

OCELLULARIA

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Ocellularia G.Mey., *Nebenst. Beschäft. Pflanzenk.* 1: 327 (1825), *nom. cons.*; from the Latin *ocellus* (an eye), *-ula* (diminutive) and *-aria* (indicating possession), in reference to the appearance of the ascomata.

Type: *O. obturata* (Ach.) Spreng.

Ascidium Fée, *Meth. Lichenogr. Gen. Paris* 27 (1824), *nom. rej.* T: *A. cinchonarum* Fée [= *O. cavata* (Ach.) Müll.Arg.]

Stegobolus Mont., in J.D.Hooker, *London J. Bot.* 4(3) 4 (1845). T: *S. berkeleyanus* Mont. [= *O. berkeleyana* (Mont.) Zahlbr.]

Rhabdodiscus Vain., *Ann. Acad. Sci. Fenn.*, ser. A, 6(15): 184 (1921). T: *R. auberianus* (Mont.) Vain. [= *O. auberiana* (Mont.) Hale]

Ampliotrema Kalb, in A.Frisch, K.Kalb & M.Grube, *Biblioth. Lichenol.* 92: 81 (2006). T: *A. amplius* (Nyl.) Kalb [= *O. amplior* (Nyl.) Redinger]

Thallus endophloeodal to epiphloeodal, usually a shade of olive or grey, with greenish to yellowish or whitish tones. True cortex or a protocortex present in epiphloeodal thalli. Photobiont trentepohlioid. Prothallus thin or indistinct, pale to rather dark brown. Ascomata \pm rounded, perithecioid to apothecioid, rarely \pm irregular or elongate, solitary to strongly fused, rarely forming stroma-like structures. Proper exciple non-amyloid to basally amyloid, brown to blackish brown or pale yellowish, rarely hyaline, apically often darkened or covered by granules. Hymenium non-amyloid, interspersed with oil droplets or small crystals, or clear, conglutinated; paraphyses unthickened or \pm thickened at the apices, straight to \pm bent, parallel or interwoven and branched; lateral paraphyses absent; columella absent or simple to complex and reticulate. Epihymenium hyaline to \pm brownish, with or without granules. Asci 1–8-spored, clavate, non-amyloid. Ascospores 1–2-seriate, transversely septate to submuriform or muriform, hyaline to brown, halonate or not, amyloid or non-amyloid. Conidiomata pycnidial, with bacilliform, fusiform or oblong conidia.

Chemistry: β -orcinol depsidones, orcinol depsidones or unknown compounds present, or secondary compounds absent.

Until recently, this genus was circumscribed to include thelotremataceous taxa that lacked lateral paraphyses and possessed a carbonised exciple. However, because excipular carbonisation is variable in this group, Frisch *et al.* (2006) included species with a simple columella, a proper exciple of prosoplectenchymatous cells and strongly amyloid ascospores, but also those with a hyaline exciple. Taxa lacking a columella and having an interspersed hymenium were segregated in *Ampliotrema*, while those with complex columellar structures were assigned to *Gyrotrema* Frisch, *Melanotrema*, *Redingeria* Frisch and *Stegobolus*. Molecular studies do not fully support some of the segregates (Frisch *et al.*, 2006; Mangold *et al.*, 2008). Taxa included in *Ampliotrema* and *Stegobolus* were nested within *Ocellularia*, and *Stegobolus* was also polyphyletic, suggesting that complex columellae evolved several times independently within the *Ocellularia* clade. Consequently, *Ampliotrema* and *Stegobolus* are regarded here as being synonyms of *Ocellularia*. The distinction between *Ocellularia* and *Myriotrema* is poorly understood; see the discussion under *Myriotrema*.

Species of the genus *Ocellularia* occur on bark, rarely on siliceous rocks, in lowland to montane habitats; 49 of c. 150 taxa are known from Australia, including seven endemics. Diversity is greatest in tropical rainforest, but the genus is also well represented in subtropical rainforest, coastal forest and mangroves and, less commonly, in wet-sclerophyll forest.

