Revisions of British and Irish Lichens

British Lichen Society

Volume 56 **May 2025**

Arctomiales: Arctomiaceae

Cover image: *Gabura fasccularis*, on bark of *Corylus avellana*, N. side of Loch Maree, W. Ross.

Revisions of British and Irish Lichens is a free-to-access serial publication under the auspices of the British Lichen Society, that charts changes in our understanding of the lichens and lichenicolous fungi of Great Britain and Ireland. Each volume will be devoted to a particular family (or group of families), and will include descriptions, keys, habitat and distribution data for all the species included. The maps are based on information from the BLS Lichen Database, that also includes data from the historical Mapping Scheme and the *Lichen Ireland* database. The choice of subject for each volume will depend on the extent of changes in classification for the families concerned, and the number of newly recognized species since previous treatments.

To date, accounts of lichens from our region have been published in book form. However, the time taken to compile new printed editions of the entire lichen biota of Britain and Ireland is extensive, and many parts are out-of-date even as they are published. Issuing updates as a serial electronic publication means that important changes in understanding of our lichens can be made available with a shorter delay. The accounts may also be compiled at intervals into complete printed accounts, as new editions of the *Lichens of Great Britain and Ireland*.

Downloads can be obtained from the British Lichen Society website at
https://www.britishlichensociety.org.uk/content/lgbi3

ISSN 2634-7768

Revisions of British and Irish Lichens **vol. 56**

Arctomiales: Arctomiaceae

including *Arctomia*, *Gabura* and *Gregorella*

by

Paul Cannon
Royal Botanic Gardens, Kew, Surrey TW9 3AB, UK; email p.cannon@kew.org

Brian Coppins
Royal Botanic Garden Edinburgh, 20A Inverleith Row, Edinburgh EH3 5LR, UK

Neil Sanderson
3 Green Close, Woodlands, Southampton, Hampshire, SO40 7HU, UK

Janet Simkin
School of Natural and Environmental Science, Newcastle University, Newcastle upon Tyne NE1 7RU, UK

This publication can be cited as:
Cannon, P., Coppins, B., Sanderson, N. & Simkin, J. (2025). Arctomiales: Arctomiaceae, including *Arctomia*, *Gabura* and *Gregorella*. *Revisions of British and Irish Lichens* **56**: 1–5.

ARCTOMIALES S. Stenroos, Miądl. & Lutzoni (2014)

ARCTOMIACEAE Th. Fr. (1861)

Thallus crustose-granular or minutely foliose, reddish brown or dark olive green to black when dry, thin and ephemeral or sometimes substantially swollen when wet, indeterminate, sometimes strongly lobed, corticate or not. C**ortex** (when present) a single cell thick, cells brown. **Isidia** and **soralia** absent. **Photobiont** *Nostoc*, arranged in clusters between hyphae, the whole in a gelatinous matrix. **Ascomata** apothecia, developing from primordia within lobes, ± sessile, thalline margin differentiated or not, the discs flat or convex. **Hamathecium** of narrow branched paraphyses, clavate and brown-pigmented at the apices. **Asci** *Trapelia*-type, with a well-developed apical tholus that does not blue in iodine, and a iodine-positive gelatinous outer layer, 8-spored. **Ascospores** narrowly fusiform, aseptate or multiseptate, colourless. **Conidiomata** pycnidia, immersed in the thallus, with bacilliform conidia. **Chemistry**: no lichen substances detected. **Ecology**: on bark or soil, often associated with mosses.

The Arctomiaceae is the only family of the Arctomiales, an isolated assemblage of cyanobacterial lichens that is sister group to the Ostropales and Trapeliales (Miądlikowska et al. 2014, Magain *et al.* 2020). The thallus is variable in form, corticate and gelatinous, and the *Trapelia*-type asci have an amyloid wall and a thickened non-amyloid tholus. Magain & Sérusiaux (2012) and Otálora & Wedin (2013) observed that more research is needed on generic circumscription within the family, and that was partially fulfilled by a study of *Gabura* and *Steinera* (the latter not represented here) by Magain *et al*. (2020).

References

Degelius (1954), Ertz *et al*. (2017), Gilbert *et al*. (2009), Jørgensen (2012, 2014), Jørgensen *et al.* (2016), Lücking *et al.* (2017), Lumbsch *et al*. (2005), Magain & Sérusiaux (2012), Magain *et al.* (2020), Miądlikowska *et al.* (2014), Otálora & Wedin (2013), Woods (2009).

