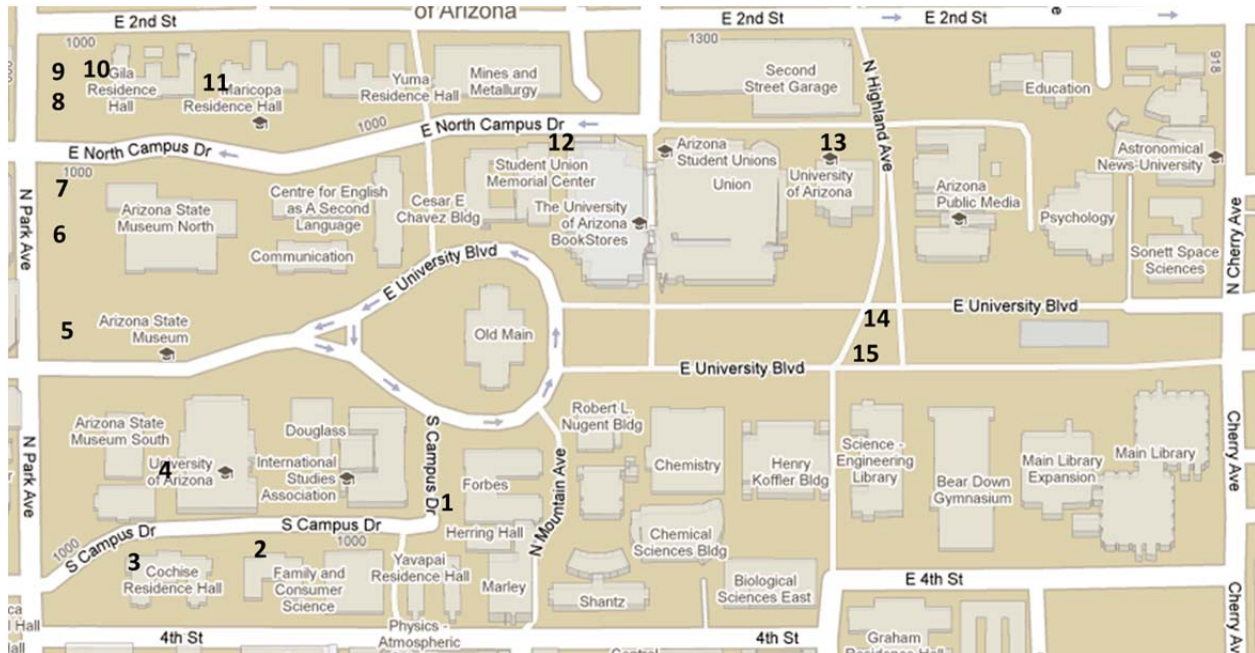


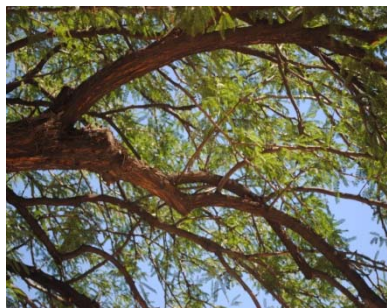
## Edible Landscapes



### Landscape Trees Producing Edibles Promote Urban Sustainability.

As Arizona's Land Grant institution, the University of Arizona is charged with offering applied research and education that addresses solutions to Arizona's changing needs. This practical focus led to major developments in Mining and Agriculture in the early years, and continued excellence in urban horticulture in later years through research, education and outreach. From the very beginning, trees and shrubs were planted, and studied creating an "oasis" of learning in desert horticulture. Throughout its history, UA faculty used the campus grounds as a test site for potential new agricultural commodities, introducing olives, citrus, and date trees, to name a few. Later, in response to population growth, urban development and concerns for resource conservation, faculty interests expanded to include arid-adapted landscape ornamentals that were also tested on the main campus grounds. As a result of this long-standing commitment, many of the trees on the main campus produce edible products that can be harvested and served.

With the goal of promoting sustainability, the Campus Arboretum provides leadership to promote conservation of resources including reduction of water, labor, and chemical inputs in landscape management. Further, we maximize the benefits of campus trees by providing guidance on tree selection, preservation, and management to enhance longevity, tree structure, aesthetics and safety. Similarly, we're capturing greater returns on our investment in the campus grounds through recent efforts to harvest campus edibles. The Campus Arboretum works alongside Linking Edible Arizona Forests (LEAF) to get the community involved with planting, conserving, and using edible trees in Arizona. LEAF has many harvests throughout the year donating the edible proceeds to Iskashitaa Refugee Network and other organizations. As you walk through campus today, we hope you'll appreciate the beauty as well as utility of this living example of urban sustainability research.



## 1. Argentine Mesquite – *Prosopis alba*

**Family:** Fabaceae

**Origin:** South America

**Location:** Forbes

**Botanical Characteristics:** The Argentine mesquite hails from South America and has been used in the Southwest primarily for its handsome form and appearance. It grows 5–15 m tall, in age the short trunk possibly reaching 1 m in diameter. The treetop is rounded with drooping branchlets; spines scarce and small, only on strong shoots, 2–4 cm long. Flowers are greenish-white to yellowish racemes (similar to flower spikes). Bean pods are 12 to 25 cm. long.

**Edible Characteristics:** The mess of beans each tree produces every year contains a nutritious pulp. This pulp can be extracted by milling and processed into sweet flour that possesses a characteristic smoky, malty flavor. However, one can't simply walk up to any tree and harvest pods. Each tree, unless grown from a cutting, is genetically unique and may produce flour with more or less bitter tannins. As it happens to be, this tree produces beans that are bitter and chalky.

**Ethnobotany:** "Patay" is the sweet floury paste of the pods, ground up and dried, serving as the basis for many popular Argentine dishes (1). These trees are grown on plantations in Argentina for production of ethanol from the pods.

