Plants have evolved specific defenses against different kinds of antagonists, including insects with different feeding strategies and a variety of pathogens. The genetic and biochemical basis for these defenses has been well characterized for some plant-insect systems, namely those involving crops and their pests in the order Lepidoptera, while other systems involving insects with different feeding styles remain largely unexplored. My dissertation research focuses on one of these groups, plant bugs (genus *Lygus*) in the family Miridae, order Hemiptera. In addition to having a unique feeding style (and effects on the plant) relative to other insect groups, Mirids in the genus *Lygus* are serious crop pests. Using a model legume (*Medicago truncatula*) that is very closely related to a crop host of *Lygus* (*M. sativa*) I propose to measure the expression of key defense genes and the production of defense signaling hormones in response to *Lygus* feeding. My previous research with *Lygus* feeding on *M. sativa* indicates that bugs induce chemical changes in the plants and that these chemical changes differ depending on the species of *Lygus* feeding. I therefore hypothesize that *Lygus* feeding will induce defenses that are distinct from those induced by Lepidopterans, and that the biochemical and genetic changes in response to feeding by different *Lygus* species will also be distinct, leading to specific indirect and direct defense profiles.