

Sticherus urceolatus (Gleicheniaceae), a New Fern Species from Southern Australia

M. Garrett¹, G. Kantvilas², and H. Laws³

¹PO Box 49, Bicheno, Tasmania 7215

²Tasmanian Herbarium, GPO Box 252–04, Hobart, Tasmania 7001

³75 Wellesley Street, South Hobart, Tasmania 7004

Abstract

Sticherus tener (R.Br.) Ching is revised and a new species, *S. urceolatus* M. Garrett & Kantvilas, is segregated. Both taxa occur in Tasmania and Victoria and are readily distinguished morphologically and cytologically. Descriptions of both species and two other southern Australian species, *S. lobatus* and *S. flabellatus*, are provided. Chromosome counts indicate that *S. urceolatus* is tetraploid whereas *S. tener* is diploid.

Introduction

The family Gleicheniaceae has been variously treated in the past. Initially it encompassed the one broad genus *Gleichenia* (e.g. Rodway 1903). Copeland (1947) recognised four genera, *Gleichenia*, *Sticherus*, *Dicranopteris* and *Hicriopteris*, whereas Holttum (1957) included only two, *Gleichenia* and *Dicranopteris*. In the latter treatment, *Gleichenia* is divided into the three subgenera *Gleichenia*, *Diplopterygium* and *Mertensia*, and the genus *Dicranopteris* is divided into the subgenera *Dicranopteris* and *Acropterygium*. Recent authors on Australian ferns (e.g. Jones and Clemesha 1981; Andrews 1990) have used a combination of these treatments, recognising four genera: *Gleichenia* (six species), *Sticherus* (four species), *Diplopterygium* (one species) and *Dicranopteris* (one species). Each of these genera has its own distinctive basic chromosome number (Walker 1966).

Within Australia, *Dicranopteris* occurs from New South Wales northwards, while *Diplopterygium* is confined to north-eastern Queensland (Andrews 1990). *Gleichenia* is wide-ranging, but most diversity is in the eastern States. *Sticherus* is confined to the eastern States: *Sticherus milnei* Baker (Ching) occurs on Cape York Peninsula, *S. flabellatus* (R.Br.) St. John in Queensland, New South Wales and Victoria, *S. lobatus* N.A. Wakefield in all eastern States, and *S. tener* (R.Br.) Ching (as previously treated) in New South Wales, Victoria and Tasmania.

The genus *Sticherus* is distinguished from the other three genera in having pinnatifid fronds bearing elongated branch-segments with once-branched veinlets, and by each segment bearing several sori, each with three to five sporangia. It contains approximately 90 species worldwide (Walker 1990).

Past treatments of *Sticherus* in Tasmania recognise two species: *S. lobatus*, which is uncommon to rare and localised mainly in the north-west, and *S. tener*, which is common and widespread (see Garrett (1996) for distributions). However, our field work in Tasmania suggested that a third species was also present. Robert Brown's type specimen of *S. tener* from Mt Wellington, Tasmania, proved to be quite distinct from the entity described and illustrated under that name by many previous workers, for example, Wakefield (1943, 1975), Thrower (1963), Willis (1970), Jones and Clemesha (1981) and Duncan and Isaac (1986). Accordingly, in this paper, we amend the description of *Sticherus tener* s. str. and describe the new species, *S. urceolatus*. A key and notes on the other southern Australian members of the genus are also included.

Methods

Taxonomic and ecological notes are derived from specimens held at the Tasmanian Herbarium (HO), the National Herbarium of Victoria (MEL) and the National Herbarium of New South Wales (NSW), and from observations in the field in Tasmania.

Sticherus leaf terminology follows that of Andersen and Øllgaard (1996). For an explanation of terms used see Figure 1.

Meiotic chromosome counts were made from aceto-carmines squash preparations. Segments bearing young sporangia were fixed in acetic-alcohol and the sporangia were later removed and squashed in aceto-carmines according to the method established by Manton (1950), care being taken to remove all empty sporangia and debris before placing the cover-slip.

Where a chromosome count could not be made with complete accuracy the number given is prefixed by "c.". Voucher specimens have been deposited in the Tasmanian Herbarium, the HO collection number being given with each chromosome number.

