Control of Canadian Thistle

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Many organic apple growers mulch their trees with wood chip or bark mulch to suppress weeds. Aggressive perennial weeds such as Canada Thistle can invade the mulch. Canada Thistle has deep roots and it's not feasible to dig up the roots near established trees. Repeatedly killing thistle shoots (without killing the roots) can deplete root reserves and gradually eliminate the weed. Unfortunately, this repeated killing is time-consuming!

We have measured the time requirements and effectiveness of four methods of killing Canada thistle shoots in our organic orchard: hand-pulling, spraying an organic herbicide, mowing with a string trimmer, and hoeing with a diamond hoe. We applied each treatment every three weeks during the growing season. This a two year experiment; we are now in the second season. We evaluated each technique in plots mulched with bark only and in plots mulched with bark and an underlying layer of cardboard.

Our observations and recommendations are:

1) Any method of repeatedly killing thistle shoots every three weeks eventually eliminated thistles. We counted over 1000 thistle shoots in our experimental plots at the beginning of spring 2019 (a density of 1.1 thistle shoots per square foot). By the end of June 2020, we could not find any thistle shoots in any of our plots.
2) Spraying is effective and quick, but expensive – see table below.
3) String-trimming and hoeing without using cardboard mulch were the most economical treatments to apply
4) Hand-weeding takes a lot of time and is not economical.
5) String trimming has disadvantages: noise and vibration, damage to tree trunk guards, and it appears to be less effective than other treatments at controlling quackgrass, crabgrass, and dandelions
6) Hoeing, hand-pulling, and string-trimming all caused the bark mulch to degrade more quickly than spraying.
7) Mulching with cardboard underneath the bark mulch resulted in a much quicker reduction in thistle density in May and June of the first year. This saved some time in weeding. By the end of the season, however, thistle density was similar (almost zero), regardless of whether cardboard was applied. Cardboard mulch was time-consuming to apply, about 9 minutes per tree, which outweighed the time-savings of reduced weeding time in May & June.

Cost of Treatments, per tree, in the first growing season (2019)
Ranked from Least to Most Expensive (Labor priced at $15 per hour)

Treatment	Labor For Weed Killing Treatments	Labor To Apply Cardboard Mulch	Herbicide	Gas	Total Cost Per Tree
Trim (No cardboard mulch)	$1.40			$0.04	$1.44
Hoe (No cardboard mulch)	$2.04				$2.04
Trim + Cardboard mulch	$0.96	$2.28		$0.03	$3.26
Hoe + Cardboard mulch	$1.10	$2.28			$3.38
Hand pull (No cardboard mulch)	$4.08				$4.08
Hand pull + Cardboard mulch	$2.31	$2.28			$4.59
Spray + Cardboard mulch	$0.81	$2.28	$2.33		$5.42
Spray (No cardboard mulch)	$1.59		$4.52		$6.11

Full data from the project online at: https://projects.sare.org/project-reports/fnc19-1181/

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