BACKYARD TO BELLY

Grow Sheets for Vegetables and Fruits

UC Marin Master Gardeners
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UC Marin Master Gardeners are a dedicated, trained group of volunteers with a shared love of gardening and horticulture. Through Community service and educational outreach, they provide home gardeners and community organizations with the knowledge and skills to create a healthy environment for Marin County. Since 1986, UC Marin Master Gardeners have worked as non-paid staff members of the University of California Cooperative Extension (UCCE), answering public inquiries and providing information on all areas of plant health and gardening practices.

Backyard to Belly is a compilation of "Grow Sheets" written for your growing enjoyment. Grow sheets provide scientific information on what, when and how to plant a wide range of edibles including the best varieties for Marin. Varieties as well as cultural practices have been field tested by UC Marin Master Gardeners in home gardens throughout Marin. Contributing UC Marin Master Gardener Authors include Jeanne Ballestero, Kathy Carver, Laura Colvin, Lauren Klein, Joan Kozlowski, Keri Pon, Martha Proctor, Alison Seaman, Jenine Stilson, and Anne-Marie Walker who also served as contributing editor. Many thanks to Steven Swain, UCCE Environmental Horticulture Advisor, for his scientific review and editorial expertise.

UC Marin Master Gardeners staff a free Help Desk five days a week at the UCCE office located at 1682 Novato Boulevard, Suite 150 B, Novato. You can email gardening questions to us at helpdesk@marinmg.org or call us at 415-473-4204. If you have a pest or disease problem, please bring a sample in a plastic bag so we can observe and analyze the issue.

You can also find us sharing information with the public at Marin Farmers' Markets, Educational Seminars, Bay Friendly Garden Walks, School Gardens and Community Gardens. You'll find our articles and stories written in the Marin Independent Journal, PATCH and other online and in-print publications. We also participate in Farm Day and the Marin County Fair, both at the Civic Center.

We have a quarterly newsletter, the Leaflet, written for residents of Marin County that provides seasonal advice, upcoming presentations and seminars and helpful hints on dealing with all sorts of gardening issues from rose blight to rats to watering practices.

Please visit us at our website at www.marinmg.org for more information and to sign up for the Leaflet. You can access the University of California's Integrated Pest Management system through our portal and find archived articles and plant guides.

SEASONAL PLANTING GUIDE

What to Plant: February, March and April

Asparagus
Beets
Brassicas including broccoli, brussel sprouts, cabbage
Alliums including onions, leeks, chives
Carrots
Leafy greens including spinach, kale, chard and lettuce
Herbs (parsley, thyme, oregano, etc…)
Peas
Potatoes
Rhubarb
Strawberries
Blueberries

What to Plant in May

Tomatoes
Eggplant
Peppers
Pumpkins
Corn
Green Beans (and other beans)
Squash
Melons

What to Plant in August

Beets, Brassicas, Carrots, and Leafy Greens
And/ or consider cover crop to work into the soil before planting next February.
Good cover crops in Marin include fava beans, alfalfa, winter wheat and rye.

Fruit Trees – generally best to plant in early spring

Apple
Citrus
Olive
Apricot
Cherry
Pear

Alliums

What: Allium is the botanical name for a group of bulbous plants that include lovely flowering perennials as well as every cook's staples, onions, garlic, leeks, and shallots. The bulb structure enables the plant to tide over during cold or dry periods safely buried in the earth until favorable conditions return. Most species are found in the northern hemisphere although a few occur in South America and Africa.

When and How to Plant:

Onions – Allium cepa

Cepa Group: Plant in the spring or fall from seed, seedling or sets (small bulb). Onion varieties require different daylight hours to form a bulb. After about six months, tops of dry onions will start to turn yellow and break over. Pull the bulb out of the ground and let them dry for a few days. Store in a dry, cool, dark place.

Leeks – Allium ampeloprasum

Porrum Group: Plant seeds in late summer and thin seedlings to 4-6 inches apart. When plants are almost full grown, push soil up around stems to blanch them white. Harvest next year in early summer before the soil gets hot.

Garlic – Allium sativum

Plant clove (garlic does not set fertile seed) in the late summer. Next summer, cease watering and the foliage will yellow. Break over like onion. Dig up bulbs and sundry them for about three weeks until the skins become papery.

Shallots – Allium cepa

Aggregatum Group: Plant bulb, reproduces only by bulb, in spring. The harvest will be next summer. Dig the bulbs out when tops begin to dry.

Best Cultural Practice: Alliums are susceptible to stem and bulb nematodes. Rotate crops and use only certified seed. These cultural practices are your best defense. Alliums are also susceptible to thrips (use insecticidal soap), maggots (destroy crop), downy mildew (keep soil well drained and allow plants to dry out between watering) and white rot (caused by fungus – destroy crop).

Artichoke, *Cynara scolymus*

What:
Artichokes are a variety of thistle in the *Asteraceae* family. The artichoke is a cool season perennial. The bud, or immature flower, is the part of the artichoke that is harvested and eaten. The edible portions of the bud are the tender bases of the leaves (bracts), and the fleshy base (heart). Artichokes allowed to become over-mature will become inedible, however, the artichoke flower is a beautiful purple-blue, fresh or dried. Although the artichoke is not necessarily known for ~~its~~ nutritional value, it does contribute small but useful amounts of a variety of vitamins and minerals, and is low in calories. One plant can produce more than 20 artichokes a year. A plant is good for five or more years of production.

When to Plant:
In our northern coastal climate, planting can take place from August through December.

How to Plant:
As a perennial, the soil should be well prepared before planting. Mix equal parts of manure, compost, or other organic matter into the first foot of soil. Artichokes are best planted using root divisions available at nurseries. Or a healthy plant can be dug up, the root divided, and replanted. Plants can reach a height of 4 feet and can have a spread of up to 6 feet with roots extending down to 4 feet, so allow plenty of space for them to grow. In the vegetable garden, plant artichokes to the side of annual vegetables so they won't be disturbed by frequent planting. Don't plant them near tree roots, as they don't compete well for nutrients and water. The root sections should be set 6 to 8 inches deep in the soil. Irrigate thoroughly before planting and irrigate consistently to help vegetative growth

Best Varieties for Marin:
Although there are lots of artichoke varieties, the 'Green Globe', or 'Green Globe Improved' are most reliable and hardy in our area. Both require winter chill to stimulate bud growth; up to 500 hours under 50 degrees. Two other varieties you can try are the spineless Imperial Star and the Violetto di Romagna both of which require under 250 hours of winter chill. The Violetta has a more purple bud, and should be harvested on the younger side. They are known to be quite flavorful.

Best Cultural Practices:
The artichoke does best in frost-free areas having cool, foggy summers. Freezing temperatures kill the buds, and hot, dry conditions destroy their tenderness. Mulching protection is required for any severe, prolonged frost. They require good drainage, moist soil, sun to partial shade, and grow best in USDA zones 7 – 9. Two crops per year can be expected. After spring harvest, cut off old stalks just below ground. New shoots will develop and produce a fall crop. Artichokes may be stored for 1 to 2 weeks at 32° F.
Artichokes are not overly bothered by pests; look for aphids, snails, slugs, spittlebugs and earwigs on foliage and under bud scales. A strong shot of water early in the day, or insecticidal soap controls aphids. Hand pick snails and slugs. Natural enemies include lady beetles and lacewings. Commercial growers have reported problems with artichoke plume moth. The larva of the moth eats the bud. The growers elect to grow artichokes as annuals, turning over the crop each fall to eliminate the larva of the moth that eats the buds. Artichokes are also susceptible to Botrytis fungus common in rainy weather. Infected plants should be removed immediately.

Asparagus, *Asparagus officinalis*

What: Asparagus is a perennial and a member of the *Asparagaceae* family. Native to the Mediterranean, it is a relative of the grasses with a rhizome emerging from an underground crown. Considered a delicacy by the Greeks and the Romans, it grows very well in Marin and according to Bon Appetit Magazine Survey, reigns supreme as our favorite vegetable followed by broccoli and tomatoes.

When to Plant: Plant asparagus crowns from January to March in full sun. For a family of four, you should plant 40 crowns in order to serve five spears to each person for a meal. It takes about three years to achieve full production, which continues for about 6 to 8 weeks and tapers off by June. The plants will produce for as long as 15 years. Choose only varieties resistant to Fusarium wilt and better suited to Marin's warm weather.

How to Plant: In a sunny location, dig a trench two feet deep and twelve inches wide. Into the soil, work in compost (about 30%) lime and steer manure. Back fill the trench halfway and lay out the crowns 12 inches apart, mounding the soil under each allowing the roots to dangle down about two inches. Cover everything with about two inches of soil. As the spears begin to emerge, cover with another two inches of soil until the trench is completely filled in. Irrigate well during the first year and **do not harvest any spears.** Second year, you may harvest spears eight inches high and at least 3/8 of an inch wide – thicker than a pencil. Always cut with a knife at ground level so as not to disturb any underground spears. After the first year, irrigate only during fern season – not harvest season. Ferns are any spear that is smaller than a pencil. The plant needs these to send nitrogen back down to the crown for next year's production. After ferns turn yellow in the fall, cut them off at ground level and fertilize the bed with compost and steer manure. Mulch is good too as it keeps the soil loose for emerging spears.

Best Varieties for Marin: 'UC 157' and 'UC 72' – both developed by UC Davis from the older variety, 'Mary Washington'. 'UC 72' is resistant to both Fusarium wilt as well as Rust – important in Marin which experiences warm weather as well as higher humidity.

Best Cultural Practice: Weed frequently and orient the asparagus beds parallel to prevailing winds in a well drained, sunny area. This helps prevent bent tips that can also be caused by Phytopthora crown and spear rot in which case you need to remove and destroy all crowns. If you get Rust or Fusarium wilt, remove plants as well and destroy. Plant only resistant varieties. Snails and slugs can be picked off and aphids hosed off.

Beans, *Phaseolus vulgaris*

What: Snap Beans (*Phaseolus vulgaris*), also called "green beans" or "string beans", have been grown as a food crop since ancient times and originated in Central or South America. They are tender annual, warm-season legumes that will fix their own nitrogen once a good root system is established. The structure of these beans can be tall-growing pole-type beans, or half-runners or the low-growing bush-type. Varieties include standard round and flat podded green, yellow wax, and purple-pod types.

When to Plant: When the soil temperature reaches 60°F, it's safe to plant beans. Seeds planted in cold soils germinate slowly and are susceptible to rotting. Also, seedling growth may be slow in cool temperatures. You need 70 to 80 days of moderate temperatures—nights not below 40°F and daytime temperatures of 70° to 90°F to grow & harvest a good crop of these beans.

How to Plant: Beans prefer a soil pH between 6.0 and 6.5. Snap beans are a low user of nutrients and do not require high amounts of fertilizer because they produce their own nitrogen. Prior to planting, incorporate compost and nitrogen-fixing bacteria into the soil for higher plant yields & healthier plants. For bush beans, sow the seeds 1-inch deep, about 6 inches apart, in rows 18 inches apart. They must have room on either side for maximum production. Plant pole beans 4-6" apart at the base of poles, or a trellis. Plant 6 to 8 seeds around each pole, thinning to 3 plants per pole.

