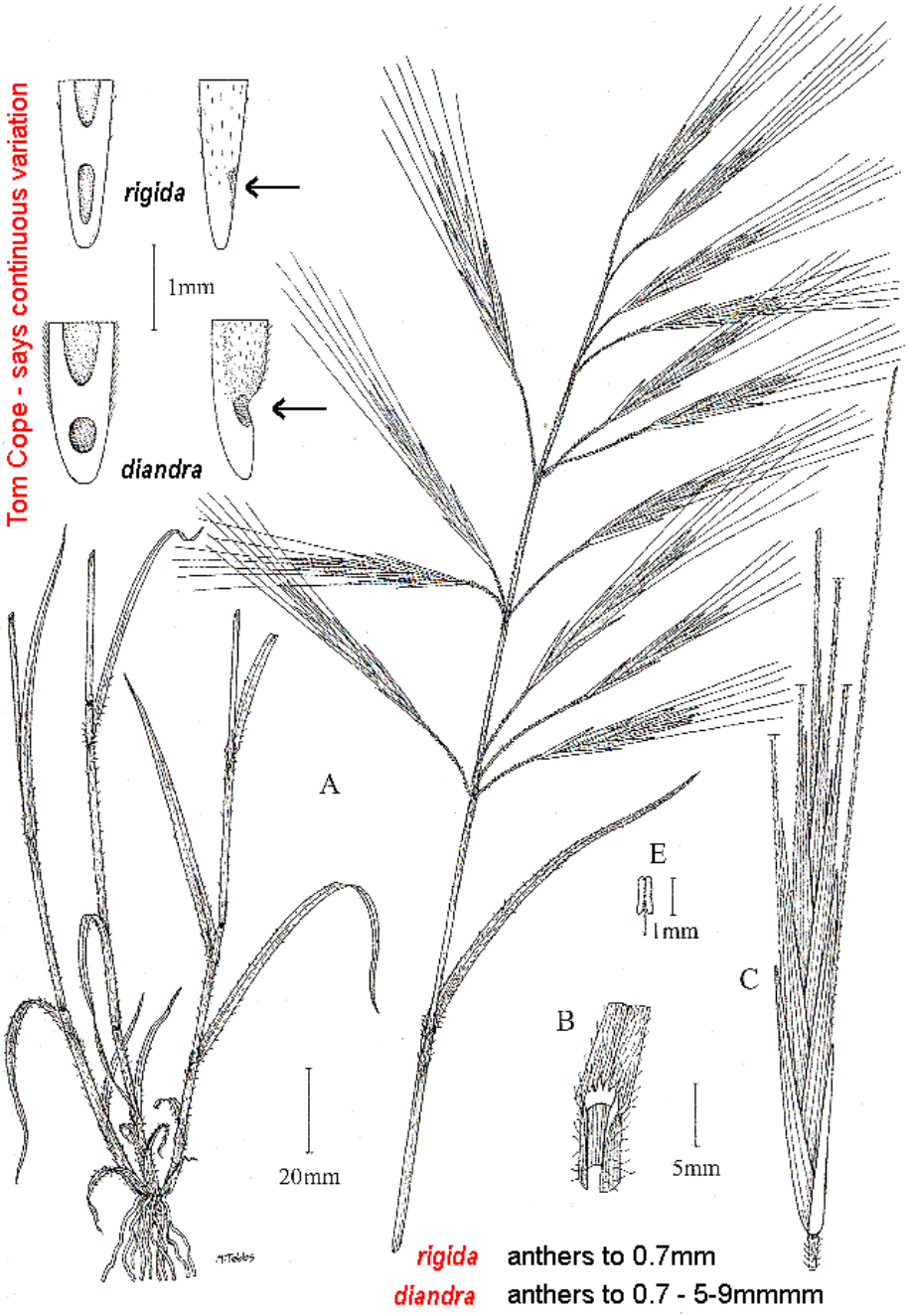
- sterilis Barren Brome
- diandra Great Brome
- rigida Rip-gut Brome
- tectorum Drooping Brome (only one with branched branches)
- madritensis Compact Brome (bifid tipped lemma)
- rubens Foxtail Brome (bifid tipped lemmas)

Tom Cope says better distinguishing character is length of glumes rather than lemmas.

sterilis - lower glume (7.5)9 – 13(15)mm
upper glume 12.5 – 19.5(22)mm
lemma (14.5)16.5 – 23mm
awn to (1.5)2.5 – 3.5cm
anthers 0.9 – 1.8mm

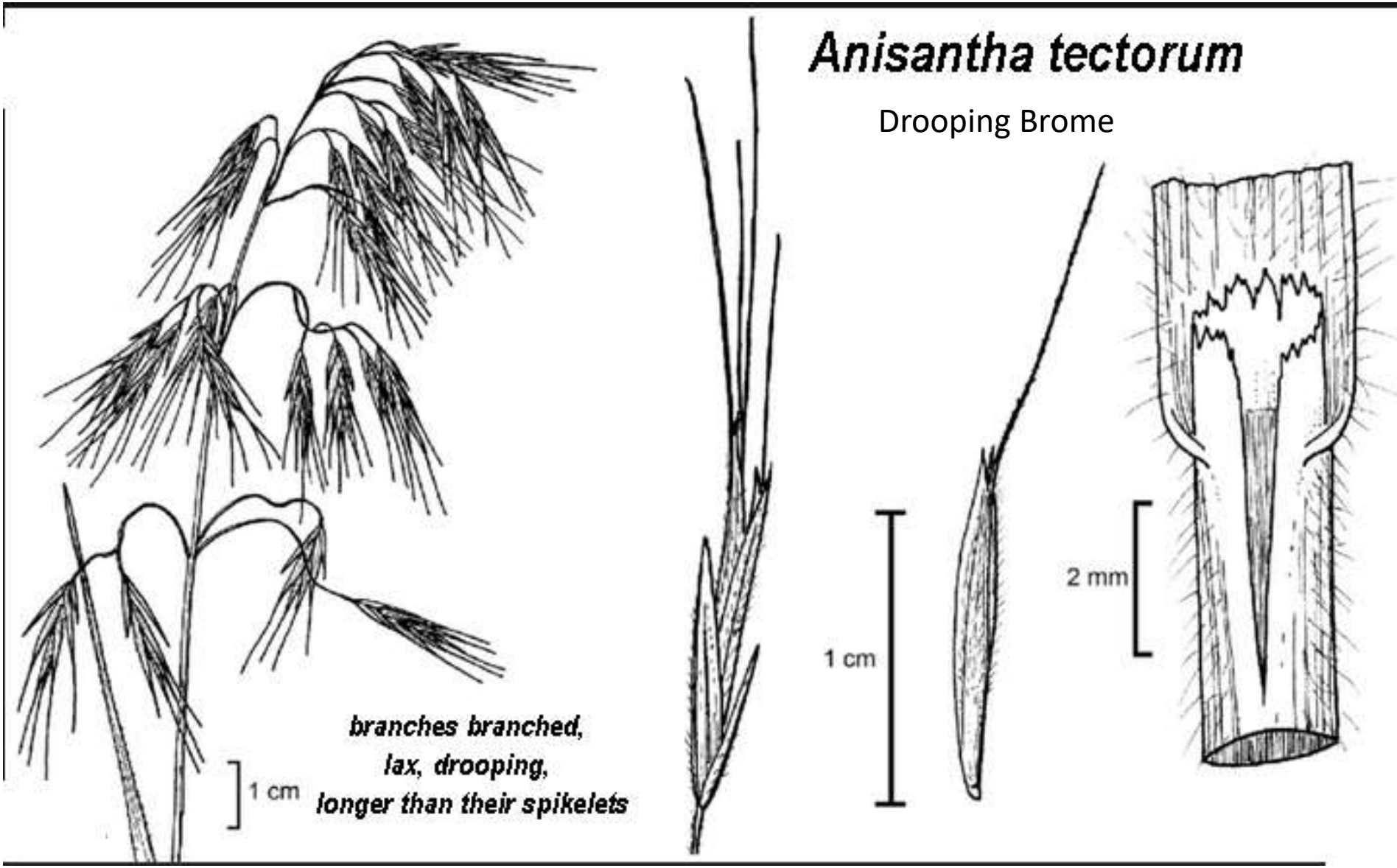
diandra/ rigida - lower glume 14 - 24mm
upper glume 20 - 32mm
lemma (21)24 – 32(35)mm
awn (3)4 – 5.5cm
anthers 0.6 – 1.3(2.6)mm

Anisantha rigida

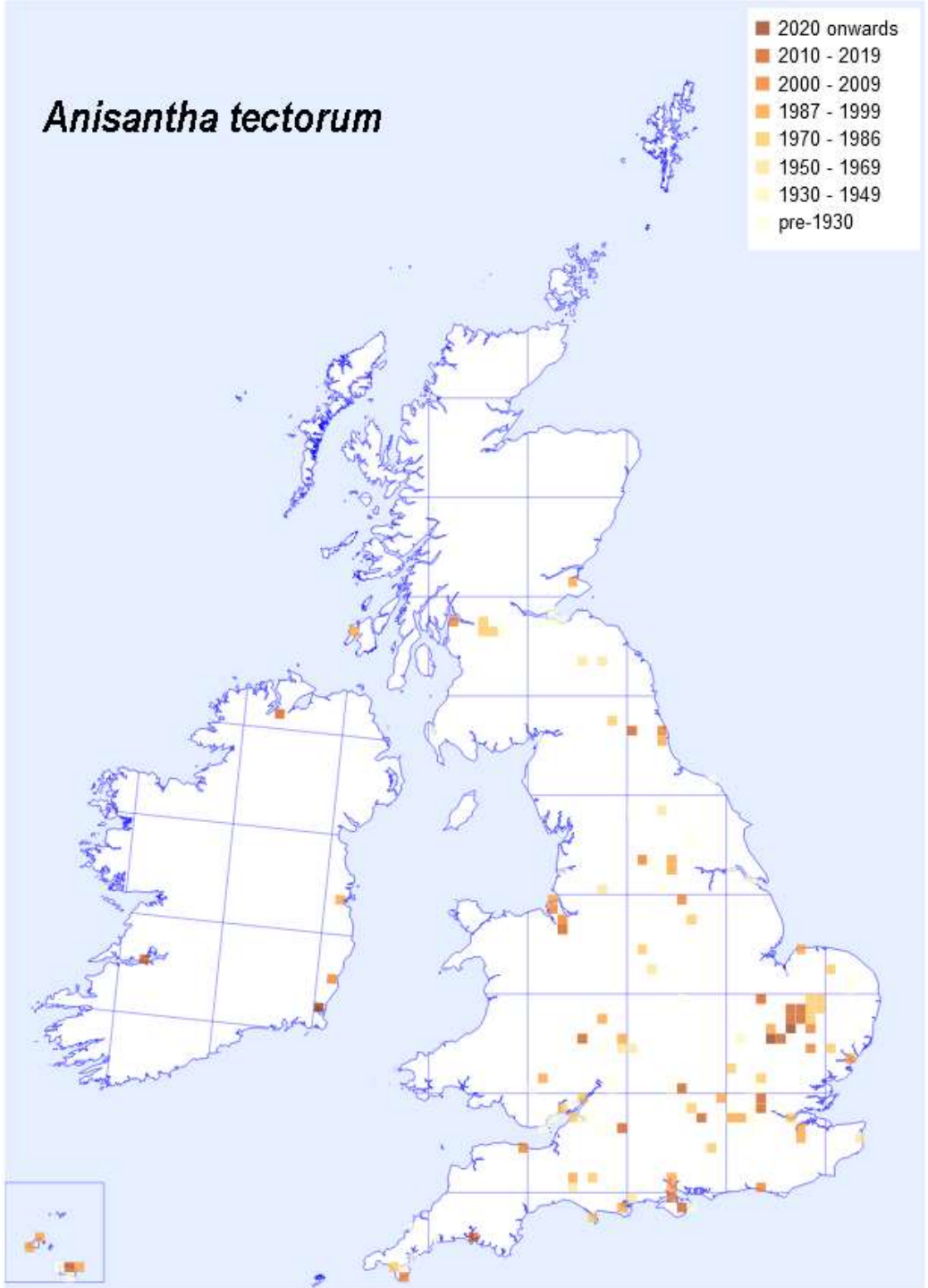


diandra – panicle lax, spreading branches patent to semi- erect mostly longer than spikelets.
anthers 0.7 – 5.9mm
2n = 42

rigida - panicle contracted branches stiffly erect, mainly shorter than spikelets.
anthers up to 0.7mm
2n = 56

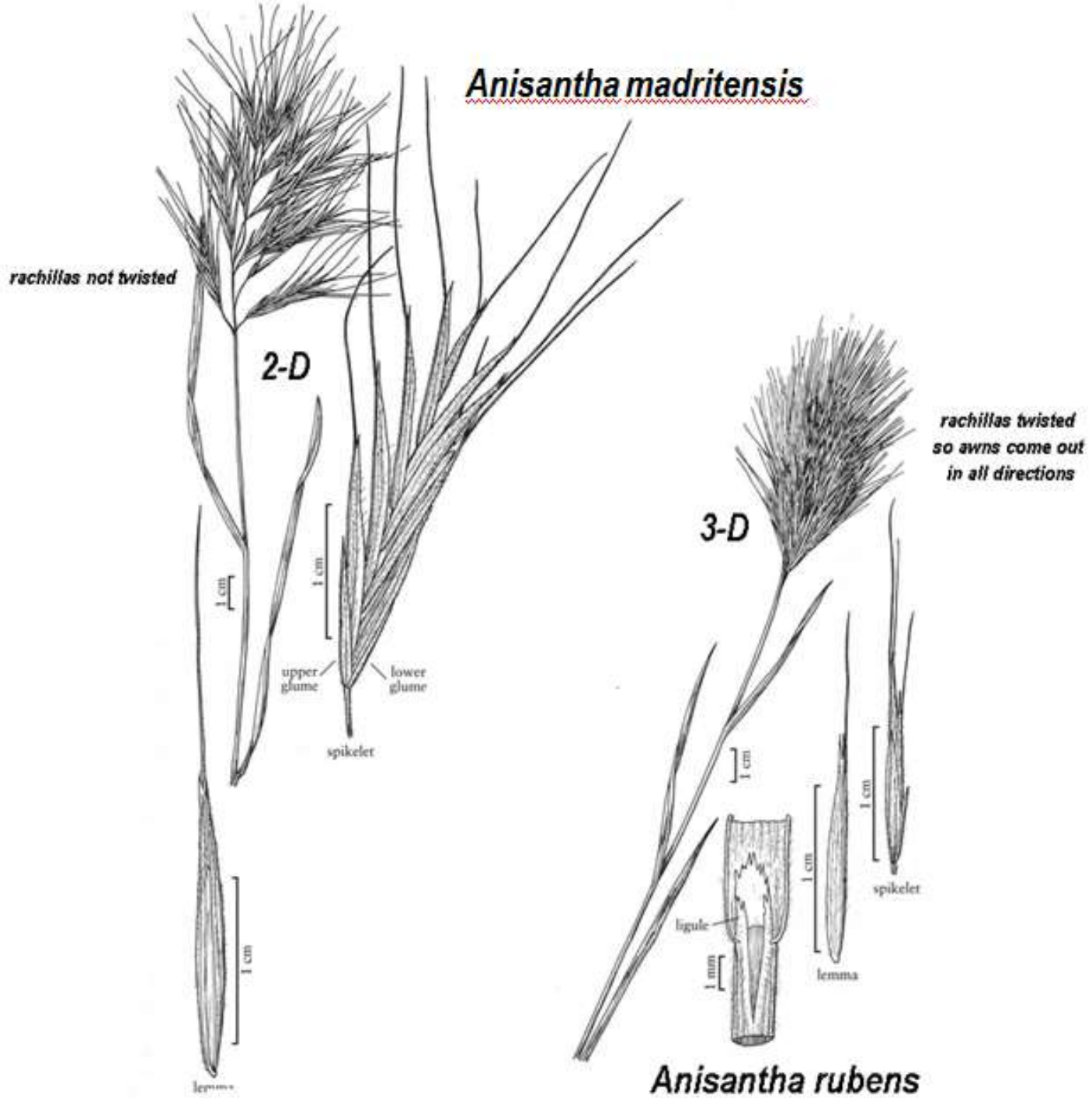

Anisantha tectorum
Drooping Brome
branches branched,
lax, drooping,
longer than their spikelets
1 cm
1 cm
2 mm


