

***Elytrigia repens* (L.) Desv. ex Nevski subsp. *arenosa* (Spenner)  
A. Löve (Poaceae) in north-western Europe**

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ABSTRACT

*Elytrigia repens* subsp. *arenosa* differs from subsp. *repens* in being a much smaller plant with shorter ribbed cauline leaves and shorter panicles and spikes. It is recorded from the east, south and south west coasts of England and the Channel Islands on maritime sand. Its nomenclature is summarised, specimens seen are listed and the north western European distribution is given and mapped.

KEYWORDS: nomenclature, European specimens, distribution, maritime sands, sandy heaths.

INTRODUCTION

*Elytrigia repens* (L.) Desv. ex Nevski subsp. *arenosa* (Spenner) A. Löve has had a chequered history. It is an undistinguished grass which has had little attention. It was first recognised by Koch & Ziz (1814) in Germany, later by Jansen & Wachter (1933) in the Netherlands and by Holmberg (1926) and Hylander (1953) in Denmark, Finland and Sweden. Korneck (1966) and Hecker (1987) both record it in studies on the Mainz sands in Germany. In Britain it was not recorded in Bentham & Hooker (1858) or subsequently. As far as I know, Melderis (1980) was the first to report this taxon from Britain. It is likely that Stace (1991) carried its first description in a British Flora. Of this taxon he says “its distribution and taxonomic status are very uncertain”. I here attempt to clarify this uncertainty.

The late C. E. Hubbard had early knowledge of subsp. *arenosa* and had been alerted by a specimen he collected in 1936 from reclaimed land near The Wash, W. Norfolk, v.c. 28. The specimen is in **K**, labelled “*Agropyron repens* var.?” I have examined it and consider it to be *Elytrigia repens* subsp. *arenosa*. Further evidence of his early interest in this taxon comes from a sheet recently found at **NWH**. The label records “*Agropyron maritimum* (*Triticum maritimum*) Koch & Ziz, sea bank, Burnham Overy Staithe, Norfolk, 28 July 1967: collected by C. E. Hubbard and E. L. Swann”. I have seen this specimen and agree the determination with the nomenclature updated to *Elytrigia repens* subsp. *arenosa*. Swann also annotates the sheet “like *A. repens* but glaucous with glabrous leaves, convolute when dry, with stout smooth ribs, spikelets small”. This agrees with my own description.

Hubbard (in litt. 1972) informed me “I have a living plant of the plant originally named *Triticum repens* var. *maritimum* by Koch & Ziz in Germany”. He had also received six sheets of specimens of var. *maritimum* from K. Watermann of Ingelheim which were collected from the type locality on the Mainz sands in Germany; these were later incorporated at **K**. Of these sheets, Hubbard also commented “these I hope to pass to Melderis for study”. Hubbard’s health intervened and Melderis never received the sheets. When the latter included *Elymus repens* subsp. *arenosus* in *Flora Europaea* (Melderis 1980) I was interested to see a specimen. In 1986 I asked Melderis if he had a list of British localities for this taxon. He did not reply to my question but said that the inclusion of this taxon in Melderis & McClintock (1983) “was simply on the authority of C. E. Hubbard”. He said he would shortly go to Kew and study the Watermann specimens of *E. repens* var. *maritimum* and later let me have a report. However, this intention, written into his last letter which was addressed to me and in his pocket at the time of his death, was never realised. Melderis had also referred (in litt. 1986) to specimens at **BM**, but in my subsequent researches I found no annotations on any sheets referring to *Elymus repens* subsp. *arenosus*. From these events it seems clear that Melderis was

unable to complete his proposed study and had accepted Hubbard's opinion in the listing of subsp. *arenosus*. It is not known which of the two proposed the rank of subspecies.

The specimens at **K** from the Mainz area of Germany subsequently proved of guidance to me in the primary field identification. In 1986 on coastal dunes on L'Ancrese Common, Guernsey I found my first living specimens of subsp. *arenosa*. Subsequent searches at **CGE** and **LTR** yielded several British specimens which matched those I had taken in Guernsey. I then made further successful searches on the east coast of England and was satisfied that this taxon could be included in the British list and its description could be improved.

