

Herbs and Spices



Culinary Herbs and Spices

- Herbs and spices associated with cooking
- “Herbs” are generally aromatic leaves used to spice food (many Mediterranean).
- “Spices” are generally fruits, flowers, seeds of tropical origin used in cooking (many Asian).
- We consider them together
- More than \$2 billion per year business in the U.S.
- U.S. imports more than \$80,000,000 per year.
- Fascinating history, tied to exotic places and world history

Herbs

Mint

Use to garnish sweets
or stir into lemonade.

Bay Leaves

Flavor soups and stews with whole
leaves; remove before serving.

Rosemary

Use whole sprigs to season
a marinade for beef.

Basil

Add to a simmering pasta
sauce just before serving.

Purple Basil

Substitute for green
basil in a pesto sauce.

Oregano

Sprinkle into tomato sauce
destined for a pizza.

Dill

Add a bunch
to homemade
chicken soup.

Cilantro

Kicks up
fresh or
bottled salsa.

Thyme

Combine thyme, salt
and pepper with flour
for dredging poultry.

Tarragon

Stir into mayo with
a bit of lemon zest
for a tangy spread.

Chives

Mash into butter
and melt over
roasted potatoes.

Chervil

Pairs well with scrambled
or baked egg dishes.

Italian Parsley

Mix into bread crumbs as a
coating for chicken or fish.

Sage

The strong flavor stands
up well in sausage dishes.

Marjoram

The fresh, citrusy flavor is
great on chicken or beef.

Mostly
aromatic
leaves, from
Mediterranean
region

“Spices”

Mostly
tropical
aromatic
fruits,
seeds,
roots, and
bark



Certain Herbs Are Associated To A Particular Culinary Style

Culinary style Herbs

Mexican	cilantro, garlic, cumin, coriander, Mexican oregano, epazote, chilies
Italian	rosemary, thyme, basil, oregano
French	rosemary, thyme, tarragon, oregano, Herbes de Provence blend
Indian	curry powder, cinnamon, ginger, coriander, turmeric
Asian	ginger, garlic, lemongrass

Where do they come from?

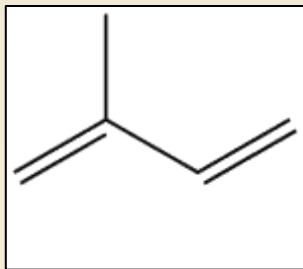
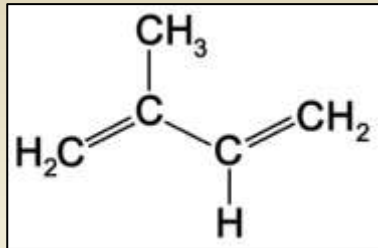
- Several came from the Americas (allspice, *Capsicum* peppers, and vanilla).
- Many “herbs” come from the Mediterranean: the common herbs we use (mint, basil, thyme).
- Some from colder areas of Eurasia: Caraway, horseradish.
- Most “spices” from S.E. Asia (pepper, ginger).
- Native indigenous cultures use many other plants (studied by ethnobotanists).
- Major spices tend to be used all over the world today. You can grow many herbs yourself.

Essential Oils

- Most spices and herbs owe their properties to the presence of **volatile** compounds known collectively as "essential oils". These compounds make up the aroma or “essence” of the plant.
- Volatile oils often found in special plant cells and glands. Found in all parts of plants and the contents of the different parts often differ.
- Some spices are used as extracts and others are used as whole plant material.

Essential Oil Chemistry

Isoprene

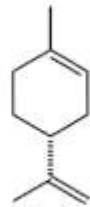


Terpenes

Monoterpenes



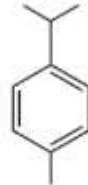
α -Pinene



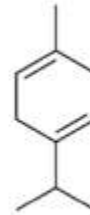
Limonene



Sabinene

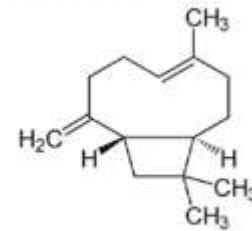


p-Cymene



γ -Terpinene

Sesquiterpenes



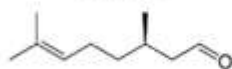
β -Caryophyllene

Terpenoids

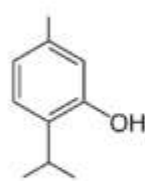
Monoterpenoids



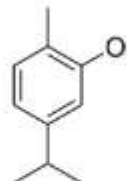
Linalool



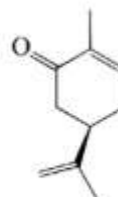
Citronellal



Thymol



Carvacrol

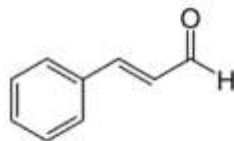


Carvone

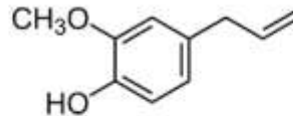


Borneol

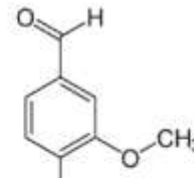
Phenylpropanoids



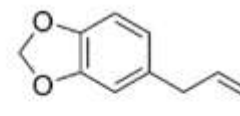
Cinnamaldehyde



Eugenol

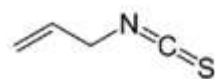


Vanillin

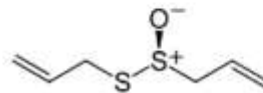


Safrole

Others



Allyl-isothiocyanate



Allicin

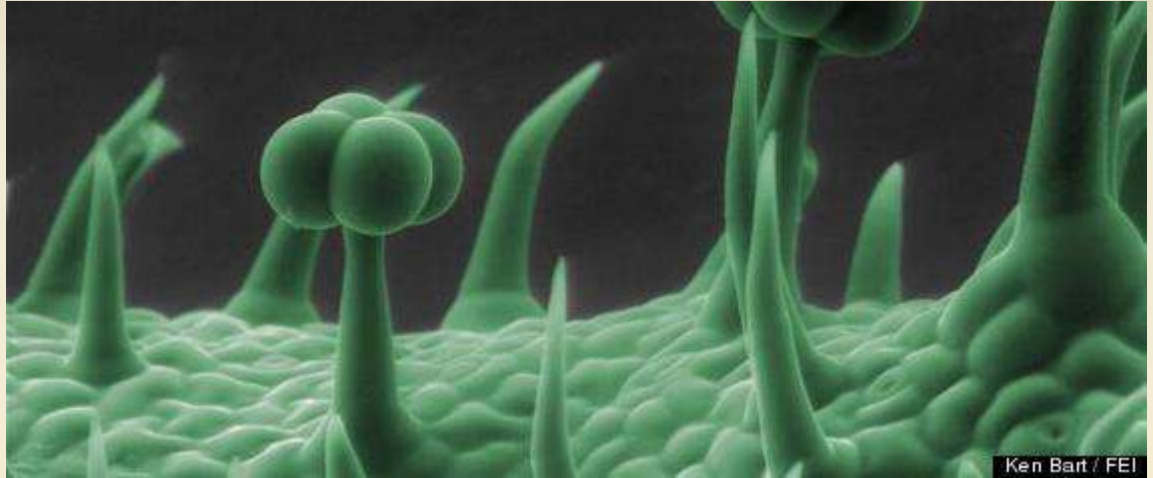
External secretory structures

Typically occur in specialized cells, glands or vessels

Lavender (*Lavendula*)



Tomato leaf – glands and hairs

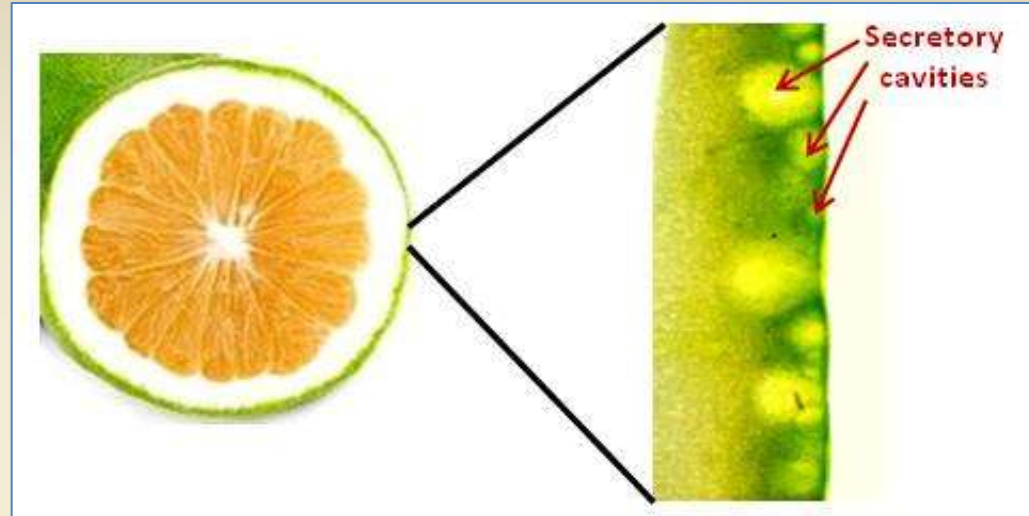
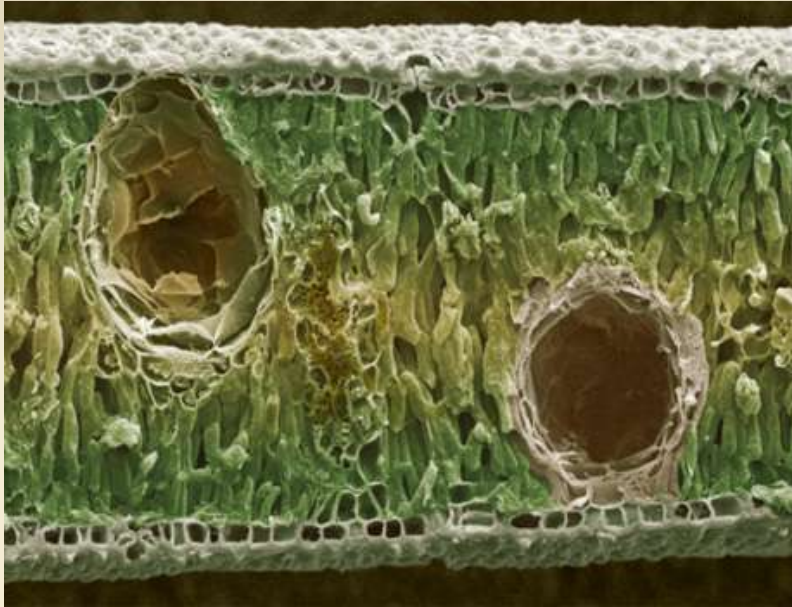


Peppermint (*Mentha*)



Common essential oils that have glandular trichomes: Basil, Lavender, Marjoram, Melissa, Oregano, Peppermint, Rosemary, and Spearmint

Internal Glands and Secretory Cavities



- **Common essential oils with secretory cavities:** Citrus oils: Bergamot, Grapefruit, Lemon, Lime, Orange, and Tangerine; Eucalyptus species; Clove bud; and Resin trees: Benzoin, Frankincense, and Myrrh
- **Common essential oils with secretory ducts:** Angelica, Caraway, Carrot seed, Dill, Fennel, Fir, Cedar, Pine, Spruce, Juniper, and Cypress

Functions of Essential Oils

- Defense – against herbivores, insects, grazers
- Repel – invaders, fungi, bacteria
- Attraction – aromas for pollinating insects



