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BIOLOGICAL AND MEDICAL SCIENCES

MOSES OF THE GREAT PLAINS X. THE NIOBRARA VALLEY PRESERVE AND ADJACENT AREA IN NEBRASKA

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Seventy-two species of mosses distributed among 43 genera and 19 families are reported for the Niobrara Valley Preserve and adjacent area. Fourteen new state records of mosses are added to the Nebraska flora. Distributional affinities for the mosses corroborated biogeographical data and hypotheses involving a strong western (arid and montane), northern (boreal), and eastern (temperate) taxic influence due to past vegetational changes associated with Pleistocene events.

† † †

A survey of the bryophytes was conducted on the Niobrara Valley Preserve and adjacent land during 1982 and 1983 as a part of a general biological inventory for The Nature Conservancy. Seventy-one species of moss and five liverworts were recorded at the completion of the survey. Results of the inventory, combined with previous studies on bryophytes in the vicinity by Churchill and Redfearn (1977), Spessard (1982), and Churchill (1982a), bring the number of species to 72 mosses and seven liverworts. The main emphasis of this paper is on the mosses, but the liverworts are enumerated at the end.

The Niobrara Valley Preserve is located in north-central Nebraska, positioned in northwestern Brown, northeastern Cherry, and southwestern Keya Paha counties along the Niobrara River (Fig. 1). The Preserve covers an area of some 219 km² and contains a diverse array of plant communities. Only a brief account of the major plant communities and associated bryophyte components found in them will be discussed. A short summary of geographical affinities will be outlined for some of the taxa. More detailed accounts of the vascular flora and plant communities and an analysis of the biogeography of the Niobrara Basin are in preparation.

The biogeographical affinities of the mosses found in the

Niobrara Basin have previously been suggested to be the result of past and recent events associated with a general change of vegetation at the end of the glacial period (Churchill, 1982a). Recent discussions of species diversity and notable associations of biogeographical elements in the Niobrara Valley Preserve area have been pointed out for both plants and animals (A. T. Harrison, 1980, an unpublished report to the Nature Conservancy entitled, "The Niobrara Valley Preserve: Its Biogeographic Importance and Description of its Biotic Communities"; Kantak, 1983). The results of this survey further corroborate the biogeographical diversity and richness of both communities and component taxa of various geographical affinities.

There is, as might be expected, a close association between species components that are representatives of major biomes as a result of past vegetational changes and plant communities in the basin. Mosses exhibiting biogeographical affinities can be assigned to one of several biotic provinces. Arid and montane western elements, here more often associated with Rocky Mountain conifer forest (*Pinus-Juniperus*) and various prairie types, including mixed and sand hill prairies found adjoining escarpments, include the following species: *Barbula acuta*, *Brachythecium collinum*, *Coscinodon calyptrata*, *Desmatodon heimii*, *Didymodon rigidulus*, *Encalypta vulgaris*, *Hypnum vaucheri*, *Jaffuellobryum raii*, and *J. wrightii*.

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Taiga or boreal northern conifer-deciduous elements are most often associated with the paper birch springbranch canyon forest (*Betula-Tilia-Corylus*) and, to a lesser extent, eastern deciduous forest (*Quercus-Tilia*) and include the following: *Brachythecium rivulare*, *Bryoerythrophyllum recurvirostrum*, *Byrum algovicum*, *B. uliginosum*, *Dicranum muhlenbeckii*, *Encalypta ciliata*, *Orthodicranum flagellare*, *O. montanum*,

