

Taxonomic Results of the BRYOTROP Expedition to Zaire and Rwanda

14. Sphagnaceae

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Six species and one variety of *Sphagnum* have been recorded from Rwanda and Zaire. Three of these were collected during the BRYOTROP field studies and are annotated below. A key is given to all the species known to occur in the region with the addition of one extra species (*S. truncatum* Hornsch.) which is likely, on ecological and distributional grounds, to be found there in the future.

Authorship and complete synonymies are given in Eddy (1985).

Key to the species recorded from Zaire and Rwanda:

1 Branch leaves linear to linear-lanceolate, mainly more than three times as long as wide2
 1* Branch leaves ovate to lanceolate, mainly less than 2.5 times as long as wide.....3
 2 All except extreme basal branch leaves linear. Stem leaves with conspicuous patches of prosenchymatous tissue at base..*S. cuspidatum*

2* Distal branch leaves linear, lower leaves lanceolate. Stem leaves without basal patches of prosenchymatous tissue
*S. planifolium* var. *angustilimbatum*
 3 Plants robust with sharply dissimilar spreading and pendent branches. Leucocysts of branch leaves mainly more than 40 µm wide.
*S. strictum* Sull. subsp. *pappeanum*
 3* Plants robust or slender but branches not sharply dissimilar (pendent branches may be weaker but not of different form to spreading branches). Leucocysts of branch leaves mainly less than 30 µm wide.....4
 4 Apices of branch leaves concave and eroded, without clearly defined apical teeth
*S. africanum*
 4* Apices of branch leaves either truncate and conspicuously dentate or "pinched" and apparently acute.....5
 5 Leucocysts of branch leaves mainly less than 6 times longer than wide in mid leaf, always with

abundant ringed pores on the abaxial side; mid-line pores often present. Stem hyaloderm usually with large single pores*S. davidii*

5* Leucocysts of branch leaves mainly more than 7 times longer than wide in mid leaf, abaxial pores usually sparse or absent; never with mid-line pores. Stem hyaloderm lacking pores.

.....6
6 Stem leaves broad and fimbriate at apex; leucocysts devoid of fibrils.....*S. cuspidatulum*

6* Stem leaves approximately triangular in outline with narrow, erose or cucullate apex or truncate and dentate like the branch leaves; at least upper leucocysts fibrose. Abaxial surface of branch-leaf leucocysts without, or with very few pores; plants usually large and flaccid.....

.....*S. planifolium* var. *planifolium*

7* Abaxial surface of branch-leaf leucocysts with numerous to abundant ringed pores; plants flaccid or compact.....8

8 Branch leaves widely truncate and 7 - 12-dentate at apex. Stem hyaloderm of a single layer of well-defined leucocysts.....

.....*S. truncatum*

8* Stem hyaloderm of mainly 2 - 3 layers of leucocysts that tend to intergrade with the internal sclereids...*S. planifolium* var. *rugegensis*

Sphagnum L.

Abbreviations::

For a revision and full synonymy of the African species, see Eddy 1985

KB: Kahuzi-Biega (Zaire)

Ka: Karisimbi (Rwanda)

Ny: Nyungwe Forest (Rwanda)

Ak: Akagera region (Rwanda)

Ki: Kigali region (Rwanda)

100-171, number of collecting site.

For locality data and a description of the collecting sites see the contribution by E. Fischer on the vegetation of the study area in this volume (Tropical Bryology 8: 13-37, 1993). The specimens are deposited at the Botanical Museum Berlin as well as in the herbarium of the author (except for

Sphagnum davidii Warnst. Fig. 1.

(*S. chevalieri* Warnst.; *S. afro-crassicladum* Dixon & Sherrin).

