Asparagus in the Home Garden
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History of asparagus: As nearly as I can ascertain asparagus (*Asparagus officinalis)* has been cultivated for thousands of years. I read somewhere that it was first domesticated by the Macedonians about 200 B.C. It is native to Eurasia and people theorize that it grew wild in seaside dunes along the Mediterranean Sea and the British Isles. If true, that would explain the tolerance of the species to salt. My speculation is that, the crop was brought to North America by English colonists, since the English are particularly fond of it. Anyone who has been to Monticello knows that Jefferson cultivated it in his gardens.

Choosing a site for your asparagus bed: If you have the alternative, choose a sandy, well-drained spot in full sun. Asparagus does not tolerate saturated soil conditions, so if you have clay soil, choose a hilltop or hillside. If water stands in the spot you have chosen for only an hour, it is probably too wet for asparagus. Don't be afraid to choose really sandy soil. Anyone who has visited Oceana County knows that most of the soil is only a step above beach sand and we grow almost 10,000 acres of asparagus here.

Preparing the Soil: Any preparation for planting asparagus should begin no later than the year before you plan to plant. Begin with a soil test. Asparagus has some unusual nutrient requirements and it may take you a while to build the soil up. One of the crop's most unusual requirements is a high pH (a "sweet" versus "sour" soil). We use a pH of about 7.0 here although a little higher doesn't really hurt anything. That may be a problem if you are living in the southern United States where soils are generally naturally acid. It could take a lot of lime and more than one year to get the pH close to right. Remember when applying lime you want to work it as deeply into the soil as you can. Asparagus will grow at lower pHs, but research at Michigan State University shows that lower pHs are more conducive to the growth of the *Fusarium* fungi. Fusarium Root Rot is generally what eventually kills asparagus plants. For other nutrients follow recommendations based on a soil test. Although asparagus prefers sandy soil, anything you can do to raise the organic matter of the soil before planting will also pay big benefits. Compost is probably the easiest way to do this, but manure would be beneficial as well.

Choosing a variety: Original plantings of asparagus in the United States are mostly one of the Washington varieties, Mary, Martha or Waltham Washington. These are unimproved, non-hybrid varieties. What hybrid means in the case of asparagus is "all-male" hybrids. In a non-hybrid bed you will have an equal number of male and female plants. You will not be able to tell the difference until berries appear on the female plants, unless you are a good enough botanist to tell the difference between male and female flowers. A hybrid asparagus variety will have something less than half female plants. This is important, because it takes a fair amount of energy to grow the berries. While female plants generally produce larger spears, they also produce enough fewer spears that the yield advantage in Michigan for hybrids is about 50% greater. Michigan grows mostly hybrid asparagus, chiefly Jersey Giant, Jersey Knight, Jersey Supreme and

Jersey Gem out of the Rutgers University breeding program in New Jersey. Increasingly growers are planting more Canadian hybrids, especially one called Millenium, which our early tests show is more productive. The Canadian hybrids were produced out of a breeding program at Guelph University in Ontario. The Jersey strains are available in many garden catalogues, I am not sure that the Canadian ones are readily available to gardeners yet. Jersey Knight is what growers here generally use for fresh market. Most of the rest of the varieties I mentioned are mostly processing varieties. These varieties are bred for northern climates. I am less familiar with some of the varieties used in the southern United States, but UC 157 is widely grown in places like California and Mexico. It comes from the University of California breeding program.

Transplanting the asparagus: Please notice I said "transplanting" not "planting". I sometimes get asked about growing the asparagus plants from seed. That was tried many years ago in our area without much success. For one thing, the asparagus crown needs to be planted deeply so that you don't have spindly spears, and if the seed is planted where it needs to be to germinate, the crown won't be deep enough. I strongly recommend year-old nursery grown crowns. They are small enough that they don't suffer so greatly from transplant shock. Even two-year old crowns don't do as well as year-old crowns because they are so big that the transplant shock cancels out any benefit from the larger crown size.

I often get asked about transplanting or moving mature crowns to a different location. While technically possible, my advice on that idea is <u>forget it!</u> Crowns more than two years old are generally huge and it is very difficult to get them out of the ground in one piece. The transplant shock is correspondingly larger and the end result is that the moved crowns usually die. Even if they don't die immediately, you are probably moving the Fusarium root rot organism, that has almost certainly infected the crown, with it, and in their weakened condition the crowns fall victim to the disease a lot more quickly.

