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Abstract Detail

Population Genetics
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Genetic differentiation among species of *Fritillaria* in Northern California: Is *F. eastwoodiae* an endangered species or a hybrid swarm?

Examining the genetic structure of sensitive species often provides insight for management decisions. Occasionally, examining the genetic structure of rare plants produces more questions than answers. The endemic herbaceous perennial *Fritillaria eastwoodiae* MacFarlane (Liliaceae) is a narrow endemic in the northern Sierra Nevada. The range of *F. eastwoodiae* overlaps three other *Fritillaria* species: *F. micrantha*, *F. recurva*, and *F. affinis*. Floral morphology in *F. eastwoodiae* is variable across the species range, with populations in the northern region resembling *F. recurva* and those in the south being more similar to *F. micrantha*, consistent with previous suggestions of a hybrid origin of the rare species. Given the geographic separation of the two regions of populations and the morphological differences among sites, an isozyme study was conducted to determine if the two regions of populations represent one or two taxonomic units. We examined a panel of 15 isozyme loci in a total of 24 *Fritillaria* populations: 14 *F. eastwoodiae*, two *F. micrantha*, five *F. recurva*, a single collection of *F. affinis*, plus two collections of intermediate morphology. The data revealed low levels of allelic variation in the collection (mean *A*=2.3, *P*=71%, *H*o=0.22), and significant differentiation among all populations (F_{ST}=0.094, P<0.001) and between species (F_{RT}=0.017, P<0.001). Within *F. eastwoodiae*, there was no evidence of differentiation between northern and southern regions (F_{RT}=0.002, P=0.053). Further, we found no evidence of the genetic distinctiveness of *F. eastwoodiae* compared to the other three wider-ranging species. Principal coordinate analyses indicated *F. micrantha* and *F. affinis* to be highly similar, while both were distinct from *F. recurva*. Samples of *F. eastwoodiae* were either similar to one of the three alternate *Fritillaria*, or intermediate to the genetic groups. Admixture analyses identified two genetic clusters in the entire collection. The assignment of individuals to each cluster (or as putatively admixed) was consistent with *F. eastwoodiae* representing a hybrid swarm in this sympatric zone between *Fritillaria* species ranges. Additional morphological and genetic studies are underway to confirm this hybrid-origin hypothesis. Results may have far-reaching impacts on the taxonomic and protected status of *F. eastwoodiae*.
Broader Impacts:

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