

Challenges in Organic Apple Production in Eastern United States

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Abstract

In 2004, an organic apple orchard was established at Penn State University Fruit Research and Extension Center in Biglerville, Pennsylvania, to provide researchers and growers with the opportunity to explore and observe the best research-based organic practices for local commercial organic apple production. The first certified organic fruit was produced and sold in 2006. The organic apple project was named PA Regional Organic Fruit Industry Transition (PROFIT). Two apple scab disease-resistant cultivars, "GoldRush" and "Enterprise," were selected for the demonstration orchard because of their resistance to diseases and their potential as processing or fresh market varieties.

A pest and disease control program consisting only of approved organic materials was utilized. In the 2007 growing season, copper, sulfur, lime sulfur, and paraffinic/mineral oils were applied throughout the season to protect the trees from diseases. There was no major occurrence of diseases, except for a sporadic occurrence of powdery mildew and cedar apple rust.

Sex pheromone mating-disruption materials, neem products, Bacillus thuringiensis, codling moth granulosus virus, natural pyrethrum, and kaolin clay were utilized to provide insect pests control through the season. An intensive insect pest-monitoring program utilized insect sex pheromones and attractants. While the management of direct fruit pests such as Cydia pomonella (codling moth), Grapholita molesta (Oriental fruit moth), or Platynota idaeusalis (tufted apple bud moth) resulted in excellent insect pest control, the occurrence of secondary pests such as Conotrachelus nenuphar (plum curculio), Haplocampa testidunea (European apple sawfly), and Popillia japonica (Japanese beetle) challenged the quality of the fruit at harvest. Increasing the population of beneficial insects such as lady beetles, lacewings, and predatory mites provided excellent control of numerous indirect pests.

Weed management alternatives, including hand-hoeing, weed-mowing, and "mechanical hoeing", such as Weed Badger™ and propane weed burner, were also evaluated and demonstrated in the orchard. The use of organic herbicides containing vinegar/acetic acid was evaluated but did not prove effective. The crop load management practices included organically acceptable fruit thinners such as paraffinic and fish oils and lime sulfur. Set and yield data revealed a promising effect of applied treatments. The primary causes of grade-out at harvest evaluations were sunburn, cracking, and incidences of cedar apple rust caused by Gymnosporangium juniperi-virginianae. The applications of kaolin clay made no difference in the tree response to the crop management treatments.

This commercial organic apple project demonstrated that high-quality organic apples can be grown on a commercial scale in the eastern United States with existing and alternative materials currently approved and available to organic fruit growers.

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