

**PART 2**

**FIGURES, PHOTOGRAPHIC AND SEM  
MICROGRAPHIC PLATES  
AND DISTRIBUTION MAPS**

## INDEX TO ILLUSTRATIONS, PLATES AND DISTRIBUTION MAPS

Genera and species are arranged alphabetically.

(The literature was consulted for the distribution of most cosmopolitan and subcosmopolitan species)

### *Riccia alatospora*

Fig. 28A-F	line drawings .....	145
Plate 14C, D	SEM micrographs of spores.....	178
Map 29	distribution.....	200

### *R. albolimbata*

Fig. 15A-H	line drawings.....	132
Plate 1D	photograph of thalli.....	165
Plate 9C, D	SEM micrograph of spores.....	173
Map 16	distribution in southern Africa.....	193
Map 56	known distribution range.....	220

### *R. albomarginata*

Fig. 25A-F	line drawings.....	142
Plate 13A, B	SEM micrographs of spores.....	177
Map 25	distribution.....	198

### *R. alboporosa*

Fig. 18A-G	line drawings.....	135
Plate 10E, F	SEM micrographs of spores.....	174
Map 19	distribution.....	195

### *R. albornata*

Fig. 16G-L	line drawings.....	133
Plate 10A, B	SEM micrographs of spores.....	174
Map 18	distribution.....	194

### *R. albovestita*

Fig. 27F-K	line drawings.....	144
Plate 14A, B	SEM micrographs of spores.....	178
Map 28	distribution.....	199

<i>R. ampullacea</i>		
Fig. 26A-F	line drawings.....	143
Plate 13C, D	SEM micrographs of spores.....	177
Map 26	distribution.....	198
<i>R. angolensis</i>		
Fig. 10A-G	line drawings.....	127
Plate 7C, D	SEM micrographs of spores.....	171
Map 10	distribution in southern Africa.....	190
Map 51	known distribution range.....	215
<i>R. argenteolimbata</i>		
Fig. 16A-F	line drawings.....	133
Plate 1E	photograph of thalli.....	165
Plate 9E, F	SEM micrographs of spores.....	173
Map 17	distribution in southern Africa.....	194
Map 57	known distribution range.....	221
<i>R. atropurpurea</i>		
Fig. 6A-H	line drawings.....	123
Plate 6A, B	SEM micrographs of spores.....	170
Map 6	distribution in southern Africa.....	188
Map 48	known distribution range.....	212
<i>R. bicolorata</i>		
Fig. 19A-G	line drawings.....	136
Plate 11A, B	SEM micrographs of spores.....	175
Map 20	distribution.....	195
<i>R. bullosa</i>		
Fig. 37A-F	line drawings.....	154
Plate 17E, F	SEM micrographs of spores.....	181
Map 37	distribution.....	204
<i>R. cavernosa</i>		
Fig. 35G-M	line drawings.....	152
Plate 17A, B	SEM micrographs of spores.....	181
Map 35	distribution in southern Africa.....	203
Map 59	known distribution range.....	223
<i>R. concava</i>		
Fig. 30A-H	line drawings.....	147
Plate 15A, B	SEM micrographs of spores.....	179
Map 30	distribution.....	200
<i>R. congoana</i>		
Fig. A-F	line drawings.....	125
Plate 1C	photograph of thalli.....	165
Plate 6E, F	SEM micrographs of spores.....	170
Map 8	distribution in southern Africa.....	189
Map 50	known distribution range.....	214

<i>R. crozalsii</i>		
Fig. 2A-D	line drawings.....	119
Plate 4C, D	SEM micrographs of spores.....	168
Map 2	distribution in southern Africa.....	186
Map 45	known distribution range.....	209
<i>R. crystallina</i>		
Fig. 35A-F	line drawings.....	152
Plate 16E, F	SEM micrographs of spores.....	180
Map 34	distribution in southern Africa.....	202
Map 58	known distribution range.....	222
<i>R. cupulifera</i>		
Fig. 36A-F	line drawings.....	153
Plate 3A	photograph of thalli.....	167
Plate 17C, D	SEM micrographs of spores.....	181
Map 36	distribution.....	203
<i>R. curtisii</i>		
Fig. 43A-E	line drawings.....	160
Plate 19E, F	SEM micrographs of spores.....	183
Map 41	distribution in southern Africa.....	206
Map 61	known distribution range.....	225
<i>R. elongata</i>		
Fig. 31A-G	line drawings.....	148
Plate 15C, D	SEM micrographs of spores.....	179
Map 31	distribution .....	201
<i>R. furfuracea</i>		
Fig. 33A-F	line drawings.....	150
Plate 16A, B	SEM micrographs of spores.....	180
Map 32	distribution.....	201
<i>R. garsidei</i>		
Fig. 38A-F	line drawings.....	155
Plate 18A, B	SEM micrographs of spores.....	182
Map 38	distribution.....	204
<i>R. hantamensis</i>		
Fig. 29A-G	line drawings.....	146
Plate 2D	photograph of thalli.....	166
Plate 14E, F	SEM micrographs of spores.....	178
Map 29	distribution.....	200
<i>R. hirsuta</i>		
Fig. 21A-G	line drawings.....	138
Plate 2B	photograph of thalli.....	166
Plate 11E, F	SEM micrographs of spores.....	175
Map 22	distribution.....	196
<i>R. limbata</i>		
Fig. 9A-H	line drawings.....	126
Plate 7A, B	SEM micrographs of spores.....	171
Map 9	distribution.....	190

<i>R. macrocarpa</i>		
Fig. 11G-L	line drawings.....	128
Plate 8A, B	SEM micrographs of spores.....	172
Map 12	distribution in southern Africa.....	191
Map 53	known distribution range.....	217
<i>R. mammifera</i>		
Fig. 4G-L	line drawings.....	121
Plate 5C, D	SEM micrographs of spores.....	169
Map 2	distribution.....	186
<i>R. microciliata</i>		
Fig. 3A-F	line drawings.....	120
Plate 1A	photograph of thalli.....	165
Plate 4E, F	SEM micrographs of spores.....	168
Map 3	distribution in southern Africa.....	187
Map 46	known distribution range.....	210
<i>R. montana</i>		
Fig. 17A-H	line drawings.....	134
Plate 1F	photograph of thalli.....	165
Plate 10C, D	SEM micrographs of spores.....	174
Map 19	distribution.....	195
<i>R. namaquensis</i>		
Fig. 24A-F	line drawings.....	141
Plate 2E	photograph of thalli.....	166
Plate 12E, F	SEM micrographs of spores.....	176
Map 24	distribution.....	197
<i>R. natalensis</i>		
Fig. 4A-F	line drawings.....	121
Plate 5A, B	SEM micrographs of spores.....	169
Map 4	distribution.....	187
<i>R. nigrella</i>		
Fig. 11A-F	line drawings.....	128
Plate 7E, F	SEM micrographs of spores.....	171
Map 11	distribution in southern Africa.....	191
Map 52	known distribution range.....	216
<i>R. okahandjana</i>		
Fig. 7A-H	line drawings.....	124
Plate 1B	photograph of thalli.....	165
Plate 6C, D	SEM micrographs of spores.....	170
Map 7	distribution in southern Africa.....	189
Map 49	known distribution range.....	213
<i>R. parvo-areolata</i>		
Fig. 27A-E	line drawings.....	144
Plate 2C	photograph of thalli.....	166
Plate 13E, F	SEM micrographs of spores.....	177
Map 27	distribution.....	199

<i>R. perssonii</i>		
Fig. 44A, B	line drawings.....	161
Plate 20A, B	SEM micrographs of spores.....	184
Map 41	distribution in southern Africa.....	206
Map 62	known distribution range.....	226
<i>R. pottsiana</i>		
Fig. 12A-H	line drawings.....	129
Plate 8C, D	SEM micrographs of spores.....	172
Map 13	distribution.....	192
<i>R. pulveracea</i>		
Fig. 34A-F	line drawings.....	151
Plate 2F	photograph of thalli.....	166
Plate 16C, D	SEM micrographs of spores.....	180
Map 33	distribution.....	202
<i>R. purpurascens</i>		
Fig. 42A-F	line drawings.....	159
Plate 3D	photograph of thalli.....	167
Plate 19C, D	SEM micrographs of spores.....	183
Map 40	distribution.....	205
<i>R. rosea</i>		
Fig. 14A-G	line drawings.....	131
Plate 9A, B	SEM micrographs of spores.....	173
Map 15	distribution in southern Africa.....	193
Map 55	known distribution range.....	219
<i>R. rubricollis</i>		
Fig. 40A-F	line drawings.....	157
Plate 18E, F	SEM micrographs of spores.....	182
Map 40	distribution.....	205
<i>R. runssorensis</i>		
Fig. 13A-G	line drawings.....	130
Plate 8E, F	SEM micrographs of spores.....	172
Map 14	distribution in southern Africa.....	192
Map 54	known distribution range.....	218
<i>R. schelpei</i>		
Fig. 46A-F	line drawings.....	163
Plate 3F	photograph of thalli.....	167
Plate 20E, F	SEM micrograph of spores.....	184
Map 43	distribution.....	207
<i>R. simii</i>		
Fig. 22A-F	line drawings.....	139
Plate 12A, B	SEM micrographs of spores.....	176
Map 22	distribution.....	196
<i>R. sorocarpa</i>		
Fig. 5A-G	line drawings.....	122
Plate 5E, F	SEM micrographs of spores.....	169
Map 5	distribution in southern Africa.....	188
Map 47	known distribution range.....	211

<i>R. stricta</i>		
Fig. 41A-I	line drawings.....	158
Plate 3C	photograph of thalli.....	167
Plate 19A, B	SEM micrographs of spores.....	183
Map 39	distribution.....	204
Map 60	known distribution range.....	224
<i>R. tomentosa</i>		
Fig. 45A-F	line drawings.....	162
Plate 3E	photograph of thalli.....	167
Plate 20C, D	SEM micrograph of spores.....	184
Map 42	distribution.....	206
<i>R. trachyglossum</i>		
Fig. 32A-F	line drawings.....	149
Plate 15E, F	SEM micrographs of spores.....	179
Map 32	distribution.....	201
<i>R. trichocarpa</i>		
Fig. 1A-D	line drawings.....	118
Plate 4A, B	SEM micrographs of spores.....	168
Map 1	distribution in southern Africa.....	186
Map 44	known distribution range.....	208
<i>R. villosa</i>		
Fig. 20A-E	line drawings.....	137
Plate 2A	photograph of thalli.....	166
Plate 11C, D	SEM micrographs of spores.....	175
Map 21	distribution.....	196
<i>R. vitrea</i>		
Fig. 23A-F	line drawings.....	140
Plate 12C, D	SEM micrographs of spores.....	176
Map 23	distribution.....	197
<i>R. volkii</i>		
Fig. 39A-F	line drawings.....	156
Plate 3B	photograph of thalli.....	167
Plate 18C, D	SEM micrographs of spores.....	182
Map 38	distribution.....	204
<i>Ricciocarpos natans</i>		
Fig. 47A-F	line drawings.....	164
Plate 21A, B	SEM micrographs of spores.....	185
Map 43	distribution in southern Africa.....	207
Map 63	known distribution range.....	227
Map 64	Number of species of <i>Riccia</i> endemic to southern Africa per degree square. ....	228

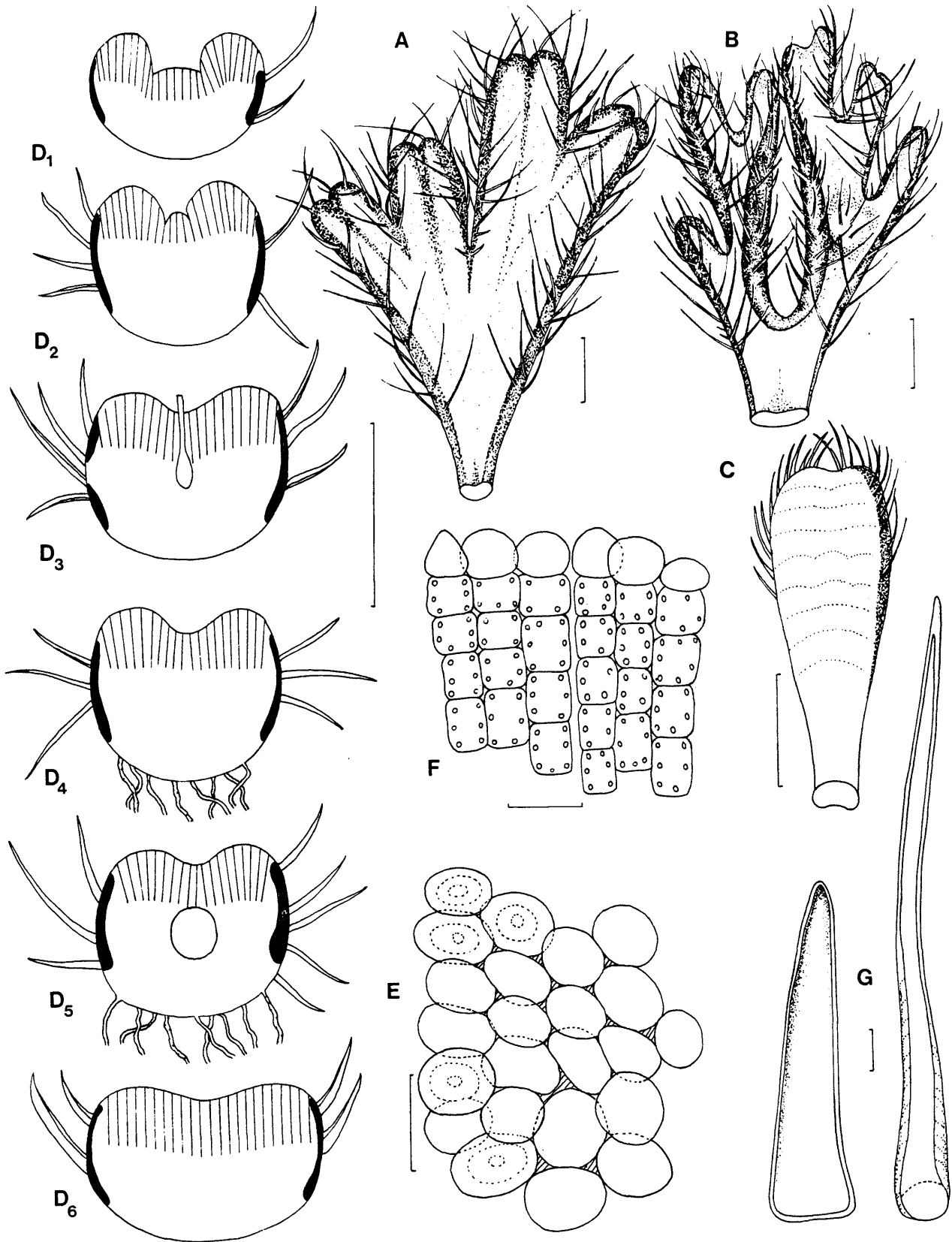


FIGURE 1.—*Riccia trichocarpa* (A–G): A, thallus wet; B, thallus dry; C, ventral face of branch; D, cross sections of branch at different distances from apex to basal part; E, epithelial cells and air pores (hatched), seen from above; F, epithelial and assimilation tissue cells in cross section; G, cilia: short and wide, long and slender. (A–G, Henderson 658). Scale bars A–D = 1 mm; E–G = 50 μm.



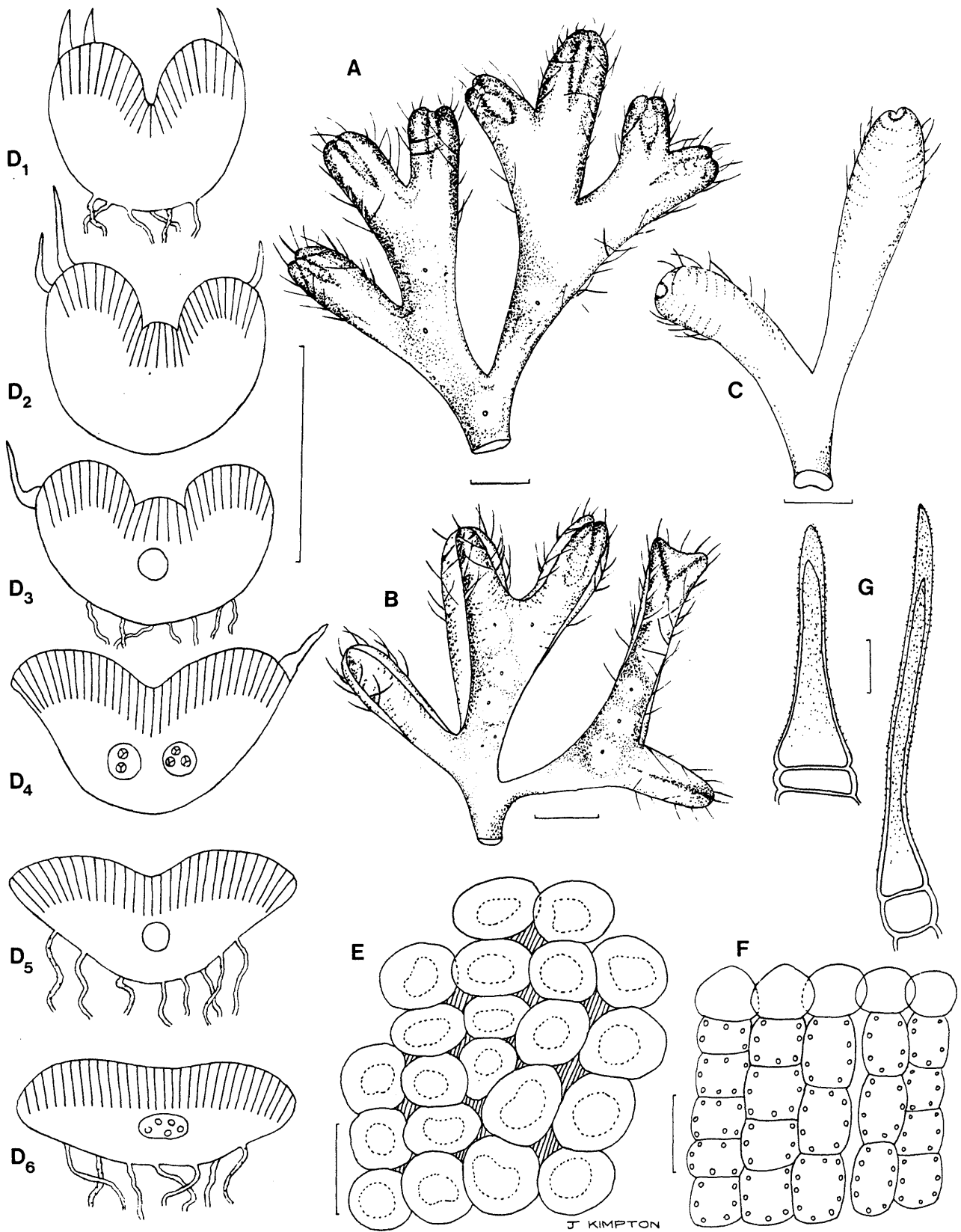


FIGURE 2.—*Riccia crozalsii* (A–G): A, thallus wet; B, thallus dry; C, ventral face; D, cross sections of branch at different distances from apex to basal part; E, epithelial cells and air pores seen from above; F, epithelial and assimilation tissue cells in cross section; G, cilia. (A–G, S.M. Perold 473). Scale bars A–D = 1 mm; E–G = 50 μm.

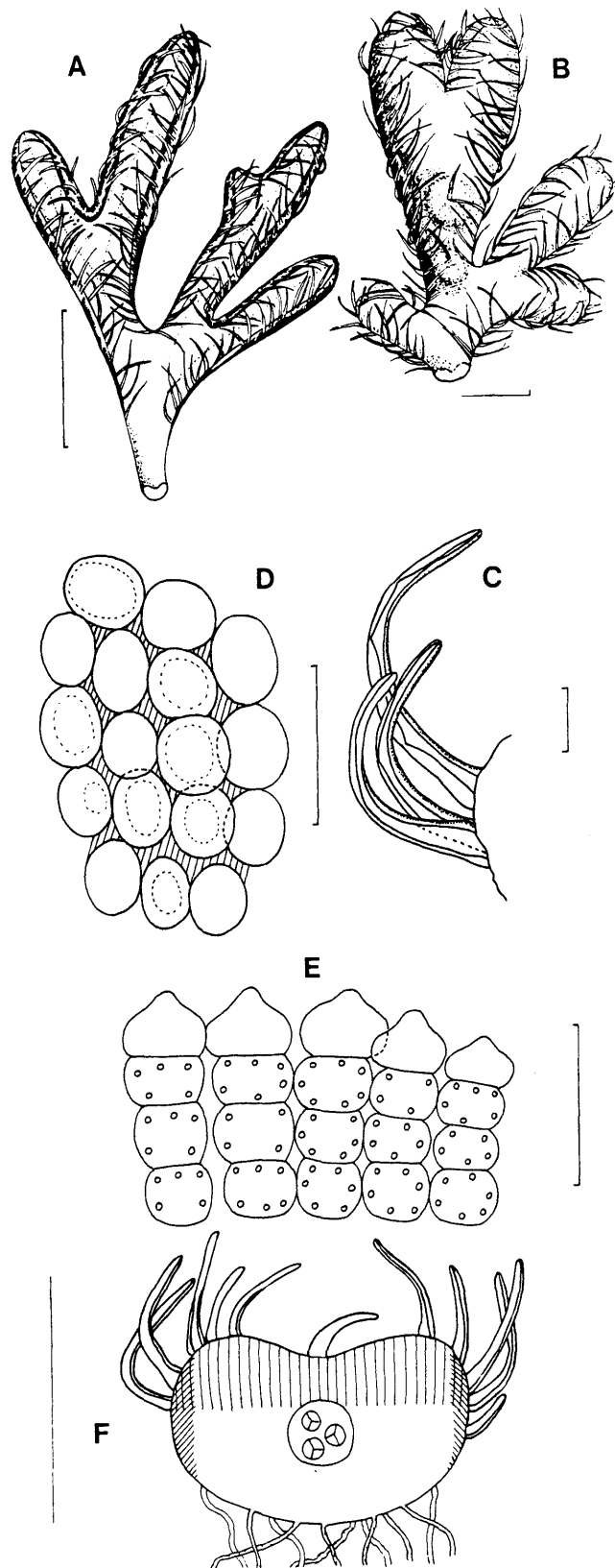


FIGURE 3.—*Riccia microciliata* (A–F): A, thallus dry; B, thallus wet; C, cilia at margin; D, epithelial cells and air pores seen from above; E, epithelial and assimilation tissue cells in cross section; F, cross section of branch. (A–F, *S.M. Perold* 1026). Scale bars A, B, F = 1 mm; C–E = 50 µm.

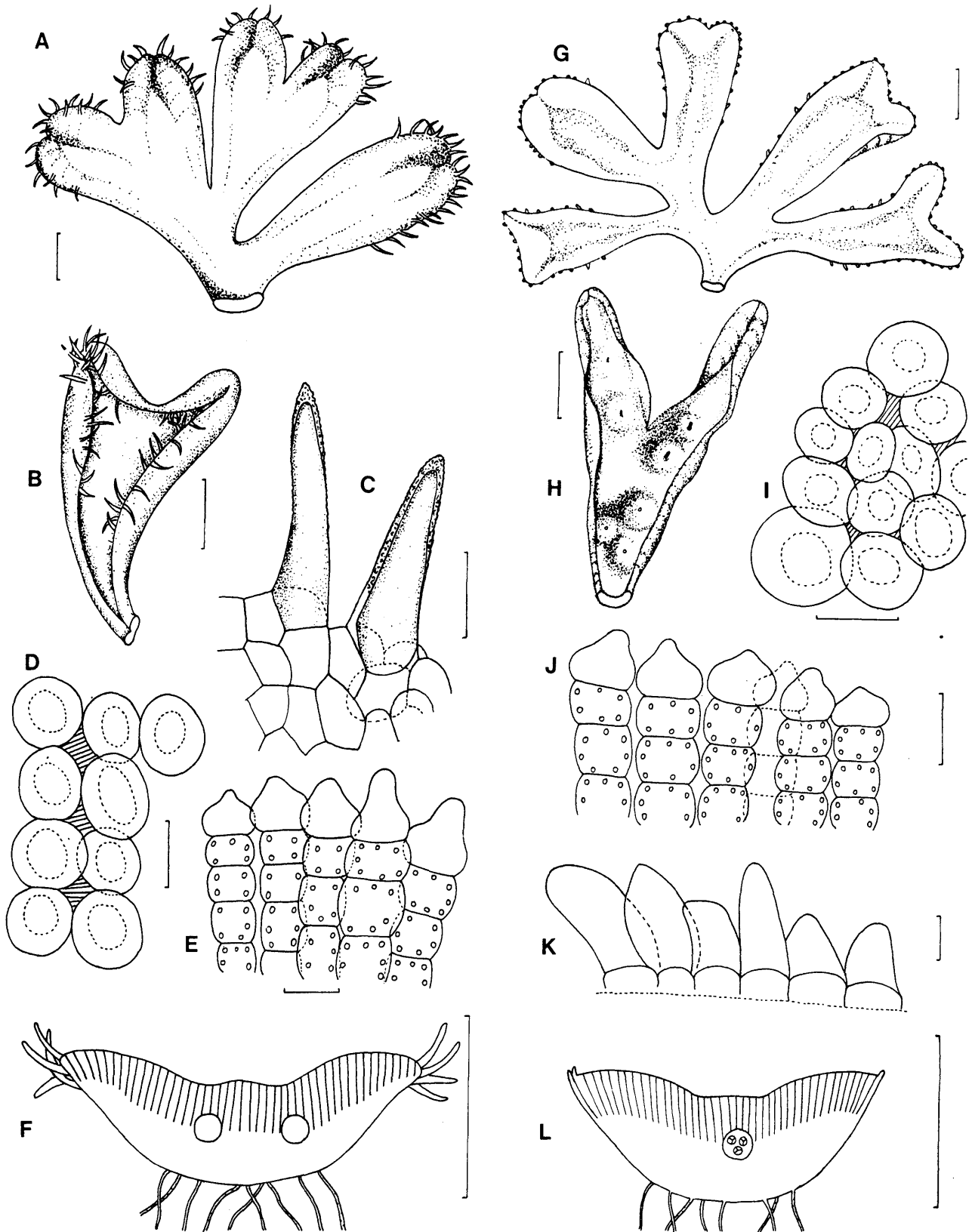


FIGURE 4.—*Riccia natalensis* (A–F): A, thallus wet; B, thallus dry; C, cilia at margin; D, epithelial cells and air pores seen from above; E, epithelial and assimilation tissue cells in cross section; F, cross section of branch. *R. mammifera* (G–L): G, thallus wet; H, thallus dry; I, epithelial cells and air pores seen from above; J, epithelial and assimilation tissue cells in cross section; K, marginal row of short cilia; L, cross section of branch. (A–F, S.M. Perold 1048; G–L, S.M. Perold 447). Scale bars A, B, F, G, H, L = 1 mm; C–E, I–K = 50  $\mu$ m.

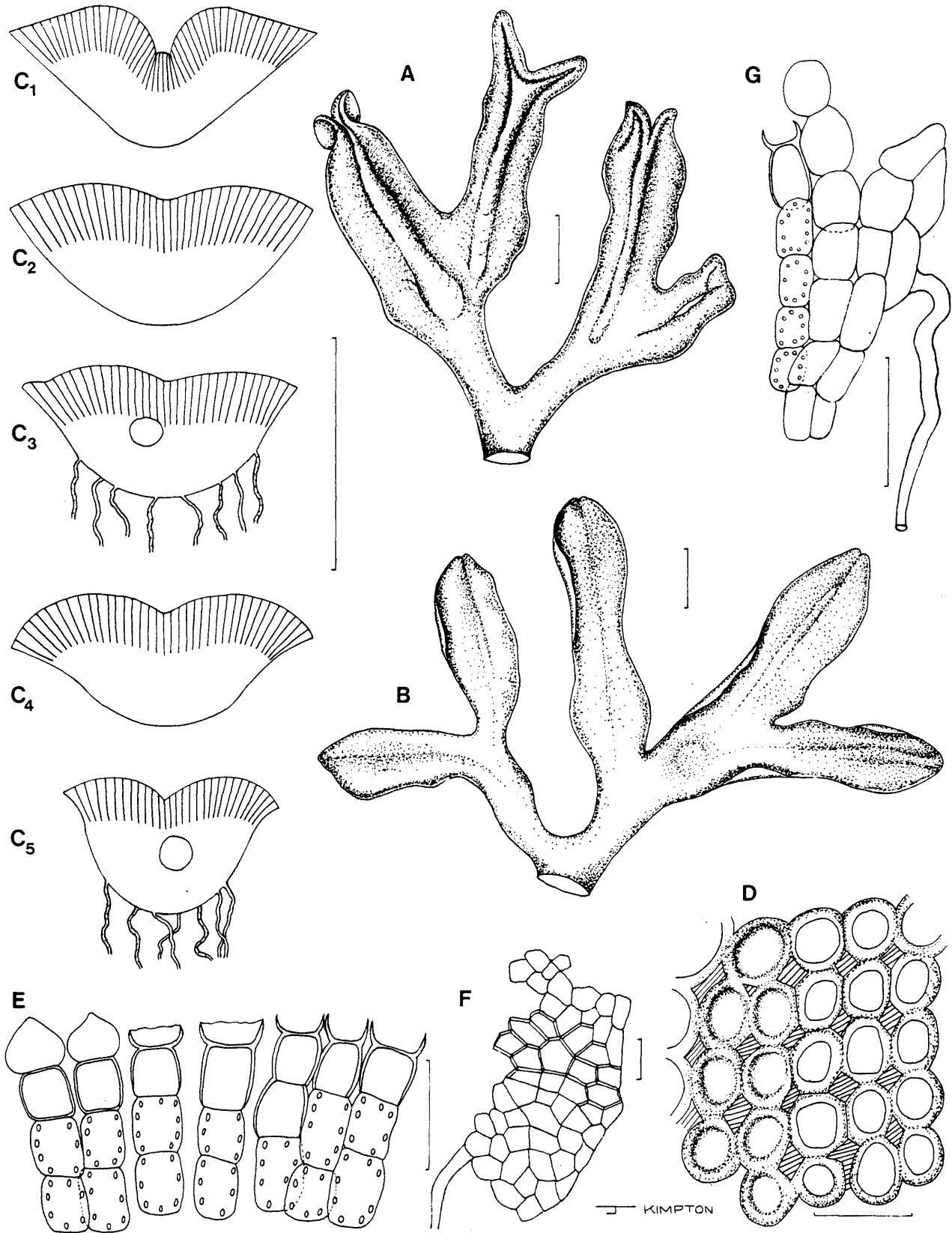


FIGURE 5.—*Riccia sorocarpa* (A--G): A, thallus dry; B, thallus wet; C, cross sections of branch at different distances from apex to basal part; D, epithelial cells and air pores from above; E, partly thick-walled epithelial cells and thin-walled assimilation tissue cells in cross section; F, scale; G, margin of thallus and scale in cross section. (A, B, Lambert 2; C, E, Oliver 8875; D, Arnell 136; F, S.M. Perold 1147; G, Arnell 7). Scale bars A--C = 1 mm; D, E, G = 50 µm; F = 100 µm.

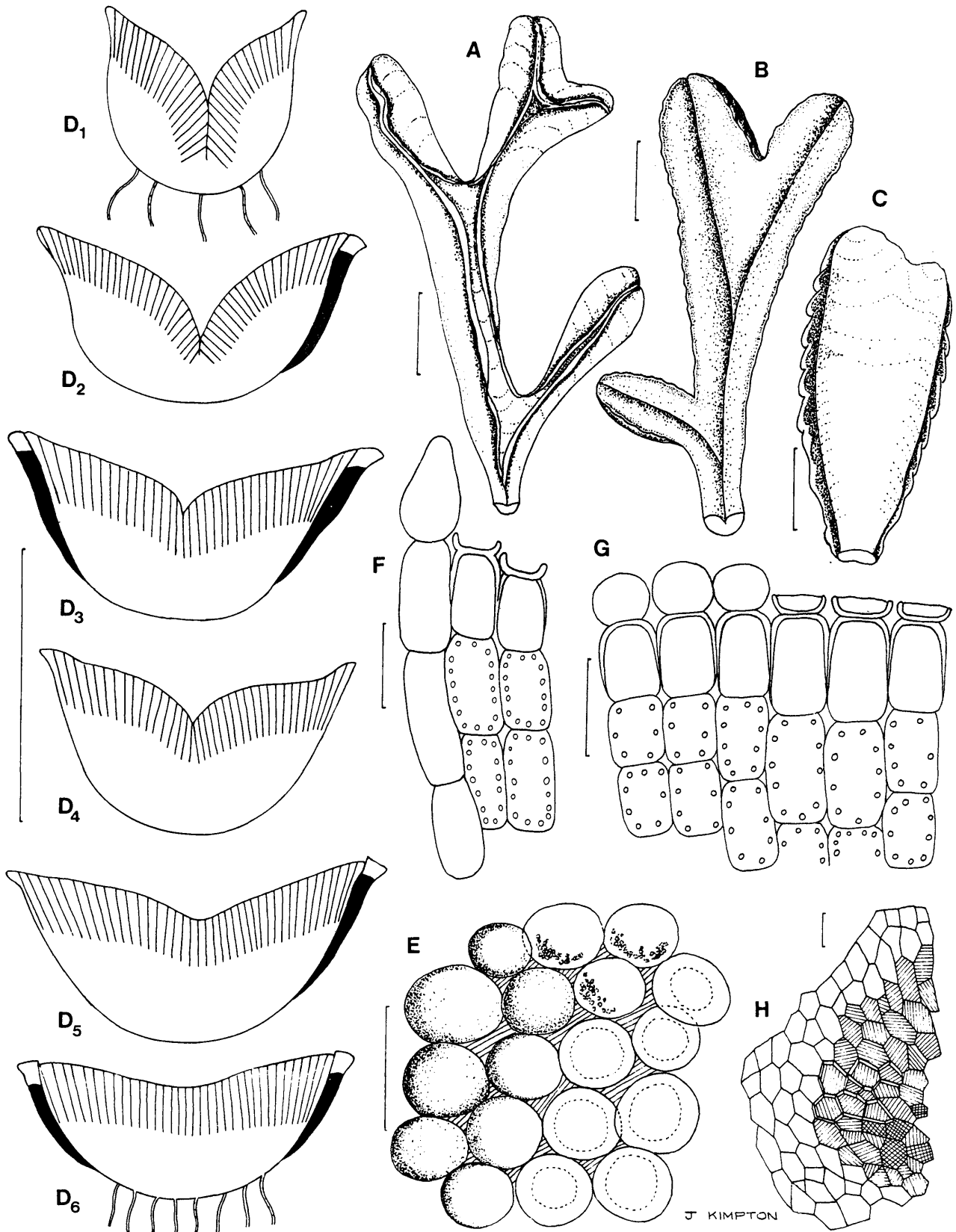


FIGURE 6.—*Riccia atropurpurea* (A–H): A, thallus dry; B, thallus wet; C, ventral face of thallus; D, cross sections of branch at different distances from apex to base; E, epithelial cells as seen from above on left intact, on right collapsed; F, cross section of cells at thallus margin; G, cross section of epithelial and assimilation tissue cells: top left epithelial cells intact, on right collapsed, subdorsal cells partly thicker-walled; H, scale. (A, *S.M. Perold* 1087; B, F, *S.M. Perold* 1241; C, *S.M. Perold* 2005; D, *S.M. Perold* 1376; E, *S.M. Perold* 397; G, *S.M. Perold* 197; H, *S.M. Perold* 124). Scale bars A–D = 1 mm; E–G = 50  $\mu$ m; H = 100  $\mu$ m.

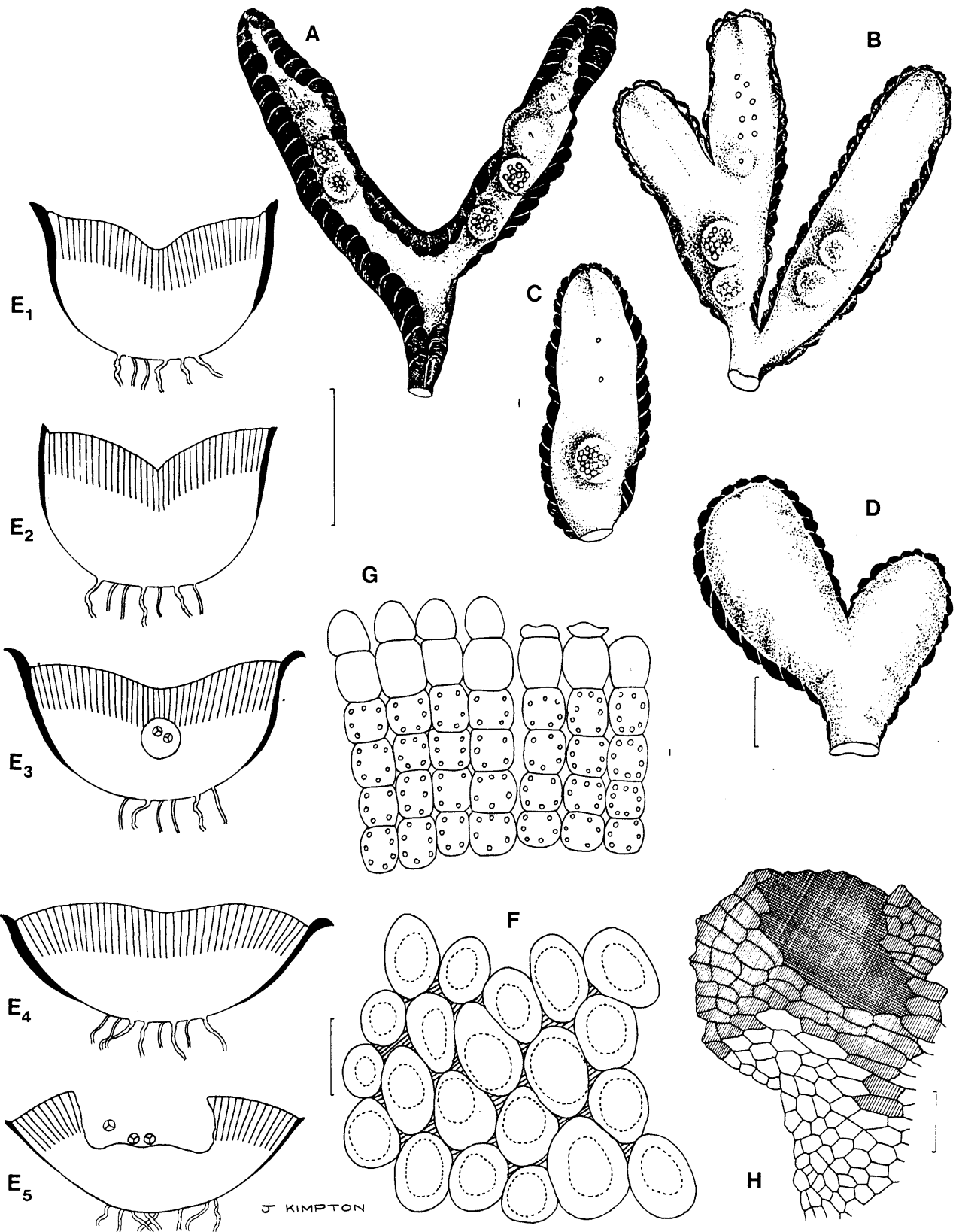


FIGURE 7.—*Riccia okahandjana* (A–H): A, thallus dry; B, C, thalli wet; D, ventral face of thallus; E, cross sections of branch at different distances from apex to base; F, epithelial cells and air pores from above; G, cross section showing epithelial cells, bistratose on the left, top cells collapsing and unistratose on the right; H, scale. (A, B, E, *S.M. Perold* 1041; C, F, G, *S.M. Perold* 1365a; D, *H. Anderson* PRE-CH 13443; H, *S.M. Perold* 315). Scale bars A–E = 1 mm; F, G = 50  $\mu$ m; H = 100  $\mu$ m.

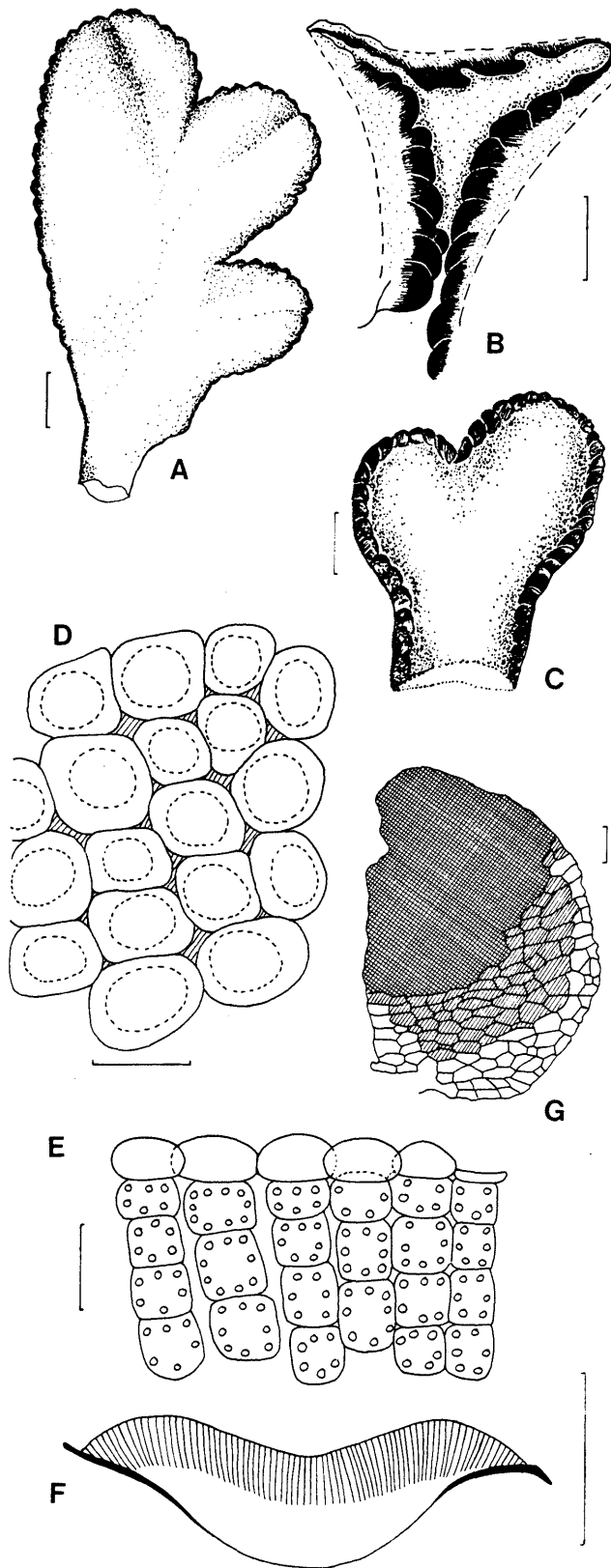


FIGURE 8.—*Riccia congoana* (A--G): A, thallus wet; B, thallus dry; C, ventral face of thallus; D, epithelial cells and air pores from above; E, cross section of epithelial and assimilation tissue cells; F, cross section of branch; G, scale. (A, *S.M. Perold* 747; B, D, E, *S.M. Perold* 763; C, G, *Volk* 00978; F, *Arnell* 1332). Scale bars A--C, F = 1 mm; D, E = 50  $\mu$ m; G = 100  $\mu$ m.

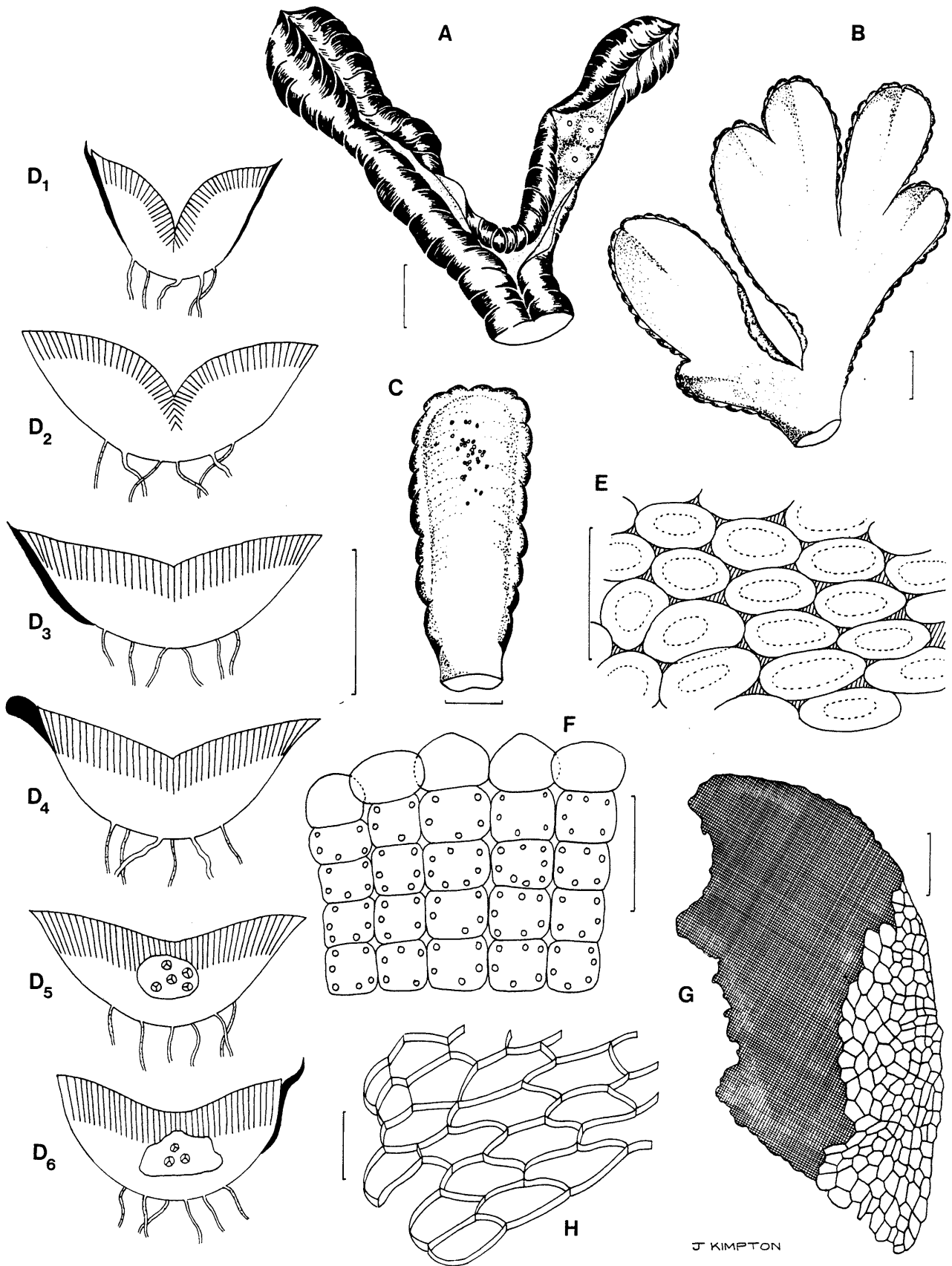


FIGURE 9.—*Riccia limbata* (A–H): A, thallus dry; B, thallus wet; C, ventral face of branch; D, cross sections of branch at different distances from apex to base; E, epithelial cells and air pores from above; F, cross section of epithelial and assimilation tissue cells; G, scale; H, cells in body of scale with sinuate walls. (A, F, *S.M. Perold* 583; B, D, E, *E. Retief* 1235; C, G, H, *Oliver* 8042). Scale bars A–D = 1 mm; E, F, H = 50  $\mu$ m; G = 100  $\mu$ m.



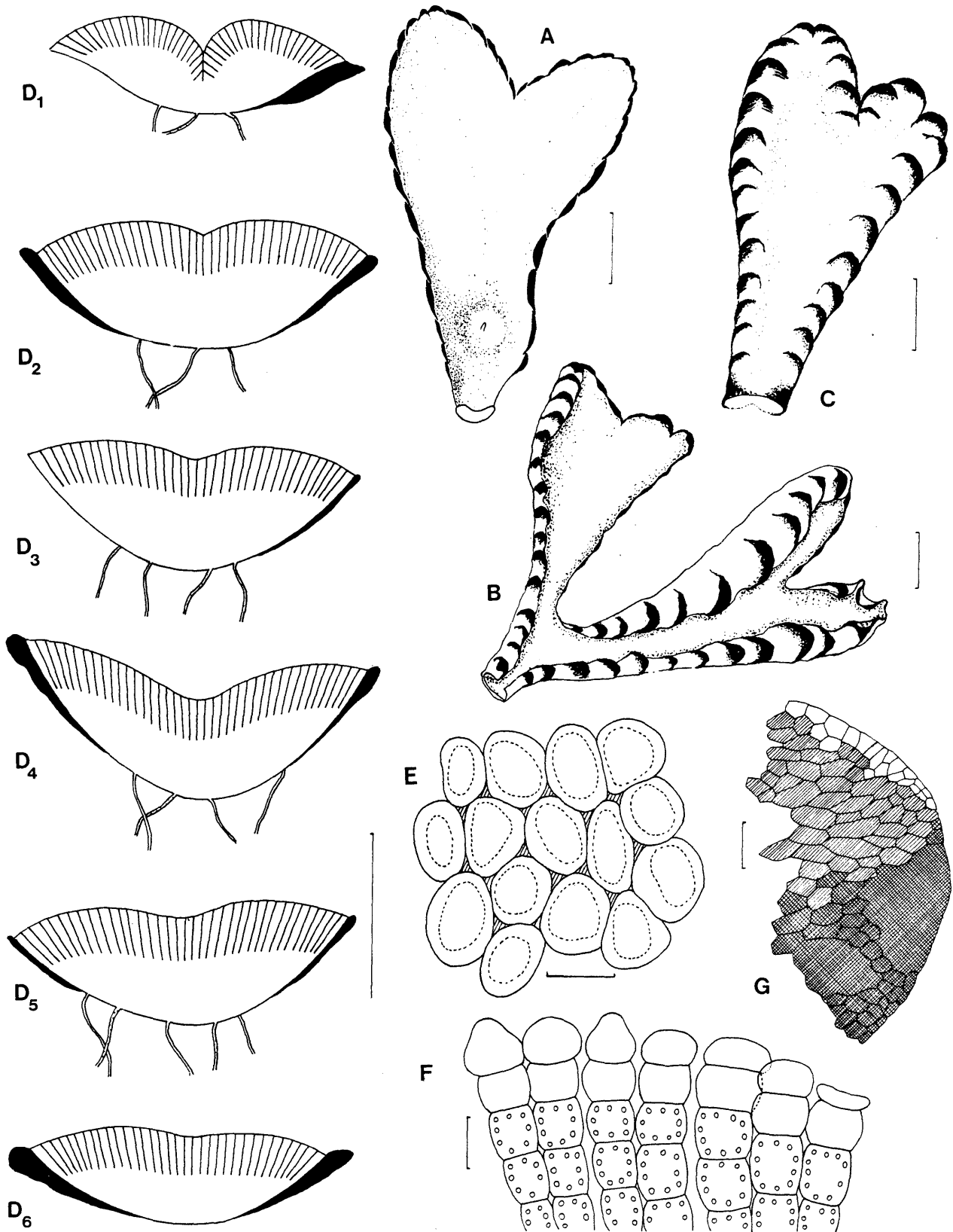
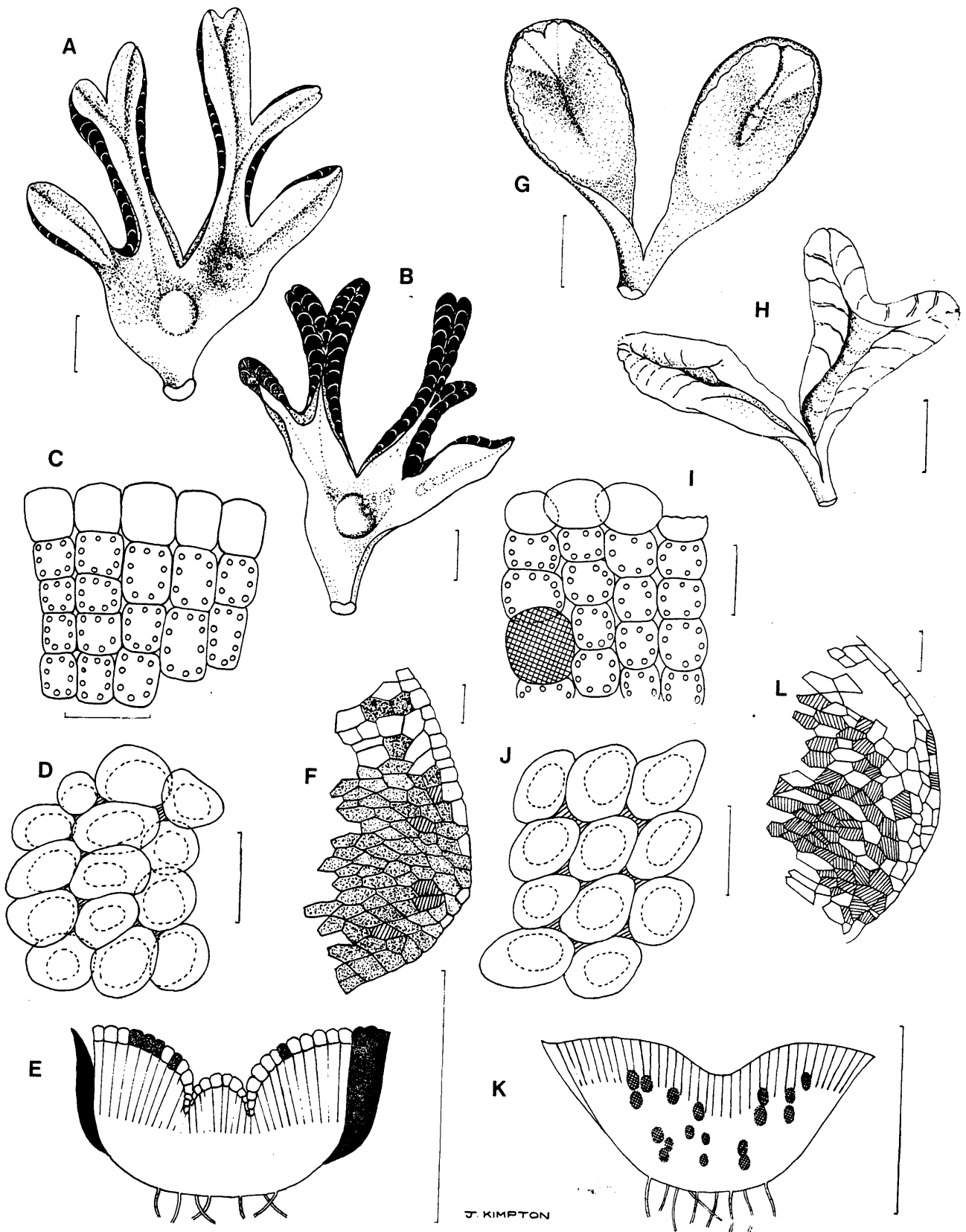


FIGURE 10.—*Riccia angolensis* (A–G): A, thallus wet; B, thallus dry; C, ventral face of thallus; D, cross sections of branch at different distances from apex to base; E, epithelial cells and air pores from above; F, cross section of bistratose epithelial cells, top cells collapsing toward the right; G, scale. (A, B, *Magill* 6371a; C, *Volk* 01287; D, *S.M. Perold* 1354; E, F, *S.M. Perold* 1276; G, *E. Retief* 1543). Scale bars A–D = 1 mm; E, F = 50  $\mu$ m; G = 100  $\mu$ m.



J. KIMPTON

FIGURE 11.—*Riccia nigrella* (A–F): A, thallus wet; B, thallus dry; C, cross section of epithelial and assimilation tissue cells; D, epithelial cells and air pores from above; E, cross section of branch, showing persistent epithelial cells, some with finely granular contents; F, scale. *R. macrocarpa* (G–L): G, thallus wet; H, thallus dry; I, cross section of epithelial and assimilation tissue cells with one idioblast; J, epithelial cells and air pores from above; K, cross section of branch showing some idioblasts (cross hatched); L, scale. (A, B, *S.M. Perold* 520; C, F, *Van Rooy* 2414; D, *S.M. Perold* 1322; E, *S.M. Perold* 1147; G, H, K, *S.M. Perold* 888; I, *S.M. Perold* 80; J, *Van Rooy & Perold* 634; L, *Volk* 81/024). Scale bars A, B, E, G, H, K = 1 mm; C, D, I, J = 50  $\mu$ m; F, L = 100  $\mu$ m.

