



Dwarf trees planted in rows 16 to 20 feet apart should accommodate utility tractors as wide as seven feet. Semi-dwarf orchards will need rows at least 20 feet apart to accommodate common utility tractors. Twenty-four feet between rows of vigorous, semi-dwarf trees on rich clay loam soils would be reasonable for a seven-foot wide tractor. Standard and semi standard trees should not be planted closer than 24 feet between rows because the tractor tires will hit and remove apples when the trees mature.

By Harry Hoch, M.S.  
Hoch Orchard and Gardens, La Crescent, Minnesota

pests in those sections after harvest. Late varieties will require several more weeks of monitoring and control. They are best grouped separately. Summer varieties color and sweeten in mid-summer when apple maggot females are at peak flight. Concentrating traps and repellants in these areas will be necessary while the late ripening green acidic fruit will be much less attractive to the maggot flies.

An orchard of less than ten acres with many varieties of apples will not have pollination issues or need pollinator trees. A small planting of plums should have pollinator trees mixed throughout. Most plum varieties will not self-pollinate as easily as apples as they bloom earlier before the pollinating insects are as active. A pollinator tree placed every five to ten plum trees within a row can drastically increase fruit set in a spring with poor pollination conditions.

Spacing between trees is determined by rootstock and variety combination, but row spacing is determined by how much production you want per acre and the size of equipment you intend to use. Rows as narrow as 12 or 14 feet are possible with full dwarf stock, but equipment four feet wide or narrower will be necessary. A small, high-density orchard of an acre or two can get by with a yard tractor. Five to ten acres will require more powerful equipment. Compact orchard tractors, sprayers, and mowers are expensive and used compact equipment is hard to find.



The Midwest Organic and Sustainable Education Service (MOSES) provides education and resources to farmers to encourage organic and sustainable farming practices. To learn more, please see:  
[www.mosesorganic.org](http://www.mosesorganic.org)

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MOSES ORGANIC FACT SHEET

# Planning the Organic Orchard



**Carefully plan the design and layout of your orchard so you can manage it organically.**

This fact sheet is written for the small-scale, commercial tree fruit grower in the upper Midwest who is planning at least one half-acre of orchard to be managed organically.

to start? Do you want full production in five years or can you let it build more gradually?

## Site Selection

Site selection can make or break your orchard. Elevation is one of the most important factors. Good air drainage can reduce the possibility of spring frosts. Well-drained soil (of any soil type) is needed as most tree fruits will struggle and die where it stays wet part of the year. Locating your orchard a few hundred yards from woodlots, brushy windbreaks and fence rows, or any area with unmaintained apple trees will reduce pest pressure.

## Fruit and Cultivar Selection

An organic orchard in the Midwest can easily produce a diversity of fresh fruit from July to November. Consult the many books and extension publications available on cultivar selection.

Disease resistant cultivars (DRC) should be on the top of your list, particularly for apples, in our humid climate. All organic apple growers should plant some, if not all, disease resistant cultivars. Use of these cultivars can save a lot of time and money spent on

Carefully planning the design and layout of your orchard will facilitate managing it organically. Consider these four questions before designing your orchard:

1. What is the purpose of the orchard? Producing fruit for family and staff, direct marketing and on-farm sales, or wholesale delivery to stores?
2. How long of a harvest season do you want?
3. What quality of fruit do you need for your market? A farmstead orchard can produce low-grade fruit for family and staff while a wholesale orchard will require more management and inputs to have at least half of the fruit grade as US #1.
4. How long can you wait for fruit production

[organictreefruit.org](http://organictreefruit.org)

The Organic Tree Fruit Association (OTFA) is a non-profit membership organization dedicated to serving the interests of organic tree fruit growers and advancing the organic tree fruit industry through education, research and advocacy.

sprays to control diseases, as well as the use of copper and sulfur. Note that not all DRCs have the same levels of resistance to each disease affecting apples.

## Rootstock and Tree Density

The rootstock controls the size of the tree, its hardiness, and in some cases, susceptibility to diseases and some insect pests, such as dogwood borer affecting apples. In general, the more dwarfing the rootstock the sooner the tree will start to bear fruit. The more dwarfing the tree, the more support it will need, such as a stake or trellis. Other tree fruits do not have as many rootstock options as apple, and the range of dwarfing is not as large. Consult the internet and tree fruit conferences to get information on the most recent rootstock releases, particularly the newest disease-resistant, dwarfing ones.

Tree density and tree size determine how quickly your orchard reaches full production. Dwarfing trees can be planted closer together resulting in higher yields per acre. You do not need to buy certified organic trees to eventually produce organic fruit. There are few nurseries supplying organic stock. Your trees may not be producing much for the first three years from planting, which is the required transition time to produce an organic crop.

