



Genetic Limits on Evolution in Invasive Species

by Spencer Barrett and Iain Martyn

Background

The introduction and spread of invasive species is a serious environmental and economic problem for Canada, but scientists are still not sure why some introduced species spread rapidly and reach high densities, while others remain rare and relatively benign. What causes biological invasions to speed up or slow down and what factors serve to limit their geographical spread? Canadian researchers are investigating these questions and finding some unexpected answers.



The Research

As part of NSERC Discovery Grant funded research on purple loosestrife invasions in North America, Ph.D. student Robert Colautti with supervisor Dr. Spencer Barrett (Univ. of Toronto) and collaborator Dr. Christopher Eckert (Queen's Univ) were puzzled to find that purple loosestrife plants from northern Ontario were much smaller than those from the southern portion of the range, and that this difference evolved since human introduction from Europe. Not only was the evolution surprisingly rapid, but natural selection during invasion would have been expected to favour larger plants because they produce thousands more seeds than smaller plants. An interesting discovery was that northern plants flowered up to 50 days earlier than southern plants when grown under similar conditions, suggesting that genes causing early flowering may also reduce plant size. Such 'genetic constraints' arise when genes for particular trait combinations, in this case flowering early at a larger size, are absent from populations.

Why It Concerns Canada

These results have important implications for predicting how plant populations may evolve in response to climate change. Longer growing seasons could increase the rate of invasion of species like purple loosestrife as a result of natural selection on flowering time, plant size, and seed production.

To learn more

Barrett lab: <http://labs.eeb.utoronto.ca/barrett/>

Eckert lab: http://post.queensu.ca/~eckertc/Eckert_Lab/Welcome.html

The NSERC Discovery Program: Promoting discovery and fostering innovation in ecology and evolution.

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