Mulches for Organic Farming

Conservation Job Sheet 484.1

Natural Resources Conservation Service (NRCS) April 2009

Mulching is applying plant residues or other suitable materials not produced on the site to the soil surface.

In organic farming mulch is used in vegetable or fruit production to:

- conserve moisture
- prevent surface compaction or crusting
- reduce runoff and erosion
- control weeds
- improve soil quality
- protect produce quality

Mulch is an approved weed control option with many natural materials such as straw, tree leaves, grass clippings or Ramial wood chips. ***It does not require organic mulches.***

The National Organic Program Final Rule (NOPFR), 7 CFR Part 205.203 (c) & (d) requires that …

> "The producer must manage plant and animal materials to maintain or improve soil organic matter content in a manner that does not contribute to contamination of crops, soil, or water by plant nutrients, pathogenic organisms, heavy metals, or residues of prohibited substances."

For example, mulches can not contain chemical residues such as: wood that contains lumber treated with arsenate or other prohibited materials or lawn clippings treated with pesticides. There are also restrictions on pen packed manure containing E. coli or other harmful bacteria.

According to the NOPFR, 7 CFR Part 205.206c:

"Weed problems may be controlled through:

- Mulching with fully biodegradable materials"…
- Plastic or other synthetic mulches: Provided, that they are removed at the end of the growing season."

Living mulches are sometimes used in no till to control weeds. Living mulches are cover crops manage by mowing or crimping with a roller designed for this purpose.

Straw mulch in this strawberry field helps to control weeds, reduce soil erosion and retain soil moisture.

NOPFR, 7 CFR Section 205.203 (c) (3) allows the use of: "uncomposted plant materials" as a soil fertility and crop nutrient practice. Examples of available plant materials for organic fertilizers are: alfalfa meal, Brewers grain (wet), Cocoa Shell Meal, Coffee Grounds, Kelp, Cottonseed meal (dry) etc.

For a more extensive list of plant materials see the University of Georgia Circular 853, "How to Convert an Inorganic Fertilizer Recommendation to an Organic One."

Operation and Maintenance

Periodically inspect mulched areas and reapply or repair damage sections, if needed.

Placement and removal of mulch shall be consistent with the purpose and site conditions.

Operation of equipment near and on site shall not compromise the purpose of the mulch.

Prevent fire damage to the mulch.

Collect and dispose of artificial (plastic) mulch after intended use according to local & state laws. Monitor and control weeds in mulched area.

Anchor mulches in drainage courses

Specifications

The amount of mulch and the type of management needed are site specific. The following specifications are specific to type of mulch and conditions necessary to meet the practice objective.

Mulch Materials

Mulch shall consist of one of the following materials: 1/Straw or hay that is reasonably free of weeds.2/ Sawdust 3/ Ramial wood chips (wood chips made from fresh tree branches 1-2 inches in diameter) 4/ Plastic Mulch

Mulching Rate

Apply straw, hay, and sawdust mulch as required for the intended purpose.

For Small Fruits such as blueberries, raspberries or blackberries: Apply straw or sawdust to a settled depth of 4 inches between the rows and under the plants, if no cultivation.

For Strawberries: Use weed-free straw. Apply loose 3-4 inches deep over the entire field just after the first hard freeze in the fall. Remove straw from plants and place between the rows just before growth starts in the spring.

Mulch may be cropped into the soil after strawberry harvest. **Plastic Mulch** can be used to warm the soil, control weed, conserve moisture, and provide erosion control. Plastic mulches laid contour or across slope on a flat grade are preferred to up and down slope arrangements. Concentrated flows may develop in plastic culture farming that requires additional conservation practices to prevent gully erosion. Remove plastic after harvest and dispose of according to local or state laws.

References

Riddle J. 2009. Organic Certification of Vegetable Operations, University of Minnesota. St. Paul, MN

NOP Final Rule, Federal Register Vol. 71, No. 109, Wednesday, June 7, 2006

Allison F. E., Anderson, M.S. 1951. The Use of Sawdust for Mulches and Soil Improvement. Circular No 891. USDA Agricultural Research Administration, Washington, D. C.