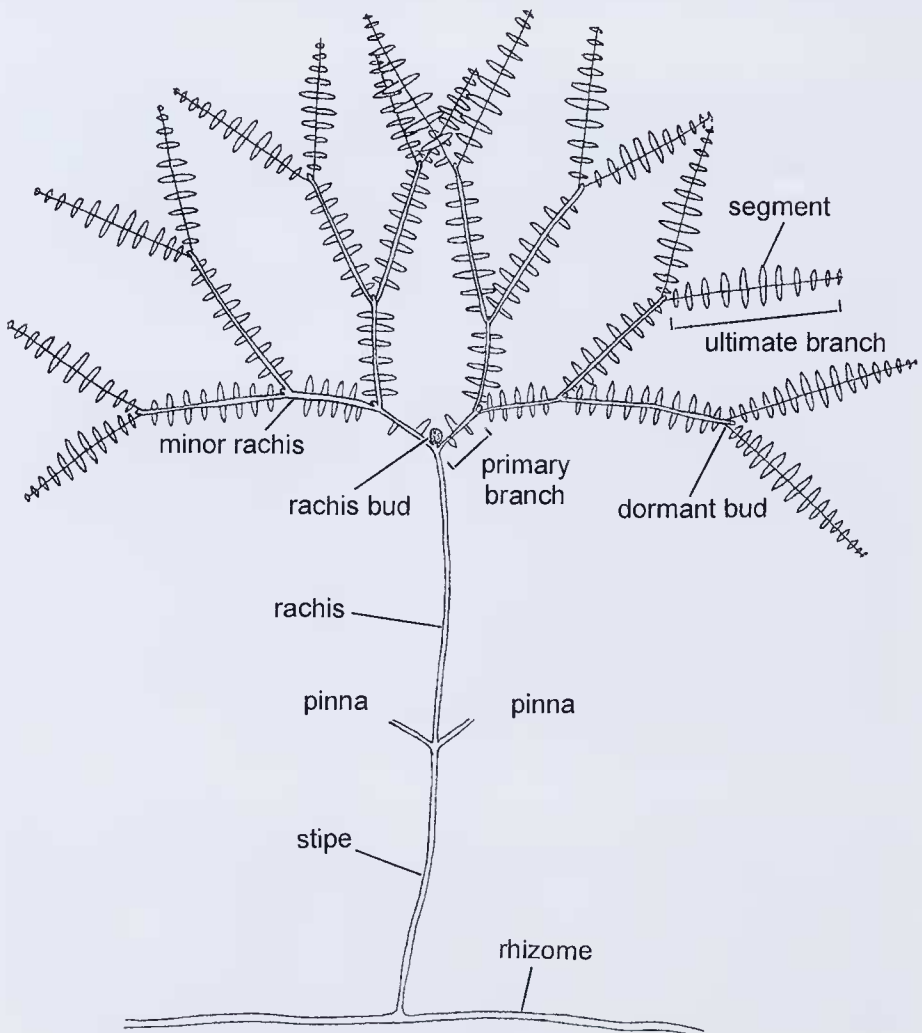


Fig. 1. Diagrammatic representation of a *Sticherus* plant, explaining terminology used

Key to southern Australian species of Sticherus

1. Ultimate-branch segments arising at near right angles (75–90°) to the axis..... 2
1. Ultimate-branch segments arising obliquely (40–75°) to the axis..... 3
2. Segment undersurface glabrous; undersurface of minor rachis glabrous or with broad, pale-brown, slightly fringed scales *S. lobatus*
2. Segment undersurface sparsely covered with pale-brown hairs (may become glabrous with age); undersurface of minor rachis covered in narrow, brown, heavily fringed scales..... *S. tener*
3. Segment undersurface glabrous or with a sparse covering of hair-like scales; angle between primary branches of paired pinnae <45°..... *S. flabellatus*
3. Segment undersurface sparsely covered with pale-brown hairs; angle between primary branches of paired pinnae >45°..... *S. urceolatus*

Taxonomy

Sticherus urceolatus M. Garrett & Kantvilas, sp. nov.

S. flabellato et *S. tenero* s. str. maxime similis sed ab hoc segmentis latoribus marginibus praecipue integris et pilos simplices vel ramosos infra ferentibus, angulo latiore inter ramos primarios, et ramis primariis comparate longioribus, ab illo praecipue angulo inter segmenta axemque multo angustiore et ramis ultimis lanceolatis differt.