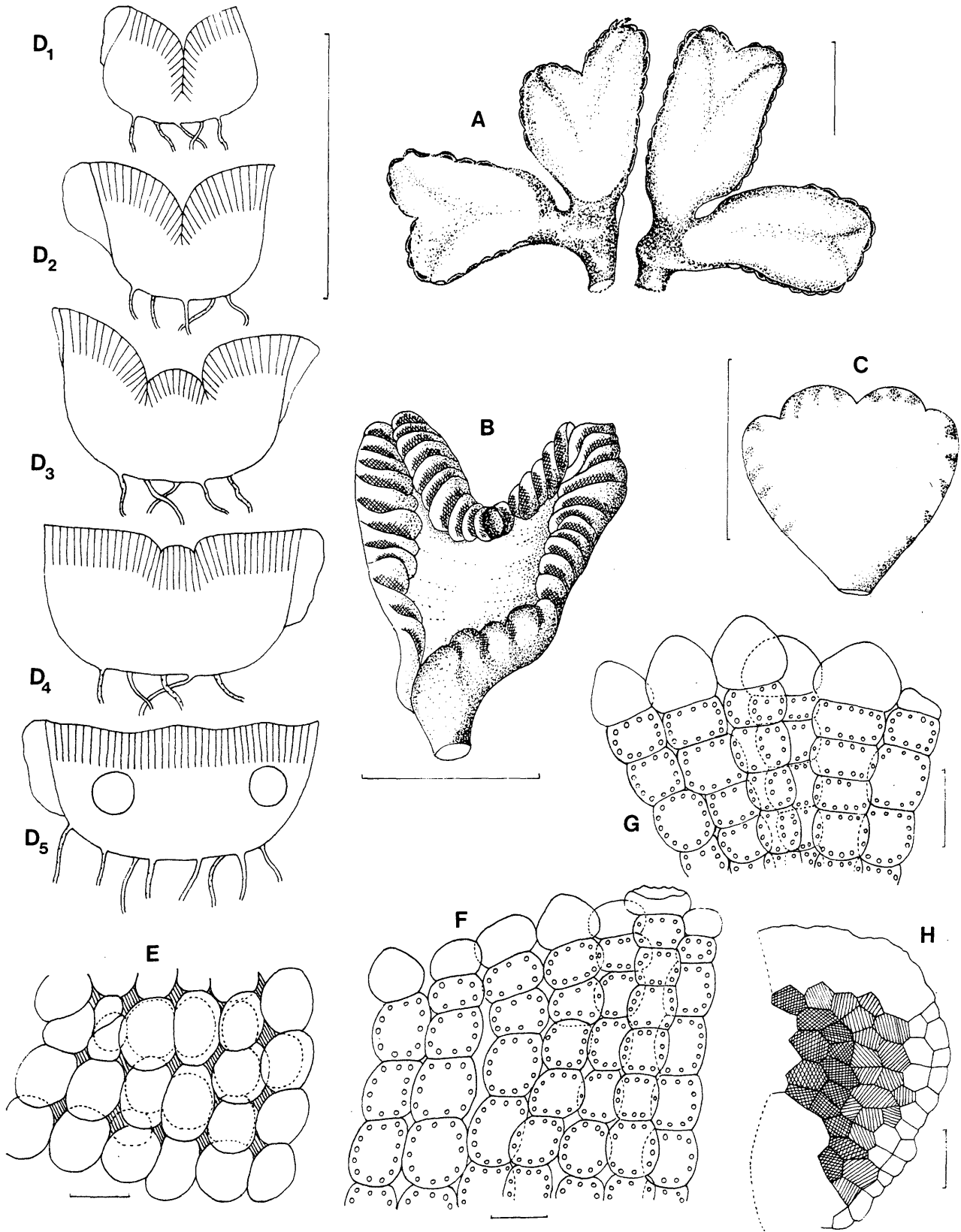


FIGURE 12.—*Riccia pousiana* (A–H): A, thallus wet; B, thallus dry; C, ventral face of thallus; D, cross sections of branch at different distances from apex to basal part; E, epithelial cells and air pores from above; F, cross section of epithelial and assimilation tissue cells; G, epithelial cells and assimilation tissue near apex and groove; H, scale. (A, C, E–H, *S.M. Perold* 1361; B, *J.M. Perold* 37; D, *S.M. Perold* 285). Scale bars A–D = 1 mm; E–G = 50  $\mu$ m; H = 100  $\mu$ m.

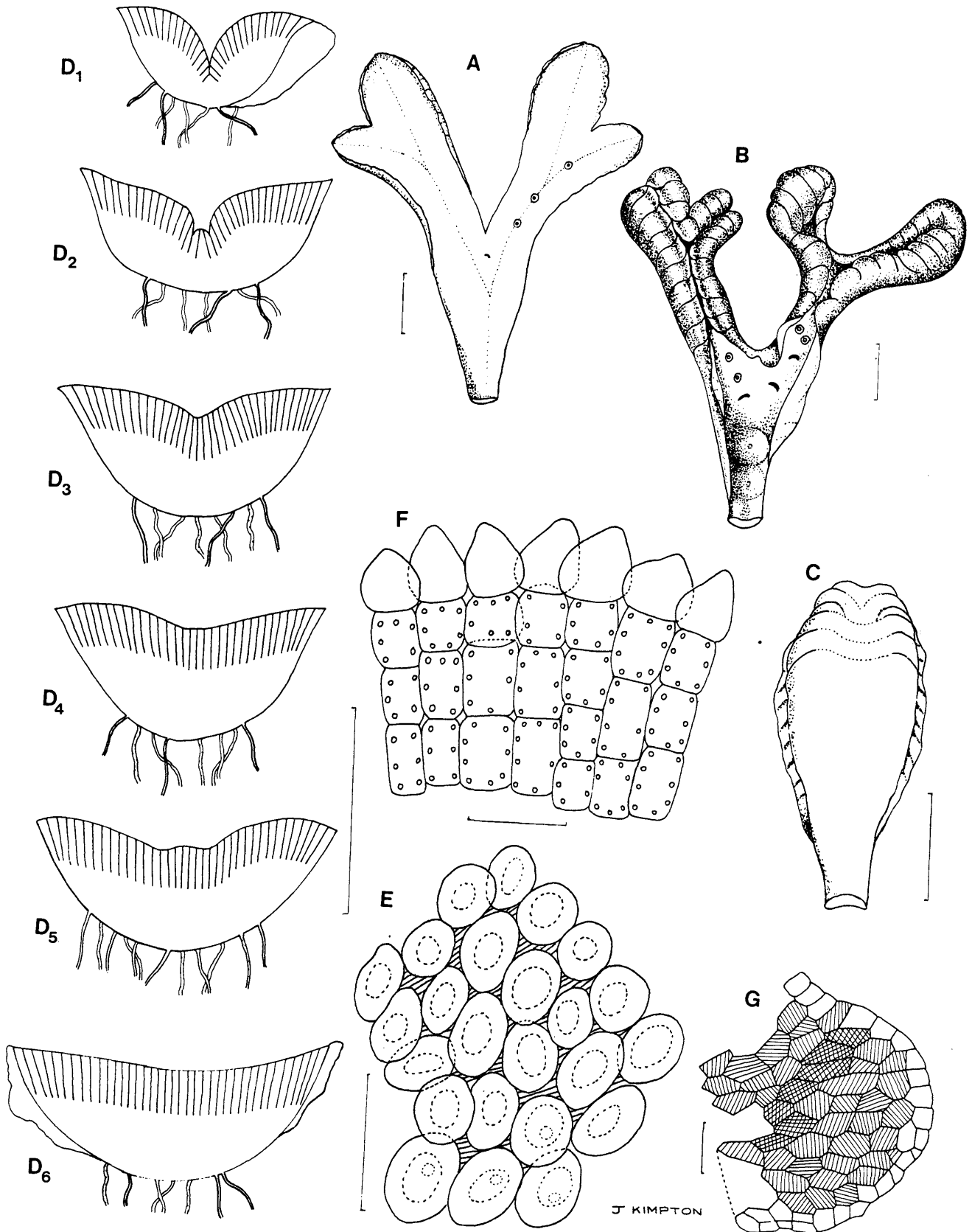


FIGURE 13.—*Riccia runssorensis* (A--G): A, thallus wet; B, thallus dry; C, ventral face of thallus; D, cross sections of branch at different distances from apex to basal part; E, epithelial cells and air pores from above; F, cross section of epithelial and assimilation tissue cells; G, scale. (A, C, *S.M. Perold* 2004; B, *S.M. Perold* 219; D, *S.M. Perold* 785; E, G, *S.M. Perold* 1208a; F, *S.M. Perold* 782). Scale bars A--D = 1 mm; E, F = 50  $\mu$ m; G = 100 $\mu$ m.

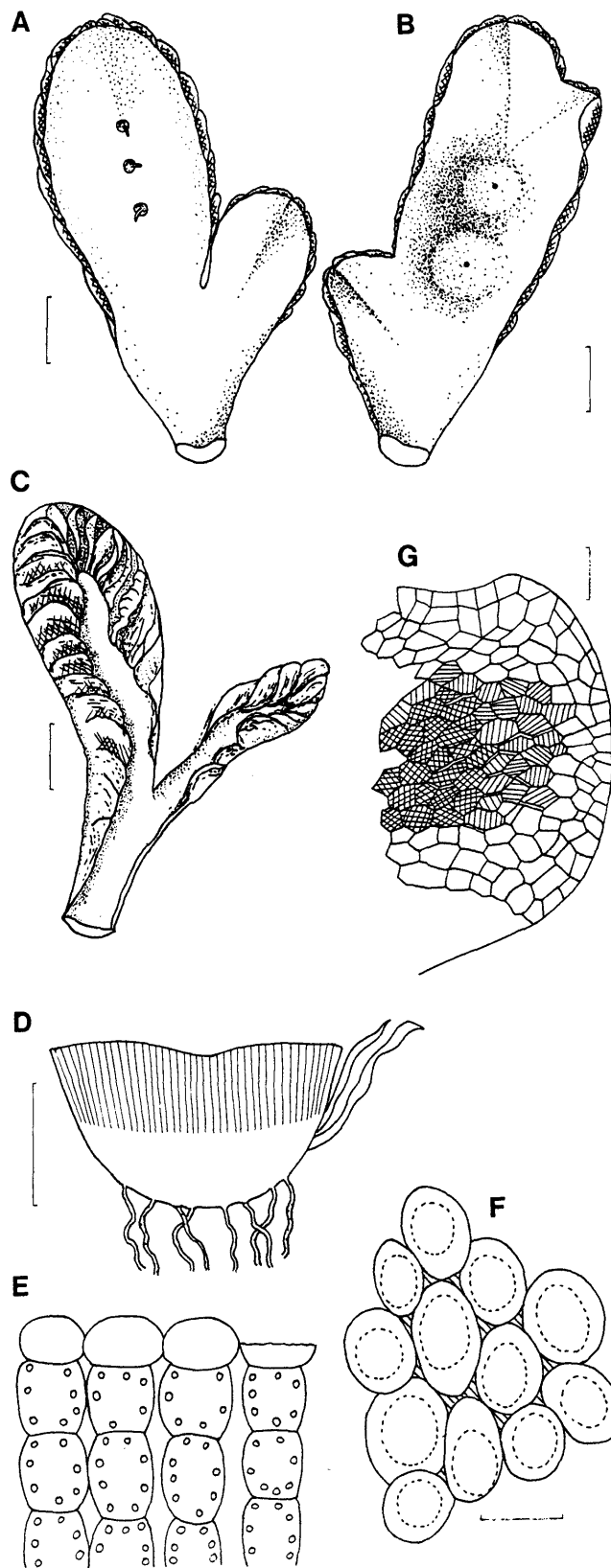


FIGURE 14.—*Riccia rosea* (A–G): A, male thallus wet; B, female thallus wet; C, thallus dry; D, cross section of branch; E, cross section of epithelial and assimilation tissue cells; F, epithelial cells and air pores from above; G, scale. (A, B, *S.M. Perold* 2018a; C, D, G, *S.M. Perold* 346; E, F, *H. Anderson* PRE-CH 13445). Scale bars A–D = 1 mm; E, F = 50  $\mu$ m; G = 100  $\mu$ m.

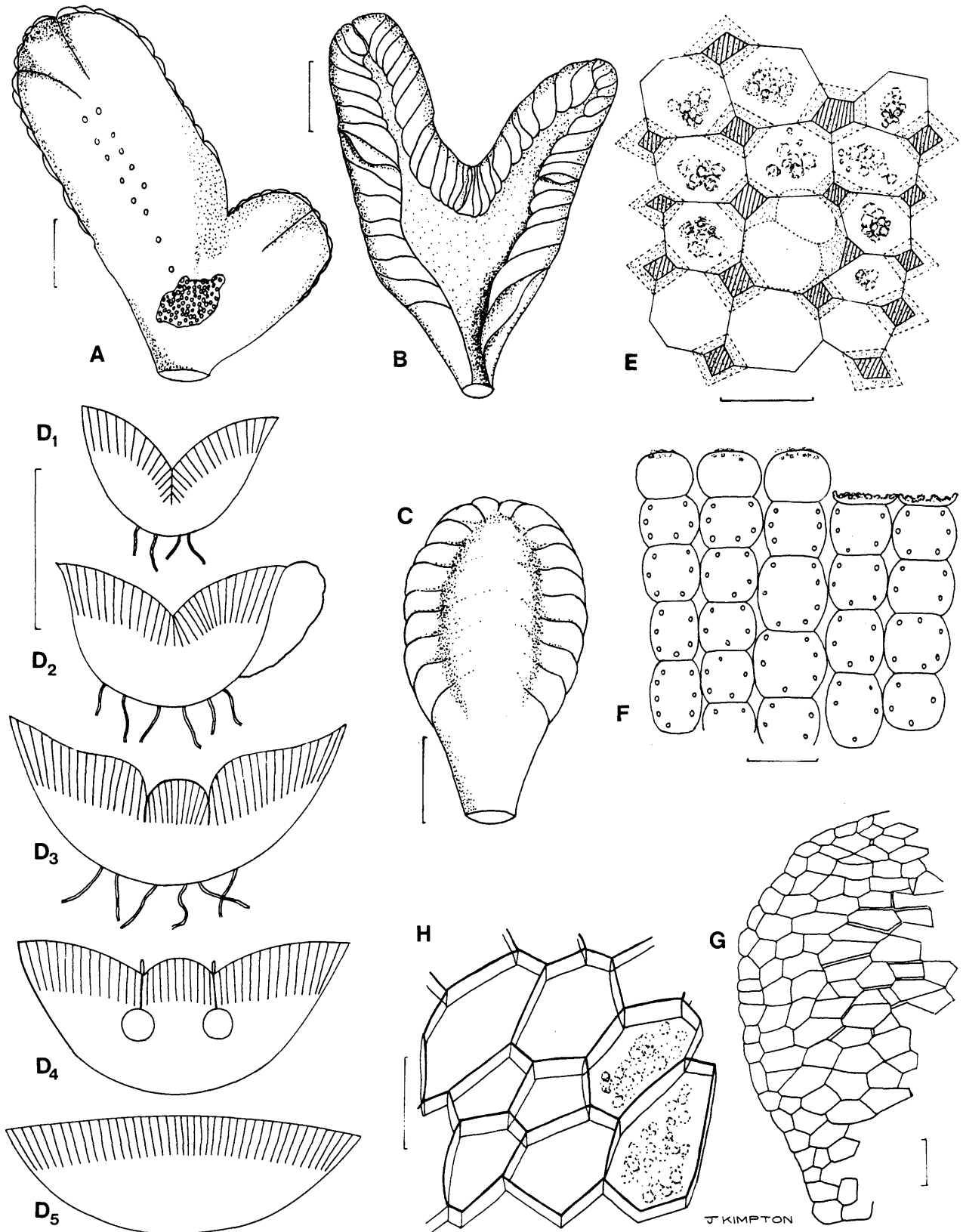


FIGURE 15.—*Riccia albolimbata* (A–H): A, thallus wet; B, thallus dry; C, ventral face of thallus; D, cross sections of branch at different distances from apex to basal part; E, epithelial cells, some with overlying calcium crystals, and air pores (hatched) seen from above, air canals stippled; F, cross section of epithelial cells, intact on the left, collapsed on the right, assimilation tissue below; G, scale; H, enlarged scale cells, on the right with overlying calcium crystals. (A–D, *S.M. Perold* 1380; E, F, *S.M. Perold* 398; G, H, *S.M. Perold* 803). Scale bars A–D = 1 mm; E, F, H = 50  $\mu$ m; G = 100  $\mu$ m.

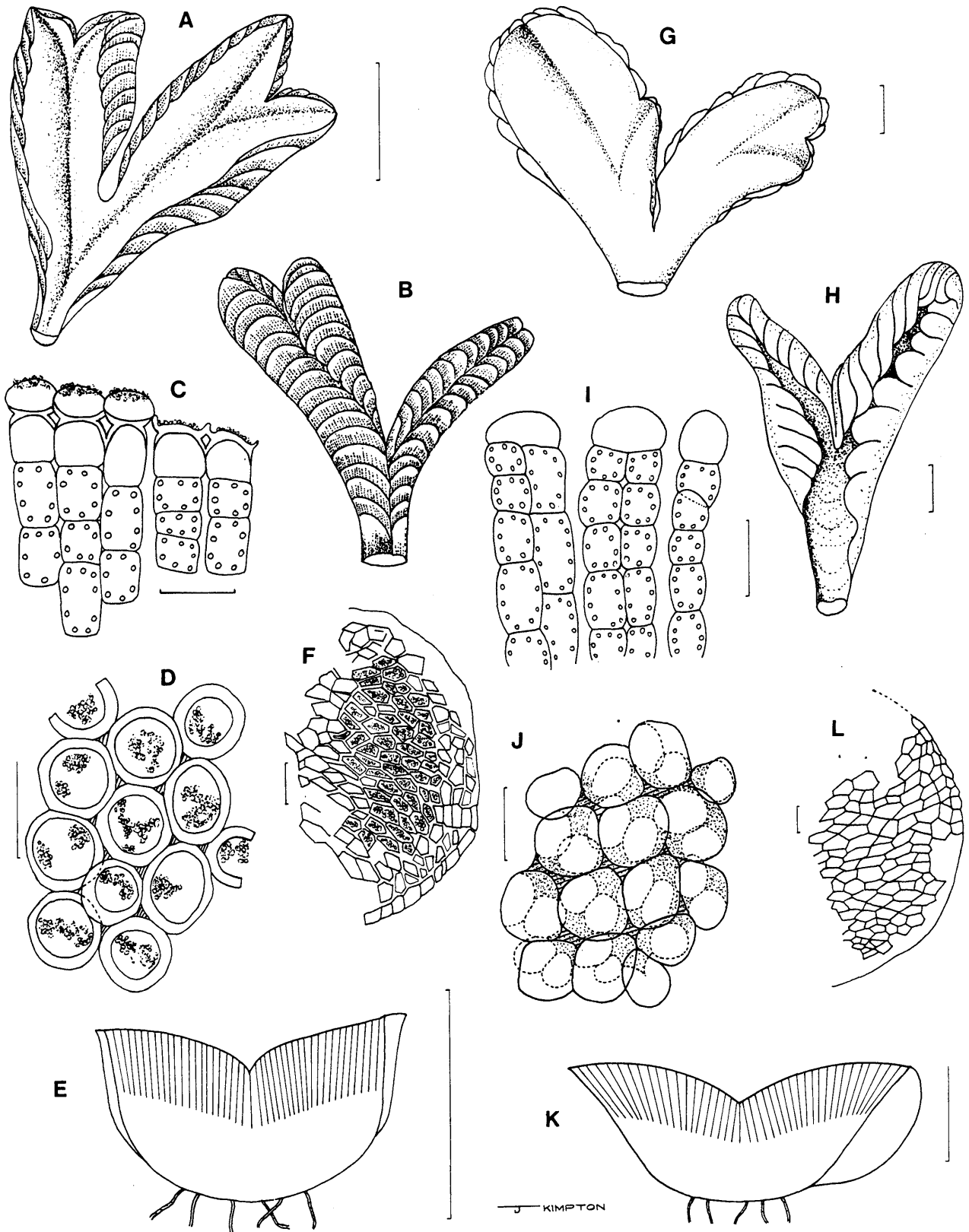


FIGURE 16.—*Riccia argenteolimbata* (A–F): A, thallus wet; B, thallus dry; C, cross section of epithelial cells, partly thicker-walled, on the left intact, on the right collapsed, assimilation tissue below; D, collapsed, thicker-walled epithelial cells with overlying calcium crystals, air pores mostly three-sided, as seen from above; E, cross section of branch; F, scale. *R. albornata* (G–L): G, thallus wet; H, thallus dry; I, cross section of epithelial and assimilation tissue cells; J, epithelial (solid lines) and subdorsal (broken lines) cells, air pores (hatched) overlying air canals (dotted), seen from above; K, cross section of branch; L, scale. (A, B, Volk 84/692; C, D, S.M. Perold 772; E, F, Volk 881; G, H, J, Smook 6961; I, Oliver 8854a; K, L, Volk 81/081). Scale bars A, B, E, G, H, K = 1 mm; C, D, I, J = 50  $\mu$ m; F, L = 100  $\mu$ m.

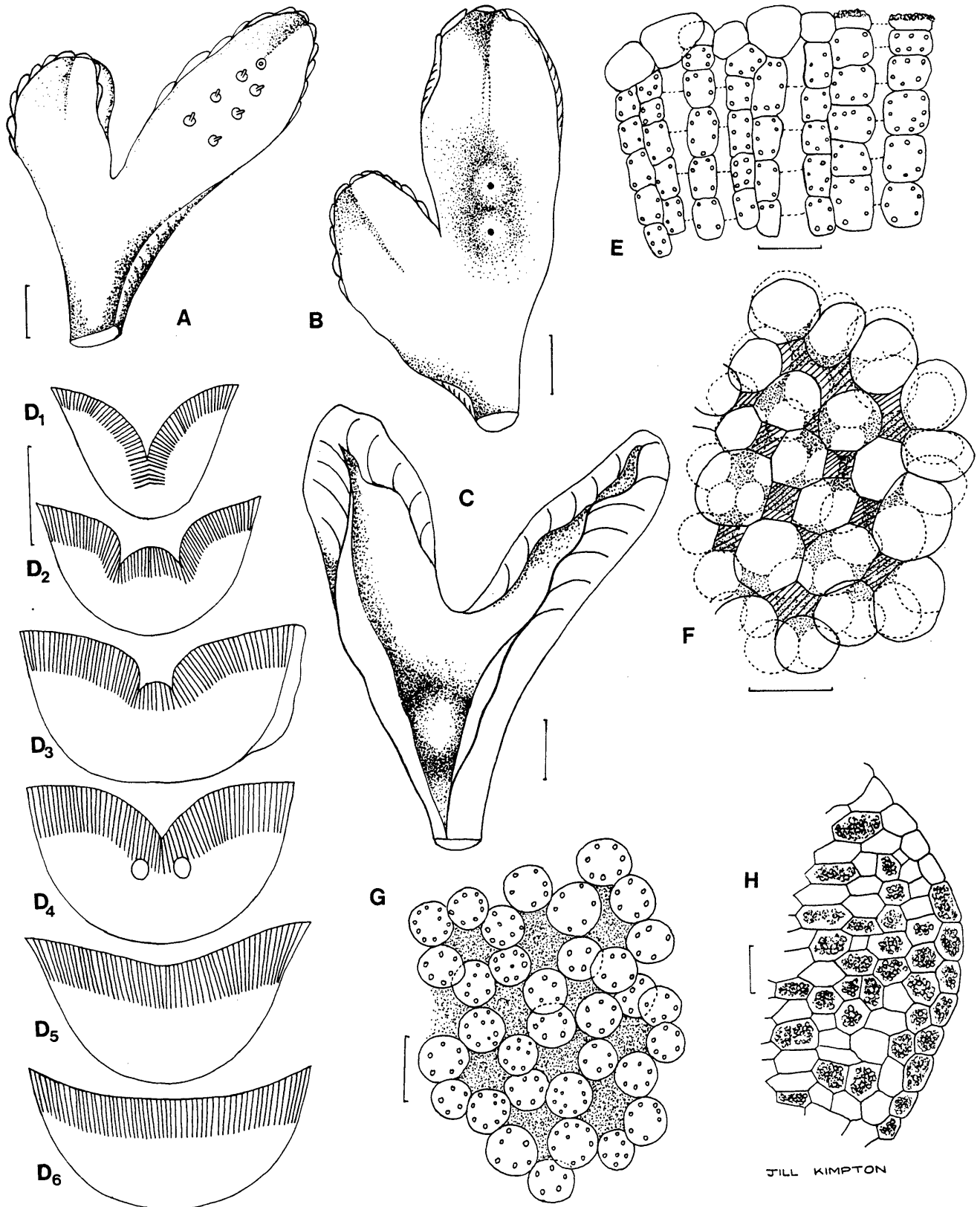


FIGURE 17.—*Riccia montana* (A--H): A, male thallus wet; B, female thallus wet; C, female thallus dry; D, cross sections of branch at different distances from apex to basal part; E, cross section of epithelial and assimilation tissue cells; F, epithelial (solid lines) and subdorsal (broken lines) cells, air pores (hatched) overlying air canals (stippled), seen from above; G, horizontal section through assimilation tissue, air canals stippled; H, scale. (A--C, *Van Rooy* 3046; D, *Van Rooy* 2712; E, *Oliver* 8354; F, G, *J.M. Perold* 31; H, *Van Rooy* 2718). Scale bars A--D = 1 mm; E--G = 50  $\mu$ m; H = 100  $\mu$ m.



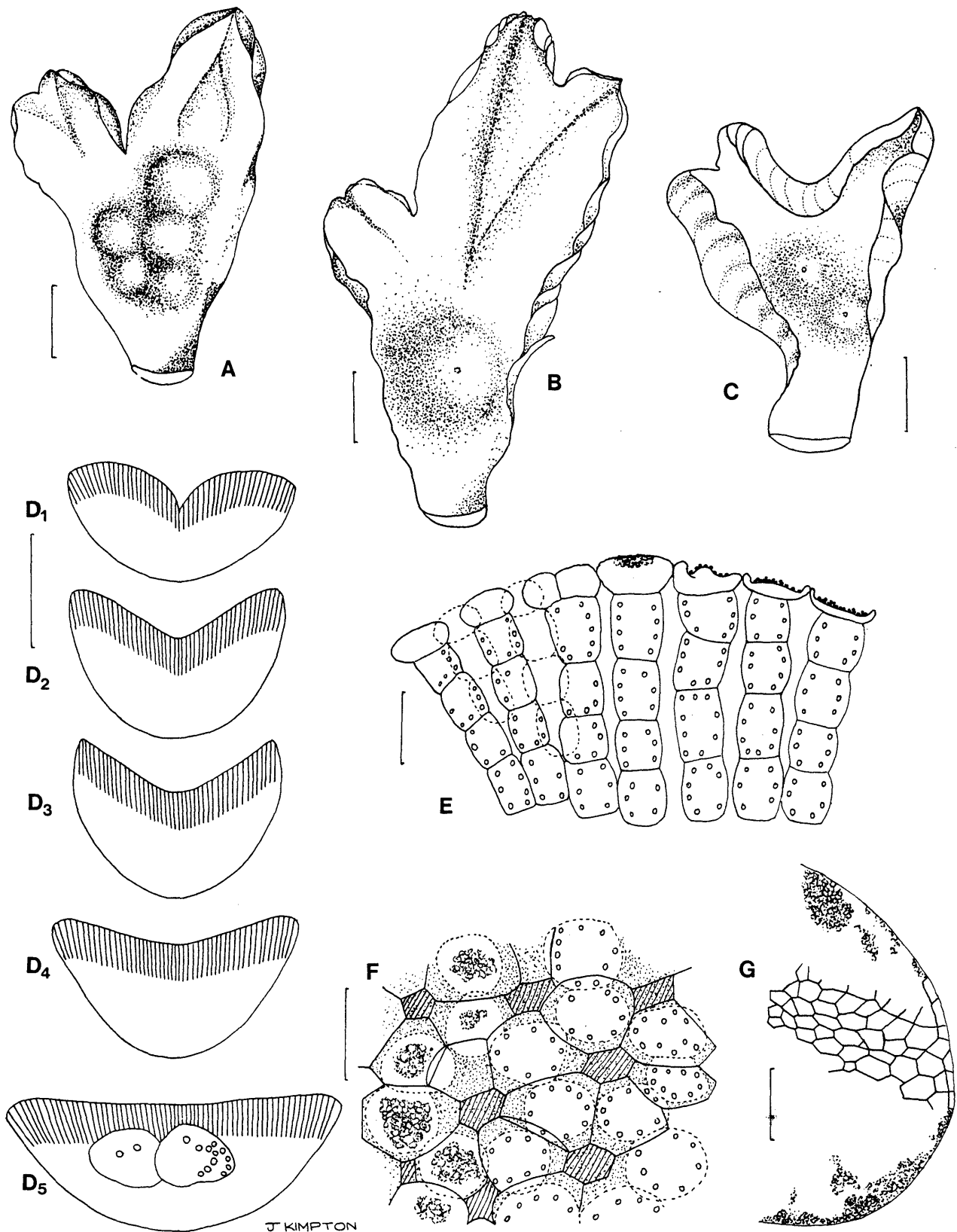


FIGURE 18.—*Riccia alboporosa* (A–G): A, B, thalli wet; C, thallus dry; D, cross sections of branch at different distances from apex to basal part; E, cross section of epithelial cells, intact on the left, collapsed on the right and covered with calcium deposits, assimilation tissue below; F, epithelial (solid lines) and subdorsal (broken lines) cells, air pores (hatched) overlying air canals (stippled), seen from above; G, scale. (A, B, F, *S.M. Perold* 1775; C–E, G, *Oliver* 8854). Scale bars A–D = 1 mm; E, F = 50  $\mu$ m; G = 100  $\mu$ m.

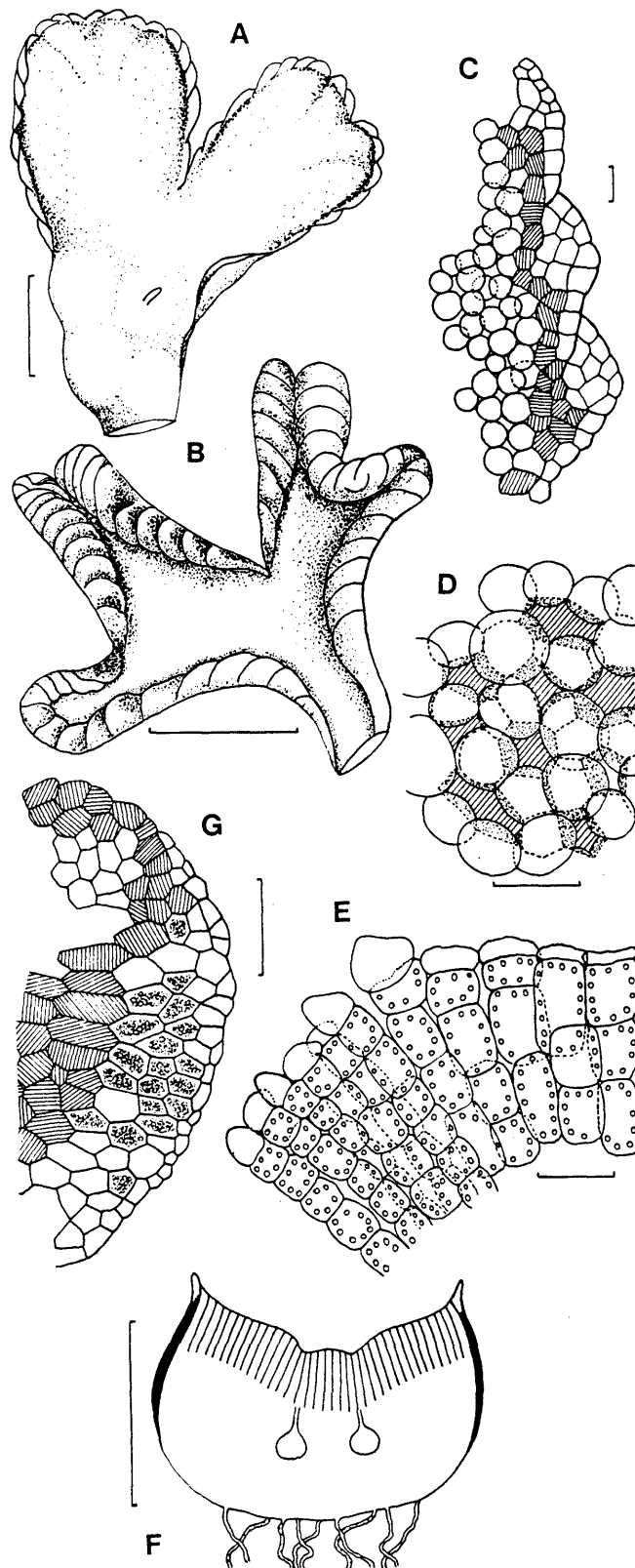


FIGURE 19.--*Riccia bicolorata* (A--F): A, thallus wet; B, thallus dry; C, dark margin of thallus (hatched) and projecting scales seen from above; D, epithelial (solid lines) and subdorsal (broken lines) cells, air pores (hatched) overlying air canals (stippled), seen from above; E, cross section of epithelial cells, intact at groove on left, collapsing to the right, assimilation tissue below; F, cross section of branch; G, scale. (A--G, *Smook 6990a*). Scale bars A, B, F = 1 mm; D, E = 50  $\mu$ m; C, G = 100  $\mu$ m.

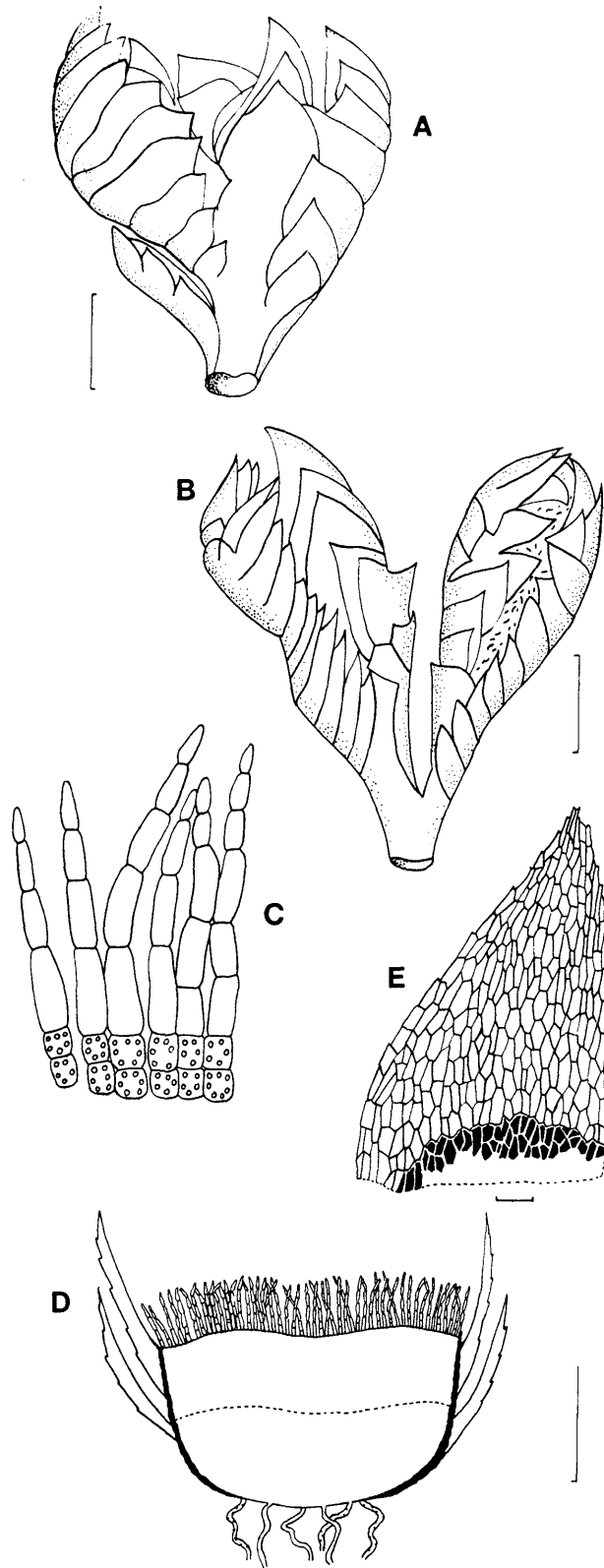


FIGURE 20.--*Riccia villosa* (A--E): A, thallus wet; B, thallus dry; C, cross section of long tapering epithelial cell pillars and assimilation tissue below; D, cross section of branch; E, scale. (A, C, D, *C.M. van Wyk* 2522; B, E, *S.M. Perold* 504). Scale bars A, B, D = 1 mm; C = 50  $\mu$ m; E = 200  $\mu$ m.

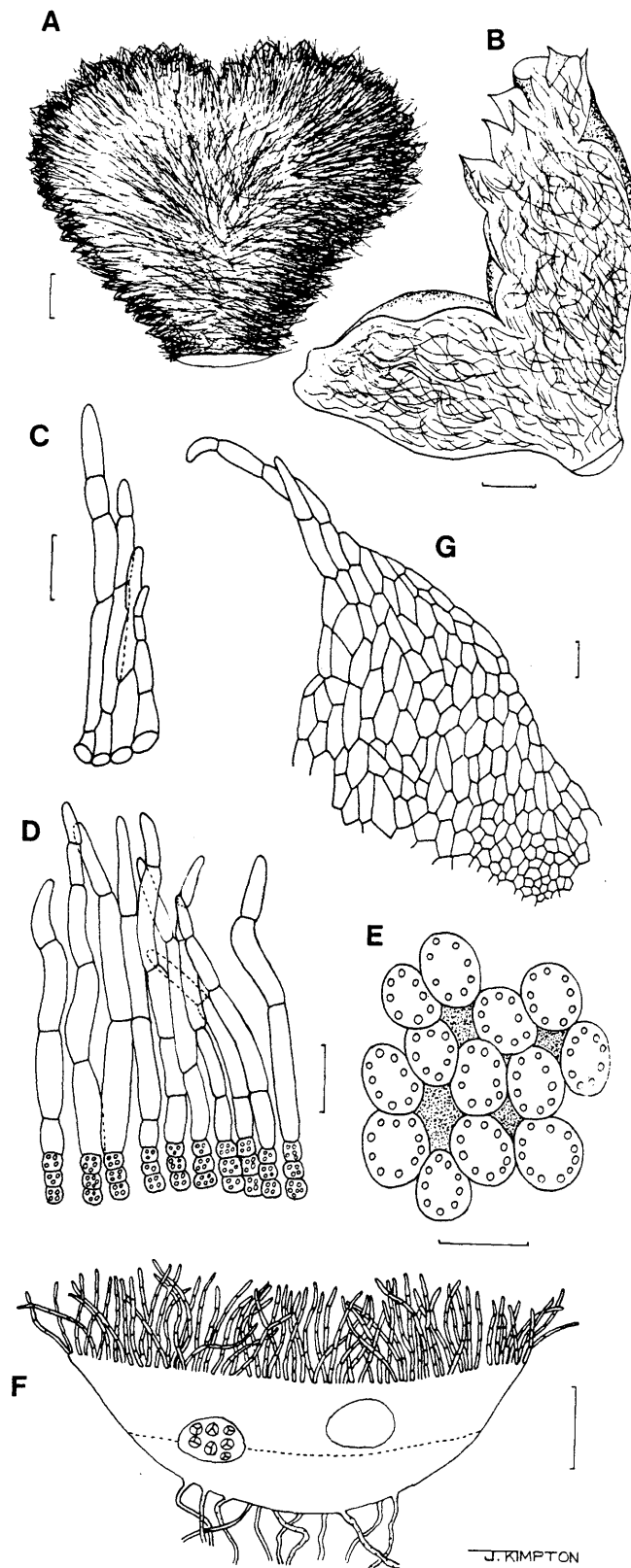


FIGURE 21.—*Riccia hirsuta* (A–G): A, thallus wet; B, thallus dry; C, filiform apex of scale; D, cross section of very long, slightly tapering epithelial cell pillars and assimilation tissue below; E, horizontal section through assimilation tissue, air canals stippled; F, cross section of branch; G, scale. (A, B, D, F, *S.M. Perold* 2182; C, E, G, *Oliver* 8040). Scale bars on A, B, F = 1 mm; C, D, G = 100  $\mu$ m; E = 50  $\mu$ m.

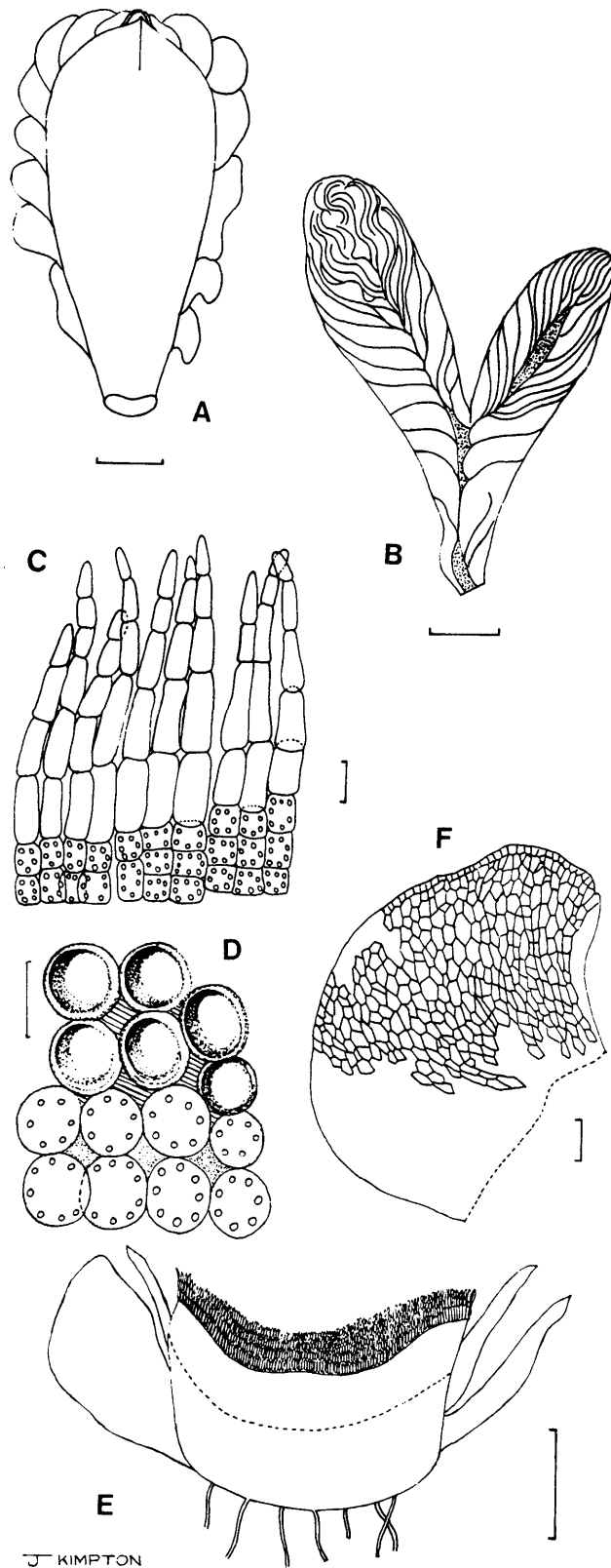


FIGURE 22.—*Riccia simii* (A--F): A, thallus wet; B, thallus dry; C, cross section of long tapering epithelial cell pillars and assimilation tissue below; D, horizontal section through basal cells of dorsal pillars with air pores hatched, and through assimilation tissue with air canals stippled; E, cross section of branch; F, scale. (A, E, *S.M. Perold* 1318; B, *S.M. Perold* 1346; C, *S.M. Perold* 505; D, *Smook* 6631; F, *C.M. van Wyk* 1781). Scale bars on A, B, E = 1 mm; C, D = 50  $\mu$ m; F = 100  $\mu$ m.

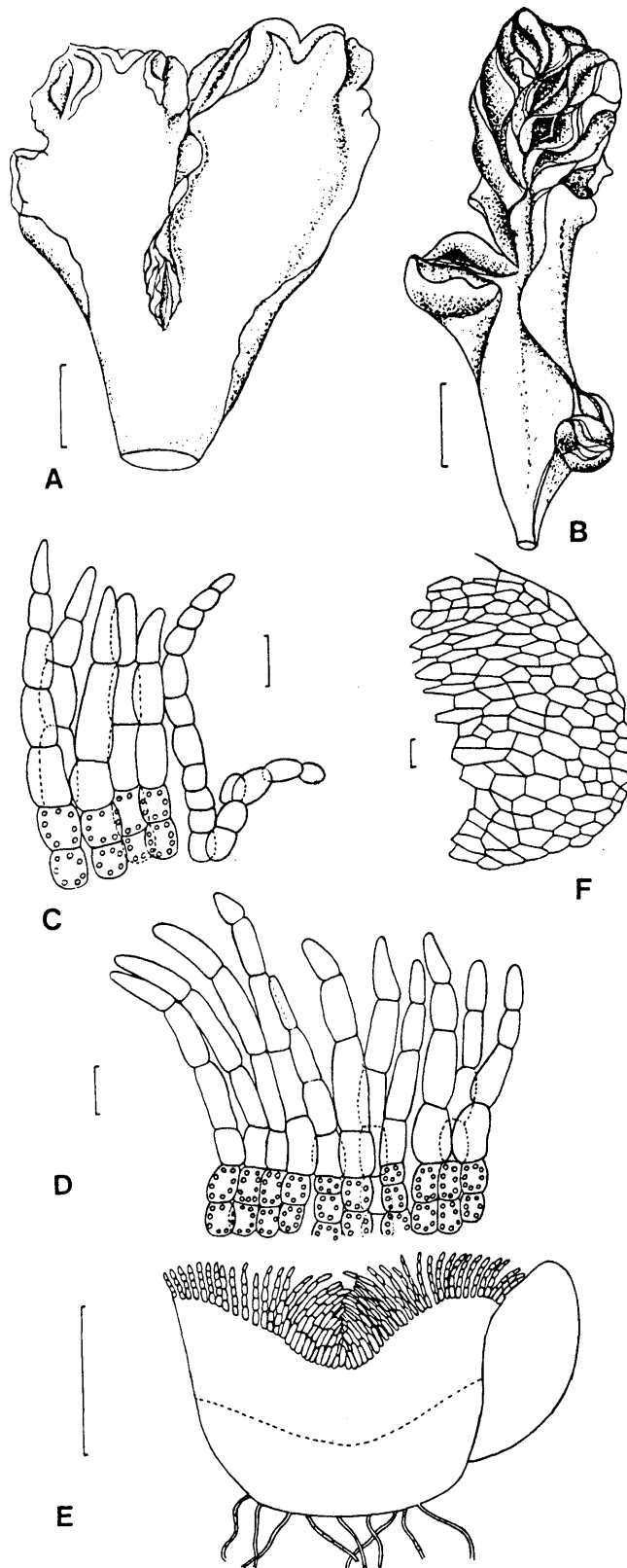


FIGURE 23.—*Riccia virea* (A–F): A, thallus wet; B, thallus dry; C, cross section toward margin, of erect epithelial cell pillars and scales; D, section of arched and erect epithelial cell pillars, assimilation tissue below; E, cross section of branch; F, scale. (A, D, F, *S.M. Perold* 2149; B, *S.M. Perold* 1475; C, E, *S.M. Perold* 1419). Scale bars A, B, E = 1 mm; C, D = 50  $\mu$ m; F = 100  $\mu$ m.

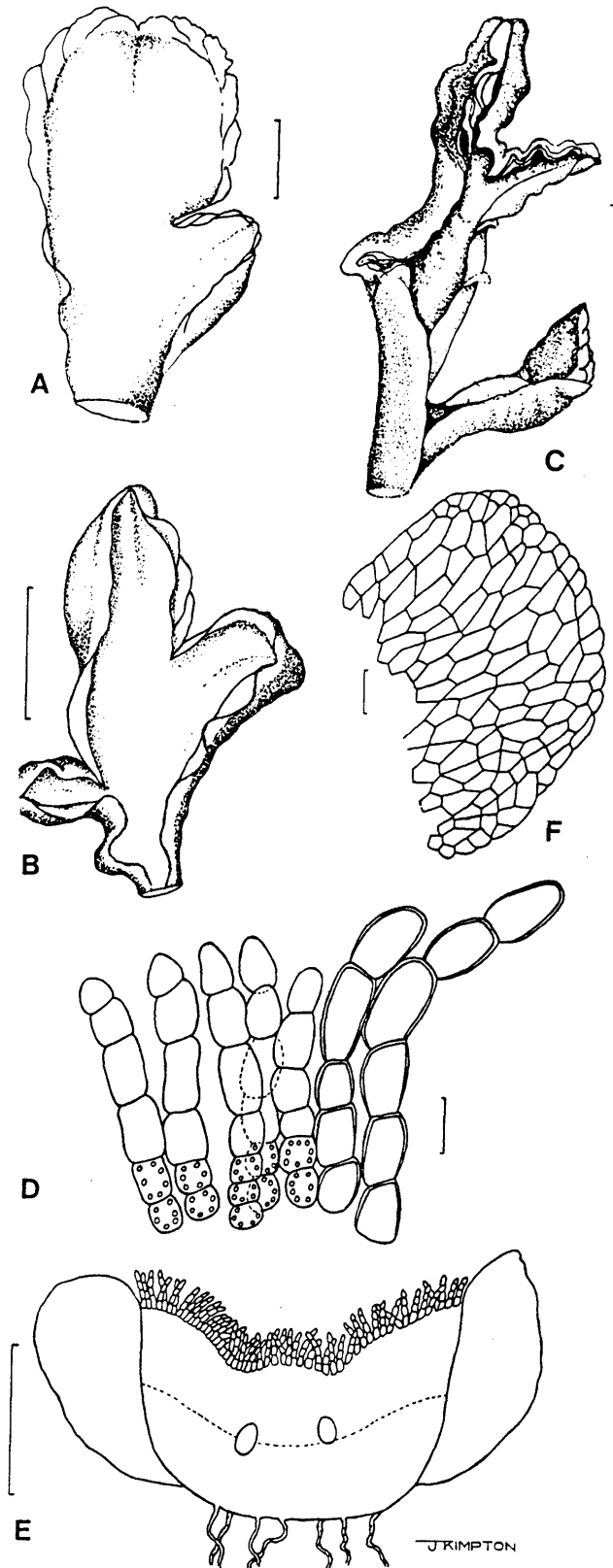


FIGURE 24.—*Riccia namaquensis* (A–F): A, thallus wet, from seepage area; B, thallus wet, from drier habitat; C, thallus dry; D, cross section toward margin of epithelial cell pillars and scales; E, cross section of branch; F, scale. (A, *S.M. Perold* 2136; B, *S.M. Perold* 2036; C, *S.M. Perold* 1420; D, E, *S.M. Perold* 565; F, *S.M. Perold* 1832). Scale bars A–C, E = 1 mm; D = 50  $\mu$ m; F = 100  $\mu$ m.

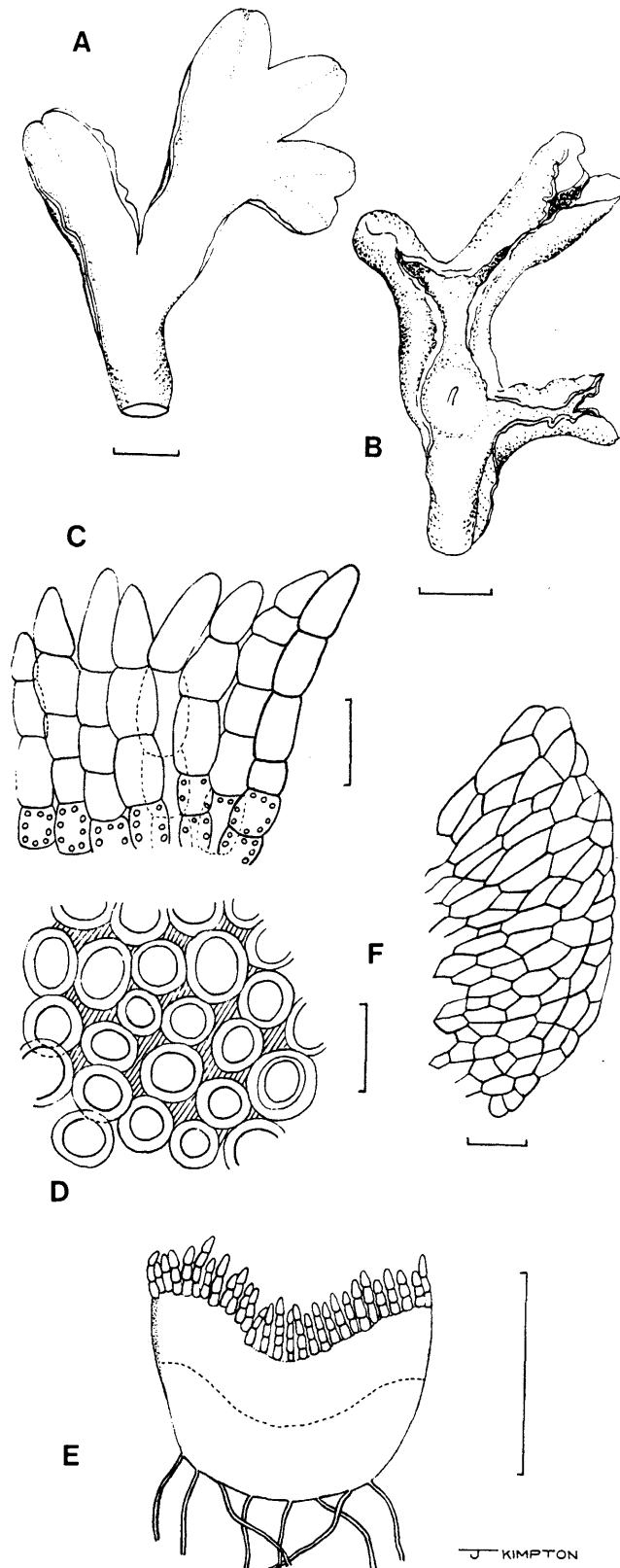


FIGURE 25.—*Riccia albomarginata* (A–F): A, thallus wet; B, thallus dry; C, cross section toward margin of epithelial cell pillars and scale; D, epithelial cell pillars and air pores from above; E, cross section of branch; F, scale. (A, C, E, *S.M. Perold* 1979; B, *S.M. Perold* 2118; D, *S.M. Perold* 538; F, *S.M. Perold* 2031 p.p.). Scale bars A, B, E = 1 mm; C, D = 50  $\mu$ m; F = 100  $\mu$ m.



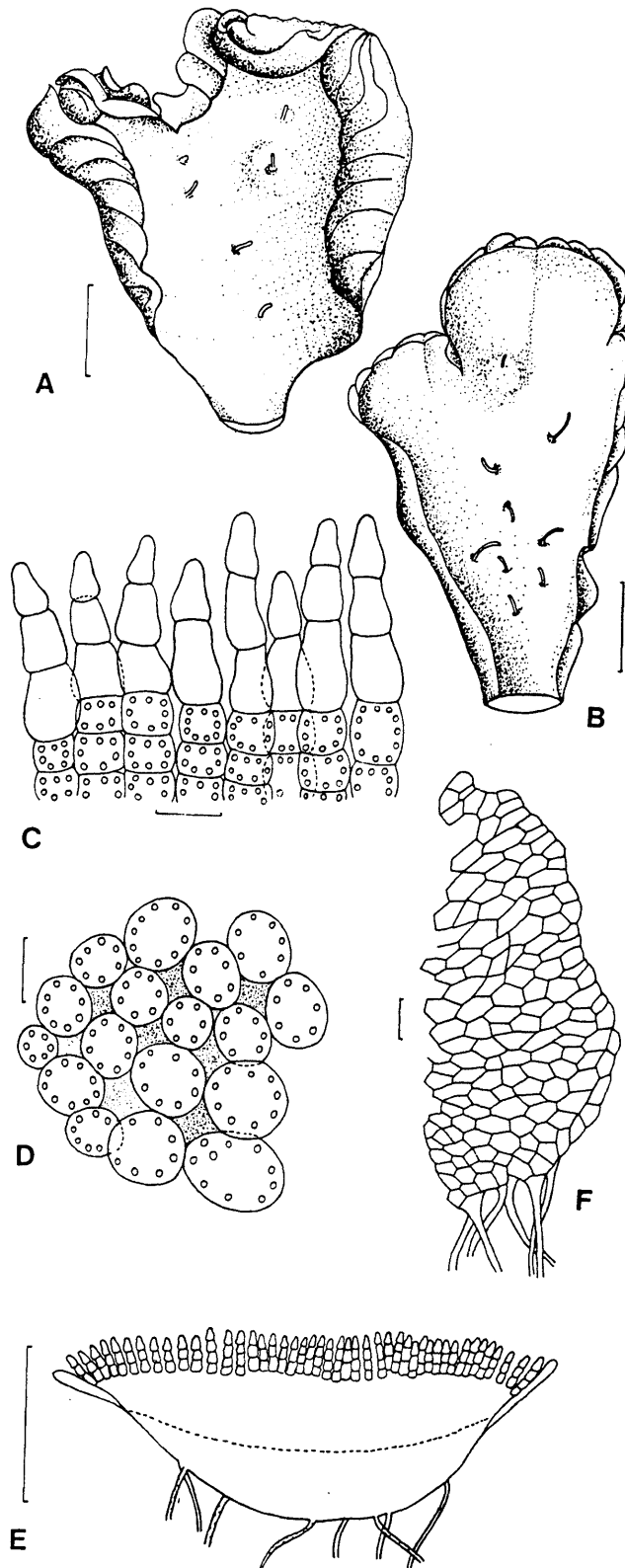


FIGURE 26.—*Riccia ampullacea* (A–F): A, thallus dry; B, thallus wet; C, cross section of epithelial cell pillars and assimilation tissue below; D, horizontal section through assimilation tissue, air canals stippled; E, cross section of branch; F, scale. (A–F, *Van Rooy* 3573). Scale bars A, B, E = 1 mm; C, D = 50 µm; F = 100 µm.

