Chapter 5c-Fruits and Nuts of Warm Regions
Tree Fruits from Semi Tropical Regions

Pomegranates, Punica granatum (Puniceae) are subtropical fruits native to the region from Iran to the Himalayas.

Pomegranates were a symbol of fertility in the Mediterranean world.

This symbolism travelled to eastern Asia.

Pomegranates were offered to wedding guests to throw on the floor of the honeymoon bedroom.

The scattered seeds would ensure a large number of offspring for the newly weds.

The Moors took pomegranates to Europe when they conquered Spain in 800 A.D.

The Spanish introduced the fruit to the New World.

Pomegranates are now grown in the southern U.S., northern Chile and Argentina.
Fruits from Plants Restricted to the Tropics

Bananas and their relatives in the genus Musa (Musaceae) are native to eastern Asia and Australia.

Wild bananas were important in the lives of preagricultural and early agrarian peoples in Southeast Asia.

Bananas rank second after tomatoes in tons of fleshy fruit produced annually worldwide.

Domestication and commercial production of the modern edible banana involve hybridization and polyploidy of this diploid species:

![Musa acuminata](https://en.wikipedia.org/wiki/Musa_acuminata#/media/File:Banana_ancestors_(Musa_acuminata_and_Musa_balbisiana)_original_range.png)

![Musa balbisiana](https://en.wikipedia.org/wiki/Musa_balbisiana)

This process of domestication and cultivation occurred in a region that includes New Guinea and surrounding islands.

Original native ranges of the two ancestors of edible bananas.

*M. balbisiana* range shown in orange *M. acuminata* range shown in green
Domestication and commercial production of the modern edible banana involve hybridization and polyploidy of two diploid species:

\[ \text{Musa acuminata} \times \text{Musa balbisiana} \]

All edible bananas, regardless of ploidy level, are now lumped under the name \textit{Musa x paradisiaca}.

Wild bananas:

Modern bananas:

Because modern bananas have no seeds, they are planted using modified stems (corms), suckers and other vegetative parts.

Banana “trees” are actually herbs with “trunks” composed of overlapping leaf bases.
Mangoes, *Mangifera indica* (Anacardiaceae) are native to southeast Asia.

The mango is known as the “king of fruits” in India.

These fruits are so revered that leaves are hung above doorways as sources of goodness in Southeast Asia.

Mango fruit type-drupes

Mangoes belong to the same family as poison ivy.
Fruits from Plants Restricted to the Tropics

The Portuguese introduced mangoes to Brazil in the early 1700’s.

Mangoes were brought from South America to the West Indies in 1742.

Commercial production of mangoes include grafting and dwarf plants.

Pineapples, *Ananas comosus* (Bromeliaceae), are indigenous to the New World.

These fruits were widely cultivated by native people by the middle of the 15th century.

Native Americans considered the pineapple a symbol of hospitality.

We have retained the association between pineapple and hospitality by using pineapple motifs in decoration.

**REVIEW**

Multiple fruits are the enlarged ovaries of multiple flowers that more or less fuse together.

Modern pineapple cultivars are parthenocarpic and commercial plantings use vegetative propagation.

Fruits from Plants Restricted to the Tropics

Pineapples are canned or used for juice.

The fruit contain proteolytic enzymes, bromelains, that prevent the use of pineapple juice in foods containing gelatin or milk.
Fruits from Plants Restricted to the Tropics

Papayas, *Carica papaya* (Caricaceae), are native to Central America.

Papayas are called “paw-paws” in Britain, Australia and the West Indies.

Papain and chymopapain are proteolytic enzymes that are extracted from the latex.

Papain is used in:

Papaya plants are short-lived, soft wooded trees.

After the leaves are shed, the mature ovoid fruits emerge directly on the stem.
More Exotic Tropical Fruits

Breadfruit – multiple fruit in the Moraceae (mulberry family)

Soursops, custard apple family, (Annonaceae).

Native to the Americas.

Aggregate fruit

Carambola, star fruit, (Oxalidaceae)

Berry

Rambutans

Southeast Asia

berry

Litchi fruit

China

Passion fruit (Passifloraceae); Native to Brazil, Paraguay and northern Argentina

Guava; Native to Central America
More Exotic Tropical Fruits

Durians, mallow family (Malvaceae); Southeast Asia; capsule

Açai fruits; palm family (Arecaceae); Native to northern Brazil; drupe

Dragonfruit; cactus family (Cactaceae)

Tropical “Nuts”

Several important “nuts” come from warm subtropical or tropical areas.

