



Oregon State University  
Extension Service  
Lincoln County



## Gardening Roundtable Session on Winter Vegetables with Pat Patterson

*Neglect of the soil has "helped topple empires and wipe out entire civilizations" and care of the soil "has enabled other societies to flourish for centuries".*

*Dr. Lowdermilk, Soil Conservation Service. "Conquest of the Land Through 7,000 years"*

### VEGETABLE FAMILIES

Prepared by Patricia Patterson

OSU/Lane County Extension Service Master Gardener volunteer  
(Revised 2018)

- ❖ Greens: Spinach, lettuce, kale, chard, corn salad, chickweed, bittercress, Asian greens, such as Kyona/Mizuna mustard and leafy Pak Choi plus some protected leaf lettuces and sprouting broccoli are the mainstays of the winter garden. For the summer greens, kale, chard, lettuce, New Zealand spinach and the cabbage family greens work well. In the warm season it is best to keep the latter greens covered with Reemay™ or netting to ward off the aphids, cabbage maggot, and cabbage caterpillars. These are easy to grow here almost year round. There is a tremendous variety of cultivars. The trick is to do succession sowings based on how long each green can be expected to produce well. Sow the new batch when ½ the useful life of that green is past. Interplant these and use the tips on keeping them cooler. These require very fertile soil and adequate water.
- Root crops: beets, carrots, parsnips, etc. All the root crops appreciate deep loose soil with no fresh manure. Parsnips are exceptional in the winter stir fried with carrots.

The major reason for learning plants by families is that it often helps in understanding their climate and cultural preferences as well as their life cycles and possible problems.

ASTERACEAE (the daisy family) is the most evolved dicot family and the most numerous. It is characterized by multiple (composite) flower heads. A sunflower is an excellent example with disk flowers and ray flowers. Dandelion is another composite and shows the "parachute" type seed dispersal often found in this family. In the vegetable garden globe artichoke, Jerusalem artichoke, cardoon, sunflower, lettuce, celtuce, cultivated dandelion, salsify, endive, chicory, and scorzonera (black salsify) are in this family. No culinary herbs belong to this group. A very large number of ornamentals and some of our most successful weeds are in this family. For the most part, the seeds are light and small and often attached to a wind foil.

- Globe artichokes (*Cynara scolymus*) greatly resemble thistles, their wild cousins, and the part we eat is the flower bud. Being Mediterranean natives, they are not reliably winter-



**Oregon State University**  
**Extension Service**  
**Lincoln County**



hardy in the Willamette Valley, but will often survive. There is usually top kill under 28 degrees. Artichokes can be raised from seed to bear a crop that year most years. Unfortunately the genetic variability of the seed makes it a game of chance how good a plant you will get each time. Start the seeds in February or March. Green Globe, the most common seed, is particularly erratic. There are a couple of other seed varieties which are supposed to come true. We have tried Imperial Star and Grande Beurre. Imperial Star was the winner. Emerald is a new spineless variety, usually perennial here, that shows great promise. The chokes tend to be smallish but very tender. Globe artichoke is best started from seed indoors and transplanted out about the same time as tomatoes. The soil should be well-drained, but high in organic matter with good amounts of available N and P, since the plant must be pushed to complete a cycle in one season. PH should be in the 6.5-7.5 range. Artichokes like cool damp climates such as ours and once mature will stand light frosts. Plant after last frost. The buds should be harvested as the scales barely begin to open. Very young buds are incredibly tender to eat. The plant will bear most of the year, and then the older foliage will begin to look bad. At the same time you will probably notice new offsets coming from the base of the parent plant. If the parent plant was particularly good, save these offsets for your new plants. Cut down the old stalks to force growth into the offsets as soon as the buds are harvested. You may even get a second cropping. If the young plants survive the winter, the harvest will be much greater the next year. Eventually each plant will require about four square feet of room. Do not stint on fertilizer or water. Winter survival can be enhanced by mulching the plant before winter with loose hay or straw.

- Jerusalem artichoke (*Helianthus tuberosus*) is a North American native that easily becomes weedy. It brightens the garden with multiple sunflowers and ten foot high stalks. Successful growing is not hard. It should **always** be confined. The main varieties are Indian Red, American Smooth and Stampede. Fuseau is a smaller, smooth variety but it has not yielded as well for me. Although it will grow almost anywhere, well-drained, very fertile soil will greatly increase yield and quality. They will not survive in waterlogged soils. Plant at 9-12 inch spacing. For best yields dig all the sunchokes (a commercial name for JAs) and replant only the smoothest and best. Jerusalem artichokes can often be substituted for potatoes and are excellent raw or stir-fried. The sweetness comes from inulin, a non-absorbed sugar. They keep well in plastic bags in the refrigerator crisper. We are still eating from last year's crop. They also keep well in the ground unless harvested by rodents. They are one of the easy-grow crops except for their extreme ability to spread and persist.
- Cardoon (*Cynara cardunculus*) is a tender somewhat bitter perennial thistle native to the Mediterranean. The bitter, celery-like ribs are regarded as delicacies from Libya to France. The swollen base is the most desired part. Here it is can resprout the next year, but the harvest requires a long season, plenty of water and rich soil. It should be fed weekly or have access to continuously slow-releasing fertilizer. Even when it does not



**Oregon State University**  
**Extension Service**  
**Lincoln County**



mature to an edible stage it is a lovely ornamental and makes nice dried arrangements. Plant 24 or more inches apart. This plant is somewhat difficult to transplant as it resents root disturbances. Once well-established cardoon takes up a lot of space and is very hard to dig out. It easily gets to 8' tall. Sow in April, blanch stalks in September.

- Sunflower (*Helianthus annuus*—as well as other species) is best known for the large-headed, edible seeded varieties, but far more of the oil seed variety with multiple heads grows throughout the world. It is not too uncommon to find multiple heads on the garden variety, but people are always astounded when one appears in their garden. Each year there is a nationwide giant sunflower contest. True to their name, sunflowers prefer full sun. They also respond very well to highly fertile soil. Manure worked in the fall before seem to be especially effective. This is the highest source of protein per gram vegetable which we grow. Sunflowers are native to South America and were venerated by the Incas as a symbol and as food. In our area, it is best to remove the seeds from the ripe head and dry them separately to avoid mold. The seeds are ready to harvest when the head bends over, the flowers wipe off easily when stroked, and the typical coloring is visible on the seeds. They must mature on the plant. For the large-headed varieties 12-15 inches would be a minimum spacing. These plants are especially nice as a living fence, but it is often difficult for other plants to survive within their zone of influence due to their competition for minerals, water and light and to an allelopathic substance emitted by the roots.
- Lettuce (*Lactuca sativa*) is a fine crop here, since it prefers cool moist weather and tends to become bitter and bolt in hot weather. Most loose-leaf varieties do better as the solid heads are very prone to rot, tip burn and to slug damage. Of course, the slug is quite happy to dine on the open-headed lettuces too, but is more easily discovered. The major nutrient needed for lettuce is N. Leaf lettuce is native to the Mediterranean and Near East and was cultivated more than 2,500 years ago in Persia. It was originally prized for its thick leaf stalks and was used as an aphrodisiac and soporific. In fact, the bitter white latex is much like morphine in its effect, though not very strong. Iceberg lettuces are the most modern type. Lettuce has good potential for the winter garden with minimal protection. It usually needs protection more from the rain and ice than the cold. Leaf lettuces are also higher in nutrition because they are not blanched. Blanching always reduces the vitamin levels. It is also slightly lower in water content, and thus can survive the cold temperatures better. There are many varieties, patterns and colors of lettuces. This lends them to ornamental patterns as in a lettuce wall or in containers. High organic matter, good phosphorous and potassium levels and plenty of water give this crop its best flavor. Spacing varies 6 to 12 inches, depending on the variety. Lettuce will germinate at 40-70 degrees and prefers 61-65 degrees for growing. Lettuce is a good crop to grow in more shade or in an area shaded by other, taller plants. Lettuce can even be used in stir fries and the like.



**Oregon State University**  
**Extension Service**  
**Lincoln County**



- Celtuce (*Lactuca sativa*, var. *asparagina*) is grown for the stalks which may reach 5 feet. The stalks are best harvested at 30 inches, however. It is a specialty in China and closely related to the ancestral lettuce. It requires 1-1/2 sq. ft. per plant. The young leaves are also edible. It has been known as a crop in America since the turn of the century and is bred in China, although many years ago it was imported from the Mediterranean area. It is good fall crop since it resists light frosts. Celtuce is a heavy feeder, especially of N. The outer skin of the stalk must be peeled unless you are fond of extremely bitter foods. It is quite disease-resistant. It shines in stir fries.
- Endive/escarole (*Cichorium endivia*) is a hardy biennial often grown for forcing. Endive is deeply cut and curled while escarole is broad and crumpled. Endive originated in East India and was favored by the Greeks of classical times. The leaves are used in salads for a slightly bitter tang and it is especially liked in Europe. It is an excellent candidate for the winter garden. It transplants well and should be at 12 inch spacing for maximum yield. It is often blanched to moderate the bitterness of the leaves. This also makes the plant more tender but less nutritious. Aphids seem to like endive better than the slugs do. It must not be allowed to dry out while still maintaining good drainage. Stress will cause great bitterness and bolting. A pH of 6.5+ and loose soil high in organic matter is best.
- Chicory (*Cichorium intybus*) is also called Witloof chicory. It grows wild all over the valley, waving bright blue flowers on roadsides. Garden chicory is grown for its leaves, its roots and as a forced winter vegetable. Witloof is especially for forcing and Magdeburg for its roots. It will overwinter here and has no problems. It grows best when cool and needs 4-4 sq. ft. for good production. It is native to Europe. Other ornamental and edible varieties of chicory are also available. There is a red form that is particularly attractive. Radicchio comes in green and red. It also overwinters well and prefers 6.5+ as pH. Radicchio can be grown on 12 x 12 inch spacing.
- Dandelion (*Taraxacum officinale*) has a cultivated form that is larger, more succulent and less bitter than the native form. Common dandelion is a nutritional powerhouse and has no problems. Deep rich soil produces the best flavor. The plant does well on 8-inch spacing. Young or blanched leaves are best. The dried and roasted root makes a good beverage or vegetable and the buds are tasty in omelets. The petals add spice and color to a salad, but the sepals are very bitter. It also makes a wine, which needs much aging. Dandelion can also be forced for a winter vegetable. It is native to Europe and Asia. This plant is noted for its medicinal uses. It is a major food source early for pollinators.
- Salsify or Oyster Plant (*Tragopogon porrifolius*) is native to Southern Europe, and is rampant as a weed in North America. Good roots require very loose, deep (c. 10 inches), well-drained fertile soil with no fresh manure. Fresh manure causes a hairy and often deformed root. Salsify has a long growing season and will be tough if not adequately



**Oregon State University**  
**Extension Service**  
**Lincoln County**



watered. Like parsnips, salsify has a small, but dedicated following. The seedlings look like grass, so mark carefully where it was sowed. It is often very slow to germinate and does not transplant easily. High levels of organic matter and slow release N sources will assure success. Space 2x12 or 4x4 inches for a higher productivity. With closer spacing the available levels of water and fertilizer must be ample. Roots, tips and shoots are all edible. Roots can be dug all winter.

- Scozonera (*Scozonera hispanica*) is a perennial usually raised as an annual. Culture and edibility is the same as for salsify. The fleshy root is usually rather thin and is black. The leaves are grass-like and the flower is yellow. The leaves can be used as a salad green. It is native to Europe also. Both sconzonera and salsify can be found as wild escapees. I admit that it is not one of my favored plants.
- Edible Burdock (*Arctium minus*) is also known as gobo. The roots have brown skins and may be two feet long. It needs a very deep loose soil. Sow several weeks before last frost ¼ inch deep. Space 2x2 feet. Dig in the fall of the first year. Do not let flower heads develop. This can easily become an invasive weed. Store in moist sand and cool as in a root cellar. This is now a commercial crop in Oregon.

