

# Tea - the World's favorite drink



*Camellia sinensis* has 2 botanical varieties

- var. *sinensis* leaves 8 cm long, serrated edge
- var. *assamica* leaves up to 35 cm,
- However so much hybridization has occurred that wild types are unknown. *Sinensis* native to southern China was crossed in Assam with the wild *assamica*.



# Tea History

Originated in SE Asia (western and southern China, Cambodia, Laos, Burma (Myanmar), & NE India (Assam)).

Long grown in China, earliest use was probably medicinal, but used as a beverage for 2000 years.

First brought to Europe in the 16th century but did not reach eastern Europe until after 1650, when coffee drinking was well established.

Use became general in Europe in the 18th century and replaced coffee in Britain who spread the tea-drinking habit throughout their sphere of influence. Boston Tea Party (1773) destroyed tea because of a tax.

Wild tea discovered in India (Assam) 1788- 1832).

East India Company loses monopoly in China tea trade in 1833. Forms a tea committee to grow tea in India, by 1835 tea seedlings sent to hill areas in northern, southern, and eastern India.

Indian-grown tea was sold in London in 1839.

Crosses made between the two species.

# History

Today tea is consumed around the world particularly in China, Japan, India, Indonesia, Britian (Eng, Wales, Scotland former British colonies (New Zealand, Canada, Australia), Middle East, Eastern Europe.

# World Production 2009

4.0 M Mt

China 1.4 M Mt

India 0.8 M Mt

Kenya 0.3 M Mt

Sri Lanka 0.3 M Mt

Turkey 0.2 M Mt

*Camellia sinensis*, *sinensis*





*Camellia sinensis*  
*assamica*

- Tea is a woody evergreen tree, assamica can grow up to 15 m tall , sinensis 2-3 m.
- It is propagated by cuttings because it is cross pollinated or clones are allowed to hybridize and seedlings planted.
- First crop in 4 yrs from transplants, mature at 5, 50 or more yr production
- Soil pH 5 to 6
- 2500 kg/ha dry leaf removes 100 kg N, 10 kg P, 50 kg K





## Environmental conditions

- Optimum air temperature 18-30 C, no frost (however there are frost tolerant varieties in China and Japan).
- Commercially in tropics @ 1000 to 3000 m to N 42 and 27S lat at sea level.
- Uniform rainfall distribution best; 1100-1400 mm /yr min. monthly min. 60 mm
- Shade used in warm or dry areas particularly if light intensity is high and fertilizer not available.

# Area for production of high quality tea in Hawaii

- 500 to 1500m elevation
- Sunny day, cool night with late afternoon fog
- Good air circulation
- Acid soil, good drainage
- Even rainfall distribution or irrigation

# Propagation

- Seed – 1 to 2 months
- Peat & cinder or perlite
- Acid fertilizer (foliar)
- Slow release fertilizer
- Likes moisture
- 12 to 18 months to form picking table
- Cutting – mature green wood
- Single leaf cutting
- Oasis block
- 0.3% IBA rooting powder
- Good air circulation
- 4 to 5 months to transplanting



# Training

Space transplants 0.9 x 1.5 to 0.45 x 2m.

Goal is to create a hedge 60 cm high, level top flat or curved called 'picking table'

Cover ground with hedge and leaf mulch.

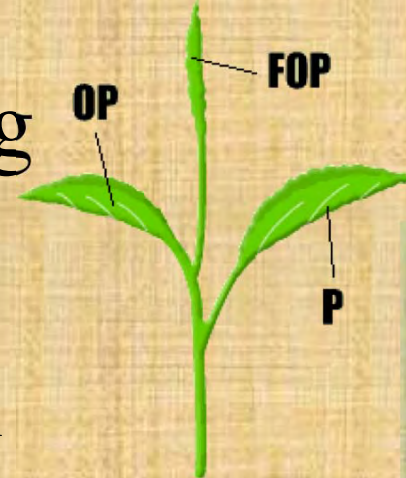


# Harvesting

Harvestable target :

2 leaves and a bud

Mostly by hand, but mechanical  
in Taiwan, Japan, Australia, US  
(S. Carolina)



## Disease and Pests

- Disease - blister blight of leaves, and a soil transmitted leaf blight.
- Pests- mosquito bug- a leaf sucker, thrips, mites, twig borer, termites.

# Processing: in four steps

## 1. Withering and drying.

Fresh shoots are 75–80% water, spread on trays, may be heated.

## 2. Rolling and sorting.

Leaves are separated from the tips and crushed to distribute sap using a corrugated table and cylindrical rollers or rolled into a ball in cloth.

