

The taxonomic relationships and typification of *Festuca brevipila* Tracey and *F. lemanii* Bastard (Poaceae)

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ABSTRACT

Festuca brevipila Tracey (= *F. trachyphylla* (Hack.) Kraj.) and *F. lemanii* Bast. have long been a source of confusion for British botanists. The aim of this paper is to clarify the current taxonomic situation by distinguishing the two species on the basis of their morphology and anatomy, by reviewing the taxonomic history and nomenclature and by examining their taxonomic status. Some data are also presented on the geographical distribution and ecology of each species.

INTRODUCTION

The subject of this paper is two species of grass that have for long been collectively known in the British literature as *Festuca longifolia* Thuill. It was shown conclusively by Auquier (1973) that this application is wrong, and that *F. longifolia* is the correct name for the glaucous fescue found in East Anglia, to which the names *F. caesia* Smith and *F. glauca* Lam. had been applied. *F. caesia* correctly refers to that taxon (though a later synonym), but *F. glauca* is another misapplication, the true *F. glauca* not occurring in the wild in the British Isles.

The correct names of the two species to be discussed are *F. brevipila* Tracey and *F. lemanii* Bastard. The misapplication of the name *F. longifolia* to these seems to date from Howarth (1925), who was followed by Hubbard (1954), Dandy (1958) and Tutin (1952, 1962). These authors included both *F. brevipila* and *F. lemanii* as a single species, although the former is probably more closely related to *F. valesiaca* Schleicher ex Gaudin and the latter to *F. ovina* L. The drawing in Hubbard (1954) for the most part could refer to either species, but the leaf section is definitely that of *F. lemanii*.

The long list of differential characteristics which separate *F. lemanii* and the only slightly less variable *F. brevipila* (Table 1) suggests that the species are very well separated. However, Hackel

TABLE 1. CHARACTERS WHICH SEPARATE *F. LEMANII* AND *F. BREVIPILA*

Character	<i>F. brevipila</i>	<i>F. lemanii</i>
Panicle	usually nodding	usually erect
Awn length (mm)	1.4-2.5	0.3-1.8
Palea length (mm)	3.8-4.7	4.0-5.2
Leaf-blade scabridity	usually scabrid or scabrid distally	usually scabridulous distally
Number of adaxial leaf-blade furrows	4-6	2-4
Number of leaf-blade veins	(5-)7-9	5-7
Margins of leaf-blades	infolded	infolded or not
Sclerenchyma in leaf-blades	usually in three islets (sometimes semi-connected)	usually in ring or broken ring
Prickle length on adaxial surface of leaf-blade (μm)	(2.7-)5-13(-15)	(10.5-)23-46(-63.5)
Stomatal length (leaf) (μm)	(37.5-)41-50	38-42(-46)
Stomatal length (lemma) (μm)	31.5-37.5	29-33.5

(1882, p. 87) noted the existence of individuals intermediate between *F. ovina* subsp. *eu-ovina* var. *vulgaris* subvar. *firmula* Hack. (= *F. lemanii*) and *F. ovina* subsp. *eu-ovina* var. *duriuscula* subvar. *trachyphylla* Hack. (= *F. brevipila*). The present study has also uncovered a number of intermediate specimens, although completely intermediate individuals are rather rare and the taxa are generally easily separated when all differential characters are taken into consideration. We therefore consider them to be best recognised as distinct species.

FESTUCA LEMANII BASTARD

- F. lemanii** Bastard, *Essai Fl. Maine et Loire* 36 (1809). TYPE: France. Chinon. In sabulosis aridis. *E. H. Tourlet No. 12530* – ex herb. Hackel (Neotype: W, designated here).
- F. cinerea* sensu Desvaux, *Fl. Anjou* 61 (1827); sensu Moisan, *Fl. Nantaise* 185 (1839); non Vill. (1787).
- F. duriuscula* sensu Moisan, *Fl. Nantaise* 185 (1839); sensu Guépin, *Fl. Maine et Loire*, 3rd ed., 50 (1845); sensu Boreau in *Mém. Soc. Acad. Maine et Loire* 6: 181 (1859); sensu Lloyd, *Fl. Ouest France*, 3rd ed., 372 (1876); sensu Corbière, *Nouv. Fl. Normandie* 645 (1893); sensu Desvaux, *Fl. Anjou* 61 (1927); sensu Huon in *Bot. Rhed.*, sér. A, 9: 187 (1970); non L. (1753).
- F. glauca* sensu Moisan, *Fl. Nantaise* 185 (1839); non Lam. (1787).
- F. duriuscula* L. var. *hirsuta* sensu Hardouin, Renou & le Clerc, *Catal. Pl. vasc. Calvados* 307 (1848); sensu Tourlet, *Catal. rais. Pl. vasc. Indre et Loire* 583 (1908); non (Host) Gaudin (1828).
- F. ovina* subsp. *eu-ovina* var. *vulgaris* Koch subvar. *firmula* Hack. f. *lemanii* (Bast.) Hack., *Monogr. Fest. Europ.* 87 (1882); *F. ovina* subsp. *ovina* var. *firmula* (Hack.) Hegi f. *lemanii* (Bast.) Hack. in Stohr, *Wiss. Z. Martin-Luther-Univ. Halle-Wittenberg* 4: 405 (1955).
- F. hirsuta* sensu Corbière, *Fl. Normandie* 645 (1893); non Host (1802).
- F. ovina* subsp. *eu-ovina* var. *lemanii* (Bast.) Aschers & Graebn., *Syn. Mitteleur. Fl.* 2: 468 (1900).
- F. longifolia* sensu Howarth in *J. Linn. Soc. (Bot.)* 47: 35 (1925), pro parte; sensu Hubbard, *Grasses* 111 (1954), pro parte; sensu Tutin, *Fl. Br. Isl.*, 2nd ed., 1129 (1962), pro parte; non Thuill. (1800).
- F. ovina* var. *firmula* (Hack.) Richt. subvar. *lemanii* (Bast.) Kraj. in *Acta Bot. Bohem.* 9: 189, 193 (1955).
- F. cinerea* Vill. var. *trachyphylla* sensu Stohr in *Wiss. Z. Martin-Luther-Univ. Halle-Wittenberg* 4: 732 (1960); sensu Auquier in *Bull. Jard. Bot. nat. Belg.* 39: 97–118 (1969); non (Hack.) Stohr.

