

Title: Phenotypic plasticity as an indicator for exotic noxious plants

Jing Luo

Abstract:

Exotic noxious plants, including invasive plants and exotic weeds, cost huge economic loss and ecological damage around the world. To prevent further introductions of such species, biological and ecological traits associated with invasiveness and weediness need to be identified so that prediction can be made on the potential of being noxious for proposed species. It was suggested weeds were usually generalists, which can survive and reproduce in a wide range of environments, *i.e.* they were quite “plastic” in response to different environments. Following this idea, phenotypic plasticity has been recently proposed as an indicator and predictor for weeds and invasive plants.

This hypothesis is tested using two exotic dandelion species: *Taraxacum officinale* (common dandelion), a wide-spread weed, and *T. laevigatum* (red-seeded dandelion) which occurs in a much lower frequency in Ohio. A greenhouse experiment was conducted in which the two species were grown in two soil moisture levels (dry vs. wet) combined with two light exposure levels (full sun vs. light competition). Various traits were measured to determine whether *T. officinale* is more plastic than *T. laevigatum* in these four environments. The results show that, when using coefficient of variance (CV) as a measurement of plasticity, *T. officinale* has significantly larger CV than *T. laevigatum* in plant diameter ($P=0.02$), shoot:root ratio ($P=0.04$) and soil pH ($P=0.02$). This indicates that *T. officinale* is more plastic in some of the resource-capture-related traits such as leaf morphology and biomass allocation, and presumably also in root exudates which influence soil pH.