

DRAFT

Fruiting Trees in Urban Lawrence Basic Information on Growing, harvesting, storing

This is an ongoing & developing project

Introduction

Our local climate and soil conditions allow us to grow a tremendous variety of native, cultivated native and non-native fruiting trees. Becoming involved with a fruit tree perennial crop is one important step towards living more sustainably in the urban environment. Benefits of growing fruit trees are as follows:

- Once established, fruit & nut trees will produce a crop of fresh delicious fruit most years
- Will make an attractive yard tree
- Provides shade to cool the environment and store carbon from the atmosphere
- Will reduce some of your food expenses
- Reduces or eliminates the costs of transporting fruit from far away places
- Provides an opportunity for people to share fruit production experiences with each other.
- Offers you an opportunity to connect with nature and the source of the food that you consume.
- Enjoy harvesting and sharing that experience with others.

The past decades of commercial fruit production has made us very accustomed to 'perfect' fruit – fruit that is the perfect color, large, free of bug holes, beautifully shaped and ships well. These factors (color, size, shape & an occasional blemish) are of course not important when we consider the nourishment requirements for our bodies.

- A) We can reduce or eliminate harmful herbicides/pesticides by growing our own fruit.
- B) Fruit that is ripened on the tree will have better flavor.
- C) Varieties that are not considered "commercially viable" produce very delicious fruit and can be very productive. They are not just sugary with little substance as in the case of our sweet, reduced flavor & pithy apples that are sometimes found on grocery shelves.
- D) Individual actions impact the larger system. You can help reduce fossil fuel consumption by eliminating the long distance transportation of fruit when you grow and/or harvest fruit locally. Local fruit orchards can contribute positively in this regard.

The fruit information provided here is somewhat specific to our local area (Lawrence, KS) based on experience and research. Included are both general information and some very specific information that may be useful to your project. A variety of informative links are provided on the Lawrence Fruit Tree Project (LFTP) site that should be helpful in your research. Other documents will be available for download on the LFTP website (including fruit comparison charts, fruit family relationships, etc)

Fruit trees do generally require maintenance including: watering (especially in the early years of establishment), picking up rotten fruit, planning ahead to prevent disease & pest problems (selecting more disease resistant plants, using preventative sprays that are minimally toxic to the environment, etc), paying attention to pest & diseases invasions, taking action to correct serious disease & pest problems, pruning, removing dead branches, etc. The weather may also affect production from year to

year. The rewards however, far outweigh the time spent planning, thinking, taking action and harvesting.

You can make a difference whatever your involvement is with local fruit production (grower/planter, consumer, helper, knowledge distributor). If you have the space to grow fruiting plants, take some time to learn about the interesting possibilities.

Urban Orchards

An urban orchard can encompass trees planted on your property, a friend's yard, another resident's property, by permission in a community garden located on public or private land, or by permission on public land (right of ways, parks, school yards, church property, etc). Organizing harvesting parties, sharing harvested fruit and sharing knowledge is key to making the most of this venture.

Harvesting & Storage

Learn about the fruit tree(s) that you grow or are available to you. Seek knowledge about harvesting so that you know when fruit properly ripens, and how to pick them. Become familiar with processing options, specific uses, and storage methods.

Most of the fruits are easily eaten fresh when ripe and any given tree/bush will produce fresh fruit for one to three weeks or more each year. You can extend the period of harvest for a particular type of fruit by planting more than one variety. (Various apple varieties for example, ripen from late July through frost) Test fruit for ripeness before picking the whole lot. Take care so that the tree is not damaged during harvest.

Various apples varieties, for example, ripen from late July through frost. Early ripening apples are called summer apples and are crisp for a short period of time. These apples do not store well and are used for fresh eating or cooking. Fall and winter apples can be stored for a longer period of time and are used for a wide variety of purposes. Sometimes their flavor is improved through storage. The term 'dessert apple,' means an apple that is eaten fresh.

Picking fruit too early may result in an undeveloped and unpleasant flavor. One exception is the European pear, which are best picked just before they ripen on the tree. Pears can then be ripened in less than a week in a sealed bag (that includes an apple - adds more ethylene gas that hastens ripening) at room temperature. Waiting for a pear to ripen on a tree may be too late for good consumption.

