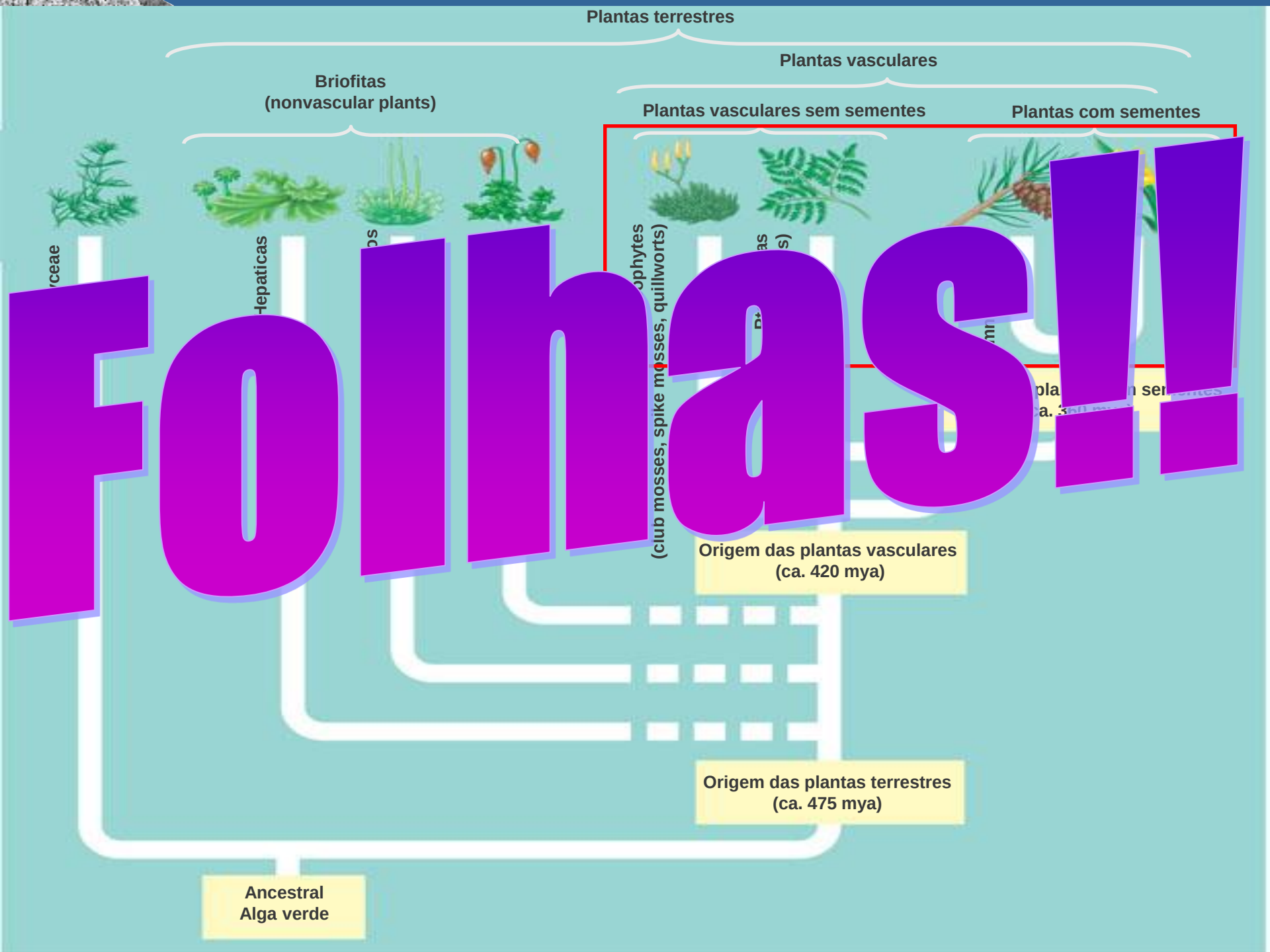
Anatomia Vegetal

Folhas

Algas

Laminas – Não são folhas verdadeiras


Plantas terrestres
Plantas vasculares
Briofitas
(nonvascular plants)
Plantas vasculares sem sementes
Plantas com sementes
Hepaticas
(club mosses, spike mosses, quillworts)
Origem das plantas vasculares
(ca. 420 mya)
Origem das plantas terrestres
(ca. 475 mya)
Ancestral
Alga verde

Folhas!!

Folhas: Evolução

Mas como surgiram as folhas?

(a) Microphylls (b) Megaphylls

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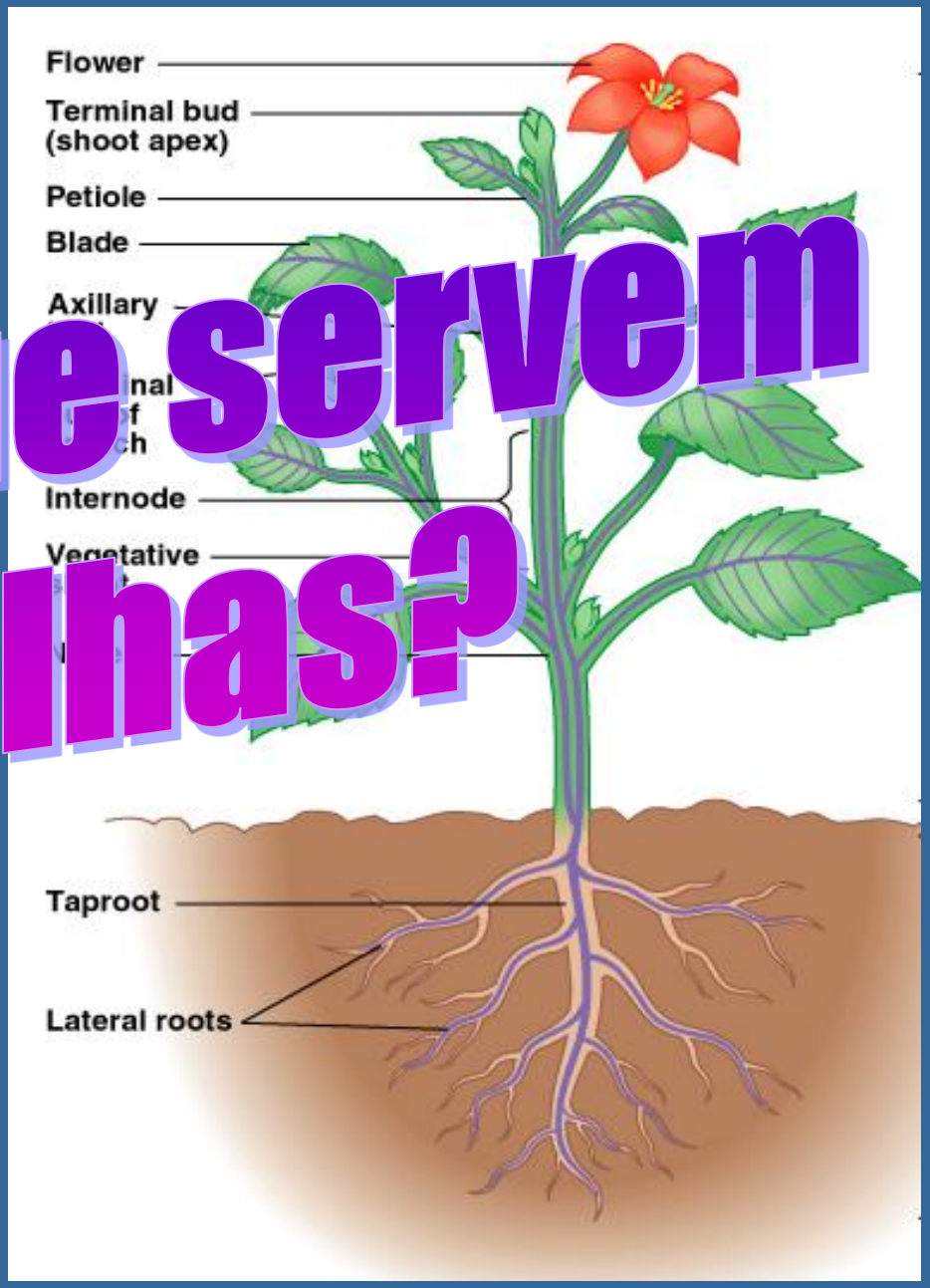
Folhas

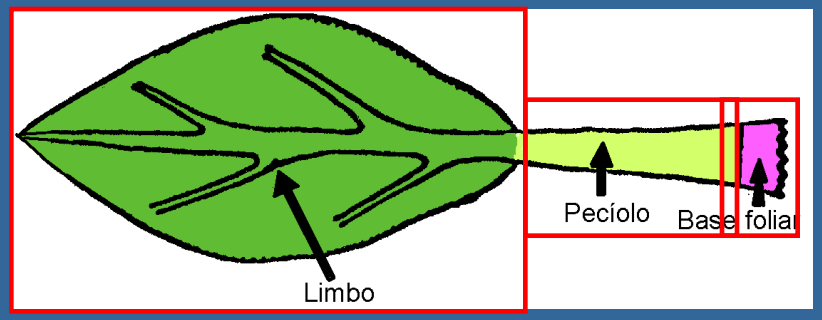
- Funções:
  - Fotossíntese
  - Troca [illegible] as
  - [illegible] ze [illegible] ent [illegible]
  - [illegible] tes)
  - Proteção

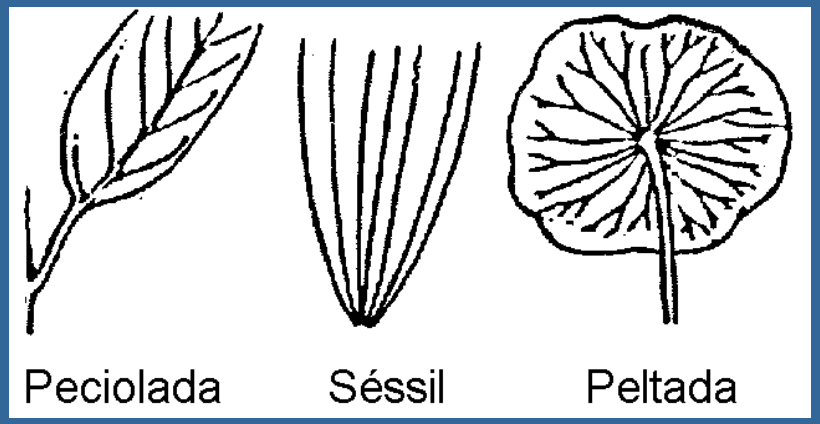
E para que servem as folhas?