**Health Benefits:** Mesquite pods can be ground into a highly nutritious flour. Mesquite flour promotes satiety, leaving you feeling full longer because of its high fiber content. It is also low in fat and helps stabilize insulin in the body which makes it a great food for diabetics. Further, mesquite flour contains high amounts of calcium, magnesium, iron, potassium, zinc, sulfur and other vitamins and minerals which are proven to maintain good bone health. (14)

**Cultivation:** Argentine mesquite trees thrive best in xeriscapes.

When irrigated, this plant has a fast growth rate and can reach twenty to forty feet. In all conditions, minimal water is needed after the tree is established. This tree is very adaptable to a range of soils and does best in full sun (15). This plant grows well in USDA zones 9 to 11 (38).

Nutrition Facts				
Serving Size (5g)				
Amount Per Serving				
<b>Calories 68</b>				
		% Daily Values*		
<b>Total Fat</b> 0g			<b>0%</b>	
Saturated Fat 0g			<b>0%</b>	
Trans Fat 0g				
<b>Cholesterol</b> 0mg			<b>0%</b>	
<b>Sodium</b> 15mg			<b>1%</b>	
<b>Total Carbohydrate</b> 15g			<b>5%</b>	
Dietary Fiber 6g			<b>24%</b>	
Sugars 10g				
<b>Protein</b> 1.9g			<b>4%</b>	
Vitamin C 1.8%			Calcium 2.3%	
Iron 3%				
*Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.				
		Calories	2,000	2,500
Total Fat	Less than	65g	80g	
Sat Fat	Less than	20g	25g	
Cholesterol	Less than	300mg	300mg	
Sodium	Less than	2400mg	2400mg	
Total Carbohydrate		300g	375g	
Dietary Fiber		25g	30g	



## 2. Common Fig - *Ficus carica*

**Family:** Moraceae

**Origin:** Mediterranean

**Location:** Saguaro Hall

**Botanical Characteristics:** *Ficus carica* is a Mediterranean deciduous tree that can reach 15-30 ft with equal spread. The leaves are simple, with 3-5 lobes, ranging between 4-10 inches long and wide. The trunk is thick, knobby, and grey. The fruits are edible figs, and the tree may bear them up to twice a year. Unlike other relatives that must be pollinated by the fig wasp, the common fig develops fruit parthenocarpically (without pollination). Its USDA hardiness zone is 6-11. The fig tree can live up to 200 years.

**Edibility:** Ripe figs are edible raw, cooked or dried. Figs are usually pear-shaped and up to 5cm in diameter. They are green to maroon-brown.

**Ethnobotany:** The common fig was domesticated in the Near East roughly 11,400 years ago, predating the domestication of other fruit, olive, and date plants by 5,000 years.

**Health Benefits:** Figs are known to be high in potassium making them a great fruit to help decrease high blood pressure. Figs are also high in dietary fiber which promotes satiety, helping you feel full and reducing food cravings. These benefits also contribute to weight loss. Studies show a diet that includes regular consumption of figs decrease women's risk of breast cancer by 34%! (17)

**Cultivation:** The Common Fig tree is easy to grow. They grow best in hot climates. If the temperature lowers below 15 degrees F, mulch and fabric should be used to protect the tree. Pruning is not necessary, but helps decrease the chance of falling over in early years as well as with interfering with other plants. Pruning should not occur during winter months because this affects the crop production later on. Fertilization should only occur for potted trees. (18) This plant does best in zone 6 to zone 9 (42).

Nutrition Facts			
Serving Size (50g)			
Amount Per Serving			
<b>Calories 37</b>			
		% Daily Values*	
<b>Total Fat</b> 0.2g			<b>0%</b>
Saturated Fat 0g			<b>0%</b>
Trans Fat 0g			
<b>Cholesterol</b> 0mg			<b>0%</b>
<b>Sodium</b> 1mg			<b>0%</b>
<b>Total Carbohydrate</b> 10g			<b>3%</b>
Dietary Fiber 1.4g			<b>6%</b>
Sugars 8g			
<b>Protein</b> 0.4g			<b>1%</b>
Vitamin A 1%	•	Vitamin C 1%	
Calcium 1%	•	Iron 1%	
*Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.			
		Calories	2,000      2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2400mg	2400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

### 3. True Date Palm- *Phoenix dactylifera*



**Family:** Arecaceae

**Origin:** Middle East

**Location:** Cochise Hall

**Botanical Characteristics:** The true date palm, *Phoenix dactylifera*, is grown for its highly prized fruits: dates. Their growth rate is slow and it can grow to 100 ft. by 30ft. Palms are not technically trees because they lack wood. The leaves are pinnate, feather-like fronds, 15- 20ft. long. Male and female flowers are borne on separate plants in spring. Female flower bearing plants only produce dates if a male flower bearing plant is nearby for pollination.

**Edibility and Uses:** The yellow orange to red dates are oblong and about 1.5 inches in length. These are harvested in late summer and early autumn. Ripe dates are rich in sugar, 60-80% of the contents.

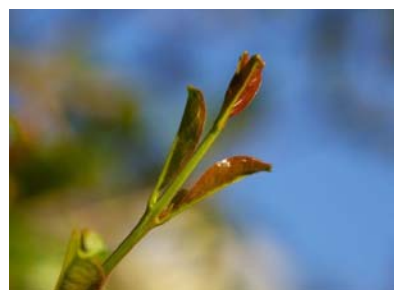
**Ethnobotany:** The word “date” comes from an Ancient Greek word “dáktulos”, meaning finger. The tree is cited 10 places in the Quran. Generally grown in arid regions with supplemental water, a single palm can produce in excess of 250 pounds of dates per season.

**Health Benefits:** Dates contain tannins with antioxidants properties that are proven to have anti-inflammatory characteristics. Dates are also a great source of Vitamin A which helps with vision, and skin health, and protects from oral and lung cancer. Dates protect against age-related macular degeneration as a result of the high level of the carotenoid zeaxanthin (21).

