Organic Fruit Research Update for the US

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Abstract

A variety of research on organic fruit production occurs in the US but with no overall coordination of effort. Example topics are fire blight, Spotted Wing Drosophila, replant disease, and crop load management, primarily supported by federal grants.

Keywords: Fire blight, breeding, replant, pests

Introduction

Most funding for organic fruit research in the US comes from USDA programs, including Organic Research and Education Initiative, Specialty Crop Research Initiative and state Specialty Crop Block grants, Sustainable Agriculture Research and Education, and Integrated Pest Management. However, there is no national coordination or prioritization. Examples of some recent and current projects follow.

Fire Blight Control

An extension publication was completed that describes recent progress in non-antibiotic control of fire blight (*Erwinia amylovora*) in organic apples and pears for the western US (DuPont et al., 2017). Combinations of yeast biocontrols, soluble coppers, and Bacillus biocontrols generally provided good to excellent control. A bacteriophage that performed well in lab trials has had poor to moderate results in field trials (Johnson & Temple, 2017), while alum (DuPont, 2017) has been more effective.

Breeding and New Cultivars

The apple breeding program at Washington State University is incorporating fire blight resistance genes from *Malus sieversii* and screening for fruit quality (Harshman et al., 2017). The recently released WA-2 apple (Evans et al., 2010) is of particular interest for organic production due to its excellent storage properties, as well as its good eating qualities. Commercial plantings of fire blight tolerant pears are being evaluated for performance and consumer acceptance (Bell et al., 2014; Ingels, 2015). 'Geneva' apple rootstocks have a number of useful traits for organic production, including replant tolerance, fire blight resistance, and woolly apple aphid (*Eriosoma lanigerum*) resistance (Dininny, 2016).

Replant Disease and Soil Quality

Brassica seed meal can provide more durable control of replant disease than fumigation (Mazzola et al., 2015), and anaerobic soil disinfestation is being investigated as well. Practices to improve overall soil health, such as compost amendment and mulch, also show potential to control certain elements of replant disease (Watson et al., 2017).

Other

Long-term trials of organic blueberry production in Oregon examined variety, planting system, weed control, soil and nutrition, and economics (Larco et al., 2013), as well as a similar project on organic blackberries. Peaches grown with birdsfoot trefoil (*Lotus corniculatus*) in the drive alley instead of grass were insensitive to the level of weed control

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in the tree row (Reeve et al., 2017). Sweet woodruff (*Galium odoratum*) and creeping thyme (*Thymus serpyllum*) living mulch in the tree row of newly planted apple repelled voles (*Microtus* spp.) more than grass or legumes but still had unacceptable tree damage compared with a vegetation free strip (Sullivan et al., unpublished). Peck et al. (2016) found that a pollen tube growth model can be combined with organic compliant bloom thinning materials. A national project on Spotted Wing Drosophila (SWD, *Drosophila suzukii*) is investigating traps, lures, pesticide controls, and cultural controls (Petran, 2017). Research in Washington State (E. Beers, pers. comm.) is testing trap selectivity for SWD males, which would greatly aid monitoring. Paper bags on fruit are being tested for pest and disease management in organic peaches. Management of soil amendments is being tested to address food safety and soil health issues. An organic strawberry systems project is underway in Florida. Organic nitrogen fertilizer affected gene expression in tomato differently than synthetic N (Dhingra and Andrews, 2014) and led to more secondary metabolites.

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