TAXONOMIC HISTORY

The type specimen of *F. lemanii* was described by Bastard as being collected from the area around Brissac and Saumur (Maine et Loire, France). The herbarium of Bastard is said to be mainly in Angers (ANG) with other specimens in Paris (P) and Manchester (MANCH). M. Kerguélen (in litt. 1984) examined the collections in ANG and P but failed to find either a type specimen or an authentic specimen which may become a neotype. Auquier (1974) reported having requested such material from MANCH and ANG but without success. M.J.W. visited MANCH but also failed to find a suitable specimen. In the apparent absence of a type specimen or of an authentic specimen to serve as a neotype, Kerguélen (in litt. 1984) suggested that an alternative neotype might be sought.

Hackel's (1882) concept of the epithet '*lemanii*' came from the examination of herbarium material collected from areas around Chinon (Indre et Loire, France) by E. H. Tourlet. Auquier (1974) examined one such specimen from Hackel's herbarium (W, No. 12530) collected by Tourlet from "Chinon in sabulosis aridis", and stated that it agrees well in the majority of characters with plants of the thermophilous calcareous grasslands in the region (and by implication with *F. lemanii*). He later suggested, in a note attached to the specimen, that this plant may provide a convenient neotype for *F. lemanii*. Kerguélen (in litt. 1984) agreed with this view.

We have observed *F. lemanii* growing on both calcareous and acidic soils and a detailed comparison of the two ecodemes covering 126 characters has revealed few differences between them. Traditionally important characters such as spikelet length, awn length and leaf-blade diameter were not found to differ between the two ecodemes, but minor differences were observed in both panicle length and culm height (Fig. 1). These differences are considered by us to be too small to warrant taxonomic distinction, since both characters were found to be highly unreliable under cultivation. Therefore, we feel that it is not inappropriate to use a specimen collected from

