

Keys to buellioid lichens in Australia

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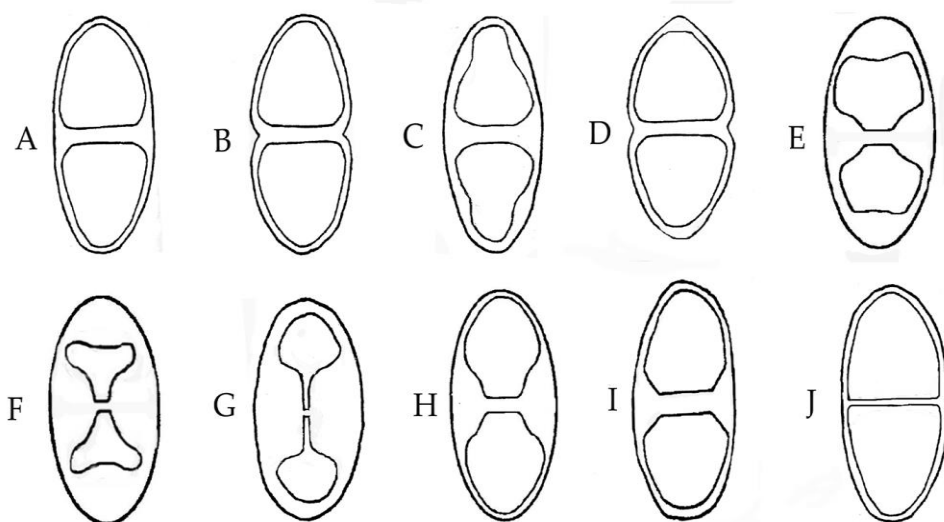
Key A. Species growing on bark, wood, soil or other lichens; lacking lichen substances [K-, C-, KC-, PD-, UV-, TLC-]

Key B. Species growing on bark, wood or soil; containing lichen substances [positive test with one or more of K, C, KC, PD, UV, TLC]

Key C. Species growing on rock; lacking lichen substances [K-, C-, KC-, PD-, UV-; TLC-]

Key D. Species growing on rock; containing lichen substances [positive test with one or more of K, C, KC, PD, UV, TLC]

Species marked with an asterisk are yet to be formally described



Types of ascospore. A = *Buellia*-type; B = *Buellia*-type (constricted); C = *Callispora*-type; D = *Cratiria*-type; E = *Dirinaria*-type; F = *Mischoblastia*-type; G = *Orcularia*-type; H, I = *Physconia*-type; J = *Rinodinella*-type.

Key A. Species growing on bark, wood, soil or other lichens; lacking lichen substances

1	Thallus growing on bark or wood	2
1:	Thallus growing on soil or other lichens	22
2	Ascospores 1–3-septate or submuriform	3
2:	Ascospores 1-septate	5
3	Ascospores 1–3-septate	Baculifera metaphragmia
3:	Ascospores submuriform	4
4	Ascospores 13–20 × 6.5–10 µm; thallus crustose to subsquamulose	Diplotomma alboatrum
4:	Ascospores 25–30 × 9–12 µm; thallus endophloedal	Diplotomma sp. A*
5	Ascospores <i>Orcularia</i> -type; conidia filiform, curved.....	6
5:	Ascospores <i>Callispora</i> -, <i>Physconia</i> -, <i>Mischoblastia</i> - or <i>Buellia</i> -type; conidia various	9
6	Ascospores persistently <i>Orcularia</i> -type, 13–22 µm long	7
6:	Ascospores initially <i>Orcularia</i> -type, then <i>Physconia</i> -type	8
7	Ascospores 10–[13.5]–16 × 5–[6.8]–8.5 µm	Orcularia elixii
7:	Ascospores 11–[15.5]–22 × 6.5–[8.0]–10 µm	Orcularia insperata
8	Ascospores 12–18 × 6–10 µm	Amandinea stajscicii
8:	Ascospores 20–28 × 9–14 µm.....	Amandinea dudleyensis
9	Hymenium densely interspersed with oil droplets; ascospores <i>Callispora</i> - or <i>Mischoblastia</i> -type.....	10
9:	Hymenium not or weakly interspersed with oil droplets; ascospores <i>Physconia</i> - or <i>Buellia</i> -type.....	11
10	Ascospores <i>Callispora</i> -type, 30–38 × 12–16 µm; conidia bacilliform, 4–6 µm long	Buellia levieri
10:	Ascospores <i>Mischoblastia</i> -type, 18–31 × 9–13 µm; conidia filiform, 11–21 µm long	Sculptolumina japonica
11	Ascospores 5–11 × 4.5–5.5 µm; conidia narrowly ellipsoid, 5–11 × 1.5–3 µm long	Buellia schaeferi
11:	Ascospores 10–30 × 5–13 µm; conidia bacilliform or filiform, 4–38 µm long	12
12	Ascospores 17–30 × 7–13 µm	13
12:	Ascospores 10–20 × 5–8 µm.....	16
13	Hymenium interspersed; conidia filiform, curved, 18–38 µm long.....	14
13:	Hymenium not interspersed; conidia bacilliform or absent	15
14	Ascospores <i>Buellia</i> -type, with apical wall-thickenings, 22–30 × 9–14 µm; conidia 18–28 µm long.....	Amandinea occidentalis
14:	Ascospores <i>Physconia</i> - to <i>Buellia</i> -type, lacking apical wall-thickenings, 17–25 × 7–12 µm; conidia 25–38 µm long.....	Amandinea pillagaensis

