Raspberries

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Small fruit production in the home garden. Raspberries.

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Washington produces about 6,800 acres of raspberries. Our state is the first in the United States in total production, producing over 9,000 pounds per acre. Western Washington has an ideal climate for raspberry production, but raspberries will grow most anywhere in the state.

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Raspberries, like blackberries are in the family *Rosaceae,* and a member of the genus *Rubus.* Although commercial fields many times are rotated out of raspberry production every 8 or 10 years, well-managed backyard raspberry stands can live for more than 40 years. They tend to be the hardiest of the cane fruits, even though winter hardiness can vary from variety to variety for raspberries.

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The raspberry fruit is an aggregate fruit called a drupe. Each ovary develops into a drupelet. The difference between raspberries and blackberries is that the receptacle detaches from the raspberry fruit, whereas in the blackberry, the receptacle remains with the fruit. Here show in this slide you can see the raspberry fruit, the hollow nature of the raspberry fruit after harvest, and the receptacle remaining on the plant after harvest.

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There are two types of raspberries. The first type are the summer bearers. The summer bearers the most common commercial variety of raspberries and make up close to 100% of the commercial production in the state. Summer bearers will produce fruit starting in late June. Many will produce throughout July, and some of the later varieties will be still be providing some harvest into August. One of our oldest cultivars still grown in the region is Willamette. The variety Willamette was released by Oregon State University in 1943. The most common variety grown is the variety Meeker, released by Washington State University in 1967. A variety released in the late 1980s is Tulameen, which was developed by British Columbia. The three newest varieties released by Washington State University include Cascade Bounty, Cascade Dawn, and Cascade Delight, with the most popular variety being Cascade Delight. A newer variety from British Columbia is Saanich, which is an earlier variety well-suited for the fresh market.

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Tulameen, developed in 1989, has a long fruiting season, a sweet raspberry flavor, and very large fruit. One drawback it does have is very susceptible to Phytophthora root rot,
a common fungal disease in Western Washington.

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Cascade Delight, developed by Washington State in 2003, is fairly tolerant to Phytophthora root rot. It is not resistant, so it still must be grown on well-drained soils. But because of its resistant characteristics will still allow it to get through wetter winters on marginal soils where other varieties may have production problems and plants dying off. The Cascade Delight has a very large fruit, and here you can see it is up to about two inches long.

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Cascade Dawn, developed in 2005, is an earlier season fresh market variety with some Phytophthora root rot tolerance.

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Also in the summer bearing classification are black raspberries also called Blackcaps. These will grow wild in the region but there are improved varieties with 100% of the black raspberry production being grown in Willamette Valley of Oregon. Popular varieties include Cumberland and Bristol. Purple raspberries, a cross between red raspberries and black raspberries, can also be grown in the region. They have dark purple, fairly small fruit. Common varieties include Brandywine and Royalty. Although they can be grown, and they may be a novelty in the garden, there really is no advantage to growing these in the home garden unless you have the space.

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A second type of raspberry are the everbearing raspberries, also known as primocane. And these can be divided up into two subcategories, with one being red everbearing. Some of the common red everbearing or primocane varieties include Caroline, from the University of Maryland, that has very large fruit. And earlier than the industry standard Heritage, but it is susceptible to root rot. Other varieties include Autumn Bliss from England, which is much earlier and a good selection for this area; Heritage, which is very productive and will survive in the coldest parts of even Eastern Washington, but is fairly late. And other varieties include Fall Red from University of New Hampshire, Amity and Summit from Oregon State University, and Dinkum from Australia.

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Second type of primocane are the yellow everbearing. These include Fall Gold from the University of New Hampshire, Summit Gold from Oregon State University, and a newer variety, Anne from University of Maryland. They have a color that ranges from bright yellow to almost deep gold and have a nice sweet mild raspberry flavor, and they will grow very well in this area. The advantages of having everbearing varieties versus just the summer bearing variety is having raspberries fresh out of the garden during August, September, and well into October. So it can definitely extend the harvest season for the home garden.
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Here is Yellow Summit with a lighter yellow color and Fall Gold with a deep orange gold color.

