
Ozobryum ogalalense (Pottiaceae), a New Moss Genus and Species from the American Great Plains

G. L. Smith Merrill

Division of Biology, Kansas State University, Manhattan, Kansas 66506-4901, U.S.A.

ABSTRACT. Among the bryophytes collected in northwestern Kansas by Vernon L. Wranosky of Colby, Kansas, during the summer of 1990 is a new genus and species of Pottiaceae, *Ozobryum ogalalense*. Subsequent collecting in the vicinity has resulted in two additional localities for this moss, one in Kansas and one in Nebraska.

Ozobryum ogalalense Merrill, gen. et sp. nov.

TYPE: U.S.A. Kansas: Decatur County, on Ogallala Formation mortarbeds above south fork of Sappa Creek, 25 km SW of Oberlin, 39°40'N, 100°43'W, ca. 800 m, 11 Aug. 1990, *Wranosky 62* (holotype, KSC; isotypes, DUKE, MICH, MO). Figures 1, 2.

Planta insignis foliis obtusatis margine incrassatis quasi succulentis, cellulis utroque folii paginae grosse mamilliosis, costa debili obscura utrinque cellulis mamilliosis occulta bene distincta.

Plants minute, growing in soft, compact cushions, to 2 cm high, dark green to yellowish green at surface of tufts, without a central strand. Leaves erect when dry, spreading at 45° or less when moist, concave, oblong-elliptic, rounded at the apex, 0.35–0.55 mm long, margins plane or erect. Costa ending well below the apex, thin and obscure, with 2 guide cells but no stereids, covered on both surfaces by short, bulging-mamillose cells similar to those of the lamina. Upper leaf cells bistratose (or 3-stratose) at the margins and in patches internal to the margins, rounded-hexagonal to subquadrate, ca. 7–9 μm, green and obscure, bulging on both surfaces, crowned with a broad, circular, knoblike thickening of the outer wall, centered over the lumen. Basal cells hyaline and subquadrate in a short area. Archegonial buds scattered along the stem, sometimes easily detached, with a tuft of rhizoids at the base. Perichaetial leaves smooth, ovate, acuminate, entire to unevenly serrate, the costa ending in the apex. Perigonia not seen.

Paratypes. U.S.A. KANSAS: Decatur County, type locality, 30 Apr. 1991, *Merrill 12888*; on N-facing mortarbed cliffs, "Elephant Rock," 2.5 km S of Traer, 30 Apr. 1991, *Merrill 12903*; Rawlins County, on mortarbeds above N fork of Sappa Creek, 22 km SE of

Atwood, 11 Aug. 1990, *Wranosky 69*, 30 Apr. 1991, *Merrill 12901*. NEBRASKA: Hitchcock County, on mortarbeds exposed in arroyo, 17.6 km NW of Herndon (Kansas), 30 Apr. 1991, *Merrill 12919*. Voucher specimens deposited in the Reed Bryophyte Herbarium, Kansas State University Herbarium (KSC).

The genus name *Ozobryum* is derived from "bryum" (moss) and from the fictional Land of Oz, the creation of American author L. Frank Baum, now popularly associated with the Kansas plains. The specific epithet "ogalalense" refers to the Ogallala Formation, named for a locality in southwestern Nebraska. The Ogallala is the principal aquifer throughout most of the High Plains from southern South Dakota to the Texas Panhandle.

The leaves of *Ozobryum* are highly distinctive and are characterized by their oblong-elliptic shape, the leaf cells bistratose and mamilliose on both surfaces, and the reduced costa obscured on both surfaces by short mamilliose cells. In its soft, dense cushions and habitat beneath ledges and in crevices on moist vertical cliff faces, *Ozobryum* resembles a miniature *Gymnostomum*. Under the hand lens the living plants have a peculiar frosted and succulent appearance due to the mamilliose cells and thickened leaf margins (Fig. 2). The perichaetial leaves are strikingly different in shape from the vegetative leaves, the cells rhombic, unistratose, and smooth or only slightly roughened at the extreme apex. The female buds, which are sometimes easily detached and have a tuft of rhizoids at the base, could function as vegetative propagules, as improbable as this may seem. No brood bodies have been observed so far.

At the suggestion of Richard Zander, I examined a series of 154 specimens (BUF) from Mexico and elsewhere representing his concept of *Molendoa sendtneriana* (B. S. G.) Limpr. (see Zander, 1977). The tropical American specimens mostly belong to the lax, glaucous-green, linear-leaved plant that corresponds to *Anoetangium obtusifolium* (Broth. & Par. ex Card.) Grout, illustrated by Crum & Anderson (1981). Among the Mexican specimens, however, are several that resemble *Ozobryum* in their small size, short blunt leaves, and thickened leaf margins.