- 15 Ascospores *Buellia*-type, straight, 16–30 × 7–12 µm; conidia bacilliform, 5–6 µm long
..... **Baculifera macromera**
- 15: Ascospores *Buellia*-type, often bent, 17–26 × 9–13 µm; conidia not seen
..... **Amandinea montana**
- 16 Epihymenium deep green, N+ black or dark purple-grey; conidia bacilliform,
straight, 8–12 µm long **Baculifera xylophila**
- 16: Epihymenium brown, N–; conidia filiform or bacilliform 17
- 17 Ascospores persistently *Buellia*-type; conidia filiform or bacilliform 18
- 17: Ascospores initially *Physconia*-type, then *Buellia*-type; conidia filiform 20
- 18 Ascospores 9–14 µm long **Amandinea conranensis**
- 18: Ascospores 12–20 µm long 19
- 19 Ascospores 12–15 × 7–9 µm; conidia filiform, curved, 14–20 µm long
..... **Amandinea punctata**
- 19: Ascospores 12–19 × 5–8 µm; conidia bacilliform, 4–6 µm long **Buellia extenuatella**
- 20 Apothecia initially lecanorine, then biatorine and lecideine; juvenile ascospore locules
lachrymiform (tear-shaped) **Amandinea ropinii**
- 20: Apothecia lecideine throughout; juvenile ascospore locules spherical or clavate 21
- 21 Ascospores 11–16 µm long; thallus crustose or absent, esorediate
..... **Amandinea extenuata**
- 21: Ascospores 13–20 µm long; thallus often becoming subsquamulose and soresediate
..... **Amandinea lignicola** var. **australis**
- 22 Thallus growing on soil; ascospores 15–20 × 6.5–8.5 µm **Buellia epigaella**
- 22: Thallus growing on other lichens 23
- 23 Thallus growing on *Xanthoparmelia mougeotina*; ascospores *Buellia*-type,
14–18(–24) × 5–8 µm, rarely constricted at septum **Buellia servilosina**
- 23: Thallus growing on crustose lichens 24
- 24 Thallus growing on *Buellia albula*; ascospores *Buellia*-type, 13–20(–25) × 8–12 µm,
not constricted at septum **Buellia albulella**
- 24: Thallus growing on *Caloplaca*; ascospores *Physconia*-type, then *Buellia*-type,
12–16 × 7–10 µm, constricted at septum **Buellia subadjuncta**

Key B. Species growing on bark, wood or soil; containing lichen substances

1	Thallus growing on bark or wood	2
1:	Thallus growing on soil	60
2	Ascospores 1–3-septate or submuriform	3
2:	Ascospores 1-septate	7
3	Ascospores submuriform; thallus sorediate	Buellia griseovirens
3:	Ascospores 1–3-septate; thallus esorediate	4
4	Medulla intense red; chiodectonic acid present	Gassicurtia capricornica
4:	Medulla white; chiodectonic acid absent	5
5	Thallus K+ yellow; stictic acid present	Cratiria sp. A*
5:	Thallus K+ red; norstictic acid present	6
6	Thallus thick, crustose; atranorin present; tropical	Cratiria lauricassiae
6:	Thallus thin or endophloedal; atranorin absent; temperate	Baculifera metaphragmioides
7	Thallus K+ red; norstictic acid present	8
7:	Thallus K– or K+ yellow; norstictic acid absent	29
8	Hymenium densely interspersed with oil droplets	9
8:	Hymenium not interspersed with oil droplets	18
9	Epihymenium K+ violet	10
9:	Epihymenium K–	12
10	Asci with 16 ascospores	Buellia pleiotera
10:	Asci with 8 or fewer ascospores	11
11	Asci 8-spored; ascospores 13–22 × 5.5–8 µm; 4,5-dichlorolichexanthone absent	Buellia bahiana
11:	Asci (2–)4(–)8-spored; ascospores 18–30 × 8–14 µm; 4,5-dichlorolichexanthone present	Buellia mesospora
12	Ascospores more than 22 µm long	13
12:	Ascospores less than 22 µm long	14
13	Ascospores smooth, with pronounced subapical wall-thickenings	Buellia fraudans
13:	Ascospores strongly ornamented, with weak subapical wall-thickenings	Buellia subcrassata
14	Ascospores subglobose, 12–14 × 8–11 µm; 4,5-dichlorolichexanthone present	Buellia ventricosa
14:	Ascospores ellipsoidal, 14–22 × 8–14 µm; 4,5-dichlorolichexanthone absent	15
15	Epihymenium olive-brown or blackish green, N+ black or purple-grey; atranorin absent	16
15:	Epihymenium brown, N–; atranorin present	17
16	Upper surface glossy; thallus thick, warty or subsquamulose	Buellia rechingeri
16:	Upper surface dull; thallus thin, smooth	Buellia conspirans