Best Varieties for Marin: There are two basic types of snap beans: green-podded and yellow-podded or wax beans and they come in different shapes: long, short, flat, round, broad. Some folks prefer growing bush beans to pole beans because although they take up more space, they require less work planting, staking, weeding and watering. Bush beans also produce most of the crop all at once, which is great for freezing. 'Nickel' was exclusively developed as a baby French/filet bush bean that produces 4-inch long, dark green pods in 53 days. It tolerates hot and cold temperatures better, and displays superior resistance to foliar disease and root rots, compared to other beans in this class. Pole beans are beautiful and bountiful, and you don't have to bend over to reap your harvest. Although they mature later than bush beans, most of the pole bean varieties are really prolific. 'Blue Lake Pole' produce stringless pods and can be grown in pots if you tepee them. They mature in 75 days. The 'Romano' pole bean is a reliable, stringless flat bean that matures in 65 to 70 days. Pole beans should be picked often for continuous harvest.

Best Cultural Practices: Once planted, keep the soil evenly moist. This is especially important from flower bud formation to pod set. Too much or too little water causes blossom and pod drop. Extremes in soil moisture can also lead to malformed pods in which only the first few seeds develop, leaving the rest of the bean pod shriveled. Water plants early in the morning to allow plants to dry quickly and reduce the opportunity for disease infection. Drip irrigation is recommended to help keep the foliage dry. Pick the beans while they are relatively small for best flavor and to keep the plant producing more beans. At the end of the season you may want to let a few pods mature for saving seeds for planting the next season.
Cutworms, aphids and mites can be a problem. A variety of viruses also attack beans. To control bean diseases, do not handle or work among bean plants when foliage is wet. See UCIPM website for pest management solutions.

Beets, *Beta vulgaris*

What: The garden beet is a member of the *Chenopodiaceae* family. It is an herbaceous biennial grown as an annual during the cooler months of the year. It is a root crop but the leaves (which can reach up to 18 inches) can be eaten, as well, and are very tasty and highly nutritious. Each beet seed is actually a dried fruit containing a cluster of 2-6 seeds. The garden beet is closely related to chard and the sugar beet, an important crop for sugar production. The roots are commonly deep red-purple in color but other varieties reveal yellow, white, orange and red and white striped colors. Garden beet greens, such as 'Bulls Blood', with its intense deep red-maroon color, add beauty to any edible landscape.

When to Plant: Beets are at their best when daytime temperatures are between 60-65 degrees, in the spring and fall months in Marin, but they can survive some frost. They don't like temperatures above 75 degrees and they typically take from 5-10 days to germinate. They will not germinate if soil temperatures are below 40 degrees with the strongest plants emerging when soil temperatures range from 50-75 degrees. Expect to harvest your beets around 50-70 days. Beets are wind pollinated.

How to Plant: Like other root crops, beets are best grown in sandy, loamy or well-amended (with organic matter) soil. They are a good indicator of soil pH with a neutral soil (6.5-7.5) being ideal for their growth. They grow best in nutritious soil in deeply dug, raised beds so be certain to amend your soil well, adding a low nitrogen, organic fertilizer high in phosphorus and potassium. Too much nitrogen will cause excessive green growth and a lack of mature bulbs underground. Beetroots can reach deeply into the soil with its taproot easily reaching 1 foot and its finer root hairs extending several feet down if the soil is well loosened. Beets are almost always direct seeded but can be transplanted successfully. Plant in rows or scatter sow, them in small blocks. Plant ½ inch deep and 1-2 inches apart. Thin seedlings when seedlings have two true leaves to 4 inches apart with scissors. Beets must be watered regularly. Harvest the beets at the optimum size (usually 1 1/2 -2 1/2 inches in diameter) as indicated on the seed packet. Some varieties remain tender as they age but most toughen up and become woody.

Best Varieties for Marin: 'Detroit Dark Red', 'Early Wonder', 'Chiogga', 'Golden', 'Bulls Blood'

Best Cultural Practice: Beets need plenty of moisture so mulch to keep them cool in warmer weather and water well. They will store longer in the refrigerator if the greens are cut off leaving about 1 inch of stem, Store the greens separately. Although there is no exact science to companion planting, beets are known to grow well with onions and kohlrabi. Beets are prone to leaf miner. One of the best protections for this pest is to remove infested leaves and cover the plants with a floating row cover.

Blackberry, *Rubus*

What: Blackberries, deciduous vines belonging to the Rosaceae family, are in the same genus as raspberries but are less cold hardy and more heat tolerant. They have perennial roots and biennial shoots, or canes. The vegetative canes that grow in one season are called primocanes, and go dormant in winter. In the second growing season, they leaf out, flower, fruit and die, and during this period are called floricanes. Both are present from early spring through harvest.

When to Plant: Buy plants as bare root in containers or green plants in a pot. Be sure to purchase stock from a reliable, registered grower who has disease free plants. If you plant bare root, do it in winter or early spring. Typically, it takes about three years to become productive. Green plants can be planted anytime and watered well. Berries ripen 40 to 60 days after bloom and production lasts up to 7 weeks. Trellising all blackberries (erect and trailing) simplifies care and harvest.

How to plant:
Plant bare root in well drained, fertile, acidic soil with a pH from 5.5 to 6.5 at about the same depth as at the nursery. Cover the crowns with 1 inch of soil and apply regular moisture throughout the growing season. Berries do not generally require fertilizer.If vegetative growth lokks sparse, apply compost in the spring. Organic fertilizers including blood meal, fish meal and feather meal work as well. Berries grow best in an open sunny area, trellised for support of the vine. Plant in rows 10 feet apart with vines spaced 2 to 4 feet apart. Cut the canes to 6 inches at planting time. Do not expose roots to sun; best to plant on an overcast day. Most are self-fruitful but a few require cross-fertilization, so check the label. Because blackberries require a weed free site, apply organic mulch to a depth of 3 to 4 inches.

Best Varieties for Marin:
There are two basic types of blackberries: erect and trailing both with thorny and thornless types. Be sure to buy disease free plants from a nursery. Varieties, some of which are blackberry/raspberry hybrids, include the following listed by fruiting characteristics:
Trailing Blackberries: Early fruiting: Logan; Midseason: Boysen, Marion, and Olallie
Erect Blackberries: Early fruiting: Arapaho, Black Satin, and Brazos; Midseason: Cherokee, Dirksen, Prime Jan and Prime Jim; Late: Chester and Triple Crown

Best Cultural Practices: In the spring, thin the canes to 7 strong canes per plant. In the summer, when the primocanes are about three feet tall, prune top two inches to force more branching. After the harvest, cut to the ground all floricanes, the canes that have fruited, and rake up all leaves. Then trellis the canes from the current season. Blackberries are susceptible to insect disease including scale, borers, raspberry horntail worms and mites. To control scale, get rid of ants and cut out scale, borers and worms. Spider mites can be hosed off or sprayed with insecticidal soap. Redberry mites are more difficult to control. Under moist weather conditions, spotted wing drosophila are also infecting blackberry fruits. Frequent harvest and pick up of fallen fruit can reduce drosophila populations. For more information, check UC IPM Management Guidelines for Growth and Development of Caneberries. Blackberries are also susceptible to fungal soil and leaf diseases. To avoid disease, practice crop rotation, select disease resistant cultivars and water consistently.

Boysenberry, *Rubus ursinus x idaeus*

What: Boysenberries, belonging to the Rosaceae family, are a hybrid of Pacific blackberry and red raspberry.
Hybridized in 1923 by Charles Rudolph Boysen, a California horticulturist, Walter Knott of Knott's Berry Farm became the first person to cultivate the plant commercially in the late 1920's. The fruit is an aggregate of numerous druplets. It has a woody stem with prickles like a rose and has a large fruit that is a deep maroon color. 'Thornless Boysen' is trailing, the fruit is deep maroon colored. The berry tastes like a raspberry with a tart undertone.

When to Plant- Plant boysenberries in late spring or fall while they are dormant. Always plant disease free certified nursery stock. Take care not to injure plants when planting to avoid possible infection sites. Any infected plants should be removed and destroyed.

How to Plant:
Buy plants as bare-root in containers or green plants in a pot. Plant in full sun spacing the plants 3-6' apart in rows 8 feet apart. Trellis the canes to help keep trailers off the ground and simplify harvest. Boysenberries like humus rich acidic soil with a pH from 5.8 to 6.5. Apply 1-2 inches of water per week from May through October keeping soil constantly moist but not wet. Plants usually bear fruit in the second year between early July and early August and are very productive.

Best Varieties for Marin: 'Thornless' is the most commonly sold boysenberry variety in the US. Most thornless boysenberries have a number of short, hairy thorns along their canes and stems, and occasionally send up a fully thorny cane. 'Brulee' is a thornless type developed abroad. 'Mapua' and 'Tasman' are two thornless New Zealand types. 'Thornless youngberry' is a hybrid thornless type that is also seedless. Because boysenberry's parentage is so complicated, discerning distinct types of boysenberries can be difficult. Some boysenberries may be sold as 'nectarberry' while hybrids resulting from further crosses with loganberries may be sold under the names 'youngberry' and 'hybridberry.' All of these types can be thorny or thornless.

Best Cultural Practices-
Prune in winter while plants are dormant. Cut the canes that fruited the previous summer to the ground. Then thin the remaining canes, leaving 8-10 of the most vigorous ones per plant. Shorten those to 7' then cut back sideshoots to 12-18 inches. Make sure to wear heavy gloves to avoid thorns. Plants are self-fruitful and do not generally require fertilizer. Check vegetative growth and if it looks sparse, apply compost in spring.

Fungal and soil diseases that affect boysenberries include crown gall, downy and powdery mildew, Verticilium wilt, botrytis, Cane Leaf Spot, and Yellow Rust. Rotate crops to reduce incidence of these diseases. The insects attracted to boysenberries include earwigs, leafrollers, the red berry mites, thrips and spotted wing drosophila. Weeding reduces areas where insects can breed and overwinter. Birds (e.g., robbins and starlings) and snails present ongoing problems. Cover bushes with netting or use visual scares or noisemakers to keep birds off as soon as small fruits begin to develop.
Boysenberries are among the easiest fruit bearing plants to grow at home. Harvest frequently and in the morning when fruit is firmer. The fruit keeps only 2-3 days so use it quickly or freeze it.

Blueberries, ***Vaccinium***

What: Blueberries, members of the *Ericaceae* family that also includes cranberries, rhododendrons, azalea and huckleberries, are deciduous. Three main types are grown in the United States: the high-bush, the low-bush and the rabbit eye. Blueberries make great hedges with their glossy green foliage, white blossoms in spring turning to berries in May through July and scarlet fall foliage.

When to Plant: Blueberries may be planted from fall through early spring. The blueberry plant begins to bear at about three years and continues for about forty years. Berry production occurs over a period of time and accordingly, berries are classified as early, midseason and late producers. They are to some extent self pollinating but bumblebees and wind help them along. All blueberries will cross-pollinate with each other and having cross-pollinated, the fruit tends to be larger.

How to Plant: To plant a blueberry, dig a hole one foot deep and twice as wide. Keeping the plant high spread the roots in all directions and cover them with a couple of inches of soil. Water thoroughly and mulch. About a month after planting, apply a 10-10-10 fertilizer, about 1 and ½ T per plant. If you prefer organic-based fertilizers, apply 1 pound of fish or blood meal per plant. Blueberries are heavy feeders and like an application of fertilizer in early spring. Continue feeding every two months until berry season is complete. Watering is most important when the berries begin to swell. Apply 1 inch of water per week. For drip systems, this is about 1.25 gallons per week. Regarding pruning, do it if you want production of large berries. Remember the fruit is produced on 1-year old wood. Prune twiggy, spindly older wood, keeping the bush open. You can tell the difference between a fruit bud and a vegetative bud by their fatter, less pointed appearance. Growers recommend limiting the number of canes to 6 to 8 per bush. If you want the bushes to form a hedge, do not limit the number of canes.