Folhas

- **Partes:**
  - **Limbo**
  - **Pecíolo**
  - **Base foliar**
- **Tipos:**
  - **Peciolada**
  - **Séssil**
  - **Peltada**
- **Bainha**

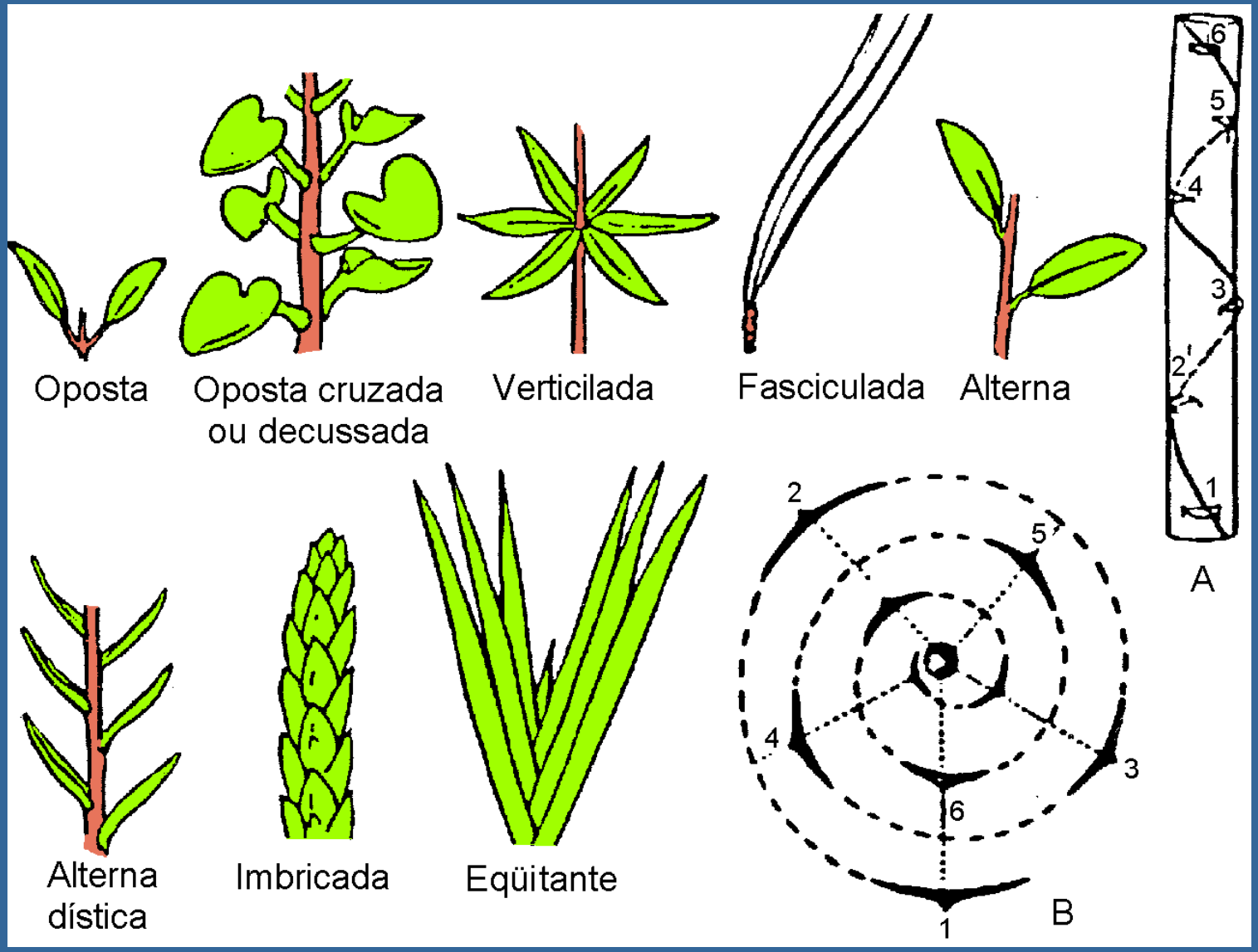




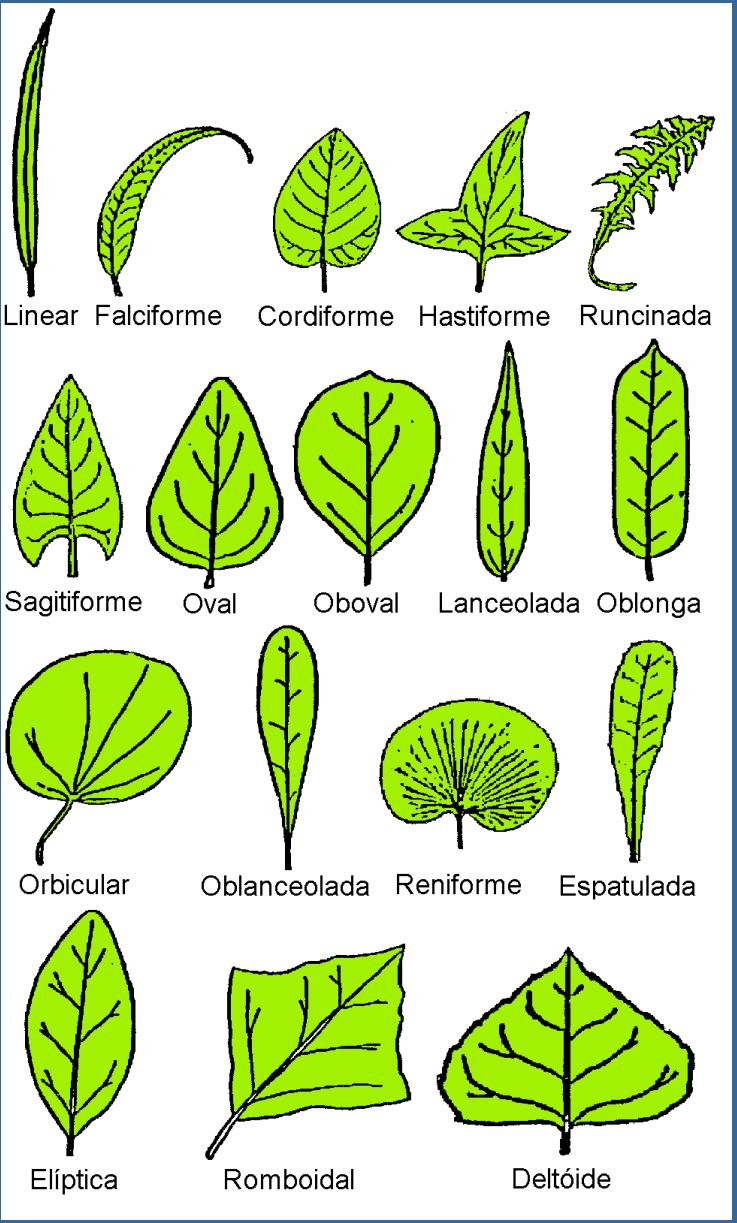
Peltada

Bainha

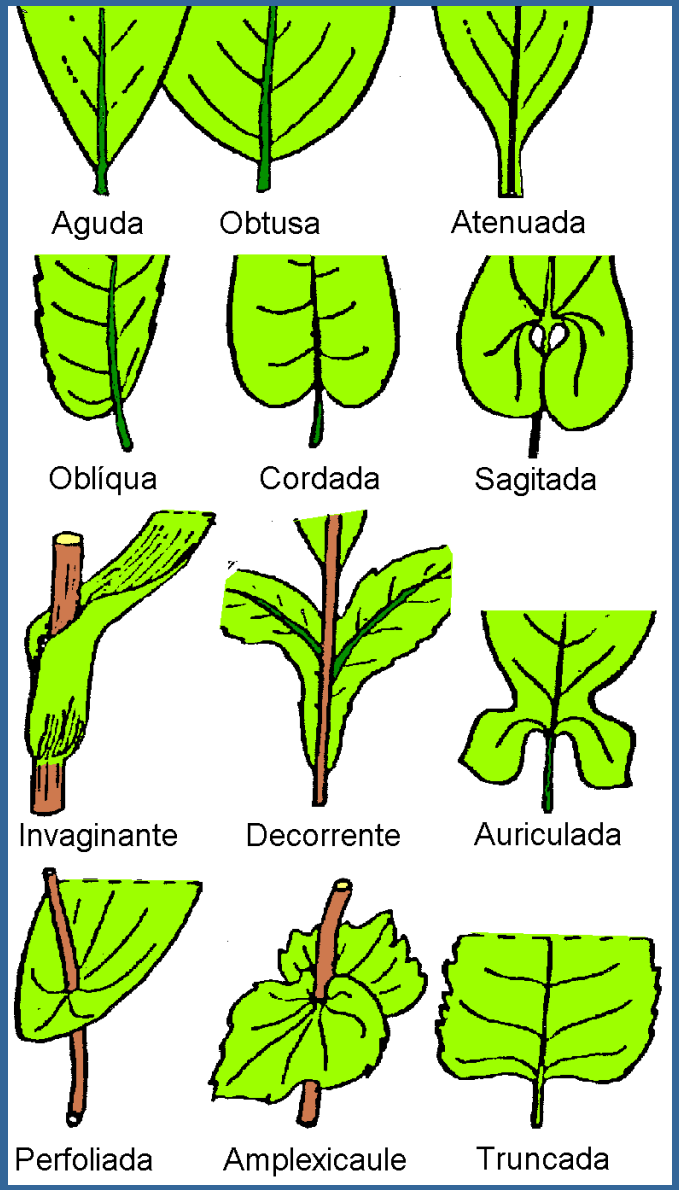
Filotaxia


Oposta
