

## Effects of Rye Cover Crop on Arthropod Communities

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Corn (*Zea mays* L.) and soybean (*Glycine max* L.) are two widely produced crops in the United States, both with demand and value rising rapidly throughout the last decade. Sustainability of increased production poses significant environmental and human health concerns as both corn and soybean require significant inputs, such as fertilizers and pesticides, for cultivation. Alternative management strategies, such as the planting of a rye (*Secale cereale* L.) cover crop, can limit soil erosion and decrease pest pressure, especially from arthropods (invertebrate animals which have an exoskeleton). Some arthropods have the potential to significantly reduce crop yields while others can have beneficial impacts, such as natural enemies or consumers of the weed seed bank. In 2011, we measured how a rye cover crop planted within a corn-soybean rotation affected key beneficial and pest arthropod taxa at two locations in Iowa. Data collected from these locations were used to test the hypothesis that pest abundance and diversity should be diminished in the presence of a rye cover crop compared to conventional production of corn and soybean. Arthropod abundance and diversity were measured using pitfall traps and sweep netting; abundance of soybean aphids was measured (*Aphis glycines* Matsumura) with speed scouting. Ground cover was also estimated to measure the differences in habitat for ground-dwelling arthropods. Although we observed pest and beneficial arthropods in our experiment, we did not see a difference in their abundance between crops grown with or without a rye cover crop. Incorporating a cover crop into conventional corn or soybean production may have benefits, however, how this cover crop is managed may alter the benefits to the arthropod community.



Pitfall trap collection at Jefferson City, MO



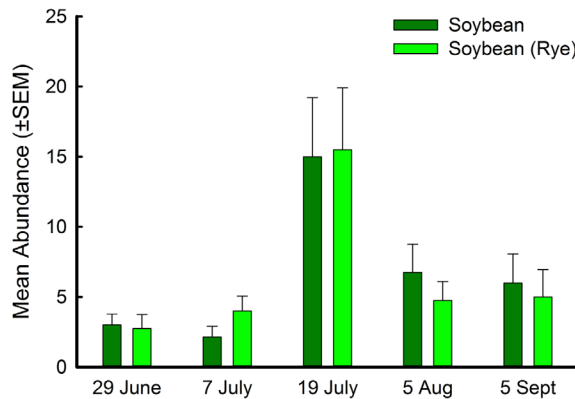
Setting stakes for sticky cards in wheat plots at Lancaster, WI



Sampling soil for weed seeds at Gilmore City, IA



Measuring percent ground cover at Ames, IA



Mean abundance of beneficial arthropods captured by pitfall traps averaged between the Ames and Gilmore sites in soybean and soybean grown with a rye cover crop. Beneficial arthropods include predators of pest arthropods and predators of weed seeds. There were significant differences in abundance of beneficial arthropods captured among dates ( $F_{4, 47} = 40.57$ ,  $P = <0.0001$ ) but not between treatments ( $F_{1, 12} = 0.08$ ,  $P = 0.7813$ ).

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