**Cultivation:** True Date palms grow best in well-draining, neutral to acidic soil with plenty of direct sunlight. It is commonly used as a “street tree” because it can thrive even when there is limited space for root growth. The tree is vulnerable to lethal yellowing disease and fungus which can be avoided by trimming the lower leaves that grow (22). This plant grows well in zone 8 to zone 17 (43).

#### Nutrition Facts

Serving Size (100g)		
Amount Per Serving		
Calories 282		
	% Daily Values*	
<b>Total Fat</b> 0g		<b>0%</b>
Saturated Fat 0g		<b>0%</b>
Trans Fat 0g		
<b>Cholesterol</b> 0mg		<b>0%</b>
<b>Sodium</b> 0mg		<b>0%</b>
<b>Total Carbohydrate</b> 75g		<b>25%</b>
Dietary Fiber 8g		<b>32%</b>
Sugars 63g		
<b>Protein</b> 2.45g		<b>5%</b>
Calcium 3.9%	•	Iron 5.6%
*Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.		
	Calories	2,000 2,500
Total Fat	Less than	65g 80g
Sat Fat	Less than	20g 25g
Cholesterol	Less than	300mg 300mg
Sodium	Less than	2400mg 2400mg
Total Carbohydrate		300g 375g
Dietary Fiber		25g 30g



#### 4. Pomegranate - *Punica granatum* 'Wonderful'

**Family:** Lythraceae

**Origin:** Iran to Northern India

**Location:** Women's Plaza

**Botanical Characteristics:** A deciduous multi-stemmed tree or large vase-shaped shrub growing to 5 m (16ft.) by 8m (26ft.) at a medium rate. The leaves are simple, oval and about 3 in. long. The flowers are bright red, 3 cm. in diameter with three to seven petals. In Arizona, they flower between late winter and early spring. The fruits typically ripen in August and September. It generally takes the fruit six to seven months after flowering to reach maturity. A pomegranate fruit can contain 200 to 1400 seeds depending on the size!

**Edibility and Uses:** The pulp surrounding the seed can be eaten raw or used for juicing or cooking. If the seed is fresh it is soft and can be eaten raw. The fruit juice can be used in soups, sauces, jellies, ice cream, cakes, etc.

**Ethnobotany:** The pomegranate is native to the plains of Iran and it now is widely cultivated throughout India and the drier parts of Southeast Asia, Malaysia, the East Indies, and tropical Africa. It has been mentioned as early as Homer's poems, and is found 25 times and 3 times in the Bible and Quran, respectively.

**Health Benefits:** Pomegranates are praised as one of the most antioxidant-rich foods. Science suggests their nutrients are vital for optimal health. Antioxidants help cells resist damage, and subsequent aging, thus decreasing your chance of tissue and organ damage, as well as chronic inflammation. According to studies, pomegranates are shown to support joint health and function and may reduce arthritis symptoms. Scientists also have found that pomegranates help prevent prostate and breast cancer by inhibiting cell proliferation, as well as increasing death of cancer cells (19).

**Cultivation:** Pomegranate trees excel in alkaline soil. They do well in full sun to part shade. Grafting isn't recommended, but branches can be air layered. For the first couple of years pruning is encouraged on the whole tree, but afterwards only suckers and dead branches should be removed (20). This tree's USDA hardiness zone is 7-11.

Nutrition Facts		
Serving Size (100g)		
Amount Per Serving		
<b>Calories 83</b>		
		% Daily Values*
<b>Total Fat</b> 1.1g		<b>2%</b>
Saturated Fat 0g		<b>0%</b>
Trans Fat 0g		
<b>Cholesterol</b> 0mg		<b>0%</b>
<b>Sodium</b> 0mg		<b>0%</b>
<b>Total Carbohydrate</b> 18.7g		<b>6%</b>
Dietary Fiber 4g		<b>16%</b>
Sugars 0g		
<b>Protein</b> 1.67g		<b>3%</b>
Vitamin C 16.7%	•	Calcium 1%
Iron 1.7%		
*Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.		
	Calories	2,000 2,500
Total Fat	Less than	65g 80g
Sat Fat	Less than	20g 25g
Cholesterol	Less than	300mg 300mg
Sodium	Less than	2400mg 2400mg
Total Carbohydrate		300g 375g
Dietary Fiber		25g 30g



## 5. European Olive – *Olea europaea*

**Family:** Oleaceae

**Origin:** Mediterranean

**Location:** Olive Walk

**Botanical Characteristics:** This is an evergreen tree growing to 10m (32ft.) by 8m (26ft.). It is relatively hardy, and slow-growing. The leaves are silvery grey and replaced every two years. They have cream colored flowers that are either sexually complete or male.

**Edibility and Uses:** The fruit, a drupe, ranges in color from green, to copper, to purplish-black and is usually bitter unless processed. As such, they are pickled or cured with water, brine, oil, salt, or lye before eating. They can also be dried in the sun and eaten without curing (fichouilles). Olives are widely used as a relish and flavoring for foods. The ripe fruits are pressed and oil extracted for use in cooking or as an ingredient in bath and beauty products.

**Ethnobotany:** Olive culture has been documented from the year 4800 BCE in Cyprus. Archaeologists have found evidence of olive oil productions as far back as 6,000 years ago in Carmel, Israel (2).

Planted on the UA campus by Robert Forbes beginning in 1895, the trees on campus were part of variety trials investigating agricultural crops from dry lands around the world, as potential agricultural commodities in Arizona (3).

**Health Benefits:** Olives are an essential part of the Mediterranean diet and are considered by some to be a superfood. Olives protect the digestive tract and reduce risk of colon cancer as a result of their vitamin E content and the monounsaturated fats found inside the fruit. Olives act as a natural alternative to ibuprofen, as they have a

strong anti-inflammatory inhibitor called cyclooxygenase which is 1/10 the strength of ibuprofen's medicinal properties. Lastly, olives are great for skin and hair health. They also help protect against UV rays and skin cancer (23).

**Cultivation:** Olive trees grow well in loamy and well drained fertile soil. They are drought tolerant, but watering during dry weather is ideal. Full sun and warm weather of USDA Zone 8 to 11 is preferred, however they can grow in colder climates if facing a wall for protection (24, 44).