Oposta cruzada ou decussada
Verticilada
Fasciculada
Alterna
A
Alterna dística
Imbricada
Eqüitante
B
1
2
3
4
5
6

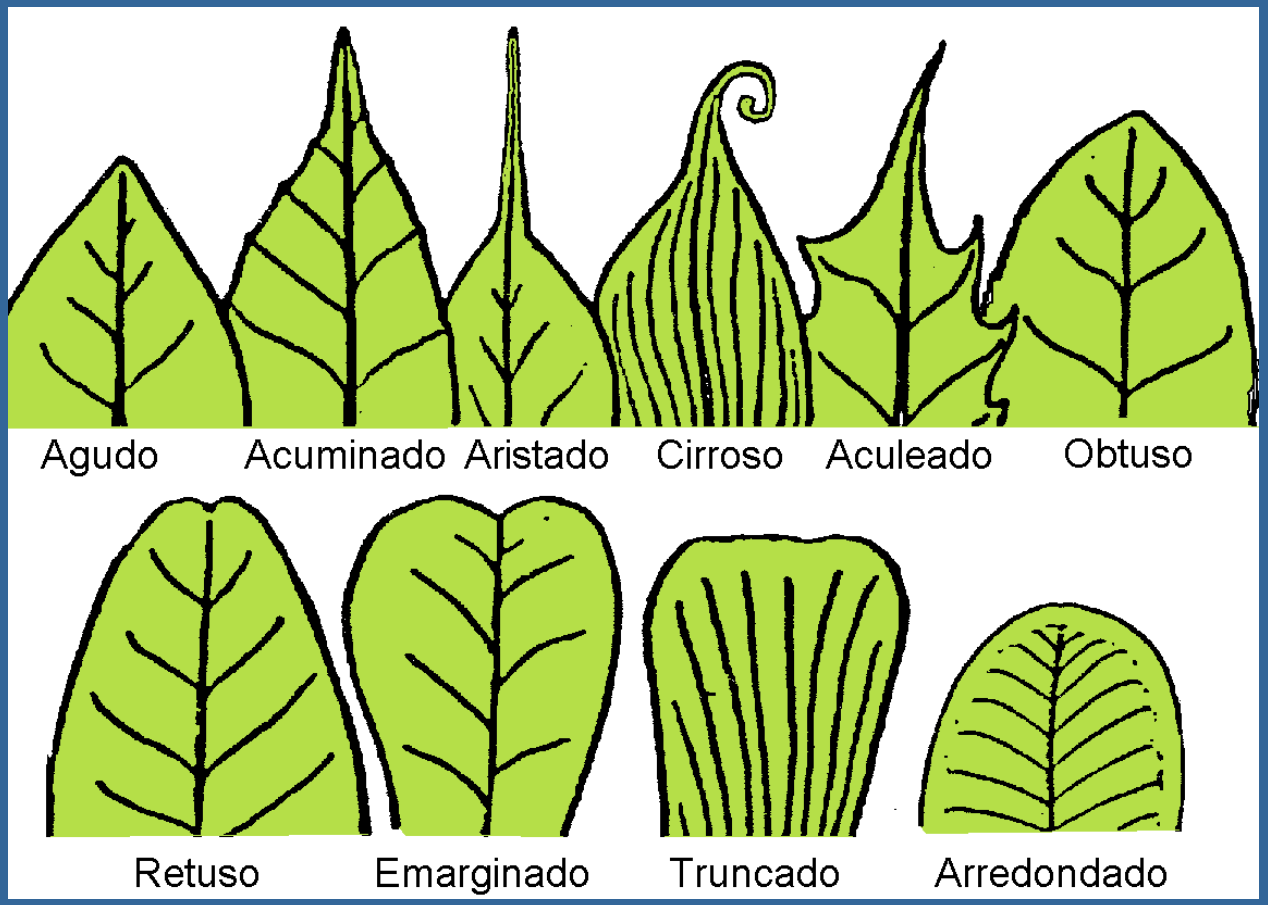
Forma


Linear
Falciforme
Cordiforme
Hastiforme
Runcinada
Sagitiforme
Oval
Oboval
Lanceolada
Oblonga
Orbicular
Oblanceolada
Reniforme
Espatulada
Elíptica
Romboidal
Deltóide