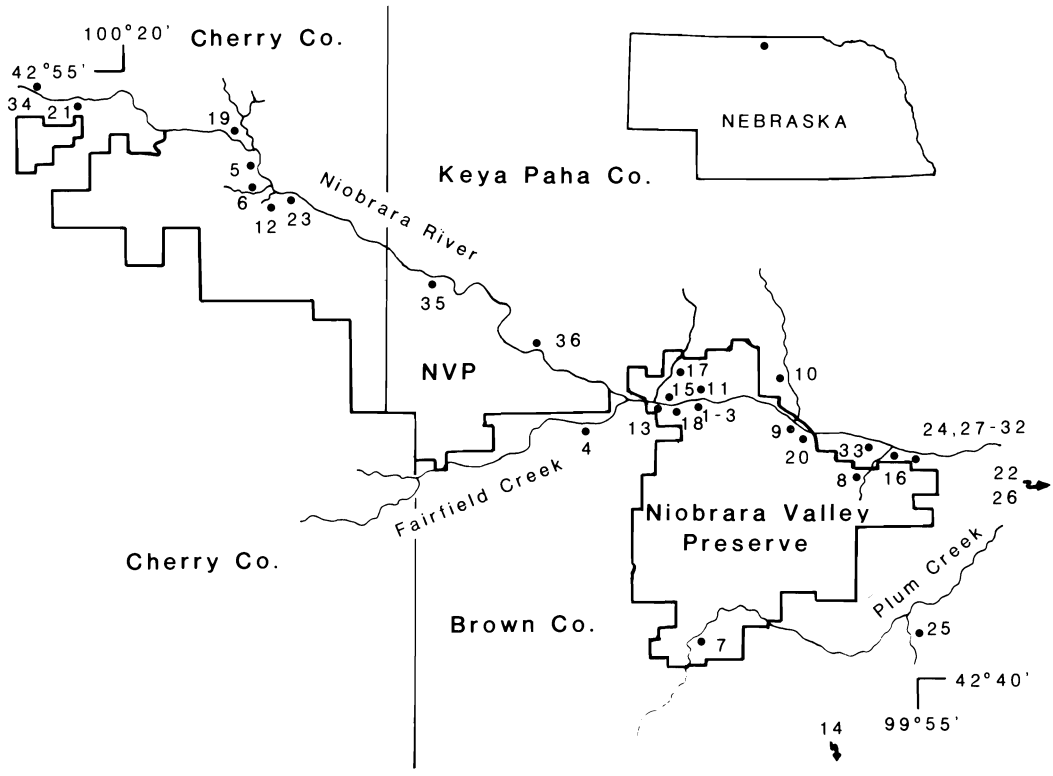


FIGURE 1. The Niobrara Valley Preserve (NVP) and adjacent land with approximate localities for collection sites and collection numbers for Churchill (numbers only) and Kantak and Churchill. 1. Brown County: Birch Hollow (42°47'N, 100°01'W), 11,865-11,871. 2. Brown County: Horsetail Canyon (42°47'N, 100°01'W), 11,872-11,873. 3. Brown County: Dicranum Gorge (42°47'N, 100°01'W), 11,874-11,882. 4. Brown County: Fairfield Creek (42°46'N, 100°06-08'W), 11,886-11,908 and 12,033. 5. Cherry County: Smith Falls (42°53'15"N, 100°18'55"W), 11,917 and 12,430. 6. Cherry County: Big Cedar Creek (N½ Sec. 4, T. 33 N., R. 25 W.), 11,918 and 11,977-11,980. 7. Brown County: Plum Creek (42°42'10"N, 100°00'25"W), 11,930-11,952 and 12,015; (42°41'49"N, 100°01'45"W), 12,025-12,026; (42°42'20"N, 99°59'42"W), 12,117-12,119. 8. Brown County: Hazel Creek (center of Sec. 13, T. 32 N., R. 23 W.), 11,954-11,961; (42°45'40"N, 99°56'26"W), 12,088. 9. Brown County: Barney Creek (Sec. 2, T. 32 N., R. 23 W.), 11,965-11,967-a and b, 12,130, and 12,259. 10. Keya Paha County: Turkey Creek (42°47'N, 99°56'W), 11,991-12,004; (Sec. 26, T. 33 N., R. 23 W.), 12,499. 11. Keya Paha County: Turkey Vulture Point (SE¼ Sec. 27, T. 33 N., R. 23 W.), 12,034-12,035. 12. Cherry County: Little Cedar Creek (NE¼ Sec. 4, T. 33 N., R. 25 W.), 12,036-12,040 and 12,052-12,054. 13. Brown County: 3 km W of NVP Headquarters (NE¼ Sec. 6, T. 32 N., R. 23 W.), 12,041-12,042. 14. Brown County: 11.2 km W and 11.2 km N of Ainsworth (NE¼ Sec. 16, T. 31 N., R. 23 W.), 12,043. 15. Keya Paha County: 4 km E of Nordent Bridge (NW¼ Sec. 35, T. 33 N., R. 23 W.), 12,044-12,051. 16. Brown County: Jeff Creek (NE¼ Sec. 7, T. 32 N., R. 23 W.), 12,055-12,063-a. 17. Keya Paha County: East Middle Creek (N½ Sec. 17 and Sec. 29, T. 33 N., R. 23 W.), 12,077-12,083; (SW¼ Sec. 29, T. 33 N., R. 23 W.), 12,314-12,317. 18. Brown County: just E of NVP Headquarters (SW¼ Sec. 34, T. 33 N., R. 23 W.), 12,096-12,098 and 12,134. 19. Cherry County: 5.6 km S and 0.8 km W of Sparks (42°53'N, 100°15'W), 12,099-12,103. 20. Brown County: Garden Creek (SE¼ Sec. 1, T. 32 N., R. 23 W.), 12,131-12,133. 21. Cherry County: Berry Bridge (42°54'04"N, 100°21'42"W), 12,144-12,145. 