This species is recognised by its small dimensions, ovate, very concave branch leaves which are smaller than the lingulate stem leaves, and by the relatively short and wide (for Sect. Subsecunda) leucocysts that have many commissural ringed pores on the abaxial side. Free central pores are frequent (up to 3 per cell) in this species and its closest relatives and are a useful character, when present. *S. davidii* is closely related to *S. capense* Hornsch. from which it differs principally in having 5 - 6 branches per fascicle (3 - 4 in *S. capense*) and in having centrally disposed chlorocysts (abaxially displaced in *S. capense*). *S. ceylonicum* Warnst., which occurs in E. Africa, has adaxially displaced chlorocysts and usually rather longer and narrower branch leaves.

Sphagnum davidii grows in a variety of base poor, wet habitats in which there is not too heavy competition from other plant life, hence is found most frequently on shallow humus on the ground or on wet rocks on cliffs and by streams. One collection, *Frahm 7699*, is exceptional in being corticolous in "elfin-forest-like *Syzygium* stand and *Erica* heath". Although no species of *Sphagnum* can be classed as normally epiphytic, a number of species can occupy epiphytic habitats provided basic parameters of acidity and water regimen are satisfied; the genus lacks any means of attachment to a host plant which would characterize a "normal" epiphyte. The ecology of *S. davidii* closely parallels that of its near relative, *S. capense* Hornsch, although the latter descends to lower altitudes within its range which does not extend into Zaire and Rwanda. The BRYOTROP gatherings range from 1300 to 3400 m altitude.