Nutrition Facts			
Serving Size (1g)			
Amount Per Serving			
Calories 5			
		% Daily Values*	
<b>Total Fat</b>	0.5g		<b>1%</b>
Saturated Fat	0g		<b>0%</b>
Trans Fat	0g		
<b>Cholesterol</b>	0mg		<b>0%</b>
<b>Sodium</b>	32mg		<b>1%</b>
<b>Total Carbohydrate</b>	0.3g		<b>0%</b>
Dietary Fiber	0.1g		<b>0%</b>
Sugars	0g		
<b>Protein</b>	0g		<b>0%</b>
Iron 1%			
*Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.			
	Calories	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2400mg	2400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

## 6. Weeping Mulberry – *Morus alba* 'Chaparral'



**Family:** Moraceae

**Origin:** East Asia

**Location:** Green Belt

**Botanical Characteristics:** This is a deciduous tree growing to 18 m (59ft.) by 10m (32 ft.) at a medium rate. It is in flower in May, and the fruits ripen from July to August. The flowers are monoecious (individual flowers have either male or female parts, but both flowers can occur on the same plant). It is self-fertile.

**Edibility and Uses:** It produces small, red, or white fruits that resemble raspberries in shape but lack a distinctive flavor. They may be eaten raw or processed into preserves, syrup, or wine. A richer flavor develops if the fruits are dried. In times of famine, leaves and shoots can be cooked and eaten.

**Ethnobotany:** The mulberry is the host plant of the silk worm and is an important feedstock for the silk industry (4).

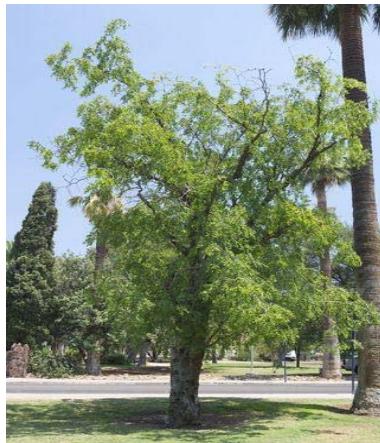
*Did you know? The pollen of the mulberry is ejected from the flower at approximately half the speed of sound.*

**Health Benefits:** One of mulberries greatest health benefits is that they contain resveratrol which is shown to reduce the risk of stroke. Not only are mulberries low in calories, they also have been shown to fight against cancer, bacterial infections, inflammation, and associated aging effects, and diabetes (25).

**Cultivation:** Mulberries grow all over the world and have some potential for invasive . They do best in well drained soils and prefer full sun. They can be planted by seed or propagated by cuttings. High fertilizer and a seed bed is strongly recommended. Luckily, pests and diseases aren't attracted to it (26). It does best in 4 to 8 (45).

Nutrition Facts		
Serving Size (100g)		
Amount Per Serving		
<b>Calories 43</b>		
		% Daily Values*
<b>Total Fat</b> 0g		<b>0%</b>
Saturated Fat 0g		<b>0%</b>
Trans Fat 0g		
<b>Cholesterol</b> 0mg		<b>0%</b>
<b>Sodium</b> 10mg		<b>0%</b>
<b>Total Carbohydrate</b> 9.8g		<b>3%</b>
Dietary Fiber 1.7g		<b>7%</b>
Sugars 8.1g		
<b>Protein</b> 1.4g		<b>3%</b>
Vitamin A 0.5%	•	Vitamin C 60.7%
Calcium 3.9%	•	Iron 10.3%
*Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.		
	Calories	2,000 2,500
Total Fat	Less than	65g 80g
Sat Fat	Less than	20g 25g
Cholesterol	Less than	300mg 300mg
Sodium	Less than	2400mg 2400mg
Total Carbohydrate		300g 375g
Dietary Fiber		25g 30g

## 7. Chinese Jujube – *Zizyphus jujuba*



**Family:** Rhamnaceae

**Origin:** China

**Location:** Green Belt

**Botanical Characteristics:** A small deciduous tree growing to 10m (32ft.) by 7m (23ft.) at a fast rate. The leaves are small, ovate or oval leaves 1-2 inches long. Leaves turn bright yellow in fall before falling. The tree is in flower April to May, and fruits ripen in September and October. The flowers are perfect (have both male and female organs) and are pollinated by insects.

**Edibility and Uses:** *Zizyphus jujuba* produces abundant, red, walnut-sized fruits that resemble apples in flavor and texture. Fruits are smoked, candied, dried, or made into a wine or liquor. The dried fruit can also be ground into a powder and used in preparation of “kochujang”, a fermented hot pepper soybean paste that resembles miso. Jujube fruits are high in VitC 1oz=32% of your daily requirement.

**Ethnobotany:** Believed to have been domesticated for nearly 11,000 years, the jujube is thought to hail from South Asia. However, extensive cultivation has made it difficult to determine its actual origin. In Chinese medicine it is prescribed as a tonic to strengthen liver function.

Japanese research shows that jujube increases immune system’s resistance.

**Health Benefits:** Jujubes provide amazing health benefits. The fruit can be used to treat insomnia, and reduce anxiety as it works as a natural sedative. They have high levels of antioxidants nutrients, mainly vitamin C, vitamin A and vitamin B2, which support the immune system. Further, jujubes protect the liver as their antioxidants combat free radicals allowing the liver to work smoothly (27).

**Cultivation:** Chinese jujubes survive in a variety of well drained soils and prefer warm temperatures. The plant grows fast (only 3-4 years to produce fruit) and spreads far, so large amounts of space for growing is recommended. It is also resistant to many diseases and pests (28). This plant grows well in zone 6 to 10 (45).

