

Strigula Fr.
(STRIGULACEAE)

After Harris (Dissertation; 1995), Coppins, Galloway, and Awasthi

Rev. November 17, 1998

Thallus thin, usually at least partly immersed; sometimes effigurate; lobes distinct or confluent; cortex not differentiated. Photobiont Trentepohlia or Cephaleuros.

Perithecia totally exposed, partially immersed in thallus, or totally covered by thallus, not carbonaceous, rather soft, globose, or upper part conical. Involucrellum present in most species, blackish brown. Most ostioles apical. Exciple dark brown or (especially below) pale brown or colorless, complete or dimidiate, K-. Hamathecium of simple or sparsely branched, slender (ca. 1 μ m wide) long-celled paraphysoids; gel I+ blue (centrum I- according to Awasthi). Asci cylindrical, cylindrical-clavate or obclavate, thin walled laterally but thickened at the tip, lacking a chitinoid ring at the tip of the exoascus, with a conspicuous apical dome penetrated by a narrow ocular chamber, fissitunicate, 8-spored, I-. Spores with transversely 1(-3)-septate, small, 8-12 x 3-4 μ m, colorless, ellipsoid, ovoid or fusiform, often constricted at middle septum, smooth, without conspicuous perispore, often uniseriate; septa thin.

Pycnidia globose to convex or conical, immersed to semi-emergent, black at least in upper (exposed) part; conidiophores simple; conidiogenous cells mostly sessile, often percurrently proliferating, acrogenous; conidia colorless; macroconidia commonly present, 1-7(-9)-septate, oblong to fusiform, cylindrical or rarely filiform, often \pm curved at proximal end with an appendage; microconidia simple, ellipsoid or narrowly ellipsoid. No substances. On bark or mosses, more rarely soil or rock; commonly on leaves in the tropics, and then growing below the cuticle.

I. Growing on leaves.

1. Spores 4-celled, rarely 2-celled, (12-)15-24 x 3.5-6 μ m; macroconidia filiform, 3-7(-9)-septate. Ascospores fusiform to almost bacillar. Ascocarps 0.1-0.2 mm diameter; typical involucrellum absent; excipulum brown-black. Thallus greenish gray, rounded, often with white hairs. Reported by Fink to be widespread in the southeastern U.S., but he included S. elegans (and probably S. nitidula). In the United States often sterile or producing only pycnidia. Recognized by the filiform conidia. Florida, Louisiana. S. complanata (Fée) Mont.

1. Spores 2-celled, rarely 4-celled; macroconidia bacillar, 1-septate or simple. Ascospores with both cells \pm equal in size or one larger. Thallus subcuticular. Tropical. 2

2. Ascospores 8-10(-12) x (2-)2.5-3 μ m; macroconidia simple. Ascospores \pm ellipsoid to almost bacillar, rather easily breaking into two part spores, uniseriate, with obtuse ends; asci \pm cylindrical to almost threadlike, very numerous and dense, 30-80 x 3.5-5 μ m; ascocarps 0.4-0.6 mm diameter, almost conical and top and sides, round, totally exposed, black, shining. Thallus \pm indistinctly effigurate, rounded to irregular 3-7(-10) mm diam., continuous, without distinct lobes; margins \pm entire, often with scattered black points or irregularly wavy lines, between the points or lines bright green to grayish green, shining, without a prothallus. Pycnidia rather few, 0.1-0.15 mm diam., convex, exposed, black, shining; macroconidia simple, bacillar, 4-5 x 2 μ m; microconidia simple, fusiform, 4 x

1.5 μ m. On Magnolia leaves, Florida. S. nitidula Mont.

2. Ascospores over 11 x 4 μ m. 3

3. Ascospores with cells relatively equal in size, 14-22(-24) x 4-5.5 μ m, Spores \pm fusiform, not breaking into part spores, biseriate; asci \pm obclavate, 40-70(-90) x 8-12(-14) μ m; ascocarps 0.25-0.4 mm diameter, almost toatally immersed in thallus, or \pm convex, their uppermost part exposed, black, shining, ostiole punctiofrm, gray or white. Pycnidia common and sometimes numerous, punctiform, black, \pm globose, immersed; macroconidia 1-septate, bacillar, (12-)14-18(-21) x 3-4 μ m; microconidia simple, ellipsoid to fusiform, 4-5 x 2 μ m. Thallus effigurate, rounded to sometimes irregular, 2-5(-10) mm diam.; margins with short, rounded lobes 0.1-0.3 mm broad, or \pm entire without distinct lobes, or lobes long with rounded ends, 0.20.4 mm broad, confluent in central parts, convex to plane, smooth, shining, bright green to grayish green, sometimes with white, soft hairs at periphery; prothallus absent. Florida, Louisiana. S. smaragdula Fr. (syn. S. elegans (Fée) Müll. Arg.)