Coconuts, Cocos nucifera (Arecaceae)

The origin of the coconut is confusing.

The original hypothesis was that coconuts are native to the Indo-Pacific region.

Coconuts were dispersed across the ocean by means of currents.
Tropical “Nuts”

Molecular studies indicate two independent domestications of coconuts.

Coconut palms are monocots.

The trunk is composed of sheathing leaf bases.

Coconuts are monoecious.
Tropical “Nuts”

The fruit is formed from a flower with 3 carpels.

Each carpel represents the “eye” of the coconut, but only one will develop.

The mature fruit contains one seed with a tiny embryo near the stem tip.

The developing endosperm is liquid (coconut water).

As the endosperm matures, it solidifies into an oil-rich layer of coconut “meat” inside the seed coat.

The coconut “milk” used in many Asian recipes is made by soaking grated coconut meat and squeezing out the liquid.

**How to Make Coconut Milk**

1. Use unsweetened coconut flakes.
2. Add hot water & soak for several hours.
3. Blend until flakes are pureed.
4. Strain and enjoy!
Tropical “Nuts”
Macadamia nuts, *Macadamia integrifolia*, (Proteaceae), are native to Australia, but are now produced in Hawaii.

Macadamia nut plants have been cultivated as ornamentals in Hawaii since the 1800’s.

The fruit is a very hard, woody, globose follicle that contains 1-2 seeds.

Commercial macadamia fruit production was hindered by:
Tropical “Nuts”

The “nut” is the embryo borne inside the endocarp of a drupe surrounded by a thin, fleshy layer.

The receptacle becomes larger, fleshy, and turns yellow or red.

South Americans eat the fleshy portion or “cashew apple” because the fruit wall contains irritating compounds.

Brazil nuts are native to the South American tropics.

The fruits develop into large woody spheres weighing 1-2.5 kg (2-5 lbs) each.

The fruit is a capsule.

Almost all of the world supply of Brazil “nuts” is collected from wild trees.
Family: Rutaceae (citrus family); *Citrus*; citrus fruits

Know 4 common types of citrus fruits: citron *C. medica*, mandarin *C. reticulata*, pummelo *C. maxima* and kumquat *C. japonica* (Table 5.3)

Know type of fruit, flower/leaf structure, origin/history and information about cultivation/domestication and uses of sweet/bitter orange, lemon, citron,

Family: Lauraceae (bay family); *Persea americana*; avocado; alligator pear

Know that avocados were most likely independently domesticated 3 times in the Americas: West Indian; Guatemalan and Mexican.

Know type of fruit, flower/origin/history and information about cultivation/domestication and uses.

Family Arecaeae (palm family); *Phoenix dactylifera*; date palm

Know type of fruit, flower/origin/history and information about cultivation/domestication and uses.

Family Moraceae (mulberry family); *Ficus carica*; fig

Know type of fruit, flower/origin/history and information about cultivation/domestication and uses.

Pomegranate *Punica granatum* (Puniceae)

Know type of fruit, origin/history and information about cultivation/domestication and uses

Fruits from Plants Restricted to the Tropics

Banana *Musa* (Musaceae)

Know type of fruit, flower/origin/history and information about cultivation/domestication and uses

Mangoes, *Mangifera indica* (Anacardiaceae)

Know type of fruit, plant/origin/history and information about cultivation/domestication and uses

Pineapples, *Ananas comosus* (Bromeliaceae),

Know type of fruit, plant/origin/history and information about cultivation/domestication and uses

Papayas, *Carica papaya* (Caricaceae)

Know type of fruit, plant/origin/history and information about cultivation/domestication and uses

More Exotic Tropical Fruits

Know examples, fruit types and origin of breadfruit, litchi fruit, passion fruit, durian, guava, soursops and acai fruit.

Tropical “Nuts”

Coconuts, *Cocos nucifera* (Arecaceae)

Know type of fruit, plant/origin/history and information about cultivation/domestication and uses

Macadamia nuts, *Macadamia integrifolia*, (Proteaceae)

Know type of fruit, origin/history and information about cultivation/domestication and uses

Cashew, *Anacardium occidentale* (Anacardiaceae)

Know type of fruit, origin/history and information about cultivation/domestication and uses

Brazil nuts

Know type of fruit, origin/history and information about cultivation/domestication and uses