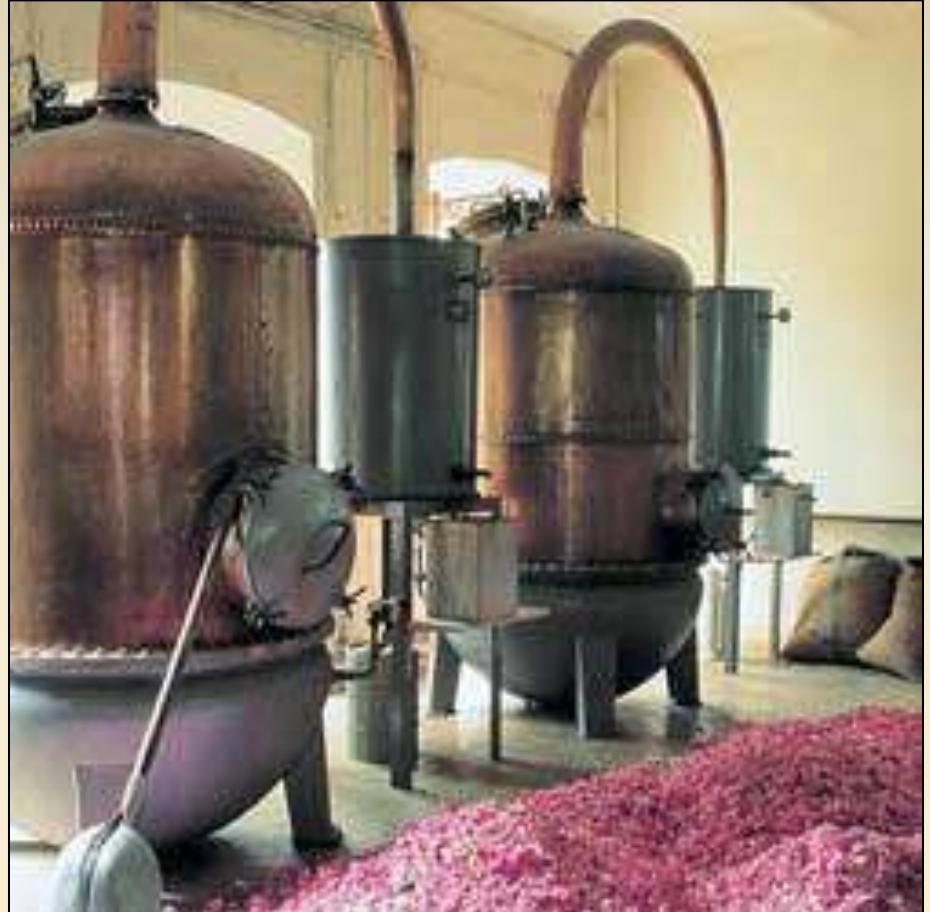
The orchid and the orchid bee. Photo by H. Nijssen

Flower Scents Attract Pollinators

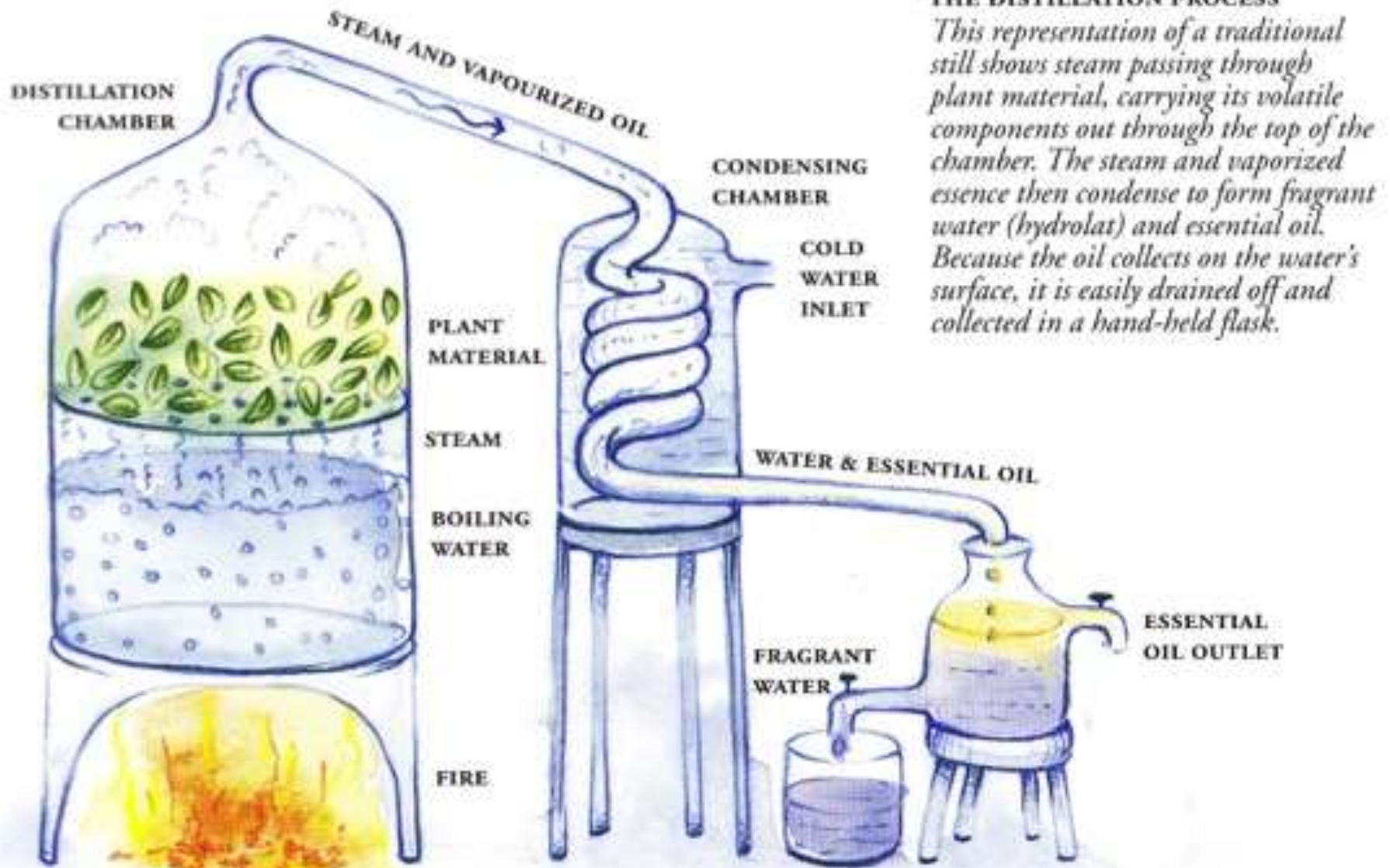
Essential Oils Extracted for Perfume Industry



Box Figure 5.3 Rose petals undergo distillation to extract rose oil, one of the perfume industry's most valued scents.



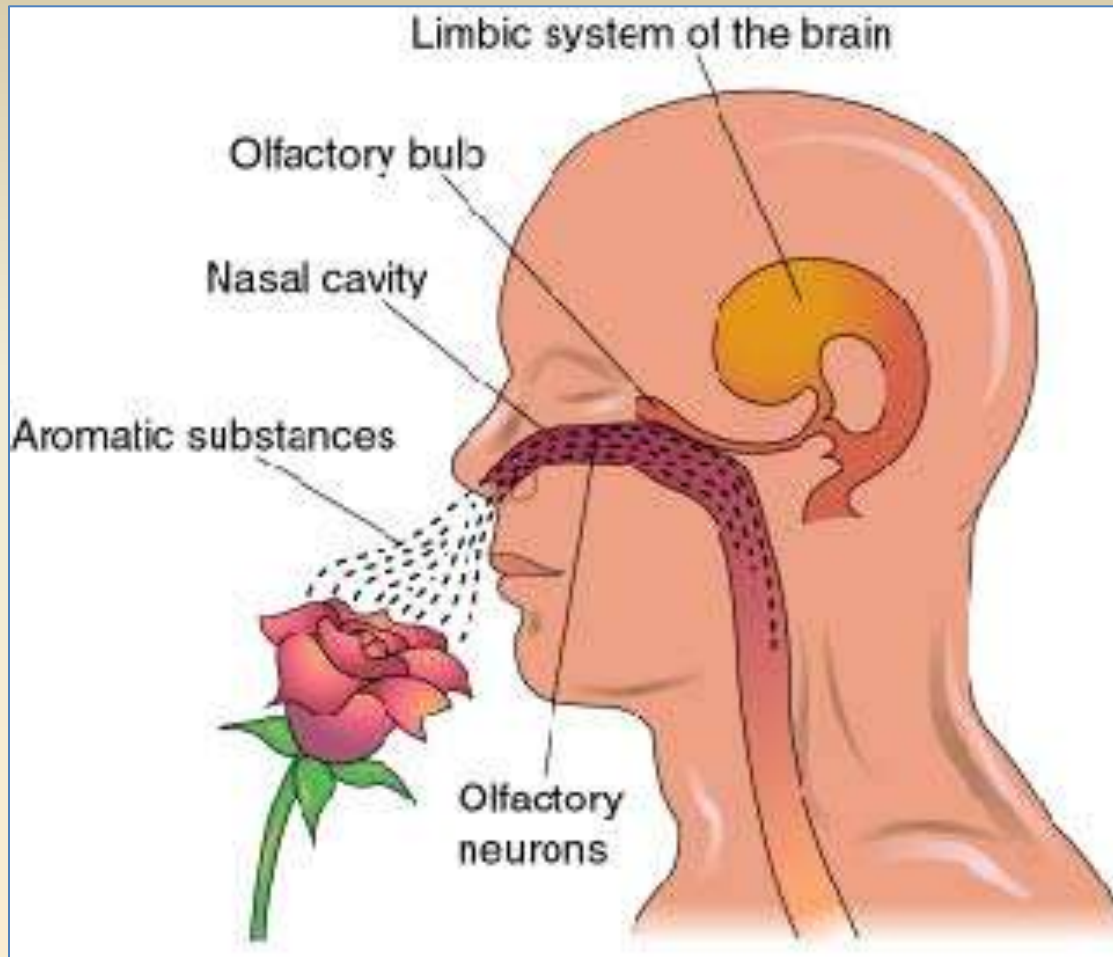
Distillation of Essential Oils



Aromatherapy

- The art and science of utilizing aromatic essences from plants to balance, harmonize and promote the health of body, mind and spirit.
- Seeks to unify physiological, psychological and spiritual processes to enhance an individual's innate healing process.
- Term coined by French perfumer and chemist, Rene- Maurice Gattefosse in 1937. Meant to distinguish the medicinal application of essential oils from their perfumery applications

Aromatherapy – power of smells



Limbic system (old mammalian brain) governs emotions and behavior, involved in the formation of long-term memory, and closely associated with the olfactory structures

Table 17.A Commonly Used Essential Oils for Aromatherapy

Essential Oil	Common Uses
Bulgarian rose	Antiseptic, insomnia, relaxation
Cypress	Antiseptic, asthma, coughing, relaxation
Eucalyptus	Anti-inflammatory, arthritis, relaxation
Frankincense	Coughing, bronchitis
Geranium	Dermatitis, relaxation, depression
Ginger	Bronchitis, arthritis, stimulant
Juniper	Antiseptic, aches, pains, relaxation
Lavender	Antiseptic, respiratory infections, relaxation
Marjoram	Respiratory infections, relaxation
Pine	Asthma, arthritis, depression
Roman chamomile	Toothaches, arthritis, tension
Rosemary	Bronchitis, depression, mental alertness
Sandalwood	Acne, bronchitis, depression
Tea tree	Respiratory infections, acne, depression



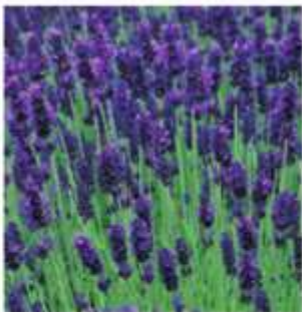
SAGE

Fights Infections
Heals Wounds
Calms Upset Stomach



ROSEMARY

Boosts Mental Activity
Calming/Stress Relief
Natural Antiseptic



LAVENDER

Calming/Stress Relief
Relieves Insomnia
Decreases PMS Symptoms



ROSE

Natural Astringent/Clears Skin
Reduces Scars/Wrinkles
Decreases Muscle Tightness



PEPPERMINT

Clears Respiratory Passages
Decreases Indigestion & Nausea
Eases Headache Pain



LEMON

Fights Fevers
Boosts Immune System
Clears Respiratory Passages



ORANGE

Aphrodisiac
Antidepressant
Decreases Inflammation/Pain



CUCUMBER

Detoxifies & Moisturizes Skin
Decreases Eye Puffiness
Calming/Stress Relief



CINNAMON

Reduces Nervousness
Improves Circulation
Relieves Joint Pain



STAR ANISE

Calming/Stress Relief
Relieves Arthritic Pain
Decreases Flatulence



EUCALYPTUS

Clears Respiratory Passages
Eases Muscle & Joint Pain
Kills Lice



CHAMOMILE

Antidepressant
Reduces Nervousness
Tones Skin



VANILLA

Aphrodisiac
Antidepressant
Calming/Stress Relief



JASMINE

Relieves Muscle Spasms
Reduces Scars
Decreases PMS Symptoms



TEA TREE

Antifungal
Antiseptic
Heals Wounds

Essential Oils



Using Essential Oils for Aromatherapy

Diffusion



Massage



Candles



Inhalation



Soap Bath



Essential Oils YouTube Videos

Aromatic Oil Distillation plant by Best Engineering Technologies

<https://www.youtube.com/watch?v=TRhhS4OrJr8#t=75>

Distilling Essential oil

https://www.youtube.com/watch?v=RR9vKd_Auz4

Essential Oil Extraction: Spearmint Oil via Direct Steam

<https://www.youtube.com/watch?v=zQ7V8ObABA4>

How It's Made - Lavender Essential Oil

https://www.youtube.com/watch?v=Cz_jYx4dFOU

Science of Essential Oils

<https://www.youtube.com/watch?v=vryNtoYGUzY>



Spices



[illegible]

