

Hafellia Kalb., Mayrh. & Scheid.
(LECANORALES: PYXINACEAE)

After Sheard (1992)

Rev. 5/94

Thallus crustose, evanescent or partly immersed on wood, to thin and continuous or thick and areolate when epiphloedal; surface sometimes minutely verrucose, the verrucae sometimes becoming papilliform; hypothallus poorly developed and only visible when adjoining thalli of other species.

Apothecia lecideine; discs plane or convex, brown or black; margin often flexuous; exciple (as seen in freezing microtome sections) continuous below hypothecium or absent in medial section, reddish brown, highly carbonized, but inner, lateral part adjacent to hymenium sometimes paler or hyaline. Hypothecium dull brown, thin or thick, especially in convex apothecia; stipe present below hypothecium, paler, lighter, reddish brown. Hymenium inspersed with oil droplets, opaque even in thin sections. Paraphyses branched near the tips; apical cells rather weakly dilated, pale brown, or sometimes immersed in a blueish green, K+ purple, N+ purple pigment and forming a dark epihymenium. Ascospores 2, 8 (or variably 48), or 1632, with irregularly thickened walls (thinwalled at the apices from the first, the apices often mucronate at maturity), (20)2530 um or more long, 1septate (with occasional 3septate spores) or constantly 3septate; walls appearing pitted or ridged, or smooth; wall pigmentation tending to fade in old herbarium specimens.

Pycnidia unknown in most species; pycnosporos bacilliform or slightly tapered and relatively long (57 x 1 um). Thallus containing placodiolic acid or diploicin.

A segregate of Buellia, characterized mainly by the unevenly thickened spore walls. In most species the paraphyses tips are less dilated than typical of Buellia and Rinodina; the pycnosporos are also relatively long.

I'm not sure what Sheard means by "mat" (quotation marks mine, here and in the descriptions); it doesn't seem to be the same as "matt" (i.e., dull, not shiny), but more like "smooth, flat and even".

In his monograph of Hafellia, Sheard gives spore measurements with the mean values separated by commas from the ranges, with the confidence limits about the mean (p = 0.05) given in

parentheses, and the range limits two standard deviations above and below the mean, within which 95% of the spore population is expected to fall.

1. Spores 2 per ascus, 4celled at maturity. H. bispora
Sheard

1. Spores 48 or more per ascus, typically 2celled, rarely
or never 4celled. 2

2. Spores averaging under 20 um long; epithecium dark bluish
green, K+ and N+ purplish; thallus K+ red (norstictic acid).
..... 3

2. Spores averaging over 25 um long; epithecium a shade of
brown, K and N; thallus K+ yellow (diploicin and atranorin).
..... 4

3. Spores 8 per ascus. H. bahiana var. bahiana

3. Spores (12)1632 per ascus. Hymenium densely inspersed;
epihymenium greenish, K+ purplish; Apothecia plane to convex, the
margin thin, often excluded. Epihymenium brown; hypothecium
brown to brownblack. Ascospores 13.516.5 x 6.57.5 um, 1septate.
On bark or wood. Florida..... H. bahiana var. pleiotropa

4. Spores averaging 35.136.0 x 18.018.4 um.
Southeastern. H. parastata

4. Spores averaging under 30.0 um long. 5

5. Spores slightly mucronate and walls pitted as viewed under
oil immersion, rarely curved; exciple 3060 um wide laterally and
fully carbonized. Southeastern coastal plain. H.
callispora

5. Spores not mucronate and walls not pitted, typically slightly
curved; exciple over 70 um wide laterally, the inner part not
pigmented. Coastal beach habitat in Pacific Northwest.
..... H. fosteri

Detailed descriptions:

H. bahiana (Malme) Sheard

Thallus thin, light gray, continuous or rimose, plane or uneven and "mat", determinate, without perceptible hypothallus except black where joining other species. Apothecia sessile, frequent and often contiguous, angular by compression, 0.4-0.7 mm diam., larger apothecia often lobate from regeneration; disks black, plane or becoming slightly convex, sometimes degenerate due to invertebrate activity; margin concolorous with disk, ca. 0.05 mm wide, persistent; exciple heavily carbonized, rather narrow laterally, 20-35 µm wide, inner 10-15 µm not or lightly pigmented, 35-40 µm wide below and absent beneath hypothecium in medial section, peripheral cells to 5.0-5.5 µm wide; hypothecium dark brown, 35-60 µm deep, margin with shallow stipe below, deeper in convex apothecia; hymenium 70-85 µm high, heavily inspersed with oil and opaque, sometimes pigmented like epithecium at base but more lightly so; paraphyses 2.0-2.5 µm wide; asci to 3.5-5.0 µm wide, strongly pigmented and immersed in a dispersed pigment, typically forming a dark olive or bluishgreen epithecium reacting K⁺ and N⁺ grayish purplishpink, becoming light purple before fading; asci 50-60 x 13-16 µm, 8-spored; spores callisporate, 1-septate, 13.9(15.8-16.6)-18.5, 16.2 x 6.3, 5.36-26.5)7.4 µm, acutely ellipsoid, a broad porus visible in some young spores, septum and porus not seen but torus often present, some spores slightly dilated at septum, not curved, walls not pitted, often with faint pigmented bands across each cell at position of subapical wall thickening, not mucronate. Thallus K⁺ red, C, P⁺ yellow, with norstictic acid crystals in medulla. On bark or wood in both mesic and relatively dry habitats, Pinus clausa forest, TaxodiumFraxinus swamp, pine forest with live oak hammocks, dry turkey oak scrub, sand pine forest, and low pine scrub. Alabama, Florida.