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The growth habit of raspberries. The raspberry roots have a perennial growth habit. They can live 8, 10, 20, even 40 years. However, the top growth or the canes on raspberries have a biennial growth habit. There are two types of canes: the primocane or the vegetative cane, and the floricane or the reproductive cane. The primocane is the cane that will emerge from the crown from the soil during the spring or early summer of each season. On our summer bearing varieties the primocane will grow up during the spring, summer, and into the fall and will get very tall and will just have leaves. It will over winter and the following spring it will begin growth again, and in late spring will flower, will be pollinated, and then will produce fruit. After harvest is complete, the summer bearing variety floricanes will die and will need to be pruned out. But at the same time primocanes will be emerging and will be ready to set a crop for next year’s harvest. Primocane or everbearing varieties are very similar. In the spring or early summer primocanes will emerge from the crown and will grow up. They’ll grow during the summer and then later on in the summer, in late August or early September depending on the variety, they will begin to flower on the top third or quarter of the plant. After flowering, fruit will begin to form and will ripen. And harvest will be in August or September depending on the season and the variety. Harvest will go up until fall rains or frosty temperatures do not allow the fruit to ripen. And as we go into winter the canes will begin to go dormant. During the winter where the fruit was harvested on that top one quarter or one third of the cane, it will die. And the following spring the canes will leaf out lower down on the canes. At this point we prune off that top about 25 or 30% of the cane, down to a live bud. Once we prune that off, fruiting laterals will form and we’ll get a second or a summer crop off the lower part of that cane from the fruiting laterals. At the conclusion of the summer harvest the cane should be pruned out down to ground level, and new primocanes will provide a fall harvest. You can always select a summer bearer and an early everbearer for extended season long production in the home garden.

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When selecting a place for raspberries be sure and select a well-drained soil - that is a requirement. Plant in full sun with at least 8 hours of sun per day. Bareroot plants can be purchased in early spring and can be planted as soon as the soil can be worked. Many of us have gardening friends that have perfectly good raspberry plants and are willing to share primocanes in the spring when they are still dormant for transplanting. That’s fine, but be careful you are not transplanting diseases, such as virus diseases, or insects, such as root weevils. Or weeds such as quack grass, horsetail, or morning glory in the soil along with the canes. So sharing is good, but it’s recipient beware. Our first recommendation is to use purchased Washington State Department of Agriculture certified plants or plants certified by another Department of Agriculture agency in another state. These plants are certified to be true to variety, free of insects, and free of diseases. Plants should be planted about 24 inches apart in rows about 5 feet apart in the garden.
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For raspberries only one variety is required for production, just like blackberries, but plant more for longer production. Now I said before, you can certainly plant an everbearing and a summer bearing for summer-long and fall-long production. And bees are required for pollination.

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When selecting a place for your raspberries, be sure the area is free of perennial weeds. You want to eliminate them before planting. Most people would say hedge bindweed and horsetail are impossible to eradicate and that may be true, but at some point they will probably reinvade your raspberry planting and they are very difficult to control at that point. Although quack grass is obnoxious, it is one that you can certainly eradicate by careful digging and removing rhizomes from the soil. Many of our annuals, creeping perennial grasses and creeping perennial weeds such as buttercup, are a nuisance but certainly can be eradicated before planting, but then you have to be careful about new plants emerging from seeds. Prior to planting be sure and use a full complement of fertilizers in the soil. After plants are in place and established, we recommend applying two to three pounds of a dilute fertilizer, such as 5-10-10 per 100 feet of row. Or other equivalent fertilizers can be used, whether they are organic or inorganic. Because we are probably going to lose some of our nitrates to leaching in the early spring, apply half of the fertilizer at bud break, and one-half 6 weeks later. That should ensure a full complement of fertilizer through the spring and the harvest season.

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Establishment of raspberries. We’ll plant a dormant plant early in the spring. It will probably look like a very small thin dead stick with a small crown and some fine roots attached. We plant it into the deeply worked soil, watered to firm up the soil and settle the soil around the roots, and wait. That first cane to emerge will depend on time of the spring, how warm the soil is, and how warm our spring is to let things progress. Here shows the emergence of that first primocane from the crown.

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Later on in the spring we’ll start to get multiple primocanes. You may see some yellowing of the lower foliage, and this is normal as the plants become established. It’s showing a slight deficiency in nitrogen as the rapid new growth on the top of the plant takes nitrogen from the lower leaves. As the soil warms up and more nitrogen mineralizes and is available to the root system into the plant, the plant will become entirely green.