BRASSICACEAE has 1,800 species, including the majority of our winter vegetables, quite a few ornamental flowers and a number of weeds. It is also known as the mustard family. Many in this family are biennials, requiring a warm period followed by a cool period and then warm again to flower. The flower is a four-armed cross. Many of its members are peppery or pungent. It is a family from the temperate and cold regions of the world. All this family is hard on the soil with high nutrient requirements. They even reduce the soil biology. Do not grow in the same soil two years running.

- Brassicas (the cabbage alliance) are the largest vegetable group in this family. This group appreciates a fertile, moist soil, high in organic matter with a pH of 6.5 or higher. Brassicas generally have a higher boron requirement than other families since a deficiency may cause a hollow stem. It is generally frost tolerant and even improves in flavor after a frost. The roots are in general shallow and wide-spreading, so cultivating or walking close to the plants damages them. This group should be rotated with some other family since it is quick to build disease and insect infestations. Brassicas are usually high in vitamins A and C and are thus best raw or lightly cooked. However, some people are very sensitive to the sulfur compounds in these vegetables and cannot tolerate them raw. The major pests are mealy gray aphids, green loopers, cabbage worms and, by far the worst, the root maggot. Overwintering brassicas should have an ample supply of phosphorus and potassium in the fall, but not too much N. About early February, N should be side-dressed alongside the plants. Based on widespread reports from Oregon, younger plants survive severe winters better than older ones. The plants should not be headed up or budding when full winter



Oregon State University  
Extension Service  
Lincoln County



arrives. All brassicas are biennial and cross-pollinate with each other, so seed saving is a challenge.

- Broccoli (*Brassica oleracea*, var. *botrytis* or *italica* -sprouting types) originated in the Eastern Mediterranean and traveled to Europe only in the 17<sup>th</sup> Century. The best part of broccoli is the flower bud, but the leaves are also edible, although rather strong and tough. The stems may be peeled and eaten. The buds should be harvested before they begin to open. Careful cutting on a slant will usually result in second and even third harvests. Sprouting broccoli, an excellent winter crop, has many loose clusters of buds that proliferate well into May most years. These are outstanding marinated for salad or stir fried. Since broccoli is basically flower buds, it will not keep like cabbage and must be used or frozen. The flower clusters are also very edible. Broccoli requires 18 x 18-inch spacing and is otherwise cared for as is cabbage. Sow 6-8 weeks before frost. There is a perennial broccoli available that is a rampant grower and which you might like to try for fun. Nine star perennial broccoli (*Brassica oleracea botrytis aparagoides*) is a hardy perennial plant from the Brassicaceae or Cruciferae family.
- Broccoli Raab (*Brassica rapa*) is also known as Italian turnip. It is a non-heading broccoli whose tops and flower shoots are used in the early spring. It was developed in Europe. Plant from earliest spring to midsummer;
- Brussels sprouts (*Brassica oleracea*, var. *gemnifera*) are usually a reliable winter crop. As the name indicates, they were developed near Brussels in Belgium. They will germinate at 50 degrees but 70 is ideal. Grow the transplants over 45 and under 85 degrees. As the miniature cabbages begin to mature, twist the leaves off below them. Harvest the buds before they begin to open. If you want a lot of sprouts all at once, pinch out the growing tip as soon as the heads have started to form (bottom buds will be 1/2-3/4 inch. Brussels sprouts are prone to flower if the weather turns hot. They appreciate daily averages of 65 degrees or less. A month before your first frost in fall, cut out the growing tip of Brussels Sprouts plant allowing the plant to develop larger brussels sprouts. Nutrition and flavor are improved by near freezing temperatures at harvest. If grown too vigorously, the sprouts tend to be loose and not keep well. Tight sprouts store very well. Brussels sprouts are slow to mature. Aphids are a major contaminant in this vegetable. One ingenious solution is to encase the plant in a large pantyhose leg as the heads begin to form. Should be fun tucking in all those leaves. Salt water soaks remove most of the aphids and the remaining ones are actually quite edible.
- Cabbage (*Brassica oleracea*, var. *capitata*) has been cultivated at least 2,000 years. The cabbage started as a loosehead in the Middle East, but moved to Europe and Asia thousands of years ago. It developed its firm head only in the 16th century. When starting, try to keep the temperature at 60 degrees or less to avoid legginess. For fall and winter harvest. plant 2-3 months before the first frost. It can be intensively planted at 12 x 12 inches for small-head types to 18 x 18 inches for large types. Ornamental cabbages look like giant roses. When the head is firm as a softball, you can harvest. Cut the head carefully, leaving the bottom leaves and extra bonus heads will grow. If the cabbage is ready for harvest, but you are not, twist it enough to crack the roots and it will store in the garden without splitting for quite a while. It can be stored in a root cellar environment for months if harvested with the roots attached and hung. The Savoy types (especially Chieftain Savoy and January King) are most winter



**Oregon State University**  
**Extension Service**  
**Lincoln County**



hardy. Red cabbages seem to be more insect and disease resistant in our area. They are also very winter hardy. Over watering and high pH may increase clubroot. Cabbage is a heavy user of P, K and S. Sometimes this whole family requires extra boron.

- Cauliflower (*Brassica oleracea*, var. *botrytis*) was used in the Eastern Mediterranean area about 2000 years ago and entered Europe around the 14<sup>th</sup> century. As with broccoli the flower buds are eaten. Culture is as for broccoli, except that cauliflower is much more sensitive to environmental stress. It must have fast, unchecked growth to head properly. If it is not the self-blanching type, be sure to tie the leaves loosely over the head. You can use a broad rubber or pantyhose. Cauliflower is best grown as a fall crop. It also makes a good over-wintering crop most years. There are many improved varieties now available and a self-blanching one would be highly recommended. It is also a crop best grown yourself from seed, though be sure the transplant is not allowed to suffer any stress which expresses itself as "ricey" curds. Purplish or greenish coloration of the curds is harmless. Uniform moisture is needed to prevent "buttoning". There are also violet, golden or green colors of cauliflower. I especially like the golden form 'Cheddar', though it is not as winter hardy.
- Collards (*Brassica oleracea*, var. *acephala*) have been a food crop for 4,000 years and have been cultivated in its present form for 2000 years. Collards are genetically almost identical to kale. They tend to be quite large and require a minimum spacing of 18x18 inches. They definitely need frost for best flavor and thrive here. They are nutritionally very rich. Collards love warm weather and seem to be little bothered by root maggots. A really good variety is Blue Max. Champion is also quite good. There does not seem to be a lot of breeding being done in this vegetable. From collards one can have greens through the winter and plenty of flower sprouts for stir-fry through the spring. Occasionally collard seed may revert to the kale form. There are heading and loose leaf types.
- Kale (*Brassica oleracea*, var. *acephala*) tends to bolt if hot and cool weather alternate. It is probably the original *oleracea* from which the others developed. It is mild and tender when very young or after frosts. It makes a reliable winter salad base, rarely freezing out. It is also low in oxalic acid. Kale has few insect problems besides an occasional slug or an aphid attack if it is under stress. Kale can also be exceptionally beautiful with brightly colored (ornamental type) and deeply curled leaves. It is best raw or very slightly cooked and should be harvested just before use. Heat over 75 degrees can make its growing leaves tough and harsh. These are best fed to birds and other animals and the new leaves then eaten. Try some *Gai Loh*n (Chinese Kale in the *alboglabra* group, not *acephala*) if you can find it. Kale is cultured as cabbage. In rich soil, high in organic matter 18x 18 inch spacing will result in tree-like plants. When kale bolts in the spring, the flower buds are great stir-fried. There are now many kale cultivars available with exceptional curling and/or color. The cultivation of kale is lost in pre-history, but it probably originated in Central or Northern Europe. Some claim a Mediterranean origin for it. Konserva, Winterbor, & Westland Winter seem to have superior flavor for raw use. Don't overlook the Russian Red and Dinosaur (Tuscan) kale (*B. lacinatedus*) for winter use particularly. Tuscan was the only survivor of some past winters. Kale is now the new wonder vegetable and snack food, as in kale chips.



**Oregon State University**  
**Extension Service**  
**Lincoln County**



- Kohlrabi (*Brassica oleracea*, *Gongylodes* group) is a great replacement for the insect-prone turnips if you get the right variety. It should be harvested before it gets woody and Kongo, Winner and Grand Duke give good leeway in harvest time. The giant forms such as Gigante are fun to grow as they can provide a 15 lb. tender bulb. The young leaves are also good. This European plant is genetically very close to turnips. It does best if growth is steady and uninterrupted, but the seed should not be sown if temperatures are below 40 degrees or the plant may just flower. Small transplants usually do best and two can be grown in one hole if the fertility and tilth are good. Kohlrabi will be most tender when the days do not exceed the upper 60's. It stores very well in a root cellar environment. An 8 x 8 inch (except for Gigante) spacing usually works out well. It requires full sun. The Vienna types are definitely inferior to the newer forms.
- Turnips (*Brassica rapa*) are probably the best trap crop available for root maggots. Without careful timing and/or screening, they are next to impossible to grow in the summer garden organically. Some years even persistent pesticides have trouble keeping them completely clean. One solution is to plant where no cabbage root maggots may be overwintered and the other is then to cover them tightly with row cover until harvesting. Turnips prefer cool weather and should be used young. Turnip greens are relatively easy to grow and are more nutritious than the bottoms. Turnips can make an excellent late fall/green manure crop that can be harvested in the spring. The vegetable originated in Asia, but was used in northern Europe in Roman times. They were used primarily for livestock until the 17<sup>th</sup> century. They need 3-5 inch spacing to form roots. They are best planted from March to June 7 for the early crop. A new white turnip like a radish is Oasis. It can be planted at 1-2" spacing and is crisp and sweet. The earliest Jack-o-Lanterns were made of turnips.
- Rutabaga (*Brassica napus*, var. *napobrassica*) is also called Swedish turnip. It seems to be less prone to attack by root maggots and is a good fall crop. Rutabagas are more nutritious than turnips and the tops may also be eaten, although they are somewhat strong. "Swedes" store very well. Unfortunately many people have difficulty in acquiring a taste for them. Seed these in April, early June and July 20-August 1 (overwintering) for three main crops. Their main use has been as a livestock feed. Rutabaga prefers fertile soil that holds moisture but still drains relatively well. Do not add an excess of nitrogen to the soil at planting time or hairy roots will develop.
- Mustard (*Brassica juncea*) also comes in many varieties, but most are characterized by a peppery taste. Kyona/Mizuna is a mild mustard excellent in salads. Mustard is generally not a good summer crop as it gets too peppery and also tends to bolt. Very young leaves are best, used in moderation. The term mustard gas refers to a chemical found in these plants which can really bring tears to your eyes and dyspepsia to your tummy. Mustard does well on 8x8-inch spacing unless you are growing the giant variety. It really should be kept picked as the larger leaves are rarely palatable. Start successive plantings in early spring while weather is cool and again in midsummer for a fall and winter crop. Harvest is about 50 days from seed. Garden cress (*Lepidium sativum*) has the mustard or watercress flavor and is a very easy early spring crop. The weeds in this family are also good salad greens, especially before the garden really comes into production. One I use a lot is bittercress (*Cardamine oligosperma*).





**Oregon State University**  
**Extension Service**  
**Lincoln County**



Asian Brassicas have been cultivated for about 3000 years in eastern Asia. All are cultivated much like cabbage.