As I've already said, asparagus needs to be planted in a trench. In sandy soil, that trench needs to be 8-10 inches deep. Clay soils should have shallower trenches, about 6 inches in depth. Rows in Michigan are planted from 4 to 5 feet apart to give fern room to grow in the summer. Crowns should be planted between 8 and 12 inches apart on center. A little phosphate fertilizer should be put in the trenches before the crowns are set. Be careful that the fertilizer you use does not also have enough potassium or nitrogen to burn the crown. I usually recommend triple super phosphate, also known as 0-46-0, if you are going to use dry fertilizer. I believe you can also buy liquid, high-phosphate, transplant fertilizer. We are not exactly sure why the phosphate is important, although we speculate that it enhances development of the root system and helps reduce transplant shock. This benefit seems to occur regardless of the phosphorus level already in the soil.

Do not fill the trenches in completely, although that is sometimes done successfully on very sandy soils. The best approach is to cover the crowns with about 3 inches of soil. Let the new plants grow through that soil for about 6 weeks and add another 3 inches of soil. Wait until the plants have gone dormant in the late fall or in the spring before growth begins to finish filling the trenches.

Commercial asparagus in Michigan usually lasts between 12 and 15 years, but in soil that hasn't grown the crop before and is isolated from other asparagus fields the life expectancy can be longer. A few people have asparagus beds that are over 50 years old. However, spear diameter can begin to drop as the bed ages.

Harvesting Asparagus: Do not harvest your asparagus the year you plant it or the year following planting. The asparagus plant needs to grow and establish a healthy crown and it will need all of its energy to do that. The third-year after transplanting we generally harvest the field for about two weeks. A better way to look at it is in terms of the number of pickings. We try to harvest fields 8 to 12 times the first year of harvest. Which number we use depends on the strength of the field. A picking is taken whenever the spears get tall enough to harvest, usually between 8 and 10 inches, which may be every day in warm weather or every four days in very cool weather. In warmer weather you will find that tip quality will be better if the spears are picked at the shorter end of this size range. The second year of harvest we will pick the field for about four weeks and the third year of harvest we will pick for a full season which is six or seven weeks. In terms of number of harvests for a full-season, figure 22-24 harvests. Harvests may be more or less than that depending on the strength of the field indicated by carbohydrate storage in the roots. However, most gardeners lack access to the modern tools needed to measure those levels. One thing you can use as a guide is the number and diameter of the spears you are harvesting. If the number of spears in a harvest drops off dramatically beyond 15 pickings or so, or if the spear diameter drops, you may want to consider ending harvest early. These yield drops are a good sign that the crown is beginning to experience stress.

Growers should harvest all of the spears that come up until the end of the harvest period, even the small diameter ones we call "whips". You will find that whips are generally higher in fiber and tougher to eat than large diameter spears. That is because most of the fiber in asparagus is in the skins, making the larger spear the more tender. This is the exact opposite of what consumers assume when buying fresh asparagus, but is true nevertheless.

I also get questions on cutting versus snapping of asparagus. We see no difference to the plant whether the spear is cut below the soil surface, at the soil surface or snapped off above the soil surface. Most of the world cuts their asparagus, but in Michigan we snap ours. Snapping has an advantage to the home gardener in that you really don't need to trim snapped asparagus because it generally breaks off above the woody, high-fiber section of the spear. You may have noticed that fresh asparagus purchased from other states usually requires a fair amount of trimming to get rid of the woody bottom section, even if the white "butt" is trimmed off before you buy it. Snapping generally eliminates this problem.

After the end of the harvest season, the spears should be allowed to grow. A spear is really just a plant shoot, and the shoots will grow into the mature fern that re-charges the crown for the next harvest season.

Managing the asparagus fern: It is important to remember that the asparagus fern is the "factory" that supplies the energy to the crown and storage roots for the next year's crop. Anything that a gardener can do to keep healthy, green fern throughout the post-harvest growing season will increase yield and quality the next season. Fern should never be pruned or cut back. Competing weeds and insect and disease pests should be controlled throughout the growing season. However, it is not a good idea to encourage excessive fern growth late in the season, August and September in Michigan. That means that fertilizer and irrigation water should be stopped after August 1st. It takes a great deal of energy from the crown to grow new fern, and after that date there may not be enough day light and warm weather left to allow the plant to make enough new photosynthate to replace the energy lost in growing the fern.

