

Master of Gardens & Gardeners of Costa Rica 2008

BOTANICA

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Que es Botanica?

**Y otra pregunta... ¿Que
es Horticultura?**



Plant classification (Taxonomy)

- Sistema por identificada o grupo plantas (y insectas) por comunicacion
- Mucho systems para classification
 - Which ones can you think of?

Life cycle

- Annual (por un ano de semina)
- Biennial (por un o dos anos)
- Perennial (mas dos anos por semina)



Morphology or appearance

- Siempreverde, decidius
- **Woody, herbaceous**
- Lianas, arbol, arbusta
- Verticilada, opuesto o alternado hojas
- Fruto, semilla, otra typos

Mas de morfologia en una Minuto!

Environmental

- Xero-phyte, halo-phyte, hydro-phyte
- Hardy, tender
- Temperate, tropical, subtropical
- Warm season, cool season

A donde usa plantas frios en Costa Rica?

Usa de planta

- Fruta, vegetal, ornamental



*¿Que es diferencia
entre al fruta y una
vegetal?*

Nombre Ordinario

- ¿Que es una rosa?



Nombres Científicos

- Kingdom
- Animalia
- Otras
- Plantae
- Division (varios, estas de horticultural include -)
 - Pteridophyta - helechos
 - Spermatophyta –plantas con semilla
- Class
 - Gymnospermae –semilla in cobija
 - Angiospermae
 - Subclass
 - Monocotyledonae (monocots) - 49,000 typos
 - Dicotyledonae (dicots) - 237,000 typos

Espera – es solamente media de todo

Monocots vs. Dicots

- Numero de **cotyledons** en semilla
- Venas: palmeada, paralela
- Numero de partas de flor
- **Arrangement of vascular bundles**



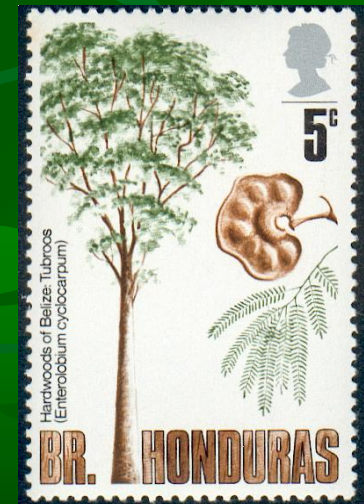
Porque necissitas ese palabras?

¿Porque Nombre Cientifica?

Árbol de Guanacaste

Enterlobium cyclocarpum

Ear Tree



Scientific nomenclature

- Order
- Familia - 'aceae' a la fin
 - Pimero punta en **identification**
- Genus
- Species
 - Persona primera llame -
- Cultivar - **cultivated variety**
- Variety - **botanical variety**
- Etc.

*Binomial
nomenclature –
Genus y species*

*¡Gracias al
Linnaeus por ese!*



Tomato

Order	Solanales
Family	Solanaceae
Genus	<i>Lycopersicon</i>
Species	<i>esculentum</i>
Botanical variety	<i>esculentum</i>
Cultivar	Solar Fire

*Nombre botanico habla
algo sobre la planta*



Y mas de nombres scinetifico

- Most commonly used system of nomenclature
- System is not static
- As you move down though the sections, plants included are more closely related
- Usa partas de la flor y partas de planta

So when someone brings me a plant, how do I get to the scientific name?

- Libros para identificación plantas
- Glosarios
- Websites o “CDs”
- **Dichotomous keys**

Key to Woody Plants by W.C. Muenscher

A. Plants with leaves present

B. Plants with needles

go to Key I p. 6

B. Plants with broad leaves

C. Leaves opposite or whorled

go to Key II p. 8

D. Leaves simple

go to Key III p. 12

D. Leaves compound

C. Leaves alternate

E. Leaves simple

go to Key IV p. 13

E. Leaves compound

go to Key V p. 23

A. Plants with leaves absent

F. Leaf-scars opposite or whorled

go to Key VI p. 26

F. Leaf-scars alternate

go to Key VII p. 30

¿Que hace a planta una planta y no un animal?