S. davidii is most frequent in Zaire and Rwanda but is one of the more widespread taxa in Africa,

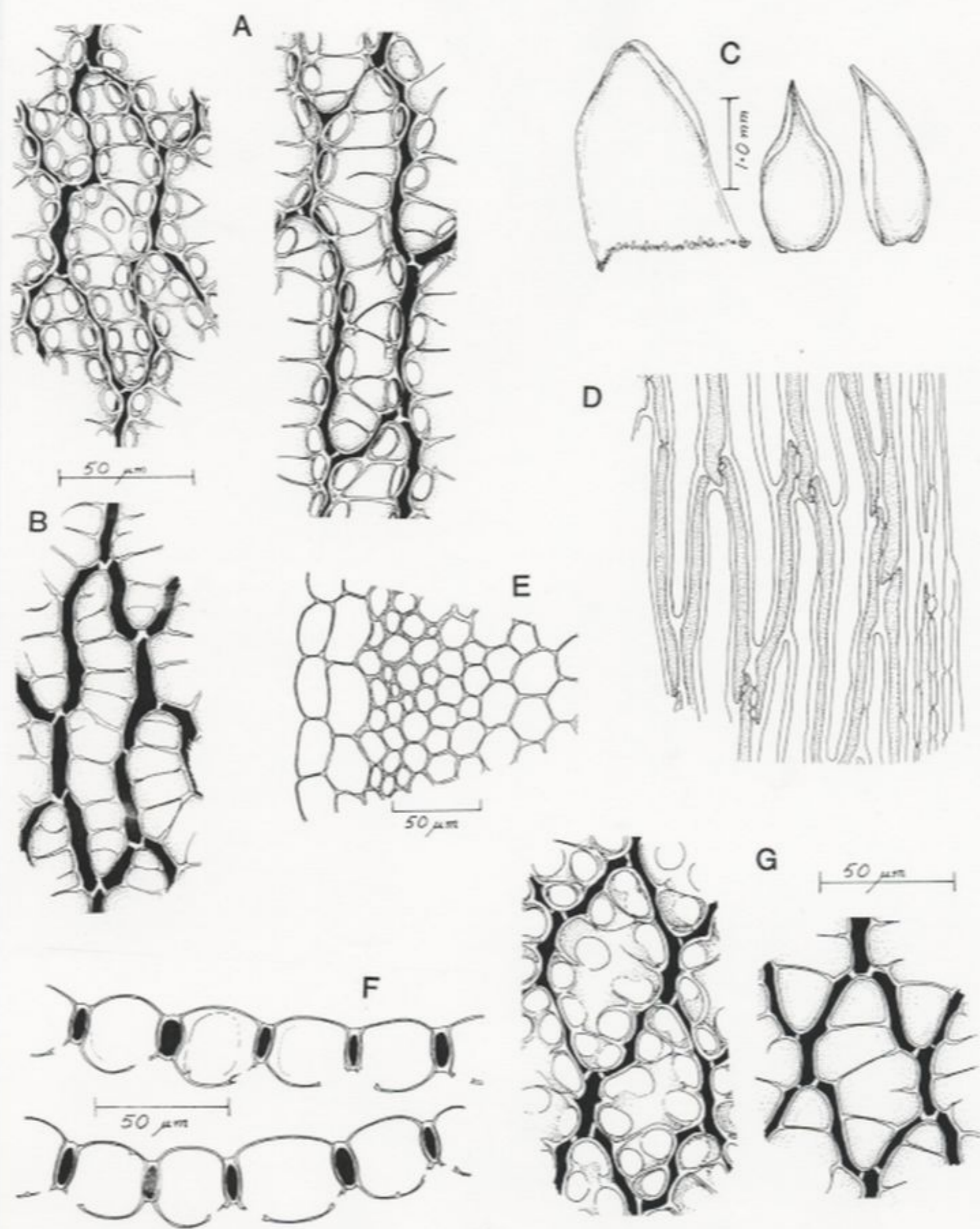


Fig. 1. *Sphagnum davidii* A: abaxial surface of upper (left figure) and lower-mid leaf (right figure); B: adaxial surface of branch leaf; C: stem leaf (left) and branch leaves; D: basal margin of stem leaf; E: transverse section of stem; F: transverse section of branch leaf; G: abaxial (left) and adaxial (right) surface of upper part of stem leaf. All drawn from Fischer 8336.

exhibiting wide variation. The BRYOTROP specimens vary comparatively little in their morphology.

Ny: 106, *Pócs* 6234, 6235; *Frahm* 6282. **KB:** 125, *Pócs* 6746, 132, *Frahm* 6933, 148, *Frahm* 7698, 7699. **Ka:** 159, *Frahm* 8264, 167, *Fischer* 8336.

Sphagnum planifolium C. Müll. Figs 2, 3.

This extremely variable species can normally be recognised by its pallid or green colour in which secondary pigments are absent. Robust forms are characteristically larger than *S. cuspidatum* and have broader branch leaves; weaker plants may strongly resemble the latter species, but their stem leaves are almost completely fibrillose and lack the expanded patches of linear cells that are present in *S. cuspidatum*. Emergent plants from drier and more exposed habitats at high altitudes may have stem leaves very like those of *S. cuspidatum* but have more the habit of *S. recurvum* P. Beauv. (not recorded from Africa) or *S. cuspidatulum*. They have lanceolate, 5-ranked branch leaves, but differ from the latter species in having larger, part fibrillose stem leaves which are not fimbriate at apex.

Sphagnum planifolium is a sub-aquatic species of oligotrophic mires and pool margins, occurring either as pure stands or mixed with other acidophilous plants. The species is endemic to Africa and the East African islands but widespread within the continent south of the Sahara. It is extremely polymorphic within this range, reacting to altitude, immersion and probably other environmental variables, and is itself genetically heterogeneous.

The specimens collected for BRYOTROP show a degree of the variation of which the species is capable but only *Pócs* 6028 is sufficiently marked to warrant distinction at a named infraspecific level (below). They were found at altitudes ranging from 2350 to 3400 m altitude, although the species has been recorded both higher and lower elevations elsewhere.

Ny: 101, *Pócs* 6003. **KB:** 129, *Pócs* 7060, 7064. **Ka:** 166, *Fischer* 8090.

S. planifolium var. *rugegensis* (Warnst.) A. Eddy. Fig. 3,B.

(*S. rugegensis* Warnst.).