17	Ascospores 15–20 × 7–10 μm; hafellic acid absent.....	Cratiria amphorea
17:	Ascospores 16–23 × 8–14 μm; hafellic acid present.....	Cratiria subtropica
18	Apothecial discs pruinose; pruina UV+ intense red, yellow or orange	19
18:	Apothecial discs epruinose or white-pruinose; pruina UV–	21
19	Ascospores 12–16 per ascus; pruina UV+ orange	Stigmatochroma maccarthyi
19:	Ascospores 8 per ascus	20
20	Pruina UV+ intense red; parietin present	Stigmatochroma epimarta
20:	Pruina UV+ intense yellow; lichexanthone present	Stigmatochroma adaucta
21	Ephymenium olive-green or blackish green, N+ black or deep purple-grey	22
21:	Ephymenium yellow-grey to orange-brown or brown, N–.....	23
22	Ascospore wall rugulate; apothecia usually white-pruinose; atranorin absent	Baculifera entochlora
22:	Ascospore wall smooth or microrugulate; apothecia epruinose; atranorin present	Baculifera pseudomicromera
23	Atranorin absent; thallus K–, PD–	24
23:	Atranorin present; thallus K+ yellow, PD+ pale yellow.....	25
24	Apothecia epruinose; ephymenium K+ dark brown to blackish brown; ascospores 15–23 × 7–12 μm.....	Baculifera epifuscenscens
24:	Apothecia pruinose; ephymenium K–; ascospores 14–25 × 6–9 μm.....	Baculifera intermedioides
25	Ascospores 17–28 × 7–14 μm; conidia 4–6 μm or 8–11 μm long	26
25:	Ascospores 12–21 × 6–8 μm; conidia 4–6 μm long.....	27
26	Ascospores with weak subapical and septal wall-thickenings; conidia 8–11 μm long.....	Baculifera orosa
26:	Ascospores with weak apical wall-thickenings only; conidia 4–6 μm long	Cratiria americana
27	Disc black; ascospores with strong apical wall-thickenings; paraphyses interspersed with oil droplets	Cratiria obscurior
27:	Disc reddish or black; ascospores with weak apical wall-thickenings; paraphyses not interspersed	28
28	Disc black; ascospores 16–23 × 7–12 μm; subhymenium interspersed	Cratiria sp. B*
28:	Disc reddish; ascospores 16–21 × 7–8 μm; subhymenium not interspersed	Cratiria rutilantoides
29	Thallus K+ yellow, PD+ pale yellow; atranorin present.....	30
29:	Thallus K–, PD–; atranorin absent	40
30	Hymenium densely interspersed with oil droplets.....	31
30:	Hymenium not interspersed with oil droplets	38
31	Medulla yellow or ochre; secalonic acid B and other pigments present	Buellia pigmentosa
31:	Medulla white; secalonic acid B and other pigments absent.....	32

32	Asci 2-spored	33
32:	Asci 3–8-spored	34
33	Ascospores 22–42 × 10–16 μm	Buellia dissa
33:	Ascospores 38–61 × 15–24 μm	Buellia pseudotetrapla
34	Asci 3–4-spored	Buellia tetrapla
34:	Asci usually 8-spored	35
35	Ascospores with strong subapical wall-thickenings; diploicin present	36
35:	Ascospores with weak subapical or apical wall-thickenings diploicin absent	37
36	Ascospore wall rugulate; lumina straight.....	Buellia demutans
36:	Ascospore wall smooth; lumina bent	Buellia parastata
37	Ascospores with weak apical wall-thickenings; hafellic acid present	Cratiria subtropica
37:	Ascospores with weak subapical wall-thickenings; hafellic acid absent	Buellia disciformis
38	Ascospores 13–17 × 5.5–7 μm; epihyemenium olive-green or blackish green, N+ black or deep purple-grey;	Baculifera micromera
38:	Ascospores 16–23 × 7–14 μm; epihyemenium brown, N–	39
39	Ascospores 7–9 μm wide; conidia filiform, curved, 24–27 μm long	Amandinea subduplicata
39:	Ascospores 8–14 μm wide; conidia bacilliform, straight, 4–6 μm long	Cratiria verdonii
40	Ascospores <i>Dirinaria</i> - or <i>Mischoblastia</i> -type	41
40:	Ascospores <i>Callispora</i> -, <i>Cratiria</i> -, <i>Physconia</i> - or <i>Buellia</i> -type	43
41	Ascospores <i>Dirinaria</i> -type, 12–20 × 8–11 μm; thallus bright yellow, K+ orange, C+ orange; xantholepinone A present	Endohyalina gillamsensis
41:	Ascospores <i>Mischoblastia</i> -type, 18–31 × 9–18 μm; thallus grey to olive-brown	42
42	Medulla pigmented in part, K+ violet; anthraquinones present	Sculptolumina japonica
42:	Medulla white throughout, K–	Sculptolumina serotina
43	Medulla intense red; chiodectonic acid present	44
43:	Medulla white; chiodectonic acid absent	45
44	Thallus densely isidiate.....	Gassicurtia blencoensis
44:	Thallus lacking isidia	Gassicurtia coccinea
45	Thallus C+ orange, UV+ intense yellow or orange; xanthonenes present.....	46
45:	Thallus C–, UV–; xanthonenes absent	60
46	Thallus sorediate	47
46:	Thallus esorediate	49
47	Ascospores 15–28 × 7–10 μm; thiophanic and gyrophoric acids present.....	Buellia yilliminningensis
47:	Ascospores 10–15 × 4.5–6.5 μm; thiophanic and gyrophoric acids absent	48