Some Common Spices



Table 17.1

Common Spices, Their Scientific Names and Families, and the Plant Part Used

Spice	Scientific Name	Family	Part Used
Allspice	<i>Pimenta dioica</i>	Myrtle	Fruit
Black pepper	<i>Piper nigrum</i>	Pepper	Fruit
Capsicum peppers	<i>Capsicum annuum</i>	Tomato	Fruit
	<i>Capsicum baccatum</i>		
	<i>Capsicum chinense</i>		
	<i>Capsicum frutescens</i>		
	<i>Capsicum pubescens</i>		
Cassia	<i>Cinnamomum cassia</i>	Laurel	Bark
Cinnamon	<i>Cinnamomum zeylanicum</i>	Laurel	Inner bark
Cloves	<i>Eugenia caryophyllata</i>	Myrtle	Flower
Ginger	<i>Zingiber officinale</i>	Ginger	Rhizome
Mace	<i>Myristica fragrans</i>	Nutmeg	Aril
Nutmeg	<i>Myristica fragrans</i>	Nutmeg	Seed
Saffron	<i>Crocus sativus</i>	Iris	Stigma
Turmeric	<i>Curcuma longa</i>	Ginger	Rhizome
Vanilla	<i>Vanilla planifolia</i>	Orchid	Fruit

Spices in Ancient Times

- Spices used in Egypt 2500 B.C.
- Embalming mummies
- Food preservation, flavor.
- Perfumery, religion.
- Cardamon, pepper, myrrh, cassia, cinnamon, cumin, anise and marjoram commonly used
- Many plants used in Egypt were not native, imported from India even at that time.



The Mummification Process

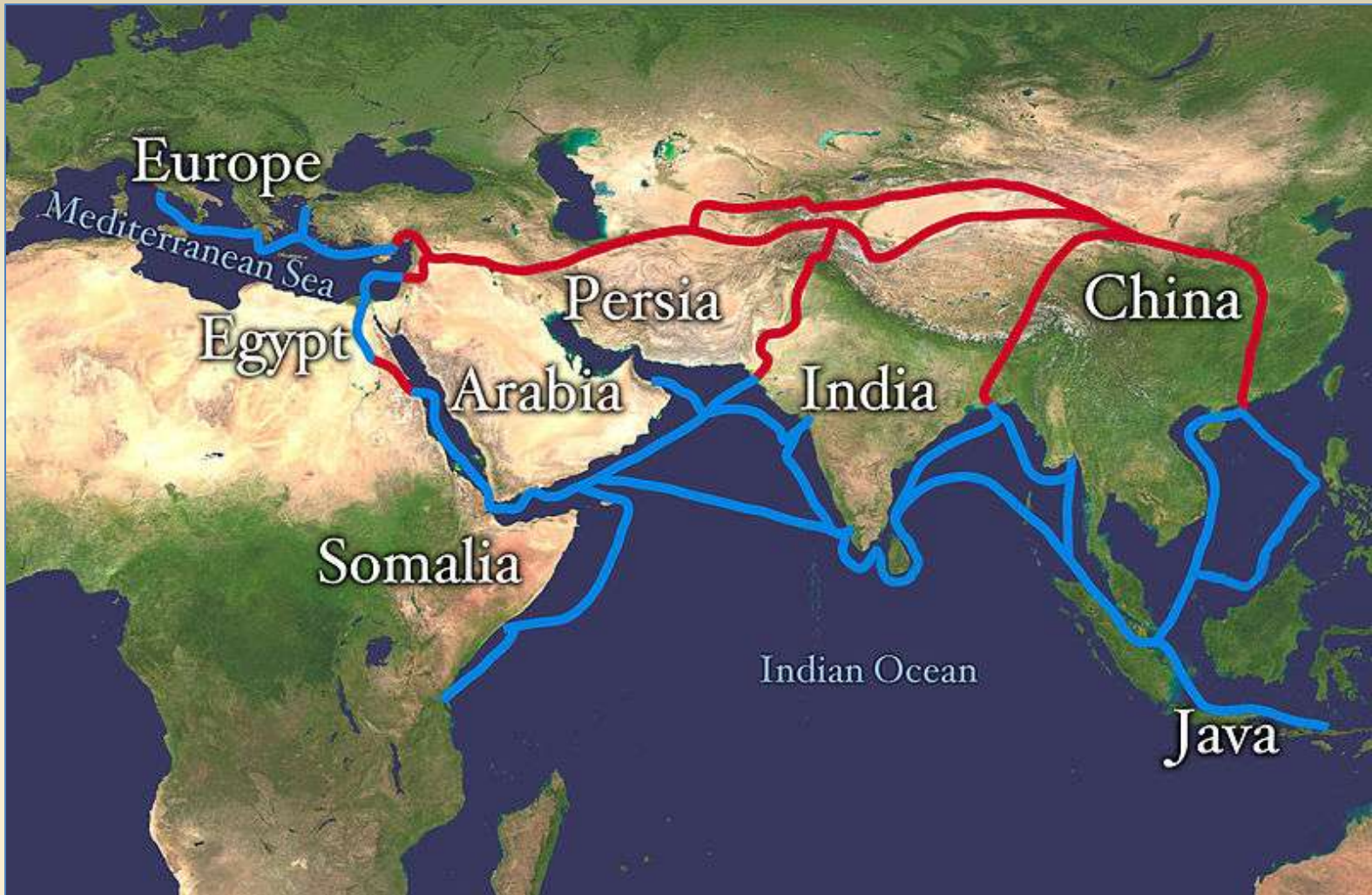
<https://www.youtube.com/watch?v=-MQ5dL9cQX0>

Timeline of Spice Trade (approximate)

- 2500 BP - Egyptians, using spices for embalming, perfume, cooking, medicine
- 2000 BP – Greeks and Romans used lots of spices
- 1500 BP - Trade routes established across Asia
- 1000 BP - Arabs dominate spice trade. Crusaders learn about spices
- 500 BP – Age of Discovery; Europeans find new routes to spice trade, dominated by Portuguese, Dutch, and British; Spain “discovers” New World spices



Medieval Silk and Spice Trading Routes



Later blocked by the Ottoman Empire in 1453, spurring exploration to find alternative sea routes

Early Spice Trade Routes



Map showing the ancient spice route from China to the spice islands of Indonesia and from Arabia to India and then to the Spice Islands. As well as the Mediterranean routes to Europe the old route across North Africa is shown. Also included on the map (blue lines) is the silk road extending from the Middle East to China.

- 600-1100 AD – Dark Ages, European use of spices reduced
- 1096 – Crusades, spices rediscovered by Europeans, developed taste for them
- 1271 - Marco Polo visits China, clarifies origins of many spices in Asia
- 1200s - Genoa and Venice get rich on spice trade
- 1453 – spice trade blocked by the Ottoman Empire, spurring exploration to find alternative sea routes

The fall of Constantinople in 1453 (modern day Istanbul, Turkey) to the Ottomans ended the 1,500 year Roman empire which cut off the land connection between Europe and Asia.



Vasco da Gama

In 1497, Vasco da Gama led four ships around the Cape of Good Hope. After a 10-month voyage, da Gama finally reached the great spice port of Calicut on the west coast of India. The long voyage home took a heavy toll.

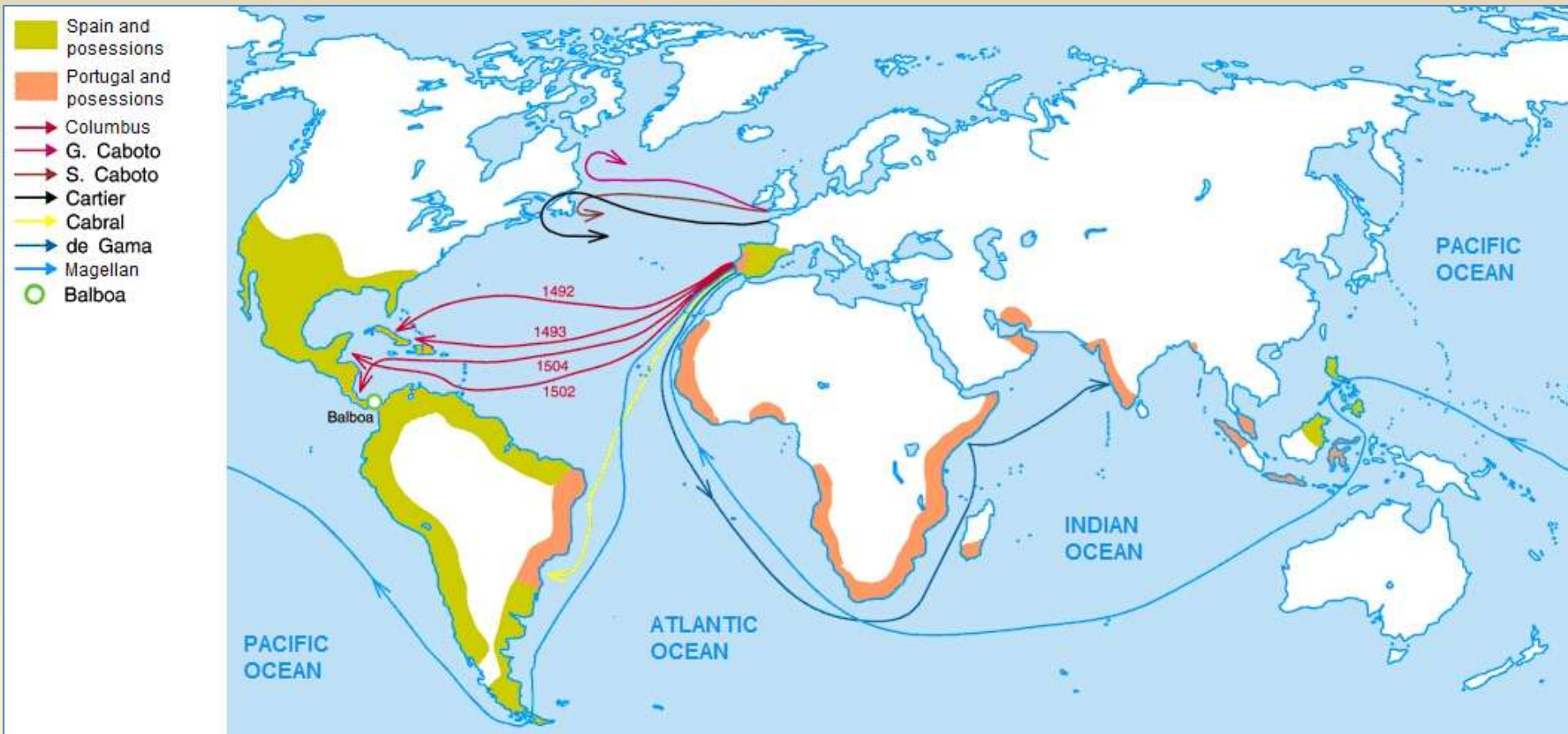


Christopher Columbus



News of Portugal's successes spurred other nations to look for a sea route to Asia. An Italian navigator from the port of Genoa, Christopher Columbus, sought Portuguese backing for his own plan. He wanted to reach the Indies' by sailing west across the Atlantic. Like most educated Europeans, Columbus knew that the Earth was a sphere.

Age of Discovery



Spice Wars



Between 1602 and 1680 European traders brutally fought for control, sometimes torturing and executing those they fought against. By the mid 1600s the Dutch East India Company of Holland had established themselves as the strongest force in the islands.