The callisporoid nature of the spores in this species is sometimes indistinct; it is best seen in young spores prior to full development of wall pigmentation (when the spores appear to be polarilocular, with two cells connected by a canal), and in KOH; the slightly pigmented bands around each cell in mature spores, and the relatively hyaline (and often bluntly mucronate) apex of each cell, are also helpful in recognizing that the species belongs in Hafellia. In specimens I've collected in Florida, there seems to be considerable variability not only in the spores, but also in the degree of inspersation of the hymenium, and in the characteristics of the thallus, which ranges from thin

and smooth to thick and strongly verrucose. Hafellia bahiana could be confused with Buellia curatellae, which has a brownish, K epithecium, or B. imshaugiana and B. curtisii, which have noninpersed hymenia; B. imshaugiana has the spore walls thickened only around the septum (not appearing polarilocular, and not pale and mucronate at the apices), and B. curtisii has uniformly thin spore walls.

H. bahiana v. pleiotropa (Malme) Sheard

Spores 1632 per ascus, 10.8(13.2)14.2)16.6, 13.7 x 5.1, 4.2(5.05)6.2 um (smaller spores are in 32spored asci), the callisporoid nature of the spores being most evident in the larger spores. K reaction of the thallus sometimes weak due to low concentration of norstictic acid. Florida.

H. bispora Sheard

Thallus thin, light gray, becoming rimose and scurfy, "mat", determinate but apparently not delimited by its own hypothallus. Apothecia sessile, frequent and sometimes contiguous, to ca. 0.70 mm diam.; disk very dark brown or black, quickly becoming convex; margin concolorous with disk or darker, ca. 0.05 mm wide, entire, at least partly excluded in convex apothecia; exciple ca. 50 um wide laterally, 80 um wide below, and ca. 70 um wide beneath hypothecium, dark reddish brown throughout, merging with lighter colored stipe below, peripheral cells ca. 4.5 um wide; hypothecium dark brown, ca. 40 um deep; hymenium ca. 120 um high, heavily inpersed; paraphyses ca. 2.0 um wide, apices to ca. 3.0 um, relatively heavily pigmented and forming a brown epithecium; asci ca. 75 x 19 um; spores 2, callisporatype, 4celled when mature, 26.6(32.2)35.7)41.3, 34.0 x 15.4, 14.2(15.1)15.7)16.7 um, broadly ellipsoid when 2celled, narrowly ellipsoid at maturity, pointed but not mucronate; prongs persistent; central septum well developed, other septa developing later if at all, walls darkly pigmented and pitted (x 1,250), not curved. Thallus K+ yellow, C, P+ yellow, with atranorin and diploicin crystals in cortex and medulla. On Pinus cembroides in low forest of Quercus, P. cembroides and Juniperus. Mexico (Tamaulipas).

Hafellia callispora (Knight) Mayrh. & Sheard

Thallus thin, light gray, continuous or rimose, plane or rarely minutely verrucose; verrucae ca. 0.15 mm diam., "mat", determinate but only rarely delimited by an entire dark hypothallus. Apothecia sessile, frequent but not contiguous, sometimes erumpent at first in specimens with thick thalli, to

