A new tool to help predict species invasiveness

There is a common assumption that plant species are more inclined to thrive in a non-native community than a native one, sometimes becoming 'invasive'. However, this behaviour is likely to be quite unusual and invasive alien plants are actually an important exception, according to a new study. Much can be learned from the population of a species 'at home' and should be included in official assessment criteria.

A popular ecological theory, known as the 'abundance assumption', says that a species that has been deliberately or accidentally introduced into an area where it has no evolutionary history is likely to have a competitive advantage over native species. It is thought this happens because of fewer controlling factors on its growth, for example, fewer competitors, disease and natural grazers.

An extreme example of this occurs with Invasive Alien Species (IAS), which have particularly high populations in non-native areas and begin to threaten the natural ecosystem. IAS are recognised by the EC as one of the five influences leading to declining biodiversity[1], alongside climate change, overexploitation, habitat change and pollution.

However, the extent to which the abundance assumption theory reflects actual patterns in a wide range of species, not just invasive ones, has not been adequately tested, say the researchers. They examined species abundance data from 51 herbaceous sites in the UK, Switzerland, Germany, New Zealand, Australia, Canada, China and USA. The different species present at each location were identified and classed as either *native* or *introduced*. The scientists then searched all 51 locations for plant species that occurred in both categories.
They identified 12 species of grass and 14 species of forb (flowering plants including clover, sunflowers and milkweed) across 39 locations. Of the 26 species identified, 16 were classed as introduced. Ten of those were officially considered invasive.

The researchers compared the relative abundances of the native and introduced populations of each species. This was calculated as the area covered by the study species as a percentage of the total area covered by all species in a given region. On average, they found no significant difference in relative abundance between the native and introduced grass populations. For the forb species, the average relative abundance was higher in the native population than the introduced population.

Looking at the individual species, only 23 per cent conformed to the abundance assumption theory. The ten plant species considered to be invasive did not consistently have higher relative abundances than the non-invasive species.

The ability to estimate the likely success of a species in a new area from abundance in its native environment may be a useful tool that is currently missing in biosecurity screening standards. The study recommends that it is added as an extra criterion in the official assessment of the potential invasiveness of a plant species. The reasons behind the success of current invasive species, which are indeed more abundant in their introduced range, requires a dedicated on-going research effort.

1. See:
    http://ec.europa.eu/environment/nature/invasivealien/docs/IEEP%20report_EU%20IAS%20Strategy%20components%20%20costs.pdf