

The genera *Elymus* L. and *Leymus* Hochst. in Britain

A. MELDERIS

12 Bankhurst Road, London S.E.6

and

D. McCLINTOCK

Bracken Hill, Platt, Sevenoaks, Kent

ABSTRACT

The typification and circumscription of some genera allied to *Agropyron* Gaertn. and *Elymus* L. are outlined. It is concluded that *Agropyron* is not a native of Britain; the species formerly included in it, or in *Elytrigia* Desv. or *Roegneria* C. Koch, should be treated under *Elymus* L., and the single British species treated under *Elymus* should be transferred to *Leymus* Hochst. New combinations are made for two varieties and three hybrids under *Elymus*, and for one inter-generic hybrid under \times *Elyhordeum* Mansfeld ex Zizin & Petrova.

GENERIC LIMITS

The absence of clear-cut generic characters has created much difficulty in the delimitation of the group of genera around *Agropyron* Gaertn. sensu lato and *Elymus* L. sensu lato. Recent cytogenetical evidence and analysis of the morphological characters of species belonging to these genera have, however, thrown some light on the inter-relationships of these genera. The results of these investigations have been utilized in a revision of the genera in question (Melderis 1978), and the new combinations were adopted in *Flora Europaea* (Melderis 1980).

The name *Agropyron* Gaertn., *Nov. Comment. Acad. Sci. Imp. Petrop.*, **14** (1): 539 (1770), has been typified by *A. cristatum* (L.) Gaertn. This species and its allies seem to be well-isolated, being taxonomically and genetically distinct from the other genera. The species of this genus possess a single genome, which has not been found elsewhere. Some members of *Agropyron*, such as *A. cristatum* subsp. *pectinatum* (Bieb.) Tzvelev and *A. desertorum* (Fischer ex Link) Schultes, are rare casuals in Britain.

Agropyron caninum (L.) Beauv. and its allies have mostly been placed in the genus *Agropyron*, but are sometimes segregated into *Roegneria* C. Koch, *Linnaea*, **21**: 413 (1848), of which the type species is *R. caucasica* C. Koch. They exhibit a close morphological and ecological affinity with *Elymus sibiricus* L., which is the type of both *Elymus* L., *Sp. Pl.* 83 (1753) and *Clinelymus* (Griseb.) Nevski, *Bull. Jard. Bot. Acad. Sci. URSS*, **30**: 640 (1932), but in the past they were kept in separate genera, mainly on the basis of the spikelet arrangement on the rhachis (solitary in *A. caninum* and its allies, in pairs or threes in *E. sibiricus* and its allies). Occasionally, however, *A. caninum* and some related species bear spikelets in pairs in the lower part of the rhachis. On the other hand, the Asiatic *Elymus nutans* Griseb., a close relative of *E. sibiricus*, occasionally possesses solitary spikelets on the rhachis, causing difficulty in distinguishing it from an Asiatic species of *Agropyron* (*A. schrenkianum* (Fisch. & Mey.) Cantargy) related to *A. caninum*. These facts indicate that the arrangement of spikelets on the rhachis is of limited taxonomic value. The recent cytogenetical investigations also indicate a close relationship between these groups, which have similar genomes in common. Therefore, they should both be placed in the genus *Elymus*.

The genus *Elytrigia* Desv., *Nouv. Bull. Sci. Soc. Philom. Paris*, **2**: 190 (1810), is often used to include the group of species around the rhizomatous *E. repens* (L.) Nevski, which is the type species, although more usually they have been placed in *Agropyron*. Some representatives of the *A. repens*

group are caespitose, e.g. *A. elongatum* (Host) Beauv. and its allies (not found in Britain). They connect *A. repens* with *Elymus*. Like *A. repens*, they are cross-pollinating and have glabrous glumes with a more or less scabrid midvein towards the apex, long anthers, a minutely strigose rhachilla and a broadly obtuse glabrous callus, but share with *Elymus* persistent glumes and one genome in common. In addition, some of the caespitose species produce hybrids with *Elymus caninus* easily. For this reason they should be included in *Elymus* and consequently so should all the other members of the *A. repens* group. Thus, the genus *Elymus* should be used to cover all the British native species hitherto known as members of the genus *Agropyron*.

