

Comparison of Native and Invasive Populations of *Taeniatherum caput-medusae* ssp. *asperum* (medusahead): Evidence for Multiple Introductions, Source Populations and Founder Effects

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Abstract

The native range of *Taeniatherum caput-medusae* (L.) Nevski includes much of Eurasia, where three distinct subspecies have been recognized, but only *T. caput medusae* ssp. *asperum* (hereafter referred to as medusahead) is believed to occur in the United States (U.S.). Medusahead, a primarily self-pollinating annual grass, was introduced into western U.S. in the late 1800s. The results of an earlier allozyme analysis were consistent with the genetic signature associated with multiple introductions, although this finding can only be confirmed with the analysis of native populations. In the current study we compared allozyme diversity in native and invasive populations of medusahead to test the multiple introduction hypothesis, identify source populations for the U.S. invasion, and determine the genetic consequences of these events. Five of the seven homozygous multilocus genotypes previously observed in the western U.S. have been detected in native populations, thereby providing support for the multiple introduction hypothesis. Source populations for these introductions appear to have been drawn from France, Sardinia, Greece and Turkey, although additional analyses are ongoing. Across native populations, 17 of 23 loci were polymorphic and a total of 48 alleles were detected, while only five polymorphic loci and 28 alleles were found among invasive populations. On average, invasive populations possess reduced within-population genetic diversity, compared with those from the native range. While U.S. populations have experienced founder effects, 38% (17 of 45) these populations appear to be genetic admixtures (consisting of two or more native genotypes). Results of this study have implications for the biological control of medusahead: i) the search for effective and specific biological control agents will have to occur broadly across the species' native range, ii) multiple agents may be required to control invasive populations that are admixtures, and iii) because many invasive populations are genetically depauperate, highly adapted biological control agents are likely to be quite effective.