

Predicting potential distributions of plants invasive between the U.S. and China: a Sino-U.S. collaboration

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Because of the high rate and potential for biological invasions between the U.S. and China, the U.S. Geological Survey's EROS Data Center and the Chinese State Bureau of Surveying and Mapping have begun a partnership in order to assess and predict the current and potential ranges of invasive plants in both countries. Early work has focused on species native to China that are currently invasive in the US: Chinese tallow tree (*Triadica sebifera*), kudzu (*Pueraria montana* var. *lobata*), tree-of-heaven (*Ailanthus altissima*), and Amur honeysuckle (*Lonicera maackii*). We acquired and developed a spatially referenced database of occurrences of these species from various sources in both their native and invaded ranges. Field data related to abundance and site characteristics were collected in order to facilitate comparison across scales. We also acquired and developed a database of geographic variables thought to influence plant distributions at broad scales. These include climatic, topographic, pedologic, and vegetation variables as well as land cover, landscape metrics, vegetation greenness, and other remotely sensed parameters. After identifying a subset of relevant variables for each species, we developed models based on the genetic algorithm for rule-set prediction (GARP) and classification and regression trees (CART) in order to infer the potential invaded distribution of each species. Early results of the models suggest that the invasive species investigated may substantially expand beyond their current distribution in the U.S. This approach provides a complement to coarse scale transcontinental biogeographic comparisons and field studies of invasive species. Future activities will include model corroboration, comparisons at finer scales, and expansion of modeling to include species native to the U.S. that are invasive in China.