1 Thallus well-developed, persistent, ascospores narrowly fusiform, multiseptate 2
Thallus granular, ephemeral; ascospores ellipsoidal, ± aseptate ..... ***Gregorella***

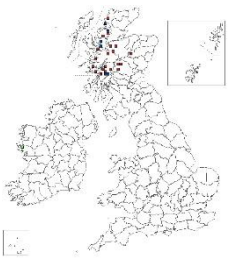
2(1) Thallus not swelling strongly when wet; apothecia developing from outgrowths of the thallus lobes, biatorine ..... ***Arctomia***
Thallus ± swelling strongly when wet; apothecia developing within the main thallus, with a distinct thalline margin..... ***Gabura***

ARCTOMIA Th. Fr. (1861)

Thallus crustose-granular or minutely foliose-squamulose, reddish brown to black when dry, not substantially swollen when wet, indeterminate, sometimes strongly lobed, corticate. C**ortex** a single cell thick, cells brown. **Isidia** and **soralia** absent. **Photobiont** *Nostoc*, arranged in clusters between hyphae, cells 5-7 µm diam., the whole in a gelatinous matrix. **Ascomata** apothecia, developing from

primordia within lobes, ± sessile, thalline margin not differentiated, the discs flat or convex. **Hamathecium** of narrow branched paraphyses, clavate and brown-pigmented at the apices. **Asci** *Trapelia*-type, with a well-developed apical tholus that does not blue in iodine, and a iodine-positive gelatinous outer layer, 8-spored. **Ascospores** narrowly fusiform, multiseptate, hyaline. **Conidiomata** pycnidia, immersed in the thallus, with bacilliform conidia. **Chemistry**: no lichen substances detected. **Ecology**: on bark or soil, often associated with mosses.

Arctomia delicatula Th. Fr. (1860) **NT**



Thallus crustose-granular to minutely foliose-squamulose, then with lobes 0.05–0.3 mm wide, rarely partly terete-nodulose, red- or olive-brown, often forming a ± continuous crust; surface matt, rather roughened; sometimes inconspicuous, especially when overgrowing *Polychidium*. Apothecia frequent, to 0.5 mm diam., dark red-brown, convex, with an often paler exciple which soon becomes excluded; epithecium thin, brown; hymenium 85–105 µm, tall, colourless; paraphyses 1–2 µm diam., with apices to 5–7 µm diam. Asci 80–90 × *ca* 20 µm. Ascospores (40–) 50–80 × 4–5.5 µm, 7- to 10-septate, elongate-fusiform, sometimes with an ± attenuated end cell. Pycnidia *ca* 40 µm diam.; conidia 2–3 × *ca* 1 µm. **BLS 0050**.

On bryophytes or *Polychidium muscicola* on trees (*Betula*, *Corylus*, *Fraxinus*, *Populus tremula* and *Salix*) and on mossy rocks; infrequent and sparsely recorded. Scottish Highlands (Argyll, Perthshire, S. Aberdeenshire, Mull, Skye, W. Ross and W. Sutherland). Also recorded in the 19th century from Ireland (Galway, Kylemore).

Well-developed specimens may be confused with the more frequent *Massalongia carnosa* which occurs in similar habitats but has larger apothecia, smaller, 1 (-2)-septate ascospores, and a cortex 3–4 cells thick, not one cell thick as in *A. delicatula*. When on *Polychidium muscicola* its apothecia could be confused with those of the host, but the latter are larger with 1-septate, spindle-shaped ascospores; the multiseptate ascospores of *A. delicatula* are then diagnostic.

GABURA Adanson (1763)

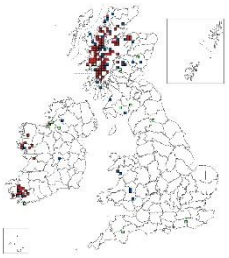
Thallus crustose or minutely foliose, dark olive green to black when dry, sometimes substantially swollen when wet, crumpled with indistinct lobes or cushion-forming and strongly lobed. **Cortex** absent or incompletely developed. **Soralia** present in some species, granular, yellowish to brownish. **Photobiont** *Nostoc*, arranged in clusters between hyphae, cells 5–7 µm diam., the whole in a gelatinous matrix. **Ascomata** apothecia (where present), developing from primordia within lobes, ± sessile, thalline margin not differentiated, the discs flat or convex. **Hamathecium** of narrow branched paraphyses, clavate and brown-pigmented at the apices. **Asci** *Trapelia*-type, with a well-developed apical tholus that does not blue in iodine, and a iodine-positive gelatinous outer layer, 8-spored. **Ascospores** narrowly fusiform, multiseptate, colourless. **Conidiomata** pycnidia, immersed in the thallus, with bacilliform conidia. **Chemistry**: no lichen substances detected. **Ecology**: on bark or soil, often associated with mosses.