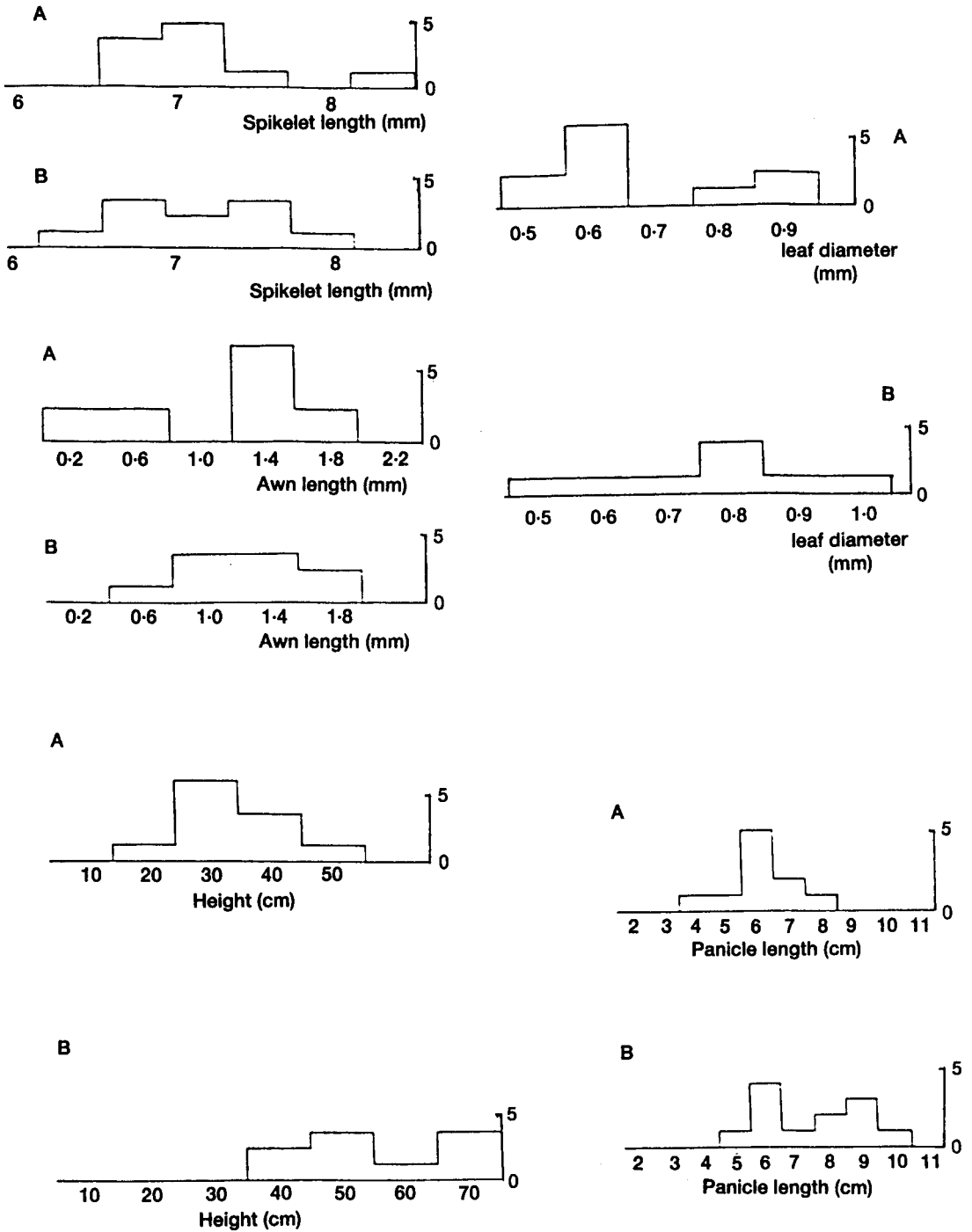


FIGURE 1. Variation in spikelet length, awn length, leaf-diameter, height and panicle length in two ecodemes of *F. lemanii*, A. calcifuge, B. calcicole. Vertical axes = no. of plants.

acid sands as a neotype for *F. lemanii*, even though the original plant was collected from an area of predominantly calcareous soils.

The Tourlet specimen was obtained on loan from W and examined. The characteristics of this specimen agree reasonably well with the descriptions of *F. lemanii* given by Auquier (1974), Markgraf-Dannenberg (1980) and Kerguélen (1983) (Table 2). Accordingly, we designate this specimen as the neotype of *F. lemanii*.

Hackel (1882, p. 87) included *F. lemanii* under *F. ovina* var. *vulgaris* subvar. *firmula*. Plants referable to *F. lemanii* were distinguished from others in the subvariety only by their hairy spikelets. However, the modern concept of *F. lemanii* encompasses plants with both hairy and glabrous spikelets and so is more accurately referable to the whole of Hackel's subvar. *firmula*.

TABLE 2. CHARACTERISTICS OF *F. LEMANII*

Character	Neotype (W-N.12530)	Auquier (1974)	Kerguélen (1983)	Markgraf- Dannenberg (1980)
Panicle length (cm)	(4.6-)5.7(-7.5)	(2-)5-7(-11)	(2-)5-7(-11)	(2-)4-7(-11)
Spikelet length (mm)	(6.3-)6.6(-7.2)	(5.6-)6.5-7.2(-8.3)	(5.6-)6.5-7.2(-8.3)	(5.6-)6.5-7.2(-8.3)
Lemma length (mm)	(3.8-)4.1(-4.5)	(3.6-)4.2-4.6(-5.5)	(3.6-)4.2-4.6(-5.5)	(3.6-)4.2-4.6(-5.5)
Awn length (mm)	(0.7-)1.5(-2.3)	(0.2-)0.8-1.6(-2.8)	—	<2.75
Upper glume length (mm)	(3.6-)3.8(-4.3)	(2.8-)3.5-4.0(-5.2)	—	(2.8-)3.5-4.0(-5.2)
Leaf-blade scabridity	scabridulous in distal third	usually scabridulous distally or at tip	scabrid only at tip	usually scabrid distally
Leaf-blade diameter	(0.59-)0.62 (-0.66)	(0.43-)0.62-0.79 (-1.14)	(0.45-)0.6-0.8(-1.14)	(0.43-)0.62-0.79 (-1.14)
No. of veins	5(-7)	(5-)7(-9)	(5-)7(-9)	(5-)7(-9)
No. of grooves	2(-4)	2-4(-6)	(2-)3-4	(2-)3-4
Sclerenchyma distribution	much broken ring	continuous or broken ring	continuous ring	continuous or broken ring

MORPHOLOGICAL VARIATION

Plants fairly densely to loosely tufted; vegetative shoots all intravaginal and retaining or shedding old leaves. Culms (19-)28-66 cm, erect, (0.32-)0.38-0.5(-0.55)mm wide below the first panicle node, generally smooth or scabridulous below the panicle, glabrous or hairy, grooved or weakly grooved distally; nodes 2-3, the uppermost not pruinose, visible beyond the subtending sheath or not, and reaching (3-)12-32(-37)% of the height of the plant.

Leaves green, usually not glaucous, subpruinose or not. Leaf-sheaths (1.3-)2.1-4.4(-4.7)cm, fused for (0-)15-36(-41)% of their length, smooth or scabridulous distally, glabrous or hairy; auricles short, usually minutely ciliate (rarely glabrous). Ligules short, usually minutely ciliate (rarely glabrous). Leaf-blades lank to robust, (4-)6-11(-17)cm, not acutely pointed, (9-)11-56(-79)% on each plant curved at the tip, usually scabrid at least in the upper half, occasionally scabridulous in the distal third or smooth, glabrous or hairy at the base.