Drooping Brome
branches branched
Anisantha tectorum


Anisantha tectorum
2020 onwards
2010 - 2019
2000 - 2009
1987 - 1999
1970 - 1986
1950 - 1969
1930 - 1949
pre-1930

Downy brome (*Bromus tectorum*) florets and spikelets

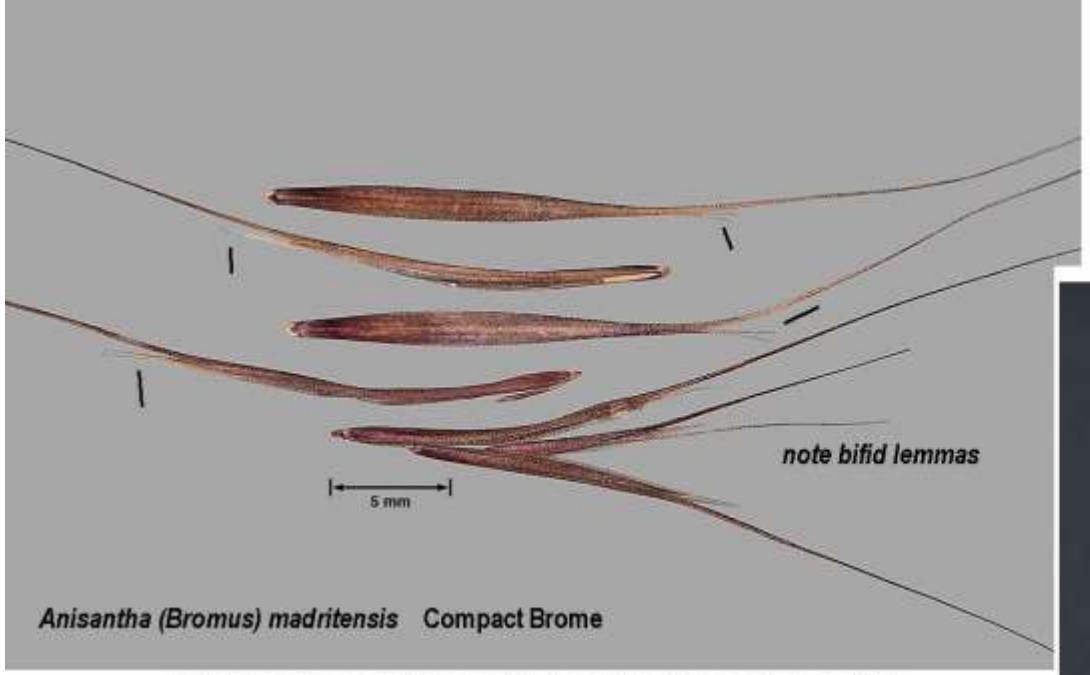
Bromus madritensis


Anisantha madritensis
rachillas not twisted
2-D
1 cm
1 cm
upper glume
lower glume
spikelet
1 cm
rachillas twisted so awns come out in all directions
3-D
1 cm
1 cm
1 cm
spikelet
ligule
1 mm
lemma
Anisantha rubens

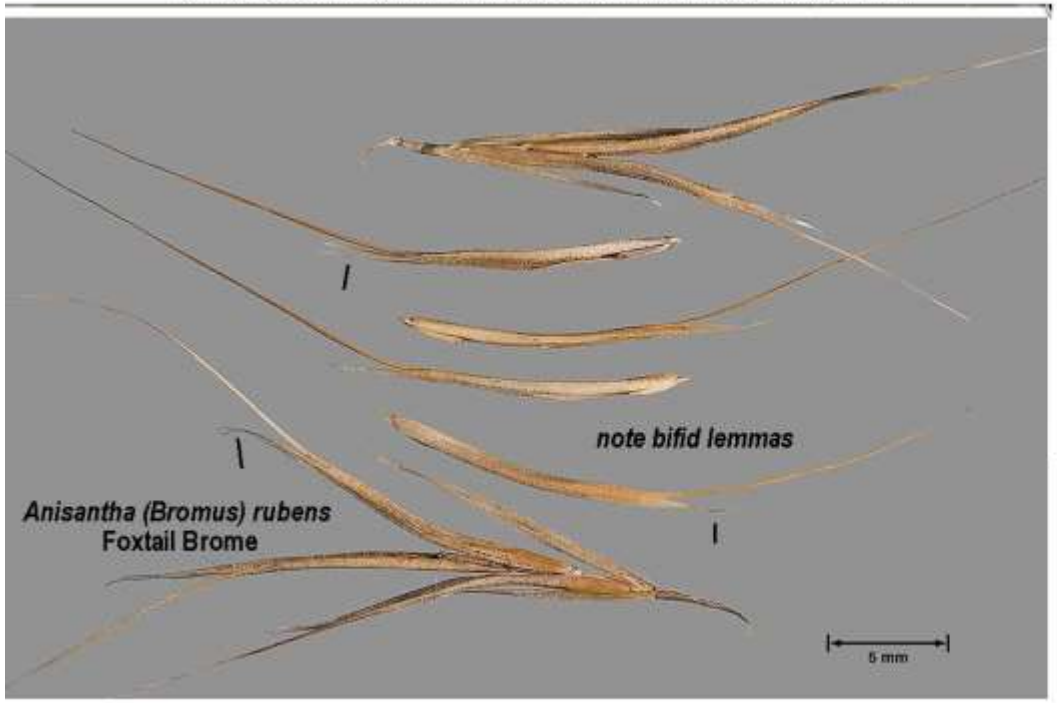
Bromus rubens L. Red Brome

- rhachillas are twisted so that floret awns form 3-D shape
- it is a low-growing grass, usually 20-30mm high
- the flower cluster is dense, held erect when fresh
- the glumes are shorter than the lemmas
- the lemmas are long-awned
- the leaves are flat
- the ligules are to 2.5mm long, becoming torn.
- the mature flowers take on a dark-red colour, hence "Red Brome".
- Native to the Mediterranean area. Annual. C3.

picture and notes from Castlemaine Flora Australia



Four florets and a spikelet (bottom) of compact brome (ssp. *madritensis*). Photo: J. O'Brien, © 2007, The Regents of the University of California



Two spikelets (top and bottom) and four florets of red brome (ssp. *rubens*). Photo: J. O'Brien, © 2007, The Regents of the University of California

BROMOPSIS

- ramosa
- Ssp. ramosa — Hairy Brome
- Ssp. benekenii — Lesser hairy Brome
- erecta — Upright Brome
- inermis — Hungarian Brome
- Ssp. inermis — shortly pubescent lemmas
- Ssp. pumpelliana — densely pilose lemmas


Bromopsis ramosa

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redrawn from Hubbard

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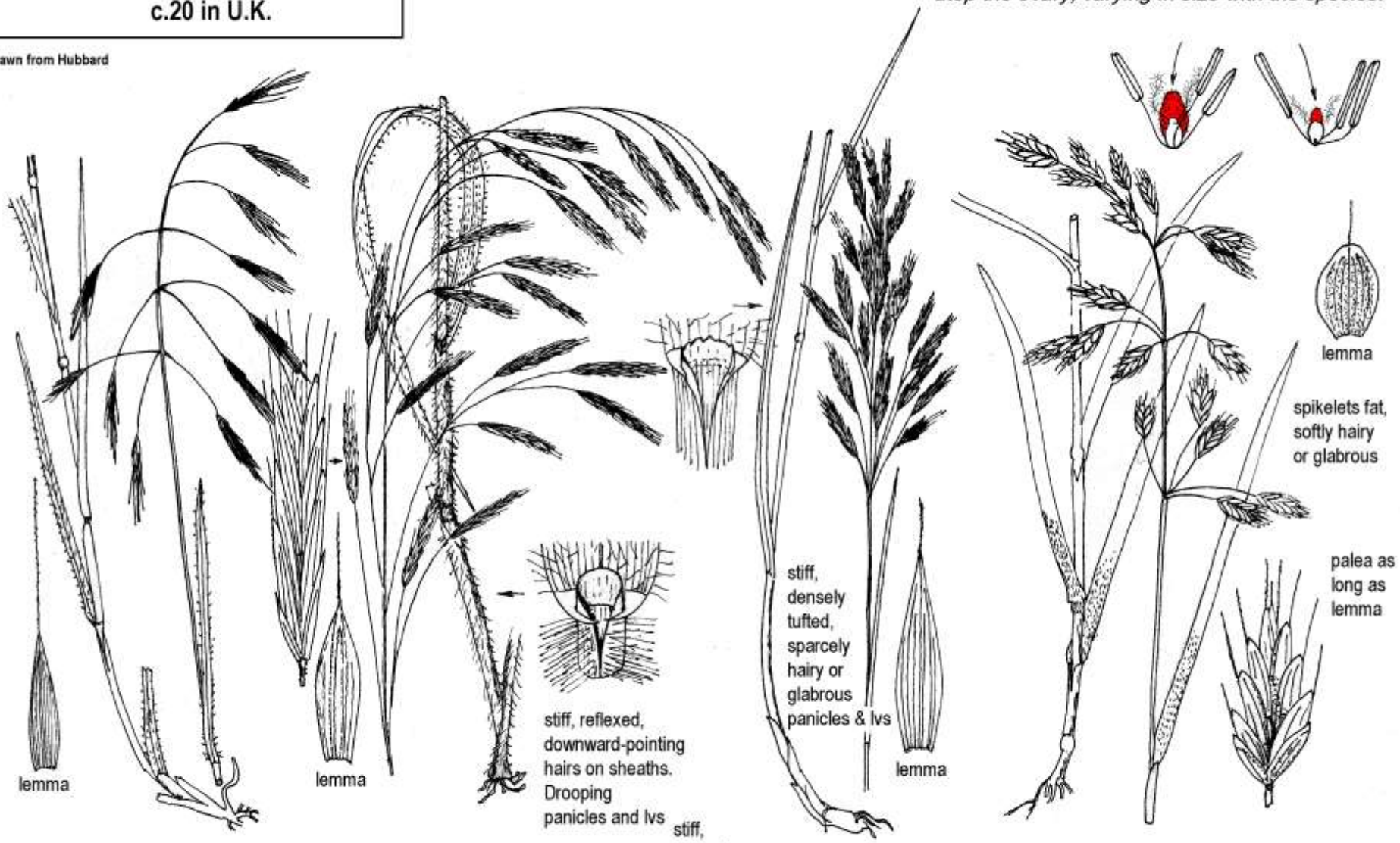

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Barren Brome
common, waysides, hedgerows, field margins
[see also *A. diandra* - increasingly invasive in arable]

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Wood Brome
shady woodland, green rides

stiff, densely tufted, sparcely hairy or glabrous panicles and lvs

Bromopsis erecta (Bromus erectus)
Upright Brome
chalk grassland

Bromus secalinus
Rye Brome
now rare, but persistent in a few places - old wheat crop contaminant before grain cleaning

Call code: Brome1.bmp


Bromopsis benekenii

- ***Bromopsis ramosa*** all sheaths loosely to densely hairy, panicle to 40cm, wide, drooping, not all one sided, branches in a pair at lowest node, anthers (1.8)2.1 – 4.3(5.3)mm. 2n = 42

  Shady moist soils in woodland & green lanes
- ***Bromopsis benekenii*** upper sheaths usually glabrous, panicle to 20cm, narrow, drooping, one sided, branches 1-4 at lowest node, anthers 1.8 – 3.3mm. 2n=28.

  Shady shallow calcareous soils in woodland, particularly beech. Fls. A month earlier than *ramosa.*
- OVERLOOKED ?????

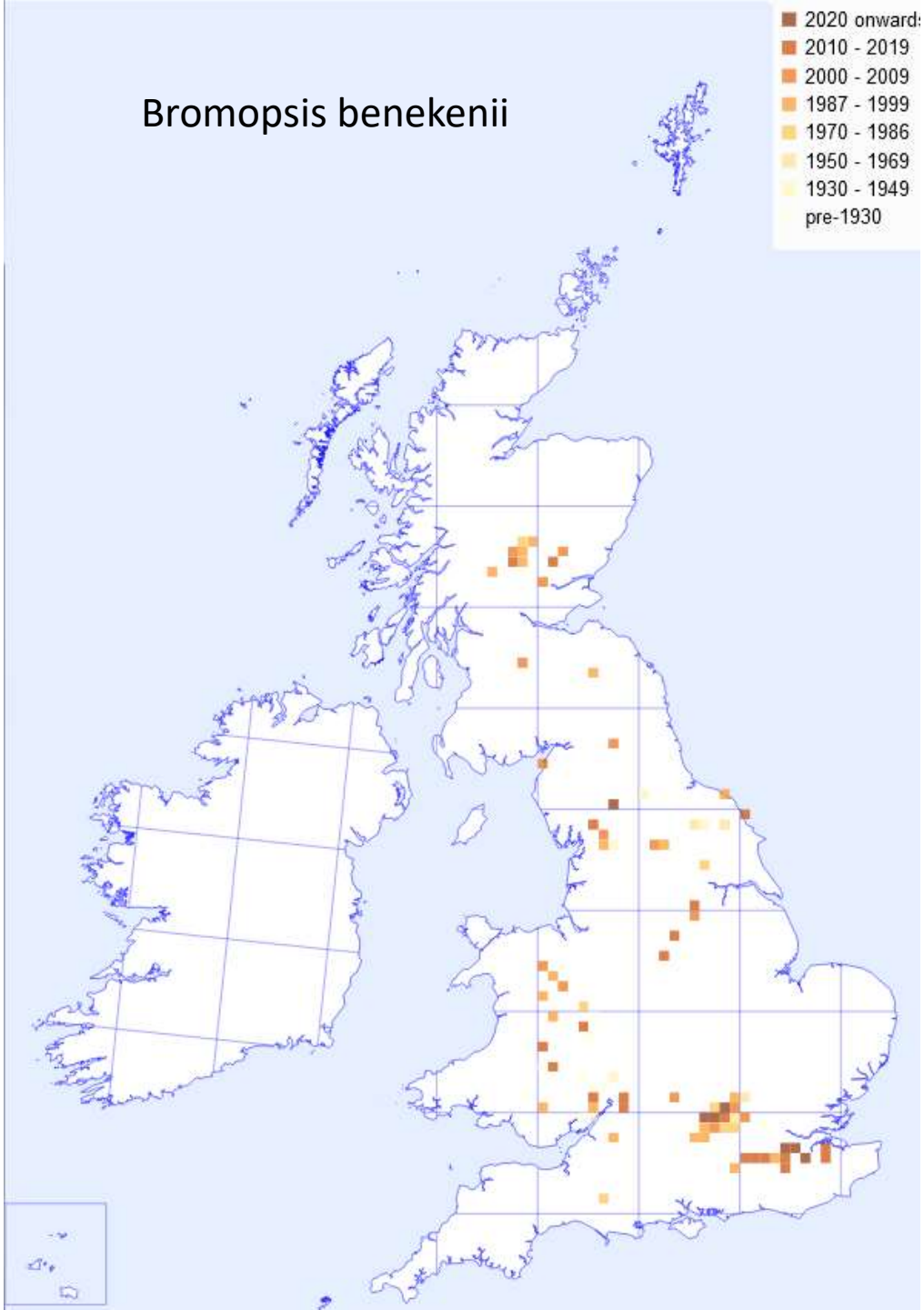
Bromopsis inermis

Hungarian Brome

Not tufted, long rhizomes, culms to 1.5m. Sheaths glabrous, panicle erect , lvs of tillers flat, spikelets somewhat compressed but rounded backed not keeled,
lemmas (7)9 – 13(16) mm, usually awnless.
Anthers 4-5mm.

c.f. *Ceratochloa cathartica* no rhizomes, spikelets compressed and sharply keeled, lemmas (9.5)10 - 13.5 (14.5), awn 0.5 - 4.5(5)mm.
Tiller leaves enrolled, anthers 0.4 – 1.1mm (but in cleistogamous packets up to 3.5mm).

