



Organic Weed Management Strategies for Apple Trees

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Few effective options are available for weed management in organic orchards. A new herbicide, Greenmatch® (d-limonene) may be useful for control of annual and perennial weeds. In this study, we compared herbicide to bark mulch and close mowing in an apple orchard.

The Experiment

'Honeycrisp' and 'SnowSweet®' apple trees were planted in 2007 on M.26 rootstock and subsequently trained to the vertical axe system. Honeycrisp trees were spaced 6 ft. and SnowSweet 8 ft. within the row and 16 feet between rows. In 2009 (year 1), the orchard was transitioned to the organic system at which time five weed management strategies were established in July and maintained through 2011:

- 1) mowing in the tree row in June, July and Sept.
- 2) herbicide applied 2 times from June to July (H1)
- 3) herbicide applied 3 times from June through Aug. or Sept. (H2)
- 4) bark mulch applied once in year 1 (M1)
- 5) bark mulch applied once in year 1 with herbicide before mulch and twice in year 3 (M2)

Weeds were mowed prior to mulch and herbicide application in year 1 and prior to herbicide application in year 2, but after herbicide in year 3. The herbicide GreenMatch™, which contains the active ingredient d-limonene, was applied at the labeled rate (8% a.i.) in a 4-ft. strip under the trees. Bark mulch was applied in a 5-ft. strip and a depth of 6 inches on July 23, 2009. Soil moisture was measured with tensiometers. Tree size was based on trunk diameter in October of each year that were converted to cross-sectional area.



Herbicide was effective for suppression of weeds in most plots (left), but less effective in where weed growth was strong and on difficult weeds such as milkweed (right).



Mulch continued to suppress weeds in the third year in most plots (left), but was less effective where weed growth was strong (right).

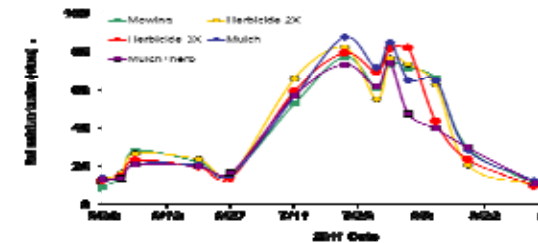
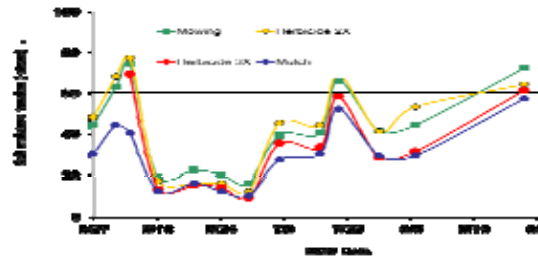


Ground cover after close mowing with a weed wacker in year 1.

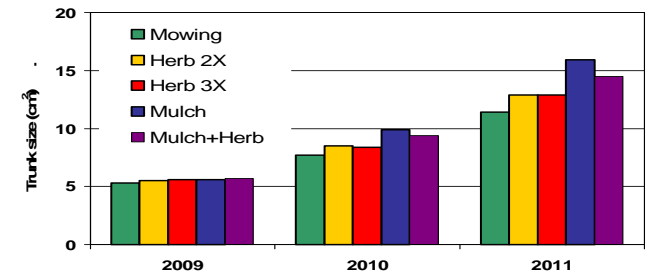


Bark mulch (in the background) and herbicide (in the foreground) plots soon after application in year 1.

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Soil moisture was mostly influenced by rainfall in this unirrigated orchard in 2010 (top graph) and 2011 (lower graph). High readings indicate a drier soil and corresponded with periods of insufficient rainfall. In 2010, soil moisture was greater in mulched soil during much of the season. Herbicide also reduced soil drying but only early August. In 2011, herbicide and mulch generally had a similar level of soil moisture as mowed sod, but on Aug. 11, slightly greater soil moisture.



Herbicide did not affect tree size, which was based on trunk girth. Mulch increased trunk girth in 2010 and 2011 compared to the trees in mowed sod or with herbicide. Yield was not affected by any weed management strategy, but trees have not reached full production (data not shown).

Conclusions

Bark mulch suppressed weeds for a longer duration than d-limonene herbicide and mowing, and resulted in greater tree growth. The herbicide effectively suppressed weeds, but did not measurably affect tree growth during the time span of this study.



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