K.Kalb, New or otherwise interesting lichens II, *Biblioth. Lichenol.* 88: 301–329 (2004); A.Frisch, K.Kalb & M.Grube (eds), Contributions towards a new systematics of the lichen family Thelotremaaceae, *Biblioth. Lichenol.* 92: 1–556 (2006); A.Mangold, J.A.Elix & H.T.Lumbsch, *Ocellularia* species with a cone-shaped columella in Australia, *Biblioth. Lichenol.* 96: 193–208 (2007); A.Mangold, J.A.Elix & H.T.Lumbsch, *Ocellularia wirthii* (Ascomycota, Ostropales), a new species from New South Wales, Australia, *Sauteria* 15: 363–369 (2008).

1	Ascospores transversely septate (rarely with a longitudinal septum).....	2
1:	Ascospores submuriform to muriform.....	32
2	Ascospores brown (1).....	22. O. exuta
2:	Ascospores hyaline.....	3
3	Asci 1 (–2)-spored (2:).....	17. O. domingensis
3:	Asci 4–8-spored.....	4
4	Ascospores non-amyloid (3:).....	19. O. ecorticata
4:	Ascospores strongly amyloid, rarely weakly amyloid.....	5
5	Hymenium interspersed (4:).....	6
5:	Hymenium not interspersed.....	7
6	Columella present; secondary compounds absent, or with the hirtifructic acid chemosyndrome and ‘cinchonarum unknown’ (5).....	24. O. fumosa
6:	Columella absent; thallus containing the protocetraric acid chemosyndrome.....	2. O. amplior
7	Ascospores 80–200 µm long, with 24–40 locules (5:).....	34. O. neopertusariiformis
7:	Ascospores to 130 µm long, with up to 22 locules.....	8
8	Ascospores 50–120 (–130) µm long, with 8–20 (–22) locules (7:).....	1. O. allosporoides
8:	Ascospores to 70 µm long, with up to 17 locules.....	9
9	Ascospores 40–70 µm long, with 12–17 locules (8:).....	35. O. orthomastia
9:	Ascospores to 40 (–45) µm long, with up to 13 locules.....	10
10	Columella absent (9:).....	11
10:	Columella present.....	12
11	Isidia present; proper exciple non-carbonised; thallus containing the psoromic acid chemosyndrome (10).....	27. O. isidioalbula
11:	Isidia absent; proper exciple carbonised; thallus containing the stictic acid chemosyndrome.....	18. O. ecolumellata
12	Soredia or schizodiscs present (10:).....	13
12:	Vegetative propagules absent.....	14
13	Schizodiscs present; ascospores 10–20 µm long; thallus containing the psoromic acid chemosyndrome (12).....	9. O. berkeleyana
13:	Soredia present; ascospores 18–35 (–40) µm long; thallus containing the norisonotatic acid chemosyndrome.....	8. O. baileyi
14	Ascospores to 20 µm long, with up to 6 locules (12:).....	15
14:	Ascospores > 20 µm long, with > 6 locules.....	16
15	Thallus glossy, corticate, containing the psoromic acid chemosyndrome (14).....	9. O. berkeleyana
15:	Thallus dull, ecorticate, containing the stictic acid chemosyndrome.....	41. O. reticulata
16	Thallus with a ±distinct grainy-speckled surface; columella non-carbonised; proper exciple non-carbonised or slightly carbonised apically (14:).....	11. O. bonplandiae
16:	Thallus glabrous, rarely rough, never with a grainy-speckled surface; columella at least partly carbonised; proper exciple carbonised.....	17
17	Ascomata immersed; pores to 80 µm diam.; thallus containing the psoromic acid chemosyndrome (16:).....	33. O. minutula
17:	Ascomata immersed to emergent; pores > 80 µm diam.	18
18	Thallus with a yellowish or pale orange or pink medulla, containing the norisonotatic acid, hirtifructic acid or hypoprotocetraric acid chemosyndromes, ‘cinchonarum unknown’ or ‘roseotecta unknown’ (17:).....	19
18:	Thallus lacking a pigmented medulla, containing the stictic, protocetraric or psoromic acid chemosyndromes, or secondary compounds absent.....	23

