

Liverworts and Hornworts of the Interior Highlands Exsiccatae — Fascicle 5

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ABSTRACT. — Sets of ten liverwort specimens from the Interior Highlands of North America are issued in this fifth exsiccatae fascicle. The second Missouri station of *Fossombronia texana* is reported with the plants included in this fascicle. The distribution of *Frullania stylifera* is expanded to include eight additional Missouri counties, as well as the first documented localities in Illinois, Kansas and New York.

The discovery of unreported taxa, as well as the general lack of representative liverwort and hornwort specimens from the Interior Highlands in herbaria, has compelled the authors to prepare an exsiccatae based on their collections from southern Missouri, northwestern Arkansas, and parts of southern Illinois, southeastern Kansas, and eastern Oklahoma. The exsiccatae is issued in fascicles of ten specimens that are distributed to the following herbaria: CAS, DUKE, E, F, GOET, KPABG, MHA, NICH and NY. The primary set of specimens is deposited at MO. Four fascicles have previously been distributed (Atwood & Brinda 2013, 2013a, 2014, 2015). In this fascicle, notes are given on the distributions of *Fossombronia texana* and *Frullania stylifera*.

41. *Aneura sharpii* Inoue & N.G. Mill.

U.S.A. MISSOURI: WAYNE CO.: Coldwater Conservation Area. Forested seep along south branch of Hunter Creek hummock, on soil at base of clumped shrubs, 642 ft., 37.25838°N, 90.40077°W, 3 April 2019, *Atwood 3717 & Brant*.

42. *Fossombronia texana* Lindb.

U.S.A. MISSOURI: TANEY CO.: Beaver Township, Town of Hercules. Along Hwy. 125, approximately 3.5 miles south of Hwy. DD, at bridge over Brushy Creek. Just west of Hercules Church, shaded, E-facing dolomite ledges along creek, 921 ft., 36.70496°N, 92.87155°W, 23 September 2017, *Atwood 3523 & Holmberg*.

Lindberg (1875) described *F. texana* from part of Austin's (1873) *Hepaticae Boreali-Americanae Exsiccatae*, no. 118 (*F. longiseta* Austin), which is a mixture of Texas plants collected by Charles Wright and California plants collected by Henry Bolander. The Texas plants belong to *F. texana*, and differ from *F. longiseta* in gametophyte and spore morphology. Although the two species are similar in their size and monoicous sexuality and have oblong leaves, plants of *F. texana* lack tubers at the stem apices, and have leaves with auriculate antical margins. By

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comparison, plants of *F. longiseta* usually have prominent apical tubers, while the antical leaf margins extend only to the middle of the stem. Furthermore, the spores of both species are polymorphic, but those of *F. texana* generally have an irregularly reticulate ornamentation on the distal surface, whereas the distal surface ornamentation in the spores of *F. longiseta* are more regularly lamellate to echinate.

The Taney County specimen, cited here, matches the description of *F. texana* by Bray (2001), with the spores most closely resembling Schuster's detailed illustrations of the species (1992, fig. 843, 4–7). The spores are 38–44 μm in diameter, with low, thin lamellae, approximately 2 μm tall. The lamellae are frequently spurred, with rows 4–6 μm apart, sometimes forming irregularly connected areolae that are about 6 μm in diameter. Most spores examined have the outlines of 3–4 weakly formed areolae spanning the outer spore face. The inner spore face is cristate, with a weakly defined tri-radiate ridge.

The known distribution of *F. texana* in North America was expanded by Schuster (1992) who cited several specimens from west-central Texas as well as two specimens from counties in northwestern Arkansas. Bray (2001) further expanded this distribution by citing fourteen additional Texas localities from counties throughout the Edwards Plateau region, as well as six new stations in the Interior Highlands of Arkansas, Missouri and Oklahoma. His report of the species from Missouri (*Redfearn 4684* [MO]), and Oklahoma (*Mahler 1000, 1101* [both SMU]) represents new, but overlooked distribution records for those states (Atwood 2014; Timme & Redfearn 2012). The Taney County station is approximately 100 miles southeast of the other Missouri locality, and about 50 miles north of the two closest Arkansas localities. As indicated by the similar habitat data for nearly all of these specimens, *F. texana* is calciphilic, occurring on limestone near streams.