1 Thallus minutely foliose, lobed and cushion-forming; apothecia present ..... ***fascicularis***
Thallus minute, weakly lobed and strongly crumpled; apothecia not known ..... ***insignis***

Gabura fascicularis (L.) P.M. Jørg. (2014) **NT IR**

Arctomia fascicularis (L.) Otálora & Wedin (2013)

Collema fasciculare (L.) Weber ex F.H. Wigg. (1780)



Thallus to 1.5 cm diam., crustose or small-foliose, very swollen, pulpy, to 10 mm thick when wet, ± coarsely nodulose-wrinkled and indistinctly lobed, forming rounded cushions; easily loosening when moist. Lobes, when distinct, short, flattened, appressed, overlapping, sometimes distinctly lobulate, the lobules developed from wrinkles; upper surface dark olive-green to brown-black, grey-green to olivaceous when wet, often wrinkled and ridged, without isidia or soralia. Apothecia developing from lobules, numerous, crowded, generally predominant; disc 0.8–2 mm diam., ± flat, concolorous with the thallus, often with a thick, ± wrinkled thalline margin. Asci (6-) 8-spored. Ascospores 50–95 × 4.5–5 µm, 9- to 16-septate, worm-like and helically twisted in the ascus, often attenuated towards one or both ends, without a gelatinous sheath. **BLS 0444.**

Frequently associated with mosses on trunks of usually old trees, especially *Fraxinus* and *Corylus*, in rather moist, shady, sheltered sites characteristic of the *Lobarion*, rarely on mossy rocks; locally frequent. W. & N. Britain and Ireland. Historically lost from southern England and not seen recently south of the Scottish Highlands.

Characterized by the mainly crustose thallus, which becomes remarkably swollen, spherical and pulpy when wet, and the worm-like, multiseptate spores.

Gabura insignis (P.M. Jørg. & Tønsberg) Magain & Sérusiaux (2020) **NE**

Arctomia insignis (P.M. Jørg. & Tønsberg) Ertz (2017)

Thallus minute, 2–5 mm diam., with distinct and erect lobes 1–1.2 mm broad, dark brown, without any bluish tinge, the main lobes flat but sometimes obscured by erect secondary lobes. Soralia present in some collections, punctiform or rarely linear, yellowish to dark brown, never bluish and not forming a linear soredioid margin. Apothecia not known. **BLS 2756**.

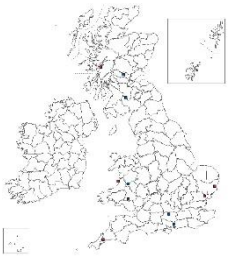
Overgrowing mosses on parkland trees, Scotland (Skye) and Ireland (Kerry).

A very inconspicuous species that is likely to be overlooked. It could be mistaken for poorly developed *Leptogium brebissonii*, but that species has corticate and isidiate blue-grey thallus lobes, rather than dark brown sorediate lobes.

GREGORELLA Lumbsch (2005)

As this is a monotypic genus the description below (*G. humida*) constitutes the generic description. Segregated from *Fuscopannaria* principally based on molecular criteria, the ontogeny of the apothecium, and structure of the ascus tip. In *Gregorella* the paraphyses are easily separated. It is related to *Arctomia* which has elongate-fusiform ascospores.

Gregorella humida (Kullh.) Lumbsch (2005) **LC**



Thallus crustose, thin, ephemeral, olivaceous to dull grey-brown, developing a bluish tinge where abraded or in shade, bluish grey when wet, granular, consisting of corticate goniocysts; goniocysts roundish, 30–60 µm diam., covered by a layer of isodiametric cells; photobiont *Nostoc*. Ascomata apothecia, 0.3–0.5 mm diam., numerous, sessile, roundish, constricted at the base, discs red-brown, pale brown when wet, colourless when young, convex, immarginate or margins soon becoming excluded; exciple annulate, yellowish, composed of long-celled, thin-walled hyphae; hymenium colourless, non-amyloid; hypothecium pale yellowish; paraphyses 1–1.5 µm diam., unbranched to slightly branched, easily separated, apices not thickened. Asci clavate, *Trapelia*-type, 8-spored with K/I+ ascus wall and K/I– tholus. Ascospores 12.5–19 (–24) × 6.5–9.5 µm, ellipsoidal, colourless, aseptate or rarely with a pseudoseptum, without a gelatinous sheath. Conidiomata unknown. Lichen products not detected by TLC. **BLS 1879**.

