Investigations on the invasion success of *Ulmus pumila* L. in North America and Argentina

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Humans play a decisive role in the dispersal of species due to globalization of trade, transport and emigration (Meyerson & Mooney 2007). As a consequence, many species have become introduced to areas which they had not reached before. Some of these species became so successful after establishment that they are regarded as being invasive in their new ranges. It is increasingly realized that invasive species have a tremendous impact on biodiversity and ecosystem functions. Therefore, understanding the invasion success of an alien species is a crucial step in order to develop effective control or management strategies.

Our project focuses on the invasion success of the Asian tree *Ulmus pumila* L. (Siberian elm) in North America and Argentina. The Siberian elm is a native of relatively moist regions of East Asia, but occurs westwards up to the dry Gobi desert, where it is bound to water surplus sites and oases (Wesche et al. in press). In North America, the Siberian elm was widely planted on the plains as a fast growing windbreak or shady tree, and naturalized populations can be found along river banks as well as on dry sites (Moore & Davis 2006). Furthermore, this species spreads in the Argentinean Pampa where it colonizes old field and grasslands (Facelli and León 1986; Ghersa and León 1999). *Ulmus pumila* produces huge quantities of wind-dispersed seeds and the seedlings can build dense stands. They can overgrow native vegetation, and this can lead to an additional invasion of shade-tolerant weedy species (Wieseler 2005). Once established, it is exceedingly difficult to get rid of these trees due to their ability to resprout after cutting.

To investigate the invasion success and the invasion history of *U. pumila*, we plan different experiments with elm material from the invasive ranges North America and Argentina as well as the native range. Genetic analyses will show if invasive

populations are characterized by a reduced or otherwise different genetic diversity, e.g. due to genetic bottlenecks and founder effects during the introduction and establishment process. Furthermore, genetic analyses can provide valuable information about the introduction history and the native origin of invasive populations. Germination tests and a common garden greenhouse experiment under controlled growth conditions will allow us to test if invasive populations show a more successful germination and more vigorous growth than native populations (so-called "evolution of invasiveness" hypothesis). Information on site parameters, e. g. soil conditions and population characteristics, will be used to gain a more detailed insight into the spectrum of habitats colonized by the Siberian elm in North America.

To implement these studies, elm material (i.e. leaves, seeds and wood samples) was collected by cooperation partners in Argentina, China and Mongolia. Furthermore, a 3-month fieldtrip to New Mexico, Colorado, Utah, Idaho, Oregon and Washington in the USA was used to collect elm material as well as soil samples and to record detailed population characteristics. We would like to thank all cooperating partners for providing research material and information. We also thank all colleagues and friends in the USA who helped us to point populations or providing hospitality during the fieldtrip.

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