

Chapter **TWELVE**

Supercharged Vegetables - Varieties That Grow Well

In This Chapter

- **What Grows Well**
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- **Results Of Our Planting Trials Over Our First Six Years**
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AquaponiGardens grow a lot of vegetables much better than these same vegetables will grow in the ground. There still are some things you just have to grow in the ground, like raspberry bushes and redwood trees. So aquaponics is obviously not a perfect match for every plant. However, many of the edible plants we eat every day (or that we should eat every day, anyway!) grow twice as fast in aquaponics, last much longer in your fridge, and taste better than any other vegetable you've ever eaten - even organic - that was grown in the ground.

We'll cover in what worked well and what didn't work at all in a general manner, and then we'll give you a "planting trials" section with very specific information on well over one hundred different varieties of vegetables.

What Grew Well

There's a ton of stuff aquaponic gardens grow really well: all the basil (and there are a lot of different kinds of basil); oregano, cilantro; curly parsley and Italian parsley; mint and lemon balm; and other specialty herbs; all kinds of lettuces; chives, green onions, leeks, strawberries, green beans, purple beans, snap peas, snow peas, regular peas, Japanese cucumbers, all kinds of tomatoes; celery and celeriac; many different kinds of oriental stir-fry vegetables including kyona mizuna, bak choi, tat soi, and mustard; cabbages, kohlrabi, silver beet/Swiss chard; taro,; watercress, pepper cress, and garden cress; broccoli, cabbage, raab, and romanesco.

Root vegetables that surprisingly worked well included bulb onions, several kinds of radishes; white and purple kohlrabi; golden, chiogga, and red beets; and white and purple turnips.

We grew tomatillos, garden berries, thornless blackberries, a papaya tree, banana plants; and amaranth and quinoa, both of which are **grains!** Wheatgrass grew like wildfire, and could be cut and regrown up to three times while still staying very sweet, and when left to grow, turned into amazing wheat heads with delicious wheat grains. There are lots of other plants that probably would grow well, so feel free to experiment.

One of the smartest things you can do is to get a good backyard organic gardening book and use it as a reference. There will be a ton of information about things such as beneficial insects, growth habit (shape), and varieties that are best for certain climates.

You can ignore the information the book gives about soil pH, nutrient levels, or about needed fertilizers and what percentages of lime, phosphorus, calcium, etc., are needed. You should pay attention to the general information the book gives about actually growing these things. We're not the experts in horticulture (the science, technology, and business of intensively growing plants for human use) - in fact, we began in 2007 not knowing how to grow anything. We'd never even been able to keep a houseplant alive! We speak only from our direct experience, or the experience of trusted co-explorers that we've either learned from or coached.

There are some significant differences, though: you will find that almost everything grows in an aquaponic garden in about half the time the gardening book says it should take in the ground. You will also find that the resulting produce has incredible shelf life, and much better taste than even organic soil-grown produce. Some things, like watercress and basil, grow like weeds in our aquaponic gardens with no pest problems whatsoever, in stark contrast to how difficult it is to grow them in the soil, even with plenty of water!

Also, ask your neighbors who garden about their experiences. The only thing an avid gardener likes to do as much as gardening is talking about gardening. Be a good listener and you will get absolutely invaluable advice, free of charge.

What's Not Appropriate For Aquaponics

Marijuana is the first and most important thing that's not appropriate this type of aquaponic gardening. Not only is it illegal according to Federal law to both grow and possess, but our "deep water raft" aquaponics systems simply don't work for growing marijuana. There are other books out there that talk about growing "tomatoes" with tongue in cheek; in this book, when we say tomato, we mean tomato! If that's the reason you bought this book, please rethink your plan, because we're not kidding when we say it does not work.

How do we know? We're not going to put one of those cute smiley faces on this one, there's no "wink wink" here. We know, because we tried it in our aquaponic systems for eight months, and could not get any aquaponically-grown marijuana plants to live through their flowering phase in our deep water raft systems. As of this writing (November, 2013), we will be facing a Federal judge soon, and the possibility of five years in prison for our flaunting federal law. Don't be stupid; it doesn't work, and it's unlawful. Even in a state where it's legal on the state level, or even legal for medical use (as is the case in Hawaii), it's NOT lawful on the Federal level, and they're the proverbial 800-pound gorilla. You do not want to fight them. If you choose to walk down this path, be aware that you will be out on some very thin ice, and you may find yourself facing time in federal prison.

What Else Have We Noticed?

What just plain didn't grow well was the following: melons and squashes didn't do well because of problems with blossoms and fruits rotting during one planting, but did great on other plantings, and we're not sure why. Lima beans and fava beans grew huge bushes but made no beans; both sweet and hot peppers all grew well, but then seemed to die and stems rotted out; an eggplant finally matured a three-ounce fruit after three months next to a tomato plant that had given 200 pounds of tomatoes during the same period.

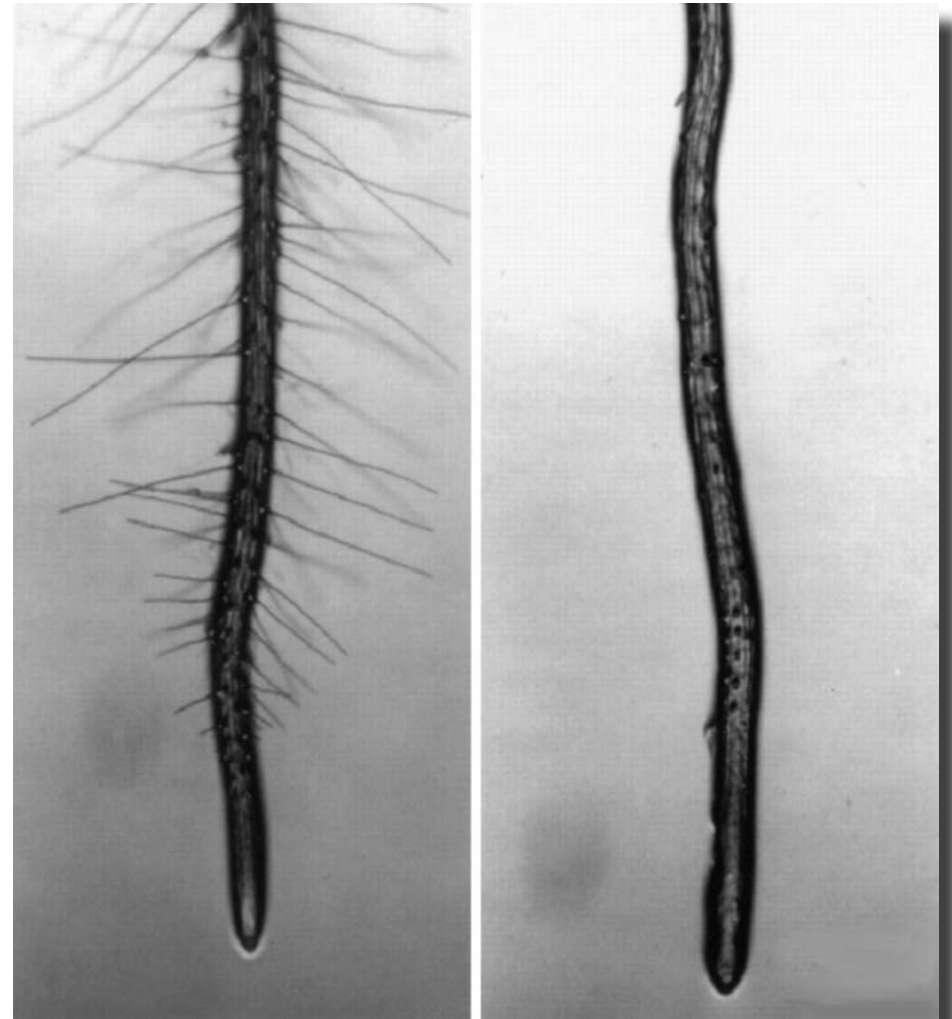
This was during our first system planting. Since then, we've gotten eggplant to grow enthusiastically, though aphids loved the plants. We've had lima bean bushes loaded with lima beans (yummy in soup!), as well as sweet melons and huge squash. We don't know what the difference was that made them grow poorly then and well now, and that leads us to be wary of saying "this or that doesn't grow well" in aquaponics.