Type: Tasmania, Freycinet Peninsula, Graham Creek, 2 km S of Wineglass Bay, 10.viii.1997, M. Garrett s.n. (holotype HO; isotypes BM, MEL, NSW, WELT).

Illustrations (all as *Sticherus tener*): Jones & Clemesha (1981): 205, fig. 284; Duncan & Isaac (1986): pl. 4; 74, figs 7.8C, 7.9, 7.10; Garrett (1996): 119, photos 142-3 (as *S. tener* form A).

Scrambling or thicket-forming terrestrial fern. Rhizome dark brown to black, to 4 mm thick, long-creeping, bearing semi-appressed, light brown to reddish brown, ciliate scales. *Stipes* stiff and erect, to 90 cm in length, arising up to 50 mm apart, black at the base, brown or green in the upper section, glabrous except for appressed scales at the base similar to those on the rhizome. *Pinnae* fan-shaped, paired at the stipe apex and with up to 4 annual increments of growth arising from the rachis bud, pseudodichotomously branched up to 4 times, with a dormant bud at each axis which rarely develops; angle between paired primary branches (45–)50(–75)°; ultimate branch (6–)9(–13) times the length of the primary branch, lanceolate, sometimes with a caudate apex. *Minor rachises* sparsely covered in brown, narrow, heavily fringed scales; ventral surfaces light to dark brown in colour. *Rachis bud* situated between paired primary branches; bud and basal section of new rachis growth bearing light or reddish brown ciliate scales. *Segments* on primary branch usually variable in size and coverage, on ultimate branch arising at (50–)55–65(–75)° to the axis, sessile, broadened at the base, with the apex obtuse or acute and margins entire or slightly crenate, (13–)15–27(–45) × 2–3 mm at the middle section of the ultimate branch; undersurfaces with pale brown, simple and branched hairs along midveins and veinlets. *Sori* exindusiate, in a single row either side of the segment midvein, situated halfway between the midvein and the segment margin on one branch of a forked veinlet, mostly absent from distal sections of both segments and ultimate branches, each with 3–5 large sporangia. *Spores* yellow, monolete, kidney shaped, (32–)36–42(–44) × (16–)18–22(–25) µm. (Fig. 2A)



Fig. 2. Photographs of *Sticherus* pinnae. **A** *Sticherus urceolatus*. Note the lanceolate-shaped ultimate branches bearing segments that are obliquely angled. **B** *Sticherus tener*. Note the linear-shaped ultimate branches bearing segments which arise at almost right angles to the axis.

Cytology

Chromosome number: $n = 68$, Tasmania, Hastings Caves Road, 23.xi.1995, *M. Garrett* (HO 321501); $n = c. 68$, Tasmania, St. Marys, Gardiner Creek, 5.ii.1997, *M. Garrett* (HO 321500). Relatively few chromosome numbers are known for the approximately 90 species of *Sticherus*, but the base number $x = 34$ has been established for the genus (Walker 1990). *Sticherus urceolatus* is therefore tetraploid. The taxon Thrower (1963) figured and described as *Gleichenia* (subgenus *Mertensia*) *tenera*, is in fact *S. urceolatus*; her chromosome count of $n = 68$ confirms those recorded here for Tasmanian collections.

Representative specimens

New South Wales: South Coast, Neenah Gorge, Nungatta Nat. Park, 5.iv.1986, *D.E. Albrecht* 2563 (MEL 690217). Leura, Blue Mountains, 9.i.1941, *N.A. Wakefield* (MEL 1512231). Govetts Leap, 2.4 km E of Blackheath, 26.i.1975, *R.G. Coveny & P. Hind* (MEL 528023).

Tasmania: South Bruny Island, Waterfall Creek, 13.vii.1986, *M. Garrett & R. Purden* s.n. (HO 99248). Roger River, c. 6 km SW of Trowutta, 7.iv.1985, *A. Moscal* 10549 (HO 401802). Lewis River at Low Rocky Point track bridge, 1.iii.1985, *A. M. Buchanan* 5992 (HO 406700). Forestier Peninsula, Fazackerleys Range, 30.i.1989, *A. Moscal* 17130 (HO 144554). Montana Falls, 20.ii.1992, *M. Garrett* s.n. (HO 142648). King River, 23.xii.1984, *P. Collier* 190 (HO 116466).