This differs from the type variety in its more compact habit, with shorter and much more porose branch leaves. The specimen cited below, from the type locality, fits reasonably well with the variety, although less well marked than in the type gathering.

Ny: 101, *Pócs* 6028.

Sphagnum strictum Sull. subsp. *pappeanum* (C. Müll.) A. Eddy Figs 4, 5.

(*S. pappeanum* C. Müll.; *S. sparsifolium* Warnst. *S. mildbraedii* Warnst.).

This species is easily recognised by its robust dimensions, large, squarrose branch leaves and strongly modified pendent branches, in combination with very small, strongly reduced stem leaves. It is reportedly monoecious and frequently fertile, in contrast to the other species of the region in which fruit is rare.

Sphagnum strictum is a plant of wet acid heathland in highly oceanic situations and, in Africa, occurs principally in the Cape Peninsula and the mountains of East Africa, rarely being found below 2750 m altitude at these latitudes.

The differences between *S. strictum* subsp. *strictum* and subsp. *pappeanum* are slight and mainly quantitative, and the BRYOTROP gatherings would be virtually impossible to separate from the former. However, I think it more probable that the Kivu specimens are to be regarded as slightly underdeveloped states of subspecies *pappeanum* rather than a disjunct occurrence of subsp. *strictum*. The internal commissural papillae which are normally evident in African gatherings are very faint in *Frahm* 6927 and apparently lacking in *Pócs* 7661.

