

Changes in community context: causes and consequences of plant invasion success

by Anna T. Liebaug, Restoration Ecology, Technische Universität München

Invasion ecology considers species that spread outside their original range and cause ecological and economical damage. Invasive alien plant species often grow bigger and occur in other habitats than in their native range. The success of biological invasions is determined by the interplay of the invasiveness of the species and the invasibility of the new range. While abiotic conditions, e.g. climate, often remain similar in the new range, the biotic circumstances can be different. However, there are few studies on such differences in the community context of invasive alien species so far.

The PhD project focuses on the relevance of changes in the community context for the invasion success of plants. Native species, which have been in their range for a long period, should occur in all plant communities where they potentially can occur. This means their realized niche matches with their potential niche. In contrast, invasive alien species have not had sufficient time to establish in all vegetation types where they possibly could. This is most likely the case for habitats that are not linked to current dispersal mechanisms. Therefore, in invasive alien plants the realized niche should be narrower than their potential ecological niche. It follows that the number of occupied vegetation types should be larger for native than for invasive species. Another aspect is that the community context may shift. The invasive alien species may be able to colonize plant communities in the new range which are not occupied in the native range.

The PhD project consists of four subprojects. In one of them I will develop the idea that the community context of an invasive alien species in the new range is important for the invasions success by reviewing existing literature. Two subprojects focus on the community context of invasive alien plant species and congeneric native species in Central Europe. In the following I will shortly introduce the subproject which is connected to Canada.

Subproject: The competition situation of native and invasive purple loosestrife populations

Here I am focusing on the invasion of the well-known invasive plant species purple loosestrife (*Lythrum salicaria* L.). Purple loosestrife is native to Eurasia and spreading over North America since about 200 years. There are many impacts attributed to this invasion, e.g. the replacement of native wetland species. The southeastern part of Canada with the region of St.-Lawrence-River and the Great Lakes is most affected by the purple loosestrife invasion.

The community context of purple loosestrife populations in two regions within the native range (Germany, Norway) and two regions within the invasive range (Quebec, New York) will be investigated. The regions have been selected to be comparable with regard to climatic factors. In every region six plots in six representative wetlands respectively will be studied. Additionally to classical phytosociological relevés pin-point data will be collected. This provides more detailed insights to the competition situation of individual plants in the field.

To collect the field data I will go to Quebec in summer 2011. There is a cooperation with Prof. Dr. Claude Lavoie who leads the Research Laboratory on Invasive Plants (LAREPE) at Université Laval in Quebec. For studying biological invasions biogeographical studies, especially in an intercontinental scale, are of essential importance.