SIGNIFICANT RANGE EXTENSION OF *STREPTANTHUS SQUAMIFORMIS* (BRASSICACEAE), A OUACHITA MOUNTAIN ENDEMIC

Virginia L. McDaniel

Southern Research Station, U.S.D.A Forest Service
607 Spring St., Hot Springs, Arkansas 71901, U.S.A.
virginia.l.mcdaniel@usda.gov

Brent Baker

P.O. Box 337
Dardanelle, Arkansas 72834, U.S.A.

Theo Witsell

Arkansas Natural Heritage Commission
1100 North St.
Little Rock, Arkansas 72201, U.S.A.

Susan L. Hooks

Retired, Ouachita National Forest
U.S.D.A. Forest Service
Hot Springs, Arkansas 71901, U.S.A.

ABSTRACT

Streptanthus squamiformis Goodman (Brassicaceae) is a plant narrowly endemic to the Athens Plateau; Central Hills, Ridges, and Valleys; and Central Mountain Ranges ecoregions of the Ouachita Mountains, and previously known from five adjacent counties in western Arkansas and southeastern Oklahoma. We document a 100-km range extension of this species to Perry County in central Arkansas, its first occurrence in the Fourche Mountains Ecoregion.

RESUMEN

Streptanthus squamiformis Goodman (Brassicaceae) es un endemismo restringido que se encuentra en la ecorregión Meseta Athens; Central Hill, Ridges, y Valleys; y las ecorregiones de Central Mountain Ranges de las Montañas Ouachita. Previamente conocida de 5 condados adyacente del oeste de Arkansas y sureste de Oklahoma. Documentamos una ampliación de rango de 100 kilómetros de esta especies hasta el condado de Perry en el centro de Arkansas, el primero en la ecorregión del las montañas Fourche.

Key Words: endemic plant, *Streptanthus squamiformis*, *Streptanthus maculatus* subsp. *obtusifolius*, range extension, Ouachita Mountains, Fourche Mountains Ecoregion

INTRODUCTION

Two taxa in the genus *Streptanthus* Nutt. (twistflowers or jewelflowers, Brassicaceae) are endemic to the Ouachita Mountains in Arkansas and Oklahoma (Gentry et al. 2013; ANHC 2022). On 10 April 2020, Virginia McDaniel documented the first known occurrence of the genus in Perry County, Arkansas, when she found *Streptanthus squamiformis* Goodman (Ouachita twistflower or pine-oak jewelflower) in the South Fourche Botanical Area of the Ouachita National Forest. This occurrence represents a 100-km range extension for this narrowly endemic species. It was previously known from an approximately 2600-km2 (50km*75km) area within five adjacent counties—Howard, Pike, Polk, and Sevier in western Arkansas and McCurtain in southeastern Oklahoma (Al-Shehbaz 2010; Baker 2013, 2015; NatureServe 2022; Fig. 1).

This newly discovered population was located on a steep, south-facing sandstone glade above the South Fourche La Fave River. It was confined to open, exposed glades and predominantly was associated with thin soils adjacent to steep sections of exposed sandstone bedrock of the Lower Atoka Formation (Haley et al. 1976; Fig. 2). Approximately 200 plants were found in a 4000-m2 area in the vicinity of the new population. Plant associates included *Cheilanthes lanosa, Cunila origanoides, Dichanthelium linearifolium, Eriogonum longifolium, Helianthus hirsutus, Nuttallanthus texanus, Quercus stellata, Salvia azurea, Schizachyrium scoparium, Tradescantia ohiensis*, and *Triodanis biflora*.

Voucher Specimens: **ARKANSAS. Perry Co.:** Ouachita Mountains, Fourche Mountains Ecoregion, Ouachita National Forest, South Fourche Botanical Area, from [CR] 207 (Casa-Alpin Rd.) go W ~3.8 mi on CR 37, continue left (N) for 0.5 mi to top of the hill, go right on road across ridge (through deep puddle) to camp spot, growing in a south-facing sandstone glade, vicinity of 34.91696°, –93.05564°, 10 Apr 2020, *McDaniel 3750* (ANHC) https://doi.org/10.15468/dl.6b4w5d; Ouachita Mountains, Fourche Mountains Ecoregion, Ouachita National Forest, South Fourche Botanical Area, from [CR] 207 (Casa-Alpin Rd.) go W ~3.8 mi on CR 37, continue left (N) for 0.5 mi to top