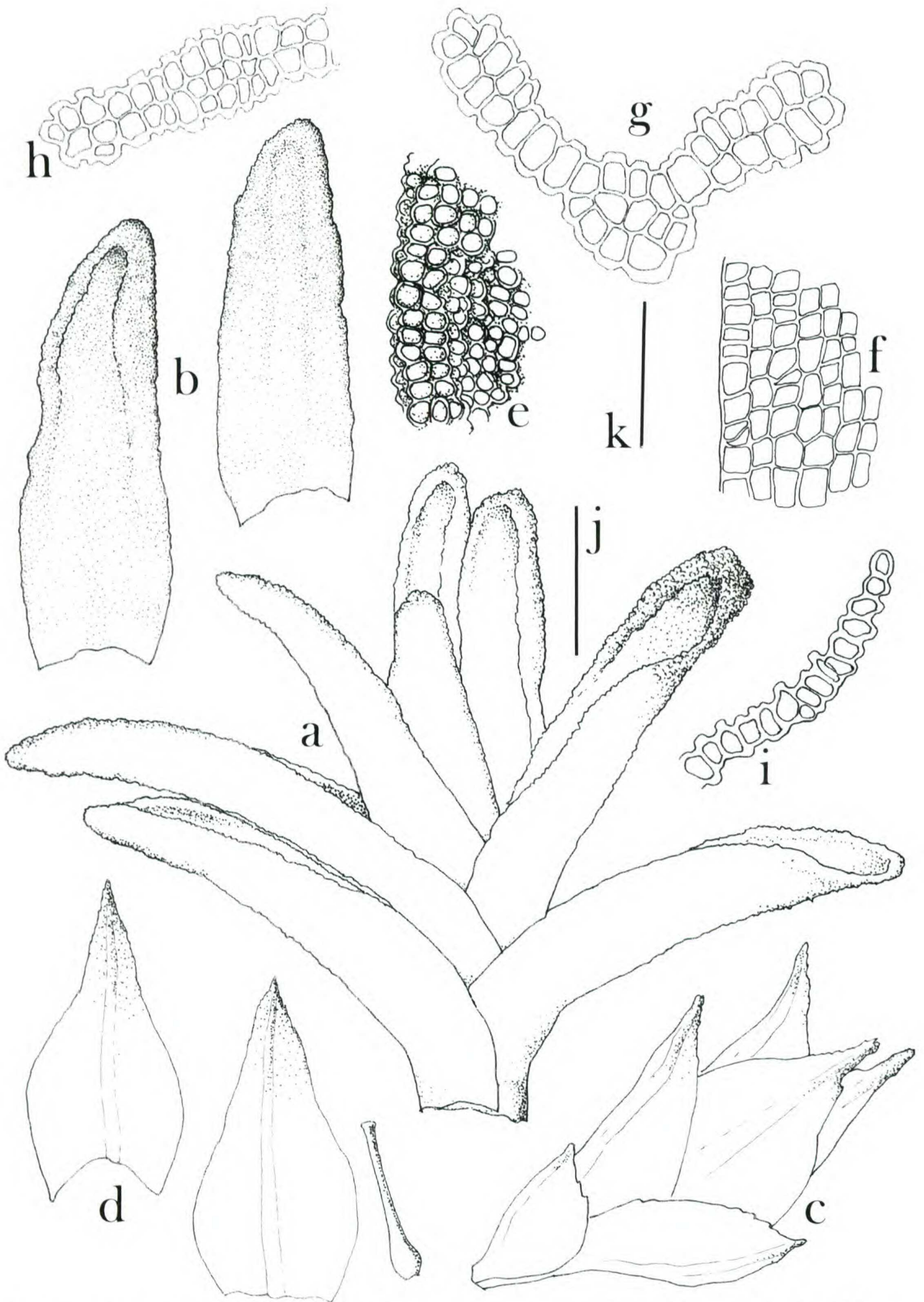


Figure 1. *Ozobryum ogalalense* Merrill. —a. Habit. —b. Leaves. —c. Archegonial bud. —d. Perichaetial leaves and archegonium. —e. Upper leaf cells at margin. —f. Marginal cells near base of leaf. —g. Cross section of leaf in upper third. —h. Cross section of thickened margin of leaf. —i. Cross section of margin near base of leaf. Scales $j = 0.2$ mm (a-d); $k = 0.05$ mm (e-i). (All drawings from Merrill 12888.)



Figure 2. Living plants of *Ozobryum ogalalense* Merrill, from the type locality (Merrill 12888); $\times 90$.