Nutrition Facts	
Serving Size (100g)	
Amount Per Serving	
<b>Calories 287</b>	
	<b>% Daily Values*</b>
<b>Total Fat</b> 1.1g	<b>2%</b>
Saturated Fat 0g	<b>0%</b>
Trans Fat 0g	
<b>Cholesterol</b> 0mg	<b>0%</b>
<b>Sodium</b> 9mg	<b>0%</b>
<b>Total Carbohydrate</b> 74g	<b>25%</b>
Dietary Fiber 0g	<b>0%</b>
Sugars 0g	
<b>Protein</b> 3.7g	<b>7%</b>
Vitamin C 21%	•
Iron 9%	Calcium 7%
*Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.	
	Calories    2,000    2,500
Total Fat	Less than 65g    80g
Sat Fat	Less than 20g    25g
Cholesterol	Less than 300mg    300mg
Sodium	Less than 2400mg    2400mg
Total Carbohydrate	300g    375g
Dietary Fiber	25g    30g





## 8. Italian Stone Pine – *Pinus pinea*

**Family:** Pinaceae

**Origin:** Mediterranean

**Location:** Green Belt

**Botanical Characteristics:** The Italian stone pine is an evergreen tree growing to 32 ft. by 32 ft. at a medium rate. Also called Umbrella pine, it has a flattened round canopy. Needle-like leaves are 6 in. long and borne in pairs. It produces male and female cones from May to June and the female cones ripen in April. The fertilized cones can take up to 36 months to mature, longer than any other pine.

**Edibility and Uses:** The small seeds from this tree are shelled and eaten raw or used in cuisine. High in protein and fiber, the nuts have a delicate pine flavor with a buttery texture. Often roasted to bring out the subtle flavors, the nut is essential for making pesto. Seeds from other pines can be shelled and eaten as well, but most pine seeds are too small to be worth the labor of processing.

**Ethnobotany:** Identified by its characteristic umbrella shape, *Pinus pinea* has been cultivated for 6,000 years in the Mediterranean. The resin contains turpentine, which is used medicinally as an antiseptic and to treat skin conditions. Turpentine is also used as a solvent for waxes and making varnish. The resin also yields rosin, which is rubbed on violin bows and soles of ballet shoes for grip (5).

**Health Benefits:** Pine nuts have B-vitamins that works as enzyme cofactors in the human body. They also contain monounsaturated fatty acids which lower LDLs (bad cholesterol) and increase HDLs (good cholesterol), thus preventing artery diseases and strokes. Pine nuts are not only nutritious, but an ingredient in gluten-free foods (29).

**Cultivation:** The Italian Stone Pine is known as a street tree and grows in the Western half of the United States. It prefers dry weather and slightly alkaline to acidic soil. Little pruning is required but if done so it should be during winter months (30). USDA hardiness zones 8 to 11 are

recommended (45).

Nutrition Facts				
Serving Size (100g)				
Amount Per Serving				
<b>Calories</b> 673				
		% Daily Values*		
<b>Total Fat</b>	68g		<b>105%</b>	
Saturated Fat	0g		<b>0%</b>	
Trans Fat	0g			
<b>Cholesterol</b>	0mg		<b>0%</b>	
<b>Sodium</b>	2mg		<b>0%</b>	
<b>Total Carbohydrate</b>	13g		<b>4%</b>	
Dietary Fiber	3.7g		<b>15%</b>	
Sugars	3.6g			
<b>Protein</b>	14g		<b>28%</b>	
Vitamin C	1%	•	Calcium 1%	
Iron	30%			
*Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.				
		Calories	2,000	2,500
Total Fat	Less than	65g	80g	
Sat Fat	Less than	20g	25g	
Cholesterol	Less than	300mg	300mg	
Sodium	Less than	2400mg	2400mg	
Total Carbohydrate		300g	375g	
Dietary Fiber		25g	30g	



## 9. Carob – *Ceratonia siliqua*

**Family:** Fabaceae

**Origin:** Mediterranean

**Location:** Green Belt

**Botanical Characteristics:** The tree reaches 15 to 17 m (50-55 ft.) in height. The evergreen leaves are pinnate with 6 to 10 opposite leaflets that are oval, dark green, and leathery.

**Edibility and Uses:** This common chocolate substitute, *Ceratonia siliqua* is another Mediterranean native grown here on campus. Fallen pods can be gathered under female trees. Seedpods are filled with a sweet pulp and can be eaten both green and dried. A flour is made from them which is 60% protein.

**Ethnobotany:** The pods from this relative of peas has been used as a sweetener for millennia, sweetening the beverages of Egyptians (and taking on the role of “sweet” in hieroglyphs), and replacing chocolate in modern times. The term “karat” is from “karob”, as the seeds were used as a standard weight in ancient times because they are so consistently weighted. Carob is also known as St. John’s bread. This alludes to the “locusts” which sustained St. John the Baptist in the desert according to the Bible. “Locust” originally applied to the carob tree; later to migratory and other grasshoppers (6).

**Health Benefits:** Carobs are used as a nutritious and low fat alternative to cocoa-derived chocolate. The bean is also used for many different therapeutic treatments. The vitamin E in the carobs also help with healing colds, flus, and osteoclasia. Carobs have high levels of both phosphorus and calcium, which promote bone strength, fighting against osteoporosis. Singers have been known to chew on carob husks to enhance clarity in their voice by treating the throat (32).

**Cultivation:** Carobs do best in medium, rocky fertilized soil.

They also thrive during warm temperature weather and salty air. The roots spread far and deep so carobs do best in large plots of land (33). This plant grows best in zone 9 to zone 11 (45).