22. Brown County: Buzzard Canyon (N½ Sec. 10, T. 32 N., R. 23 W.), 12,152-12,155. 23. Cherry County: just E of Little Cedar Creek (Sec. 3, T. 33 N., R. 25 W.), 12,176-12,182. 24. Brown County: Tickclover Canyon (42°45'43"N, 99°54'50"W), 12,216-12,222 and 12,355-12,356-b. 25. Brown County: Quinn Canyon (42°40-41'N, 99°40'W), 12,276-12,286. 26. Brown County: Dutch Creek (42°42'53"N, 99°48'25"W), 12,301-12,305-b. 27. Brown County: Aggravation Creek (42°45'45"N, 99°55'45"W), 12,398-12,401. 28. Brown County: Rhodobryum Gorge (42°45'50"N, 99°55'36"W), 12,402. 29. Brown County: Smith Creek (45°45'45"N, 99°55'25"W), 12,405-12,407-b. 30. Brown County: Kantak Coulee (42°46'30"N, 99°53'07"W), 12,411-12,412-b. 31. Brown County: creek between Kantak Coulee and Rockbed Creek (42°47'00"N, 99°53'06"W), 12,414. 32. Brown County: Rockbed Creek (42°46'30"N, 99°53'07"W), 12,415 and 12,420. 33. Brown County: old Kirkpatrick ranch house (42°46'05"N, 99°56'59"W), 12,442-12,446. 34. Cherry County: 4.8 km W, 3.2 km S, and 2 km W of Sparks (42°54'39"N, 100°20'34"W), 12,500-12,503. 35. Keya Paha County: Rock Barn Marsh (42°48'21"N, 100°07'05"W), Kantak and Churchill 38. 36. Brown County: Sunnybrook Marsh (42°50'05-10"N, 100°11'08-15"W), Kantak and Churchill 61-64b.

Orthotrichum obtusifolium, *Plagiomnium ellipticum*, *Pleurozium schreberi*, *Pohlia nutans*, *Rhodobryum ontariense*, *Saelania glaucescens*, *Thuidium delicatulum*, and *Tortula mucronifolia*.

Temperate, eastern components are equally associated with both eastern deciduous (*Quercus-Tilia*) and paper birch springbranch canyon (*Betula-Tilia-Corylus*) forests and include the following mosses: *Anomodon minor*, *Atrichum altecristatum*, *Brachythecium acuminatum*, *B. rutabulum*, *Entodon cladorrhizans*, *Gyroweisia tenuis?*, *Lindbergia brachyptera*, *Pylaisiella selwynii*, and *Timmia megapolitana*.

Those of the last group can be assigned to a southern or southeastern association and occur mostly in transitional Rocky Mountain (*Pinus-Juniperus*) and eastern deciduous (*Quercus-Tilia*) forests. They are: *Desmatodon plinthobius*, *Funaria americana*, *Orthotrichum diaphanum*, and *Tortella humilis*.

