

# Organic Weed Control Decision-Making Tool

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**Summary:** *Newly designed software guides organic farmers through an informed decision-making process about weed control and management. The Organic Weed Manager software is available for free at [organicweedmanager.com](http://organicweedmanager.com).*

Weed control without chemicals means fewer options. This is the reality in organic farming systems. In fact, weed control is often cited as a reason farmers decide not to pursue organic certification. Research has revealed that although chemical-free (or ecological) weed management tactics are available, many organic farmers do not take advantage of them. As with chemical controls, non-chemical control methods come with a variety of pros and cons. Deciding which tactic(s) to use can be tricky. A few examples of chemical-free weed management tactics, and their associated pros and cons, are listed in Figure 1.

The importance of these specific pros and cons depends heavily on a farmer's growing conditions, cropping system, personal priorities, and values. For example, in a low-value crop, investing time into mechanical or hand-weeding may not be economically feasible. In poorly draining soils or under wet conditions, frequent cultivation may lead to soil compaction and drainage problems. The importance of weed control varies depending on the competitiveness of the crop as well. An onion farmer and a field corn farmer may have different ideas about how many weeds are acceptable, and what amount of resources can be afforded to control them.

Thinking through all these trade-offs can be difficult. To help navigate the choices,

The Ohio State University has developed a decision-making software tool focused on organic weed management. The computer-based [Organic Weed Manager](http://organicweedmanager.com) tool collects specific information on growing conditions and farmer priorities. The software then compares the users' current strategy with alternative approaches, showing the predicted impact of changes across diverse objectives and across time (See Figure 2). For those who want to consider making changes to their weed control approach, the tool also suggests specific steps to take.

Non-Chemical Tactics	Pros	Cons
Mechanical Manipulation of the Soil	Effective, relatively low cost.	Can reduce soil organic matter, disrupt soil structure, and cause compaction, erosion and water run-off.
Hand Weeding	Effective.	Labor and time intensive.
Cover Crops	Protects soil from erosion, prevents bare ground for weeds to sprout, adds organic matter.	Extra cost and labor, and could compete with main crop in some situations.
Stale Seed Bed	Effective and relatively low cost.	Requires greater inputs of time and labor, and can negatively impact soil if tillage and/or cultivation are used.
Mulching	Adds organic material, protects soil from erosion.	May increase diseases related to excess moisture, and may not work for all crops.
Crop Rotation	Disrupts weed and insect cycles, and can provide organic matter and/or an additional cash crop. If managed properly, can reduce the amount of time the ground is left bare.	Requires planning and more intensive management.

**Figure 1** Examples of weed control option with their benefits and drawbacks. These need to be balanced against other farm conditions and goals.



The online tool is easy to use, informative, and gives individualized results. By providing an opportunity to consider and compare alternative strategies, while at the same time reflecting on priorities and values, the team hopes to lower barriers to on-farm experimentation with organic weed management, resulting in improved adoption of new techniques.

The Organic Weed Manager software is free and available at [organicweedmanager.com](http://organicweedmanager.com). Completing the tool takes approximately 20 minutes. Users may save their progress and return later to complete it. Users can access it from a desktop or laptop computer, tablet, but not from a phone. Farmers and farm advisors are encouraged to use the tool and provide feedback for further development. The tool itself contains an area for evaluation and comments.

For more information about organic weed control options, including case studies and ongoing research projects, please visit Ohio State’s Organic Food & Farming Education and Research page at [offer.osu.edu](http://offer.osu.edu).

**Figure 2 Sample screens from the Organic Weed Control Decision Making Software**

*Right: What’s Important to you? Users are asked to rate considerations like weeding costs or soil organic matter. You can then adjust the relative values using the slider bars or go back and change your responses.*

*Below: Based on previous inputs, the tool compares your organic weed management strategy with others for various factors. It combines this information with your individual values to recommend new strategies to try where appropriate.*



Step 1: What You Do		Step 2: How Well It Works		Step 3: What You Care About		
Questions	Comparison	Questions	Comparison	What do you like?	What's Important to you?	What's Best for you?
<b>How your strategy compares to all strategies</b>						
Characteristics	Your Strategy	Common Strategy	Critical Stage Weed Management	Seedbank Elimination Strategy Short	Seedbank Elimination Strategy Long	Legend
Soil Health				Years 1-4	Years 5+	
Soil Organic Matter	3 - 4%	> 4%	3 - 3.5%	2.5 - 3%	> 4%	Much Better
Water Infiltration	Moderate	Moderate	Moderate	Slow to Moderate	Moderate	Better
Biological Health	Good	Moderate	Moderate	Poor to Moderate	Good	Same
Weed Seedbank	Moderate	High	Moderate	Low to Moderate	Low	Worse
Time Spent Weeding						
Time Weeding	5 - 10%	11 - 20%	28%	42%	5 - 10%	Much Worse
Costs						
Costs Per Acre	Low	Low	Medium	High	Low	

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