

**New State and County Records for the genus *Sphagnum*  
from Delhaas Woods, Bucks County, Pennsylvania**

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The Coastal Plain physiographic province situated in southeastern Pennsylvania makes up less than 5% of the state land mass and occurs as a narrow strip of and that parallels the Delaware River floodplain through portions of adjoining Bucks, Philadelphia, and Delaware Counties. The low-lying topography of the Pennsylvania Coastal Plain and immediate access along the Delaware River has attracted land use since the time of William Penn (circa 1682) for whom the state of Pennsylvania is named. During the 1950's and 60's as a result of its proximity to the Philadelphia metropolitan area, much of the Coastal Plain woodlands in Bucks County were impacted by suburban encroachment and industrialization.

Amidst this development, the Delhaas Woods section (175 acres) of the Silver Lake Nature Center, located in Bristol Township, Bucks County, Pennsylvania (74°52' W and 40°07' N), is recognized by the Eastern Chapter of the Nature Conservancy as the best remaining portion of Coastal Plain woodlands remaining in the state of Pennsylvania. In recent history, the area has not escaped the adverse consequence of development. During World War II, sections of Delhaas Woods were cleared of trees to build a munitions storage facility. Following the abandonment of this facility, a corridor of trees was cut through the middle of the Delhaas Woods for the construction of high tension wires. During the "energy crisis" of the 1970's many of the remaining oak trees were felled for firewood, and the final insult to the area was the unscrupulous dumping of contractor waste under the power lines. Fortunately however, the Eastern Chapter of the Nature Conservancy purchased several parcels of this land since 1985 in an initiative to rescue the Delhaas Woods. The purchased land was presented to the Bucks County Department of Parks and Recreation and is managed locally by the Silver Lake Nature Center (SLNC). Today, as a result of this conservation effort, much of the Delhaas Woods has slowly regenerated and presently supports several Pennsylvania Species of Special Concern.

Recently, this anomalous refugium has been found (1998) to support a disjunct *Sphagnum* flora more typical of the minerotrophic fens in the New Jersey Pine Barrens. The Delhaas Woods are underlain with unconsolidated sandy and acidic soils that are geochemically suitable to support a limited *Sphagnum* growth within a few specialized wetland habitats. However, local climatic conditions, warm summer temperatures and periodic droughts, prevent any significant peat formation. The wetlands supporting *Sphagna* at SLNC are

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classified as either topogenous (surface runoff) or soligenous (groundwater) and commonly have standing water during the cooler parts of the year and are driest during the summer growing season when the evaporation rate often exceeds the precipitation rate (high P/E ratio).

Forty-one *Sphagnum* taxa are reported to occur throughout Pennsylvania's sixty-seven counties and only *S. recurvum* P. Beauv. is previously reported to occur in Bucks County (List and Andrus, 1989). However, recent collections (spring and summer 1998) from wetland habitats at the SLNC complex: Coastal Plain forest, vernal ponds, wet meadows, and an unglaciated bog (considered a Pennsylvania Community of Special Concern) revealed 14 *Sphagnum* species (2 new state records ++ and 13 new county records +):

+	<i>S. affine</i> Ren. & Card.	+*	<i>S. isoviitae</i> Flatb.
++	<i>S. angermanicum</i> Melin	+	<i>S. lescurii</i> Sull.
+	<i>S. cuspidatum</i> Hoffm.	+	<i>S. molle</i> Sull.
+	<i>S. compactum</i> DC.	++	<i>S. pylaesii</i> Brid.
+	<i>S. fimbriatum</i> Wils.		<i>S. recurvum</i> P. Beauv.
+	<i>S. henryense</i> Warnst.	+	<i>S. squarrosum</i> Crome
+*	<i>S. inundatum</i> Russ.	+	<i>S. trinitense</i> C. Müll.

\*See special notes

1) Coastal Plain Forest. The Coastal Plain Forest is the largest vegetation habitat in the Delhaas Woods section of SLNC and is made up of a discontinuous stand of hydric and mesic woodlands. Several populations of *S. squarrosum* were observed growing in scattered lawns on moist, but nonflooded sections, of the forest floor. Both *S. affine* (Bien 1016 PA) and *S. recurvum* (Bien 1012 PA) were collected from the base of trees and shrubs along the forest periphery (partial shade).

2) Unglaciated Bog. The unglaciated bog is bordered by a dense shrub-thicket that is encroaching into the remaining open bog where a number of open pools support *S. cuspidatum* (Bien 1019 PA) and small patches of *S. isoviitae* (Bien 1006 PA). Several species were collected on low hummocks surrounding the base of *Carex* tussocks and low shrubs: *S. henryense* (Bien 1003 PA), *S. angermanicum* (Bien 1004 PA), *S. squarrosum* (Bien 1014 PA) and *S. affine* (Bien 1013 PA). Both *S. recurvum* (Bien 1017 PA) and *S. fimbriatum* (Bien 1010 PA) were collected from the base of larger shrubs in the drier transition zone between forest and bog.