43. *Frullania riparia* Hampe ex Lehm.

U.S.A. MISSOURI: WARREN CO.: Little Lost Creek Conservation Area, steep and narrow draw leading to the southeastern branch of Low Gap Hollow, on shaded sides of dolomite boulders, 735 ft., 38.75668°N, 91.26910°W, 25 March 2019, *Atwood 3693, Holmberg & Turner*.

44. *Frullania styliifera* (R.M. Schust.) R.M. Schust.

U.S.A. MISSOURI: MONTGOMERY CO.: Grand Bluffs Conservation Area, Grand Bluffs Natural Area, forested bluff top approximately 0.8 mile NE of Bluffton. Persimmon grove with 3–4" dbh trees on SW-slope, on tree trunks with *Frullania eboracensis*, 850–900 ft., 38.70690°N, 91.60897°W, 24 July 2018, *Atwood 3672*.

Atwood (2016) reported *F. styliifera* from several localities in Arkansas, Missouri, Oklahoma and Tennessee, expanding the known distribution of the species. Prior to that publication, *F. styliifera* was previously known only from the type locality in southern Minnesota. Additional collecting, as well as the redetermination of herbarium specimens, has revealed several

new Missouri localities. In addition, new state distribution records from Illinois, Kansas and New York are documented here for the first time.

Additional specimens examined: **U.S.A. ILLINOIS:** RANDOLPH CO.: Turkey Bluffs State Fish and Wildlife Area, 8 km SE of Chester, along road, 0.15 miles W of road junction, on ash trunks in disturbed woods, associated with *F. inflata* and *F. virginica*, 670 ft., 37.86916°N, 89.74777°W, 27 April 2018, *Holmberg 6118 p.p.* (MO). **KANSAS:** CHEROKEE CO.: 4 miles E of Baxter Springs, bank of Shoal Creek, 8 July 1952, *McGregor 5650* (as *F. inflata* Gottsche) (NY). **MISSOURI:** LACLEDE CO.: Bear Creek Conservation Area, beside road, 20 m SE of parking lot, sparse on trunk of large oak tree, fallen in ice storm, in oak/hickory woods, 1215 ft., 37.73361°N, 92.57944°W, 2 February 2007, *Holmberg 2162* (as *F. eboracensis* Lehm.) (MO). LINCOLN CO.: Cuivre River State Park, Blazing Star Trail, 25 yds. N of trailhead, off RV campground road, T49N R1E S4, several small patches growing on bark of 10" diameter *Quercus alba*, alongside trail at edge of upland oak-hickory forest strip, 650 ft., 9 October 2003, *Darigo 3996* (MO) (as *F. inflata*). OZARK CO.: Mark Twain National Forest. Glade Top Trail National Forest Scenic Byway, Caney Picnic Area, along Hwy. 935, on bark, trunk of elm, 1224 ft., 36.74321°N, 92.76023°W, 23 September 2017, *Atwood 3515* (MO). Mark Twain National Forest. 'McClurg Glade', along Glade Top Trail and Hwy. 932, approximately 1.25 miles west of Douglas County Rd. in McClurg, on bark, branches and trunk of smoke tree, 1300 ft., 36.78278°N, 92.75083°W, 23 September 2017, *Atwood 3511* (MO). PHELPS CO.: Mark Twain National Forest, Lane Spring Recreation Area, Blossom Rock Trail at Blossom Rock, on bark, oak tree along south-rockface, mixed with *Frullania eboracensis*, 1012 ft., 37.79401°N, 91.82923°W, 22 September 2017, *Atwood 3495 & Holmberg* (MO). ST. FRANCOIS CO.: Saint Francois State Park, small creek valley, 0.22 airline miles from junction, US Hwy. 67 & secondary entrance for service road in northern part of Park, oak-hickory forest, on fallen living canopy branch of red oak tree, 250 m., 37.99194°N, 90.51916°W, 11 July 2014, *Davidse 41774* (MO). VERNON CO.: Pleasant Run Creek Prairie (Missouri Prairie Foundation), 270 meters N of road, on fallen elm trunk along creek in native prairie, 820 ft., 37.65138°N, 94.34666°W, 3 June 2018, *Holmberg 6141* (MO). WARREN CO.: Little Lost Creek Conservation Area, in the southeastern branch of Low Gap Hollow, on upper branches of recently fallen tree along a steep slope, 671 ft., 38.75498°N, 91.27361°W, 25 March 2019, *Atwood et al. 3705A* (MO). **NEW YORK:** NIAGARA CO.: New York Office of Parks, Recreation and Historic Preservation, Golden Hill State Park, picnic areas near boat launch, on *Fraxinus*, 80 m., 43.36972°N, 78.47381°W, 4 June 2018, *Brinda 12027* (MO).