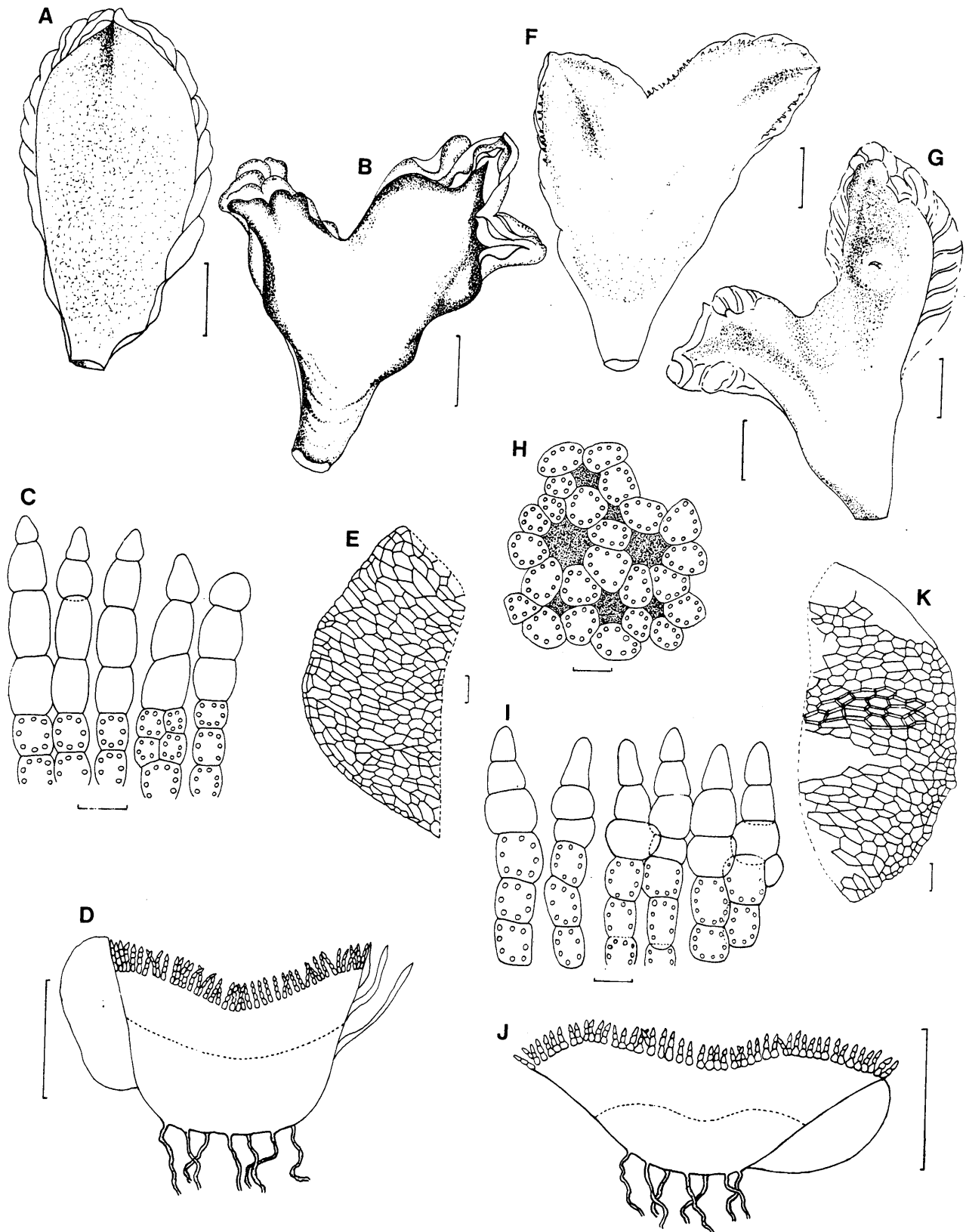


FIGURE 27.--*Riccia parvo-areolata* (A--E): A, thallus wet; B, thallus dry; C, cross section of epithelial cell pillars, assimilation tissue below; D, cross section of branch; E, scale. *R. albovesita* (F--K): F, thallus wet; G, thallus dry; H, horizontal section through assimilation tissue, air canals stippled; I, cross section of short tapering epithelial cell pillars, assimilation tissue below; J, cross section of branch; K, scale. (A, S.M. Perold 1727; B, C, D, S.M. Perold 1726; E, J.M. Perold 26; F, G, Smook 6583). Scale bars A, B, D, F, G, J = 1 mm; C, H, I = 50  $\mu$ m; E, K = 100  $\mu$ m.

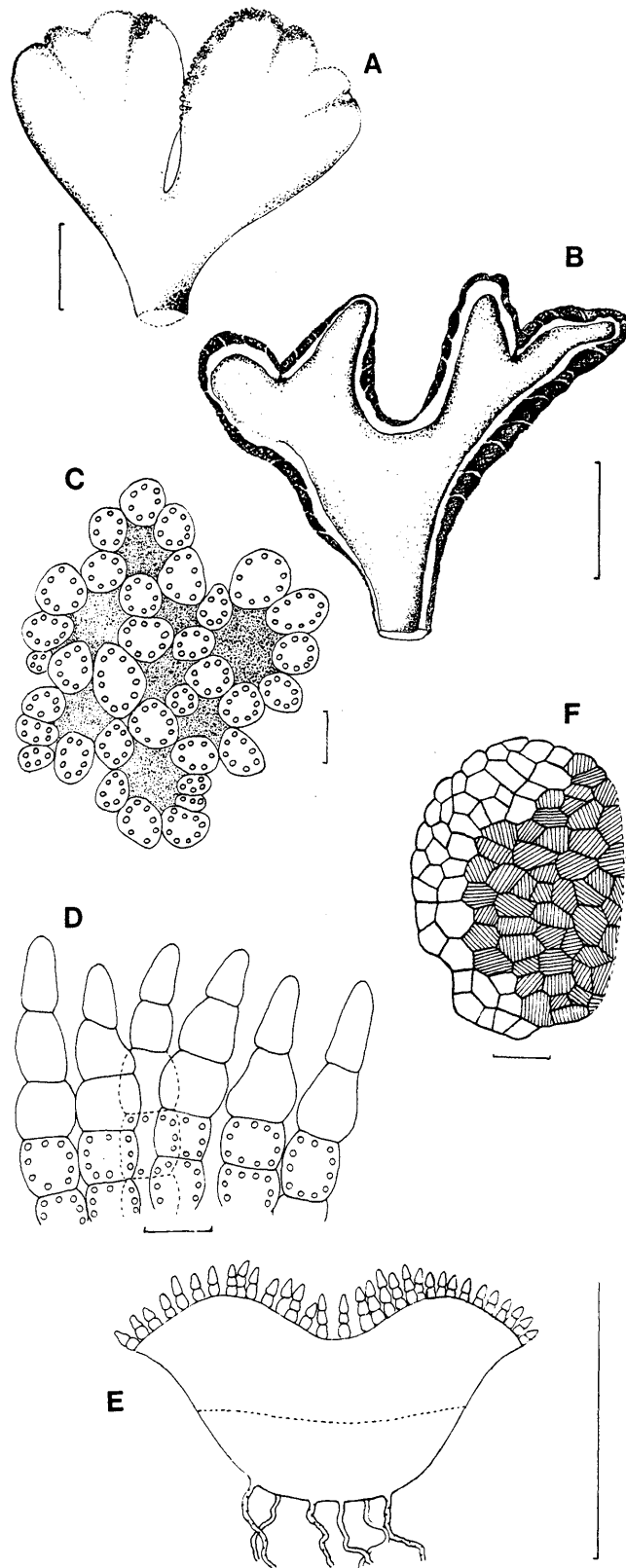


FIGURE 28.—*Riccia alatospora* (A–F): A, thallus wet; B, thallus dry; C, horizontal section through assimilation tissue, air canals stippled; D, cross section of epithelial cell pillars, assimilation tissue below; E, cross section of branch; F, scale. (A, C–E, *Oliver* 9025; B, F, *S.M. Perold* 468). Scale bars A, B, E = 1 mm; C, D = 50  $\mu$ m; F = 100  $\mu$ m.

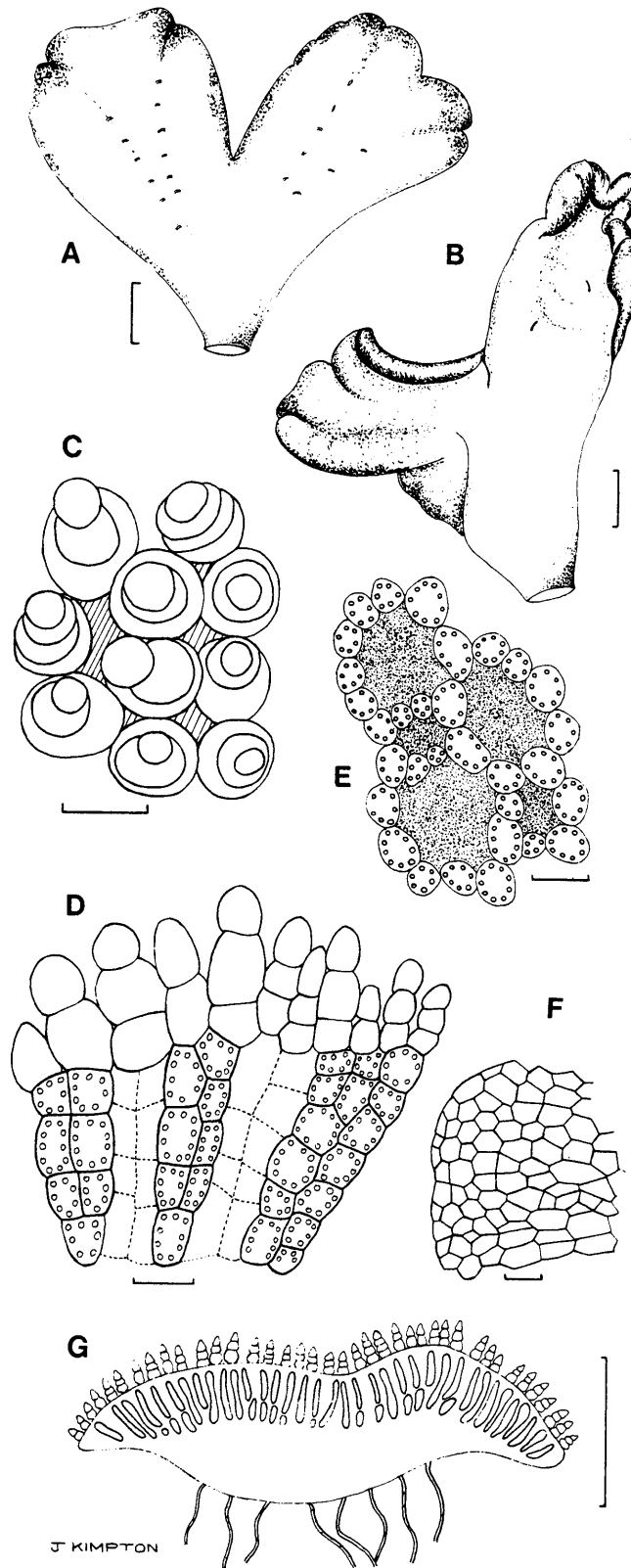


FIGURE 29.—*Riccia hantamensis* (A–G) = A, male thallus wet; B, female thallus dry; C, short tapering epithelial cell pillars and air pores (hatched) from above; D, cross section of epithelial cell pillars, assimilation tissue below, with wider air canals; E, horizontal section through assimilation tissue, air canals stippled; F, scale; G, cross section of branch. (A, C–E, G, *Germishuizen* 4034; B, F, *S.M. Perold* 1830). Scale bars A, B, G = 1 mm; C–E = 50  $\mu$ m; F = 100  $\mu$ m.

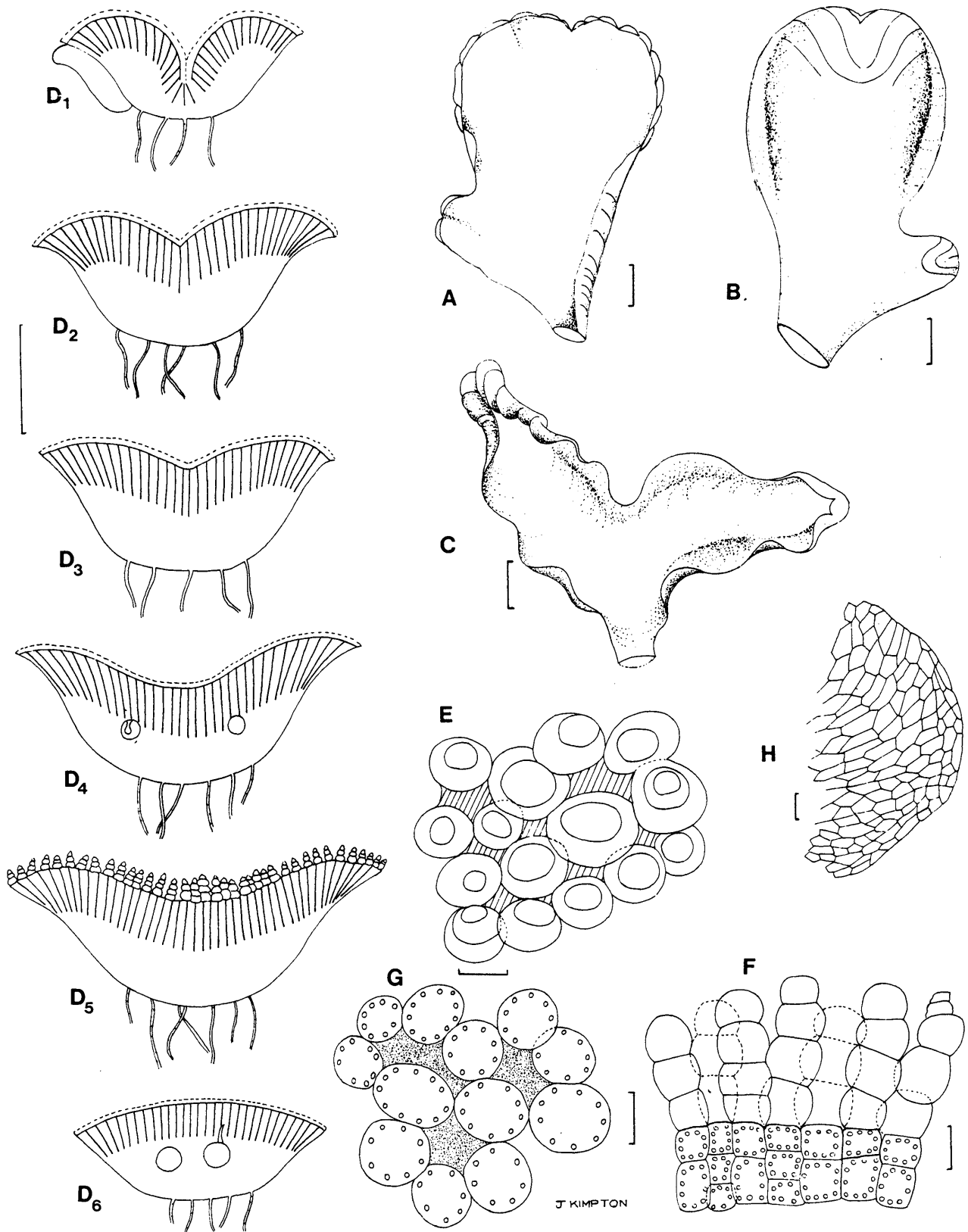


FIGURE 30.—*Riccia concava* (A–H): A, thallus wet; B, ventral face of thallus; C, thallus dry; D, cross sections of branch at different distances from apex to base; E, epithelial cells and air pores (hatched) from above; F, cross section of epithelial cell pillars and assimilation tissue below; G, horizontal section through assimilation tissue, air canals stippled; H, scale. (A, B, D, *S.M. Perold* 1431; C, *S.M. Perold* 1899; E, H, *Morley* 214; F, *S.M. Perold* 1447; G, *Moll* 6015). Scale bars A–D = 1 mm; E–G = 50  $\mu$ m; H = 100  $\mu$ m.

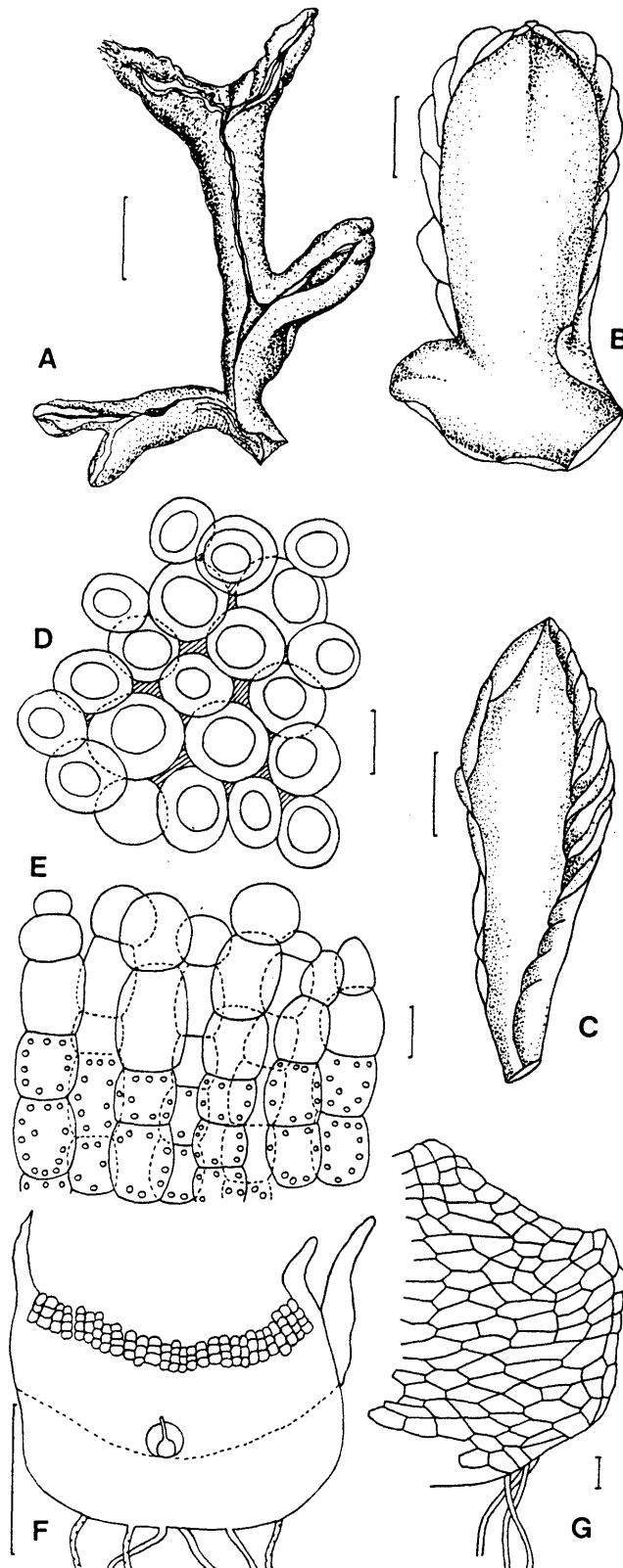


FIGURE 31.--*Riccia elongata* (A--G): A, thallus dry; B, thallus wet and fully expanded; C, thallus generally with partly inflexed sides; D, epithelial cells and air pores (hatched) from above; E, cross section of epithelial cell pillars and assimilation tissue below; F, cross section of branch, scales projecting beyond margins; G, scale. (A, D--G, *S.M. Perold* 2476; B, C, *S.M. Perold* 2018). Scale bars A--C, F = 1 mm; D, E, = 50  $\mu$ m; G = 100  $\mu$ m.

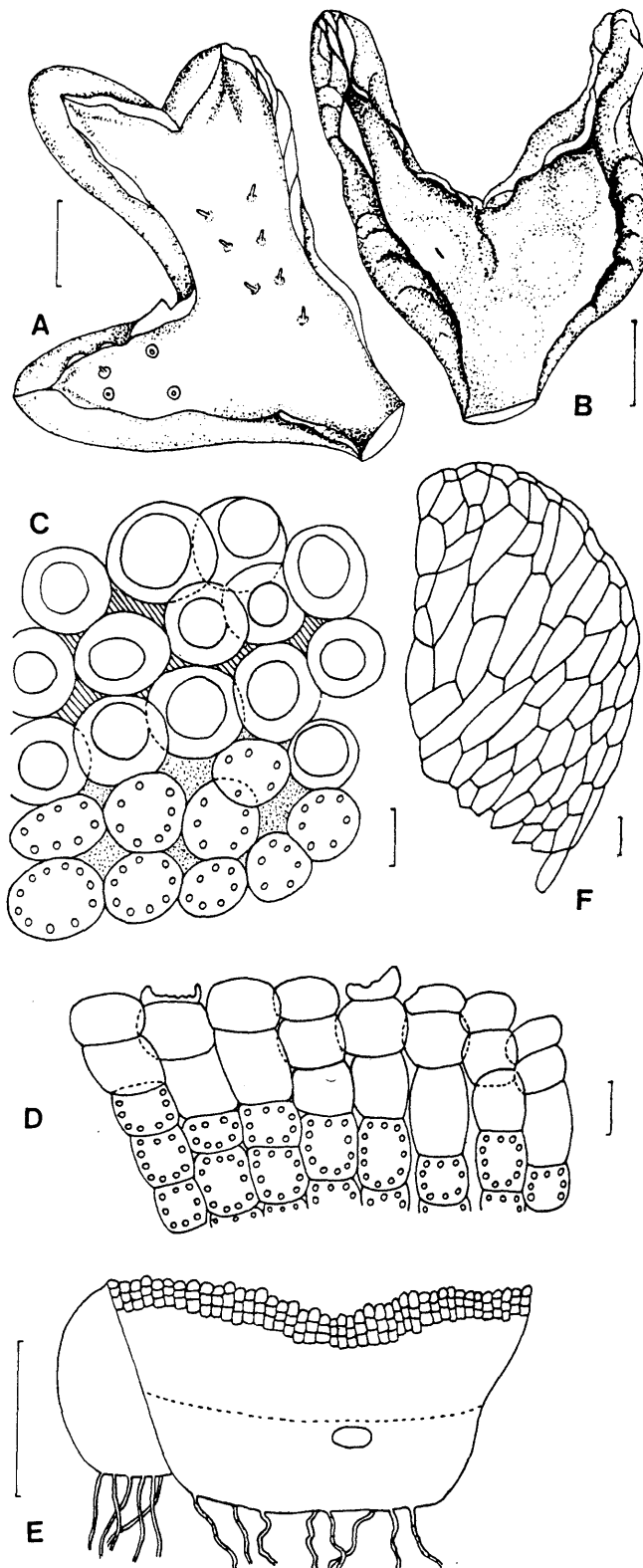


FIGURE 32.—*Riccia trachyglossum* (A--F): A, thallus wet; B, thallus dry; C, epithelial cell pillars and air pores (hatched) seen from above, assimilation tissue with air canals below; D, cross section of epithelial cell pillars and assimilation tissue; E, cross section of branch; F, scale. (A, C, D, F, *S.M. Perold* 2530; B, *Van Rooy* 3539; E, *J.M. Perold* 33). Scale bars on A, B, E = 1 mm; C, D = 50  $\mu$ m; F = 100  $\mu$ m.

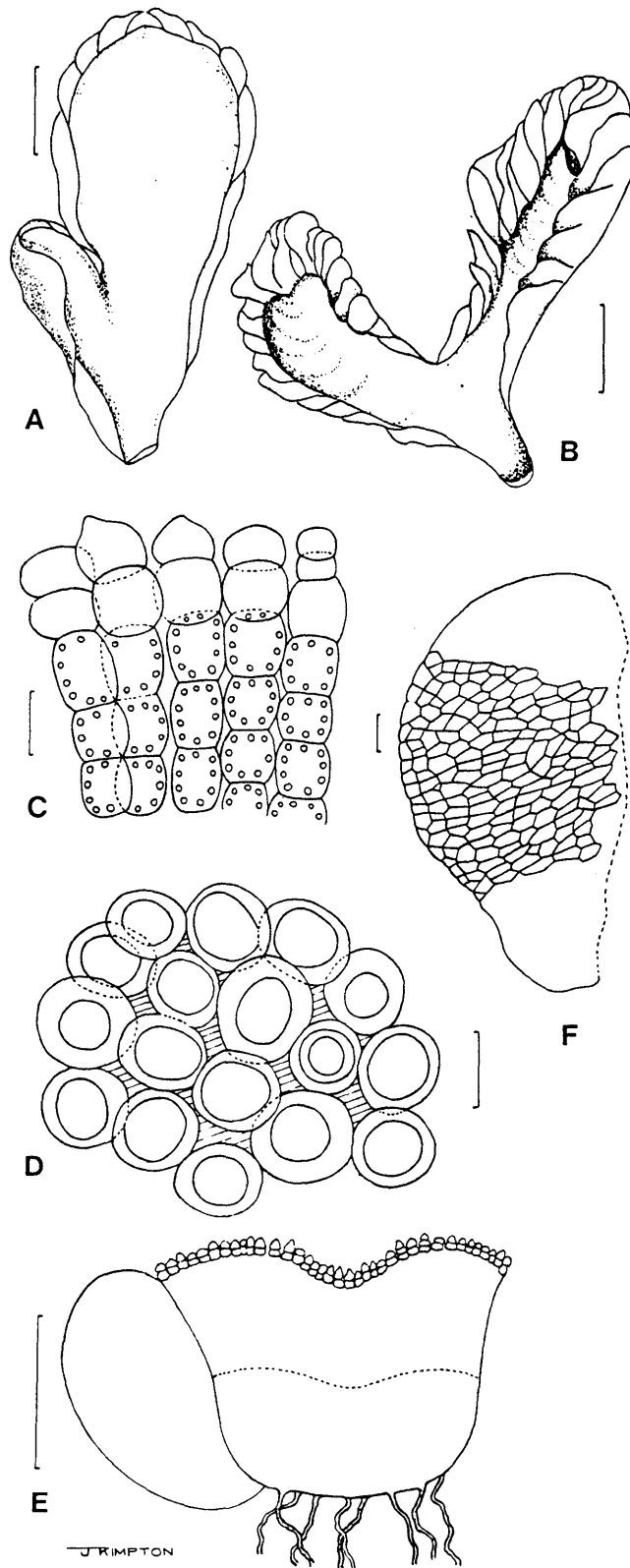


FIGURE 33.—*Riccia furfuracea* (A--F): A, thallus wet; B, thallus dry; C, cross section of epithelial cell pillars and assimilation tissue below; D, epithelial cells and air pores (hatched) from above; E, cross section of branch; F, scale. (A, *S.M. Perold* 2180; B, *Oliver* 8910; C, D, *S.M. Perold* 1476; E, *S.M. Perold* 1398a; F, *S.M. Perold* 1475). Scale bars A, B, E = 1 mm; C, D = 50  $\mu$ m; F = 100  $\mu$ m.



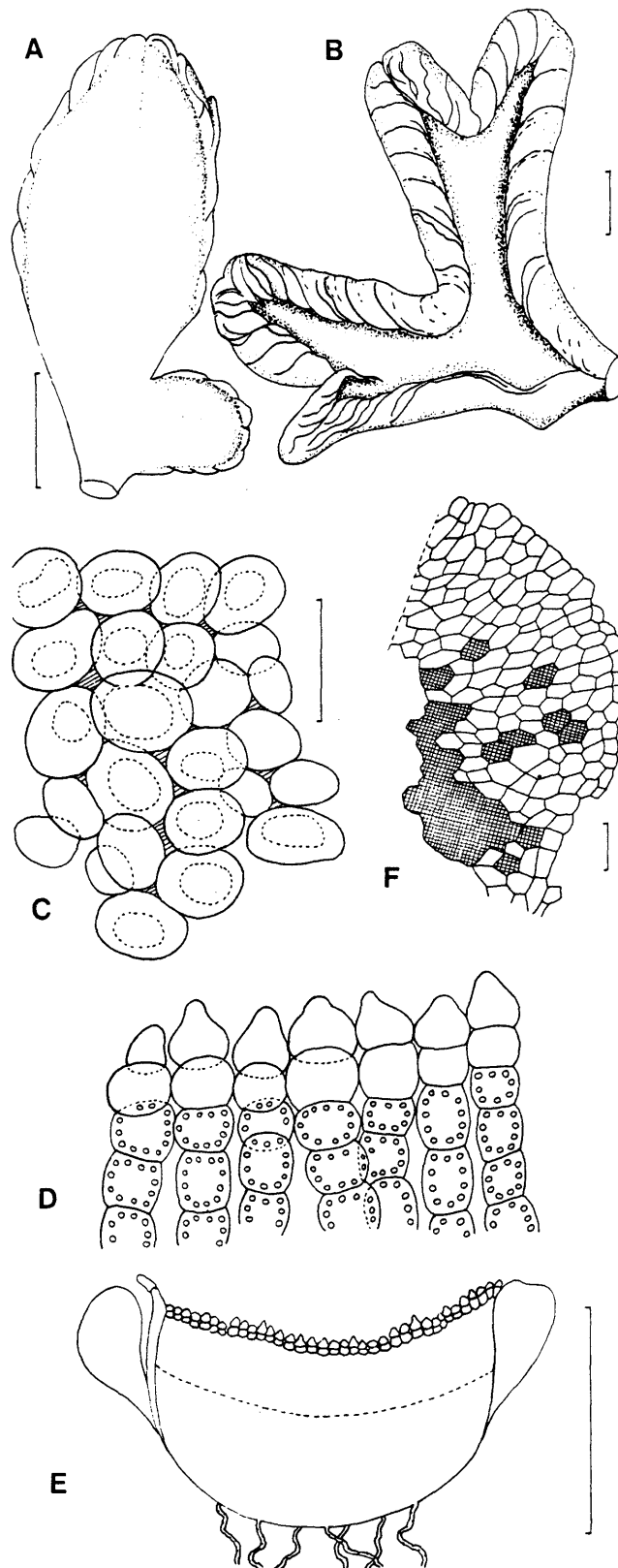


FIGURE 34.—*Riccia pulveracea* (A–F): A, thallus wet; B, thallus dry; C, epithelial cells and air pores (hatched) from above; D, cross section of epithelial cells and assimilation tissue below; E, cross section of branch; F, scale. (A–F, Smook 6962c). Scale bars A, B, E = 1 mm; C, D = 50  $\mu$ m; F = 100  $\mu$ m.

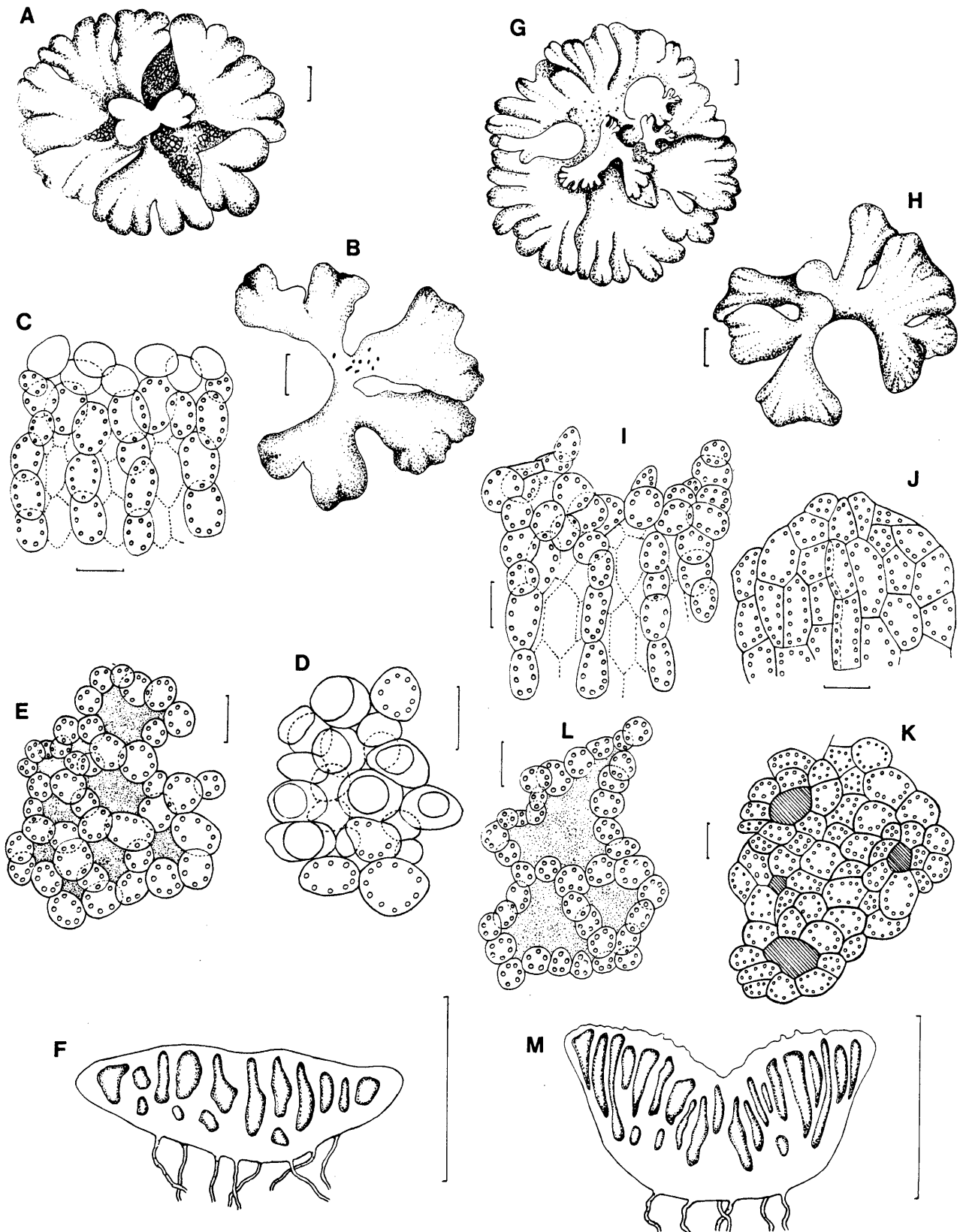
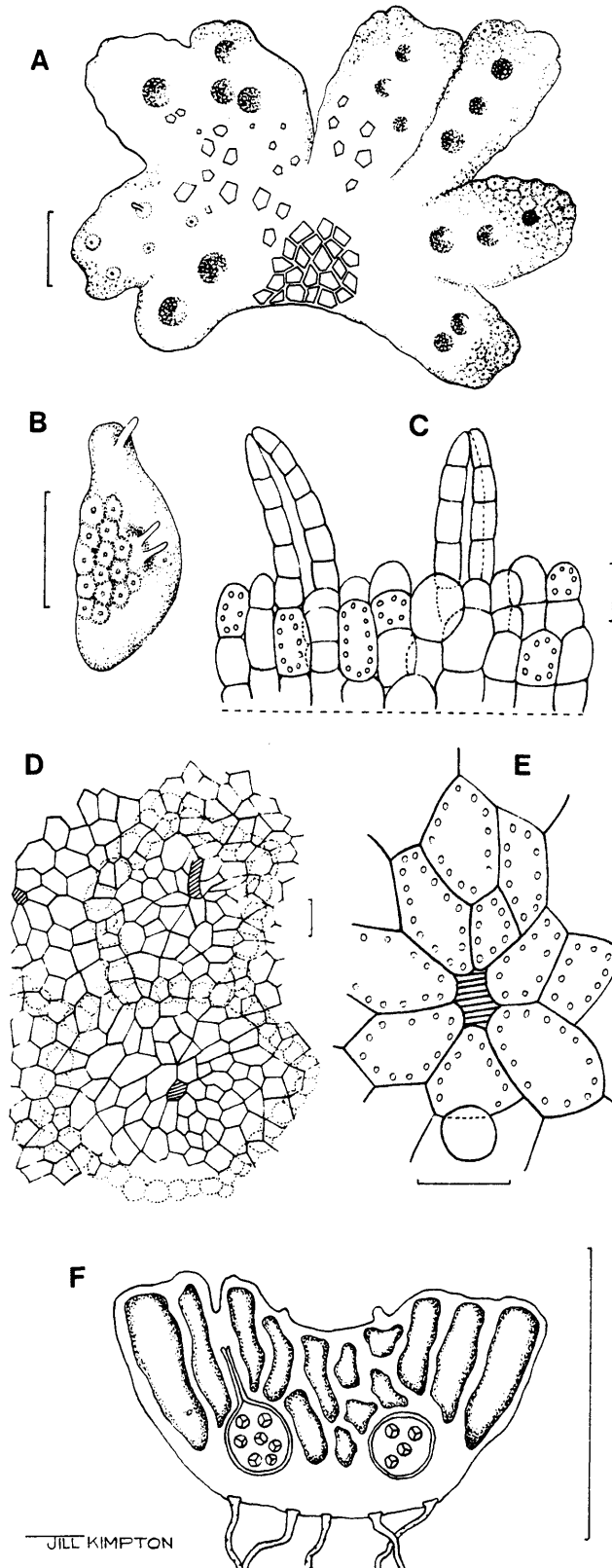


FIGURE 35.--*Riccia crystallina* (A--F): A, complete rosette; B, partial rosette; C, cross section of epidermal cells and assimilation tissue below; D, epidermal cells from above; E, horizontal section through assimilation tissue, air canals stippled; F, cross section of branch. *R. cavernosa* (G--M): G, complete rosette; H, partial rosette; I, cross section of epidermal cells and assimilation tissue below; J, dorsal epidermis forming a 'dome' over larger air chamber; K, several epidermal 'domes' and air pores (hatched) from above; L, horizontal section through air chambers (stippled); M, cross section of branch. (A, D, E, F, *Koekemoer* 103; B, *S.M. Perold* 2428; C, *S.M. Perold* 455; G--I, L, *Arnold* 4323; J, K, M, *S.M. Perold* 453). Scale bars A, B, F--H, M = 1 mm; C--E, I--L = 50  $\mu$ m.



JILL KIMPTON

FIGURE 36.—*Riccia cupulifera* (A–F): A, female thallus in partial rosette; B, small male thallus; C, longitudinal section of same, with two antheridial necks; D, epidermal cells and air pores (hatched) overlying air chambers, as seen from above; E, air pore (hatched) with surrounding cells, only one of scattered rounded cells shown, seen from above; F, cross section of branch. (A–C, *S.M. Perold* 2395; D–F, *Oliver* 8043). Scale bars A, B, F = 1 mm; C, E = 50  $\mu$ m; D = 100  $\mu$ m.

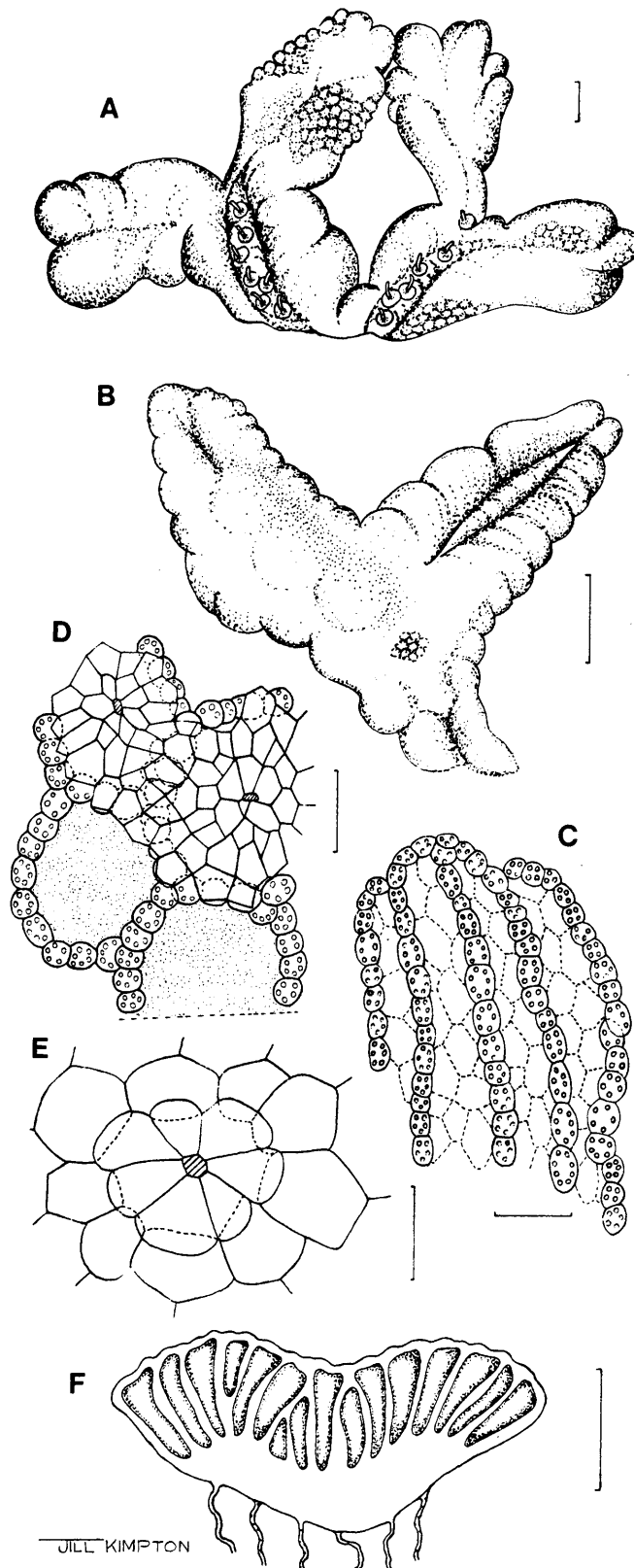


FIGURE 37.—*Riccia bullosa* (A–F): A, male thallus; B, female thallus; C, cross section of epidermis and assimilation tissue; D, epidermal cells and air pores (hatched) overlying air chambers, the latter exposed (and stippled) below; E, air pore (hatched) and surrounding cells as seen from above; F, cross section of branch. (A, B, *S.M. Perold* 467; C–F, *Van Rooy* 3541). Scale bars A, B, F = 1 mm; C, D = 100 µm; E = 50 µm.

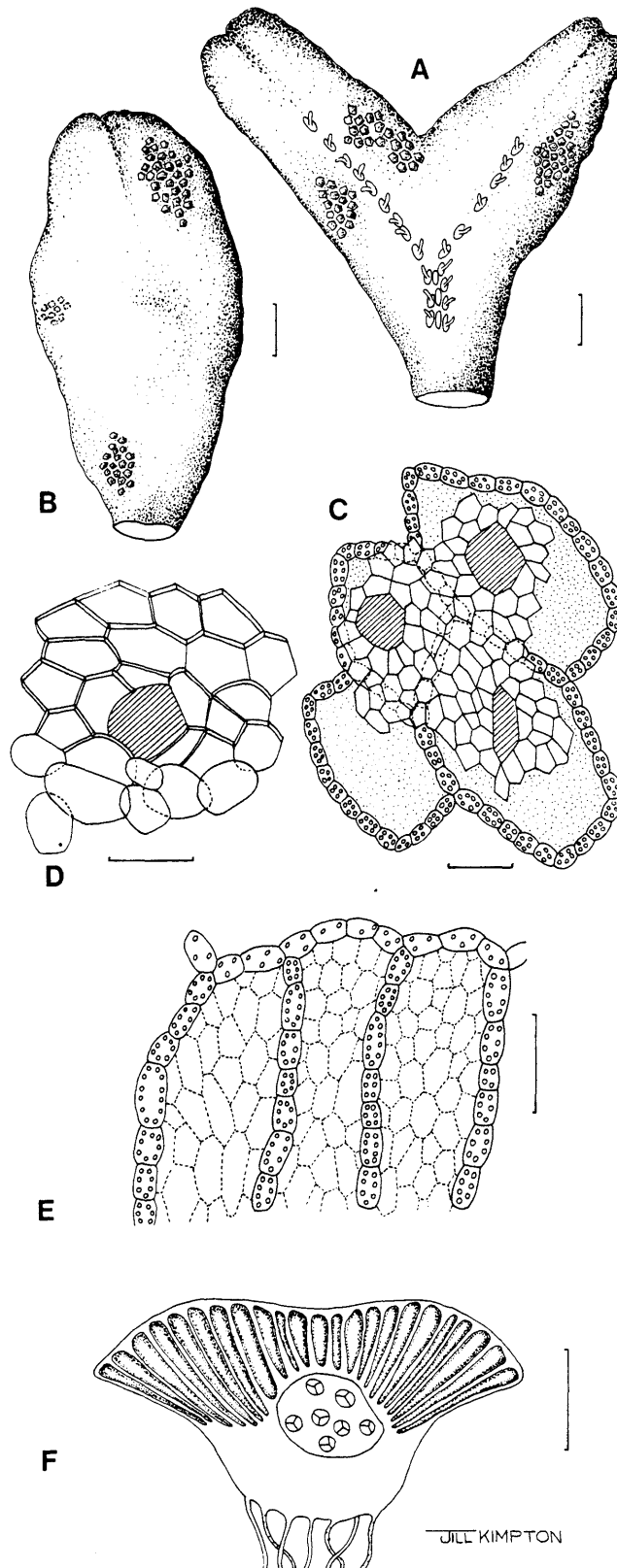


FIGURE 38.—*Riccia garsidei* (A–E): A, male thallus; B, female thallus; C, epidermal cells and air pores (hatched) overlying air chambers, as seen from above; D, air pore (hatched) with surrounding cells; E, cross section of part of thallus through air chambers; F, cross section of branch. (A–F, *Duthie 15/11/1937*). Scale bars A, B, F = 1 mm; C, E = 100  $\mu$ m; D = 50  $\mu$ m.

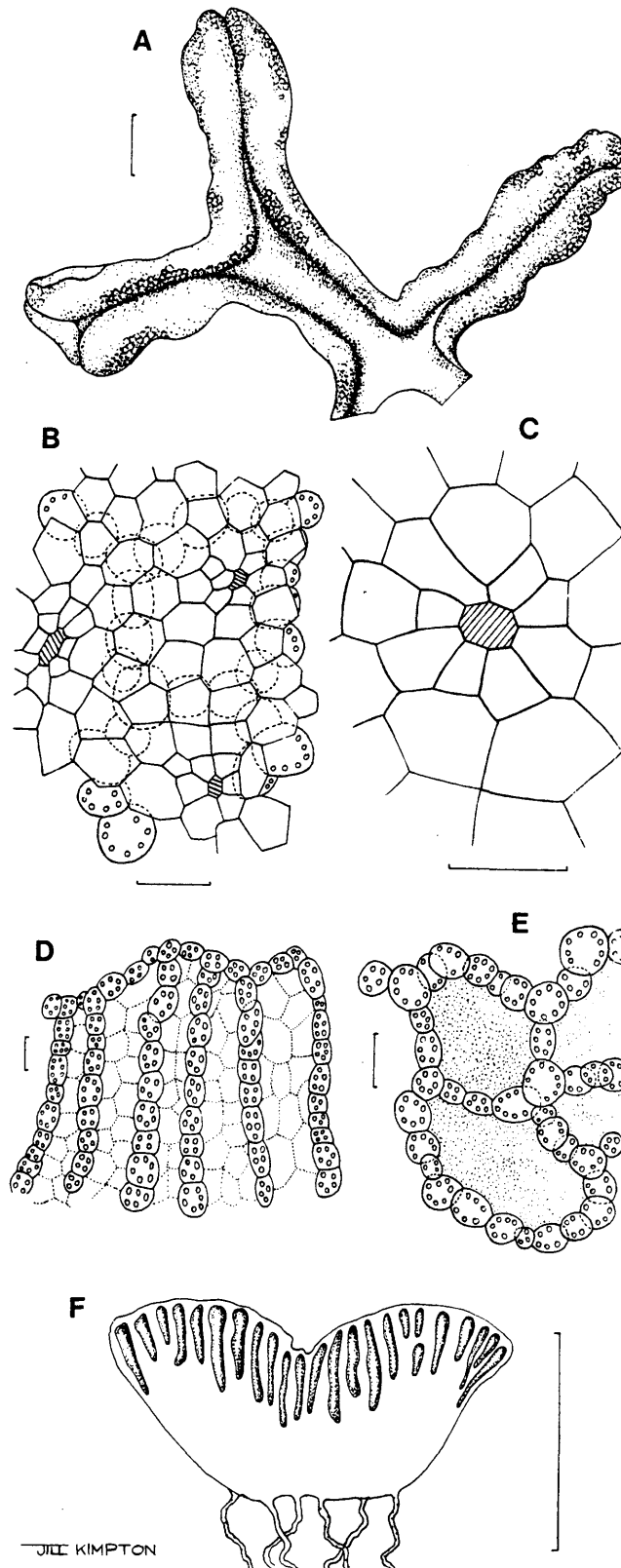


FIGURE 39.—*Riccia volkii* (A–F): A, thallus; B, epidermal cells and air pores (hatched), overlying air chambers, as seen from above; C, air pore (hatched) and surrounding cells from above; D, cross section of epidermis and assimilation tissue below; E, horizontal section through air chambers (stippled); F, cross section of branch. (A, *S.M. Perold* 433; B–F, *S.M. Perold* 2472). Scale bars A, F = 1 mm; B, D, E = 100  $\mu$ m; C = 50  $\mu$ m.

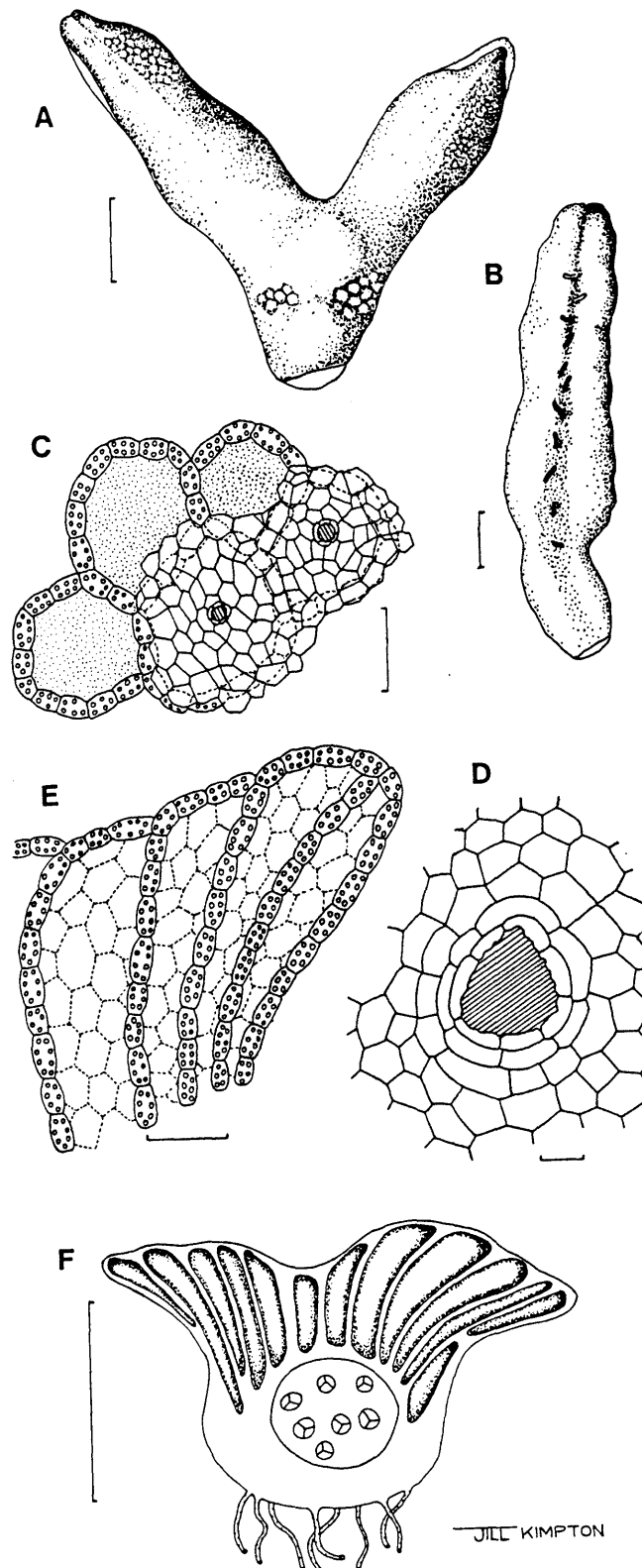


FIGURE 40.—*Riccia rubricollis* (A–F): A, female thallus; B, male thallus; C, epidermal cells and air pores (hatched), overlying air chambers, as seen from above; D, air pore (hatched) with surrounding cells; E, cross section of part of thallus showing air chambers; F, cross section of female thallus. (A–F, *Duthie* 5014). Scale bars A, B, F = 1 mm; C, E = 100  $\mu$ m; D = 50  $\mu$ m.

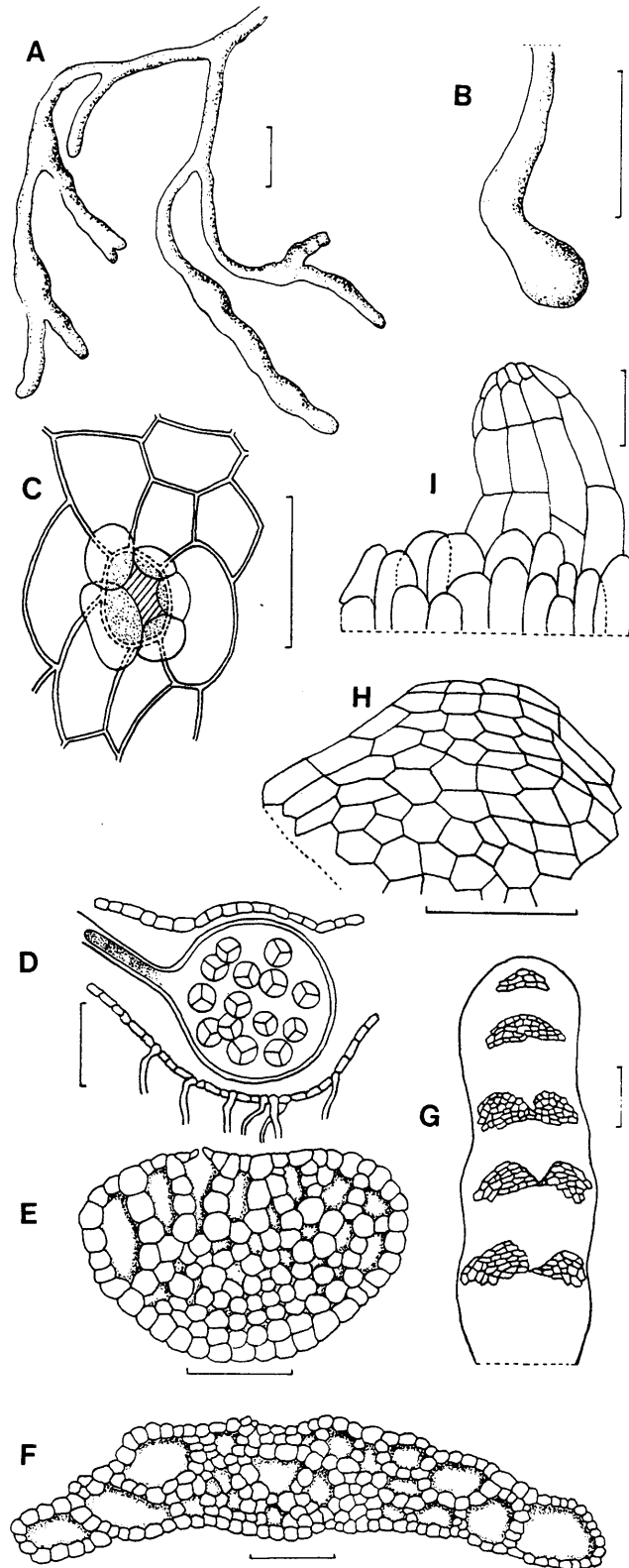


FIGURE 41.—*Riccia stricta* (A--G): A, thallus; B, ventral stolon; C, air pore (hatched) with thin-walled surrounding cells and thicker-walled epidermal cells, part of air chamber stippled; D, longitudinal section through sporangium; E, cross section of narrow branch from drier habitat; F, cross section of thin, wide branch from wet habitat; G, ventral face with scales, apically single, others split into two; H, single scale; I, antheridial neck with basal collar of conical cells. (A, *Van Rooy* 3539; B, *Van Zinderen-Bakker* 7472; C, *S.M. Perold* 861; D, *S.M. Perold* 365; E, G, *S.M. Perold* 354; F, *Magill* 6592; H, *T.R. Sim* PRE-CH 1119; I, *S.M. Perold* 842). Scale bars A, B = 1 mm; C, I = 50  $\mu$ m; D, F, G = 200  $\mu$ m; E, H = 100  $\mu$ m.