#### NOMENCLATURE

The original description of this taxon was made under *Triticum repens* var. *maritimum* Koch & Ziz in 1814. It will later be shown that this name is unacceptable. Smith (1800) in recording *Triticum repens* var.  $\gamma$  did not give a description of the plant but as his authority he cited Ray and Withering and referred to material in **herb. Lightfoot**. Roth (1802) validly published a description of Smith's plant under *Triticum repens* var. *maritimum* Sm. ex Roth. It is evident that the name var. *maritimum* Koch & Ziz published in 1814 was not based on var. *maritimum* Sm. ex Roth (1802), but was a later homonym and a nom. illeg.

It is likely that the Smith plant was based on British material and the Koch & Ziz plant was probably based on a different type as the authors were accounting for plants on the Continent and published in *Catalogus plantarum Palatinatus*.

The synonym *Triticum repens* var. *maritimum* Koch & Ziz non Sm. ex Roth is retained in the summary of the nomenclature and confirms that the plant *Triticum repens* var. *maritimum* Sm. ex Roth (1802) was unrelated to *Triticum repens* var. *maritimum* Koch & Ziz published in 1814.

The first valid and legitimate name for our plant is *Triticum repens* var. *arenosum* Spenner published in 1825. This latter was elevated to *Elymus repens* subsp. *arenosus* by Melderis in 1978 although he used a later publication of the epithet by Petif (1830) as the basis for his new combination (Melderis 1978).

Stace (1991) has corrected the nomenclature and returned the species to *Elytrigia*.

The following summarises the nomenclature.

- Elytrigia repens** (L.) Desv. ex Nevski subsp. **arenosa** (Spenner) Á. Löve in *Taxon* **29**: 351 (1980).  
*Triticum repens* L. var. *maritimum* Koch & Ziz, *Catalogus plantarum quas in ditione florum Palatinatus legerunt* **5**: 17 (1814) nom. illeg., non Smith ex Roth (1802).  
*Triticum repens* var. *arenosum* Spenner, *Flora Friburgensis* **1**: 162 (1825).  
*Triticum repens* var. *arenosum* Petif, *Enumeratio plantarum in ditione florum Palatinatu sponte crescentium* **5**: 16 (1830).  
*Triticum maritimum* Jansen & Wachter in *Nederlandsch kruidkundig archief* **43**: 178 (1933), non L. (1762).  
*Agropyron maritimum* Jansen & Wachter, *Flora Neerlandica* **1** (2): 116 (1951), non (L.) P. Beauv. (1812).  
*Elytrigia repens* var. *maritima* N. Hylander in *Botaniska notiser*: 357 (1953).  
*Elymus repens* subsp. *arenosus* (Petif) Melderis in *Botanical journal of the Linnean Society* **76**: 379 (1978).

#### DESCRIPTION OF ELYTRIGIA REPENS SUBSP. ARENOSA

Perennial, usually forming small patches but sometimes as a single-culmed plant, with rhizomes; whole plant glaucous-green. Culms (16–)28–65 cm high, 0.4–1.0(–1.6) mm wide below the spike, erect, slender, sometimes geniculate at or near the base; nodes 2–3, light to dark pink. Sheaths glabrous, rounded on the back with well developed auricles; ligules less than 0.5 mm. Lower leaves few, (4–)7–14(–20) cm  $\times$  2–4 mm, rigid, finely pointed at apex. All leaves with prominently raised, broad, whitish or green veins c. 0.15–0.2 mm wide on the adaxial surface, glabrous or with a few scattered hairs, with margins sometimes minutely scabrid, all leaves involute or quickly becoming so on drying. Upper cauline leaves 1.5–6(–9.5) cm  $\times$  1–2(–3.4) mm, long-acuminate at apex. Spikes

(2.5-)4-9 cm long, erect, short and narrow, rachis strap-shaped, with scabrid margins. Spikelets few, (7-)9-14 mm long, sessile, 2-6 flowered. Glumes (4.4-)6-9(-10) mm long, lanceolate to lanceolate-oblong, strongly keeled, scabrid, slightly unequal, blunt or mucronate and sometimes with awns (0.2-)1.0-2.3 mm at apex; veins 3(-7). Lower lemmas (5.5-)7-10(-12) mm long, lanceolate-oblong, blunt or mucronate at apex, sometimes with an awn (0.3-)1.8-2.8(-4.6) mm. In both glumes and lemma the awn is an extension of the central nerve and is sometimes scabrid distally. Palea shorter than the lemma, with ciliate margins. Anthers 4.0-5.3 mm.