Best Varieties for Marin: 'Bountiful Blue', 'South Moon', 'Sunshine Blue', 'Chandler', 'Misty', 'Jubilee', 'O'Neal', and 'Sharp Blue'. These newer varieties require fewer chilling hours than older varieties such as 'Early Blue', 'Blue Ray' and 'Berkeley'.

Best Cultural Practice: Blueberries have shallow roots and are heavy acid feeders. Accordingly, they benefit from pine needle mulch to suppress weeds. They prefer good drainage as they are susceptible to root rot.

Broccoli, *Brassica oleracea*

What: Broccoli belongs to the *Cruciferae* family, a remarkably varied plant species all descended from wild or sea cabbage native to the Mediterranean seaboard. This group of plants includes cabbage, kale, kohlrabi, bok choy, cauliflower, brussel sprouts, rocket (also known as arugula), mustard, horseradish, cress, collards, rutabaga, turnip and broccoli, one of the oldest cultivars. Cultivated by the Romans who named it *brachium* (meaning arm), broccoli's edible structure is an entirely active flower. The pungency and odor found in Brassicas comes from an essential oil, a potassium salt and glucose compound, probably not surprising for a plant native to a coastal region.

When to Plant: Most Brassicas taste best when grown in cool weather. There are newer varieties cultivated to tolerate warmer weather but generally speaking, the optimum soil temperature is from 55 to 75 degrees.

How to Plant: Direct seed in July; ¼ inch deep and 4 to 6 inches apart in rows 18 inches apart. When planting, calcium and magnesium are good soil additives. Harvest will follow in late October/ November before the flower head blooms. After the central head is cut, an impressive production of side stalks will follow, providing a continued harvest.
Pollination in Brassicas is an interesting process. Within each brassica flower, the male and female parts are very close. Some brassica species contain recognition compounds called glycoproteins. Unique to each plant, these compounds allow the brassica plant to recognize itself causing abortion of the plant's own pollen. This is called *self-incompatibility*. This means for pollination to occur, the pollen from one brassica plant must travel to the stigma of another brassica plant, thus ensuring the genes are well mixed among the brassica population. Bees are perhaps the best pollinators for brassicas although other insects help fertilize too.
Brassicas are particularly beautiful in an edible landscape, especially the lime green seashell, 'Romanesco', which can be beautifully inter-planted with Swiss chard, marigolds, artichokes and dahlias. Remember, plants in the Brassica family vary greatly in height and while broccolis generally stay around two feet, cabbages like the 'Sarth' and the 'Black Florentine' can be as tall as 6 feet. It is fun to fill in around these with chrysanthemums and feathery fennel. Brussel sprout towers look striking set off with asters.

Best Varieties for Marin: 'Thompson', an open pollinated variety grows well as do hybrids 'Apollo' and 'Veronica'.

Best Cultural Practice: Rotate cruciferous crops out every two years and use mulch which helps control weeds and creates a barrier for brassicas like cabbage, and maintain adequate soil moisture not allowing soil to dry out.

California Huckleberry, *Vaccinium Ovatum*

What: This type of huckleberry is native to California, and grows along the coastal scrubs and forests of the state at elevations below 2500 feet. It ranges north to British Columbia. It is a perennial and a member of the Ericaceae family.

When to Plant: Huckleberries are difficult to transplant, but can be grown from seed or cuttings when the plant is dormant from November to April. They do not root easily, and are slow to grow from seed, and not very successful. They can grow up to 3 to 8 feet, although it takes a while as they are quite slow-growing. They have a dense form, and fruit grows in thick bunches on stems towards the middle of the bush.

How to Plant:
These berries do best in moist, sandy, well-drained, acidic soil, with a pH from 4 to 6. They do not do well with any salinity. No fertilizer is needed. They like morning sun and afternoon or filtered shade. Full sun will keep bushes around 3 feet tall, with heavy berries. In the shade, it can grow up to 10 feet tall, but will produce fewer berries. Keep roots moist until well established, after which the plant is moderately drought tolerant.

Best Cultural Practices:
This is generally a low care plant. Its biggest pests are deer, rabbits, birds and squirrels.
The branches can be pruned after picking berries to stimulate new growth and fruit production.
No trellising of any type is needed.

The plants bloom in spring, and the fruit ripens between August and November. It can be hand-picked, or beat the bush over a bucket. It is often used for tea and jam. The fruit can be eaten fresh or you can freeze it for later use later.

Carrots, *Daucus carota*

What: Members of the *Apiaceae* or parsley family, carrots are a cool weather crop best grown in Marin in the fall to spring with other root crops. Members of this family all have ferny foliage and flat topped, umbrella-like flower clusters. Other vegetables in this family include parsnip, celery and fennel. First grown over two thousand years ago in Asia near Afghanistan, the first carrot was probably purple. You may notice that the top of a carrot exposed to sun may sport some of this ancestral purple color. The yellow carrot, a mutation, was most likely first grown in the ninth century in Iran. Carrot cultivation spread from the Middle East to Europe by the fourteenth century. The first orange varieties were cultivated in Holland in the seventeenth century. North American settlers brought the orange carrot to the western part of the world.

When to Plant: The best time to plant carrot seed in Marin is from August to October. You can also plant it from February to March. Carrots grow best at a mean temperature of 65 degrees. Have you ever wondered where carrot seeds come from? Flower initiation in some plants begins only in the second year of growth after winter chill. This process is called vernalization: the promotion of flowering due to exposure to low temperatures or chilling.

How to Plant: Pick a sunny spot where the seeds will receive sun all day. Root crops prefer sandy soil that drains well. They can be raised in a container, raised bed, row-bed or border garden. When planting any root crop, remember this old French proverb, *Un binage vaut deux arrosages;* one tilling of the soil is worth two waterings. Work and amend the soil with compost to 12 inches deep until friable; cloddy soil will not grow straight carrots and often produces forked carrots. Next, apply compost and mix it into the soil. If you add fertilizer, avoid excess nitrogen as carrots like a pH range of 5.5 to 7.0. When carrots get hairy, that is a sure sign of excess nitrogen. Rake ground level and irrigate until moist 12 inches deep. Plant the seeds about ¼ inch deep with 4 seeds per inch. Cover the seeds with fine soil and water lightly once or twice a day until the seeds sprout. This may take as long as 21 days at soil temperature of 55 to 80 degrees. Once sprouts appear, you can cut back on the watering. Excess water may cause splitting. Thin the seedlings to 3 inches apart. Carrot seed tapes avoid a lot of backbreaking thinning; just apply a bit of flour and water on to a strip of newspaper and drop a small seed every three inches. Carrots are ready to harvest when they are large enough to eat anywhere from 60 to 90 days depending on the variety. Carrots left in the ground too long get woody.

Best Varieties for Marin: The most successful carrot for Marin's conditions are the blunt end, smaller Nantes, Chantenay and Danvers variety carrots. Recent successes include 'Royal Chantenay', 'Thumbelina Baby Ball', and 'Nelson'. A new Nantes carrot that may prove successful is 'Yaya'. If you want to have some fun, try 'Purple Sun', wine-red to its core although like other purple vegetables, the color fades a bit when cooked.

Best Cultural Practice: Water evenly from planting to sprouting. Work the soil well before planting.

Corn, *Zea mays*

What: While sometimes eaten as a vegetable and sometimes as a grain**,** corn is classified by botanists as a fruit as are tomatoes, peppers, cucumbers, zucchini and other squashes. Corn is a member of the *Poaceae* family, developed by the Mayans from its wild cousin, Teosinte grass (*Zea Mexicana).*

When to Plant: Corn, a warm season crop, germinates best when soil temperatures reach at least 60 degrees.

How to Plant: Before planting, amend the soil with a blended all natural fertilizer (5-5-5) and direct seed covering with about 1 inch of soil. Because corn is wind pollinated, planting four short rows of plants (each about eight feet long) works well. Seeds can be planted every four inches and after three to four leaves appear, thin to eight inches. When the plants are 12 inches tall, side dress with fertilizer or water with fish emulsion and seaweed product (4-1-1). Each stalk has been bred to produce two ears, maybe three with optimal conditions. It is unnecessary to remove suckers and if you plant more than one variety, you need to isolate the varieties from each other to ensure maintaining the desirable characteristics; remember it is wind pollinated! A distance of 400 yards is recommended between varieties. Corn is ready to pick when the silk browns, the husk is still green and the kernels are full sized to the tip of the ear. Experience teaches it is best to feel along the ear to ascertain ripeness, as sometimes the tip may not develop fully. Pull the ear down and twist and snap from the stalk. Picking in the cool of the morning is best and store as quickly as possible in the refrigerator to maintain sweetness.

Best Varieties for Marin: 'Jubilee', 'Silver Queen', 'Golden Bantam', 'How Sweet it Is', 'Kandy Korn', 'Early Xtra Sweet', 'Super Sweet Jubilee', and 'Triplesweet' (the newest hybrid). These varieties minimize chances of worms, mosaic virus, aphids, rust, fungi, and cutworms.

Best Cultural Practice: Water 1 to 1.5 inches of water per week especially during the pollination process, which can take up to 5 days. If you don't, kernels may be improperly formed or not form at all (known as blanking). Weed control can be accomplished with mulch (straw works) and companion planting with beans and squashes. Do not over fertilize corn as it can cause the stalks to fall over (known as lodging).

Eggplant, *Solanum melongena*

What: *Solanum melongena*, also known as the aubergine, or eggplant, is a member of the plant family Solanaceae. As a member of the nightshade family, it is closely related to the tomato and potato. It is thought to have been domesticated in India from the species S. incanum. S. melongena is a delicate, tropical perennial often cultivated as an annual in temperate climates. The standard eggplant produces egg-shaped, glossy, purple-black fruit 7 to 10 inches long when fully mature. The long, slender Japanese eggplant has a thinner skin and more delicate flavor. Both standard and miniature eggplants can be grown successfully in containers, but standard varieties yield a better crop.

When to Plant: Probably the most important thing to note about growing eggplant is that they cannot tolerate cold. Warm to hot weather throughout the season is necessary for good production. Seeds germinate quickly at 70 to 90 °F. and should be grown for 8 to 9 weeks before setting them out. Cold temperatures will stop plant and root growth, reducing plant vigor and yields. Using hot caps or row covers protects plants from cold conditions. Most cultivars require a frost-free period of between 100 to 140 days to mature. Eggplants prefer a daytime temperature of between 75 and 85 degrees F and a nighttime temperature at or above 65 degrees F. Be sure to set the plants out in a warm but sheltered spot.

How to Plant: Plant and handle eggplant in the same way as tomatoes; although eggplant is slightly more sensitive to cold than tomatoes. They require steady moisture and well-drained, fertile soil, so make sure you mulch the soil around them. They develop fungal diseases in very humid areas, so if you are using them in your landscape be sure to allow for plenty of air circulation.

Eggplants are heavy feeders, prepare planting beds with aged compost and side dress with organic fertilizer or compost tea every 2 or 3 weeks until the fruit has set. Do not chose a fertilizer high in Nitrogen as this will promote foliate growth to the detriment of the fruit set. Eggplants and other members of the tomato family should be rotated around the garden to prevent disease proliferation.