Another exception is the medlar. After picking, it needs to be "bled" for about two weeks at room temperature to make it edible.

Most fruits can be stored under refrigeration to extend their use as fresh fruit. Generally a high humidity level and a temperature close to 33 deg F is adequate. Some fruit will perish rather rapidly and should be processed in a timely manner. Fruit can be processed into sauce, juice, pies, jam, jelly, preserved, frozen fruit (after blanching), frozen pulp (for later use), bread, pudding, ice cream, a canned product, etc.

Nuts generally need to 'dry' out in a cool place for a week or two before consuming. They are best when be stored in 35 to 40 deg F at high humidity to prevent them from becoming rancid over time.

Selecting varieties

What grows here & description – the spreadsheet

We will post a comprehensive spreadsheet titled Fruit Variety Comparison that lists most of the fruit and nut trees/bushes that can be grown in our area (Lawrence, KS). Basic and general facts are provided so that you can decide what is interesting and feasible for your project. In addition to this information read Extension research bulletins, researched articles books and most of all consult with other growers in your area.

One of the charts that we will post includes a family and genus 'chart' to show the relationship between our fruiting plants. You will notice that the roseacea (rose) family contains a large proportion of our commonly consumed fruits.

An explanation of the maintenance column in this document is as follows:

- 1) No maintenance other than when being established it should be watered.
- 2) Low maintenance, some pruning
- 3) Low maintenance, pruning, moisture concerns, cleaning up dropped fruit
- 4) Medium maintenance, pruning, moisture concerns, cleaning up dropped fruit, bug issues, some spraying
- 5) High maintenance, pruning, possible moisture concern, cleaning up dropped fruit, bug issues that requires some spraying

We have not included exotics such as loquats, pomegranates, figs, passion fruit, bananas, citrus, etc. With special care these fruits can also be successfully grown in containers, indoors or in a greenhouse. Growing these fruits however, is not within the scope of this paper. This document does not address vegetables or additional native edibles.

Pollination & Fruit Set

All flowers need to be pollinated with pollen from another similar variety in order to make fruit. Pollen must also be produced at the same time by the other tree. There are some exceptions to this rule. Some fruit trees are self-pollinating. The other exception are fruits that form parthenocarpically. This means that pollination is not required for fruit set. Common examples are bananas and figs.

Pollination is carried out by the wind and insects which include honeybees, bumble bees, mason bees, (other native bees), etc. Plants pollinated by the wind need to be in close proximity to each other. Examples are the pecan and hazel nut. Specific information about pollination can be found on charts from Extension services, nurseries, books, etc.

Another peculiar aspect of pollination involves the pecan. Pollen shed and stigma receptivity occur at different times, preventing self pollination. The terms are protandrous and protogynous. Be aware of this when selecting pecan varieties.

Not all fruit trees are good producers of pollen. This must be considered, if for example, you had picked two pear varieties for your yard but one of them did not produce pollen. This would leave one tree without a pollinator.

The setting of fruit is also affected by late frosts that occur in the spring. This can strongly affect apricots, peaches, and nectarines. Other fruit trees can also be affected by late frosts depending on timing and severity.

Here is some additional general information about pollen requirements for some common fruit trees. Apple – most require another apple or crabapple. Pears - requires another pear variety. A few pears do not make good pollen. Plums – European plums pollinate European plums only. Asian/Japanese plums only pollinate Japanese plums. Hybrid plums might be pollinated by Asian or native American plums.

Selecting for Disease Resistance

Rarely are fruit trees completely immune to diseases and pests. Generally a tree that is grown in reasonably good soil & proper drainage, has proper sunlight, good air circulation, and appropriate moisture will not be stressed and will be more free of problems or will tolerate problems better than a stressed tree. This will reduce the need for future corrective measures.

Our website has a page that gives a 'short list' of recommended common fruit trees. More extensive comparison charts will be added over time for download.

Apples for example, can be a high maintenance fruit tree. Fortunately there are some apple varieties that have some resistance to common diseases. In the case of making an apple variety decision, you should study the apple variety spreadsheet (or the 'short list') to assist you in making a reasonable decision. Be aware that disease resistant plant lists are general, based on research trials in different parts of the country including some limited local experience. General disease resistance information is sometimes reliably expressed in mail order catalogues but may apply to a certain growing region only and may not specify which diseases the tree is resistant to.