48	Thallus olive-green; 4,5-dichlorolichexanthone and lobaric acid present;	Amandinea efflorescens var. efflorescens	
48:	Thallus yellow-green to orange-grey; arthothelin and thuringione present	Amandinea efflorescens var. pseudohypopelidna	
49	Hymenium densely inspersioned with oil droplets.....		50
49:	Hymenium not inspersioned with oil droplets		54
50	Apothecial discs pruinose; ascospores with apical wall-thickenings; arthothelin and thuringione present.....		51
50:	Apothecial discs epruinose; ascospores with subapical wall-thickenings; 4,5-dichlorolichexanthone present.....		53
51	Excipulum K-.....	Cratiria melanochlora	
51:	Excipulum K+ orange-red or red-violet		52
52	Excipulum K+ orange-red; ascospores 17-[22.5]-28 × 8-[10.1]-13 μm	Cratiria aggreiciens	
52:	Excipulum K+ red-violet; ascospores 12-[16.9]-20 × 6-[7.6]-10 μm	Cratiria chloraceus	
53	Epihymenium olive-brown, K+ purple	Buellia reagenella	
53:	Epihymenium brown to olive-brown, K-	Buellia xanthonica	
54	Apothecia grey-brown-pruinose; thiophanic acid present.....		55
54:	Apothecia epruinose; thiophanic acid present or absent		56
55	Excipulum red in part, K+ violet solution	Gassicurtia pseudosubpulcella	
55:	Excipulum brown to red-brown, K+ yellow	Gassicurtia subpulcella	
56	Epihymenium red, K+ crimson solution; lichexanthone, barbatic and chiodectonic acids present.....	Gassicurtia victoriana	
56:	Epihymenium brown, no coloured solution with K.....		57
57	Ascospores 9-13 × 5-8 μm; upper surface UV+ yellow or orange; lichexanthone or thuringione present.....		58
57:	Ascospores 12-19 × 6-8 μm; upper surface UV+ orange; thiophanic acid present		59
58	Upper surface UV+ orange; thuringione, arthothelin present	Amandinea diorista var. hypopelidna	
58:	Upper surface UV+ yellow; lichexanthone, barbatic and obtusatic acids present	Gassicurtia catasema	
59	Epihymenium K+ intense red-brown; medulla white	Gassicurtia vaccinii	
59:	Epihymenium K-; medulla with small patches of dull purple-brown pigment [K-, H ₂ SO ₄ + blue-violet]	Gassicurtia gallowayi	
60	Epihymenium red, K+ crimson solution; 10-18 × 5-7 μm barbatic and chiodectonic acids present	Gassicurtia victoriana	
60:	Epihymenium K-; 7-12 × 3-4 μm; testacein present	Buellia testaceina	
61	Thallus C-, UV-; xanthonones absent		62
61:	Thallus C+ orange, UV+ intense yellow or orange; xanthonones present.....		63
62	Medulla white; K+ intense red, K+ yellow or K-; atranorin, bourgeanic or norstictic acids present	Buellia subcoronata	
62:	Medulla pigmented red in part; pigmented medulla K+ pale purple	Monerolechia glomerulans	

- 63 Thallus lacking calcium oxalate, H₂SO₄ –; arthothelin and thuringione present
 **Buellia sp. A***
- 63: Thallus containing calcium oxalate, H₂SO₄+; arthothelin present,
 thuringione present or absent64
- 64: Ascospores more than 9.5 μm wide; thallus effigurate-lobate **Buellia georgei**
- 64: Ascospores to 9.5 μm wide; thallus effigurate-lobate or crustose-squamulose65
- 65 Thallus effigurate-lobate; arthothelin and thuringione present **Buellia lobata**
- 65: Thallus crustose to squamulose; arthothelin present, thuringione absent... **Buellia dijiana**

Key C. Species growing on rock; lacking lichen substances

1	Ascospores 3-septate or submuriform; on limestone	2
1:	Ascospores 1-septate; on limestone or siliceous rocks	3
2	Ascospores submuriform	Diplotomma alboatrum
2:	Ascospores 3-septate	Diplotomma venustum
3	Upper surface granular-sorediate	Buellia amandineaeformis
3:	Upper surface not sorediate	4
4	Thallus growing on limestone	5
4:	Thallus growing on siliceous rocks	8
5	Apothecia lecanorine; ascospores <i>Rinodinella</i> -type, 12–21 × 5–7 μm	Rinodinella dubyanoides
5:	Apothecia lecideine; ascospores <i>Buellia</i> -type, 8–15 × 4–9 μm	6
6	Apothecia immersed; ascospores 14–25 × 7–12 μm	Buellia albulella
6:	Apothecia immersed to sessile; ascospores 8–15 × 4–7 μm	7
7	Epihymenium aeruginose, N+ violet	Buellia subalbula
7:	Epihymenium brown, N–	Buellia albula
8	Thallus initially lichenicolous; crustose or squamulose	9
8:	Thallus never lichenicolous; crustose or endolithic	10
9	Areoles and/or squamules aggregated to form elevated, broccoli-like glomerules; medulla often red-orange pigmented in patches	Monerolechia glomerulans
9:	Areoles and/or squamules not aggregated or forming elevated glomerules; medulla white	Monerolechia badia
10	Thallus epilithic, crustose	11
10:	Thallus endolithic, not apparent, or with few scattered, thalline flecks	35
11	Epihymenium aeruginose, N+ violet; on montane rocks	Buellia epiaeruginosa
11:	Epihymenium brown, N– or N+ greenish black then orange-brown	12
12	Ascospores with marked medial wall-thickenings, <i>Orcularia</i> - to <i>Physconia</i> -type; conidia curved, filiform	13
12:	Ascospores without medial wall-thickenings or with weak medial wall-thickenings during spore ontogeny, <i>Buellia</i> -type; conidia straight, bacilliform or curved, filiform	16
13	Apothecia to 1 mm diam., often pruinose	14
13:	Apothecia to 0.6 mm diam., not pruinose	15
14	Ascospores 14–18 × 6–9 μm; subhymenium interspersed; with or without SV-1	Amandinea variabilis
14:	Ascospores 17–23 × 10–14 μm; subhymenium not interspersed with oil droplets; with or without variolaric acid	Amandinea decedens
15	Apothecia immersed; thallus cream-coloured to pale brown, weakly verrucose; ascospores 7.5–10 μm wide	Amandinea otagensis
15:	Apothecia broadly adnate; thallus dirty white to grey-brown, rimose-areolate; ascospores 6–8 μm wide	Amandinea pelidna

