Equipment, Products, and Services

Organic Matter - What You Should Know Before You Buy

Organic matter is an essential ingredient in growing a successful bareroot seedling crop and should play an important part in every nursery's soil management strategy. Here are a few things to think about when shopping for organic matter.

Consider Your Objectives

The type of organic matter you consider purchasing should be based on clear objectives specific to your site and needs. There are several reasons or objectives (see Table 1) for applying organic matter: 1) short term or long term tilth (improving soil physical and chemical properties); 2) addition of nutrients; 3) seedling disease control; 4) seedbed mulch; 5) frost protection and 6) erosion control. Some objectives overlap. For instance, organic matter for seedbed mulching will also provide erosion control and long-term soil tilth when incorporated into the soil between crop rotations. However, others do not - organic material that adds nutrients to soil or cover crops grown for erosion control can sometime promote seedling diseases. Understanding the characteristics of the available organic matter and how you intend to use it will help you determine which material to purchase.

Once you have settled on your objectives locating a source will be easier but nevertheless, still challenging. Paying attention to details will help you avoid the horror stories that some nursery managers have experienced over the years.

Here is a checklist of things to consider.

? **Composition**

Visit the site where the organic matter is being stockpiled. What you see in the pile is what you will eventually get. For instance, leaves obtained from municipal recycling programs can contain trash, including such items as shoes, oilcans, and toys. If this material is not removed before it is delivered to your nursery, you will have to have it removed when it arrives (Figure 1). Decide on the size range that is acceptable for your objectives. Sawdust material can range from dust to large chunks of scrap lumber (Figure 3). Both sizes can pose problems. Discuss your desired range with the seller. Often the unwanted material can be removed through screening.

Determine how much of the material is actually organic matter? It is not uncommon to have soil, gravel and even ash mixed into the material. While small amounts might be ok, your objective is to incorporate organic matter, not something else. There are several tests offered at soil testing facilities that can be used to determine percent organic matter but the most common is the LOI (loss on ignition). This is simply burning a known weight of material at very high temperatures and weighing the noncombustible remains. This test tends to report somewhat higher organic matter percentages than is actually present in the sample. Based on these results, you will have to decide how much inert material you will accept. There is no real guide for making this decision since every source and nursery circumstance is different. The best approach

	Objectives						
	Short-term tilth	Long-term tilth	Nutrient addition	Disease control	Seedbed mulch	Erosion control	Frost protection
Straw					+	+	+
Alfalfa cover crop	+		+	-		+	
Fresh sawdust	+	+		+	+	+	
Aged sawdust	+	+		+	+	+	
Sewage sludge	+	+	+		-	?	
Composted manure	+		+		-	+	
Pine needles	+	+		?	+	+	+

Table 1. Common Sources of Organic Matter and Objectives

is to revisit your original objectives for why you are applying organic matter and see if this extra material helps or hinders meeting these objectives.

Figure 1: *Leaves obtained from municipal recycling programs often include trash that must be removed at the nursery.*

? Weeds and toxic substances

There are many tales of woe of how weeds or toxic substances were brought into a nursery through the addition of organic matter purchased from an outside source. You don't want to add to these stories! One simple test can address both these concerns - sow seeds in a sample of the product and observe the results. Here's one way to do it. You will need seed that is stratified and ready for sowing, 3 mason jars with lids and a magic marker (Figure 2). It is advisable to use several species. Fill separate jars with 1) nursery soil (control), 2) organic material, and 3) organic material mixed with soil at the ratio that you plan to incorporate into your nursery beds. The jars should be a half to two thirds full and the material moist but not saturated. In each jar place 10 seeds on the surface and cover with the material normally used in your sowing operations. Screw on the lid and label with date, treatment and species used. Punch a few holes in the lids for aeration. Place jars in a germinator at the optimum temperature for that species or leave somewhere on a windowsill where it does not get direct sunlight. The jars make for great conversation pieces.