Panicles usually erect but occasionally slightly nodding, 3.7-7.8(-8.6)cm, with (8-)16-24(-34) spikelets. Panicle branches subpruinose or not pruinose, not narrowing below the spikelets, smooth to scabrid, covered in hairs or prickles, rarely subglabrous; 1st and 2nd panicle nodes (1.1-)1.3-2.7(-3.2)cm apart. Spikelets subpruinose or not, (6.1-)6.5-7.5(-8.5)cm, with (2-)3-6(-8) florets (plus one sterile floret); pedicels (0.62-)1.45-2.35(-2.5)mm. Glumes unequal; the lower subulate to narrowly lanceolate, (2.15-)2.4-3.2(-3.52) × 0.58-0.82 mm, usually glabrous, but sometimes with a scabrid tip or rarely laxly hairy, 1-veined, with a ciliate margin; the upper narrowly lanceolate to lanceolate, (3.4-)3.5-4.6(-4.8) × (0.89-)1.05-1.2(-1.3)mm, usually glabrous or with a scabrid

distal third, rarely laxly hairy, 3-veined with a ciliate margin or rarely glabrous. Lemmas lanceolate, (4.05-)4.1-4.85(-5.35) (excluding awn) \times 1.5-1.83(-1.93)mm, green but often purple at the apex, with awns (0.3-)0.6-1.6(-1.9)mm long, 5-veined, scabrid in the distal half or hairy. Paleas linear-lanceolate, (3.9-)4.1-4.6(-5.2) \times 0.68-0.9 mm. Anthers yellow or purple, 1.83-2.5mm. Pollen grains oblong, brown, 2.3-3.1 \times 0.65-1.0mm.

Leaf-blade anatomy (Fig. 2): outline of leaf-blades usually oval or V-oval, occasionally V-form or circular-elliptical; margins usually not infolded; leaf-blade diameter (0.43-)0.59-0.85(-0.95)mm, diameter/thickness ratio (1.87-)2.1-2.4(-2.9); veins 5 (-7); sclerenchyma forming a complete or broken ring which may be thickened slightly at the margins and midrib, sometimes forming a much broken ring; 2-4 grooves and 1-4 ridges on the adaxial surface; adaxial midrib (0.09-)0.1-0.14(-0.15)mm wide and 0.035-0.08mm deep; adaxial epidermal cells usually of fairly uniform size, rarely individualized, lacking bulliform cells but with prickles (10.5-)23-46(-63.5) μ m. Leaf-blade adaxial epidermis: stomata (31-)38-41.5(-45.8) μ m, usually predominantly solitary or with an accompanying prickle-cell, (1-)8-74(-91)% solitary, (0-)23-88(-99)% with an accompanying silica-cell; prickles usually predominantly solitary, (28-)35-79(-100)% solitary, (0-)11-50(-57)% forming short rows of 2 or more prickle-cells, 0-15(-65)% with an accompanying silica-cell.

Leaf-blade abaxial epidermis: stomata absent; long-cells with sinuous walls, (75-)85-133(-143) μ m; silica-cells and cork-cells present; prickles usually present.

FESTUCA BREVIPILA TRACEY

F. brevipila Tracey, *Plant Syst. Evol.* **128**: 287-292 (1977). TYPE: Niederösterreich, Waldviertel, Amplendorf (nördlich von Schrems), in der Nähe des Houses Nr. 55; in sehr flachgründigen Rasen über Granit. 20 Mai 1977, A. Weber (Holotype: WU).

F. ovina L. var. *glaucescens* Link, *Hort. Berol.* **2**: 266 (1833), nom. ambig. sec. Stohr (1960, p. 398).

F. ovina subsp. *eu-ovina* var. *duriuscula* (L.) Koch subvar. *trachyphylla* Hack., *Monogr. Fest. Europ.* **91** (1882) (Lectotype: Prenzlau, Grantzow, ex herb. Hackel (W), designated here).

F. ovina subsp. *eu-ovina* var. *duriuscula* subvar. *pubescens* Hack., *Monogr. Fest. Europ.* **91** (1882).

F. duriuscula var. *trachyphylla* (Hack.) Richt., *Pl. Eur.* **1**: 94 (1890).

F. duriuscula subsp. *trachyphylla* (Hack.) Rohlena in *Vestn. Kral. ces. spol. Nauk* **24**: 4 (1900), sec. Rauschert (1960, p. 270).

F. ovina var. *trachyphylla* (Hack.) Druce, *List Br. Pl.* **83** (1908).

F. longifolia var. *trachyphylla* (Hack.) Howarth in *J. Linn. Soc. (Bot.)* **47**: 35 (1925).

F. trachyphylla (Hack.) Kraj. in *Acta Bot. Bohem.* **9**: 190, tab. 2, fig. 5, 6 (1930); non Hackel ex Druce (1915).

F. ovina subsp. *ovina* var. *duriuscula* subvar. *trachyphylla* (Hack.) Maire, *Fl. Afrique Nord* **3**: 126 (1955).

F. longifolia sensu Hubbard, *Grasses* **111** (1958), pro parte; sensu Tutin, *Fl. Br. Isl.*, 2nd ed., **1129** (1962), pro parte; non Thuill. (1800).