Bromopsis benekenii

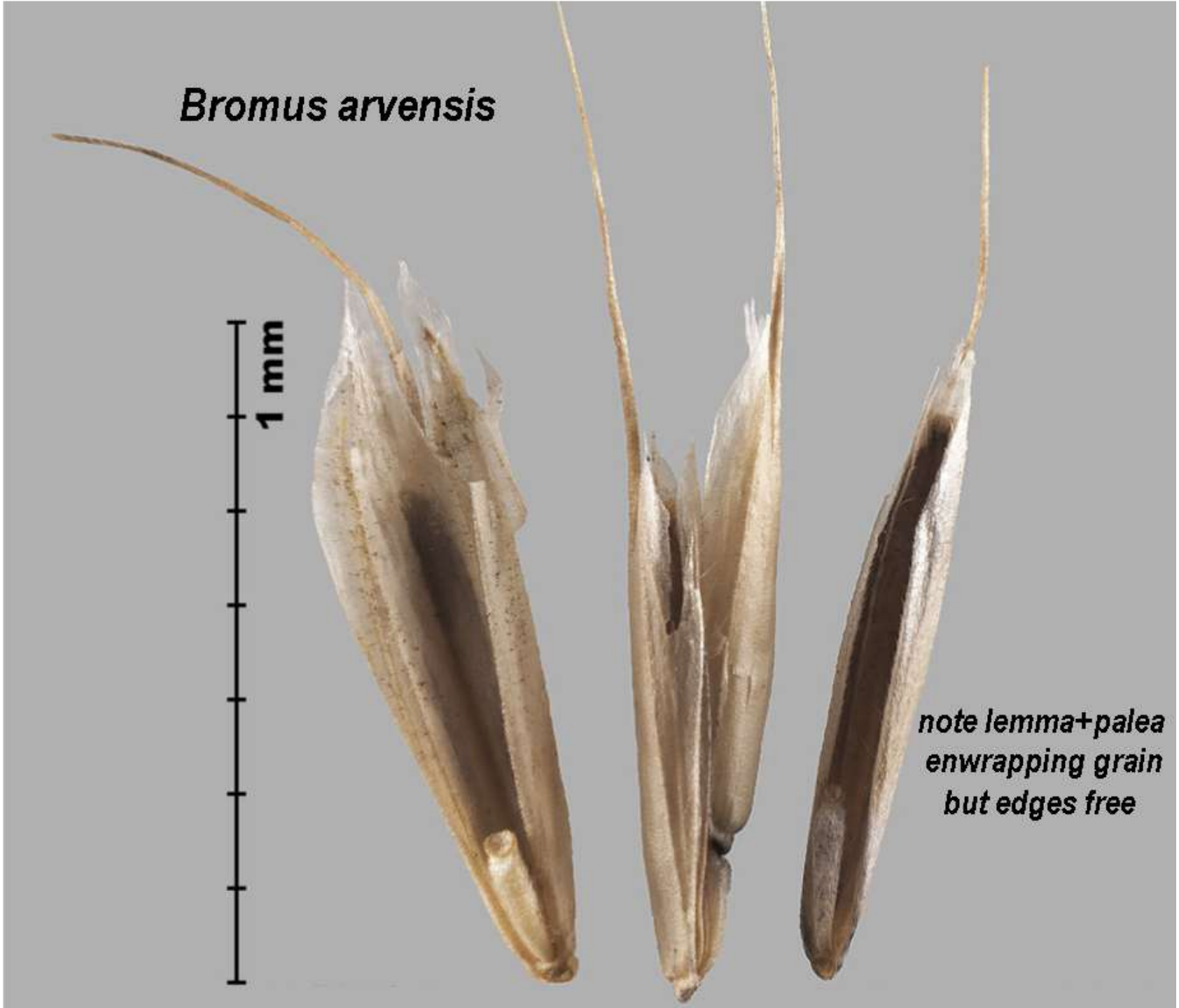


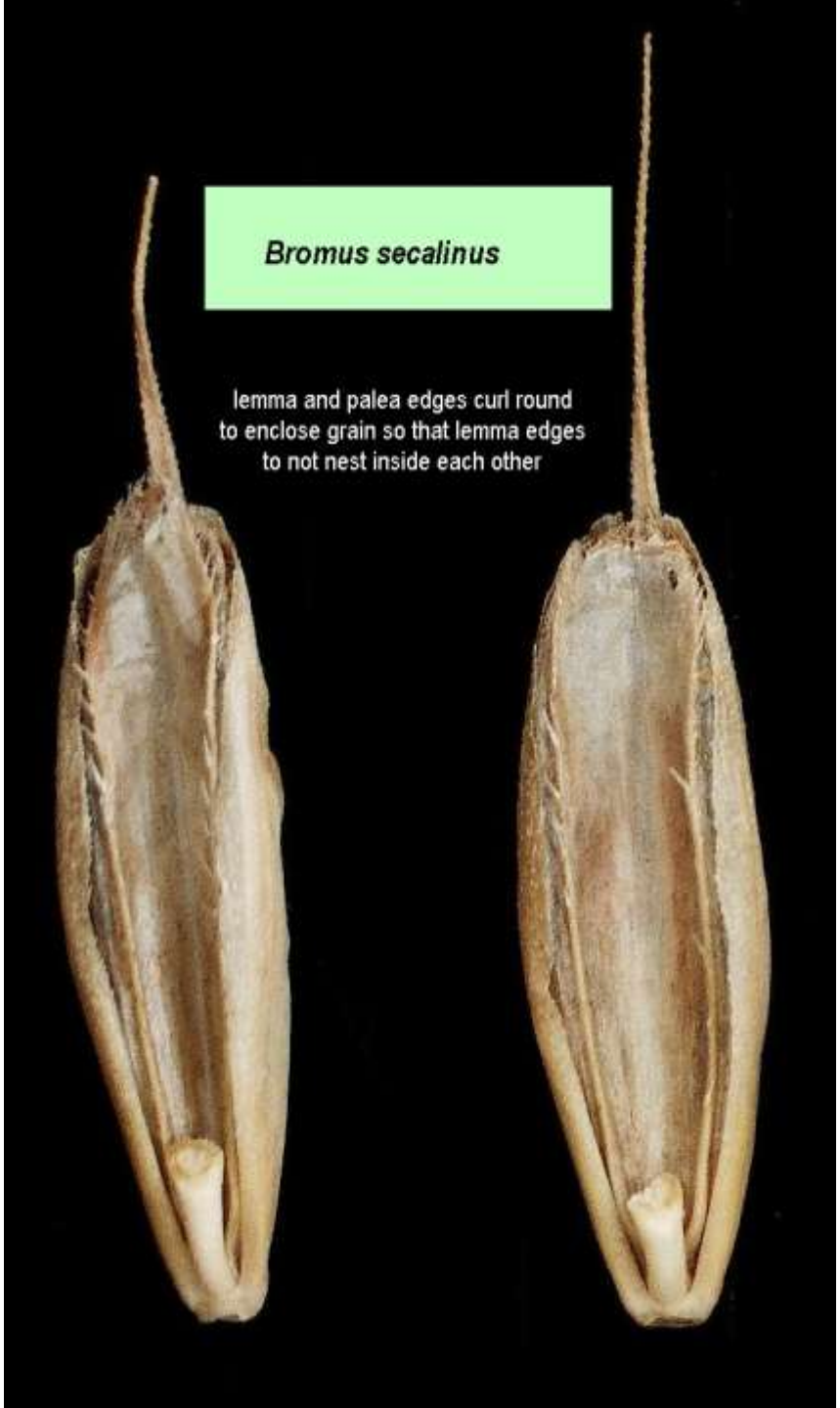
BROMUS

• secalinus	Rye Brome	
• pseudosecalinus	Smith's Brome	
• arvensis	Field Brome	extinct ?
• racemosus	Smooth Brome	scabrid lemmas
• commutatus	Meadow Brome	scabrid lemmas, coriaceous
• hordeaceus	Soft Brome	softly hairy lemmas
– Ssp. hordeaceus		
– Ssp. molliformis (divaricatus)		
– Ssp. ferronii		
– Ssp. thominei		
– Ssp. longipedicellatus	like commutatus but lemmas softly hairy & papery	
– SSp. x pseudothominei		
• lepidus	Slender Soft-brome	
• interruptus	Interrupted Brome	
• japonicus	Thunberg's Brome	
• lanceolatus	Large-headed Brome	

13+ other alien species


Bromus hordeaceus
mm
although lemma and palea enwrap grain, edges free so that lemmas nest inside each other


Bromus arvensis
1 mm
note lemma+palea
enwrapping grain
but edges free


Bromus secalinus
lemma and palea edges curl round to enclose grain so that lemma edges to not nest inside each other