Our local conditions may be better or worse for a particular variety. Disease resistant charts and reliable nursery assessments should be heeded when making decisions, since comprehensive local data doesn't always exist or can't be located. Drastic climatic changes, variations in the weather and the movement of diseases across a region may also change the picture.

Visiting with experienced fruit growers may be a good way to find varieties that do well. When visiting with local growers, also ask about the amount of spraying that might be required for that person's recommended varieties.

Selecting good fruit trees may also be as simple as determining which trees have done well in town. If for example, you become aware of a local pear tree that has been around for many years, is productive, is disease resistant and tastes good, it may be worth propagating this local 'heirloom' tree. You will then have a clone of this tough low maintenance fruit tree.

Disease, pests & other maladies -resistance, spraying

There are several diseases and pests that you should learn about so that you know how to identify their presence, and ultimately understand the life cycles. With this information, you have a good chance of breaking the cycle and eliminating the pest. You should also be aware of less harmful sprays or other remedies that can be used. Pest and disease issues are mentioned on the comparison spread sheets. Information about specific problems can be found in books and web sites. Local nurseries and the

Agricultural County Extension agent can also be helpful. You should research and learn about specific problems since the information below does not go into great detail.

Some remedies are very easy, but one must be vigilant and prompt with action. Trunk boring insects that might affect peaches, plums, apples, etc, for example, can be thwarted by covering the lower two feet of susceptible trees with window screen. Make a skirt about two inches out from the trunk, set it two inches in the soil and tie it lightly at the top. Untie it during the off season so that you do not girdle the tree. This also keeps mice & rabbits from chewing on trees and offer some protection from weed whackers and lawnmowers. There are also special tree wrapping materials and special paint that may also help.

One easily controlled pest is the persimmon girdler. By picking up and disposing of the small branches found on the ground in the fall that were trimmed off by the female beetle, the eggs laid in the branches are then destroyed, breaking the cycle.

Other deterrents may need to be used for bird, squirrel, deer, woodchuck, raccoon and mole issues. Sometimes the threat from these critters can be serious depending on the location of the fruit trees and other factors. A very dry year might prompt wild animals to feast on your efforts when wild fruits are in short supply. Planting more than you can use may guarantee that the critters will not eat up your entire crop.

If hazel nuts are located near other trees, they will likely get eaten by squirrels, but if the hazel nuts are isolated from trees and other vegetation, the squirrels will likely leave them alone.

Sunscald is a problem that occurs in the late winter months when the warm sun warms up the tree causing sap to rise. When it freezes at night, the sap stuck in the bark causes a split, not noticed till later in the spring. Painting the tree with white latex paint is a solution so that the bark is lightened to reflect the sunlight. Do not use oil paint since the bark has to breathe.

Dormant oils (no pesticide or fungicides added) will smother overwintering egg cases when applied in late winter. This controls aphids, mites, scale, pear psylla, etc.

Safer Insecticidal Soap (or a home made version) controls aphids, mites & leafhoppers. Leaf eating caterpillars can be controlled with 'Dipel' a natural agent containing *Bacillus thuringiensis*. Small infestations can be removed mechanically.

Sulfur is an effective fungicide and can control apple scab, powdery mildew, brown rot, rust, scab and mites. Keep sulfur away from the soil, do not apply when temperatures are over 80 deg, or on sulfur sensitive plants like concord grape. Lime-sulfur is more potent, but more damaging to plants.

Copper is a very toxic natural fungicide used to control downy mildew, leaf spot, anthracnose, botrytis and fireblight. Copper is best used in a Bordeaux mix and should be applied early in the spring.

Codling moth, an apple and pear pest, can be controlled with pheromone traps in the tree. The larva burrow into the fruit causing worm holes. Yellow monitoring traps and red spheres can be coated with 'Tanglefoot' to control apple maggot.

Plum curculio affects the fruit of plums, peaches, apples & pear. Natural controls don't really exist unless you have chickens that love the pests. Picking up and disposing of dropped fruit is effective for curculio reduction and will also keep fungal diseases controlled so that the infection of other fruits on the tree are limited and limited in future crops.

Black knot is a fungal disease affecting cherry and plum. Dark knobby growths + 12" of wood should be trimmed away if noticed during winter months and removed from the premises.