3. Ascospores with upper cell enlarged, 11-15 x 4-4.5 μ m. Florida. S. subelegans Vainio
s. lato

II. Growing on bark, wood, rock, or soil.

1. Ascospores with at least 1 or 2 cells longitudinally septate, submuriform to muriform. 2
1. Ascospores transversely 1-7-septate. 4
 2. Ascospores densely muriform, 35-45 x 13-17 um; macroconidia not found; ascomata immersed; wall colorless except around ostiole. Georgia and Louisiana. S. laceribracae R. C. Harris
 2. Ascospores submuriform, 20-33 x 6-10 um. 3
3. Ascospores 26-33 x 8-10 um, 7(-8)-septate with 2-6 cells 1-2 longitudinally septate; macroconidia not found. On bark, Florida. Mississippi. S. griseonitens R. C. Harris
3. Ascospores 20-27 x 6-7.5 um, 5-7-septate with only 1-few cells longitudinally septate. Mostly midwestern but a single dubious record from Florida. S. submuriformis (R. C. Harris) R. C. Harris
 4. Ascospores 3-7-septate. 5
 4. Ascospores 1-septate. 6
5. Ascospores 7-septate, 24-42 x 5-7.5 um; macroconidia 8-celled, 23-30 x 3.5-5 um. Often over mosses. Northeastern N. America. S. stigmatella (Ach.) R. C. Harris
5. Ascospores 3-septate, (12-)15-19(-21) x (3.5-)4.5-5(-7) um; macroconidia 4-celled, 13-17 x 3-3.5 um. On mosses over limestone or mortar. Perithecia perhaps half sunken, rather crowded, with shield-shaped involucrellum, with pale to brownish exciple. S. jamesii
 6. Growing on limestone. 7
 6. Growing on bark or wood. 8
7. Ascospores 11-15(-18) x 3.5-5 um. Florida. S. bermudana (Nyl.) R. C. Harris
7. Ascospores 18-22 x 5-7.5 um. Florida. S. wilsonii (Riddle) R. C. Harris
 8. Black hypothallus present; thallus white punctate; ascospores 17-22 x 5-6 um. On bark. South Carolina. S. hypothallina R. C. Harris
 8. Black hypothallus absent. 9
9. Ascomata 2-3-locular; ascospores 7-10(-12) x 3-4.5 um. Florida. S. connivens R. C. Harris
9. Ascomata unilocular. 10
 10. Ascospores 8-12 x 2.5-3 um. Florida. S. phaea (Ach.) R. C. Harris
 10. Ascospores larger, 12-25 x 4-5.5 um. 11
11. Ascospores 12-17 x 4.5-5 um; macroconidia 7-9 x 2-2.5 um. Florida. S. viridiseta (Nyl.) R. C. Harris
11. Ascospores 15-25 x 4-5.5 um; macroconidia 14-19 x 3-4.5 um. Florida. S. americana R. C. Harris

Descriptions of Species

S. americana R. C. Harris (syn. Arthopyrenia tenuis)

Spores 16-25 x 4-5.5 μm . Ascocarps hemispherical or somewhat conical, 0.3-0.5 mm diam.; wall thinner or lacking below. Asci cylindrical, 70-135 x 8-12 μm . Spores uniseriate to biseriate, narrowly ovate with pointed ends, occasionally slightly bent, 2-celled, slightly constricted at the septum. Microconidia narrowly elliptical to elliptical, 3-5 x 1.2-2 μm ; macroconidia narrowly elliptical, 2-celled, 12-20 x 3-4.5 μm . On bark. Alabama, Florida, Louisiana, New Jersey; Great Lakes region (see Harris, 1973 for more info.).

S. connivens R. C. Harris

Ascocarp compound, with 2(-3) chambers sharing a common ostiole, complanate; spores small, 7-10(-12) x 3-4.5 μm . Thallus greenish gray, well developed, endophloedal. Ascocarps 0.3-0.4 mm long, slightly less in width; chambers connected above; wall thinner or lacking below. Asci narrowly elliptical, 45-50 x 7-8 μm . Spores subbiserial to biserial, narrowly ovate, 2-celled, slightly constricted at septum. Microconidia narrowly elliptical to elliptical, 2.5-4 x 1.5-2 μm ; macroconidia narrowly elliptical, 2-celled, 6.5-7.5 x 2-3 μm . On bark. Florida.