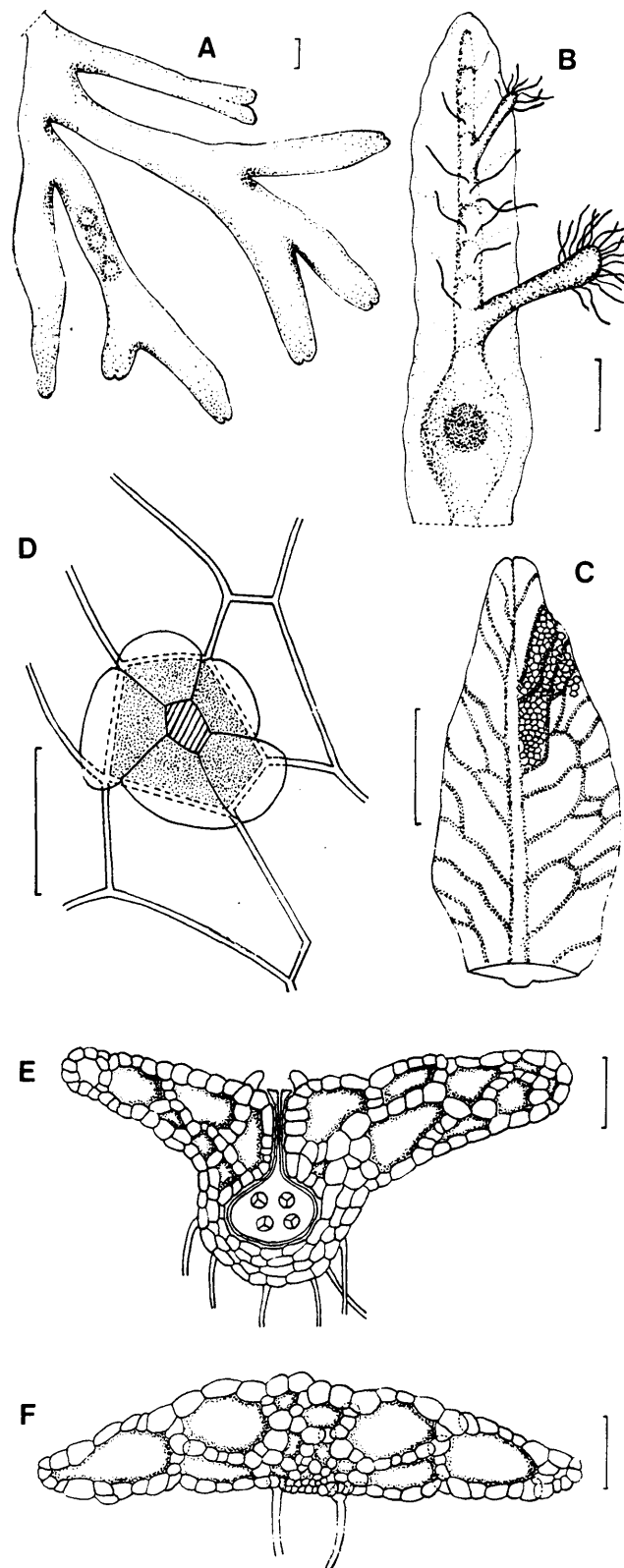
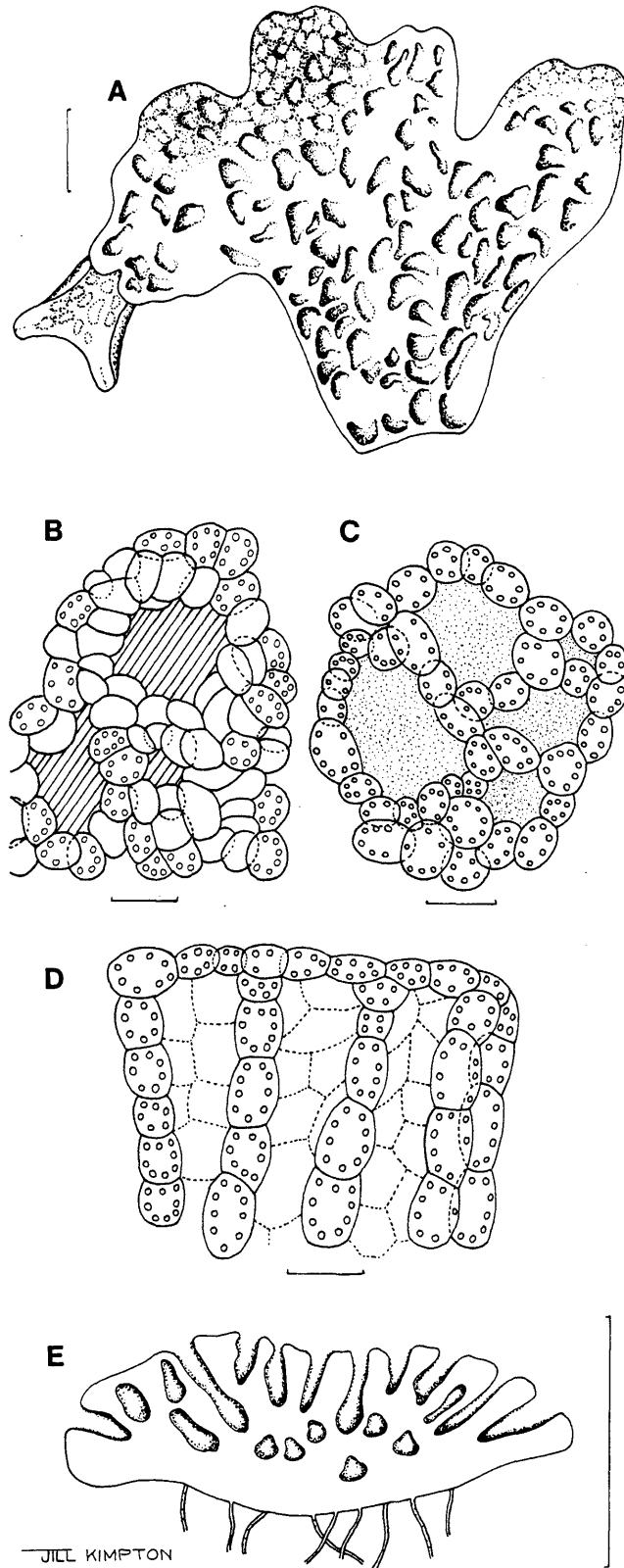


FIGURE 42.—*Riccia purpurascens* (A–F): A, thallus; B, ventral face with stolons and sporangium; C, dorsal face with air chambers and epidermal cells partly drawn in; D, air pore (hatched), with thin-walled surrounding cells and thicker-walled epidermal cells, part of air chamber stippled; E, cross section of branch at sporangium; F, cross section of sterile part of branch. (A, B, F, *Morley* 291; C, *S.M. Perold* 1941; D, E, *S.M. Perold* 1170). Scale bars A, B, C = 1 mm; D = 50  $\mu$ m; E, F = 200  $\mu$ m.



JILL KIMPTON

FIGURE 43.--*Riccia curtisii* (A--E): A, female thallus with small male thallus projecting from underneath, at the left side; B, epidermal cells and air pores (hatched) from above; C, horizontal section through assimilation tissue, air chambers stippled; D, cross section of epidermis and assimilation tissue; E, cross section of branch. (A, *S.M. Perold* 641; B--E, *S.M. Perold* 2395a). Scale bars A, E = 1 mm; B--D = 100  $\mu$ m.

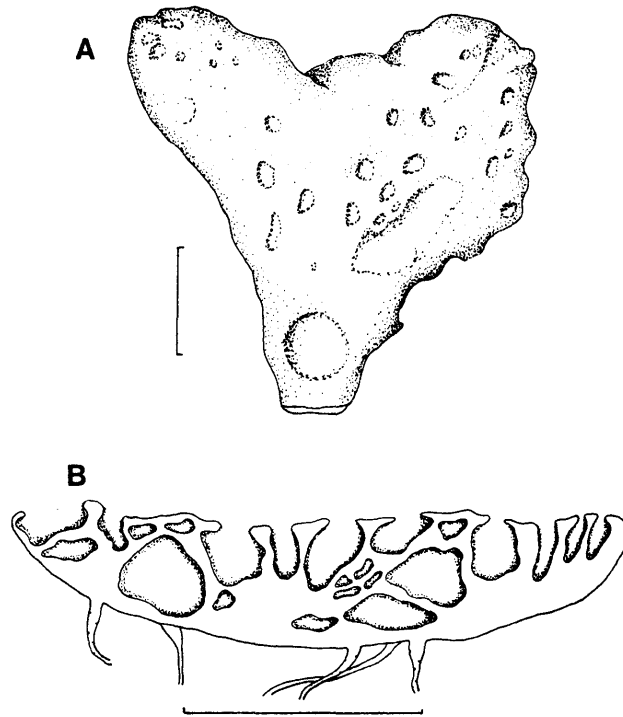


FIGURE 44.--*Riccia perssonii* (A, B): A, female thallus; B, cross section of branch. (A, B, Volk 2059). Scale bars A, B = 1 mm.

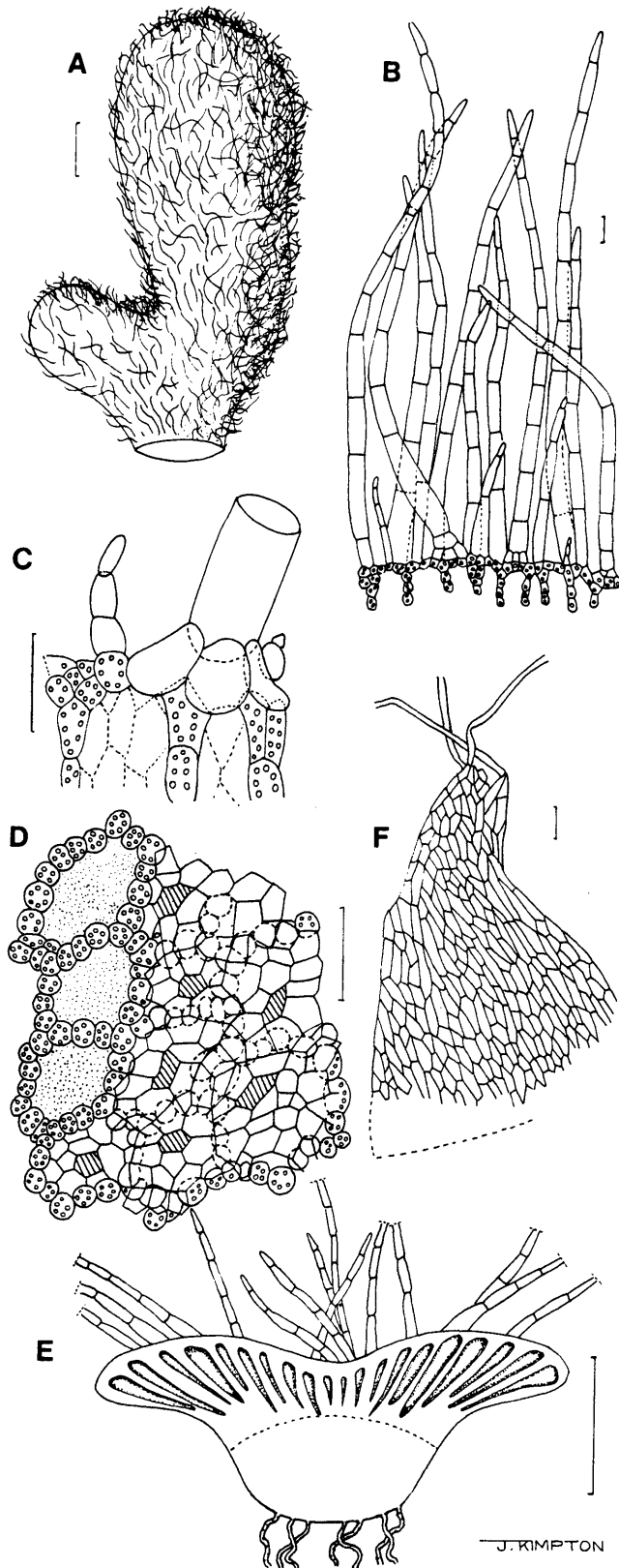


FIGURE 45.—*Riccia tomentosa* (A–F): A, thallus; B, cross section of dorsal hair pillars and top of assimilation tissue below; C, at right, cells supporting base of large hair; at left small hair; below assimilation tissue; D, as viewed from below, horizontal section near dorsal surface: on the left, air chambers (stippled) exposed; on the right, air pores (hatched) and epidermis; E, cross section of branch; F, scale. (A, *S.M. Perold* 1495; B–D, F, *S.M. Perold & M.J.A.W. Crosby* 2157; E, *S.M. Perold* 1556). Scale bars A, E = 1 mm; B–D, F = 100  $\mu$ m.

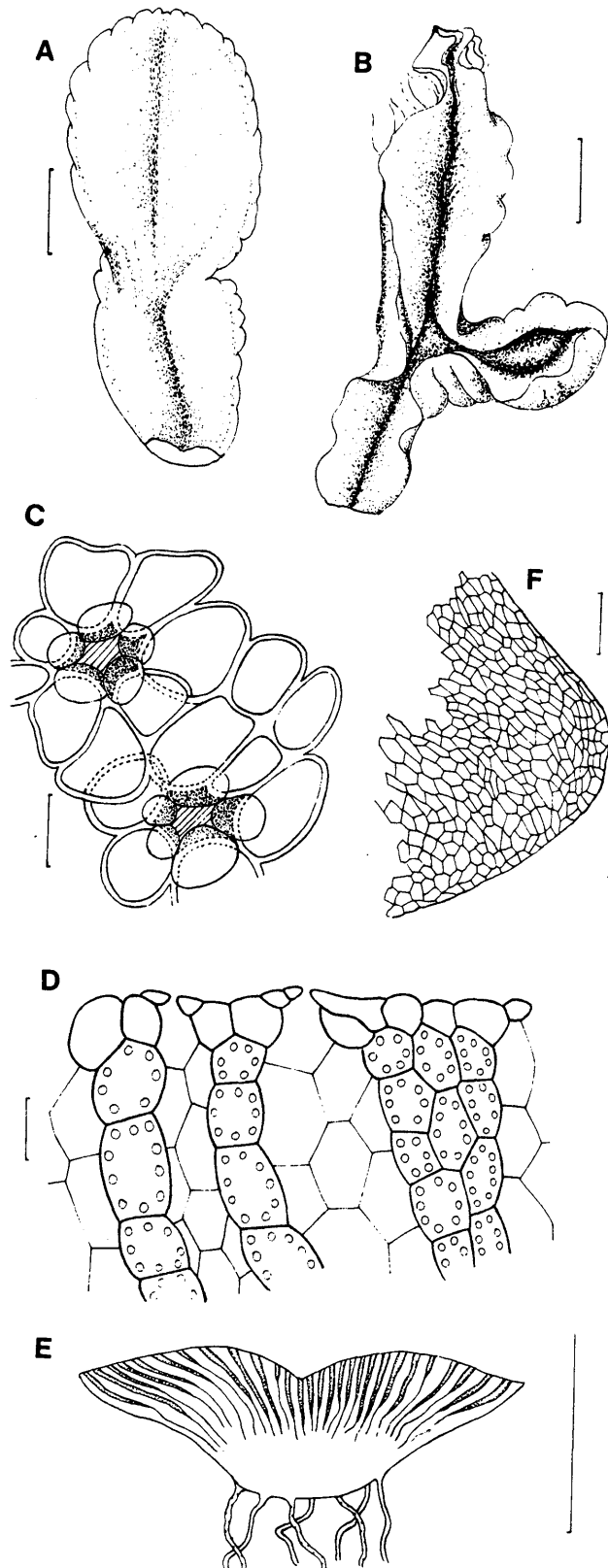


FIGURE 46.—*Riccia schelpei* (A--F): A, thallus wet; B, thallus dry; C, thick-walled epidermal cells with small, thin-walled cells surrounding the air pores (hatched), air chambers below, partly stippled, seen from above; D, cross section of epidermis and assimilation tissue; E, cross section of branch; F, scale. (A, *S.M. Perold* 1422 p.p.; B, *S.M. Perold* 2052; C--E, *Oliver* 8041; F, *C.M. van Wyk* 2524). Scale bars A, B, E = 1 mm; C, D = 50  $\mu$ m; F = 100  $\mu$ m.

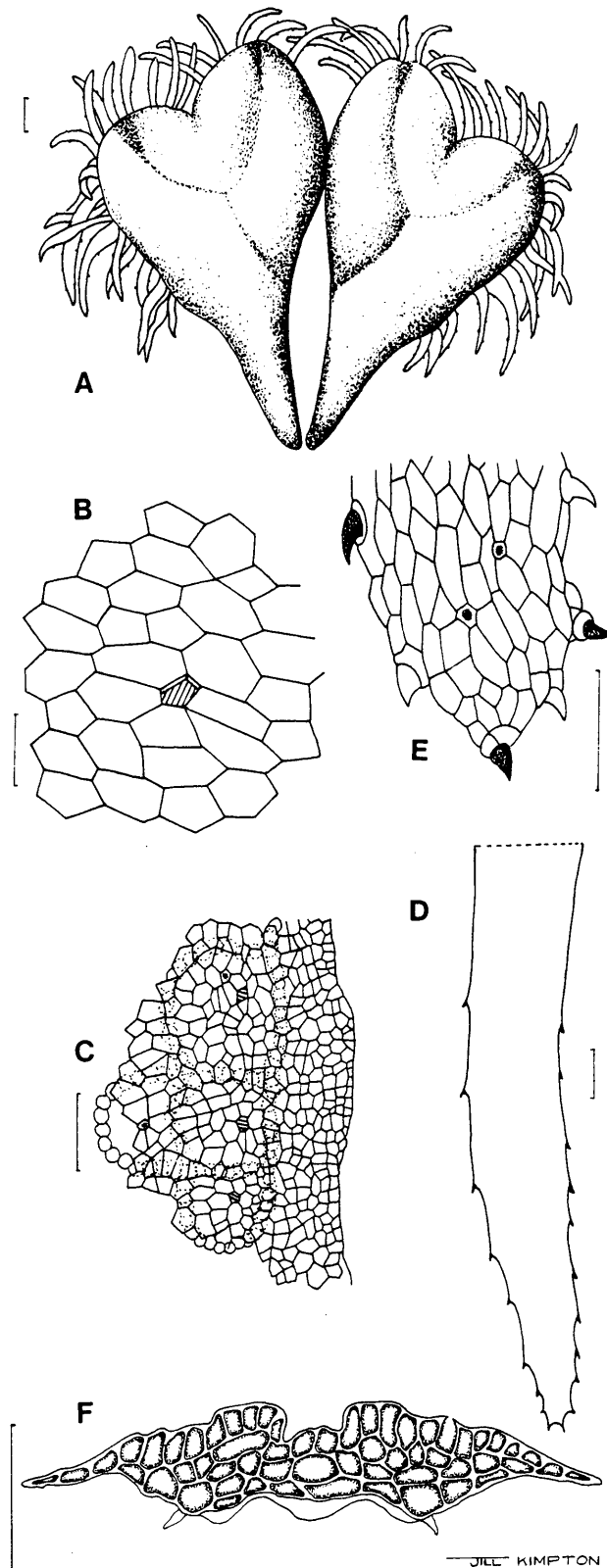


FIGURE 47.—*Ricciocarpus natans* (A–F): A, thallus of aquatic form; B, dorsal epidermis and air pore (hatched); C, dorsal epidermis with air pores (hatched) and occasional oil cells (with solid specks), overlying air chambers left, thin marginal area right; D, scale; E, more enlarged tip of scale, showing oil cells (solid speck) and toothed margin; F, cross section of branch. (A–F, *Ward* s.n.). Scale bars A, F = 1 mm; B, E = 50  $\mu$ m; C, D = 100  $\mu$ m.

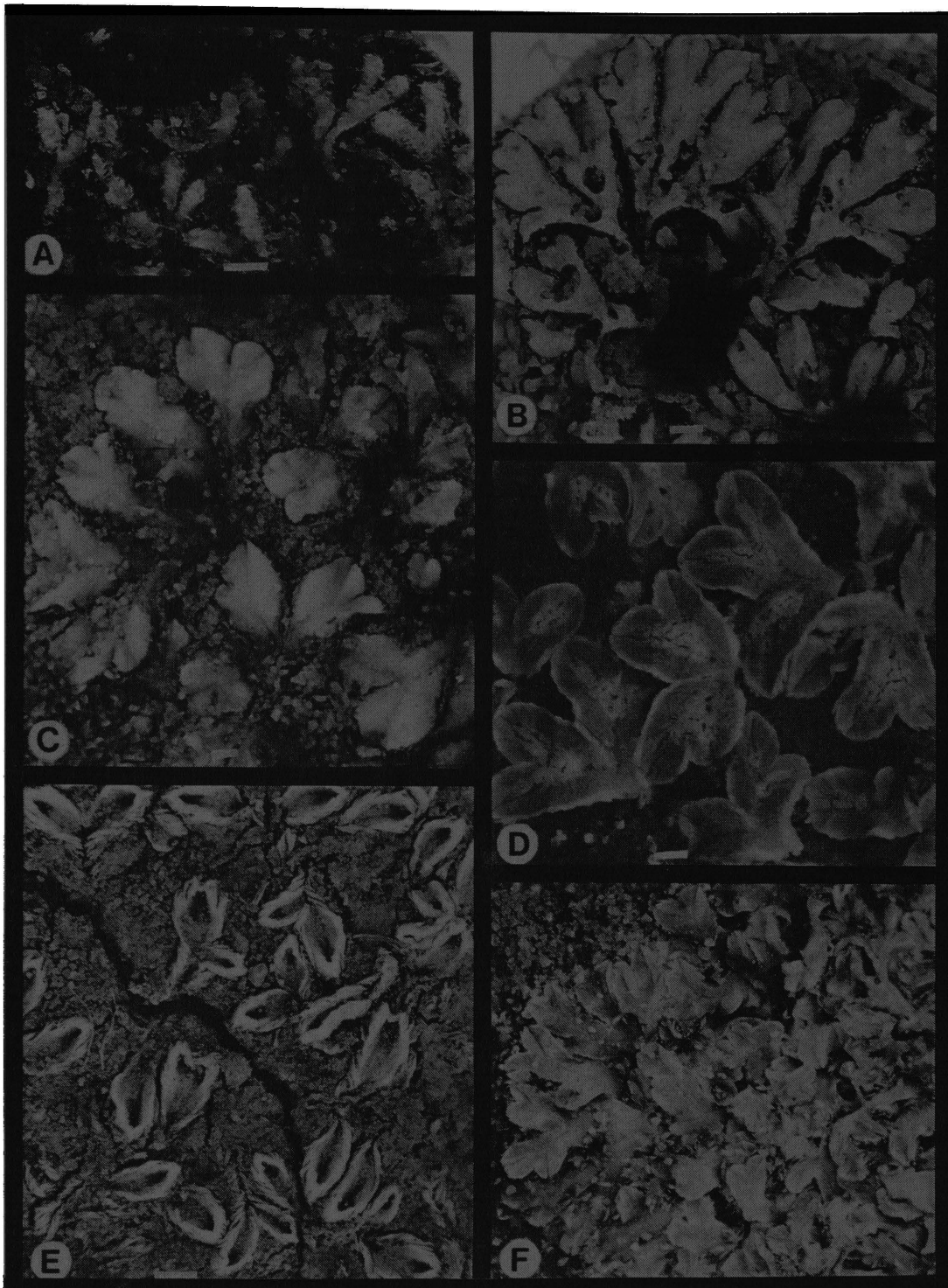


PLATE 1.--A, *Riccia microciliata*: branches; B, *R. okahandjana*: partial rosette; C, *R. congoana*: partial rosette; D, *R. albolimbata*: scattered branches; E, *R. argenteolimbata*: scattered branches; F, *R. montana*: crowded branches. (A, S.M. Perold 383; B, Van Rooy s.n.; C, Smook 5139; D, Volk 86/927; E, Volk 84/713; F, Oliver 8354). Scale bars A--F = 1 mm.

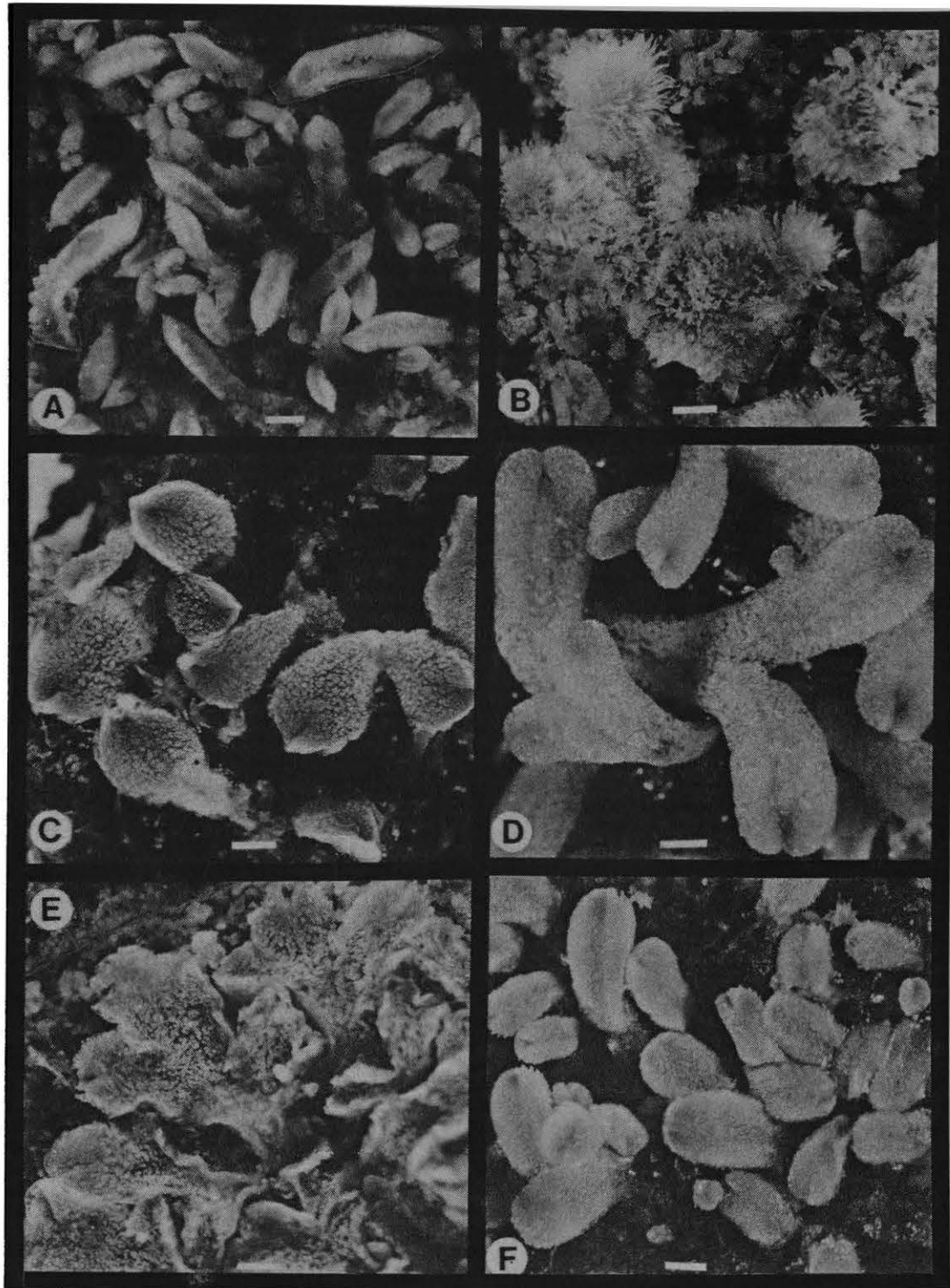


PLATE 2.—A, *Riccia villosa*: crowded thalli; B, *R. hirsuta*: scattered branches; C, *R. parvo-areolata*: scattered branches; D, *R. hantamensis*: overlapping branches; E, *R. namaquensis*: crowded thalli; F, *R. pulveracea*: crowded branches. (A, Oliver s.n.; B, S.M. Perold 2101; C, S.M. Perold 2136; D, S.M. Perold 1830; E, S.M. Perold 2136; F, Smook 6990). Scale bars A--F = 1 mm.



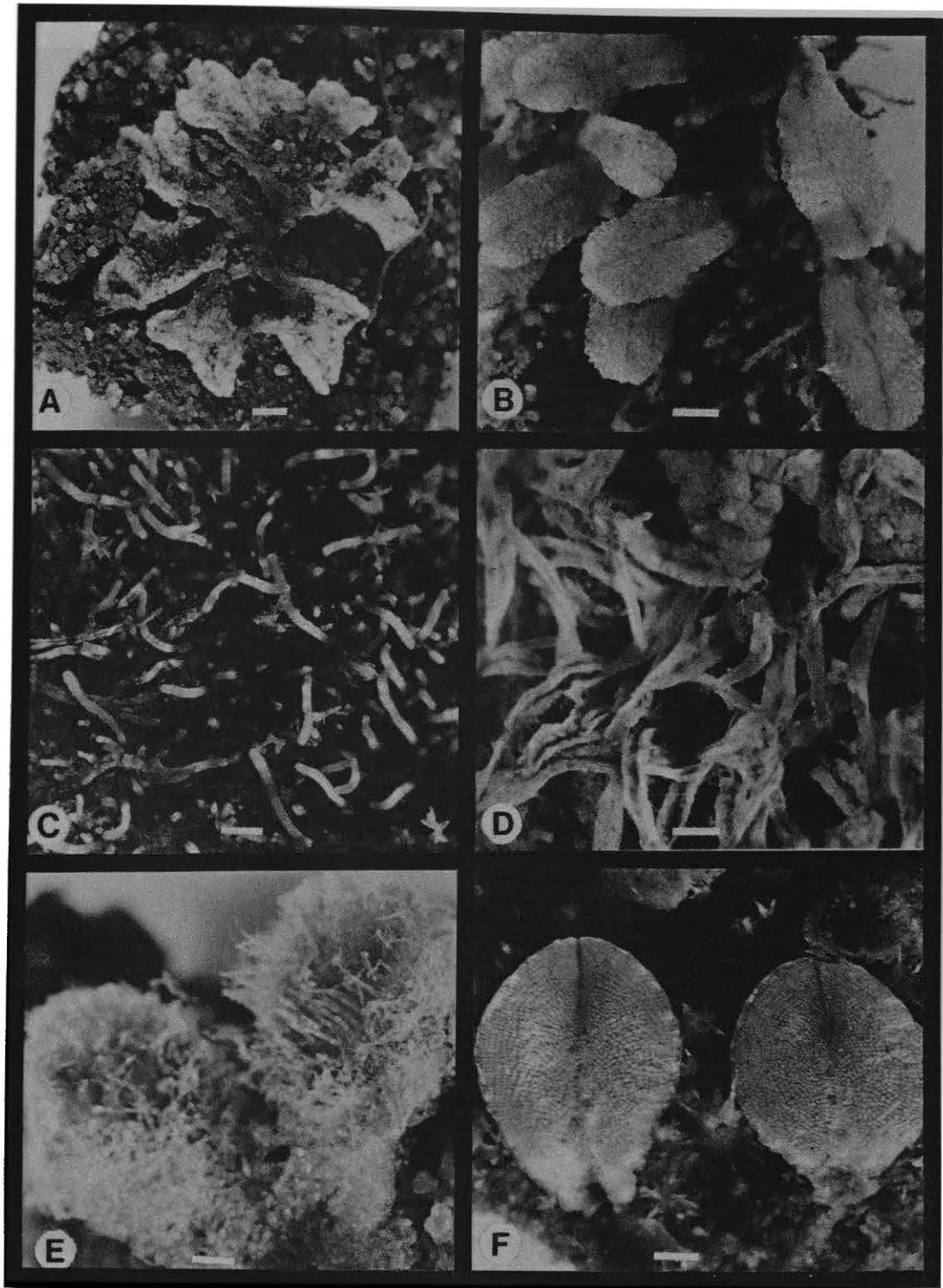


PLATE 3.—A, *Riccia cupulifera*: rosette; B, *R. volkii*: crowded branches; C, *R. stricta*: overlapping branches; D, *R. purpurascens*: overlapping branches; E, *R. tomentosa*: hairy branches; F, *R. schelpei*: deeply grooved branches. (A, S.M. Perold 2395; B, S.M. Perold 2472; C, S.M. Perold 2524; D, S.M. Perold 2386; E, S.M. Perold & M.J.A.W. Crosby 2157; F, S.M. Perold 1422). Scale bars A–F = 1 mm.

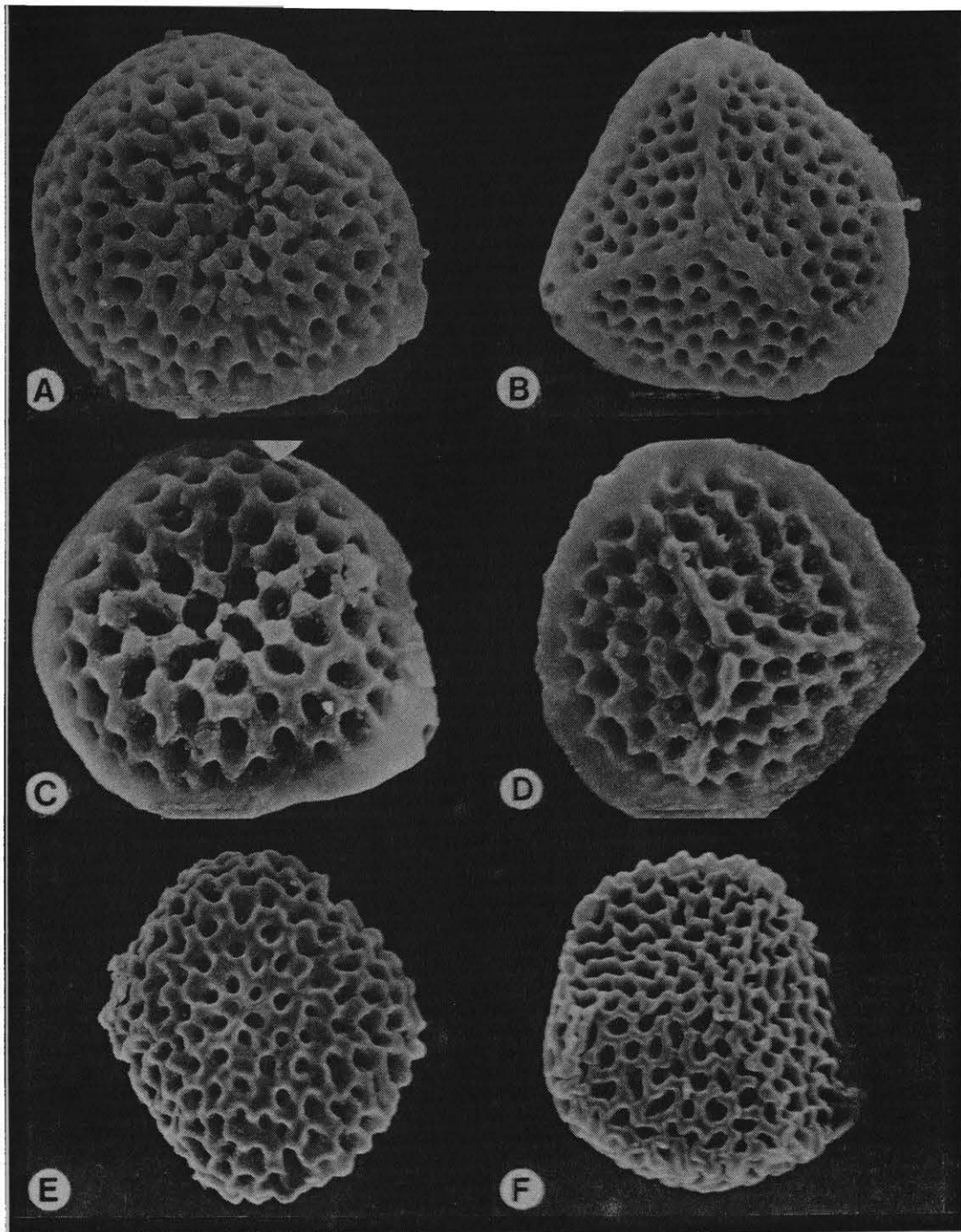


PLATE 4.--*Riccia trichocarpa* (A, B): A, distal spore face; B, proximal spore face. *R. crozalsii* (C, D): C, distal spore face; D, proximal spore face. *R. microciliata* (E, F): E, distal spore face; F, proximal spore face. (A, B, *S.M. Perold* 748; C, *Morley* 305; D, *S.M. Perold* 1149 p.p.; E, F, *S.M. Perold* 102). Magnification A, B, D = x 600; C, E, F, = x 700.

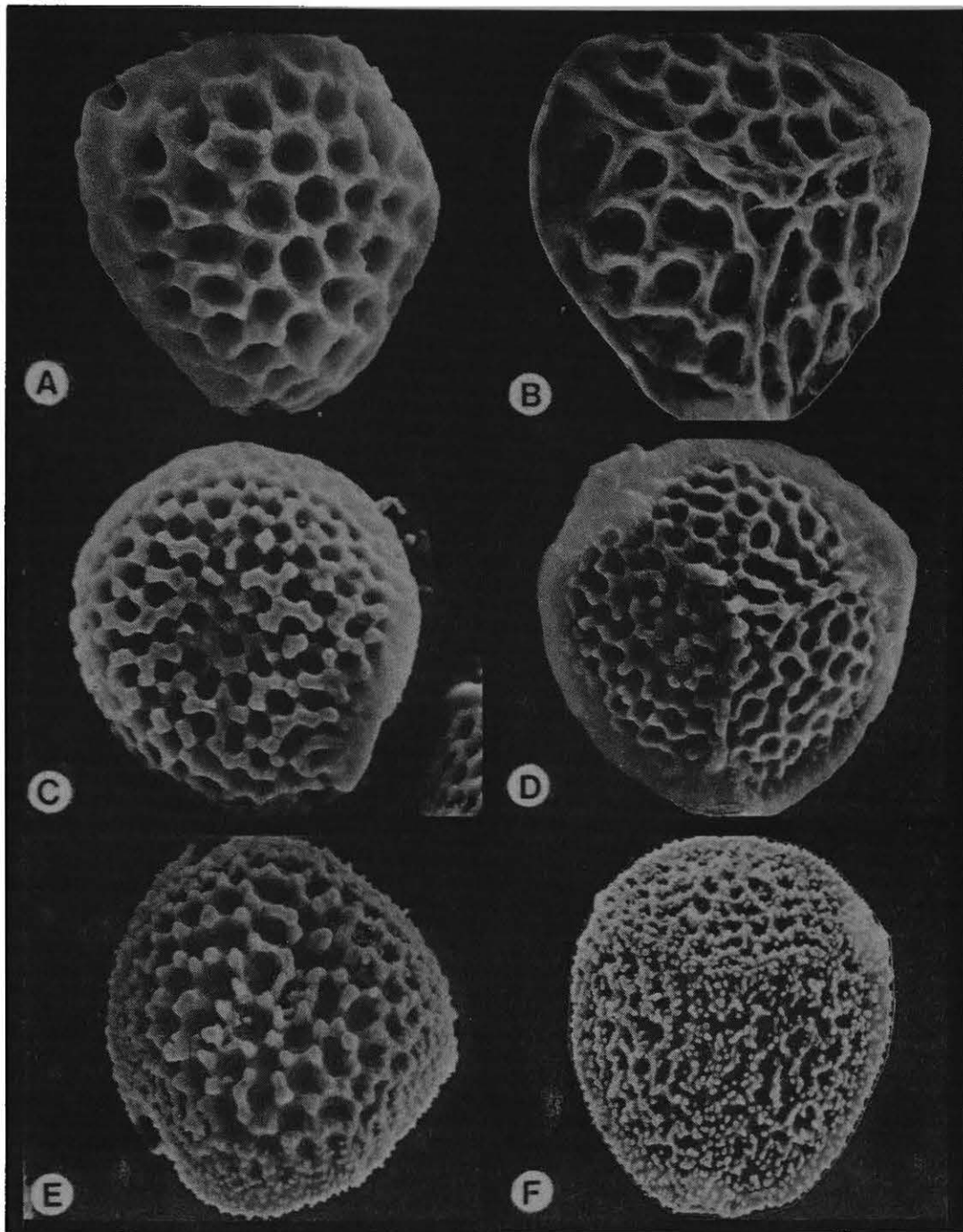


PLATE 5.—*Riccia natalensis* (A, B): A, distal spore face; B, proximal spore face. *R. mammifera* (C, D): C, distal spore face; D, proximal spore face. *R. sorocarpa* (E, F): E, distal spore face; F, proximal spore face. (A, S.M. Perold 679; B, S.M. Perold 430; C, D, S.M. Perold 447; E, S. Arnell 303; F, S. Arnell 7). Magnification A, C, D = x 600; B, E, F = x 700.

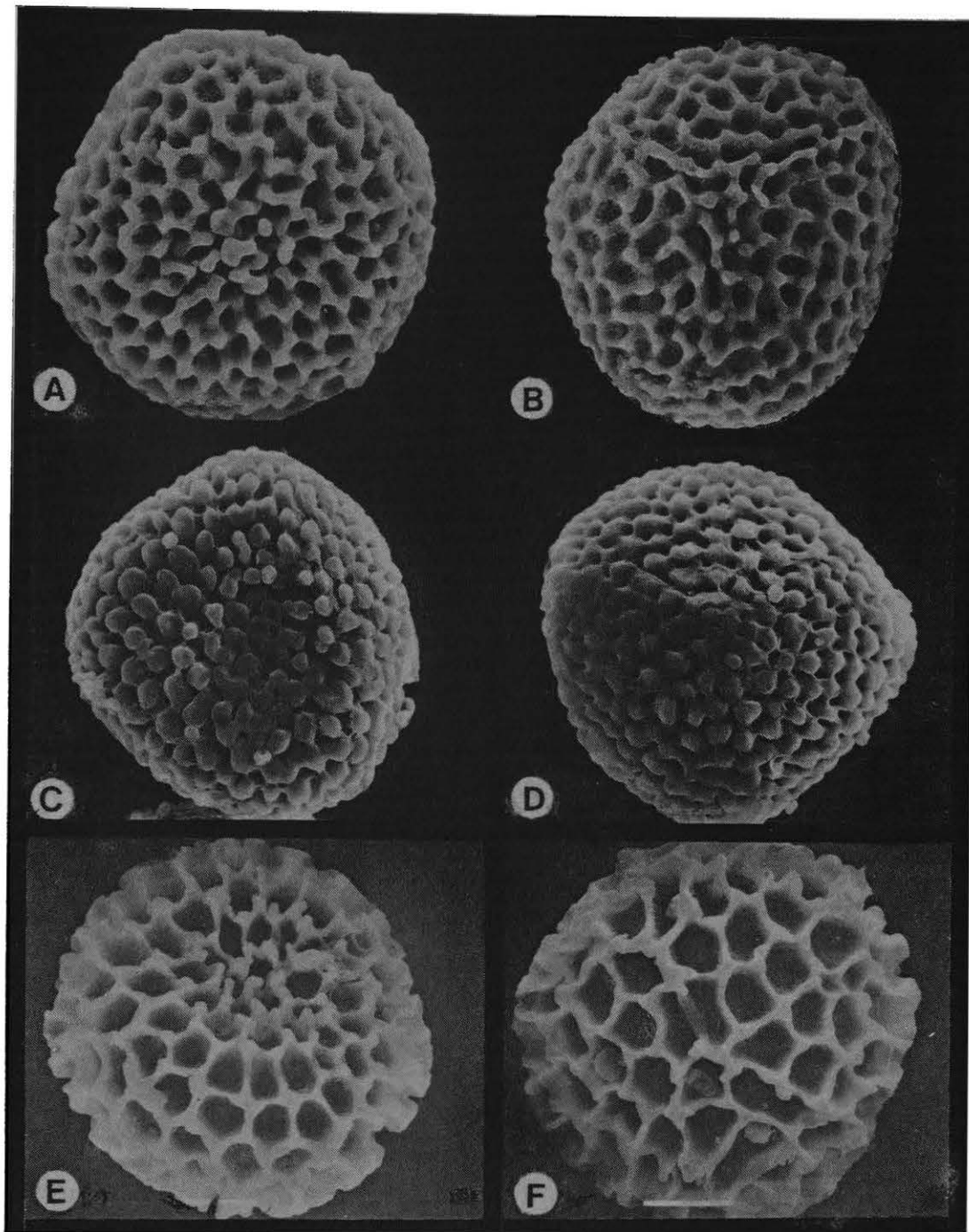


PLATE 6.--*Riccia atropurpurea* (A, B): A, distal spore face; B, proximal spore face. *R. okahandjana* (C, D): C, distal spore face; D, proximal spore face. *R. congoana* (E, F): E, distal spore face; F, proximal spore face. (A, *S.M. Perold* 782b; B, *Volk* 84/710; C, D, *Volk* 88/005; E, F, *S.M. Perold* 394). Magnification A--F = x 600.

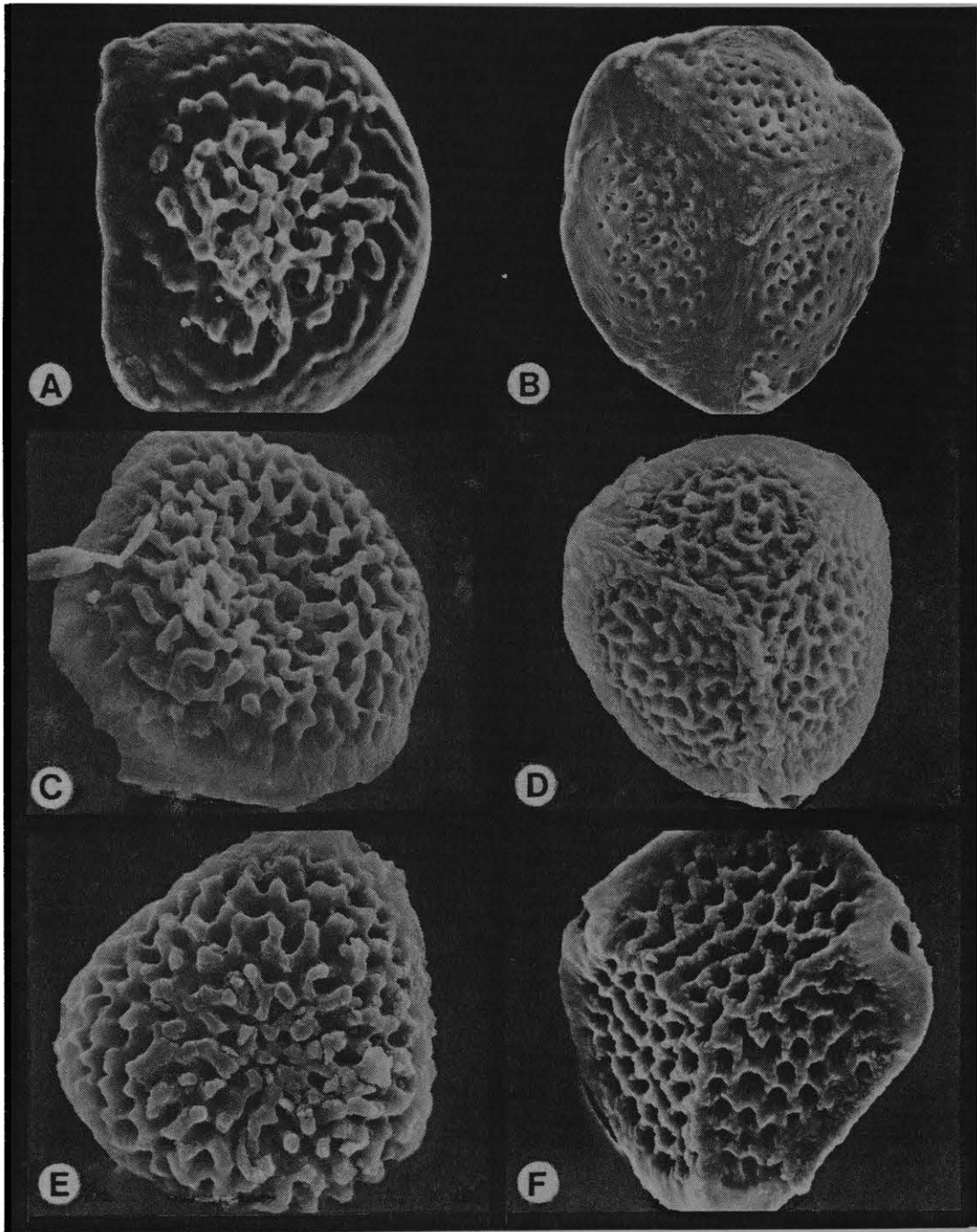


PLATE 7.—*Riccia limbata* (A, B): A, distal spore face; B, proximal spore face. *R. angolensis* (C, D): C, distal spore face; D, proximal spore face. *R. nigrella* (E, F): E, distal spore face; F, proximal spore face. (A, S. Arnell 67a; B, Garside 6276; C, E. Retief 1543a; D, S.M. Perold 1275; E, Duthie 5023a; F, S.M. Perold 1147). Magnification A, D = x 700; B = x 600; C, E, F = x 800).

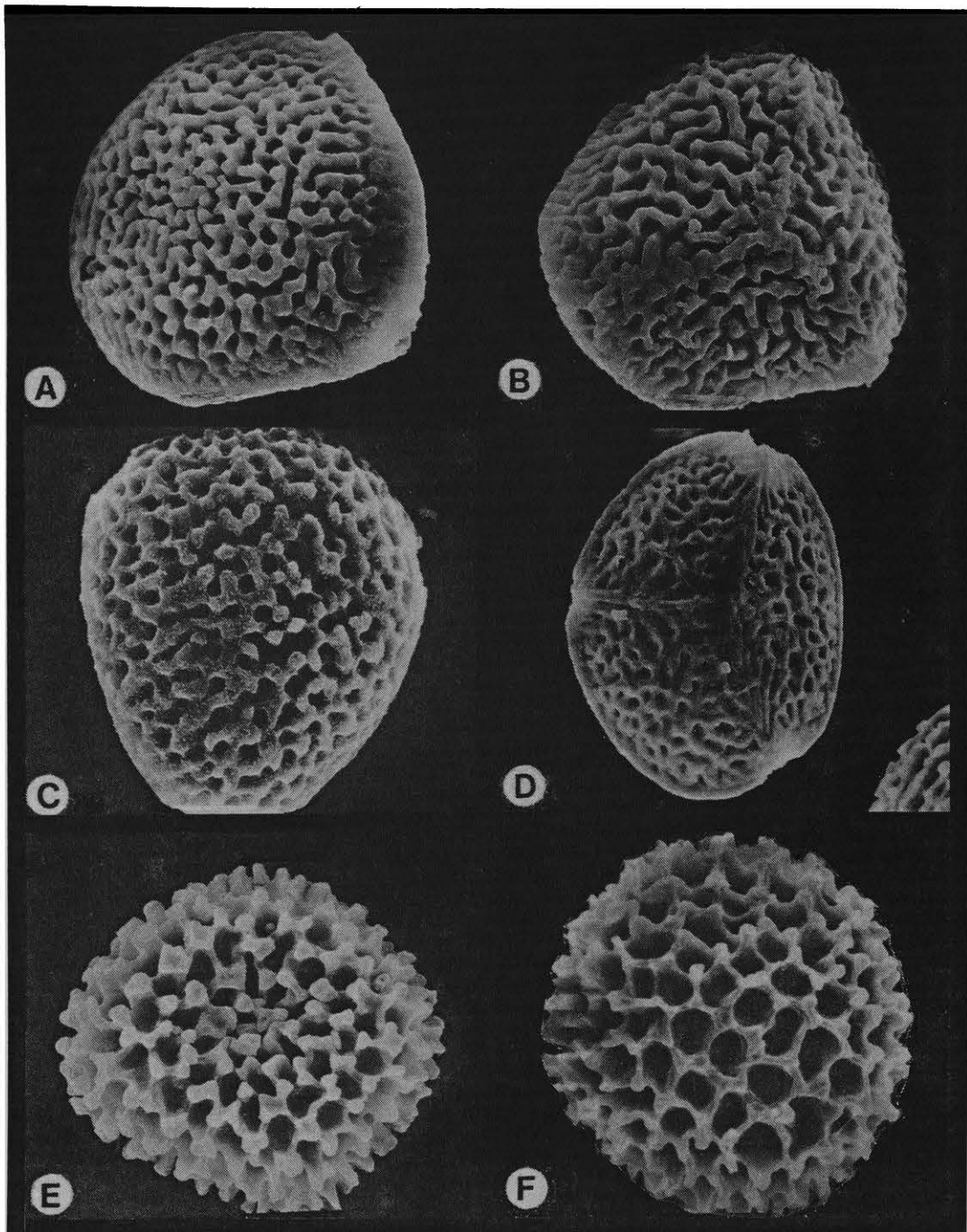


PLATE 8.—*Riccia macrocarpa* (A, B): A, distal spore face; B, proximal spore face. *R. potsiana* (C, D): C, distal spore face; D, proximal spore face. *R. runssorensis* (E, F): E, distal spore face; F, proximal spore face. (A, B, S.M. Perold 888; C, D, Duthie 5463; E, F, Volk 81/125c). Magnification A, B, D = x 700; C = x 1000; E, F, = x 600.

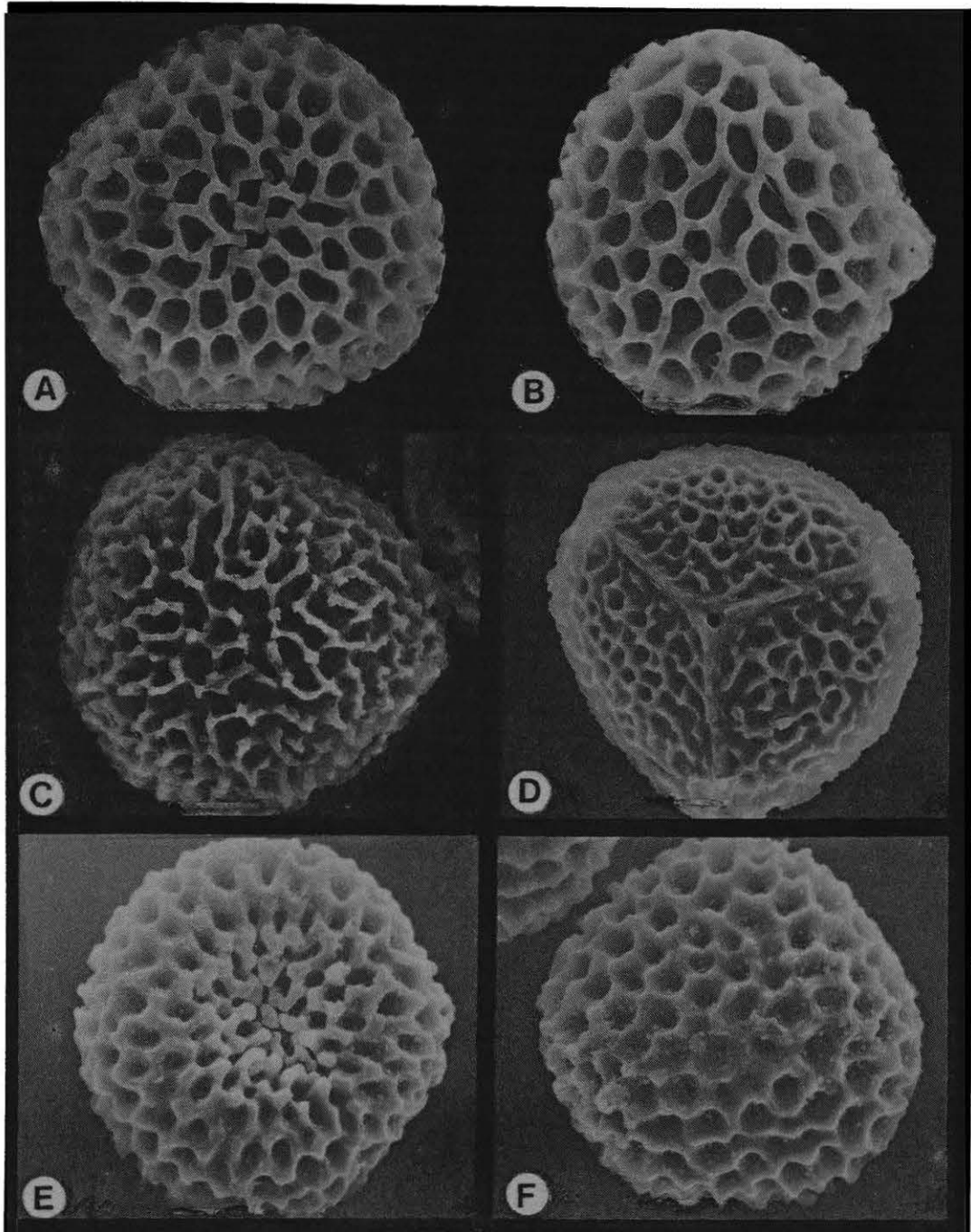


PLATE 9.—*Riccia rosea* (A, B): A, distal spore face; B, proximal spore face. *R. albolimbata* (C, D): C, distal spore face; D, proximal spore face. *R. argenteolimbata* (E, F): E, distal spore face; F, proximal spore face. (A, B, *S.M. Perold* 135a; C, *Volk* 81/921; D, *Stephansen* 5393; E, F, *Volk* 86/930a). Magnification A–F = x 700.