3) Wet and Dry Meadow. The service road along the power lines traps water creating a pattern of wet and dry open meadows where the water table is seasonally variable. Within this drainage catena only the lowest lying areas retain enough available water to sustain *Sphagnum* growth. Samples of *S. inundatum* (Bien 1005 PA), *S. lescurii* (Bien 1015 PA), and *S. trinitense* (Bien 1007 PA) were collected from shallow depressions with standing



water during the spring (1998). In a partial shaded area, *Sphagnum fimbriatum* (Bien 1018 PA) was collected on shrub roots just above the water table. *Sphagnum compactum* (Bien 1008 PA) and *S. molle* (Bien 1009 PA) were sampled from a single location at the highest point along the wet-to-dry gradient near the end of the service road. The "damming" effect of the service road and occasional cutting of trees and shrubs below the power lines appears to be a beneficial disturbance that maintains an exposed habitat for *Sphagnum* species with greater light and temperature requirements.

4) Vernal Ponds. Several desiccation tolerant species were collected from a vernal pond that runs as a drainage swale for approximately 30 meters adjacent to the power line service road. This shallow depression supports a large carpet of *S. pylaesii* (Bien 1000 PA) and casual amounts of *S. cuspidatum* and *S. trinitense*. Water trapped in this drainage swale slowly drains to the wet meadow on the lower side of the service road. By mid-summer (1998) most of the swale had dried back exposing a large desiccated mat of *S. pylaesii*. Although the surrounding area was surveyed for additional sites, surprisingly none were found, and this single location is the only known occurrence of *S. pylaesii* in Pennsylvania.

The *Sphagnum* flora at SLNC represents 34% of Pennsylvania's known *Sphagnum* taxa, and apart from *S. squarrosum*, all are Coastal Plain species. Ten of the 14 species recently discovered at the SLNC complex have a limited distribution in Pennsylvania. *Sphagnum angermanicum* and *S. pylaesii* are new state records. As a result of *S. inundatum* and *S. isoviitae* being recently segregated into new species, their distribution in Pennsylvania is reported here for the first time (see special notes). *Sphagnum compactum* and *S. trinitense* are previously reported to occur at several sites all within Clinton County (List and Andrus, 1989) and *Sphagnum molle* is known from single sites in Westmoreland and Clinton counties (R. Andrus pers. com.). *Sphagnum cuspidatum*, *S. lescurii*, *S. recurvum* and *S. squarrosum* are reported to occur in five or less Pennsylvania counties, and only *S. affine*, *S. fimbriatum* and *S. henryense* are reported to occur in more than five counties in Pennsylvania (List and Andrus, 1989). A total of four *Sphagnum* species are reported to occur in the two adjoining counties (Philadelphia and Delaware Counties) that also border the Atlantic Coastal Plain in Pennsylvania, making the Delhaas Woods in Bucks County, the last significant stronghold of Atlantic Coastal Plain *Sphagna* in Pennsylvania.

Special Notes: At the time of the List and Andrus (1989) publication, *S. inundatum* Russ. was formerly lumped with *S. lescurii* Sull., but is now recognized by Andrus as a separate species in the sense of Daniels and Eddy (1985). Similarly, *S. isoviitae* Flatb. has recently been segregated from *S. fallax* (Klinggr.) Klinggr. as a new species (Flatberg 1992) and is probably more widespread in Pennsylvania than its reported occurrence at SLNC. Although this paper officially reports both species at SLNC, Andrus has previously collected *S. inundatum* (five counties) and *S. isoviitae* (four counties) in Pennsylvania. Additional sites may become known with further examination of *S. lescurii* and *S. fallax* in herbarium collections. The substantial precipitation in the spring of 1998 created prime



wetland conditions for *Sphagna* at the SLNC. However, a period of extended drought followed, and by mid-summer many wetland areas were completely dried back and much of the *Sphagna* was either completely desiccated or showing signs of extreme water stress. It remains unclear what effect this drought event, which extended through December 1998, will have on the *Sphagnum* flora and especially those species that are less desiccation tolerant. Voucher specimens have been deposited at Binghamton.

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### Annual Meeting American Bryological and Lichenological Society

July 30 - August 1, 1999

Southern Illinois University, Carbondale

The American Bryological and Lichenological Society (ABLS) will hold its annual meeting and foray in southern Illinois, July 30-August 1, just prior to the XVI International Botanical Congress in St. Louis. The International Association for Lichenology (IAL), the International Association of Bryologists (IAB), and Moss 99 Conference are co-sponsors. The meeting and field trips are being organized by Barbara Crandall-Stotler ([crandall@plant.siu.edu](mailto:crandall@plant.siu.edu)), Andrew Wood ([wood@plant.siu.edu](mailto:wood@plant.siu.edu)) and Bob Egan ([egan@unomaha.edu](mailto:egan@unomaha.edu)). Field trips are planned for the Shawnee National Forest, Giant City State Park, and Crab Orchard National Wildlife Refuge. Student members are encouraged to attend and participate in oral paper presentations for the annual ABLS A. J. Sharp Award. Limited student travel grants will be available. Time has been set aside for general business meetings as needed. Participants may stay in SUI dormitory housing or at local motels. Campgrounds are available within 15 miles of Carbondale. Participants will have ample time on Sunday afternoon, August 1, to travel to St. Louis for the opening of the XVI International Botanical Congress.

Registration fee will be US\$30.00 and will include meetings, programs, snacks, and Saturday evening dinner. Housing in the SIU dormitories will cost US\$17.15/night (double) or US\$21.70/night (single). Local motels range from US\$35.00/night to US\$109.00/night. The Saturday field trip to Shawnee National Forest will cost US\$20.00/person. Registration forms have been sent to ABLS members in January and posted on the ABLS web site <http://ucjeps.herb.berkeley.edu/bryolab/ABLS.html>



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