



The impact of biodiversity services in row crop production in annual versus perennial landscapes

Abstract:

Researchers studied the behavior of soybean aphids in fields and prairies, and the implications for biological control of these pests.

Although beneficial insects, such as lady beetles, are common in soybean fields and are a source of mortality for the soybean aphid, prairie did not significantly contribute to increasing the biological control of this pest. The prairies that were studied contained plants that beneficial insects are attracted to, but the abundance of these plants was low. This may explain why prairies did not significantly contribute to the abundance and diversity of beneficial insects in adjacent soybean fields. Results suggested that landscape factors affect soybean aphid abundance at a scale much larger than what was addressed in this study.



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What was done and why?

The project objective was to characterize the relationship between soybean aphids, their associated natural enemies and landscape features surrounding soybean fields.

Perennial habitats such as prairie contribute to many ecosystem services that are valued for annual crop production. In this project's study-system, there is prior evidence that perennial habitat contributes to the biological control of soybean aphids, possibly because prairies contain flowering plants that are attractive to insect predators of aphids. The investigators conducted the project studies on soybean fields near the reconstructed prairies of the Neal Smith National Wildlife Refuge (NSNWR) near Prairie City, Iowa.

What did we learn?

The first project yielded information that the soybean aphid and its natural enemies are not highly influenced by landscape features within and around the NSNWR. Project results suggested that variability in the abundance of soybean aphid was most affected by one or more unmeasured abiotic and/or biotic factors associated with the particular crop year. Going forward, they considered that a component of this 'year' factor is the immigration of aphids. As the field study suggests, this immigration is likely due to stands of buckthorn found many miles away from the study site.

The second project did not provide evidence that proximity to prairie consistently affected aphid populations. Rather, sentinel plant results suggested there was no difference between soybean acreage and prairie in soybean aphid predation. Investigators found native plant species in the prairies that are attractive to beneficial insects. However, the relative abundance of plants attractive to insects was very low. Therefore, the diversity and abundance of plants may not have been optimal for enhanced biological control of soybean aphids.

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