Spice Wars

- 1400s – Europeans search for new trade routes and sources for spices.
- 1500s - Portuguese circumnavigate world, find Spice Islands, monopolize spice trade
- 1600s – Dutch dominate Asian spice trade
- 1800s – British control Asian spice trade
- 1900s – European colonies achieve independence, legacy of colonialism still felt

The Columbian Exchange

NORTH AMERICA

EUROPE

AFRICA

AMERICAS TO EUROPE, AFRICA, AND ASIA

EUROPE, AFRICA, AND ASIA TO AMERICAS



Major Spices



Cinnamon - *Cinnamomum*

- Two main species:
- *C. verum* – true Cinnamon
- *C. aromaticum* – Cassia, but also called cinnamon

Lauraceae, Laurel Family



Cinnamon - *Cinnamomum*

- One of the oldest and most important spices.
- Used in ancient times by Egyptians, Phoenicians.
- Well known to the Greeks, had lots of strange tales about where it came from.
- One of the most sought out spices in early explorations.
- Native to Bangladesh, Sri Lanka, the Malabar Coast of India, and Burma.



Cinnamomum verum, Lauraceae
a.k.a. Ceylon Cinnamon





Essential Oil Industry in Sri Lanka: Part I (Cinnamon, Citronella)

<https://www.youtube.com/watch?v=wCJ7K-oFdPk>

Essential Oil Industry in Sri Lanka: Part II

<https://www.youtube.com/watch?v=XdQveoRAs1o>

The Spice Of Life - Cinnamon: The Elegant Addition- 1983 BBC production

https://www.youtube.com/watch?v=Zsfchlo_SWw

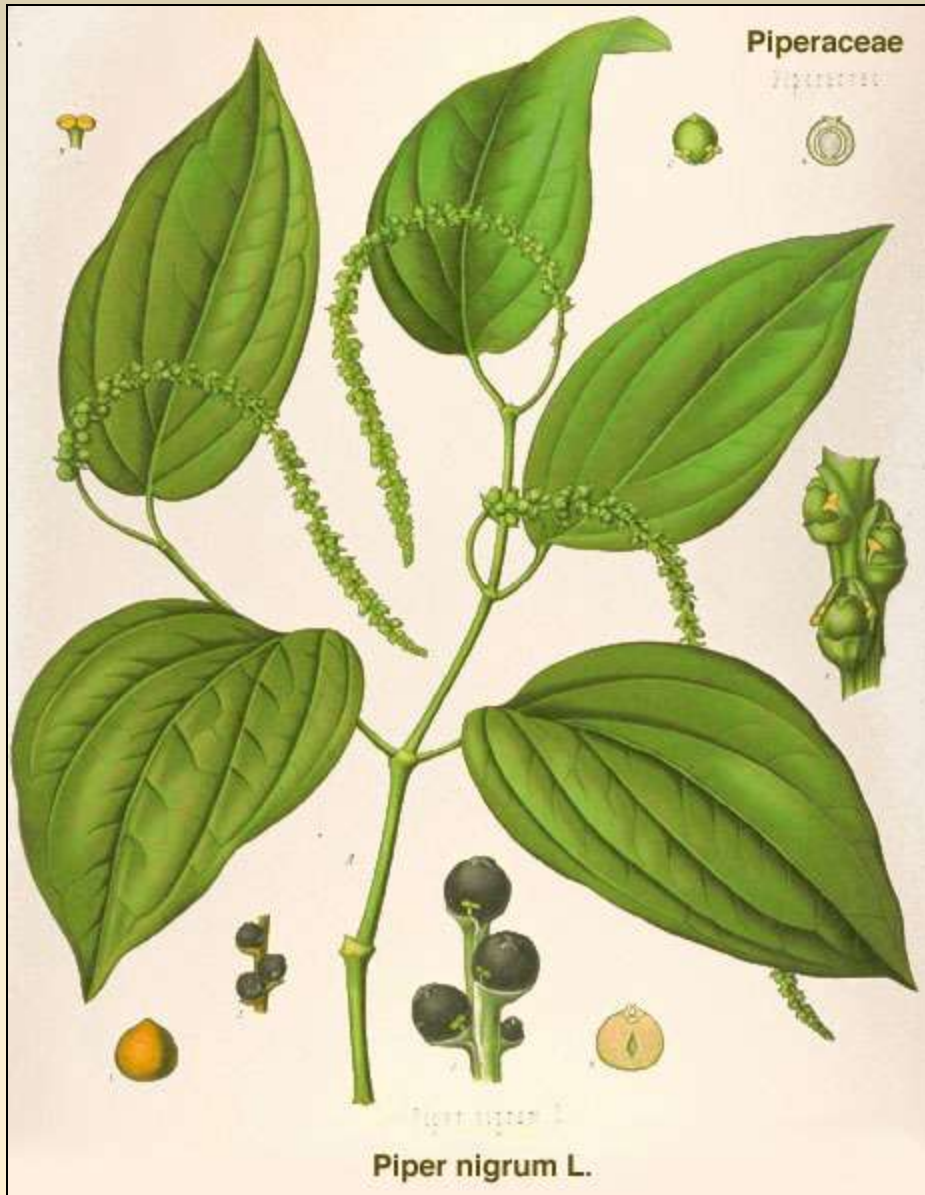
THE CINNAMON STORY

<https://www.youtube.com/watch?v=4GO-rxNI6M0>

Introduction to cinnamon industry in Sri Lanka

<https://www.youtube.com/watch?v=jEJ1dYPgl64>

Black and White Pepper



Piper nigrum – Piperaceae

- Pepper – drupe, dried and processed
- Black pepper – fermented, dried (“peppercorn”)
- White pepper – mesocarp allowed to rot
- Green pepper – pickled in brine or vinegar



Piper nigrum



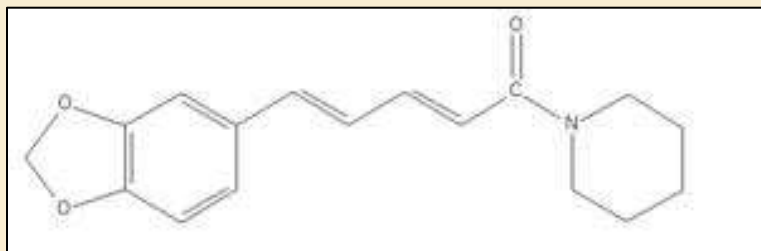
Black pepper, *Piper nigrum* (Piperaceae)

- In terms of quantities traded, black pepper is still the most important spice. It was also an early important spice and probably the most important in leading to the discovery of the New World.
- Black pepper is made by picking the green fruits of *Piper nigrum* (Piperaceae) and processing them. This process involves fermentation.
- White pepper is made from ripe fruits that are soaked and lightly crushed to remove the fleshy part.

Black and white peppercorns



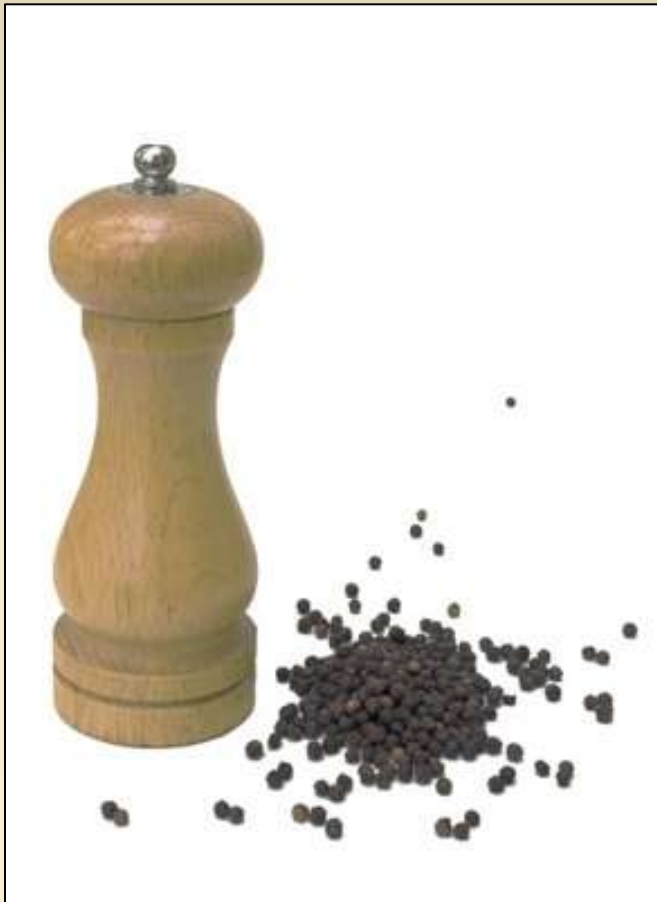
Piperine - Found in Pepper (mild)



The Chemistry of Pepper: The Spice that Changed the World - Reactions

<https://www.youtube.com/watch?v=O0kJunDHk8Y>

Pepper begins to lose flavor shortly after grinding,
reason for freshly ground pepper.



- The U.S. is the world's leading user of black pepper.
- Produced in Indonesia, India, Brazil and Madagascar.

Spice Trip Cambodia - Black Pepper

<https://www.youtube.com/watch?v=CTLmBGUtEO4>

How to Grow Black Pepper (Piper nigrum)

<https://www.youtube.com/watch?v=XOoBqQmz8jc>

The Spice of Life - Pepper: The Master Spice - BBC

<https://www.youtube.com/watch?v=NuZujx-LMfg>

Cloves - *Syzygium aromaticum*

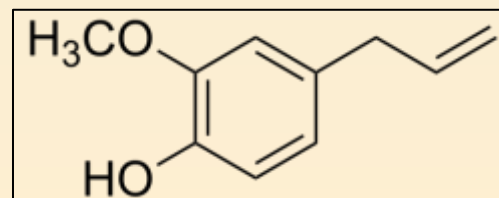


Unopened flower buds



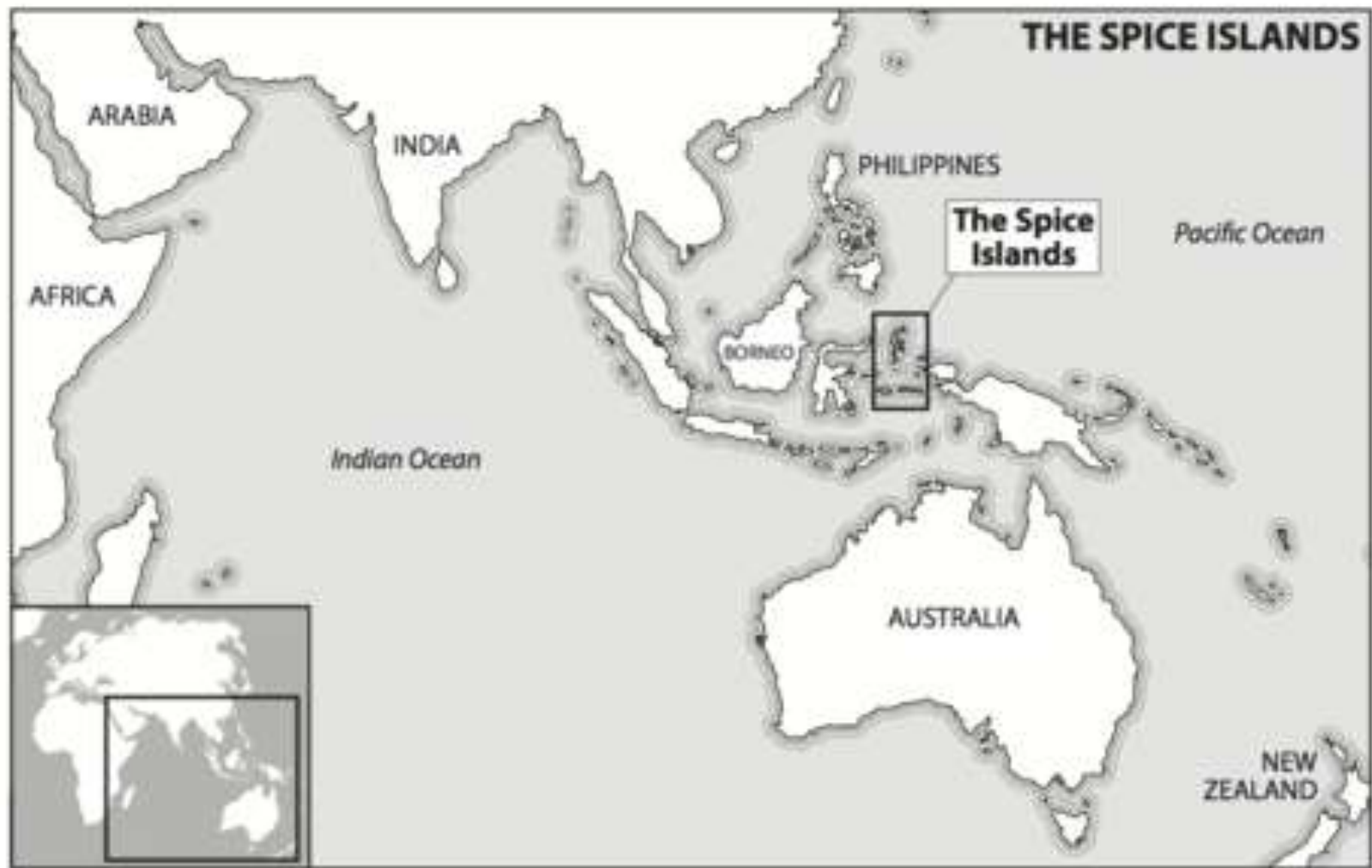
Figure 17.5 The dried flower buds of *Eugenia caryophyllata* become the familiar clove "nail."