- Chinese cabbage (*Brassica pekinensis*) comes in many forms. It can be very difficult to grow here since all the pests, especially root maggots, adore it. The root maggot fly is usually active from mid-April to late September and the plants must be protected at that time. This plant is best grown under a cloche or row cover to exclude the pests and not where cabbage family plants were grown the previous year. Chinese cabbage is also very prone to bolt in long days and is best grown as a fall crop. Space them at 15 x 15 inches. As the name implies this is originally an Asian plant. The optimum temperature for the first half of growth is 68 degrees, for heading 59. If it is too hot or if it remains under 55 degrees for a long period, the plants will bolt.
- Bok (pak) choy (*Brassica chinensis*) is sometimes called Chinese mustard, but the term is misleading. This is a very sweet succulent plant. It looks a little like Swiss chard but is very mild with stout stems. It is well suited to stir fries and salads. It is moderately winter hardy. Bok choy is planted on 12 x 12 -inch spacing and the outer leaves are harvested as needed. Most years it will provide nutritious and tasty greens until well into spring. There is enormous variety in the seed strains of this plant, so if you find one you like, it is probably best to stay with that packager. Tatsoi is like a miniature Pak Choi. All choy adapt well to containers.
- Mizuna (Kyona) is an excellent mild Asian frilled mustard which we especially enjoy early and late in the year. It is very easy to grow and highly productive.
- Radishes (*Raphanus sativus*) started in China and spread to Japan, through Central Asia and finally to Northern Europe. All the early varieties were elongated. Round ones first showed up about 200 years ago. Both the ancient Greeks and Egyptians valued them very highly. Originally they were a cooked vegetable and are still so used in many cultures. They need to be grown outside the root maggot season or protected. 4 sq. ft. can easily produce 144 radishes at a time, so succession sowing at 2 week intervals is obviously desirable. Radish tops can be used in soups. It is a quick crop and a natural for succession. The young radish pods are excellent in salads and stir fries. I now tend to use them more than I do the roots. One radish can produce a quart of pods easily. Radishes can be harvested in as little as 25 days. If they do not grow quickly, they will be pithy or hot. Water stress will ruin them. The large winter radishes make a fine vegetable, but require a deep, well-drained soil. Radishes can be scatter-sowed, spaced at 1x 1 inch or seed tape sowed. Radishes come in all kinds of colors and shapes and are especially rewarding for children to grow. Winter radishes should never be seeded before midsummer or they will be hot and woody and buggy. Wild radish is common here so saving seed from your own is very tricky. Radishes are commonly grown as a marker crop for the slower germinating carrots. Root maggots are most fond of turnips and radishes and these are sometimes used as a trap crop.
- Horseradish (*Armoracia rusticana*) is grown as a condiment and a little goes a long way. Once established it readily becomes weedy and should never be rototilled as each root part will become a new plant. To grow prime roots offer it 12+ inches of loose well-drained soil high



Oregon State University  
Extension Service  
Lincoln County



in organic matter. Manure is an excellent additive. Horseradish responds very well to high levels of fertility. In good soil its side roots will easily forage laterally 18 inches or more and choke out any plant with which it comes in contact. Even comfrey can lose this battle. Harvest after the tops die down. Use root cuttings 1/2-3/4 inch in diameter for "seed stock". Horseradish is native to Eastern Europe. This is a perennial. It has been used extensively as a condiment and in medicine.

LILIACEAE is a family of monocots with more than 2000 species. These are mostly perennials, many with bulbs, corms or fleshy rootstalks. The family often has very showy flowers. Botanists sometimes shift plants between this family and AMARYLLIDACEAE. There are medicinal, edible and ornamental members in this family, as well as some highly poisonous plants and some persistent weeds. It has representatives all over the world.

- Onions (*Allium* sp) are available in five types: scallions (*Allium cepa*), large-bulbed onions (*Allium cepa*), multiplier onions such as shallots (*Allium ascalonicum*), potato onions, multiplier onions (*Allium aggregatum*), and Egyptian top onions (*Allium proliferatum*), plus chives (*Allium schoenoprasum*), garlic chives (*Allium tuberosum*) and leeks (*Allium porrum*).

---Bulbing onions determine their bulb formation by day length and temperature. The best ones will be grown from seedlings, not sets. If you do use sets, smaller ones are better than very large ones. If the weather does not get very hot, sets are the easy way to get big onions. Bolting is very undesirable and such bulbs (splits) will not store well. If it is unusually cool, bulbing may be retarded. Unfortunately, once an onion has begun to bulb, temperatures in the 40's will cause bolting. Careful choice of varieties is essential. Most years we have trouble with red and white onions. If starting bulbing onions from seed, do not let them get root-bound. Seed germinates from 46-86 degrees but prefers 60+. The pH should be at 6.5-7.0, and there should be ample organic matter in the soil. Set out in March if possible, for large bulbs this year and in early fall for overwintering onions. The transplants should be cloched for protection against rain and extra cold events. They need to grow steadily for good production. Bulbing onions can be put in at 2- inch spacing and then every other one harvested for green onions. Final spacing will be at 4-6 inches. Use long day varieties. For overwintering onions start from seed in late August. Walla Wallas are better from seed than starts. If you start your own seedlings you can transplant them into the garden in early September. Add light fertilizer when sowed, then sidedress in February and April. Keep evenly moist until May, then cut off the water. Dig when the neck is dry (May, June or July). Don't plan on long storage. For storage onions fertilize heavily in the planting row. Cut off all water after the tops flop over. Once 50% of the tops are down, you can break over the rest. Dig after 1 week and cure 2 days to 1 week to harden them up in a warm place with no direct sun. Store them near freezing.

---Perennial onions are easy to grow and store well, but they tend to have small bulbs. They can be fall planted on well-drained soils with good fertility. Especially important is N early in the spring. True shallots will have pinkish flesh. There are also gray shallots. Yellow ones are less desirable. They need plenty of N to form good sized bulbs. A large shallot bulb when planted will give many small "cloves", whereas a small bulb will give larger, more desirable individual



**Oregon State University**  
**Extension Service**  
**Lincoln County**



bulbs. Plant 3-4 bulbs/foot at 3" deep. The red and yellow ones are spring planted. The grey (true French shallots) are fall planted. These do very well in containers. Chives are used primarily as an herb and are best harvested by cutting one patch to the ground each time. If they do flower, the young blooms are a lovely tasty addition to the salad. The purple flowers can also be used for dried arrangements. They tend to become weedy through exuberant self-sowing. The leaves of garlic chives have a distinctly garlic flavor and are snipped as needed. They produce large amounts of seed in the starry white flowers and also multiply by bulblets underground. They are very aggressive growers and best done in containers. ---Leeks are in a class by themselves both for their rich flavor, so well mated to new potatoes, and for their winter hardiness. Flowering spoils their texture, but is a delight to the eye. The bees love the flowers. They can reproduce from bulblets or seed. There is a small salad leek called Durabelle that is especially nice. Fat leeks are over wintered ones such as Giant Musselburgh, slim ones are King Richard and American Flag and are spring planted. For longer white stems slit toilet paper rolls and put around each stem.

- Garlic is usually loved or hated. It is a plant of many uses, many medicinal. The small, strong garlic is *Allium sativum*. It prefers the high end of the *allium* pH scale (6.5-7.0). This type of garlic comes as hardneck or softneck. Elephant garlic (*Allium ampeloprasum*) is much larger, milder and better adapted to our soil, but it has much less insect deterrence. Elephant garlic is more closely related to leeks than to true garlic. Much garlic in Oregon may carry yellows virus that will show up if the plants are put under stress. Garlic is best fall-planted in rich, well-drained soil. Cloves should be broken apart just before planting if possible. Too small a clove or planting too late will not give you cloves back, just 1 big round (called onioning). The rounds are great for planting back for next year. Bulbs planted February and March will bulb, but will be small. Bulbing initiates in May. Give no water after about 2-3 covering scales have formed. Another sign is leaves starting to yellow. Too much water will cause "naked" cloves that do not keep well. Larger cloves result if the flower stalk is kept cut off at the earliest stage, but the showy blooms are much loved by bees and may be worth the smaller cloves. The garlic "whistles" (the flowering stem and bud) are also a culinary treat. In May you can taste the leaves for the flavor of the garlic being grown. True garlic (*sativum*) is native to the Mediterranean area. Elephant garlic was popularized by Nichols Nursery in Albany, Oregon. Standard garlic is planted on 2x12 inch spacing or on 4x 4 inch. Elephant garlic needs more room and is planted 4x12 inches or 6x 6 inches. Both garlics after harvest should not have the bulb exposed to light to avoid greening and poor flavor. The choices in garlic cultivars has really increased to suit every taste from mild to wild. Mature garlic must be kept dry. The flowers are also excellent habitat for good bugs, but do reduce the yield. Store cool and dark at about 50 degrees or less. If garlic is exposed to cold temperatures and then warmth, it will begin to sprout and spoil. Do not store fresh garlic in oil (botulism) unless you use the approved OSU food preservation guidelines!.
- Asparagus (*Asparagus officinalis*) originated on the seacoasts of Europe and Asia. It is a hardy perennial, grown from seed or root crowns. With care a bed can last a long time. It can, however, crowd itself out. If using seeds, be sure to get an improved variety. Many are open



Oregon State University  
Extension Service  
Lincoln County



field seed which is highly variable, and there are selected strains. Tenderness is determined by the fertility of the soil, by rapid growth and frequent cuttings. Asparagus prefers cool, moist areas with a pH around 7.0. The roots can go down 10 feet, so deep well-drained soil is needed. Soil which stays waterlogged in the winter will not support a long-lived bed. The major pest is the asparagus beetle (two kinds), and the major disease is root rot. Slugs and snails are fond of the very young spears. Fertilizer should be provided before growth starts in the spring and again when the harvest is finished in early summer. All male varieties have been developed that do not spend growing energy on flowers and seed. Plant the seed in a 6x 6 inch grid pattern in a nursery bed. Move the one-year old plants to a permanent location in April after roguing all the female (berry-bearing) plants. These are never as productive as the male plants. Leave ferns on each year until they die back and then cut and remove. The beetle likes to overwinter in fern debris. Final spacing should be about 21 x 21. By planting some of the crowns deeper than others the harvest time will be extended. In the garden it is better to break off the shoots underground than to cut them. Usually harvest should cease by June 20 or when the stalks dwindle in diameter. It is not necessary to plant asparagus in a deep trench when using crowns. Asparagus crowns move upwards about 1 inch a year, so they must be kept adequately buried or production will suffer. . Spears begin to form when the soil is at 50 degrees F. Asparagus is nutrient dense, having 20 gr. Protein to eight spears.

CUCURBITACEAE is a warmth-loving family. The major vegetables in this family are squash, pumpkin, cucumber, melon and gourd. All appreciate rich, well-fertilized soil, a pH around 6.5 and an even supply of moisture. They respond well to additions of composted manure and most require a minimum of 60 degrees to germinate. 70-95 degrees is preferred. All also commonly "abort" the first fruits due to a lack of synchronization of the male and female flowers or too cool temperatures. Most benefit from the use of heat-enhancers. Never handle any of these plants when wet and there will be fewer disease problems. Most in this family lend themselves to trellising unless bush varieties. Summer squashes, field pumpkins, acorn squash, vegetable spaghetti, small gourds, butternut and Golden Cushaw all cross readily, so seed saving is tricky. The first generation fruits are not affected. Buttercup, Hubbard, Banana, Sweetmeat, Turk's Turban and Big Max cross and will also cross on Butternut and Golden Cushaw. Most squashes are natives of the Americas. Any member of this family which tastes bitter should not be eaten. What you are tasting is the alkaloid cucurbitacin which can be toxic. Squash is one of the oldest staple crops of America and was one of the three sisters: corn, beans and squash. Cucumbers and melons are the most sensitive to the cold. Train up to enhance drying. Use S. exposures. The critical watering time is at flowering and as the fruit develops. Sidedress as they start to run. Trellis if you can. Most of the cucurbit family is happiest at 75-95 deg. air temperature. Hollow fruits may be due to B or Ca deficiency or excess N or erratic watering or overmaturity.