Nomenclature for the mosses generally follows Crum et al. (1973) except for the Grimmiaceae (Churchill, 1981) and the Mniaceae (Koponen, 1968); for the liverworts nomenclature follows Stotler and Crandall-Stotler (1977). Taxa are listed alphabetically by genus. The family is listed parenthetically with the first species of each genus, and names of species reported here for the first time from Nebraska are preceded by an asterisk (*). Habitat data are provided, preceded by plant community (or vegetational zone). Abbreviations are as follows: eastern deciduous forest (EDF), flood plain eastern deciduous forest (FEDF), mixed prairie (MP), paper birch springbranch canyon forest (PBSCF), Rocky Mountain forest (RMF), and sand hill prairie (SP). Hyphenated abbreviations indicate transitional zones. Reproductive modes observed are stated, including production of sporophytes (abbreviated C.fr.). A qualitative statement is provided on species frequency based on the authors' observations. Localities are divided among counties and are abbreviated: Brown (B), Cherry (C), and Keya Paha (K). All collection numbers are those of the author unless stated otherwise. Those collection numbers by the author or Kantak and Churchill can be referenced to localities given on the map of the Niobrara Valley Preserve and vicinity (Fig. 1). The primary set of collections cited is deposited at either the Missouri Botanical Garden or the New York Botanical Garden; both herbaria will distribute duplicate collections. A representative set of bryophytes is also deposited with the herbarium at the Niobrara Valley Preserve.

The need for detailed studies in Nebraska is well illustrated by this report. In a previous paper concerning the entire Niobrara Basin, Churchill (1982a) reported only 68 mosses, 4 of which were new to the state, for an area of 30,768 km², while in this report 72 mosses are recorded, 14 of which are new, for an area of 219 km². While broad surveys are needed

in Nebraska to gain understanding of general distribution patterns and diversity, detailed work, especially in species-rich areas, will provide a better resolution and characterization of the Nebraska flora.

MUSCI

Amblystegium serpens (Hedw.) B.S.G. Amblystegiaceae. Shaded on soil, over decaying logs, and base of trunk of *Juniperus virginiana* and *Quercus macrocarpa*: RMF-EDF. C.fr. Frequent. B: 11,867-b, 11,944, 12,132, 12,216, and 12,259.

A. tenax (Hedw.) C. Jens. On soil, decaying logs, and calcareous rocks; often found in creek beds: PBSCF. Very common. B: 11,867-a, 11,879, 11,904, 11,917, and 11,956; C: Kantak and Churchill 64b, 12,103, and 12,145.

A. varium (Hedw.) Lindb. On soil and base of trees: RMF and RMF-EDF. C: reported by Spessard (1982); K: reported by Churchill (1982a).

Anomodon minor (Hedw.) Fuernr. Thuidiaceae. On soil and base of trees including *Ostrya virginiana*: PBSCF. Occasional. B: 11,866 and 11,957; C: 12,037.

Atrichum undulatum (Hedw.) P.-Beauv. *sensu lato*. Polytrichaceae. On shaded banks; often on sandy soils: RMF-EDF and PBSCF. C.fr. Frequent. B: 11,894 and 12,218; C: Kantak and Churchill 62a and 12,179. Our material can be assigned to *A. altecristatum* (Ren. & Card.) Smyth & Smyth (see Churchill, 1985).

Barbula acuta (Brid.) Brid. Pottiaceae. On calcareous rocks: RMF. Common. B: 11,889-b, 12,045, and 12,499.

B. unguiculata Hedw. On soil; often in disturbed areas: MP-RMF-EDF. Occasional. B: 11,889-a, 12,154, 12,305-b, and 12,407-a.

Brachythecium acuminatum (Hedw.) Aust. Brachytheciaceae. On bark of trees including *Ostrya virginiana*: EDF and PBSCF. Infrequent. B: 12,133; K: 12,314.

B. collinum (Schleich. ex C. Muell.) B.S.G. On sandy or calcareous soils; often on slopes: RMF and PBSCF. C.fr. Frequent. B: 11,888, 11,943, and 12,063-a.