The incidence of awns on subsp. *arenosa* is variable. On British material I found 22 spikes awned and 25 awnless. All 26 spikes of Swedish specimens were awned but only two out of 23 in German material. Those from Finland and Spain were awned but in French specimens the incidence was only two out of ten. The incidence of hairs on the adaxial leaf surfaces on subsp. *arenosa* is of little help in effecting determination. Four specimens of 50 British plants had leaf hairs, one in 26 of German and 15 of 18 in Swedish material. The occasional presence of hairs on subsp. *arenosa* leaves should not lead one to confuse the leaves with those of subsp. *repens*, as in the latter the leaf surface is flat and the leaf is flaccid and longer than in subsp. *arenosa*. Another possible confusion in determination may arise from the rare occurrence of cilia on the sheath margin of *Elytrigia repens* subsp. *arenosa* which is a character of *Elytrigia atherica* (Link) Kerguelen ex Carreras Mart. and its hybrids. Where a specimen with sheath cilia also has narrow and stiff leaves with involute margins and raised veins, it should be determined as *Elytrigia repens* subsp. *arenosa*.

An examination of a wide range of European specimens has enabled me to expand and modify the previous descriptions given by Melderis (1978, 1980) and Stace (1991). As examples I consider that all leaf margins of subsp. *arenosa* are involute or become so soon after collection; that geniculation at lowest nodes is infrequent; that leaves are found with either flat or round topped ribs and that none have been found more than 4 mm wide; and that lemmas are sometimes awned.

A comparison of the two subspecies is given in Table 1.

TABLE 1. A COMPARISON OF *ELYTRIGIA REPENS* SUBSP. *REPENS* AND SUBSP. *ARENOSA*

	<i>Elytrigia repens</i> subsp. <i>repens</i>	<i>Elytrigia repens</i> subsp. <i>arenosa</i>
Culm length	30-120 cm	(16-)28-65 cm
Culm geniculation	Sometimes at or near the base	Infrequent
Culm nodes	Light to dark brown	Light to dark pink
Leaves	Generally flat and flaccid, veins narrow; usually with dispersed hairs on adaxial surface	Thick, rigid; margins involute, veins broad, rounded or flat, 0.15-0.2 mm wide; usually glabrous
Upper leaves	8-16(-25) cm × 2-8.5 mm	1.5-6(-9.5) cm × 1-2(-3.4) mm
Basal leaves	8-30 cm × 3-10 mm	(4-)7-14(-20) cm × 2-4 mm
Spike length	5-20(-30) cm	(2.5-)4-9 cm
Spike habit	Erect to nodding with up to c. 25 spikelets	Short and strict often with <10 spikelets
Spikelet length	10-20 mm	(7-)9-14 mm
Number of florets	3-8	2-6
Glume length	7-12 mm	(4.4-)6-9(-10) mm
Glume: no. of veins	3-7	3(-7)
Glume awns	Sometimes mucronate and rarely awned in British specimens	(0.2-)1.0-2.3 mm
Lemma length	8-13 mm	(5.5-)7-10(-12) mm
Lemma awns	Usually absent in British material but in var. <i>aristatum</i> are thin and weak up to 15 mm long	Thick, straight and rigid, (0.3-)1.8-2.8 (-4.6) mm long. Where the lemma is mucronate, the tip is corneous and often scabrous
Anthers	3.5-6 mm	4-5.3 mm

## HABITAT

*Elytrigia repens* subsp. *arenosa* occurs on maritime sand and dunes and can be seen within 30 m of the tide but is more often at least 70 m from the sea. It is also found at the rear of partially colonized sand beaches where infrequent tidal overflows encourage the growth of a salt tolerant flora. More observations and sampling for salinity are necessary before an opinion can be given on the salt tolerance of subsp. *arenosa*. The pH of the sands examined ranges from 6 to 7.

