

A Guide to Growing Mirlitons (*Sechium edule*) in Louisiana

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Introduction:

The mirliton, a native plant to Mexico, has a long and unique history in New Orleans. Popularly known as Chayote (botanical name: *Sechium edule*), records of this member of the gourd family indicate that it was grown in New Orleans as early as 1867, and the city is virtually the only major urban area in North America where the mirliton was cultivated throughout the last century. The proximity to the Caribbean and the large migrations from that area, as well as the banana trade, probably contributed to its popularity. In the 1920s the U.S. Agriculture department attempted to introduce the mirliton to a broader public in a project based in Homestead, Florida, using varieties imported from Cuba. That project ultimately failed because most U.S. consumers had no idea what this odd vegetable was: was it a squash or a fruit? It is, in fact, a member of the gourd family, *Cucurbitaceae*—or Cucurbit for short, and botanists refer to the vegetable as “fruit.” In the U.S. it took on the name “vegetable pear” in the 1920s when first introduced outside of New Orleans, but lack of consumer demand ended the federally funded project. The mirliton retreated to New Orleans where eccentricity in music, culture, and even vegetables were well tolerated.

The “backyard mirliton vine” was a staple of New Orleans homes. A generally self-sufficient plant resistant to most diseases and pests, homeowners traditionally planted mirlitons to run along fences (the vines can grow to 50 feet), over shrubs, and even straight up trees. The fruit is highly perishable: within thirty days of harvesting it can germinate and send out a shoot which draws water and nutrients from the fruit causing it to shrivel. Because the soft inner-seed cannot be planted apart from the fruit shell (the whole fruit must be planted for propagation), the vine was an ideal Fall-yielding crop. It was a very “sociable” vegetable in that its abundant yield and small commercial market helped create a tradition of backyard growers giving mirlitons to neighbors and “sacking” fruit under the sink to give sprouted seedlings to new growers.

The tradition of the backyard mirliton (locally pronounced “mel-uh-tawn) was strong only a few decades ago, but in recent years people stopped growing mirlitons, especially as imported varieties from Latin America became available inexpensively and year round. In 2005, hurricane Katrina brought saline flood waters that destroyed much of the traditional Louisiana mirliton variety. A few growers retained their plants, but in 2008, hurricane Gustav’s high winds traumatized the vines and virtually wiped out the varieties that had been grown for decades in South Louisiana. Some growers attempted to propagate imported varieties purchased at local markets, but found that the fruits would not germinate (perhaps a result of new chilling practices) and that the commercial varieties, grown using pesticides and fungicides and bred for uniformity in size and color, were not as disease resistant as the traditional Louisiana varieties and lacked flavor.

Working with the Crescent City Farmer's Market, I have introduced the Adopt-a-Mirliton project to restore the traditional mirliton varieties in South Louisiana. I located a farmer in Tangipahoa Parish who was growing a variety (light green, smooth, and flat globular) that had been propagated for decades in the area. We are using these plants to re-seed South Louisiana with the traditional varieties and encourage consumers to increase their use of these easily home-grown vegetables. This guide can be useful to anyone growing in the coastal and warm zones where you have 150 days between planting and fruiting, before temperature drop below 55° F which can damage immature fruit.

For the most part, in Louisiana mirlitons are used in only a few traditional recipes (stuffed mirlitons, mirliton breads). But the internet has opened a world of hundreds of recipes, since the *Sechium edule* is grown around the globe. In addition, the increasing Latino population has increased the national demand for what is marketed outside New Orleans as "Chayote." In New Orleans, we eat only the fruit, although the entire plant is edible: in some cultures the tendrils are used as greens in salads and stir-fries; the tubers (roots), which can grow up to 20 pounds, are harvested and cooked as yams; and the fruits are used to make jams, jellies, dried fruit, and even wine. Chicken and hogs are fond of the vines and fruit (chickens prefer cooked mirlitons over raw).

On Reunion Island in the Seychelles, the mirliton is called "chou-chou" and artisans learned how to weave the vines into fine women's hats, straw hats for men, and even slippers. Indeed, the versatile chou-chou helped run-away slave communities to thrive for generations in the Mountains of the Salaizie Province in Reunion where the humble vegetable has acquired cult status. In the Philippines, "sayote" is referred to as "hanging gold."