- Summer Squash (*Cucurbita pepo*) are crookneck, pattypan, scalloped, zucchini, and others. All like a rich soil high in OM with a pH of 6.5 or higher. They respond well to composted manure. The soil temp should be 60+ and the optimum air temp is 70-80. The critical



**Oregon State University**  
**Extension Service**  
**Lincoln County**



watering time is slightly damp at seeding, damp at bud development and flowering. Do not handle wet plants. The first fruits commonly abort due to non-pollination. Usually the male flowers come first, then just female flowers and finally zucchini glut. Harvest by cutting the stems 1" from the fruit. If bitter they are very toxic and cannot even be pickled. The fruits of all are eaten while immature. All grow well here and do best in full sun with rich soil and ample moisture. Zucchini are especially known for aborting young fruits at the beginning and end of the season. They are also known for their exuberant production. All these squashes should be picked young for best flavor and for greatest production. Greyzini zucchini is very productive and easier to see as are the green ones.

- Winter Squash (*Cucurbita maxima*, *C. moschata* and *C. pepo*) are like summer squash for care but are rarely bitter. Pinch off all small fruits and flowers after 9/1. They are mature when the skin cannot easily be pierced by a thumbnail. If they are left out in a hard frost, the fruit will be damaged and will not store. Cut the stems 2-4" from the fruit and cure at 60-70 deg. for 10 days. 2-4 inch stems when harvesting minimizes storage rot. Store at 40-50 degrees. Ours often hold from October to May, especially the butternuts. If properly cured washing with bleach is not beneficial. You can cut back on the runners, but all the leaves provide the energy to form the fruit. My favorite is probably Waltham Improved or Amish butternut. The winter squashes are used in the hard-shell stage. If you cannot pierce the skin with a thumbnail, they are ready for harvest. Most of this group love to ramble. The fruit size ranges from one to hundreds of pounds. The seeds are delicious and nutritious. In fact, when the fruits were first grown it was for the seeds and not for the flesh. The blossoms are also tasty. In this group are the hubbards, buttercup, butternut, turban, acorn types, true pumpkins and "Big Max" squash (the competition pumpkins) among others. Pumpkins require less light to mature than the other cucurbits. Pumpkins with seeds are about 27% protein. My sheep adore them as do the chickens.
- Cucumbers (*Cucumis sativus*) probably originated in India and have been cultivated for thousands of years. If chosen for fresh eating, select non-bitter varieties. Cucumbers particularly require warm nights for top performance and avoidance of disease. Cucumbers like soil temps of 70-80 deg. Like summer squash, they should be kept picked small as seed production quickly stops fruit production. Many advances have been made in breeding cucumber cultivars such as burpless varieties, gynococious (females only) varieties greenhouse varieties etc. Many varieties have been superseded, although they are still found in the trade. One of the most reliable in this area has been Sweet Slice for fresh eating. Victory is also good choice. For incredible production, plant Elite or Jazzier. Each year sees new and improved cultivars, so experiment! The old Straight 8 is one of the most prone to develop bitterness. A different type is the lemon cucumber which trellises readily and is a pretty reliable bearer. It is definitely best when eaten quite young. Once it turns lemon yellow, it is quite seedy. Any cucumber may be pickled, but the pickling varieties give the best results. The bitterness often found in the pickling varieties (white or black spined) disappears in the pickling process. In other countries cucumbers are frequently cooked. Spacing varies by plant type and how it is trained, but usually 18 inches would be a minimum. There are even varieties which will happily grow and fruit in a flower pot. There is a wild cucumber here



(*Marah oreganum*) which can act as a trap crop for cucumber pests and as a reservoir for cucumber diseases. One good vining cucumber can produce up to 100 fruits in a good year. For a real treat grow the Mexican sour gherkin. They look like mini-watermelons and are snack size. These must be trellised.

- All melons are a challenge here, since they prefer a long, very warm season. With planning, luck and perseverance one can grow cantaloupe and small watermelons. Breeders are working hard on shorter season varieties with more tolerance to disease and cool temperatures. All melons need heat-enhancing techniques in the Willamette Valley and on the coast. Variety is crucial and transplants should be used. Put out unstressed sturdy transplants about late May to early June. In general, cucurbit transplants should only be about 4 weeks old. Over watering near harvest will dilute the flavor of the melons, as will heavy cool soils, excess N and cool nights.

---Cantaloupe (*Cucumis melo*) is native to central Asia and is more properly called a muskmelon. It is ready when the fruit separates from the vine when lifted gently (slip stage). It will also have strong fruity aroma at the blossom end at that time. The flavor will be best 1-2 days after harvest. Half the sugars are developed in the last week of ripening. If not trellised, ripening fruits should be kept from ground contact both to avoid rots and to minimize damage from slugs and soil insects. To grow cantaloupe you need the correct variety for your site! You also need to manage the microclimate for maximum heat. Generally it is best to plant <than 4 week old transplants in June. The soil temps should be 70-80 ideally. A cool start can doom them to non-fruiting. They respond well to composted manures. Sidedress when they start to run. If trellised, support the fruit with stocking slings. Keep the water even, but never soggy. Too much N or water ruins the flavor. Optimum temps are 86-98 air, 55-60 minimum soil temps. The critical time for watering is flowering through fruit swell. Once fully expanded, reduce the water to enhance ripening and flavor. Store at 70 deg. for 1-2 days after harvest to set the flavor. Excess water or N with melons of all kinds shuts down the roots, stops photosynthesis and destroys the sugars. The plant must have 5-9 mature leaves before it flowers. Use maximum heat enhancement techniques. Rodents are especially fond of cantaloupe.

---Watermelon (*Citrullus lanatus*) comes from Africa and rarely is generous with its fruits here. The small varieties do best. Watermelon demands well-drained soil, high fertility and much moisture. It must be harvested promptly when ripe. When ripe the ground spot will turn golden, the skin color will dull and the tendril nearest the fruit will dry up. The "thump" test is highly unreliable. There are bush and vining types. The bush type usually matures more quickly but they are rambling bushes. Allow enough room or trellis with supports for the developing fruits. There are many other kinds of melons but they are seldom grown in cooler climates.

- Gourds (*Cucurbita*, *Lagenaria*, and *Luffa*) really need very warm nights and dry weather at the end of the growing season to do well. They do best if trellised to avoid ground moisture and to promote air circulation. Ideally they should be able to dry totally on the vine, but most years the fall rains make that impossible. Some gourds are edible, but most are not. Because they are all long-season, they need to be started indoors and transplanted. Like most



**Oregon State University**  
**Extension Service**  
**Lincoln County**



cucurbits all root stress should be avoided, especially avoid chilling stress. General culture is the same as for squash. Nipping off the ends of the vines at about 10 feet will increase the fruit set. Once harvested gourds should be seasoned about a week at 70 degrees and can then be paste waxed. Immature gourds will rot in storage. Small gourds (*Cucurbita pepo* var. *ovifera*) are easiest to grow here. Most gourds originated in tropical and semi-tropical lands.

SOLANACEAE is the nightshade family and contains many poisonous plants. For this reason both the tomato and the potato were regarded with considerable suspicion when first introduced. There are more than 75 genera and most of the garden members are subtropical in origin. All members of this family will carry at least some poison with them, in leaf, root or fruit. The alkaloid solanine is, however, normally reduced or eliminated by high temperatures (i.e. pressure canning). Many people have physical reactions such as burning from various solanaceous plants. Most of us adore them.

- Eggplant or aubergine (*Solanum melongena*) is native to India and the Far East. It is also found in Africa. Eggplants can be purple, pink, white or striped, although the purple ones are considered "normal" here. It is a tropical perennial, but very tender, slow growing and easily stunted by temperatures below 50 degrees. Soil temperatures should be at a minimum of 60 degrees and germination is best at 75-90 degrees. While young, day temperatures should not drop below 70 or night below 64 degrees. They need to be started indoors and put out after night temperatures have stabilized into the upper 50's. Cloches and row covers or Wall o'Waters™ are a big help. Fruits will not set under 70 degrees. In some summers that never happens and that is when the various methods of heat-enhancement prove their worth. Most eggplants do best with 18 to 24 inches of room to grow. Their growth should not be checked by cold, drought or poor fertilizer availability. Add extra N at first flowering. 2-5 fruits is a good average yield here. The elongated forms, often called Japanese, are usually a little more tolerant of our climate. There are also smaller ones that do well. Blossom end rot can also attack these plants. Black streaking or brown scalding of the fruits is often due to cold nights and is harmless. A rich, deep, warm soil will give the best results. Eggplants should be harvested before the color dulls or a finger impression remains on the skin. They are especially good when about 1/3 grown. Eggplant will grow well in a pH range of 5.5-6.8. Blossom end rot may show up at the lower end of the pH scale in a hot year. The eggplants grown at the GrassRoots Garden in Eugene are grown in a greenhouse grow tunnel. Eggplant is a challenge in cool summer areas. Plant it in June with your peppers. Use warm water when irrigating. Eggplant needs less water and more heat than peppers. Use the fish/kelp fertilizer mix (1 TBS fish emulsion + 1 TBS liquid kelp) about every 3<sup>rd</sup> week.
- Potato (*Solanum tuberosum*) comes from the Andes where a wealth of varieties is still grown. Western nations have been rather conservative in which varieties are accepted. Brown-skinned oval "bakers" are #1, with far fewer red potatoes and fewer still yellow or purple ones being grown. Each type has its own flavor, texture and uses. Greened potatoes contain large amounts of alkaloids such as solanine and should be carefully pared and cooked or not eaten at all. Potatoes are much more cold-tolerant than the other Solanaceae. The history of potatoes is fascinating reading, especially their difficult entry into European civilization. Potatoes are available in a rainbow of colors including one with a royal purple exterior and



**Oregon State University**  
**Extension Service**  
**Lincoln County**



lovely blue interior. Most potatoes seem to do well here, given well-drained soil and adequate fertility. Potatoes produce more calories per square foot of space than any other garden crop. Coupled with milk, they can produce a complete, healthy diet. Well-mulched potatoes need little extra water most years. Most gardeners tend not to provide adequate N for this crop, but excess N can reduce tuber size.. Sidedress with N at 8" if needed. A pH below 6 will reduce potato scab. In heavy soils potatoes are subject to a number of rots and can be harder to grow. It is best to avoid all fresh manure and undecomposed organic matter in the soil for 12 months ahead of this crop. Certified seed pieces are a good investment to keep serious diseases out of the garden. It takes 5-7 days to callus eyes properly. Chitting is preparing the potato piece for planting. You use a small whole potato or cut pieces with 2-3 eyes. Keep these 7-14 days in good light to grow sturdy, short green leaved starts that are then planted. If potatoes seem quite healthy and sound, you can save your own until disease does appear. You can plant a second crop in June, but all potatoes require a chilling period of 40-50 degrees for 4-15 weeks before replanting. Wireworms, flea beetles and rodents all can damage or destroy the crop. Adequate mulching or hilling is essential to avoid greening. 5-7 weeks after emergence the tubers begin to form. 1# of standard potatoes well grown will make 10# of potatoes, but 1 # of fingerling types will produce up to 20#. Potatoes that are watery when cooked but smell normal probably suffered a deficiency of K while growing. Flowering is not related to tuber formation, so don't worry if your plants don't bloom. In fact, when a potato sets seed (which look like little green tomatoes) it is taking energy away from the tubers which we eat. Tubers tend to grow above the set, so allow enough depth, whether you are trenching potatoes or growing above ground under mulch. My preference is to barely cover the potato sets, then keep adding mulch over the top as they grow. Potatoes bear best if the foliage is supported above the soil on a mesh or string "bed" and well hilled up. As the days cool the food of the plant is moved down into the tubers and the foliage begins to look sickly. If possible, watering should cease at this point.. New potatoes may be harvested 2 weeks after bloom, or about 10 weeks after planting. Water only as needed until the plants start looking shabby or until you can feel full-sized potatoes in the ground. Then cut off all water. Erratic watering can cause knobby or hollow tubers. If the vines won't quit and the potatoes are formed, break over the foliage to force the energy into the tubers. Wait 2 weeks and dig. When potatoes are dug, they must be handled gently to avoid bruising and conditioned in a dark, warm (55-60 degrees) and dry area before storage. Tubers are more susceptible to bruising when the soil is at 45 degrees or less. Storage should be dark but not too cold as potato starches will turn to sugar and the texture will suffer at 40 degrees or less in storage. Too high a temperature will induce sprouting as will storage near bananas, apples or tomatoes due to ethylene gas. Do not use a frostfree refrigerator. Over 55 they will sprout after the chilling period. Below 45 potatoes get sweet and often flabby. Let them warm up a couple of days before using.