For example, we've gotten taro (an in-ground root crop) to grow exceedingly well in our aquaponics systems. We've got thriving pineapple plants, and we grew an eight-foot-tall banana plant in a Micro System (hey, we're in Hawaii!), that threw off banana "keikis" (babies) at its base, each of which is a clone of the mother tree and can be successfully cut off and planted to make another more bananas. We've also noticed that plants that reproduce by budding/cloning (celery, banana plants, taro, sweet potatoes) and shoots (mint, watercress, mint, ginger, tumeric) do the same thing - both buds and shoots form at a **very** young age.

We've found that fruiting plants have a tendency to bloom when they're tiny, and so the blooms need to be pinched off until the plant develops a large enough root system to be able to sustain fruiting. It's our best guess that this is because soluble nutrients are so readily accessible to the plant - it's supercharged from the very beginning.

By looking through a microscope at the roots, we've found that there is an entire root structure that seems to be missing in aquaponic plants. The part of the root called root hairs, which function to of going out into the spaces between

the soil particles to find water are just not there. We think this might be a major contributing factor in how rapidly plants grow in aquaponics systems of every size. We have discovered so much more that grows amazingly well in Aquaponics, and our best hope is that you will experiment, make discoveries, and share your new knowledge about these systems in a manner that will add to the total body of aquaponic knowledge.



In aquaponics systems, plant roots simply do not seem to grow root hairs, probably because water is so readily available, along with the soluble nutrients that are dissolved in the aquaponics water.

What Grew Well - And Not So Well:

General Overview of Aquaponics Test Plantings, December 2007 to December, 2013

Many things grow VERY well in Aquaponics systems. They are: any leafy plant where the whole plant is harvested and used, such as lettuces, cabbages, oriental stir fry varieties, kale, chard/silver beets, kohlrabi, culinary herbs, green onions, chives, leeks, and green onions; fruiting plants such as melons, cucumbers, squashes, tomatoes, strawberries, peppers, okra; and many different kinds of legumes including peas, sugar snap peas, purple beans, green beans, French green beans, and Chinese long beans.

But what grows well in the system you build, in your location, you will have to determine through experimentation or learning from another gardener (dirt gardening is fine to learn about the types of plants that grow well where you live). This information will vary a great deal from place to place, as it is highly dependent upon your temperature, the amount of sun/light your system receives, etc. In other words, all the same considerations you would have to give

to that location if you were planning what would go into a garden in the ground. Where is the best place to put your system? Put it where the sunlight is best and most plentiful at your site.

Many different kinds of flowers (both edible and cut) grew very well, especially delicious nasturtiums and marigolds, chrysanthemums, basil flowers, oregano flowers, sunflowers (all edible), and zinnas.



Nasturtium, "Empress of India"

Leeks grew in half the time it takes to grow them in the dirt, and got HUGE, while still being quite tender and flavorful. We cut and re-grew leeks for months. We tried 3" net pots, but 2" pots work just as well. Green onions, chives and regular bulb onions (which grew on top of the rafts!) all grew wonderfully.

Some unexpected things grew really well; we got a sweet and flavorful three-pound pound turnip that grew on TOP of the pot, on top of the raft, and still had two feet of turnip greens sticking up above that (which were also sweet and flavorful). Kohlrabi, parsnips, yellow and red onions, radishes, taro (a Hawaiian root crop), and beets grew the same way. Carrots, however, did not grow on the top of the rafts, but instead filled the net pot with very strange and twisted shapes.

We grew mint, ong choy (Vietnamese water spinach), watercress, and pepper cress, along the sides of the rafts, in the space between the raft edge and the trough side. We trained tomatoes, green beans, and sugar snap peas to climb on a trellis, using plant tape (a green, soft tape available in garden supply centers). We trained squash and melons to grow out over the ground, and harvested hundreds of pounds of some cultivars, while others did not do well at all - this is an area you will have to experiment with, as we have not yet figured it all out!



WARNING!

Remember, if you have a pest attack, YOU CANNOT USE POISON; you can't spray bug sprays! If any of this stuff gets into your water, it will kill your fish. Even things as mild and organic as neem oil spray have killed all the fish in one of our student's systems. We've even had a student that killed all his fish by applying insecticidal soap to his system, which he thought would be OK because he was in a greenhouse. He was wrong. See Chapter Nineteen for more information on this.

Some things didn't grow well in our initial tests. These need further research to figure out what happened. Did we plant at the wrong time of year, use the wrong variety of seed, did our plants not get pollinated adequately, did it need some kind of special nutrient supplement that wasn't present, does that variety just not respond well in an Aquaponics system? (The first trial to which we refer was planted outdoors in December of 2007, at the beginning of a six-week long cold, rainy period. Germinating your seeds indoors gives you much better results if it's cold and wet outside. However, even our subsequent, and much more extensive tests are not conclusive. Please understand that what grows well for you may be completely different, based upon a whole host of factors!)

All in all, the "failures" were a small minority. Almost everything we planted in the system grew like gangbusters in about half the time as in the dirt. Below are two comparison photos, taken of our very first planting, in early 2008. This photo shows the almost unbelievably rapid growth in an entire large system. This is how your plants will grow in your AquaponiGarden!



Photo of squash plants, taken 1/7/08, in our very first system ever.

Since we began in 2007, with our first plants into our first large commercial system in early 2008, we have built a several test systems. We have one test system in our Aquaponics Solar Greenhouse (even though we don't need a greenhouse at all in our location!), and five outside, so we can run more controlled tests. These systems are designed so we can adjust and control more things in the system. Trying things out in the greenhouse system allows us to eliminate many possible pest problems. If a variety still doesn't grow well in the greenhouse, we'll know it is some other factor than pests, or lack of warmth. So check back to our website, and we'll keep you updated. Make sure to sign up for our free newsletter, as that will share a lot of what Tim calls "Aquaponics Nuggets". In those Newsletters, you will find the most up-to-date information that we have about how to get as much food as possible out of your AquaponiGarden.



Another photo taken from the same place, on 2/9/08, of the same squash, front right. Also, broccoli, fava, cress, and basil in this photo.

NOTE: **Bold** text indicates that this plant grew well, plain text indicates that plant either didn't flourish, or didn't fruit.

Initially, all these seeds were obtained from Baker Creek Seed Company, <http://www.rareseeds.com>, and were all heirloom varieties, but not all organic. Subsequent tests have included seeds procured from Johnny's (<http://www.johnnyseeds.com/>, NOT owned by Monsanto, and an excellent company, in all ways), Territorial, Seeds of Change, and Seed Saver's Exchange. Descriptions from seed packets and catalogs, along with our own observations and experiences.

Flowers

Marigolds – yummy in salads! For those who like the idea of companion planting (which is not, unfortunately, backed up by scientific studies), marigolds are supposed to be a great detrimental insect repellent. We like to make leis with them, and we both eat them in salads and blend them into "green drinks". They're really pretty, so we interplant them wherever we have an empty hole. Marigolds are used as a natural feed additive for chickens, to brighten the yolks of eggs, and for fabric dyes. We planted a cultivar called "Orange Hawaii", which gave us large, deep-orange flowers that the seed packet said would grow to 4" across, but ours were 5½" across – HUGE and very striking and beautiful, and also tasty! The seed packet also said plants would grow to three feet tall, but ours grew to five and a half feet tall!

Aster - Giant Perfection Mix - Beautiful, long-lasting cut flowers, an old-fashioned favorite. Asters originated in China. Peony type, extra-large flowers, great for cutting.

Bachelor's Buttons - Tall Mixed Colors - An old-fashioned mix of tall types. Many beautiful colors: purple, violet, light and dark blue, rose, white, lavender, pink and more! Very easy to grow.

Nasturtium - The edible flowers are popular for salads and as a garnish; the peppery leaves are also very flavorful. A colorful garden favorite that grew phenomenally well in our system. Plants got HUGE, leaves are edible as well. Make sure to plant on an end of a grow bed, so it can grow out over the ground. The whole plant is edible.