Victoria: Eastern Highlands, Kalorama, Olinda Creek, 2 km NNW of Silvan Dam wall, 15.ii.1994, *G.S. Lorimer* 786 (MEL 2020104). Dingoos Creek Road, 18 km NE of Foster P.O., 21.xii.1978, *A.C. Beauglehole* (MEL 1605292). Mt Buffalo Nat. Park, 19.i.1988, *A.C. Beauglehole* (ACB 92545), *N.A.F. Gibb & J.E. Stanwick* s.n. (MEL 1595673). South Gippsland, Wilsons Promontory, 9.ii.1989, *E. Chesterfield* 2164 & *J. Bush* (MEL 1576053). Mt Drummer, 14.vi.1941, *N.A. Wakefield* (MEL 1512546).

Etymology

The specific epithet describes the vase-shaped habit of the plant's pinnae when growing in an exposed position.

Distribution and ecology

Sticherus urceolatus is endemic to Australia, occurring in Tasmania and Victoria where it is common and widespread, and along the Central Coast of New South Wales. The species grows in wet forests in areas of high rainfall from sea-level to 800 m a.s.l., in permanently moist clay soils beside streams, rivers and waterfalls, and on forested slopes. It is common in seepage lines on sheltered rock-faces where it may grow in soil at the top or base of outcrops, or in soil-filled seams in the rock. In disturbed sites such as road cuttings, track margins and on uprooted tree buttresses, the species may clothe the near-vertical substrate to the exclusion of other plants.

Notes

Since the earliest publications on Australian ferns, *Sticherus urceolatus* has been overlooked and submerged within other taxa. Hooker (1860) reduced Brown's taxon, *Gleichenia tenera*, to a variety of *G. flabellata*. Subsequently, Bentham (1878) and Bailey (1881) cite it as *G. flabellata* var. *tenera*, Rodway (1903) and Ewart (1930) include it within *G. flabellata*, whilst the majority of authors, including Wakefield (1943, 1975), Thrower (1963), Willis (1970), Jones and Clemesha (1981), Tindale (1982), Duncan and Isaac (1986), Wilson (1990) and Entwisle (1994) consider it conspecific with *Sticherus tener*. Although the heterogeneity within *S. tener* s. lat. is alluded to by Duncan and Isaac (1986) and Entwisle (1994), the first published recognition of the distinctiveness of *S. urceolatus* is by Garrett (1996) who refers to the taxon as "*Sticherus tener* form A".

As regards gross morphology, the new species is most similar to *S. flabellatus*. Both species possess fronds with ultimate-branch segments that are obliquely angled. *Sticherus flabellatus* is distinguished by its narrower segments with serrated margins, by its usually glabrous segment-undersurfaces, by the acute angle between its paired primary branches, and by its comparatively very short primary branches. However, there is likely to be greater confusion between *S. urceolatus* and *S. tener*, at least in Tasmania, where both species are common and widespread, where *S. lobatus* is uncommon and localised, and where *S. flabellatus* is not present.

Both *S. urceolatus* and *S. tener* possess hairs on the segment undersurfaces, a character which taxonomically has perhaps helped unite the two species in the past. However, they are obviously distinguishable by two macrocharacters: the angle of the segments to the axis of the ultimate branch (55–65° in *S. urceolatus*, 80–85° in *S. tener*) and the shape of the ultimate branch (lanceolate in *S. urceolatus*, linear in *S. tener*). These characters are easily discernible in Figures 2A and 2B. Furthermore, the ratio of the width of the ultimate branch (at its widest point) to its length is 1:4.3 (28 specimens measured) in *S. urceolatus*, compared with 1:5.7 (22 specimens) in *S. tener*.

Scales from all parts of *S. urceolatus* are marginally broader, less caudate, and lighter in colour than those of *S. tener*. *Sticherus urceolatus* also exhibits uniform gradation in the length of segments on the ultimate branch whereas segment length is noticeably uneven in *S. tener*. Segments are less likely to be present on the primary branch in *S. urceolatus* than in *S. tener* but, when present, are more inclined to be stunted or not of uniform size. The sori tend to cover less of the segment length of *S. urceolatus* than of *S. tener* and, in the latter species, are borne on segments nearer the distal end of the ultimate branch. The lamina of *S. urceolatus* is overall thicker textured and more glossy than that of *S. tener*, and the indentations of the sori are often noticeable on its upper surface.

