

## Introduction to Organic Land Care for Home Lawns and Gardens

Organic Land Care is a holistic approach to landscaping that improves the natural resources of a site by fostering cycling of resources, promoting ecological balance, and conserving biodiversity.

The question of what "organic" actually means can lead to a lot of confusion. The term "organic" as it applies to landscaping means landscaping without the use of traditional synthetic pesticides, fertilizers, or soil amendments. But organic land care is not simply about the type of fertilizer or pesticide product used on a home landscape. Rather, organic land care is a holistic approach to landscaping that restores and enhances biological cycles involving soil microorganisms, plants, and animals. When transitioning to an organic home landscape, the ultimate goal should be to create a healthy lawn and garden by recycling nutrients, growing pest resistant plants, and utilizing best management practices. Organic landscaping and gardening involves taking an active role in the long-term health of all plants at the site while also maintaining soil health.

Making the transition to organic land care may seem intimidating or overwhelming to the average homeowner who maintains their own lawn and landscape. Many misconceptions exist about organic lawn and land care. Homeowners have questioned whether "that stuff really works" or voiced fears of their yards turning into a hotbed of weeds and pests.

The information below is meant to give an overview of different aspects of organic land care. Resources are provided for more in-depth information on each topic. In addition, a checklist is available (see FS????) that outlines specific steps to take in the first and second year to transition a home landscape to organic management.

### Standards

The federal government has developed national organic standards for *agriculture* through the United States Department of Agriculture National Organic Program (USDA NOP) and a certification program identified by the "USDA Organic" symbol, which certifies that agricultural products meet federal organic standards. However, there are *no* federal standards for organic land care. This means that homeowners and land care practitioners must determine for themselves how to conduct organic land care on a property. A few organizations around the country have developed regional guidelines and standards for professionals such as the Northeast Organic Farming Association's Standards for Organic Land Care.

### Soil Health

The basis of organic land care is promoting healthy soil, which translates into healthy plants. The objectives of promoting healthy soil include:

- increasing organic matter through the use of composted materials
- correcting soil pH to maximize soil biological activity and nutrient uptake by plants
- promoting beneficial soil organisms which help make nutrients available to plants and restores ecological balance within the soil

Soil is made up of 4 major components:

- Air
- Water

- Minerals and rock fragments known as inorganic or non-living material
- Partially decaying plant and animal material known as organic matter

***"We might regard the soil as the furnace of life, wherein organic matter is the fuel, soil organisms are the fire consuming the fuel, and the plant nutrients are the ashes of the combustion." Robert Barnes, Fertile Soil***

The soil contains living organisms which make up the life of the soil. These organisms range from worms and insects to the tiniest of bacteria. The number of bacteria in 1 gram of soil may range from 100,000 to several billion!

It is the activity of these soil organisms, termed biological activity, which releases nutrients and makes them available for plant uptake. The biological activity starts with insects and earthworms shredding plant material and ends with the complete decomposition of the residues by the smallest of organisms such as bacteria and fungi. This decomposition process releases many nutrients; including nitrogen, phosphorus, and sulfur, making them available for uptake by plant roots for proper growth.

Soil organisms perform other important functions including:

- Taking nitrogen from the air and making it available to plants
- Forming symbiotic relationships with plant roots, and helping the plant absorb nutrients
- Producing vitamins and growth hormones, and acids that help break down the mineral portion of the soil
- Binding organic matter and minerals, and mixing it into the soil
- Creating tunnels and nutrient rich fecal matter
- Preying on plant pathogens

To achieve optimal biological activity, soils need to be warm and have adequate moisture, drainage, and a pH above 6.

The first step for transitioning to organic should be to have the soil from the area of interest tested. No soil inputs should be made without a soil test. The results of the soil test will provide information about soil nutrients, pH, composition, and the amount of organic matter. Soil test kits can be purchased through your local Cooperative Extension office or you can download instructions for testing your soil from the Rutgers Soil Testing Laboratory website- <http://njaes.rutgers.edu/soiltestinglab/>.