0.550.85 mm diam.; disk dark brown (lighter when moist), sometimes black, plane or becoming slightly convex; margin black, entire, 0.05(0.10) mm wide and persistent; exciple 3060 um laterally, expanded to 60100 um below, dark reddish brown throughout but sometimes lighter adjacent to hymenium, not continuous across base of apothecium in medial section, peripheral cells 4.05.5 um diam.; hypothecium dark brown, 2040 um deep in plane disks, 4080 in convex disks, distinct from exciple but merging with reddish brown stipe, less heavily pigmented than exciple; hymenium 120150 um high, heavily inspersed; paraphyses 2.02.5 um wide, richly branched at tips, apical cells 3.03.5(5.0) um wide, lightly pigmented and immersed in a dispersed pigment to form a redbrown epithecium; asci 80100 x 2028 um; spores 48, callisporatype, 2celled or rarely 4celled in oldest spores, 22.0(25.727.3)31.0, 26.5 x 12.1, 10.9(11.912.4)13.4 um, sharply and narrowly ellipsoid on average, ± mucronate, septum present in mature spores, torus not seen, walls darkly pigmented, strongly pitted (x 500), ridged (x 1250), rarely more lightly pitted and curved. Thallus K+ yellow, C, P+ yellow or faint yelloworange, with atranorin and diploicin crystals in cortex and medulla. On bark of Diospyros and Quercus virginianus and on wood; one record from dry scrub. Alabama, Florida, Louisiana, S. Carolina, Texas.

H. fosteri Imsh. & Sheard

(Buellia callispora sensu Hale & Culberson, 1970; Rinodina dissa sensu Egan, 1987, p.p.)

Thallus evanescent, primarily within substrate, or thin to thick, light gray, becoming areolate with a rugose and "mat" or granular surface, areoles to 0.501.60 mm wide, granules 0.100.20 mm diam., granules giving a darker gray color and sometimes becoming papilliform; thallus indeterminate, without perceptible hypothallus. Apothecia sessile, frequent, sometimes contiguous and then angular by compression, to 0.81.8 mm diam.; disk dark brown to black, plane, sometimes becoming convex; margin concolorous with disk or darker, 0.050.10 mm wide, becoming partly excluded in convex disks, entire, flexuose and often distinctly lobed in largest apothecia; exciple ca. 80 um wide laterally, expanded to 90100 um below, continuous below hypothecium in medial section, merging with stipe; lateral outer 2040 um dark reddish brown, inner part ± hyaline; hypothecium dark brown, 3060 um deep in central part only, deepest in convex apothecia; hymenium 80120 um high, inspersed; paraphyses 2.53.0 um wide, richly branched below tips, apices expanded to 4.55.0 um wide, pigmented and immersed in dispersed pigment to form a light graybrown or darker brown epithecium; asci ca. 80 x 2630 um;

spores 8, callisporatype, 2 or rarely 4celled, 21.0(25.026.2)30.1, 25.6 x 13.7, 10.5(13.314.1)16.9 um, acutely ellipsoid but not mucronate, porus present at first, disappearing at maturity when septum becomes visible, torus rarely developed, walls not pitted, many spores slightly curved. Pycnidia + superficial, pigmented, under 0.10 mm diam.; spermatia 5.57.0 x 1.0 um, bacilliform or slightly tapered and therefore elongately but bluntly ellipsoid. Thallus K+ yellow, C, P+ faint yellow. Diploicin and atranorin crystals in medulla and cortex. On driftwood and old roots subject to tidal action. British Columbia and Washington.

H. parastata (Nyl.) Kalb

Thallus thin, light gray, sometimes with a brownish tinge, continuous or becoming rimoseareolate and plane, or areolate and finely verrucose, areoles to 0.802.40 mm wide, verucae 0.150.30 mm diam., mat; thallus determinate, sometimes limited by a narrow black entire hypothallus. Apothecia frequent but rarely contiguous, sessile, to 0.651.40 mm diam., largest sometimes slightly lobed; disk dark brown (lighter when wet) more rarely black, plane or becoming slightly convex; margin black, entire, ca. 0.10 mm wide, partly excluded in convex apothecia; exciple 4090 um wide laterally, 80140 um below, dark reddish brown throughout, or inner lateral 1020 um less pigmented, 40130 um deep below hypothecium, merging with more lightly pigmented stipe in medial section, marginal cells 4.05.5 um wide; hypothecium dark brown, 1020 um deep; hymenium 130160 um high, richly inspersed; paraphyses 1.52.5 um wide, branched near apices, apical cells to 3.04.5 um wide, not or scarcely pigmented, immersed in dispersed pigment to form a very light redbrown highly gelatinized epithecium; asci 90120 x 3555 um; spores 68, consistently 2celled, 30.0(35.136.0)41.1, 35.5 x 18.2, 15.7(18.018.4)20.8 um, broadly and bluntly ellipsoid, + mucronate, septum faint, torus present in some older spores, lightly pigmented, walls not pitted, longer spores curved. Thallus K+ yellow, C, P or P+ faint yellow crystals in cortex and medulla, atranorin and diploicin present. Corticolous on gum, maple, oak and Celtis. Florida, Louisiana; Hawaii.

Literature

Sheard, J. W. 1992. The lichenized Ascomycete genus Hafellia in North America. [Need to get species descriptions from this].