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Here are the plants later on in the summer as the soil temperatures warm up, the plants have multiple primocanes and good uniform dark green color.
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Late summer shows primocanes about three feet tall, and it’s time to get trellising in place. Whether they are wooden posts, steel posts, two wires, four wires; we do have to trellis up raspberries so they’ll not lodge and fall on the ground.

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By the third year after planting you should have plants that are capable of being up to seven feet tall, very uniform, very vigorous, and into maximum production.

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As I mentioned before, trellising is required to prevent the canes from lodging or falling over. This shows a four-wire system with the canes tied to prevent them from rubbing on the wire. You could use a two-wire system and those have to be tied, otherwise they will fall over. Cross-arms can be used to provide 18 to 24 inches of spacing between the wires at the top of the trellis.

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Trellising is required for raspberries, it doesn’t have to be a difficult task and it is something that could only take a few minutes depending on the size of your raspberry patch. If raspberries are not trellised up, they are going to end typically lodging over and falling on the ground, which really makes management difficult. Here you can see an example of a four-wire trellis system with a wire on each side of the cane. These have been banded together with small wires to keep them in check. But it prevents the raspberry cane from sliding back and forth in the wind. There will also be a set of wires at about knee height or 2½ feet up above the soil surface. Between these two wires, we’ll help guide the plant as they emerge in the summer. And then they can be finally contained between the two wires later on in the summer as they reach about five feet in height. The material used for trellising, usually like twelve-gage wire works very well. Posts should be 8 to 10 feet apart; they should be sturdy posts that will be able to handle the weight of the wire and the foliage that grows on the trellising system.

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Avoid too many canes per stool, with a stool being one plant. 8 to 10 or maybe as many as 12 canes will be ideal. This will maintain the vigor of each plant and allow for maximum cane diameter. But we do want to keep rows narrow, about 18 inches wide. If allowed raspberries will have new canes emerge 3, 6, 8, or more feet away from the mother row. We want to remove all of these plants or transplant them to start a new row because sooner or later it will become a solid stand of raspberries. We definitely want to maintain distinct narrow rows for maximum plant vigor and yield.

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A variety of things going on in the raspberries this time of year. And this is a variety Tulameen which was developed in the 1990s and is a very popular variety from British
Columbia. First thing we have here is trellised with a four-wire system. Two wires at about the 4-foot level and you can see we have a nice bundle of canes here, about 8 that are all bundled together and looking perfect going into the fall. The canes right now are about 8 to 9 feet tall. You can see the canes are very vigorous, diameter about like somebody’s finger. You can see good green color, uniform color from the ground right up to the top of the cane. Now these canes will go through the winter and they do require a certain amount of chilling to be able to produce flowers next spring. Right now these are considered to be primocanes, meaning those canes that emerge from the crown during the summer, and grow through the summer into the fall. And these canes by the time the growing season stops may be up to twelve feet tall. You can see this variety does have mild thorns, several of our varieties will be completely thornless. So the thornless varieties are certainly something that is enjoyed by the home gardener and anyone harvesting raspberries. These have mild thorns, meaning there’re not lots of thorns, there’re not long thorns, and they tend not to be a problem in production. You can also see that these have been bound together with landscape ties that are traditionally used around the new trees that are planted and staked up in landscaping. One disadvantage with this style is the rubbing on the cane, and you can see the brown rubbing from the up and down movement of the ties. These could be just as easily tied either individually or in bundles of three or four directly to the wire, which will keep them more stationary. It can cause a little bit of rubbing, but is more preferred by home gardeners.

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At the conclusion of harvest, after the canes will die. And summer bearers when the harvest is complete in late July or early August, those floricanes that produce fruit will die. These floricanes need to be removed, they can be removed just after harvest, anytime during the fall, winter, and into early spring. They are very distinctive to identify because they’ll have brown flaking bark versus the bright green color of the primocanes on live stems. They can be removed with hand clippers and should be pruned down to a couple inches above the soil surface. In primocane or everbearing producing varieties, the canes aren’t going to die at the conclusion of that summer or fall harvest. Only the top part of the canes will die, they’ll over winter and you will get potentially a crop lower down on those canes. Those canes will die after that summer harvest is done. These can then be pruned down close to ground level, allowing for the primocanes to produce the fall crop.