F. duvalii (St. Yves) Stohr in *Wiss. Z. Martin-Luther-Univ. Halle-Wittenberg* **4**: 232 (1955), pro parte quoad descr., excl. typ.

F. cinerea var. *trachyphylla* (Hack.) Stohr in *Wiss. Z. Martin-Luther-Univ. Halle-Wittenberg* **9**: 395, 402 (1960).

F. stricta Host subsp. *trachyphylla* (Hack.) Patzke in *Österr. Bot. Zeitschr.* **108**: 506 (1961).

TAXONOMIC HISTORY

Auquier (1973, pp. 270-272) pointed out that considerable confusion had arisen over Hackel's original concept of subvar. *trachyphylla*. Some authors had applied the epithet *trachyphylla* to fescues with a continuous ring of sclerenchyma (Stohr 1955, 1960; Korneck 1961; Huon 1970; Bidault 1966, 1968), whereas others applied the name to fescues with three islets of sclerenchyma tissue (e.g. Howarth 1925, 1948; Krajina 1930). Auquier (1973) outlined the principal arguments for each view. Evidence in favour of using the epithet to describe specimens with a continuous ring of sclerenchyma is as follows:

i) Hackel (1882, pp. 90) placed subvar. *trachyphylla* under var. *duriuscula* (L.) Koch, which he considered to have a continuous ring of sclerenchyma only rarely interrupted.

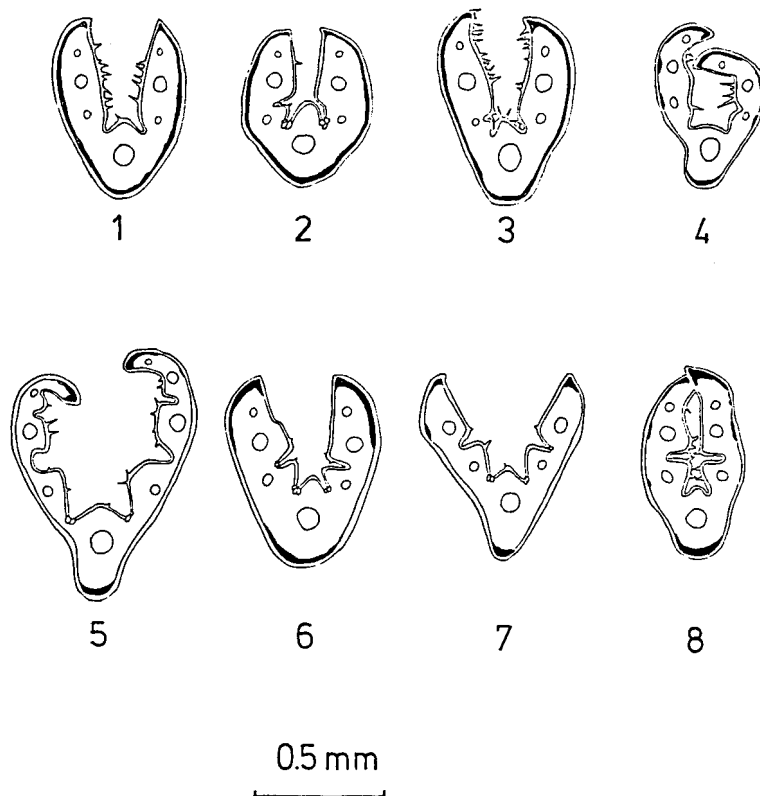


FIGURE 2 Leaf-blade sections of *F. lemanii* and *F. brevipila*.

1. *F. lemanii*, Seven Sisters, nr River Wye, Herefordshire, v.c. 36 (LTR).
2. *F. lemanii*, Monks Dale, nr Tideswell, Derbyshire, v.c. 57 (LTR).
3. *F. lemanii*, Jezainville, Meurth-et-Moselle, France (LTR).
4. *F. lemanii*, (Neotype) Chinon, France (W).
5. *F. brevipila*, Lakenheath Warren, W. Suffolk, v.c. 26 (LTR).
6. *F. brevipila*, Wangford, W. Suffolk, v.c. 26 (LTR).
7. *F. brevipila*, nr Brandon, Suffolk (LTR).
8. *F. brevipila*, (Holotype), Niederosterreich, Austria (WU).

ii) Hackel determined and annotated specimens with a continuous ring of sclerenchyma under this name (cf., for example, St Yves (1913, pp. 63–64)).

iii) Hackel (1882) established a close affinity between subvar. *trachyphylla* and subvar. *firmula* of var. *vulgaris* Koch, the latter typically having a continuous ring of sclerenchyma.

iv) In Hackel's herbarium (W) specimens with a continuous ring of sclerenchyma are often classed under the epithet "*trachyphylla*".

