ORTHOTRICHUM

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Orthotrichum Hedw., Sp. Musc. Frond. 162 (1801); from the Greek ortho (erect) and trichos (a hair), in reference to the hairs present on the calyptra of some species.

Type: O. anomalum Hedw.

Autoicous (in Australia). Plants short to tall, erect, densely or loosely tufted. Stems usually branched. Leaves erect, appressed or, rarely, contorted when dry, markedly hygroscopic, ovate-lanceolate to lanceolate, usually unistratose and with an acute apex; costa strong, not reaching the apex; upper laminal cells rounded to short-rectangular, papillose, thick-walled; basal laminal cells rectangular or rhomboidal, smooth, sometimes with nodose and porose walls. Fusiform gemmae on leaves of some species.

Perigonal and perichaetial leaves not or only slightly differentiated. Calyptra large, mitrate to conical, smooth or plicate, hairy or glabrous. Capsules on main stem, immersed, emergent or exserted, cylindrical to ovoid, usually ribbed when dry; exothecial bands usually 8, each 3 or 4 cells wide; stomata immersed or superficial, usually in the central capsule region; operculum conico-rostrate. Peristome single or double; exostome teeth 8 or 16, erect to strongly decurved when dry, papillose; endostome segments 8 or absent, derived from 1 or 2 cell rows, smooth or papillose. Spores unicellular, uniform, small or medium-sized, papillose.

A genus of c. 120 species predominantly in temperate regions in both hemispheres. Represented in Australia by five non-endemic species. Diversity is greater in New Zealand with nine species, four of which are endemic. Orthotrichum is mainly epiphytic on native and exotic hosts; it also occurs on calcareous and siliceous rocks. Only O. tasmanicum reaches as far north as Qld; other species occur in S.A., eastern N.S.W., A.C.T., Vic. and Tas. from sea level to 2000 m.

Four of the seven subgenera, Orthotrichum Hedw., Phaneropororum Delogne, Cryptoporus (Braithw.) Limpr. and Pulchella (Schimp.) Vitt, occur in Australia. These can be distinguished by their cytology, the position of the stomata and other characters. Subgenera with immersed stomata have the chromosome number \( n = 6 \), while those with superficial stomata have the chromosome number \( n = 11 \). This cytological correlation is consistent for the Australian taxa examined.

References


1 c/- National Herbarium of New South Wales, Royal Botanic Gardens and Domain, Mrs Macquaries Road, Sydney, New South Wales 2000, Australia.


1 Basal laminal cells usually with nodose, sometimes porose walls; stomata superficial ..................................................2

2 Exostome erect to spreading when dry, roughly papillose; endostome often absent; leaves sometimes bistratose above; usually on rock (1)..................................................4. **O. rupestre**

3 Endostome segments usually 2 rows of cells, with compound papillae; setae long, distinct; capsules exserted (2)..................................................5. **O. tasmanicum**

4 Exostome teeth erect to spreading when dry; endostome usually absent or of small segments; capsules erect when dry; on calcareous rock (1)..................................................2. **O. cupulatum**

5 Exostome recurved when dry; endostome well developed; capsules often recurved when dry; usually epiphytic ..................................................1. **O. assimile**


Illustrations: J.Lewinsky, *J. Hattori Bot. Lab.* 56: 436, fig. 32; 438, fig. 33 (1984), as *O. longithecum*.

Plants loosely or densely tufted, 3.5–12.0 mm tall, yellow to olive-green above, brown to black below. Leaves appressed-flexuose when dry, ovate-lanceolate to lanceolate, 1.8–4.1 mm long; apex rounded-acute, acute or acuminate; margin recurved, entire, rarely dentate apically; upper laminal cells isodiametric, 6.5–20.0 µm wide, thick-walled, each with 2–4 low mostly unbranched papillae; basal laminal cells rectangular, 15–90 × c. 9.5 µm, usually thin-walled, smooth, without pores. Gemmae 5–7 cells long.


Occurs in south-eastern N.S.W., A.C.T. and Vic.; also in New Zealand and South America. This species is primarily epiphytic, but it is also found on calcareous and non-calcareous rocks up to 1500 m.

2. Orthotrichum cupulatum Hoffm. ex Brid., Muscol. Recent. 2(2): 25 (1801)

var. cupulatum

Illustrations: J.Lewinsky, J. Hattori Bot. Lab. 56: 430, fig. 27; 434, fig. 30 (1984).

Plants loosely tufted, 12–20 mm tall, moderately glaucous, blue-green to olive-green above, brown to black below. Leaves slightly contorted when dry, lanceolate to ovate-lanceolate, 2.3–3.2 mm long; apex acute; margin recurved, entire; base decurrent; upper laminal cells isodiametric, 8–13 µm wide, each with 2 or 3 low unbranched papillae; basal laminal cells rectangular, 32–64 × 9.5–16.0 µm, thin-walled, without pores, smooth.


This species occurs on calcareous rocks in south-eastern N.S.W., A.C.T. and eastern Vic.; also in New Zealand. It can tolerate large variations in temperature, but it is not found in very dry habitats.