To the east of Caen, Normandy, it is seen on high dunes of mobile fine sand which are partially colonized with *Ammophila arenaria* (L.) Link, *Ononis repens* L. and *Tamarix gallica* L. At Sizewell E. Suffolk (v.c. 25) it grows on similar dunes with *Elytrigia atherica*, *Rumex crispus* L. and *Carex arenaria* L. At both of these sites subsp. *arenosa* only colonizes the perimeter of the associated vegetation. At L'Anresse Common, Guernsey it grows as single-culmed plants widely spaced in semi-open consolidated dunes with *Agrostis stolonifera* L., *Cynosurus cristatus* L., *Gaudinia fragilis* (L.) P. Beauv. and *Vulpia bromoides* (L.) Gray.

In the vicinity of the Old Dunwich River at Walberswick, E. Suffolk (v.c. 25) it is found on consolidated sand subject to occasional tidal overflow, the soil of which is a mixture of fine sand and undecomposed organic matter derived from plant remains of *Festuca rubra* L., *Glaux maritima* L., *Atriplex portulacoides* L. and *Spergularia marina* (L.) Griseb. indicating a low salinity. On the beach at Thorpness, E. Suffolk (v.c. 25) it is found in small shingle and coarse sand with *Silene uniflora* Roth, *Senecio vulgaris* L. and *Ononis repens* L. On the same coast at Dunwich it is sparingly seen in small isolated colonies in sandy areas in large shingle on the back of the sea defences with *Lathyrus japonicus* Willd. It is recorded from the sand banks of the tidal estuary of the River Parret, S. Somerset (v.c. 5).

In Germany subsp. *arenosa* occurs on sandy heaths and in sandy arable land in the Mainz area c. 400 km inland (Korneck 1966; Hecker 1987). The protologue of this taxon by Koch & Ziz (1814) reads "*Triticum repens maritimum* in sabulosis prope Moguntiam (Mainz) cum aliis plantis salinis copiose occurit". Hecker (1987) lists 217 taxa on the Mainz sands, and 159 of these are also found on the sands in the West Suffolk Breckland. Subsp. *arenosa* has not yet been reported from the latter, but it could well occur there. Recalling the above "plantis salinis copiose occurit", the Breckland sands support some maritime taxa including *Corynephorus canescens* (L.) P. Beauv., *Carex arenaria* L., *Phleum arenarium* L., *Trifolium scabrum* L. and *T. suffocatum* L.; the area is today c. 40 km from the tidal bay of The Wash. The inland stations of *Elytrigia repens* subsp. *arenosa* in the Rhine locality of Mainz suggests that it requires open sandy habitats rather than specifically maritime ones. It may well be a taxon like *Hippophaë rhamnoides* L. which was once more widespread and now occurs predominantly on the coast of Britain as its former inland sand habitats have been eroded (Godwin 1975). Both subsp. *arenosa* and *H. rhamnoides* are included in Hecker's (1987) list.

DISTRIBUTION OF *ELYTRIGIA REPENS* SUBSP. *ARENOSA* IN NORTH-WESTERN EUROPE

The distribution of *Elytrigia repens* subsp. *arenosa* in north-western Europe is shown in Fig. 1.

## ENGLAND

S. Somerset, v.c. 5. Banks of River Parret between Stert Point and Combwich, 1907, *E. S. Marshall* (CGE, OXF).

W. Sussex, v.c. 13. Sea shore at Pagham, 1875, *H. E. Fox* (OXF).

S. Essex, v.c. 18. Foot of sea wall, Sandbeach Farm, Bradwell Juxta Mare, TM/030.053, 1986, *P. J. O. Trist* (herb. P.J.O.T.).