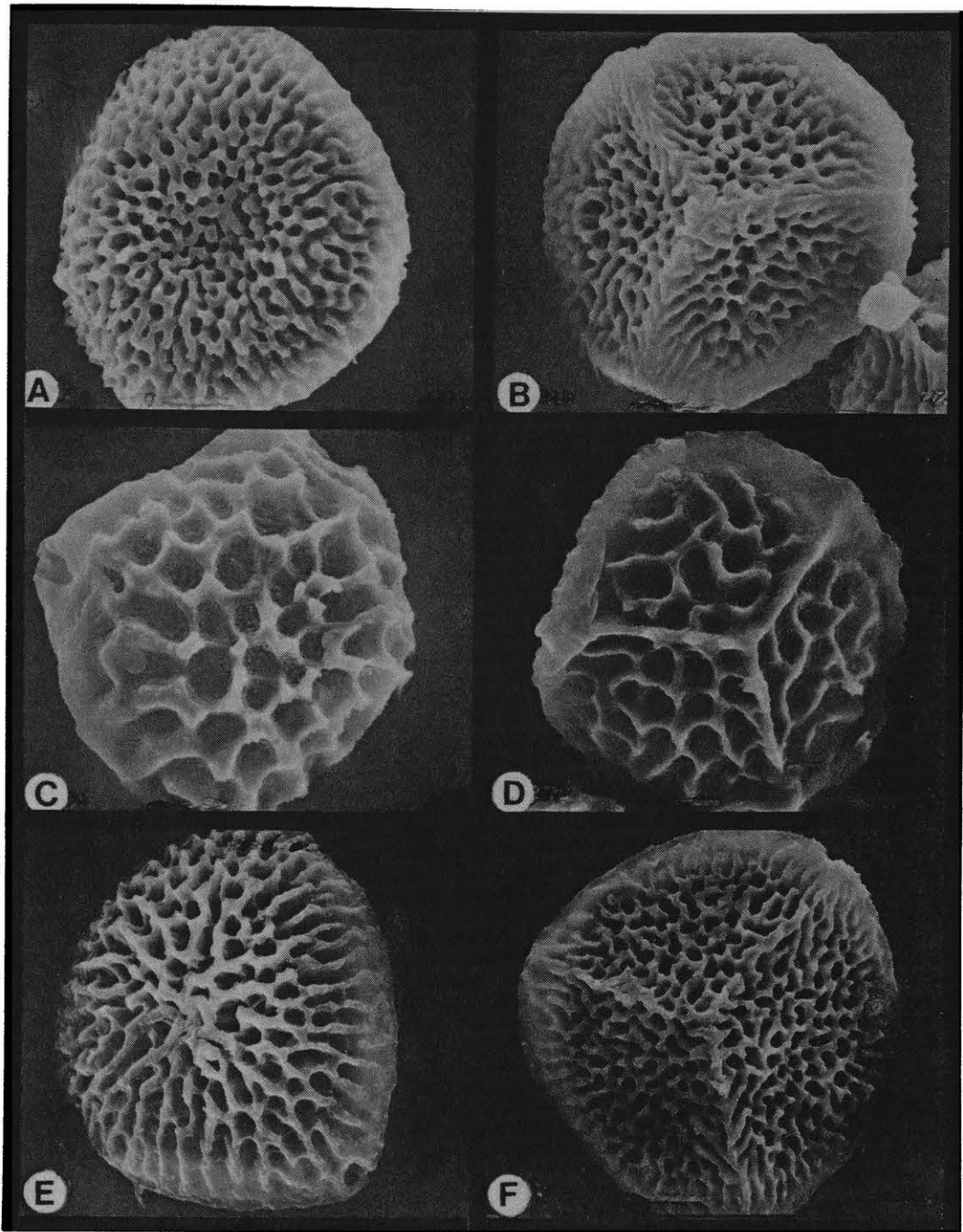


PLATE 10.—*Riccia albornata* (A, B): A, distal spore face; B, proximal spore face. *R. montana* (C, D): C, distal spore face; D, proximal spore face. *R. alboporosa* (E, F): E, distal spore face; F, proximal spore face. (A, B, Smook 6862a; C, D, Van Rooy 3549a; E, F, Oliver 8849). Magnification A, B, E, F = x 700; C, D = x 800.



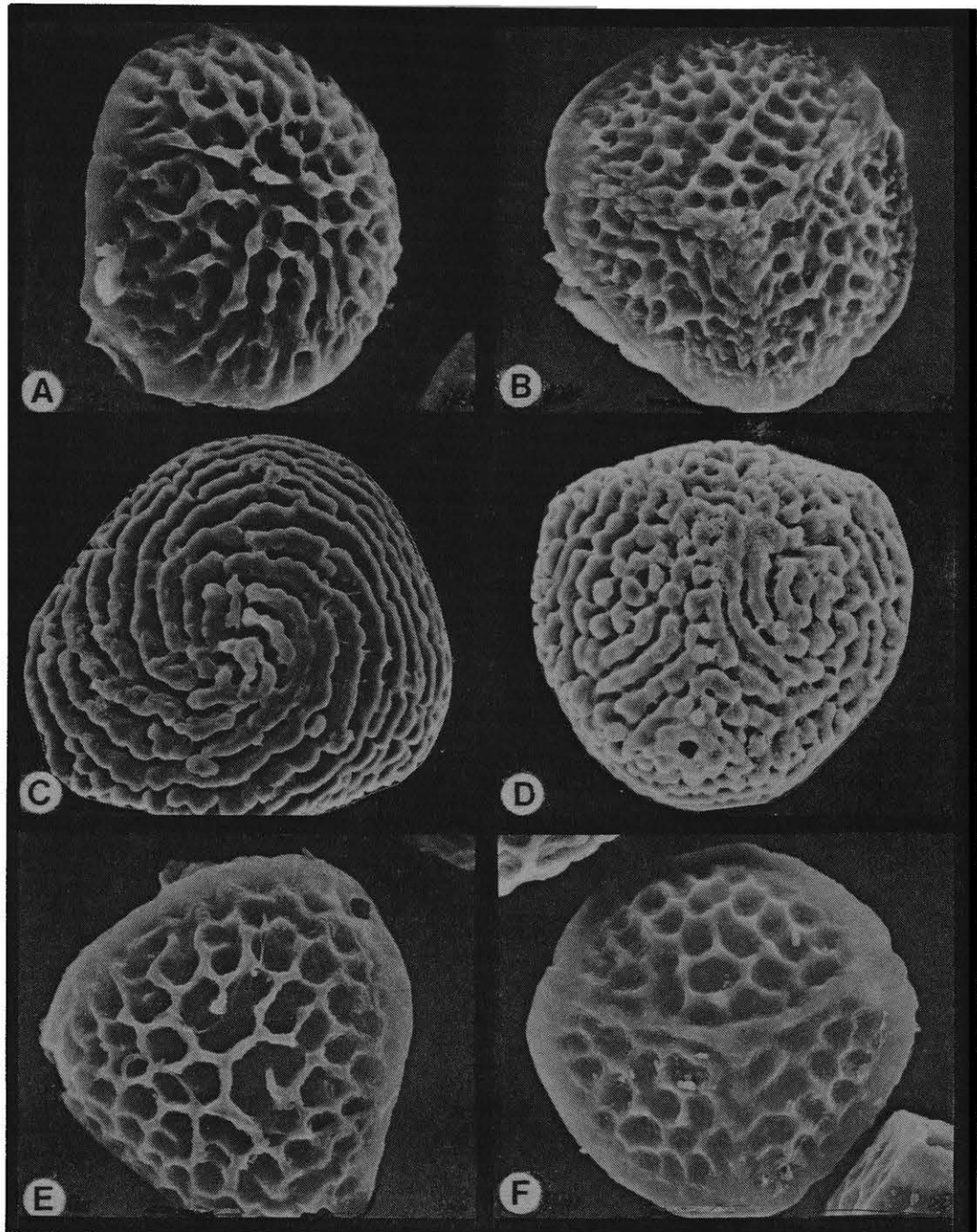


PLATE 11.—*Riccia bicolorata* (A, B): A, distal spore face; B, proximal spore face. *R. villosa* (C, D): C, distal spore face; D, proximal spore face. *R. hirsuta* (E, F): E, distal spore face; F, proximal spore face. (A, B, Smook 6990a; C, D, Oliver 8039; E, Oliver 8040; F, S.M. Perold 2100). Magnification A--D = x 700; E, F = x 500.

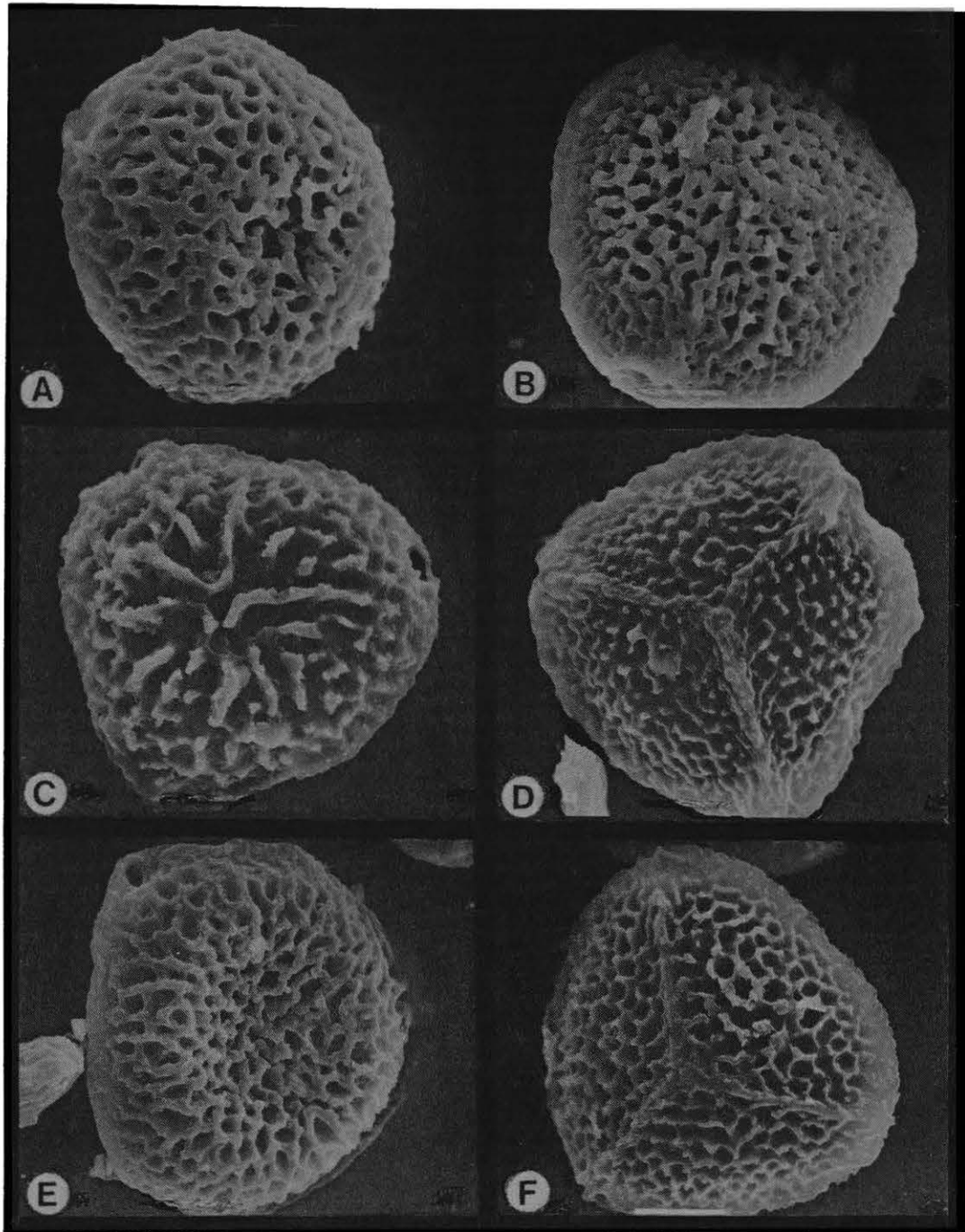


PLATE 12.--*Riccia simii* (A, B): A, distal spore face; B, proximal spore face. *R. vitrea* (C, D): C, distal spore face; D, proximal spore face. *R. namaquensis* (E, F): E, distal spore face; F, proximal spore face. (A, B, *J.M. Perold* 39a; C, D, *S.M. Perold* 1425; E, F, *S.M. Perold* 1420). Magnification A--D = x 700; E, F = x 800.

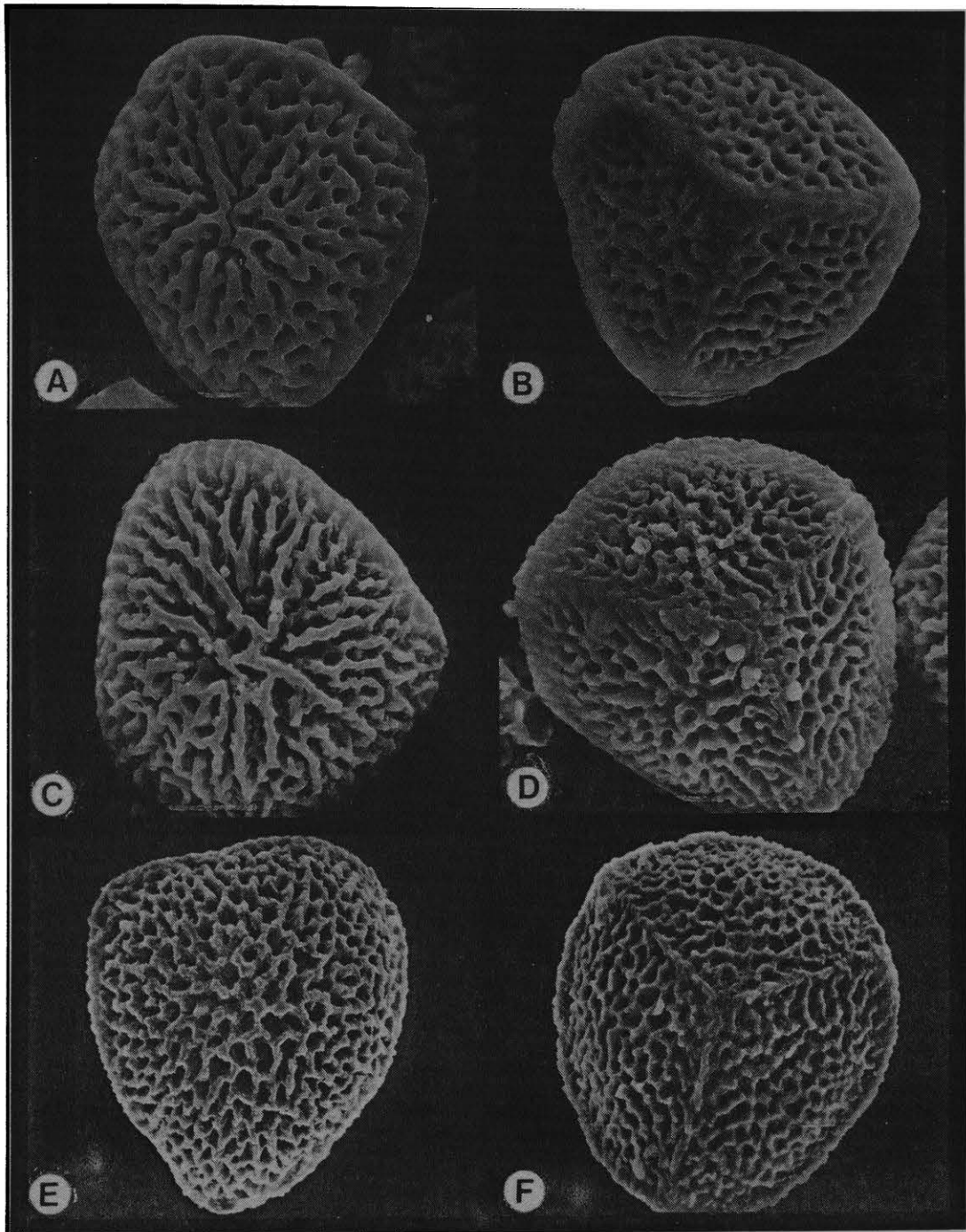


PLATE 13.—*Riccia albomarginata* (A, B): A, distal spore face; B, proximal spore face. *R. ampullacea* (C, D): C, distal spore face; D, proximal spore face. *R. parvo-areolata* (E, F): E, distal spore face; F, proximal spore face. (A, B, S.M. Perold 2383; C, D, Van Rooy 3164a; E, F, J.M. Perold 24). Magnification A, B = x 600; C–F = x 700.

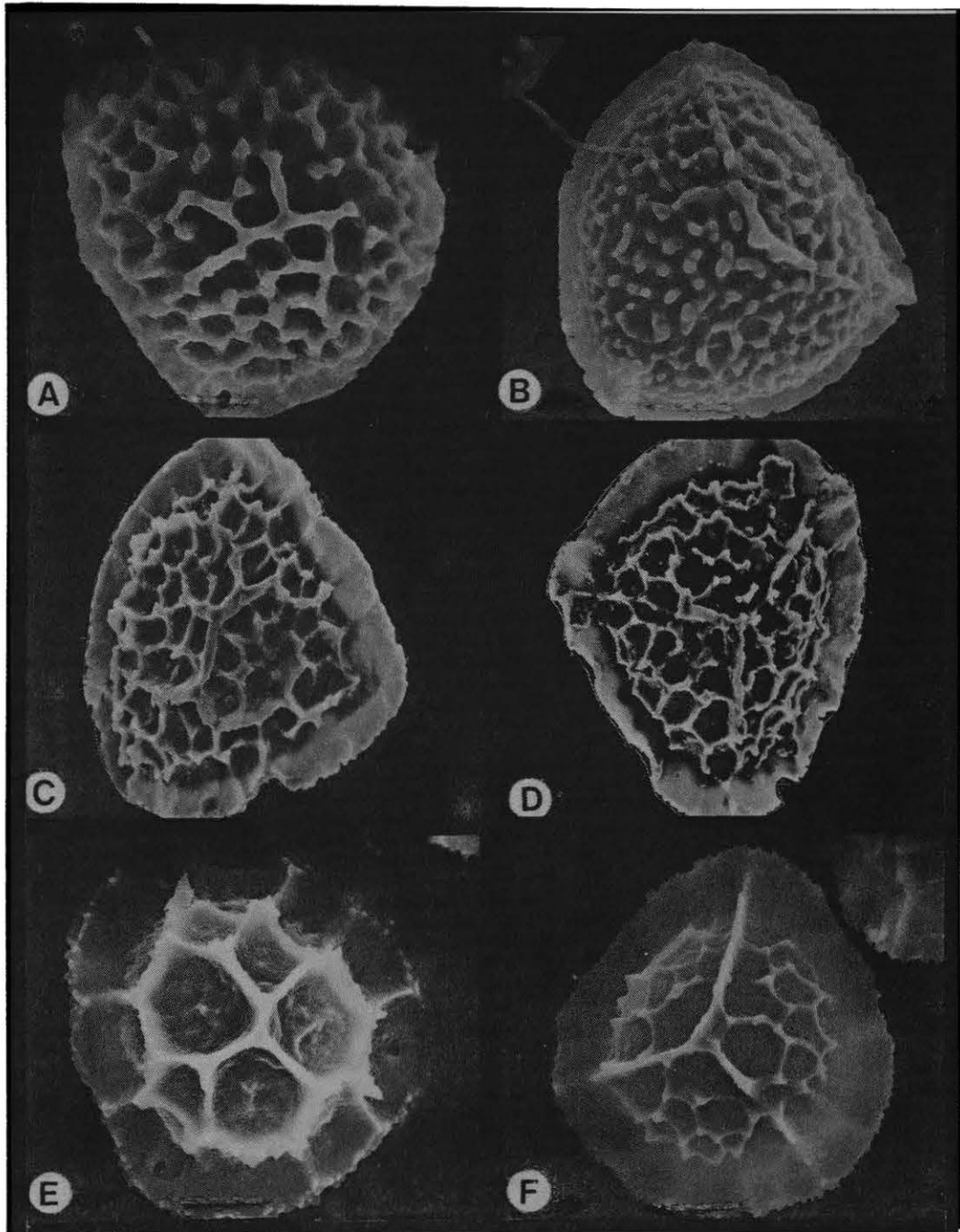


PLATE 14.—*Riccia albovestita* (A, B): A, distal spore face; B, proximal spore face. *R. alatospora* (C, D): C, distal spore face; D, proximal spore face. *R. hantamensis* (E, F): E, distal spore face; F, proximal spore face. (A, B, *J.M. Perold* 39; C, D, *Duthie* 5004b; E, F, *S.M. Perold* 1830). Magnification A, B = x 700; C, D = x 500; E, F = x 800.

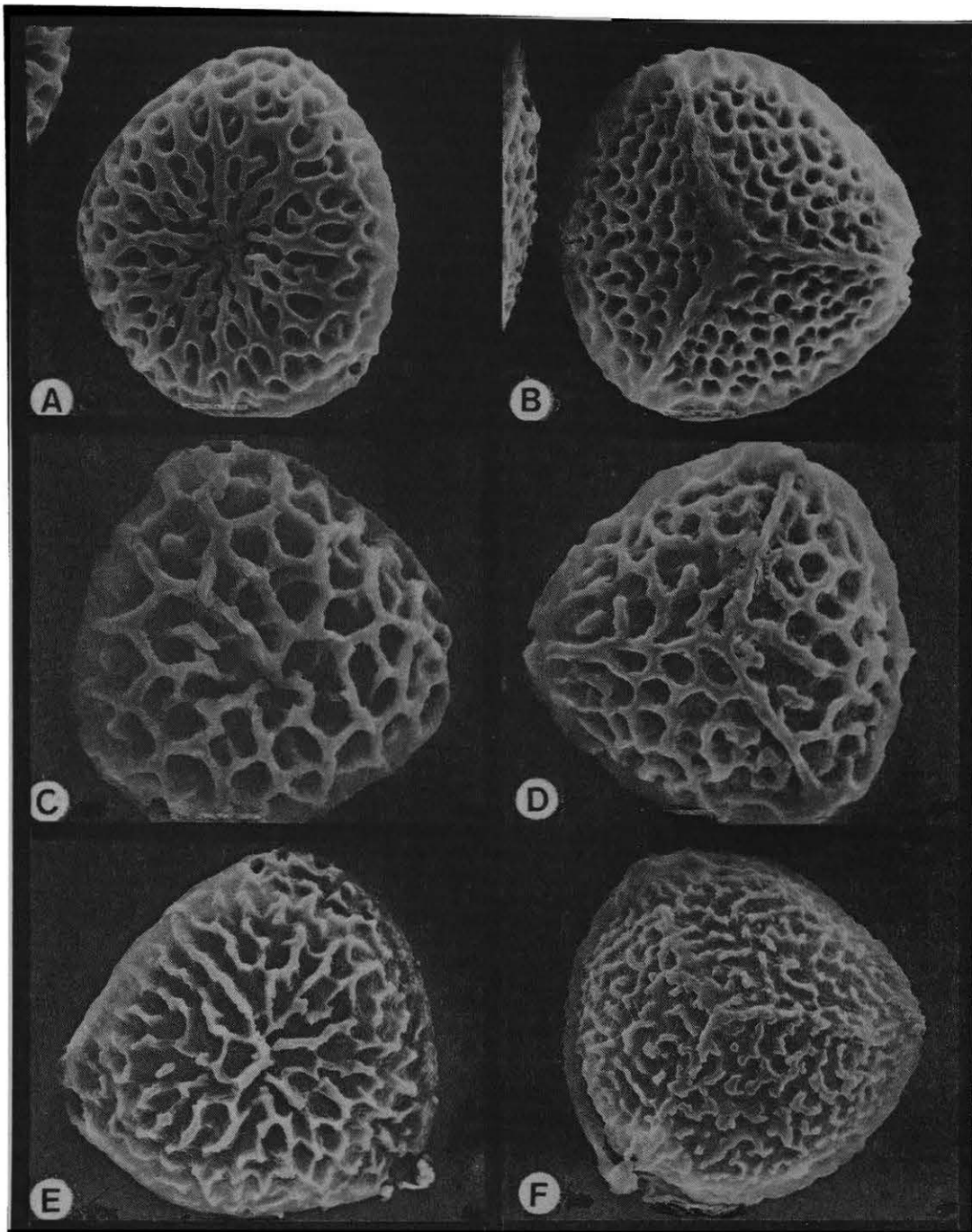


PLATE 15.—*Riccia concava* (A, B): A, distal spore face; B, proximal spore face. *R. elongata* (C, D): C, distal spore face; D, proximal spore face. *R. trachyglossum* (E, F): E, distal spore face; F, proximal spore face. (A, B, *Arnell* 30; C, D, *S.M. Perold* 2018; E, F, *J.M. Perold* 34). Magnification A, B, E, F = x 700; C, D = x 600.

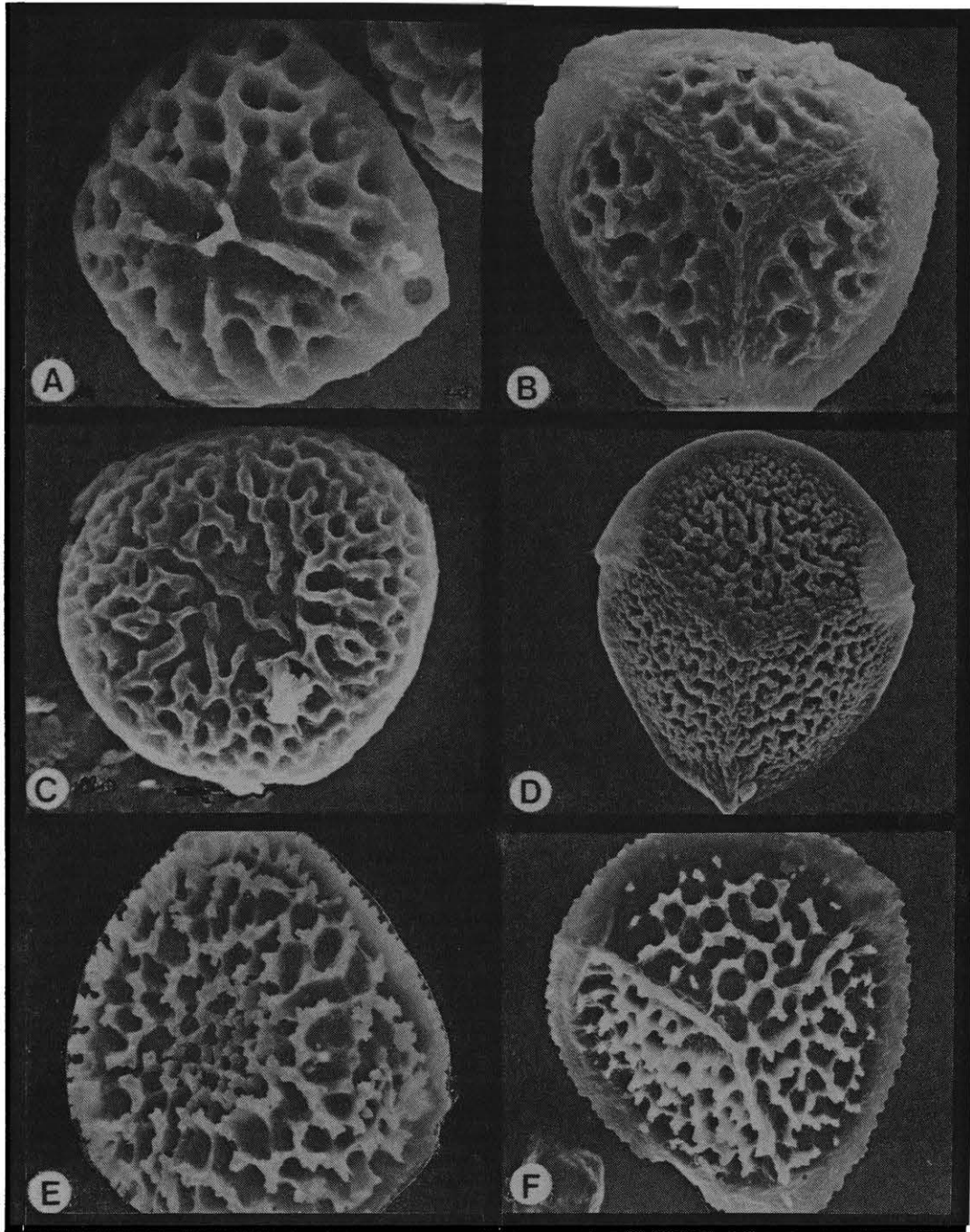


PLATE 16.—*Riccia furfuracea* (A, B): A, distal spore face; B, proximal spore face. *R. pulveracea* (C, D): C, distal spore face; D, proximal spore face. *R. crystallina* (E, F): E, distal spore face; F, proximal spore face. (A, Oliver 8957a; B, Oliver 8910a; C, Duthie 5484; D, Duthie 5455; E, F, Duthie 5529). Magnification A–D = x 700; E, F = x 1000.

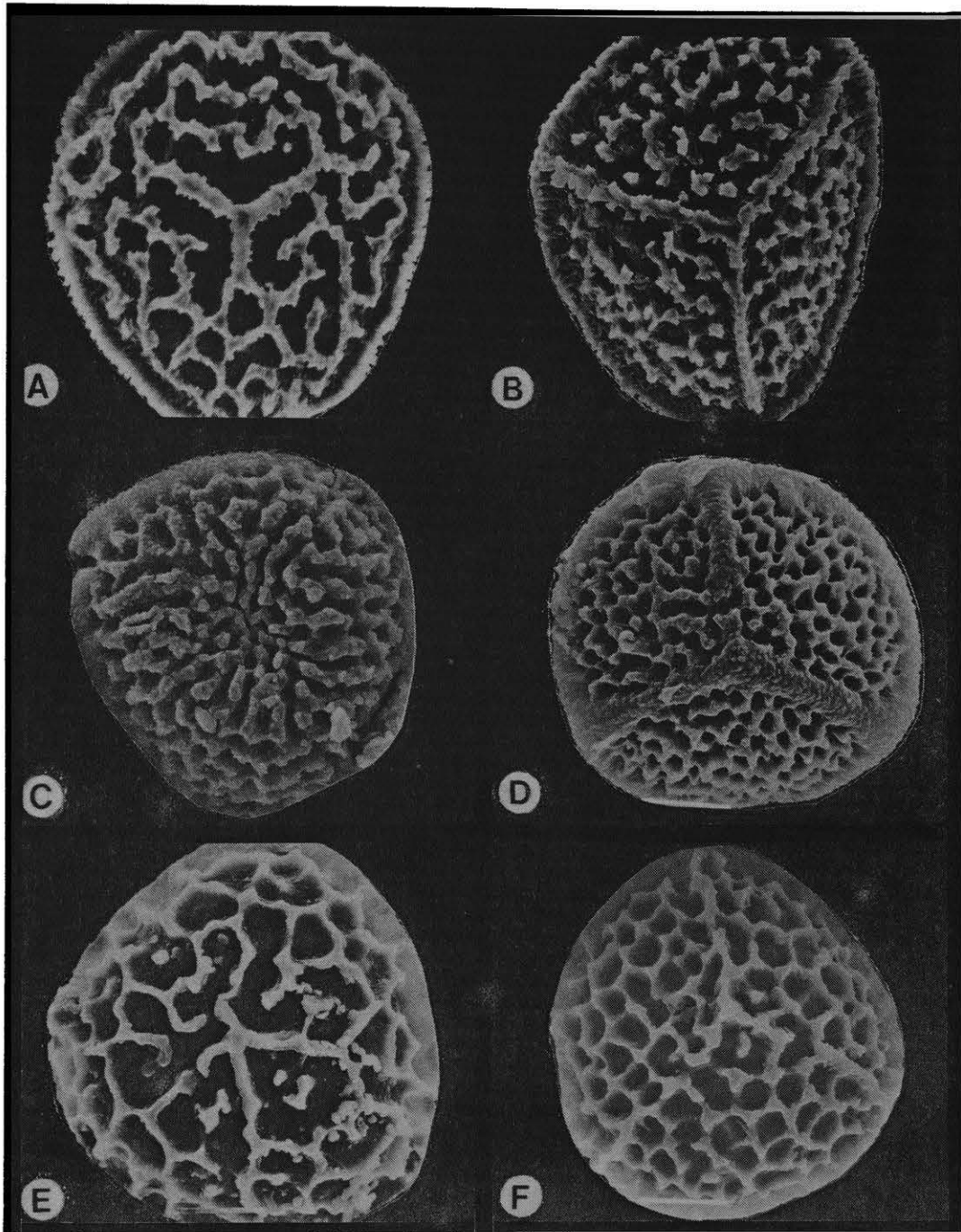


PLATE 17.—*Riccia cavernosa* (A, B): A, distal spore face; B, proximal spore face. *R. cupulifera* (C, D): C, distal spore face; D, proximal spore face. *R. bullosa* (A, B): A, distal spore face; B, proximal spore face. (A, B, Koch 14934; C, D, S.M. Perold 2371; E, F, S.M. Perold 467). Magnification A, B = x 700; C–E = x 600; F = x 500.

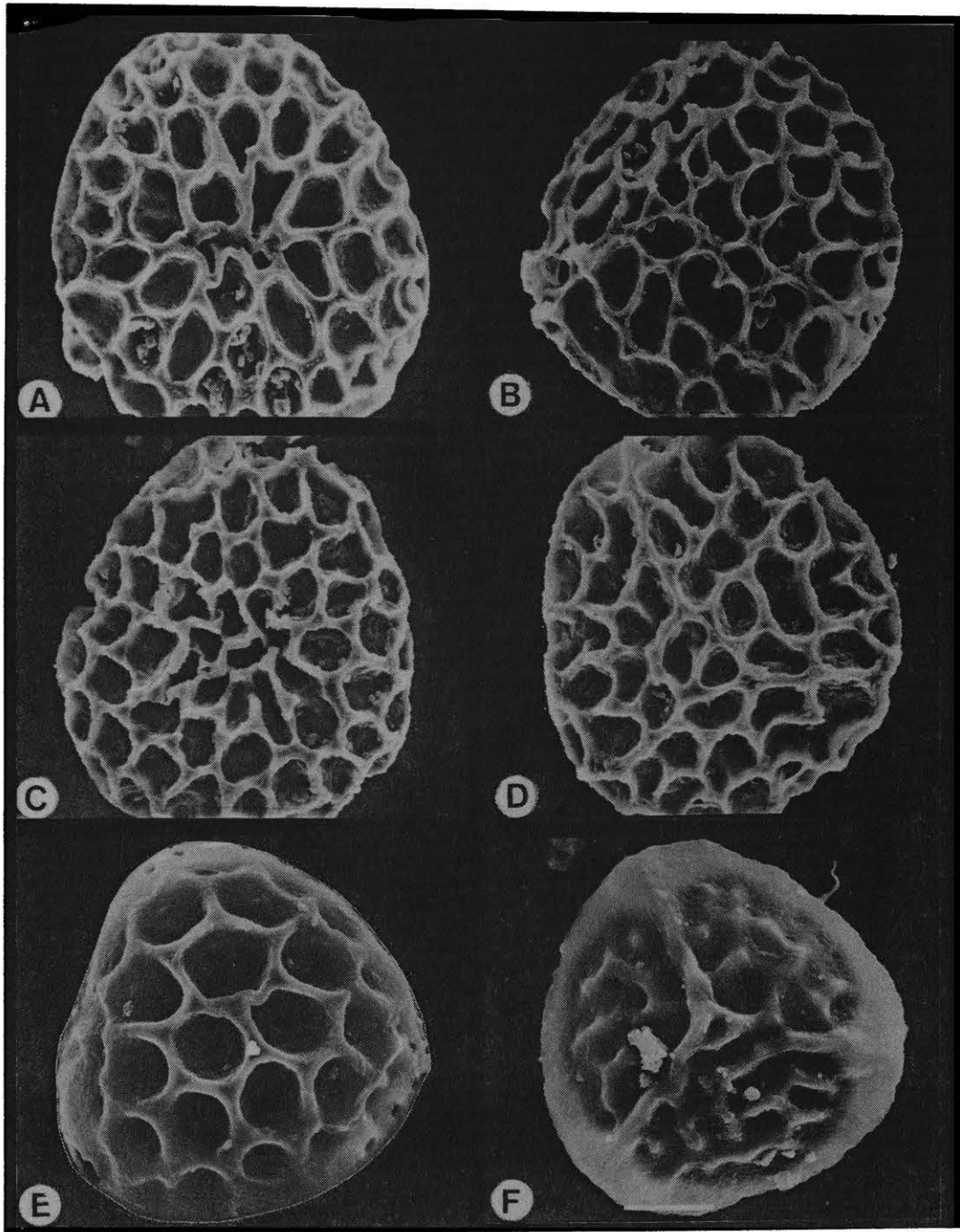


PLATE 18.—*Riccia garsidei* (A, B): A, distal spore face; B, proximal spore face. *R. volkii* (C, D): C, distal spore face; D, proximal spore face. *R. rubricollis* (E, F): E, distal spore face; F, proximal spore face. (A, B, *Garside 2*; C, D, *Volk 81/230*; E, F, *Duthie 5014*). Magnification A, B, E, F = x 600; C, D = x 700.



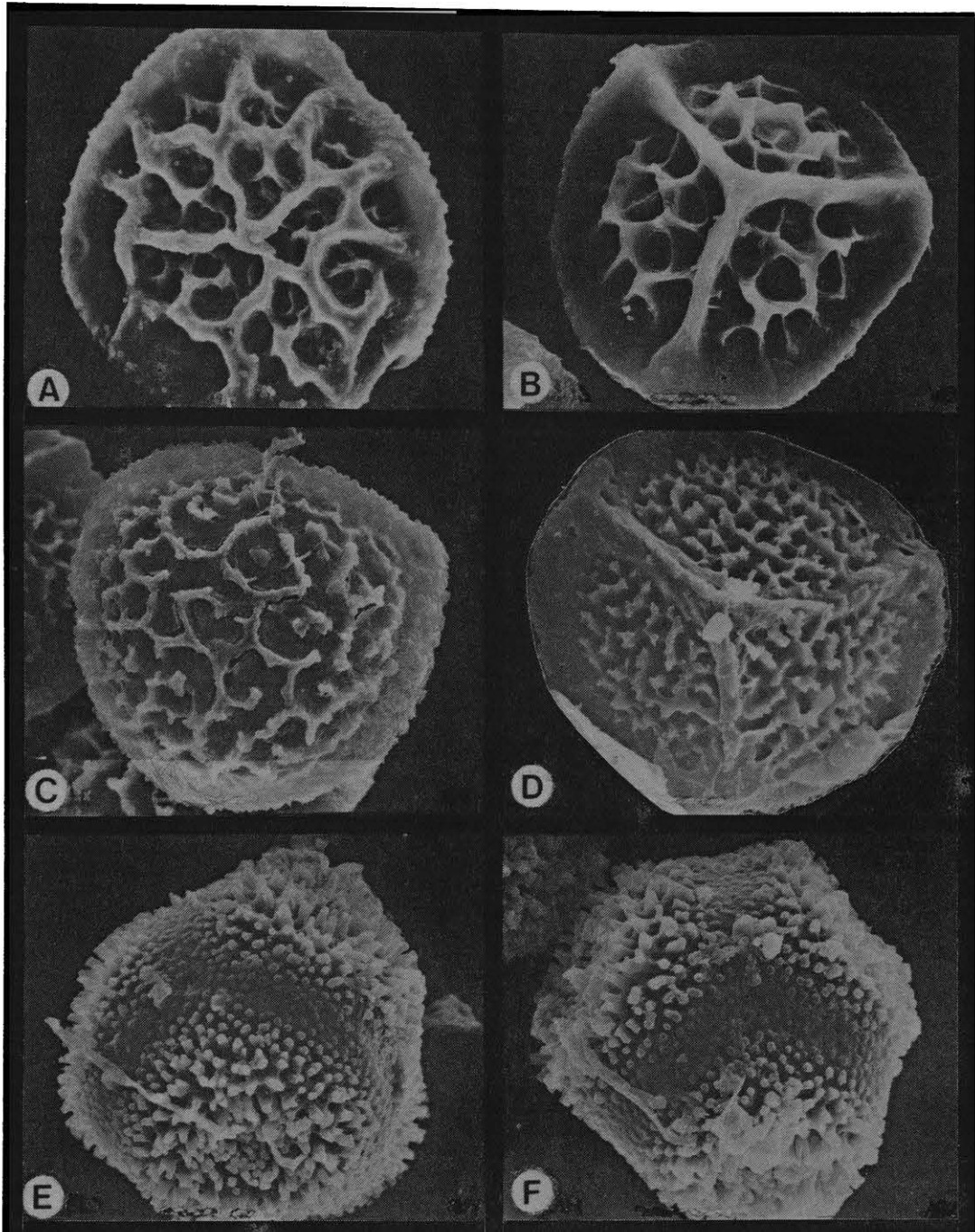


PLATE 19.--*Riccia stricta* (A, B): A, distal spore face; B, proximal spore face. *R. purpurascens* (C, D): C, distal spore face; D, proximal spore face. *R. curtisii* (E, F): E, F, spore tetrads. (A, Eyles 1405; B, Wells 57; C, D, Garside 7; E, F, S.M. Perold 2059). Magnification A--D = x 800; E, F, = x 600.

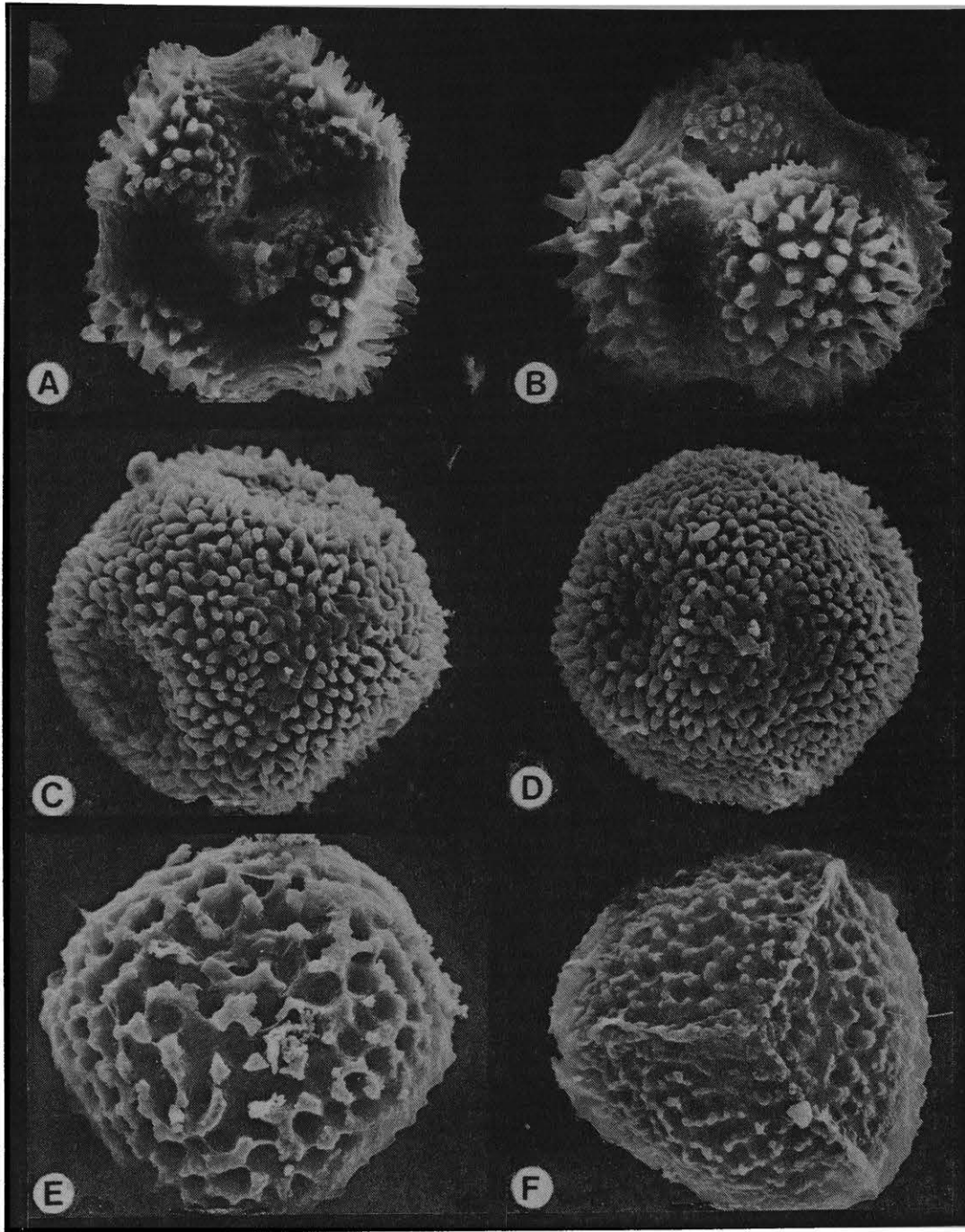


PLATE 20.—*Riccia perssonii* (A, B): A, B, spore tetrads. *R. tomentosa* (C, D): C, D, spore tetrads. *R. schelpei* (E, F): E, distal spore face; F, proximal spore face. (A, B, Volk 2059; C, CL D, S.M. Perold 1495; E, F, S.M. Perold 1426a). Magnification A—D = x 600; E, F = x 700.

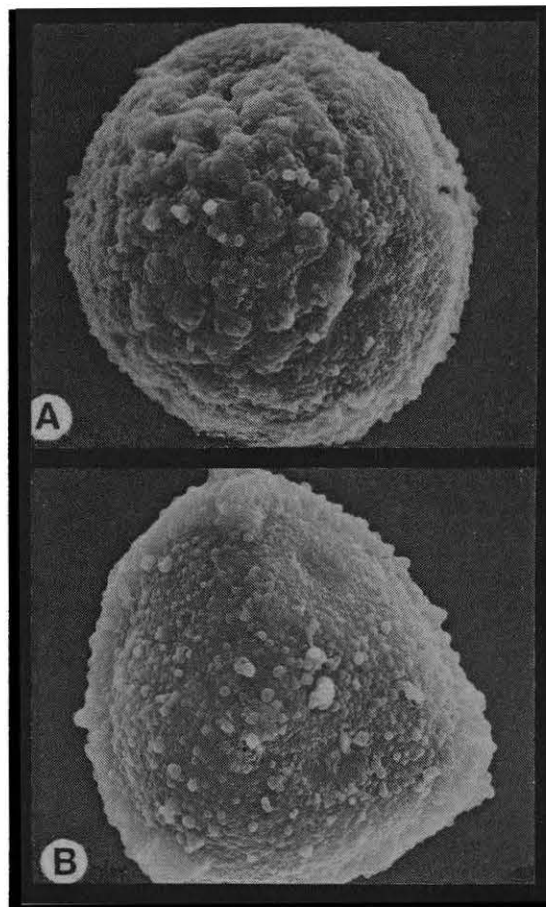
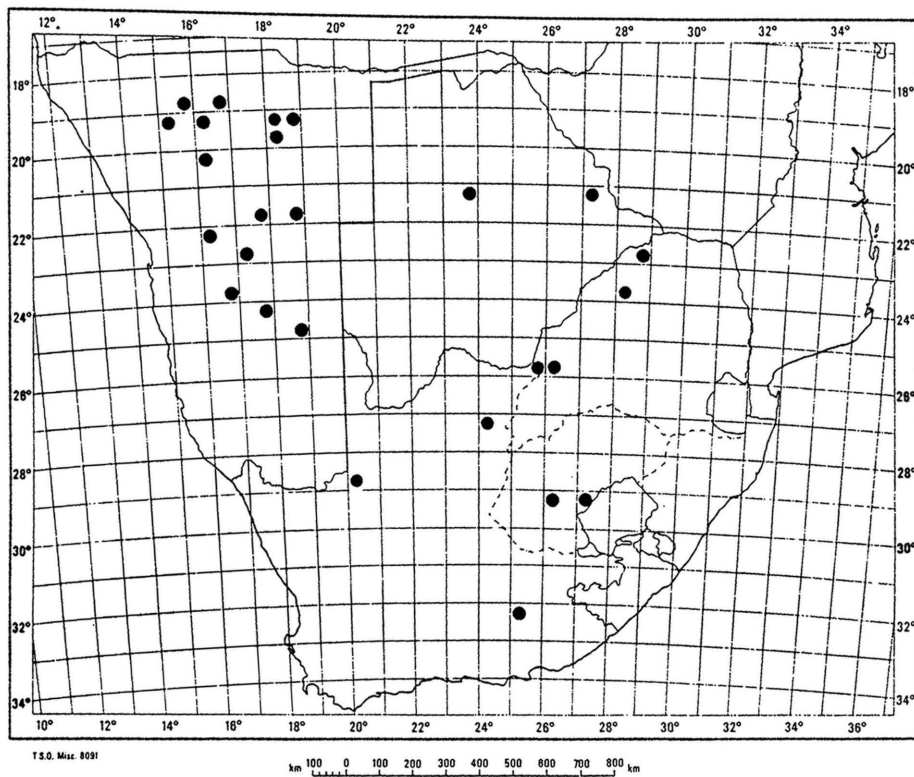
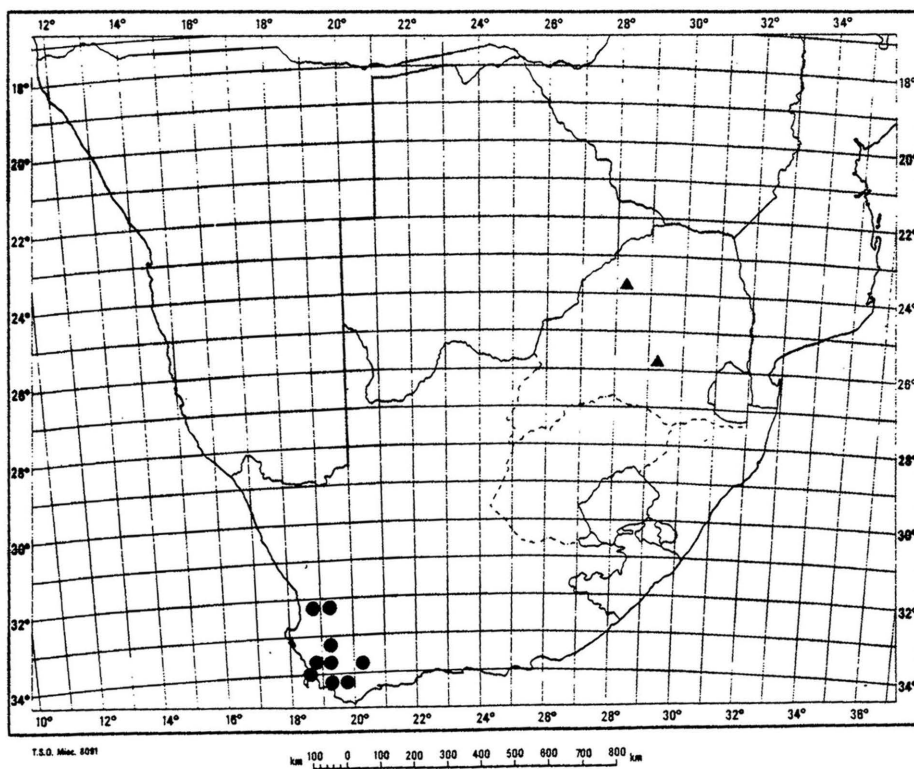


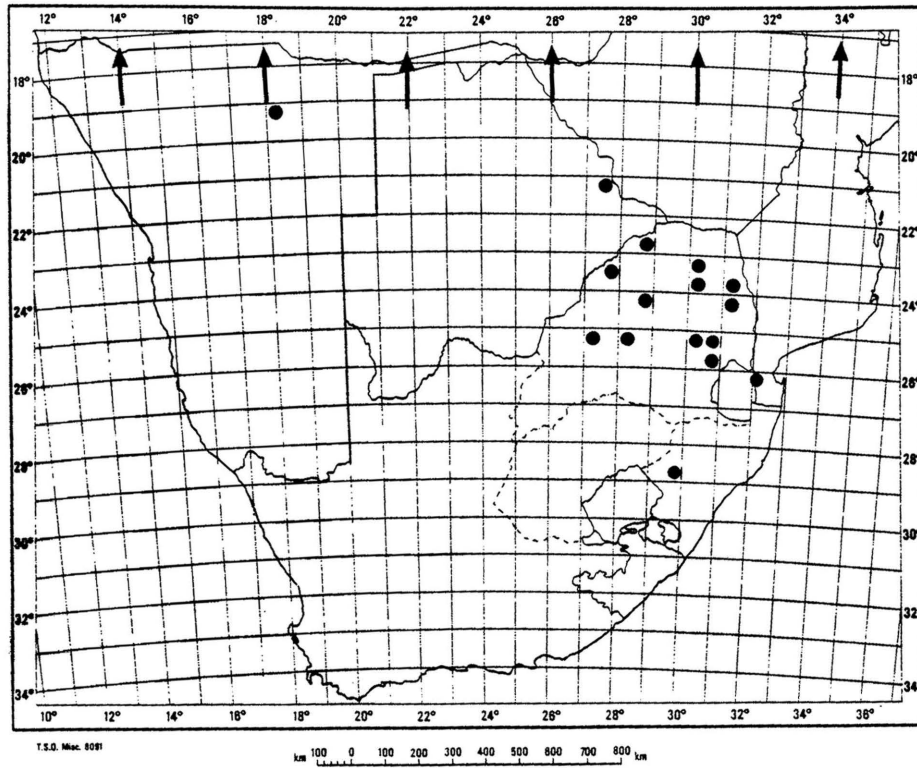
PLATE 21.—*Ricciocarpos natans* (A, B): A, distal spore face; B, proximal spore face. (A, B, *Ward* s.n.). Magnification A, B = x 800.



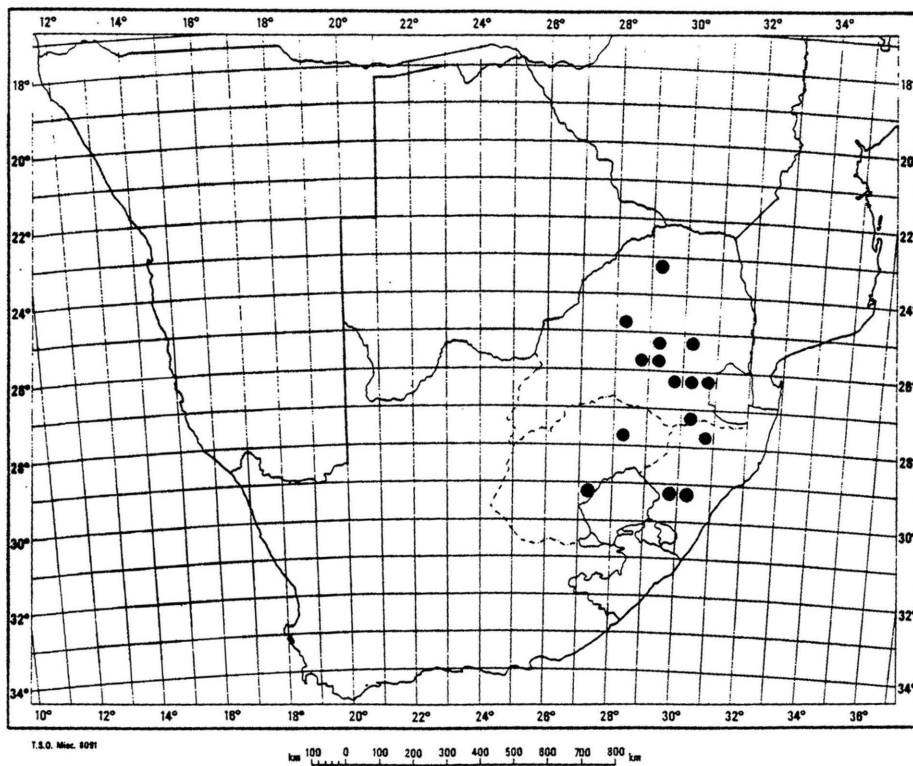
MAP 1.— Distribution of *Riccia trichocarpa* in southern Africa.