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After harvest of our summer bearing raspberries the old canes, the floricanes that are through producing are going to go ahead and die. The home gardener must at some point cut out the old canes. This can be done soon after harvest like July and August, or it can be done anytime during the fall, or it can even be done the following spring. This is always a good time of year to do pruning out the floricanes because it’s very easy to tell which are the new canes. And we can see these by the green bark, and all the green leaves, versus those that were harvested during July and August of this year and are really on the decline. The important thing to do is just to get the old canes out. They will have to be cut down to 2 or 3 inches above the soil surface. And you can certainly start up high and pull it through the trellis wire… cut it out in segments… and just keep
following those down to ground level. Again, it is very easy to tell those that are dead or are dying. The old canes can be infested with a variety of insects including mites, aphids, there is always a potential for weevils and other things, and some diseases. They don’t compost so well right out in the row so they can be raked up and removed completely from the raspberry patch and managed somewhere else separately. Whether they is allowances for burning in your area, for composting, for putting in a yard bin and recycling with the municipal compost are all good options. At the end you should have canes, vigorous canes, 8 to 12 vigorous canes depending on the age of the stand and those should be managed for next year’s crop.

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Raspberries need to be tied up. This shows a single wire up at chest height. Using an organic twine will allow the twine to be cut after harvest as the canes die. It can be dropped on the ground and will compost along with leaves, small stems, and other materials. It’s recommended not to use plastic baling twine or other synthetic fibers as these should be picked up from the garden as they will not compost readily, if ever.

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This gardener is topping canes in the spring, usually around the first of March. Cut canes back to 5 feet or 6 feet as this will force fruiting laterals to form the upper buds. Fruiting laterals will grow one to one and a half feet long, and is where all of the fruit will be born. If a raspberry cane is not topped, a cane can grow 10, 12, to 14 feet depending on the vigor and the variety. It will not only require the home gardener to get out a step ladder to harvest the fruit up ten feet high, but production will be very low as it will only produce a few clusters of fruit. By topping and producing fruiting laterals, it will multiply production many times over, plus will be easily reachable by the home gardener.

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Diseases in raspberries. There are some disease, insect, and weed problems that certainly are capable of attacking raspberries. One common disease over the years has been Phytophthora root rot. Phytophthora root rot, if it shows up, will usually show up in early July as the soil temperatures begin to warm. These pictures show yellowing and browning of the foliage and shriveling of the fruit as it nears peak harvest time, at a time when the raspberries should look very good. However at this point the soil temperatures have increased, the soil moisture has decreased, air temperatures have increased dramatically to the 80 or even 90 degree range and the plant has a heavy demand for moisture for the developing fruit and for the stems. At that point the root system may not be able to deliver enough water and cause burning of the foliage.

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Here is a picture of Phytophthora root rot affecting emerging primocanes, showing wilting and rapid drying of the primocanes.
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Here are a pocket of plants in a row showing Phytophthora root rot in the floricanes.

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To identify Phytophthora root rot the home gardener has to start below the ground. We have one picture here that shows the normal color of the inside of the raspberry cane, the lateral roots, the root buds, and the fibrous roots on the lateral roots; versus infected that shows a darkening cane, dark brown spongy lateral roots, and a primocane or a floricanes that’s separating from the lateral root. Although the plant looks good through the spring and into the summer, when nutrient and water demands become too high this damaged root system is unable to keep up with the demands of the raspberry plant.

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So to recap, Phytophthora root rot can be a common disease, in western Washington especially. It is a fungal disease and the spores are found in the soil and are mobile. So when the soil spaces become saturated with water they’re allowed to swim around in the free moisture and infect the plants so saturated soils provide an ideal environment. Detrimental effects on plants will be increased by wet soils during the growing season, and especially as we get into May and June if the soils are still saturated due to poor drainage this will be devastating to the plants. And although it’s not directly Phytophthora root rot that causes this, the requirements of the plant to expend energy to live in saturated soils will allow secondary pathogens to attack and kill the weakened plants. Improved soil drainage will certainly help this situation, but that’s not always easily done in a home garden situation and raised beds will substitute nicely to improve the soil drainage.

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Yellow Rust. Yellow rust can be found throughout western Washington. Many people will never see this in the home garden but there are pockets of yellow rust in various parts of Western Washington. It’s easily identified by the yellow/rust pustules that can be found on the leaf, and when rubbing the pustules to have a yellow rusty powder come off on your hand.