Nutrition Facts				
Serving Size (237g)				
Amount Per Serving				
<b>Calories 229</b>				
		% Daily Values*		
<b>Total Fat</b> 1g			<b>2%</b>	
Saturated Fat 0g			<b>0%</b>	
Trans Fat 0g				
<b>Cholesterol</b> 0mg			<b>0%</b>	
<b>Sodium</b> 36mg			<b>2%</b>	
<b>Total Carbohydrate</b> 92g			<b>31%</b>	
Dietary Fiber 41g			<b>164%</b>	
Sugars 51g				
<b>Protein</b> 5g			<b>10%</b>	
Calcium 36%	•	Iron 17%		
*Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.				
		Calories	2,000	2,500
Total Fat	Less than	65g	80g	
Sat Fat	Less than	20g	25g	
Cholesterol	Less than	300mg	300mg	
Sodium	Less than	2400mg	2400mg	
Total Carbohydrate	Less than	300g	375g	
Dietary Fiber		25g	30g	



## 10. Hackberry – *Celtis reticulata*

**Family:** Cannabaceae

**Origin:** Mountain Southwest

**Location:** Gila Hall

**Botanical Characteristics:** A deciduous tree growing generally to 10-16m (20-40ft.) at a slow rate. It has gray, blue-gray, or gray-brown bark, with corky ridges on trunk and smooth bark on the twigs. Simple, rough-textured leaves are 3-6cm long and 1.5-4 cm broad, dark green on top and lighter underneath. Flowers are minute; only 1-3 mm in diameter. Yellow or orange spherical fruit is 8-9mm in diameter. This tree can be evergreen in Tucson. It is native to southwest US and Northern Mexico at elevations of 2500-6000 ft. (7). This tree is commonly found along washes.



**Edibility and Uses:** Hackberry fruits are pea sized berries with a single hard seed and a thin sweet flesh that can be ground to make jellies, syrups, or wine. The berries can also be eaten fresh, but doing so is extremely tedious because of their small size and thin flesh. Trees flower in spring and fruits turn orange/red by late summer or fall. The berries are an important source of food for many birds. If the hard outer shell is cracked the white kernel of the seed is edible.

Did you know? Native to the southwestern U.S. and northern Mexico this tree has inhabited the state since before the last ice age.

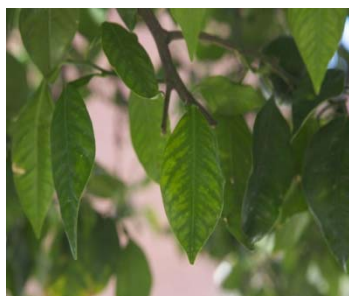


**Health Benefits:** Hackberries have high levels of natural sugar which can be used to sweeten up recipes. They are also found to have large amounts of protein, phosphorus and calcium which help bones and energy production in the body (34).

**Cultivation:** Hackberries are often used for wind erosion control because they have deep roots. Insects and fungal infections can occur so proper maintenance is required. Full sun and frequent irrigation is best for plant growth (35). This plant's hardiness zone is 2 through 9 (46).



**\*Although this plant is edible and health benefits are known there has been no publishing of nutrition facts or servings.**



## 11. Sour Orange – *Citrus aurantium*

**Family:** Rutaceae

**Origin:** East Asia

**Location:** Gila/Maricopa Hall Allee

**Botanical Characteristics:** The tree ranges from less than 3 m (10ft.) to 9m (30ft.). It has smooth, brown bark, green twigs, and flexible, dull thorns from 2.5-8 cm long. The evergreen leaflets are aromatic, alternate, on broad-winged petioles much longer than those of the sweet orange. The highly fragrant flowers are about 3.75 cm (1.5in.) with 5 petals.

**Edibility and Uses:** It is most commonly used to make marmalade. The juice is used as a flavoring for fish, and in Spain it is used on meat. In Mexico sour oranges are cut in half, salted, coated with hot chili paste and eaten. Bitter orange oil, expressed from the peel, is used for flavoring. Perfume is made from neroli oil is distilled from the flowers.

**Ethnobotany:** The genus originated in Southeast Asia and found its way across the globe over several millennia. Natives of the South Sea Islands believe the tree to have been brought to their shores in prehistoric times. Arabs are thought to have carried it to Arabia in the 9th century. It was reported growing in Sicily in 1002 CE. For 500 years it was the only orange in Europe and the first to be brought to the Americas. It was naturalized in Mexico by 1568 and in Brazil by 1587, and not long after it was running wild in the Cape Verde Islands, Bermuda, Jamaica, Puerto Rico and Barbados.

This species is commonly used as a rootstock, grafted to another citrus variety in order to impart its hardiness (8).

**Health Benefits:** Bitter oranges have lots of health benefits whether ingested orally, applied to skin or inhaled. When eaten, they are natural remedies that help heal stomach aches and nasal congestion. If applied to skin, orange peels are known to help eyelid inflammation, headaches, muscle and joint pain. When bitter orange is inhaled, it can even be used as a painkiller.

**Cultivation:** It is best grown in shaded areas and prefers a sub-tropical climate. It prefers rich soil. It is a sturdy tree that handles windy weather well. This tree grows in zone 9 to zone 11 (45).

Nutrition Facts				
Serving Size (100g)				
Amount Per Serving				
<b>Calories</b> 140				
		% Daily Values*		
<b>Total Fat</b> 0.1g			<b>0%</b>	
Saturated Fat 0g			<b>0%</b>	
Trans Fat 0g				
<b>Cholesterol</b> 0mg			<b>0%</b>	
<b>Sodium</b> 40mg			<b>2%</b>	
<b>Total Carbohydrate</b> 38.2g			<b>13%</b>	
Dietary Fiber 3.4g			<b>14%</b>	
Sugars 29.2g				
<b>Protein</b> 0.3g			<b>1%</b>	
Vitamin C 58%	●	Calcium	1%	
*Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.				
		Calories	2,000	2,500
Total Fat	Less than	65g	80g	
Sat Fat	Less than	20g	25g	
Cholesterol	Less than	300mg	300mg	
Sodium	Less than	2400mg	2400mg	
Total Carbohydrate		300g	375g	
Dietary Fiber		25g	30g	



## 12. Texas Honey Mesquite – *Prosopis glandulosa*

**Family:** Fabaceae

**Origin:** Texas/Northeast Mexico

**Location:** Student Union Allee

**Botanical Characteristics:** A tall shrub or tree of 3-9m with deciduous foliage. The crown spreads an equal distance or more to the height. Bright green, feathery leaves are twice compound with 6-17 pairs. Leaflets are up to 2 inches long and 3 1/16 inch wide. Tiny, yellow-green, fragrant flowers occur in dense, spike-like racemes appearing in April and as late as August during wet summers. Fruit a long, yellowish brown pod, somewhat flattened and with slight constrictions between the seeds (9).

