

Orchard Floor Management Affecting the Performance of Young Organic 'Honeycrisp' Apple Trees.

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Background:

In an establishing apple orchard, weeds can out-compete young trees for space, nutrients and moisture leading to a cumulative decrease in tree vigour and poor productivity. Herbicides are often used to control weeds but orchard floor management has the potential to successfully replace agrichemicals in weed control. Research on long term, non-chemical and sustainable solutions are needed.

Project Overview:

Six orchard floor management systems (OMSs) were installed in an establishing 'Honeycrisp' apple orchard aiming to suppress weed growth. Bare ground used as control, reflective mulch, reflective mulch placed over composted manure, composted manure, green manure and bent grass as companion plant cover were set up as replicated, randomized plots. The effect of these OMS on weed abundance, tree growth and leaf photosynthesis was assessed in 2011.

Weeds in each plot were identified and their percentage coverage was quantified. Compost plots had abundant weeds with 61 % and 87 % coverage respectively in June and July. Green manure plots had progressively more weeds as the season progressed, reaching 74% weed coverage in July. Bent grass and reflective mulch were most effective in weed suppression. Weed composition differed in the OSMs; chickweed was predominantly found in the compost plots whereas sheep sorrel was abundant in green manure plots.

By the end of the growing season, trunk diameter was measured in each treatment tree and the cross-sectional area (TCA) 30 cm above the scion-rootstock union was calculated. TCA was highest in trees treated with compost, followed by trees growing in the reflective mulch and bare ground plots; trees in the bent grass and green manure plots had the slowest growing trees. Leaf photosynthetic rate was highest in trees treated with compost.

This is the first cropping season for this 3-year old orchard. Although trees have not yet reached their full cropping potentials, those in compost plots and reflective mulch plots yielded on average 31 and 12 fruits respectively. Placing reflective mulch over compost had enhanced fruit yield with an average of 45 fruits produced per tree. Trees in bare ground, bent grass and green manure plots produced few fruits (0 – 4).

Conclusion:

Reflective mulch in combination with compost as an OMS is effective in weed control and promotes tree growth and fruit production. Research is ongoing to provide all apple growers with access to new management techniques and information for organic tree fruit production.

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