The genus *Leymus* Hochst., *Flora*, 31: 118 (1848) should be kept apart from the genera *Agropyron* and *Elymus*. The type species is *L. arenarius* (L.) Hochst. (*Elymus arenarius* L.). Dewey (1972) has pointed out that tetraploid species of this genus have two genomes in common, one derived from the Asiatic *Psathyrostachys juncea* (Fischer) Nevski (*Elymus junceus* Fischer), not found in the genera *Agropyron* and *Elymus*, the other of undetermined origin. *L. arenarius* is an octoploid species, and genome analysis in high polyploids is very difficult. Morphological comparisons, however, show that *L. arenarius* has a close relationship with tetraploid species.

In connection with the treatment of these genera in *Flora Europaea*, nomenclatural changes affecting British native species are given below, with the addition of some new combinations involving the binomial names of hybrids and some varieties.

LIST OF TAXA

ELYMUS L., *Sp. Pl.* 83 (1753); *Gen. Pl.*, 5th ed., 36 (1754)

Elytrigia Desv., *Nouv. Bull. Sci. Soc. Philom. Paris*, 2: 190 (1810)

Roegneria C. Koch, *Linnaea*, 21: 413 (1848)

Clinelymus (Griseb.) Nevski, *Bull. Jard. Bot. Acad. Sci. URSS*, 30: 640 (1932)

Elymus caninus (L.) L., *Fl. Suec.*, 2nd ed., 39 (1755)

Triticum caninum L., *Sp. Pl.* 86 (1753)

Agropyron caninum (L.) Beauv., *Ess. Agrost.* 102 (1812)

Roegneria canina (L.) Nevski, *Acta Univ. As. Med., ser. 8b (Bot.)*, 17: 71 (1934)

var. *donianus* (F. B. White) Melderis, **stat. et comb. nov.**

Agropyron donianum F. B. White, *Proc. Perthshire Soc. Nat. Sci.*, 1: 41 (1889)

Triticum biflorum sensu Mitten, *London Jour. Bot. (Hooker)*, 7: 532 (1848)

Triticum alpinum Don ex Mitten, *London Jour. Bot. (Hooker)*, 7: 533 (1848)

Agropyron violaceum sensu Melvill, *Jour. Bot. (London)*, 25: 57 (1887)

Triticum donianum (F. B. White) Wilmott in Bab., *Man. Brit. Bot.*, 10th ed., 511 (1922)

Roegneria doniana (F. B. White) Melderis, *Svensk Bot. Tidsskr.*, 44 (1): 157 (1950)

Var. *donianus* is a short-awned variant of *E. caninus*, occurring on a few Scottish mountains in Mid Perth and W. Sutherland. Similar short-awned, but slightly morphologically different, forms are reported from mountains of Austria, Germany, Switzerland, Italy, Jugoslavia, Sweden and Iceland.

The appearance of some plants with lemma-awns of intermediate length in populations of the long-awned *E. caninus*, growing in close proximity to a short-awned variant from Ben Lawers, Mid Perth, v.c. 88, in A.M.'s garden, initiated the synthesis of an artificial hybrid. A crossing under controlled conditions between the short-awned variant from Ben Lawers and a long-awned *E. caninus* from Shooter Hill Woods, W. Kent, v.c. 16, was carried out in 1973. Five caryopses were obtained and produced five plants with awns of intermediate length. Further generations provided offspring exhibiting a great variation in the length of awn. There are no other essential characters for separating the short-awned variant from *E. caninus*, and for this reason it is proposed to demote it to varietal rank.

Elymus repens (L.) Gould, *Madroño*, 9: 127 (1947)

Triticum repens L., *Sp. Pl.* 86 (1753)

Agropyron repens (L.) Beauv., *Ess. Agrost.* 102 (1812)

Elytrigia repens (L.) Nevski, *Acta Inst. Bot. Acad. Sci. URSS, ser. I*, 1: 14 (1933)

This is a polymorphic species containing a considerable number of variants. Most of the characters tend to be highly variable, often intergrading from one variant to the next.

subsp. *arenosus* (Petif) Melderis, *Bot. Jour. Linn. Soc.*, 76: 379 (1978)

Triticum repens (var.) δ *arenosum* Petif, *Enum. Pl. Palat.* 16 (1830)

Triticum repens (var.) β *maritimum* Koch & Ziz, *Cat. Pl. Fl. Palat.* 5 (1814), non Sm. ex Roth (1802)

Triticum maritimum Jansen & Wachter, *Nederl. Kruidk. Arch.*, **43**: 178 (1933), non L. (1762)

Agropyron maritimum Jansen & Wachter, *Fl. Neerl.*, **1** (2): 116 (1951), non (L.) Beauv. (1812)

Elytrigia repens var. *maritima* Hyl., *Bot. Not.*, **1953**: 357 (1953).