- Ground Cherry (*Physalis pruinosa*) is native to North America and readily raised here. The lantern enclosed small fruits are called pohaberries (a different species) in Hawaii and are very sweet. When ripe the lantern will be yellow-papery and the fruit bright yellow. It does best in a warm summer and has no major problems. Culture is as for the tomato. The fruits





**Oregon State University**  
**Extension Service**  
**Lincoln County**



usually reseed themselves each year. The plant tends to sprawl, so support it well and allow about a 2'+ spacing. These store very well into winter. Aunt Mollie's is reliable and resows very freely, coming back in numbers next summer. Aunt Molly saved seeds from this variety which came to America via Poland via the Andes. Plants are tolerant of cool climates. These are terrific out of hand and will store even in a basket in the kitchen. They can also be made into a sauce.

- Tomatillo (*Physalis ixocarpa*) is also called the husk tomato. It is much like the ground cherry except the fruit is the size of a medium tomato and it takes longer to mature. It originated in Mexico, but grows well here most years. The plants are very prolific. It requires at least 2-foot spacing. This plant will also volunteer in the spring, at which time the young plants can be transplanted to the proper locations. The flowers are exceptionally pretty, but the plant is ungainly and is best grown in a cage. The culture is the same as for the tomato. Tomatillo (toe-mah-tea-yo) seems to have no frost tolerance. This *Physalis* can be caged or tied to a trellis also. They make great salsa.
- Tomato (*Lycopersicon esculentum*) is the king of the American garden after having finally lived down its poisonous reputation. It is probably native to South America, but it moved up to Mexico at an early date. Leaves, roots and raw unripe fruits may cause problems. Some people cannot eat even ripe tomatoes with impunity. Even the hairs on the leaves can cause contact dermatitis in some people. Tomatoes can be determinate or indeterminate. Determinate tomatoes grow, form their flowers, set fruit and ripen in a fairly set and circumscribed pattern. Whatever the weather, when this cycle is done the plants begin to look shabby. Often all the fruit will ripen over a relatively short period of time. Many tomatoes seem to be more "semi-determinate" in that they will stop growing, but the fruits will ripen erratically. Indeterminate plants will continue flowering, growing and setting fruit until killed. Some of these, such as Sweet 100 have attained 20+ feet of growth with literally hundreds of fruits. Most research is aimed at developing the determinate varieties. Tomatoes are self-pollinating and thus good candidates for seed saving unless hybrids. When starting tomatoes they do best with daytime air temperatures of 64-70 and night ones of 55-61 until the first true leaves are unfurled. Then drop the temperature to 54 degrees for one week to initiate early flowering. The temperature is then raised again. Tomatoes are excellent candidates for the use of heat enhancers in the garden. Well-drained soil not overly rich in N, but with ample P, K, and Ca enhances ripening and flavor. Moisture must remain in good supply until the fruit is fully sized. Tomatoes do most of their ripening in the dark and are prone to sunscald, so overpruning can cause much damage. A wide range of pH is tolerated (5.5-7.5) but 6.5 is probably ideal. Fruits are cold-damaged below 45 degrees whether on the plant or in storage. Leaf curling and purpling is usually a reaction to the cold, although purpling also indicates a P deficiency. Production is greatest when tomatoes are allowed to sprawl on the ground, but problems with pests, disease and harvesting make it advisable to train them. Tomato tables, trellises and cages allow maximum growth and production and single staking the least, although the tomatoes will mature more quickly. Concrete reinforcing wire makes the best cages. A 45° angled concrete reinforcing wire or cattle panel



**Oregon State University**  
**Extension Service**  
**Lincoln County**



makes an ideal trellis. Variety selection is crucial most years, but our cold varieties sometimes have trouble when we get a long hot spell. Starting with vigorous, unstunted transplants not yet in bloom gives the best results. Second best results are achieved by direct sowing into warm ground. Do not spray tomatoes with insecticidal soaps. Tomatoes will form roots at the nodes, so burying them on a slant more deeply than in the pot makes a stronger support system. Grafted tomatoes have greater vigor, productivity and disease resistance as a rule, but the graft must not be buried or the rootstock will take over, losing the advantage of the graft. Air flow is crucial to slowing down disease, so all lower branches should be pruned. No foliage should touch the ground if possible. If needed, sidedress when fruit sets. Watch the Ca:N balance. Excess nitrogen may predispose the plant to blossom end rot, to insect damage, to excess growth leading to delayed fruiting and fruit maturity. It may also dilute the flavor. The critical water period is blossom onset through fruit swell. Fruit sets at over 50 deg. 64-70 is the ideal temperature. Most varieties need one week at no less than 54 deg. to flower. Too hot (temperatures over 85 or 90) also causes blossom drop as does over watering or drought. Tomatoes require 2-1/2 gal/week/standard size plant, more if staked or windy or extra hot. No overhead water after they start to color. Stress reduces the sugar content and cold kills the flavor components.. The fruits do not require sunlight to ripen and may sunscald if the vines are pruned. Use moderate N, high P, K and Ca. To speed ripening cut roots on one side, cover with plastic and throw banana peels and apple waste under. Once the season is closing, you can remove all flower trusses and tiny fruit which cannot possibly mature to direct more energy to the ripening fruit. Tomatoes cut at starburst (white star on bottom of pale green tomato) will ripen with full vitamin content and nearly full flavor. Any sooner and they will be red cardboard. . For tomatoes picked mature green (or, heaven forbid, those gassed red supermarket ones) 5-7 days of exposure to warmth and light will greatly improve the flavor. Picked tomatoes are very subject to chill damage with resultant flavor loss, and should never be refrigerated.

- Peppers (*Capsicum annuum et alia*) are found in most warm parts of the world. The variety is amazing. Varieties that mature well in cooler climates, especially for sweet or bell peppers, are being developed. The hot principle, capsaicinoids, is present in all peppers, but is not very noticeable to us in the sweet peppers. Taste the seeds and white membrane of a bell pepper and you will notice the hint of hotness. It was thought that the hotness concentrated in the seeds, but apparently it is primarily in the tissue-like membrane surrounding the seeds. Truly hot peppers can raise blisters on bare skin and fumes from their cooking can give an excellent imitation of tear gas. Peppers grown in a cool climate cannot accumulate as many capsaicinoids as in a hot climate. Excess water or N also seems to dilute this principle. Peppers need 65-85 degrees in the day and 60-65 at night when starting. After they have two sets of true leaves drop the temperature to 55 for 4 weeks for more flowers and stockier plants. In the garden cool nights also encourage short bushy plants which set more flowers. In fact peppers can become too crowded with cool nights and hot days. Cutting out the tip of the pepper plant at planting will promote more side branches and more fruit. It will also make the pepper stockier. pH should be 6.5-7.0. Peppers require more light, N (add some N



Oregon State University  
Extension Service  
Lincoln County



at fruit set) and S (add 1/2#/1000 sq. ft.) than tomatoes. Caution may be advised for the advice to add a pack of matches to the hole, as this may even kill the young plants. Peppers also require more heat. Soil temperatures below 50 will cause root die-back. Spacing depends on variety and varies from 12 inches to 24. Peppers, like tomatoes, are self-fertile and often pollinate within the flower. You can, however, get 25% outcrossing as well, so isolate for seed saving. Although fruits will be set at 50 degrees, they will contain few seeds and will be small. The seeds release a hormone which determines fruit size. More seeds form at the warmer temperatures. Black streaking on peppers is usually a reaction to cold temperatures. Ideal night temperature once the fruit has set is 68 degrees. Obviously the use of heat enhancers is very important. Peppers are also subject to blossom-end rot. Keep the soil evenly moist, using about 1 1/2 gal/plant/week.. The critical water period is blossom set through full expansion. Peppers can get blossom end rot too. Let no flowers set before 7/1 for best yield. Peppers are very good in containers. As of September consider cloching all the pepper plants. One trick for all plants which need warm nights is to have a long cloche and string old style Christmas lights inside. They heat the space very efficiently.

- Garden Huckleberry or Wonderberry (*Solanum nigrum?*) is a plant surrounded by controversy. Seed Savers Exchange is selling one which they say is from Africa. Generally this plant is sold as a creation by Luther Burbank from *Solanum nigrum*, a common toxic weed, also known as Black Nightshade. The berries are supposed to always be cooked and are used for pies and the like. It is a handsome plant, larger and with larger fruits than the native Black or Deadly Nightshade. I have eaten it (not raw) and found it rather insipid unless lots of sugar was added. It is fun to serve Deadly Nightshade Pie to your friends, however.

FABACEAE is the soil-building family, since all its members have the ability to fix atmospheric N by means of root nodules. These root nodules are a form of symbiosis with *Rhizobium* bacteria. If the soil is very rich in N, the nodules will be small or lacking. There are several thousand species in this family from tiny weeds to large trees. There are many food and forage plants as well as ornamental and poisonous members. All have the typical "pea" flower and form a seeded pod. The family is worldwide and even the ones commonly used in our gardens vary widely in their temperature preferences. If given excess N, legumes in general will not capture atmospheric N efficiently if at all.

- The pea (*Pisum sativum*) dates back well before the Christian era. Pea seeds have been found in Middle Eastern and European settlements that are at least 9,000 years old. Peas are probably the oldest cultivated vegetable. Originally the tender tops of the peas were eaten and the pods were cooked, either fresh or dried. Shelling the peas out is only about 300 years old. The main types are smooth seeded and wrinkle seeded peas. Smooth seeded peas are not as sweet as wrinkle seeded peas, but they are more cold-hardy and make the best soup. Most often grown here are shelling peas, sugar pods and snap peas, the latest member of a venerable family. The major problem is pea enation virus, spread by aphids. Little Marvel is the most susceptible of the peas to enation virus. Some areas are also bothered by pea weevil and pea leaf weevil. Peas generally prefer cool weather for their development and are grown as an early spring and late fall crop. Warm-weather peas have been developed at Oregon



**Oregon State University**  
**Extension Service**  
**Lincoln County**



State University that resist enation virus and powdery mildew, so three crops can be grown in one year. Preferred pH is 6.0-6.2 but not over 6.5. Even bush peas seem to do better with some support. Pole peas, like pole beans will produce more, but the new developments in breeding are mostly being done on bush varieties. There are also field peas, which are often used for forage or green manure. Peas do not mind cool soil temperatures if the soil is well-drained. If the soil is heavy and soggy, they will usually rot and insects will be blamed.