Eugenol - Oil found in cloves, responsible for the aroma and flavor



Cloves, *Syzygium aromaticum*, Myrtaceae

- Cloves, the flower buds of a tree
- Native to the Spice Islands
- Cloves were specifically prized by Europeans for medicinal purposes
- Used in dentistry to deaden toothaches
- Imported by the Greeks through Alexandria before the Roman Empire.
- One of the spices on which the Dutch had a monopoly.



Nutmeg and cloves grew only in one place on earth: on a few small islands called the Moluccas (in present-day Indonesia), north-west of present-day New Guinea. These islands became known as the Spice Islands.



Clove King of spice

<https://www.youtube.com/watch?v=rGCMuJITZAk>

The Spice of Life - Cloves: Nature's Little Nails - BBC Production 1983

<https://www.youtube.com/watch?v=XISqsDKWPI0>

clove harvest in aceh sumatra

<https://www.youtube.com/watch?v=GdoVINechIh>

Cloves



Harvested clove buds being segregated from the stalks at Ambanad in Kollam

Usually cloves grow their best, when they are cultivated near the coastal area. According to the old saying “cloves must see the sea to prosper”. The rich smell of cloves can be smelt from far and perhaps that was how the ancient explorers could discover the spice land.

Clove Cigarettes

- About one half of the world's supply of cloves is used each year for making cigarettes in Indonesia.
- Contain 60% to 70% tobacco, 30% to 40% ground cloves (aromatic dried flower buds), clove oil, and other additives.
- They are primarily produced in Indonesia, where they are the preferred (smoked by 90% of smokers) smoking product.



Nutmeg and Mace (Myristica *fragrans*, Myristicaceae)



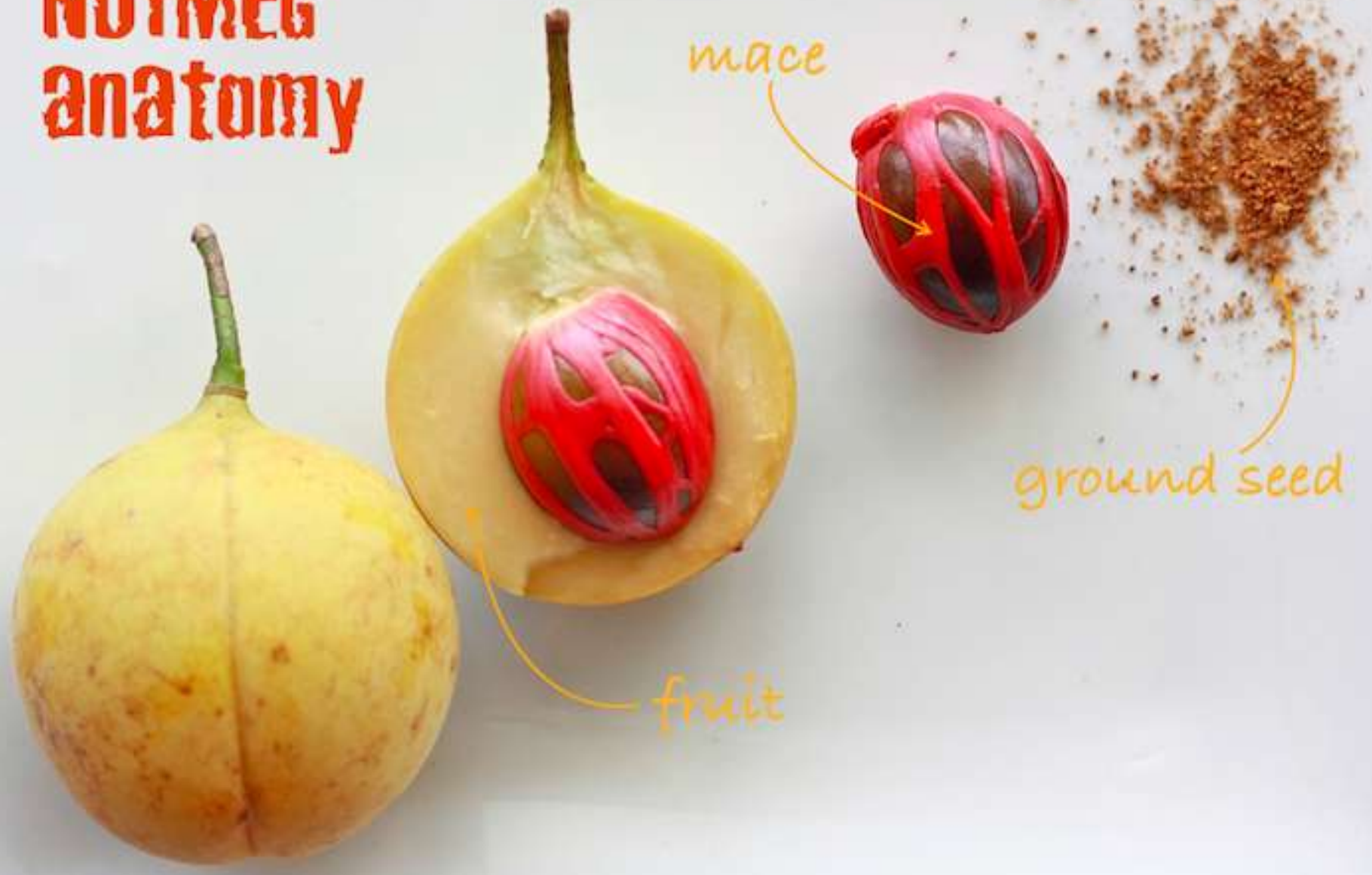
Nutmeg and Mace

- Both nutmeg and mace come from the same tree (*Myristica fragrans*, Myristicaceae).
- The fruit is a drupe that splits open at maturity and exposes the red aril. When dried, the aril is called mace.
- The inner part of the seed is called nutmeg. Nutmeg is both toxic and hallucinogenic.
- Today widely grown in the West Indies, Sri Lanka, and the Moluccas.
- Dioecious, and most male trees removed as soon as possible.

Nutmeg and Mace



NUTMEG anatomy



Nutmeg and Mace - Peeling



Nutmeg and Mace - Drying



Ginger - Zingiber



Ginger – *Zingiber officinale*, Zingiberaceae



Figure 17.7 Ginger rhizome, source of the familiar spice.

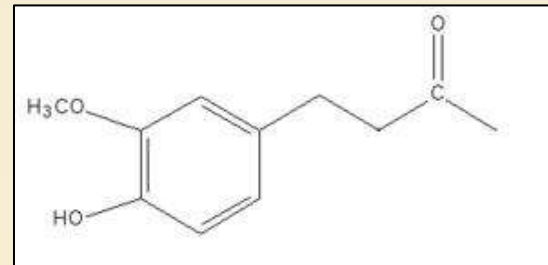
Zingiberaceae – Ginger Family

- Turmeric – rhizome of *Curcuma domestica*, used for flavoring and color.
- Cardamon - round seed of *Elettaria cardamomum*
- Both cardamom (*Elettaria cardamomum*) and ginger (*Zingiber officinale*) come from southeast Asia.
- Ginger comes from the rhizome, and cardamom from the seeds.
- All were introduced into Europe by several hundred years B.C.

Ginger – *Zingiber officinale*, Zingiberaceae



Zingerone - Found in ginger



Originally from SE Asia, Ginger now comes from West Africa, India, and especially Jamaica (considered the finest).

Cardamom - *Elettaria cardamomum*



Cardamom - *Elettaria cardamomum*

- Zingiberaceae
- Ground seed of *Elettaria cardamomum*
- Comes from India and Guatemala
- India - used in curry blends
- Scandinavian countries added to breads
- Most is used in Arabic countries as a flavoring for coffee



Turmeric, *Cucurma longa*, Zingiberaceae

- Used as brilliant yellow dye to color both food and fabric
- Common ingredient in yellow mustard, curry powder
- Middle Eastern and East Indian cooking



Saffron, *Crocus sativus*, Iridaceae



Kashmiri farmers pluck threads, or crocus, from saffron flowers



Saffron - *Crocus sativus*

- World's most expensive spice
- Mediterranean countries and Asia Minor
- Stigmas picked by hand
- Pungent flavor, widely used in cooking
- Important as yellow dye



(a)

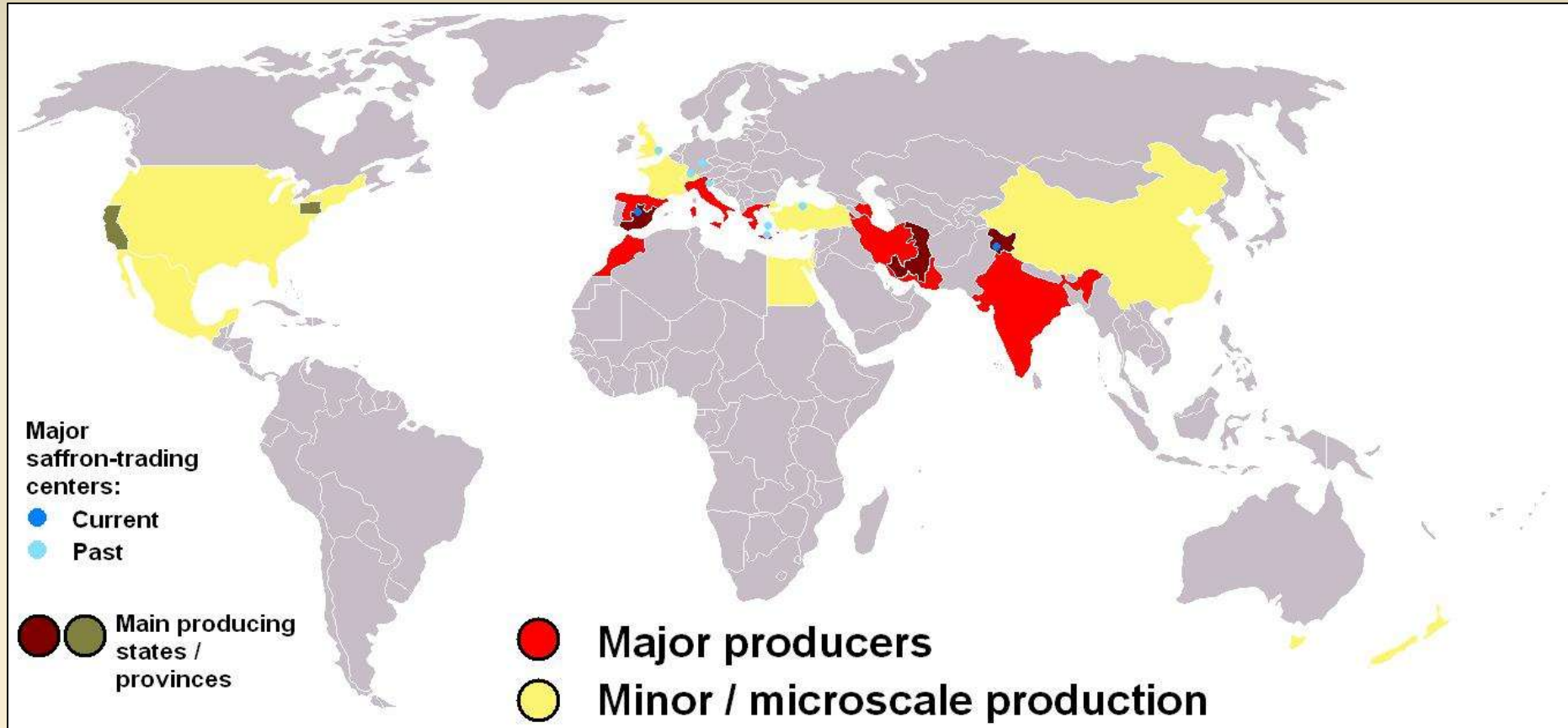


(b)