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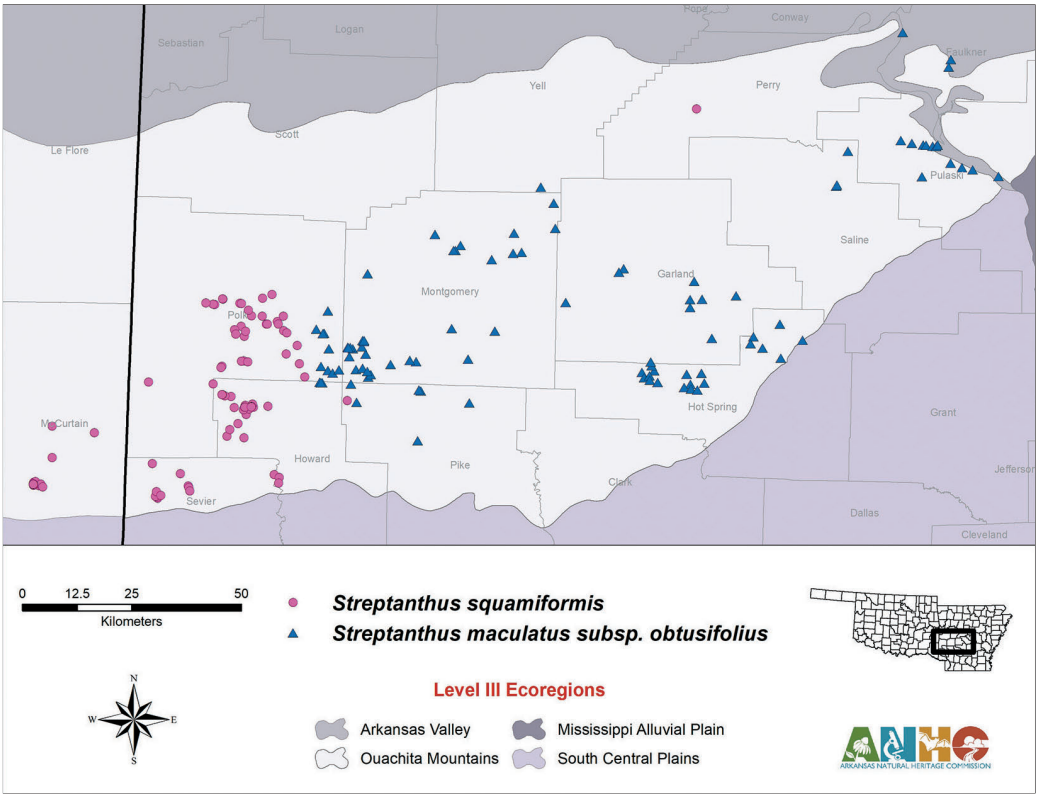

Fig. 1. Range of *Streptanthus squamiformis* (pink circles) and *S. maculatus* subsp. *obtusifolius* (blue triangles) in the Ouachita Mountains Ecoregion of Arkansas and Oklahoma. Occurrence data for Arkansas is primarily from the ANHC (2022), with supplemental data from iNaturalist (2022). Occurrence data for Oklahoma is from iNaturalist (2022) and herbarium records available on SERNEC (2022).

of the hill, go rightt on road across ridge (through deep puddle) to camp spot, located 600 ft W, growing in a very steep south-facing sandstone glade, western extent of population on this glade, flws magenta, vicinity of 34.91702°, –93.05645°, 1 May 2020, *McDaniel 3785* (OUF).

Streptanthus squamiformis, an annual herbaceous plant in the mustard family (Brassicaceae), has been considered endemic to the southwestern portion of the Ouachita Mountains in Arkansas and Oklahoma, restricted to portions of the Athens Plateau; Central Hills, Ridges, and Valleys; and Central Mountain Ranges ecoregions (Goodman 1956; Woods et al. 2004).

Streptanthus squamiformis superficially resembles *S. maculatus* Nutt. subsp. *obtusifolius* (Hook.) Rollins which is known only from the Arkansas portion of the Ouachita Mountains (Fig. 1). *Streptanthus squamiformis* is distinguished from *S. maculatus* subsp. *obtusifolius* by the presence of squamous hairs on the sepals and pedicels (Fig. 3) and by its narrow, acuminate leaf apices (Fig. 2). *Streptanthus maculatus* subsp. *obtusifolius* lacks hairs and has broadly rounded leaves with obtuse apices (Fig. 3).

Streptanthus squamiformis and *S. maculatus* subsp. *obtusifolius* are tracked by the Arkansas Natural Heritage Commission as plants of conservation concern in Arkansas, but *S. squamiformis* is less common and has been thought to have a much narrower geographic range (Baker 2013, 2015). *Streptanthus squamiformis* has a global conservation status rank of G2 (globally imperiled, NatureServe 2022) and a state conservation status rank of S2 (state imperiled) in both Arkansas and Oklahoma. The global conservation status rank for *S. maculatus* subsp. *obtusifolius* is G3T3 (globally vulnerable) and its state conservation status rank is S3 (state vulnerable) in Arkansas.

Fig. 2. Habitat **(a)** and close-up **(b)** of *Streptanthus squamiformis* growing on steep, south-facing sandstone glades of the Lower Atoka Formation at the South Fourche Botanical Area, Ouachita National Forest, Perry County, Arkansas, on 10 April 2020. Photos by Virginia McDaniel.

Fig. 3. Flowers and calyx of a. *Streptanthus squamiformis* showing squamous hairs and b. *S. maculatus* subsp. *obtusifolius* with no hairs. Photos by Brent Baker.

This newly discovered population of *S. squamiformis* is the first to be found in the Fourche Mountains Ecoregion, the northernmost of the Level IV ecoregions of the Ouachita Mountains (Woods et al. 2004). Although *S. maculatus* subsp. *obtusifolius* populations are known from the central and eastern portions of the Fourche Mountains Ecoregion, the newly discovered *S. squamiformis* population is located in a rather large and curious gap in the distribution of the former (Fig. 1). More surveys and inventories of glades and woodlands of the Fourche Mountains are needed to better elucidate the extent of *Streptanthus* in Arkansas. Management of the forests and glades on the Ouachita National Forest could play a role in where *Streptanthus* are found. Anecdotal evidence suggests that fire may promote the germination of *Streptanthus* (McDaniel 2014). Likewise, a lack of fire could inhibit germination because of increased leaf litter and shading, making it difficult to find populations. Additionally, a detailed geological analysis of sites occupied by both species also is warranted but is beyond the scope of this paper. A thorough understanding of the geology and soil chemistry at each site may help provide insight into the specifics of each taxon's distribution.

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