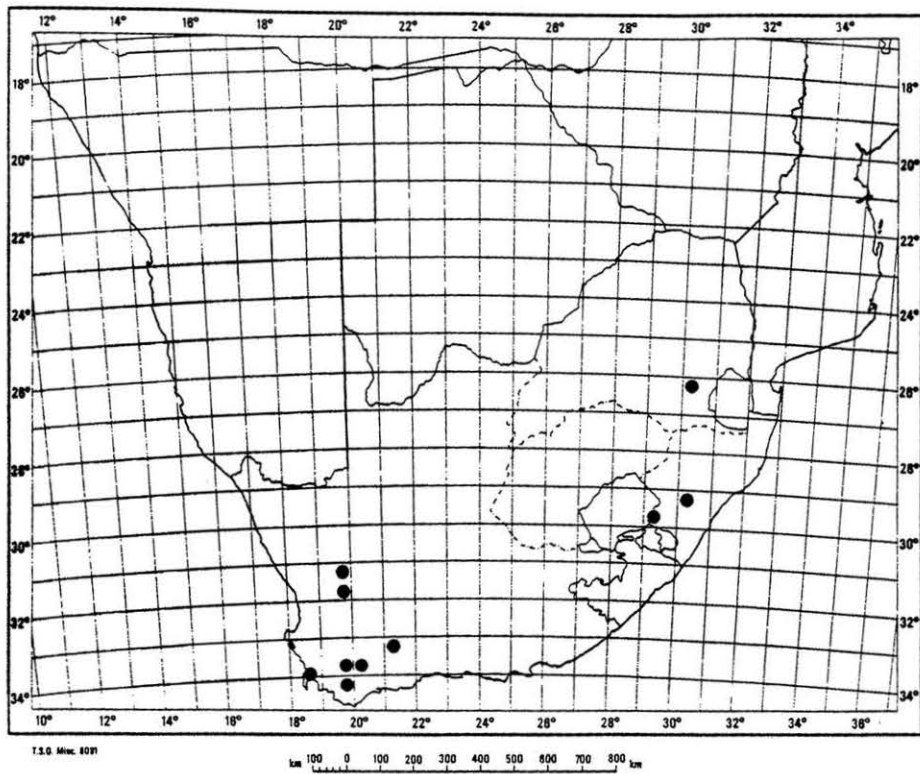
MAP 2.— Distribution of *Riccia crozalsii* (dots) and *R. mammifera* (triangles) in southern Africa.



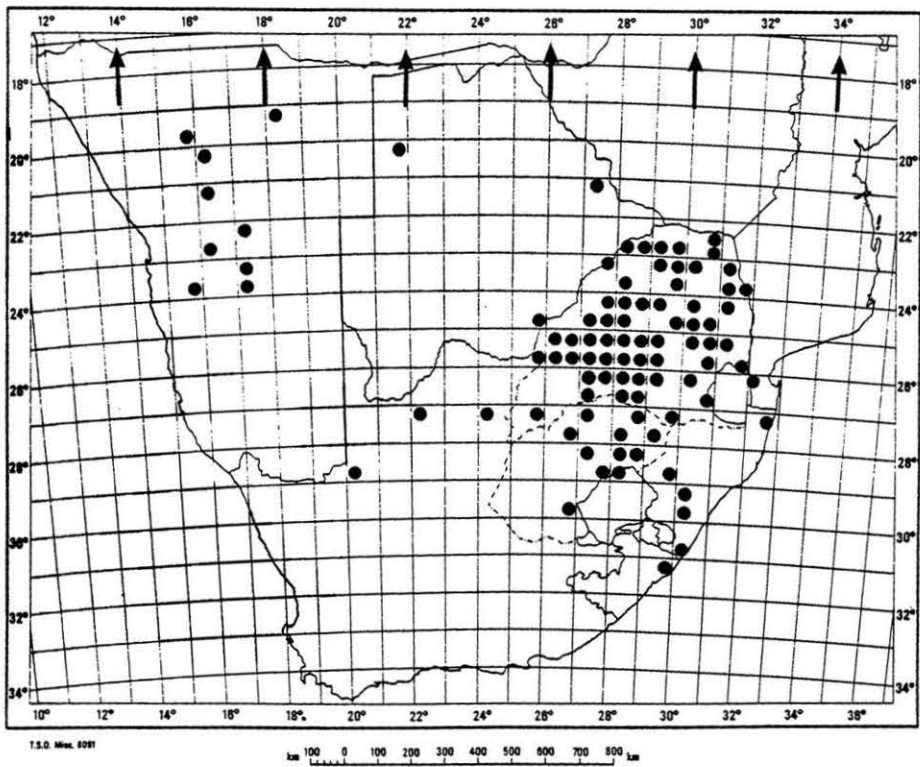
MAP 3.— Distribution of *Riccia microciliata* in southern Africa.



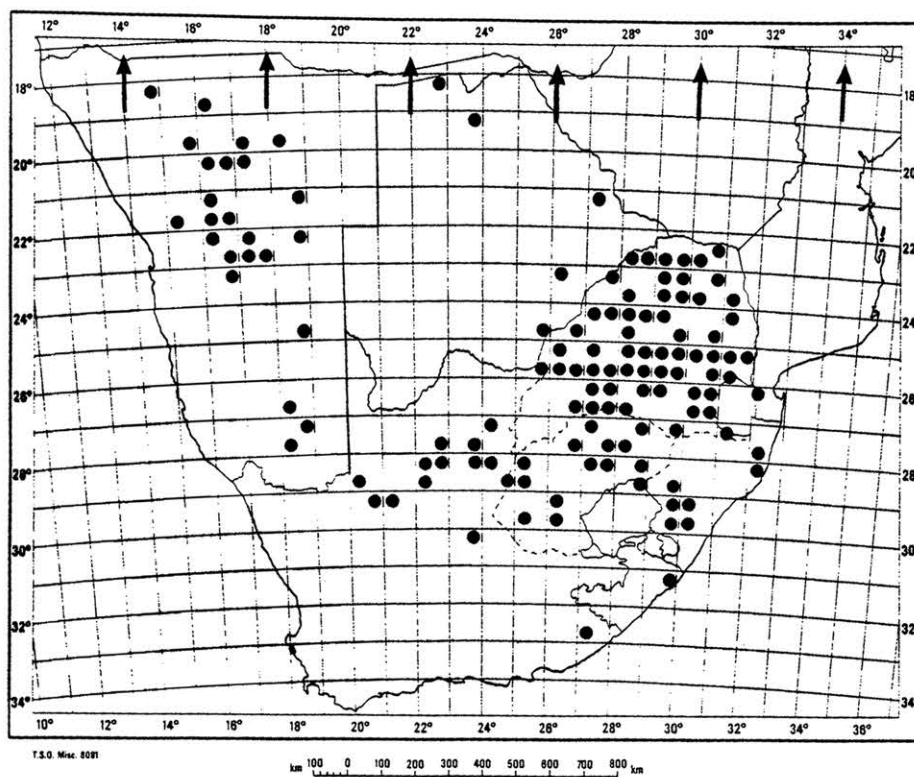
MAP 4.— Distribution of *Riccia natalensis*.



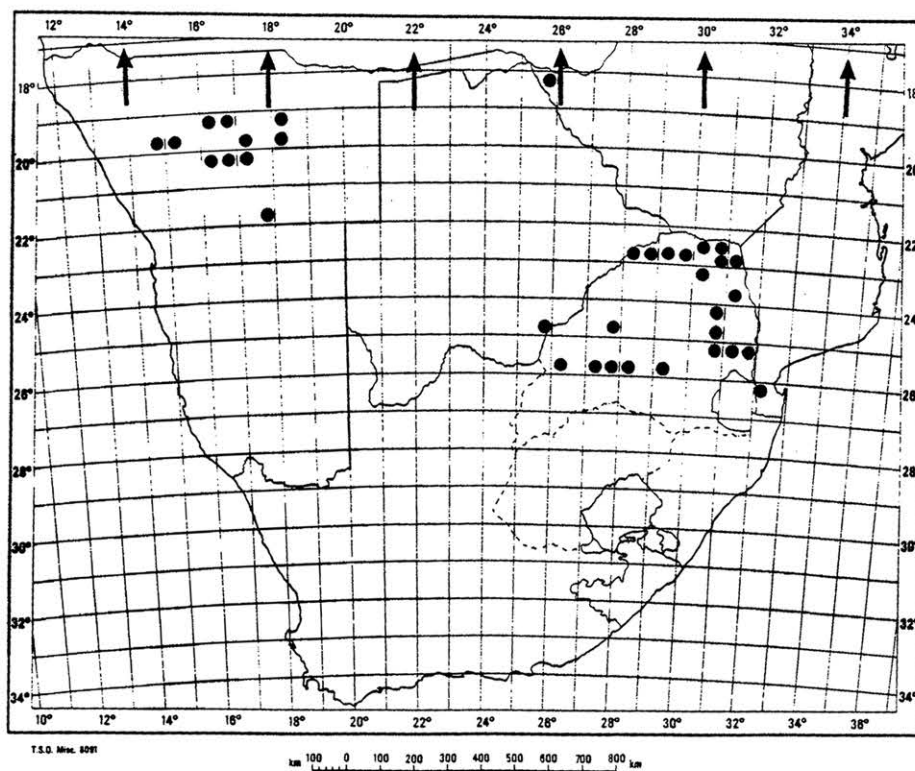
MAP 5.— Distribution of *Riccia sorocarpa* in southern Africa.



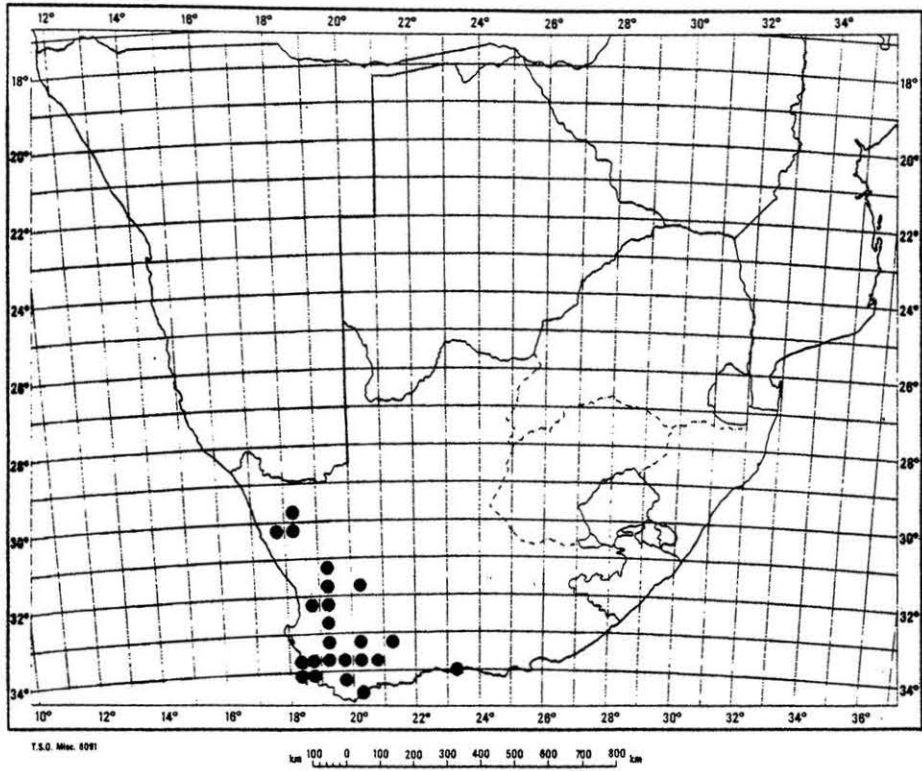
MAP 6.— Distribution of *Riccia atropurpurea* in southern Africa.



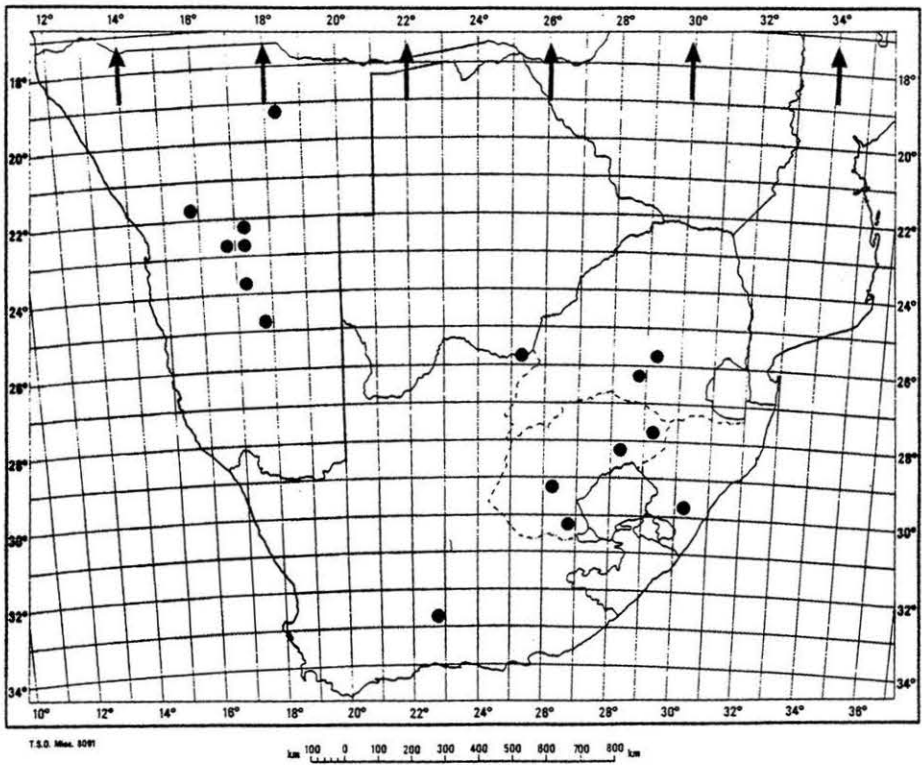
MAP 7.— Distribution of *Riccia okahandjana* in southern Africa.



MAP 8.— Distribution of *Riccia congoana* in southern Africa.

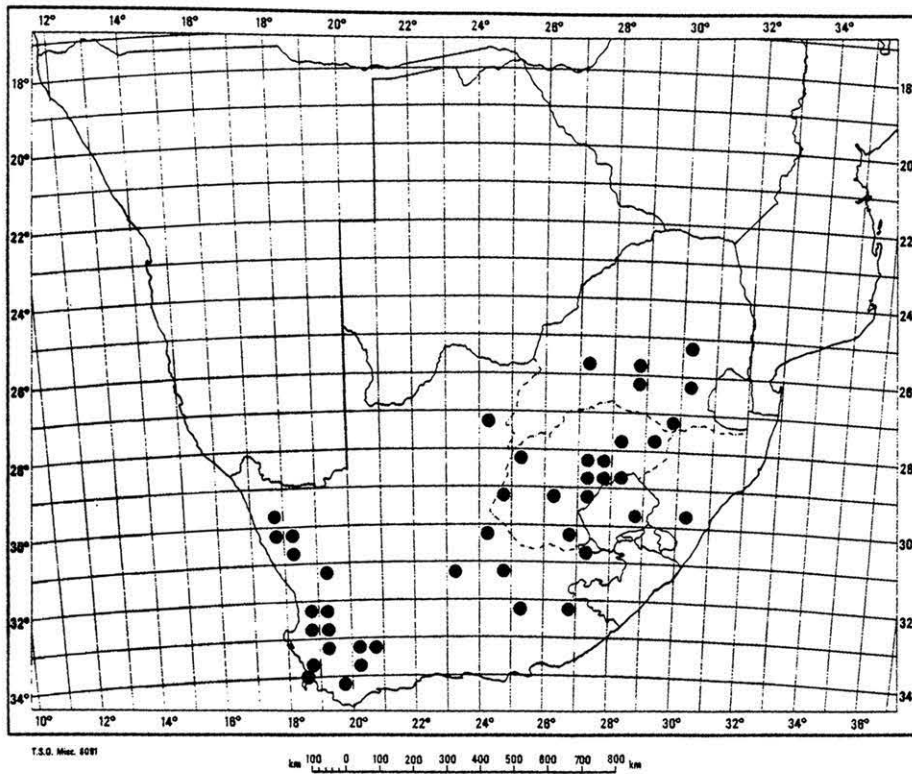


MAP 9.— Distribution of *Riccia limbata*.

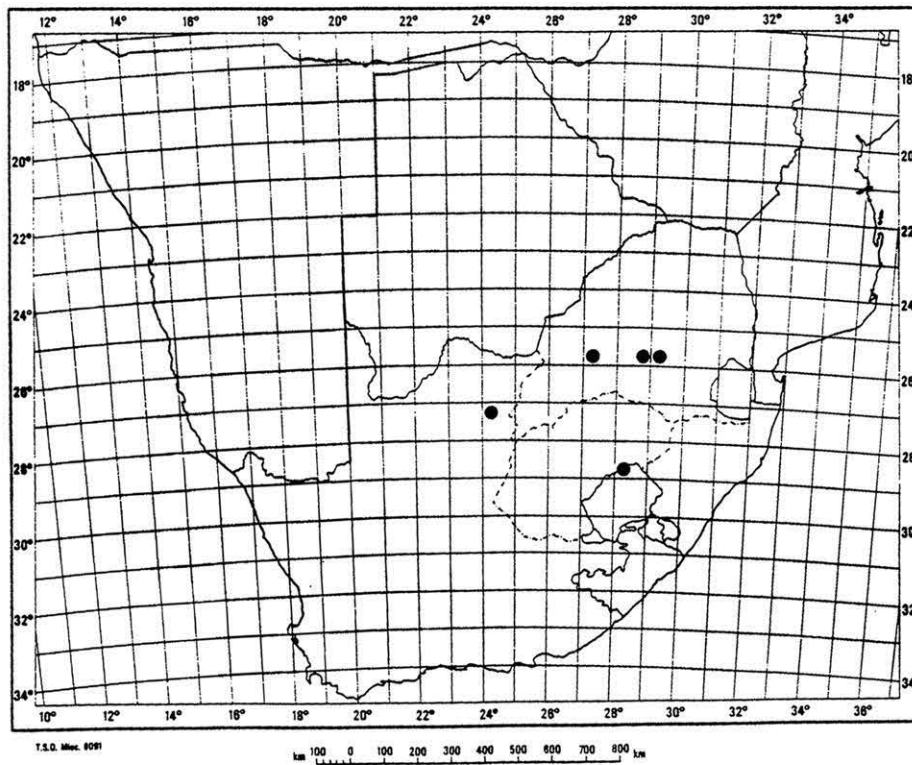


MAP 10.— Distribution of *Riccia angolensis* in southern Africa.

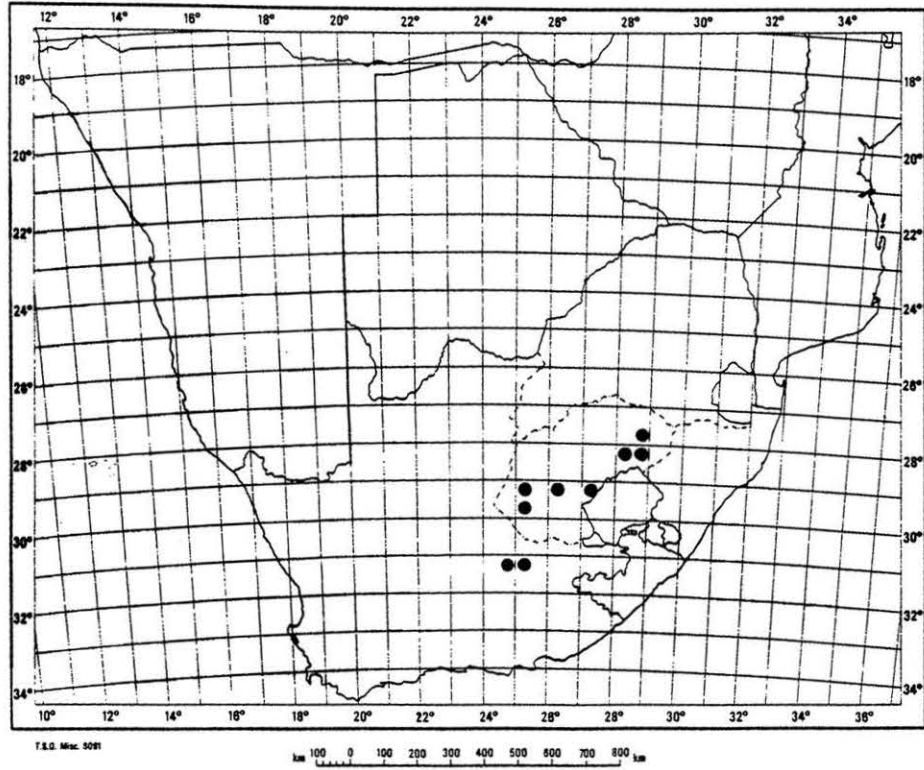




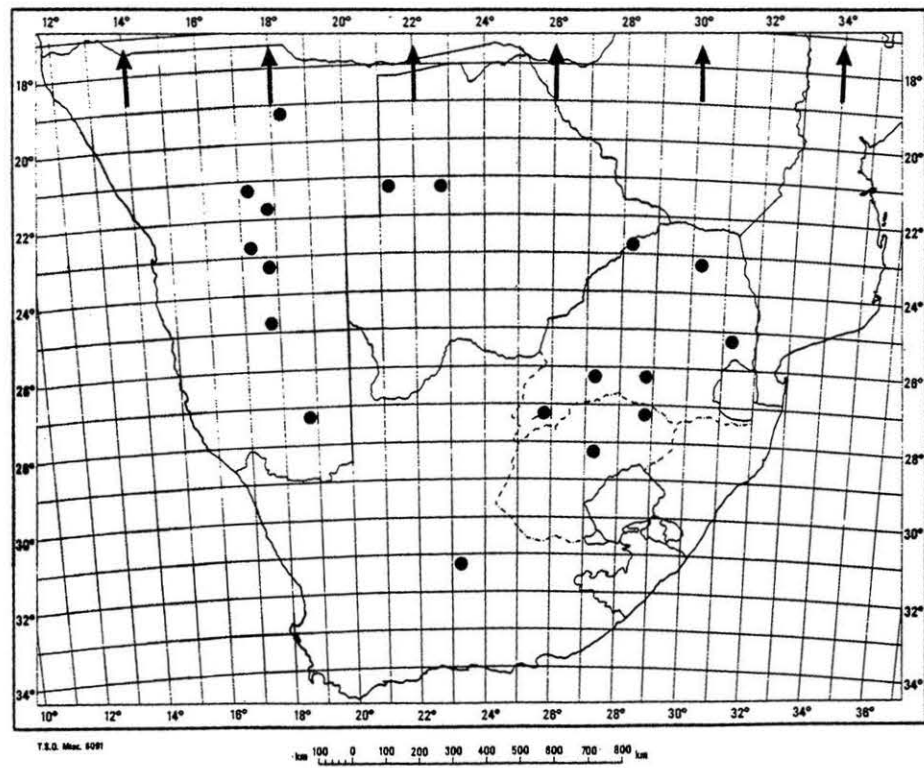
MAP 11.— Distribution of *Riccia nigrella* in southern Africa.



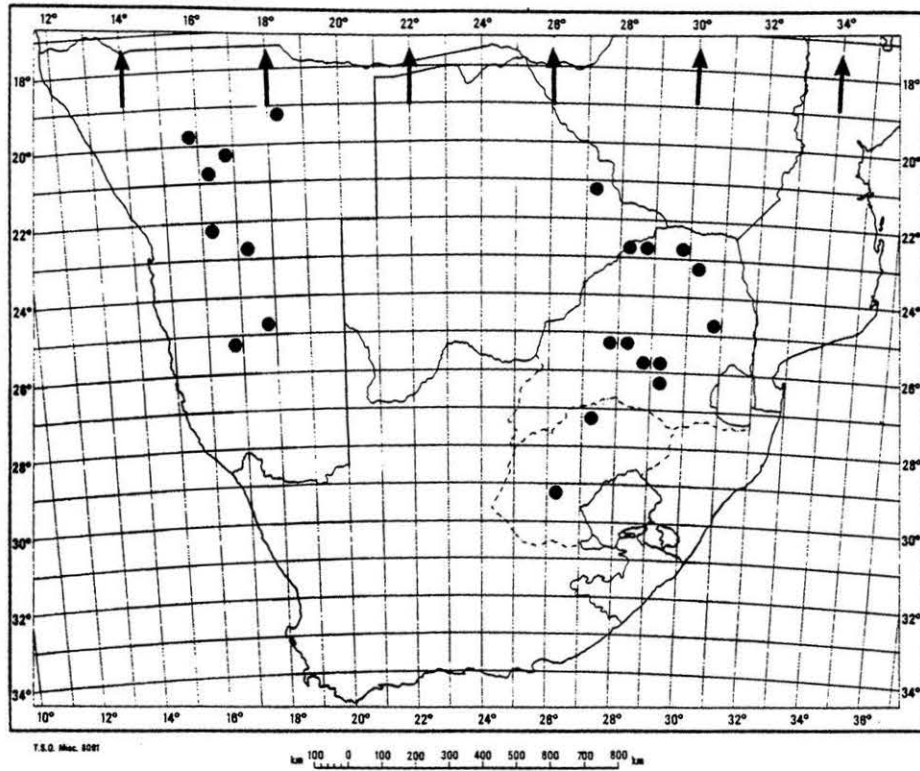
MAP 12.— Distribution of *Riccia macrocarpa* in southern Africa.



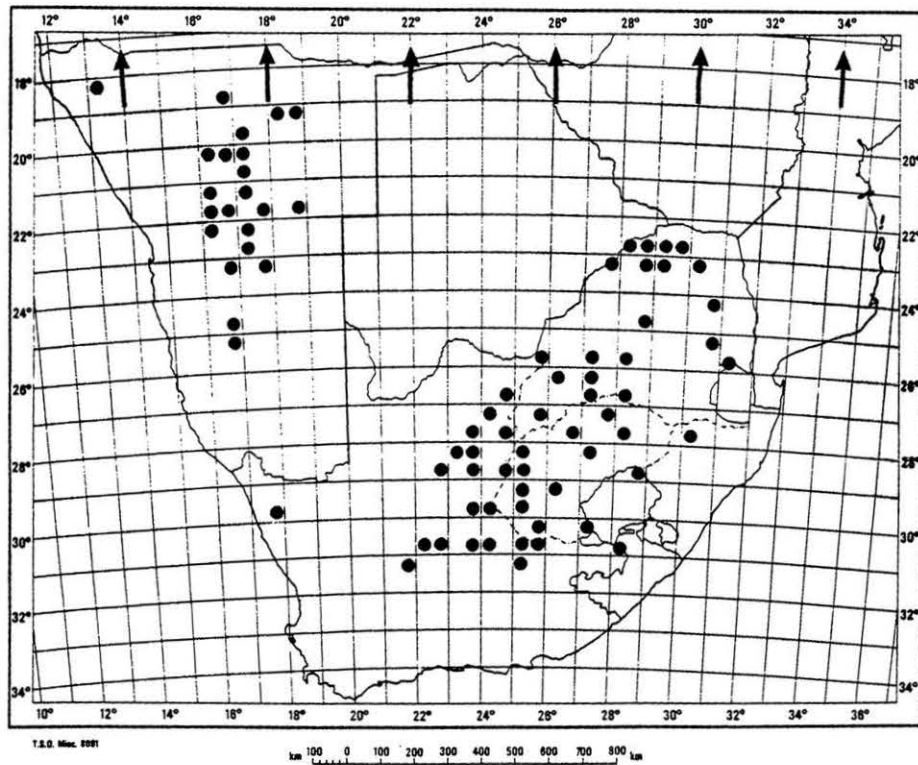
MAP 13.— Distribution of *Riccia potsiana*.



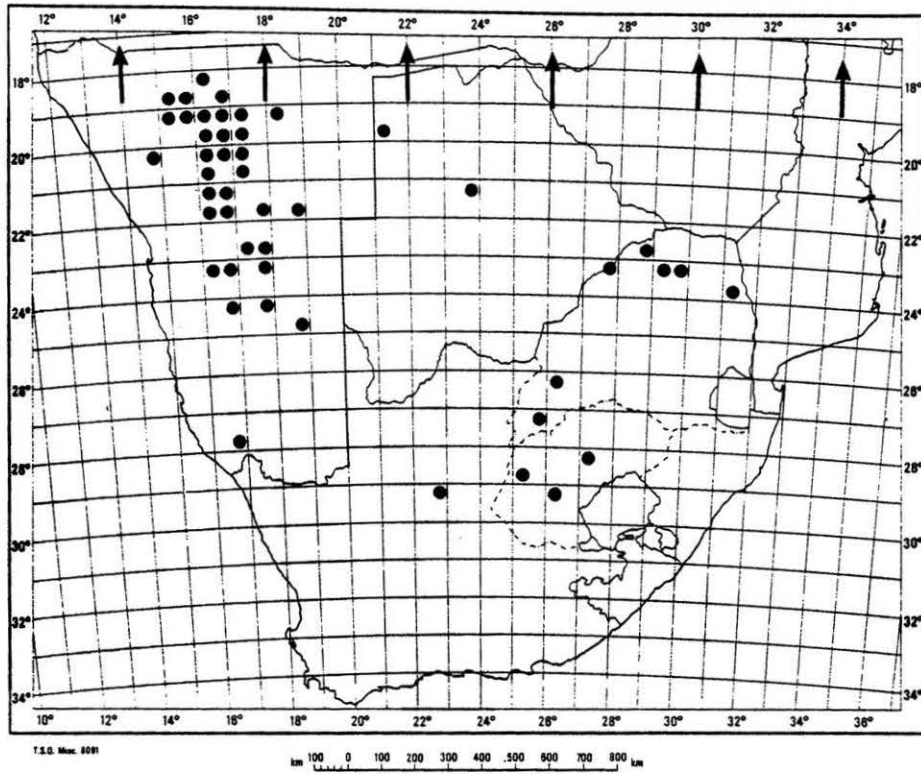
MAP 14.— Distribution of *Riccia runssorensis* in southern Africa.



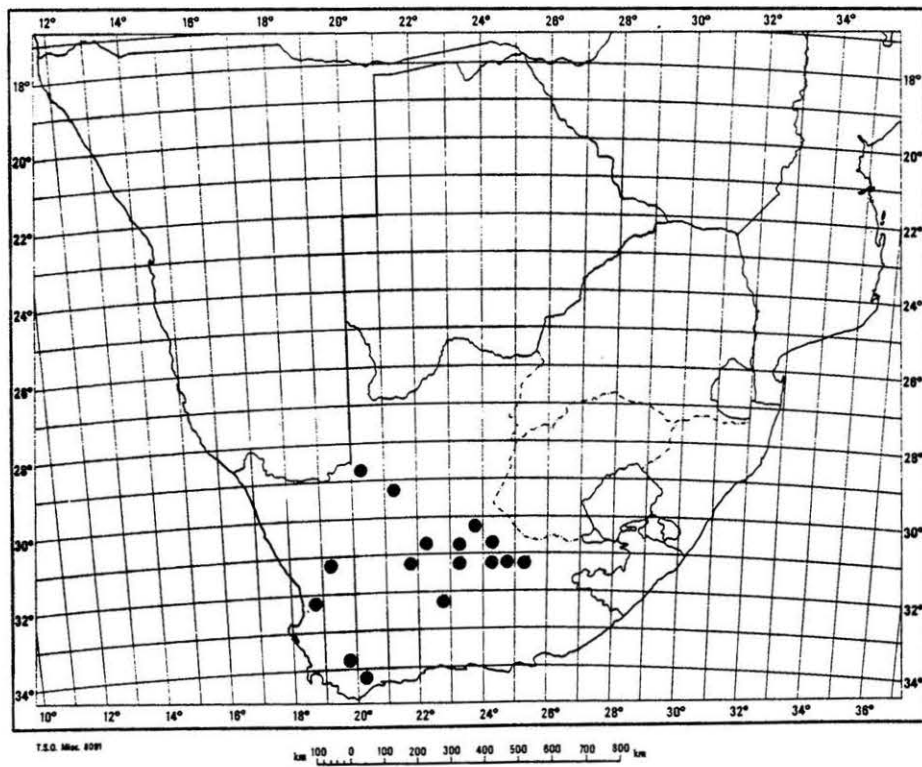
MAP 15.— Distribution of *Riccia rosea* in southern Africa.



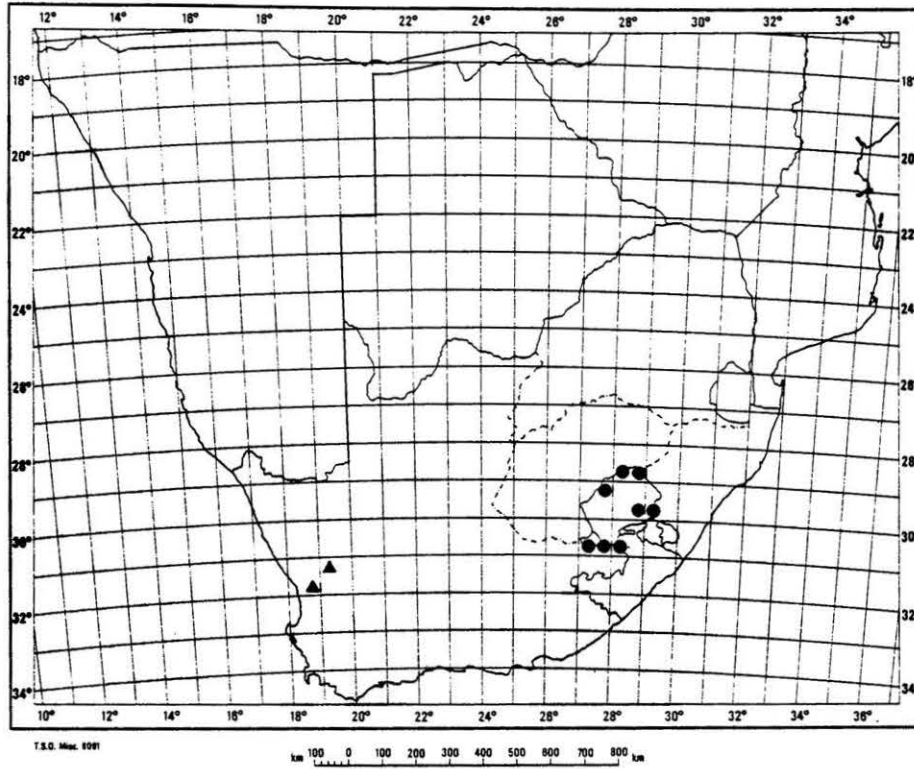
MAP 16.— Distribution of *Riccia albolimbata* in southern Africa.



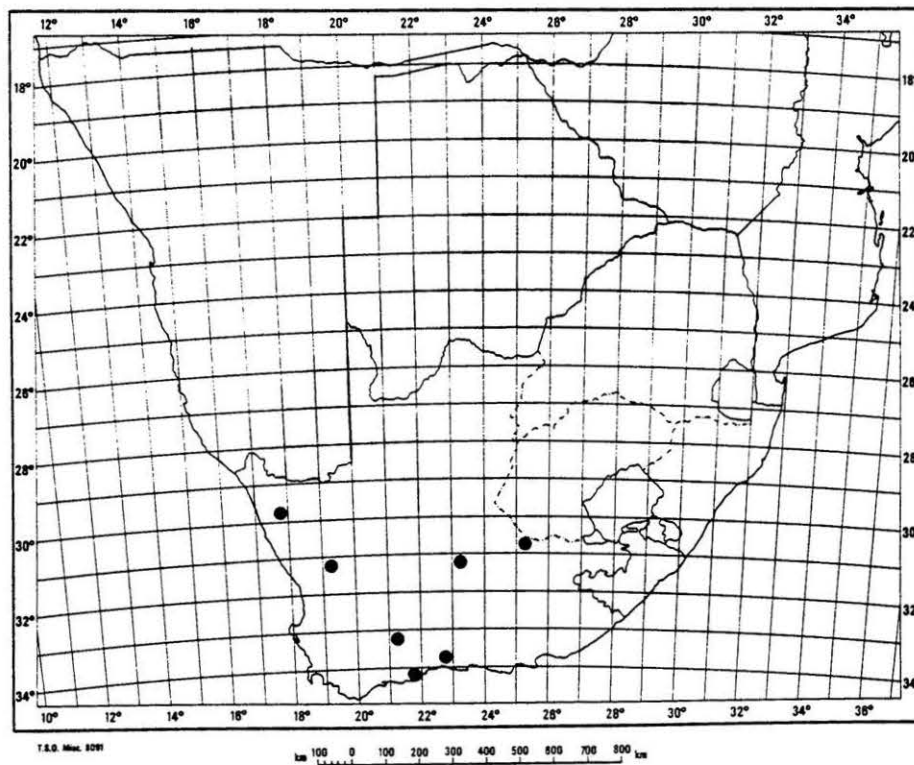
MAP 17.— Distribution of *Riccia argenteolimbata* in southern Africa.



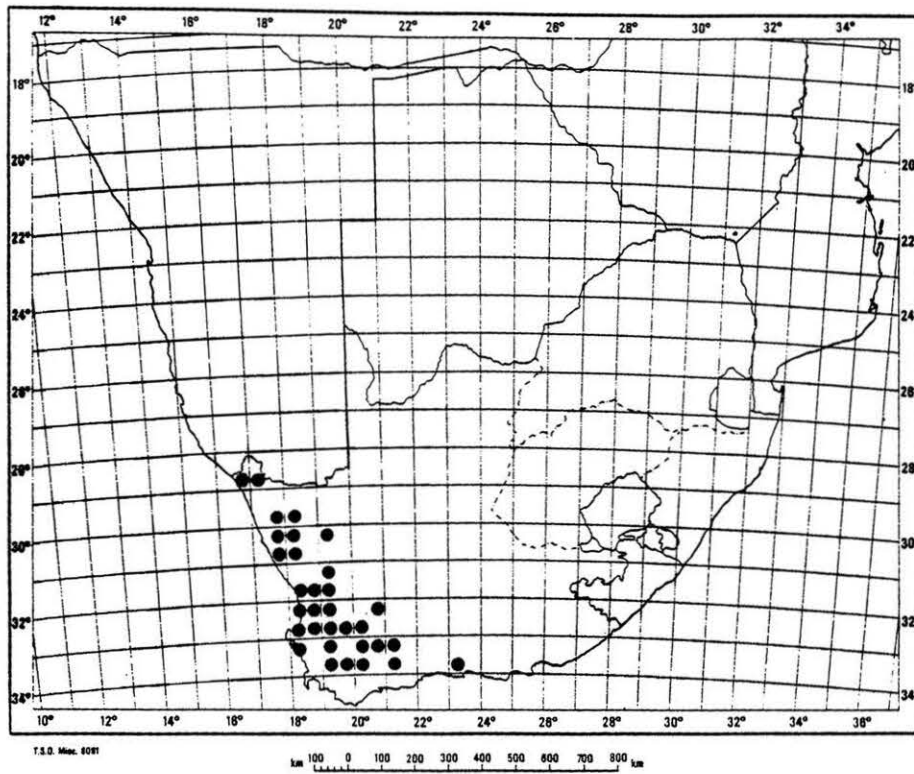
MAP 18.— Distribution of *Riccia albomata*.



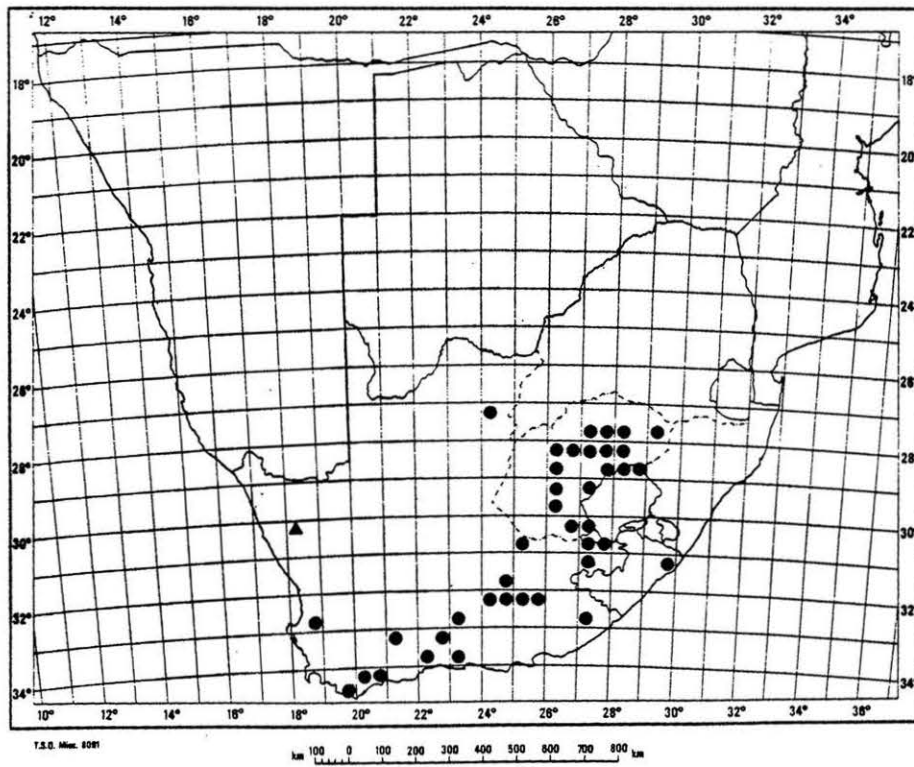
MAP 19.— Distribution of *Riccia montana* (dots) and *R. alboporosa* (triangles).



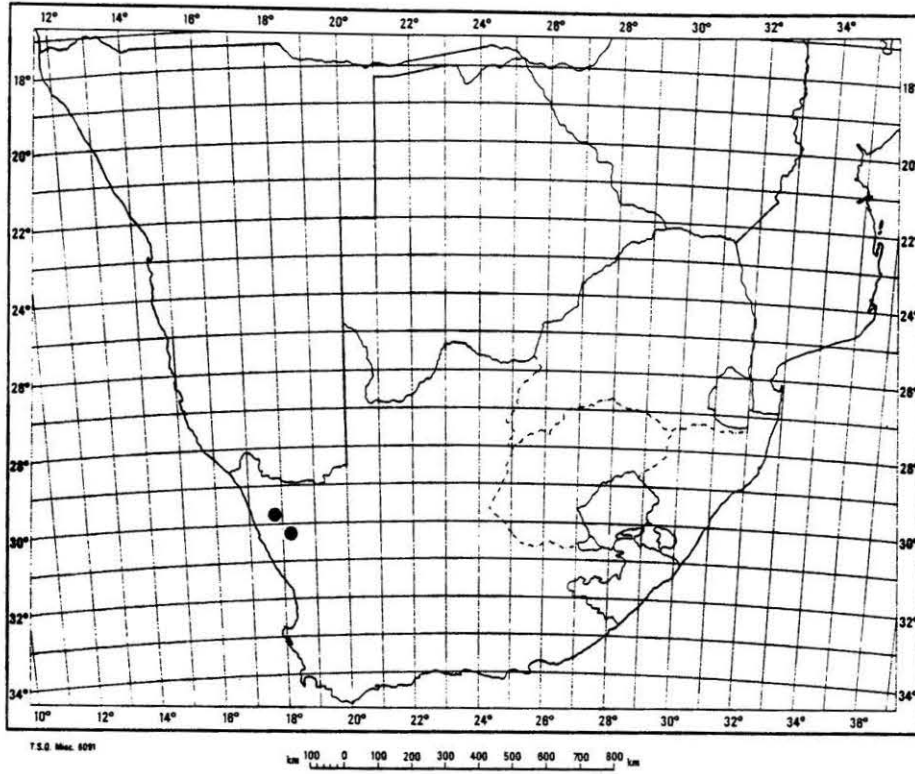
MAP 20.— Distribution of *Riccia bicolorata*.



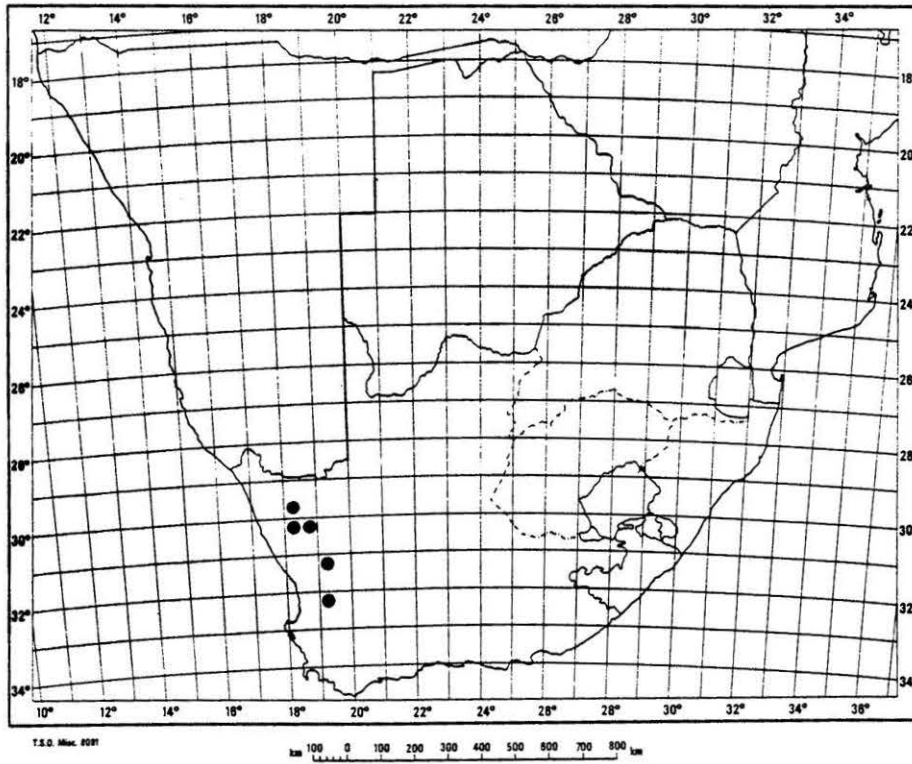
MAP 21.— Distribution of *Riccia villosa*.



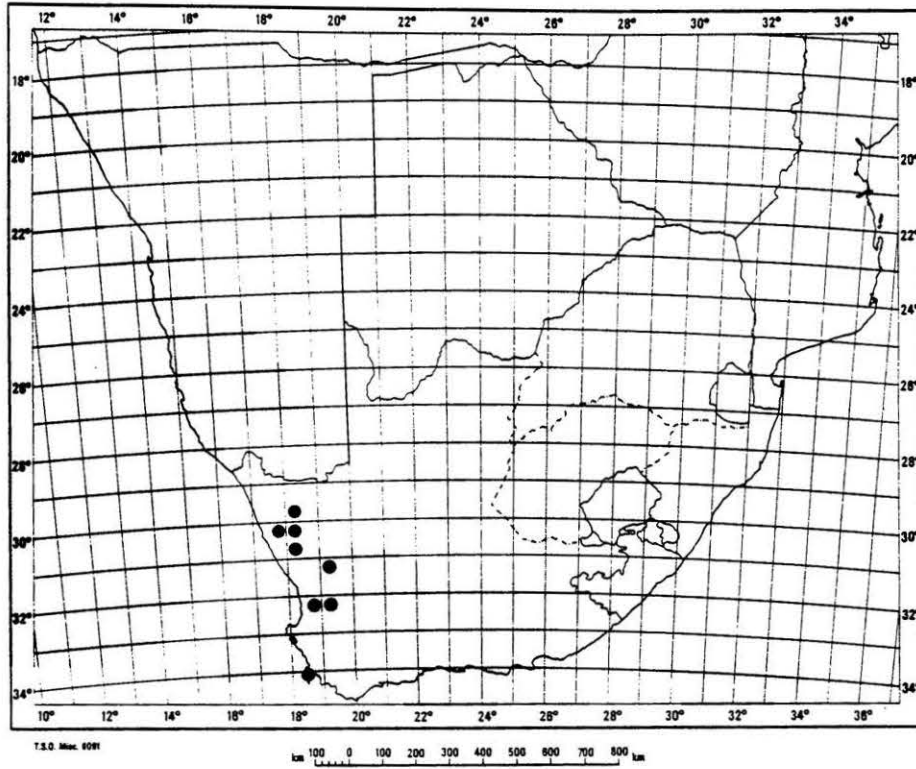
MAP 22.— Distribution of *Riccia hirsuta* (triangles) and *R. simii* (dots).



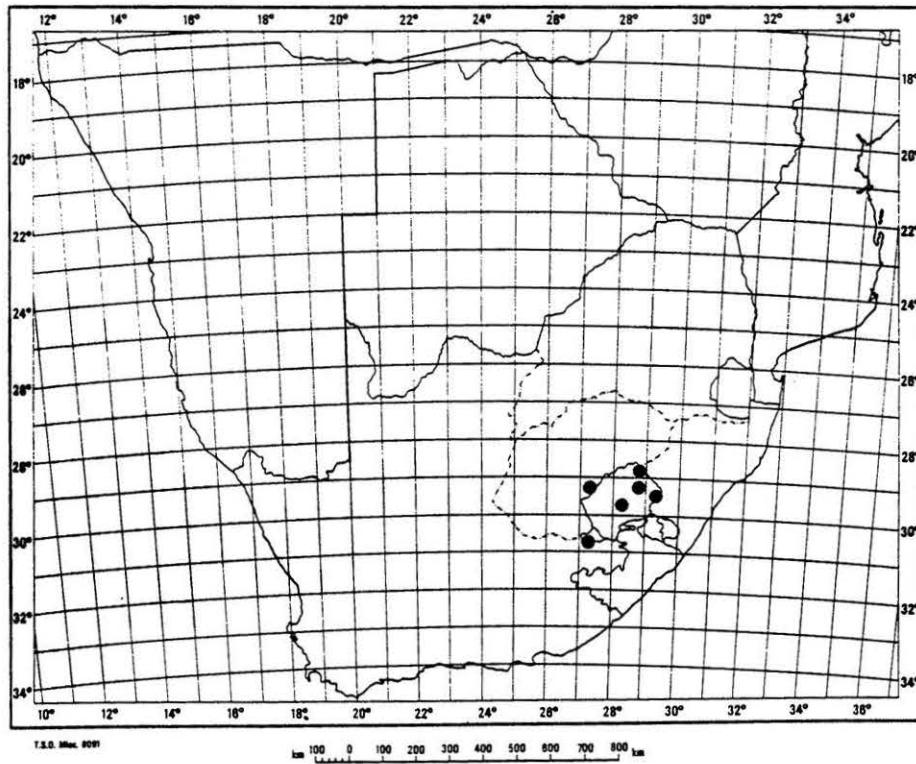
MAP 23.— Distribution of *Riccia vitrea*.



MAP 24.— Distribution of *Riccia namaquensis*.

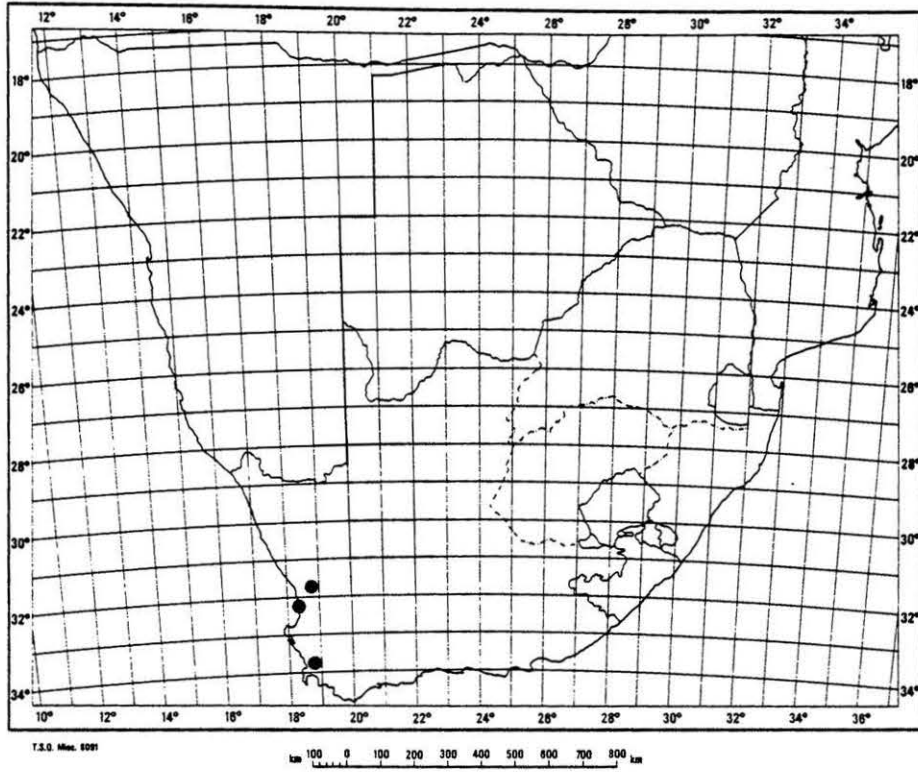


MAP 25.— Distribution of *Riccia albomarginata*.

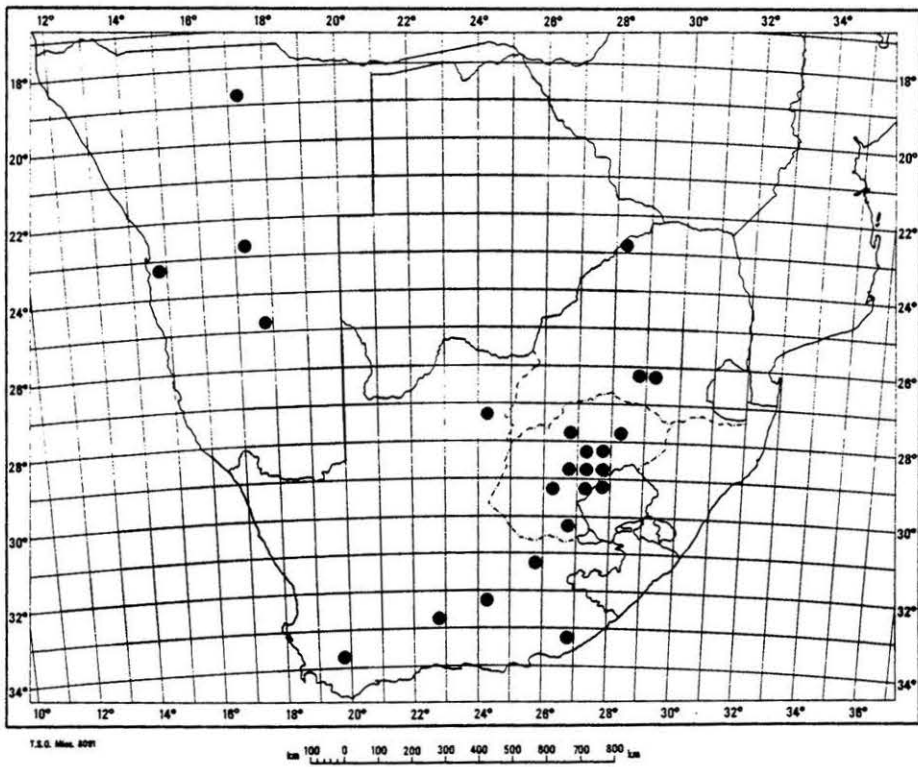


MAP 26.— Distribution of *Riccia ampullacea*.