19	Ascospores 15–25 µm long, with 4–8 locules; thallus containing ‘roseotecta unknown’ (18).....	42. O. roseotecta
19:	Ascospores > 25 µm long, with more than 8 locules; thallus chemistry different	20
20	Columella to 300 µm wide, entire; thallus containing the hirtifructic acid chemosyndrome and/or ‘cinchonarum unknown’ (19:.).....	21
20:	Columella > 300 µm wide, entire to complex; thallus containing the norisonotatic acid or hypoprotocetraric acid chemosyndromes.....	22
21	Hymenium to c. 130 µm thick; columella to 200 µm wide; thallus containing the hirtifructic acid chemosyndrome (20)	16. O. diacida
21:	Hymenium to c. 160 µm thick; columella to 300 µm wide; thallus not containing the hirtifructic acid chemosyndrome.....	12. O. cavata
22	Ascomata emergent; pores to c. 0.5 mm diam.; thallus containing the hypoprotocetraric acid chemosyndrome (20:.)	38. O. phaetropa
22:	Ascomata immersed to emergent; pores to c. 0.8 mm diam.; thallus containing the norisonotatic acid chemosyndrome	8. O. baileyi
23	Columella complex (18:.)	24
23:	Columella simple.....	26
24	Thallus ecorticate, containing the stictic acid chemosyndrome; columella conical; ascospores 15–25 µm long (23).....	48. O. turbinata
24:	Thallus corticate, containing the psoromic acid chemosyndrome; columella not conical; ascospores > 25 µm long.....	25
25	Thallus to c. 150 µm thick; columella to c. 600 µm wide; thalline rim thin, incurved to erect; ascospores with 6–12 × 1 (–2) locules (24:.)	20. O. emersa
25:	Thallus to c. 300 µm thick; columella to 300 µm wide; thalline rim thick, erect to recurved; ascospores with 6–9 × 1 (–2) locules	43. O. schizostoma
26	Thallus predominantly endophloeodal, ecorticate to indistinctly corticate, containing the stictic acid chemosyndrome (23:.)	40. O. pyrenuloides
26:	Thallus endophloeodal to epiphloeodal, corticate, containing the psoromic or protocetraric acid chemosyndrome, or secondary compounds absent.....	27
27	Ascomata immersed to indistinctly emergent and weakly carbonised (26:.).....	28
27:	Ascomata ±distinctly emergent and strongly carbonised	30
28	Ascomata to c. 1 mm diam.; thalline rim unpigmented; thallus containing the psoromic acid chemosyndrome (27).....	46. O. terebrata
28:	Ascomata to 0.8 mm diam.; thalline rim becoming distinctly darkened with age; thallus containing the protocetraric acid chemosyndrome, or secondary compounds absent.....	29
29	Thallus to 200 µm thick; secondary compounds absent (28:.)	36. O. papillata
29:	Thallus to 600 µm thick, containing the protocetraric acid chemosyndrome.....	37. O. perforata
30	Ascomata to c. 0.5 mm diam.; pores to 0.2 mm diam., with distinctly darkened margins; columella to 200 µm wide (27:.)	49. O. wirthii
30:	Ascomata > 0.5 mm diam.; pores > 0.2 mm diam.; margin concolorous with the thallus or slightly darker; columella > 200 µm wide.....	31
31:	Ascomata to c. 0.9 mm diam.; pores > 0.4 mm; ascospores 20–35 µm long (30:.).....	20. O. emersa
31	Ascomata to c. 1.5 mm diam.; pores to c. 0.4 mm diam.; ascospores 10–25 µm long	44. O. subcavata
32	Asci 1–4-spored (1:.)	33
32:	Asci 8-spored.....	42
33	Columella present (32).....	34
33:	Columella absent	38
34	Ascus tholus indistinct; thallus containing the hypoprotocetraric acid chemosyndrome (33).....	4. O. arecae
34:	Ascus tholus distinct; chemistry different	35
35	Ascospores 170–250 µm long; thallus containing salazinic acid (34:.).....	30. O. massalongoi
35:	Ascospores > 250 µm long, if shorter, then the spores long-appendiculate; thallus containing the psoromic acid chemosyndrome, or secondary compounds absent.....	36
36	Thallus dull, ecorticate; ascospores 170–300 µm long, with long appendices (35:.).....	10. O. bicuspadata
36:	Thallus glossy, corticate; most ascospores > 300 µm long, with rounded to subacute ends.....	37

