

BUELLIA

John A. Elix

[From *Flora of Australia* volume 57 (2009)]

Buellia De Not., *Giorn. Bot. Ital.* 2: 174 (1864), *nom. cons.*, named by De Notaris after his friend, Esperanzo Buelli.

Type: *B. disciformis* (Fr.) Mudd

Hafellia Kalb, H.Mayrhofer & Scheid., in K.Kalb, *Lich. Neotrop.* 9: 9 (1986). T: *H. parastata* (Nyl.) Kalb, H.Mayrhofer & Scheid. [= *B. parastata* (Nyl.) Zahlbr.]

Thallus crustose, superficial, thin, smooth to rugulose, continuous, membranous to rimose and areolate or scaly, 1–5 cm wide, 35–70 µm thick, corticate or not, rarely immersed and inconspicuous. Prothallus absent or present as a thin dark brown or black marginal line. Isidia and soredia absent. Upper surface white, grey-white to grey, yellow-grey, brown or greenish. Photobiont a unicellular green alga; cells 8–14 µm diam., not forming a continuous layer. Medulla and lower cortex present or absent. Ascomata apothecial, orbicular, sessile or rarely subimmersed; disc dark brown to black, rarely pruinose, plane to convex or weakly concave; margin concolorous with the disc, usually persistent, becoming excluded in convex apothecia; thalline exciple absent; proper exciple carbonised, dark red-brown to ±black, consisting of radiating agglutinated hyphae, uniformly pigmented or with a paler inner zone. Epithemium 10–30 µm thick, brown or greenish, K⁺ violet, yellow-green, olive or K⁻; hypothecium 50–170 µm thick, brown to dark brown, occasionally not differentiated from the exciple; hymenium 60–150 µm thick, colourless, often interspersed with oil droplets, amyloid. Paraphyses septate, 1–2 µm thick, simple or with short branches near the apices; apices clavate, 3–5 µm thick, usually brown-capitate, K⁺ purple or K⁻. Asci of *Lecanora*-type, clavate, 2–16-spored; apex wall layers thickened; apex amyloid, with a distinct axial mass. Ascospores olive to dark brown, 1–3-septate, thick-walled, *Callispora*-type, with weak to strong subapical and septal wall thickenings, ellipsoidal, 12–65 × 4–25 µm; outer wall smooth to strongly ornamented; torus present or absent. Conidiomata pycnidial, laminal, immersed, pyriform; conidiophores of type V (*sensu* Vobis, 1980), acrogenous. Conidia bacilliform or weakly clavate, 5–6 × 0.8–1.2 µm.

Buellia s. str. (formerly *Hafellia* Kalb, H.Mayrhofer & Scheid.) is one of the few well-delimited groups within *Buellia s. lat.* (Bungartz, 2008). It is characterised by *Callispora*-type ascospores, bacilliform or weakly clavate conidia, an often strongly oil-interspersed hymenium, and by the presence of norstictic acid, diploicin and congeners of 4,5-dichlorolichexanthone. For nomenclatural reasons, the name *Hafellia* must be regarded as a synonym of *Buellia s. str.* because *B. disciformis*, the conserved type of *Buellia*, shares all the typical characters of ‘*Hafellia*’. Thus, Moberg *et al.* (1999) suggested changing the listed type of *Buellia* to *B. aethalea* (Ach.) Th.Fr. However, *B. disciformis* had already been chosen as the type of *Buellia* when that name was conserved against *Gassicurtia* Fée. The suggested replacement of a conserved type would have been the first such action in the history of the Botanical Code. The proposal was not recommended by the Committee for Fungi (Gams, 2004), and the decision to reject the proposal of Moberg *et al.* (1999) was accepted by general vote at the International Botanical Congress in Vienna in 2005. Therefore, the species formerly included in *Hafellia* must now be regarded as *Buellia s. str.*, and the remaining species of *Buellia s. lat.*, which are not closely related, must be excluded from the genus.

Buellia s. str. is a pantropical and pantemperate genus currently thought to contain c. 30 species world-wide; 19 of them occur in Australia. Most grow on bark and wood, and one species is saxicolous.