Best Varieties for Marin: Choose type according to use – Japanese types are good for stir-fry, too tender for Eggplant Parmesan. 'Little Prince' is a proven producer for Marin. Two Japanese eggplants, 'Millionaire', a very early maturing (55 days), productive plant and 'Lavender Touch '(matures in 63 days), a pastel lavender & white plant also do well in Marin. If you live near the coast or in the cooler microclimates in southern Marin, 'Nadia' was developed for cool climates and is resistant to verticillium wilt. It has excellent yield, and is disease resistant. 'Dusky' and 'Early Bird' are also early maturing eggplants that can be grown in your microclimates.

Best Cultural Practices: Eggplants are subject to the same challenges as tomatoes. Pick disease resistant varieties. Eggplant should be pruned to three main branches. Benefits of pruning include increased fruit quality and decreased susceptibility to disease. Prune early so a leaf canopy develops before fruiting to prevent sunburn of the fruit. Prune suckers periodically throughout the growing season. Test for maturity by pressing with the thumb. If the flesh springs back, the fruit is green; if it does not and an indentation remains, the fruit is mature. Harvest when the fruit is about halfway between these stages. Mature fruit should not be left on the plant because they will reduce overall productivity. Use a knife or pruning shears to cut the fruit from the plants.

Garlic, *Allium spp.*

What
Garlic is a food crop in the Allium genus in the *Amaryillidaceae* family. Garlic has been grown for centuries. It's delicious, nutritious and easy to grow.

When to Plant
Plant garlic between Oct 15 and Feb 15, although fall planted garlic tends to be larger because it has more time to mature. Start with certified disease-free bulbs. Separate cloves, do not peel, and plant pointy-end up, one inch down, and about 4 inches apart in rows 12-18 inches wide. After planting, wait to water until shoots emerge. Water when necessary but do not let the soil get soggy. If there are no issues with your garlic crop, you may save cloves as seeds for the next crop.

Best Varieties for Marin
There are two types of garlic, softneck (*Allium sativum*) and hardneck (*Allium ophioscorodon*).
Softneck garlic: best adapted to our Marin mild winters; the outer ring of cloves surrounds another ring of cloves (no center scape/stem); stores better than hardneck garlic – up to a year: tops are good for braiding. Recommended varieties for Marin: California Early, California Late, Silverskin, Inchelium Red, Early Italian Purple, Mild French Silverskin
Hardneck garlic: cloves are organized around a center stem, or scape; cross section reveals one row of cloves around the stem; does well in colder, longer-day areas; scapes are edible, and some recommend cutting the scape off before bloom so more energy goes to the forming garlic bulb. Recommended varieties for Marin: Chesnok Red, Music, Spanish Roja, German Red, Asian Tempest, China Stripe, Italian Red Rocambole, Purple Glazer, Siberian

Best Cultural practices
Plant garlic in well-draining soil and add mulch once tops have peeked through. Keep weeds controlled throughout the crop cycle. Garlic benefits from compost at planting and when garlic begins its strong re-growth in late winter. Fungal diseases to watch for include pink root, downy mildew and white rot all of which may be prevented using control methods including crop rotation and post- harvest clean up. Insects include onion maggot (avoid over-fertilization) and onion thrips (minimized by yard clean up).Garlic is also susceptible to mites, nematodes and cutworms. Between May and late June, the tips of garlic leaves will turn yellow even with adequate watering. This means the bulbs are nearly mature and should be watered less frequently. Too much water at this point could rot the garlic, and some recommend not watering at all after mid-May. In softneck varieties, the stem near the ground will begin to flatten and the mature plant may fall over. Hardneck types, because of the (scape) stem, won't fall over. Mature bulbs have well developed, compact cloves throughout and 4-6 dry leaves wrapped around the entire bulb. (Feel free to harvest a test bulb, as you don't want garlic to over-ripen, where cloves begin to separate from the bulb.) Harvest in late June or July by troweling gently under the bulb and then pulling the released plant from the soil. Brush off the soil, and cure the whole plant in a warm, dry place out of direct sunlight for 2-3 weeks. When dry/cured, clean the bulb by brushing off dirt and outer 1-2 layers of loose and broken skin. Cut roots to 1 in. Braid the stems or cut them 2 in. from the bulb. Store garlic out of the sun in a cool, dry, airy place.

Herbs

What: An herb is a small, seed bearing plant with fleshy parts. The word herbaceous describes this kind of plant. These plants are valued for their savory and aromatic qualities. They are generally easy to grow, some tolerating poor soil, extreme winds, and deep shade. Some herbs are perennials, some biennials, and some annuals.

When and How to Plant:

Basil – *Ocimum spp.*

Basil is an annual plant that grows best in a warm sunny location in well-fertilized soil with good drainage. The plants should be grown ~8" apart. For best results, once the plant has three to four sets of true leaves pinch off the tip of the plants to create one that will be bushy. As the plant starts to mature it's important to pinch off the flowers or they will start the decline of the leaf production. It is best to pinch off leafy tops always leaving at least two thirds of the plant intact; the tips can continue to be harvested all season.

When the weather turns wet and cold the leaves will begin to fall off and the plant will soon die; this typically occurs in September to October depending on local conditions. At this point harvest the remaining leaves which can be frozen or dried.

Grown indoors basil is susceptible to aphids or whiteflies; outdoors, snails, slugs, earwigs and Fusarium wilt can affect basil plants.

Oregano - *Origanum spp.*

A perennial, oregano has a zesty, strong taste that is enhanced by placing it in an area with more hours of sun. It can be grown easily from seed planted indoors in the spring and transplanted to the garden or container. New plants can also be started by dividing another plant or using a cutting from an established one. Plant in light, well drained, moderately fertile soil. No compost or fertilizer is necessary. Water oregano thoroughly only when soil is dry to the touch. Too rich or too wet a soil will decrease the flavor of its leaves. Cut back long, rangy stems when harvesting so as to shape the plant and encourage the plant to send up new shoots from the ground. Never cut off more than 1/3 of the plant's leaves at one time.

Oregano is fairly disease resistant but can become infested with aphids or spider mites. A strong spray from a hose will usually control these pests if done regularly for a time.

Parsley - *Petroselinum spp.*

A biennial usually grown as an annual, there are three primary varieties of parsley; curled leaf (P. crispum), flat leaf or Italian parsley (P. neopolitanum), and Japanese or Mitsuba (Cryptotaenia japonica). Growing parsley from seed requires approximately six weeks to germinate and usually best done indoors from December to February and sown outdoors as late as May. Seeds sown later will have a shortened growing season. Plant in rich, well-drained soil in full sun to partial shade; set plants 6"– 12" apart. For best results, cut leaves/stalks at the soil level to promote secondary growth. The plant will grow flower stalks in the second season and if left to seed, it will reseed itself and new plants will pop up in late winter early spring. Seedlings can be replanted but take care not to damage the taproot of the young plant.

Parsley does not usually attract pests, but is susceptible to spittlebugs that may cause minor damage in the spring. It may also attract parsley worm; the green, yellow and black caterpillars of the western swallowtail butterfly.

Rosemary – *Rosmarinus officinalis*
Rosemary, a perennial herb, is a woody shrub with dark green needlelike leaves that are ½" – 1 ½" in length with small blue flowers that appear in the spring. The plant typically grows from 2' – 4' in height, but can also reach upwards of 6'. Some varietals are more ground hugging and used ornamentally as ground cover or to hang over rocks and walls. Rosemary is a hardy plant that once established needs little water and will grow in most soils in both full sun and partial shade or fog. As the plant is a native to dry Mediterranean climates, it likes light sandy soil but can also grow in more heavy clay soils typical of the Bay Area as long as there is good drainage.

Rosemary needs to be pruned on a regular basis or the plant will become large and ungainly. It's best to prune through thinning cuts on large upright plants or pinching back ends of smaller ground hugging varieties. Aphids, spittlebugs and whiteflies are pests that can infest rosemary. A strong spray of water from the hose can help control these populations.

Sage - *Salvia spp.*
A perennial, sage can be started from seed but because it is slow to mature, start with a small plant. Sage can tolerate a variety of conditions like poor and dry soil and foggy areas. But it will thrive in well-drained garden soil in full sun. Water deeply only when soil is dry to the touch. Cut back sage plants every spring, removing woody growth to stimulate tender shoots. Replace every three to four years when plants get too woody. Harvest sage leaves as needed. It is best to use fresh leaves but if drying is preferred, pick leaves before the plant blooms or in late summer when the leaves are fully grown.

Mites, thrips, aphids, spittlebugs and whiteflies are pests that sometimes infest sage. A strong spray from a hose from time to time will usually control these populations. For stronger infestations, an insecticidal soap can be used only when beneficial insects are not present.

Thyme – *Thymus spp.*
Thyme is a perennial plant that thrives in dry conditions. *T. vulgaris* is the culinary thyme. It can be grown from seed but starting with a small plant is faster. Plant in friable soil; amended to make it light. Established plants should be kept on the dry side in order to avoid root rot. Shape the plant as you harvest the leaves, pinching off stem tips that are rangy. To dry, harvest most of the plant in early summer before it blooms. Do not harvest heavily again until the same time the following year. After three or four years, plants often become woody and die out in the center. It is best then to replant with a new plant.

Thyme is susceptible to root rot. Prevent problems by having good drainage and air circulation. Aphids and spider mites can sometimes infest thyme. For difficult infestations, insecticidal soap can be used. Spray plant only when beneficial insects are not present.

Kale, *Brassica oleracea*

What: Kale, a member of the cabbage family, is a hardy cool season vegetable, which is harvested for its nutritious foliage. In the same group as collard greens, the two are extremely similar genetically. Until the end of the Middle Ages, Kale was one of the most common green vegetables in all of Europe. It's so easy to grow and it survives most winters without protection. In fact, mild frosts actually sweeten the flavor. Kale has become so popular in recent years as the "new beef" or "queen of the greens". It is very low in calories and high in fiber, iron, Vitamins K, A and C, antioxidants and calcium. It can be eaten raw in a salad or cooked in soups and stir-fries. When it is baked or dehydrated, it takes on the consistency of a potato chip, which can be seasoned with salt and other spices. Many kales are grown for their ornamental leaves, which can be brilliant white, pink, red, lavender, blue and violet in the interior of the rosette. These ornamental types add color to a winter garden even it areas that receive minimal winter sun

When to Plant: Grow kale from transplants or sow directly in place. Start seeds in midsummer for fall and winter harvests and as early as January for a spring crop. The optimal soil germination temperature is 55 to 75 degrees. Refer to individual seed packet varieties for determining days to germination.

How to Plant: Kale is grown best in full sunshine in cool, moist, fertile soil but can tolerate some shade. Kale tastes best when it grows fast, so enrich the soil with compost before planting and add some fish emulsion a month later. Sow seeds ¼- ½ inch deep and approximately 12-18 inches apart, depending on the variety. Mulch the soil with compost, straw or other appropriate materials. You can begin to harvest outer leaves as soon as they are large enough to toss in a salad. Kale is another "cut and come again" plant so you can either continually harvest the outer leaves or harvest the plant all at once.

Best Varieties for Marin: All varieties of kale will do well in our climate and seeds are readily available. 'Red Winter', an improved 'Red Russian', is sweet and very tender. Its red veins and wavy margins resemble oak leaves and are very dramatic in the garden. 'Toscano', a lacinato type, is also known as dino kale. Its dark green leaves don't curl but are heavily savoyed and the variety tolerates heat and cold very well. 'Siberian', 'Dwarf Blue Curled Scotch', and 'Winterbor' are some other favorites.

Best Cultural Practice: Relatively hardy, Kale does not have many diseases or pest problems. Rotating crops alleviates many plant diseases. Kale should avoid following cabbage family crops. Watch for flea beetles and aphids and protect young plants from cutworms with a collar made from paper cups with the bottoms removed.