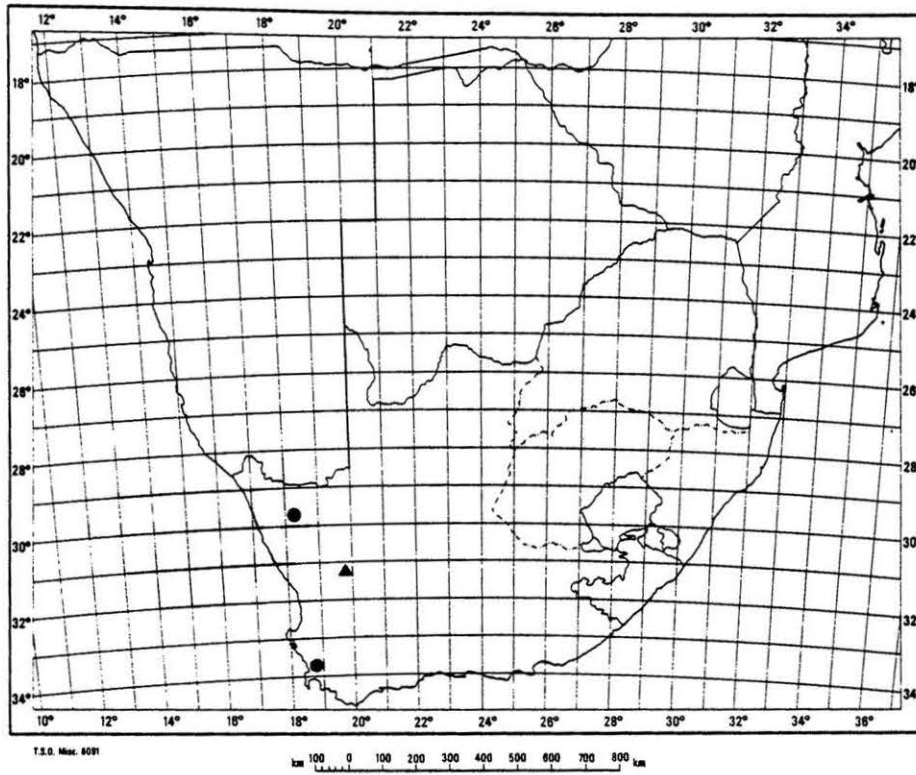




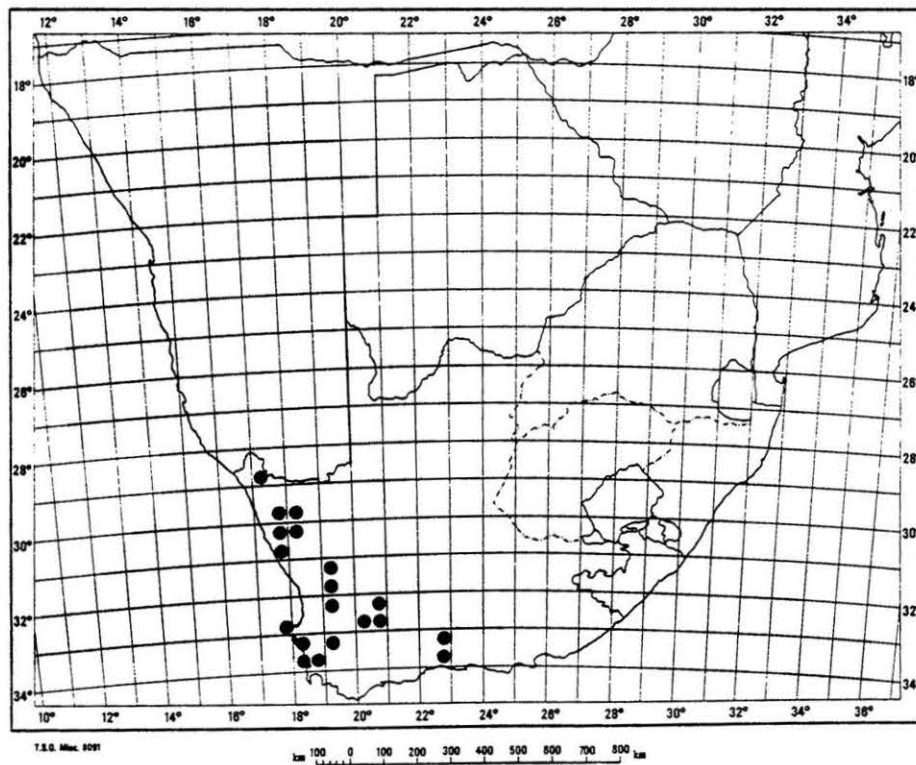
MAP 27.— Distribution of *Riccia parvo-areolata*.



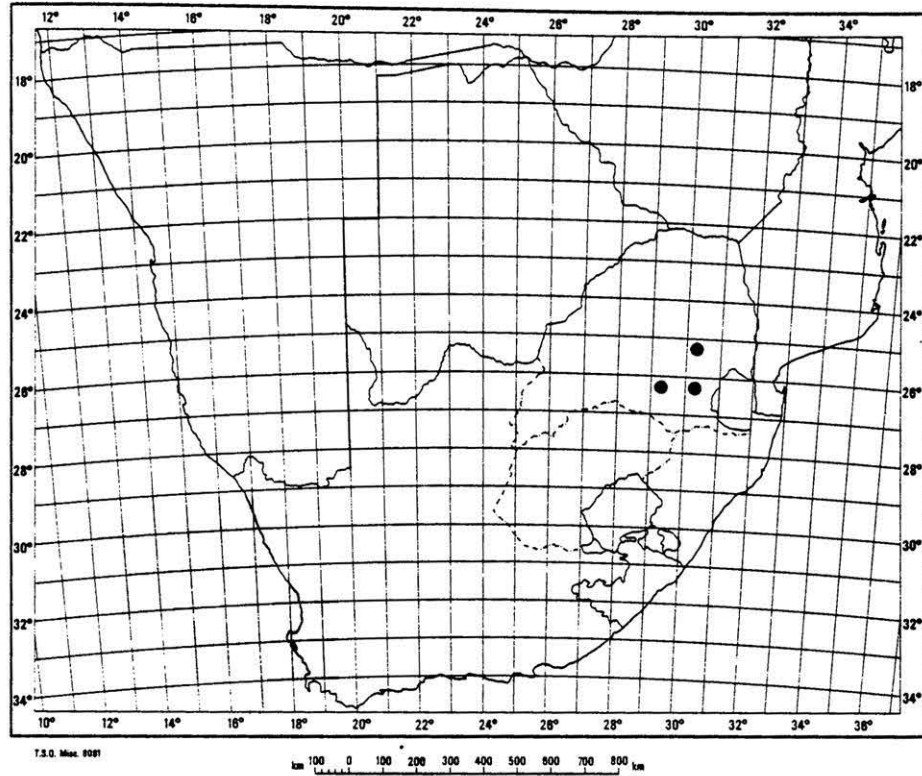
MAP 28.— Distribution of *Riccia albovestita*.



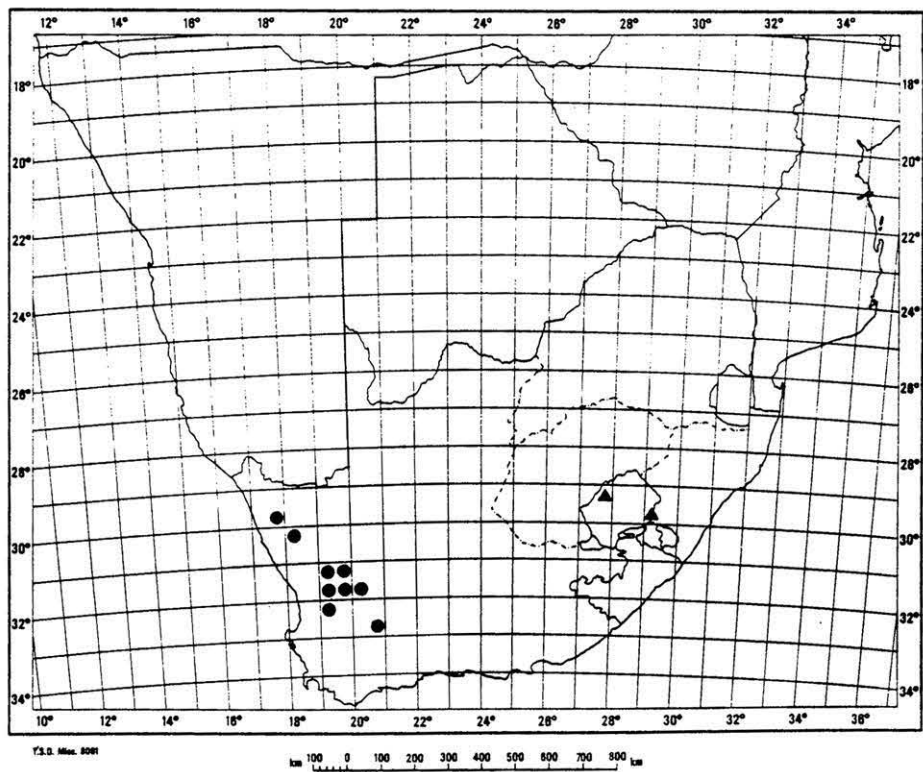
MAP 29.— Distribution of *Riccia alatospora* (dots) and *R. hantamensis* (triangles).



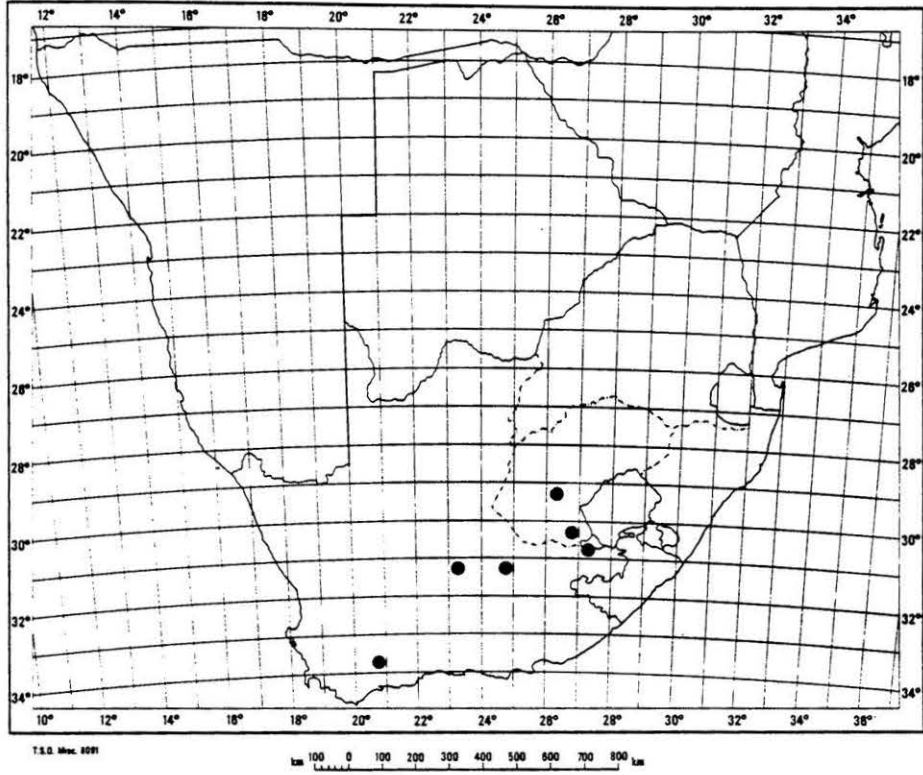
MAP 30.— Distribution of *Riccia concava*.



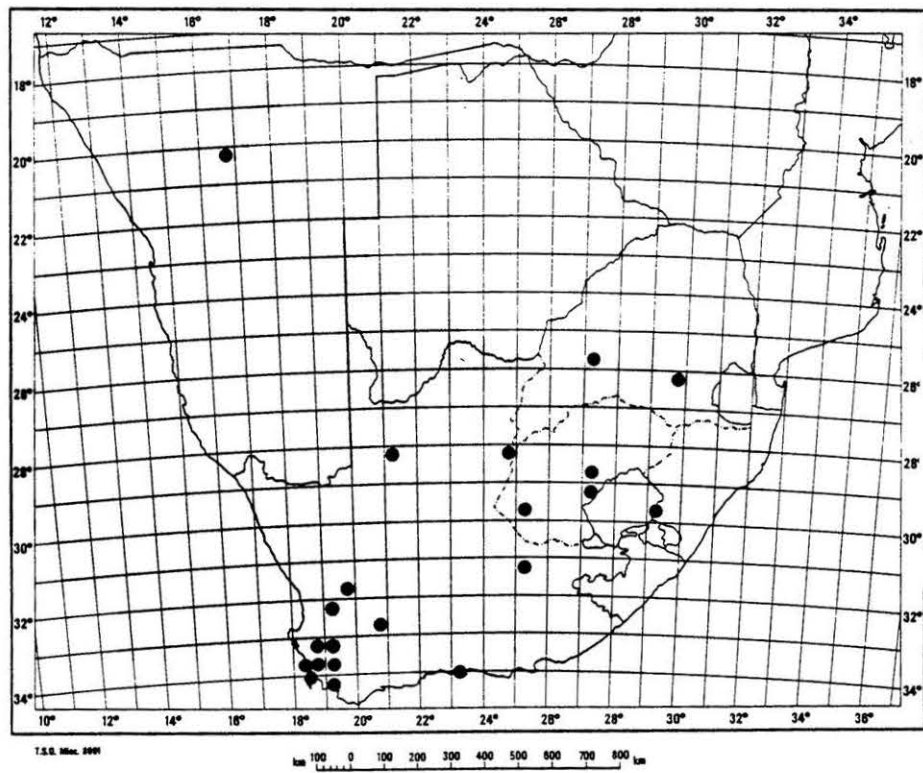
MAP 31.— Distribution of *Riccia elongata*.



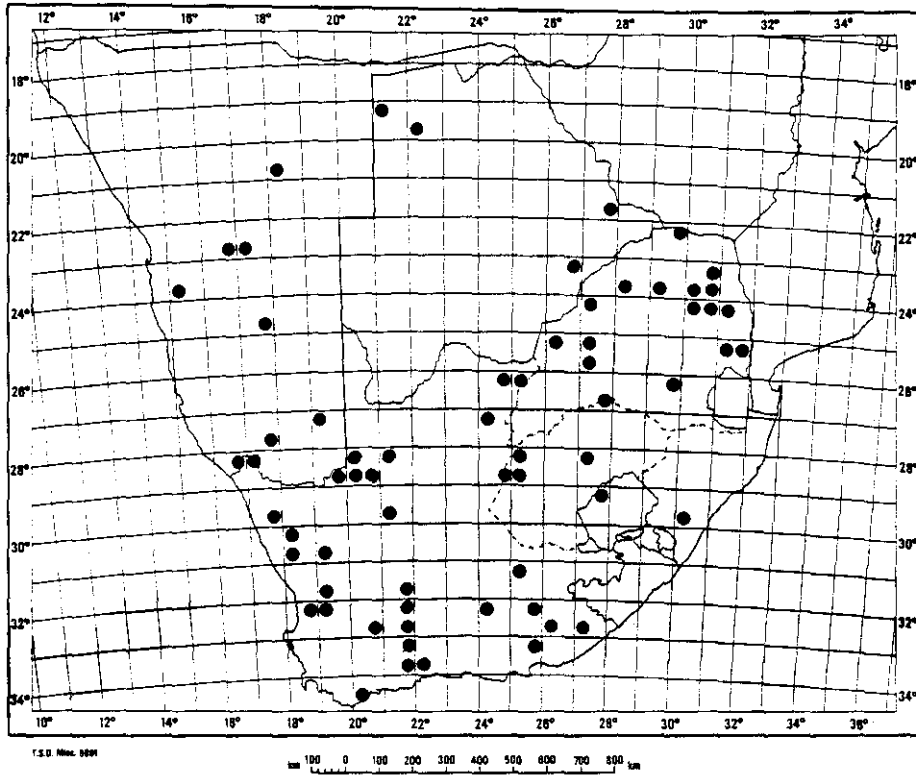
MAP 32.— Distribution of *Riccia trachyglossum* (triangles) and *R. furfuracea* (dots).



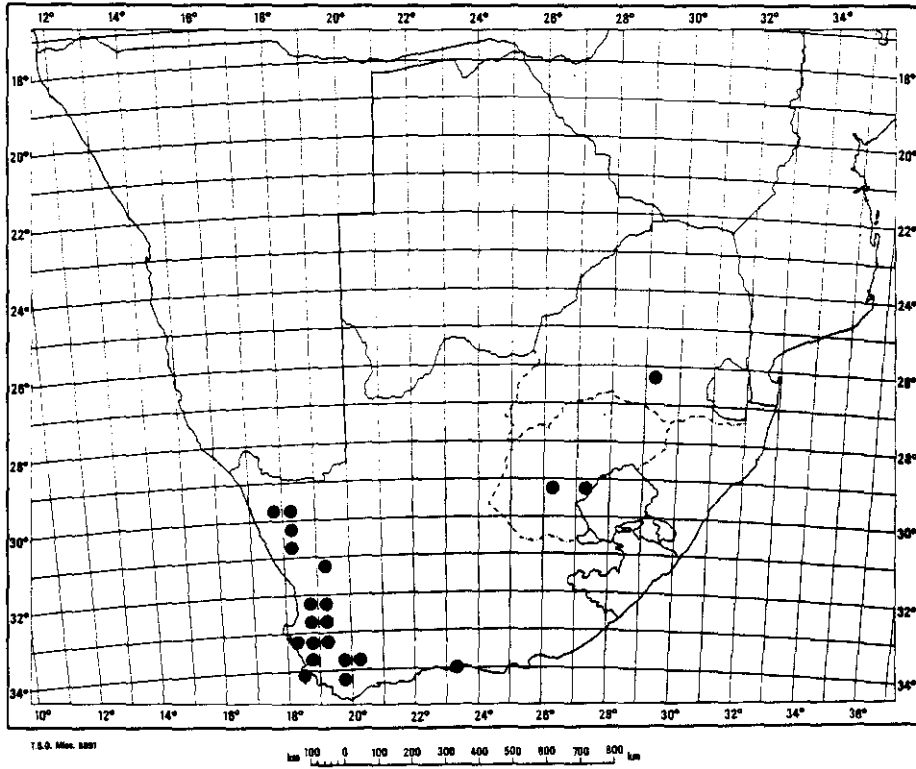
MAP 33.— Distribution of *Riccia pulveracea*.



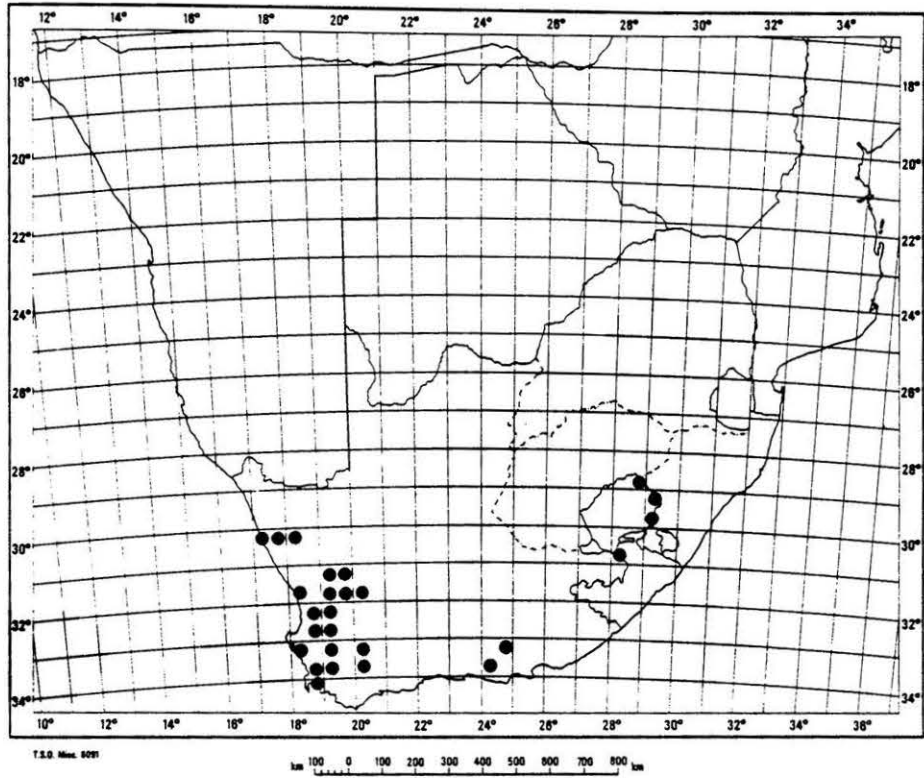
MAP 34.— Distribution of *Riccia crystallina* in southern Africa.



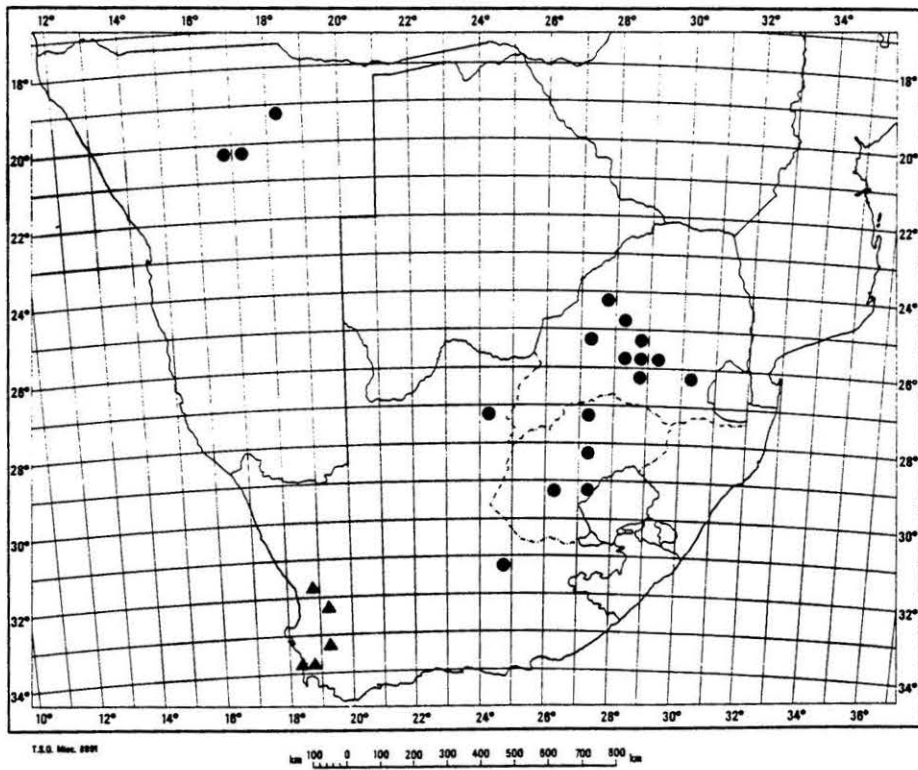
MAP 35.— Distribution of *Riccia cavernosa* in southern Africa.



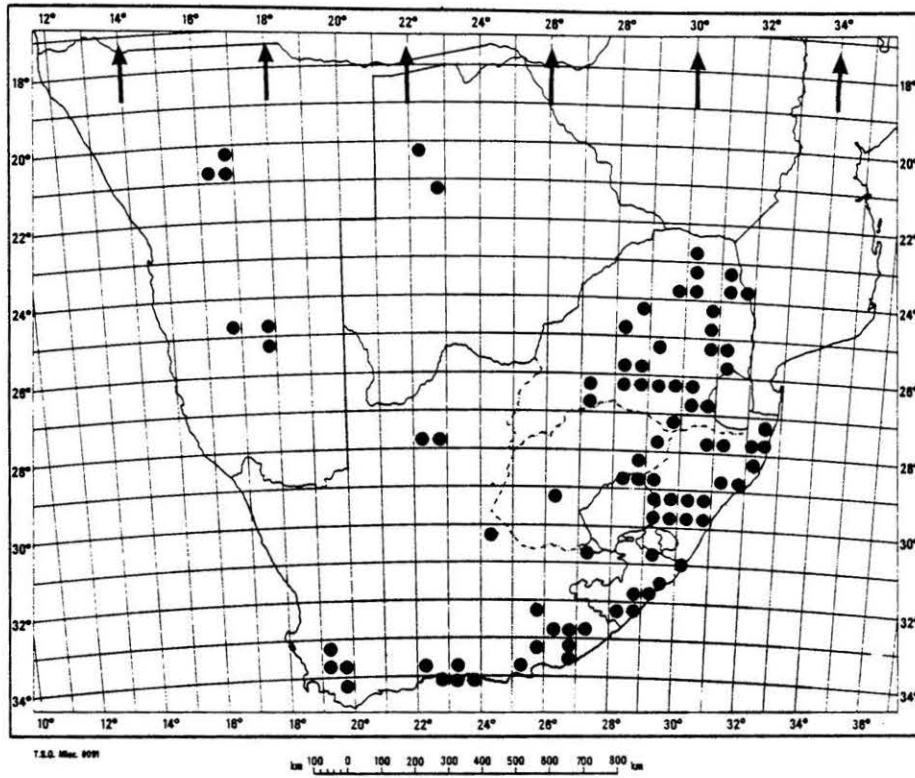
MAP 36.— Distribution of *Riccia cupulifera*.



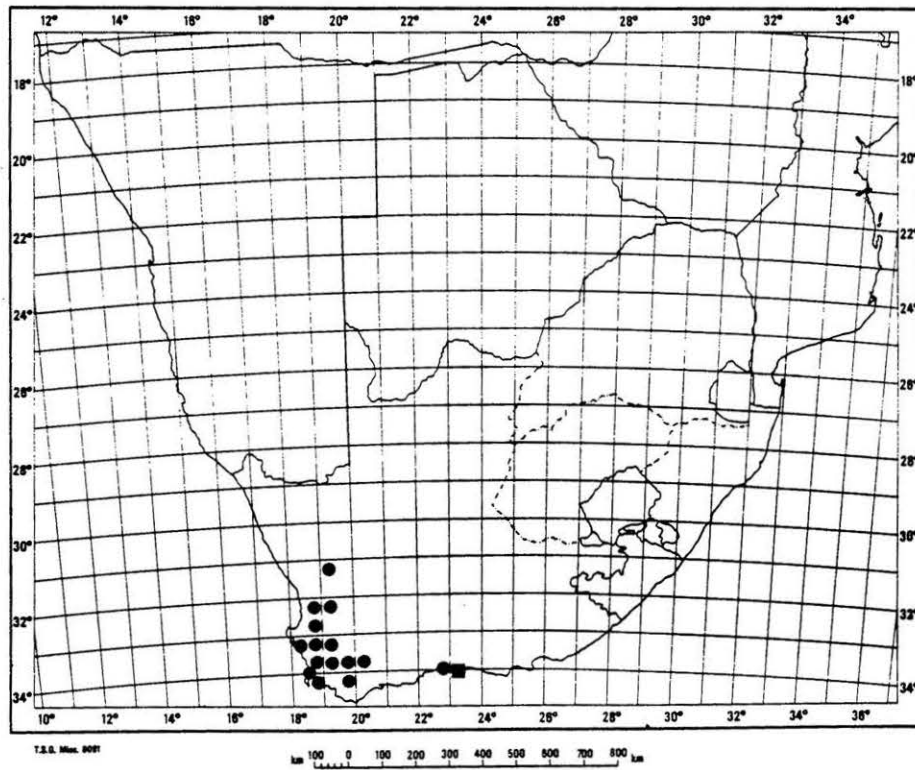
MAP 37.— Distribution of *Riccia bullosa*.



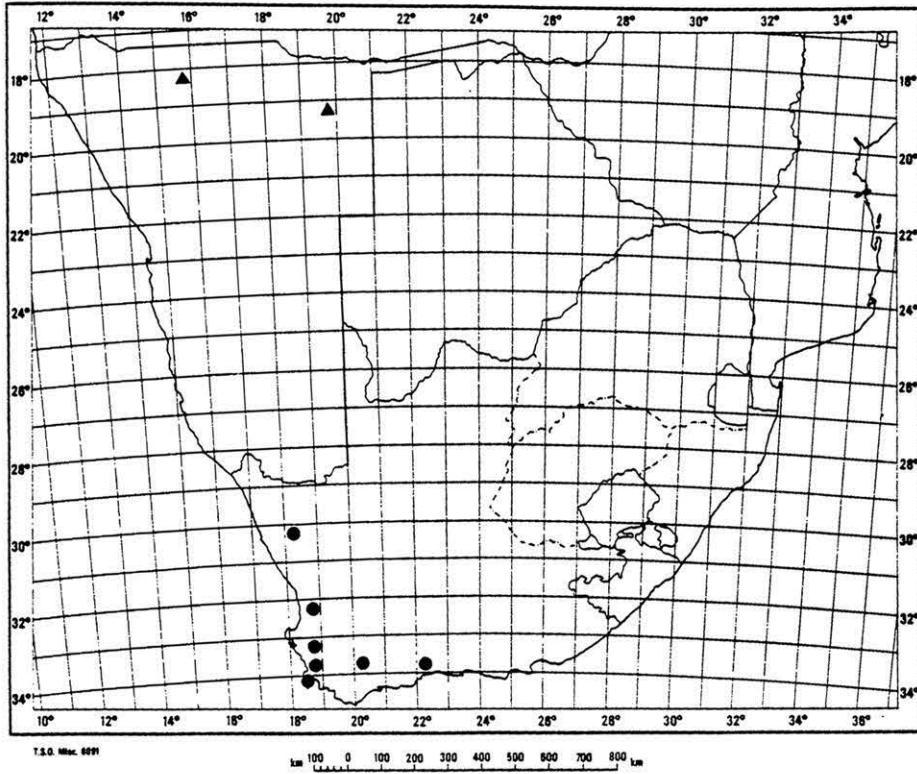
MAP 38.— Distribution of *Riccia garsidei* (triangles) and *R. volkii* (dots).



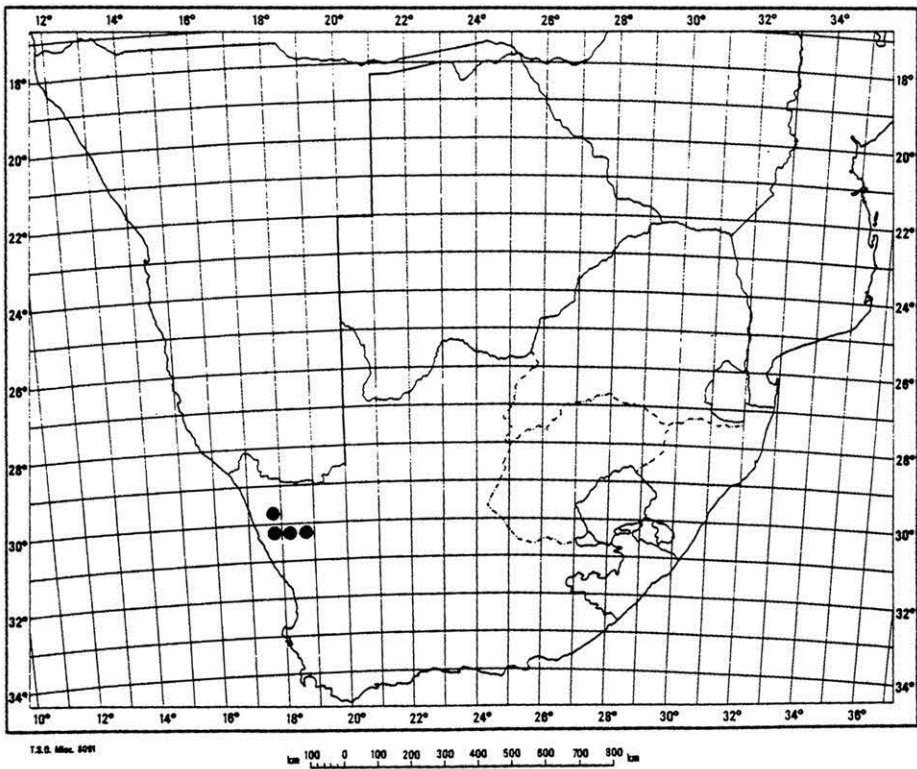
MAP 39.— Distribution of *Riccia stricta* in southern Africa.



MAP 40.— Distribution of *Riccia rubricollis* (square) and *R. purpurascens* (dots).

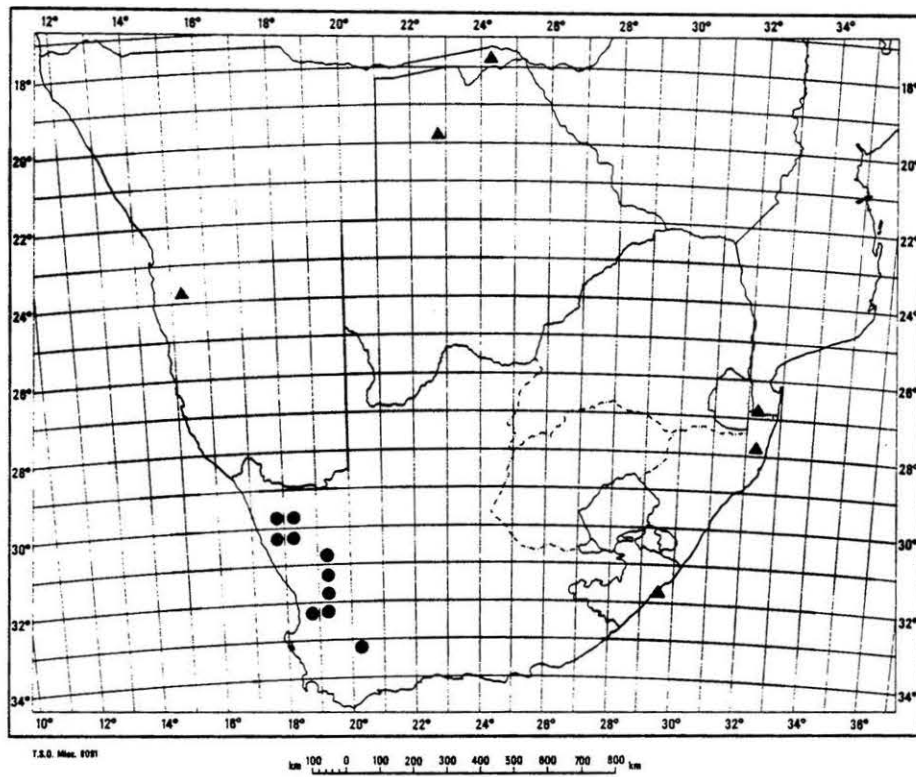


MAP 41.— Distribution of *Riccia curtisii* (dots) and *R. perssonii* (triangles) in southern Africa.

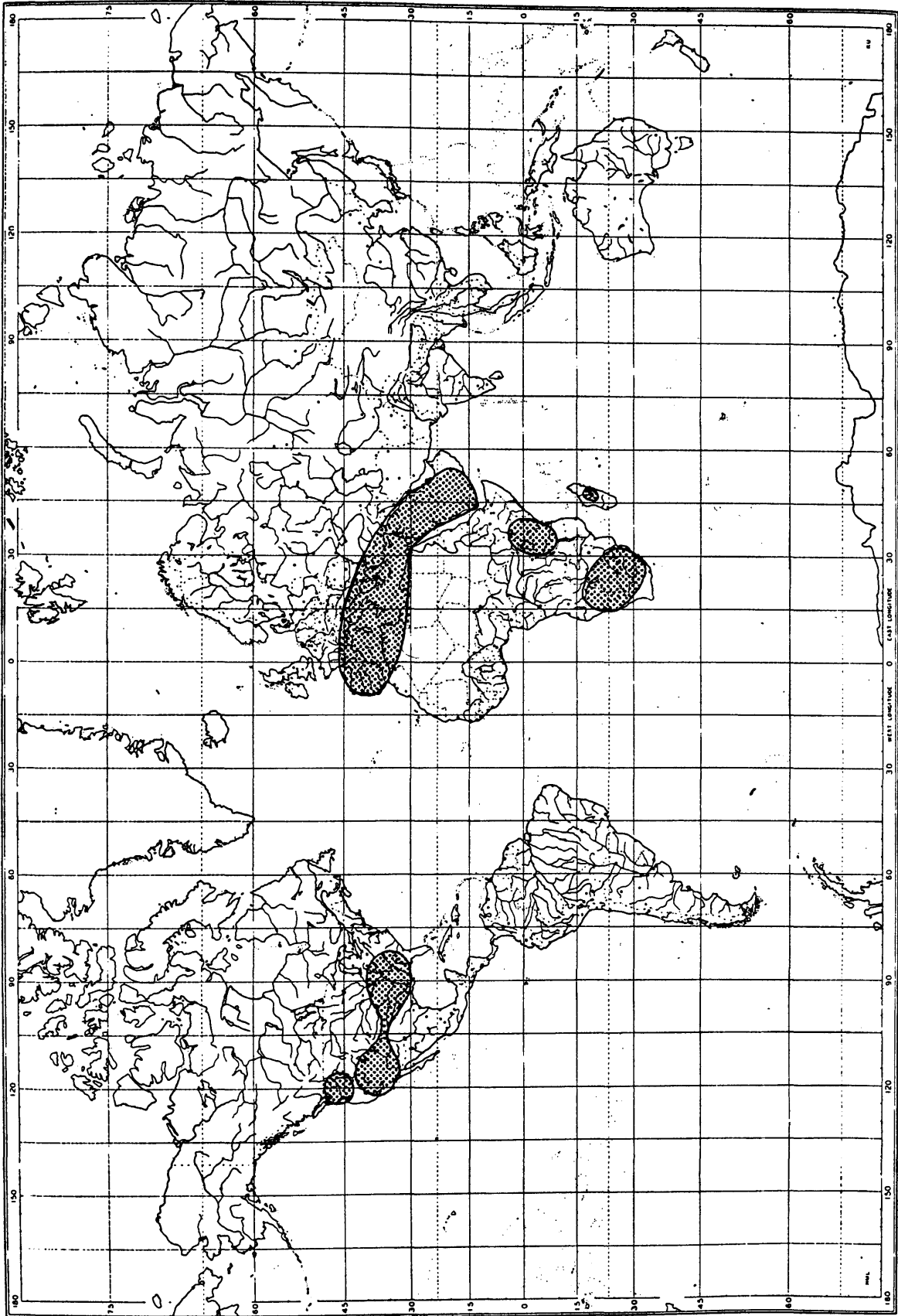


MAP 42.— Distribution of *Riccia tomentosa*.

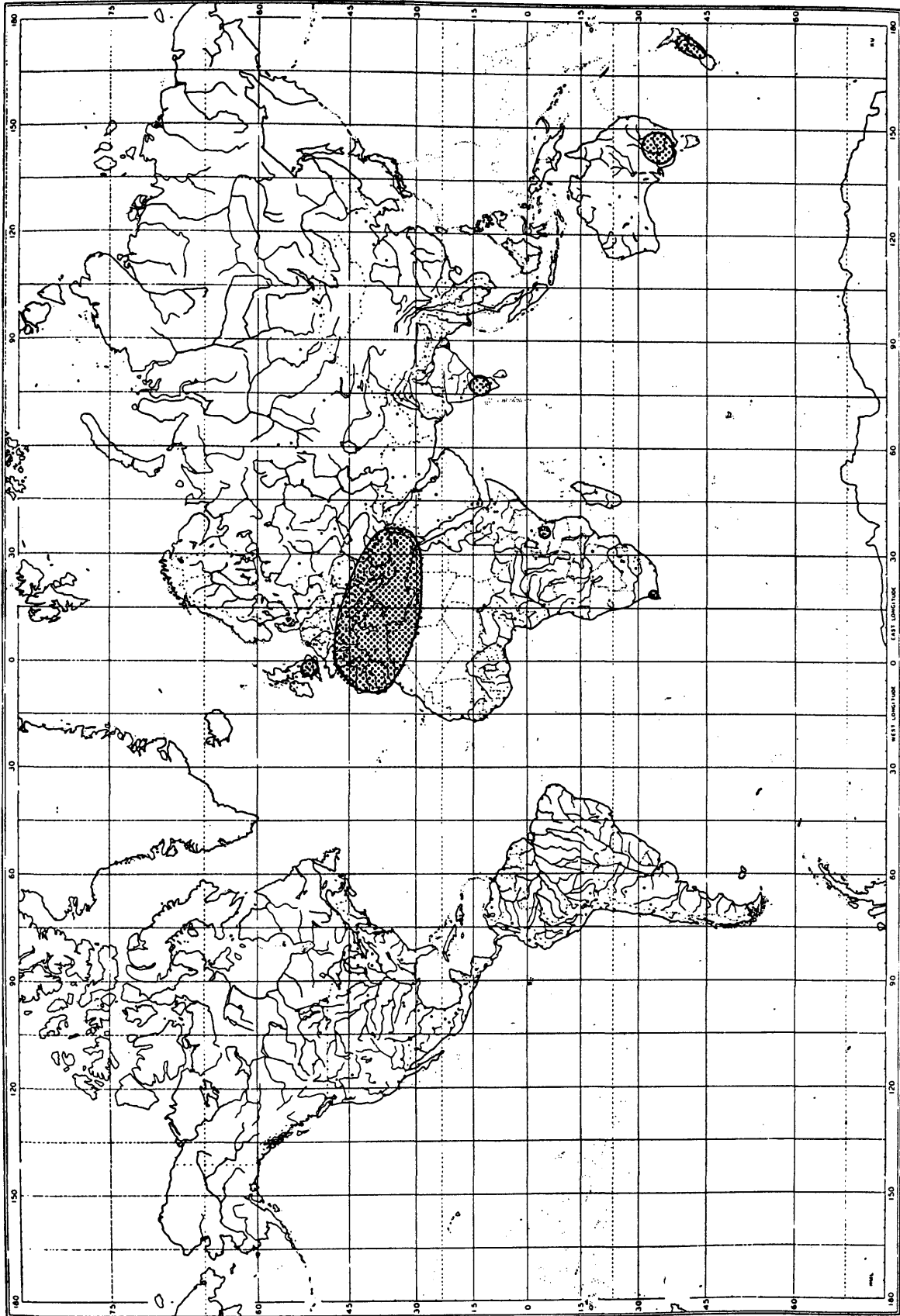




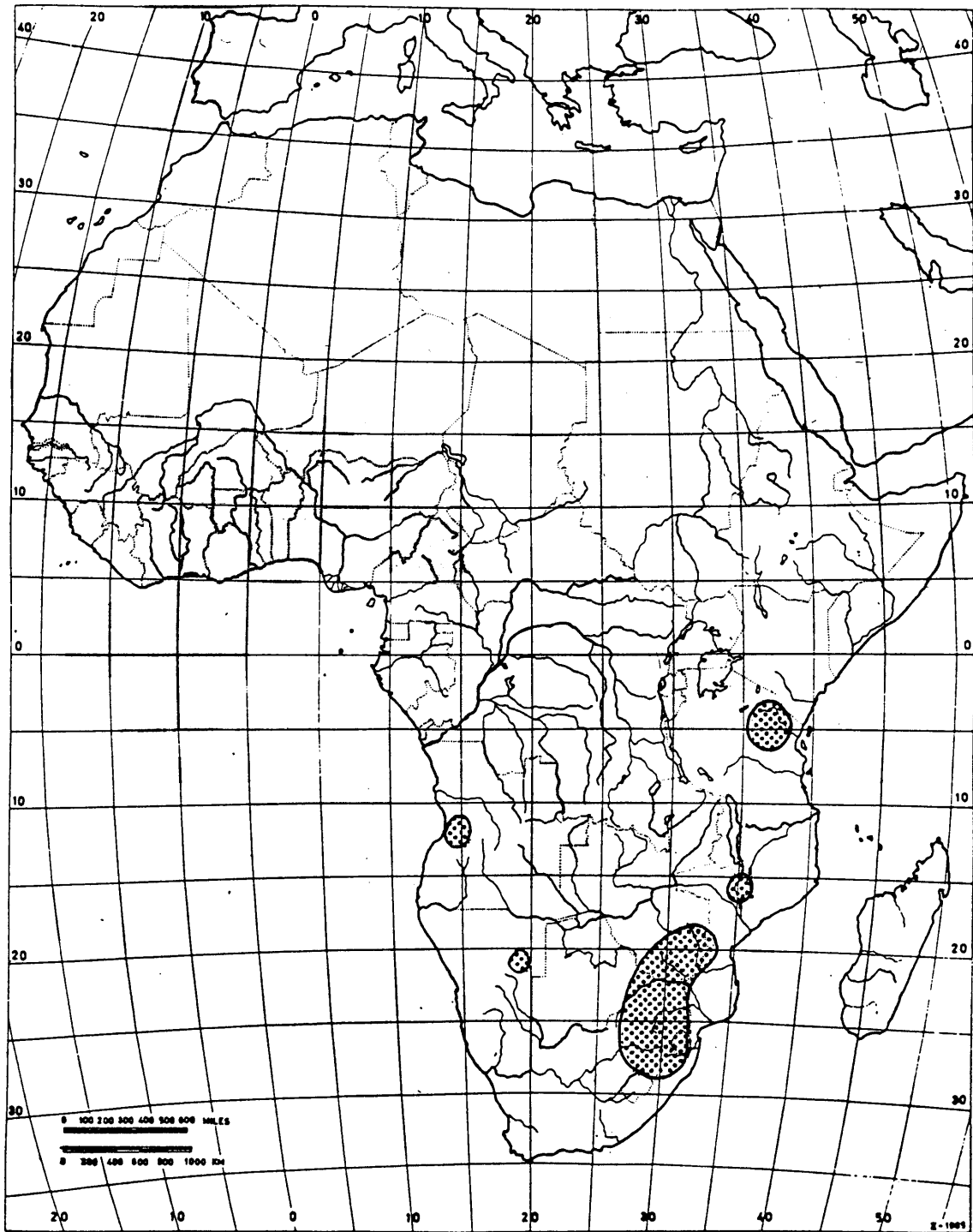
MAP 43.— Distribution of *Riccia schelpei* (dots) and *Ricciocarpos natans* (triangles) in southern Africa.



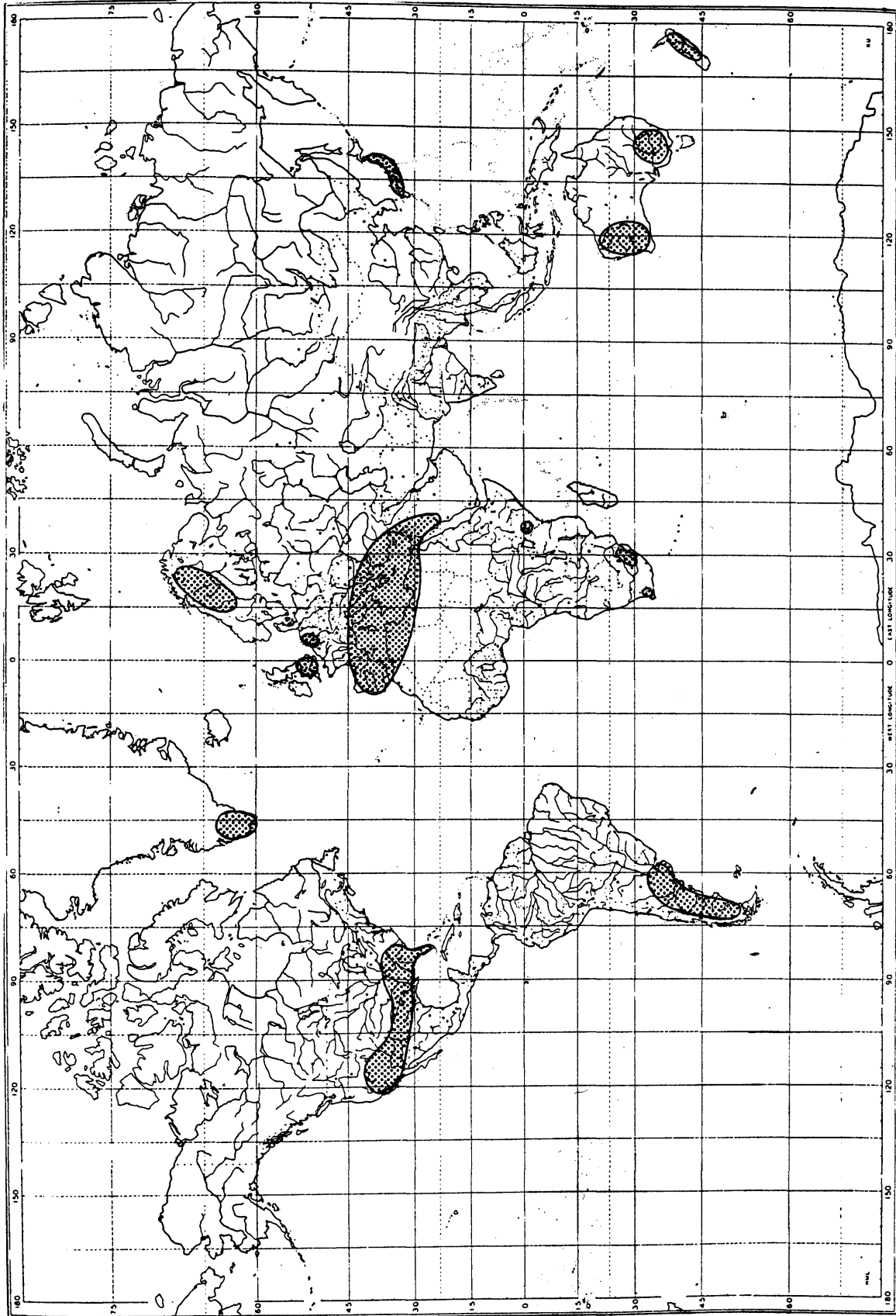
MAP 44.— Known distribution range of *Riccia trichocarpa*.



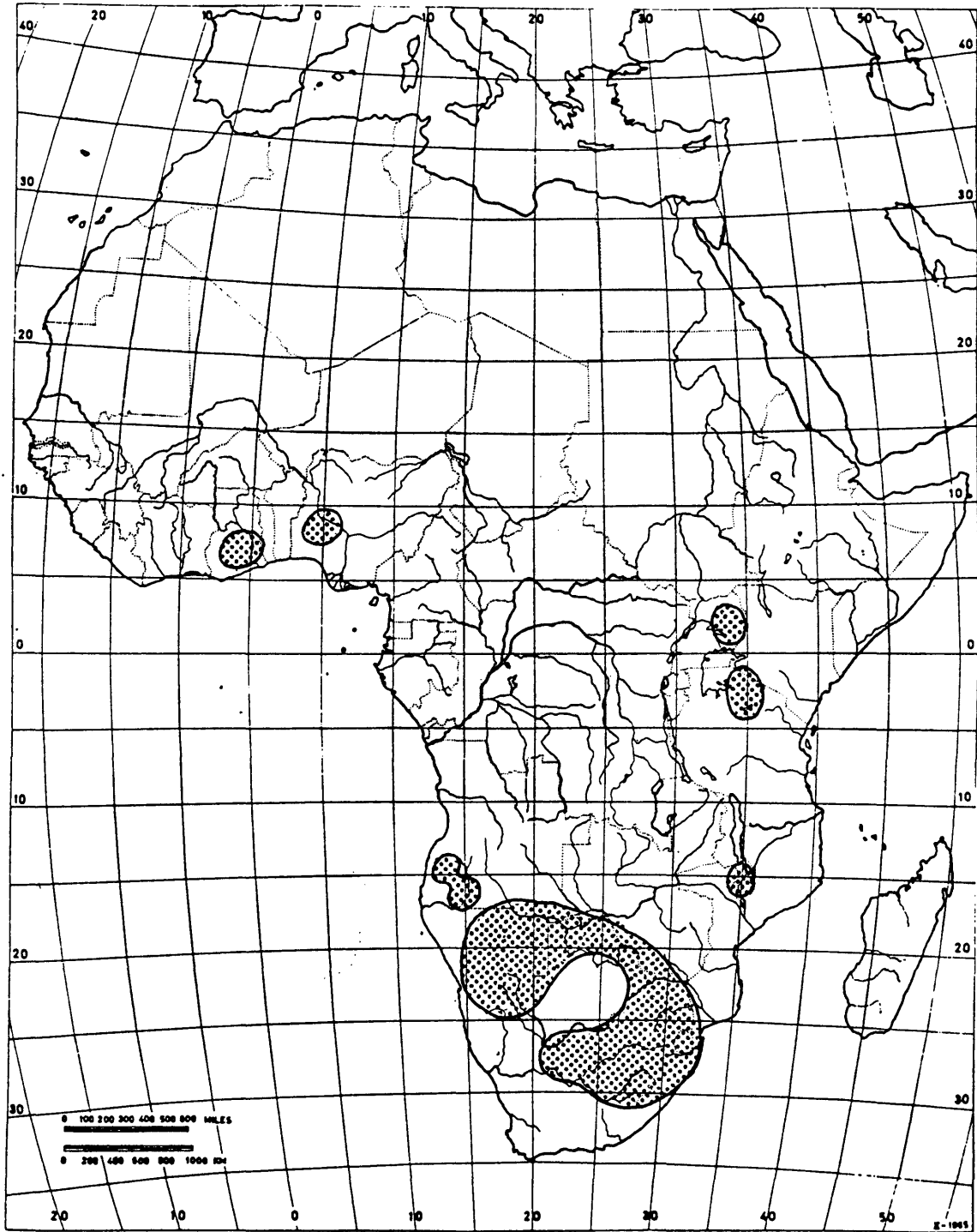
MAP 45.— Known distribution range of *Riccia crozalsii*.



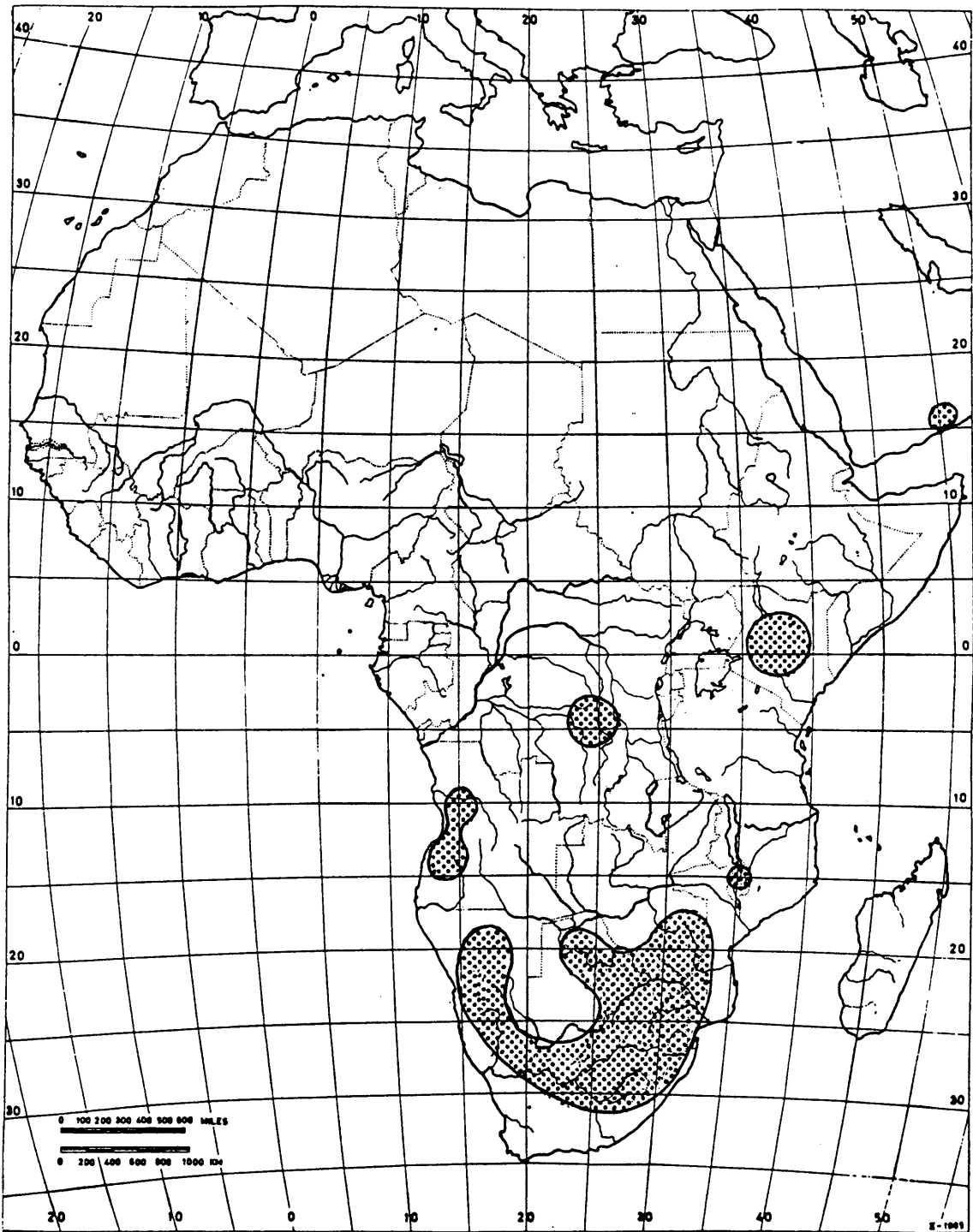
MAP 46.— Known distribution range of *Riccia microciliata*.