Fireblight is a bacterial disease that can be devastating. It enters tender new growth and moves inward. The leaves turn dark and look burned. Cut off the branches affected and re-cut in the winter months. A preventative spray of streptomycin might be helpful if the problem is common. Plant resistant fruit tree varieties. When trimming off disease branches, always sterilize the cutting tool with a %10 Clorox solution before trimming another tree.

Apple scab affects apples and crab apples. This fungus infects fruit and foliage during the cool humid conditions of spring. Seek resistant varieties. This may not be a problem in drier climates.

Cedar apple rust is a fungal disease that depends on the eastern red cedar (*Juniperus virginiana*) as an alternate host to apples, crabapples, hawthorns, etc. Foliage and fruit are affected. Seek more resistant varieties.

Powdery mildew is a fungus. It infects blooms, leaves and fruit. Selecting resistant varieties and good air circulation usually eliminate this problem.

The diseases and pests listed above are the more common ones encountered. Select resistant varieties to start with, be watchful for problems, and research solutions.

Understanding the Importance of the Rootstock & Grafting - match with soil, climate & size of tree

Many of the fruiting trees are propagated by grafting the scion (the production end) on to a rootstock. Grafting is used for the following reasons:

- This makes mass propagation of a variety feasible. Rootstocks are produced from seedlings, rooted cuttings, or other asexual propagation techniques.
- Rootstocks or interstems determine the final size of the tree ranging from dwarf (%25 of standard), semi-dwarf (%35 to %80), and standard sized (%100).
- Rootstocks may have roots that are more resistant to soil disease or soil conditions than the scion.
- Rootstocks determine the vigor of the tree
- Rootstocks determine anchoring ability
- Rootstocks determine how soon a tree may fruit and final production capacity.

The rootstock you choose will have a considerable impact on your plantings. Highly dwarfing rootstocks are not always recommended because they do not anchor the tree very well. Staking would have to be permanent. Dwarfing rootstocks however, will bring a tree into production sooner. Standard sized trees may be objectionable to some folks since they can get large (keeping the fruit out of reach, etc), although they can be controlled a bit through thoughtful and careful pruning. Standard trees are strongly rooted, very sturdy, vigorous and if conditions are good, will last many years. Vigorous standard trees may be less prone to disease problems.

There is an interesting graft called an interstem. These are compound grafts involving three pieces - the rootstock, the interstem scion and the production end scion. Since dwarfing rootstocks do not anchor a tree very well, a standard rootstock could be used, but between the scion and the rootstock is a dwarfing piece of scion which makes the top part of the tree dwarfed. Interstems are available from some nurseries or could be grafted once you learn the technique.

Lastly, you should learn about your local soil & climatic conditions and compare this to the characteristics exhibited by rootstocks that you are considering. We may post a rootstock comparison spreadsheet. Nurseries do not always know what rootstock their fruit trees are grown on.

Nurseries

In this article we are promoting varieties that are unfortunately not always available at local nurseries. Some nurseries however, make an effort to stock fruit trees that are a good match for the local region. Disease resistance, good production in our climate, rootstocks good for our area are not always part of the combination available locally since nurseries buy from wholesalers in other parts of the country. Links to nurseries are listed on the website. We do not endorse any specific one over another and have not listed all of the possibilities.

Nurseries generally ship bare root trees in the early spring and the fall when the trees are dormant. Bare root trees are inexpensive compared to potted trees. Early spring planting seems to work well around here. You must place orders very early, by December or January to improve the chance of getting what you want. It is also important to be prepared (have the site selected, the planting hole prepared) and to plant them as soon as they arrive!

Propagating varieties

Propagating fruiting plants is not that difficult. Some are worth propagating by seed, some can be multiplied by cuttings, and many by grafting to a rootstock. Grafting is one of the best ways to obtain a known durable variety growing in the local area.

Sharing plants on the local level is one of the goals of sustainable fruit production. Keeping a database of who has which variety, and how a particular variety behaves is essential. Finding local information takes some effort and research since this data resides mostly with local individuals. The LFTP will be collecting some data to help in this effort.

