

New strategies to enhance sustainability of apple orchards

Abstract: Three years of experiments were conducted to help increase profit margins for apple growers, cope with new regulations on pesticide use, and deal with increased pesticide resistance by major apple pests and diseases.

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Project field trials showed how Iowa apple growers can take advantage of disease-resistant varieties and mulching to cut back on pesticide use, reduce production costs, and minimize their environmental impact. The lab-scale hard cider results offered apple growers a head start in exploring this value-added production option.



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What was done and why?

Commercial apple growers in Iowa face significant challenges that threaten their continued sustainability. The project evaluated several strategies to help with these challenges. Among them were growing disease-resistant apple varieties, validating sustainable options for codling moth management, organic mulches for groundcover management, advanced management practices, and the potential of hard cider as a new value-added product for Iowa orchards.

What did we learn?

One of the new integrated pest management (IPM) systems reduced the number of pesticide sprays compared to conventional management, and was less expensive than conventional practices for larger orchards. In contrast, the other new IPM strategy required more applications and was more costly than the other treatments because it relied on frequent (weekly) sprays of the virus-based biological control product for codling moth. Pest and disease control in the new IPM treatments was comparable to that in the conventional treatments. Both of the new IPM treatments substantially lowered environmental risk compared to conventional calendar-based spraying and current IPM practices.

Composted hardwood mulch suppressed weeds when compared to bare soil and required fewer herbicide applications. Soil under the mulch treatment was cooler and moister in summer than in the bare soil treatment.

Several of the hard ciders created by the ISU team were potentially competitive with U.S. commercial brands of hard apple cider, because the ISU ciders had a more pronounced apple flavor.

On-farm demonstration trials showed that the SBFS warning system reduced fungicide use by an average of two sprays per year compared to standard grower practices and controlled SBFS as the conventional schedule.

Spray volume had no discernible impact on the effectiveness of the SBFS warning system in most of the on-farm trials.