Actually the insects are usually just opportunists who feed on any decaying matter. In raised beds peas can often be planted by Washington's birthday or even earlier, but they may not sprout before April if the soil does not warm to over 40 degrees. I get my best results by starting the peas ahead in speedling flats in late January and then transplanting. It solves the problem of spacing and establishment in the variable weather of later winter. It also eliminates the problem of birds pulling up the freshly sprouted peas. Peas should be kept picked, because over mature pods will halt production, just as with beans and cucumbers. Peas are usually pollinated within the flower, often before it even opens, so the seeds are easily kept true. If peas have not been previously grown in a spot, it is a good idea to use the proper inoculant. For longest harvest, do not pull peas off, rather cut them without tugging on the vines which are often shallow rooted.

- Snap beans (*Phaseolus vulgaris*) have been found from Brazil to Mexico in sites up to 7,500 years old. Obviously they prefer warm temperatures. Beans will germinate at 60-84 degrees, but they prefer 75-80. After planting do not water again for 2 weeks, especially in heavy soils. Bean seed is very subject to damage. If handled roughly or if too old there will be many "snakeheads", where a stem comes up, but no leaves unfold. If soaked to where the skin cracks, the seed will frequently rot in the soil or be attacked by soil insects unless the soil temperature is above 50. Kidney beans and most dry beans are *P. vulgaris*. The "strings" have been bred out of the modern varieties so they are referred to a green or snap beans when eaten at the immature stage. All green beans will mature first to shelly beans and then to dry beans. Some varieties are, however, grown especially as dry beans and often have pods which are far from tender even when young. Pole beans produce more beans, but again most of the research is concentrated on the bush varieties. Some old and very good varieties are available only as a pole bean. You could grow a different bean each year and never live long enough to scratch the surface of their diversity. Commercially, beans are bred for "once over" picking so they all ripen at once and are machine-harvested. Gardeners usually prefer a steady supply for the table with perhaps a row or two of "synchronized" beans for canning. The major problem with dry beans is that they should dry on the vine. About the time they begin to mature, it begins to rain here and the beans mold on the vine. In fact, molds of various kinds are the major disease problem in beans in the Willamette Valley. Crop residues of lettuce, carrots, cabbage, parsnips and cucurbits may increase a white mold problem. Cucumber beetles are probably the worst insect pest as they will chew on flowers and pods. Of course, deer, rabbits and slugs also enjoy fresh beans. Green beans are ready for harvest about 2 weeks after flowering. Picking will usually have to be done every 3 days or so to keep the beans producing. The beans may need extra N at flowering. Beans do best at a pH of 6.5 but tolerate 5.5-6.8. The Scarlet Runner bean (*P. multiflora*) is exceptional as an



ornamental and is a perennial in the tropics where it originated. Occasionally it will come back here after a mild winter. It is a good shelly bean or dry bean. It can be eaten very young as a green bean as well. The striking flowers make it a lovely addition to any garden. The tepary bean (*P. acutifolius*) is an exceptional plant suited to extremely hot and arid climates. It would probably have difficulty here. Lima beans (*P. limensis* or *lunatus*) are also from South America, but they require considerably more warmth and a longer season than snap beans and are very difficult to mature here. Some are grown as shelly beans. Some beans called limas here are not, but are instead a form of *P. vulgaris*.

- Fava beans, also know as broad beans, (*Vicia faba*) are very cold-hardy and can often be planted here in September or October in raised beds for an early spring crop. They are native to Southwest Asia and Africa. Their origins are lost in pre-history. Broad beans are much grown in Europe. Fava beans are self-supporting and can attain 6 feet. Before the discovery of the Americas, this was the bean of history. It thrives in cold, rainy locales and has almost no problems. Black aphids will attack the new growth about flowering time. Blossoms will drop if the temperature exceeds 70 degrees. The beans do well on a 4x4 inch spacing if well-watered. They need vetch inoculant. The pods are quite furry inside. They can be eaten as a shelly bean, but most prefer them as a dry bean. The protein is nearly equal to the soybean for quality. Unfortunately it is quite indigestible for some people. There is even a genetic allergy to it called favism. Favas mature from the bottom upwards. There is a forage variety (Banner) which looks like a small brown pea, which is especially good as a green manure, but not for eating.
- Cow Peas (*Vigna unguiculata*) are a Southern favorite which rarely has its heat requirements met in the Willamette Valley. It is good, however, also as a green pea. There are many favorite varieties, but little availability here. Other names are Southern Peas, Field Peas or Black-Eye Peas. They were probably first cultivated in Ethiopia around 4000 BC.

•  
APIACEAE or the parsley family has many very poisonous members, some fine edibles and ornamentals. It also forms some of the best habitat for beneficial insects. Herbs are well-represented in this family. It is found mostly in the temperate or boreal climes. There are about 250 genera in



this group including *Angelica*, *Petroselinum*, *Coriandrum*, *Daucus*, *Foeniculum* and *Pastinaca*. All are characterized by ferny foliage and umbrella-like, flat-topped flower clusters. Vegetables in this group are carrot, sweet fennel, celery and parsnip. All in this family tend to be deep rooted and demand loose deep soil for good production.

- Carrot (*Daucus carota sativa*) was developed into the modern crop in Holland. It is considered that carrots were originally purple, red or white with a thin root, then a mutant occurred which removed the purple pigmentation resulting in a new race of yellow carrots, from which orange carrots were



**Oregon State University**  
**Extension Service**  
**Lincoln County**



developed. The center of diversity for the carrot is in Central Asia, and the first cultivation of carrot for its storage root is reported to be in the Afghanistan region, approximately 1,100 years ago (Mackevic 1929). Long before carrot was domesticated, wild carrot had become widespread, as seeds were found in Europe dating back nearly 5,000 years ago. Queen Anne's Lace is the ancestral plant. Comparison of its root with that of the domestic carrot will readily show what breeding can do. To distinguish the two plants, the term "variety *sativa*", can be added to the scientific name. Today wild carrot is found around the world in temperate regions, particularly in wild areas, road sides and agricultural land. Our carrot varieties date back to the 1600s to a very limited genetic pool. Breeders are bringing in some new genetic stock for new characteristics and because genetic diversity is a safety factor in any crop. Carrots whose shoulders are exposed to sun will often show the ancestral purpling. Carrots come in many shapes, and in heavier soils the half-long or ball types should be chosen. Heavy or rocky soils often cause forked carrots. Too much N, particularly in fresh manure, can cause very "hairy" roots and poor flavor. Excess water may cause splitting, especially if there is an alteration of extreme dryness and extreme wetness. Carrots can be scatter-sown mixed with sand and then thinned to 1 x 1- inch spacing. In this way a large number of carrots can be grown in a small, highly improved area. On a 1x1 spacing 1/2 the carrots can be harvested as baby carrots, a rare treat, and the rest left to become storage carrots. Carrots are sometimes slow to germinate and have difficulty breaking through any crusting on the soil. Carrot seed tapes can save a lot of backbreaking thinning also. You can intersow radishes as a nurse crop either in the soil or on the tape. Leave 1" between seeds on the tape. Sprinkling coarse sand, fine sifted compost, perlite or vermiculite over the rows will also prevent crusting. I have used seedling mix for this. Carrots can be done as transplants if there is no disturbance of the taproot. This is, however, rather difficult. To maintain moisture for summer germination make a shallow trench for the seeds or seed tape, barely covering the seeds and then Reemay cloth, burlap, perforated plastic or the like can be laid over the seed bed. Be sure to remove it before the young growth is suffocated. Reemay can be left on if there is a carrot rust fly problem and will provide 100% protection. There are no other serious insect problems in our area. Carrots have considerable cold-tolerance once germinated and will winter store in the ground easily if the soil is well drained and the rodents are not plentiful. They will grow at a mean temperature of 65 degrees. Prolonged hot spells can produce shorter, rather blunt roots and below 50 the roots tend to be long, slender and pale. A yellows virus can cause problems, but has not been significant here. Too little sun will rob flavor. Carrots can be difficult because of slow germination. Do not plant deep. Keep carrots evenly moist, especially during the long germination, but never soggy. Early on apply with a mister or sprinkle over the top of the protective material. Excess water or nitrogen may cause splitting in fully-grown carrots. Sidedress at 4". Warm days and cool nights make the sweetest carrots. They are best as a fall crop, planted in late August or early September, and great for overwintering. They will then be super crisp but not as sweet. 39-41 degrees is the minimum soil temp to germinate, but 65 is optimum. Carrots may take forever (over 30 days) to germinate at cool temperatures. Wash them just before using. They store well buried in barely moist sand in a



**Oregon State University**  
**Extension Service**  
**Lincoln County**



cool area. Stress may make them bitter. Sun on the shoulders will cause greening and bitterness. Carrots and tomatoes are very compatible provided there is enough sun for the carrots.

- Celery (*Apium graveolens*) is somewhat fussy to grow correctly. It probably originated in the Mediterranean, but grew throughout Europe and southern Asia as a weed in wet areas. It quickly becomes woody or pithy if checked in its growth in any way. It should be started indoors and transplanted before it suffers any root stress. Celery seed can be difficult to germinate and responds well to a soil temperature of 68 degrees when germinating. It is very prone to damping off. Celery is a gross feeder and, as you might guess from its wild habitat, needs a great deal of water. Water stress may even cause bolting. Don't plant it out before May 1 or it will bolt, in fact celery is best as a fall crop because the seedlings need to go from warm weather to cold. If they go from cold to warm and then there is a cold spell, the plants will bolt. Nights under 45 also induce bolting. Clipping the leaves of seedlings results in greater uniformity of the stand and stronger stems. Spacing should be a minimum of 12 x 12 inches. Most modern varieties do not require blanching and the green stalks are much more nutritious. Celery seedlings should not be exposed to frost. The mature plants are relatively cold hardy. It should grow especially well in a maritime climate. 6.5 is an ideal pH, but a range of 5.8-6.8 is fine. Fertilizer needs to be readily available in the root zone as celery is a poor producer of feeder roots. There is a thin stalked seasoning celery called 'Dinant' that is quite easy to grow.
- Celeriac (*Apium graveolens* var. *rapaceum*) is a form of celery grown for the root. It is grown exactly as celery. It seems to be little bothered by insects and disease, but requires a long summer and fall to make a good sized root. Celeriac also comes from Europe. Celeriac has been cultivated since at least the 5th century. It is relatively frost-tolerant, once mature. It is a marsh plant by origin, but tolerates dryness better than celery. It should be started indoors or in a cold frame about 8 weeks ahead of planting. Remove the small roots near the top of the crown for a better textured root. Allow 120 to 180 days for this one to mature. Celeriac keeps very well in root cellar storage. The flavor actually improves in cold storage. The roots can be used anytime they have attained a 2 inch diameter. It combines very well with leeks and potatoes for a winter soup.
- Parsnip (*Pastinaca sativa*) is native to Europe and Asia. The foliage is poisonous and may even cause dermatitis if handled when wet. It should be grown in well-drained soil free of fresh manure for a winter harvest. Once frosted the roots are very sweet. Parsnip used to be prized as a source of sweetness. The seed germination is often poor and the plant is difficult to transplant, so it should be sown rather heavily in very loose deep soil. One variety that has been clearly superior in my garden is Cobham. Another satisfactory variety is Gladiator. A good percentage of organic matter results in better roots. If the soil is dense or rocky the roots will be very poor in shape. Too much N will also cause problems. The seed is sown at 1x 8-1/2 inch intervals and 1/2 inch deep. When it is up well the plants should be thinned to 3-4". If handled carefully many of the thinnings may transplant. Attempt this only in soils of very good tilth, so the roots are not broken. Parsnips can be sown at the same time as peas,



Oregon State University  
Extension Service  
Lincoln County



but they will often make a better root if sown in June. They are intolerant of a pH below 6.2. The preferred pH is 6.5-8. Most people do not much like them if harvested before late fall or winter. Parsnips store well in the ground. They are especially tasty in a winter stir-fry with carrots. All should be harvested before growth begins in the spring as they will quickly become woody and inedible. Use only fresh seed. Parsnips like high OM, but no fresh manure within a year or you will have to shave the roots to use them. Excess N causes forking and wiry roots, so go easy on it. They are best after frost and a thorough chilling. They are incredibly sweet when properly homegrown, nothing like the stuff in the stores.