Evidence in favour of the epithet being used to describe specimens with discontinuous sclerenchyma is as follows:

i) Hackel said of subvar. *trachyphylla* "*vulgaris* in Germania boreali . . . non vidi e Gallia, Hispanica". Auquier (1973) pointed out that this distribution agrees well with that of fescues with discontinuous sclerenchyma but differs strongly from those with a continuous ring.

ii) Hackel (1882, p. 105), in proposing a new taxon (*F. ovina* subsp. *sulcata* Hack. var. *genuina* Hack. subvar. *typica* Hack.) that typically has three sclerenchyma islets (cf. p. 104: "fasciculis sclerenchymaticis 3 crassiusculis") and five veins, distinguished it from subvar. *trachyphylla* as follows: "Laminae rarissime 7 nerves inveniuntur et planta tum a *F. ovina duriuscula trachyphylla*

vix distinguenda". Auquier (1973) concluded from the last point that it seemed that Hackel considered subvar. *trachyphylla* to have a discontinuous sclerenchyma as well.

Specimens of subvar. *trachyphylla* were obtained on loan from Hackel's herbarium in Vienna (W) in order to search for a possible lectotype. This search produced one specimen of relevance (W, No. 977). The main label of this specimen contains a description of the collection site signed by Grantzow (of which only the locality Prenzlau can be deciphered readily) and the determination "*F. ov. var. duriuscula* subv. *trachyphylla*" signed by Hackel. A pencil note contains measurements of the lemma, awn and leaf-diameter and the date 2.5. [18] 65. This predates Hackel's monograph (1882) in which the taxon is described. A note added by P. Auquier places Prenzlau 60 km north of Berlin, but a later note by C.A.S. corrects this to 90 km N.N.E. of Berlin in Brandenburg (E. Germany). Morphologically this specimen agrees fairly well with the modern concept of *F. trachyphylla* (*F. brevipila*) (Table 3) and it is accordingly selected as the lectotype.

TABLE 3. CHARACTERISTICS OF THE LECTOTYPE OF *F. OVINA* SUBVAR. *TRACHYPHYLLA* COMPARED WITH THOSE OF *F. BREVIPILA*

Character	<i>F. brevipila</i>	<i>F. ovina</i> subvar. <i>trachyphylla</i> (W-No.977)
Panicle length (cm)	(3.5-)4.2-8.8(-9.5)	(4.5-)5.8(-6.8)
Spikelet length (mm)	(6.1-)6.4-8.0(-8.5)	(6.9-)7.2(-7.5)
Lemma length (mm)	(3.9-)4.2-5.1(-5.5)	(3.9-)4.2(-4.4)
Awn length (mm)	(1.2-)1.4-2.3(-2.6)	(0.3-)1.6(-2.2)
Leaf-blade scabridity	scabrid or scabrid distally	scabrid distally
Leaf-blade shape in section	V-form or V-oval	V-form or V-oval
No. of leaf-blade veins	(5-)7-9	7
No. of adaxial leaf-blade furrows	4(-6)	4
Prickle length (μ m)	(2.7-)5-13(-15)	(7.5-)11.6(-15)

Krajina (1930) was the first author to recognise subvar. *trachyphylla* Hackel at the species level. However, Hackel (ex Druce 1915) had previously used the name to describe a totally different taxon from South America. The one character (prickles on the glumes) used to distinguish it from *F. dumetorum* Phillippi non L. is sufficient to validate the name. Therefore, the later homonym *F. trachyphylla* (Hackel.) Kraj. must be rejected. This had earlier been realized by Dandy (1958) when erroneously placing *F. trachyphylla* as a synonym of *F. longifolia*, as pointed out to us by P. J. O. Trist (in litt. 1984). M. Kergu len (in litt. 1984) drew our attention to the fact that Pils (1984) quoted *F. brevipila* Tracey as a synonym of *F. stricta* Host subsp. *trachyphylla* (Hack.) Patzke. Tracey (1977) distinguished *F. brevipila* from *F. trachyphylla* (Hack.) Kraj. by its shorter culms and leaves, its very shortened hairs on the leaves, its more variable stomatal length, its shortened panicles, and its relatively shorter spikelet lengths only encompassing the lower part of the range found in *F. trachyphylla*. The holotype and the isotype of *F. brevipila* were received on loan from WU and compared with the lectotype of *F. trachyphylla* (Hack.) Kraj. (Table 4). These specimens bear a remarkable resemblance to one another in all of Tracey's diagnostic characters, including the variability of stomatal length, and there seems little justification for their separation taxonomically. This being so, *F. brevipila* becomes the oldest legitimate name for the taxon at the species level and so replaces the illegitimate *F. trachyphylla* (Hack.) Kraj.

MORPHOLOGICAL VARIATION

Plants densely to loosely tufted; vegetative shoots all intravaginal and retaining or shedding old leaves. Culms (9-)30-47(-72)cm, erect, (0.3-)0.38-0.62(-0.74)mm wide below the first panicle node, smooth or scabrid distally, grooved; nodes 2(-3), the uppermost not pruinose, visible beyond subtending sheath or not, and reaching (8.5-)11-20(-32)% of the height of the plant.