The leaf cells of *Ozobryum* are mamilllose, and the broad knoblike thickening of the outer cell wall is centered over the lumen. The leaf cells of these small Mexican plants, however, are distinctly cuticular-papillose. There are always several small papillae per cell, and they often extend over the cell wall and onto adjoining cells. The cells at the back of the costa are rather more distinct and elongate, and the costa is not obscured above by bulging cells like those of the lamina. The costa is not strongly developed in these Mexican plants, but all the leaf cross sections examined had a few dorsal stereids in the costa.

The lateral female inflorescences of *Ozobryum* indicate a placement in the subfamily Pleuroweisiidae, thus narrowing the field of potential relationships considerably. The other familiar pleurocarpous genera, *Anoectangium* and *Molendoa*, have distinctly papillose (or rarely almost smooth) leaf cells. Brotherus's drawing (Engler & Prantl, ed. 2) of *Pleuroweisia schliephackei* Limpr. is somewhat suggestive of *Ozobryum* in leaf shape and in habit. However, examination of isotypes (H) of this rare European species reveals that the leaves are also papillose. Moreover, they are unistratose, and the

margins are narrowly revolute for most of their length. The fertile branches with their convolute-tubular perichaetial leaves are also distinctive. Zander (1977) distinguished *Molendoa* from *Anoectangium* by the tendency to develop a ventral as well as a dorsal stereid band in the costa. Stereids and a central strand appear to be absent in *Pleuroweisia*, as they are in *Ozobryum*.

The original locality for *Ozobryum* in Decatur County, Kansas, is 36 km south of the Kansas-Nebraska state line and 114 km east of the Kansas-Colorado line. The Rawlins County collection was made about 8 km to the west. "Elephant Rock" is 25 km north, and the Hitchcock County, Nebraska, station is 43 km north of the type locality.

Mortarbeds are arkosic sand and gravel deposits that are partly or completely cemented by calcium carbonate, and are exposed locally as eroded benches or scarps (Walters, 1956). The name is derived from their resemblance to mortar, as well as to their use by early settlers in the area as natural mortar material.

The vegetation of the area is northern grama-buffalo grass prairie (*Bouteloua-Buchloe*), and mixed bluestem-grama prairie (*Andropogon-Bouteloua*)

(Küchler, 1974). The landscape may be described as a gently rolling, treeless plain with eroded rock outcrops (mortarbeds) exposed in low bluffs bordering the principal stream valleys, such as along Sappa and Beaver creeks. Floodplain forest (*Populus-Salix*) is confined to the valley bottoms.

Ozobryum is the second endemic species, and the first endemic genus of mosses to be recorded for the Great Plains. This is of considerable interest since the region is not known for endemism of either bryophytes or vascular plants. *Aschisma kansanum* Andr. is presently known only from south-central Kansas, growing beneath translucent, white quartz pebbles. *Ozobryum* may be more common than these few collections indicate, but its distributional range may be limited to those areas where mortarbeds occur at the surface. The Ogallala Formation is composed primarily of unconsolidated sands and gravels, and mortarbeds are discontinuous and localized (Walters, 1956; Hodson, 1969). Although extending over a huge area, the Ogallala is mostly buried beneath a thick deposit of Pleistocene alluvium and loess, forming a flat, almost featureless surface with poorly developed drainage. In other areas, the Ogallala was entirely removed by erosion prior to the deposit of the overlying loess.

Acknowledgments. Contribution no. 91-553-J from the Kansas Agricultural Experiment Station. Support was provided by Konza Prairie Research Natural Area and by NSF Grant BSR-8514327 for Long-Term Ecological Research to Kansas State University. I am indebted to Lewis Anderson, Howard Crum, and Richard Zander for comments and suggestions as to the identity of this moss and its possible relationships, and to the curators of BUF and H for the loan of specimens.

Literature Cited

- Crum, H. A. & L. E. Anderson. 1981. Moss Flora of Eastern North America. 2 vols. Columbia Univ. Press, New York.
- Hodson, W. G. 1969. Geology and ground-water resources of Decatur County, Kansas. State Geological Survey of Kansas, Bulletin 196: 1-41.
- Küchler, A. W. 1974. The potential natural vegetation of Kansas. Supplement to Ecology, vol. 55, no. 3.
- Walters, K. L. 1956. Geology and ground-water resources of Rawlins County, Kansas. State Geological Survey of Kansas, Bulletin 117: 1-100.
- Zander, R. H. 1977. The tribe Pleuroweisieae (Pottiaceae, Musci) in Middle America. The Bryologist 80: 233-269.