Observe these jars over the course of several weeks and note how many seeds have germinated. Compare germination rates and appearance of germinants with those of other jars. Is there much of a difference? Did the seedlings come up at different times? Are there differences in appearance? You might also see germination of seed that you did not sow. Make note of this. These will be the weeds that you introduce to your nursery if you purchase this material. If you see poorer germination and growth between materials and the control you should consider either not buying the material or conducting further testing. One test is to incorporate the material into your soil. This can be done in small plots that are established before sowing or transplanting. Seed germination and seedling growth can be evaluated over the first or second growing season to see what differences occur.

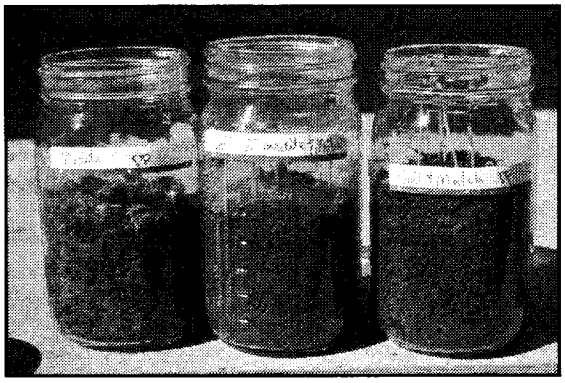

Figure 2: *Seeds grown on organic material can identify if it includes weeds or toxic substances*

? pH and Soluble Salts

pH and soluble salt tests are reasonably inexpensive to perform and will yield very basic information about the material. Both tests can be done at your nursery with the purchase of a pH and electrical conductivity meters. The optimum pH values for forest tree nurseries generally range from 5.5 to 6.0. Purchasing organic matter with values more than 1.0 outside of this range should be discussed with a nursery consultant to determine how the material will affect the overall soil pH.

Presence of salts is detected with an electrical conductivity meter. Incorporating material that is high in soluble salts can decrease germination and reduce survival and growth of most species.

Electrical conductivity values greater than 2 milliSeimens/cm^2 (mmhos/cm^2) are usually too high for good sources of organic matter.

? **Mineral Nutrients**

If you are considering buying organic matter that is high in nutrients, you must decide if these are nutrients you actually need for your soil. Reviewing recent soil test results for your nursery and your soil management plan will help you make this decision. In some instances, organic matter containing excessive nutrients can actually interfere with other macro or micro nutrients, making them less available to the plant.

? **Costs**

Maintaining or increasing the present organic matter in your nursery soil can be very expensive . Not only the purchase but also the transportation, spreading and incorporation in the soil, can be as expensive as the material itself. Costs however, should never prevent you from making organic matter an integral part of your soil management program, nor compromise your objectives. High costs might make you consider different sources and easier ways of applying and incorporating into the soil.

Figure 3: *Large wood scraps are common in sawdust piles and should be screened.*

Sampling & Lab Testing

As they say with computers, garbage in ...garbage out, the same goes with soil testing. Testing laboratories will only give you information on the samples that you send them, so it is important to collect enough samples and in the right areas to be representative of the material you are interested in purchasing.

Collect several composite samples representing different portions of the piles and locate where you collected them on a map. To collect a composite sample, randomly dig from one area at least a half dozen shovel-size scoops and mix into a bucket. Take your sample from that. Obtain samples from deep in the pile as well as on the surface. Keep in mind that the testing facilities will sieve out gravel-sized and larger material. Since sawdust, bark and other organics often contain material larger than this, it is important to notify the lab not to sieve your sample.

Look for a reputable lab that will process these samples quickly and use the same lab to maintain consistency from year to year. As a check for lab quality, take one sample and split it in half. Send each as a separate sample to see if the results that come back are the same. To check lab consistency from year to year, collect a large sample and keep in a cooler or freezer. Take a sample from this reference whenever a group of samples are sent to the lab. The results from these samples should be the same from year to year.

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