All photographs of plants and trellis structures referred to in this document can be found at the two photo site links below. Makes sure you click on "detail" which will drop down the descriptions under the photos. The photographs can be "zoomed in on" by clicking on the photo and selecting the "all sizes" icon and then clicking on "download the large size." You can then use the "zoom" tool in your viewer to enlarge sections:

<http://bit.ly/MirlitonGuidePhotos>

<http://picasaweb.google.com/lancesphotos>

Mirliton Overview:

The mirliton is a perennial—once planted it will, in warm climates, grow anew annually up to eight years. In the "cucurbit family" along with cucumbers and melons, the plants are vulnerable to disease in damp climates, so mirliton plants normally replaced after three years because of root-knot nematode root-problems. The mirliton is monoecious or "self-compatible," meaning that a single plant has both male and female flowers and is able to be fertilized by its own pollen. For some reason, many New Orleanians are convinced that you need to plant two plants to ensure fertilization, but one will do. The succinct botanical definition of mirliton is that it is a "monoecious perennial herbaceous vine."

Mirlitons love to climb, sending out slender, branching stems up to 40 feet long and a mature plant can sprawl out over an overhead trellis thirty feet and fifteen feet wide. Although it produces fruit best when trellised horizontal to the ground so the stems grow longitudinally, it will produce more than enough fruit if grown along a vertical fence or even on shrubs and trees. Planted in the spring, the mirliton will bear flowers in late September when the days are as long as the nights, generally presenting mature fruit in October and well into December. Vines will flower at different times in the fall, so the fruiting season can last several weeks but usually peaks in October. Once temperatures dip below 55° F, the immature fruit will die and fall off the vine. Yields in the first year are typically 30 fruit; second year can be up to 80; and third year even more. In dry climates where plants can grow for several years, mirlitons with well-developed roots can produce as many as 400 fruit. Yields depend on the number of hours in full sun, soil fertility, root competition, and trellising methods and size.

Varieties:

There are scores of varieties of *Sechium edule* (Seek'-ee-uhm Ed'-yew-lee) though they fall into two commercial varieties (1) pear-shaped, medium size, smooth skin, with pale green exterior and a lighter green flesh or (2) globular, small, pale green, smooth skin exterior and lighter green flesh. The Louisiana traditional varieties are often more pear-shaped and have furrows (creases) that run from top to bottom of the fruit. The fruit's characteristics in rest of the world can vary widely, from dark green to pure white; smooth to spiny; ridged and creased to smooth. Flavors and textures differ as well. Because mirlitons easily cross pollinate by bees and insects, it is difficult to breed and maintain genetic uniformity or to define a specific variety. Fortunately, mirlitons can be grown from cuttings of the mother plant so growers can always retain an exact copy of the original plant, though plants grown from cuttings do not produce as well in the first year.

Names

There are hundreds of names for *Sechium edule*, but the most popular word for mirlitons is "chayote", which is used throughout the Spanish-speaking world and is most frequently used by botanists. Knowing the culture-specific name will aid you in researching recipes and growing methods. Simply use the Google search feature and insert the name or character, and then use "google translate" to translate the selection or entire web site. The translations can be confusing, but are more useful than not. See "*International List of Names*" in "*Internet Resources*."

Growing Requirements:

Mirlitons need at least six hours of full sun daily and can endure a full day of tropical sun. The plant, which will spread shallow roots in a 12 foot diameter circle, can be started in part sun and if trellised correctly, will seek out full sun. Sun and air circulation are important in suppressing airborne plant diseases. The plant likes well-drained sandy-loam soil with a pH of 6.0 - 6.8. This means placing the plant at a high point in your yard: water-logging the mirliton is the best way to kill it. You may have to create a raised bed or build up a high mound in your yard by adding garden soil and sand.

Mirlitons are compact at the ground level only taking up a few feet, but they require a six foot root radius around the plant. The rooting area should be mulched constantly to retain water and create more nutrients; because the roots are very shallow, never cultivate the rooting area. If you don't have a 12 foot diameter planting site, the mirliton will still do well if the roots are allowed to run six feet in either direction along a narrow bed.

Mirlitons will climb straight up a vertical trellis and then branch out longitudinally to the ground if provided horizontal support (wire or trellis), so a fence will do fine but adding a horizontal trellis along the fence works better. Trellising along a wooded security fence gives added protection against the hurricane winds we get in Louisiana which can destroy a vine or, at best, cause flowers to drop off. Horizontal trellises also cause less fruit bruising. I planted a mirliton one year that climbed 30 feet into an oak tree, beyond my reach, and then dropped its huge fruit like vegetable bombs.

Remember, mirlitons descended from ground climbers so it helps to think like a mirliton if you want a good yield. The progenitor of mirlitons, the wild varieties of *Sechium*, grew on the ground on mountainsides in rain forests (and still are grown on the hill sides in some places or in the understory of banana groves or sunny forests) so the plant produces fruit when it senses that its seed has ground beneath it. Horizontal raised trellises also prevent predation by animals.

The bottom line is to grow mirlitons in the way that is most convenient for. All the suggested growing methods will increase production, but a vine left to grow on a linear fence or over a stand of shrubs will produce plenty of fruit for one household. If you want healthier, more dependable plants with greater yields, then give attention to fertilizing, trellising, pollination, and disease treatment.