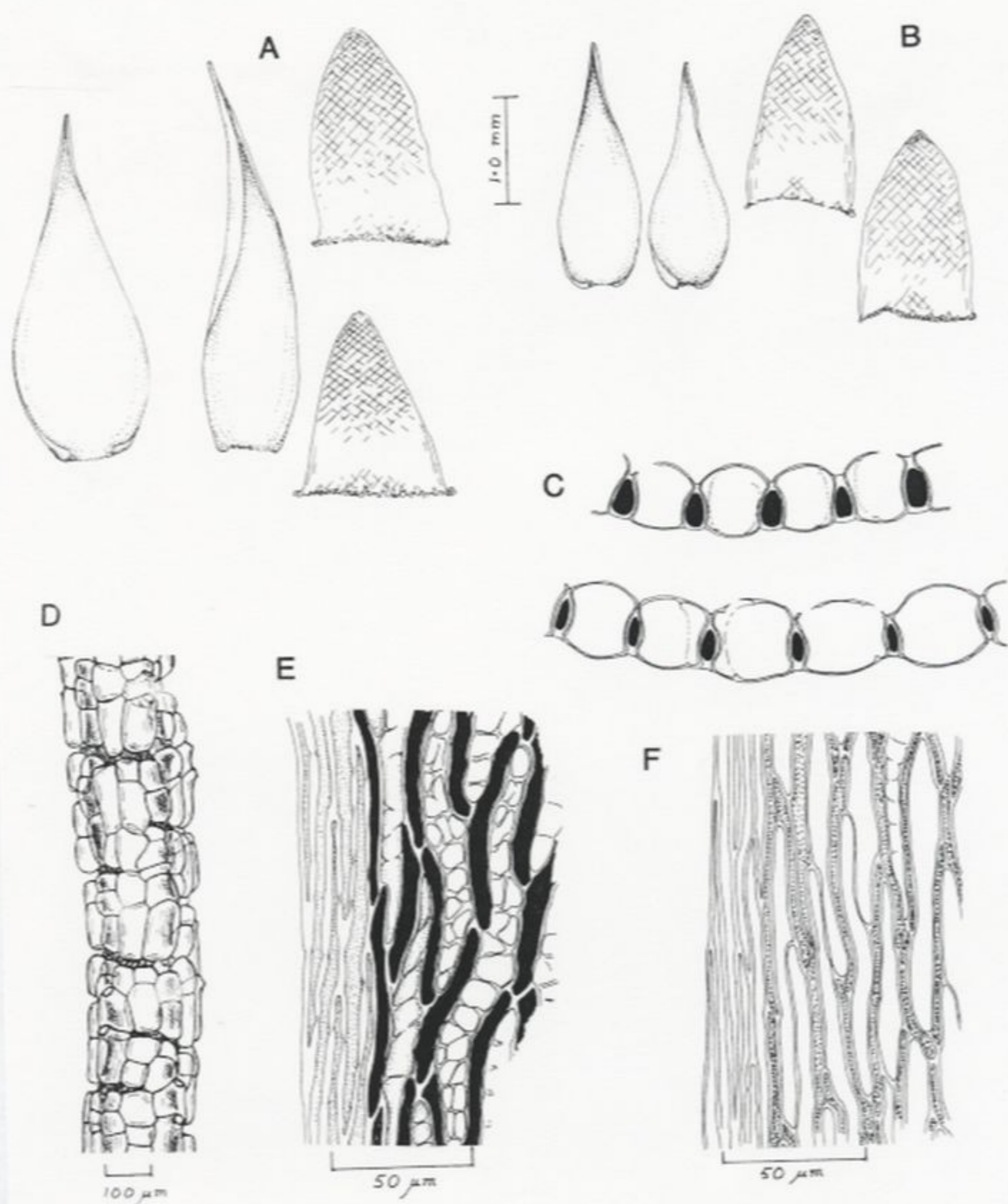


Fig. 2. *Sphagnum planifolium* A, B: branch leaves and stem leaves (cross hatching represents degree of fibrillation of stem leaves); C: transverse section of branch leaf; D: defoliated branch axis; E: margin of branch leaf; F: basal margin of stem leaf. C (upper figure) and B drawn from Pócs 7060, the rest from Pócs 7064.