16	On coastal and lowland rocks	17
16:	On montane rocks.....	32
17	Ascospores <i>Buellia</i> -type, without medial wall-thickenings.....	18
17:	Ascospores with weak medial wall-thickenings during spore ontogeny, but quickly disappearing	22
18	Conidia bacilliform, straight, 3–6 µm long	19
18:	Conidia filiform, curved, 12–30 µm long.....	21
19	Thallus lacking calcium oxalate [H ₂ SO ₄ -]	Buellia suttonensis
19:	Thallus containing calcium oxalate [H ₂ SO ₄ +]	20
20	Thallus thick, corticate, continuous.....	Buellia cranwelliae
20:	Thallus of scattered ecorticate areoles.....	Buellia poolensis
21	Mature ascospores not constricted at septum; prothallus usually absent; conidia 12–18 µm long.....	Amandinea punctata
21:	Mature ascospores constricted at septum; prothallus broad, marginal; conidia 20–30 µm long.....	Amandinea prothallinata
22	Ascospores 15–30 × 7–14 µm.....	23
22:	Ascospores 10–16 × 5–9 µm.....	25
23	Medulla I+ blue; ascospores 15–26 × 8–14 µm	Amandinea austroconiops
23:	Medulla I-	24
24	Ascospores often curved, 18–[21.8]–25 × 10–[12.8]–16 µm; spore-wall rugulate	Amandinea destituta
24:	Ascospores not curved, 12–[16.5]–22 × 7–[8.5]–11 µm; spore-wall microrugulate	Amandinea coniops
25	Ascospores 12–16 × 6–9 µm, elongate-ellipsoidal	26
25:	Ascospores 10–13 × 5–7 µm, broadly ellipsoidal	29
26	Conidia bacilliform, straight, 5–8 µm long	Buellia mayrhoferae
26:	Conidia filiform, curved, 15–30 µm long.....	27
27	Subhymenium interspersed with oil droplets; thallus fragmentary or absent	Amandinea conglomerata
27:	Subhymenium not interspersed with oil droplets; thallus thick or rimose-areolate	28
28	Mature ascospores often constricted; thallus thick, warty; prothallus absent; apothecia to 1.5 mm wide	Amandinea litoralis
28:	Mature ascospores not or very rarely constricted; thallus thin, rimose-areolate; prothallus often black and prominent; apothecia to 0.8 mm wide	Amandinea fuscoatrata
29	Ascospores often constricted; prothallus pale or absent	Amandinea australasica
29:	Ascospores not constricted	30
30	Thallus discontinuous, verruculose to granulose, white to pale orange; prothallus absent; thallus containing orange pigment.....	Amandinea vitellina
30:	Thallus rimose-areolate, continuous, grey to brown or dark brown; prothallus often present; orange pigment present or absent.....	31

- 31 Thallus brown or dark brown; prothallus often dark and prominent; disc epruinose; thallus lacking orange pigment **Amandinea brunneola**
- 31: Thallus white to pale grey-brown; prothallus grey-white or not apparent; disc often grey-white pruinose; thallus containing orange pigment **Amandinea julianae**
- 32 Medulla I+ blue; ascospores 15–27 × 8–14 µm **Amandinea austroconiops**
- 32: Medulla I– 33
- 33 Ascospores 10–13 × 5–8 µm; thallus effuse or membranaceous **Amandinea nebulosa**
- 33: Ascospores 12–20 × 6–10 µm; thallus thick, rimose-areolate or verrucose 34
- 34 Conidia curved, filiform, 20–30 µm; thallus thick, of congested verrucules **Amandinea isabellina**
- 34: Conidia straight, bacilliform, 8–13 µm; thallus rimose-areolate **Buellia ewersii**
- 35 On montane rocks; subhymenium inspersioned with oil droplets; ascospores 10–14 × 5–8 µm, not constricted at septum; conidia ellipsoid, 5–7 × 2–3 µm **Buellia canobolasensis**
- 35: On coastal and hinterland rocks; subhymenium inspersioned or not 36
- 36 Subhymenium inspersioned with oil droplets or granules 37
- 36: Subhymenium not inspersioned with oil droplets or granules 38
- 37 Subhymenium inspersioned with oil droplets; ascospores 11–17 µm long; thallus containing calcium oxalate [H₂SO₄+] and orange pigment **Amandinea conglomerata**
- 37: Subhymenium inspersioned with granules and oil droplets; ascospores 8–15 µm long; thallus lacking calcium oxalate [H₂SO₄–] and orange pigment **Amandinea neoconglomerata**
- 38 Ascospores 12–15 × 6–8 µm 39
- 38: Ascospores 8–14 × 3–7 µm 40
- 39 Ascospores constricted; conidia straight, bacilliform, 3–6 µm long **Buellia sp. B***
- 39: Ascospores not constricted; conidia curved, filiform, 12–18 µm long **Amandinea punctata**
- 40 Thallus containing calcium oxalate [H₂SO₄+] **Buellia austroabstracta**
- 40: Thallus lacking calcium oxalate [H₂SO₄–] 41
- 41 Conidia curved, filiform, 25–40 µm long **Amandinea sp. A***
- 41: Conidia bacilliform, 3–5 µm long 42
- 42 Ascospores 5–[5.9]–7 µm wide, sometimes constricted **Buellia suttonensis**
- 42: Ascospores 3.5–[4.6]–6 µm wide, not constricted **Buellia abstracta**