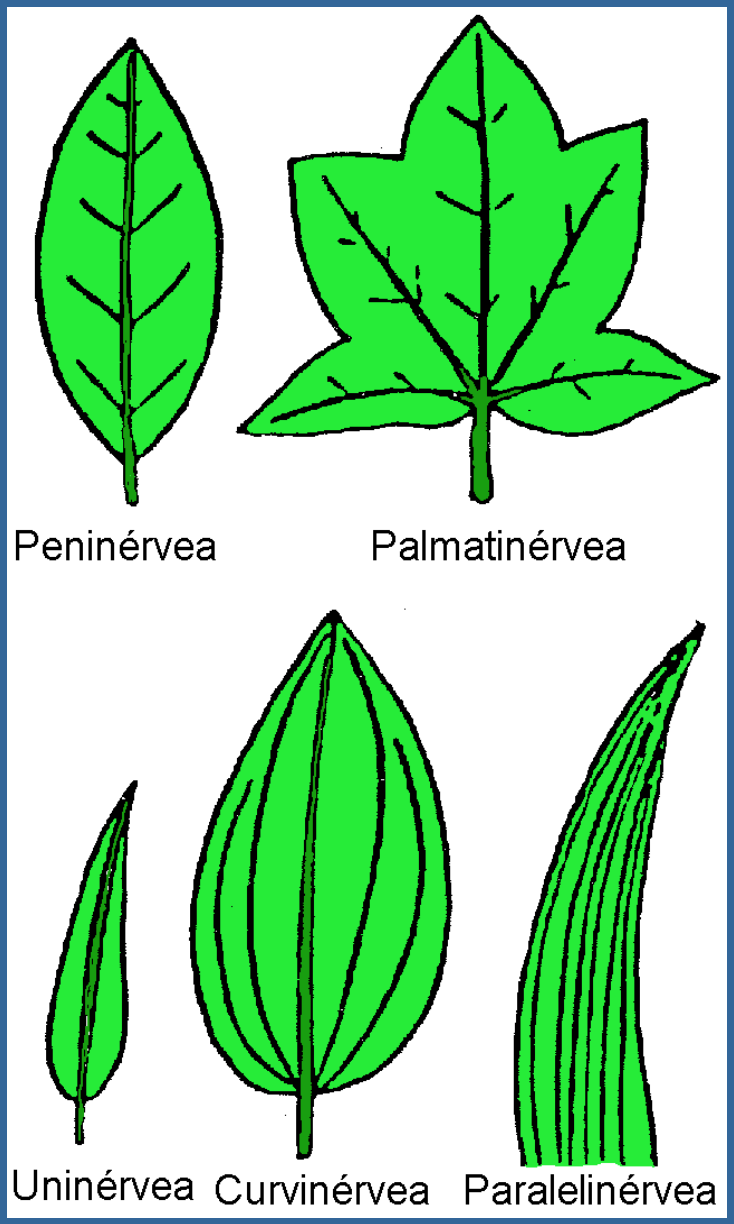
Base

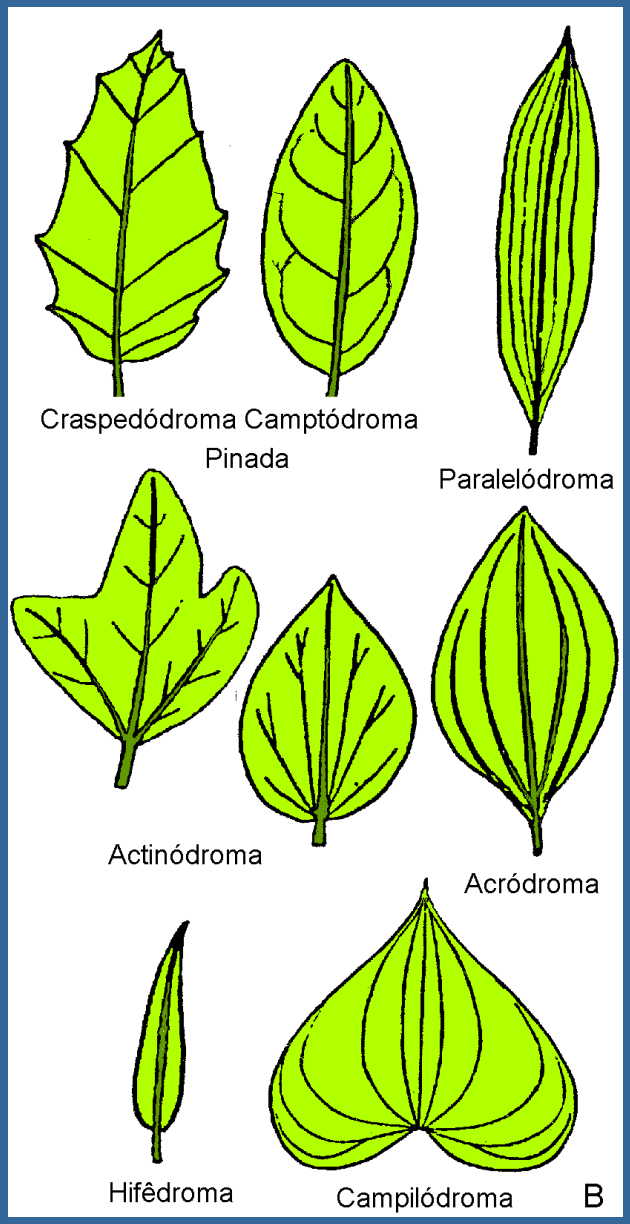

Aguda
Obtusa
Atenuada
Oblíqua
Cordada
Sagitada
Invaginante
Decorrente
Auriculada
Perfoliada
Amplexicaule
Truncada

Ápice

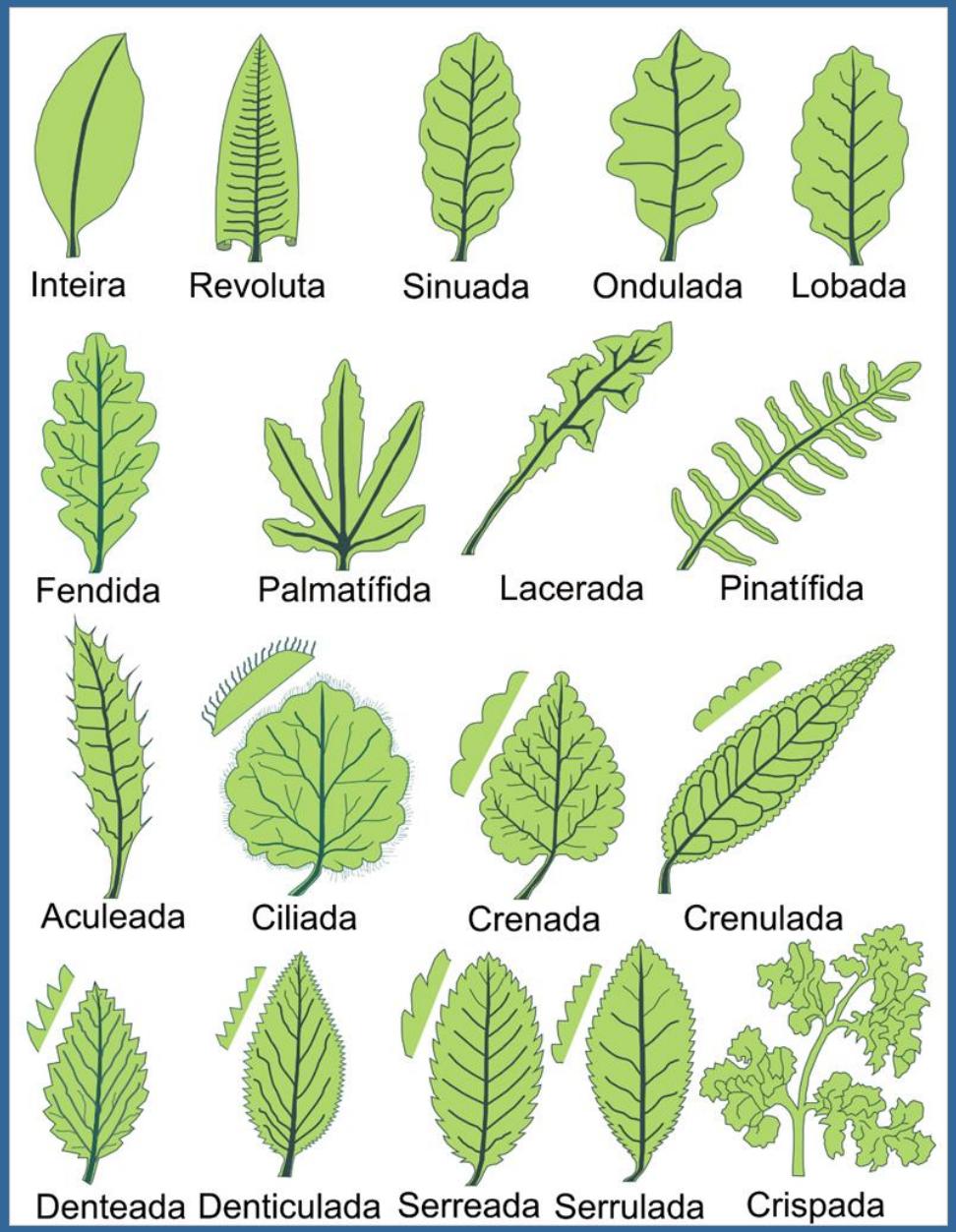

Agudo
Acuminado
Aristado
Cirroso
Aculeado
Obtuso
Retuso
Emarginado
Truncado
Arredondado

Venação

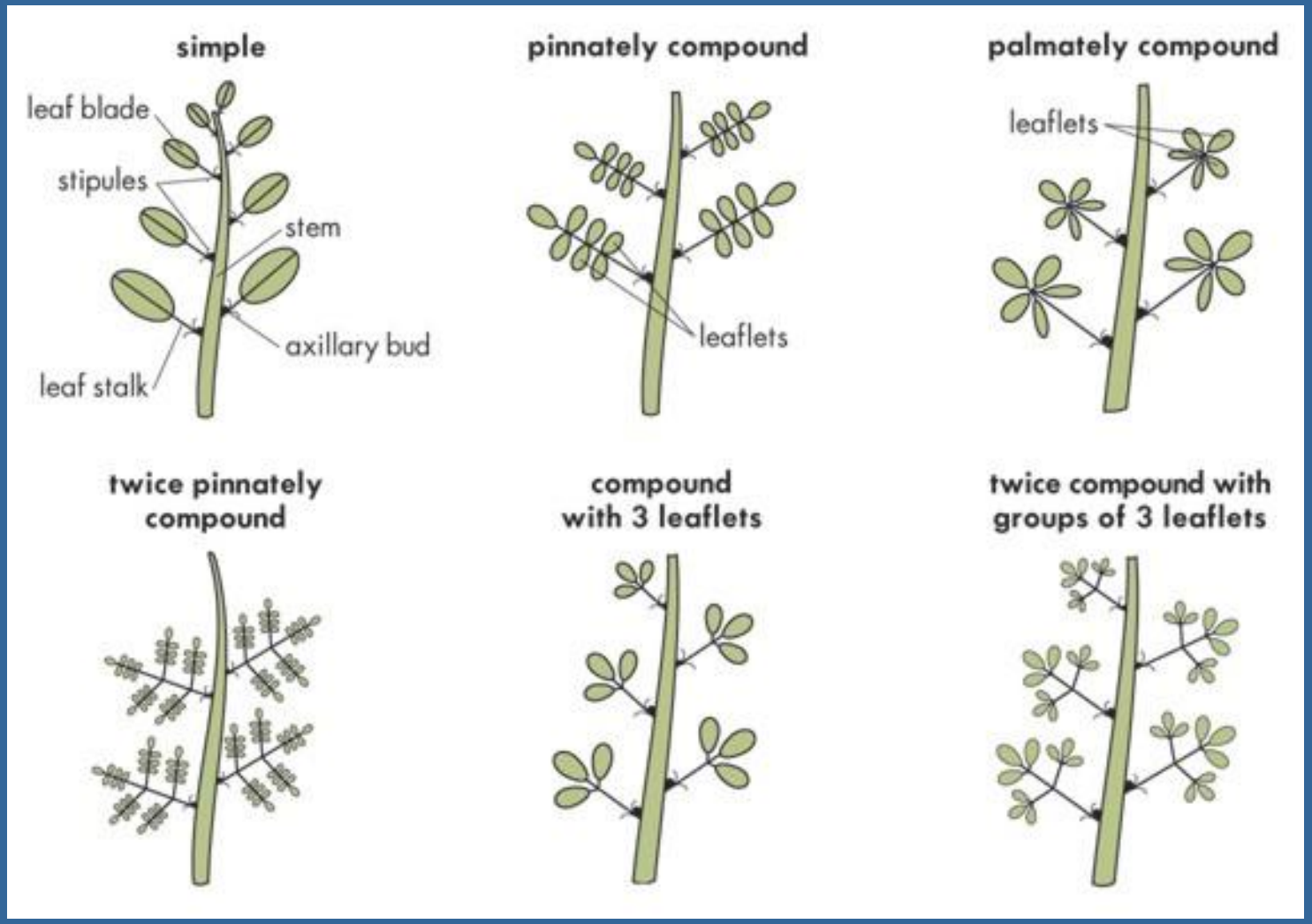

Peninérvea
Palmatinérvea
Uninérvea
Curvinérvea
Paralelinérvea


Craspedódroma
Camptódroma
Pinada
Paralelódroma
Actinódroma
Acródroma
Hifêdroma
Campilódroma
B