**Edibility and Uses:** By far the most tantalizing of the mesquites on campus, Texas honey mesquite lives up to its name that promises something sweet and tasty. The pods of this Southwest native are high in sugar and protein, making an excellent flour from the pulp (like other mesquites).

**Ethnobotany:** The fruits were an important food source for native peoples, especially since it produces a crop even in drought. Wild animals also rely on its nutritious pods for sustenance during dry years. Here in Tucson, you can pick pods and attend the Desert Harvester's annual mesquite grinding event to produce flour. The name mesquite is a Spanish adaptation of the Aztec name mizquitl (10).

**Health Benefits:** Many parts of mesquite trees are used for their health and nutritional benefits including their bark, pods, branches, leaves and the gum from the trunk of the plant. Medicinally, these plant parts are used to treat wounds, digestive problems, fevers and bladder infections. Vets use the tree to make a poultice to treat stings on animals (36).

**Cultivation:** The mesquite tree does well in arid environments with little natural rainfall and well-drained soil such as sandy, sandy loam, medium loam clay. Minimal water is needed after full growth. However, when establishing a new tree drip irrigation is required to keep the plant healthy (35). This tree grows best in USDA zones 6 to 11 (47).

Nutrition Facts	
Serving Size (15g)	
Amount Per Serving	
<b>Calories</b> 10	
	% Daily Values*
<b>Total Fat</b> 0g	<b>0%</b>
Saturated Fat 0g	<b>0%</b>
Trans Fat 0g	
<b>Cholesterol</b> 0mg	<b>0%</b>
<b>Sodium</b> 0mg	<b>0%</b>
<b>Total Carbohydrate</b> 4g	<b>1%</b>
Dietary Fiber 2g	<b>8%</b>
Sugars 2g	
<b>Protein</b> 0g	<b>0%</b>
Vitamin C 2%	
*Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.	
	Calories 2,000 2,500
Total Fat	Less than 65g 80g
Sat Fat	Less than 20g 25g
Cholesterol	Less than 300mg 300mg
Sodium	Less than 2400mg 2400mg
Total Carbohydrate	300g 375g
Dietary Fiber	25g 30g



### 13. Century plant – *Agave Americana*

**Family:** Asparagaceae

**Origin:** Mexico/Desert Southwest

**Location:** Administration building

**Botanical Characteristics:** This agave has flattened, strap-shaped, succulent blue-green leaves, sometimes curved or reflexed, margins toothed but not horny, foliage tapering to a deadly terminal spine, 5 feet long and 10 inches wide, leaves arranged in a rosette pattern. Agaves grow to maturity and produce a large flower stalk in one last effort before dying. Contrary to its name, its average lifespan is 10-30 years.

**Edibility and Uses:** The pulp is obtained from the heart (caudex), leaves, and stalk by dismembering and killing the plant. The sap that is obtained by severing the emerging flower stalk at the base, allows the plant to live for several months. Sap can be harvested daily from the reservoir that is formed where the harvester scrapes the cut where the stalk was severed. This species is closely related to the blue agave, *Agave tequilana*, which is used to produce tequila in the state of Oaxaca, Mexico and related drinks elsewhere. It is grown for twelve years to maturity, the leaves are stripped, and the heart is harvested for further processing. After being baked, the hearts are pressed and the liquid is used to produce tequila.

**Ethnobotany:** Agave has sustained native peoples for thousands of years. In south-central Arizona, thousands of acres of yard-wide piles of rocks served to capture runoff to irrigate a virtual dryland sea of agave plants. It is estimated that the rock-piles were constructed during the classic Hohokam period between 1150 and 1350 CE when the Tanque Verde cultural phase in the Tucson Basin was at its peak (11). Edible parts were baked in stone-lined pits or were sometimes boiled in clay pots.

**Health Benefits:** Agave is a popular and natural substitute for sugar. It is sweeter than sugar, therefore less can be used for the same taste. Agave is a low glycemic food which can help regulate blood sugar and positively influence weight loss. It also contains high levels of zinc, fiber and can lower cholesterol.

**Cultivation:** The century plant does best in full sun with well-draining soil, requiring no watering once established. Root rot occurs if the soil is constantly moist. This plant grows well in zone 3b to zone 11.

### Nutrition Facts

Serving Size (5g)

Amount Per Serving

**Calories 21**

% Daily Values\*

<b>Total Fat</b> 0g	<b>0%</b>	
Saturated Fat 0g	<b>0%</b>	
Trans Fat 0g		
<b>Cholesterol</b> 0mg	<b>0%</b>	
<b>Sodium</b> 0mg	<b>0%</b>	
<b>Total Carbohydrate</b> 5g	<b>2%</b>	
Dietary Fiber 0g	<b>0%</b>	
Sugars 4.7g		
<b>Protein</b> 0g	<b>0%</b>	

\*Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.

	Calories	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2400mg	2400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g



#### 14. Saguaro – *Carnegiea gigantea*

**Family:** Cactaceae

**Origin:** Desert Southwest

**Location:** Krutch Garden

**Botanical Characteristics:** Saguaros grow up to 50ft. in height. It is a columnar cactus native to the Sonoran desert of Arizona and Mexico. Requiring 75 years to develop even one side arm, the cactus can live for 200 years. Its tremendous weight, up to nine tons, is supported by a skeleton of about two dozen spongy wooden rods. Accordion pleats expand and contract as they gain and lose moisture. A crown of white flowers opens in May, followed by red, 3-4 in. long fruits in June. Its white flowers open in the night, attracting the bats needed to transport pollen from flower to flower. Each flower develops into a fruit that contains up to 2,000 seeds.

**Edibility and Uses:** The bright red, fleshy fruit is eaten fresh, juiced, or made into preserves, wine, or syrup. The fruits split open into flower-like shapes when ripe.

