Gaddy, L.L. 2011. A new species of *Hexastylis* (Aristolochiaceae) from the Sandhills of North and South Carolina. Phytoneuron 2011-47: 1–5. Published 14 September. ISSN 2153 733X

A NEW SPECIES OF *HEXASTYLIS* (ARISTOLOCHIACEAE) FROM THE SANDHILLS OF NORTH AND SOUTH CAROLINA

L. L. GADDY
terra incognita
125 South Edisto Avenue
Columbia, South Carolina 29205
llgaddy@bellsouth.net

ABSTRACT

Hexastylis sorriei is a new species of *Hexastylis* from the Sandhills of the Inner Coastal Plain of the Carolinas. It is closely related to *Hexastylis minor* and has frequently been mistaken for *Hexastylis virginica*.

KEY WORDS: *Hexastylis, Hexastylis minor, Hexastylis sorriei, Hexastylis virginica,* Sandhills, North Carolina, South Carolina.

In the spring and summer of 2004, I conducted fieldwork at Camp Mackall, a United States military installation just south of Fort Bragg in Cumberland Co., North Carolina, in the Sandhills of the Inner Coastal Plain physiographic province. On several occasions, I encountered a strange *Hexastylis* growing on wet, acidic slopes under cinnamon fern (*Osmunda cinnamomea*) along the margins of streamhead pocosins. Most plants had only a leaf or two, and only a few plants had flowers. The calyces of the flowers were similar to those of *Hexastylis minor* (Ashe) Blomquist, a North Carolina-South Carolina-Virginia endemic found on clayey soils of the Piedmont (see Gaddy 1987 for distribution maps). A review of herbarium specimens from the area revealed that most *Hexastylis* collections from the North Carolina Sandhills had been identified as *H. minor* or *H. virginica* (L.) Small. Later, in 2005, while annotating specimens at the herbarium at the University of North Carolina at Charlotte, I saw a specimen of *Hexastylis* from an acidic, ecotonal habitat in the Sandhills of Chesterfield Co., South Carolina. It was determined to be *H. minor* and had been previously annotated by me as "possibly" *H. virginica*. Although most *Hexastylis* species are acidophiles, I found it strange that this sandhill *Hexastylis*, found in hyperacidic soils, could be *H. minor*, a common Piedmont species known for its ability to grow on the less acidic Piedmont clays. Furthermore, the calyx lobes on all the flowers of the sandhill plants I had seen in the field and the ones I had annotated were spreading (not erect as in *H. virginica*) and too long to be called *H. virginica*. I, therefore, decided to take a closer look at these sandhill plants.

In the spring of 2005 through the spring of 2011, I made additional field trips to Fort Bragg and the Sandhills of North and South Carolina and saw the same plant at various wet, acidic habitats — even growing with *Dionaea muscipula* at one site and with *Sarracenia purpurea* and *Sarracenia rubra* at another. I collected numerous flowers at each site for morphological studies. In the spring of 2005, I visited the Chesterfield Co. population and studied fresh flowers from there. In the winter of 2007, I reviewed the holdings of the herbarium at the University of North Carolina-Chapel Hill (NCU). In the spring of 2007, I revisited most of the populations identified as *Hexastylis minor* and *H. virginica* in Cumberland, Harnett, Hoke, Moore, Richmond, Robeson, and Scotland counties. None of the populations I visited in the xeric Sandhills of North Carolina appeared to be either good *H. minor* or *H. virginica.*

After several years of observation and analysis of the floral and leaf characteristics of these sandhill *Hexastylis* plants, I have concluded that these populations represent a new species of *Hexastylis,* which I am calling *Hexastylis sorriei,* the Sandhills Heartleaf. I take pleasure in naming

this species after Mr. Bruce A. Sorrie, Research Associate at the UNC-Chapel Hill Herbarium, sandhill botanist and naturalist.

HEXASTYLIS SORRIEI Gaddy, sp. nov., Figures 1 and 3. **TYPE**: **USA**. **North Carolina**. Hoke Co.: In burned ecotonal area under *Osmunda cinnamomea*, along E side of Juniper Creek just S of Plank Road, ca. 5 mi NNW of Raeford, on Fort Bragg Military Installation, 14 May 2007, *L.L. Gaddy 051407* (holotype: USCH).

Hexastyli minor (Ashe) Blomquist affinis sed differt foliis non variegatis vel leviter variegatis; *Hexastyli virginicae* (L.) Small affinis sed differt lobis calycis patentibus (non erectis).