When growing under severely exposed conditions, plants of both species are stunted, but the pinnae of *S. urceolatus* are held semi-erect and the frond is vase-shaped, whereas pinnae of *S. tener* are drooping and the frond umbrella-shaped. Sporelings are easily attributable to either *S. urceolatus* or *S. tener* because the first pair of pinnae display the distinguishing characters of segment angle and ultimate-branch shape.

The diploid *S. tener* is fairly stable in its morphological characters whereas the tetraploid *S. urceolatus* is infamous for its instability of characters (Thrower 1963, as *Gleichenia tenera*). Thus any plant presenting confusion as to its proper identity tends invariably to be *S. urceolatus*.

In Tasmania, the distributions of the two species are broad and seemingly co-extensive. However, *S. urceolatus* occurs mostly at or near sea-level, and only extends to higher altitudes in milder areas of the State such as Mount Victoria in the north-east. *Sticherus tener* is infrequently found in the north-east and on the north and east coasts, but is abundant at sea-level on the west and south coasts and from there extends inland up to at least 900 m a.s.l. Both species occasionally occur sympatrically under identical ecological conditions.

Sticherus urceolatus is easily distinguished from *S. lobatus* by the segments arising acutely to the axis of its ultimate branches, and by the presence of hairs on its segment undersurfaces.

Sticherus tener (R. Br.) Ching

Sunyatsenia 5: 285 (1940). *Gleichenia tenera* R. Br., *Prodromus Florae Novae Hollandiae*: 161 (1810). *Mertensia tenera* (R. Br.) Poirlet in Lamarck, *Encyclopédie Méthodique, Botanique suppl.* 3: 670 (1814). *Gleichenia flabellata* var. *tenera* (R. Br.) Hook. f., *Flora Tasmaniae* 2: 131 (1858).

Type: Tasmania, Derwent, Table Mountain [= Mt Wellington], R. Brown 110 (syntype BM!). *Illustration:* Garrett (1996): 119, photo 144 (as *Sticherus tener* form B).

Scrambling or thicket-forming terrestrial fern. Rhizome dark brown to black, to 4 mm thick, long-creeping, bearing semi-appressed, dark brown, ciliate scales. Stipes stiff and erect, to 90 cm in length, arising up to 50 mm apart, black at the base, reddish brown or green in the upper section, glabrous except for appressed scales at the base similar to those on the rhizome. Pinnae fan-shaped, paired at the stipe apex and with up to 4 annual increments of growth arising from the rachis bud, pseudodichotomously branched up to 4 times, with a dormant bud at each axis which rarely develops; angle between paired primary branches (55–)70(–90)°; ultimate branch (3–)6(–9) times the length of the primary branch, linear. Minor rachises sparsely covered in brown, narrow, heavily fringed scales; ventral surfaces light to dark brown in colour. Rachis bud situated between paired primary branches; bud and basal section of new rachis growth bearing brown ciliate scales. Segments present on the primary branch, mostly of uniform size and coverage, on the ultimate branch arising at (75–)80–85(–90)° to the axis, sessile, broadened at base, with the apex obtuse or acute and margins entire or slightly crenate, 8–15(–20) × 2–3 mm at the middle section of the ultimate branch; undersurfaces with pale brown, simple and branched hairs along midveins and veinlets. Sori exindusiate, in a single row either side of the segment midvein, situated halfway between the midvein and the segment margin on one branch of a forked veinlet, usually present near distal sections of both segments and ultimate branches, each with 3–5 large sporangia. (Fig. 2B)

Cytology

Chromosome number: $n = 34$, Tasmania, Newall Creek, 7.xii.1996, M. Garrett (HO 321499). The diploid number found in *S. tener* distinguishes this species from tetraploid *S. urceolatus*.

Representative specimens

Tasmania: Arm River below Arm Falls, 19.ii.1992, M. Garrett s.n. (HO 142647). Neasey Creek, 29.iii.1984, A. Moscal 7235 (HO 404197). Zeehan, 27.iv.1976, L. Richley 263 (HO 30469). Serpentine Dam, near Strathgordon, 6.viii.1981, P.J. Brownsey (HO 52503). Dunning Rivulet, 18.ii.1986, A.M. Buchanan 8282 (HO 405197). Upper Spence River, 27.iii.1985, A.M. Buchanan 6432 (HO 406537). Kermadie River, 11.v.1993, A. Moscal 10870 (HO 403183).