B. oxycladon (Brid.) Jaeg. & Sauerb. On soil: RMF and PBSCF. Occasional. B: 11,896 and 11,932; K: 12,003.

**B. rivulare* B.S.G. On shaded banks and along creeks associated with spring seeps. Occasional. B: 11,907, 11,954,

- and 11,961. The ascending branches and enlarged alar cells with decurrent leaves are distinctive features.
- B. rutabulum* (Hedw.) B.S.G. On soil and rock; often along creek banks: PBSCF. C.fr. Infrequent. C: *Kantak and Churchill 64a*.
- B. salebrosum* (Web. & Mohr) B.S.G. On seepy banks and wet sandy soils in marshes associated with flood plains: EDF and PBSCF. C.fr. Occasional. B: 11,878 and 12,098; C: 12,102.
- Bryoerythrophyllum recurvirostrum* (Hedw.) Chen. Pottiaceae. On shaded soil banks: EDF and PBSCF. C.fr. Common. B: 12,219, 12,400, 12,405, and 12,407-b; C: 12,100.
- Bryum algovicum* Sendtn. ex C. Muell. Bryaceae. On shaded sandy soils: PBSCF and RMF. C.fr. Occasional. B: 11,890 and 12,304; C: 12,039.
- B. argenteum* Hedw. On sandy soil; in disturbed areas along Niobrara River flood plain. Infrequent. B: 11,872.
- B. capillare* Hedw. On shaded, partly sandy soil: RMF. Gemmae present. Infrequent. B: 11,933. This taxon can be assigned to *Bryum flaccidum* Brid. if taken in the narrow sense.
- B. lisae* De Not. var. *cuspidatum* (B.S.G.) Marg. (*B. creberimum* Tayl.). On soil: EDF-RMF. Infrequent. K: 12,139.
- B. pseudotriquetrum* (Hedw.) Gaertn., Meyer & Scherb. On wet sandy soil: EDF. Uncommon. B: 12,130.
- B. uliginosum* (Brid.) B.S.G. On shaded, moist sandy soil: PBSCF. C.fr. Uncommon. B: 12,415.
- Ceratodon purpureus* (Hedw.) Brid. Ditrichaceae. On sandy soil; often associated with disturbed sites; once found on wooden slates of old ranch house: EDF-RMF, MP, RMF, and SP. C.fr. Common. B: 11,870, 11,931, 11,952, and 12,444 (with Brogie).
- **Coscinodon calyptata* (Hook.) C. Jens. in Kindb. Grimmiaceae. On wooden slates of old ranch house in Niobrara River flood plain. C.fr. Rare. B: 12,443 (with Brogie). This species is distributionally confined to the Rocky Mountains of North America and should be sought in more natural sites within Nebraska.
- Desmatodon heimii* (Hedw.) Mitt. Pottiaceae. On shaded soil banks: EDF-RMF and FEDF. C.fr. Occasional. B: 11,947 and 12,134; K: 12,004 and 12,315. Newly known in the Niobrara Basin, this western species was reported for Banner County by Koch (1971).
- D. obtusifolius* (Schwaegr.) Schimp. On calcareous rock: RMF. C.fr. Uncommon. K: 12,080.
- D. plinthobius* Sull. & Lesqu. ex Sull. On calcareous rock: RMF. C.fr. Uncommon. K: 12,081. Previous reports of this taxon in Nebraska have been from the extreme south-east portion of the state (Churchill, 1976).
- Dicranella varia* (Hedw.) Schimp. Dicranaceae. On soil bank: EDF-RMF. C.fr. Uncommon. C: 12,502; K: Spessard (1982).
- **Dicranum muhlenbeckii* B.S.G. Dicranaceae. On moist shaded banks: PBSCF and EDF-RMF. C.fr. Infrequent. B: 11,881; K: 12,000. This species has previously been reported only for North Dakota (Churchill, 1982b) within the Great Plains.
- **Didymodon rigidulus* Hedw. Pottiaceae. On calcareous rock: RMF. Brood-bodies present. Occasional. B: 12,279; K: 12,079. This species, newly discovered in Nebraska, should be expected in the central and western parts of the state based on the frequency of collection in the western half of Kansas (Churchill, 1985). *Didymodon rigidulus* is often found in association with *Barbula acuta*.
- D. tophaceus* (Brid.) Lisa. On soil and rock associated with calcareous seeps: PBSCF. Occasional. B: 12,057 and 12,355. Newly discovered in the Niobrara Basin, this species previously was reported by Koch (1971) from Keith, Sarpy, and Sioux counties.
- Drepanocladus aduncus* (Hedw.) Warnst. Amblystegiaceae. On wet soil or over decaying marsh vegetation: PBSCF and FEDF. Very common. B: 11,882, 11,901, 11,947, 12,004, and 12,398; K: 12,004.
- Encalypta ciliata* Hedw. Encalyptaceae. On moist shaded slopes: PBSCF. C.fr. Occasional. B: 11,899 and 12,015; C: 12,101. Previously known within the Niobrara Basin only from along Long Pine Creek in Brown County (Churchill, 1982a).
- E. vulgaris* Hedw. *sensu lato*. On shaded soil banks; often sandy: RMF and EDF-RMF. C.fr. B: 11,873, 11,934, and 11,938. Occasional. Our collections represent the easternmost populations of an intermediate form between *E. vulgaris* and *E. rhaptocarpa* Schwaegr. that is frequent from the Rocky Mountains west to the coast (Horton, 1983).
- Entodon cladorrhizans* (Hedw.) C. Muell. Entodontaceae. On decaying logs: PBSCF. C.fr. Uncommon. B: 12,411; C: reported by Spessard (1982).

