# LIVERWORTS AND HORNWORTS OF FERNE CLYFFE STATE PARK, JOHNSON COUNTY, ILLINOIS

**Douglas Zehr and Raymond Stotler**
**Department of Botany**
**Southern Illinois University**
**Carbondale, IL 62901**

## ABSTRACT

Ferne Clyffe State Park, with habitats ranging from xeric blufftops to lowland woods, possesses an anthocerote and hepatic flora of 40 taxa. Thirty-five of these are reported for the first time from the park and 26 are reported for the first time from Johnson County, Illinois. No taxa new to Illinois were found. The earlier report of *Scapania undulata* (L.) Dum. and *Plagiochila undata* Sull. was based on misidentified specimens.

## INTRODUCTION

Ferne Clyffe State Park is located in Goreville Township of northwestern Johnson County (sections 22, 27, 28 and 33 of T11s, R2E). The 412 hectares within the park lie in the Greater Shawnee Hills Section of the Shawnee Hills Division, just north of the Lesser Shawnee Hills Section. This Division is unglaciated with east-west sandstone encarpments, faulted bedrock formations and rocky, cascading streams (Reuter, 1977). The exposed bedrock dates from the Mississippian and Pennsylvanian Periods of the Paleozoic Era and contains three basic rock formations: The Kinkaid Formation consisting of Kinkaid Limestone, the Caseyville Formation consisting of Lusk Sandstone, Battery Rock Sandstone, Drury Shale and Pounds Sandstone and the Abbott Formation consisting of Grindstaff Sandstone. Pounds Sandstone is the most dominant outcrop feature of the park whereas Battery Rock Sandstone and Drury Shale are of slightly less occurrence. The Battery Rock Sandstone is characterized by a conglomerate of well-rounded pebbles of chert, quartzite and vein quartz, all of which reach a maximum diameter of 12.7 mm while Pounds Sandstone, although similar, contains smaller quartz pebbles. The Drury Shale member is composed of thinly-bedded gray shales with lenses of medium grained sandstone (Reuter, 1977).

Elevation in the park varies from 122 m above sea level in the valleys to over 201 m above sea level on the blufftops. Numerous wooded slopes, blufftops, and vertical sandstone of various aspects, lowland woods, old fields and a man-made lake allow for a diversity of vascular plants which includes over 700 taxa, 22 of which are ferns or fern allies (Mohlenbrock *et al.*, 1966). The area consists of mainly of an oak-hickory forest dominated by *Quercus stellata* Wang., *Quercus marilandica* Muench., *Ulmus alata* Michx. and *Juniperis virginiana* L. on the blufftops, *Quercus alba* L., *Carya tomentosa* (Poir.) Nutt., *Carya ovata* (Mill.) K. Koch and *Juniperus virginiana* on the slopes; *Ulmus americana* L., *Acer saccharum* Marsh., *Liriodendron tulipifera* L., *Quercus rubra* L. and *Quercus alba* in the lowlands.

Although collecting was done in all parts of the park, three areas were sampled extensively, namely, Happy Hollow, Black Jack Oak Trail and Round Bluff. Happy Hollow is a narrow northeast to southwest valley, which contains a small stream and many sandstone slump blocks, bounded by high sandstone bluffs on both sides. Because of small canyons with intermittent waterfalls leading off the major valley, there are vertical sandstone walls of varying aspects and hence numerous microhabitats. Black Jack Oak Trail is a south, southwest to west facing blufftop area and is part of a line of bluffs which run through the park from northwest to southeast for a distance of nearly five kilometers (Mohlenbrock *et al.*, 1966). Not only were the xeric blufftops sampled but also the more

mesic base of the cliffs. Round Bluff, a 21.5 hectare location designated as an Illinois Nature Preserve, consists of vertical sandstone cliffs with exposures in all directions. The diverse aspects and natural spring and seepage areas allow for a multitude of microhabitats ranging from shaded and moist to exposed and dry conditions.

