

Evolutionary Insights from the Invasion of Greece by *Solanum elaeagnifolium* (Solanaceae): Implications for Biological Control

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Abstract

Silverleaf nightshade (*Solanum elaeagnifolium* Cav.) is considered to be not only a noxious Solanaceae in its subtropical American native range but also an invasive neophyte in many regions across the world, including the Mediterranean Basin. Its invasiveness in cultivated lands and disturbed areas is aggravated by high seed output and an extensive creeping root system, both attributes that render conventional chemical and mechanical control methods very difficult. Through collaboration between USDA-ARS, the Benaki Phytopathological Institute, and the Universities of Athens and Thessaloniki in Greece, a biological control program including mapping against this weed is being attempted for the first time in the Mediterranean Basin. Notwithstanding that biological control of this target has already been successful in South Africa, conducting rigorous specificity testing of candidate biological control agents in the Mediterranean region still boils down to i) the weed is in the same *Leptostemonum* clade as Old World eggplants, all major crop plants in this region ii) the origin of invasions in Greece, and iii) the levels of genetic and phenotypic variations relative to their native range. In Greece, we identified the source populations across the native range (Texas, Mexico) using Cp sequencing and multilocus genotyping approaches. Molecular data suggested a taxonomic revision of the Argentinean silverleaf nightshade. They showed that invasion in Greece resulted from several introduction events with some populations composed of admixture of introduced genotypes. No change in ploidy levels occurred following invasion. Based on the links between some life history traits and reproductive

strategies, first hypotheses related to its invasion success can be drawn and be presented here. From preliminary molecular and cytogenetic data in Moroccan populations, it is clear that patterns of invasion in Greece and Morocco share striking similarities, creating a situation more conducive for future global biological control programs in the Mediterranean Basin.