S. griseonitens R. C. Harris

Thallus corticolous, gray, \pm shiny, with prosoplectenchymatous cortex, 10-30 μm thick. Ascomata immersed, subglobose, 0.3-0.4 mm diam.; wall colorless below, expanded and streaked with pale brown around ostiole. Asci cylindrical, 100-130 x 15-20 μm , with eight biserial spores. Ascospores submuriform, 7(-8)-septate with 3-6 cells longitudinally 1-2-septate, 26-33 x 8-10 μm . Microconidia not found.

S. hypothallina R. C. Harris

Thallus with scattered small white dots; black hypothallus visible at margins of thallus or in section. Spores 17-22 x 5-6 μm . Thallus light brown, shiny. Ascocarps complanate to hemispherical, immersed, 0.5-0.8 mm in diameter, 0.2 mm in height; wall black, sometimes merging with hypothallus, lacking below. Asci cylindrical, 90-120 x 9-10 μm , with eight uniseriate spores. Ascospores narrowly ovate, with \pm pointed ends, 2-celled, slightly constricted at septum. Conidia not found. On bark (Ilex). South Carolina.

S. jamesii (Swinscow) R. C. Harris (syn. N. American reports of S. affinis)

Ascospores 4-celled, 12-16(-19) x 4-5 μm [according to British book, but Harris 1995 incorrectly quotes that book as saying 12-20(-22) x 2-3.5 μm , which is what the British book gives for macroconidia; Harris 1995 says according to his observations the ascospores are 13-17 x 4-5 μm ; ascospores up to 7 μm wide according to ?]. Thallus thin and filmy, effuse, continuous, whitish to pale gray. Perithecia 0.1-0.2 mm diam., ca. 1/2 immersed, usually rather crowded, rather distinctly hemispherical; involucrellum usually distinct; true exciple colorless, or pale brown above. Asci 45-60(-70) x 9-10 μm . Pycnidia 40-100 μm diam.; macroconidia 12-22(-22) x 2-3.5 μm [according to British book; 13-17 x 3-3.5 μm according to Harris 1995], 3-septate, oblong-fusiform; microconidia 2.5-4 x 1-1.4 μm . On smoothish or rough bark of tree trunks or exposed roots in sheltered woodland. Louisiana; Ontario.

S. laceribracae R. C. Harris

Thallus corticolous, white, thin, ecorticate, mostly endophloeodal. Ascomata immersed, subglobose, 0.3-0.4 mm diam.; wall colorless below, expanded and streaked with brown around ostiole. Asci broadly ovate to obpyriform, 110-130 x 40-60 µm, with eight subbiseriately to irregularly arranged spores. Ascospores broadly fusiform, narrower at one end, densely muriform, 10-15 x 1-5-septate, 35-45 x 8-10 µm. Conidia not found. Georgia, Louisiana.

S. phaea (Ach.) R. C. Harris

Spores small, 9-11(-13) x 2.5-4 µm, ends usually rounded with upper cell often broader than lower. Thallus light green to dark green or dark olive or brown, at least in part epiphloeodal. Ascocarps hemispherical or conical, 0.2-0.3 mm diam.; wall usually thinner or lacking below. Asci narrowly elliptical to dacytoid, 40-55(-65) x 5-8 µm. Spores uniseriate to biseriate, narrowly ovate or narrowly elliptical, 2-celled, slightly constricted at the septum. Microconidia elliptical, 2.5-4.5 x 1.2-2 µm; macroconidia narrowly elliptical, 2-celled, 6.5-10 x 2-3.5 µm. On bark. Florida, Georgia.

S. stigmatella (Ach.) R. C. Harris

Spores never submuriform, 24-35(-50) x 5-8 µm. On bryophytes, less commonly directly on bark. Thallus thin, mostly immersed, effuse, white to pale gray or sometimes green. Perithecia 0.3-0.4 mm diam., ca. 1/2 immersed, partly covered by a thin layer of thallus; involucrellum closely clasping the exciple; true exciple pale brown or colorless. Asci cylindrical, 70-80(-100) x 12-15 µm. Spores (4-)6-7(-9)-septate, biseriate or subbiseriate, fusiform or narrowly ovate with pointed ends, slightly constricted at the septa, especially the middle one. Pycnidia ca. 100 µm diam.; macroconidia 20-30 x 4-6 µm, 5-7-septate, oblong-fusiform. On bark of old broad-leaved trees, or over mosses on tree bases. Michigan and western Canada. Usually on Thuja. Michigan.