- Cell walls
- Ability to make own food
- Anatomical parts



Las Raizes

■ Functions

- Absorption of water and nutrients
- Anchoring
- Conductance
- Storage

■ Morphology

- Primary root/secondary roots
- Tap root/fibrous roots
- Adventitious roots
- Root hairs



Los Tallos

- **Functions**

- Conductance
- Support
- Photosynthesis
- Gas exchange
 - Lenticels

- **Morphology**

- Nodes/internodes
- Modifications



Hojas

■ Functions

- Collection of light
- Photosynthesis
- Gas exchange
- Storage

■ Morphology

- Lamina/peciolo
- Shape of blade
- Marginal
- Attachment to stem
- Number and arrangement of leaflets



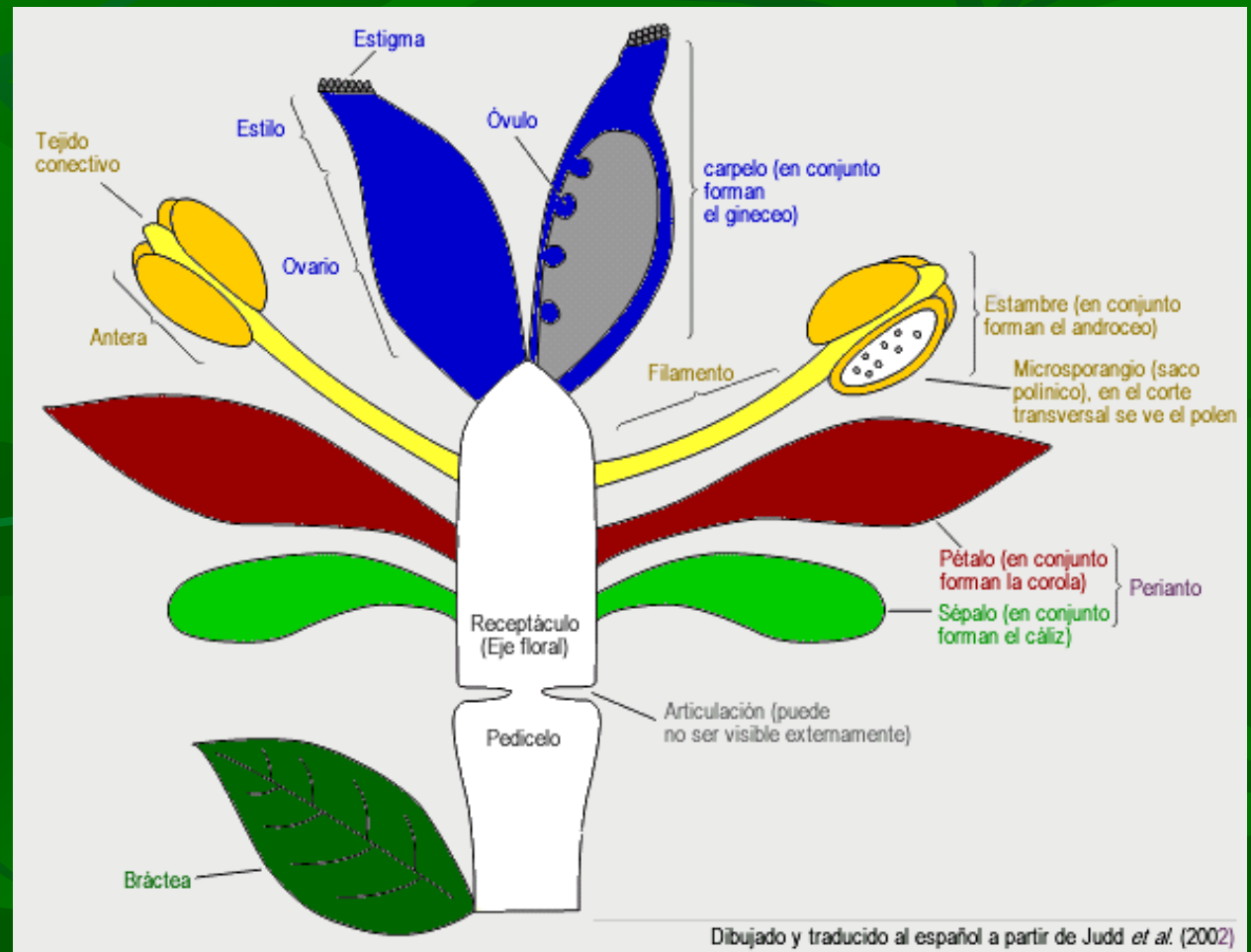
Flores

- Function
 - Control pollination
 - Develop into fruit and seed
- Morphology
 - We need a whole slide for this!
 - *Remember* – much of the classification of plants is based on floral morphology