Victoria: Otway Ranges, 1.4 km from Seaview Road junction, 31.xii.1973 (MEL 522725). Otway Ranges, 3.ix.1966, A.C. Beauglehole (MEL 1502833). Gellibrand River Road, 21.ii.1982, B. Duncan (MEL 1541790). Otways, Carlisle River, Lavers Hill Road, 9.iv.1991, S. Glissman-Gough D 2780 (MEL 1599051). Federal Track, Stirling Gap, Powelltown, 17.v.1964, R. Filson 6405 (MEL 643118). Otway Ranges, Turtons Track fern gully, 17.ix.1950, L.G. Dale (MEL 1502829). Otway Ranges, W of Lavers Hill, 14.xi.1959, A.C. Beauglehole (MEL 1502830). Board of Works, Maroondah Catchment in Watts River area, 19.iii.1979, B. Duncan (MEL 1541785, 1541786, 1541787). Aire Valley Road, S of Beech Forest, 21.ii.1982, B. Duncan (MEL 1541793).

New Zealand: South Island, Dusky Sound, Five Finger Peninsula, 13.xi.1984, A.F. Mark (OTA 41949) (seen only in photocopy).

Distribution

Sticherus tener is common and widespread in Tasmania where it ranges from sea-level to at least 900 m a.s.l. It is far more common in the western half of the State than in the east. It grows in habitats similar to those of *S. urceolatus*, the two species sometimes growing together. It is uncommon in Victoria and localised in the Otway Ranges and near Powelltown. The species has recently been discovered in the South Island of New Zealand (B. Parris *in litt.*).

Notes

The distinguishing characters between *S. tener* and *S. urceolatus*, its closest relative, have been discussed under the latter species (above). In brief, *S. tener* is characterised by its linear-shaped ultimate branch, and by the segments of the ultimate branch which arise at 80–85° to the axis. *Sticherus tener* and *S. lobatus* may also be easily confused, although due to the scarcity or the limited distribution of either one in Tasmania and Victoria, the two species are not commonly found together. *Sticherus lobatus* lacks hairs on the undersurfaces of its pinnae segments and overall is a much more robust plant with larger parts. Undersurfaces of the minor rachises in *S. tener* are covered in brown, narrow, heavily fringed scales while those of *S. lobatus* have translucent, pale brown, broad scales and become glabrous with age. *Sticherus tener* and *S. flabellatus* are unlikely to be confused as they differ markedly in the shape of their ultimate branches and in the angle of their segments. In addition, their known ranges of distribution do not overlap.

Sticherus lobatus N.A. Wakefield

Victorian Naturalist 60: 110 (1943).

Type: Victoria, Mt Drummer, N.A. Wakefield s.u., 6.vii.1941 (holotype MEL!).

Illustrations: Wakefield (1943): 109, fig. 1.1; Duncan & Isaac (1986): 74, fig. 7.8B; Garrett (1996): 118, photo 141.

*Fron*d with fan-shaped pinnae, paired at the stipe apex, and with annual increments of growth arising from the rachis bud situated between paired primary branches; angle between paired primary branches (40–)75–80(–110)°; ultimate branch linear to lanceolate; average ratio of ultimate branch length to primary branch length 6:1. *Minor rachises* glabrous in old growth, sparsely covered in broad, pale brown to near-transparent scales in new growth; ventral surfaces yellow to brown in colour. *Segments* present on the primary branch, mostly of uniform size and coverage, arising at (75–)80–85(–90)° to the axis on the ultimate branch, with mostly entire margins; undersurfaces glabrous, mostly 20–30 × 2–3 mm at the middle section of the ultimate branch (sori never meeting segment margin and midvein).

Additional descriptions are provided by Duncan and Isaac (1986) and Thrower (1963).

Cytology

Chromosome number: $n = 34$, Tasmania, River Leven, Dial Creek, 21.xi.1996, M. Garrett (HO 320624). This confirms the previously published count for the species (Thrower 1963).

Representative specimens

New South Wales: Clyde Mountain, 12.vi.1950, J.E. Gauba (MEL).

Tasmania: Newhaven Road, 10 km S of Rocky Cape township, along Alarm River, 10.iv.1984, G. Kantvilas 86 (HO 76698). Lowrana Road, King River, a few km before Teepookana Bridge, 5.iii.1992, M. Garrett s.n.(HO 143401). River Leven, 18.ii.1992, M. Garrett s.n.(HO 142649).

