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Study Title: Insect colonization and invasion in the recovering devastation zone of Mount St. Helens.

Key Words: terrestrial plants animals insects Coccinellidea
colonization upland vegetation patches blowdown zone pyroclastic flows
archives

Abstract: Vegetation patches at Mount St. Helens represent discrete islands that are a focus for interactions among plants and insects. Our continuing studies focus on the role of biotic interactions (plant-herbivore and predator-prey), dispersal, and disturbance in this highly fragmented landscape. In the 1997 field season, we aim to address two primary questions: 1) What factors have allowed exotic ladybird beetles to displace native ladybird species within the monument? and 2) How does the size of vegetation patches influence colonization by insect species?

In recent years, a European ladybird beetle (*Coccinella septempunctata*) has displaced native ladybird species throughout large portions of the Mount St. Helens monument (Kareiva, manuscript in preparation). We will continue to monitor the invasion of exotic ladybird beetles, and we will perform behavioral studies and ant exclusions to understand the role of aphid-tending ants in determining the success of native and introduced ladybird species. This study will add to our understanding of the invasion process and provide insights as to how species interactions affect invasion success.

Our second research focus involves the effects of patch size on species interactions, and how these interactions, in turn, influence patterns of insect colonization in fragmented landscapes. The recovering devastation zone of Mount St. Helens is an ideal site for this work because it offers a naturally patchy landscape with clear "islands" of plants and animals occurring in a sea of pumice. This work will not only add to our understanding of natural patterns of species diversity, but will also allow better conservation and management of biodiversity in habitats fragmented by human activities.

Type of Measurement(s): Measurements will include: density of insects and other arthropods, records of Coccinellid behavior, measures of patch size and diversity, measures of plant size and density. Manipulations will include: 1) Moving insects among plants to stage interactions between ants and ladybird beetles, 2) exclusion of insects from plant patches via caging and insecticide application; 3) removal of some herbaceous plants to manipulate the size of vegetation patches

Frequency of Measurements: Measurements will be made weekly from 1 July - 1 October, at which time cages and temporary markers will be removed, but permanent markers left so plots can be relocated in 1998.

Data Storage: Data will be stored in ASCII or SYSTAT files.

Long-term plans: Data available for collaborative efforts: Our long-term goal is to use the structurally and biologically simple community of the blowdown and vegetation zones of Mount St. Helens to ask questions about community assembly and the effects of habitat geometry on those dynamics. Our data are available for anyone to use within 3 years of its collection.