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Insects - raspberry crown borer. The adult looks similar to a yellow jacket and if the home gardener happens to see the adult will often confuse it or write it off as being a yellow jacket or another wasp. Actually it is a clear-winged moth that will lay eggs on the raspberry leaf. When the larva emerges from the leaf it will tunnel down the petiole into the lower stem of raspberry. The larva will develop inside the raspberry, will consume the contents of the lower stem and will cause the cane to die. These can easily be controlled by pulling on the stem, they will usually sever easily from the lower stem and the larva can be killed. Insecticides should not be necessary.
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Sunscald. Sunscald will appear as white drupelets, and can be found on some cultivars of raspberries. Although not overly common, some cultivars certainly are more susceptible than others. One factor that leads up to sunscald is having cool, cooler cloudy weather during development, early development of the raspberry fruit. Going from moderate temperatures to extremely high temperatures such as 85 to 90 or more from one day to the next can cause those fruits to easily sunscald because they aren’t conditioned for the warmer temperatures.

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Weeds. Many weeds can affect all of our small fruit, including raspberries. Raspberries are very difficult to manage for weeds because of the many canes that arise and the shallow nature of the root system. Whatever you decide, do not ever use a string trimmer or a weed eater around the raspberries. The string will wrap many times around the stems, girdling the bark and killing those canes. Another thing is do not use glyphosate or other Roundup type products to control weeds. Glyphosate will be easily absorbed into the raspberries and even if you don’t think there is a raspberry where you are spraying, there may be a primocane just emerging through the weeds that you don’t notice. The Roundup can be translocated further into the plant, causing damage to the plant and stunting of the leaves, plants, and should not be used. Be sure and identify the weeds you have, know how to control them, and be sure and keep up with weeding in the home garden.

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OK, weeds are a problem in any home garden. It doesn’t matter if it’s in small fruits, vegetables, or the landscape. We have a variety of weeds in this state that really present problems. In the fall, the summer annuals tend to be one of the bigger weed problems. Summer annuals can be grasses such as barnyard grass that comes up during June-July and makes all its growth during the warmth of summer and then will die when the temperatures start hitting freezing later on in the fall. Some of the broadleaf weeds are also going to be a problem, such as lady’s thumb, a type of smartweed, which also comes up during the earlier part of the summer, grows all summer long and into the fall until we get some cooler temperatures that start killing the weeds off. But you can see both all the summer annuals whether its grasses or the broadleaves are going to leave thousands of seeds behind which is only going to make the weed problems worse as we go down the road. Weeds - you have to keep up with weeds. It doesn’t matter what type of weeds they are. To mow, to hand pull, do whatever it takes to keep the weeds clean out of the raspberries within the row and between the row. You can certainly mow and compost flowering stage and earlier, prior to seed development cause once you have seeds developed after pollination of the weeds it’s only going to compound the problems that you have to deal with. The mulches early prior to seed germination in the weeds is going to be very helpful because it’s going to keep the raspberry row much cleaner, and the walkway much cleaner. The other thing we have to remember about raspberries, although raspberries are very vigorous plants and they can grow up to 12 feet tall, we are going to, the weeds are serious competition against the growth of the raspberries. So the more weeds you have out here the more competition we are going to have from
the raspberries. Water - additional water, drip irrigation system is going to be critical, especially if you have large amounts of grasses that are competing with the raspberries.

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Crumbly berry. Crumbly berry is a common complaint from many home gardeners. Instead of having a normal compliment of about 120 drupelets in that drupe or aggregate fruit, you may have 60 or 80. And when the berries are harvested they fall apart. Crumbly berry can be due to many causes, such as virus that causes raspberry bushy dwarf virus. Genetics in some of our older varieties that can have problems with crumbly berry. Poor pollination where poor bee activity or poor weather for bee activity caused incomplete pollination. Nutrient deficiency such as a boron deficiency, or possibly either other things. So try to control nutrients by providing good nutrition for the plants, and if you continuously have problems you may have to look at another variety.

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Washington State University has a raspberry breeding program that continuously tries to improve the raspberry varieties available for the commercial industry in Washington and the home gardener. About 100 crosses are made by our plant breeder each year. For each cross made has a potential for one fruit to be developed, and 120 seeds to be developed from that cross. When these must be handled separately, recorded, planted in the greenhouse, and transplanted, 100 crosses can easily result in over 12,000 new plants to manage.

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Raspberries, the end.