A pioneer lichen on sunny, well-drained acidic to somewhat basic, ± clayey soil exposed on steep banks such as in disused railway cuttings, on tipped material on roadsides, on recently landscaped ground of an old lead mine, and on gravel workings. An ephemeral species, probably much overlooked. A scatter of records from Ireland, C.S. England through mid-Wales to C. Scotland.

Differs from many other terricolous species of disturbed habitats, e.g. *Aphanopsis coenosa*, *Micarea leprosula*, *Placynthiella* spp., by the presence of a blue-green photobiont in this species. It resembles *Placynthiella uliginosa* which differs in the green photobiont and smaller ascospores (9–14 × 5–6 µm). *Epiphloea byssina* shares a similar habitat ecology, thallus appearance and photobiont, but differs in having muriform ascospores.

References

Degelius, G. (1954). The lichen genus *Collema* in Europe. *Symb. Bot. upsal.* **13** (2): 1–499.

Ertz, D., Poulsen, R.S., Charrier, M. & Søchting, U. (2017). Taxonomy and phylogeny of the genus *Steinera* (Arctomiales, Arctomiaceae) in the subantarctic islands of Crozet and Kerguelen. *Phytotaxa* **324**: 201–238.

Gilbert, O.L., James, P.W. & Purvis, O.W. (2009). *Collema*. In *Lichens of Great Britain and Ireland* (Smith, C.W., Aptroot, A., Coppins, B.J., Fletcher, A., Gilbert, O.L., James, P.W. & Wolseley, P.A. eds): 345–357. London: British Lichen Society.

Jørgensen, P.M. (2012). Arctomiaceae. In Ahti, T., Jørgensen, P.M., Kristinsson, H., Moberg, R., Søchting, U. & Thor, T. eds), *Nordic Lichen Flora* edn 2, **3**: 9–11. Stenungsund: Nordic Lichen Society.

Jørgensen, P.M. (2014). Taxonomy and nomenclature of *Collema fasciculare* (L.) G.H. Weber. *Lichenologist* **46**: 594.

Jørgensen, P.M. & Palice, Z. (2016). *Leptogium insigne* new to Ecuador, with notes on its generic position. *Evansia* **33**: 14–17.

Lücking, R., Hodkinson, B.P. & Leavitt, S.D. (2016). The 2016 classification of lichenized fungi in the Ascomycota and Basidiomycota – approaching one thousand genera. *Bryologist* **119**: 361–416.

Lumbsch, H.T., del Prado, R. & Kantvilas, G. (2005). *Gregorella*, a new genus to accommodate *Moelleropsis humida* and a molecular phylogeny of Arctomiaceae. *Lichenologist* **37**: 291–302.

Magain, N. & Sérusiaux, E. (2012). A further new species in the lichen genus *Arctomia*: *A. borbonica* from Reunion (Mascarene archipelago). *Mycokeys* **4**: 9–21.

Magain, N., Spribille, T., DiMeglio, J., Nelson, P.R., Miądlikowska, J. & Sérusiaux, E. (2020). Phylogenetic evidence for an expanded circumscription of *Gabura* (Arctomiaceae). *Lichenologist* **52**: 3–15.

Miądlikowska, J. and 31 co-authors (2014). A multigene phylogenetic synthesis for the class Lecanoromycetes (Ascomycota): 1307 fungi representing 1139 infrageneric taxa, 317 genera and 66 families. *Molecular Phylogenetics & Evolution* **79**: 132–168.

Otálora, M.A.G. & Wedin, M. (2013). *Collema fasciculare* belongs in Arctomiaceae. *Lichenologist* **45**: 295–304.

Woods, R.G. (2009). *Gregorella*. In *Lichens of Great Britain and Ireland* (Smith, C.W., Aptroot, A., Coppins, B.J., Fletcher, A., Gilbert, O.L., James, P.W. & Wolseley, P.A. eds): 417. London: British Lichen Society.

Index