Watering and fertilizing are discussed below. The key is to water regularly, but make sure the soil is not soggy. It is highly recommended that you obtain a soil sample test from your local extension service. In Louisiana, it only costs \$7 and especially if you live in a flooded area, the test will give you an accurate idea of pH, sodium levels, and nitrogen. It's a good baseline for keeping records year to year. There is a link to print out an order form at the end of this document.

[Caution! If you don't do your own lawn work, it is important to tell the gardener (or neighbor sharing a fence) that this is a vegetable plant and not a weed! I know of many cases where gardeners or neighbors have pulled up a beautiful mirliton on the assumption it was a weed.]

Planting and Propagation Overview:

Mirlitons come complete with their own supply of water and fertilizer: the fruit flesh. You just plant the entire fruit: in the middle of the fruit is the true seed (ovule), a flat white soft seed that cannot be dried (many cultures eat the seed alone which often serves as a substitute for sea-food). While you can plant the fruit before it sprouts (germinates), using sprouted plants is preferable (see below).

Sprouted mirlitons can be directly planted in the ground or in pots for later transplanting. Planting in the ground is easy (see below) but there is chance the plant will get too much water and rot if we have a rainy cool season, or that squirrels will dig it up (and they will), or that the seedling will succumb in a hard freeze. If you do direct plant in the ground, plant at least three plants to increase your odds, mulch well, and cover with a piece of carpet to protect from freezing and marauding squirrels.

Planting in a two-gallon container for transplanting works well and allows you to control soil type (use loose, well-drained but moisture-retentive soil rich in organic matter with a pH of 6.0 to 6.8 (see below). They have plenty of their own water in the fruit, so you want to avoid water-logging to pot, which can happen if you leave it out and it rains a great deal. You can keep out in the sun but cover with a lean-to of clear plastic that conveys UV light but diverts the rain. Cover potted plants with netting to protect from squirrels and move inside on cold nights. Plant as soon as the first threat of frost passes (see details below).

Vine Growth, Flowering and Fruiting

Once planted in the spring, the mirliton will start to send off stems and will flourish through the summer. Anthracnose plant disease is the main threat if we have a cool and humid (foggy) spring (see below) but there may be strains of powdery mildew hosting on some plants in recent years. Otherwise, the plant may come and go with bouts of anthracnose during the summer, but the August heat will normally drive out most of the plant diseases. Typically the plant will begin to flower 110-120 days after planting. Botanists suspect that mirlitons are “photoperiodic” plants that flower when the length of day and night is equal (fall equinox). There will be hundreds of male flowers and only a few female. Once fertilized, the female flower will mature into a harvestable fruit within 30 days (details below).

I have found that my plants will continue to flower and fruit well into December, but the small fruits will be damaged and fall off when temperatures drop below 55° F. The first year production is normally around 30 fruit, but second and third year plants can produce 150 fruit—and older plants in Latin America can produce as much as 400 fruits.

Propagating by Cuttings

Mirlitons can also be propagated from cuttings taken in the autumn. I have yet to attempt this, but there is good article below on the procedure in “Internet Resources.” Use butyric acid for soaking the cuttings to ensure rooting.

How to Grow Mirlitons

Select the Right Variety:

First obtain a *traditional heirloom Louisiana mirliton* by contacting the Adopt-a-Mirliton project at mirlitons@marketumbrella.org. We can recommend growers who are participating in the free seed program or commercial growers of heirloom mirlitons. It is important that you obtain the mirliton from a grower who has not grown their crop too close to other varieties which would result in a cross-pollinated hybrid fruit. Some

nurseries even sell plants grown from imported varieties. It may be hard to maintain the genetic integrity of the traditional variety since bees move around a two-mile area and can cross-pollinate different varieties unbeknownst to growers. But the Louisiana variety grown on rural farms are more likely to be a pure variety. Keep in mind that imported, store-bought mirlitons are grown for uniformity in size and color, are treated heavily with pesticides and fungicides, and some are varieties adapted to 3,000 feet altitude, so they may not grow well in our climate. Imported or even domestic mirlitons are often chilled for several weeks and since the fruit does not have a dormancy period, they may not sprout.

Sprouting:

Mirliton fruit can be directly planted before sprouting, but sprouting ensures rooting and increases plant survival. To sprout the fruit, place the mirliton in a dark cool and dry area (in a cabinet) and it will normally send out a shoot within four weeks. When the shoot is about five inches long, you are ready to plant (if the shoot has grown too long, just trim it back to about five inches). Since most Louisiana mirlitons fruit in October, this means you can have sprouted fruit ready for planting in December. Mirlitons love to sprout and are one of the few plants in the world that can sprout while still on the vine (viviparous). They can also be propagated from cuttings (see below). If you want to delay sprouting and direct-plant the fruit, the LSU pamphlet below offers some methods.