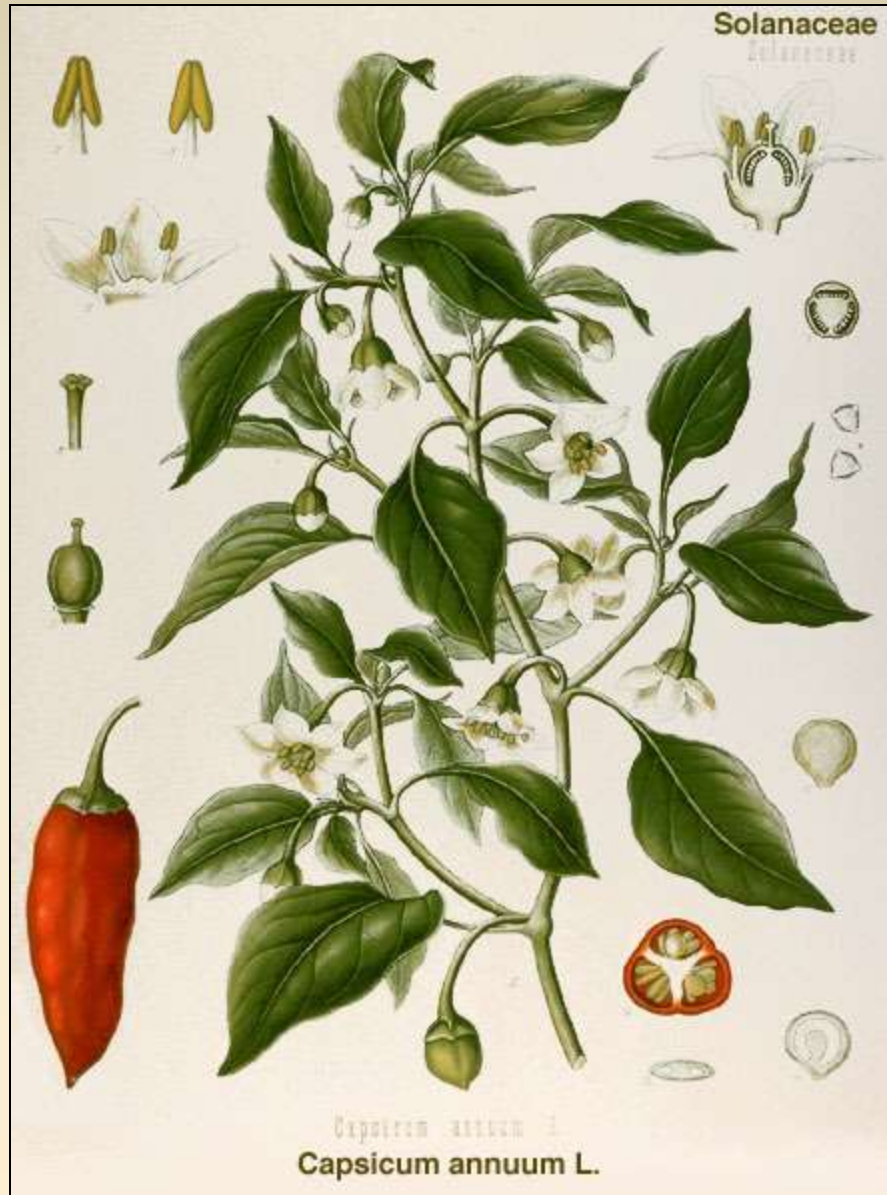
Figure 17.8 (a) The delicate orange-red stigmas of *Crocus sativus*, the source of saffron, must be separated carefully by hand. (b) In this wall painting from ancient Crete, the stigmas of saffron flowers are being harvested by a trained monkey.



Saffron - *Crocus sativus*



New World Spices - *Capsicum*



Capsicum – Solanaceae

C. annuum – Sweet, bell peppers

C. frutescens – hot peppers

C. chinense – hot peppers



Capsicum peppers

- *Capsicum* peppers are now widely cultivated in many parts of the world.
- About 4-5 species are cultivated.
- They have become an integral part of cooking in many parts of the world.



Capsicum annuum, Solanaceae



Sweet green and red peppers



Cultivated as ornamental

The Spice of Life - Chilies: A Dash Of Daring - 1983 BBC Production

<https://www.youtube.com/watch?v=-P0Fkf1N97Q>

Chile Farming - America's Heartland

<https://www.youtube.com/watch?v=uRCIfIn35Uc>

Scoville Heat Scale

How hot is hot?

Group of tasters

Ranked successive dilutions until
no more heat detected

- Bell pepper – 0 (no heat at all)
- Banana pepper – 100 -500
- Jalapeno pepper – 2,500-8,000

Capsaicin

Found in chilies (hot)

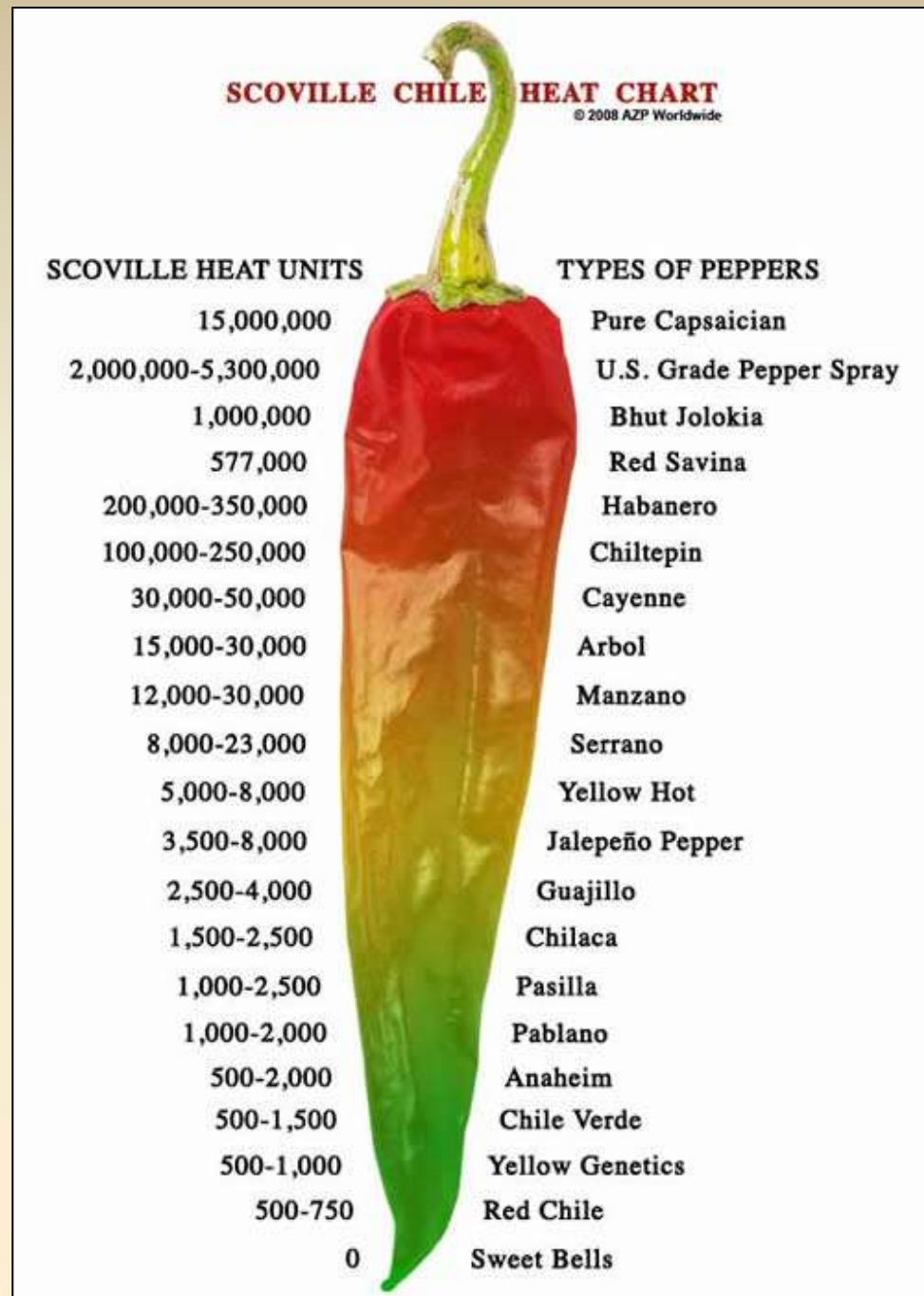
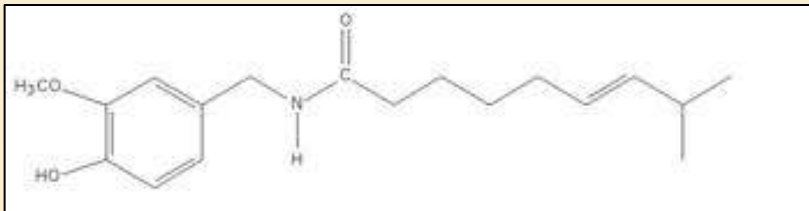




Table 17.2 Scoville Ratings for
a Variety of Capsicum Peppers

Peppers	Scoville Heat Units
Aji	30,000–50,000
Banana (sweet)	<1
Bell	<1
Capsaicin	16,000,000
Cayenne	30,000–50,000
Cherry	100–500
Chiltepin	50,000–100,000
Habanero	100,000–300,000
Jalapeño	2,500–5,000
Jamaican hot	100,000–200,000
Pimento	<1
Scotch bonnet	100,000–250,000
Tabasco	30,000–50,000
Thai	70,000–80,000

Allspice – *Pimenta dioica*, Myrtaceae

- Aromatic dried berries
- Long used by Mayans
- Western hemisphere, mostly Jamaica
- Multi-faceted flavour, cinnamon, nutmeg, and cloves
- Baked goods, jerked meat, BBQ, sausages



Vanilla, *Vanilla planifolia*, Orchidaceae



(a)



(b)

Figure 17.10 (a) Fruits of the vanilla vine, the source of vanilla flavoring. (b) Cured vanilla beans.

Vanilla, *Vanilla planifolia* (Orchidaceae)

- Vanilla is the fermented fruit of an orchid. This is almost the only plant in the family that is important as a food plant.
- Orchid vine
- The plant is native to Mexico and other parts of Latin America. The Aztecs used it to flavor chocolate (along with chile peppers).
- The plants are usually hand pollinated. Good quality vanilla is expensive. Madagascar, Reunion, and Seychelles are major growers.