Our smiling intern, Tracy, with her ever-present coffee cup, and mint (far left trough, outside the empty PVC frame), basil (left trough, inside the PVC frame), and in the right trough, top to bottom: stir fry mix, marigolds, zinnas, September '13.

Veggies

Thai Winged Beans (*Psophocarpus tetragonolobus*) This is a unique beans, with delicious pods that have four winged edges, the leaves are cooked like spinach and the roots have a delicious, nutty flavor. This high-protein bean is an excellent crop in aquaponics. The plants are tropical and do best in warm areas. Soak seeds 24 hours before planting. It's a climber, so it needs to be strung up, (I used my tomato trellises). Plant along the back row of a grow bed, so as to not shade plants on sunny side.

King of the Garden Lima - Large 8-10' vines yield very LARGE white lima beans and give huge yields over a long season, as long as the beans are picked daily. An heirloom from 1883. An old-fashioned favorite, excellent for home gardeners.

*A full pot of
Henderson's Lima Beans
- great with butter!*



Henderson's Bush Lima (Introduced in 1888 by Peter Henderson & Co. and one of their most famous varieties; it's still popular to this day. In 1888, Henderson offered \$100.00 in cash for plants bearing the most pods and said, "A VEGETABLE WONDER!!!" & "Can and should be grown in every garden..." and "Of all the Novelties ... ever sent out, there is nothing so entirely distinct and valuable as this New Vegetable." Dwarf bush plants can be grown like regular bush beans. Seed packet says tasty, tender lima beans, and very early too! (So, that means they're good in colder climates/higher elevations).

We also tried a few cultivars that grew beautiful, lush leaves, but never formed beans. We're not sure why, and more experimentation is needed.

Long Beans

Chinese Red Noodle Bean - This is the most stunning and unique bean I have ever seen. Fantastic deep red 18" pods are delicious, full of nutrition, and they even keep most their color when sautéed! Long vines produced all spring and summer. Must be trellised. Plant along the back row of a grow bed, so as to not shade other plants.

Chinese Green Noodle - 20" pods are straight and smooth, bright-green, and of excellent quality. This hardy long bean grew very well in our systems. Very tasty stir-fried. Plant along the back row of a grow bed, so as to not shade other plants.

Beans

Royalty Purple Pod - Seed packet said 56 days, I had beans on a 4" tall plant that was 33 days from germination! Tender, bright purple pods turn green when cooked. Very ornamental, beautiful and tasty beans. Bush plant.

Golden Wax - Delicious, golden-yellow pods are stingless and are of good quality with rich flavor. This old-time favorite grows on in a bush plant.



On the top left is a photo of a Golden Wax bean plant that was 6" high but already had 2" long beans! The beans were sweet and delicious, and there were a lot of them. This is a wonderful variety in aquaponics. On the right is a Royalty Purple Pod bean plant that was also tiny - also just 6" high, with 2" long beans. In this photo, you see almost the entire plant. We picked pounds of beans off these plants over several months. The kids loved eating them right off the vine. Very tasty!

Rattlesnake Pole Bean - This pole bean is easy to grow and produces lots of green pods that have purple streaks. Good flavor and very tender, the speckled seeds are great in soup. This variety is great for hot, humid areas. Plant along the back row, on the side away from the sun's direction, so as to not shade plants on sunny side of trough.

Lettuce (*Lactuca sativa*) Mixes - sold by Baker Seeds

European Mesclun Salad - Grow this mix of greens for one of the tastiest salads ever! Flavors range from sweet-mild to sour-hot-tangy, and colors come in red, purple, yellow, and green. Colorful lettuce, radicchio, arugula, endive, orach, mizuna, kale, mustard, corn salad and more.

Rocky Top Lettuce Salad Mix - Brightly colored and unique lettuces; it made a flavorful and brilliant salad.

Red Wing Lettuce Mix - "The All Red Formula Mix". At last a lettuce mix that contains a wide range of the best brilliant red (and red splashed) specialty types. Beautiful mix.

Siamese Dragon Stir-Fry Mix - All the best Asian greens for stir-frying and steaming. The rich flavor of these greens is incredible when lightly cooked and seasoned with garlic and Thai peppers. This formula mix is perfect for market growers. Also plant them very closely together with a healthy pinch of seeds, 20-30 per net pot to pick the greens in the "baby stage" for a tangy salad mix.

Lettuce (*Lactuca sativa*) Mixes - sold by Johnny's

Wildfire Mix - High percentage of red leaves. This blend was created for high color contrast of the darkest red varieties paired with vibrant green varieties. Includes Green Oakleaf, Red Oakleaf, Green Romaine, Red Romaine, and Red Leaf lettuces.

Allstar Gourmet Lettuce Mix - A specially designed blend based on two years of trial research. Selected varieties yield darker reds and greens even under low-light conditions indoors or in a greenhouse. Ruffled edges and unique leaf shapes provide loft, interesting texture, good shelf life, and fancy appearance.

Encore Organic Lettuce Mix

An all-organic, stunning lettuce mix of different colors, shapes and textures. Suitable for outdoor production or in low-light conditions present indoors and in greenhouses.

Five Star Greenhouse Lettuce Mix

A blend of downy mildew resistant varieties for indoor production, newly reformulated for more uniform growth rates. The components were selected for their ability to hold their color (especially red leaf varieties) and resist downy mildew.

Cucumbers

Chinese Yellow - Beautiful, yellow-orange cucumber from Mainland China, the young fruit is green. 10" fruit are as crisp as an apple. Very mild and delicious, great for slicing or for pickles. A very rare Chinese heirloom. Plant in the edge row of a grow bed, to allow it to crawl over the ground.

Suyo Long - Long, ribbed, dark green fruit can grow to 18". They are very mild, sweet and burpless. Excellent for fresh eating. This productive heirloom comes from northern China and is very attractive. Plant in the edge row of a grow bed, to allow it to crawl over the ground.



A Chinese Yellow cucumber blossom with the baby cucumber forming just to the right of the blossom.

Eggplant

Ping Tung - From Ping Tung, Taiwan. Fruits are purple and up to 18" long and 2" in diameter. This variety is so sweet and tender, superbly delicious! One of the best Chinese eggplants on the market. Did not thrive in 2008, it's done much better in current trials, though aphids love the plants and colonize under the plant's broad leaves.

Listada de Gandia - One of the most popular heirloom types, this variety has 7" long fruit that are white with lovely bright-purple stripes. Very beautiful & with fabulous flavor in the sweet, tender flesh. This great variety hails from Italy, a country that is renowned for fine food. However, it took three months to get one 3" fruit, right next to a tomato plant that gave us 200 pounds of tomatoes in the same period. Did not thrive in 2008, it's done much better in current trials, though aphids love the plants and colonize under the plant's broad leaves.

Fennel

Orion (F1) (*Foeniculum vulgare*) - from Johnny's Seeds - Big and high-yielding, with large, thick, rounded bulbs. Crisp and flavorful with a nice anise flavor. Due to its heavier bulbs, Orion has a higher yield potential than flatter heirloom fennel cultivars.



Young Orion Fennel (*Foeniculum vulgare*)

Di Firenze (*Foeniculum vulgare*) - This is the anise flavored vegetable that Italians love. Large one to two pound bulbs are delicious in soups, sautéed, baked, and raw in salads. This Italian authentic Italian "Finocchio" cultivar grew huge and gorgeous, with the bulb forming on top of raft.

Garden Berries

Red Wonder Wild Strawberry - This variety was selected to produce large, elongated red fruits that are sweet and aromatic. Perfect for growing in flower gardens and containers as the plants, flowers and berries are ornamental. So delicious, the fruit won't last long! Plant did well, with small, tasty fruit that the kids loved.

Wonderberry (*Solanum burbankii*) - Developed by Luther Burbank, tasty small blue-purple fruit, and good fresh or cooked. Small plants produce good yields in about 75 days. A historic heirloom that is easy to grow and fun for kids. Bush grew HUGE (probably should grow this in the ground and water it with system water).

Strawberry Spinach (*Chenopodium capitatum*) - An old-fashioned plant that dates to 1600 AD in Europe. This curious plant produces greens that are picked and cooked like spinach, but it also produces sweet, red berries that are rather bland. These add a nice touch to fruit salads. Easy-to-grow plants are similar to "Lamb's Quarters", a wild relative. Found in a European Monastery garden.

