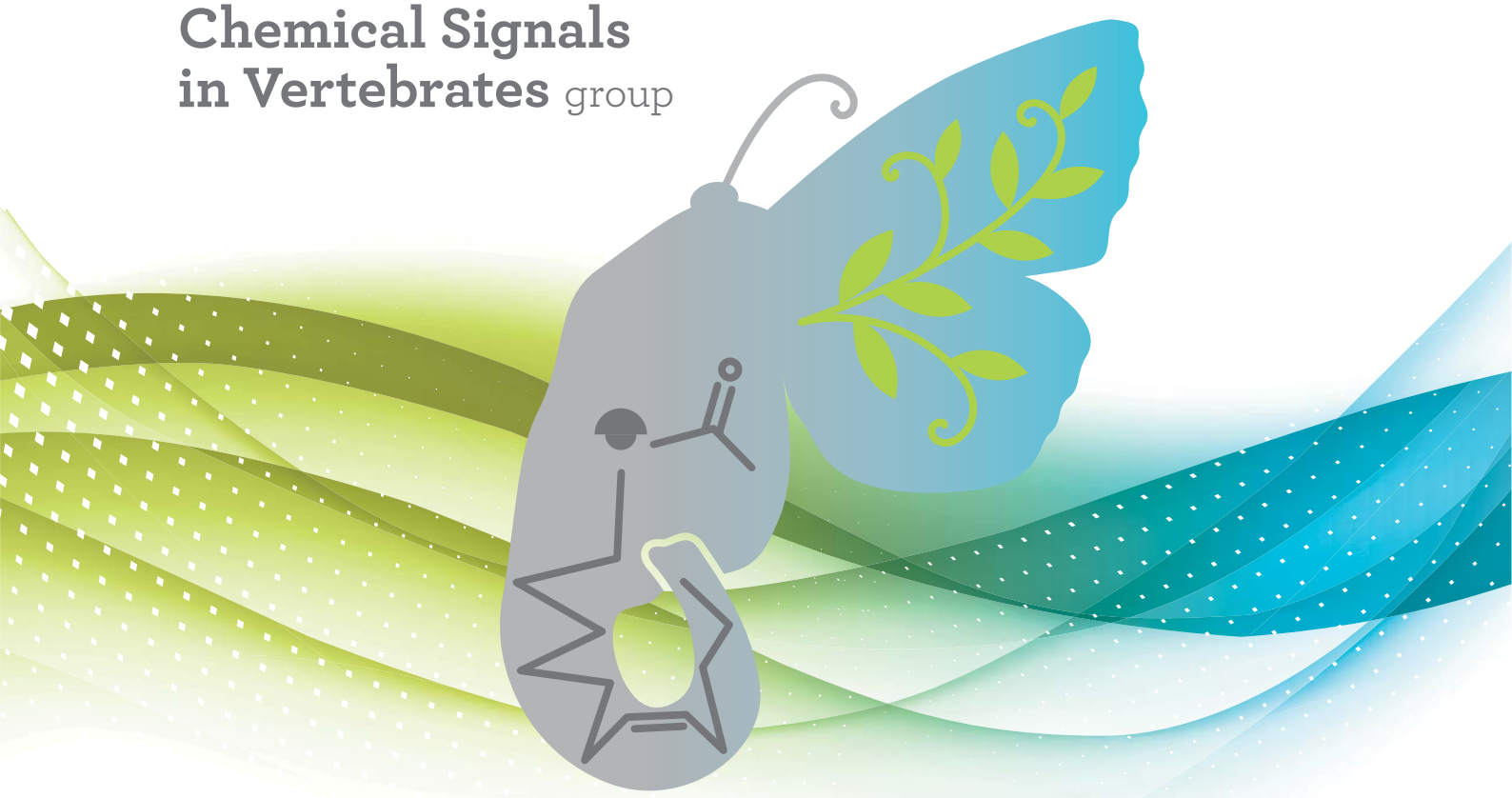
joint meeting of the

International Society for Chemical Ecology

and the

Chemical Signals in Vertebrates group



ISCE-CSiV

July 8–12, 2014

University of Illinois at Urbana-Champaign

www.life.illinois.edu/isce-csiv

4:10 PM 186 **Contemporary evolution of plant chemical defenses after invasion in response to herbivory and climate** • *Illini Room A*

Eva Castells, Universitat Autònoma de Barcelona

Presenter: Eva Castells, Universitat Autònoma de Barcelona

Biological invasions are excellent systems to study rapid evolution of plant chemical defenses. Current hypotheses predict a rapid divergence of plant chemical defenses in response to changes in herbivore consumption pressure caused by a decrease in the enemies from the area of origin (e.g. evolution of increased competitive ability –EICA– hypothesis) or in response to differences in the climatic conditions. *Senecio pterophorus* (Asteraceae) is a perennial shrub native to eastern South Africa that has recently invaded western South Africa, Australia and Europe. The four distributional regions of *S. pterophorus* differ in their levels of herbivory[1] and summer drought stress. Here we evaluated 1) whether native and introduced populations diverged in their genetically-based levels of chemical defenses, and 2) whether these biogeographical differences were driven by post-invasive changes in herbivory or climate. We performed a common garden experiment with 54 populations of *S. pterophorus* sampled throughout the entire known worldwide distributional area, including the native and three non-native ranges. Genetically-based chemical defense concentrations varied among regions. Contrary to the EICA hypothesis we found higher levels of chemical defenses in the introduced populations. The role of enemy release and summer drought stress are simultaneously evaluated as potential drivers for the evolution of chemical defenses. This is the first study to evaluate rapid evolution of an exotic plant covering the entire known distributional area of a species.

[1]Castells et al. (2013) Reduced seed predation after invasion supports enemy release in a broad biogeographical survey. Oecologia 173: 1397-1409