Direct Planting of Sprouts:

Choose your plant destination location and prepare the soil. If you are starting with untilled soil, cover a 12 foot diameter circle with black plastic for a few weeks to kill the grass. Work and amend the soil in a twelve foot circle around where you intend to plant. If you are planting along a fence, don't worry about making a circle—just till up a bed about three feet wide, six feet in both directions along the fence so the roots have a place to run. Dig a planting hole (pit) about 18 inches deep and three feet in diameter. If you have a sandy soil (batture sand) you may want to fill with a good commercially produced garden soil. Be careful what you buy: some material sold as soil is just sand and decomposed tree bark and will not retain nutrients nor will it drain properly. Spend a few extra dollars and get a good loose, well-drained but moisture-retentive soil rich in organic matter that is “pH adjusted,” which simply means that the pH will optimize the plants uptake of fertilizer.

If you have good alluvial soil but rich in clay, as in many areas of New Orleans, then you may only need to loosen up the soil with compost for drainage. Add fertilizer to the pit mix: if synthetic fertilizer, use 2 tablespoons of 8-24-24; if organic, use a comparable — see the information below on how to convert synthetic fertilizer recommendations to organic fertilizer amounts. Then refill the pit with soil and leave room to place two or three sprouted plants with the large end down--so the spout is facing down--at a 45° angle (see LSU planting guide at end of document). The top of the mirliton must be exposed—covering the whole fruit will cause it to rot.

Don't worry, the sprout will head back to the surface and will draw water and nutrients from the fruit. Water the whole thoroughly and then water on a weekly basis if needed

(test the soil by sticking your finger in the soil up to the second knuckle—the soil should be moist and loose, not muddy. Mulch entire growing area with leaves or pine straw (available at most garden stores) and cover plant with heavy mulch or carpet for wintering. You may want to treat with organic fungicide (see below).

Raised Garden Bed:

If you have low-lying ground that does not drain well, or if you have only a paved area available, consider using a large planter box. The large hardware stores and on-line garden supply outlets have “no hammer or drill” cedar boxes that are easy to install. A 4' x 12' box 18 inches deep should work well since the roots are shallow. There are several web sites with free instructions on how to construct your own raised bed from cedar or untreated rail-road rails.

Using a Potted Plant for Transplant to Ground:

Use loose, well-drained but moisture-retentive potting soil rich in organic matter that drains well and dries out easily and is “pH adjusted.” Overwatering potted plants will damage the plants and encourage plant disease. Using a two-gallon pot, mix in one teaspoon of 8-24-24 fertilizer or comparable manure. Place sprouted fruit “sprout down” as above, at 45° angle with top of fruit exposed on the surface. Water well and place outside in full sun. Keep in mind that the mirliton has its own water and nutrient source and that it will have to develop a dense root structure before it can absorb water from the potted soil, so be careful that the plant does not get water-logged. As the roots develop, it won't hurt the plant to dry out a bit. Shelter the potted plants when extensive raining is anticipated—you may want to place them under a patio table where they can get sun but not rain. Add one teaspoon of 8-24-24-fertilizer or organic equivalent every three months *only if the plant looks faded*.

Create a trellis in the pot with two thin 36 inch bamboo sticks with string or growing tape strung across the middle and top. The plant will climb the trellis. Prepare the planting site as indicated above and transplant the potted plant in April. You may want to treat with organic fungicide.

Trellising:

In Latin America mirlitons are grown on overhead horizontal trellises (see photos). In some parts of the world growers use short horizontal trellises elevated only a few feet off the ground. Indeed, in mountainous terrain, *Sechium Edule* is grown on the ground (I had one grower do this on the levee and his goats ate the mirlitons, so I don't recommend it for Louisiana). The point is that mirlitons are easy to grow—you can just plant them in a hole and let them run up a chain-link fence and along the edge. But if you want a good yield, then horizontal is the way to go. See the photo section for ideas. My first horizontal trellis was nothing more a roll of four-foot fencing about four feet off the ground: supported by a fence on one side and six-foot poles on the other side. This trellis ran about 30 feet long, so I upgraded from about 30 square feet of trellis space to 120 square feet.

Many older growers in New Orleans use a T-trellis made of pipe and wire similar to grape trellises (see photo section) which looks like a clothes line and uses small turnbuckles to adjust wire tension (14 gage wire). These last for decades and are certainly hurricane-proof, but establishing a trellis near a building or tall wooden fence may provide more wind protection for the vines. *If you do not have bees that visit your plants, make the trellis low enough so that you can hand-pollinate and inspect for insects.*

I am growing a mirliton in a ten-gallon container pot as an experiment with container gardening, and for this I set the pot next to a wooden security fence and built a narrow trellis five feet off the ground on the fence using plant holders and bamboo. We hope that our grower network will develop some innovative approaches.