A second variety, O. cupulatum var. austrocupulatum (Dixon & Sainsbury) Lewinsky, occurs in New Zealand.

3. Orthotrichum hortense Bosw., J. Bot. 30: 97 (1892)


Plants loosely tufted, 5–20 mm tall, bright green to olive-green above, dark brown below. Leaves slightly flexuose when dry, ovate-lanceolate, 2.4–3.4 mm long, unistratose; apex long-acuminate; margin recurved, entire; upper laminal cells isodiametric to short-rectangular, 8–19 × 6.5–14.5 µm, thick-walled, papillose; basal laminal cells rectangular to rhomboidal, 45–87 × 8–14 µm, thick-walled, not porose, each with 2 or 3 branched papillae.

Calyptra conical, slightly split, plicate, hairy. Setae short. Capsules emergent or short-exserted, cylindrical, deeply 8-ribbed and constricted below the mouth when dry; stomata superficial. Peristome double; exostome teeth 8, recurved, moderately papillose; endostome segments 8, incurved, shorter than exostome, papillose. Spores 16–21 µm.

Rare in alpine, south-eastern N.S.W.; also in New Zealand and South America. Predominantly epiphytic, occasionally on rocks.

N.S.W.: Yarrangobilly Village, W.W.Watts 8503 (NSW); loc. id., I.G.Stone 10824 (MEL); Yarrangobilly Caves, W.W.Watts 8901A (NSW); near Lawn Cemetery, Khancoban, R.G.Coveny 17525 (NSW); Cave Ck via Blue Waterholes fire-trail, Kosciusko Natl Park, R.G.Coveny 17530 (NSW).

There are no records of chromosome numbers for Australian collections, but the haploid number in New Zealand is n = 6 (H.P.Ramsay & J.Lewinsky, New Zealand J. Bot. 22: 346, 1984).


var. rupestre


Plants loosely to densely tufted or matted, 15–45 mm tall, olive-green to yellow-brown above, dark brown to black below. Leaves appressed and almost straight when dry, ovate-lanceolate, 3–4 mm long, partially bistratose above; apex acute; margin broadly recurved, entire; upper laminal cells isodiametric or short rectangular, 10.0–17.5 x 6.5–13.0 µm, with branched papillae; basal laminal cells rectangular or rhomboidal, 35–77 x 10–18 µm, with thick walls, nodose, with or without pores. Gemmae not known.

Calyptra conical, slightly split, plicate, long-hairy. Capsules emergent, short-ovoid to short-cylindrical, sometimes shallowly 8-ribbed, with the mouth constricted when dry; stoma superciliar. Peristome single or double; exostome teeth 8 or 16, erect to spreading, roughly papillose; endostome segments absent, or 8 in single row. Spores 20–26 μm diam. Chromosome number not known for Australia.

This cosmopolitan moss occurs in south-eastern N.S.W., A.C.T., north-eastern Vic. and Tas. Grows mainly on non-calcareous rocks and boulders, occasionally on trees and shrubs, in lowlands and on mountains in dry and moist areas.


5. Ortithrichum tasmanicum Hook.f. & Wilson, in W.Wilson, London J. Bot. 7: 27 (1848)

var. tasmanicum


Ortithrichum whiteleggei Müll.Hal., Hedwigia 37: 137 (1898). T: Moss Vale, N.S.W., T.Whitelegge; iso: MEL.


Plants loosely tufted, 10–30 mm tall, olive-green, bright green or yellow above, dark brown below. Leaves crisped and contorted when dry, lanceolate to ovate-lanceolate, 2.7–3.7 mm long, unistratose; apex long-acute or acuminate; margin recurved, slightly undulate, entire; upper laminal cells isodiametric or short-rectangular, 6–13 µm long, thick-walled, papillose, the papillae sometimes branched; basal laminal cells rectangular to rhomboidal, 54.5–70.5 x 8.0–14.5 µm, thin- to thick-walled, nodose, porose. Gemmae not known.

Occurs in S.A., eastern Qld, southern N.S.W., A.C.T., Vic. and Tas., from sea level to 2000 m; also in New Zealand. Epiphytic on native and introduced shrubs and trees, rare on non-calcareous rocks; absent from dry areas.


A second variety, var. *parvithecum* (R.Br.ter.) Sainsbury, occurs in New Zealand.

Two specimens listed as *nomina nuda* have been examined at MEL. *Orthotrichum waltheri*, named by Watts & Whitelegg as a synonym of the New Zealand species *O. calvum* Hook.f. & Wilson, has been identified as *O. tasmanicum* (A.W.Thies, *Australas. Bryol. Newslett.* 32: 4, 1995). *Orthotrichum campbelliae* has been studied by D.A.Meagher (pers. comm.) and was also found to be conspecific with *O. tasmanicum*. In his revision of *Ulota*, Malta (1933) found a specimen in C.Müller’s herbarium at H-BR labelled “Victoria, O.Campbell, 1889”, the same label data as the original specimen which he recorded as *O. tasmanicum* (Malta, 1933, p. 9).