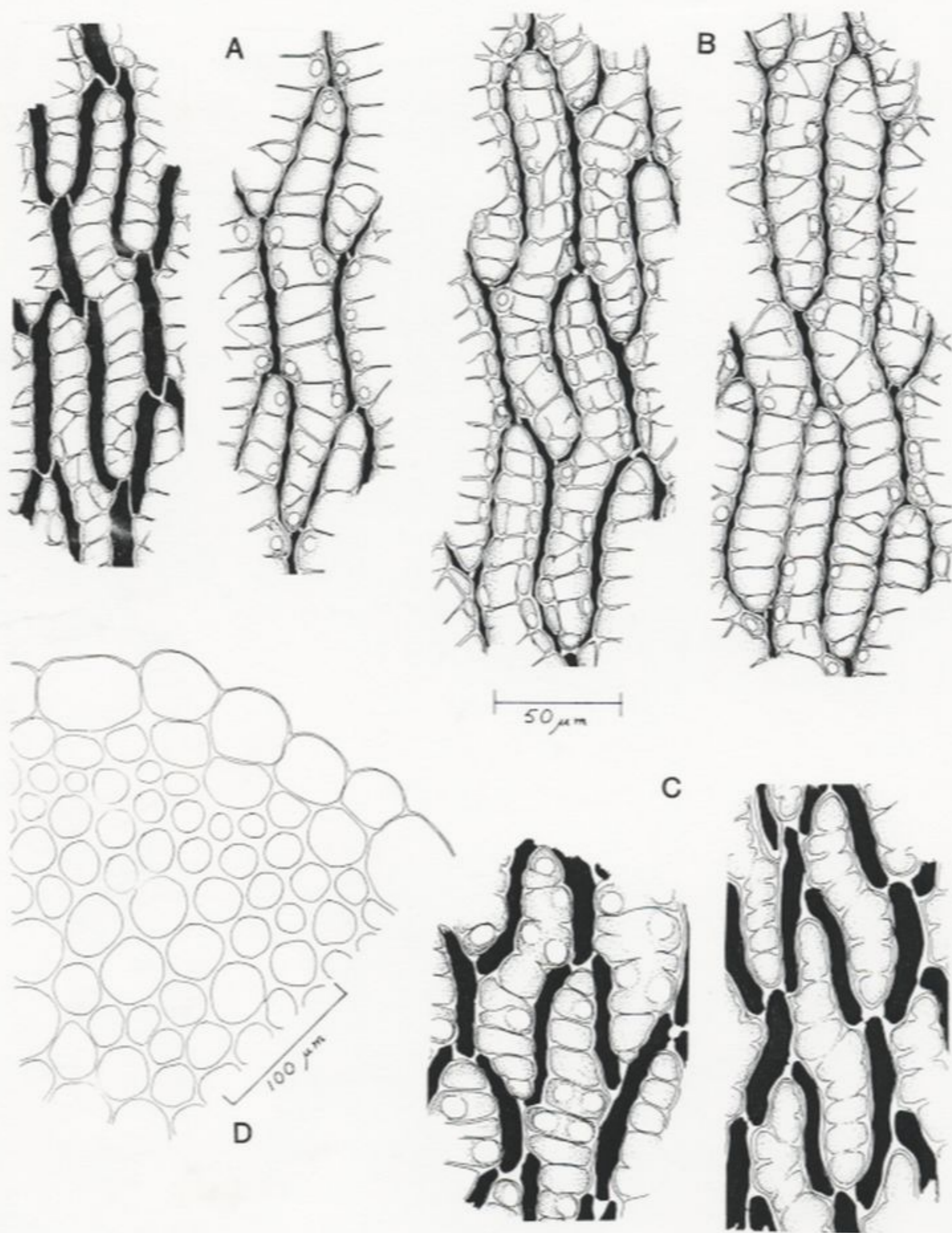


Fig. 3. *Sphagnum planifolium* A, B: abaxial (left figs) and adaxial (right figs) surface of branch leaf; C: adaxial (left) and abaxial (right) surface of upper part of stem leaf; D: transverse section of stem. B drawn from Pócs 6028, var. *rugegense* the remainder from Pócs 7064.