Fertilization:

Experts disagree on the exact amount of nitrogen best for mirlitons. Some suggest fertilizing only three times: upon planting, once in the middle of the season, and once before flowering. LSU extension service recommends one teaspoon of 8-24-24 fertilizer at two-month intervals up to flowering or more frequently if the plant seems to need plant. The nitrogen available in your soil can vary depending on soil type and rainfall, so these suggestions are just guidelines—just fertilize evenly over a period of time so that the plant is growing well and not to pale green.

Unfortunately, the LSU recommend fertilizer mix is only available in bulk fifty pound bags, but Garden-Tone has a 3-4-4 organic dry fertilizer (on-line) that they recommend at 1/4th cup per month up to flowering. Insufficient nitrogen will manifest as yellowing of lower leaves, but excessive nitrogen is a concern as well. Mirlitons are like tomatoes: too much nitrogen can create a robust plant but reduce flowering and fruiting. Some plant pathologists say that too much nitrogen, especially in the spring, can also contribute to plant disease; pathogens like nutrients as well as plants do. Also, keep in mind that synthetic fertilizers and organic fertilizers release nitrogen at different rates, which may affect both plant disease and fruiting. A strictly organic approach with no nitrogen supplements, such as liquid manure, provides slow release nitrogen but that may not be sufficient for fruiting time.

Again, the mirliton is a resilient plant and I know many growers who use organic fertilizers (chicken manure) without much attention to the amount and they still get a good crop. If growers keep careful records of fertilizing practices and yields, we can develop some useful guidelines. (see fertilizer recommendations below)

Watering:

Water on a weekly basis the same amount but put out a rain gauge and use your “second knuckle” test about 12 inches from the base of the plant to make sure that you are not overwatering. A healthy mirliton will wilt during the day in the August summer heat through transpiration, but that is not a bad sign and does not mean the plant needs watering. The plant may have plenty of water and it will, as many plants do, regain water

at night through the process of “imbibation.” A drip system is ideal since it conserves water and reduces soil splash that spreads soil-borne diseases.

Hand Pollinating:

Flowering will begin in September and the plant is self-reproducing with both male and female flowers on same plant. Male flowers will far outnumber female flowers, which contain the actual ovule that develops into the fruit (see photos). Normally bees and insects will pollinate the mirliton, moving from male (stamen) to female (pistil) flowers and transferring pollen from the male flower to the ovule-bearing female flower (see photos). But the Katrina flooding damaged the bee population in New Orleans and I have found that I had to hand-pollinate the plants. This can be easily done with a Q-tip or small #2 artists paint brush by dabbing the male (stamen) yellow pollen and transferring it to the open female (pistil) flowers. There are instructions on the photo site. If you see bees at your plant, let them do all the work. Mirliton honey is considered some of the best honey in the world.

Cross-Pollination Problems

If you are growing the traditional Louisiana variety and want to prevent accidental cross-pollination by insects that have visited a nearby different variety (bees can travel three miles between plants), one suggestion is to hand-pollinate as soon as the female flowers open and then gently wrap that section of the vine with a patch of “summerweight garden fabric” (Google to buy on-line). It’s a light-weight floating row cover of spun-bound polyester that will let the sun and air through. This will keep the bees and insects off the particular flower. And it can be removed once the female flower drops. Do this on a few fruit so that you always have a good “genetic duplicate” for seed for the next year. In truth, if bees are pollinating your vine it is difficult to predict what the cross-pollination you will get. Cuttings in the fall (methods are in the link below) are the best way to ensure genetic consistency.

Expedite Flowering?

If you live in a cooler climate and are trying to get flowering and fruiting in before cold temperatures, you may want to experiment with shade covers. I have yet to see this tried, but covering a vine with a light shade fabric for a few hours a day will even-out the day/dark ratio and might fool the plant into flowering earlier in the season. See the “growers guide update” for details.

Harvesting:

Fruit will mature within about 30 days of pollination. The Louisiana “globular, smooth” variety we are distributing when mature will be about four inches long and weigh approximately nine ounces. You can test for harvesting by pushing on the fruit skin with your thumbnail: if the fruit skin dents, the fruit is still immature and will be too watery; if it is firm and does not dent, you are ready to pick. The fruit will grow larger if left on the vine, but its flesh will become stringy. Mirlitons have a short shelf life and will begin to sprout in 4-6 weeks, so to preserve them a few weeks longer, place them in a small open plastic bag. Do not refrigerate—most refrigerators operate at temperatures that are too

cold for mirlitons and will damage them. They can be preserved in many forms: jams, jellies, pickled, chutneys, dried, candied, and even wine. We will soon have a data-base of recipes and plant processing.