Margem


Inteira
Revoluta
Sinuada
Ondulada
Lobada
Fendida
Palmatífida
Lacerada
Pinatífida
Aculeada
Ciliada
Crenada
Crenulada
Denteada
Denticulada
Serreada
Serrulada
Crispada

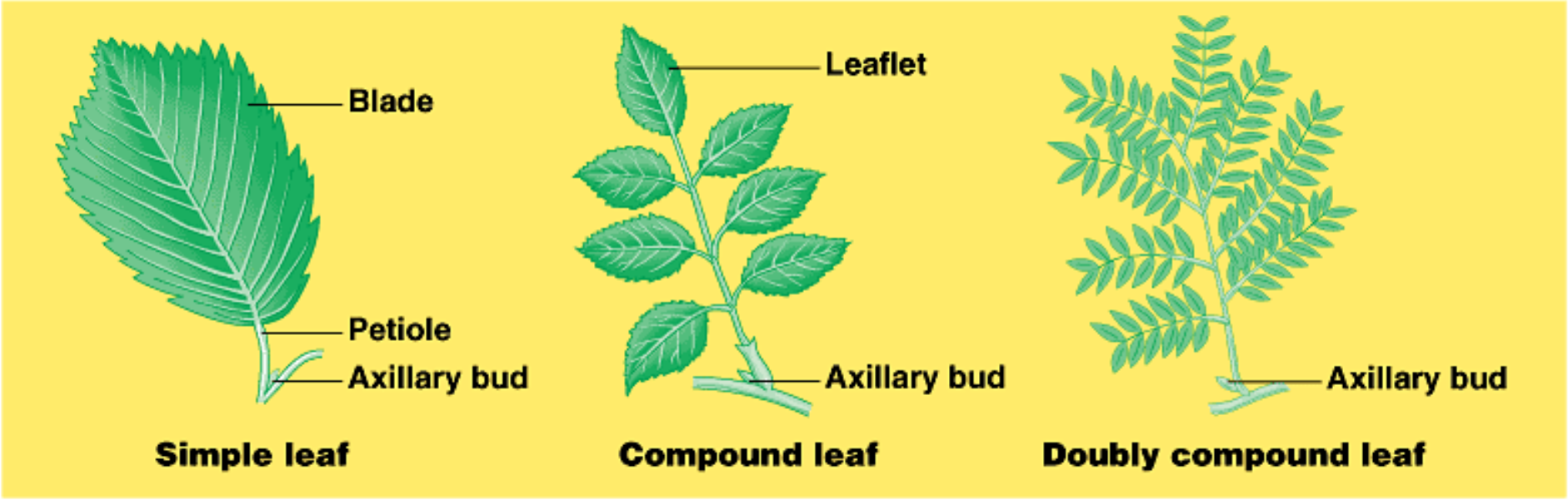
Folhas simples x compostas



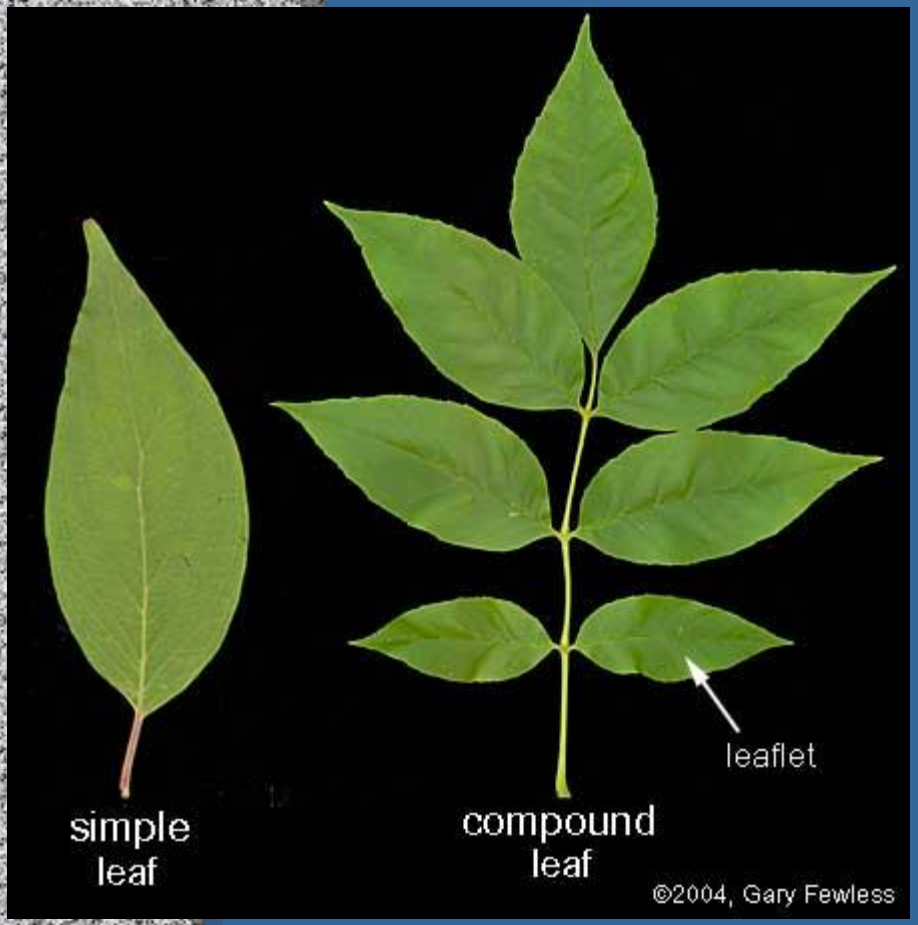
Folhas simples x compostas

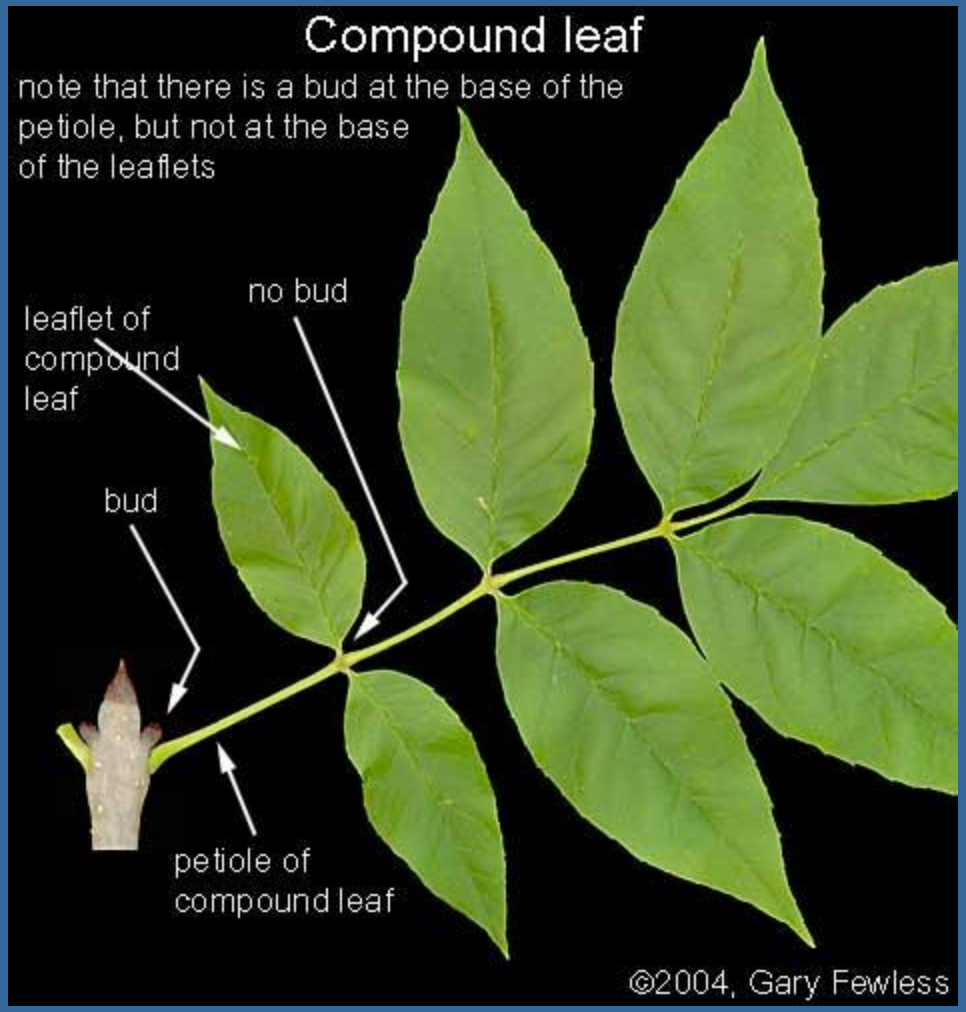
Pinada

Bipinada

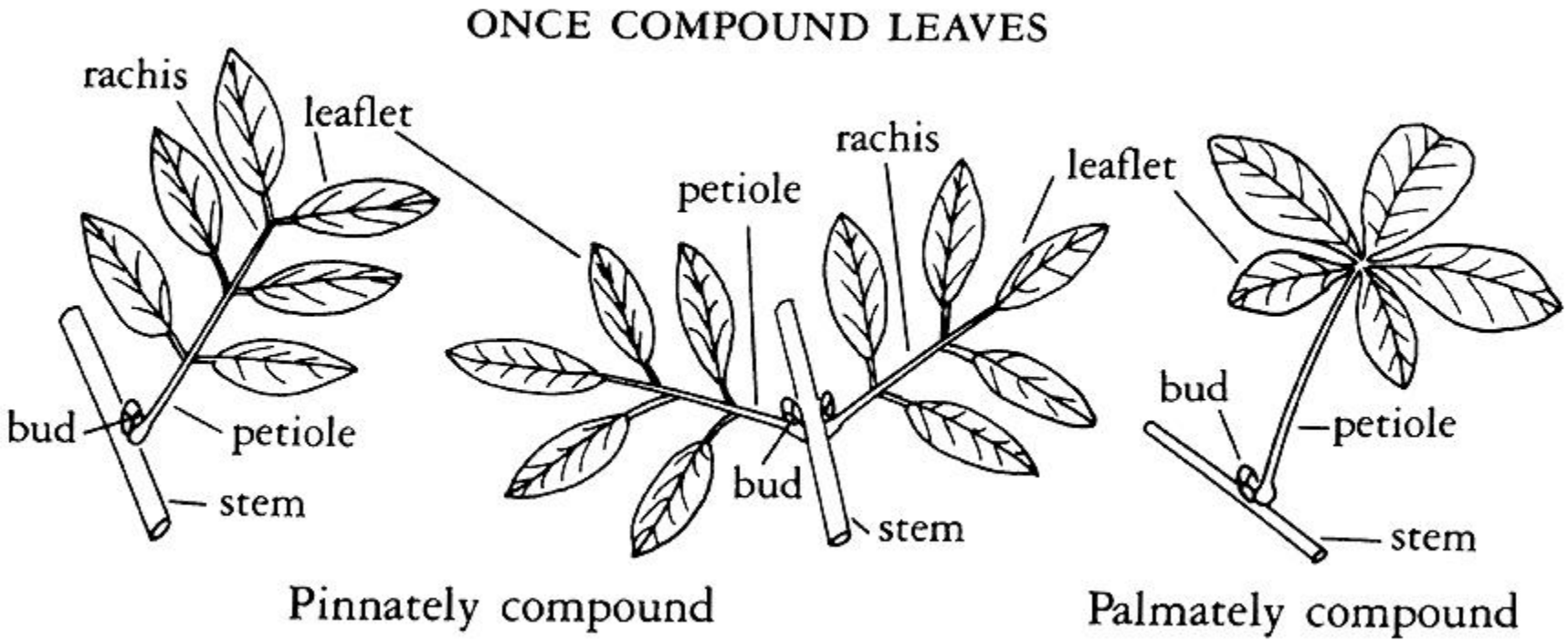


Folhas simples x compostas