Key D. Species growing on rock; containing lichen substances

1	Ascospores 1–3-septate or submuriform	2
1:	Ascospores 1-septate	7
2	Epihymenium brown, N–; ascospores 1–3-septate or submuriform	3
2:	Epihymenium aeruginose, N+ violet; ascospores submuriform	6
3	Thallus K+ red, C–; norstictic acid present; ascospores submuriform	Diplotomma chlorophaeum
3:	Thallus K–, C+ orange; arthothelin present; ascospores 1–3-septate.....	4
4	Ascospores usually 3-septate, not curved, 12–18 × 5–7.5 µm; Qld	Buellia kaproorea
4:	Ascospores rarely 2- or 3-septate, often curved, ACT or Tas.	5
5	Ascospores 19–30 × 7–13 µm; Tas.	Tetramelas allisoniae
5:	Ascospores 15–22 × 6–10 µm; ACT.	Tetramelas concinnus
6	Thallus K–, C+ orange; isoarthothelin present; coastal	Buellia aeruginosa
6:	Thallus K+ red, C–; norstictic acid present; montane	Buellia bogongensis
7	Thallus sorediate, bright yellow; rhizocarpic acid present	Buellia rhizocarpella
7:	Thallus esorediate; rhizocarpic acid absent	8
8	Thallus K+ red; norstictic acid present.....	9
8:	Thallus K+ yellow or K–; norstictic acid absent.....	32
9	Hymenium or subhymenium interspersed with oil droplets.....	10
9:	Hymenium and subhymenium not interspersed with oil droplets	13
10	Epihymenium K+ violet; Tas.	Buellia claricollina
10:	Epihymenium brown or aeruginose, K–.	11
11	Epihymenium aeruginosa; N+ red-violet; ACT, Tas	Buellia patearoana
11:	Epihymenium brown, N–; Qld, NT	12
12	Apothecia adnate to sessile: medulla I–	Cratiria vioxanthina
12:	Apothecia immersed; medulla I+ blue-violet.....	Cratiria burleighensis
13	Thallus growing on limestone	14
13:	Thallus growing on siliceous rocks	16
14	Epihymenium brown, N–	Buellia albula
14:	Epihymenium aeruginose, N+ violet	15
15	Medulla containing calcium oxalate, H ₂ SO ₄ +; atranorin absent	Buellia subalbula
15:	Medulla lacking calcium oxalate, H ₂ SO ₄ –; atranorin present.....	Buellia fluviicygnorum
16	Thallus squamulose, initially lichenicolous	Monerolechia norstictica
16:	Thallus crustose, not lichenicolous	17
17	Epihymenium aeruginose, N+ violet or purple-brown.....	18
17:	Epihymenium brown, N–.....	23
18	Medulla containing calcium oxalate, H ₂ SO ₄ +; atranorin absent	19
18:	Medulla lacking calcium oxalate, H ₂ SO ₄ –; atranorin present or absent	20

19	Apothecial discs epruinose; subhymenium not inspersioned with oil droplets	Rinodinella fertilis var. fertilis	
19:	Apothecial discs white-pruinose; subhymenium inspersioned.....	Buellia kantvilasii	
20	Apothecia remaining immersed; atranorin absent		21
20:	Apothecia superficial at maturity; atranorin present or absent		22
21	Areoles contiguous	Buellia aethalea	
21:	Areoles scattered	Buellia ectolechioides	
22	Ascospores 10–16 × 5–8 µm, rarely constricted	Buellia spuria var. amblyogona	
22:	Ascospores 12–20 × 6–10 µm, commonly constricted	Buellia homophylla	
23	Medulla containing calcium oxalate, H ₂ SO ₄ +		24
23:	Medulla lacking calcium oxalate, H ₂ SO ₄ –		26
24	Thallus epilithic, consisting of convex, verrucose areoles	Buellia maunakeansis	
24:	Thallus endolithic or consisting of fragmentary, ecorticate, white flecks		25
25	Subhymenium not inspersioned; conidia bacilliform, 3–5 × 1 µm	Buellia ferax	
25:	Subhymenium inspersioned with oil droplets and granules; conidia filiform, curved, 15–30 µm long.....	Amandinea feraxioides	
26	Thallus UV+ orange; 4,5-dichlorolichexanthone present: apothecia initially lecanorine or cryptolecanorine	Buellia mamillana	
26:	Thallus UV–; 4,5-dichlorolichexanthone absent; apothecia lecideine		27
27	Thallus endolithic and not apparent		28
27:	Thallus epilithic, crustose		29
28	Ascospores 4–[5.1]–6 µm wide	Buellia abstracta	
28:	Ascospores 6–[6.9]–9µm wide.....	Buellia northallina	
29	Apothecia remaining immersed; atranorin present; montane	Buellia austroalpina	
29:	Apothecia superficial at maturity; atranorin absent; lowland or coastal		30
30	Conidia filiform, curved, 15–30 µm long; prothallus black, marginal; on coastal rocks	Amandinea devilliersiana	
30:	Conidia bacilliform, straight, 4–10 µm long; prothallus absent; on hinterland rocks		29
31	Ascospores 5–7 µm wide; conidia 4–6 µm long; mainland	Buellia kimberleyana	
31:	Ascospores 7–9 µm wide; conidia 8–10 µm long; Tas.....	Buellia austera	
32	Thallus K+ yellow or K+ yellow then pale red; atranorin or hypostictic acid present		33
32:	Thallus K–; atranorin and hypostictic acid absent		58
33	Thallus growing on limestone; subhypotheceum red	Buellia cinnabarina	
33:	Thallus growing on siliceous rocks; subhypotheceum brown or brown-black.....		34
34	Hymenium densely inspersioned with oil droplets.....	Buellia procellarum	
34:	Hymenium not inspersioned with oil droplets		35
35	Epihymenium aeruginose, N+ violet or purple-brown.....		36
35:	Epihymenium brown, N–		46