Rhizomes: internodes short, leaves crowded at rhizome apex. **Leaf blades:** variegated to not variegated, cordate, usually 2–8 leaves per plant. **Flowers:** usually 2–4 flowers per plant, calyx tube cylindric to cylindric-campanulate, sometimes with a prominent transverse ridge (flare) just below the sinuses, calyx length 8–18 mm, calyx width 8–16 mm (flare to 16 mm wide), inner surface longitudinally ridged with reticulations between ridges, reticulation deep and finely dissected, calyx tube thin and easily torn, calyx lobes 4–8 mm long, spreading, 6–8 mm long, 10–12 mm wide, adaxially puberulent; stamen connective not extending beyond pollen sacs; ovary ca. 1/3 inferior, ovules 6 per locule; style notched at apex (format follows Whittemore and Gaddy 1997).

Hexastylis sorriei is most similar and probably most closely related to *Hexastylis minor.* It differs from *H. minor*, however, in many ways: 1) the leaves of *H. sorriei* display sparse to no variegation, while those of *H. minor* are densely variegated, almost to the point of being white in the central portion of the leaf, as shown in Fig. 2; 2) the flowers of *H. sorriei* are generally smaller than those of *H. minor* and have greater color variation (the flowers of *H. minor* are nearly always purple or whitish-purple, Fig. 4 — those of *H. sorriei* often have white or greenish-white bases and are frequently greenish when they first open); and 3) the internal ridged reticulation in the flowers of *H. sorriei* is usually more finely dissected and deeper than that found in the flowers of *H. minor.*

Additional collections examined: **NORTH CAROLINA. Cumberland Co.**: Fort Bragg Military Reservation, south side of Little River, 1.1 mi E of Lamont Road, 17 April 1993, *B.A. Sorrie* (NCU); sandy area above cypress pond with *Vaccinium*, Gordon Butler Nature Preserve, Hope Mills, 30 March 1990, *D.P. Jensen 3* (NCU). **Moore Co.**: deciduous thicket near stream, Weymouth Woods—SNP, Southern Pines, 08 April 1973, *J.H. Carter, 453* (NCU). **Richmond Co.**: bay forest, Hitchcock Creek, 3 ½ miles west of Marston, *19 May 1956, A.E. Radford 11356* (NCU); **Robeson Co.**: margin of pocosin 3 ½ mi. northwest of Parkton near county line, 5 April 1958, *R.F. Britt 1616* (NCU). **SOUTH CAROLINA. Lancaster Co.**: in thicket margins of streamhead pocosin with *Osmunda cinnamomea* and *Fothergilla gardenii* on headwaters of unnamed creek approximately 3 mi SSE of Kershaw (0.4 mi NE of jct of County Roads 770 and 769), 4 May 2007, *L.L. Gaddy 050407* (USCH). **Chesterfield Co.**: Carolina Sandhills National Wildlife Refuge, thickety woods at Lake 12, 2 May 1982, *Tom Daggy 8953* (UNCC).

There is a *Hexastylis* specimen from Darlington Co., South Carolina, that is labeled *Hexastylis virginica*. This specimen has been cited (Blomquist 1957; Radford et al. 1968; Gaddy 1987) as the only South Carolina record for this species. I revisited the site (the boggy edges of a sandhill pond) but could not find any *Hexastylis* plants. Based on the habitat, however, I am confident that this collection was from a population of *H. sorriei*. *Hexastylis virginica* probably does not occur in South Carolina. **Darlington Co.:** Kilgore's Pond woods, *21 Apr 1932, Budd Smith s.n.* (NCU).

Figure 1. *Hexastylis sorriei* leaves emerging from soil after a fire (note lack of variegation).

Hexastylis sorriei is noteworthy in its ability to withstand and prosper in an ecotonal habitats exposed to frequent, hot fires. Here, the Sandhills Heartleaf grows with *Nyssa biflora*, *Acer rubrum*, [rarely with *Chamaecyparis thyoides*, *Osmunda cinnamomea*, *Clethra alnifolia*, *Ilex glabra*, *Ilex coriacea*, *Lyonia lucida*, *Cyrilla racemiflora*, *Fothergilla gardenii*, *Magnolia virginiana*, *Persea palustris*, *Sarracenia rubra*, *Sarracenia purpurea*, *Sphagnum* spp., and, very rarely, *Dionaea muscipula* (the latter only in North Carolina). The first year after fire, *Hexastylis sorriei* sprouts and flowers. The second year after fire, as its habitat gradually becomes more crowded with stems of other species, it produces fewer leaves and flowers. After several years without fire, most plants have only one or two leaves and flowers are very hard to find. Some historic locations where fire has been absent for decades have no plants at all today. Even with fire, it produces smaller clumps than most species of *Hexastylis* — a "large" clump of *H. sorriei* has about 8 leaves and 4 flowers, while in other species of *Hexastylis*, healthy clumps often have around 20 leaves and nearly as many flowers. *Hexastylis sorriei* can generally be said to be rare and local. Fort Bragg and Camp Mackall, where annual burning is widespread, are the only locations where the Sandhills Heartleaf can be said to be common.