Garden Huckleberry (*Solanum melanocerasum*) - Large purple berries, that are that cooked and sweetened, (do not eat raw). Great in pies, huge yields of fruit all summer long. Plant 14" apart. Strong tall plants do not have to be staked. Grow plants like peppers. Great for anyone wanting quick easy berries, and a huge yield. Originated in Africa.

Chichiquelite Huckleberry (*Solanum nigrum*) - Sweet purple berries are great fresh or cooked. They are much like Wonderberry but are larger in size with heavier yields. Very easy to grow; start seeds and grow like pepper plants. 75 days to harvest, says seed packet; in our AquaponiGardens, it took days 35 for small berries, and 45 days for very large ones. Add sugar to make jam or pie.

Herbs

Basil – Bushes must be harvested from regularly, or plant goes to seed. Excellent for cut and regrow, up to three times.

Genovese Basil - This famous Italian heirloom is very popular with many cooks. Bushes must be harvested from regularly, or plant will go to seed. Excellent for cut and regrow.

Siam Queen Thai Basil - Very strong, clove-scented basil. This heirloom is very popular in Thailand and is a very flavorful specialty variety.

Lime Basil - A unique lime-flavored basil from Thailand.

Cinnamon Basil - Spicy flavor, tasty Mexican variety.

Licorice Basil - Has a strong licorice scent and flavor. Unique.



Lettuce Leaf Basil grew brilliantly in our aquaponics systems.

Dark Opal Basil

- A beautiful and ornamental variety, for garnishes and cut flowers. Mostly deep purple leaves, with 20% variegated or green leaves makes a great color combo. Leaves average 1½-3" at full size (16-18" tall).

Lemon Basil

- Wonderful lemon fragrance & taste, a real culinary delight.

Lettuce Leaf Basil

- Huge 3-5" leaves; Japanese basil with a great flavor.

Fine Verde Basil - Very small, fine leaves on compact bushes. Perfect rich, spicy basil flavor that's perfect in Italian food. Our absolute favorite basil ever – no chopping required when using it to cook!



Chinese Chives Mix - (*Allium tuberosum*) Cold-tolerant and great for greenhouse production, this chive mix has a wonderful garlic flavor and is popular in Asian cuisine. Cut and regrow, for months!

Thyme - French Summer (*T. Vulgaris*) a very aromatic French variety; not winter hardy. Slow-growing, small plant. Roots did not seem to do well in the water.

Yarrow - (*Achillea millefolium*) Beautiful when used as a dried flower. Also popular as an herb, used for colds, fevers, and for healing wounds.

German Chamomile - (*Matricaria recutita*) Beautiful small flowers, makes a relaxing tea with a sweet fruity fragrance, medicinal. Attractive plants; got very large in the system, with lots of flowers. Harvest flowers daily.

Shungiku Edible Chrysanthemum - Delicious green leaves are great in salads and stir-fries. The brilliant yellow flowers are also tasty! A beautiful Oriental heirloom, very colorful. Did exceptionally well!

Shisho or Perilla Purple Zi Su - A beautiful and delicious plant that is very popular in Asia. The purple-red leaves are used to color and flavor vinegar and to make a beautiful pink rice. Great in salads; flavor is a mix of basil and mint.

Kales (*Brassica oleracea*)

In general, the plants grew very well, but cabbage moths and the Chinese beetles loved every kale we've ever planted! Get floating row covers to cover your AquaponiGarden or use a screen house or a greenhouse. Harvest it very young, or simply consider planting kales as a "sacrifice" planting, because in our experience, when kale is around, the bugs don't bother anything else!



Dwarf Siberian - This tasty Russian variety produces leaves that are only slightly frilled and of top quality. 16" plants are very hardy and productive.

Russian Red Ragged Jack - Very tender and mild, a pre-1885 heirloom variety. Oak type leaves have a red tinge, and stems are a purplish-red. One of our favorite kales. Great flavor.

Blue Curled Scotch - Compact plants yield tender, blue-green, crinkled leaves that are quite delicious, very cold hardy, and rich in Vitamin A.

A net pot planted completely with brassicas (mostly kales), 10-15 seeds per pot, for harvesting baby plants for salad or stir fry.

Five Color Silverbeet from Baker Creek Seed Company (which sells only heirloom seeds), also called **Orange Fantasia**. These plants grew HUGE. The largest I weighed (not this one, it is still young) was 6.83 pounds / 3 kg with the stalks looking tough and stringy. Even though the plant was old, when it was cooked, the stalks were tasty, sweet, and tender.



Chard (*Beta vulgaris*)

Five Color Silverbeet (Rainbow Chard) - A beautiful chard, its colors are brilliant (pink, yellow, orange, red and white). This chard from Australia is very mild, ornamental, and tasty. Pretty enough to plant in the flower garden, so delicious, one of our favorite greens! Grew brilliantly in our systems. Sometimes sold as "Bright Lights".

Orange Fantasia - beautiful, brilliant orange. Very tasty. Grew beautifully in system.

Fordhook Giant (*Beta vulgaris, cicla* group) - The standard green Swiss chard, with medium green and savoyed (crinkled) leaves with white veins and broad, white stems.

Ruby Red or Rhubarb Chard (OG) (*Beta vulgaris, vulgaris* group) - Candy-apple red stems with dark green, red-veined leaves. Great as a true red color in salad mix.

Melons

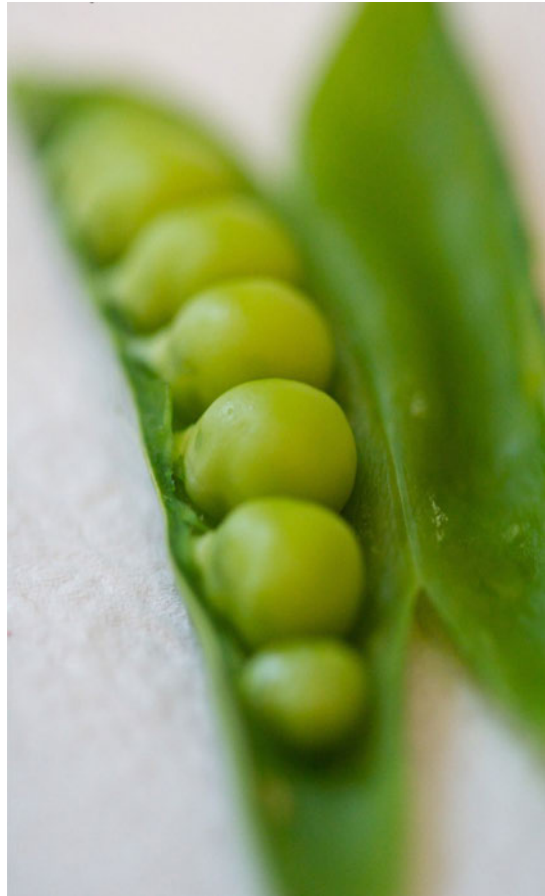
We tried cantaloupe, honeydew, watermelon, and many other special melons. We got only a few small melons before the blossom end rot got them. The vines produced many flowers from a very young age, and began to form fruit, which we believe was mostly destroyed when the vines got blossom end rot. We got perhaps one melon for every twenty flowers - though that one melon was a really tasty, flavorful, and sweet melon! We need to find a suitable, safe, and organic application to remedy this, because the all the varieties of melon vines themselves looked GREAT!

Snow Peas (*Pisum sativum*)

Sugar Snap - This is the wonderfully sweet, edible-pod pea that you've seen selling for \$10.00 per pound in gourmet grocery stores. The delicious, tender pods are great raw (most got eaten before we ever leave the garden), stir-fried, or in salads. They also freeze very well. Plants did exceptionally well, with pounds and pounds of peas per plant.

Oregon Sugar Pod II - Large, thick, 4-5" pods are superbly tender and delicious. This is my favorite snow pea. Bush plants are high yielding and stay compact. Developed by Dr. James Baggett, of Oregon State University. Plants did very well, with pounds and pounds of peas per plant.