- Eurhynchium pulchellum* (Hedw.) Jenn. Brachytheciaceae. On sandy soil: EDF-RMF. Common. B: 11,886 and 11,930; C: 12,182.
- **Funaria americana* Lindb. ex Sull. Funariaceae. On shaded sandy banks: EDF-RMF. C.fr. Infrequent. B: 12,025, 12,033, and 12,088. This new state record represents a notable biogeographical record. Uncommon in North America, Smith (1980) characterized this species as one that "appears to be a strict calciphile with a distribution that corresponds to Pleistocene glacial and postglacial phenomena." Our records corroborate Smith's conclusion.
- F. hygrometrica* Hedw. On soil; often in recently burnt sites; border of marshes and in disturbed areas: PBSCF and EDF. C.fr. Occasional. B: 12,305-a and 12,406.
- Grimmia plagiopodia* Hedw. Grimmiaceae. On calcareous rock: RMF. C.fr. Infrequent. B: 12,285; K: 12,077.
- **Gyroweisia tenuis* (Hedw.) Schimp. Pottiaceae. On partly exposed calcareous rock: RMF. Rare? B: 12,286. This species was described by Crum and Anderson (1981) as "one of our rarest species." They provided only four known North American localities: one in Manitoba, Canada; one in Iowa; and two in Michigan.
- **Hedwigia ciliata* (Hedw.) P.-Beauv. Hedwigiaceae. On wooden slates of old ranch house along Niobrara River flood plain. Rare. B: 12,442 (with Brogie).
- Hypnum vaucheri* Lesq. Hypnaceae. On soil or in crevices of calcareous rock: RMF. Frequent. B: 12,280; C: 12,503; K: 12,034.
- Jaffuelobryum raii* (Aust.) Thér. Grimmiaceae. On calcareous rocks: RMF. C.fr. Frequent. B: 12,282; K: 12,035 and 12,044.
- J. wrightii* (Sull. in Gray) Thér. On calcareous rocks: RMF. C.fr. Infrequent. B: 12,284; K: 12,078.
- Leptobryum pyriforme* (Hedw.) Wils. Bryaceae. On spring-fed banks: EDF and PBSCF. C.fr. Occasional. B: 11,966; C: 11,980; K: 11,998.
- Lindbergia brachyptera* (Mitt.) Kindb. Leskeaceae. On decaying logs and trees including *Ostrya virginiana*, *Quercus macrocarpa*, and *Tilia americana*. C.fr. and brood-branchlets. Common. B: 11,880, 12,131, and 12,446; C: 12,052; K: 11,992.
- **Mnium marginatum* (With.) P.-Beauv. Mniaceae. Shaded on moist banks: PBSCF. Infrequent. B: 12,058 and 12,062; C: 11,918. This species is similar to *Mnium thomsonii* but is synoicous and has thickened lamina cell corners.
- M. thomsonii* Schimp. On soil banks: EDF-RMF. B: 12,220 and 12,303. C: *Kantak and Churchill 63b*. Our plants exhibit features generally diagnostic to this taxon, including dioicous sexual condition and bordered cells equal in size to median cells; sporophytes are unknown in our area. Newly known in the Niobrara Basin.
- **Orthodicranum flagellare* (Hedw.) Loeske. (*Dicranum*) Dicranaceae. Shaded on decaying logs: PBSCF. Flagelliform branchlets present. Rare. B: 12,152. This taxon was known previously in the Great Plains only from the Black Hills of South Dakota.
- **O. montanum* (Hedw.) Loeske. (*Dicranum*). On shaded, decaying logs: PBSCF. Rare. B: 12,356-b. This new state record is also the first report for the Great Plains.
- Orthotrichum diaphanum* Brid. Orthotrichaceae. On trunk of *Juniperus virginiana*: EDF-RMF. C.fr. Uncommon. C: 11,978.
- O. obtusifolium* Brid. On trunk of *Juniperus virginiana*: EDF-RMF. Brood-bodies present. Uncommon. C: 11,979.
- O. pumilum* Sw. On decaying logs and trees including *Ostrya virginiana* and *Quercus macrocarpa*: PBSCF, EDF-RMF, FEDF. C.fr. Common. B: 11,946; K: 11,991, 12,046, and 12,049.
- Philonotis marchica* (Hedw.) Brid. Bartramiaceae. On wet sandy soil in marsh: FEDF. Uncommon. B: 12,096. This taxon has been reported only once before from Cherry County (Churchill, 1982a).
- Plagiomnium cuspidatum* (Hedw.) Kop. Mniaceae. On soil and decaying logs: PBSCF, EDF-RMF, and EDF. C.fr. Common. B: 11,898 and 11,937; C: 12,040.
- P. ellipticum* (Brid.) Kop. On wet soil; often associated with seeps: PBSCF and FEDF. Frequent. B: 11,903, 12,062, and 12,412; K: *Kantak and Churchill 38*.
- Platygyrium repens* (Brid.) B.S.G. Hypnaceae. On decaying logs and base of trees including *Betula papyrifera*: PBSCF, EDF-RMF, and EDF. C.fr. and brood-branchlets present. Common. B: 11,875, 11,900, 12,041, and 12,155; C: 12,053 and 12,099; K: 12,048.
- **Pleurozium schreberi* (Brid.) Mitt. Hylocomniaceae. On shaded, partly sandy, slopes among pine litter: RMF.