45. *Kurzia sylvatica* (A. Evans) Grolle

U.S.A. MISSOURI: SAINTE GENEVIEVE CO.: Hickory Canyon Natural Area, Benne Tract, side canyon along S-branch of Hickory Creek, ca. 0.33 mile N, and 0.35 mile W of Sprott Rd., steep-sided box canyon with numerous boulders, dripping ledges, seasonal waterfall and pool, underside of N-facing ledge, 948 ft., 37.86970°N, 90.30960°W, 20 April 2018, *Atwood 3610*.

46. *Lophocolea heterophylla* (Schrad.) Dumort. subsp. *heterophylla*

U.S.A. MISSOURI: WARREN CO.: Little Lost Creek Conservation Area, main branch of Low Gap Hollow, on well-rotted log at base of dripping bluff, 607 ft., 38.75542°N, 91.27819°W, 25 March 2019, *Atwood 3712, Holmberg & Turner*.

47. *Marchantia polymorpha* subsp. *ruderalis* Bischl. & Boissel.-Dub.

U.S.A. MISSOURI: SAINT LOUIS CITY: Missouri Botanical Garden. In flower bed near southeast (Tower Grove Avenue) entrance, on shaded bare soil and mulch, 533 ft., 38.61083°N, 90.25861°W, 30 June 2018, *Atwood 3671*.

48. *Odontoschisma sphagni* (Dicks.) Dumort.

U.S.A. MISSOURI: SAINTE GENEVIEVE CO.: Hickory Canyon Natural Area, Benne Tract, rock house near entrance to side canyon off Hickory Creek, ca. 450 yds. north and 290 yds. west of Sprott Rd., beneath overhang, base of back wall, in mats with *Calypogeia*, *Diplophyllum* and *Leucobryum*, 885 ft.: 37.86943°N, 90.30618°W, 3 March 2018, *Atwood 3582 & Holmberg*.

49. *Pellia epiphylla* (L.) Corda

U.S.A. MISSOURI: SAINTE GENEVIEVE CO.: Hickory Canyon Natural Area, Benne Tract, small drainage up side canyon along south branch of Hickory Creek, approximately 560 yds. north and 370 yds. west of Sprott Rd., in loose, thick mats, partially peeling off of dripping wet, vertical sandstone rock wall, 814 ft., 37.87023°N, 90.30726°W, 3 March 2018, *Atwood 3586 & Holmberg*.

50. *Riccardia multifida* (L.) Gray subsp. *multifida*

U.S.A. MISSOURI: WAYNE CO.: Coldwater Conservation Area. Forested seep along south branch of Hunter Creek, on wet gravel deposits along creek, 600 ft., 37.26043°N, 90.40203°W, 3 April 2019, *Atwood 3722 & Brant*.

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