Partes de La Flor

- petalo - corola
- sepalo - caliz
- **pistil**
- ovario
- estilo
- stigma
- estambre
- filamento
- antera
- **pollen**



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Morphology

- Complete
 - has petals, sepals, stamens and pistils
- Perfect
 - has both stamens and pistils
 - staminate
 - pistillate
- Flower types
 - monoecious
 - dioecious



Fruitas y semillas

- **Function**

- seed dispersal
- seed protection
- contain genetic information for next generation and structures to create new plant

- **Morphology**

- Ovary development
- Cotyledons/endosperm, embryo



Dry fruits

Fleshy fruits

Dehiscent or

indehiscent

Multiple/aggregate

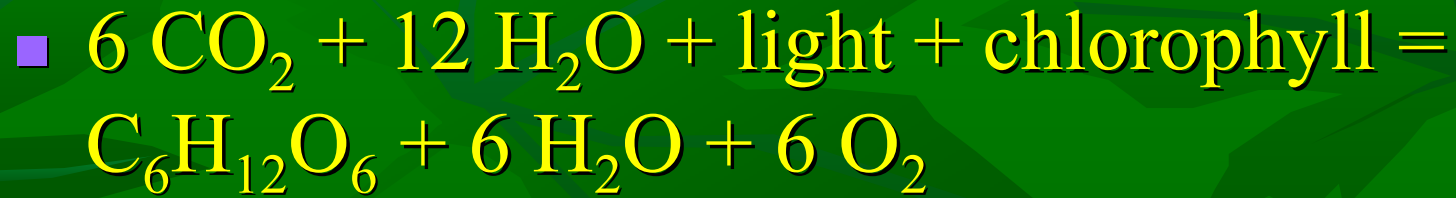


Plantas y energía (simplificado)

- Photosynthesis
 - The process of turning light energy into energy that can be transported and stored by the plant

Why not just use the energy directly?

Eek! Chemistry!



What does this mean to you?

EEK! Chemistry!

- $6 \text{CO}_2 + 12 \text{H}_2\text{O} + \text{light} + \text{chlorophyll} = \text{C}_6\text{H}_{12}\text{O}_6 + 6 \text{H}_2\text{O} + 6 \text{O}_2$
- $\text{C}_6\text{H}_{12}\text{O}_6$ is the general formula for carbohydrates
 - Sugars can be transported
 - Starches can be stored

Both are forms of carbohydrates – as anyone on the Atkins diet can tell you!

More energy stuff

- Respiration
 - Changing the carbohydrates into a form of energy the plant can use

Although we think of respiration in humans as breathing, breathing is really gas exchange.

And more chemistry

- $C_6H_{12}O_6 + 6 H_2O + 6 O_2 + \text{mitochondria} = 6 CO_2 + 12 H_2O + \text{energy in a useable form}$
- Does anything about this formula look familiar?

What's all this energy used for, anyway?

- Plant growth and development
 - Cell division
 - Cell elongation
- Where does growth occur in plants?
 - Meristems

Plants and the environment

- Light
- Water
- Nutrients
- Temperature
- Air



Luz

- Color
 - Why don't plants grow well in green light?
- Intensity
 - Shade plants and full sun plant
- Duration
 - Total amount in a day
 - Photo-period effects flowering

Agua

- 90% of the plant is water
- Water is a carrier for nutrients
- Water is essential in chemical reactions – like?



Alimentos – mas proxima semana

- Required for growth

- C, H, O

- Macro

- N, P, K, S, Mg, Ca

- Micro

- Mn, Mo, Zn, Bo, Fe, Cu, Cl

- What's the difference between macro and micro?

- Where do these nutrients come from?

mas proxima semana!

Temperatura

- Affects rate of chemical reactions
- and therefore, plant growth

Aire

- Source of some nutrients
- Gases for chemical reaction
- Even some plant hormones are gases



¿Preguntas?



¡BASTA!