Sugar Snap Peas in our aquaponics systems thrived. Peas need to be picked daily, so they keep on producing. Like beans, if the pea pods dry on the vine, the plant stops producing and dies.



Spinach - overall, didn't thrive. Needs "drier feet" (roots).

We tried Bloomsdale Long Standing Spinach (*Spinacia oleracea*), a true spinach, and New Zealand Spinach, (*Tetragonia tetragonioides*). Neither did well in our systems.

Red Malabar Spinach - This beautiful plant is not a true spinach but a different species (*Basella rubra*). This heat-loving Asian vine has lovely red stems and delicious, succulent leaves that are great in salads and stir-fries. A delicious green that can be grown as an annual in many areas or as a perennial in sub-tropical areas.

Summer Squash (*Cucurbita sp.*)

White Scallop (*Cucurbita pepo*) - A very ancient native American heirloom squash, grown by the Northern Indians for hundreds of years, first described by Europeans in 1591 AD, and one of the best tasting and yielding varieties still around today! Great fried and baked. Flat fruit with scalloped edges, beautiful! Plant at edge of raft, grow over edge.

Winter Squash (*Cucurbita sp.*)

Red Kuri (Hokkaido) - (*Cucurbita maxima*) A red-orange Japanese winter squash, fruit are 5-10 pounds and teardrop-shaped. The golden flesh is smooth, sweet and rich, a great yielding and keeping variety. Grew very well, vines got huge; many fruit. Plant at edge of raft, allow it to grow over edge.

Shishigatani or Toonas Makino - (*C. moschata*) The unique Japanese pumpkin that was developed in the Bunka era of the Edo period (1804-1818). The fruit are uniquely shaped, like a bottle gourd and are ribbed and very warty. They are dark green, turning to tan at full maturity. The fine-grained flesh has a delicious nutty flavor. Traditionally

believed to prevent people from getting paralysis if eaten in the hottest part of summer. Shishigatani pumpkin is a famous vegetable in Kyoto cuisine. Very rare and historical.

Long of Naples (*C. moschata*) - Large, oblong-butternut shaped fruit can weigh 20-35 lbs. The flesh is bright orange; flavor is superbly rich and very sweet. The skin is deep green, turning tan in storage. These are attractive squash and great for areas with warm, long seasons. A good heirloom for home or market growers. A beautiful very old Italian heirloom that was listed in America by Fearing Burr in 1863; very rare in the USA.

Pennsylvania Dutch Crookneck (*C. moschata*) - A popular 19th century Pennsylvania variety that is still grown in many Amish communities. Sometimes called "Neck Pumpkin" because of its long, flesh-filled neck. It kind of resembles a giant butternut squash with a very long neck; they can reach 20 pounds in size! The flesh is superb, being deep orange and richly flavored, making it so popular with Amish wives for making their delectable pumpkin pies, butters and other desserts. A favorite of ours; lasts months on the shelf.

Honey Boat Delicata (*C. pepo*) - One of the sweetest squash varieties in existence. Oblong, Delicata shaped squash have tan skin with green stripes. Excellent quality. Developed by Dr. James Bagget, Oregon State University.

Black Futsu (*C. moschata*) - Rare, black Japanese squash; the fruit is flattened, round and has heavy ribbing. Very unique and beautiful. The black fruit will turn a rich chestnut color in storage. Flesh is golden color and has the rich taste of hazelnuts. Fruits are 3-8 pounds each, and vines give huge yields, with good insect resistance. Grew wonderfully here. Very popular in Europe.

Sucrine Du Berry Squash (*C. moschata*) - A famous, old, traditional variety from the heart of France. It has a sweet, musky fragrance and a delicious, sweet flesh that is used in jams, soups, and many French recipes. Small 3-5 lb. fruit are perfect for roasting and have deep orange flesh.

Jumbo Pink Banana (*C. maxima*) - Large, pink, banana-shaped fruit that can weigh 10-40 lbs. This variety is over 100 years old. Fine flavored, dry, sweet, orange flesh that is superbly fine tasting. Popular on the West Coast. Large yields off of huge vines.



Jack, left, with a Long of Naples squash; Rose in the center, with Pennsylvania Dutch Crookneck; Lucky, on the right, with a Black Futsu.

Celery (*Apium graveolens*)

Celery grows slowly from seed, but puts off a lot of "pups", or new starts. These pups will save you a lot of time if you plant them instead of seeds. Just break off whatever pups you want to plant, and put them in coir and vermiculite, in a net pot. Keep in your sprouting table, or plant directly into your AquaponiGarden.

Conquistador - Tall, dark stalks. Conquistador is an early, widely-adapted celery that produces full, upright heads packed with crisp, flavorful stalks. Performs well in hot conditions.

Tango (OG) - Vigorous organic celery, similar to Conquistador, but the flavor is better and the stalks are more tender and less fibrous. The plant is also a few inches taller. Tango performs well under less-than-ideal growing conditions such as heat stress, which often causes celery to bolt. Our favorite celery, by far.

Oriental Stir Fry Greens

There were a number of different kinds of heartier greens that grew amazingly well in the system. All these can be eaten either raw or cooked, and the entire plant is edible, up to and including when the plant is bolting! (Usually the plant becomes too bitter to enjoy once the process of going to seed has begun.) Probably the very best overall category of food to grow in Aquaponics; everything I have tried thrived!

From Baker Creek Heirloom Seeds:

Shiso (*Perilla frutescens*) Spicy Oriental favorite. Distinct cinnamon/clove flavor and aroma, with the spiciness of cumin. Used in oriental cooking, sushi and salad mix. Red Shiso colors radish pickles and "umeboshi" plums. Choose from red- or green-leaved varieties.

Chinese Pak Choy and Extra Dwarf Pak Choy: (*Brassica rapa - Chinensis* group) - Grew beautifully, great in stir fries!

Pac Choi (Bok Choy) - Flat, pale, misty green stems form a thick, heavy base with broad, oval, rich green leaves. The compact, vase-shaped plant at full growth is about 8-10" tall, but perfectly formed at "baby" size when young.

Shungiku Edible Chrysanthemum - (*Chrysanthemum coronarium*) - Special aromatic greens. Cut greens when about 4-8" tall for a flavorful addition to salads, vegetables, pickles, and sushi. Plant more thickly than other greens. Small orange and yellow chrysanthemum flowers appear later on unharvested plants. This is the preferred "fine" or "small" leaf strain.

Hong Vit (*Raphanus sativus*) - Pink-stemmed leaf radish. Fast growing, erect plants produce attractively lobed, essentially hairless leaves with pink stems. Mild radish flavor. Harvest from micro to mini to full-size bunched for a nice addition to soups, salads, or stir-fries.

From Johnny's Selected Seeds:

NOTE: Johnny's is NOT owned by Monsanto, as has been rumored. Johnny's Selected Seeds provides quality vegetable, herb and flower seeds and flower bulbs--as well as a full line of gardening/small-grower accessories--to home garden and commercial growers.

An independent company since 1973, and over the past few years it has become employee-owned, Johnny's provides superior products, technical information, and customer service. All of Johnny's seeds and accessories are thoroughly tested at their 40-acre certified organic farm in Maine, and are backed by a 100% satisfaction guarantee.

Their customer service is impeccable. Shipment is rapid, staff is knowledgeable. Your phone call to them will initially be answered by an automated attendant, however, it's very easy to reach a real person. Johnny's a member of the Safe Seed Initiative (who we all need to join forces with, to protect our seeds). I am inspired by Johnny's Mission Statement (emphasis is mine): "To provide superior product, research, technical information, and service to **critical home gardeners**, and specialty and small commercial growers." Note the phrase "critical home gardeners". We believe that **this is you**.

Tatsoi (*Brassica rapa - Narinosa* group) - Standard salad mix and stir fry ingredient. The leaves form a compact, thick rosette, with a very long harvest period. Tatsoi has a mild taste in salads, and stir-fries, tasting more like whatever it's cooked with. Thin to 6-8" apart for full-sized rosettes. Unique and easy to grow. NOTE: Suitable for late spring through autumn sowing. Spring sowings should be made after last frost date to eliminate risk of premature bolting.