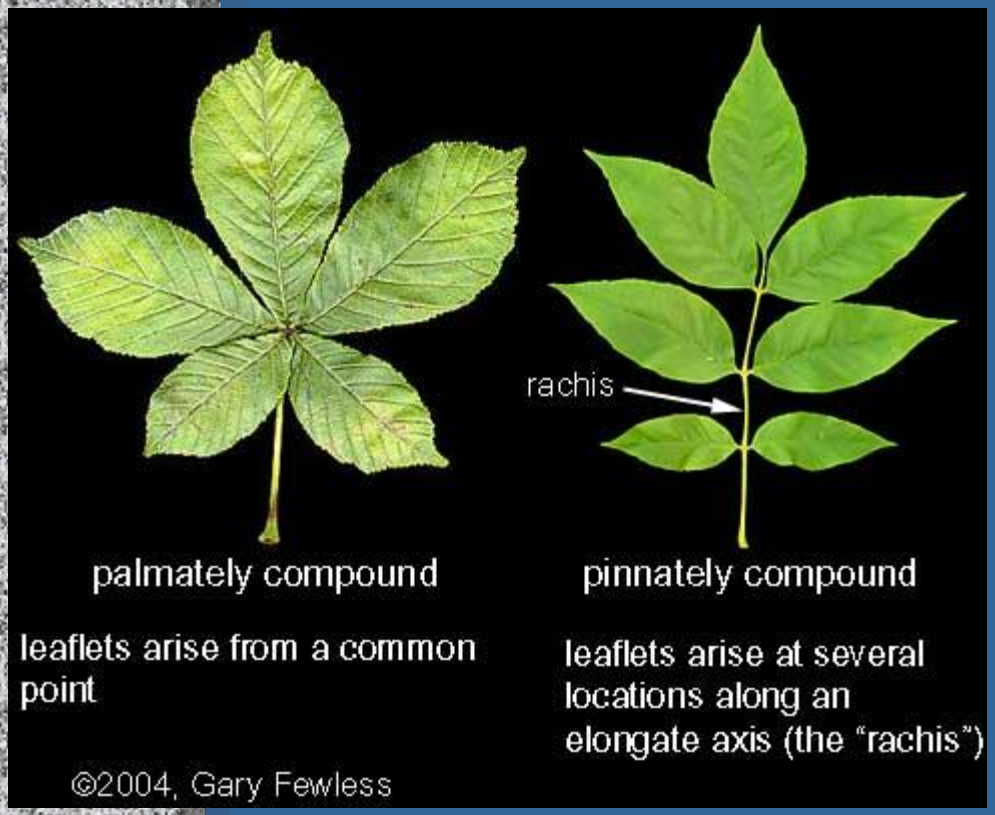


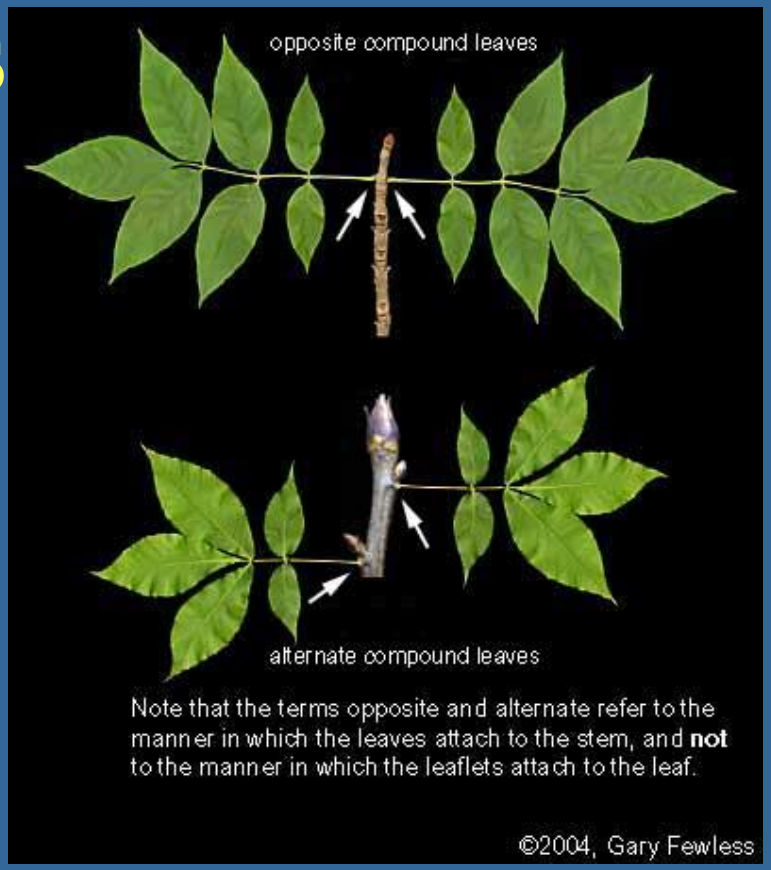


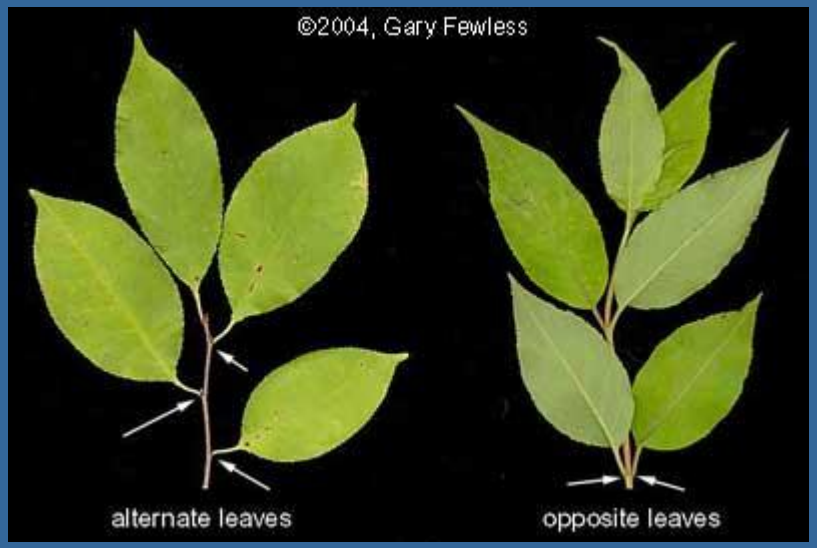
Paripinadas x Imparipinadas



Folhas compostas

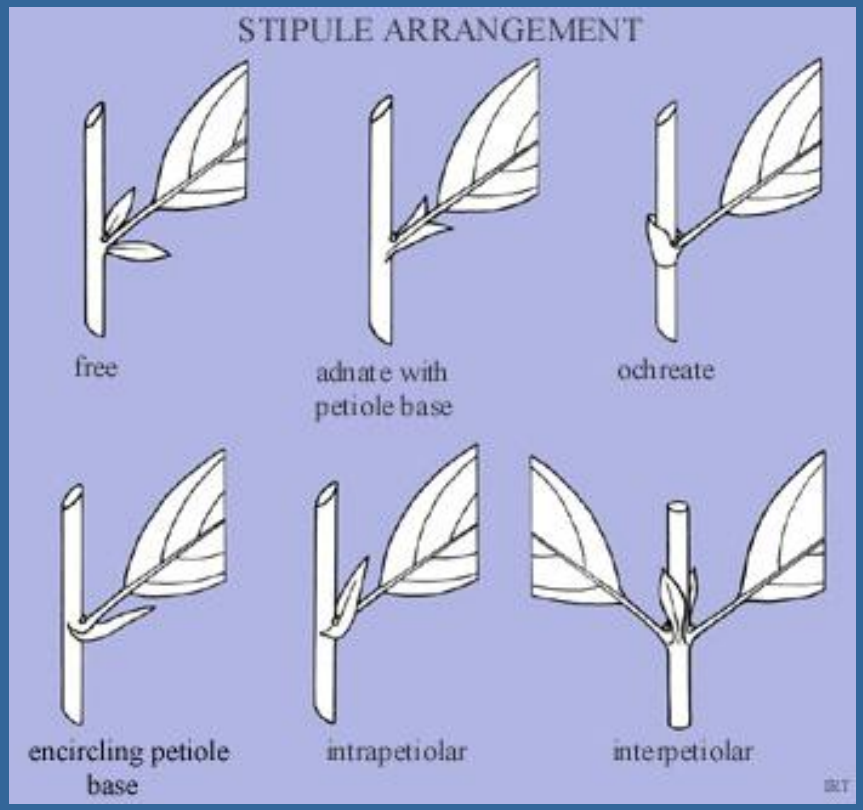






Modificações em folhas

Estipulas


STIPULE ARRANGEMENT
free
adnate with
petiole base
ochreate
encircling petiole
base
intrapetiolar
interpetiolar

Estipulas

Botanical Society of America
(photo by John Curtis/Nels Lersten)