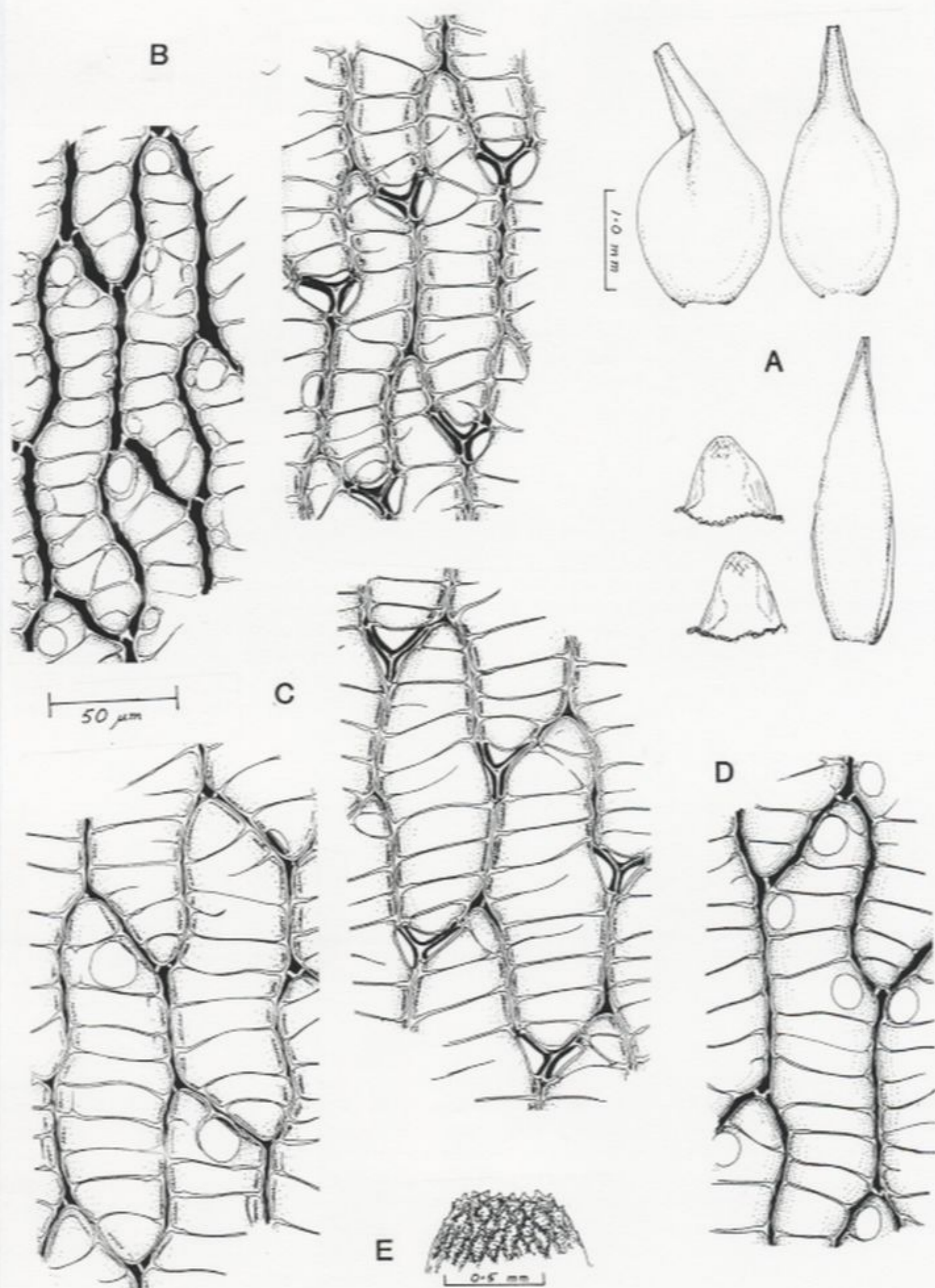


Fig. 4. *Sphagnum strictum* subsp. *pappeanum*

A: branch leaves (above) stem leaves and pendant branch leaf; B, C: abaxial (left figs) and adaxial (right figs) surface of branch leaf (at 1/3 from apex); D: abaxial surface of pendant-branch leaf; E: branch-leaf apex. A drawn from *Pócs* 7661, the rest from *Frahm* 6297.