This subspecies is characterized by culms geniculate at the base, prominently veined leaves and usually 3-veined glumes. It occurs on maritime sands in southern and eastern Britain and north-western Europe (Sweden, Denmark, the Netherlands and Germany).

Elymus pycnanthus (Godron) Melderis, *Bot. Jour. Linn. Soc.*, **76**: 378 (1978)

Triticum pycnanthum Godron, *Mém. Soc. Émul. Doubs.*, sér. 2, **5**: 10 (1854)

Triticum littorale Host, *Gram. Austr.*, **4**: 5 (1809), non Pallas (1776)

Triticum pungens auct., non Pers. (1805)

Agropyron pungens auct., non (Pers.) Roemer & Schultes (1817)

Agropyron littorale Dumort., *Obs. Gram. Fl. Belg.* 97 (1824), nom. illegit.

Agropyron pycnanthum (Godron) Gren. & Godron, *Fl. Fr.*, **3**: 606 (1856)

This species has been confused with *E. pungens* (Pers.) Melderis, which occurs in northern and central Spain and northern Portugal. The epithet '*pungens*' has been misapplied also to a hybrid *E. pycnanthus* \times *E. repens*. Examination of the type material from Persoon's herbarium in L has revealed that it does not belong to a hybrid, because its anthers contain normally developed pollen.

The name *Triticum littorale* Host is invalidated by an earlier homonym of Pallas. *Agropyron littorale* Dumort. is an illegitimate substitute for the earlier (1817) *Agropyron obtusiflorum* (DC.) Roemer & Schultes, based on *Triticum obtusiflorum* DC. (1813), whose type proved to be identical with *E. elongatus* (Host) Melderis, not a British species.

A striking variant with a dense spike and large spikelets has been reported from Guernsey by Marquand (1901) as '*Triticum pungens* var. *pycnanthum* G. & G'. (nom. invalid.) and by Barton (1915) as *Agropyron pungens* f. *cristatum* Hackel ex Barton. It has been known since the second part of the 18th Century, and repeatedly collected between Albecq and Vazon Bay. It possesses some characters of the hybrid between *E. farctus* subsp. *boreoatlanticus* and *E. pycnanthus*, such as prominent ribs of unequal width with numerous short, rigid spinules on the upper leaf-surface, a rachis nearly smooth on the angles, and narrow anthers with imperfect pollen; but the rachis is tough, its internodes short, and cilia on the overlapping margin of leaf-sheaths are absent. The characters mentioned last usually do not occur in the typical hybrid. The ovaries of the plant in question seem to be abnormally developed, probably owing to a fungal attack, which may be the cause of the change in the appearance of the plant. This plant is in need of further investigation.

var. **setigerus** (Dumort.) Melderis, **comb. nov.**

Agropyron littorale var. *setigerum* Dumort., *Obs. Gram. Fl. Belg.* 97 (1824)

Triticum athericum Link, *Linnaea*, **17**: 395 (1843)

Agropyron pungens var. *athericum* (Link) Richt., *Pl. Eur.*, **1**: 124 (1890)

Agropyron athericum (Link) Sampaio, *Fl. Port.* 74 (1910)

This variety has a lemma with an awn up to 10 mm long. It has been found in scattered localities in maritime areas of England (northwards to W. Gloucs, v.c. 34, and S. E. Yorks, v.c. 61) and Jersey. Outside Britain it has been reported from western Ireland (S. E. Galway, v.c. H15), the Netherlands, Italy and Portugal.

Elymus \times **oliveri** (Druce) Melderis & D. McClintock, **comb. nov.**

Agropyron \times *oliveri* Druce, *Rep. botl Exch. Club Br. Is.*, **3**: 38 (1912)

Elymus pycnanthus (Godron) Melderis \times *E. repens* (L.) Gould

Agropyron campestre auct., non Gren. & Godron 1856, excl. syn. Reichenb.

The most essential diagnostic characters of this and the other hybrids involving British species of *Elymus*, accompanied by their distributional data, are given by Melderis (1975).