Melons, *Cucumis melo*

What: Melons are members of the *Cucurbitaceae* Family. Most of the melons eaten in the United States are closely related members of the single genus *Cucumis,* which includes cucumbers. This annual is likely native to Asia, India and/or Egypt. Melons including musk, cantaloupe, honeydew, Crenshaw and casaba (all *Cucumis melo)* are eaten as fruit whereas some varieties of melons grown in Asia are in fact eaten as vegetables. The flesh of all melons, except watermelons, is derived from the ripening ovary wall. Watermelons, *Citrullus lanatus,* are native to Africa and their flesh is placental tissue, which explains the distribution of seeds throughout the flesh.

When to Plant: Melons are most sensitive to cold, germinating only when soil temperatures reach 60 to 65 degrees and ripening best when air temperature is between 75 and 95 degrees. In Marin, with luck, you can grow cantaloupes and watermelons and will increase your chance of success by picking early maturing varieties with small fruit.

Melons are large seeded plants and therefore best grown direct seeded in late May to early June. Fruit development requires about 90 days and, like other members of the cucurbit family, development of male flowers occurs first followed by female blooms. Pollination is by honeybees.

How to Plant: Melons thrive in well-fertilized soil with a pH around 6.5 and full sun exposure and even moisture. Plant the seeds one inch deep and about 6 inches apart. The vining varieties sprawl along the ground but do make good candidates for trellising, growing in large containers, which help retain heat and for planting along stone walls which also retain heat. If trellised, fruit will need a sling support. If you want to plant melons in a flowerbed, select a bush variety. It is important to remember that excess water or nitrogen shuts down the roots, stops photosynthesis and destroys the sugar in melon fruit. Almost half of the sugar content is developed in the last week of ripening. The melon is ripe when the fruit separates from the vine referred to as slip stage. The fruit will taste best 1 to 2 days after harvest with storage at 70 degrees. Watermelons are ripe when the ground spot turns golden. If you have trellised, the tendril nearest the watermelon will have dried up and the skin of the watermelon will have dulled. The thump test is highly unreliable.

Best Varieties for Marin: Cantaloupe/ Muskmelon**:** 'Lil' Loupe' and 'Minnesota Midget'. Watermelon: Sugar Baby, and Green Flesh melon: Honey Ace

Best Cultural Practice: Water evenly but never let the soil get soggy especially from flowering to fruit swell. Once plants have expanded, reduce the water to enhance ripening and flavor. Use maximum heat enhancement techniques. Fertilize with fish emulsion once about 6 weeks after planting. Selection of disease resistant varieties is important as melons are subject to the same diseases as cucumbers; powdery mildew, downy mildew, mosaic virus, verticillium wilt and blossom end rot and poor fruit set. Attract bees to your garden with companion plantings and give melons plenty of space to grow.

Onions, *Allium cepa*

What: Onions are cool-season, biennial plants meaning vegetative growth occurs in the first year and flower and seed production in the second year, cultivated as annuals. Allium cepa is the species we grow for bulb onions. You can grow onions from seed, set or transplant. In your backyard, seed gives the best selection and results. Sets (dried bulbs that are ready to plant) are best grown as green onions (also known as scallions or bunching onions). When planted as bulb onions, they frequently fail to bulb. Bulbing is highly dependent on day length. To form a bulb, short-day onions need about 12-14 daylight hours before bulbs begin to develop. These are adapted to So Cal at a maximum of 36 degrees latitude but can be grown in Marin as green onions. Intermediate day length requires 12-14 hours and long-day onions require 14-16 daylight hours. Some seed catalogues will indicate if an onion variety is suitable for our 38 degree latitude. In Marin County, our longest days are about 14 1/2 hours; the daylight required for long-day varieties. Before selecting a variety of onion to plant, be sure to check whether the variety can be grown in Marin because the variety and the planting date are both very important in the production of a good bulb crop.

When to Plant: Timing is everything. For best results, plant seeds indoors in October/November. Transfer seedlings into the garden in January/February. This planting schedule allows the plant to develop a strong root system before the required daylight length signals the plant to form a bulb. The planting schedule also helps avoid stimulating the plant to flower. When the onion flowers, it becomes woody and unpalatable.

How To Plant: When transplanting seedlings into the soil, plant them close to the surface about 3-4 inches apart. If you plant sets for a quick crop of green onions, plant 1" apart and harvest when ¼" to ½" in diameter. Remember to use only certified seed and to practice crop rotation.

Best varieties for Marin:

Intermediate bulb varieties successful in Marin include:

- California Early Red
- Candy, yellow (3-6 month storage)
- Valencia, Yellow (day neutral) (3-6 month storage)
- Red Candy Apple (2-3 month storage)
- Red torpedo (1 month storage)
- Sierra Blanca (2 month storage)

Late bulb varieties successful in Marin include:

- Cortland, yellow (6-8 month storage)
- Patterson, yellow (8-10 month storage)
- Yellow of Parma, yellow (8-10 month storage)
- Red Wing, red (9-12 month storage)
- White Sweet Spanish, White (4-6 month storage) also grown as a green onion/scallion

Best cultural practices: Onions are shallow-rooted and need a friable soil and frequent irrigation. Growth is impacted by even mild water stress. Stressed plants will be stunted, may result in doubles and splitting, and are usually higher in pungency. Water once or twice a week depending upon the weather. Fertilize during green growth but stop as the weather warms and onions are nearing their bulb forming stage. Harvest onions when tops begin to yellow. Dry on a screen until tops are brittle. Store in a cool dark place with good ventilation. This helps avoid post-harvest diseases including molds and rot. Onions are subject to fungal and viral disease including Botrytis, Downy Mildew and Onion Yellow Dwarf. The best defense is the use of certified seed and the practice of crop rotation. Pests such as thrips and aphids can be a problem. Encouraging beneficial insects is good biological control. Cultural controls include avoid planting near host plants that harbor thrips (grains and grasses) and with aphids, control of ants.

Peas, *Pisum sativum*

What: Pea probably originated in southwestern Asia and thereafter spread to the temperate zones of Europe. There are several types of peas: garden peas, snap peas and sugar peas (snow peas). The pods on the latter two are edible when the peas are still immature and small; the garden pea varieties are those that need shelling before eating. All are delicious, especially when fresh from the garden.

When to Plant: Peas are cool-season, frost hardy plants, making them an ideal part of the Marin winter vegetable garden. The seeds are easy to grow because they will germinate at soil temperatures between 40° to 70 °F. Most peas will tolerate mild frosts. The best time to plant peas in Marin is between January and April, although you can plant them in late October or early November if the weather is mild & they have time to germinate. Warm weather shortens the harvest season. Temperatures above 80.6°F shorten the growing period and adversely affect pollination. A hot spell is more damaging to peas than a light frost.

How to Plant: Direct seeding is the preferred method. Peas do not like to be transplanted. Sow directly into fertile, loosened soil with a pH of 5.5 to 6.8. If your garden has a heavy clay soil, mix in organic matter. Also, remember that peas have the ability to "fix" nitrogen in the soil, and can actually leave the soil richer than it was prior to planting. Legume inoculates are available from seed suppliers for seed treatment, and is recommended. Yields can increase 50-100% by inoculating with Rhizobium bacteria. Do not use fertilizer unless your soil is very poor or low in organic matter. Too much nitrogen encourages foliage growth and not pods. Seed at depths no more than 2 – 3 times the seed diameter. Plant extra seeds and then thin to the recommended spacing within the row. Seed every 2 weeks to extend the growing and eating (Yum!) season.

Peas generally need something to climb on so add a trellis or other support when you plant your seeds. There are also pea varieties that are short and don't require a climbing structure.

Best Varieties for Marin: 'Oregon Sugar Pod II', 'Cascadia', 'Sugar Snap" or 'Super Sugar Snap' have a long season and are disease resistant , particularly to mildew.

Best Cultural Practices: Peas need constant soil moisture to develop well. Peas are shallow rooted and will generally do better with light, frequent irrigation. It is important to avoid overwatering because that will promote root rot diseases, especially in heavier soils.

Many adult insects, as well as larvae, find parts of the pea plants as delicious as we do. Cabbage maggots or cutworms, both grayish grubs, aphids and thrips are all potential pea pests. Check the UCIPM for remedies. Peas are especially prone to fungal diseases; peas should be planted in a different spot each year, if possible, to minimize their potential exposure to these soil diseases. Aphids spread mosaic virus and pea enation virus. Choose disease resistant varieties.

Pick your peas according to what type you have planted – garden peas should be picked when the pods swell and the peas inside feel firm. Snap peas should be picked earlier – when the pods have started to swell, but the peas inside are smaller. If you wait too long the pods will get stringy and unpleasant to eat. Snow peas should be picked even earlier – when you can barely discern the peas inside.

Peppers, *Capsicum annum*

What: Peppers, members of the *Solanaceae* family, are found in the warmest parts of the world. A perennial, ranging in taste from the hottest habaneros to the sweetest bells, the "hot" agent comes from capsaicinoids primarily found in the tissue like membrane surrounding the seed.

When to Plant: Peppers need daytime temperatures of 65 degrees to 85 degrees and do not like nighttime temperatures below 65 degrees. Soil temperatures below 50 degrees will cause root dieback. Accordingly, in Marin, the best planting date is after June 1st. Peppers grow very slowly and harvest is usually 60 to 80 days out. Blooms after the end of August usually do not mature. When temperatures approach 100 degrees, pollination, fruit set and yield are reduced.

How to Plant: Just like tomatoes, peppers like soil with a pH range from 6.5 to 7.0 but they require more sun and nitrogen than tomatoes. Before planting, amend the soil with a nitrogen rich manure and side dress with fish emulsion or cow manure at fruit set. For good plant development, do not plant from seed unless you have a greenhouse or hotbed with exposure to sunlight. Be forewarned, it takes seven to ten weeks from sowing to produce transplants. Rather, you may choose to plant purchased seedlings four to six inches tall with healthy green leaves. Do not select seedlings with flowers or fruit on them. If you do, those plants are not as likely to develop good root systems after transplanting. As with tomatoes, do not handle the stems when transplanting. Hold only the leaves and space the plants 12 to 24 inches apart depending on variety. Pinching off the tip of the pepper plant at planting encourages more side branches and fruit.

Peppers like soil kept evenly moist and water is important from fruit set through full fruit development. In the edible landscape, peppers are very attractive plants. To avoid breaking branches, harvest peppers by clipping the stem. Most peppers turn from green to red or yellow when fully ripe. Interestingly, red peppers have twice as much vitamin C as green or yellow peppers.

Best Varieties for Marin: Varieties that have performed well in Marin include 'Hungarian Wax Banana' (3 inches long), 'Cherry' (a hybrid that's red, small, round, spicy and showy), 'Pimento' (red, medium and heart shaped) and 'Jalapeno' (can be picked green or red, slim and pointed). 'Ascent' is an attractive edible ornamental pepper with lush foliage and tiny red peppers (hot).

Best Cultural Practices: Peppers are subject to the same challenges as tomatoes including verticillium wilt, mosaic virus, and blossom end rot. Pick disease resistant varieties and keep the soil evenly moist to avoid problems.

PLUM

What: *Prunus salicina* (Japanese plum) & *Prunus domestica* (European plum)

Three categories of edible plums are grown in the West: European, Japanese and hardy hybrids. All bloom in late winter or early spring: fruit ripens sometime between May and September, depending on the variety and the climate.

