

The OrganicA Project - IPM Research Results and Insights from Two Certified Organic Apple Production Systems



Lorraine P. Berkett¹, Renae E. Moran², M. Elena Garcia³, Heather M. Darby¹, Robert L. Parsons¹,

Terence L. Bradshaw¹, Sarah L. Kingsley-Richards¹, and Morgan C. Griffith¹

¹University of Vermont, ²University of Maine, ³University of Arkansas Contact address: Lorraine.Berkett@uvm.edu

Project Background

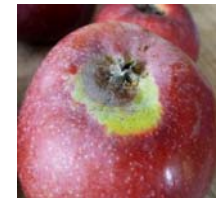
The small number of certified organic orchards in New England reflects the arthropod management and horticultural challenges of organic apple production in the region and the disease challenges associated with the predominant cultivar grown in New England (i.e., McIntosh). However, recent shifts in consumer preference for 'newer' cultivars has led to the planting of different apple cultivars in the region which have different arthropod and disease susceptibilities and recent research has identified potential alternatives for arthropod and horticultural obstacles in organic apple production. The objective of this research was to evaluate the arthropod and disease susceptibilities among five cultivars that were identified as important to the future of the apple industry (Ginger Gold, Honeycrisp, Liberty, Macoun, and Zestar!) within the two major orchard systems growers are using to change to new cultivars: (i) a new orchard planted with young trees purchased from a nursery and (ii) a "top-grafted" orchard, i.e., an established, older orchard onto which new cultivars were grafted. Orchard 1 was planted in April 2006 and Orchard 2 was originally planted in 1988 with the cultivars Liberty and McIntosh and was top-grafted to the five new cultivars in 2006. Disease and arthropod incidences were assessed on foliage in August and on fruit at harvest for three years, 2009-2011.



Assessment	Diseases Evaluated	Arthropods Evaluated
Foliar	Fire blight Apple scab Rust Powdery mildew Necrotic leaf spots	Green aphids European red mite Two-spotted spider mite White apple leafhopper (and its damage) Potato leafhopper (and its damage) Spotted tentiform leafminer damage Japanese beetle damage Beneficial Insects & predatory mites
Fruit	Apple scab Rust Fruit rot Sooty blotch Flyspeck Brooks spot Lenticel Blackening	Plum curculio Tarnished plant bug Apple maggot fly European apple sawfly Rosy apple aphid Stink bug Internal feeding Lepidoptera Surface feeding Lepidoptera

Cultivar Susceptibilities

- No significant differences among the cultivars in fire blight severity in 2009 (the only year of the study in which symptoms were seen)
- Honeycrisp had low levels of foliar scab in all three years; Ginger Gold usually ranked the highest in level of foliar or fruit scab, but was not always significantly different than Macoun or Zestar!
- Rust emerged as a major challenge with 5-55% foliar incidence and 0-39% fruit incidence
- Ginger Gold and Honeycrisp cultivars had the numerically highest foliar rust in both orchards in all three seasons
- Macoun and Zestar! usually had the highest percent of leaves with necrotic leaf spots
- No consistent trends among cultivars' susceptibilities to general fruit rots, brooks spot, or lenticel blackening
- When sooty blotch and flyspeck were observed, Liberty and Macoun had the numerically highest incidences, although not always statistically significant.
- Beneficial arthropods were observed in low numbers in all three years
- Honeycrisp and Liberty had the numerically highest incidence of Japanese beetle damage in all three years.
- No other consistent trends emerged in differences of incidence of arthropods and their damage among the cultivars over the three years



Rust on Liberty apple



Zestar! apples



Fruit Rot on Honeycrisp

Issues in Organic Apple Production

- Scab can be managed using sulfur and/or lime sulfur (S/LS) but these materials do not effectively manage rust lesions
- S/LS are also known to flare mite populations and both orchards had high European mite populations during all three growing seasons
- S/LS can, under certain environmental conditions, cause phytotoxicity which can result in fruit rot.
- The most problematic pest has been the codling moth (CM). Orchard CM trap captures have been increasing each of the three years of this study.

Funding sources: USDA Organic Agriculture Research & Extension Initiative, University of Vermont, University of Arkansas, University of Maine, USDA NIFA Integrated Pest Management Program, and the VT Tree Fruit Growers' Association

For additional and more specific research results, please visit the OrganicA Project website: <http://www.uvm.edu/organica>