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Asarum chueyi (Aristolochiaceae), a new species from the foothills of the Blue Ridge Mountains of Tennessee and Virginia, USA

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Abstract

The forests of eastern North America continue to yield new species, despite more than 200 years of botanical exploration. As a result of fieldwork conducted from 2012–2014, a new *Asarum* (Aristolochiaceae) species was found in the foothills of the Blue Ridge Mountains of Tennessee and Virginia. This species, *A. chueyi*, is here distinguished from other North American *Asarum* species by a unique combination of several morphological characters (calyx tube shape, style extension length, abaxial sepal reticulation, and stamen morphology). Furthermore, a taxonomic key to the species of Blomquist's informal *Virginica* group, along with a new combination for *Hexastylis sorriei* Gaddy, which has not been validly published in *Asarum*, is provided.

Key words: *Asarum*, *Hexastylis*, Elliptical Fourier analysis, floral morphometrics, magnoliids, Piperales, Wild Ginger

Introduction

The genus *Asarum* (Aristolochiaceae) comprises approximately 100 species distributed in both the Old and New Worlds (Cheng and Yang, 1983; Huang *et al.*, 1995), 17 of which are found in North America (Gaddy, 1987; Whittemore and Gaddy, 1997, Whittemore *et al.*, 1997; Kelly, 1997, 1998, 2001). Our own work (Sinn *et al.*, 2015a) and that of others has shown (Kelly, 1997, 1998; Niedenberger, 2010) that the North American members of *Asarum* do not form a monophyletic group, but instead comprise two separate monophyletic groups. North American *Asarum* species with separate sepals, two deciduous leaves per node, and flowers that are autonomously self-pollinated via delayed stamen movement are found on both the east and west coasts, and form a clade that falls within *Asarum* subgenus *Asarum*. North American taxa that produce a single evergreen leaf per node and herkogamous flowers with connate sepals are restricted to the eastern portion of the continent and have been placed within *Asarum* subgenus *Heterotropa* (Kelly, 1997; 1998) section *Hexastylis* (Araki, 1937). Species of subgenus *Heterotropa* have showy, complex calyces that may mimic the sporocarps of basidiomycete fungi (Vogel, 1978; Lu, 1982; Sugawara, 1988; Leins and Erbar, 2010) and appear to have influenced the diversification of this subgenus (Sinn *et al.*, 2015b). The North American members of this subgenus remained under-collected and under-described, most obviously due to their often restricted ranges, low growth habit, early flowering period, and the difficulty of working with the deformed flowers of pressed material (Ashe, 1897; Weakley, 2012).

Several populations of difficult to identify herbarium specimens were located during fieldwork completed during the springs of 2012 and 2013; these populations represent a species new to science, *Asarum chueyi* B.T.Sinn. Additional *A. chueyi* localities in the foothills of the Blue Ridge Mountains of Virginia and Tennessee were discovered during the spring of 2014. This new species is described herein, and is distinguished from sympatric and morphologically similar species.

Materials and Methods

The holdings of BOON, CLEMS, FLAS, GA, GH, MO, MICH, NCSC, NY, PH, TENN, US, WCUH, WVA, and YUO were studied. Keys and descriptions published by Blomquist (1957), Gaddy (1987, 2011), Whittemore and

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