Estipulas

Espinhos

Espinhos

Reserva

Brácteas

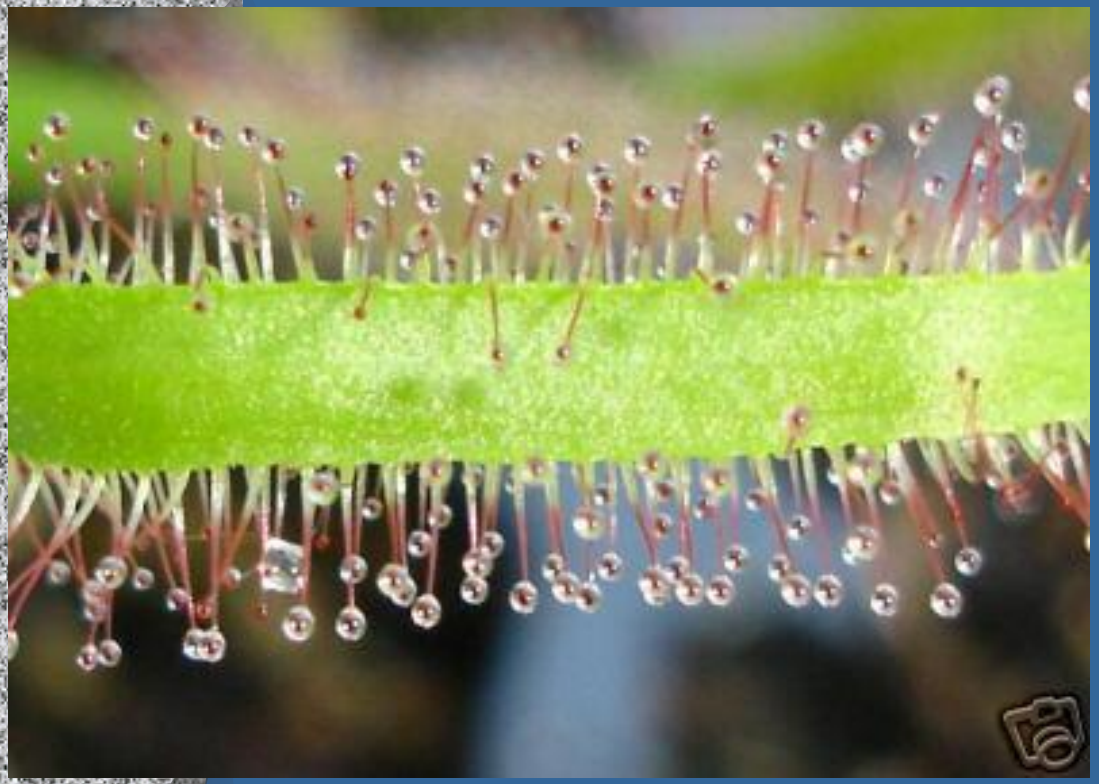
Brácteas

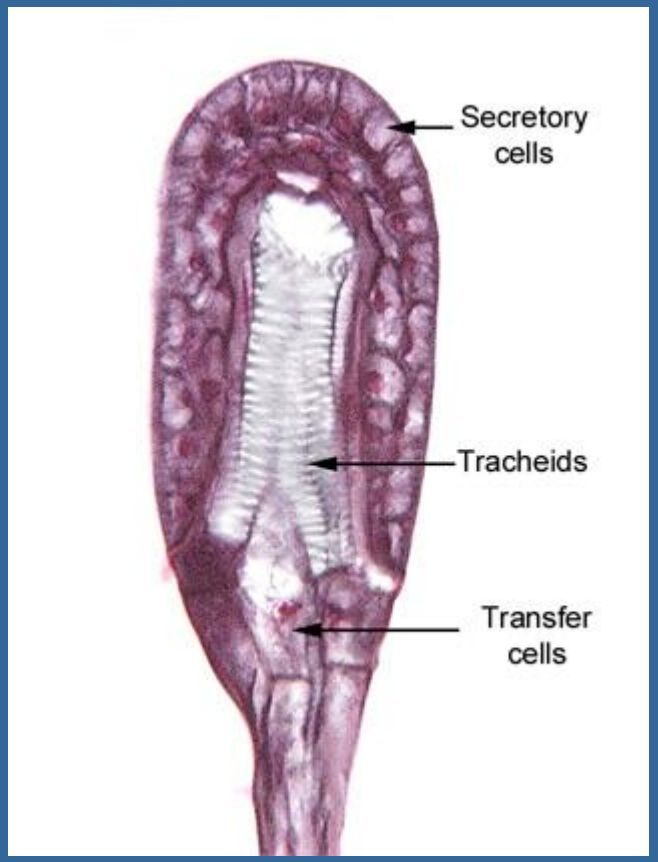
Gavinhas

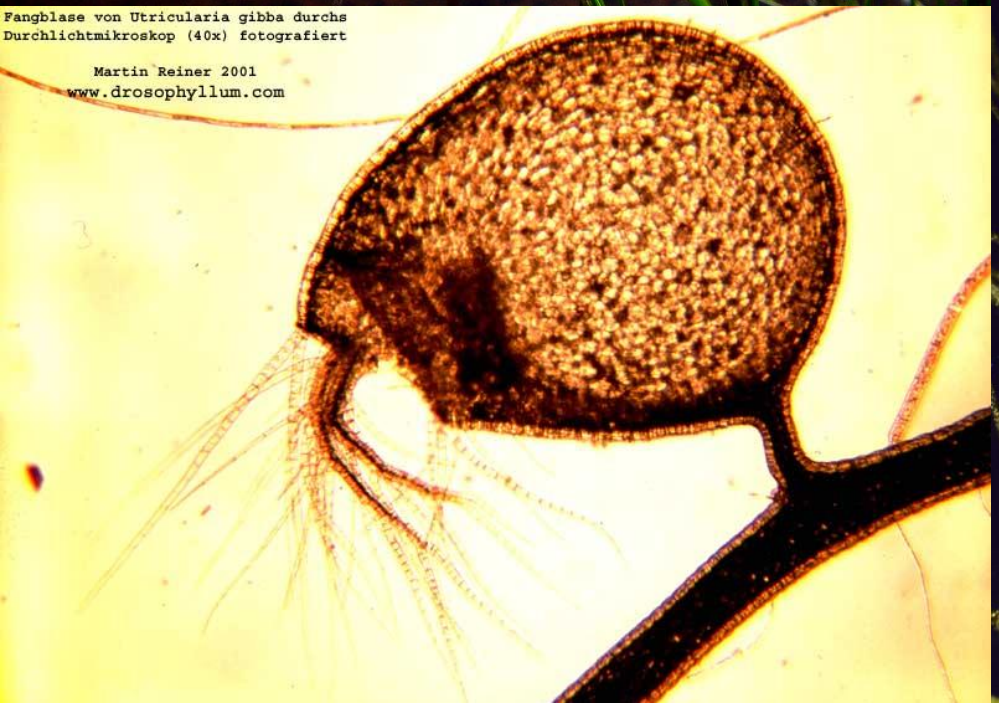
Folhas cotiledonares

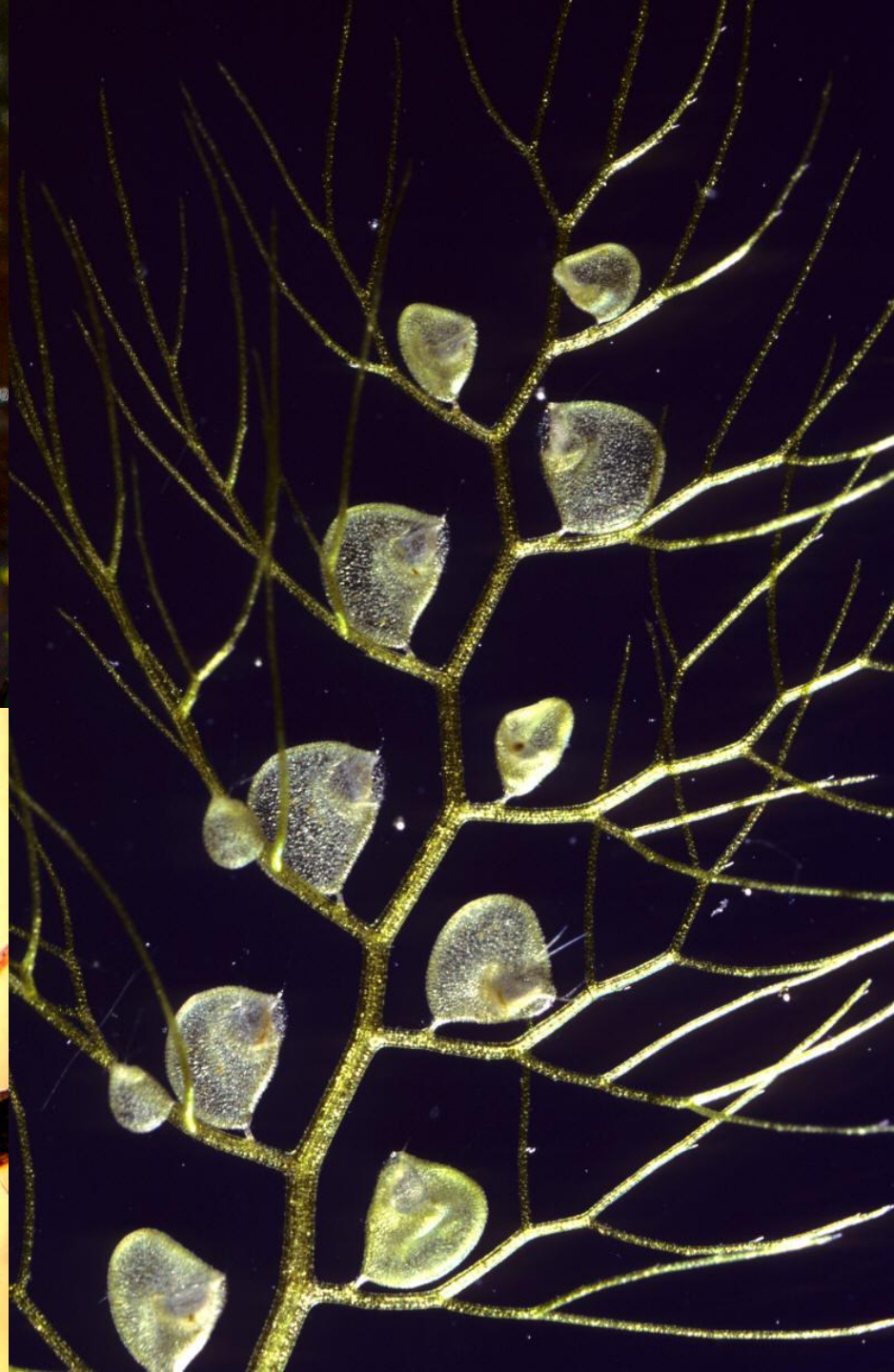
Glândulas digestivas

- Plantas carnívoras