First rolling without pressure for 1 hr; later rollings with increasing pressure and higher speed 45 to 60 min. (longer rollings stronger teas; less rolling lighter and more flavorful teas) followed by sifting and grading.

3. Fermentation. 21°–25°C, 90% humidity.  
Enzymatic (biochemical changes requiring oxygen) not microbial.
4. Drying. 20–25 minutes at 90° to 100°C, moisture reduces to 3–6%; sorting on screens.
5. Grading. Teas are graded on appearance, uniformity, and aroma.

There are 3 grades:

Leaf teas (orange pekoe—regular pieces with orange tip; pekoe; pekoe souchon; souchon)

Broken teas

Lower grades



# Tea styles

## White Tea *Cameilla senensis senensis*

This the most unflavored of teas, it is picked as the smallest buds with white hairs -unopened leaves- steamed and dried. Can be produced from green or black tea varieties.

Origin in Fujian, China. White needle tea.

Highest anti-oxidants.



Green more mature leaves, wither and dry



# 白龍茶

ONG TEA

Oolong  
same maturity,  
slightly 'ferment





Black tea  
same maturity  
most 'fermented'











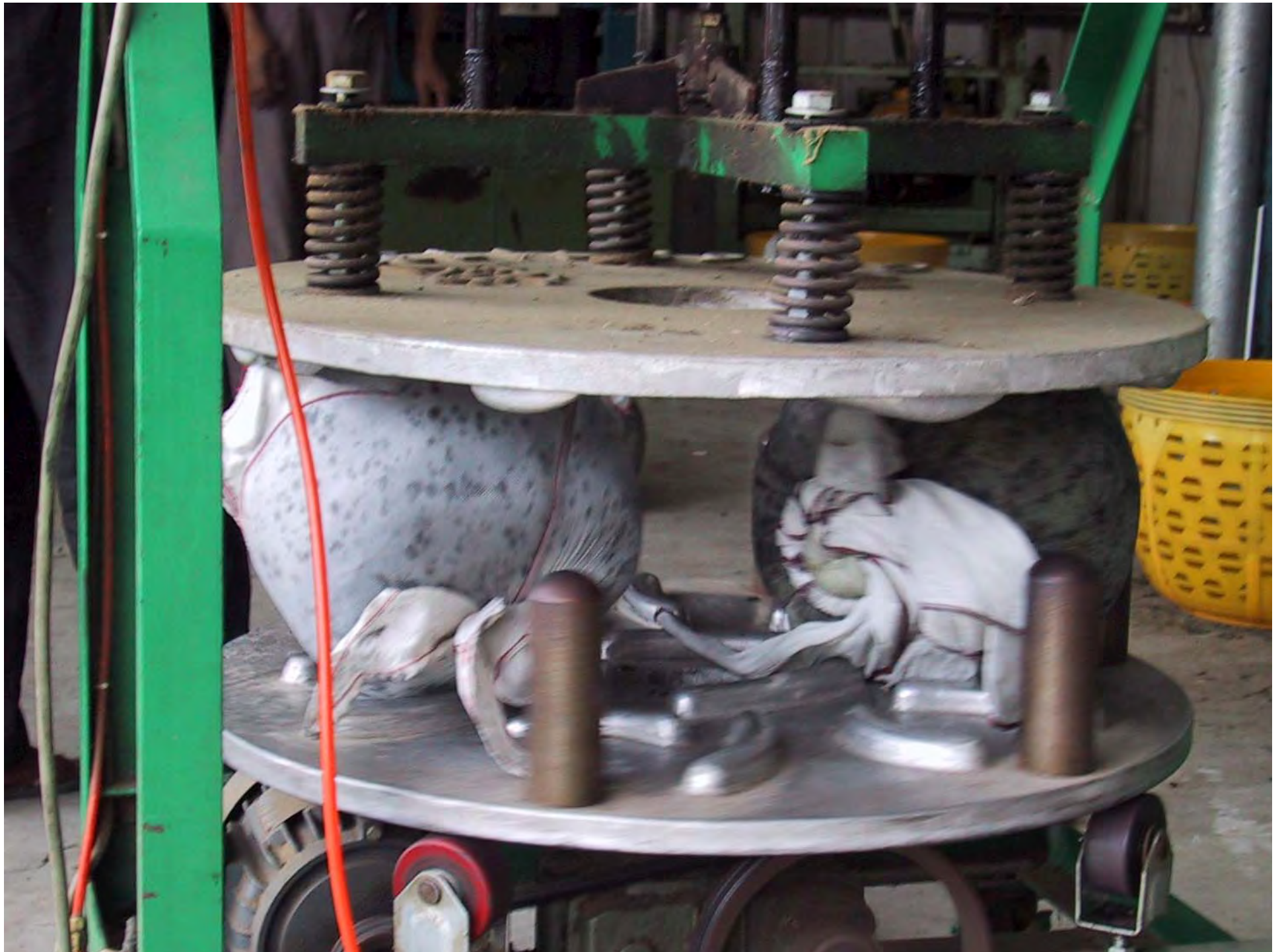
























Micro wave processing of tea  
leaves

Microwave 200 to 500 g fresh leaves in  
microwaveable bag at medium for 2 min.



Separate leaves and let stand for 3 min. This reduces liquid moisture and cools leaves.



Place leaves in cheese cloth or muslin, roll into tight ball, roll and squeeze lightly for 1 to 2 min. This produces sap on cloth, reduces moisture.



Tease apart the leaves so individual.





Leaves separated before drying in wok





Place wilted tea from ball into wok at medium temp and stir for 1-2 min. Put leaves back into cheese cloth, roll into ball, press harder, for 2 min. Separate leaves in wok, heat for 5-6 min, and repeat as necessary until stems/petioles are crisp. Store in air tight container.



Dry green tea ready for storage.

# Flavored teas

## Tea *Camellia senensis*

blended with synthetic or natural flavorings.

### Earl Grey

Original blend presented as a gift from a Chinese businessman to 2nd Earl Grey, British Prime Minister 1830-1834.

Twining's recreated the blend for him.

Blend of black teas and oil of Bergamot.



Citrus bergamia is a 4 m tree with sour fruits from Africa. Its grown commercially in Italy and Africa for the oil from the peel.



## Flavored contd.

Jasmine tea

Native India, known as pikake (HI)

Arabian Jasmine, *Jasminum sambac*