Morrone V. 2008. Transitioning to Certified Organic in Michigan – Where to Start? Extension Bulletin 3067, Michigan State University

Estimated Nitrogen Needed to Counteract the Nitrogen Depleting Effect of Dry Sawdust

Nitrogen Source	Nitrogen Content	Quantity Required	
Organic Nitrogen Sources*	**(Analysis % Nitrogen/lb)**	**Per ton (Pounds)**	**Per bushel (Pounds)**
Chicken Manure	1.65	1500	
Horse Manure	0.7	3420	
Swine Manure	0.5	4800	
Turkey Manure	1.35	2400	
Alfalfa Meal	3.0	800	
Blood Meal	12.0	200	
Fish Meal	10.0	240	
Guano (Peru)	12.5	195	

Dry sawdust usually has a 0.2% N content. The addition of 24 lbs of N per Ton is the approximate N needed to bring the N level up to 1.2 to 1.5 % if the initial harmful effect on crops (N immobilization in the soil) is to be avoided. There may be other suitable N sources like soy meal.

**No Bedding included. Manure N analysis: Chicken 33 lbs; Horse 14 lbs, Swine 10 lbs, Turkey 27 lbs / ton. All manure sources should be composted with sawdust prior to mulching to insure live E. coli bacteria do not contaminate direct human consumption crops ."The NOP regulation has strict requirements on the use of manure and compost in organic production systems. All animal manure must be composted if applied to vegetable crops destined for human consumption, or else certain restrictions apply. If the manure is fresh, or has not gone through a coplete composting process, it must be incorporated in to the soil at least 120 days before a vegetable crop will be harvested, if the edible portion of the crop comes into contact with the soil or soil particles. In regions where cold limits the season all raw manure should be incorporated in the field during the fall prior to vegetable crop planting, …to comply with the 120-day waiting period. If the edible portion of the crop does not come into contact with the soil (e.g., sweet corn), raw manure may be incorporated into the soil at least 90 days before harvest." Riddle J. 2009. Organic Certification of Vegetable Operations. University of Minnesota. St. Paul, MN.

Mulch materials

	Amount to Apply	Notes
Bark mulch 	2-4 inches	Smaller chips are easier to spread, especially around small plants. Excellent for use around trees, shrubs, and perennial gardens. When spreading mulch around trees, keep the mulch an inch or two away from the trunk. A couple inches of mulch is adequate. There is no need to apply the mulch 6 or 8 inches high, as often is seen.
Wood chips 	2-4 inches	Similar to bark mulch. If using fresh wood chips that are mixed with a lot of leaves, composting may be beneficial.
Leaves 	3-4 inches	Best to chop and compost before spreading. If using dry leaves, apply about six inches deep.
Grass clips 	2-3 inches	Thicker layers tend to compact and rot, becoming quite slimy and smelly. Add additional layers as clippings decompose. Do not use clippings from lawns treated with herbicides.
Newspaper 	1/4 inch	Apply sheets of newspaper and cover lightly with grass clippings or other mulch material to anchor. If other mulch materials are not available cover edges of paper with soil. Applying on a windy day can be a problem.
Compost 	3-4 inches	Excellent material for enriching soil.

Table re-printed from Backyard Conservation Tip Sheet *Mulching*, a cooperative project by NRCS, National Association of Conservation Districts and the Wildlife Habitat Council, originally printed by the National Association of Conservation Districts, April 1998

Design and Certification Sheet

Participant Name:	Date:
Tract #:	Written by:
Field(s):	

Purpose(s) (Check all that apply)	
☐ Conserve soil moisture	☐ Facilitate the establishment of vegetative cover
☐ Moderate soil temperature	☐ Improve soil condition
☐ Provide erosion control	☐ Reduce airborne particulates
☐ Prevent Surface crusting or soil compaction	☐ Protect quality of produce
☐ Suppress weed	

Field	Mulch Material	Application Rate		Application Depth or % Cover	Anchoring Method	Additional instructions or comments
		Per 1000 ft^2	Per Acre			

"You should always ask your certifying agency before initial use of any input on the farm." See MSU Extension Bulletin 3067.

Certification: This practice meets the Michigan NRCS 484 Standard and Specification

Certified by TSP_____ Date: _____

This practice was applied according to specifications

Client: _____ Date: _____