IOWA STATE UNIVERSITY
Department of Plant Pathology, Entomology, and Microbiology

Solar-Powered Beekeeping

Maximizing honey yield in Agrivoltaic systems

Researchers at Iowa State University are testing if beekeeping is compatible with utility-scale solar farms. This work includes multiple solar farms in central Iowa, including the Alliant Energy Solar Farm at ISU.

Coupling Beekeeping and Renewable Energy

Adding perennial, flowering plants back to the land at a solar farm supports pollinators by increasing floral resources. These resources benefit both wild pollinators and local beekeepers. When properly managed, solar farms can be a valuable resource for beekeepers. We evaluated honey production at three solar farms in Iowa– each with different vegetation management strategies. Our team monitored changes in colony health and honey production for four colonies at each farm from 2024– 2026.





Alliant Energy Solar Farm at Iowa State University
A team of researchers at ISU is currently evaluating the benefits of agrivoltaics for energy production, growing horticultural crops, forage production, beekeeping, and pollinator conservation.

"Solar farms designed with pollinator conservation in mind can provide substantial resources for bees."
Dr. Matt O'Neal, Iowa State University

What is a dual-use solar farm?
Solar energy production and agriculture can occur at the same location using agrivoltaic practices. Common practices include crop production and livestock grazing.

Why study agrivoltaic practices?
Global energy needs are dramatically increasing. Solar farms are one of the fastest and least expensive ways to generate electricity. Agrivoltaic practices offer an opportunity for multiple uses where both energy production and agriculture can coexist, offering multiple revenue streams to the surrounding community.

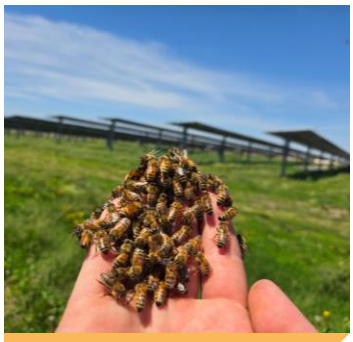
IOWA STATE UNIVERSITY
Department of Plant Pathology, Entomology, and Microbiology

What We've Learned

Bee colonies kept at solar farms can produce honey crops. Honey production per site varies with the number of flowers on the farm.

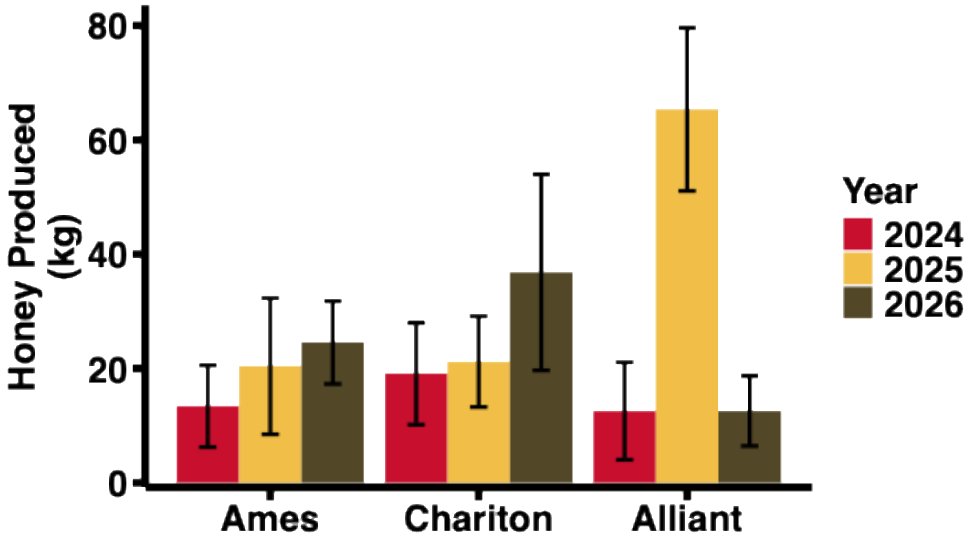
At the Alliant Energy Solar Farm at ISU, we observed a **5x increase** in honey production in 2025 compared to 2024 (129 lbs compared to 25 lbs per colony). This is more than twice the national average of 51.2 lbs per colony.

The increase in honey production co-occurred with a 10x increase in flowers at the Alliant solar farm compared to the previous year (up to 30 flowers per ft^2 recorded in 2025). The associated decrease in honey production at the Alliant site follows a decrease in floral abundance. The results suggest solar farms designed with bees in mind can increase resources available for bees, supporting both pollinator conservation and the beekeeping industry in the U.S.



Research Sites

- Alliant Energy Solar Farm at Iowa State University in Ames, IA
- SunSmart Solar Farm in Ames, IA
- Hy-Vee Solar Farm in Chariton, IA



"By incorporating flowering plants into groundcover at a solar farm, it's possible to benefit electricity consumers, beekeepers, and pollinators all at once."
Carl D. Bowling, Iowa State University

Project Contacts
Dr. Matthew O'Neal – Agrivoltaics Project Lead
oneal@iastate.edu

Dr. Michael Killewald – Agrivoltaics Outreach & Research Coordinator
killewal@iastate.edu

Learn more about Agrivoltaics at Iowa State
To learn more about your research on agrivoltaics at the Alliant Energy Solar Farm at ISU, or to schedule a tour of the site, please visit our project website.

https://agrivoltaics.research.iastate.edu/