When and How to Plant: Plant bare root plum trees in a site which receives full sun in late winter or early spring; Plant container grown plants any time except in extreme summer heat. Space trees 10-20' apart. It is advisable to choose a site where fallen fruit won't be a problem. Use raised beds or mounds if you plant where soil is heavy or compacted.

Best Varieties for Marin: European plums bloom later than Japanese plums and are better adapted to areas with late frosts or cool rainy spring weather. Most of the European varieties have a moderately high chill need that excludes them from extremely mild winter areas. The best choices for Marin are Japanese varieties with low chill needs e.g., as low as 250 hrs: *Japanese*: Beauty (250 hrs) is a better choice in coastal areas; Elephant Heart (600 hrs); Howard's Miracle (300 hrs); Mariposa (250 hrs); Nubiana (400-500 hrs) self-fertile; Santa Rosa (300 hrs); Satsuma (300 hrs); Weeping Santa Rosa (400 hrs). Use Santa Rosa as a pollinizer for Japanese plums. No truly dwarfing rootstocks are available; semi-dwarf are only slightly smaller than standards. Dwarf varieties can be espaliered. *European*: Green Gage (500 hrs) fruitful; Sugar Prune (500 hrs) - both self-fruitful. Many Japanese & European plum varieties are self-fruitful but others need cross pollination so it's best to plant 2 varieties if the type you plant is not self-fruitful. Japanese & European plums do not pollinize each other.

Best cultural Practices: Plums do best in fertile soil with ample organic matter and good drainage. If you suspect nutrient deficiencies, consider a soils test. Most fruit trees in backyard settings do not need routine fertilization. For more information on nutrient deficiencies, go to http://ipm.ucanr.edu/PMG/GARDEN/FRUIT/ENVIRON/nutrientdefic.html
Provide drip irrigation several times per week at the drip line, well away from the trunk. In dry season, an occasional deep watering is beneficial.

Prune out any dead, diseased or broken branches. Thin branches out (~20% of last year's growth) to allow light into the canopy. Avoid making heading cuts except on young trees. Japanese plums need severe pruning to control vigorous shoot growth. Remove new, non-fruiting growth in June. Many varieties produce excessive vertical growth: shorten vertical shoots to outside-facing branchlets. Thin plums to 4-6" apart when they are 1/4-3/4" in diameter or the fruit load may break branches. Summer pruning: Remove strong, vigorous shoots from inner to improve air/light circulation.

Japanese plums should be trained to a vase shape, with 5 or 6 main scaffold branches; fruiting laterals grow from these scaffolds. European plums are trained to a central leader. Mature European plums require pruning mainly to thin out annual shoot growth.

While plums can get various pests, they don't seem to be seriously plagued by any particular pest in our region. In our dry summers, plums are subject to fewer problems than peaches & apples. Dormant season sprays which combine horticultural oil with lime sulfur or fixed copper control brown rot and various insect pests e.g., scale. Peach tree borer attacks trees stressed by poor growing conditions. For Santa Jose scale, mite and aphid management, spray trees with dormant oil late in dormant season, just prior to bud break. Provide thorough coverage, including trunk. Aphids often cause curling of young leaves in spring but only require control when 50% of leaves are curled & live aphids are present. Clean up fallen fruit immediately to reduce pest problems. Remove fruit mummies.

Plums are among the best adapted fruit tree for almost anywhere in California.

Potatoes, ***Solanum tuberosum***

What: It is a modified stem (tuber).
It is a cool season perennial grown as an annual.

When to Plant: Native to the Andes region of South America, you can plant potatoes in Marin as early as February and as late as May. Tuber production occurs underground until soil temperatures reach 80 degrees. Plant only certified seed potatoes to avoid disease.

How to Plant: Plant certified potato seed 3" deep and 6" to 12" apart. When the plant is 6" high, cover with another 3" of soil. This is called hilling and can be done once again after 6" more of plant growth. Hilling increases production and prevents greening. Green potatoes cannot be eaten as they contain a high level of toxic alkaloid solanine. Water just enough to keep the soil from cracking and to avoid rot – about one to two inches per week.

Potatoes mature in 90 to 120 days. Dig up a test potato and if it is a good size, cut off the plant at ground level and discard the leaves and all tiny green fruit as they are toxic and can spread disease. Leaving the crop in the ground for another couple of weeks without watering, hardens off the skin.

Best Varieties for Marin: 'Buffalo', 'Bison', 'Carola', 'Carlotta', 'White Rose', 'Kennebec', 'Chieftain', 'Nargold', 'Russet', 'Red Lasoda' and 'Yukon Gold'.

Best Cultural Practice: Plant only certified potato seed and practice a 4-year crop rotation.

Pumpkins, *Curbita pepo*

What: Pumpkins are actually winter squashes, meaning that they are harvested when the rind is hard which keeps them from spoiling through the winter months. They are thought to have originated in North America. Pumpkins range in size from miniature to mammoth and range in color from the ghostly white 'Lumina' to the deep red-orange 'Rouge vif D'Etampes.'

When to Plant: Pumpkins are a very tender vegetable and the seeds do not germinate in cold soil. Plant after the soil has thoroughly warmed from April through June. Keep in mind that pumpkins require a long growing season -- from 75 to 100 frost-free days and may not do well near the coast or in some cooler areas of southern Marin.

How to Plant: Full sun, good air circulation, and rich, well draining soil are all key to growing your own pumpkins. They need eight hours of sun per day. Pumpkins need ample space. Air circulation is important to help fend off powdery mildew, which can be a huge problem for pumpkins in late summer. The soil should be enriched with compost. Cover the seeds with soil. When several true leaves have appeared, thin each direct-seeded circle to the healthiest two or three plants. Use mulch to keep weeds down; do not over cultivate or the shallow roots may be damaged.

Best Varieties for Marin: One thing to keep in mind is that pumpkins can take up a huge amount of space. However, 'Buskin' is a compact vine for a large container or garden. 'Jack O'Lantern' is great for carving, while 'Spirit', a semi bush type, is a multipurpose pumpkin that can be used for both cooking & carving. 'Jack be Little' and Wee B Little' are just 3 inches across and can be grown on a trellis. The best varieties for cooking are 'Small Sugar' and 'New England Pie.'

Best Cultural Practices: Pumpkins require regular irrigation and fertilizing for good growth and production. Pumpkin vines grow quickly, and pull nutrients from the soil like mad. The best way to ensure that your pumpkin vines get plenty of nutrients is to start with compost-enriched soil. You can also add a granulated organic fertilizer to the soil at planting time, and alfalfa meal will provide your plants with a nice amount of potassium -- great for overall plant health. After initial planting, feed the plants every month with fish emulsion or kelp meal.

Be sure to water regularly -- pumpkin plants need about an inch of water per week. Don't just assume your plants need water if you see the leaves wilting in the heat of summer -- check your soil before adding extra water. If the soil is still moist, don't give them extra water or you'll risk drowning them. Pumpkin leaves often wilt during very hot days, but recover once the hottest part of the day is past. *In order to prevent wilt diseases, keep leaves dry when watering. Use drip irrigation if possible.*

Pumpkins can be harvested whenever they are a deep, solid color (orange for most varieties) and the rind is hard. If vines remain healthy, harvest in late September or early October. If vines die prematurely from disease or other causes, harvest the mature fruit and store them in a moderately warm, dry place until Halloween. Cut pumpkins from the vines carefully, using pruning shears or a sharp knife and leave 3 to 4 inches of stem attached.

Raspberry, *Rubus*

What: Like blackberries, raspberries belong to the Rosaceae family. There are four types of raspberries: red, golden, purple and black, each with a different growth habit.

- Red Raspberries (*Rubus idaeus*) have erect canes and consist of 2 types-summer and fall bearing. Summer bearing varieties (fruits on second year canes) include 'Canby,' 'Comox,' 'Nootka,' 'Skeena,' 'Willamette'. Fall bearing varieties (fruits on new canes in first year) include 'Amity,' 'August Red,' 'Caroline,' 'Fall Red,' 'Heritage,' 'Indian Summer,' 'Oregon 1030,' 'Redwing,' 'September,' 'Summit.'
- Golden raspberries (which are a mutant of red) include 'Golden Harvest,' 'Fall Gold' and 'Honey Queen.' They fruit in the fall.
- Purple raspberries (*Rubus neglectus)* are a hybrid of red and black and include 'Royalty' and 'Brandywine.' They grow similarly to black raspberries.
- Black raspberries (*Rubus occidentalis*) include 'Bristol' and 'Munger.' They require summer tipping, and are more cold- tender than red raspberries.

When to plant:
Raspberries grow best in cool climates and are best planted in full sun in late fall through early spring in raised beds to help prevent problems caused by poor drainage. Be sure to purchase stock from a reliable, registered grower who has disease free plants. Trellising raspberries simplifies care and harvest.

How to Plant: The primary roots should be planted 1-2 inches deep spacing the plants 2 to 3 feet apart in rows 8' to 10' apart. Water well and cut the canes on new plants to 6 inches long. Keep berries free of weeds and practice crop rotation. Berries prefer sandy soils with a pH of 5.5 to 6.5 with plenty of room for roots. Water 1-2 inches per week in summer and 1 inch per week in spring and fall. Keep soil moist at all times, best with drip irrigation. Berries do not require a large amount of fertilizer. Check vegetative growth in spring and if it looks sparse, apply compost in the spring.

Cultural Practices: Canes are biennial growing the first year and fruiting the second and then die. The crown and roots are perennial. During dormant season, remove weak, broken, diseased and damaged canes, and thin to 4-5 strong canes per foot of row. After harvest, with summer- bearing red raspberries, remove fruiting floricanes, but don't pinch off the new primocanes. For fall -bearing reds, cut canes to the ground when dormant and when new primocanes appear, remove suckers. For black and purple raspberries, during the summer top the blacks at 2 feet and the purples at 2 1/2 feet. Bacterial diseases of raspberries include Crown gall and Cane and Leaf spot. Raspberries are also susceptible to fungal and viral diseases. Pests that attack raspberries include aphids, leafhoppers, spider mites, crown borers, horntail, sawfly, scales, root weevils, and thrips. Cultural practices that help lessen disease include crop rotation, selecting disease resistant cultivars and consistent watering. Spotted wing drosophila has also been observed attacking ripening raspberries. Frequent harvesting of fruit and pick up of fallen fruit can reduce drosophila populations. For more information, check UC IPM Management Guidelines for Growth and Development of Caneberries.

Rhubarb, *Rheum rhabarbarum*

What: Rhubarb is a member of the *Polygonaceae* family, as are sorrel and buckwheat. The name rhubarb comes from the Greeks who called this plant the vegetable of "barbarians beyond the Rha" (the Volga River). Native to that southeast part of Russia, rhubarb stalk is usually used as a fruit substitute in early spring even though its edible stalk classifies it as a vegetable. The leaves of rhubarb are deadly poisonous and all green matter should be stripped away before preparing the stalk to eat. Oxalic acid is in the leaf, stalk and roots of rhubarb. The higher concentration of oxalic acid in the rhubarb leaf and roots makes these parts very poisonous. Concentration in the stem is not as high and allows us to eat the stem just as we eat spinach, which also contains lower amounts of oxalic acid. Rhubarb is a hardy perennial that thrives best in cool temperatures.

