**Nontechnical description:** This project addresses the fundamental issue of how insect pests affect plant populations. When an herbivore selects a plant to eat, it can be influenced by the surrounding vegetation. This is particularly true for insect herbivores, for whom the look and smell of plants is very important. For example, a very smelly neighbor may reduce the number of insect pests that visit a plant. In 1972 the term “associational resistance” was coined to describe this kind of observation in basic ecology, but the idea has been present in agriculture (i.e. “companion planting”) for far longer. Previous studies clearly show that damage to a plant can be decreased (associational resistance) or increased (associational susceptibility) by neighboring plants, so a more general term is “associational effects”. Because insect pests can affect plant growth and reproduction, it has been suggested that associational effects could change plant competition for light or water, seed production, natural selection for traits that protect insects from plants such as spines, and other ecological processes. Although it is clear that associational effects *can* occur, very little is known about the ecological or evolutionary importance of associational effects. Long-term and large-scale studies to directly observe how associational effects change plant populations are difficult and expensive, but we can use short-term experiments in combination with mathematical models to infer how associational effects will influence populations much more cheaply. We will use a combination of mathematical models and experiments in abandoned agricultural fields to determine whether and how insect pests and associational effects influence plant populations. This work will contribute to training students and professionals in a combination of field experiment methods and mathematical skills. Because associational effects can occur in agricultural fields and gardens as well as natural plant communities, aspects of this work may help develop more sustainable agriculture. In addition to our field work with plants from natural settings, we will partner with teachers and students to develop ways of using school gardens with food plants such as collards and mustards to teach students how to do science and about how plants and insects interact.