- Sweet Fennel (*Foeniculum vulgare* var. *dulce*) is also called Florence Fennel. It is native to southern Europe and has been used at least since classic times. It is a cool season crop and grows well here. This fennel is grown for the enlarged leaf bases (bulb) but all parts are edible. The foliage has a pleasant anise flavor and the seeds are chewed to sweeten breath and calm the stomach. The dried tops are used as a flea repellent. The plant is quite ornamental. It is harvested when the base is 2 ½ to 3 inches across. It can be difficult to transplant as it tends to form a deep root quickly. Finocchio (another alias) will reseed itself freely in an untilled garden. If the summer is very warm, it will tend to bolt early. Fennel prefers a 6.8 pH and needs 18-24 inches to spread. It requires water whenever the top inch of soil dries.
- Hamburg parsley (*Petroselinum crispum*, var. *tuberosum*) is also known by two other Latin names, a very unusual state of affairs. It is also called turnip-rooted parsley. It is not much grown in home gardens. It originated in the Mediterranean area and is much used in Europe. It is the only "vegetable" parsley. The leaves are coarse, but are also used for seasoning. Avoid excess N and fresh manure where this plant is to go. It is best direct seeded and prefers cool weather. It is tolerant of poor soils, but the best roots are grown in soils of good tilth. It is frost-resistant, but prefers temperatures under 75 degrees. It can be grown as an early spring or late summer sown crop. Like most parsley germination is very slow and the seeds can be dunked in boiling water or soaked overnight in strong black tea before planting on 12 inch spacing. You can also pour just boiled water over the seeds, let them cool, drain, freeze and plant for really rapid germination. Folklore claims that parsley needs to go visit the devil's mother before sprouting. Best flavor is attained in 5-7 inch roots that have had a few frosts. They will store in the ground or in a root cellar environment.

CHENOPODIACEAE is also called the Goosefoot family. It is a group of 75 genera, mostly weeds. It is characterized by mostly alternate, simple leaves and the flowers are inconspicuous and commonly wind-pollinated. This family is wide-spread. Edible wildlings here are lambsquarter (*Chenopodium album* et alia) and picklewort (*Salicornia virginica*), a swamp plant. Vegetable members are Good King Henry, beet, Swiss chard, spinach and orach,. Most of these have the ability to concentrate nitrates. Many contain oxalates.

- Good King Henry (*Chenopodium bonus-henricus*) is a perennial from Europe with arrow-shaped leaves grown for the leaves. The leaves are green. It should have at least one square foot of growing room. It is easy to grow, resembling its cousin Lambsquarters in growth. It does not like transplanting and unfortunately the seeds are not sold widely. Like most plants it





**Oregon State University**  
**Extension Service**  
**Lincoln County**



responds to good soil and good care with higher quality yields. The plant is coarse and not well-suited to ornamental settings. It has become a common weed in the East. It transplants easily and can be propagated by root division. The young leaves are used in place of spinach. The young shoots are used as an asparagus substitute. Livestock thrive on this plant, especially poultry.

- Beets (*Beta vulgaris*) are available as garden beets, mangels, and sugar beets. Beets probably originated fairly late in Europe. They are quite hardy and will have the best quality and color if grown in cool periods. Beets will often bolt, however, if exposed for about 3 weeks to temperatures of 40 degrees or less. Too much heat may produce white and red zoning and poor flavor. They are very tolerant of soil types but form crooked roots if the soil is very heavy. Beets will not tolerate a pH below 6.0 and prefer 6.5 or higher. Beets are subject to boron deficiency and will then have black corky tissue inside the roots. They are heavy users of N and K. No fresh manure should be used. Beets transplant very well if not allowed to get too large in the flat, but do it while at the 2-4 leaf stage. Seedlings are especially good for starting beets. There is a germination inhibitor in the seed which should be leached out. They respond well to a short soak in tea or water before planting, no more than a couple of hours. Most beet seeds are multiple (more than one plant per seed) and the extras should be snipped off with a pair of scissors after transplanting. At 4 inches of height thin to 3-4 inches for most but up to 6 inches for the very large-rooted varieties. Leaves and roots are at their best in table beets when about 2 inches across on the roots. Mangels and Winterkeepers and Formanova are usually still very good at 4 inches across. Golden beets seem to have a milder flavor. Beets store best in a root cellar environment. Keep the shoulders covered with mulch or soil for top-quality beets. The leaf miner causes great damage in many areas in both beets and chard. Symphylans attack both beets and spinach by preference. Water logging can turn leaves red and stunt the plants. Beet leaves are much more nutritious than beet roots. Beets need N, K & B plus trace elements especially. Beets, like chard and spinach, can concentrate nitrates, so watch the N! Side-dress them at 4". Keep evenly moist or they will "zone." Avoid erratic watering! Beets are best for greens as these are far more nutritious than the roots and can be "cut and come again". Plant twice as close as recommended and then thin every other one for delicious greens before the leaves touch.
- Swiss chard (*Beta vulgaris* var. *cicla*) is basically a beet grown for its tops. It is probably the ancestor of our common beet. Chard does well as a transplant and should be on a 12 inch spacing if frequently cropped or on 18 inches if you want it to spread more. It is available in red, pink, yellow or green leaf forms and is one of our winter garden staples. The green and rubarb red leaf forms tend to be hardier. Slender petioled varieties hold up better in severe cold than do the broad ones. Many older varieties have a vaguely soapy flavor, but the varieties Swiss Chard of Geneva, French Swiss Chard, Perpetual and Dorat are quite mild as are most of the red varieties when young. An exciting visual mix is Bright Lights. The heirloom of it is Rainbow Chard. Its flavor is good, but not exceptional. Older leaves are always stronger flavored. Chard stands summer heat quite well if adequately watered. It should be side-dressed with N when about 1/2 grown. It can be harvested by pulling outer



Oregon State University  
Extension Service  
Lincoln County



leaves as needed or by cutting it off just above the crown and letting it resprout. The latter method usually gives more tender leaves and less stem. This can be a very ornamental plant and a good source of winter greens in mild climates.

- Spinach (*Spinacia oleracea*) probably originated in the area of Iran. It grows well only in cool weather and tends to bolt quickly with hot days. It will also bolt if crowded or if germinated at soil temperatures above 50. If it is exposed to over 12 hours of light as a seedling (even the light from a yard light), it will probably bolt. When preparing to bolt, spinach will form arrow-shaped leaves with longer petioles. Seed spinach before 5/15 or after 8/11. Spinach responds well to high levels of organic matter and is relatively salt-tolerant. It is a heavy user of N and K. Pick off all the old leaves faithfully every few days to extend the harvest. Tipburn will be seen if there is a Ca deficiency. Slugs, leaf miners and symphylans adore this crop. Spinach must be kept growing vigorously to be good. The pH should be around 6.5. Plant on 6-8 inch spacing. The air temperature should not exceed 65 degrees once the plant has germinated. There are varieties such as Slo-Bolt that are not as fussy about temperature. A lath system of shading or shade cloth will extend the harvest. Spinach is a good bet as a winter crop and should be started fairly early in August with some shading to keep the temperature down. It is a good understory crop. I have had very good results with Renegade. Most spinach contains high levels of oxalates, but Monoppa is bred to have less. There are also varieties that are less heat sensitive, and thus more bolt-resistant.
- Orach (*Atriplex hortensis*) is also called French spinach. It is native to Siberia and the leaves can be pale yellow to green to red depending on the strain. I prefer the taste of the red myself. The plant can attain 6 feet and be ornamental. Like spinach it tends to bolt readily in hot weather. It should be sown at two week intervals. A 12-inch spacing works best. Orach does not transplant well. The seeds are often not fertile, but will last 6 years in proper storage. It thrives in alkaline soil and tolerates saline soil. Orach is also fairly drought tolerant. It has been popular as a potherb since the 16th century, but is less popular now. That is a shame as it is a lovely plant with a very different and delightful flavor. Only the young leaves and stalks are good.

POACEAE is the grass family. Its members are monocotyledons. This is the grain family. The most familiar member is corn, but wheat, oats, barley, rice and millet are also in this group. Only corn is considered to be a vegetable. The flowers are wind-pollinated in this group and usually insignificant, but the male corn flowers (tassels) are quite showy. Allergic reaction to pollens of this group are common and "corn itch" is familiar to anyone who spends much time under the pollinating corn. All members of this family require very fertile soil.

- The common corns grown here are sweet corn (*Zea mays* var. *rugosa*) and popcorn (*Zea mays* var. *praecox*). A good bit of Indian corn (*Z. mays*, var *indurata*) is also grown. Corns cross-pollinate readily and since the seed is the edible part, varieties should be kept segregated by wind barriers. Sweet corn is tolerant of very light frosts and may be planted from mid-April to mid-June if the soil is warm enough. It germinates best at 70+ degrees, especially the sh2 and se types. Once germinated it is fairly vigorous. Corn transplants easily if not allowed to become root-bound and transplanting avoids many problems: insects, birds and spacing. I



**Oregon State University**  
**Extension Service**  
**Lincoln County**



seed all my corn indoors. It is important not to wait too long to plant it as it outgrows its container quickly. Corn roots will be fairly close to the soil surface, so shallow or no cultivation is the rule. Hilling corn will take advantage of the prop roots and reduce lodging. Like grass, corn requires an ample and steady supply of N and water. Since we grow for the seeds, however, there must also be a good supply of P at planting time. At knee high stage add N. A pH around 6.5-7.0 is ideal. Plant in blocks to take advantage of wind pollination. Pollination is most effective at 70-90 degrees. Corn undergoes double pollination, one pollen cell to the embryo cell, one to the endosperm. Each silk must be pollinated for a full ear. Corn can be grown on 9 inch spacing, but 12 inches will probably increase yields. I have had good luck putting 2-3 corn plants in one hole and then spacing them a bit further apart. Corn is sometimes bothered by corn earworm. Tight husks discourage this pest. Smut is a disease not often seen in Oregon, but it is highly contagious and should be destroyed when first noted and before sporulation, that is, unless you want to enjoy the *buitlacoche* fungus dish. Since it is a tall plant, plant to the north of the garden to minimize shading. Corn requires full sun and a steady supply of water. Critical stages for the corn are germination, knee high, when the buds are set for the ears, and just prior to tasseling. Succession planting of one variety rarely gives an advantage as all tend to mature together anyway. By planting varieties with different maturation times, the harvest can be extended. Supersweet corn remains sweet on the stalk and in storage longer because it converts sugar to starch more slowly. Germination is normally slower and less reliable in the supersweets. Some supersweet corn must be grown in isolation (like popcorn) or it will be more like field corn. EH supersweet corn does not have this problem. If planting corn intensively, do not plan on having much understory crop as the competition for nutrients, water and sun will be too great. Pole beans work well as an interplant, but the corn must have a good head start and wider spacing. If the third sister squash is added to the mix, much more space must be allocated to the threesome. Interestingly, the weed purslane (*Portulaca oleracea*) was brought here as a vegetable and is the perfect companion plant to corn, enhancing its growth and production. The bicolor corns tend to be sweeter than yellow corn, but not as sweet as the supersweets. They also tend to be vigorous as the yellow corns and are often early. Some find the supersweet corns too sweet. Corn can be an important element of the beautiful food garden or the landscape by choosing varieties that also have striking foliage. It makes a good screen. Do not use supersweet varieties for canning. They caramelize. It is a monocot, so it grows differently than our vegetables. It is a heavy feeder and needs extra N, P & K at planting, when 8" tall and when 24" tall. It is a heavy water user, especially from tasseling through silking to ear formation. The soil should be at 70 degrees or more and the day temps in the 80s and 90s with very cool nights for the best sweet corn. The supersweets (all shrunken kernel corn) are supersensitive to cold Lodging is when the stalk fall down and can be prevented by hilling or putting a string fence around the patch. Don't remove the basal suckers, they help prop up the plant and photosynthesize for the ears. Tasselate ears are ears with tassels where you expect silks. We also see tiny ears of corn (no husks) on the male top tassels occasionally. These seem to be due to weather vagaries (just weird). Tasseling very early and long before silking is quite common. It is usually not a problem and may be



**Oregon State University**  
**Extension Service**  
**Lincoln County**



weather stress related also. Topping is a question we often get about corn as people observe the commercial fields doing it. It is only recommended if you are machine harvesting and if done too early will drastically reduce ear fill and yields. Pick corn late afternoon and cut it off or use a sharp twist downward. Sweet corn can be dried for meal, the silks make a good diuretic tea and the cobs make jelly or fire starters. An older use was in the outhouse.