Weed Control: Weed control is very important in successfully growing asparagus, especially in the first couple of years after transplanting when the young crowns are at their most vulnerable. Commercial growers use a variety of herbicides to control weeds. Most of these are either unavailable to gardeners or are too expensive to use on less than a commercial basis. If you are really curious about herbicides I suggest that you visit the following web site, http://www.msue.msu.edu/vegetable/weeds.htm, which is part of the Vegetable Area of Expertise web site at Michigan State University. A question I often get is using salt for weed control. This was widely practiced in the United States in the 19th Century. Asparagus is very tolerant to salt and most weeds are not. The sodium in salt can actually replace some of the plant's potassium need and there may be some small benefit in Fusarium suppression from salt. But, it takes a lot of salt! In one disease control study by Dr. Mary Hausbeck at Michigan State University in the 1990s, salt was applied up to levels of 1000 pounds per acre. At the 1000 pound per acre level, some weed control was observed. Better weed control would probably require even more salt. As you can imagine, applying salt at amounts over a 1000 pounds per acre has a few side effects. On a clay soil it could result in the complete loss of soil structure causing the soil to take on a concrete-like consistency. On sandy soils this effect wasn't observed, but that is probably because the salt was washed away by rainwater percolates through the soil. Before you try salt as a weed control, you may also want to consider that very few other desirable plants can handle the salt levels of asparagus, so you are going to be stuck with a dead area in your garden for decades after it is no longer an asparagus patch. Tillage is another possible option. Commercial growers in Michigan have pretty much abandoned tillage because equipment can cut into asparagus crowns, opening them up to Fusarium root rot and thereby shortening the life of the field. If home gardeners want to till an asparagus bed, early in the spring before spears begin to grow from the crown is safest, although some people also till immediately after the last harvest is taken. The late tillage will certainly break off some of the spears that could have grown into new fern using up some of the crowns reserve energy. Remember to till as shallowly as your tiller will allow. While I have had no experience with organic mulches, I can see no reason why a leaf or straw mulch applied 3 to 5 inches deep after the fern has started to grow in the summer wouldn't also be effective.

Insect control: Asparagus is attacked by a number of insects in Michigan, and probably more in other parts of the United States. The first one you will notice in the spring is the

cutworm. In Michigan, we see the white cutworm first. The white cutworm over-winters as a larva and can begin attacking spears as soon as they emerge in the spring. The usual damage that results is that they eat the tip off the spear. The common asparagus beetle is the next major pest in our timeline. This beetle is uniquely colored with a black and white checkerboard pattern set on a field of maroon. Its chief damage during the harvest season is to glue black eggs to spears. These eggs, which can be numerous, are oblong and stick out from the spear. This pest lasts through harvest season and hatching larvae feed on growing fern, often browning the fern completely off if left uncontrolled. Dark-sided cutworm also arrives during harvest, but usually a couple of weeks after the white cutworm, since in over-winters as an egg. This cutworm feeds on the side of the spear as it grows causing it to bend, often in a corkscrew shape. At present, carbaryl, the active ingredient in most garden dusts, is often used by homeowners to control all of these pests. However, carbaryl's homeowner uses are being reviewed by the Environmental Protection Agency and if that label is cancelled, a substitute will need to be found. For cutworms, carbaryl must be used as a liquid spray and it is best to apply it just before sun set as cutworms are night feeders. It is important to remember that if you use carbaryl you should wait at least 24 hours before picking treated asparagus. Follow all label directions when applying this or any pesticide.

Disease Control: Diseases are often the most damaging pests to asparagus plants. There are two major foliar diseases in Michigan, asparagus rust and Stemphylium purple spot. Sanitation is an important tool in controlling these diseases. Since both diseases move from the debris of the previous year onto emerging spears and fern, it is beneficial to remove the debris of the previous year's fern in early winter or early spring and destroy or compost it to kill the over-wintering structures of both of these diseases. Since both of these diseases need moist conditions to grow, another cultural practice can be to plant beds so that prevailing summer winds can blow the length of the row and dry out the fern rapidly. A slightly wider row spacing, perhaps 6 feet, and a wider spacing between crowns may also help in improving air movement and drying of the fern.

Failing that, fern should be treated with a fungicide on a regular basis, two weeks is often used in preventative treatments, throughout the summer to prevent premature browning off of the fern. Fungicide treatments by commercial asparagus growers in Michigan begins when new shoots are fully ferned out up until the first week of September.

Purple spot and rust are often difficult for the ordinary gardener to tell apart. Purple spot often shows up on asparagus spears during harvest. At that point the disease, as the name implies, looks like purple spots and in severe cases may have a gray spot in the center. This disease is not generally a problem for gardeners, since cooking usually causes the spots to disappear from the spears. Purple spot during the fern season is more serious. Lesions have a brownish-purple color and are usually irregularly shaped and sunken. Lesions on the lower stalk are not serious unless numerous enough to girdle the stalk, but on small branches or needles they can cause needle drop. Since the stalk generally remains green, gardeners often miss the onset of this disease, but if you notice a carpet of yellow needles below the fern, the disease has probably already done its damage.