Lucky and a gorgeous tatsoi.

Chinese Leeks/Garlic Chives (*Allium tuberosum*) - Thin, flat leaves with delicate garlic flavor. Attractive white flowers in midsummer. Flowers are edible and make a great addition to bouquets. The budded flower stalks are sold as "Gow Choy" in Chinese grocery stores. Cut and regrow, for months and months!

Staro Chinese Chives (*Allium schoenoprasum*) - Heaviest leaf for processing and freezing. Organic seeds. Cut and regrow, for months and months.

Hon Tsai Tai (*Brassica rapa*) - Purple flower stems and buds. A Chinese specialty. The young plants soon branch and produce quantities of long, pencil-thin, red-purple, budded flower stems. Pleasing, mild mustard taste for use raw in salads or lightly cooked in stir-fries or soups. For multiple harvesting of tender stems and leaves. Can be spring sown, but yields best when sown June through October for harvest from midsummer through winter (in mild areas).

Purple Mizuna (*Brassica rapa* - *Japonica* group) - Distinctive purple-tinged, sharply serrated leaves. Leaves are mostly green with purple margins at baby stage, while mature plants are purple tinged all over. More delicate appearance than Kyona Mizuna. Plants are very slow to bolt.

Kyona Mizuna (*Brassica rapa* (*Japonica* group) - Essential salad mix ingredient. Unique mustard green of Japanese origin, producing rosettes of dozens of pencil-thin, white stalks and deeply cut, fringed leaves. Mild flavor. Cut 2"-3" above net pot and let "come again" (regrow).

Early Mizuna (*Brassica rapa* - *Japonica* group) - Similar to Kyona with narrower leaves. Cut stems 2"-3" above net pot and let come again.

Vitamin Green (*Brassica rapa* - *Narinosa* group) - Excellent in salads. An entirely different and delicious leafy green brassica crop. Sow thickly in net pot for baby leaf harvest, 10-12 seeds per net pot. Mature leaves are huge, averaging 12" x 4", are smooth and brilliantly deep green. The plants are slow-bolting and will grow for a second harvest. The tender leaves are flavorful, but not at all mustardy. Tolerant to both cold and heat, slow bolting.



Kyona Mizuna (*Brassica rapa* - *Japonica* group), with red and green mustards, in a spicy micro mix from Johnny's, planted in a very dense 20-30 seeds per pot.



Definition

Bolting is a term you will often read in the descriptions in seed catalogs ("slow bolting", is what they'll say, which is actually a good thing). This refers to the plant beginning to flower and begin seed production before it normally would. Temperature, day length, nutrient availability, disease, or insect attack are all things that can stress a plant, and plants under stress respond by bolting so that they can produce seeds before they die. Some plants are more prone to bolting, such as lettuce, brassicas (kale, choy, cabbage, broccoli, celery, onions). Look for "slow bolting" or "heat tolerant" to help choose your cultivars (varieties) of these plants, especially if you live in an area where it gets very hot. This also means that this cultivar will last longer in your fridge once harvested.

Asian Greens F1 Hybrids

The following section is about seeds that we tried that were F1 Hybrids, which Baker Creek Seed Co. (<http://www.ra-reseeds.com>) does not sell. These are NOT the seeds we recommend using over the long term, as the seeds do not breed true after the first generation. They are excellent for commercial production, which is why we tried them. However, F1 Hybrids are not useful for seed saving, which we highly recommend. We wanted to see if there was any significant advantage to using F1 Hybrids, which are far more expensive seeds to purchase (so the seed companies can make their money back on the research they did in developing the F1 Hybrid). We did not find them to be noticeably superior in any way that justified the extra expense and the inability to save the seeds. These F1 Hybrids all came from Johnny's Seeds. **All things considered, we recommend heirloom seeds, which Johnny's also sells, or from Baker Creek Seed Co., over these F1 hybrids.**

Summer Jean (F1) (*Brassica rapa*) - Tender, budded stems. Dark green leaves with small, edible buds. Similar to Hon Tsai Tai, but with thicker stems. Stems regrow for cut and come again harvest. Best suited to summer and fall planting; spring plantings may bolt.

Joi Choi (F1) (*Brassica rapa* - *Chinensis* group) - Heavy, vigorous white-stemmed Bok Choy. It forms a 12-15" tall, broad, heavy bunch with dark green leaves and thick, flattened white petioles. Joi Choi is very heavier and slower to bolt. Tolerant to heat and cold. Space 10-12" apart.

Red Choi (F1) (*Brassica rapa*) - Bok Choy with a touch of red. Excellent in micro mix, baby leaf, and full size. Red Choi changes from dark green leaves with maroon veins at micro size to dark maroon leaves with green undersides and thin green petioles at full size (8-10").

Black Summer (F1) (*Brassica rapa*) - Beautiful, dark green Bok Choy. Broad, flat, light green petioles are topped with oval dark green leaves. Forms a perfect thick vase shape even when small. Slightly smaller in size (10-12") and a complement to the white-stemmed Joi Choi. Very slow bolting, and a beautiful plant.

Happy Rich (F1) (*Brassica oleracea*) - Uniform, vigorous, dark green plants are topped with jumbo-size florets that resemble mini heads of broccoli.

Green Lance (F1) (*Brassica oleracea*) - Glossy leaves and crisp, thick stems. This uniform, budding-type Chinese kale (also called *gai lohn* and *pak kah nah*) is great in stir-fries or cooked like broccoli. Harvest the stalks when 8" tall and 2-3 flower buds are open. After the main stem is cut, the plant will send up many branches for subsequent harvests. More vigorous and adaptable than non-hybrid varieties.



Joi Choi grew amazingly big and fast. We consider all the varieties of bok choy to be some of the very best plants you can grow – you can eat all of it, it's tasty and easy to prepare, and it grows like wildfire in an Aquaponics system! In the very background (very top plants) are four nasturtiums, another great plant in aquaponics.

Komatsuna "Summer Fest" (F1) (*Brassica rapa* - *Perviridis* group) Mild, tender Japanese greens for salad and stir fry (braising) mixes. Uniform, upright plants with slender, fleshy, rounded green stems and dark green, rounded leaves. Good heat tolerance and disease resistance.

Red Komatsuna (F1) (*Brassica rapa*) Dark maroon leaves with bright green undersides. Beautiful addition to salads or baby salad mix. Upright plants with rounded leaves and green stems. Color will be darker when sown in summer and harvested in fall.

Seeds in the section following all came from Baker Creek, and are non-hybrid heirloom seeds. They represent some of the things grew well that we found somewhat surprising.

Turnips

Purple Top White Globe (*Brassica rapa*) - The traditional American turnip. Selected strain of this traditional, Southern U.S. variety. Smooth, round roots that the seed packet said would average 3-4" in diameter, also said that the turnips would be white below the soil line and bright purple above it; ours were purple all over, with average size being 6". Large, tasty greens. (See photo at right).

Snowball Turnip (*Brassica rapa*) - Fine white roots with a mild flavor. Turnips grew on top of the rafts, and were very sweet with very smooth consistency.



Jack and a 2.87 pound turnip that grew HUGE in our system! The black 2" net pot is just visible to the right of his fingers, with the roots extending down parallel to his arm. This turnip was sweet and tasty, and the kids loved it!

Beets

Golden Beet (*Beta vulgaris*) - This variety dates back to the 1820's or before. The beets are a rich, golden-yellow and very sweet. A beautiful beet that won't bleed like red beets. The greens are also very tasty. A favorite of many.

Touchstone Gold (*Beta vulgaris*) - Smooth, round roots with good internal color. Touchstone Gold has green petioles and leaves, and retains its golden color when cooked. Very good germination and excellent, sweet flavor. Compared to Golden Beet, Touchstone Gold has better germination, more uniformly round roots, and much smoother shoulders. Organic seeds.

Merlin (*Beta vulgaris*) (F1) - Smooth, round roots with high sugar content. Uniform roots with exceptional flavor.