G.Vobis, Bau und Entwicklung der Flechten-Pycnidien und ihrer Conidien, *Biblioth. Lichenol.* 14: 1–141 (1980); J.W.Sheard, The lichenized Ascomycete genus *Hafellia* in North America, *Bryologist* 95: 79–87 (1992); W.Pusswald, G.Kantvilas & H.Mayrhofer, *Hafellia dissa* and *H. levieri* (lichenised Ascomycetes, Physciaceae), two corticolous and lignicolous

species in Tasmania, *Muelleria* 8: 133–140 (1994); W.Pusswald, *Die Gattung Hafellia (lichenisierte Ascomyceten, Physciaceae) in Australien*, Dissertation, Institut für Botanik, Karl Franzens Universität, Graz (1995); R.Moberg, A.Nordin & C.Scheidegger, Proposal to change the listed type of the name *Buellia nom. cons.* (Physciaceae, Ascomycota), *Taxon* 48: 143 (1999); B.Marbach, Corticole und lignicole Arten der Flechtengattung *Buellia sensu lato* in den Subtropen und Tropen, *Biblioth. Lichenol.* 74: 1–384 (2000); J.Etayo & B.Marbach, *Hafellia alisioae* and *H. gomerana* (lichenized Ascomycetes, *Physciaceae*), two new species from the Canary Islands, with a key to all known corticolous species, *Lichenologist* 35: 369–375 (2003); W.Gams, Report of the Committee for Fungi: 11, *Taxon* 53: 1067–1069 (2004); J.A.Elix, A new species of *Hafellia* (Physciaceae, lichenized Ascomycota) from Australia, *Australas. Lichenol.* 59: 36–37 (2006); J.A.Elix, Four new crustose lichens (lichenized Ascomycota) from Australia, *Australas. Lichenol.* 60: 14–19 (2007); J.A.Elix & P.M.McCarthy, A further new species of *Hafellia* (Physciaceae, lichenized Ascomycota) from Australia, *Australas. Lichenol.* 62: 20–22 (2008); J.A.Elix, Additional lichen records from Australia 67, *Australas. Lichenol.* 63: 2–9 (2008); F.Bungartz, *Buellia*, *Lichen Fl. Greater Sonoran Desert Region* 3: 113–179 (2008).

1	Thallus saxicolous	12. B. procellarum
1:	Thallus corticolous or lignicolous	2
2:	Ephymenium K+ violet (1:)	3
2:	Ephymenium K-	5
3	Asci with 16 ascospores (2)	11. B. pleiotera
3:	Asci with 8 ascospores	4
4	Thallus K+ red; norstictic acid present (3:)	1. B. bahiana
4:	Thallus K-; norstictic acid absent	14. B. reagenella
5	Asci 2-spored (2:)	6
5:	Asci 4- or 8-spored	7
6	Ascospores 38–61 × 15–24 µm (5)	13. B. pseudotetrapla
6:	Ascospores 22–42 × 10–16 µm	5. B. dissa
7	Asci usually 4-spored; ascospores 28–45 × 14–18 µm (5:)	18. B. tetrapla
7:	Asci usually 8-spored; ascospores usually smaller	8
8	Thallus K-; 4,5-dichlorolichexanthone present or lichen substances absent (7:)	9
8:	Thallus K+ yellow or red; atranorin or norstictic acid present	12
9	4,5-Dichlorolichexanthone present (8)	19. B. xanthonica
9:	Lichen substances absent	10
10:	Ascospores 30–38 × 12–16 µm (9:)	7. B. levieri
10	Ascospores 12–20 × 5–9 µm	11
11:	Ascospores with a smooth outer wall, 1-septate (10:)	9. B. microsporella
11:	Ascospores with a markedly ornamented outer wall, commonly 3-septate	8. B. metaphragmia
12	Thallus K+ red; norstictic acid present (8:)	13
12:	Thallus K+ yellow; atranorin present	17
13	Ascospores more than 22 µm long (12)	14
13:	Ascospores less than 22 µm long	15
14	Ascospores smooth, with strong subapical wall thickenings (13)	6. B. fraudans
14:	Ascospores strongly ornamented, with weak subapical wall thickenings	16. B. subcrassata
15	Thallus glossy, thick, cartilaginous or subsquamulose; ephymenium K-; ascospores 12–18 × 4–6 µm (13:)	15. B. rechingeri
15:	Thallus dull, thin; ephymenium K+ yellow-green or K-; ascospores 15–22 × 6–14 µm	16
16	Ascospores 6–8 µm wide; ephymenium K+ yellow-green, olive or K-; hafellic acid absent (15:)	2. B. curatellae
16:	Ascospores 8–14 µm wide; ephymenium K-; hafellic acid present	17. B. subtropica
17	Ascospores less than 28 µm long, with weak subapical wall thickenings; diploicin absent (12:)	4. B. disciformis
17:	Ascospores usually more than 28 µm long, with strong subapical wall thickenings; diploicin present	18
18:	Ascospore wall strongly ornamented; lumina straight (17:)	3. B. demutans
18:	Ascospore wall smooth; lumina bent	10. B. parastata