Elymus farctus (Viv.) Runemark ex Melderis, *Bot. Jour. Linn. Soc.*, **76**: 382 (1978)

Triticum farctum Viv., *Ann. Bot.*, **1** (2): 159 (1804)

Triticum junceum L., *Cent. Plant.*, **1**: 6 (1755), pro parte, quoad pl. lectotyp. ab Hasselquist lectam, non *Elymus junceus* Fischer (1806)

This species consists of a polyploid complex of races, ranging from diploids to dodecaploids, which have been variously described as separate species or subspecies. However, they are morphologically

not well defined, and, therefore, it is proposed to treat them as subspecies within *E. farctus*. Subsp. *farctus*, consisting of hexaploid ($2n=42$) and octoploid ($2n=56$) races, occurs on coasts of the Mediterranean Sea. A tetraploid ($2n=28$) race, subsp. *boreoatlanticus*, occupies maritime coasts of northern and western Europe, including Britain.

subsp. *boreoatlanticus* (Simonet & Guinochet) Melderis, *Bot. Jour. Linn. Soc.*, **76**: 383 (1978)

Agropyron junceum subsp. *boreo-atlanticum* Simonet & Guinochet, *Bull. Soc. Bot. Fr.*, **85**: 176 (1938)

Elytrigia junceiformis Á. & D. Löve, *Rep. Dept Agric. Univ. Inst. Appl. Sci. (Reykjavik)*, ser. B, **3**: 106 (1948)

Agropyron junceiforme (Á. & D. Löve) Á. & D. Löve, *Rep. Dept Agric. Univ. Inst. Appl. Sci. (Reykjavik)*, ser. B, **3**: 106 (1948), nom. altern.

Elytrigia juncea subsp. *boreoatlantica* (Simonet & Guinochet) Hyl., *Bot. Not.*, **1953**: 357 (1953)

Triticum junceum auct. brit., eur. bor. & occid., non L. (1755)

Agropyron junceum auct. brit., eur. bor. & occid., non (L.) Beauv. (1812)

Elymus×**laxus** (Fr.) Melderis & D. McClintock, **comb. nov.**

Triticum laxum Fr., *Novit. Fl. Suec., Mant.*, **3**: 13 (1842)

Agropyron×*laxum* (Fr.) Tutin in Clapham *et al.*, *Fl. Br. Is.* 1463 (1952), non Willk. in Willk. & Lange (1861), nom. synonym.

Elymus farctus subsp. *boreoatlanticus* (Simonet & Guinochet) Melderis×*E. repens* (L.) Gould

Elymus×**obtusiusculus** (Lange) Melderis & D. McClintock, **comb. nov.**

Agropyron×*obtusiusculum* Lange, *Haandb. Danske Fl.*, 2nd ed., 48 (1856)

Agropyron hackelii Druce, *Rep. Botl Exch. Club Br. Is.*, **2**: 252 (1907)

Elymus farctus subsp. *boreoatlanticus* (Simonet & Guinochet) Melderis×*E. pycnanthus* (Godron) Melderis

Triticum acutum auct., non DC. (1813)

Agropyron acutum auct., non (DC.) Roemer & Schultes (1817)

×**ELYHORDEUM** Mansfeld ex Zizin & Petrova, *Der Züchter*, **25**: 164 (1955), in adnot.

×*Elymordeum* Lepage, *Naturaliste Canad.*, **84**: 97 (1957)

Elymus L.×*Hordeum* L.

As *Agropyron repens* has been transferred on taxonomic grounds to the genus *Elymus* L., the intergeneric name of its hybrid with *Hordeum secalinum* must be changed from ×*Agrohordeum* to ×*Elyhordeum*.

×**Elyhordeum langei** (Richt.) Melderis, **comb. nov.**

Agropyron×*langei* Richt., *Fl. Eur.*, **1**: 126 (1890)

×*Agrohordeum langei* (Richt.) Camus ex A. Camus, *Bull. Mus. Nation. Hist. Nat. (Paris)*, **33**: 537 (1927)

Elymus repens (L.) Gould×*Hordeum secalinum* Schreb.

This hybrid was found by Mrs C. I. Sandwith on a brackish pasture by the river Avon at Shirehampton, W. Gloucs., v.c. 34, and rediscovered by her and N. Y. Sandwith in 1954 (Hubbard & Sandwith 1955a, 1955b). In general appearance it resembles a slender *E. repens*, but has an articulated rachis with two or rarely three spikelets at each of the lower nodes; narrow, awned glumes; and narrow, indehiscent anthers with imperfect pollen. Similar hybrids have been recorded also from Denmark and France.

A more detailed account of this hybrid and its nothomorphs was published by Hubbard (1975).

LEYMUS Hochst., *Flora*, **31**: 118 (1848)

Leymus arenarius (L.) Hochst., *Flora*, **31**: 118 (1848)

Elymus arenarius L., *Sp. Pl.* 83 (1753).

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