When to Plant: Plant crown transplants in early spring (March) when rhizomes are available either as bare root or in containers. Plants grow vigorously into early summer and then go dormant until the rains come again next winter. The plant's large glossy green leaves with red veins and stalks make it a perfect and architecturally striking candidate for a sunny exposure border. The stalks average about 24 inches in height with leaves as wide as 18 inches and attractively pair with a spread of low vegetables. Productive for many years, its roots go deep. Crowns may be divided and re-planted every 5 years or so when the crown begins to work itself up out of the ground. Do not harvest stalks the first year and select harvest (leave at least 50% of the stalks) in subsequent years because the crowns require nitrogen to produce more stalks next year. If rhubarb begins to flower, remove the stalk or production will slow. Conversely, in the edible landscape, when left to bloom, the cream-colored flower stalk is very decorative.

How to Plant: Dig a hole 2 feet wide by 2 feet deep and fill in with rich manure and compost. Pack down the organic material to within 12 inches of the top of the hole. Lightly pack in another 12 inches of organic material with pH ranging from 5.0 to 6.8. Plant the rhizomes with "eyes" facing upwards, burying the root 2 to 3 inches deep. Keep the area free of weeds, moist and mulch with leaf mold.

Best Varieties for Marin: The red variety 'Crimson Red' grows well in the cool coastal regions of Marin as does the variety 'Victoria' which sports green stalks with red shading.
To harvest, stalks should be twisted not cut due to rot back. To cook rhubarb, strip away all green matter from the stalk and cut into 1½-inch sections. Cook for 10 to 15 minutes in a non-reactive saucepan in a 50/50 mixture of sugar and orange juice. You may also add orange peel and cinnamon stick to this delicious compote. Sometimes called the pie plant, rhubarb is also tasty cooked in a pie dish sugared, spiced and covered with a crumbled topping and baked for 45 minutes at 350 degrees. Rhubarb can also be pulverized and fermented with sweetener to make an interesting wine.

Best Cultural Practice: Rhubarb is subject to little disease but does require winter chill and a sunny location with afternoon shade provided in warmer areas. Plants may perish where winters are mild. Give rhubarb plenty of space.

Spinach, *Spinacia oleracea*

What: Spinach is an annual plant that grows well in Marin during the moist, cooler fall and winter periods to produce a green leaf crop throughout spring into early summer. Fresh spinach leaves are mostly consumed raw in salads or cooked as a side dish.

When to Plant: Plant spinach seeds from August to February directly into a prepared seedbed. It is possible to grow seedlings and then transplant, though this practice can sometimes induce early bolting. For a family of four, you should grow between 10 to 20 feet of plants, allowing 3 inches between each plant, and 18 inches between rows. The yield should be about 20lbs.

How to Plant: In a sunny location, plant seed about ½ inch deep. Spinach has very high nitrogen needs, so work fertilizer into the top few inches of soil prior to planting. Thin when the plants develop to second or third true leaf stage, leaving 3-4 inches between each plant. Thinning at the right stage of seedling growth is very important as overcrowded plants do not grow rapidly or reach good size. Spinach is fast growing and matures to its leafy foliage in 40 to 50 days. It then quickly goes to seed, though it produces for a longer period in the cool, coastal areas. Plan to sow successive plantings every 3 weeks or so to ensure a continuous supply. When spinach is ready for harvest, you can either cut the entire plant or just select outer leaves. If you carefully cut the plant above the growing point it is possible to obtain a second crop.

Best Varieties for Marin: For cooler month planting choose Melody Hybrid or America. Choose varieties resistant to downy mildew and Verticillium disease.

New Zealand spinach (Tetragonia tetragonoides) and Malabar (Basella alba) are useful spinach-like crops for growing during warmer months. Both resemble regular spinach in leaf shape and taste, but are tougher than true spinach.

Best Cultural Practice: A cool climate is best for producing spinach. During periods of warm temperatures and long days, the leaves become tough and the plants are likely to produce seed stalks before making desirable foliage growth. Poor germination results due to high soil temperatures. Two major pests can consume leaves: loopers and leaf miners. Remove loopers by hand, and discard yellowish blotches leaves affected by leaf miners. Spinach is also prone to downy mildew and Verticillium wilt, so choose a variety that is resistant to these infections, and remove any old plant debris from around the plants.

Summer Squash, *Cucurbita pepo*

What: Summer squash belong to the family, often called “cucurbits," that are harvested when immature (while the rind is still tender and edible). The name "summer squash" refers to the short storage life of these squashes. Summer squash grows on non-vining bushes. They bear two kinds of flowers, male and female, both on the same plant. In order for fruit set to occur, pollen from the male flower must be transferred to the female flower. . Many varieties have different fruit shapes and colors. The three main types include the yellow straight neck or crooked neck; the white, saucer shaped, scallop or patty pan; and the oblong, green, grey or gold zucchini.

When to Plant: Cucurbits are warm-season crops and should be planted when soil and air temperatures are above 60 degrees F. Summer squash thrives in coastal & southern Marin’s cooler climates as well as the warmer microclimates of the county. In Marin, plant seeds from May to July.

How to Plant: Choose an area that receives full sunlight (at least 4 to 6 hours a day), where squash will not be shaded by trees, fences, or walls. Try to plant away from areas that will be watered by lawn sprinklers. Soil containing plenty of well rotted compost or manure is ideal, although good crops may be grown in average soils that have been fertilized adequately. Squash can be seeded directly or transplanted into the garden. For direct seeding, plant more seeds than necessary so as to make up for any losses. Keep moist during the germination period. When the plants are about 3 inches high, thin plants. For transplants, use young plants with 4 to 6 true leaves, wider than tall, stocky, succulent, and slightly hardened to outdoor conditions. Mark where you want each plant and make the hole deep enough to bury the stem as far as the first leaf. Place the plant deep into the hole. Press the soil firmly around the plant and water thoroughly to remove any air pockets. If transplanting in the summer, shade the plants in the middle of the day for the first week or use floating row cover. When direct seeding, the beds should be irrigated until completely wet. After the seedlings emerge, water when moisture is being depleted from the soil. Apply water to 1-foot depth to insure deeper rooting. Avoid wetting the foliage or fruit with overhead watering. If plants are stressed for water when they start to set fruit, the squash may be deformed.

Best Varieties for Marin: ‘Trombetta’ is an Italian climbing variety. It produces firm-textured, light-green, 12- to 15-inch fruit with excellent flavor and huge yield, ‘Cube of Butter’ (yellow), ‘Superpik’ (yellow) and ‘Black Beauty’ (Zucchini) are also good choices as they are disease resistant and are available as bush or vine.

Best Cultural Practices: Under good growing conditions, fruits are ready for first harvest 50 to 65 days after seeds are planted. Zucchini types should be harvested when immature, about 6 to 8 inches long and 1-1/2 to 2 inches in diameter; patty-pan types, when 3 to 4 inches in diameter; yellow crookneck, when 4 to 7 inches in diameter. Pick disease resistant varieties & keep soil moist to avoid deformed fruit. Both male and female flowers develop on the same plant. Pollen must be transferred to the female flowers from the male flowers for fruit to develop and this is mostly done by honeybees. If you have to use an insecticide, use it in the evening so that you do not kill the pollinating bees.

Strawberries, *Fragaria*

What: A member of the rose family, the tiny yellow or black dots on the red berry's surface are called achenes and are the actual fruit. The ripened receptacle we call the strawberry is the base of the flower. Within each of the achenes is the true seed. Native to almost everywhere temperate around the globe, California has a native strawberry, (*Fragaria chiloensis)* so named because it is also native to Chile where it was first discovered. Much selection and breeding of strawberries has been done.

When to Plant: In Marin's mild climate, strawberries can be planted in the spring and in the fall. Selection of a cultivar is important because of varying degrees of sweetness, harvest time and disease resistance. Strawberries sold in nurseries today are either June-bearers, ever-bearers or day-neutrals. June-bearers form buds in the autumn with fruit following the next spring (June). This strawberry is a good choice if you want a lot of berries at once. It is not a good choice for areas subject to late frosts when bud formation occurs. So called ever-bearers produce two crops, one in June and one in the fall. Most of the ever-bearers form their flower buds during the long days of summer. About thirty years ago, a newer type of strawberry was developed: the day-neutral strawberry. Not sensitive to day-length, they bear continuously where temperatures range between 35 degrees F and 85 degrees F although most of the fruit is still produced in spring and fall. Because day-neutrals are smaller plants and produce fewer runners, more weeding is required. Ever-bearers are often considered synonymous with day-neutrals.

How to Plant: To plant your strawberries, select a sunny site in which you have not grown other plants susceptible to verticillium wilt. This includes tomatoes, potatoes and other berries. To reduce stress on new transplants, plant on a cool, foggy morning. Twenty-five to 50 plants will provide plenty of berries for a family of four. Dig a hole about 6" deep and amend with fish emulsion. Set the plant with the roots pointing downward and fanned out, deep enough so the midpoint of the crown is even with the surface of the soil. Firm the soil around the plant and water deeply. Three planting methodologies (cultural systems) are used to maximize fruit production, "matted row", "spaced row" and "hill system". The matted row works best for June bearers because the plants should be mowed down to 3 inches after fruit production. Set the plants 18" to 24" apart in rows 3-4 feet apart and allow runners to fill in to 18" wide, clipping as needed. With spaced rows, plant as with matted rows but clip runners leaving only 6 to 8 per plant. Plants will be larger and berries more visible. For day-neutrals, select the hill system (which isn't really a "hill") and clip all runners setting the plants 12 to 15 inches apart in rows set the same distance apart.

Best Varieties for Marin: Marin county nurseries typically carry a variety of cultivars, including 'Sequoia' and 'Chandler' (June-bearers) and 'Seascape', 'Albion' and 'Tristar' (day-neutrals) and ever-bearers: 'Eversweet', 'Ozark Beauty' and 'Quinalt'.

Best Cultural Practices: Best cultural practices remain the best defense against disease, including well drained soil, weeding and mulching with pine needles or straw. A change in location and new plants every four years will be beneficial and maintain production. Strawberries like regular water, full sun and can be planted in containers or in borders and look lovely mixed with geraniums and primroses.

Swiss Chard, *Beta vulgaris*

What: Swiss chard is an ancestor of beets, grown for its succulent stalks and flavorful leaves, but no storage root. It is a biennial (meaning that it will overwinter and go to seed the following spring) grown as an annual. It thrives in the cool season with milder conditions but will survive some light frost and can tolerate some summer heat if given afternoon shade. The foliage is a nutritional powerhouse and is a stunning color in the landscape varying from deep green to deep red with stems which can be red, yellow, orange, purple and pink.

When to Plant: Plant chard in full sun although if grown during the warmer months it will need some p.m. shade or grow it under some taller plants (corn, tomatoes, sunflowers) that will filter out the intense sun. Sow in place in the early spring to a depth of ½ inch and 2 inches apart. Thin to 10-12 inches apart and eat the thinnings! Ideal soil temperature for sowing is 50-85 degrees with the optimum being 85 degrees. You can sow indoors 1-2 weeks before the last frost and transplant out after the plant has two sets of true leaves. The ideal soil temperature for growing outdoors is anything above 50 degrees with the optimum being 60-65 degrees. Seeds can be sown in the fall, as well, but will tend to produce shorter plants.

How to Plant: Chard prefers a soil pH range of 6-7. Before planting work in several inches of organic matter, keep the area well weeded and water regularly. Apply fish emulsion or an organic fertilizer at planting and again 6 weeks later. If you're continually harvesting, fertilize again one month later. Mulch heavily to keep the soil cool and moist. The entire plant can be harvested when young or the more preferred method is to pick off several outer leaves at a time leaving at least 5 leaves for the plant to keep producing. Cut the leaves about an inch above the soil. Referred to as a "cut and come again" plant, the frequent picking helps to stimulate the production of new leaves. Be sure to sow succession plantings if you plan to harvest the entire plant. Chard is so versatile in the kitchen. It can be harvested as baby greens for salads and the more mature leaves can be used in sautés, soups, pastas, and frittatas or in any recipe that calls for spinach. Excess chard is easy to blanch and freeze.