## Site Preparation

The commercial grower needs to prepare the site in order to build up the soil, reduce weed competition, and avoid future problems. The best-case scenario is to start preparing your site three years before planting.

In year one, take soil samples, map the layout of the field, and look for potential problem areas (such as low spots, steep areas, rock outcropping, and thin eroded topsoil). While ridges and hilltops have great advantages for fruit trees, they often have issues with rocks, erosion, and irregular shaped fields.

In year two, plow the soil, add compost and fertilizer based on your soil test recommendations, and then plant a cover crop. Sudan grass or another sorghum strain makes an excellent first cover. Sudan



grows very quickly and will grow over six feet tall, smothering out grasses and perennial weeds. It can be mowed throughout the season and will come back strong. This helps to kill off woody perennials that may be struggling under the sudan grass canopy. Sudan grass is also fairly drought tolerant. It will germinate with minimal rain and survive dry spells. It does require warm soil to germinate. The fast growth, drought tolerance, and inability to reseed make it perfectly suited for the Midwest.

In the fall of year two, plow down the cover crop and smooth out the area that will eventually be the orchard floor. If the field is in good shape you may only need to disc the soil and smooth off the rough spots with a field drag. If the field was a rough pasture or has dead furrows, swales, big rocks or uneven ground you may have to rent a box blade or hire a small bulldozer to smooth things off. A few hundred dollars per acre spent prior to planting can avoid thousands of dollars of problems over the life of the orchard. After the groundwork is done a fall germinating cover, like winter wheat, will help to keep the soil in place and give you a nice green carpet to work in the following spring.

Early spring in year three, start planting. The earlier you plant, the more growth you will get on your trees. Planting in April can give you more than twice the growth you would get if you wait until June. A power auger will make the planting go more quickly than shovel digging. If you do use an auger, make the holes at least twelve inches in diameter. In wet clay soils use a shovel to break up any glazing of the hole's sides to help roots grow beyond the hole. The fastest option is to rent an apple tree planter and large tractor. If

commercial orchards are in the area, see if they are using a tree planter that you could rent or hire the rig and driver. With a tree planter, several hundred to 1000 good size trees can be planted in a day.

If you prepared excess ground, sow a cover crop to keep the perennial grasses from getting established. If you will plant more trees, mow down the cover crop in the fall and plant into it in the spring. If you do not plan to plant more trees, disc the cover crop in the fall, and seed a ground cover of mixed perennial grasses and clovers.

Not everyone can take three years to prepare for planting. The field should at least be fall plowed before the spring of planting to expose roots of woody perennials and grasses and make planting much easier in the spring. Plowing down sod and adding compost to the soil the spring of planting will be better than planting into sod, although more difficult than with fall plowing. Shovels, augers, and tree planters all have problems digging into unturned sod or clumping spring-plowed sod. Any mix of cover crops prior to tree planting is going to be much better than planting into spring-plowed sod.

## Soil Amendments

Test your soil for phosphorous, potassium, pH, and organic matter and ideally make adjustments to your soil a year or two before planting. The University of Minnesota has a very good manual titled "Nutrient Management for Commercial Fruit and Vegetable Crops in Minnesota." Use its recommendations for soils prior to tree planting.

A question you have to answer is "do I use all organic products to adjust my soils, or do I use conventional products to adjust my soils and use the three years of tree growth to go through the required transition to organic?" There are advantages to both options and each individual has to make their own choice. If you are planting into certifiable land, you may want to consider using organic products, certifying the land, and then alley cropping other crops.



Organic matter, such as compost, manure, or green manure crops, should be added to the soil prior to planting to increase the soil's biological activity and make nutrients more available. Locally produced, aged manure spread on the soil is a step better than a commercially processed product. Even raw fresh manure is suitable the year before planting.

A new area of soil science is exploring the soil's microbial life. Scientists are finding that trees prefer a fungal-based soil while prairies and field crops prefer a bacterial-based soil. While we do not yet have university-based recommendations on building the soil's fungal community, there are fungal inoculants that can be sprinkled into the hole or on the roots prior to planting. There are also micronized spore formulations that can be mixed with water and sprayed on the roots or watered into the soil. Forest soil can be spread on the orchard site or in the planting holes. These techniques are a fairly new and are not yet well researched, although the concept is sound and science-based.

## Final Layout

An orchard as close to square as possible in shape will reduce the amount of perimeter in your orchard. Trapping insects (for both monitoring and trap-out) will be easier in a square layout. Long narrow blocks of only a couple rows are the most difficult to monitor and control pests in.

Grouping the early ripening varieties together will allow you to stop monitoring and controlling