Personal collections made were deposited in the university herbarium (SIU) with duplicates when available in ABSH. Other collections examined included those of G.N. Jones (ILL), R.E. Hatcher, A.C. Skorepa and K.A. West (SIU) as well as specimens from the private herbaria of P.L. Redfearn, Jr. and R.E. Stotler.

## RESULTS AND DISCUSSION

The numerous habitats found throughout Ferne Clyffe State Park allow for a rather large assemblage of liverworts and hornworts. The relatively undisturbed xeric blufftops possess a rich thalloid liverwort flora, comprising four species of *Riccia* L. and *Asterella tenella* (L.) P. Beauv. as well as the simple thalloid *Fossombronia foveolata* Lindb. Numerous vertical sandstone cliffs of varying aspects also provide variable microhabitats which inhabited by a fairly substantial number of both leafy and thalloid liverworts. Not only do the common species such as *Conocephalum conicum* (L.) Lindb., *Scapania nemorosa* (L.) Dum., *Plagiochila porelloides* (Torrey ex Nees) Lindenb., *Calypogeja muelleriana* (Schiffn.) K. Mull., *Radula obconica* Sull. and *Lophocolea heterophylla* (Schrad.) Dum. occur in these habitats but also the rarer *Jungermannia fossombronioides* Aust., *Lophocolea cuspidata* (Nees) Limpr., *Lejeunea lamacerina* (Steph.) )Schiffn. subsp. *gemminata* Schust. and *Pallavicinia lyellii* (Hook.) Carruth.

Thirty-five of the 40 taxa are reported for Ferne Clyffe for the first time. No liverworts or hornworts new to Illinois were found, but 26 taxa new to Johnson County are reported. *Scapania undulata* (L.) Dum. and *Plagiochila undata* Sull. which had been reported from this park (Skorepa, 1968) were misidentifications of *Scapania nemorosa* (L.) Dum. and *Plagiochila porelloides* (Torrey ex Nees) Lindenb., respectively. The nomenclature used, follows that of Stotler and Crandall-Stotler (1977).

*Checklist of Taxa in Ferne Clyffe State Park,*
*Arranged Alphabetically*

Division Anthocerotophyta (Hornworts)

1. *Notothylas orbicularis* (Schwein.) Sull. - Rare on moist soil in lowland woods; *Zehr 1383.*
2. *Phaeoceros laevis* (L.) Prosk. - Uncommon on moist soil and moist sandstone; *Redfearn 18107; Zehr 1372, 1392, 1409.*

Division Hepatophyta (Liverworts)

3. *Asterella tenella* (L.) P. Beauv. -Common on soil on blufftop ridges; *Zehr 1363, 1599, 1600, 1601.*
4. *Calypogeja muelleriana* (Schiffn.) K. Mull. - Very common on moist soil and sandstone covered by thin soil; *Zehr 1189, 1132, 1411, 1185, 1248, 1387, 1393, 1411, 1403, 1562, 1590, 1591, 1703, 1704, 1708, 1710.*
5. *Calypogeja trichomonis* (L.) Corda - Rare on soil near moist sandstone; *Zehr 1241, 1382, 1554.*
6. *Cephaloziella divaricata* (Sm.) Schiffn. - Rare on blufftops; *Zehr 1636, 1670.*
7. *Cephaloziella hampeana* (Nees) Schiffn. - Uncommon but locally abundant on moist soil along path by lake; *Zehr 1669, 1671, 1672.*
8. *Cololejeunea biddlecomiae* (Aust.) Evans - Common on vertical sandstone, moist rocks along stream and rotting logs; *Zehr 1364, 1368, 1369.*
9. *Conocephalum conicum* (L.) Lindb. - Common on moist sandstone and moist soil under rock overhangs; *Zehr 1244.*
10. *Diplophyllum apiculatum* (Evans) Steph. - Occasional on moist sandstone; *Redfearn 18060; Zehr 1555, 1564, 1711.*

