

Prediction of the potential distribution of plant invaders between China and the US: Sino-US collaboration, ecological modeling, and GIS implementation

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The U.S. and China are major sources of invasive organisms for each other due to floristic, climatic, and other geographic similarities coupled with their rapid transformation from historic isolation to very high levels of present-day trade and travel. Because of this potential for biological invasions and abundant examples of currently invasive species in each country, the U.S. Geological Survey's EROS Data Center (EDC) and the Chinese State Bureau of Surveying and Mapping (SBSM) have begun a partnership in order to predict the potential ranges of invasive plants from both countries in the other. Early work has focused on three species native to China that are currently considered invasive in the US: Chinese tallow tree (*Triadica sebifera*), kudzu (*Pueraria montana* var. *lobata*), and tree-of-heaven (*Ailanthus altissima*). We have acquired and developed a spatially referenced database of plant occurrences from various sources for these species in both their native and invaded ranges. We have also further developed a database of geographic variables thought to influence plant species distribution at broad scales. These include climatic, topographic, pedologic, and vegetation structural variables as well as land cover, landscape metrics, vegetation greenness, and other remotely sensed parameters. We then developed models based on the genetic algorithm for rule-set prediction (GARP) and classification and regression trees (CART) in order to infer the potential distribution of each species. Implementation of these models in GIS suggests that all of the species investigated may substantially increase their distribution in the U.S. Future activities will include model corroboration, comparisons at fine scales, and expansion of modeling to include species native to the U.S. that are invasive in China.

Key words: *Ailanthus altissima*, China, distribution, invasive species, modeling, *Pueraria montana* var. *lobata*, remote sensing, *Triadica sebifera*, United States