DO ENVIRONMENTALLY ACQUIRED *BURKHOLDERIA* SYMBIONTS SERVE AS A RESERVOIR OF LOCAL ADAPTATIONS FOR THEIR INSECT HOSTS? A. Ravenscraft[1] and M. S. Hunter[2], [1]Center for Insect Science, University of Arizona (araven@email.arizona.edu), [2]Department of Entomology, University of Arizona (410 Forbes, University of Arizona, Tucson, AZ 85721; mhunter@ag.arizona.edu).

Introduction: Many members of animal-associated microbial communities, including the skin and gut flora, are horizontally acquired from their host's environment. Such acquisition of free-living symbionts presents a unique set of potential challenges and rewards for a host. Risks include potential failure to find the symbiont and increased chances of the symbiont becoming pathogenic. However, free-living microbes directly interact with, and adapt to, their local environment. Acquisition of the right strain could therefore supply a host with instant adaptation to local conditions, and could even promote niche expansion to new diets or climates [1–3]. For example, microbial plant associates are likely to evolve the ability to neutralize their host plants' toxins; an insect that migrates onto the plant and acquires these microbes can gain immunity to the toxins [4].

I am developing Wickham's stilt bug, *Jalysus wickhami*, and its *Burkholderia* bacterial symbionts as a system to investigate the costs and benefits of environmental acquisition of free-living symbionts.

Study System: *Jalysus* hosts symbiotic *Burkholderia* bacteria in sac-like outgrowths called "crypts" at the end of the midgut. Young nymphs acquire their symbionts from the environment every generation. Individual insects commonly host 1 to 3 strains of *Burkholderia*, and across individuals the overall diversity hosted may be greater than 20 strains. It is not known what specific benefits *Burkholderia* provides the host, but experimental elimination of symbionts causes retarded growth, increased mortality, and reduced reproductive output in related insects and, preliminarily, in *Jalysus* [5,6].

Goals and Significance: I will asses whether symbiotic *Burkholderia* help their host cope with environmental stressors that vary in space or time, such as dietary toxins, pathogens, the nutritional quality of the host's diet, and temperature. This work will address the unique potential for acquired free-living symbionts to adapt to and confer host tolerance to the specific conditions of a host's local environment.

References: [1] Janson E.M. et al. (2008) *Evolution 62,* 997–1012. [2] Jiggins F.M. and Hurst G.D. (2011) *Science 332,* 185–186. [3] White J.A. (2011) *BioEssays 33,* 823–829. [4] Mason C.J. et al. (2014) *Oecologia 175,* 901-910. [5] Fukatsu T. and Hosokawa T. (2002) *Appl Environ Microbiol. 68,* 389–396. [6] Kikuchi Y. et al. (2007) *Appl Environ Microbiol. 73,* 4308–4316.