Victoria: East Gippsland, 52 km N of Orbost on Bonang Hwy, 2.i.1983, K.R. Thiele 452 (MEL 1524156). Powelltown, off Pioneer Creek Road, 25.ii.1976, B.D. Duncan (MEL 1541808).

Distribution

Sticherus lobatus is endemic to Australia, occurring in Tasmania and Victoria where it is uncommon to rare, and in New South Wales and south-eastern Queensland where it is relatively common.

Notes

Sticherus lobatus may be confused with *S. tener*, this being especially so in Tasmania where large specimens of the latter species are common. The two are quite distinct, however, and distinguishing characters are discussed under the latter species. *Sticherus lobatus* is unlikely to be confused with either *S. urceolatus* or *S. flabellatus* because of its ultimate branch segments which arise at 80–85° to the axis (less than 75° in *S. urceolatus* and *S. flabellatus*).

Sticherus flabellatus (R. Br.) St. John

Occasional Papers of the Bernice P. Bishop Museum 17: 81 (1942). *Gleichenia flabellata* R. Br., *Prodronus Florae Novae Hollandiae*: 161 (1810).

Type: [New South Wales] Port Jackson, R. Brown 109 (holotype BM!).

Illustrations: Wakefield (1943): 109, fig. 1.3; Duncan & Isaac (1986): 74, fig. 7.8A; Jones & Clemesha (1981): pl. 43; 204, fig. 282; Brownsey & Smith-Dodsworth (1989): pl. 11F; 58, fig. 58.

*Fron*d with fan-shaped pinnae, paired at the stipe apex, and with annual increments of growth arising from the rachis bud situated between paired primary branches; angle between paired primary branches (20–)30(–45)°; ultimate branch roughly lanceolate; average ratio of the ultimate branch length to primary branch length 25:1. *Minor rachises* glabrous or with occasional hair-like scales; ventral surfaces yellow to brown in colour. *Segments* usually absent from the primary branch, or few and stunted, arising at (40–)50–60(–65)° to the axis on the ultimate branch, with serrate or crenate margins; undersurfaces glabrous or with a few hair-like scales, mostly 20–40 × 1.5–2 mm at the middle section of the ultimate branch (sori may meet segment margin and midvein).

Additional descriptions are provided by Duncan and Isaac (1986) and Thrower (1963).

Cytology

This species was not available for chromosome studies but has previously been reported as $n = 34$ (Brownlie 1961; Thrower 1963).

Representative specimens

New South Wales: Hornsby, in sandstone country, 30.xii.1940, N.A. Wakefield (MEL 1512553). Eden, in scrub by creek, 5.ix.1940, N.A. Wakefield (MEL 1512552).

Queensland: Noosa, 18.iii.1943, N.A. Wakefield 394 (MEL 1512517). Near Mt Coorey, 29.xi.1942, N.A. Wakefield 392 (MEL 1512556). Robinson Gorge Nat. Park, upstream part of main gorge in Get Down section, 11.ix.1992, P.I. Forster (PIF 11261) & P.R. Sharpe (MEL 715965).

Victoria: Junction of Boggy Creek track and Hard to Seek Creek, 15.xi.1988, R.K. Humphries & G.E. Earl (MEL 1564432). Junction of Betka River and Mines Track, 11.xii.1988, R.K. Humphries & G.E. Earl (MEL 1564437). Rainforest at Dowell Creek, vicinity of Duncans Road Crossing, near State border, NE of Mallacoota Inlet, East Gippsland, 20.iv.1976, D. Cameron (MEL 1541832).

Distribution

Sticherus flabellatus occurs in extreme eastern Victoria where it is rare, and in New South Wales and Queensland where it is far more common. The species also occurs in both the North and South Islands of New Zealand, New Caledonia and New Guinea. It is absent in Tasmania and all earlier records, e.g. Brown (1810) and Rodway (1903), are mis-identifications of *S. urceolatus* and *S. tener*.

Notes

Sticherus flabellatus could be confused only with *S. urceolatus*. It is distinguished by its narrower segments with serrated margins, by its usually glabrous segment-undersurfaces, by the acute angle between its paired primary branches, and by its comparatively short primary branches.

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