Grafting is mostly done in the spring and does take planning. Scion wood is cut early in the spring or very late in the winter while dormant, kept in a moist bag in the refrigerator till mid/late April when grafting takes place. Rootstocks can be ordered or grown from seed. Grafting instruction is available on the web and in books. Grafting is not that difficult but is best learned from someone. One must also safely work with the sharp grafting knife.

Planting and maintenance

Locating the site

Keep in mind the planting location in proximity to driveways, streets, overhead power lines, sidewalks, buildings and other trees to avoid hazards, messes and constricted growing spaces.

- Nut trees and fruit trees can pose a hazard from the falling fruit. Be thoughtful when deciding on a planting location.
- Some fruit trees are messier than others. Mulberry trees for example should be located away from areas of high foot traffic & driveways. Decide what variety of falling fruit is tolerable.
- Keep in mind the total height of fruit trees when planting near power lines. Fortunately most are relatively short and will not reach the wires.
- Keep trees a safe distance from structures. A tree that has a 15' spread at maturity should be at least 10' feet from a structure to protect buildings from foundation damage and from branches hitting the structure. Root systems could damage a weak building foundation.
- Do not plant trees too close to other trees. This is important so that air circulation and sunlight will not be a problem in future years. Keep in mind the mature size (spread & height). A tree with a 15' spread should be planted about 17 feet from a tree of similar mature dimensions. One notable exception would be the pawpaw which can be grown in the shade under larger trees.
- Keep in mind the soil toxin secreted by the black walnut. Several varieties of fruit trees including the apple, will not grow in the vicinity of a black walnut tree.
- Soil type and drainage is important - see discussion below.

Planting trees – digging the hole, planting depth and staking

Most fruit trees should be planted as early in spring as possible. If delayed until late spring/summer, they will not grow much and may be retarded one year's growth. Fall planting can occur in late October, early November when the plants are dormant.

Always dig a large hole about twice as deep and wide as the root system you planting. Do not let the roots dry out while digging the hole. It always best to have the holes prepared before the order arrives. (there is a good chance that bad weather or lack of time may put off planting which may damage the newly received plants).

Plant at the same depth they were originally grown (*see an exception below). You can mix in some well-composted humus but not peat moss. Do not fill with hard dirt clods. Place a deep mulch around the tree to conserve water and provide future nutrients. Water well.

It is also recommend that trees be staked so that trees are not damaged by strong winds, climbing animals or from human activity. In an ideal circumstance, it is recommend to put in three T-posts around the tree and wrapping the area with wire. (Two T-posts will also work) This supports the tree, keeps large& small animals from gnawing on the trunk, lets people know there is a new tree there, protects it from weed whackers & lawn mowers and might deter vandalism in more public areas.

Larger scale plantings may not allow such careful care. At minimum however, perhaps one or two T-posts could be used for support with some sort of wire or plastic trunk protector in place. Make sure trees are not tied tightly as to cut into their tender trunk.

*Apples, pears, plums, cherry, etc., can be planted (depending on circumstances) so that the soil level is two to four inches above the graft, assuming that the graft is near the base of the tree. This will cause the scion to make some roots. This will produce a stronger & larger dwarf or a standard tree if more roots develop over time. This is not recommended, especially if you want the rootstock to do its job.

Pruning

Take some time to learn about pruning. You can wreck your tree by improper pruning and pruning at the wrong time of year which may open your tree to disease. Do not seal cuts with sealers, as this tends to allow disease agents to fester. Failure to prune can result in narrow crotch angles (high susceptibility to wind damage), crossed branches (scrapping and breaking of bark opens opportunities for disease), a tight bunching of branches (doesn't allow sunlight into the tree), and too many vertical branches (fruit may not set on vertical branches).

Take some time to read extension bulletins and pruning books or ask someone who has experience. It is not that hard and once you understand the concepts you can easily do it again. Also, take the time to sterilize your clippers each time you start trimming another tree in a Clorox solution (%10 Clorox %90 water) to prevent the spread of disease, especially if you are removing a diseased branch from a tree. You do not want to spread the disease by cutting into another tree with the same unsterilized clippers.

Soil & drainage

While most plants are forgiving, those that have more specific requirements should be honored. Drainage is important. Soil should be fairly deep and well drained, not swampy. Rocky soils can be restrictive and dry, especially if the bedrock is close to the surface. If soil conditions are not right for a particular tree, don't waste your time.