## **Fertilizers and Soil Amendments**

Once you have soil test results, fertilizers and/or soil amendments may need to be added in order to correct nutrient deficiencies. Most synthetic fertilizers are not allowed in an organic program. Synthetic fertilizers differ from organic fertilizers in that most synthetic fertilizers have soluble nutrients that are immediately available for plant uptake. Natural organic fertilizers need to be broken down by the soil biological community before nutrients are slowly made available to plants. Soil microorganisms are active only once soil temperatures have increased to above 50° F and there is sufficient moisture.

### Buyer Beware:

Fertilizers labeled as "organic" may still contain ingredients that are not permitted in an organic land care program such as sewage sludge, urea, and super phosphate. This is because fertilizer labels are regulated on a state-by-state basis and most states do not mandate that "organic" fertilizers have to comply with NOP standards. When buying an organic fertilizer, read the label carefully to make sure there are no ingredients that are prohibited. Ingredients that come from natural sources such as plant or animal by-products (i.e., fish, feather, or blood meal), rock powders, and seaweed would be permitted for use. Information for understanding organic fertilizers is listed in the resources section. In addition, many fertilizer products for gardening and lawn care have been approved by OMRI and are listed on their website (see below for OMRI information).

Examples of soil practices that are prohibited in an organic land care program would be:

- Adding soil amendments and fertilizers without a soil test
- Using a synthetic fertilizer (containing for example urea, ammonia, phosphoric acid, or potash) or soil amendment
- Using chemically-treated wood, burlaps, stakes, and twines
- Using mulch made from ground-up tires
- Using sewage sludge (biosolids, ex. milorganite) as a soil amendment

Follow the soil test recommendations for correcting soil pH and nutrient deficiencies. When applying fertilizers, remember that **more is not better**. Excess fertilizer applied to a landscape can pollute stormwater runoff and, ultimately, local streams and rivers. Excess fertilizer can also enhance disease and pest problems with plants and enhance their susceptibility to heat, drought and cold stress.

Know the law on fertilizer applications in New Jersey. New Jersey's Fertilizer Law is one of the strictest in the nation and prohibits the type of fertilizer that can be applied and also restricts fertilizer applications to specific times of the year. More information is available on New Jersey's fertilizer law and how it may affect you in the resources section.

### OMRI

The Organic Materials Review Institute (OMRI), is a nonprofit, third party reviewer of organic products. This organization checks fertilizers, soil amendments, pesticides, and other products against the National Organic Standards and determines whether they are allowed for use in organic production and processing of food. Products that are OMRI-certified may be used on operations that are certified organic under the USDA NOP, as well as in an organic land care program. To determine whether a product would be approved for use in an organic program, look for the OMRI label, or search the product list on their website. Although OMRI certification is a useful guideline, not all products allowed in an organic program have been certified.

## Compost and Compost Tea

Utilizing compost and compost tea helps to increase the activity of soil organisms, such as insects, earthworms, fungi, and bacteria. All of this biological activity releases plant-available nutrients from compost and natural organic fertilizer. A key aspect of organic land care is maintaining or restoring the soil's biology, which could take many years on degraded soils. Therefore, it is important to have patience when converting to an organic system and put in the time and effort to improve soil conditions.

Compost is partially decomposed organic materials. Using compost as a soil amendment is beneficial primarily because it increases organic matter. Although organic matter makes up a very small proportion of the soil, it is vital for plant growth.

Organic matter in the soil is important for:

- improving soil structure
- holding available moisture for plant roots
- increasing oxygen availability for plant roots
- providing energy for microorganism activity
- buffering pH
- limiting uptake of heavy metals and excessive nutrient input (relates to pH)
- providing nutrients

Ideally, topsoil should have 3-5% organic matter content, depending on the soil type, and should be at least 6 inches deep. Organic matter can be increased by tilling in compost at lawn establishment. Compost has a high organic matter content so it needs to be well tilled into the soil down to 6 inches. Alternatively, on established lawns, a ¼" compost layer can be spread in the early fall and spring.