- Rare. C: 12,500. This species was associated with a rare (in our region) montane and boreal lichen, *Cladina rangiferina* (L.) Harm. (12,501, NY, determined by R. C. Harris). Within the Great Plains, *Pleurozium* was previously known only from the Black Hills of South Dakota and Wyoming and from the Pine Ridge areas in Montana (Churchill, 1983).
- Pohlia nutans* (Hedw.) Lindb. Bryaceae. On shaded, partly sandy soils: PBSCF, EDF-RMF, and EDF. C.fr. Occasional. B: 11,943 and 11,965; C: reported by Spessard (1982); K: 12,051.
- P. wahlenbergii* (Web. & Mohr) Andr. Marshy wet soils; often associated with seeps: PBSCF, EDF, and FEDF. Rare. C.fr. Common. B: 11,902, 11,967-b, and 12,097; C: 12,178; K: 12,002.
- Polytrichum juniperinum* Hedw. Polytrichaceae. On partly sandy soils: EDF-RMF. Rare c.fr. Frequent. B: 11,874, 11,895, 11,941, 12,302, and *Kuhre and Engelhoff s.n.*, 14 ix 1982; C: 11,977.
- **P. piliferum* Hedw. On sandy soil: EDF-RMF and MP-SP. Uncommon. B: 11,945 and 12,043. Newly discovered in Nebraska, this species is somewhat rare in the Great Plains, but it is frequently encountered in the Black Hills of South Dakota and Wyoming.
- Pylaisiella polyantha* (Hedw.) Grout. On decaying logs and trunks of trees including *Ostrya virginiana*; found once on wooden slates of old house: PBSCF and FEDF. C.fr. Occasional. B: 12,153 and 12,445; C: 12,181. This is the first report of this taxon in the Niobrara Basin, but it was previously reported by Grout (1932) for Nebraska.
- P. selwynii* (Kindb.) Crum, Steere, & Anderson. Hypnaceae. On bark of trees: PBSCF. C.fr. Rare. B: 12,217; C: reported from a collection made at Valentine Park (Spessard, 1982).
- Rhodobryum ontariense* (Kindb.) Kindb. [*R. roseum* (Hedw.) Limpr. of past reports.] Bryaceae. On shaded moist to wet banks: PBSCF. Rare c.fr. Infrequent. B: 12,402; C: 12,036. Newly known in the Niobrara Basin, this taxon was previously reported from Cass and Richardson counties in southeastern Nebraska (Churchill, 1977).
- Rhynchostegiella compacta* (C. Muell.) Loeske. Brachytheciaceae. On soil; especially along creek banks: PBSCF and EDF-RMF. Brood-bodies present. Infrequent. B: 12,056; K: 12,316.
- Rhynchostegium serrulatum* (Hedw.) Jaeg. & Sauerb. Brachytheciaceae. Shaded on soil bank: PBSCF. C.fr. Uncommon. B: 12,412-b. Newly known in the Niobrara Basin, this taxon is known only from Kankakee Coulee.
- Saelania glaucescens* (Hedw.) Bomanss. & Broth. Ditrichaceae. On sandy bank slopes: RMF and EDF-RMF. C.fr. Occasional. B: 11,891, 11,936, 12,117, and 12,301; K: 12,001.
- **Thuidium delicatulum* (Hedw.) B.S.G. Thuidiaceae. Shaded on log in spring seep: PBSCF. Rare. B: 11,906. Newly known in Nebraska, this species is rare in the Great Plains except in eastern Kansas and the Black Hills.
- Timmia megapolitana* Hedw. Timmiaceae. Shaded on banks: PBSCF. C.fr. Occasional. B: 11,865, 11,897, 11,995, and 12,060; K: 11,995.
- **Tortella humilis* (Hedw.) Jenn. Pottiaceae. Shaded on soil: PBSCF. C.fr. Rare. B: 12,414. This species was previously known in the Great Plains only from southeastern Kansas, eastern Oklahoma, and a single locality in Lyon County, northwestern Iowa.
- Tortula mucronifolia* Schwaegr. Pottiaceae. On partly sandy soil banks: RMF and EDF-RMF. C.fr. Occasional. B: 11,892, 11,935, and 12,118.
- T. ruralis* (Hedw.) Gaertn., Meyer & Scherb. Most commonly found on sandy soils: SP, MP, and SP-EDF-RMF. Very common. B: 11,869 and 11,887; K: 12,499 (with *Barbula acuta*).
- Weissia controversa* Hedw. Pottiaceae. Shaded on sandy soil: EDF-RMF. C.fr. Uncommon. B: 11,939. Newly known in the Niobrara Basin, this taxon is most common in the eastern third of Nebraska.

