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Invasive Escaped Ornamental Impatiens: Prospects for new varieties and better control

Environmental Issue

•Invasive species cause over $137 Billlion in damages and losses in the US

-Invasive species, or environmental weeds, are exotic species that spread after introduction to a new area.
-Invasive species are also a threat to ecosystems and native species. Nearly 50% of the 100 rarest plants in New England are threatened by invasive species.

•Many invasive plants are escaped ornamentals

-Garden environments are forgiving to plants, with abundant resources, and can be sources for seeds or propagules that disperse into native ecosystems and conservation land.
-The horticultural industry produces and disperses enormous numbers of plants. The hundred million dollar *Impatiens* industry distributes millions of plants. Most ornamental *Impatiens* are not weeds, but some individuals of all varieties have escaped, and policeman's helmet (*Impatiens glandulifera)* is highly invasive in temperate regions of Europe and North America.

•More information is needed to develop viable control strategies and safer ornamental varieties

-Information is lacking on dispersal distances and degree of population differentiation in escaped ornamental populations.
-The horticulture industry requires good information to develop new varieties with less invasive potential than many popular current varieties.

Scientific Approach

•Hypothesis: Population differentiation is an important factor allowing escape out of gardens into harsher uncultivated areas. If it is, it can be used as a factor to make control more efficient and as a way to develop safer new varieties.

•Research Plan:

Measure population differentiation

-I have developed molecular finger-printing markers (AFLPs) to measure gene flow and population differentiation.
-I will grow plants in the greenhouse to measure morphological differentiation and plasticity to varying shade conditions.

Examine seed dispersal potential

-*Impatiens glandulifera* seeds float, and this may be an important factor in developing regional control strategies.
-All populations in proximity of a watershed must be removed because seeds from one population can recolonize areas where control efforts are attempted.

An infestation of *Impatiens glandulifera*, Policeman's Helmet or Himalayan Balsam. This is the most invasive of the ornamental *Impatiens*, and has caused considerable damage in Europe where it is also invasive. These monspecific stands reduce native biodiversity.

Distribution of *Impatiens glandulifera* in New England. Because the seeds float, the potential for future invasion down the coast of Maine, and down the Housatonic watershed in Ma and Ct is a concern. But, because the invasion has just begun in the Northeast -- early action can stop it.

Impact on Conservation and Horticulture

•Conservation in New England

-Raising awareness of this invasion with land managers increases the prospects of early detection and control of new infestations. I have begun discussions with the Berkshire, MA TNC and Vindalhaven, ME Landtrust to begin wider sampling.

•Horticultural Industry

-Studies I have begun this fall on the ability of seeds to float may find natural variants unable to float or disperse well. These would be safer ornamentals than the currently commercially available policeman's helmet.

Other invasions

-Understanding this invasion will increase our ability to predict and control other invasions
-Understanding what makes *Impatiens glandulifera* a good invader may help explain why most *Impatiens* are not common invaders

For more information visit http://www.brown.edu/Departments/EEB/graduate/evw.htm or contact Eric_von_Wettberg@brown.edu; Thanks to NSF DDIG, SICB, and Brown University for additional funding; and Johanna Schmitt; Novem Auyeung, Lisa Mandle, and Nava Tabak for assistance

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