NEW RECORD OF *MYRIOPTERIS LINDHEIMERI* (HOOK.) J. SM. IN KIOWA COUNTY, OKLAHOMA

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ABSTRACT

Myriopteris lindheimeri (Hook.) J. Sm. (fairy swords; Pteridaceae) is an apogamous fern of the southwestern United States. Fairy swords are native to Arizona, New Mexico, Texas, and Oklahoma. The only two records in Oklahoma are from Comanche County: F.B. McMurry in 1942 and J.B. Beck with C.J. Rothfels in 2017. In this article, I report a new sighting from Kiowa County, describe the species, and explain how it can be distinguished from other southwestern Oklahoma species in the genus.

INTRODUCTION

Myriopteris lindheimeri (Hook.) J. Sm. (fairy swords; Pteridaceae), formerly *Cheilanthes lindheimeri* Hook. (Grusz and Windham 2013), is a fern of the southwestern U.S. that occurs in Arizona, New Mexico, Texas (Windham and Rabe 1993), and Oklahoma (Hoagland et al. 2004-present). The species has been classified as rare by the Oklahoma Natural Heritage Inventory with a SH rank (Oklahoma Natural Heritage Inventory 2018). The only occurrences in Oklahoma were reported from Comanche County (Hoagland et al. 2004-present) in 1942 and 2017. The 2017 specimens were deposited at the herbaria of the University of Oklahoma, University of Michigan, University of Duluth, and Wichita State University. A third sighting in Kiowa County in 2013 and 2016 is reported in this article. I will give a technical description of *M. lindheimeri* and describe general locations where it has been seen and collected. I will also include a simple dichotomous key to six southwestern Oklahoma species of *Myriopteris*.

METHODS AND MATERIALS

On March 18, 2013, my wife and I visited Lindheimer's Mountain (Figure 1) on the campus of Southwest Baptist Youth Camp in Kiowa County. I made two collections of what I thought were *Myriopteris rufa* Fée most likely because the blades appeared tomentose. To my surprise, both specimens were *M. lindheimeri*. On April 23, 2016, I visited the same location and again found a population (Figure 2) of what I thought was *M. rufa*. I made several collections, and once again I had made the same identification mistake as I did in 2013. Knowing how rare *M. lindheimeri* is, and knowing that the only record of its occurrence was in Comanche County, it took me by surprise. The 2013 and 2016 specimens will be deposited in the herbaria of the University of Oklahoma, University of Central Oklahoma, and Oklahoma State University. The exact location of the collection is not reported because of the status of *M. lindheimeri* as a species of conservation concern in Oklahoma.

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MYRIOPTERIS IN OKLAHOMA

Myriopteris in Oklahoma is composed of eight species that were formerly in the genus *Cheilanthes* (Grusz and Windham 2013). The eight species are typically separated by presence or absence of rachis scales and whether the fronds are clustered or separated on the rhizomes (Figures 2, 3, 4, and 5). Six of the eight species can be found on rocky slopes and ledges in the Wichita Mountains: *M. gracilis* Fée, *M. lanosa* (Michx.) Grusz and Windham, *M. rufa* Fée, *M. tomentosa* (Link) Fée, *M. wootonii* (Maxon) Grusz and Windham, and *M. lindheimeri*. Neither *M. alabamensis* (Buckley) Grusz and Windham nor *M. scabra* (C. Chr.) Grusz and Windham have been reported to occur in the Wichita Mountains. Both occur mainly on limestone rock; *M. alabamensis* is a northeastern Oklahoma species reaching its western limits in Murray County, and *M. scabra* has only been sighted in Murray County.

DESCRIPTION OF *MYRIOPTERIS LINDHEIMERI*

Plants growing in open rock crevices or rock overhangs or rocky ledges (see Figure 2; Figure 6). **Rhizomes** long creeping, fronds separate. **Fronds** all alike, 3.1-29.5 cm long, mostly erect; vernation noncircinate. **Stipes** straight or curving, brown; scales conspicuous. **Blades** oblong-lanceolate to ovate-deltate, 1.5-4 cm wide, 2-13 cm long, 3-4 times pinnately compound at the base; pinnulets or ultimate segments beadlike at the base; adaxial surfaces green, falsely appearing tomentose (the hairs have their origin from the ciliate scales that grow between the lobes of the ultimate segments from the abaxial surfaces to the adaxial surfaces); abaxial surfaces obscured by scales with ciliate margins. **Rachis** brown; scales conspicuous. **Costae** on adaxial surfaces green, obscured by scales. **Revolute margins (false indusia)** hidden or partially hidden by scales (Figure 7). **Sori** continuous.

