Noteworthy Collections

Tennessee
A Novel Hybrid Apomictic Eupatorium (Asteraceae) from the Southern Appalachians

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Apomixis as an evolutionary phenomenon evokes different responses from plant biologists depending on the lens through which it is viewed. For plant breeders, it is seen as the “holy grail” of modern plant breeding for its potential as a tool to stabilize and perpetuate hybrid genotypes indefinitely (Hofmann 2010). In contrast, for plant taxonomists, apomixis can create problems because it leads to difficulties in classification for groups in which it occurs, where species boundaries may become blurred and decisions must be made about how many and which groups to recognize (Eriksen 1999). In either case, additional knowledge of apomixis is needed.

A major contributor to taxonomic complexity in Eupatorium L. stems from the occurrence of apomixis in the genus (Sullivan 1976). This phenomenon, almost always associated with polyploidy, can lead to production of stable hybrid genotypes that are perpetuated indefinitely, creating lineages that in many aspects resemble species. The apomictic lineage will often have a distinctive morphology relative to either original parent and thus be recognizable. In situations where many hybrid apomicts of a given phylogenetic background may be created independently, there is even the potential for a range of variability beyond what might be expected from accumulation of somatic mutations within a clone (Grubbs et al. 2009). Plant hybrids often include many features that do not show simple intermediacy (or additivity) relative to parental lineages, so it is not always straightforward to identify the associated parental species. The use of molecular phylogenetic markers has allowed resolution of the parentage of many hybrid apomicts in Eupatorium. For some, such as Eupatorium godfreyanum Cronquist, the molecular markers match morphological information in confirming its original parents as Eupatorium rotundifolium L., and Eupatorium sessilifolium L. (Siripun and Schilling 2006); for others, such as Eupatorium novae-angliae (Fernald) V. I. Sullivan ex A. Haines & Sorrie (parents: Eupatorium paludicola E. E. Schill. & LeBlond and Eupatorium perfoliatum L.; Schilling et al. 2007) and Eupatorium subrenosum (A. Gray) E. E. Schill. (parents: Eupatorium hyssopifolium L., and Eupatorium petaloideum Britton; Schilling 2011) the molecular evidence suggested combinations of parents that had not previously been suspected, although, in retrospect, the combinations were not completely surprising.

Most apomictic species of Eupatorium have only been recognized when they have become widespread or, more rarely, when they occupy a special, restricted habitat. Here we report a previously undetected apomictic hybrid that, based on its restricted distribution, may represent an entirely new apomictic lineage. Data from sequence studies of the nuclear ITS and plastid trnC-petN regions were obtained to document the likely ancestry of the apomict,

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