The remaining garden vegetables are grouped as the only commonly cultivated members of each family. POLYGONACEAE is represented by rhubarb (*Rheum rhabarbarum*) and buckwheat (*Fagopyrum esculentum*). The latter is rarely cultivated as a garden crop, but makes an excellent green manure for fallowing. TETRAGONIACEAE has New Zealand spinach (*Tetragonia agonoides*) as its sole garden representative. One crop which seems to be gaining in popularity in our area as a late-planted crop is corn salad, aka mache, (*Valerianella locusta*) of the VALERIANACEAE. Garden Amaranth is in the AMARANTHACEAE family, MALVACEAE offers us Okra. Malabar Spinach is in BASELLACEAE. A challenging very nutritious upcoming vegetable is Sweet Potato in CONVOLVULACEAE.

- Rhubarb is a hardy perennial whose leaves are very poisonous. It is native to eastern Asia. It is best adapted to areas where the summers are cool and moist and winters have freezing temperatures. Too mild a winter can cause poor stalk production the following year. It requires rich soil, which drains well in the winter. Rhubarb is very tolerant of the pH of the soil growing well from 5.0-6.8. It responds well to aged manure applications and is a very heavy feeder. It can be divided in the fall or early spring by cutting the crown up. Each piece must have a viable bud or eye and two buds are preferable. Rhubarb will need a good deal of space so allow 3-4 feet between plants. The crown pieces should be covered by 4 inches of soil. Rhubarb can also be grown from seed, but the results may be unpredictable. A clump can produce for 20 years if not over harvested. No harvest should be taken the first year. By the third year there will be at least 4 weeks of good harvest if the plants have been properly cared for. When the stalks get thin, hollow or woody, harvesting should cease. Usually it is good to divide when the plant is overcrowded or climbing out of the soil. This usually occurs after 5-10 years. Stalks should be twisted from the base as cut stalks tend to rot back. If rhubarb begins to flower, remove the stalk as soon as noticed or the production will be seriously reduced. The flower is edible, but not tasty. The reddest varieties are McDonald and Ruby. Canada Red is extra tender for canning and freezing and Valentine requires less sugar due to its natural sweetness. Victoria is the tartest and most variable, and tends to have greenish stalks. I would not grow it myself. Leaf spot fungus is fairly common and is best controlled by removing the affected leaves and by cleaning up the area after winter die-back. Phytophthora root rot is the most serious problem. Usually rhubarb is harvested March-June.
- New Zealand spinach is a warm weather crop often used to substitute for spinach in the summer. It is native to Japan, Australia, New Zealand and South America. Its seed can be difficult to germinate and should be presoaked or scarified. It will grow best at a pH of 6.0-6.8. It has a sprawling growth pattern and requires at least 2 feet of growing room. Leaves and tender tips are harvested throughout the summer. It grows rather slowly at first, but



**Oregon State University**  
**Extension Service**  
**Lincoln County**



within 2 months should be filling up its space. It is quite frost-sensitive. Like most greens, New Zealand spinach responds well to N fertilization. It also does best with at least 1 inch of water per week. The older leaves get quite tough and bitter. For some reason slugs are relatively uninterested in this plant. It can have high calcium oxalate content. New Zealand spinach will frequently resow.

- Corn salad goes by many names: Feldsalat, chicken lettuce, mache, Feticus and lamb's lettuce. There is much variability in the various strains of corn salad. It is often planted in September here for winter greens. It can be planted from early spring to fall if desired. Like lettuce it germinates best in cool soil. The seed can be broadcast, but must be firmed into the soil. It will go to seed if subjected to cold and hot temperatures. Full sunlight, ample water and plenty of N will assure a good crop. The flavor is very mild and the texture is not crisp. It is used as a salad base or as a potherb. It frequently self-sows.
- Amaranth (Tampala, Chinese Spinach, Hinn Choy) is an ancient crop from the Americas. It is now being grown for greens and grain. As a green it is easy to grow, but is not frost-tolerant. As a grain it is challenging to grow since it crosses with our native pigweeds, birds adore it, the seeds tend to shatter, and it tends to fall over in the wind. New more compact varieties are being bred which tend not to shatter so easily. Most of the more decorative amaranths are also edible.
- Okra is a hot season crop similar in its requirements to Sweet Potato, eggplant and peanuts. It comes from Northeast Africa where it has been eaten for thousands of years. It came into the US via the slave trade. Okra prefers a heavy soil, clay loam, average moisture and moderate fertility. Too much N may cause less production. It will also make the plant more cold sensitive. To remove seed dormancy, wash in dishwashing soap, rinse and then soak in tepid water. Plant right away. Plant 12 inches apart in 60 degree or warmer soil. It should not be exposed to temperatures below 50 and 60 is better. Pick pods at 5 inches or less and cut them off, don't snap or pull. Some people are allergic to contact with the okra. The only variety that has occasionally done well for me has been Annie Oakley or Annie Oakley Improved. It is worth growing for the gorgeous hibiscus flowers alone.
- Malabar Spinach is a warm weather green. It is a spinach replacement for very warm areas. Other names are Basella spinach, Indian spinach or Pasali. It has a somewhat glutinous texture when cooked and is much used in SE Asia and Africa. It is a running plant, so allow 2 feet for each plant. Start seeds indoors and keep at 70+ degrees. Plants are very tender. If trained to a trellis it can be planted 12 inches apart in a row. Provide a windbreak in windy areas. Use only the small new leaves. Different strains may have different flavors. I find it barely palatable raw.
- Sweet Potatoes are a labor of love. Hoop cloches, soil warmers, green IRE plastic and plant through row cover. Of course, a good greenhouse would be a bonus. Sweet potatoes are planted from slips, small green plants which grow from the eyes. This crop is very cold-sensitive! Plant into warm, well-drained soil with most of the slip underground. The soil should have good tilth 10-12" deep. This is not a heavy feeder and too much nitrogen will give luxuriant vine growth at the expense of the tubers. Store yams are just a color version of



**Oregon State University**  
**Extension Service**  
**Lincoln County**



sweet potatoes. Before the weather and soil get too cold, dig very gently and let cure on the ground to heal nicks etc. Ideal curing is at 85-90 degrees and 70% humidity. Before storing let cure another two weeks at 70+ degrees. Proper curing is difficult and the key to storage ability. Gary Johnson is our MG expert on these.

- Others: Yacon and Oca are root crops. Yacon is in the daisy family and Oca in Fabaceae. Yacon is very tasty and crisp for salads and the like. It is a long season crop and needs lots of heat. The tops will be 8+ feet tall with large daisy type flowers. It should not be allowed to freeze hard before harvest. Use maximum heat enhancement techniques. The dahlia like tubers are harvested, but preserve the crown of the plant as that is the part to plant back at tomato planting time. Oca has very small crisp tubers and seems very palatable to all the small chewers. I have never gotten a good crop in our area. I have even grown it in containers. The plant is quite ornamental with the red clover leaves. In fact, it would be great as a hanging basket. Any hints to get tubers larger than a marble would be much appreciated.
- **Tip of the Year:** Learn to know and use the volunteer wild vegetables in your garden. They are the easiest of all to grow. We eat miner's lettuce, chickweed, bittercress, amaranth, lambsquarter, purslane, shepherd's-purse, red sorrel, dandelion and many more, especially in the winter and early spring. Also many flowers are delectable on the table and in the stomach. Of course, be very sure of your identification.

### General tips

- Wet at night, fungus delight
- Water to promote deep foraging roots
- Fertilize where needed only
- Maintain Growth Momentum
- If short of water, space them out
- Never handle wet plants
- Do not spray or fertilize plants under high stress
- Do not overdo the N. It disrupts Ca and other nutrient balances. It increases the risk of disease and pests. It may delay maturity. It may degrade flavor and nutritional value.

Note: a quick conversion guide-100#/acre of an element = 2 1/2# per 100 sq. ft. and 1 ton/acre = 50#/1000 sq. ft.

Optimum Temperature Requirements for satisfactory growth and production and quality. If you direct seed into soil at the minimum temperature listed for a vegetable, it will usually take much longer to germinate and run a much higher risk of rotting or being eaten. For example lettuce at 40 degrees takes 30 days to germinate. All germinate best around 70 degrees, but as soon as they germinate, they should be moved off the heat mats.

### Cool season



**Oregon State University**  
**Extension Service**  
**Lincoln County**



55-65: Cauliflower, Pea, Spinach, Brussels Sprouts

60-70: Broccoli, Chinese Cabbage, Head Cabbage, Celery, Collards, Kale, Head Lettuce, Rutabaga, Turnip

65-75: Beet, Bulb Onion, Carrot, Leaf Lettuce, Mustard, Potato

**Wide range of adaptability.**

60-80: Green Onions, Squash

50-80: Beans, Chard, Corn, Cowpea, Parsley, Pepper, Radish, Soybean, Tomato, New Zealand Spinach

**Warm season.**

70-85: Eggplant, Okra, Sweet Potato, Watermelon, Melons, Cucumbers

**Lane website**

<http://extension.oregonstate.edu/lane/>

**My email**

[ziegenlieb@aol.com](mailto:ziegenlieb@aol.com)



**Oregon State University**  
Extension Service  
Lincoln County



BIBLIOGRAPHY (very limited)

Growing Vegetables West of the Cascades. Steve Solomon. Sasquatch Press, Portland.

Garden Secrets. Patent & Bilderback. Rodale Press, Emmaus, Pa., 1982.

Heirloom Vegetables. Sue Strickland. Simon and Schuster, New York, NY. 1998

Pacific Northwest Guide to Gardening. McNeilan & Ronningen. Timber Press, Portland, OR., 1982 (now reprinted)

Knott's Handbook for Vegetable Growers. 2nd Ed., Lorenz and Maynard, Wiley-Interscience, New York, 1980. (or latest edition available)

Unusual Vegetables. Rodale Press, Emmaus, Pa., 1978.

Vegetables Money Can't Buy. Nancy Bubel. Godine, Boston, 1977.

Vegetables,-How to Select, Grow and Enjoy. Derek Fell. HP Books, Tucson, AZ  
Vegetables & Herbs, Taylor's Guide to. Most material by Jim Wilson. Houghton Mifflin Co., Boston, MA, 1987.