**Ethnobotany:** It has provided nutritious fruit to the natives of Sonora for centuries, particularly the Tohono O’odham nation. The Tohono O’odham people call the time of ripe fruits Ha:sañ Bak Masad, and the month to gather saguaro fruit (Ha:sañ is pronounced "Hawshawn" and means saguaro).

**Health Benefits:** Saguaro fruit is loaded with nutrients, especially B12, which is a vitamin lacking in most vegan diets. B12 is essential for the nervous system and for blood cell production. Saguaro is also used to help cure rheumatic disorder, which affects joints and connective tissue.

Saguaro fruit is very hydrating and has fiber to help digestion (41).

**Cultivation:** This cactus grows best arid climates with full sun. It takes advantage of natural rainfall and unimproved desert soil (35).

Engorgement, hanging limbs, stem failure, and toppling are common problems of large specimens located in and around irrigated landscapes.

The saguaro grows well in zones 9 to zone 11 (45) and is tolerant to 28°F (49).

### Nutrition Facts

Serving Size (50g)	
Amount Per Serving	
Calories 33	
	% Daily Values*
<b>Total Fat</b> 1g	<b>2%</b>
Saturated Fat 0g	<b>0%</b>
Trans Fat 0g	
<b>Cholesterol</b> 0mg	<b>0%</b>
<b>Sodium</b> 0mg	<b>0%</b>
<b>Total Carbohydrate</b> 5g	<b>2%</b>
Dietary Fiber 0g	<b>0%</b>
Sugars 0g	
<b>Protein</b> 1g	<b>2%</b>

\*Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.

	Calories	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2400mg	2400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g



## 15. Prickly Pear – *Opuntia engelmannii*

**Family:** Cactaceae

**Location:** Krutch Garden

**Botanical Characteristics:** The stem pads are dull green, flattened, oval to shaped like an inverse teardrop, and have white or less commonly yellow, drooping spines ringed by sparse, brown or golden glochids at each areole. Many of the large spines have a dark base. Flowers bloom in spring and range from yellow, orange, salmon pink, to buff colored (12).

**Edibility and Uses:** The prickly pear fruits are called “tunas” and can be found in late summer. The flesh is sweet, juicy, and the flavored is said to resemble watermelon. The fruit can be eaten whole, juiced, or made into preserves, wine, or syrup. Metal tongs are commonly used to carefully pick fruits a safe distance from the cactus spines. It takes about 50 pears to make a half gallon of quality juice.

The de-spined pads are used in salads and as pickles (nopalitos).

**Ethnobotany:** The fruits of prickly pears are prized by natives for their sweet, refreshing flavor. However, they don’t come without a price. The fruits are covered in small spines and irritating hairs, called glochids. Despite their defenses, one can remove the hairs through singeing them in flame, or shaking the fruits in sand. The white foamy material commonly found on prickly pear pads is the protective secretions of cochineal bugs. These insects are harvested for bright red pigment used to make carmine dye.

**Health Benefits:** Prickly pears contain large quantities of magnesium and potassium. These minerals help metabolize fat, carbs and protein and regulate normal heart beat. This fruit also has calcium to support strong bones and teeth, and to prevent osteoporosis. It is also a great weight management fruit because they are low in calories, and have fiber and protein to promote satiety (27).

**Cultivation:** This plant does best in full sun and with minimal maintenance here in the desert. Well drained soil is recommended as natural rainfall is all that is needed (35). This plant grows well in zone 8b to zone 10b (45).

Nutrition Facts	
Serving Size (237g)	
Amount Per Serving	
<b>Calories 61</b>	
	% Daily Values*
<b>Total Fat</b> 1g	<b>2%</b>
Saturated Fat 0g	<b>0%</b>
Trans Fat 0g	
<b>Cholesterol</b> 0mg	<b>0%</b>
<b>Sodium</b> 7mg	<b>0%</b>
<b>Total Carbohydrate</b> 14g	<b>5%</b>
Dietary Fiber 5g	<b>20%</b>
Sugars 9g	
<b>Protein</b> 1g	<b>2%</b>
Vitamin A 1%	•
Vitamin C 35%	•
Calcium 8%	•
Iron 2%	•
*Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.	
	Calories    2,000    2,500
Total Fat	Less than    65g    80g
Sat Fat	Less than    20g    25g
Cholesterol	Less than    300mg    300mg
Sodium	Less than    2400mg    2400mg
Total Carbohydrate	300g    375g
Dietary Fiber	25g    30g



### Check out some of the other edible plants on campus:

- **Calamondin lime - *Citrofortunella mitis***

Found in the Women's Plaza. The fruit is tart on the inside and has a sweet peel which many use them for delicious jams and pies.

- **Peach - *Prunus persica***

Found by the West side of the Math building. Peaches have a velvety coating, and people eat them in lots of different ways including whole, in smoothies, or in baked goods.

- **Kumquat - *Fortunella margarita***

Found at the Northeast corner of Saguaro Hall.

Kumquats are small oval-shaped tangy citrus fruit often used in salads or as garnish.

- **Oak - *Quercus virginiana***

Found at the Southeast corner of the Main Library (larger trees) as well as throughout campus. These low tannin acorns can be processed and roasted for eating whole. They can also be ground into nutritious flour that is high in protein.

- **Common myrtle - *Myrtus communis***

Found on the North side of the Education building. Myrtle berries are reminiscent of a blueberry in shape, but not flavor. It has a purple color with a mild clove-like taste used in sauces and to flavor drinks.

- **Barrel Cactus - *Echinocactus grusonii***

Found on the North east side of Old Main. Barrel Cacti have small yellow fruits resembling pineapples which are bland tasting. The seeds inside are usually added to breads, smoothies, cereals or used as fruit leather.

### In order to find more information on these plants:

1. Go to <http://arboretum.arizona.edu/>
2. Click "Find Trees & Tour"
3. On the drop down menu choose "GIS Map"
4. Once map is open click on magnifying glass and search for whatever tree you are interested in!

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