LEMMA & PALEA ENWRAP & FALL WITH CARYOPSIS

- *secalinus* – Rye Brome

  spikelets 12-20mm

  lemma 6.5 -9(10)mm

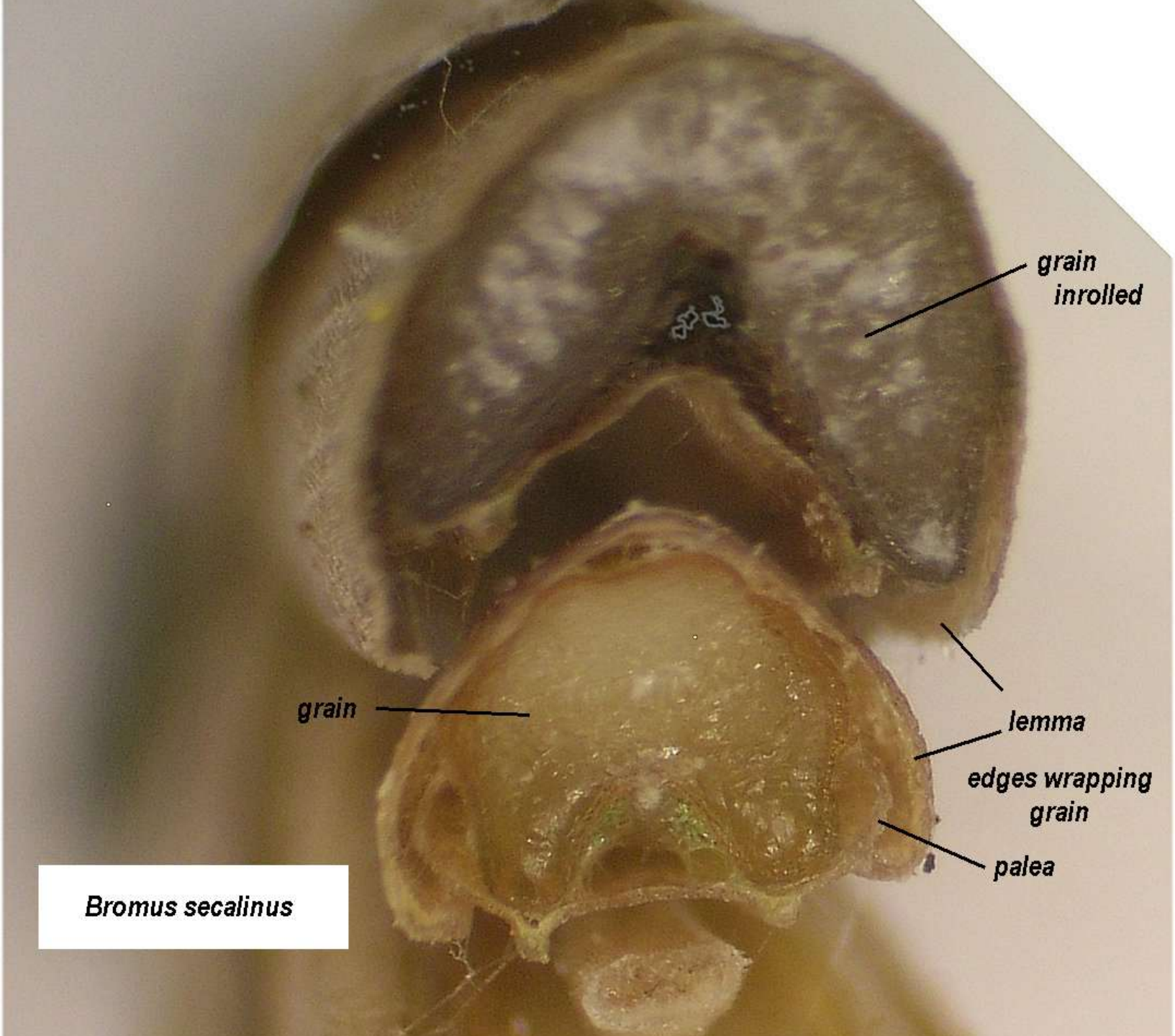
  palea as long as lemma

- *pseudosecalinus* – Smith's Brome

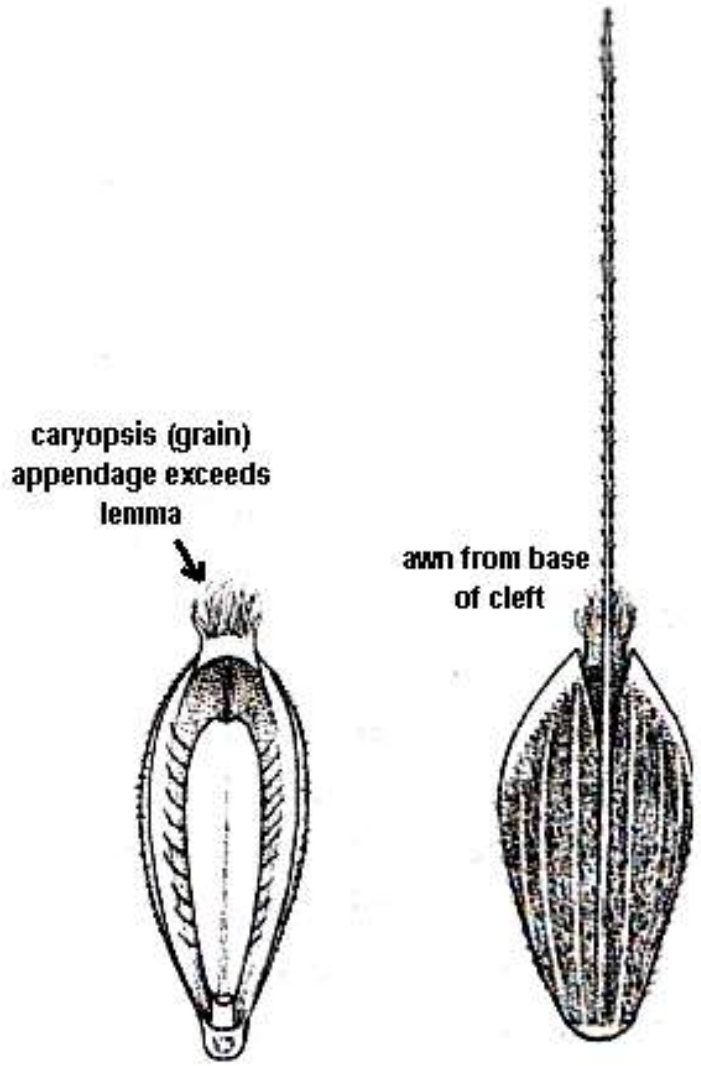
  spikelets 8.0-12mm

  lemma 5-6mm

  palea shorter than lemma

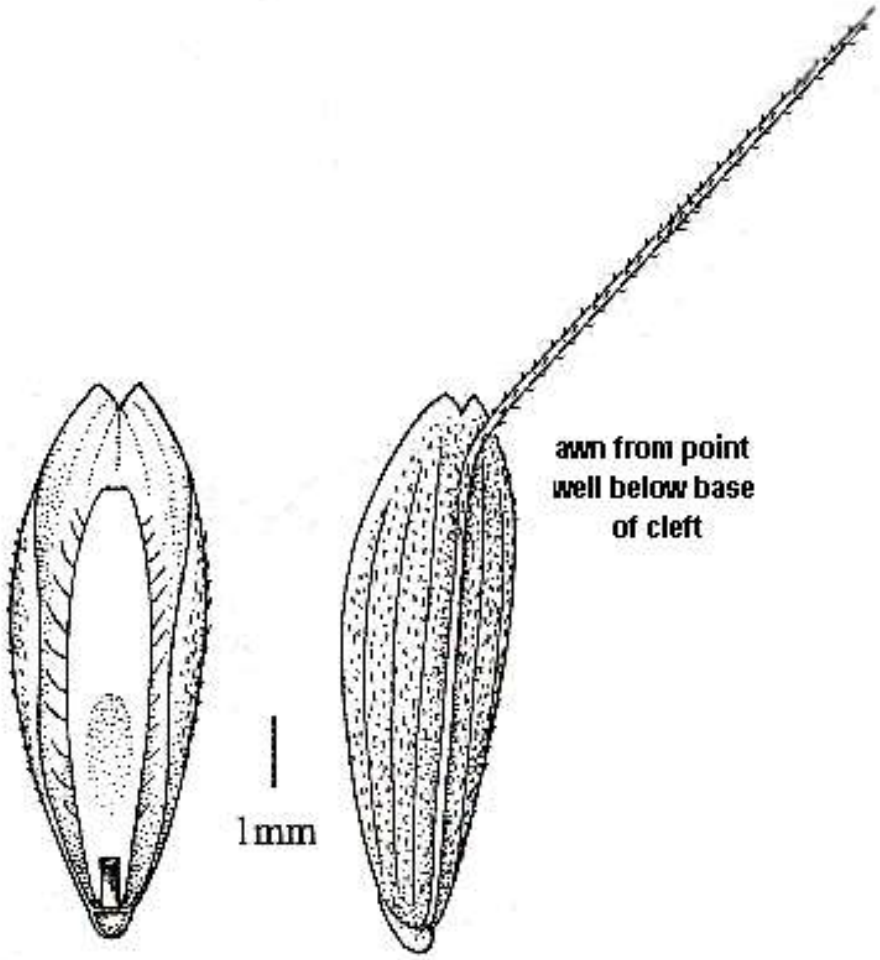

grain
inrolled
grain
lemma
edges wrapping
grain
palea
Bromus secalinus

Bromus secalinus



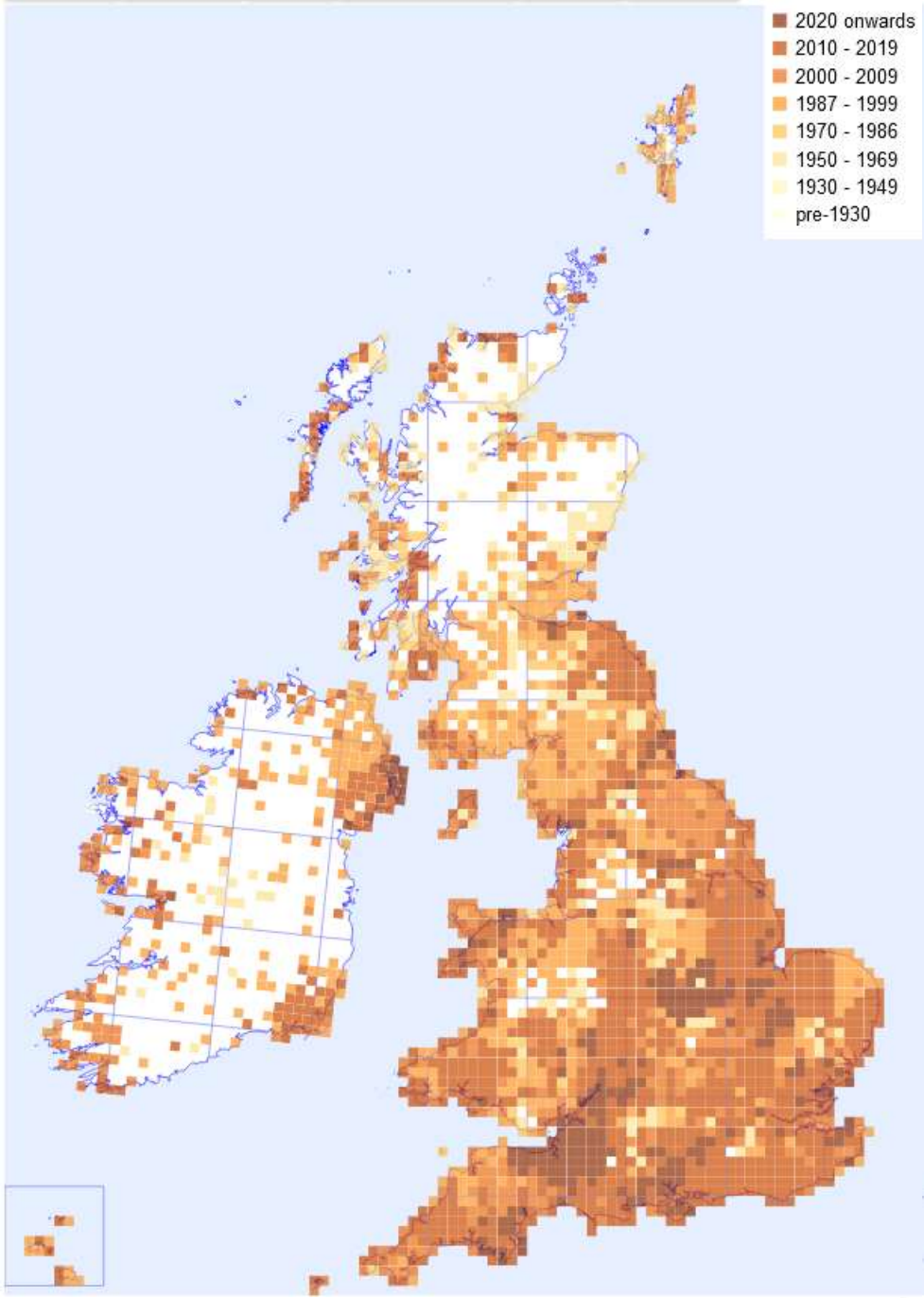
(4.5) 5.5 - 6.8mm

lepidus

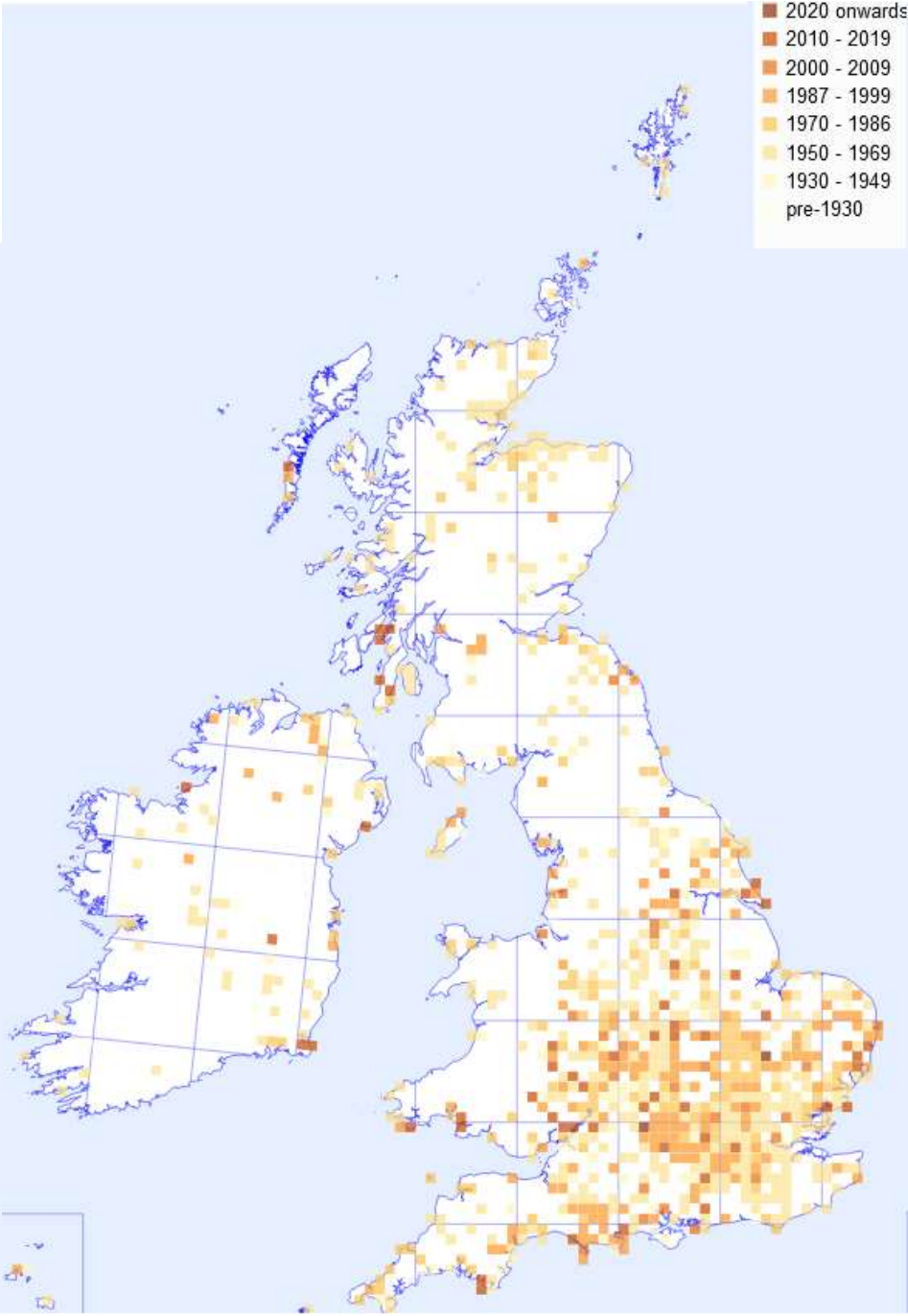


(7) 8 - 11mm

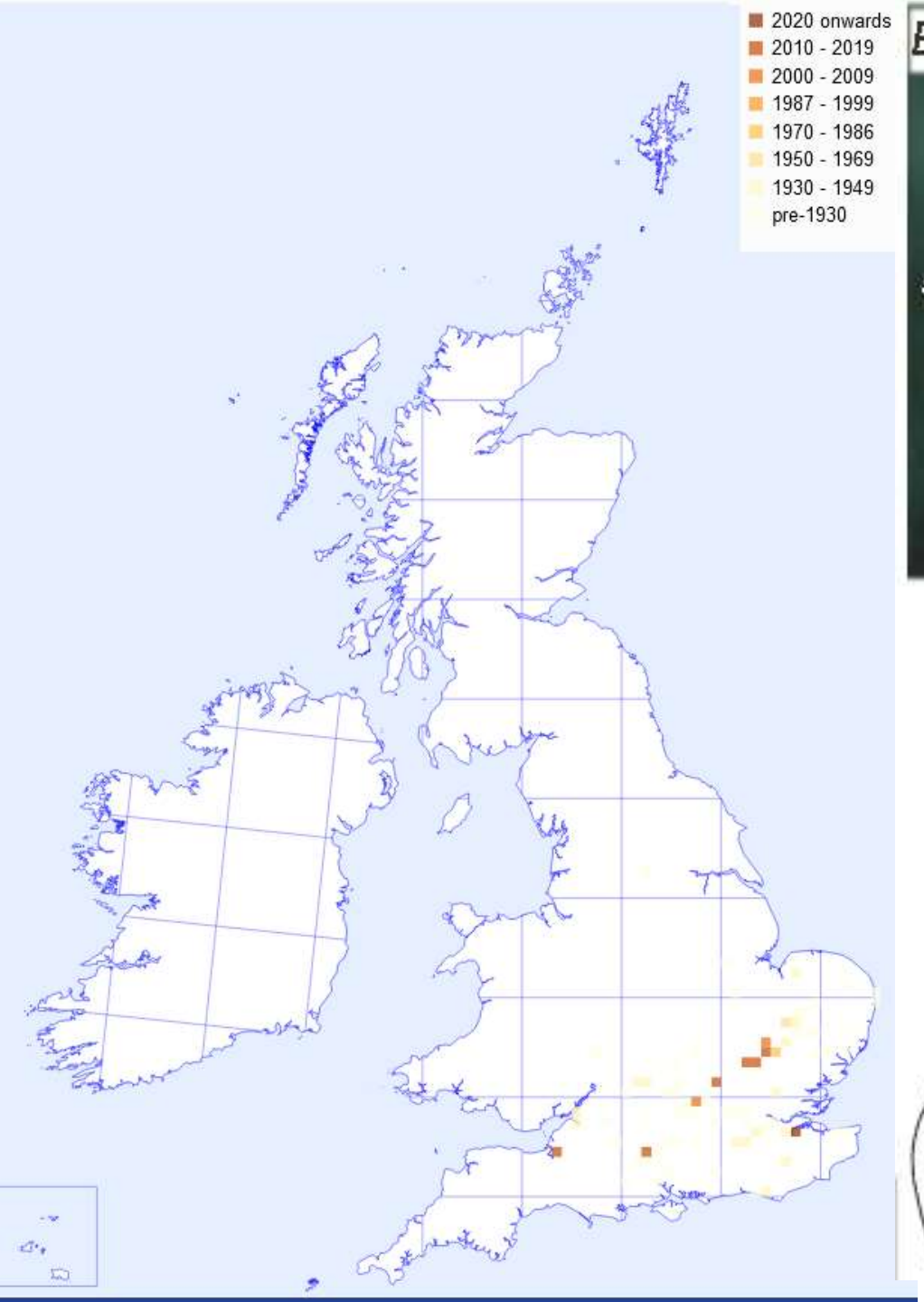
hordeaceous



hordeaceus hordeaceus



lepidus


2020 onwards
2010 - 2019
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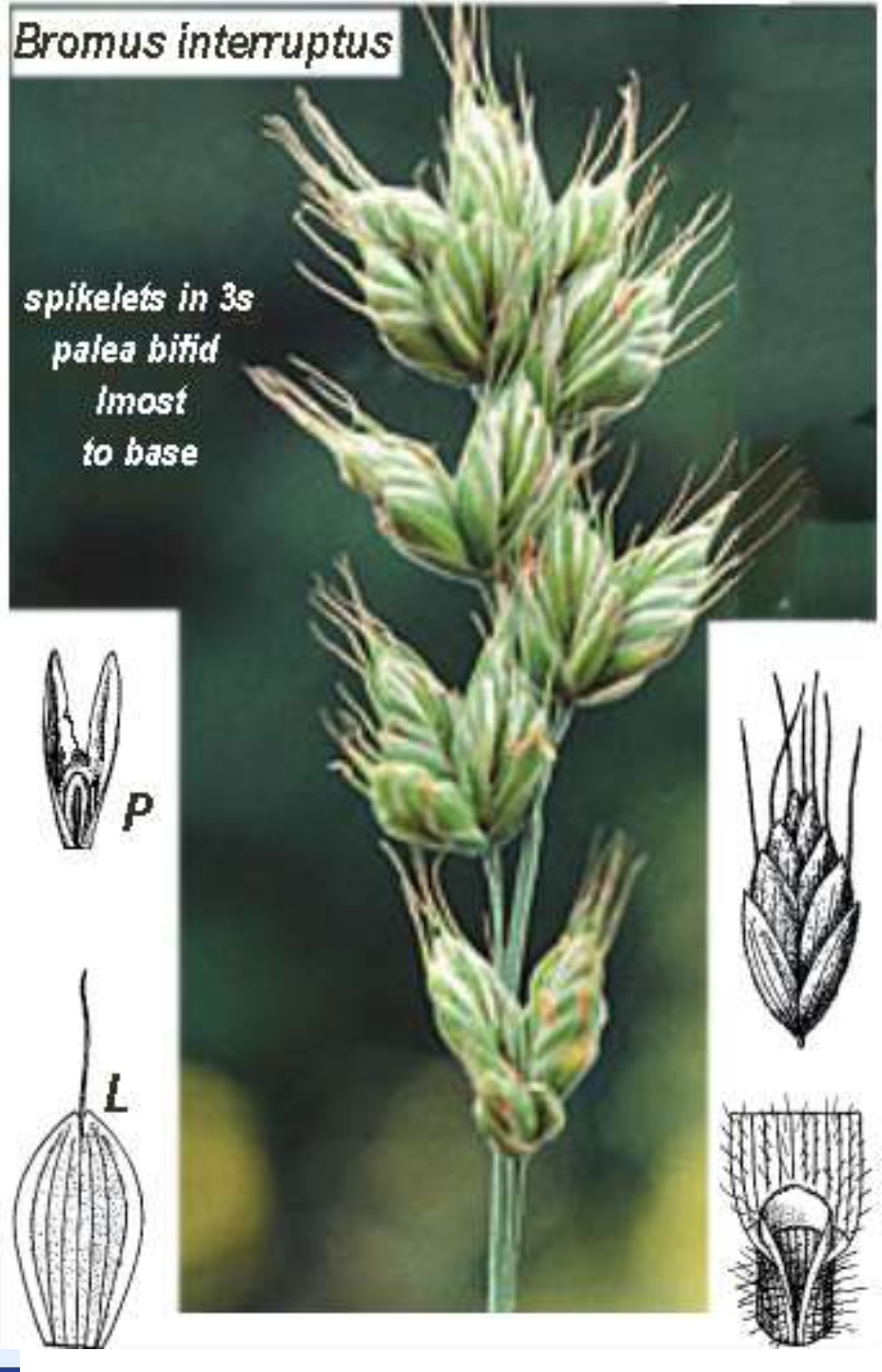
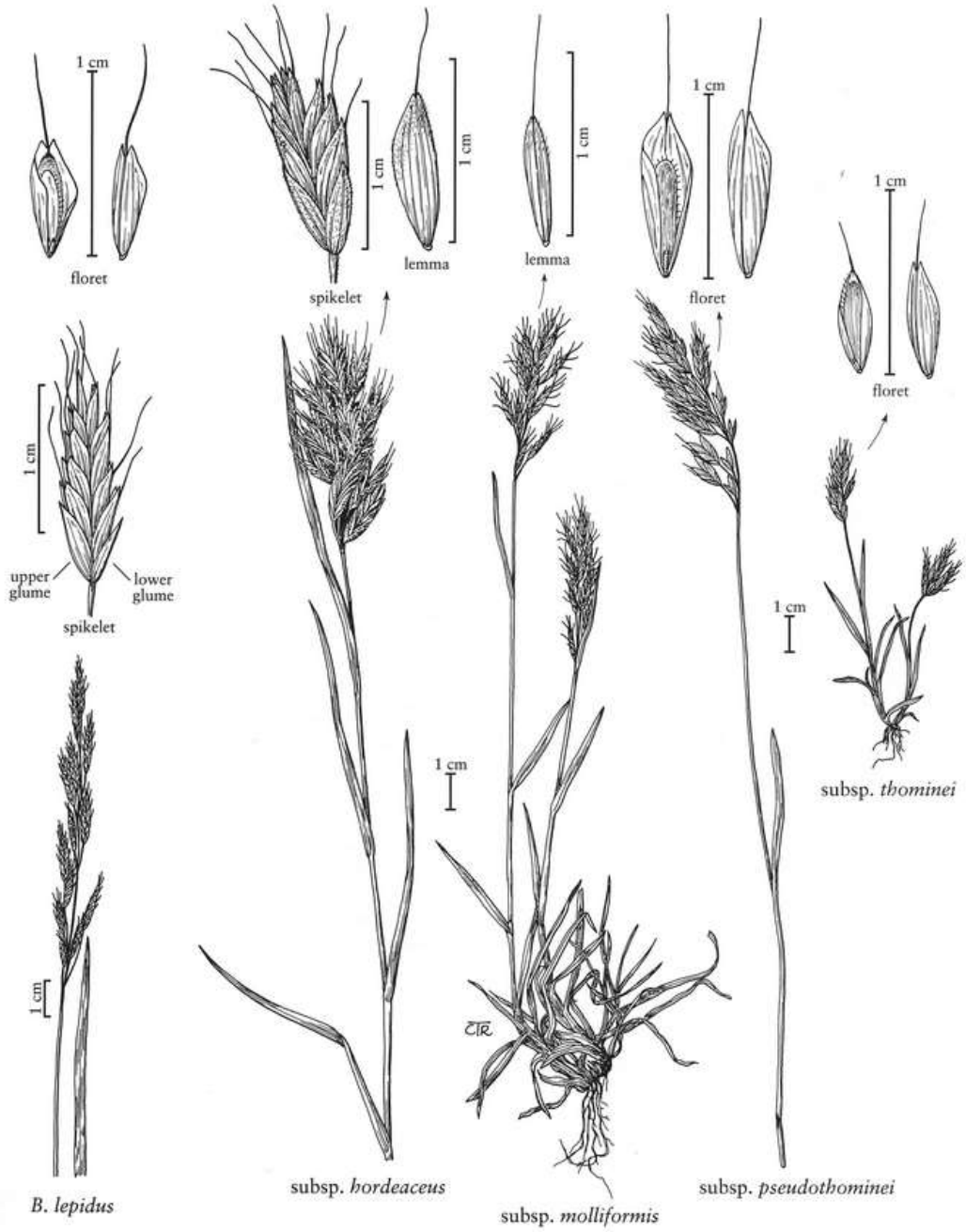