E. Suffolk, v.c. 25. The Dunes, Walberswick, 1950, *E. K. Horwood* (LTR); near the Old Dunwich River, The Flats, Walberswick, TM/501.749, 1989, *P. J. O. Trist* (herb. P.J.O.T.); sand erosion from shingle sea defence, Corporation Marshes, Walberswick, TM/495.740, 1991, *P. J. O. Trist* (herb. P.J.O.T.); foot of shingle bank sea defences, Dunwich, TM/479.707, 1989, *P. J. O. Trist* (herb. P.J.O.T.); fixed dunes, Sizewell beach, TM/475.629, 1989, *P. J. O. Trist* (herb. P.J.O.T.); sand and shingle beach, N. of Haven House, Thorpness, TM/470.589, 1989, *P. J. O. Trist* (herb. P.J.O.T.).



FIGURE 1. European distribution of *Elytrigia repens* subsp. *arenosa*.

E. Norfolk, v.c. 27. Sandy waste, Gt Yarmouth, 1953, *B. A. Poulton* (E).

W. Norfolk, v.c. 28. Hunstanton, 1935, *T. G. Tutin* (LTR); near the river by the paper mill, West Newton, 1936, *C. E. Hubbard* (K); sea defence bank, Burnham Overy Staithe, 1967, *C. E. Hubbard & E. L. Swann* (herb. E.L.S. in NWH).

Channel Islands v.c. S. Consolidated dunes by the Doyle Rock, L'Anresse Common, Guernsey, WV/348.834, 1986, *P. J. O. Trist* (herb. P.J.O.T.); coastal sand dunes, Port Soif, Guernsey, WV/304.818, 1991, *Patience Ryan* (det. P.J.O.T.).

#### SPAIN

San Sebastian, 1895, *M. Gandoger* (E).

#### FRANCE

Dyke bank on sea shore, west of St Valery-sur-Somme, 1959, *D. P. Young* (BM); sand dunes at rear of beach, E. of Le Hôme, West of Cabourg, Calvados, Normandy, 1989, *P. J. O. Trist* (herb. P.J.O.T.); high sand dunes at rear of beach, N.E. of Merville-Franceville, Calvados, Normandy, 1989, *P. J. O. Trist* (herb. P.J.O.T.).

#### THE NETHERLANDS

Oostvoorne, 1914, *A. W. Kloos & J. W. Henrard* (L); Oostvoorne, 1917, *J. T. Henrard* (L); Hook of Holland, 1910, *P. Jansen & W. H. Wachter* (L); Noordwolde, Hemelum Oldeferd, 1929, *A. N. Koopmans* (L).

## GERMANY

Sandy area near Cleves, E.S.E. of Nijmegen, 1866, *Florae rhenanae* Fasc. 6 (**BM**); Offenbach am Main, undated, *C. B. Lehmann* (**K**); heathland on 'Mainzer sand', Mainz, 1971, *Kurt Watermann* (**K**); sandy arable field, Weilersberg near Mainz, 1969, 1971, *Kurt Watermann* (**K**); Priwall, near Travemünde, N.E. of Lubeck, 1845, *G. R. Haecker* (**E**).

## FINLAND

Upper part of the sea shore meadow, west of Kuljunmaa in the Tirkkale group, off Lokalahti, 1973, *Sakari Hinneri* (**E**).

## SWEDEN

Nyköping, Sodermanland, 1921, *Carl Blom* (**K**); sandy shore south of Kristineberg, Skaftö, Bohuslän, 1947, *K. H. Mattesson* (**NMW**); Norrvreda, Singö, Upplandia, 1928, *G. A. Ringselle* (**NMW**); Tranvik, Singö, Upplandia, 1928, *G. A. Ringselle* (**NMW**); Lund, Skåne, 1901, *O. R. Holmberg* (**BM**); Rundskär, Nyköping archipelago, 1882, *Hugo Samzelius* (**E**).

I have been unable to identify any specimens from collections sent from Trondheim (**TRH**) and Tromsø (**TROM**) in Norway and it is likely that these areas are too far north for subsp. *arenosa* to occur. Dr Sivertsen of Trondheim suggests that this taxon might be found on the sands around Lista and in the Jaeren district in the south of Norway. I was surprised to find no specimens of subsp. *arenosa* in a large collection from Copenhagen (**C**).

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