KEY TO SOUTHWEST OKLAHOMA LIP FERNS, *MYRIOPTERIS*

1. Rachis and stipe scales absent; segmented hairs present.
   2. Ultimate segments beadlike. ..... *M. gracilis (=Cheilanthes feei)*
   2. Ultimate segments not beadlike. ..... *M. lanosa (=Cheilanthes lanosa)*
1. Rachis and stipe scales present; segmented hairs absent.
   3. Rhizomes short creeping. Fronds clustered, erect in center to ascending to descending on the outside.
      4. Scales on abaxial surfaces of costae conspicuous, margins erose-dentate. Blades about 6 times longer than wide. ..... *M. rufa (=Cheilanthes eatonii)*
      4. Scales on abaxial surfaces of costae inconspicuous, margins entire. Blades about 4 times longer than wide. ..... *M. tomentosa (=Cheilanthes tomentosa)*
   3. Rhizomes long creeping. Fronds separate, mostly erect.
      5. Adaxial surfaces of blades glabrous. Revolute margins (false indusia) on abaxial surfaces of blades conspicuous, not hidden by scales. ..... *M. wootonii (=Cheilanthes wootonii)*
      5. Adaxial surfaces of blade glabrous, but appearing tomentose (the hairs on the adaxial surface originate from the abaxial surfaces and grow between the lobes of the ultimate segments to the adaxial surface). Revolute margins (false indusia) on abaxial surfaces of blades inconspicuous, hidden or partially hidden by scales. ..... *M.lindheimeri (=Cheilanthes lindheimeri*)

DISCUSSION AND CONCLUSIONS

Currently *M. lindheimeri* is assigned a state rank of SH plant by the Oklahoma Natural Heritage Inventory (Oklahoma Natural Heritage Inventory 2018). SH plants are thought to be "possibly extinct or extirpated" in Oklahoma. With the two new sightings in Comanche and Kiowa counties, the status of the species will be upgraded to S1 (Amy Buthod, Oklahoma Natural Heritage Inventory, personal communication). S1 means the species is critically imperiled, with fewer than five populations. This is good news.

The number and size of the populations in the area in which it has been found are also important to conserving *M. lindheimeri*. The 2017 Wichita Mountains National Wildlife Refuge collection by Beck with Rothfels is from a single population of two small patches with at least 100 leaves (James Beck, Wichita State University, personal communication). I have no idea how many populations are on Lindheimer's Mountain; it is a large area that needs to be traversed on both sides. The picture taken in April 2016 is of a relatively large group of fairy swords. The population I visited in November 2018 (which may be the same population as the one located in 2016) is about 6 m^2 with nine groups about the size of those pictured in Figure 6. The area needs more visits to document the size of the population(s).

In conclusion, I am glad that Frank McMurry explored the Wichita Mountains and made a record of *M. lindheimeri*. Nice job J.B. Beck and C.J. Rothfels for successfully searching and finding *M. lindheimeri*, for the first time since 1942. It must have been an exciting day. Good news, it still lives in the Wichitas! Finally, I am glad we found it "thriving" in Kiowa County. Hopefully, additional populations will be found, its known range will be extended in both counties, and it will be found in other southwestern Oklahoma counties. I suggest Quartz Mountain Resort and Headquarters Mountain Hiking Trail in Granite (both in Greer County) as good areas to search. Let me know; I am ready.

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Figure 1 Lindheimer's Mountain (name given by the author), Southwest Baptist Youth Camp, near Quartz Mountain Resort. Photo by Bruce Smith.

Figure 2 *Myriopteris lindheimeri* (= *Cheilanthes lindheimeri*), fairy swords, growing under a granite rock overhang on Lindheimer's Mountain, Southwest Baptist Youth Camp. Note the long stretching rhizome, separate erect fronds, and adaxial surfaces appearing tomentose. Photo taken by Bruce Smith.

Figure 3 *Myriopteris wootonii*, beaded lip fern. Rhizomes long creeping, fronds separate. Photo by Bruce Smith.

Figure 4 *Myriopteris rufa,* Eaton's Lip fern, on Headquarters Mountain Hiking Trail in Granite, Oklahoma. Note the clustered fronds and the white hairs on the blade surfaces. Photo by Bruce Smith.

Figure 5. *Myriopteris tomentosa*, wooly lip fern. Rhizomes short creeping, fronds clustered. Photo by Bruce Smith.

Figure 6 *Myriopteris lindheimeri* growing in an open granite rock crevice on Lindheimer's Mountain, Southwest Baptist Youth Camp. Photo by Bruce Smith.

Figure 7 Abaxial surfaces of *M. lindheimeri* (top) and *M. wootonii* (bottom). Note the revolute margins (false indusia) hidden or partially hidden by scales on *M. lindheimeri.* Photo by Bruce Smith.