Bromus interruptus
spikelets in 3s
palea bifid
lmost
to base
P
L

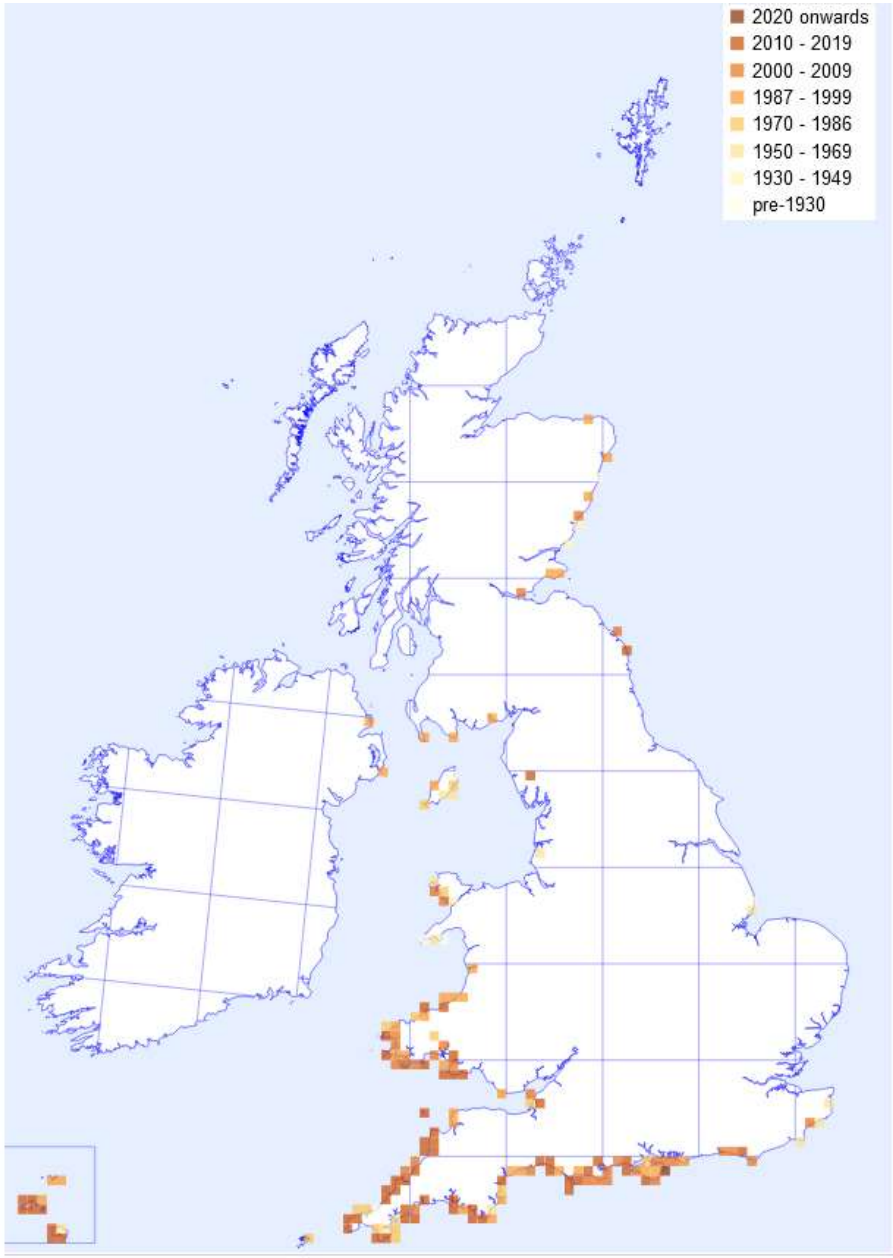

1 cm
floret
1 cm
upper glume
lower glume
spikelet
1 cm
B. lepidus
1 cm
spikelet
1 cm
lemma
subsp. hordeaceus
1 cm
lemma
1 cm
subsp. molliformis
1 cm
floret
1 cm
subsp. pseudothominei
1 cm
floret
subsp. thominei
B. hordeaceus

BROMUS

Bromus hordeaceous var. ferronii

Awns curve outward at maturity, base not flattened, panicle branches & pedicels much shorter than spikelets. Pedicels < 18mm. Grassy cliff tops plus sand and shingle by the sea.

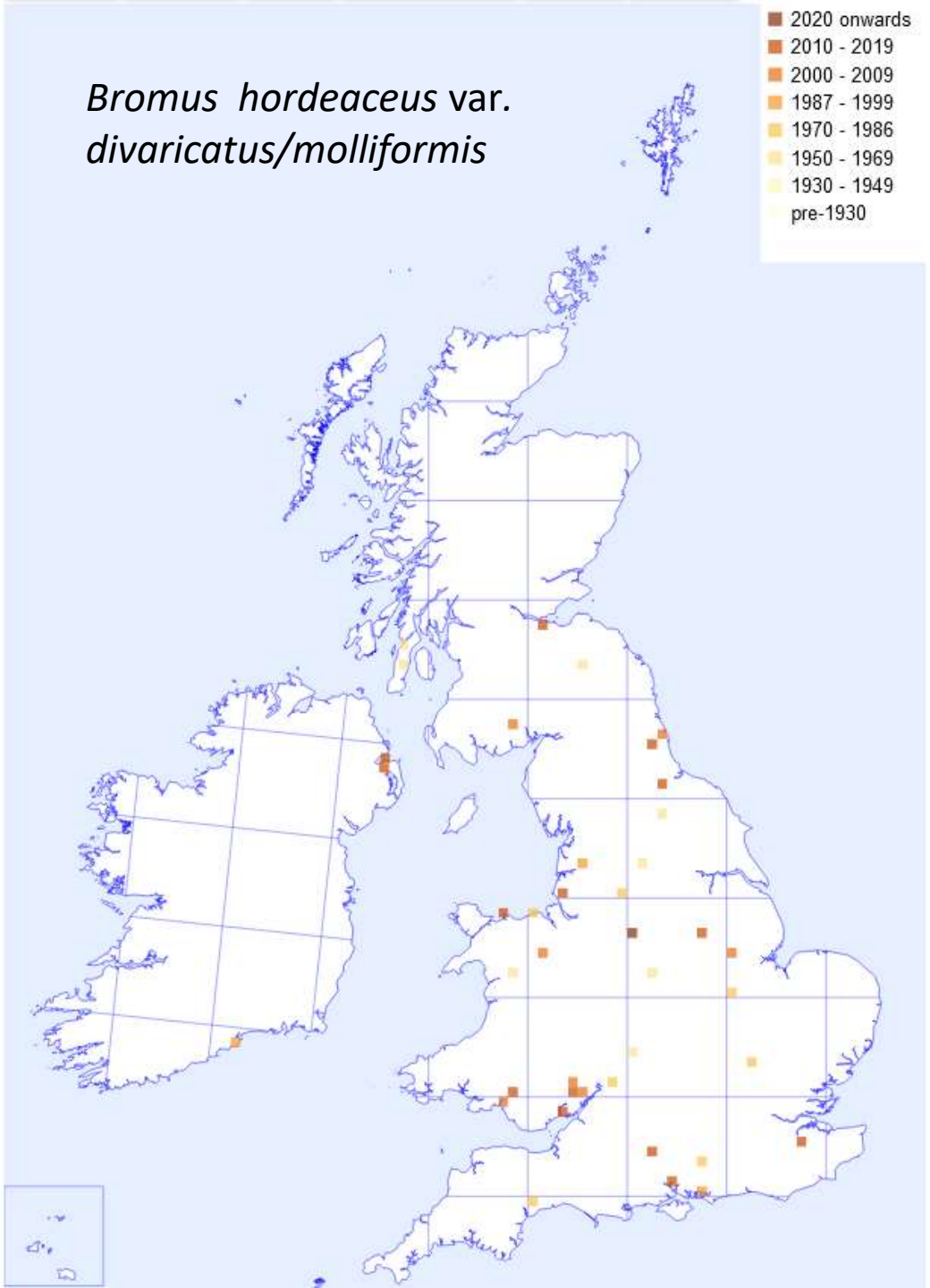
Bromus hordeaceus subsp. *ferronii* at Purn Hill (2015). Photo: HJC



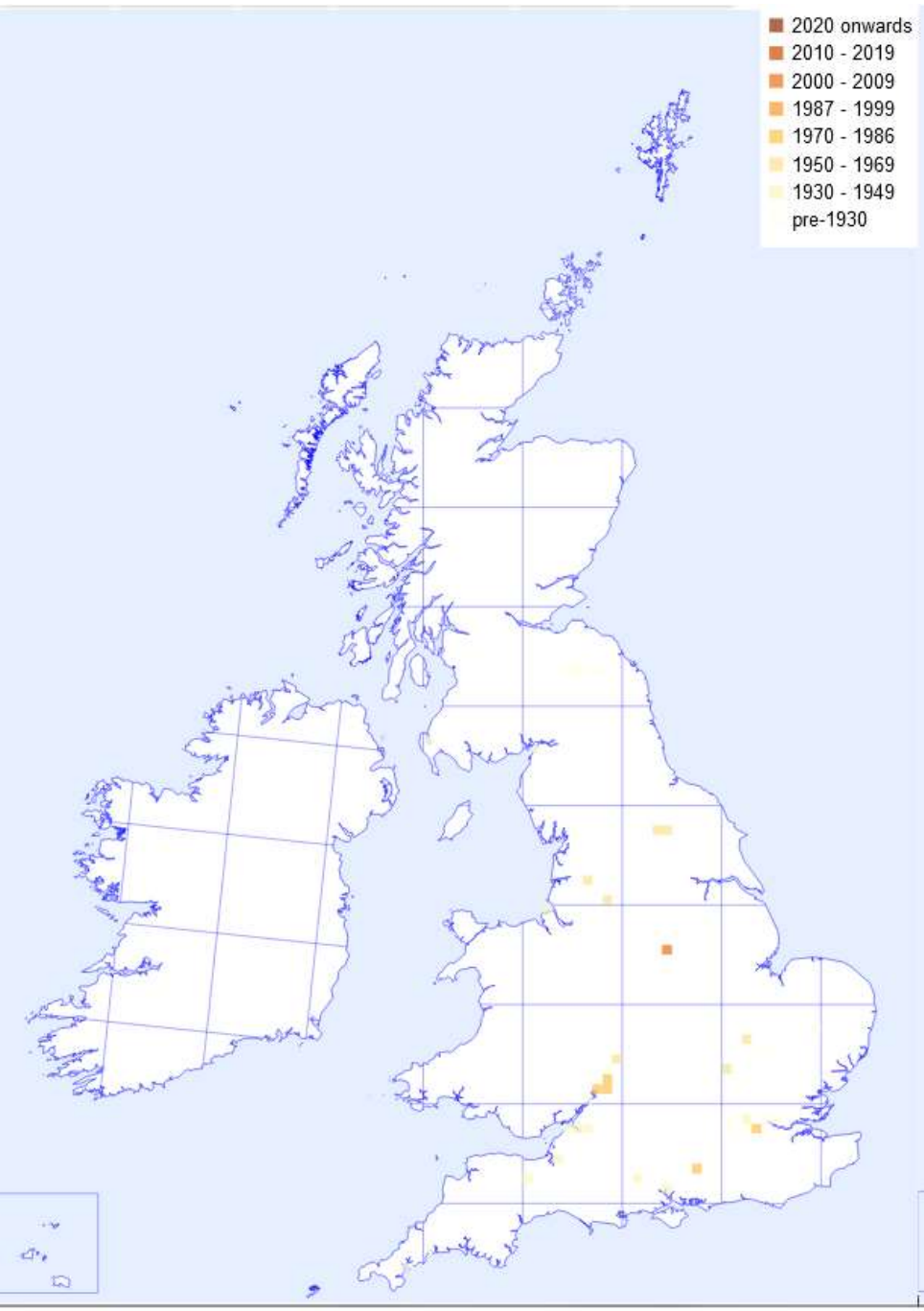
Awns divergent at maturity, branches and pedicels shorter than spikelets, culms >15cm, >10 spikelets, lemmas 8-11mm, pubescent. Alien.