Figure 2. *Hexastylis minor* — typical densely variegated leaf.

Key to *Hexastylis sorriei* and Related Species

1. Calyx tube cylindrical to urceolate, lobes 2–4 mm long ..... ***Hexastylis virginica***
1. Calyx tube cylindrical, lobes 4–15 mm long.

    2. Calyx tube longer than wide.

        3. Calyx tube opening 8–12 mm wide, greater than ½ lobe length ..... ***Hexastylis heterophylla***
        3. Calyx tube opening 3–8 mm wide, less than ½ lobe length ..... ***Hexastylis naniflora***

    2. Calyx tube about as wide as long, or wider than long.

        4. Calyx tube about as long as wide, opening width less than the lobe length ..... ***Hexastylis heterophylla***
        4. Calyx tube wider than long, opening width greater than the lobe length.

            5. Calyx tube 12–25 mm long, leaves always densely variegated ..... ***Hexastylis minor***
            5. Calyx tube 8–18 mm long, leaves sparsely variegated to not variegated . ***Hexastylis sorriei***

ACKNOWLEDGEMENTS

I would like to thank Dr. Alan Weakley, Curator of the Herbarium, University of North Carolina, and Mr. Bruce Sorrie, Research Associate at the UNC Herbarium, for reviewing several drafts of this paper. Thanks also go to Dr. John Nelson of the A.C. Moore Herbarium of the University of South Carolina for assisting me with vouchers of this species. Initial observations of this species at Fort Bragg, North Carolina, were made during fieldwork that was part of an endangered species contract between the U. S. Army and Ecological Associates of Wadmalaw Island, SC. Thanks to Mr. Nick Roark of Ecological Associates for allowing me to participate in that inventory.

LITERATURE CITED

Blomquist, H.L. 1957. A revision of *Hexastylis* of North America. Brittonia 8: 255–281.

Gaddy, L.L. 1987. A review of the taxonomy and biogeography of *Hexastylis* (Aristolochiaceae). Castanea 52: 186–196.

Radford, A.E., H.E. Ahles, and C.R. Bell. 1968. Manual of the Vascular Flora of the Carolinas. Univ. of North Carolina Press, Chapel Hill.

Whittemore, A.T. and L.L. Gaddy. 1997. *Hexastylis* (Aristolochiaceae). Pp. 54–58, *in* Flora of North America Editorial Committee (eds.). Flora of North America, Vol. 3. Oxford Univ. Press, New York.

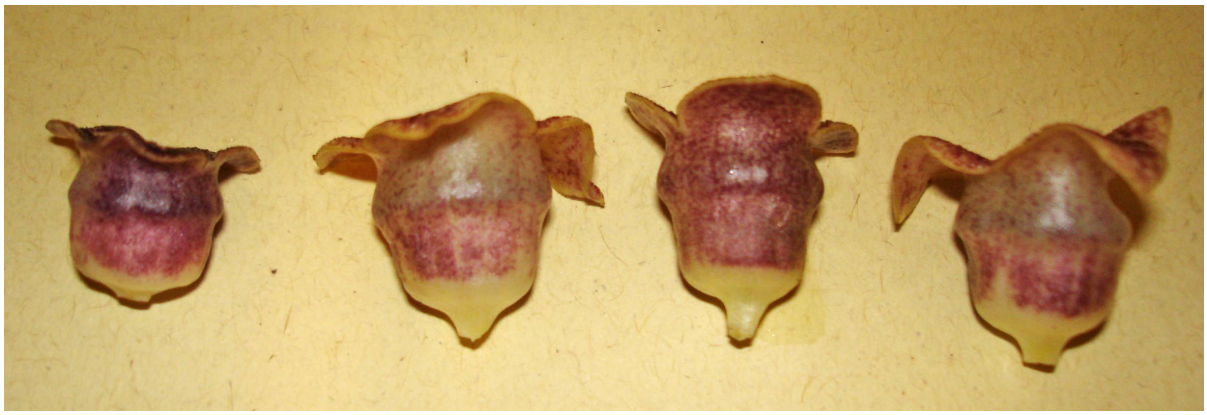

Figure 3. Flowers of *Hexastylis sorriei* Gaddy.

Figure 4. *Hexastylis* flowers left to right: *H. virginica* (note short, erect calyx lobes), *H. heterophylla, H. minor,* and *H. naniflora*. Note white bases of *heterophylla* and *naniflora.*