Compost tea is a liquid extract of compost, rich in beneficial microorganisms and small amounts of soluble nutrients. Applying compost tea to a lawn or garden may help enhance the growth of beneficial microbes onto soil and plants. Nutrients from the compost are quickly made available for plant uptake. Compost tea can be brewed in small batches using a bucket, an aerator, and a mesh bag filled with compost and steeped for 24-36 hours. Alternatively, large-scale brewers can be purchased for batch brewing at a larger scale. There are few peer-reviewed studies describing scientific evidence of the effectiveness of compost tea. Most of the information about its use and effectiveness comes from the experience of compost tea practitioners who have reported increases in plant growth and disease suppression. Further scientific research is needed to determine compost tea's efficacy and mechanisms of impact for use in land management. Compost tea applications should be restricted to non-edible plants to avoid any food safety issues.

It is important not to use chlorinated water when brewing or applying compost tea because chlorine may kill the beneficial microbes. Therefore, tap water from the public water supply should only be used after left standing for 24-36 hours so the chlorine can dissipate. Collected rainwater, such as in a rain barrel, or well water can be also used for brewing compost tea. The water should be covered with a screen to prevent mosquitoes from breeding.

## **Lawns and Lawn Alternatives**

A healthy lawn can be a beautiful asset to a home landscape and, when properly managed, can help reduce soil erosion and stormwater runoff. In an organic program, the goal for lawns is to reduce their size to what is absolutely necessary. Large lawns require a great deal of energy and resources to be maintained. Where a lawn is maintained, grass should be mowed to a height of 3 inches, which helps to stimulate root growth and shade out unwanted weeds. Low maintenance turf grass varieties should be chosen that are adapted to the particular site conditions and intended use.

Under organic management, lawn irrigation is considered a nonessential use of water and should be kept to a minimum. Irrigation should be natural rainfall except during initial turf establishment or when there are unusual periods of dry weather. During periods of drought, unless under local water restrictions, the lawn should be watered deeply but infrequently. There is more information on water conservation for a home landscape in the resources section. The organic philosophy strives for a healthy lawn that is capable of going dormant to survive drought.

Practice the law of return by ensuring grass clippings are left on the lawn in order to cycle nutrients back into the soil. Incorporating nitrogen-fixing legumes such as white clover into a lawn is also beneficial for decreasing fertilizer applications. Nitrogen that is produced naturally through the use of clover is much less likely to leach from the soil than synthetic fertilizers. Dwarf white clovers also help to break up compacted soils over time and enhance beneficial soil microbes.

Lastly, an organic land care program should include assessing a site for where lawn alternatives should be considered. These alternatives include no-mow zones, native grass and wildflower meadows, and low-maintenance perennial beds. In areas of intense shade, avoid trying to grow lawns. In dense shade, mulch around trees with only 2 inches of organic mulch or grow shade loving ground covers or shrubs suited for this micro-environment.

## **Protecting Water Resources**

New Jersey receives approximately 45 inches of rainfall per year. Compared to many western states that may receive only 10-12 inches annually, water conservation may seem unimportant in our region. In fact, New Jersey's population consumes water at an increasing rate every year. Current estimates are that one individual uses approximately 120 gallons of water per day. Water usage is at its greatest during the summer due to lawn irrigation. Unfortunately, high summer water usage coincides with the time of year with the least available water supply.

When practicing organic land care the goal should be to create a drought-resistant lawn and garden that helps protect our vulnerable water supply by:

- increasing soil organic matter, which holds moisture
- promoting deep root growth by mowing high

- utilizing low-maintenance or drought resistant grass species varieties
- incorporating native plants that are adapted to the local climate
- understanding the natural dormancy cycles of cool and warm season grasses
- planting the "right plant in the right place"

### **Stormwater Runoff**

An additional goal of an organic landscape is to ensure that the property does not negatively affect local natural resources including wetlands, streams, and rivers. Many residential properties are directly connected to local waterways through the storm drain system. Rooftops, driveways, walkways, and compacted lawns generate stormwater runoff when it rains which discharges, without any treatment, directly to local waterways through the storm drain system. This stormwater runoff becomes polluted with contaminants such as oil, grease, excess fertilizer, pesticides, grass clippings, and pet waste. Polluted stormwater runoff degrades the water quality of local rivers and streams which negatively impacts fish species, drinking water supplies, recreational waterways, and can cause public health concerns when these waterways flood.