S. subelegans Vainio s. lato

Treated as s. lato because the Florida collection has rather small ascospores, 11-15 x 4-4.5 µm, whereas Santesson (1952) gave 17-25 x 4-7 µm. However, the material otherwise seems a reasonable match for Santesson's illustration and has a bluish tinge as emphasized by Lucking (1992).

S. submuriformis R. C. Harris

Spores often submuriform, 20-27 x 6-7.5 µm. On bark or old wood. Thallus immersed, light gray to whitish, smooth. Trentepohlia abundant. Perithecia scattered to clustered and partially fused, separating walls sometimes not carbonized, black, occasionally shiny, hemispherical, mostly ca. 1/3 immersed, rarely almost entirely immersed, 0.3-0.45 mm diam., 0.15-0.25 mm in height. Involucrellum brown, lacking below, 24-30 µm thick. Exciple colorless, entire, ca. 15-20 µm thick. Hymenium I-. Interthecial hyphae ca. 1-2 µm thick, septate, rarely branched and anastomosed. Asci cylindrical to clavate-cylindrical, thickened at tip, inner surface with small indentation, 75-95 x 13-16 µm. Spores 8 per ascus, biseriate or subbiseriate, colorless, fusiform, 5-7-transversely septate, often with 1-2 cells longitudinally septate, not or only slightly constricted at the septa, without a gelatinous sheath. Pycnidia often present, black, ca. 0.1-0.2 mm diam.; macroconidia colorless, cylindrical, mostly 7-septate, 20-23 x 4-4.5 µm. On bark or old wood, western Great Lakes area to New England.

(S. taylori (Carroll ex Nyl.) R. C. Harris)

Asci narrowly ovate; spores usually breaking into two part spores, 21-32 x 4.5-5(-7) um.
[Not reported for N. America]

S. viridiseda (Nyl.) R. C. Harris

Spores 12-17 x 4.5-5 um. Thallus whitish to light green, endophloeodal or endolithic. Ascocarps hemispherical to subglobose, immersed or emergent, 0.25-0.5 mm diam. Asci cylindrical, 65-105 x 6-10 um. Spores mostly uniseriate, less often subbiseriate, narrowly ovate with somewhat pointed ends, 2-celled, slightly constricted at septum. Microconidia elliptical to narrowly elliptical, 2.5-4 x 1.2-2 um; macroconidia narrowly elliptical to elliptical, 2-celled, 10-13(-15) x 2.5-4.5 um. On bark, calcareous rock or shell. Florida, Alabama, Louisiana; possibly Ontario. A poorly understood species, often difficult to distinguish from S. americana; there may be a third species intermediate in ascospore and macroconidia size.

S. wilsonii (Riddle) R. C. Harris

Spores larger, 14-20 x 4.5-6 um. Thallus white to greenish, endolithic. Ascocarps mostly immersed, subglobose or \pm conical; wall well developed above and lacking below, or reduced to a small ring around the ostiole of deeply immersed ascocarps. Asci cylindrical, 90-130(-160) x 7-12 um. Spores uniseriate, narrowly ovate, sometimes with rather pointed ends, 2-celled, slightly constricted at septum. Conidia narrowly elliptical to elliptical; microconidia 4-5 x 1.2-2 um; macroconidia 2-celled, 10-13(-17) x 3-4.5 um. On calcareous rock. Florida.

Excluded

Spores 18-30(-35) x 7-10 um; on soil. Perithecia more than half sunken, without involucrellum, with pale exciple. Conidia not seen. Thallus forming a thin, granular-scurfy, ashy gray layer with an indistinct hypothallus. Perithecia ovate with a narrowing toward ostiole, adnate, 0.25-0.3 mm broad, brownish or reddish when wet; hymenium I-; paraphyses slender, branched, persistent; asci cylindro-clavate. Spores spindle-shaped, pointed. On soil and peat. Alaska.. Geisleria. sychnogonioides Nitschke (position uncertain; does not belong in Strigula)

Literature

Awasthi, . 19 . Keys to the microlichens of India.

Coppins, B. J. 1992. Strigula. In: Purvis, et al., Lichen Flora of Great Britain and Ireland.

Galloway, D. 19 . Flora of New Zealand. Lichens.

Harris, R. C. 1975. Arthopyrenia sensu lato in North America. Ph.D. Dissertation.

Harris, R. C. 1995. More Florida Lichens.

Thomson, J. W. 1997. American Arctic Lichens. II. The Microlichens. [description of Geisleria sychnogonoides only]