11. *Fossombronia foveolata* Lindb. - Common on dry exposed blufftops; *Zehr 1391.*
12. *Frullania eboracensis* Gott. On *Juniperus* bark; *Zehr 1184, 1729.*
13. *Frullania ericoides* (Nees) Mont. - Rare on *Juniperus* bark; *Jones 20114.*
14. *Frullania inflata* Gott. - Very common on dry exposed sandstone and the bark of various tree species; *Zehr 1125, 1161, 1169, 1188, 1379, 1396, 1402, 1381, 1596, 1597, 1598, 1604, 1732.*
15. *Jamesoniella autumnalis* (DC.) Steph. - Uncommon on moderately moist sandstone and *Juniperus* logs; *Redfearn 18105; Zehr 1726, 1730, 1731.*
16. *Jubula pennsylvanica* (Steph.) Evans - Rare on moist shaded sandstone; *Zehr 1561, 1565* p.p., *1679, 1709.*
17. *Jungermannia crenuliformis* Aust. - Fairly common on moist sandstone; *Zehr 1683, 1395; Stotler 1168; Redfearn 18101, 18089.*
18. *Jungermannia fossombronioides* Aust. - Rare on moist sandstone; *Zehr 1371.*
19. *Jungermannia hyalina* Lyell - Rare on moist sandstone; *Zehr 1395.*
20. *Lejeunea lamacerina* (Steph.) Schiffn. subsp. *gemminata* Schusts. - Rare on moist sandstone, mixed with *Radula obconica; Zehr 1715.*
21. *Leucolejeunea clypeata* (Schwein.) Evans- Common on fairly dry sandstone; *Redfearn 18068; Zehr 1407, 1413, 1586, 1633, 1707, 1699, 1712, 1718.*
22. *Lophocolea cuspidata* (Nees) Limpr. - Rare on moist sandstone, occurring with *Jubula pennsylvanica; Zehr 1565.*
23. *Lophocolea heterophylla* (Schrad.) Dum.- Very common on soil, sandstone, rotting logs and at the base of various tree species; *Zehr 1374, 1373, 1378, 1377, 1385, 1394, 1380, 1557, 1587, 1594, 1667, 1376, 1695.*
24. *Lophocolea minor* Nees - Common on moist sandstone and rotting logs; *Zehr 1240, 1251, 1375, 1558, 1559, 1632, 1700.*
25. *Metzgeria conjugata* Lindb. - Rare on moist shaded sandstone; *Zehr 1561 p.p.* with *Jubula pennsylvanica.*
26. *Odontoschisma prostratum* (Sw.) Trev. - Common on moist north-facing sandstone; *Zehr 1164, 1244, 1247, 1252, 1365, 1556, 1563, 1634, 1639.*
27. *Pallavicinia lyellii* (Hook.) Carruth. - Rare on moist sandstone; *West s.n.; Zehr 1696.*
28. *Pellia epiphylla* (L.) Corda - Fairly common on moist sandstone; *Hatcher 1163; Zehr 1258, 1260, 1538, 1665.*
29. *Plagiochila porelloides* (Torrey ex Nees) Lindenb. - Very common on moist sandstone; *Hatcher 1164; Stotler 1169; Redfearn 18053; Zehr 1221, 1412, 1414, 1405, 1408, 1631, 1716, 1717, 1719.*
30. *Porella pinnata* L. - Common on sandstone and tree bases; *Zehr 1168, 1181, 1401, 1406, 1415, 1592, 1630, 1593.*
31. *Porella platyphylloidea* (Schwein.) Lindb. - Common on sandstone and the bark of various tree species; *Redfearn 18096; Zehr 1165, 1606.*
32. *Radula obconica* Sull. - Common on moist sandstone and occasionally on trees; *Zehr 1588, 1404, 1706, 1713, 1714, 1715, 1705, 1694, 1698, 1715 p.p.* with *Lejeunea lamacerina.*
33. *Reboulia hemisphaerica* (L.) Raddi - Common on moderately moist to dry sandstone and soil; *Skorepa 3881; Stotler 1166; Zehr 1198, 1201, 1242, 1249, 1259, 1370, 1612.*
34. *Riccia austini* Steph. - Fairly common on soil on exposed blufftops; *Zehr 1204, 1662.*
35. *Riccia beyrichiana* Hampe ex Lehm. - Fairly common on soil on exposed blufftops; *Zehr 1723, 1724.*
36. *Riccia dictyospora* M.A. Howe - Fairly common on soil on exposed blufftops; *Zehr 1106, 1107, 1199, 1661, 1663.*
37. *Riccia fluitans* L. - Of rare occurrence on moist clay soil in lowland woods; *Zehr 1388.*
38. *Riccia hirta* (Aust.) Underw. - Very common on soil on exposed blufftops; *Zehr 1200, 1389, 1660, 1664, 1668.*

