

A high self-fertilization rate and fine-scale structuring genetic variation in *Polygala lewtonii*, a federally endangered species

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Polygala lewtonii is a federally endangered perennial herb endemic to central Florida. The species employs a mixed mating system via the use of three types of flowers: 1) above-ground chasmogamous, open-pollinated flowers, 2) above-ground cleistogamous, selfing flowers and 3) below-ground cleistogamous, selfing flowers on the roots. The purpose of this study was to identify the major mode of reproduction that *P. lewtonii* employs, how this mode of reproduction affects the patterns of genetic structure in the species, and how this information can be used to help conservation efforts. Seventytwo individuals in 4 blocks were sampled from a narrow geographic range (Carter Creek) to assess fine-scale genetic structure, with 3 additional blocks sampled at larger geographic scales to assess range-wide genetic structure. These 360 individuals were genotyped at 12 polymorphic microsatellite loci. Within populations, we found very low expected and observed heterozygosity and high inbreeding coefficients, suggesting a very high inbreeding rate. Among populations, we found high pairwise F_{ST} and G_{ST} values and large genetic distances, even between geographically proximal populations, indicating that genetic variation is partitioned across very spatial scales. These results suggest that *P. lewtonii* reproduces predominantly by self-fertilization, accompanied by very limited seed dispersal, suggesting that the below-ground flowers may be important contributors to the reproduction of the species. Because most genetic variation is partitioned among populations at fine spatial scales, it is necessary to protect each population to effectively protect the full range of genetic variation in the species. Conservation efforts should focus on the conservation of unprotected populations. In the event that populations cannot be publicly protected, seed banking of the populations that occupy unprotected lands is recommended to safeguard the full range of genetic variation in *P. lewtonii*.