Bromus divaricatus
Bromus hordeaceus var. divaricatus/molliformis

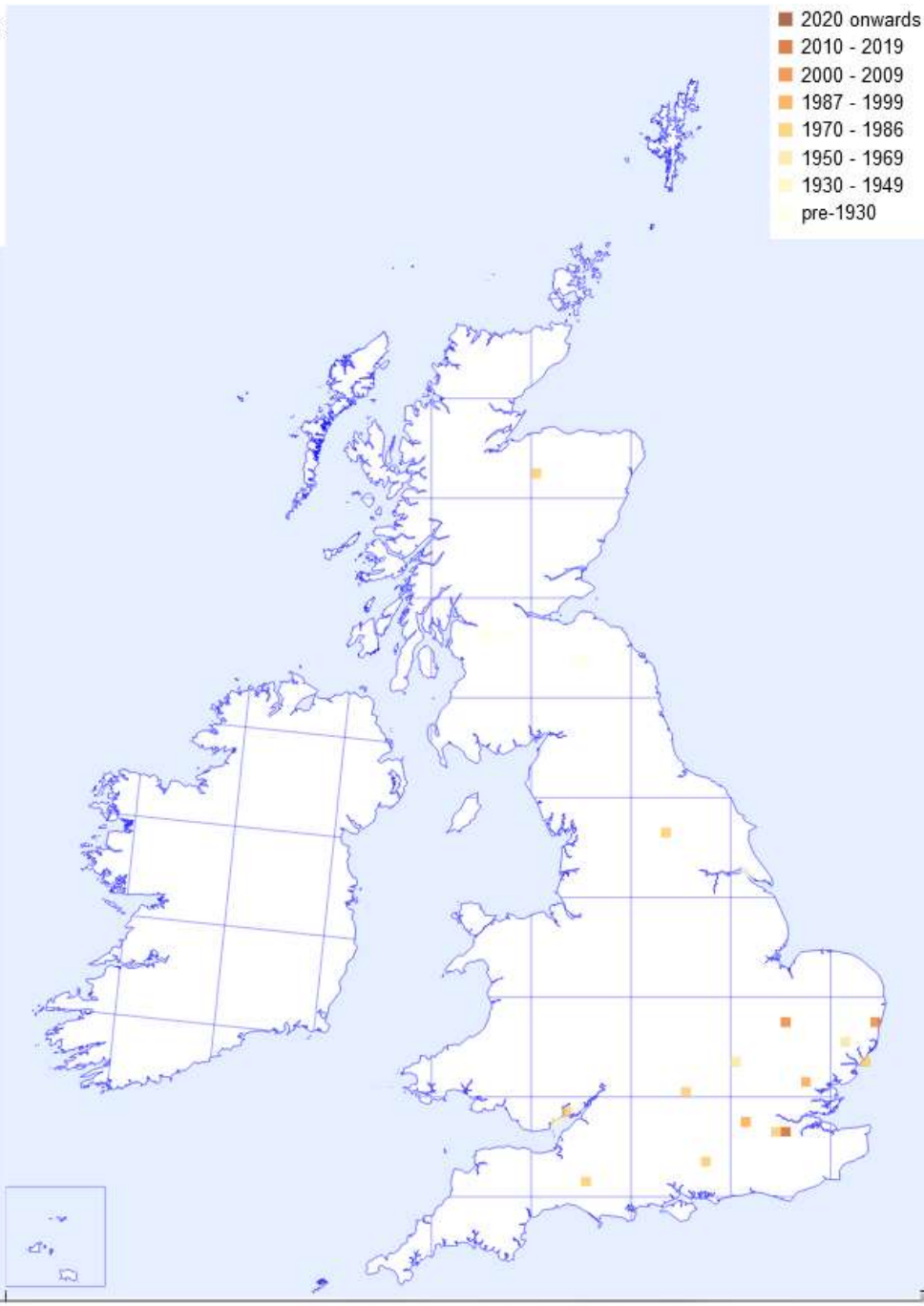
Bromus hordeaceus var. *divaricatus/molliformis*



Both have awns that are widely divergent with flattened bases to c.0.2mm wide, c.f. *divaricatus* – differ as some pedicels longer than spikelets.



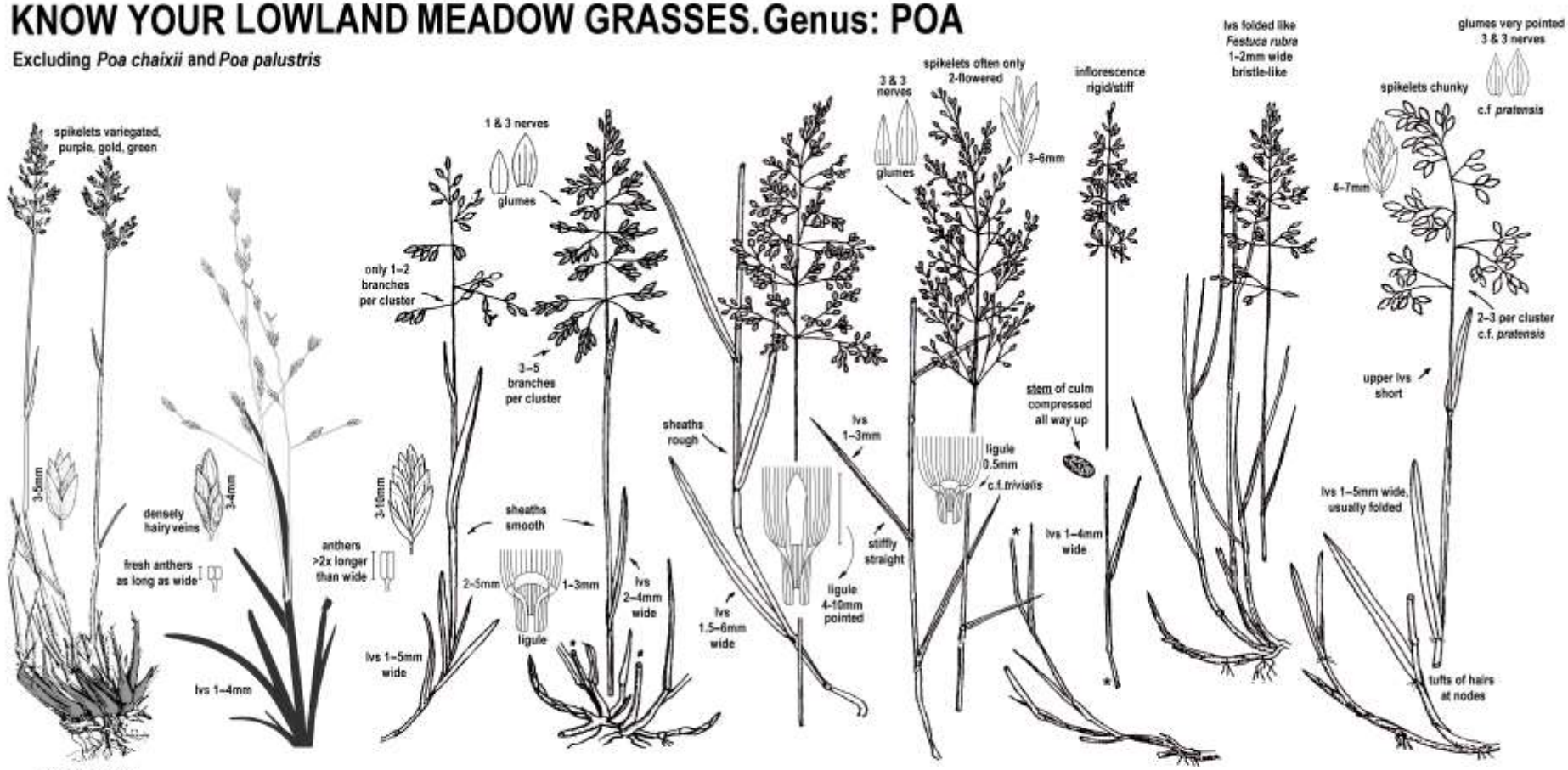
japonicus



lanceolatus

KNOW YOUR LOWLAND MEADOW GRASSES. Genus: POA

Excluding *Poa chaixii* and *Poa palustris*



persistent bulbous leaf bases
tufted perennial
fl. March to May. culms withering early

tufted annual
fl. Jan to March
lvs yellow by April

tufted annual
NO rhizomes

perennial with creeping rhizomes

perennial, loosely tufted with creeping leafy stolons

perennial loosely tufted
NO rhizomes

stiff perennial, with wiry rhizomes

stiff perennial, with compact tufts from slender wiry rhizomes

perennial, with scattered shoots and culms arising from very slender creeping rhizomes

Poa bulbosa

Bulbous Meadow-grass

5-40cm

Rare dwarf grass of coastal sandy grassland. Abundant car parks at Shoebury. Bulbous leaf bases detach and give rise to new plants. var. *vivipara* with proliferating spikelets occurs as garden escape.

Poa infirma

Early Meadow-grass

1-25cm

Recent colonist now widespread and abundant on bare ground both coastal and inland.

Poa annua

Annual Meadow-grass

3-30cm

fls. all year round, poor competitor, open ground, walls, paths & cultivated ground

Poa pratensis

Smooth Meadow-grass

10-90cm

widespread, fl. May to June spikelets usually tinged with violet.

Poa trivialis

Rough Meadow-grass

20-100cm

commonest species, fl. June to July, grasslands, waste ground - more frequent in woodland than the next

Poa nemoralis

Wood Meadow-grass

15-90cm

widespread, shady lanes & wood banks, occasionally on walls, sand and clay sites. fl. June to July, inflorescence delicate, branches hair-like

Poa compressa

Flattened Meadow-grass

10-60cm

thinly scattered dry open, sites concrete aprons in cracks, on old walls, clay sites. Over-recorded for *P. humilis* on walls.

Poa angustifolia

Narrow lvd Meadow-grass

20-60cm

fl. April to June, widespread chalk pits, railway lines and road verges. Under-recorded in mistake for the vegetatively similar *Festuca rubra*.

Poa humilis

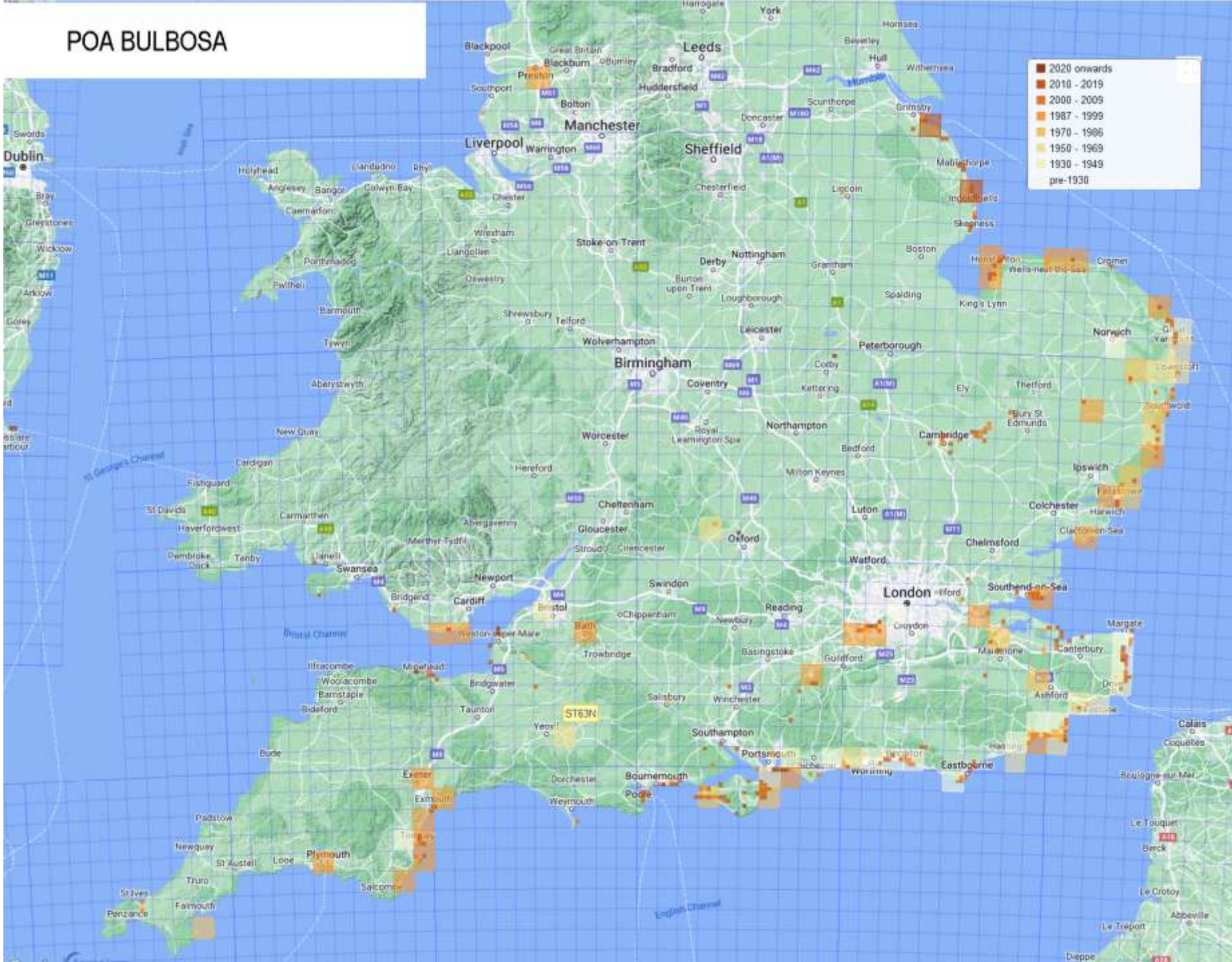
Poa subcaerulea/irrigata

Spreading Meadow-grass

10-40cm

abundant overlooked grass of damp meadows, coastal pastures, walls, dry gaps behind kerb stones. Widespread Essex coastal grasslands.