36	Medulla containing calcium oxalate, H ₂ SO ₄ +; atranorin present or absent	37
36:	Medulla lacking calcium oxalate, H ₂ SO ₄ -; atranorin present	39
37	Ascospores <i>Buellia</i> -type, 10–15 × 5–8 μm; hypostictic acid present	Amandinea hypostictica
37:	Ascospores <i>Physconia</i> - then <i>Buellia</i> -type, 13–20 × 7–10 μm; atranorin and 2'- <i>O</i> -methylperlatolic acid present	38
38	Epihymenium brown, N-; subhymenium not inspersed with oil droplets	Buellia dispersa
38:	Epihymenium aeruginose, N+ violet; subhymenium inspersed with oil droplets	Buellia ecclesensis
39	Thallus K+ yellow then pale red; hypostictic acid present	Buellia inturgescens
39:	Thallus K+ yellow or yellow-orange; hypostictic acid absent	40
40	Apothecia adnate to sessile	41
40:	Apothecia immersed, rarely becoming adnate	44
41	Thallus K+ yellow; PD+ pale yellow; atranorin only present	Buellia cranfieldii
41:	Thallus K+ intense yellow or yellow-orange; PD+ deep yellow or orange; pannarin, stictic or psoromic acids present	42
42	Thallus K+ intense yellow; PD+ yellow; psoromic acid present	Buellia psoromica
42:	Thallus K+ yellow-orange; PD+ orange; stictic acid or pannarin present	43
43	Ascospores 10–16 × 5–8 μm; stictic acid present	Buellia spuria var. spuria
43:	Ascospores 16–28 × 8–12 μm; pannarin present	Buellia pannarina
44	Ascospores 15–23 × 8–12 μm; diploicin present	Buellia tinderryensis
44:	Ascospores 9–15 × 5–8 μm; diploicin absent	45
45	Thallus with atranorin, ±roccellic acid	Buellia stellulata var. tasmanica
45:	Thallus with atranorin, 2'- <i>O</i> -methylperlatolic, ±confluent, ±roccellic acids	Buellia stellulata var. stellulata
46	Thallus subcrustose, placodioid, bullate-areolate or squamulose	47
46:	Thallus crustose	50
47	Thallus verrucose-areolate to subsquamulose; 2'- <i>O</i> -methylperlatolic acid present	Buellia ecclesensis
47:	Thallus placodioid, effigurate-lobate; diploicin present	48
48	Thallus esorediate	Diploicia africana
48:	Thallus sorediate	49
49	Buellolide and canseolide present	Diploicia canescens ssp. australasica
49:	Buellolide and canseolide absent	Diploicia canescens ssp. canescens
50	Medulla containing calcium oxalate, H ₂ SO ₄ +; hafellic acid present	Buellia fallax
50:	Medulla lacking calcium oxalate, H ₂ SO ₄ -; hafellic acid absent	51
51	Thallus C+ orange, UV+ orange; xanthonenes present	52
51:	Thallus C-, UV-; xanthonenes absent	54