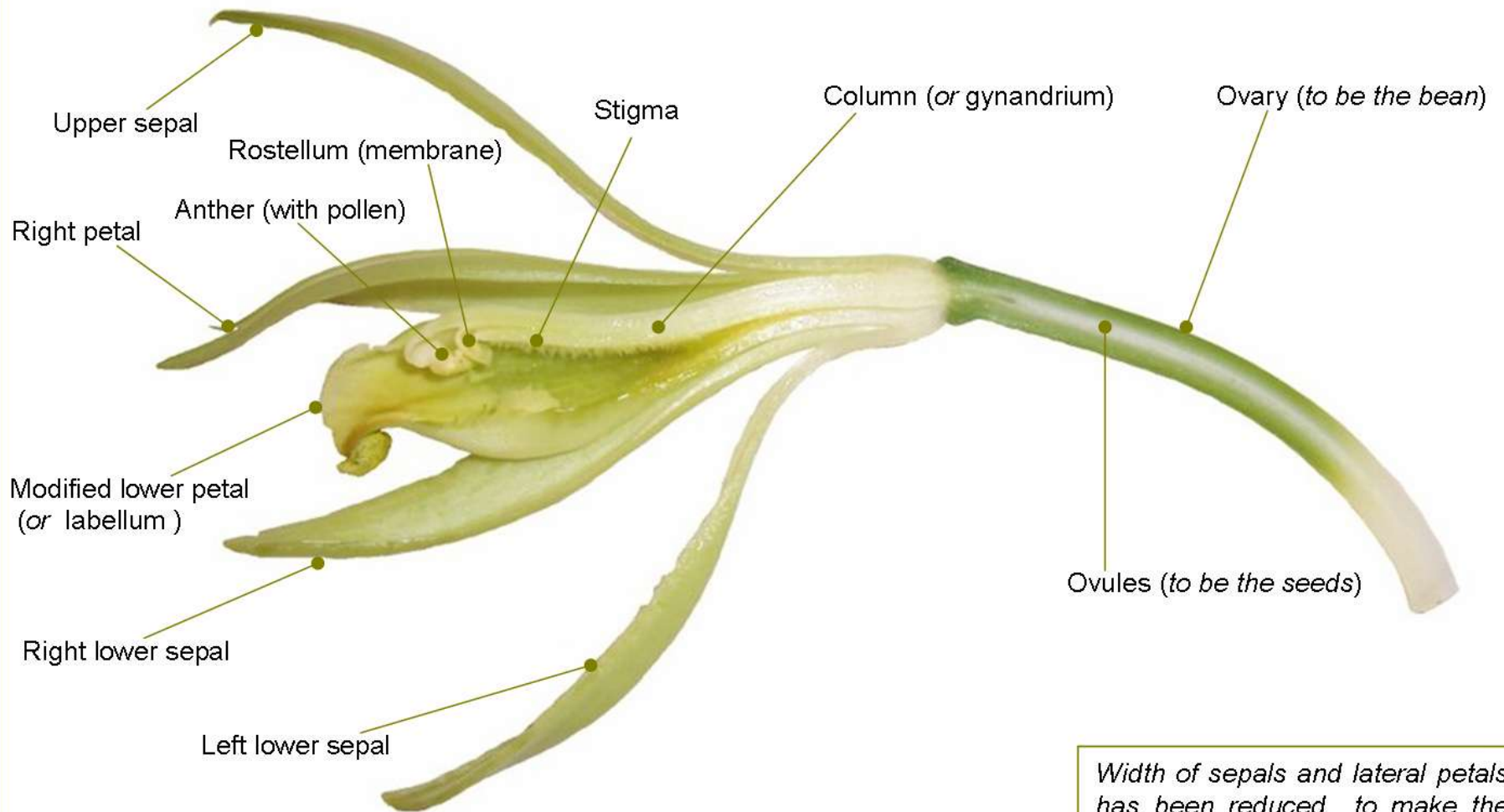
Vanilla flowers and hand pollinating vanilla flowers



Courtesy Dr. Bob Marquis

The delicate work has to be done within eight hours of the flower opening,

Longitudinal section of a vanilla flower



Width of sepals and lateral petals has been reduced to make the picture clearer

Vanilla Processing – Killing, Sweating



Vanilla Processing - Drying



Madagascar



Vanilla Extracts



Vanilla YouTube Videos

Hand pollinating a vanilla orchid (Fair Trade)

https://www.youtube.com/watch?v=i_Pguwl9c1Q

Madagascar: Vanilla farmers

<https://www.youtube.com/watch?v=0PolgYMxnCQ>

How to pollinate *Vanilla planifolia* - detailed explanation!

<https://www.youtube.com/watch?v=1RdoTcDD2EU&list=PLxQXLuCX7-OE3wn2ZMnZ-WGYJldw7Y-b1>

How to plant and grow vanilla

<https://www.youtube.com/watch?v=Nhju7wj-Lnl>



Herbs



Mint
*Use to garnish sweets
or stir into lemonade.*



Bay Leaves
*Flavor soups and stews with whole
leaves; remove before serving.*



Rosemary
*Use whole sprigs to season
a marinade for beef.*



Basil
*Add to a simmering pasta
sauce just before serving.*



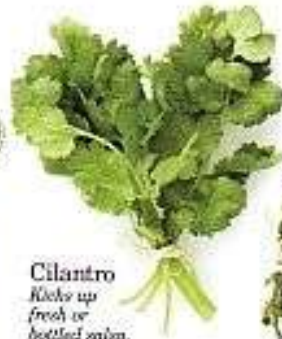
Purple Basil
*Substitute for green
basil in a pesto sauce.*



Oregano
*Sprinkle into tomato sauce
destined for a pizza.*



Dill
*Add a touch
to homemade
chicken soup.*



Cilantro
*Kicks up
fresh or
bottled onion.*



Thyme
*Combine thyme, salt
and pepper with flour
for dredging poultry.*



Tarragon
*Stir into mayo with
a bit of lemon zest
for a tangy spread.*



Chives
*Mash into butter
and melt over
roasted potatoes.*



Chervil
*Pairs well with scrambled
or baked egg dishes.*



Italian Parsley
*Mix into bread crumbs as a
coating for chicken or fish.*



Sage
*The strong flavor stands
up well in sausage dishes.*



Marjoram
*The fresh, citrusy flavor is
great on chicken or beef.*

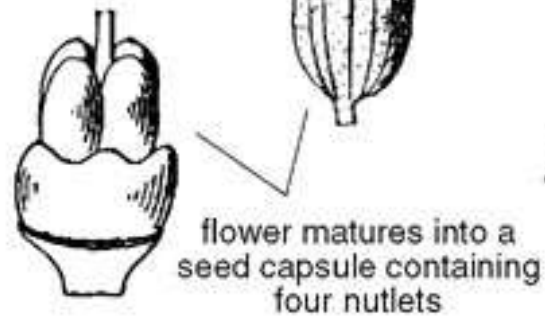
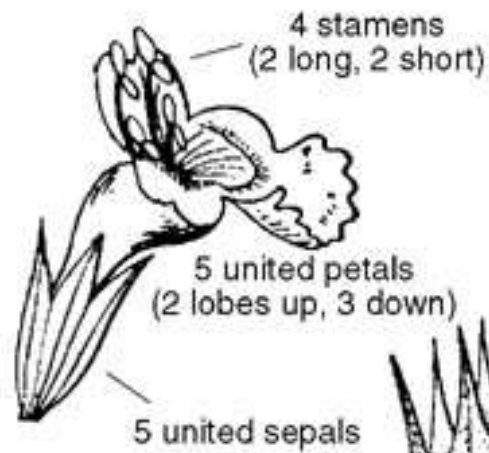
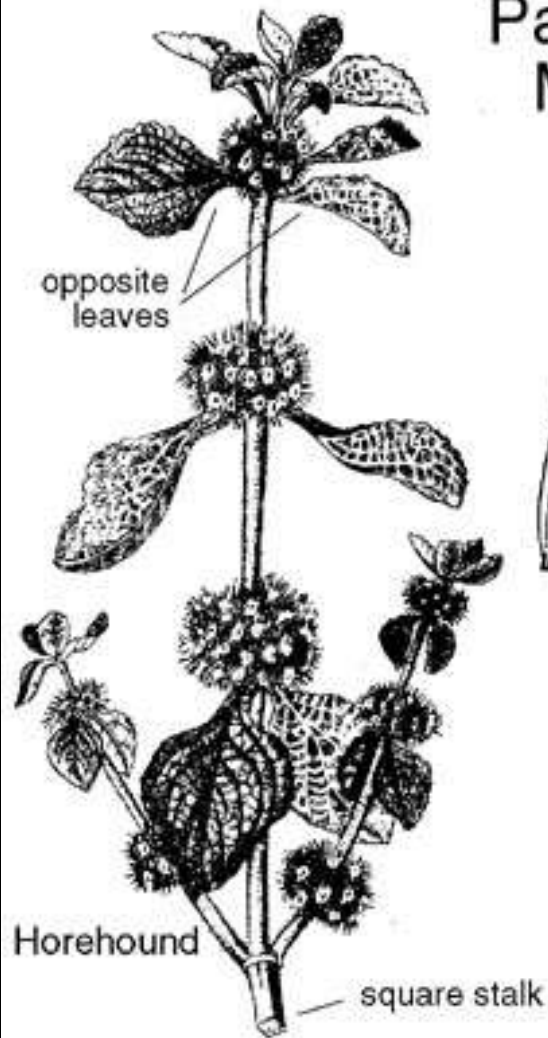
Herbs and Spices of the Mediterranean Area

The mint family (Lamiaceae or Labiatae) especially common the Mediterranean area and also as a source of herbs from there.

Among the mints are

- rosemary (*Rosmarinus officinalis*),
- thyme (*Thymus vulgaris* and other species),
- oregano (*Origanum vulgare*),
- basil (*Ocimum basilicum*), and
- marjoram (*O. majorana*).

Patterns of the Mint Family



Mints

Spearmint

Mentha spicata



Peppermint

Mentha piperita



Mints

- "Mint", usually refers to spearmint (*Mentha spicata*) or peppermint (*M. piperita*).
- The essential oils from these plants are extremely important for flavoring hundreds of products, e.g., toothpaste, mouthwash and chewing gum.
- Much in U.S. is grown in Indiana, Michigan and Oregon.
- How many times do you encounter mint each day?

Peppermint Field in Idaho



Mint Products



Idaho is one of the top three producers of mint in the United States, with about 13,000 acres of mint still grown by 100 farmers across the state

- 90 percent of the mint oil produced is used by toothpaste, mouthwash, and gum manufacturers, with the last 10% used to flavor candy, ice cream, cookies, and pharmaceuticals.
- One drum of oil, which weighs about 400 pounds, will flavor approximately 400,000 tubes of toothpaste, or 5,000,000 sticks of gum, or 20,000,000 candies!
- Pure mint oil is so strong that one drop alone will flavor 2.5 tubes of toothpaste, 31.25 sticks of gum, or 125 mint candies

Oregano and Marjoram - *Origanum*

Oregano

- *Origanum vulgare*
- Biting flavor
- Loved by Greeks and Romans
- Used in many Italian dishes, pizza, spaghetti

Marjoram

- *Origanum majorana*
- Mild flavor



Origanum vulgare

Basil – *Ocimum basilicum*

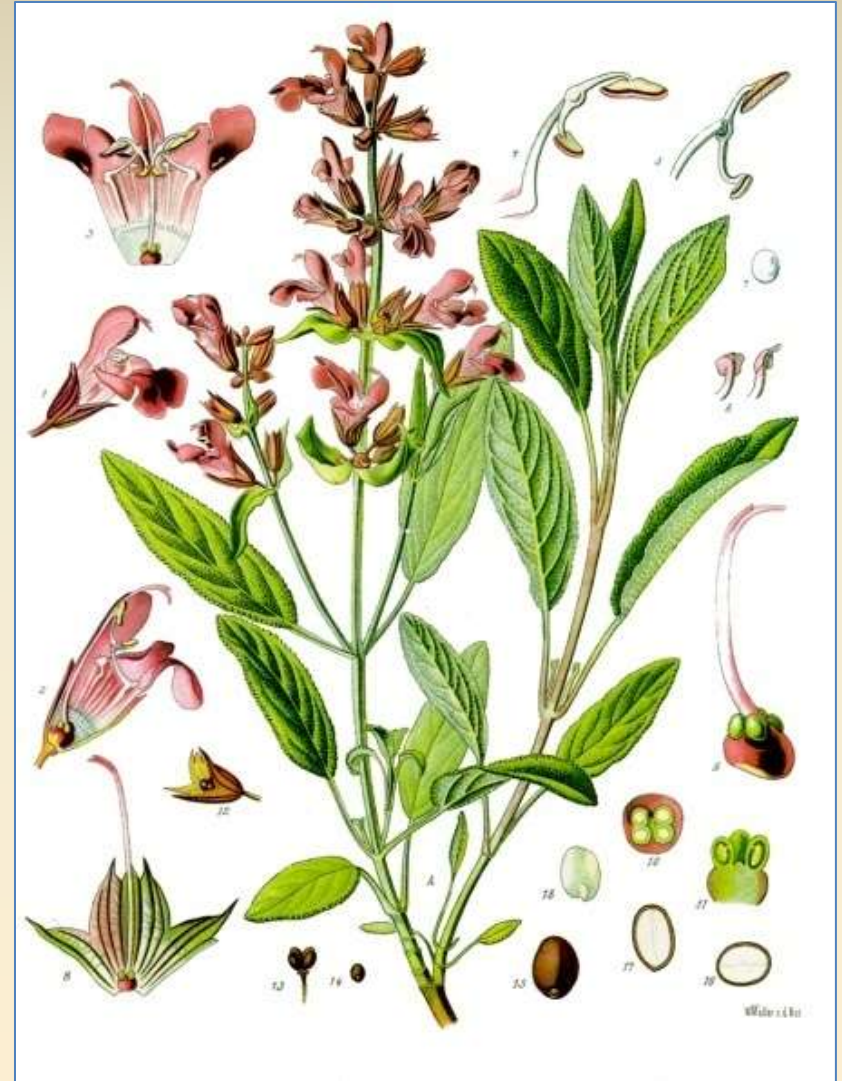
- “King of Herbs”
- One of oldest herbs
- Native to India, sacred to Hindus
- Sweet aromatic flavor
- Goes with tomato dishes (Italian)



The popularity of Italian food (which in the US mostly goes back to World War II) is responsible for the widespread use of basil and oregano in the U.S.