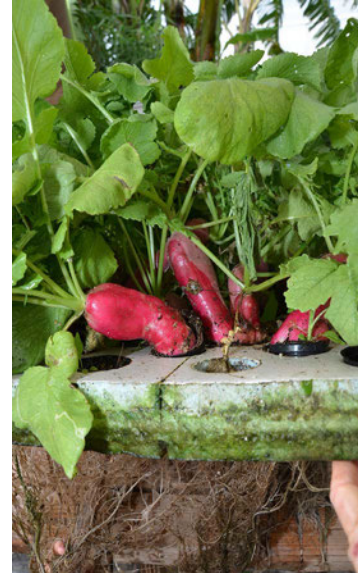
Chioggia Beet (*Beta vulgaris*, *Crassa* group) - Pre-1840 Italian heirloom beet, this variety arrived in the USA prior to 1865. They have light red skin and beautiful rings inside, like red and white candy stripes. The flesh is very tender, mild and sweet. Named after a fishing town in Italy; one of our favorites.

Kohlrabi

Purple and White (*Brassica oleracea* - *gongyloides* group) - Tender and fast-maturing, even our kids loved this sweet root vegetable that grew on top of the rafts! Easily grown for its crisp apple-like white flesh. For salads, "kohlrabi slaw," snacking, and light cooking. Sweeter than turnips.



Beet growing on top of the raft. Instead of coir and vermiculite, media used here is called "Hydroton," a reusable expanded clay product.



Radishes (*Raphanus sativus*) - Johnny's Seeds

We tried a number of different radishes (which are very closely related to turnips, and can be used in the same way). We found that the best cultivars are the ones that grow in a long cylinder, rather than the short, round types, which have a tendency to grow too fat in the net pots, and become difficult to remove. Radishes can be planted very closely together, and are ready to harvest in 30 days!

Shunkyo Semi-Long - A distinctive specialty radish from North China. Seed packet says they average 4-5" long, ours were 8-10" long, rather smooth, cylindrical, deep pink roots with crisp, white flesh. The taste is both hot and unusually sweet. Edible, smooth, strap leaf foliage with rhubarb-pink stems. Slow bolting, and can be sown throughout the year.

D'Avignon - A traditional variety from Southern France. Seed packet said 3-4" long, ours were 6-8" long (see photos on right), slender, 1/2 to 3/4 red, with a white tip, tapered to a point. The whole plant is edible.



Photos show a D'Avignon radish from raft to bowl, over about a 20 minute period - FRESH food! Radishes can be used just like turnips, with the entire plant being edible. Here the whole radish (with leaves) was chopped, pan sauted with butter, and our lima beans. Yummy!



Bulbing Onions (*Allium cepa*) - Baker Creek

Depending upon your latitude, you will either need to get onions that are listed as "short-day" or "long-day" onions. This refers to how long your days throughout the year. Here in Hawaii, I plant short-day onions (because all year, our day length is about 12 hours) that have grown beautifully. Bulbs form on top of the rafts, and are perfectly clean!

Northern gardeners should plant long-day onions. In the North, daylight length varies greatly as you get farther and farther away from the equator. Winter days are very short, but summer days are long. Long-day onions will have a chance to produce lots of top growth (hence producing bigger bulbs) before the days begin to shorten, which triggers bulbing. If short-day onions were grown in the North, the onions would bulb up too early and they would be small by comparison.

Southern gardeners should plant short-day onions. In the South, there is much less variation in day length between seasons than up North. If long-day onions were planted in the South, they may not experience enough day length to trigger the bulbing process.

Desert Sunrise (F1) - Very attractive, intense red skin. This over-wintering onion produces good yields of large, flattened globes. The flesh is crisp, sweet, and mild. Adaptation: 30°-36° latitude.



Candy (F1) - Widely adapted, mid-day, slightly flattened yellow onion has potential for large size, especially when sown for overwintering in its optimum 33°-40° latitude range. Think of it as a Walla Walla type for growing farther south. Did well, in Hawaii (we're at 19° latitude), very sweet. Here they're called "Maui Onions."

Desert Sunrise Short Day Onion.

Bianca Di Maggio - Medium-sized, flat white onions. Avg. 2-3" diameter x 1 1/2" depth. Market these little white "cipollini" onions young with green tops, or mature, dried in braids, baskets, or bags. Mild flavor. Limited storage. August through October where winter is moderate. Latitude ~35°-55°.

Green Onions - (*Allium fistulosum*) - Johnny's Seeds

Nabechan (F1) - Better flavor than other bunching onions, with a sweeter, more complex flavor. Upright plants with uniform, thick shafts and no bulbing. Nabechan is a traditional Japanese variety grown for its high quality.

White Spear - Heat-resistant, large bunching onions. Tall, upright, blue-green leaves. Thick, cylindrical, white stems; leaves resist breaking.

Parade - Organic bunching onion. Parade has bright white stalks with no bulbing, and dark green, erect foliage. Very uniform, upright growth makes for easy harvest and cleaning. Organically grown.

Red Welsh Bunching Onion - Super-hardy bunching onion that originated in northern China. Thick stems and hollow leaves which possess a sharp onion flavor. This perennial never forms a bulb in the garden; once established, new plants can be raised by replanting the abundant side-shoots. May be blanched like leeks by earthing up the thick stems as the plants grow. Widely used in Japan, Taiwan, China. Easy to grow, productive. (Baker Creek).





Here is a raft full of green onions that we ate from for over six months! Like leeks, green onions are perfect for “cut and re-grow”.

Leeks (*Allium ampeloprasum*)

Bulgarian Giant - A long thin, fast-growing leek of the best quality, light green leaves. Fine autumn variety that is popular in Europe. Use standard two-inch pots, cut and re-grow many times. I have not found an upper limit on the number of cuts/re-grows.

Giant Musselburgh Leek - An heirloom that was introduced in 1834, in Scotland. Large, very thick stems, tasty, mild flavor. Grows well in most locations, perfect for stir fry, this old favorite has huge size, and is very winter hardy. 90 days in aquaponics instead of 180, as the seed packet said. Use two-inch pots, cut and re-grow many times. I have not found an upper limit on the number of cuts/re-grows.

Bleu De Solaise Leek - A 19th century French leek with deep blue-green leaves that have a violet cast in cool weather. In cool weather, they excel, being very cold-hardy. This good-sized variety is finely flavored and a favorite of European gourmet gardeners and chefs, but is relatively unknown in the United States.

Peppers (*Capsicum annuum*)

Peppers all grew very well in our original systems, which had more fish than we recommend in these small AquaponiGardens. In our first planting (2008), plants were thriving, producing loads of peppers, and then suddenly the entire plant wilted and shortly thereafter fell over with stem rotted in the center. This has not happened in subsequent plantings, so we may have had a plant disease called *Fusarium oxysporum*, which causes stem rot at the soil line in plants in the ground. Plants produced dozens (and in some cases hundreds) of peppers until this happened. In our subsequent trials, the plants have done better in the warmer greenhouse environment. Peppers want hot days AND hot nights to do well, and here in Hawaii, we have cool nights. Also, peppers, like other fruiting plants, seem to do better with a higher fish stocking density, for more nutrients in the water, or a “high density system”.

Start the pepper seeds indoors at least six to eight weeks before temperatures for your location stays above 50°F at night on a regular basis. Pepper plants grow well in containers or in the ground, when watered with aquaponic system water. Seeds listed below were from Baker Creek.

Golden Cal Wonder - Colorful golden bells that are very sweet and tasty. Gold peppers are superb for fresh eating, great for kitchen or market gardens.

Corno di Toro Giallo - The traditional favorite in Italy. Long 8” tapered, bull-horn shaped golden-yellow peppers are sweet and spicy. They are great fresh or roasted. Large plants yield well. Among the best peppers you can grow and so delicious. Pure Italian seed.

Thai Long Sweet - Light-green fruit are about 6” long, with a tapered and pointed frying pepper shape. Great for grilling or frying, this pepper is very popular in Thailand. A rare and delicious variety.

Red Cheese Pepper - Candy-sweet, round, flat, 3”, pimento-type peppers that have thick, red flesh, great for stuffing or fresh eating. Very productive plants that can be used to color cheese.

Purple Beauty - Purple peppers are always a favorite, as they are so colorful. This variety produces loads of beautiful bells on small, bushy plants. Crisp texture and sweet flavor.