37	Thallus to c. 500 µm thick, containing the psoromic acid chemosyndrome; ascospores 200–420 (–450) µm long (36:)	39. O. profunda
37:	Thallus to c. 300 µm thick; secondary compounds absent; ascospores 300–500 (–550) µm long	28. O. kalbii
38	Asci 2–4-spored (33:)	25. O. gibberulosa
38:	Asci 1–2-spored	39
39	Ascospores 150–260 µm long; thallus containing the hypoprotocetraric acid chemosyndrome (38:)	40
39:	Ascospores mostly > 260 µm long; thallus containing the protocetraric or psoromic acid chemosyndrome	41
40	Thallus ecorticate; asci 1-spored (39:)	13. O. chiriquiensis
40:	Thallus predominantly corticate; asci 1–2-spored	21. O. eumorpha
41:	Thallus to c. 300 µm thick, containing the psoromic acid chemosyndrome (39:)	26. O. inturgescens
41	Thallus to c. 600 µm thick, containing the protocetraric acid chemosyndrome	32. O. microstoma
42	Ascospores brown (32:)	43
42:	Ascospores hyaline	47
43	Columella absent or weakly developed, entire, to 100 µm wide (42:)	44
43:	Columella entire to complex, > 100 µm wide	45
44	Proper exciple distinctly carbonised marginally; ascospores 15–20 × 12–15 µm; thallus containing the psoromic acid chemosyndrome (43:)	3. O. andamanica
44:	Proper exciple not or indistinctly carbonised apically; ascospores 15–30 × 8–23 µm; thallus containing the protocetraric acid chemosyndrome	7. O. bahiana
45	Ascospores 8–20 (–22) µm long, with 3–6 rows of locules (43:)	23. O. fissa
45:	Ascospores 10–30 µm long, with 4–10 rows of locules	46
46	Ascospores transversely septate to submuriform, with 1–2 (–3) longitudinal divisions (45:)	5. O. asiatica
46:	Ascospores submuriform to muriform, with 1–5 (–6) longitudinal divisions	14. O. confluens
47	Ascospores strongly amyloid; thallus containing the protocetraric or psoromic acid chemosyndrome (42:)	48
47:	Ascospores non-amyloid; thallus containing the stictic acid chemosyndrome, or secondary compounds absent	50
48	Hymenium inspersed; columella absent (47:)	6. O. aurata
48:	Hymenium not inspersed; columella present	49
49	Columella to 200 µm wide, entire; thallus containing the protocetraric acid chemosyndrome (48:)	47. O. thelotremoides
49:	Columella to c. 800 µm wide, entire to complex; thallus containing the psoromic acid chemosyndrome	5. O. asiatica
50	Columella present (47:)	51
50:	Columella absent	52
51	Thallus dull, ecorticate, containing the stictic acid chemosyndrome; ascospores with 5–7 × 1–3 locules (50:)	31. O. melanotremata
51:	Thallus glossy, corticate, lacking secondary compounds; ascospores with 4–5 × 1–2 locules	45. O. tenuis
52	Ascomatal margin entire; ascospores 10–16 µm long (50:)	18. O. ecorticata
52:	Ascomatal margin split or layered; ascospores 15–25 µm long	53
53	Ascomata to c. 0.4 mm diam.; thalline rim not pigmented (52:)	29. O. kurandensis
53:	Ascomata to c. 1.2 mm diam.; thalline rim with a deep red to purplish, rarely pale reddish or whitish pruina	15. O. cruentata