52	Ascospores subglobose, 7–9 × 6–7 μm; thuringione present.....	Buellia desertorum	
52:	Ascospores ellipsoid, 12–23 × 6–12 μm; 2,5,7-trichloro-3- <i>O</i> -methylnorlichexanthone present		53
53	Ascospores 12–17 × 6–9 μm; subhymenium not inspersioned with oil droplets	Buellia subarenaria	
53:	Ascospores 16–22 × 8–11 μm; subhymenium inspersioned	Buellia arenaria	
54	Apothecia adnate to sessile; medulla white		55
54:	Apothecia mainly immersed, rarely becoming adnate; medulla white or pigmented		56
55:	Ascospores 10–15 × 4–6 μm, often curved; thallus fragmentary	Buellia durackensis	
55:	Ascospores 16–22 × 8–10 μm, not curved; thallus rimose, continuous	Buellia herveyensis	
56	Lower medulla orange-brown; pigmented medulla I+ blue-violet; ascospores <i>Physconia</i> - then <i>Buellia</i> -type	Buellia maficola	
56:	Medulla white throughout, I–		57
57	Hymenium inspersioned with oil droplets; medulla PD+ orange; stictic acid present; ascospores straight, <i>Cratiria</i> - then <i>Buellia</i> -type; tropical	Cratiria streimanii	
57:	Hymenium not inspersioned; medulla PD+ pale yellow; stictic acid absent; ascospores often curved, <i>Callispora</i> - then <i>Buellia</i> -type	Buellia insularicola	
58	Thallus C+ red, UV–; gyrophoric, ±5- <i>O</i> -methylhiassic acid present		59
58:	Thallus C+ orange or C–, UV+ or UV–; gyrophoric and 5- <i>O</i> -methylhiassic acids absent.. ..		61
59	Ascospores <i>Mischoblastia</i> -type, 16–24 × 9–14 μm.....	Sculptolumina ramboldii	
59:	Ascospores <i>Buellia</i> -type, 7–20 × 4–10 μm.....		60
60	Apothecia lecideine; subhymenium inspersioned with oil droplets; conidia bacilliform, straight, 5–11 μm long; margins not radiate-plicate	Buellia poimena	
60:	Apothecia lecanorine to biatorine; subhymenium not inspersioned; conidia filiform, curved, 14–25 μm long; margins often radiate-plicate	Australiaena streimannii	
61	Ascospores <i>Dirinaria</i> -type		62
61:	Ascospores <i>Buellia</i> -type or <i>Physconia</i> -type		63
62	Thallus autonomous; hymenium densely inspersioned with oil droplets; prothallus black, marginal; diploicin and xantholepinone A present.....	Endohyalina arachniformis	
62:	Thallus lichenicolous on <i>Lecanora</i> sp.; hymenium not inspersioned; diploicin present, xantholepinone A absent	Endohyalina insularis	
63	Thallus C+ orange, UV+ orange; xanthonones present.....		64
63:	Thallus C–, UV–; xanthonones absent		81
64	Medulla containing calcium oxalate, H ₂ SO ₄ +.....		65
64:	Medulla lacking calcium oxalate, H ₂ SO ₄ –		67
65	Epihymenium N+ violet; arthothelin present; on siliceous rocks	Buellia halonioides	
65:	Epihymenium brown, N–; arthothelin present or absent; on limestone or siliceous rocks		66

66	Ascospores 16–24 × 9–14 µm; arthothelin present; on limestone	Buellia georgei
66:	Ascospores 11–20 × 6–10 µm; 2,5,7-trichloro-3- <i>O</i> -methylnorlichexanthone present; on siliceous rocks or limestone	Buellia xantholeuca
67	Apothecia initially lecanorine or cryptolecanorine	68
67:	Apothecia always lecideine.....	70
68	Epihymenium N+ purple; disc densely pruinose; arthothelin present	Buellia weberi
68:	Epihymenium N–; disc epruinose; 4,5-dichlorolichexanthone present	69
69	Conidia filiform, curved; lobaric, perlatolic or gyrophoric acids present	Australiaena streimannii
69:	Conidia bacilliform, straight; stictic acid present	Buellia mamillana
70	Ascospores <i>Orcularia</i> - then <i>Physconia</i> -type; conidia curved, filiform, 15–25 µm long.....	Amandinea prospersa
70:	Ascospores <i>Physconia</i> - or <i>Buellia</i> -type; conidia straight, bacilliform, 4–12 µm long ..	71
71	Subhypotheceum red or red-brown, K+ intense red solution	Buellia hyporosea
71:	Subhypotheceum brown, K–	72
72	Medulla I+ blue-violet	73
72:	Medulla I–	75
73	Ascospores 10–18 × 6–11 µm; epihymenium aeruginose, N+ violet	Buellia macveanii
73:	Ascospores 15–30 × 6–13 µm; epihymenium brown, N–.....	74
74	Ascospores 19–30 × 7–13 µm; Tas.....	Tetramelas allisoniae
74:	Ascospores 15–22 × 6–9 µm; ACT.....	Tetramelas concinnus
75	Ascospores <i>Physconia</i> -type; disc often pruinose; subhymenium pale brown	76
75:	Ascospores <i>Buellia</i> -type; disc epruinose; subhymenium greenish or brown	77
76	Epihymenium N+ violet; isoarthothelin and roccellic acid present	Buellia halonia
76:	Epihymenium brown, N–; 2,5,7-trichloro-3- <i>O</i> -methylnorlichexanthone present	Buellia subarenaria
77	Conidia 8–12 µm long; subhymenium pale brown; 4,5-dichlorolichexanthone or 3- <i>O</i> -methylthiophanic acid present; tropical	78
77:	Conidia 4–9 µm long; subhymenium greenish; arthothelin present; subalpine or alpine	80
78	Ascospores 15–23 × 7–12 µm; 4,5-dichlorolichexanthone present	Buellia dimbulahensis
78:	Ascospores 10–16 × 5–9 µm; 3- <i>O</i> -methylthiophanic acid and derivatives present	79
79	Upper surface with globose isidia	Buellia polyxanthonica var. isidiata
79:	Upper surface not isidiate	Buellia polyxanthonica var. polyxanthonica
80	Conidia 4–6 µm long; thallus margins not placodioid; montane-subalpine	Buellia ocellata
80:	Conidia 6–9 µm long; thallus margins placodioid; alpine.....	Buellia jugorum
81	Thallus squamulose to lobulate; margins not radiate-plicate; apothecia lecideine; conidia bacilliform, straight, 4–7 µm long; confluent acid present.....	Buellia bohlerensis
81:	Thallus crustose; margins often radiate-plicate; apothecia lecanorine to biatorine; conidia filiform, curved 14–25 µm long; lobaric, perlatolic or gyrophoric acids present	Australiaena streimannii