39. *Riccia membranacea* Gott. et Lindenb. - Rare on moist clay soil in lowland woods, occurring with *Riccia fluitans* and *Notothylas orbicularis; Zehr 1390.*
40. *Scapania nemorosa* (L.) Dum. - Very common on moist sandstone and soil; *Redfearn 18066, 18086, 18092; Zehr 1666, 1560, 1117, 1116, 1130, 1121, 1128, 1250, 1253, 1255, 1254, 1400, 1399, 1398, 1397, 1366, 1386, 1384, 1367.*

## SUMMARY

A fine assemblage of blufftop liverworts occur throughout the park. Not only are the more common *Asterella tenella* (L.) P. Beauv. and *Fossombronia foveolata* Lindb. represented but also numerous species of *Riccia* L. Plants of rarer occurrence in this area of the country but which were found in the numerous microhabitats of Ferne Clyffe include *Lophocolea cuspidata* (Nees) Limpr., *Lejeunia lamacerina* (Steph.) Schiffn. subsp. *gemminata* Schust., *Frullania ericoides* (Nees) Mont., *Notothylas orbicularis* (Schwein.) Sull., *Pallavicinia lyellii* (Hook.) Carruth. and *Jungermannia fossombronioides* Aust. The 40 taxa of liverworts and two taxa of hornworts occurring in this area provides a diverse flora of slightly less than the 48 taxa reported for Lusk Creek Canyon Nature Preserve, Pope County, by Crandall-Stotler and Stotler (1978) but more than the 32 species from Little Grand Canyon, Jackson County (Stotler, 1976), and the 21 species from Panther's Den, Union County, by west and Stotler (1977).

## LITERATURE CITED

Crandall-Stotler, B. and R.E. Stotler. 1978 (1979). Liverworts and hornworts of Lusk Creek Canyon Nature Preserve, Pope County, Illinois. Trans. Ill. Acad. Science 71: 312-321.

Mohlenbrock, R.H., *et al.* 1966. A floristics study of Ferne Clyffe State Park, Illinois. Castanea 31: 198-235.

Reuter, D. (ed.) 1977. Ferne Clyffe State Park: Master Management Plan. Illinois Dept. Conserv., Springfield, Ill., internally published document, 101 pp.

Skorepa, A.C. 1968. Liverworts from southern Illinois. Bryologist 71: 129-133.

Stotler, R.E. 1976. Saxicolous bryophyte and macrolichen associations in southern Illinois. I. Little Grand Canyon, Jackson County. Bryologist 79: 1-15.

_____and B. Crandall-Stotler. 1977. A checklist of the liverworts and hornworts of North America. Bryologist 80: 405-428.

West, V. and R.E. Stotler. 1977. Saxicolous bryophyte and macrolichen associations in southern Illinois. II. Panther's Den, Union County. Bryologist 80: 612-618.