Sage, *Salvia officinalis*, Lamiaceae

- Grown for centuries in the Old World for its food and healing properties
- Savory, slightly peppery flavor
- One of the essential herbs, along with “parsley, sage, rosemary and thyme”
- Used since ancient times for warding off evil, snakebites, increasing women's fertility, and more

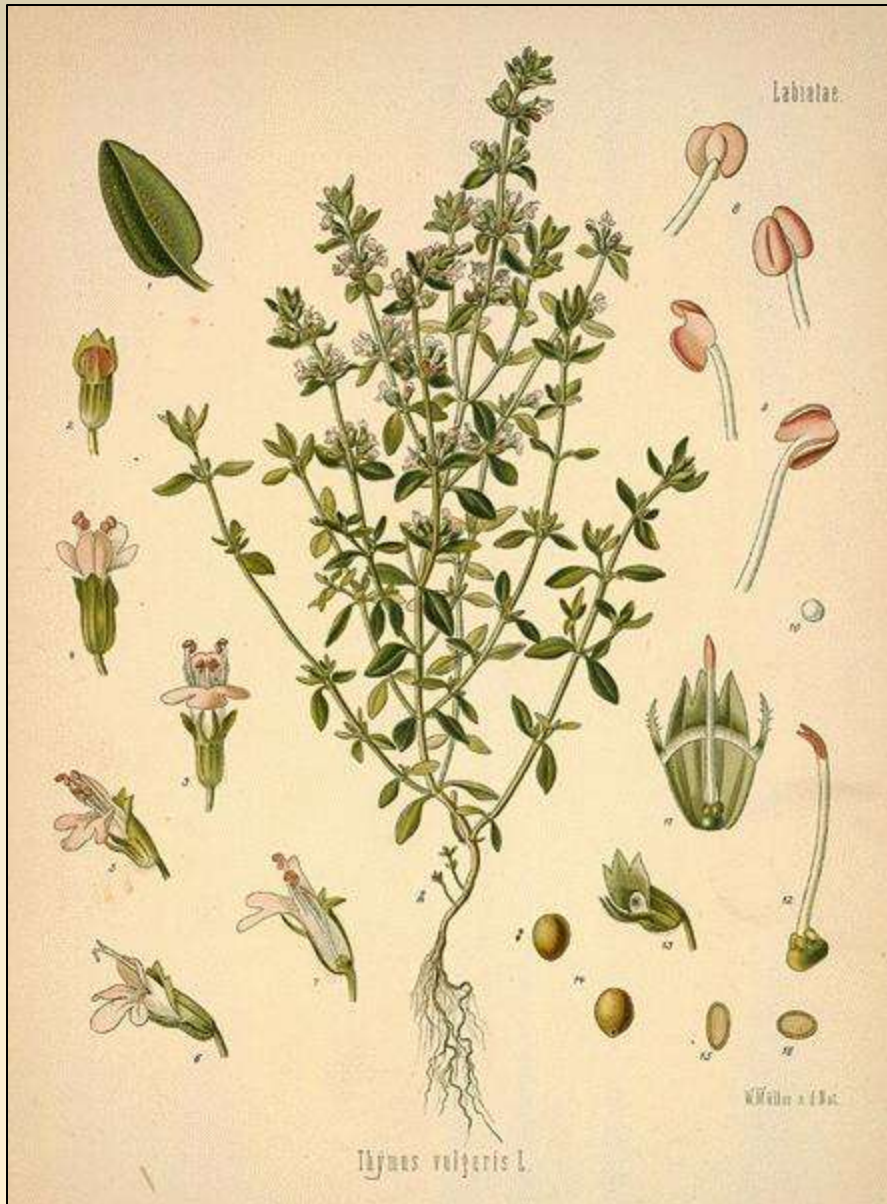


Lavender - *Lavendula*

- Lavere = “to wash” in Latin
- Used by Romans to scent their baths
- Nice smell, used in perfume, potpourri, sachets



Thyme (*Thymus vulgaris*) Lamiaceae



- Ancient herb plant native to Mediterranean area
- Small grayish-green leaves
- Used to treat melancholy, reproductive system ailments, and to improve digestion
- Spicy with a minty edge, agreeable aromatic smell and a warm pungent taste.

Parsley Family - Apiaceae



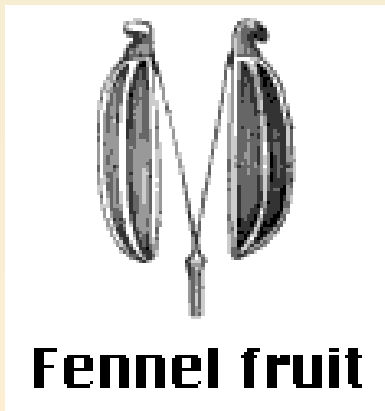
Parsley Family - Apiaceae



compound umbels



schizocarp



Fennel fruit



**Fennel fruit
x-section**

Schizocarps



Parsley Family - Apiaceae

Major family of Mediterranean herbs. In this group:

- Parsley (*Petroselinum crispum*)
- Dill (*Anethum graveolens*)
- Coriander or cilantro (*Coriandrum sativum*), used as a fruit and as the leaf.
- Chervil (*Anthriscus cerefolium*)
- Caraway (*Carum carvi*)
- Anise (*Pimpinella anisum*)
- Cumin (*Cuminum cyminum*)
- Celery (*Apium graveolens*)

Parsley – *Petroselinum crispum*



- Well-known Apiaceae
- Mediterranean
- Garnish and flavor
- Freshens breath

Dill – *Anethum graveolens*

- Both leaves and fruit are used
- Common in Russia, Ukraine, Poland
- Toppings for soup, borscht, buttered potatoes
- Used to flavor pickles



Caraway Seeds – *Carum carvi*



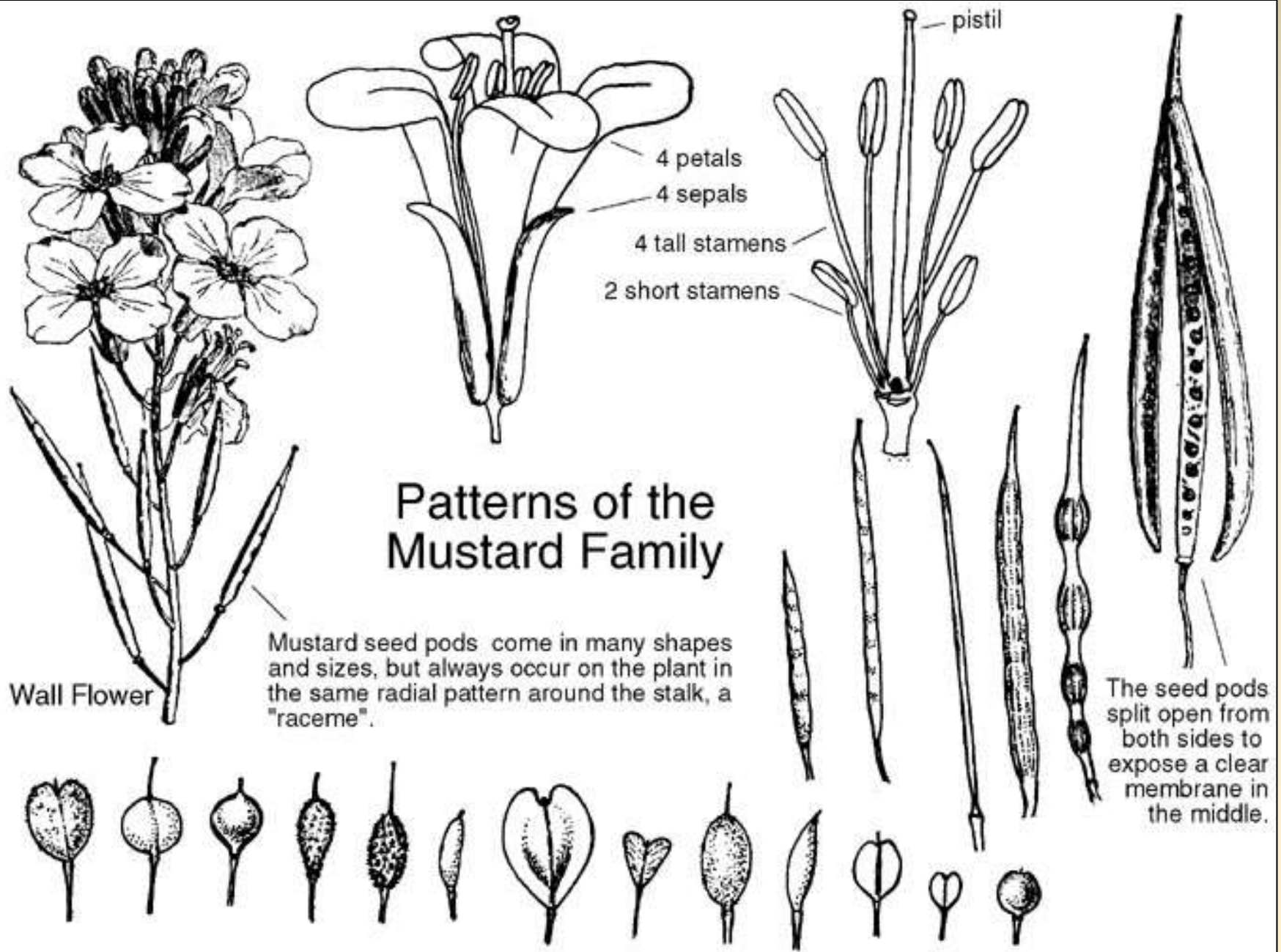
One of oldest herbs known. Used in cheese, sausages, and bread

Cumin - *Cuminum cyminum*



- Mediterranean to India
- Used over 2,000 years
- Seeds used whole or ground
- Many cuisines, Indian, Mexican, sometimes kept on table
- Add earthy warming feeling to food

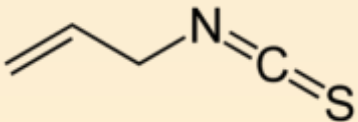
Mustard Family - Brassicaceae



Mustard, *Brassica nigra*, Brassicaceae



- The Brassicaceae or Cruciferae are also very important as herbs.
- The seeds of *Brassica nigra* (strong) and *B. alba* (mild) have long been used for mustard sauces.
- Mustard oils give them unique smell and taste.





Yellow Mustard

4 teaspoons dry ground mustard
1/4 cup water
3 tablespoons white vinegar
1/2 teaspoon Flour
1/8 teaspoon salt
1/8 teaspoon turmeric
1 pinch garlic powder
1 pinch paprika



Mustard Through The Ages

<https://www.youtube.com/watch?v=lkxJualuFbl>

Production of Mustard

<https://www.youtube.com/watch?v=Uqc2dDnjXFU>

The Spice of Life - Mustard: The Spice Of Nations - 1983 BBC production

<https://www.youtube.com/watch?v=Q7tnsWRrvpg>

Horseradish, *Armoracia rusticata*, Brassicaceae



Collinsville, Illinois
Horseradish Capitol
of the world

This plant is native to
Northern Europe.



Horseradish – *Armoracia rusticana*



Figure 17.12 The large taproots of horseradish are grated to make horseradish sauce.

International Horseradish Festival

<https://www.youtube.com/watch?v=PF2w5b2uqUA>

Illinois Horseradish Festival, Pt.1 - America's Heartland

<https://www.youtube.com/watch?v=lzR48-XOkLA>

Illinois Horseradish Festival, Pt.2 - America's Heartland

<https://www.youtube.com/watch?v=Tzx-xGZ4z3Q>



Wasabi – *Eutrema japonica*

- Japanese, grows on stream banks
- Brassicaceae
- Grown in water
- Rhizome, used fresh or dried into powder
- Extremely strong pungency, affects nasal passages



Pungent Alliums

Food, herb, or spice?

- Onion (*A. cepa*)
- Garlic (*A. sativum*)
- Leeks (*A. porrum*)
- Shallots (*A. ascolonicum*)
- Chives (*A. schoenoprasum*)

Ancient cultivated plants

Sulfur-containing compounds, allicin, released when tissues cut, cause tears, anti-microbial



Figure 17.13 Inflorescences of chives (*Allium schoenoprasum*).



End