At least 700 years old blend, best teas have petals laid on trays between tea leaf trays at night so scent rises through leaves. Lower grade put in flowers. Teas used are green and oolong.



## Herbal Teas

Plants parts are used to produce  
to a water infusion as you would  
use *Camellia senensis*

# Rooibos - *Aspalathus Linearis*

Native Tea popularized by Boers of South Africa



Processed by chopping, rolling & drying like black tea.



# Herbal contd

Yerba Mate *Ilex paraguarensis*

Consumed in Argentina, Uruguay,  
Paraguay and southern Brazil.

Tree is from tropical South America



# Herbal contd

Ginseng *Panax ginseng*, *P. quinquefolis*.

Origin China and Korea, name means 'man root' over 5000 yr use. Nutraceutical to improve immune system.





# Herbal teas contd

## Chamomile

Flower of two different plants

*Matricaria recutita* - German Chamomile

*Anthemis nobilis* - Roman Chamomile

Grown in England, Europe, South America, and US

Soothing effects on jangled nerves, irritated skin and upset stomachs. Calming evening tea



# Herbal teas contd

## Peppermint *Mentha x piperita*

Sterile hybrid of spearmint and water mint.

Found in English spearmint field about 300 years ago. Grown in Europe, Canada and U.S.A from cuttings.

Harvested for its fresh leaves, dried they contain >2% oil, including menthol, and related oils.

Refreshing, mildly sweet taste, aid to digestion; settles stomach.



# Herbal teas contd

Hibiscus or roselle *Hibiscus sabdariffa*  
*roselle*

Found in popular “zinger” teas

Native to west Africa, grown in England,  
Europe, South America, and US.

Tart, refreshing flavor from oxalic, malic  
and citric acids in the sepals covering the  
ripening seed capsule.



# Herbal teas contd

## Rosehips *Rosa canina*

Small red fruit harvested from the wild rose.

Source of Vitamin C



# Herbal teas contd

## Chicory *Cichorium intybus*

Known to be grown for 5000 years along the Nile River used as a medicine in Egypt;

French cook and eat leaves, Germans used it as medicine.

Roasted root is used as a substitute for coffee – no caffeine. Blended in a popular French-style coffee used for milk ice coffee.



# Herbal teas contd

## Licorice root *Glycyrrhiza glabra*

Origin China, by 3<sup>rd</sup> century BC, Hippocrates recommended licorice for coughs and respiratory ailments.

Legume woody shrub harvested for the root and extracted for glycyrrhizin,

50x sweeter than sugar used in candies and medicines.

Should not be used in large quantities by people with high blood pressure causes sodium retention and potassium loss.