HEPATICAE

- Conocephalum conicum* (L.) Lindb. Conocephalaceae. On soil or over logs; associated with spring seeps: EDF and PBSCF. Frequent. B: 11,868 and 12,401; C: 12,430; K: 11,999.
- Frullania inflata* Gott. Jubulaceae. On decaying logs but most often on trees including *Fraxinus pennsylvanica*, *Ostrya*

virginiana, and *Quercus macrocarpa*: EDF-RMF and PBSCF. C.fr. Common. B: 12,042; C: reported by Churchill and Redfearn (1977); K: 11,993.

Lophocolea heterophylla (Schrad.) Dum. Lophocoleaceae. Shaded on soil and over logs: PBSCF. C.fr. Common. B: 11,955 and 12,059; C: 12,144 and *Kantak and Churchill 63-a*.

Marchantia polymorpha L. Marchantiaceae. On banks associated with spring seeps and marshes: FEDF and PBSCF. C.fr. Occasional. B: 11,967-a; C: 12,038.

Moerckia hibernica (Hook.) Gott. [*M. flotowiana* (Nees) Schiffner] Pallaviciniaceae. On moist to wet soil: EDF and PBSCF. C: reported by Churchill and Redfearn (1977).

Porella platyphylla (L.) Pfeiff. Porellaceae. Shaded on soil banks and over logs: PBSCF and EDF-RMF. C.fr. Occasional. C: 12,177 and *Kantak and Churchill 61*; K: 11,994. This liverwort was known previously only from a single collection made in 1888 from Cass County in southeastern Nebraska (Churchill and Redfearn, 1977).

Riccia frostii Aust. Ricciaceae. On wet sandbars associated with flood plains. C: reported by Churchill and Redfearn (1977).

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