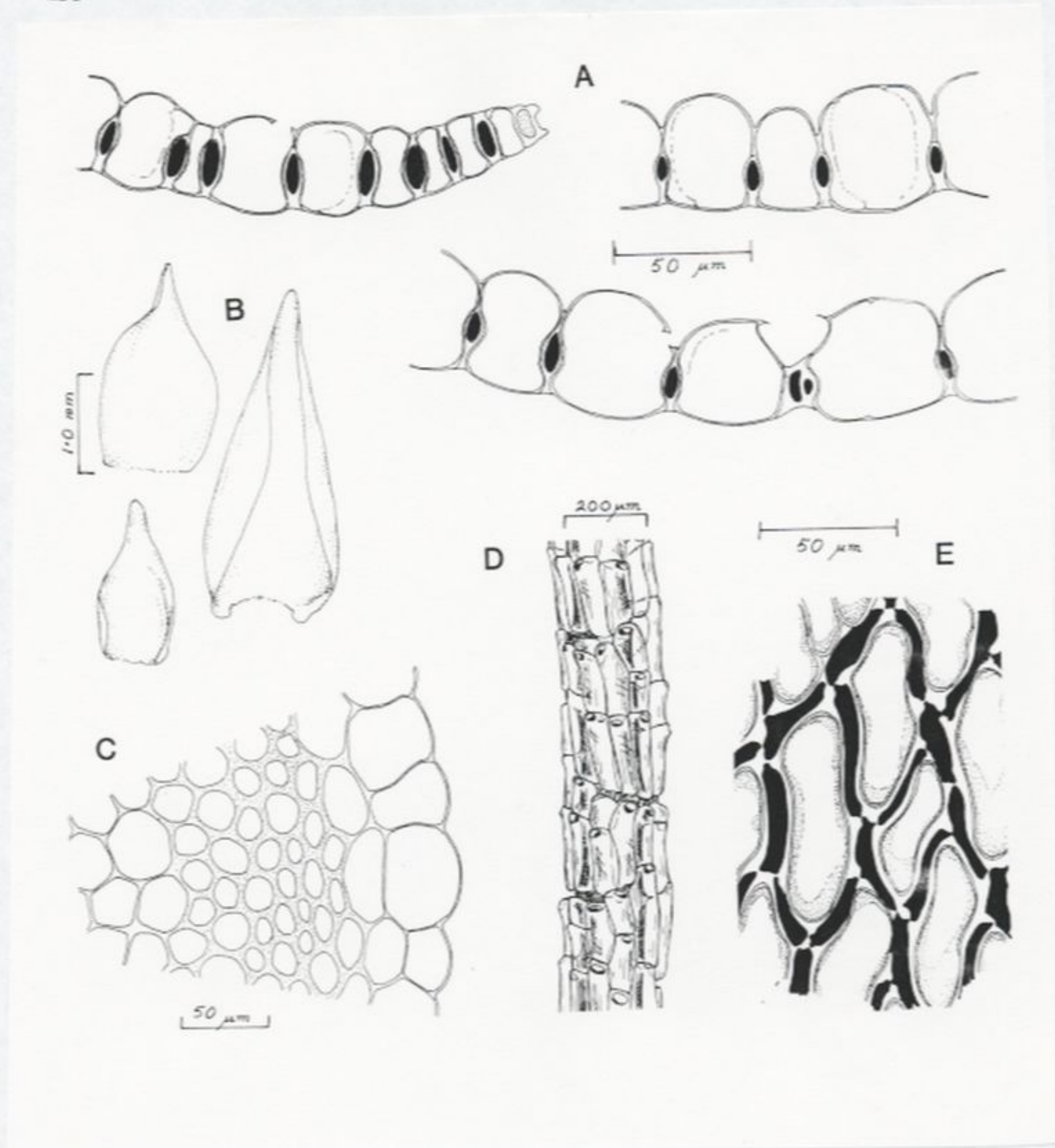


Fig. 5. *Sphagnum strictum* subsp. *pappeanum*

A: transverse section of branch leaf; B: female bracts (innermost the largest); C: transverse section of stem; D: defoliated branch axis; E: adaxial surface of stem leaf (at mid leaf). All drawn from *Frahm 6297*.

KB: 132, *Frahm 6927*, 149, *Pócs 7661*.

General note.

The area covered by the BRYOTROP expedition may be regarded as the southern limit of the afro-montane region of Ruwenzori (see, e.g. White, 1978). This region, as far as *Sphagnum* populations are concerned, has been effectively isolated from other afro-montane areas since the Miocene period (c. 19 my). Compared to many moss groups, the genus as a whole, with a few possible exceptions, shows little geographical mobility and the expedition collections could be regarded as a sample of relict late Cretaceous survivors (discussed briefly in Eddy, 1985). Ruwenzori/Usambara has been suggested as the centre of diversification of *S. davidii*, and probably also *S. planifolium*, both African endemics. In contrast, *S. strictum* subsp. *papeanum* occurs as part of a pan-tropical range.

A duplicate set of all of the specimens cited below is deposited in BM, for which thanks are due to Dr Jan-Peter Frahm, Universität Duisburg and the various members of the BRYOTROP team.

References.

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