Leaves green, occasionally glaucous, usually subpruinose. Leaf-sheaths (1.3-)1.7-4.2(-4.9)cm, fused for (6.5-)13-32(-39)% of their length, smooth or scabridulous in distal third, usually laxly hairy but sometimes glabrous; auricles short, minutely ciliate. Leaf-blades robust to fairly robust,

TABLE 4. COMPARISON OF TWO TYPE SPECIMENS OF *F. brevipila* AND LECTOTYPE OF *F. OVINA* SUBVAR. *TRACHYPHYLLA*

Character	<i>F. brevipila</i> holotype	<i>F. brevipila</i> isotype	<i>F. ovina</i> subvar. <i>trachyphylla</i> lectotype
1. <i>Diagnostic characters</i>			
Culm height (cm)	(16-)30(-36)	(25-)32(-46)	(20-)26(-32)
Panicle length (cm)	(3.5-)6.0(-7.0)	(4.5-)6.5(-7.5)	(4.5-)6.0(-7.0)
No. of spikelets per panicle	(15-)21(-31)	(13-)21(-34)	(15-)20(-24)
Spikelet length (mm)	(7.0-)7.6(-8.2)	(6.3-)6.8(-7.1)	(6.9-)7.2(-7.5)
Leaf-blade length (cm)	(2.5-)5.5(-7.5)	(7.0-)9.0(-13.0)	(4.5-)6.0(-7.5)
Stomatal length (μ m)	(42.5-)46.9(-50)	(42.5-)45(-48.8)	(33.75-)38(-42.5)
2. <i>Other important characters</i>			
Lemma length (mm)	(4.2-)4.9(-5.3)	(4.1-)4.4(-4.6)	(3.9-)4.2(-4.4)
Awn length (mm)	(0.6-)1.9(-3.0)	(1.1-)1.7(-2.3)	(0.3-)1.6(-2.2)
Sclerenchyma in leaf-blade	3 islets	3 islets	3 islets
No. of leaf-blade veins	7(-8)	7-8	7
No. of leaf-blade furrows	4(-6)	4	4

(3.7-)5.5-15(-19.2)cm, (6-)14-54(-89)% on each plant curved at the tip, scabrid at least in the upper third, usually hairy at base, but sometimes glabrous.

Panicles erect to nodding, (3.5-)4.2-8.8(-9.5) cm, with (10-)14-28(-39) spikelets. Panicle branches subpruinose or not pruinose, not narrowing below the spikelets, smooth to scabrid, covered in hairs or prickles, rarely subglabrous; 1st and 2nd panicle nodes (0.89-)1.3-2.6(-4.3)cm apart. Spikelets subpruinose or not, (6.1-)6.4-8.0(-8.5)mm, with (2-)3-6(-7) florets (plus one sterile floret); pedicels (1.2)1.5-2.6(2.8)mm. Glumes unequal; the lower subulate to narrowly lanceolate, (2-)2.5-3.1(-3.3) \times (0.45-)0.58-0.8(-0.88)mm, usually glabrous or scabrid at tip but rarely weakly hairy, 1-veined, with a ciliate or serrate margin; the upper narrowly lanceolate to lanceolate, (3.3-)3.6-4.5(-4.7) \times (1-)1.2-1.45(-1.6)mm, usually scabrid near apex but occasionally hairy or glabrous, 3-veined, with a ciliate margin. Lemmas lanceolate, (3.9-)4.2-5.1(-5.5) (excluding awn) \times (1.5-)1.6-2.1(-2.5)mm, green but sometimes purple at apex, with awns (1.2-)1.45-2.3(-2.6)mm, 5-veined, usually hairy or scabrid on distal half, but occasionally glabrous. Paleas linear-lanceolate, (3.8-)4.1-5.0(-5.3) \times (0.68-)0.8-0.9(-1.0)mm. Anthers yellow or purple, (1.9-)2.1-2.9 mm.

Leaf-blade anatomy (Fig. 2): outline of leaf-blades usually V-form but occasionally V-oval; margins not infolded; leaf-blade diameter (0.59-)0.74-0.93(-1.1)mm; diameter/thickness ratio 2.15-2.5(-2.75); veins (5-)7-9; sclerenchyma usually forming three tailing islets at midrib and margins, 1-4 cells thick, often with smaller islets opposite veins (1 cell thick), rarely forming a complete ring much thickened at margins and midrib; 4(-6) grooves and 3-5 ridges on the adaxial surface; adaxial midrib (0.85-)0.9-1.6(-1.8)mm wide and (0.03-)0.04-0.07mm deep; adaxial epidermal cells of fairly uniform size, usually lacking bulliform cells but occasionally with small bulliform cells in grooves, with prickles (2.7-)5-13(-15) μ m.

Leaf-blade adaxial epidermis: stomata (37.8-)40.3-48.3(-50.5) μ m, predominantly solitary, 52-80(-100)% solitary, (0-)3-16(-29)% with an accompanying prickle-cell, (0-)3-16(-29)% with an accompanying silica-cell; prickles predominantly solitary, (44-)53-97(-100)% solitary, 0-19(-53)% forming short rows of 2 or more prickle-cells, 0-35(-50%) with an accompanying silica-cell.

Leaf-blade abaxial epidermis: stomata absent; long-cells (101-)112-200(-212) μ m; silica-cells and cork-cells present; prickles present or absent.

DISTRIBUTION

At present, we have relatively little information concerning the distribution of either *F. brevipila* or *F. lemanii*.