POA BULBOSA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Leeds
Manchester
Liverpool
Sheffield
Birmingham
Dublin
London
Bristol
Cardiff
Nottingham
Leicester
Coventry
Southampton
Portsmouth
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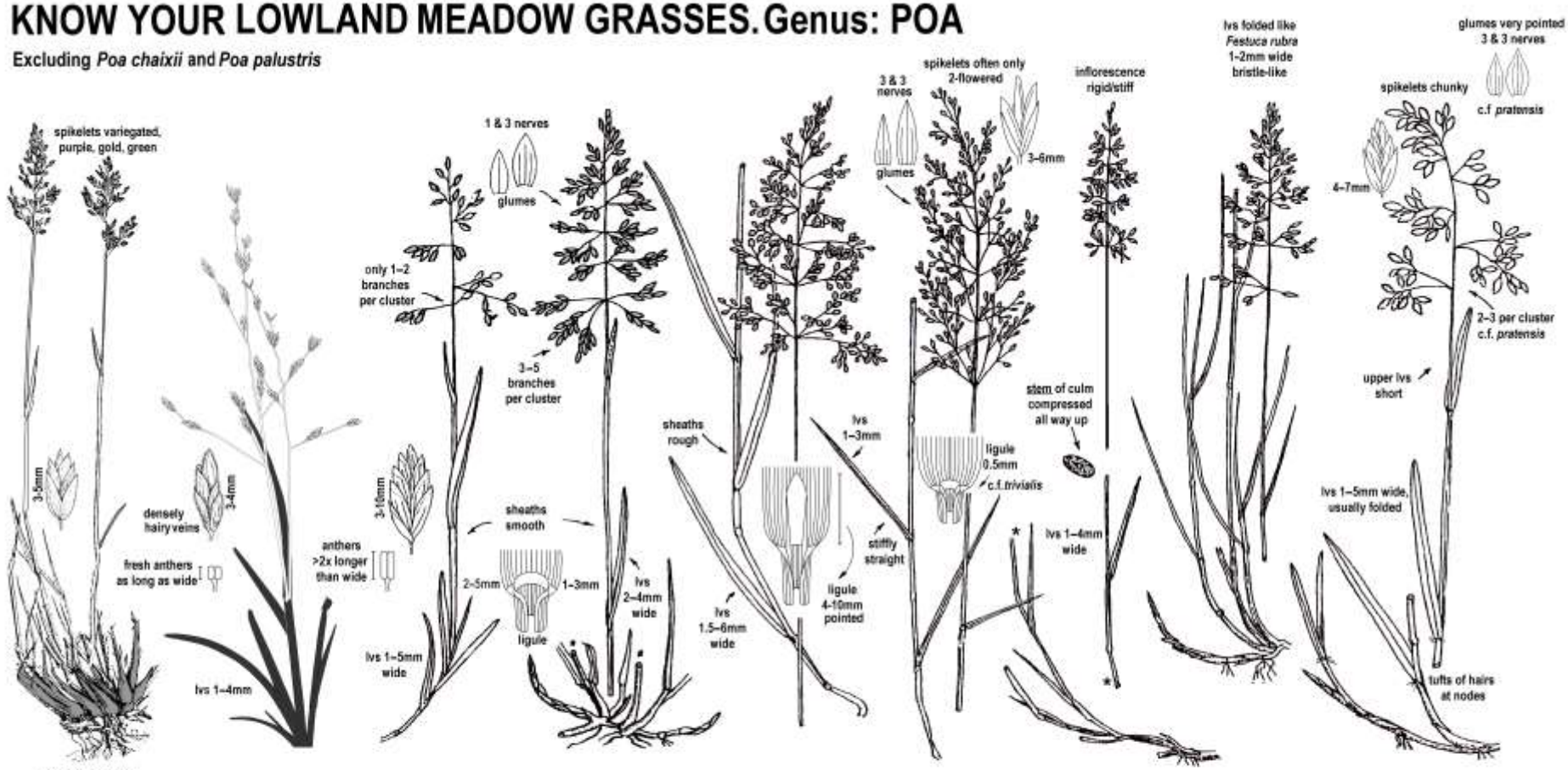
***Poa bulbosa* L. var. *vivipara* Koel.**

grass verge, Chindits Lane, Brentwood, Essex VC18. patches increasing 592,921

10 May 2012

KNOW YOUR LOWLAND MEADOW GRASSES. Genus: POA

Excluding *Poa chaixii* and *Poa palustris*



persistent bulbous leaf bases
tufted perennial
fl. March to May. culms withering early

tufted annual
fl. Jan to March
lvs yellow by April

tufted annual
NO rhizomes

perennial with creeping rhizomes

perennial, loosely tufted with creeping leafy stolons

perennial loosely tufted
NO rhizomes

stiff perennial, with wiry rhizomes

stiff perennial, with compact tufts from slender wiry rhizomes

perennial, with scattered shoots and culms arising from very slender creeping rhizomes

Poa bulbosa

Bulbous Meadow-grass

5-40cm

Rare dwarf grass of coastal sandy grassland. Abundant car parks at Shoebury. Bulbous leaf bases detach and give rise to new plants. var. *vivipara* with proliferating spikelets occurs as garden escape.

Poa infirma

Early Meadow-grass

1-25cm

Recent colonist now widespread and abundant on bare ground both coastal and inland.

Poa annua

Annual Meadow-grass

3-30cm

fls. all year round, poor competitor, open ground, walls, paths & cultivated ground

Poa pratensis

Smooth Meadow-grass

10-90cm

widespread, fl. May to June spikelets usually tinged with violet.

Poa trivialis

Rough Meadow-grass

20-100cm

commonest species, fl. June to July, grasslands, waste ground - more frequent in woodland than the next

Poa nemoralis

Wood Meadow-grass

15-90cm

widespread, shady lanes & wood banks, occasionally on walls, sand and clay sites. fl. June to July, inflorescence delicate, branches hair-like

Poa compressa

Flattened Meadow-grass

10-60cm

thinly scattered dry open, sites concrete aprons in cracks, on old walls, clay sites. Over-recorded for *P. humilis* on walls.

Poa angustifolia

Narrow lvd Meadow-grass

20-60cm

fl. April to June, widespread chalk pits, railway lines and road verges. Under-recorded in mistake for the vegetatively similar *Festuca rubra*.

Poa humilis

Poa subcaerulea/irrigata

Spreading Meadow-grass

10-40cm

abundant overlooked grass of damp meadows, coastal pastures, walls, dry gaps behind kerb stones. Widespread Essex coastal grasslands.


Poa infirma

Poa infirma


Poa annua

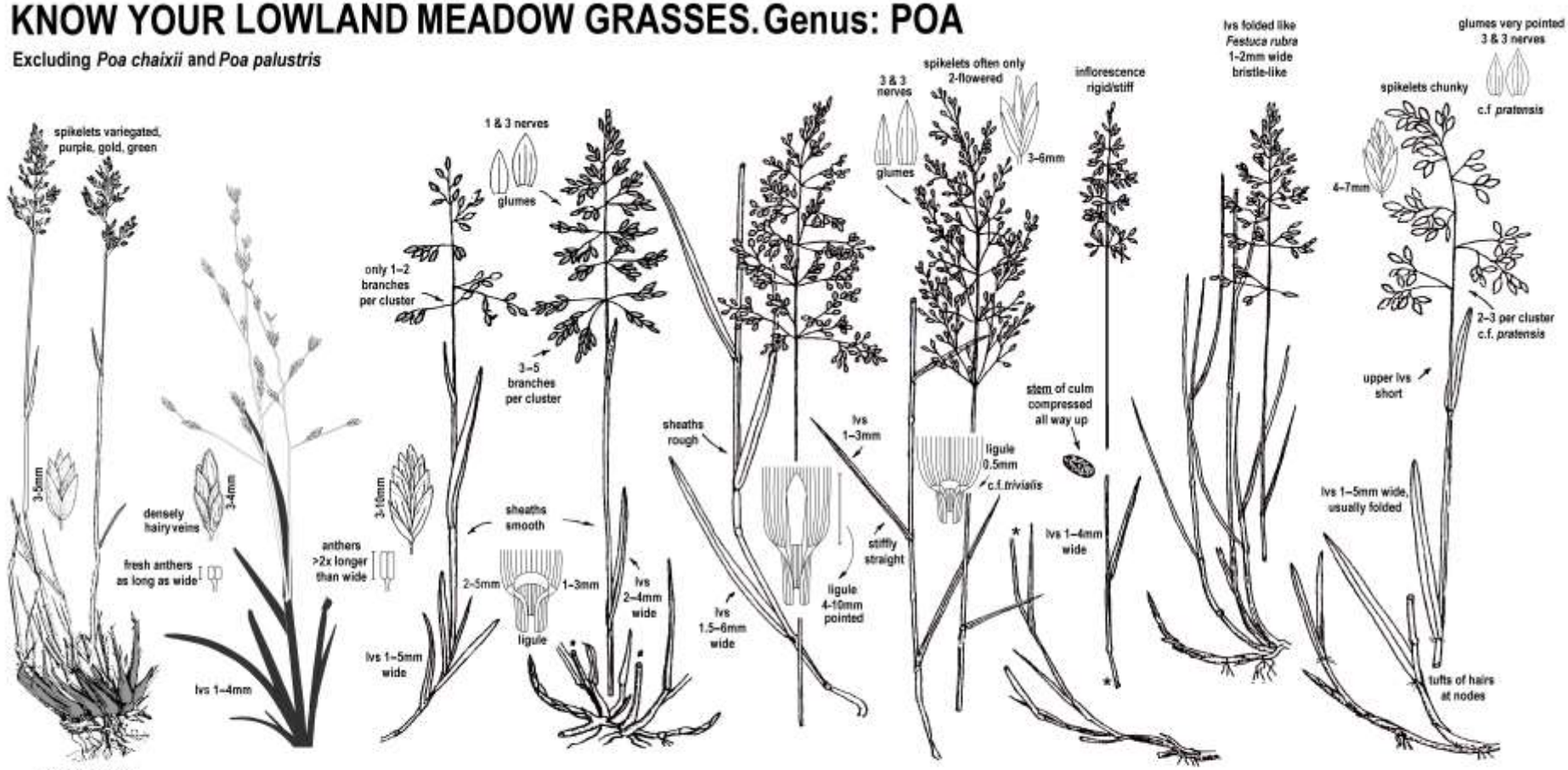

Poa nemoralis


Poa nemoralis

Poa compressa

KNOW YOUR LOWLAND MEADOW GRASSES. Genus: POA

Excluding *Poa chaixii* and *Poa palustris*



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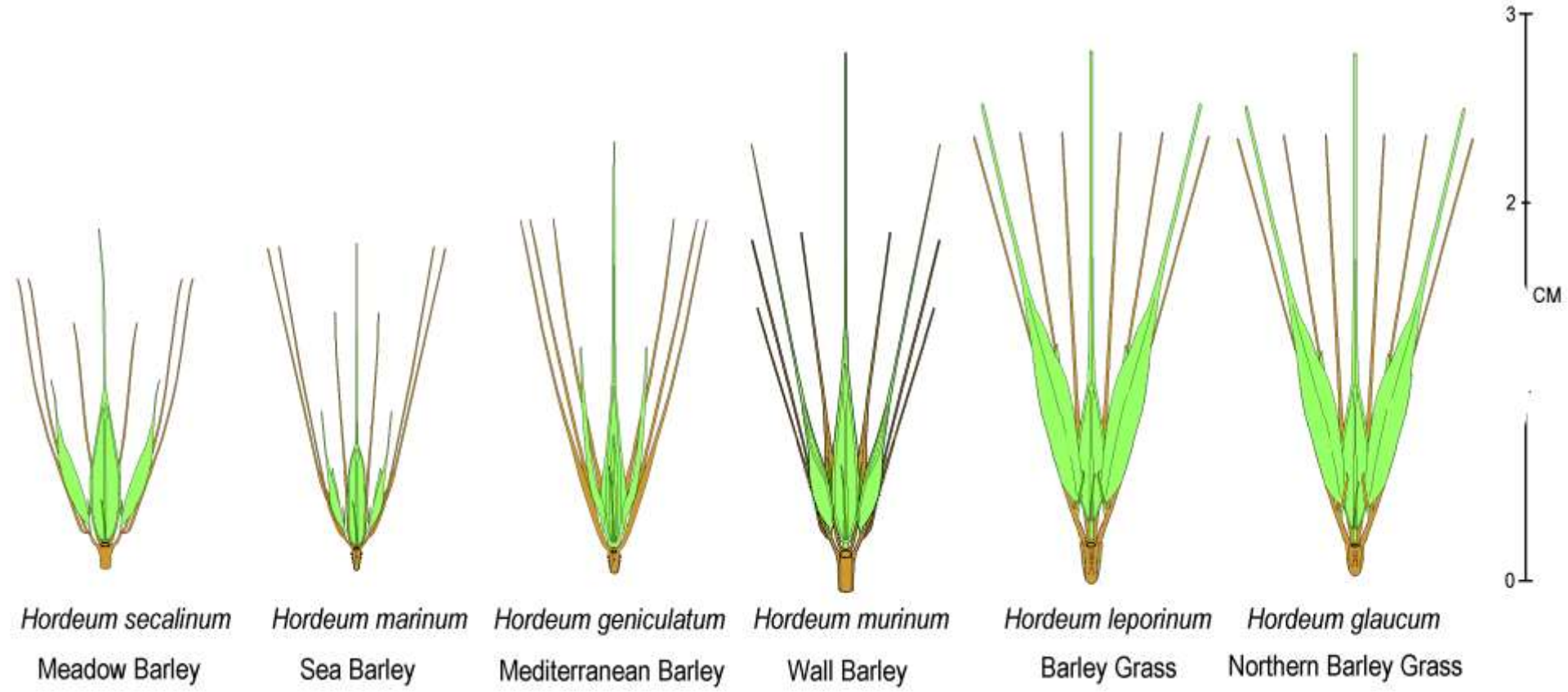
Poa humilis
Kew Herbarium



Hordeum secalinum
Meadow Barley

Hordeum marinum
Sea Barley

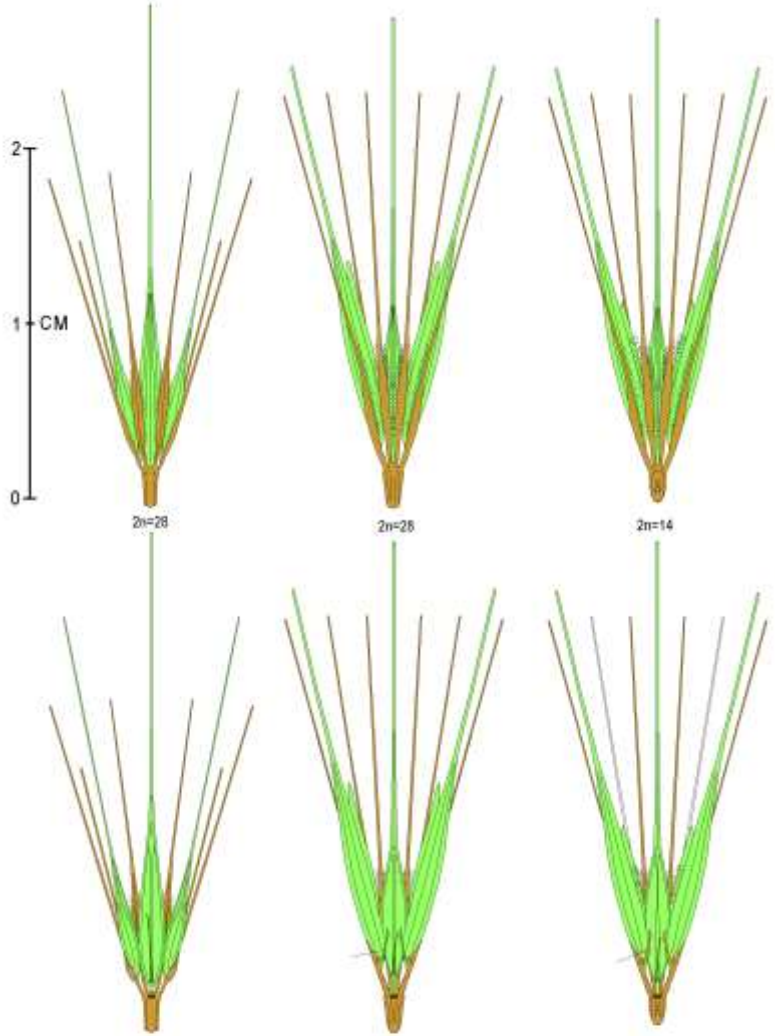
Hordeum geniculatum
Mediterranean Barley

Hordeum murinum
Wall Barley

Hordeum leporinum
Barley Grass

Hordeum glaucum
Northern Barley Grass

glumes (brown) with hairs >0.5mm long, awns bristle-like



Hordeum murinum s.s.

