

# 46<sup>th</sup> FEFCO

Forest Ecosystem Function Colloquium (FEFCO) は、地域や地球全体のレベルで森林生態系の機能とその持続的活用法を統合的に理解することを目的とし、研究者間の学術交流を推進します。

第46回森林生態系機能コロキウムは、Pacific大学のStacey Halpern教授にご講演いただきます。どなたでも参加できますので、多くの皆様のご参加をお待ちしております。京都大学農学研究科熱帯林環境学研究室がホストを務めます。各発表要旨についてはFEFCOホームページをご覧ください。 <http://www.bluemoon.kais.kyoto-u.ac.jp/FEFCO/index.html>

46<sup>th</sup> FEFCO  
2018/11/22 14:00 - 15:30  
Faculty of Agriculture Main Building, S174

Prof. Stacey Halpern  
(Pacific University, USA)

## Insect herbivore effects on population dynamics of the clonal weed *Solanum carolinense*

Understanding what determines population size and how it changes over time is a central question in basic plant ecology. It also has important conservation applications to both threatened and invasive species.

This project asks whether insect herbivore effects on individual plant fitness also influence plant population dynamics. Herbivores may affect plant populations by altering the population growth rate ( $\lambda$ ), a density-independent measure. They may also affect population regulation by changing patterns of density dependence in the plant population. Assessing herbivore effects on density dependence is required to determine whether herbivores affect the equilibrium population size of a plant, a key assumption of biological control efforts and the enemy release hypothesis. We tested the effects of herbivores on population dynamics over four years using experimental populations of *Solanum carolinense* in its native range. The experimental populations varied in plant density and herbivory, which affected plant size and reproduction; oviposition by a specialist beetle (*Leptinotarsa juncta*) also increased on plants growing at lower density. Using data from these populations, we parameterized models, and described population dynamics with and without herbivores. Herbivores affected population growth ( $\lambda$ ), though effects varied in magnitude and direction among years. Herbivores also altered density dependence, sometimes increasing it and sometimes decreasing it. Finally, herbivores reduced equilibrium plant population size, with effects again varying among years. These results demonstrate that understanding how herbivores contribute to plant population processes like invasions or control of weedy species requires accounting for density dependence, but that herbivore effects on plant population dynamics vary greatly among years. Herbivore effects may also differ in introduced populations in Japan, where preliminary results show lower damage levels than in the US and the loss of a latitudinal gradient in damage.