

Assessing the ecological and economic impact of the invasive plant species Japanese knotweed, *Fallopia japonica*

Japanese knotweed (*Fallopia japonica*) is considered to be one of the most invasive plants in Europe, particularly along river banks. However, with the exception of competitive exclusion of native vegetation, the suggested ecological impact by Japanese knotweed is poorly supported by experimental studies.

In March 2004, a project started at the Centre to assess the ecological and economic impact of Japanese knotweed in selected areas of France, Germany and Switzerland. The research will focus on changes in vegetation and invertebrate diversity, on 'higher-trophic-level' effects such as changes in predator fitness, and on soil parameters caused by the invasion of Japanese knotweed in natural habitats. Also, current management recommendations will be experimentally evaluated in terms of their effect on Japanese knotweed biomass reduction, and on the recovery of plant and invertebrate assemblage. Finally, the economic costs associated with managing this weed will be assessed.

In May 2004, eight locations along river courses with different levels of Japanese Knotweed densities were selected in Switzerland, Southwestern Germany and Eastern France. Permanent study plots were randomly established in vegetation invaded by Japanese knotweed as well as in vegetation which can potentially be invaded by Japanese knotweed: open vegetation dominated by grasses and forbs, and bush-dominated vegetation. On these permanent plots, cover of each plant species was estimated to the nearest percent, and two different traps were installed to sample invertebrate community during the summer months.

First results indicate that invasion by Japanese knotweed does not only have dramatic effects on native vegetation, but also on invertebrate abundance. As already shown in other studies, native plant species richness is significantly lower on plots invaded by this exotic plant species, compared to uninvaded plots. We also found a significant negative correlation between the number of plant species present in plots and the number of Japanese knotweed shoot density. Analyses of the invertebrate assemblages indicate that overall abundance in plots invaded by Japanese knotweed is reduced by almost 50%, compared to control plots. However, invertebrate taxa differed widely in their response to Japanese knotweed invasion; for example, abundance of herbivorous taxa and spiders showed a particularly strong reduction in invaded plots, while abundance of ants and spring-tails (Collembola) did not differ between invaded and uninvaded plots.

To evaluate three currently applied non-chemical control methods, an experimental design has been developed and a field site with several isolated Japanese knotweed selected which will enable us to set up a long-term impact experiment in spring 2005. This part of the project will be carried out in close collaboration with local authorities in Belfort/France and Freiburg/Germany.

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