Wall Barley
Mouse Barley
False Barley

- Winter annual to 60cm
- Leaves and spikes green
- Central flowers sessile to subsessile with stalk above glumes <0.6mm
- Central spikelet lemmas shorter than those of lateral florets
- Central spikelet lemma awns longer than lemmas of lateral florets
- Lateral spikelet paleas scabrid
- Anthers of central and lateral spikelets similar in size 2.7 - 1.4mm
- Rachis extension green and slender

Hordeum leporinum

Barley Grass
Hare Barley
Mouse Barley

- Winter annual to 110 cm
- Leaves green spikes turning purple late
- Central flowers with stalk above glumes 0.6mm- 1.5mm
- Central spikelet lemmas much shorter than those of lateral florets
- Central spikelet lemma awns much shorter than lemmas awns of lateral florets
- Lateral spikelet paleas scabrid
- Anthers of central and lateral spikelets yellowish and similar in size 0.9 - 3.0 mm

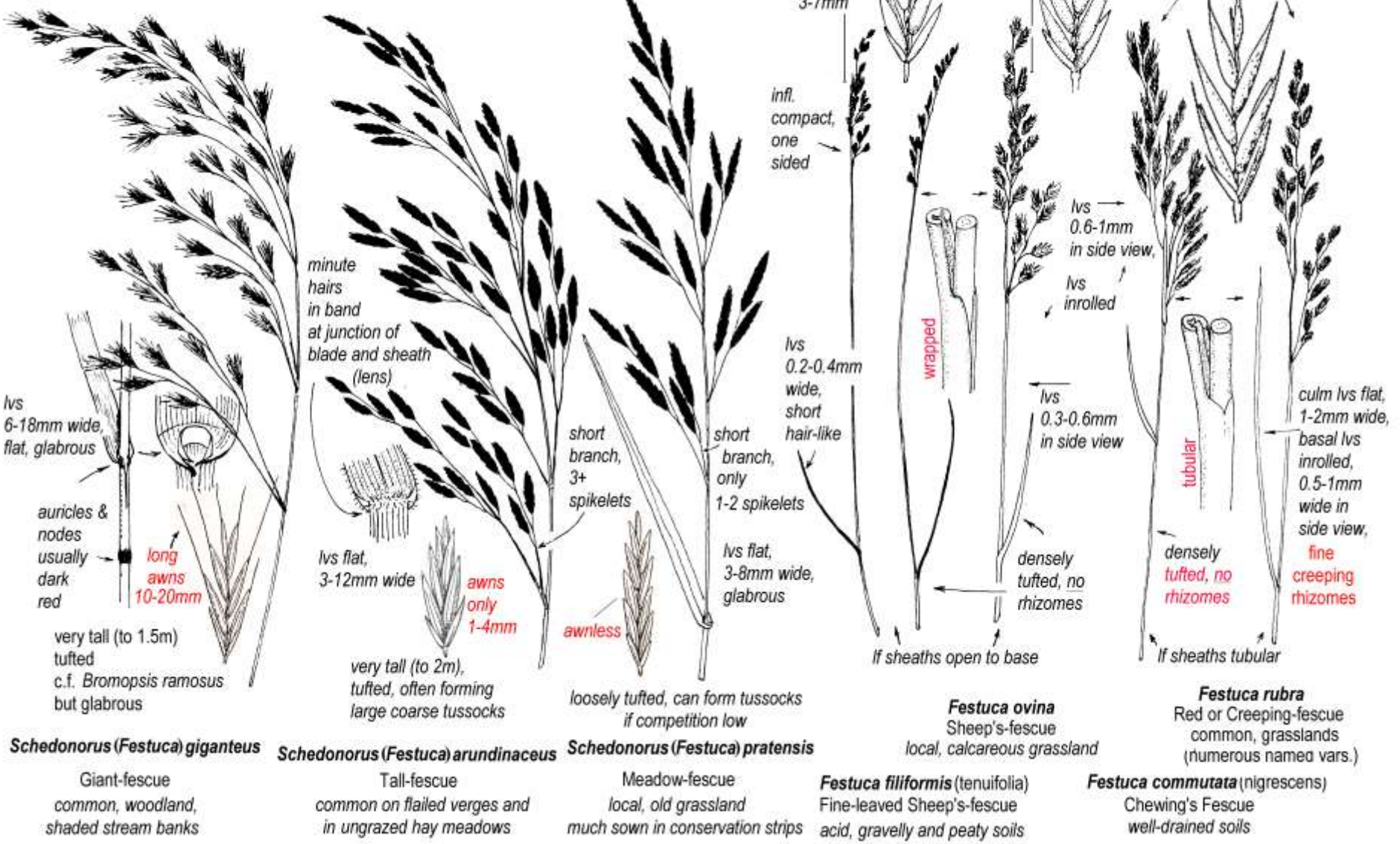
Hordeum glaucum

Smooth Barley

Northern Barley Grass

- Summer annual to 40cm
- Leaves and sometimes spikes glaucous
- Central spikelet lemmas shorter/subequal to those of lateral florets
- Central spikelet lemma awns shorter to longer than lemma awns of lateral florets
- Lateral spikelet paleas prose on lower 1/2
- Central spikelet anthers blackish and 1/3 the size of lateral spikelet anthers (0.2-0.6mm versus 1.2-1.8mm)
- Rachilla extension orange and stout

FESCUES: 170 European species
Festuca - perennials
(Vulpia - annuals) c.18 recorded from U.K.



Schedonorus* (*Festuca*) *giganteus
Giant-fescue
common, woodland, shaded stream banks

Schedonorus* (*Festuca*) *arundinaceus
Tall-fescue
common on flailed verges and in ungrazed hay meadows

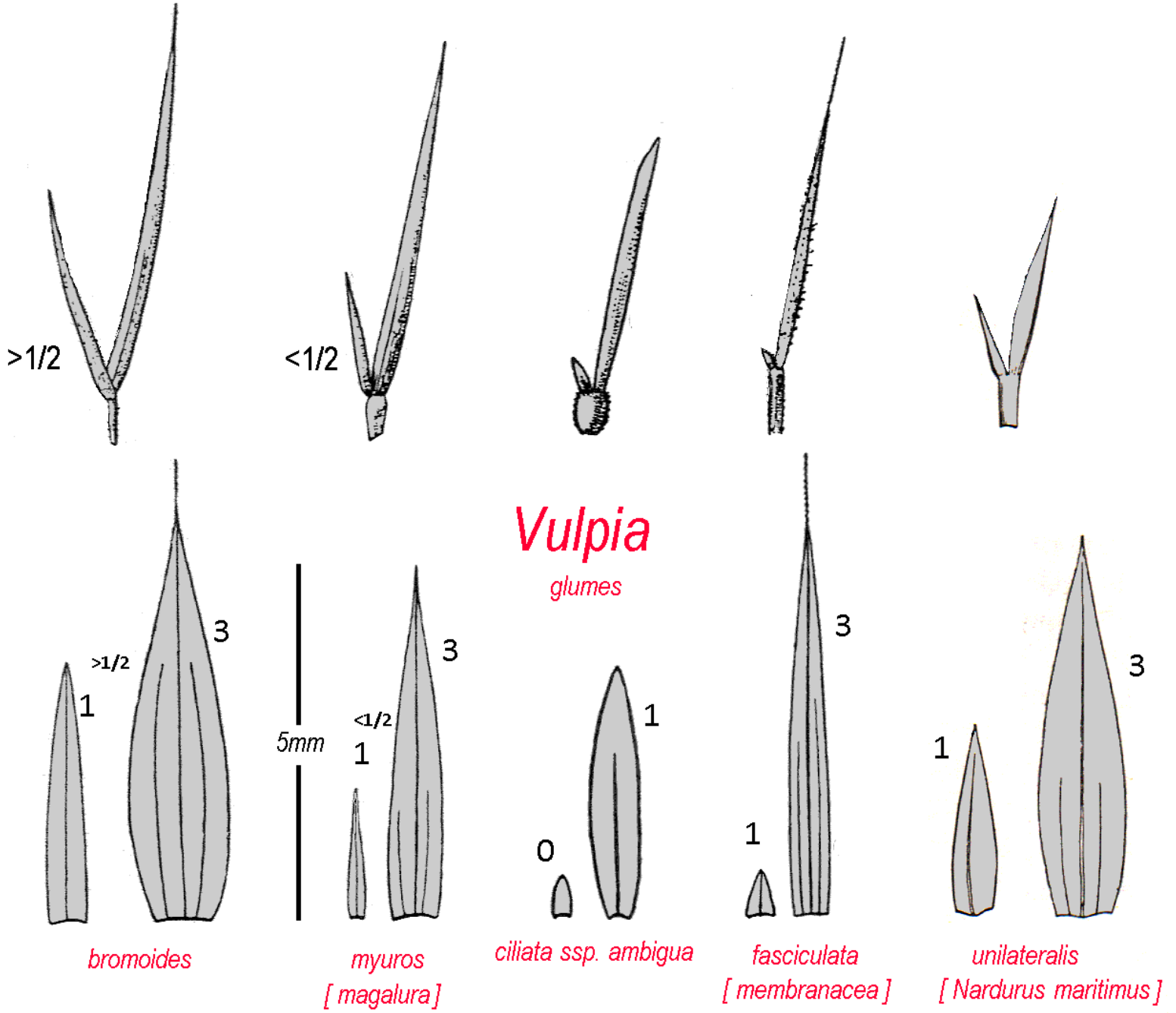
Schedonorus* (*Festuca*) *pratensis
Meadow-fescue
local, old grassland much sown in conservation strips

Festuca ovina
Sheep's-fescue
local, calcareous grassland

Festuca filiformis (tenuifolia)
Fine-leaved Sheep's-fescue
acid, gravelly and peaty soils

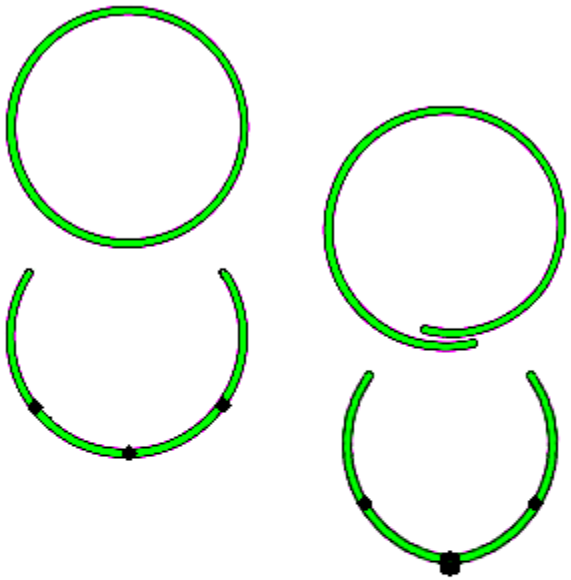
Festuca rubra
Red or Creeping-fescue
common, grasslands
(numerous named vars.)

Festuca commutata (nigrescens)
Chewing's Fescue
well-drained soils



N.B. number of nerves per upper and lower glume

Glyceria	sheaths cylindrical
Puccinellia & Poa	sheaths wrapped
Puccinellia	lemmas rounded on back
Poa	lemmas keeled



Poa

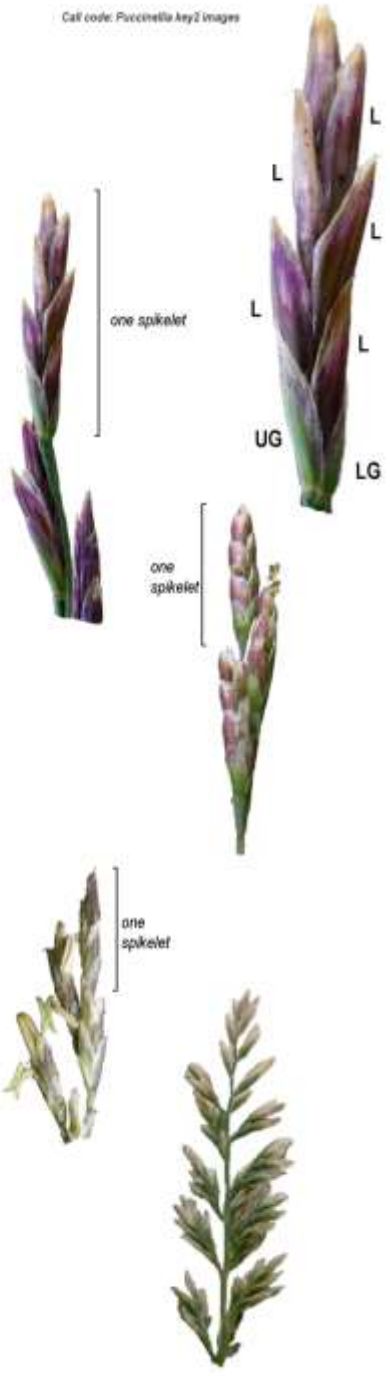
Puccinellia

Glyceria

Glyceria	sheaths cylindrical
Puccinellia & Poa	sheaths wrapped
Puccinellia	lemmas rounded on back
Poa	lemmas keeled

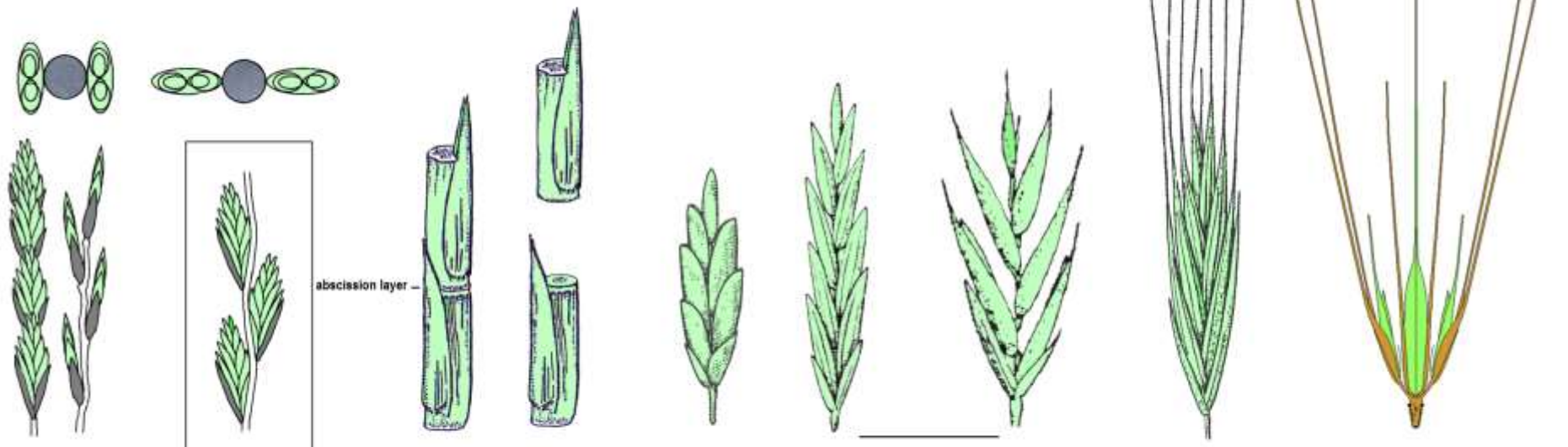
Puccinellia Salt-marsh Grasses

maritima	Spikelets		5 - 13mm long	3-10 flowers
	Glumes	lower	1.3 - 3.5mm	1-3 nerves
		upper	2.0 - 4.0 mm	3 nerves
	Lemma		3.0 - 5.0mm	5 nerves
	Anthers		2.0 - 3.0mm long	
distans	Spikelets		3 - 7 mm long	3-9 flowers
	Panicle branches bare of spikelets below			
	Glumes	lower	1.0 - 1.5 mm	1 nerve
		upper	1.5 - 3.0 mm	3 nerves
	Lemma		2.0 - 2.5mm	5 nerves
	Anthers		0.8 - 1.0mm long	
fasciculata	Spikelets		4 - 6 mm long	3-8 flowers
	Panicle branches with spikelets to base			
	Glumes	lower	1.0 - 1.5 mm	1 nerve
		upper	1.5 - 1.8 mm	3 nerves
	Lemma		1.8 - 2.3mm	5 nerves
	Anthers		0.6 - 1.0mm long	
rupestris	Spikelets		5 - 9 mm long	3-5 flowers
	Glumes	lower	1.5 - 2.5mm	1-3 nerve
		upper	2.5 - 3.0 mm	3 nerves
	Lemma		3.0 - 4.0mm	5 nerves
	Anthers		0.7 - 1.0mm long	



Call code: Maritime grass genera bmp Images

GRASSES ASSOCIATED WITH SALT MARSHES

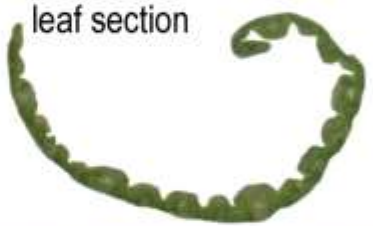


SPARTINA (CORD GRASSES)

	Ligules (line of hairs)	*Glumes*	*Anthers*
alterniflora	1.0-1.8mm	glabrous	5-7mm mostly full
anglica	1.8-3.0mm	softly hairy all over	7-10mm full
x townsendii	1.0-1.8mm		5-7mm empty
maritima	0.2-0.6mm		4-6.5mm full

ELYTRIGIA (COUCH GRASSES) Common, Sea, and Sand Couch

[fold leaf over backwards to oserve the folded edge for ridge morphology]



repens leaves flat, ribs on upper surface narrow and rounded in section

atherica leaves inrolled at edges, ribs on upper surface wide and flat topped

juncea leaves inrolled at edges, ribs on upper surface wide and flat topped and minutely densely hairy with bulbous based spines.

FESTUCA (FESCUE GRASSES) [basal leaves folded in half]

Festuca rubra rubra	abaxial leaf ribs sparcely hairy	large lemmas (6-8mm), short culms, forming mats in salt marshes
Festuca rubra litoralis		
Festuca rubra juncea		with short rhizomes forming small dense glaucous tufts with short leaves
Festuca arenaria	abaxial leaf ribs densely hairy	

Sand Couch Elytrigia juncea


Sand Couch Elytrigia juncea