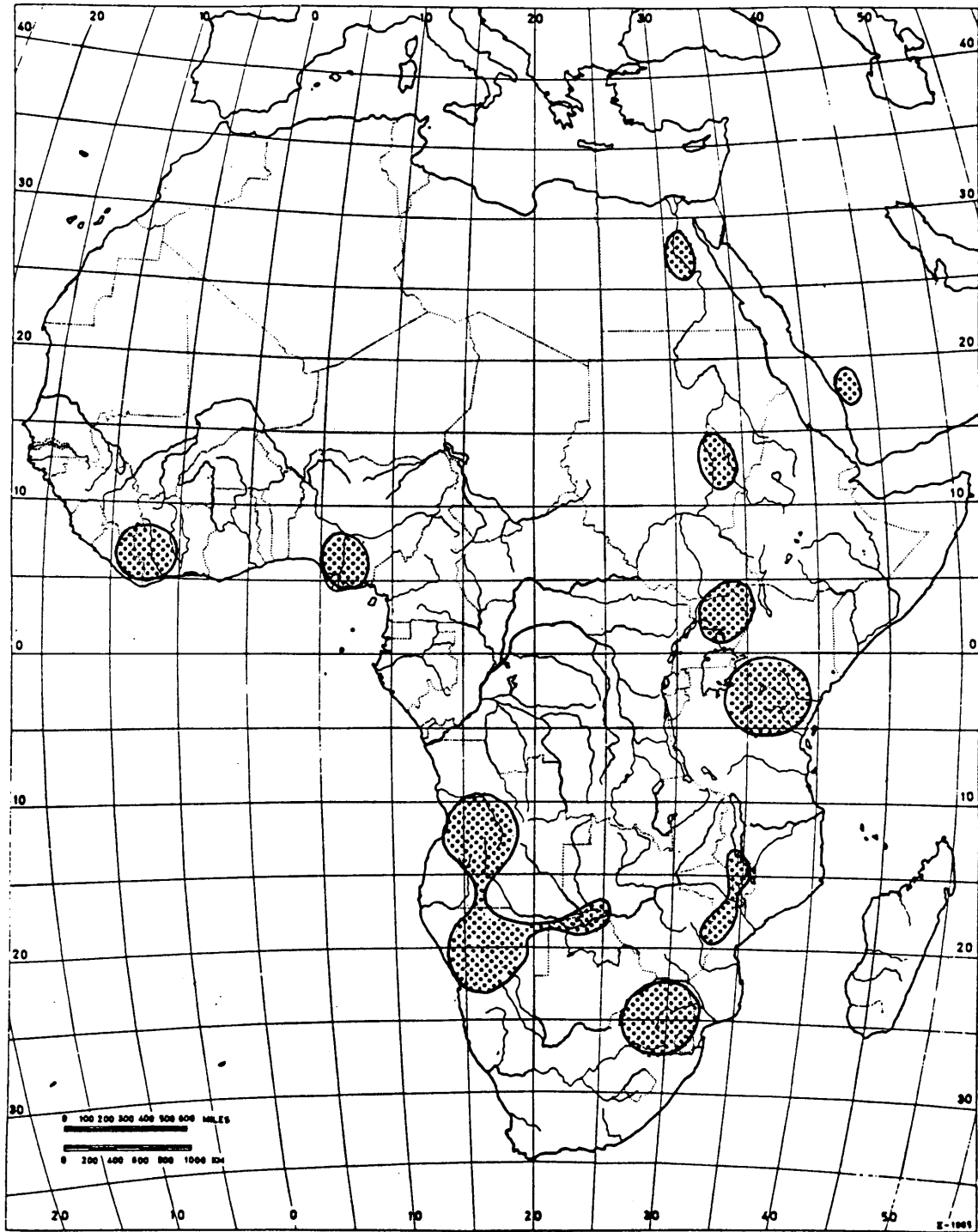
MAP 47.— Known distribution range of *Riccia sorocarpa*.



MAP 48.— Known distribution range of *Riccia atropurpurea*.

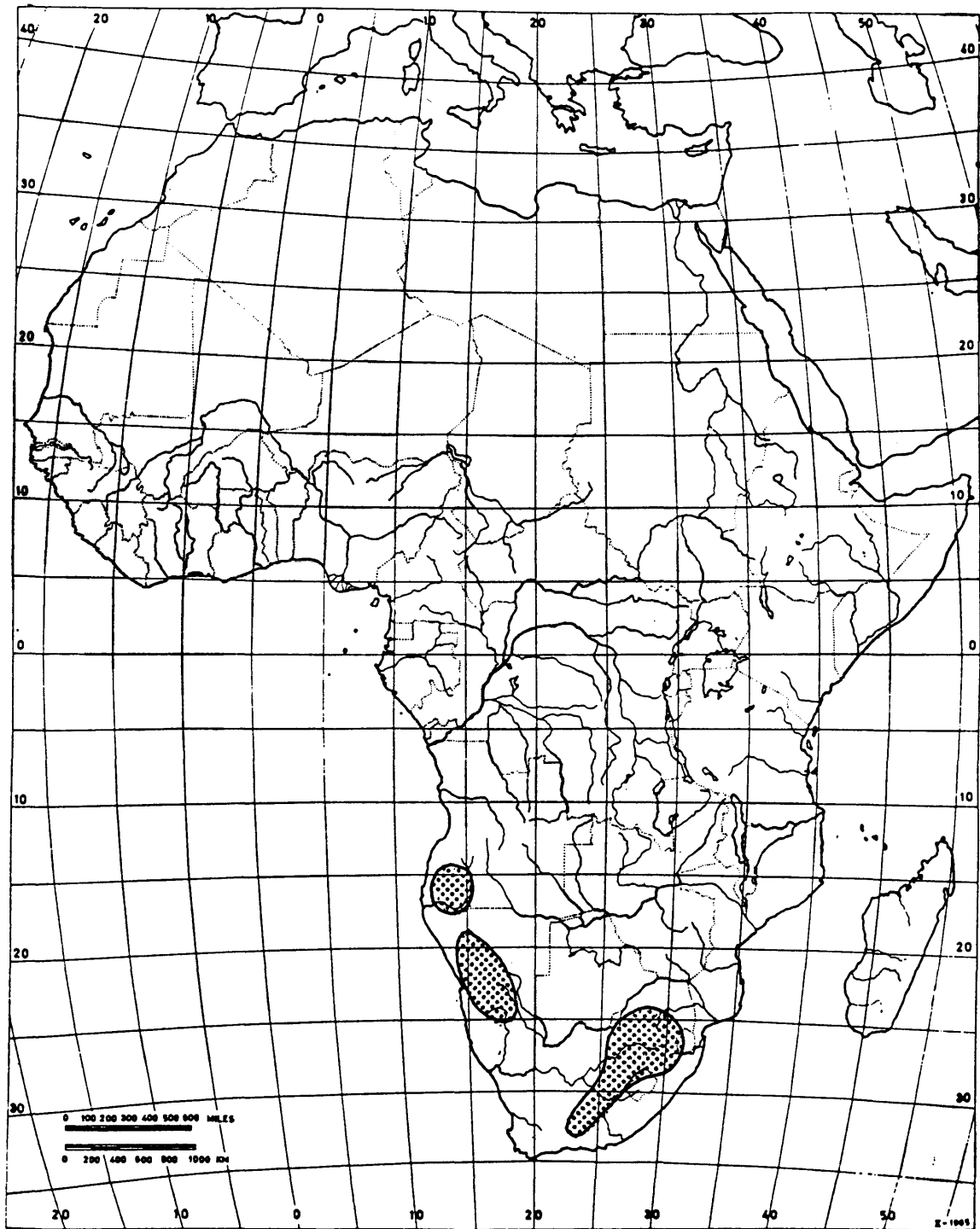


MAP 49.— Known distribution range of *Riccia okahandjana*.

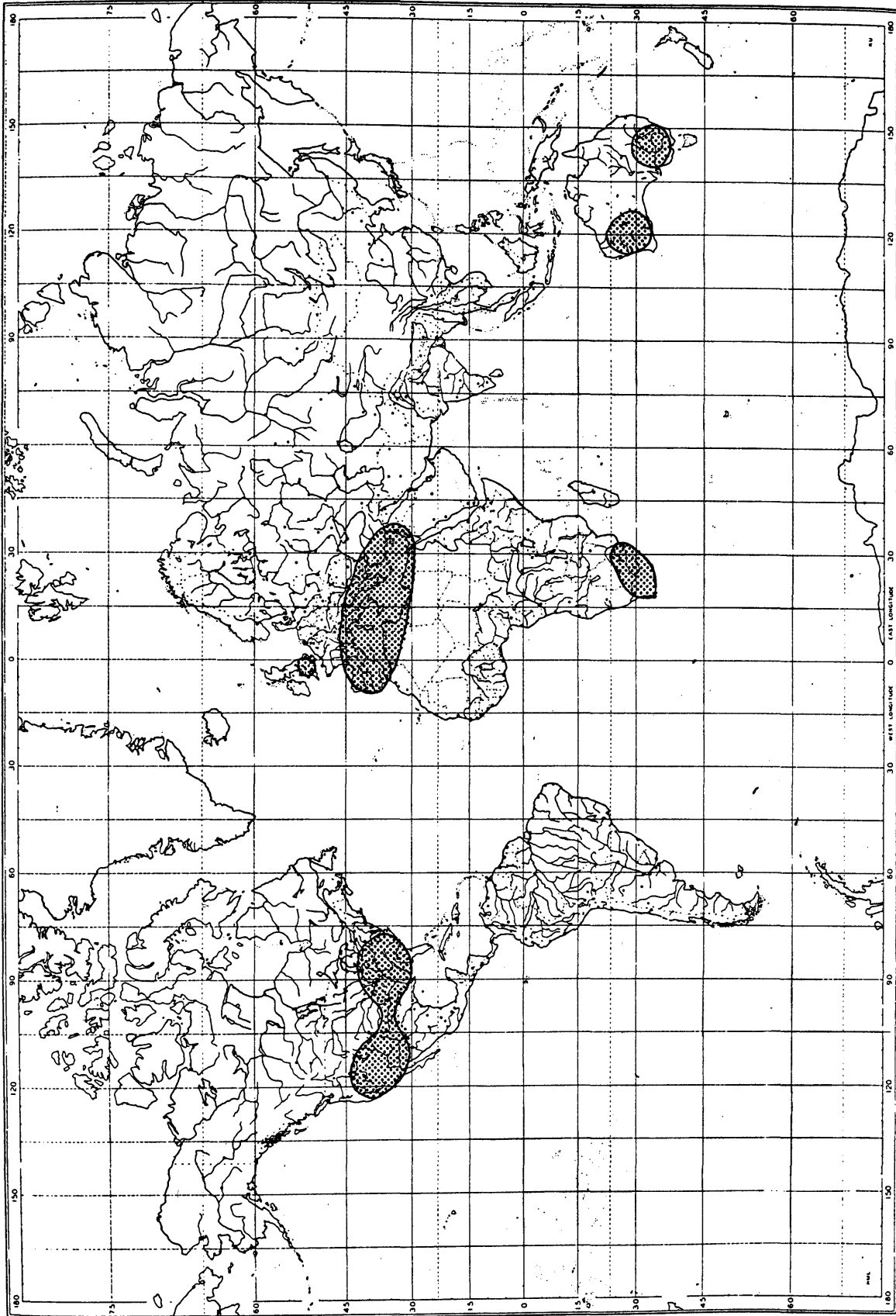


MAP 50.— Known distribution range of *Riccia congoana*.

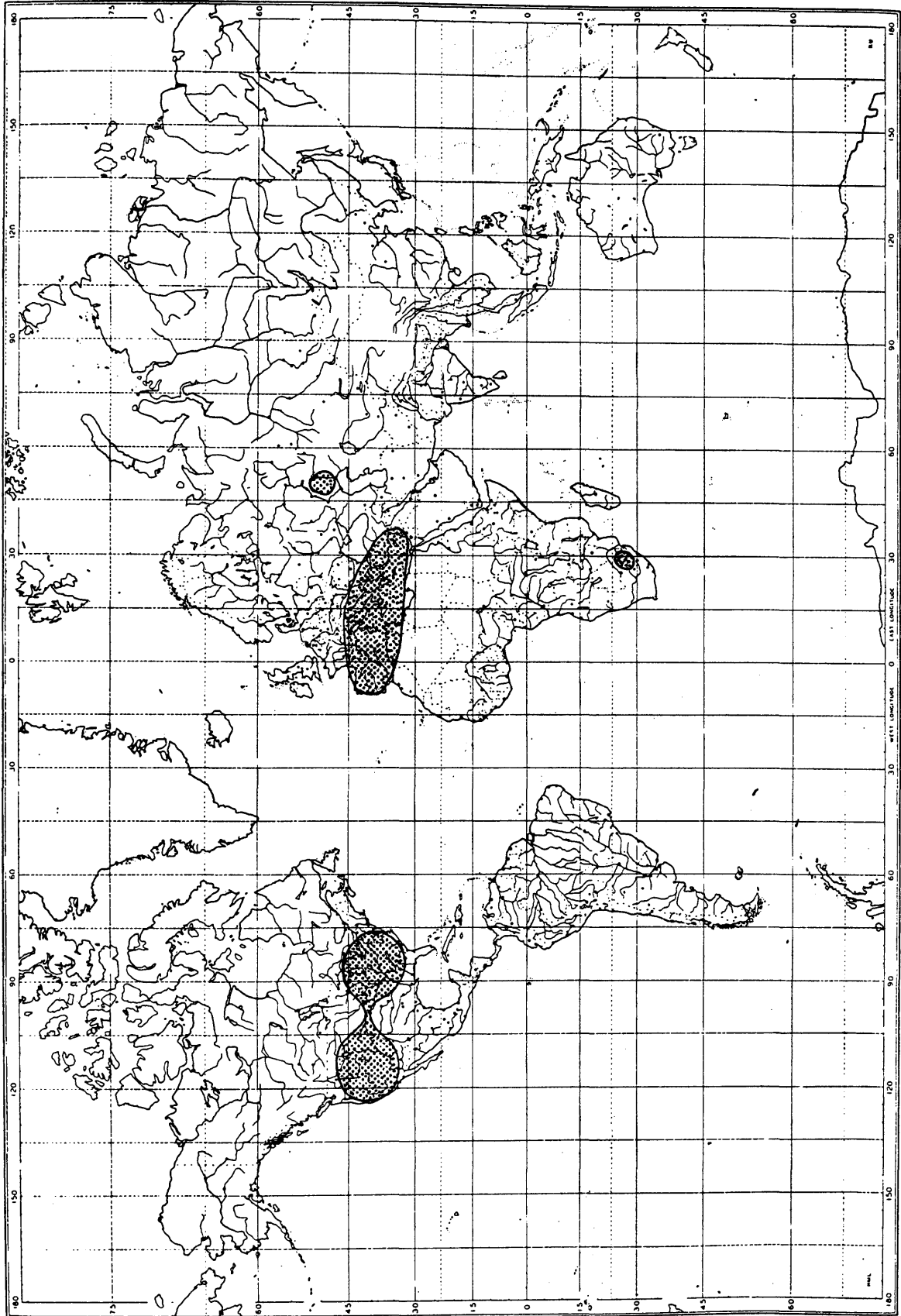




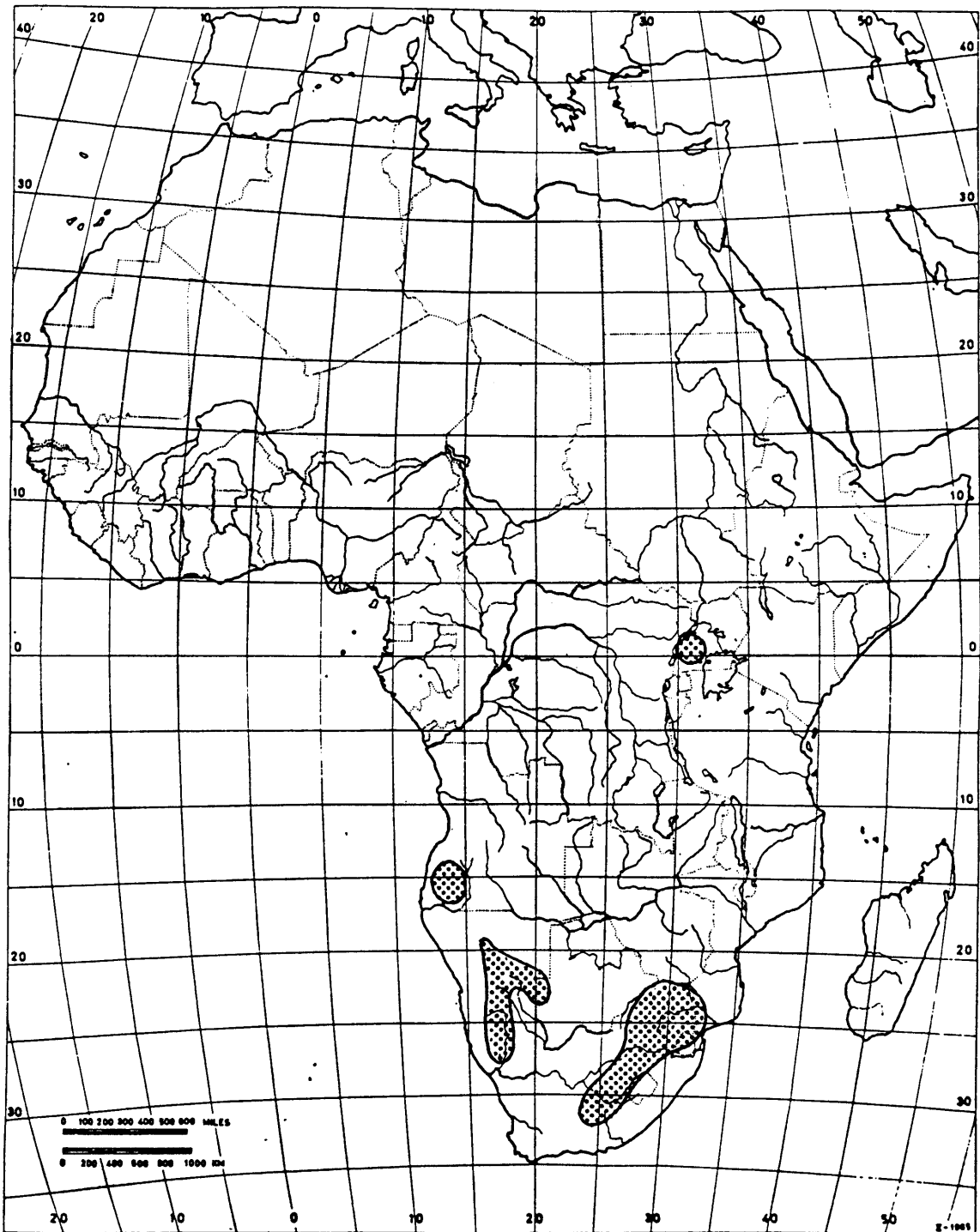
MAP 51.— Known distribution range of *Riccia angolensis*.



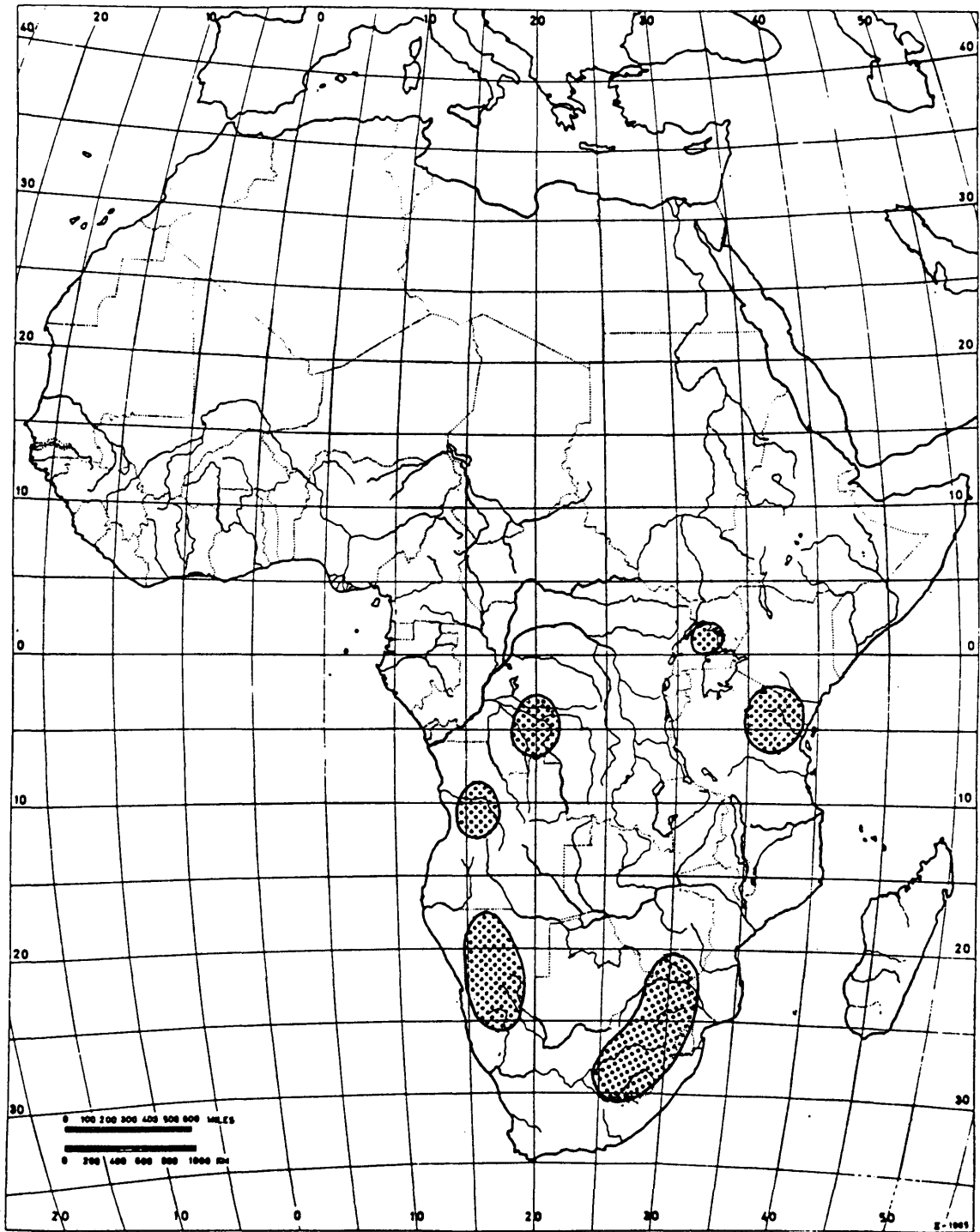
MAP 52.— Known distribution range of *Riccia nigrella*.



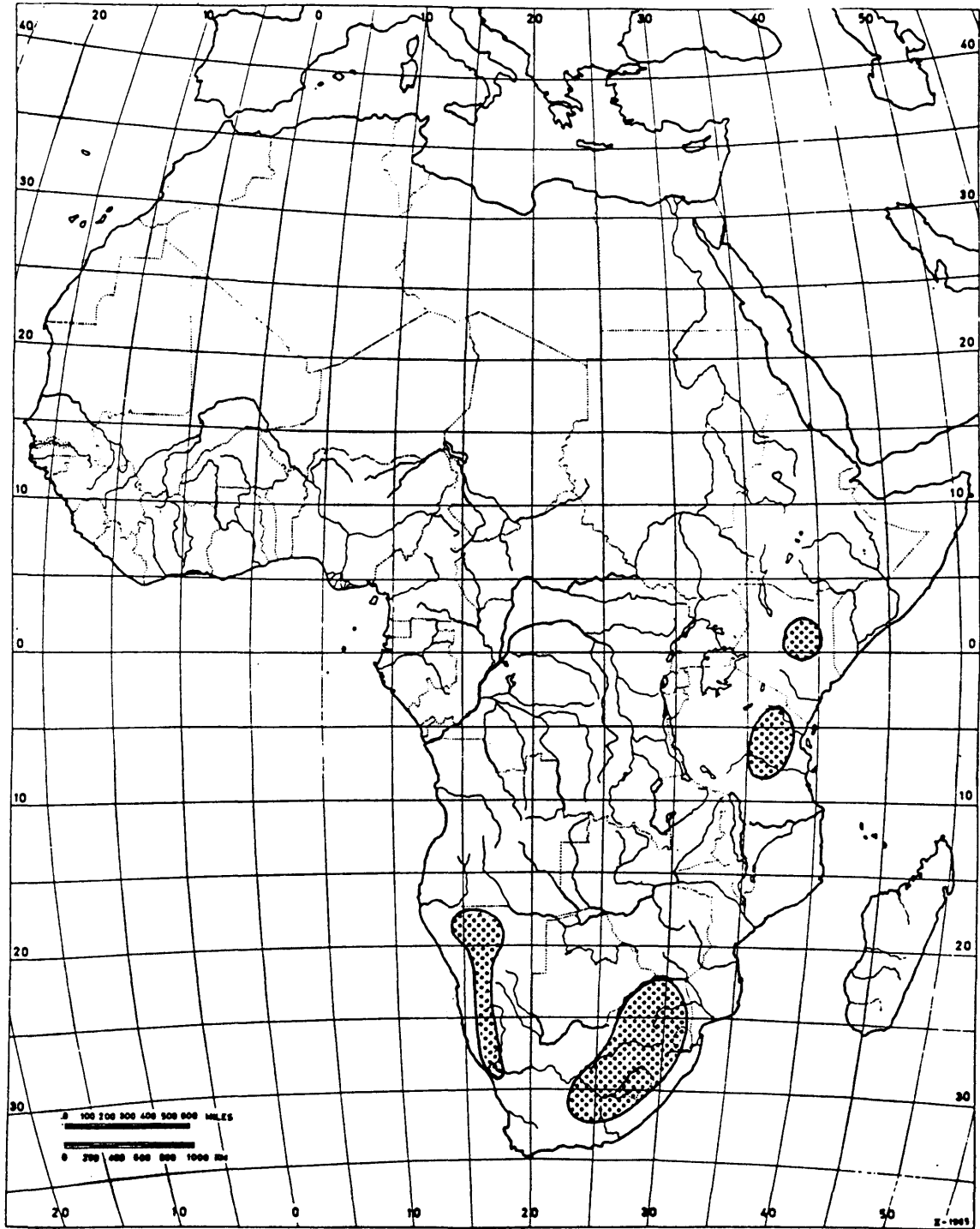
MAP 53.— Known distribution range of *Riccia macrocarpa*.



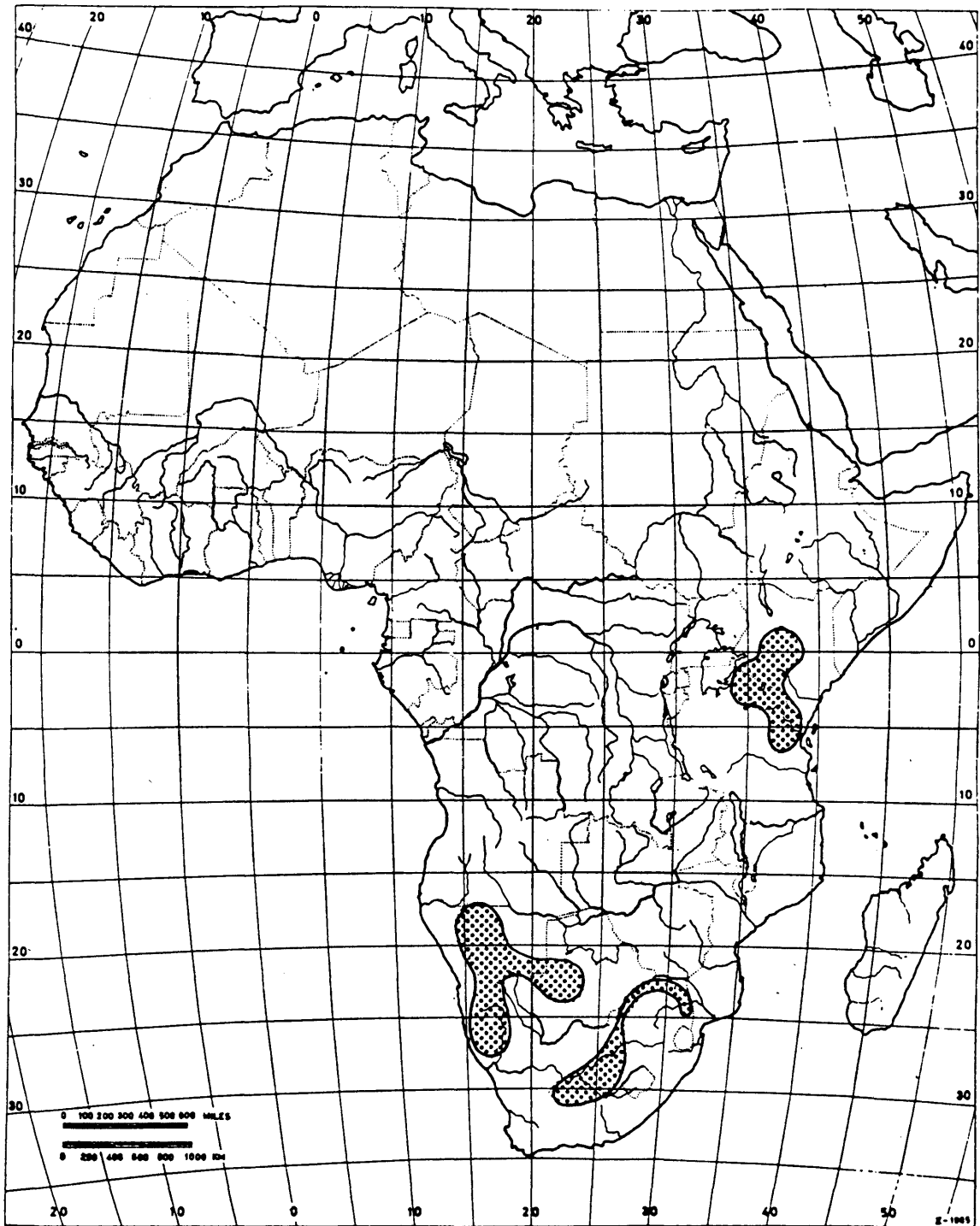
MAP 54.— Known distribution range of *Riccia runsorensis*.



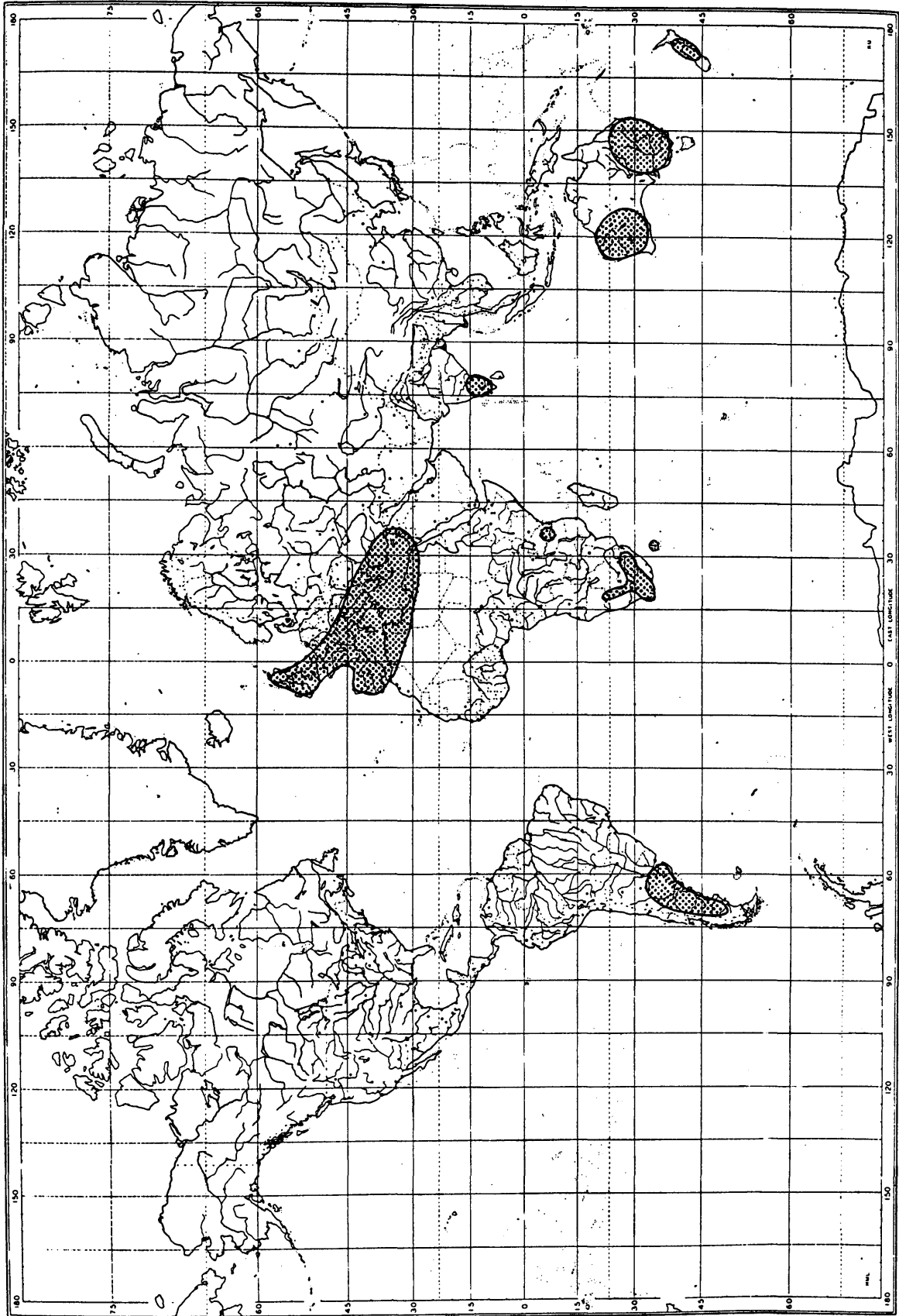
MAP 55.— Known distribution range of *Riccia rosea*.



MAP 56.— Known distribution range of *Riccia abolimbata*.

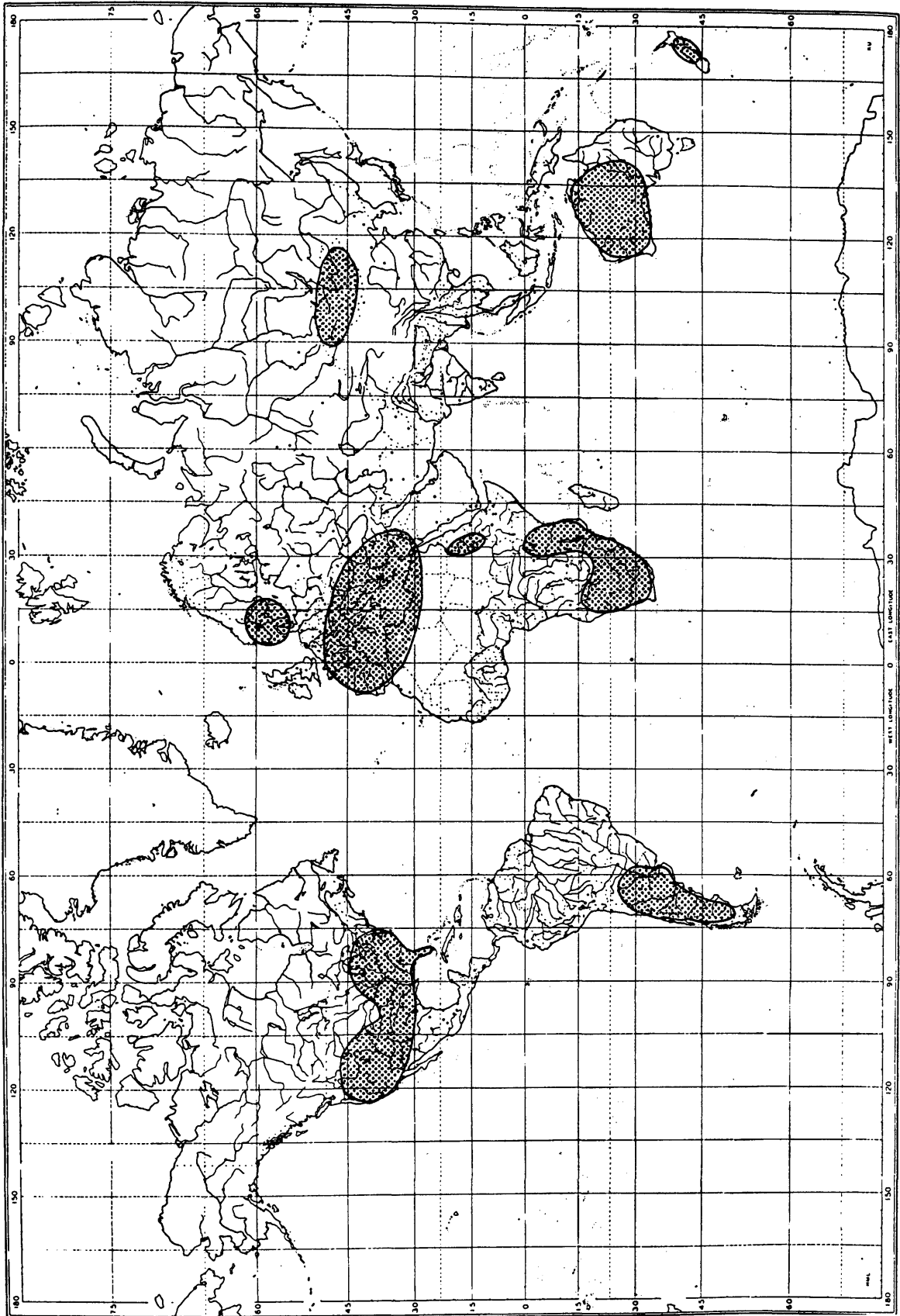


MAP 57.— Known distribution range of *Riccia argenteolimbata*.

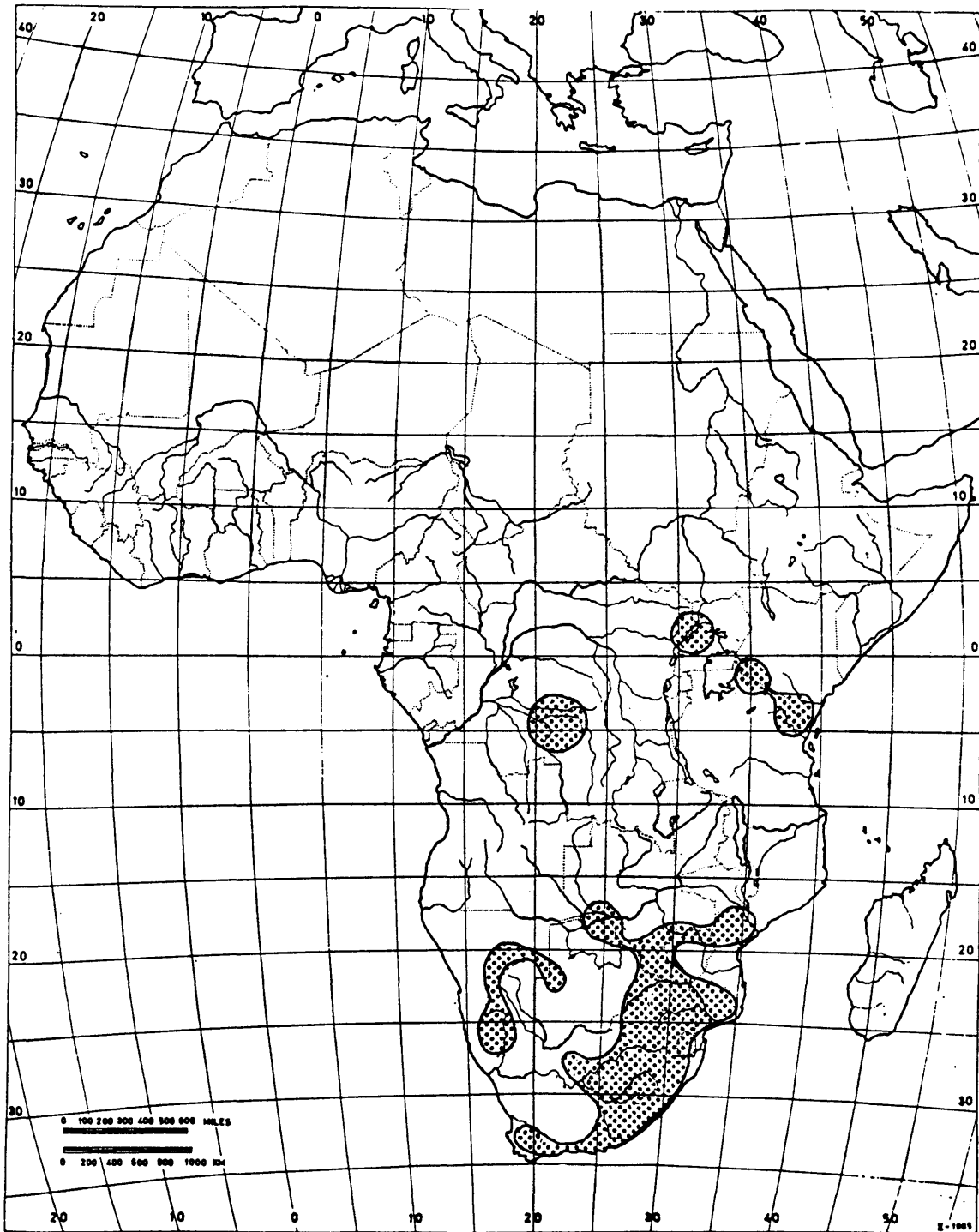


MAP 58.— Known distribution range of *Riccia crystallina*.

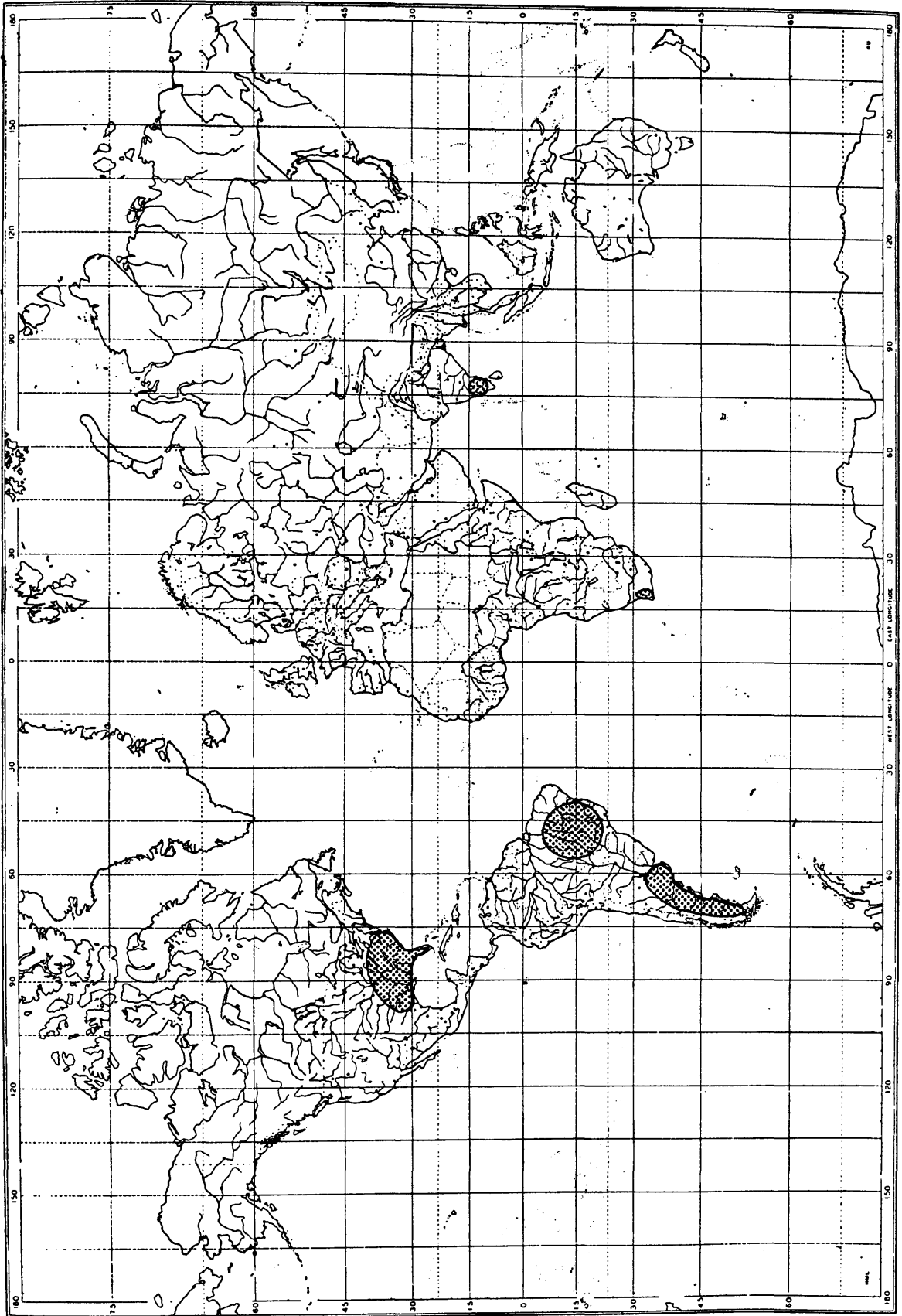




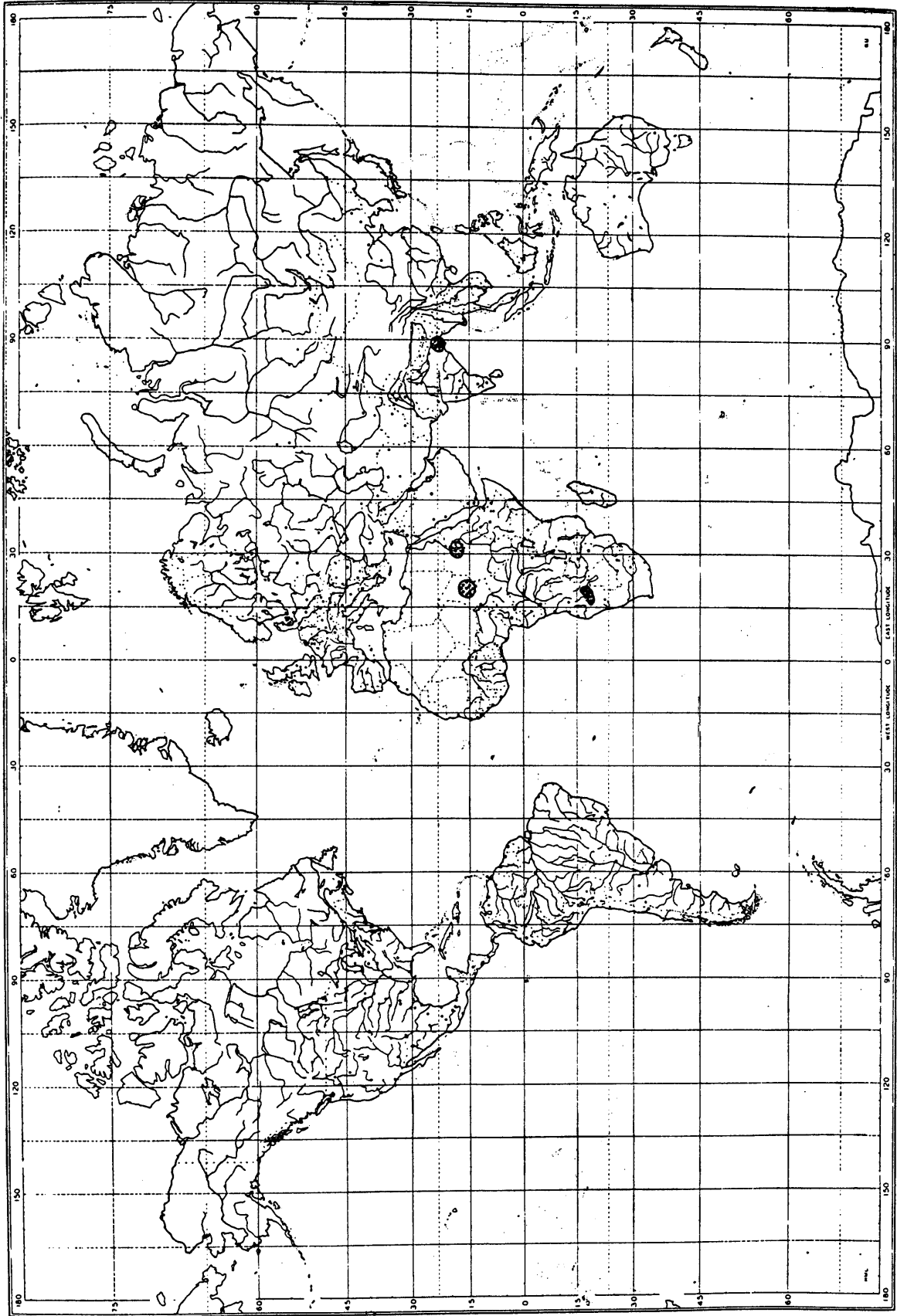
MAP 59.— Known distribution range of *Riccia cavernosa*.



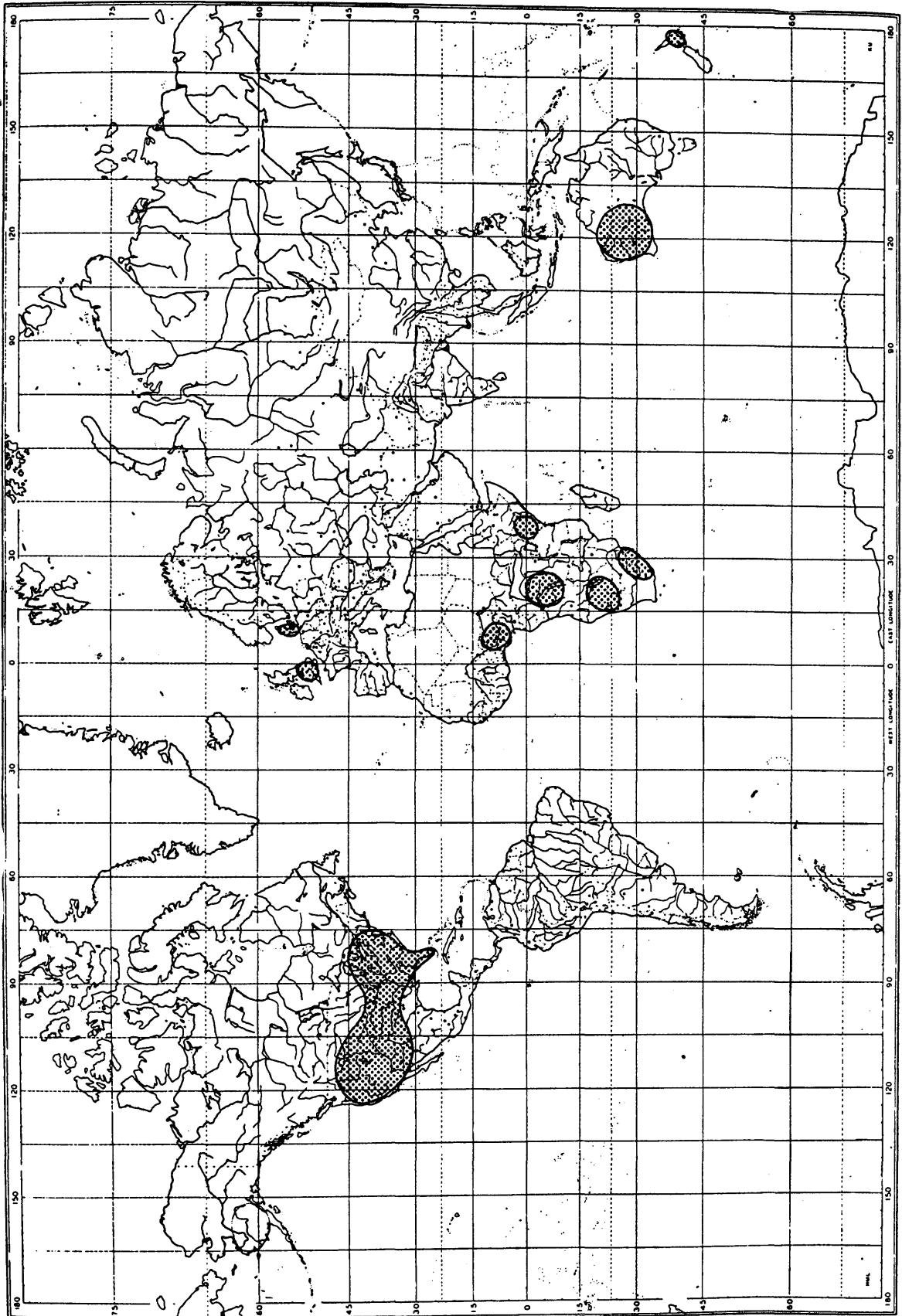
MAP 60.— Known distribution range of *Riccia stricta*.



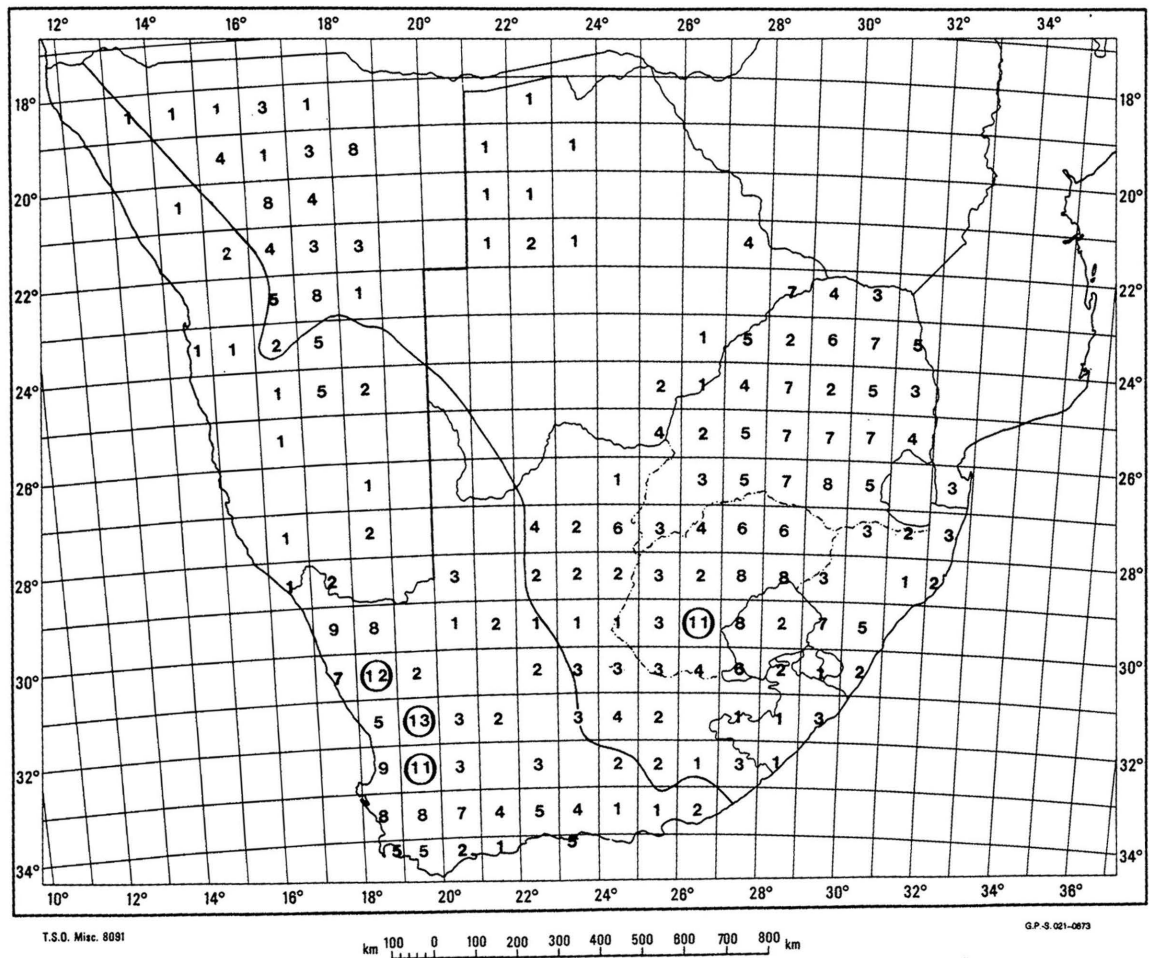
MAP 61.— Known distribution range of *Riccia curisii*.



MAP 62.— Known distribution range of *Riccia perssonii*.



MAP 63.— Known distribution range of *Ricciocarpos natans*.



MAP 64.— Number of species of *Riccia* endemic to southern Africa. Two centres of diversity are shown. The solid line separates winter and summer rainfall areas.