Container Gardening:

It is not clear how large a container is required for successfully growing mirlitons. I am experimenting this year with a ten gallon container. Since the roots are shallow and run, the length and width of the plant container may be more important. Keep in mind that there are inexpensive ways of container gardening, such as using plastic storage tubs, plastic clothes baskets lined with plastic etc. We'll let you know what happens in the first two years of our current experiment.

Pests and Diseases:

Mirlitons don't normally have insect problems in Louisiana, though there are recent reports of leaf footed stink bug attacking fruit (see updates). Vine borers can be a problem: they may respond to synthetic insecticides but organic gardeners are limited to Neem oil which can't be used in temperatures above 85° F. There may be some effective natural insecticide soaps.

The mirliton's principal problem in the sub-tropical climate of Louisiana is air-borne and soil-borne fungi, pathogens anthracnose and, more recently, powdery mildew. The best practice is prevention: keep potted or sprouting plants at a distance from each other and treat with sulfur in the early stages of growth. If the plant gets infected, remove the affected leaves after they yellow and turn brown and dispose in a plastic bag. Removing diseased leaves is important since the fungus will evolve on the leaf and create "sporelators" that issue more fungus spores into the wind--which can contaminate rest of the plant or adjacent plants. If you remove enough leaves from a single stem, the stem will die and it should be pruned off as well. But for every stem pruned, the plant will send up a new shoot.

Signs of fungi diseases vary, but normally the leaves will develop yellow splotches and eventually the whole leaf will yellow (see photos). The infection tends to move along a vine and is easy to spot. I use a "Belomo 10x Triplet Loupe" folding magnifier which helps identify insects and even allows you to monitor the progress of the web-like powdery mildew mycelium on the leaves.

Fungi like powdery mildew grow well in cool humid weather, which means that infection is most likely in the spring after planting. The good news is that fungi don't like direct sunlight, extreme heat, and clean air, so infected mirlitons tend to lose some stems during the summer (preceded by yellowing of leaves) but win the battle with plant disease in the heat of August and recuperate for the fall harvest.

Use of fungicides may or may not help for soil-borne or air-borne diseases once they take hold, but they are not necessary if plants are properly trellised. As a preventative, in the cool months you can use natural fungicides like Neem oil, Bordeaux mix, or sulfur, which seems to be the most effective. In any event, watch the temperature because the

Neem and sulfur will remain on the plant for several days and if the temperature rises into the 80s, the plants may die (phototoxicity). In the last few years there is promising research on organic potassium bicarbonate that is effective on powdery mildew and can be used throughout the growing season (see updates).

In general, a well drained, well-lighted, mirliton with good air circulation will overcome most plant diseases and produce a good yield as long as infected leaves are promptly removed and when dead and disposed of in plastic bags. I use a pair of paper scissors reserved for one plant (dipped in alcohol in between pruning) to ensure that I don't spread plant disease. Farm and gardening stores usually stock High Yield organic brands as well as bulk sulfur.

Rotation:

Mirlitons can produce for up to eight years and year round in climates that have dry periods. But in Louisiana's humid and rainy climate, mirlitons are susceptible to root-knot nematode infestation after three years. Signs of nematode infestation will be poor vine growth. To avoid this, it is advisable to pull up the plant after the third year of production and the next summer "solarize" the site by covering with clear plastic for two months (see "solarization" article below). This will reduce the nematode and soil-borne diseases down to a level of at least 14 inches. Be careful not to "till" the soil after you have solarized it, or you will just move contaminated soil back to the top: instead, make a new hole the same size as your transplant.

If you want mirlitons every year, prepare a planting site on the opposite end of the trellis or in the middle and place a new plant there in the second year. It will be mature and producing during the year that you have left the first site fallow. Rotating three sites along the trellis means that you will always have a mature plant producing. It's a bit like juggling, but I think you get the idea

Wintering Over:

At the end of the season when your harvest is complete, cut back the vines to about two inches from the ground (the plant crown). Check with the growers network to see if anyone wants the vines for livestock feed or for vine weaving projects. Protect the plant from freezing weather by heavily mulching the root area well (six feet in all directions) and especially the crown of the mother plant. Use leaves or straw for mulching and cover with a piece of carpet.

Caution: Raw mirlitons exude a sticky liquid when peeled raw that can cause skin irritation and occasionally some numbness. It's not clear what the "sap" is; researchers think it is complex latex with analgesic effects designed as a natural protection from pests: one mouthful of the raw mirliton and the bug's mouth gums up and turns numb. This is not a problem for consumers since almost all mirliton recipes call for cooking the fruit before peeling, but if you handle raw fruit you need to exercise some caution. Use gloves when harvesting large amounts where fruit damage might occur (especially if

children harvest), and always use gloves when peeling raw mirlitons or peel them under running water.