Best Cultural Practices: Chard is generally quite pest and disease free and rarely sees damage other than snails, slugs or cutworms. Trap slugs in beer-baited traps, use an iron phosphate based control product or surround your plant with crushed eggshells. Birds can devour young seedlings and leaf miners are common during the warmer months. Fungal diseases are more common in warm, rainy weather. Keep plants properly spaced to promote good air circulation and promptly remove any affected leaves.

Best Varieties for Marin: Most of the varieties of Swiss chard will thrive in our area. Some of the favorites are 'Fordhook Giant', 'Five Color Silverbeet', 'Bright Lights', 'Rhubarb' and 'Oriole Orange'. A perpetual variety called 'Perpetual Spinach' has thinner stems and smaller, smoother leaves. It will produce for several months and tastes more like Spinach. This variety works well in small gardens and containers.

Tomatoes, *Lycopersicon esculentum*

What: Tomatoes, a member of the *Solanum* family, are a tender perennial grown as a warm weather annual. Indigenous to the Andes, tomatoes were domesticated in Mexico and brought to Europe by the Spanish. Tomato plants are amongst the 8% of flowering plants fertilized not by honeybees but rather bumblebees. Because bumblebees are attracted to blue flowers, many a tomato lover incorporates plants such as borage in their edible landscape. Varieties of tomatoes are numerous and plants are categorized by vine habit as Indeterminate, Large Determinate and Determinate and ranked from large to compact. Leaf size and canopy vary by variety as do tolerance and resistance to disease. If you are incorporating a tomato plant in a bed of ornamentals or planting in a container, it is best to know the size of the vine – so do your homework before selecting a variety.

When to Plant: Tomatoes can be direct seeded or begun indoors and transplanted when the danger of frost has passed. February is a good date to seed start inside and in Marin County, May 1st is a good date to plant outside in the afternoon to minimize water loss. Fruit set occurs when nighttime temperatures are above 55 degrees and daytime temperatures do not exceed 90 degrees.

How to Plant: If you elected to start your seedlings indoors, harden them off, acclimatizing the seedlings to the number of hours of outdoor light and temperatures. Dig a hole two feet deep and amend the soil with calcium and fish emulsion. Tomatoes grow best in neutral soil with a pH of 6.5 to 7.0. You can add agricultural limestone (one pound for every 100 square feet). An 8-inch seedling can be planted 2 inches deeper than its growing pot. Pinch off the lower leaves, handling the seedling by its leaves or root ball only. Set the plant horizontally in the hole with just a few sets of leaves showing above ground and plant a sturdy stake near the seedling. Carefully fill in the hole, water and fertilize with 5-10-5 working it in two inches deep. Keep the soil moist around the seedling for the next three to four weeks. Water established plants deeply when the soil dries out to about two inches – usually twice a week.

Best Varieties for Marin: Ask Master Gardeners at the Tomato Market held every April at both Pini Hardware in Novato and Bon Air Shopping Center in Greenbrae. Last year, varieties for sale included: 'Big Beef', 'Black And Brown Boar', 'Blondekopfchen', 'Bloody Butcher', 'Bush Early Girl', 'Cabernet', 'Carmello', 'Celebrity', 'Cherokee Purple', 'Chianti Rose', 'Chocolate Cherry', 'Early Girl', 'Fantastic', 'Green Zebra', 'Haley's Purple Comet', 'Indigo Rose', 'Isis Candy', 'Japanese Black Trifele', 'Jubilee', 'Legend', 'Michael Pollan', 'New Big Dwarf', 'Oaxacan Jewel', 'Riesentraube', 'San Marzano', 'Siletz', 'Stupice', 'Sun Gold', 'Sun Sugar' And 'Sweet 100'.

Best Cultural Practices: Tomatoes are subject to verticillium wilt, mosaic virus and blossom end rot. Pick disease resistant varieties.

Turnip, *Brassica rapa*

What: Turnip is a biennial plant and a member of the Brassicaceae family commonly grown in temperate climates throughout the world. It grows well in Marin during the moist, cooler periods to produce edible, bulbous taproots and leaves. The interior flesh of the root may vary from white, to yellow and red depending on variety. When young, roots are mild and can be eaten raw or cooked. Once the root is more mature, it develops a stronger flavor. The leaves are similar in flavor to mustard greens, and are normally cooked. If leaves are particularly bitter they can be pre-washed with boiling water before replacing with fresh water to remove excess bitterness. Turnips can mature within 60 days.

When to Plant: Plant turnip seeds directly into a seed bed in January for a spring crop and August for a fall crop. For a family of four, you should grow between 10 to 20 feet of plants, allowing 2 inches between each plant, and 18 inches between rows. The yield should be about 27 pounds.

How to Plant: In a sunny location, plant seed between ¼ to ½ inches deep. Turnip has very high nitrogen needs, so work fertilizer into the top few inches of soil prior to planting. Thin when the plant grows to the second or third true leaf stage, leaving 3-4 inches between each plant. Thinning at the right stage of seedling growth is very important as overcrowded plants do not grow rapidly or reach good size. Turnip matures in 45 to 70 days.

Best Varieties for Marin: Purple Top White Globe, Tokyo Cross Hybrid and Seven Top for greens only, and All Top Hybrid.

Best Cultural Practice: The crispest and most tender turnips are grown in rich soil with plenty of water. Turnips get cabbage maggot disease (tunneling through leaves and roots especially in warmer times of the year). Apply beneficial nematodes in mid-March or use row cover to help prevent this disease. Remove cabbage aphids that cause stunting and wilting of the plant with a jet of water. Remove cabbage loopers that eat holes in the leaves by hand-picking. Deformed leaves are often due to attack by harlequin bugs, which can also be hand-picked.

Winter Squash, *Cucurbita spp.*

What: Winter squash belong to the Cucurbitaceae family. The major vegetables in the Cucurbit family are squash, pumpkin, cucumber, melon and gourd. They all appreciate warmth and an even supply of moisture. Most edible squashes originated in the Americas. Any member of this family that tastes bitter should not be eaten. You are tasting alkaloid cucurbitacin which can be toxic. Our word for "squash" comes from the Narragansett word "askutasquash" which means raw or uncooked. Native Americans ate squash raw, dehydrated and cooked in stew pots all winter long. Winter squash can be eaten in the summer, fall and winter and includes some favorite hard skinned squashes that store well including butternut, pumpkin, and acorn squashes.

When to Plant: All cucurbits are warm-season crops and should be planted when soil and air temperatures are at least 60 degrees. Germination will occur much faster when soil temperature reaches 80 degrees and air temperature is between 75 to 95 degrees. Winter squash thrives in Marin's Mediterranean climate. Days to maturity average around 100 days compared to summer squash that is ready to harvest in just 50 days.

How to Plant: Choose a sunny spot with at least 6 hours of full sun. Direct seed one inch deep in a 4 to 6 inch mound to permit good drainage; three seeds per mound. Apply water to 1-foot depth to insure deep rooting. Keep moist during germination period. When plants are 3 inches tall, thin to one plant per mound. You can expect a yield of about 5 winter squash per plant.

Best Varieties for Marin: Favorite winter squashes grown by UC Marin Master Gardeners include "Waltham Butternut" squash, a cross between the "Gooseneck" and "Hubbard", "Golden Hubbard" which today is considered a "specialty" produce and for rare seed lovers, there is "Lakota", grown for hundreds of years by the Native Americans living in the Missouri Valley. And we can't forget America's favorite winter squash, pumpkin. Varieties include some loved for soup making like "Rouge Vif D'Etampes" (Cinderella Pumpkin), some loved for carving pumpkins including "Autumn Gold" and some for pie making including "New England Pie" and "Winter Luxury Pie". Please refer to Pumpkin Grow Sheet in this booklet.

Best Cultural Practices: Squash needs deep watering so the root zone gets moisture. Soil should be allowed to dry slightly as roots also need air. The best irrigation system is drip as sprinkler irrigation will not water deeply and may encourage some disease. Mildew can be a fierce problem. Inconsistent moisture during fruit set and ripening can lead to stunted and deformed squash. Water can be cut back once the squash is fully grown. To harvest, cut the vine leaving about 4 inches of vine attached to the fruit. Let the squash field cure for a couple of weeks to increase the sugar content. On squash, male flowers with a long stem appear first. Female flowers form next and are distinguished by their ovary at the base of the flower. Because there are so few flowers on a squash plant, it is important for pollination to attract bees by planting other flower intensive crops nearby that attract nectar seeking bees. The squash bee *Peponapis* is the chief and most effective pollinator of squash. Native to the Americas, females provide exclusively squash nectar to their young. They nest deep in the ground in large gatherings and sometimes under the leaves of the squash plants near the stem. So do not mulch squash plants or turn over the soil in the fall. Lastly, because squashes cross pollinate, if you want to save seed, UC recommends one acre of distance between varieties.

Table 3.2 Companion Planting Chart for Home & Market Gardening.
Source: ATTRA (Appropriate Technology Transfer for Rural Areas) Companion Planting: Basic Concepts & Resources.

Companion Planting Chart for Home & Market Gardening		
Crop	**Compatible Companions**	**Incompatible**
Asparagus	tomato, parsley, basil	
Beans	most vegetables & herbs	onion, garlic, gladiolus
Beans, Bush	Irish potato, cucumber, corn, strawberry, celery, summer savory	onion family
Beans, Pole	corn, summer savory, radish	onion, beets, kohlrabi, sunflower
Beets	cabbage & onion families, lettuce	pole beans
Cabbage Family	aromatic herbs, celery, beets, onion family, chamomile, spinach, chard	dill, strawberry, pole beans, tomato
Carrots	English pea, lettuce, rosemary, onion family, sage, tomato	dill
Celery	onion & cabbage families, tomato, bush beans, nasturtium	
Corn	Irish potato, beans, English pea, pumpkin, cucumber, squash	tomato
Cucumber	beans, corn, English pea, sunflowers, radish	Irish potato, aromatic herbs
Eggplant	beans, marigold	
Lettuce	carrot, radish, strawberry, cucumber	
Onion Family	beets, carrot, lettuce, cabbage family, summer savory	beans, English pea
Parsley	tomato, asparagus	
Pea, English	carrots, radish, turnip, cucumber, corn, beans	onion family, gladiolus, Irish potato
Potato, Irish	beans, corn, cabbage family, marigolds, horseradish	pumpkin, squash, tomato, cucumber, sunflower
Pumpkins	corn, marigold	Irish potato
Radish	English pea, nasturtium, lettuce, cucumber	hyssop
Spinach	strawberry, fava bean	
Squash	nasturtium, corn, marigold	Irish potato
Tomato	basil, onion family, nasturtium, marigold, asparagus, carrot, parsley, cucumber	corn, Irish potato, fennel, cabbage family
Turnip	English pea	Irish potato

- *Beneficial habitats.* Beneficial habitats— sometimes called refugia—are another type of companion plant interaction that has drawn considerable attention in recent years. The benefit is derived when companion plants provide a desirable environment for beneficial insects and other arthropods—especially those predatory and parasitic species which help to keep pest populations in check. Predators include ladybird beetles, lacewings, hover flies, mantids, robber flies, and non-insects such as spiders and predatory mites. Parasites include a wide range of fly and wasp species including tachinid flies, and Trichogramma and Ichneumonid wasps.

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Local Hotline email
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