

Swainson's Warbler (*Limnothlypis swainsonii*) in a Monoculture of Invasive Japanese Knotweed (*Reynoutria japonica*)

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Abstract - This paper reports the first record of a territorial *Limnothlypis swainsonii* (Swainson's Warbler) associated with the invasive *Reynoutria japonica* (Japanese Knotweed). The observation adds to a growing body of literature documenting rapid behavioral adaptation to novel habitats in this globally rare warbler.

Limnothlypis swainsonii Audubon (Swainson's Warbler), reaches its highest breeding abundance in early-successional hardwood forests on the coastal plain of the southeastern US (Graves 2002, Graves and Tedford 2016, Meanley 1971). It also breeds in a bewildering variety of other habitats (Anich et al. 2010) that provide the essential common denominators of high understory-stem density, visual screening, and copious leaf litter (Graves 1998, Graves and Tedford 2016). Populations in the core breeding range have exhibited rapid behavioral adaptation to novel habitats, extending to the colonization of young *Pinus* (pine) plantations (Bassett-Touchell and Stouffer 2006, Carrie 1996, Graves 2015, Henry 2004).

Peripheral breeding populations of Swainson's Warbler in the Appalachian Mountains occur in *Rhododendron* (rhododendron) and *Kalmia* (laurel) thickets and mixed mesophytic cove forest from northern Georgia to West Virginia (Brooks and Legg 1942, Lanham and Miller 2006, Legg 1946, Sims and DeGarmo 1948). Virtually nothing is known about the quantitative patterns of habitat selection or the behavioral responses of montane populations to anthropogenic habitats and invasive non-native plants. Here, I report the first record of a territorial Swainson's Warbler associated with the invasive *Reynoutria japonica* Houtt. (Japanese Knotweed, hereafter, Knotweed) in Mingo County, WV. This plant is more widely known in literature as *Fallopia japonica* (Houtt.) Ronse Decr. or *Polygonum cuspidatum* Siebold and Zucc. (Del Tredici 2017).

Classified as one of the 100 worst invasive alien species in the world (Lowe et al. 2004), Knotweed was introduced in New York as a garden ornamental before 1870 (Barney 2006, Del Tredici 2017). By 2000, it had been collected in 71% of the counties in New York, Pennsylvania, Maryland, and the New England states (Barney 2006), and had also escaped cultivation at numerous sites within the breeding range of Swainson's Warbler from West Virginia to Louisiana. The perennial Knotweed readily invades riparian corridors, spreads rapidly through rhizomatous growth, and frequently forms dense monocultures that can dominate light gaps and invade mowed rights-of-way (Aguilera et al. 2010, Barney 2006, Hollingsworth and Bailey 2000). Knotweed stands commonly exhibit high densities (27–48 stems/m²) (Maurel et al. 2013, Wilson et al. 2017). The semi-woody stems die back to ground level in winter; spring growth can reach full stature (2–3 m high) by mid-May. Dense foliage of mature monocultures creates deep shade at ground level.

On 28 May 2006, I encountered a territorial male Swainson's Warbler singing from a riparian stand of Knotweed on the flood plain of Thacker Creek (222 m above sea level),

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Mingo County, WV (37°35.73'N; 82°7.74'W). The Knotweed monoculture (2–5 m wide) paralleled the mowed roadside right-of-way for ~50 m and penetrated the understory of the adjacent second-growth deciduous forest (Fig. 1). The male foraged on the ground and sang periodically in the dense shade of the Knotweed stand during the observation period (35 min). I recorded a series of songs (GRG 593) and then conducted playback trials (Graves 1996) to test the male's fidelity to the Knotweed stand. The playback recording consisted of a mixture of songs and chip notes from several males. The territorial male followed the playback (77 dB at 20 m) eastward along the road for ~150 m. It returned quickly to the center of the Knotweed stand when the playback ceased and resumed singing. This behavior is typical of males on breeding territories (Graves 2001, 2002; Graves and Tedford 2016). The territory was on private property; thus, I did not quantify stem density in the Knotweed stand or determine the off-road boundaries of the breeding territory with playback trials.

The Knotweed stand appeared to provide the essential elements found on all Swainson's Warbler breeding territories—visual screening and shade at ground level, high understory-stem density, and leaf litter (Graves 1998, 2001, 2002; Graves and Tedford 2016). Intermixed vines, shrubs, and tree saplings at the margins of the Knotweed monoculture provided abundant potential nesting sites.

The seemingly inexorable spread of Knotweed into the southeastern US will likely result in fundamental changes in both species diversity and physiognomy of local plant communities (Wilson et al. 2017) and concomitant changes in avian breeding communities. The sole paper published thus far on the effects of Knotweed on bird populations in North America found that the breeding abundance of 3 species in Pennsylvania was positively correlated with the percent coverage of Knotweed along census transects, while a fourth species showed a negative correlation (Serniak et al. 2017). This study, however, did not describe how affected species used Knotweed stands as habitat or as a foraging resource. The case reported here suggests that invasive Asian knotweeds (*Reynoutria* spp.) may provide suitable breeding habitat for the globally rare Swainson's Warbler.

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Figure 1. Two views of a stand of Japanese Knotweed occupied by a territorial male Swainson's Warbler in Mingo County, WV.

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