The pH should range from 6.8 to 7 for most fruiting trees and in our area there not many pH issues. Some plants require extraordinary conditions such as blueberry. These are conditions that can be provided, but must be thought out carefully and executed properly. Blueberries for example need a low pH of 3.5 to 5 (a very acidic soil). Blueberries could also be grown in large containers, avoiding the hassle of amending a highly buffered carbonate soil.

Keep weeds away from the base of trees and bushes. Adding mulch with compost underneath in the spring can be beneficial. Keep in mind that while mulch is composting, the microbes take nitrogen from the soil. Nitrogen is returned after it has completed its breakdown cycle.

Raised beds

Raised beds can also be made by constructing a containment system or by mounding the soil in rows. Raised beds offer plants a chance to grow in deeper non-compacted soils. The controlled space is sometimes easier to manage once established. Raised bed are mostly used for vegetables or small fruiting plants though.

A well made and potentially long lasting bed container can be expensive. Think carefully about your raised bed project so that it is built to last as long as possible when using wood or other materials. Wood eventually rots, even western red cedar will eventually decompose in unprotected outdoor applications. Do not use treated wood, it is not a long-term solution and can poison the soil. Do not use telephone poles or old railroad ties either. The preservatives that protect them from bugs will leach into the soil and are very toxic.

Water & fertilizing

Water new trees on a regular basis for the first year or two when rain is inadequate. Generally a good soaking once a week is adequate unless extreme drought conditions exist. A good rule is one inch of

rain equivalent water per week. Your soil drainage should be taken into account when watering. If you have soil that drains poorly, check the soil moisture. Over watering could cause the roots to rot.

Adding mulch with compost underneath in the spring can be beneficial. This will provide adequate fertilization over time. Never fertilize past mid summer since this may promote growth late season growth instead of letting the tree prepare itself for dormancy over the winter. Extreme growth is discouraged for apples, pears, etc., because fresh growth may also make the tree more vulnerable to fireblight.

Watering a planting in public parks will pose some special challenges since a garden hose will not be available. Perhaps it is possible to have an 'ATV' (garden tractor, etc) that can pull a large water tank to the various plantings. Over time watering will be less of an issue as the plants mature.

Hazel nuts for example are very drought tolerant once established. Pawpaws on the other hand should be planted in locations that have more moisture available in the soils.

Recap - Future Cooperative and Personal Efforts

- Conduct some basic research on the fruit trees you are interested in growing or have found in your community
- Compile a list of who has which trees for future propagation purposes
- Organize or seek workshops to learn about propagation, pruning, harvesting, storage
- Share research and experiences with others
- Organize public plantings of fruit trees in appropriate areas.
- A group of caretakers and harvesters should be established.
- Organize a 'clearinghouse' entity/contact person that organizes and connects harvesters, consumers and folks with producing trees that are not being harvested. The LFTP will be working on this project.
- Make a list of community fruit trees, trees on private and public properties that are not harvested by their owners. (Always secure permission from private land owners) Harvested fruit can be used for personal consumption and local food banks.
- Get together with others and make group fruit tree orders to save money and shipping costs.
- Make a basic annual timetable so that you know when your fruit trees blooms, when to take pest control measures, when to prune, when to harvest and how to store/process the fruit.
- Create connections for fruit tree activism, for folks to organize and connect with one another in this common interest.

Here is a quote from Euell Gibbon's book published in 1962, Stalking the Wild Asparagus. "Recently I was helping a couple with three small children move into a new house and remarked that the children would no doubt enjoy the ripening mulberries on a tree in their new yard. The mother looked horrified and said, "My children would never eat anything like that!" How sorry I felt for her children - never to know the pleasure of purpling their faces with sweet, ripe mulberries." Page 135 from the 1970 paperback edition.

Compiled by Byron Wiley
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Disclaimer & note: The information contained above and in the accompanying charts has been accumulated over years of research, experience and visiting with others. Data has also come from information that has been gleaned from reference books and research posted on the web. This is meant to be a guide. I apologize for any mistakes and will appreciate corrections and constructive

suggestions. Please independently research unfamiliar fruit varieties since some fruits may cause allergic reactions (e.g. ginko, fig latex) or may cause other problems if not handled and prepared properly. Another example, eating an unripe pawpaw will cause gastric problems.

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