Homeowners can reduce stormwater runoff from their properties by directing stormwater to pervious areas where water will naturally soak into the ground. Often these areas already exist such as a healthy lawn, garden, or gravel or mulch walkways. It may be easy to redirect downspouts to these areas. It may be necessary to create areas for stormwater to infiltrate through the use of rain gardens, permeable pavement, swales, or dry wells. In addition, stormwater runoff can be harvested onsite by using rain barrels or cisterns and stored for later use on a lawn or garden.

In addition, litter, leaf debris, motor oil, animal waste, and household cleaning products should be disposed of properly and never be discharged to the storm drain system.

### **Pest and Disease Management**

Pest and disease outbreaks usually indicate an underlying problem, be it shallow topsoil, too much water or fertilizer, a plant in the wrong location, or inappropriate mowing practices.

**It is important to first identify the specific disease, pest, or weed problem. Local Cooperative Extension offices can provide help in proper identification of plant problems. In many cases, the problem can be eliminated or reduced by using proper cultural practices. Identifying the root cause of the pest or disease is the first step to solving the problem in an organic land care program .**

If the pest population remains above tolerance levels, any use of organic pesticides should be the last resort after correctly identifying the problem, correcting any underlying problem(s), and monitoring. This approach is very similar to that of Integrated Pest Management (IPM); the difference is, in an organic program, an approved organic pesticide would be used as a last resort instead of a synthetic pesticide.

Examples of pesticides allowed under an organic program include, but are not limited to, insecticidal soaps, horticultural spray oils, botanical insecticides such as neem, boric acid, food-grade extracts (example is capsaicin from hot pepper), elemental sulfur, *Bacillus thuringiensis*

(Bt)-based products, and biological fungicides such as *Bacillus subtilis*. Many surface insects on lawns can be eliminated by planting grasses that contain endophytes, a beneficial fungus in the seed of many fescues and perennial rye grasses. Look on grass seed labels to determine if the lawn seed you select contains endophytes.

### **Weed Management**

In a similar manner that insects and diseases play a "canary in the coal mine" role, the types of weeds that exist in a lawn may indicate a specific underlying problem. Often identifying the problem will help suppress weeds. For example, crabgrass can proliferate on compacted, acidic (low pH) soils. Often aerating the area and applying compost and limestone, as well as physically removing the crabgrass, will help stimulate the desired turfgrass.

In addition, overseeding the lawn with a perennial turfgrass mixture in the early spring and late summer will help turf outcompete weeds; thus, crowding, in turn, crowds out the undesirable weeds.

Seeding bare spots and thin areas, as well as applying a 1/4 inch of compost at seeding will help prevent the germination of weed seeds. Raising the lawn mower blade to keep grass at 3 or 4 inches will shade the soil surface and prevent weed seeds from germinating. Hand pulling will also help deter future weed growth as long as the underlying soil problem or cultural practice causing the weeds is identified.

In an organic program, it is important to define a tolerance level of weeds. An organic lawn will never be completely weed free; but a lawn with high quality soils will promote healthy turf that can outcompete most weeds.

### **Native Plants**

Native plants can help achieve an important goal of organic land care by limiting use of offsite inputs necessary for a healthy, sustainable landscape. Plants that are native to a region are those that were present before European colonization and have adapted to the local environmental conditions. Many native plants support a wide variety of birds, butterflies, and other insects and often these species are dependent on certain native plants for survival.

Incorporating native plants into a home landscape can help increase diversity and habitat, as well as reduce the need for watering and fertilizer applications. Native plants can be used to create a natural-looking landscape or they can easily be incorporated into a more formal or ornamental garden. Native plants are becoming more common at home centers and nurseries but finding local sources of them may still be difficult.

### **Resources and Bibliography:**

#### **Websites:**

- Northeast Organic Farming Association Organic Land Care Program- <http://organiclandcare.net>
- Organic Materials Review Institute- <http://omri.org>

- Rutgers Soil Testing Services- <http://njaes.rutgers.edu/soiltestinglab/>
- New Jersey Fertilizer law- <http://www.nj.gov/dep/healthylawnshealthywater/>

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### Other:

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[http://agr.mt.gov/agr/Programs/Pesticides/PDFs/AAPFCO\\_Labeling\\_Guide\\_2012.pdf](http://agr.mt.gov/agr/Programs/Pesticides/PDFs/AAPFCO_Labeling_Guide_2012.pdf)