New Uses of Mirlitons:

Katrina left the New Orleans area with thousands of empty lots. Growing mirlitons on overhead trellises is an excellent form of urban commercial micro-gardening and the shade canopy would inhibit weed growth—a big problem with abandoned lots. In addition, there are a myriad of uses for mirlitons that have not been explored commercially, including food preserving and the use of vines for textiles.

Record Keeping and the Growers Network:

The key to re-establishing the “back-yard mirliton” is to keep it simple for the average gardener. Indeed, the average mirliton gardener may not garden any other plant. The mirliton is the ultimate lazy-persons vegetable: it comes with its own planting kit; it grows well on its own and follows existing paths; you never have to weed it, seldom water or feed it, and if you grow it on an elevated trellis, you just sit under the shade of the arbor and wait until the fruit falls into your lap.

Of course, something can go wrong and that’s where serious growers can help make mirliton growing easier for everyone. We need careful record keeping and trials to establish the best growing methods, especially with respect to controlling plant disease and testing different varieties.

It is important to keep careful records of your plant. I keep a clipboard in my shed and record the dates and frequency of: planting, base-line soil quality; modes of planting (direct or potted transfer plant); container gardening results; fertilizer amounts; watering practices; the appearance of male flowers; appearance of female flowers in bloom; pollination methods and results; fruit set, fruit maturity, and harvest times; average size and weight and number of fruit; signs and treatment of plant disease; and germination of new seedlings. I also have a calendar to remind me when to fertilize or apply organic fungicide.

If you keep records, send us that information at the end of the season and it will help us develop more effective growing methods.

We will soon have a blog site for growers when they can upload their photographs of plant development, trellising methods, etc.

Join the Mirliton Growers Network List by emailing Lance Hill at:
mirlitons@marketumbrella.org

Research on your Own:

The internet has revolutionized agricultural research. Below is a link to common names for *Sechium edule* in other cultures, including the Chinese symbols. Google search now offers fast and free translation in eighty languages, so one of the best ways to research mirliton culture and uses around the world is to enter the word for Sechium Edule for a

particular language and then do a “google translate” for the entire site. The translation is a little rough, but it often offers some great insights (I found a job advertisement in China for someone to develop a mirliton beverage!). For example, a google search for the Filipino word for *Sechium edule*, “sayote,” yields 72,000 hits. You can limit your search, using “advanced search” the Filipino language, and get 42,000 hits, many of which have “translate” on the top line. You can also use free translation sites to “cut and paste” text if google provides a poor translation.

Academic journals are also available on-line, many free if you have a university or student or faculty account, but most of the free abstracts can provide useful information.

Recipes, preservation, and non-food applications:

This document will be updated soon and will have an email address for the Grower’s email list. If you are on the list, you will be notified when the recipe data-base is completed.

If you have any questions, you can contact me at mirlitons@marketumbrella.org

Internet Resources

All these are good links. Your computer may give you a message that you are “opening a file” that may have a virus, but these are, for the most part, publications at educational institutions. **If you “ctrl-click” and the site does not appear, look at the bottom of your screen to see if the file has opened but been minimized. Click to open the site.**

History of Mirlitons:

Dr. Lira-Saade’s 1996 detailed botanical description and history of *Sechium edule* (mirliton or chayote) is the best single publication on the plant species, complete with numerous illustrations and photographs. The report includes nutritional values and a list of international names for *Sechium edule*, 58 pages:

<http://bit.ly/lira-saade>

Florida Sate Historical Society 1981 article on the early history of U.S. government’s efforts to popularize mirlitons. Very interesting and contains several photographs, 5 pages:

<http://bit.ly/floridaHistory>

Botanical Histories and Descriptions:

Zipcodezoo’s excellent botanical description of plant, list of literature and on-line resources, international names, pronunciation guide. 3 pages:

http://zipcodezoo.com/Plants/s/Sechium_edule/

Proto-bases botanical description of mirliton and several photos of plants and trellising, 1 page: [click here](#)

Growers Guides:

Louisiana State University's very good publication on growing mirlitons, with planting illustrations (vegetable pears), 2 pages:

<http://www.lsuagcenter.com/NR/rdonlyres/C9746D8F-B251-4343-9FF0-DDD762F72553/2826/pub2032vegpears1.pdf>

LSU Soil Test Request form – (mark you soil as “alluvial” if you live in flood plain). The standard test is \$7 and if you are in an area that flooded, I would suggest that you pay the additional \$3 for salt testing. Email LSU at stpal@agcenter.lsu.edu first if you have any questions on testing:

http://www.stpal.lsu.edu/PDF/Research_Soil_Sheet.pdf

University of California Organic Gardening free publications:

<http://ucanr.org/freepubs/freepubsub.cfm?cat=9>

Hawaiian grower's guide, 5 pages:

<http://www2.hawaii.edu/~hector/prod%20guides%20fold/CHAYOTE.pdf>

Post-harvest chilling guidelines, 1 page:

<http://www.rain.org/greennet/docs/exoticveggies/html/chayote.htm>

Wooden branch trellising (scroll down the blog page for photos):

<http://forums2.gardenweb.com/forums/load/contain/msg0111093430590.html>

Overhead grape trellis plans and photos:

<http://www.smallfruits.org/Muscadines/production/MuscadineGro/sec14.htm>

Scientific Article on problems of accidental cross-pollination:

<http://bit.ly/bIFFGA>

Short Descriptions of Mirliton Growing and Uses:

Short description of mirlitons (*Sechium edule*) with drawings of plant:

<http://www.hort.purdue.edu/newcrop/1492/chayote.html>

Fertilization articles

How to convert an inorganic chemical fertilizer recommendation into an organic fertilizer equivalent:

<http://pubs.caes.uga.edu/caespubs/pubcd/C853/C853.htm>

Problems with converting inorganic fertilizer to organic by “the numbers”

<http://www.best-organic-fertilizer.com/fertilizer-numbers.html>

Pests and Diseases:

Soil Solarization guide:

<http://ceamador.ucdavis.edu/files/942.pdf>

Anthracnose in cucurbits (mirliton family):

<http://urbanext.illinois.edu/hortanswers/plantdetail.cfm?PlantID=594&PlantTypeID=9>

Nepal scientific article on insects and mirlitons, 4 pages:

<http://journals.sfu.ca/nepal/index.php/JIAAS/article/viewFile/711/676>

Academic article on pesticide and fungicide use, inorganic and organic, in Costa Rica chayote production, 33 pages:

http://jpe.library.arizona.edu/volume_16/Galt.pdf

International Names for Mirlitons

Sechium edule names around the world, 1 page:

<http://www.plantnames.unimelb.edu.au/Sorting/Sechium.html>

Sechium edule names around the world- Wikipedia:

<http://en.wikipedia.org/wiki/Chayote>

Propagation Articles

Scientific article on how to do propagate from vine cuttings, 3 pages:

<http://www.nepjol.info/index.php/JIAAS/article/viewFile/669/635>

Indole Butyric Acid for mirliton cuttings (internet sales):

<http://www.super-grow.biz/IBASolvent.jsp>

Grower sprouts mirliton from only the seed (taken out of the fruit):

<http://central-america-forum.com/shared-images/chayote-seed-sprouting>

International Growers:

Vietnamese low-trellis mirliton farm (Susu) photo:

<http://www.flickr.com/photos/21552014@N00/2677061064/>

Philippine growers:

<http://www.bulatlat.com/news/5-42/5-42-sayote.htm>

“Green Gold” report on mirlitons (sayote) in Philippines:

<http://www.bulatlat.com/news/5-4/5-4-sayote.html>

Jamaican uses of mirliton (chocho):

<http://www.getjamaica.com/Jamaican%20Food%20-%20Jamaican%20Chocho.asp>

Salazie Province history and uses of mirliton (chouchou), including textiles and hats.
Note that the nickname for the plant is “pet”:
<http://www.speedylook.com/Salazie.html>

Dissertation on Costa Rican Contract Growers, 218 pages:
<http://library.wur.nl/wda/dissertations/dis3966.pdf>

Bibliographies:

Australian bibliography of scientific articles on mirlitons, 1 page:
http://www.newcrops.uq.edu.au/listing/species_pages_S/Sechium_edule.htm

Medicinal Uses of Mirlitons

New scientific uses of mirlitons
<http://www.sciencepub.org/nature/0203/06.pdf>

Photographs:

My flickr site with detail comments (click on captions for more details, click on photos to download and view close-ups with your viewer zoom tool:
<http://www.flickr.com/photos/sechium/sets/72157617665608097/detail/>

My picasa photo site with extensive photos of grower site visits, pollination techniques, traditional Louisiana heirloom varieties:
<http://picasaweb.google.com/lancesphotos>

Chayote Tubers photograph (these can be harvested without damaging the plants):
<http://upload.wikimedia.org/wikipedia/commons/4/4b/Ichintal.jpg>

Recipes:

Drying Mirlitons (sayote)
Scientific article on dehydrating mirlitons, 8 pages:
http://www.enpromer2005.eq.ufrj.br/nukleo/pdfs/0472_paper_472_enpromer_2005_revised.pdf

Mirliton Jam (choko in Australia)
<http://www.roslyndeakincookbooks.com/may05.html>