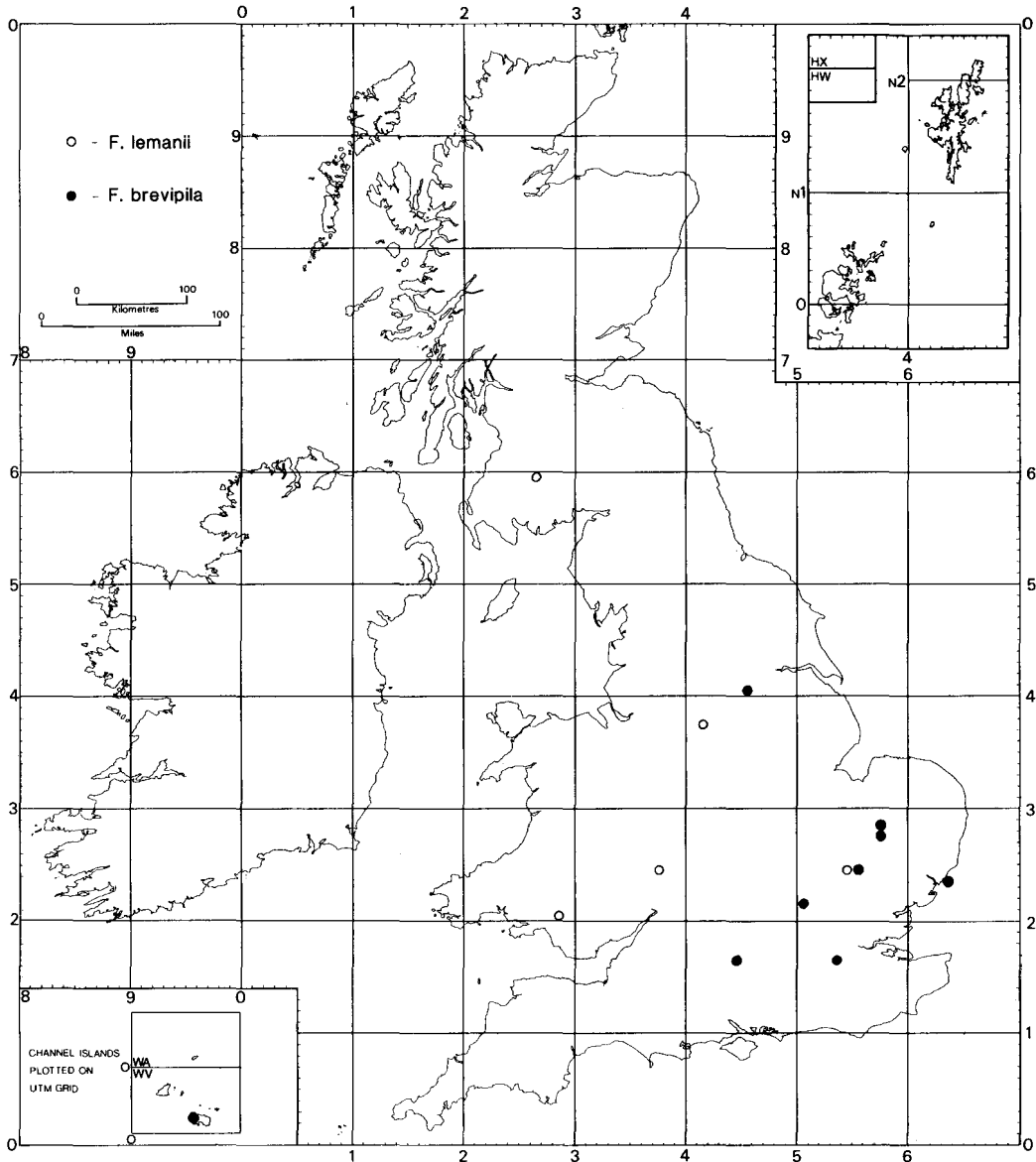


FIGURE 3. Geographical distribution of *Festuca lemanii* Bastard (○) and *F. brevipila* Tracey (●).

In Britain, *F. brevipila* appears to be most common in southern and central England, extending to South-West Yorkshire (v.c. 63) and westwards to Salop (v.c. 39). We have also collected a single specimen from a car-park in Jersey. Records have been made from the following vice-counties: 17, 19, 20, 21, 22, 25, 26, 28, 29, 30, 39, 55, 63. A distribution map is given in Fig. 3.

It is highly unlikely that *F. brevipila* is native to the British Isles. It has probably been introduced during the past 200 years as a commercial turf-grass species for roadside verges and railway embankments, and it is still available commercially as several cultivars of 'Hard Fescue'. It does not grow in its natural habitat in the British Isles. It is native to central Europe, but is also introduced in France and in much of Scandinavia.

Our records of *F. lemanii* are even less complete. Specimens have been observed from scattered sites in England, Scotland and Wales. Kirkcudbright, Scotland (v.c. 73) marks its northern limit and Glamorgan, Wales (v.c. 41) its western limit. Unlocalised specimens suggest that it may also be most common in southern and eastern England. It has been recorded with certainty from vice-counties 19, 37, 41, 57 and 73. A distribution map is given in Fig. 3.

F. lemanii is commonly found growing in more natural habitats, together with *F. ovina* subsp. *ovina*, subsp. *hirtula* (Hack. ex Travis) M. Wilkinson and/or subsp. *ophioliticola* (Kerguélen) M. Wilkinson, and it is likely to be native in the British Isles. It has a wide range of habitat preferences and has been found growing on both acidic and calcareous soils.

In Europe, *F. lemanii* extends through Belgium, France and Spain (Markgraf-Dannenberg 1980).

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