Sweet Chocolate - Great flavor, rich, chocolate-brown pepper. The flesh is cola-red color; very sweet and delicious. The semi-bell shaped fruit ripens very early. Great in salads.

Hot Paper Lantern (*Capsicum chinense*) - Earlier, larger, and more productive than regular habaneros. Magnificent, elongated and wrinkled, lantern-shaped fruits, 3-4" long.

Red Bhut Jolokia Ghost Pepper (*Capsicum chinense/Capsicum frutescens*), also commonly known as the "Thai Ghost Pepper", and according to the Scoville Scale (which measures the actual heat of the oil of all hot peppers), it's one of the hottest peppers in the world. Grew very well for two years in a system stocked with a lot of fish (more than we recommend in this manual).



WARNING!

Take care while handling hot pepper seeds. The seeds themselves are very potent even after the drying process! Remember to wear gloves while touching or handling hot pepper's seeds and fruit, and remember to wash your hands with an acid product such as vinegar, lime, or lemon juice. If not properly handled, contact will temporarily damage skin tissue. If you share your hot peppers or their seeds with others, let them know to use with caution.



To the left is a photo of Jack, at age 11. These Red Bhut Jolokia Ghost Pepper plants were taller than he was! Above is a close up of a stem almost as thick as my wrist.

Tomatoes (*Solanum lycopersicum*)

In 2008, nine varieties of hot peppers and thirteen kinds of tomatoes were planted, but records have not been located. Please keep better records that we did! The information that follows is from subsequent planting trials.

Overall, tomatoes do very well in our summer, and give us a burst of fruit, but then began to die off. This can be compensated for by planting tomato seeds every two or three weeks, in order to always have a seedling or two available for your AquaponiGarden.

Over all our trials, we only found three tomato varieties that did not have major pest problems, and they were all volunteers, so we're not completely sure what they were. Tomatoes need a greenhouse, or you need to find pest-repelling varieties. Plant where they can grow up a trellis if using indeterminate plants, and tie them up with soft green plant tape, available at garden centers or online.

Our next tests will be raising tomatoes using a "Dutch bucket" system, using a bucket or half-barrel filled with good compost material and soil, then watered with aquaponics water. This will allow us to combat pests using organic pest control solutions, such as neem, insecticidal soaps, stylet oil, and/or hot pepper wax, which **can not be used** with the tomatoes planted in our aquaponics system. (See Chapter Nineteen for more information on the differences between "Organic Pest Control Solutions" and "Aquaponics Pest Control Solutions".)



Soft green plant tape, used to tie up a tomato plant. Indeterminate tomatoes don't actually climb, but they do lean, and need to be staked up. This soft tape secures the plant, but does not hurt the stem.

All heirloom varieties below are from Johnny's Seeds, and all are indeterminate (do not form a bush) vines.

Black Prince (OG) - Mahogany brown with good flavor. Unusual brown shoulders become orange-red at the blossom end. Color is deeper and more pronounced in sunnier locations. Distinctive, rich, fruity tomato flavor. Relatively smooth, 3-5 oz., 3" globes show less cracking than typically seen in most heirlooms.

Nepal (OG) - Smooth and flavorful in late season. 10-12 oz., medium-large, globe-shaped, bright red fruits are rather soft but meaty with excellent flavor. Plenty of old-fashioned tomato flavor.

Brandywine (OG) - One of the best-tasting tomatoes. We describe Brandywine's luscious flavor as "very rich, loud, and distinctively spicy." The large fruits, often over 1 lb., have a deep pink skin and smooth red flesh. The medium-tall, potato-leaf plant is best staked or caged. Johnny's Seeds "Quisenberry" strain is considered among the best.



Definition

*A **volunteer** is a plant that comes up in a place you did not intentionally plant it, most likely seed from a plant that you planted previously, that went to seed. Volunteers are often more hardy, pest-resistant, and productive than the ones you planted! After all, these are from plants that already succeeded in your location, and in addition, now they've gotten to choose their spot! We've had very good luck harvesting seeds from some of these second generation volunteer tomatoes, even if they sprouted in the ground. I just let them grow in the ground, harvest tomatoes from them as long as they're bearing, and save some of the seeds to replant. Not only tomatoes, but garlic, as well as many flowers are self-seeding, and will come up as volunteers in your garden.*

Great White (OG) - Big yellow-white fruit with mild flavor. There are a number of heirloom "white" (they're actually very yellow) tomatoes, and Great White is the best. The fruit is meaty with few seeds, a mild non-acid flavor, and creamy texture. The medium-tall plants are less viney and mature earlier than other "whites".

Black Krim (OG) - Russian heirloom. Black Krim combines bold, smoky flavor and good texture with an unusual appearance. Deep brown/red, 8-16 oz. tomatoes have brown/green shoulders that get darker with more heat and sunlight. High yielding.

Striped German (OG) - One of our favorites! Bicolor red and yellow fruit. The flat, medium to large, variably ribbed-shoulder tomatoes are shaded yellow and red. The marbled interior looks beautiful sliced. Complex, fruity flavor and smooth texture. Medium-tall vines bear 12+ oz. fruit.



This gorgeous Striped German tasted better than any other tomato we've ever tasted. Aquaponics tomatos are NOT like hydroponic tomatos - all looks but no taste. AquaponiGarden tomatoes are full of flavor!



Pruden's Purple, not quite ripe. Note the plant tape lower left.

Pruden's Purple (OG) - Early Brandywine type. Large to very large (many over one pound in weight) fruits are flattened and smooth (except for shoulder ribbing on some), and resistant to cracking. Vivid dark pink skin with crimson flesh. Medium tall, potato-leaf plants. Indeterminate.

Yellow Pear - Petite, distinctive salad tomato. Tall, vigorous vines bear quantities of small, $\frac{3}{4}$ -1 oz., lemon yellow, pear-shaped fruits. Mild flavor. Indeterminate.

Yellow Brandywine (OG) - An orange version of Brandywine, with rich flavor. This variety can be finicky to grow, and it didn't thrive for us.

Cherokee Purple (OG) - Unusual variety with full flavor. Medium-large, flattened globe fruits. Color is dark pink with dark shoulders. Interior ranges from purple to brown to green. Relatively short vines. Indeterminate.

Valencia (OG) - Round, smooth fruits average 8-10 oz. Their meaty interiors have few seeds. This mid-season tomato is among the best for flavor and texture.

Cherokee Green (OG) - Unique color, great flavor. Medium-sized, 8+ oz., green fruits acquire some yellowish-orange color on the blossom end when ripe. Lots of bold, acidic, complex tomato flavor.

Rose (OG) - Rivals Brandywine for taste. Deep pink and smoother than Brandywine, Rose is every bit as meaty and flavorful. Fruits are large, with good yields. We had to try this cultivar, because our youngest daughter's name is Rose!

From Baker Creek (<http://www.rareseeds.com>)

Pineapple Tomato - Very large, up to two pounds each. The yellow fruit has red marbling through the flesh and is one of the most beautiful tomatoes we've ever grown. The flavor is very sweet and fruity; good yields! My favorite tomato!

Hawaiian Pineapple - This variety produces one-pound fruit with yellow-and-red mottled flesh. Flavor is excellent: sweet, fruity and somewhat pineapple-like in taste. Productive and beautiful. Another favorite.

Dr. Wyche's Yellow Tomato - This heirloom was introduced to Seed Savers Exchange by the late Dr. John Wyche, who at one time owned the Cole Brothers Circus and used the manure of elephants to fertilize his heritage gardens. The one pound fruit is solid and smooth, and is a glowing tangerine-orange that always stands out in the kitchen or on the vine. Smooth texture and tropical, sweet taste, with heavy yields.

Green Zebra Tomato - Beautiful chartreuse with deep lime-green stripes. Flesh is bright green and very rich tasting, sweet with a sharp bite to it (just too good to describe!). A favorite tomato of many high class chefs. Yield is excellent. Fruit are ~3 ounces, with Green Bay Packers team colors. =)



Here in Hawaii, this would be called "plenty tomatoes!" This photo is of our planting trails of heirloom tomatoes in the summer of 2011. Visible are Pineapple, Hawaiian Pineapple, and Rose.