Rust can be an even more damaging disease. It is very fast moving once it gets started. Unlike purple spot, it has three distinct lesions. The earliest lesions are large, ½ inch by ¼ inch, raised, eye-shaped and a creamy orange in color. They can appear on harvest stubble late in the harvest period. The mid-summer lesion type is a dark-red, rusty color, is raised and rod-shaped when the blister opens. Also unlike purple spot, these lesions are confined to stalk and branches, but when numerous can cause the entire plant to turn brown. In the fall these lesions transform into the third lesion type. Its characteristics are exactly like the summer version, only the color is black. This last stage is the over-wintering stage of the fungus. Commercial growers treat only the first two stages of this disease, usually with preventative sprays of fungicides containing the active ingredients chlorothalonil or an EBDC-type fungicide often found in combined insect/disease garden sprays. If you want details about commercial fungicides this address, http://www.msue.msu.edu/vegetable will take you to the f the MSU Vegetable AoE web site that lists various bulletins dealing with disease control in vegetables. Two other bulletins to look for on this web site are "Purple Spot Disease of Asparagus" and "Rust Disease of Asparagus."

The major soil disease of asparagus in Michigan is Fusarium root rot, caused by fungi that exist in all soils at some level. Asparagus is an excellent host for this disease and populations grow steadily in your asparagus bed over time. At present the only control is to keep asparagus crowns healthy so that they can successfully fight off the disease as long as possible. Affected crowns will have a brick-red rot that works from the outside of the crown in until the crown is killed. This disease also explains why it is not a good idea to plant a second crop of crowns in an old asparagus bed. Because levels of Fusarium are already high, the yield and life expectancy of the new bed is much less.

Non-pathogenic asparagus problems: Gardeners also may see several other conditions that they may think are caused by a pest, but are really caused by something else. Sand blown by high winds is often one of these things. Wind blown sand can injure spears, usually on the windward side. This causes the uninjured cells on the other side of the spear to grow more rapidly causing the spear to grow bent toward the wind that caused the injury. Frost can also be devastating to asparagus beds, causing spears to first take on a glassy, dark-green color and then to shrivel and turn black. In both of these situations affected spears should be removed and new ones allowed to grow. Spears can also come up bent and twisted if they are being grown in rocky soil. There is very little that can be done about this situation and the bending does not affect the eating quality of the spear.

Fertilizer: I generally do not give asparagus fertilizer recommendations unless they are based on a soil test three or less years old. In general, asparagus is a big user of potassium, uses very little phosphorus other than in the year crowns are set, and uses small amounts of nitrogen. Fertilizer types don't seem to be too important, other than that there is some evidence that ammonium-types of nitrogen fertilizer may increase Fusarium problems. That means that nitrate-types like calcium nitrate may be better, although they are much more expensive. In some areas sulfur may also be necessary, and in very high pH situations some of the micronutrients like manganese may also be deficient.

Irrigation: In Michigan and most of the eastern United States, irrigation is completely unnecessary. That is because asparagus is extremely deep rooted. In deep soils, roots often reach 10 feet in depth. In more arid regions some irrigation may be necessary, although overhead irrigation makes an ideal environment for foliar diseases.

White asparagus: Contrary to popular belief, white asparagus is not a variety. It is simply asparagus spears grown in the absence of sunlight so that chlorophyll does not develop. White asparagus does have a slightly sweeter taste and has less fiber than green asparagus. In parts of Europe, especially Germany and the Netherlands this is the primary way that asparagus is grown and consumed. Outside of Europe it is regarded more as a curiosity or gourmet item.

The traditional way to grow it is to plant crowns on the soil surface instead of trenches and to mound dirt up over the rows. During harvest pickers walk between the mounded rows and when they see an asparagus tip just cracking through the soil they dig the spear out of the dirt and cut it off. An alternate way to raise white asparagus was developed by Dr. Jim Motes, an Extension Specialist recently retired from Oklahoma State University. His system was to place bent iron hoops over flat rows and cover them with thick black plastic. The plastic blocks sunlight and the pickers can then just lift up the plastic and snap off the spears.

Purple asparagus: Purple asparagus is a variety, or rather a couple of varieties. Purple Passion, Pacific Purple and others are mutant strains bred to be purple in color, although the asparagus turns green when it is cooked. These varieties tend to send out bigger but fewer spears. People who have grown them also report to me that they are more disease prone than conventional varieties.

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