- *Nepenthes, Drosera …*
- Secreção - Enzimas
- Absorção – Fosfato
  - Nitrogênio

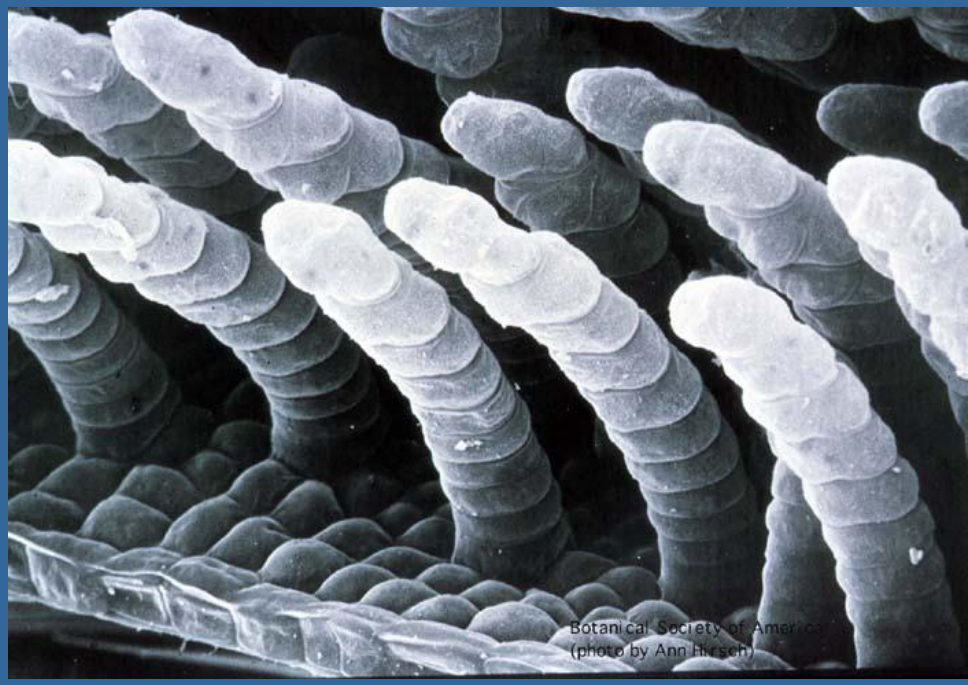





Fangblase von Utricularia gibba durchs
Durchlichtmikroskop (40x) fotografiert
Martin Reiner 2001
www.drosophyllum.com



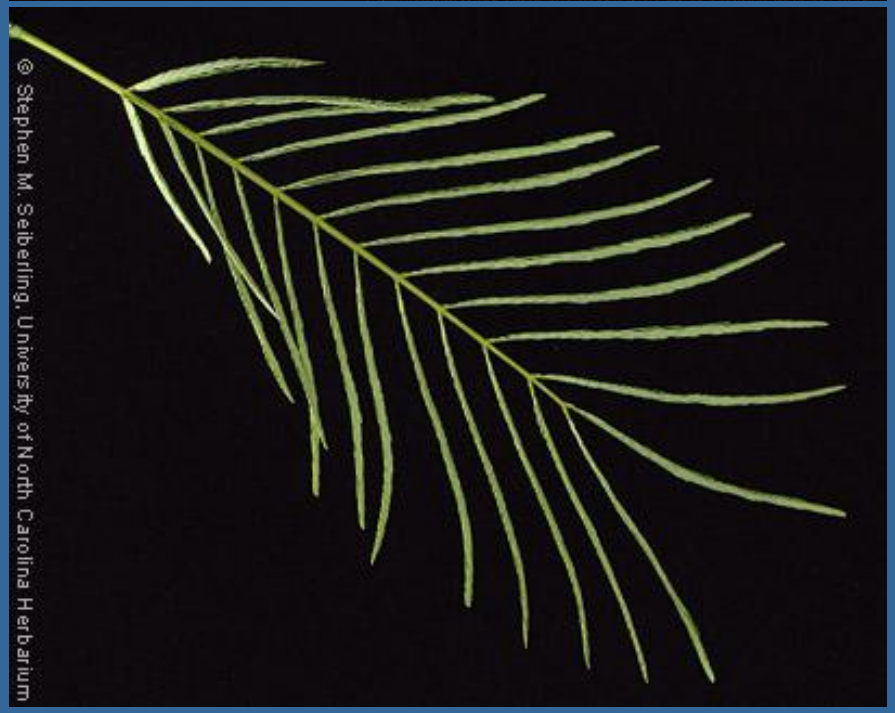
Salvinia



Nectários

Nastismo

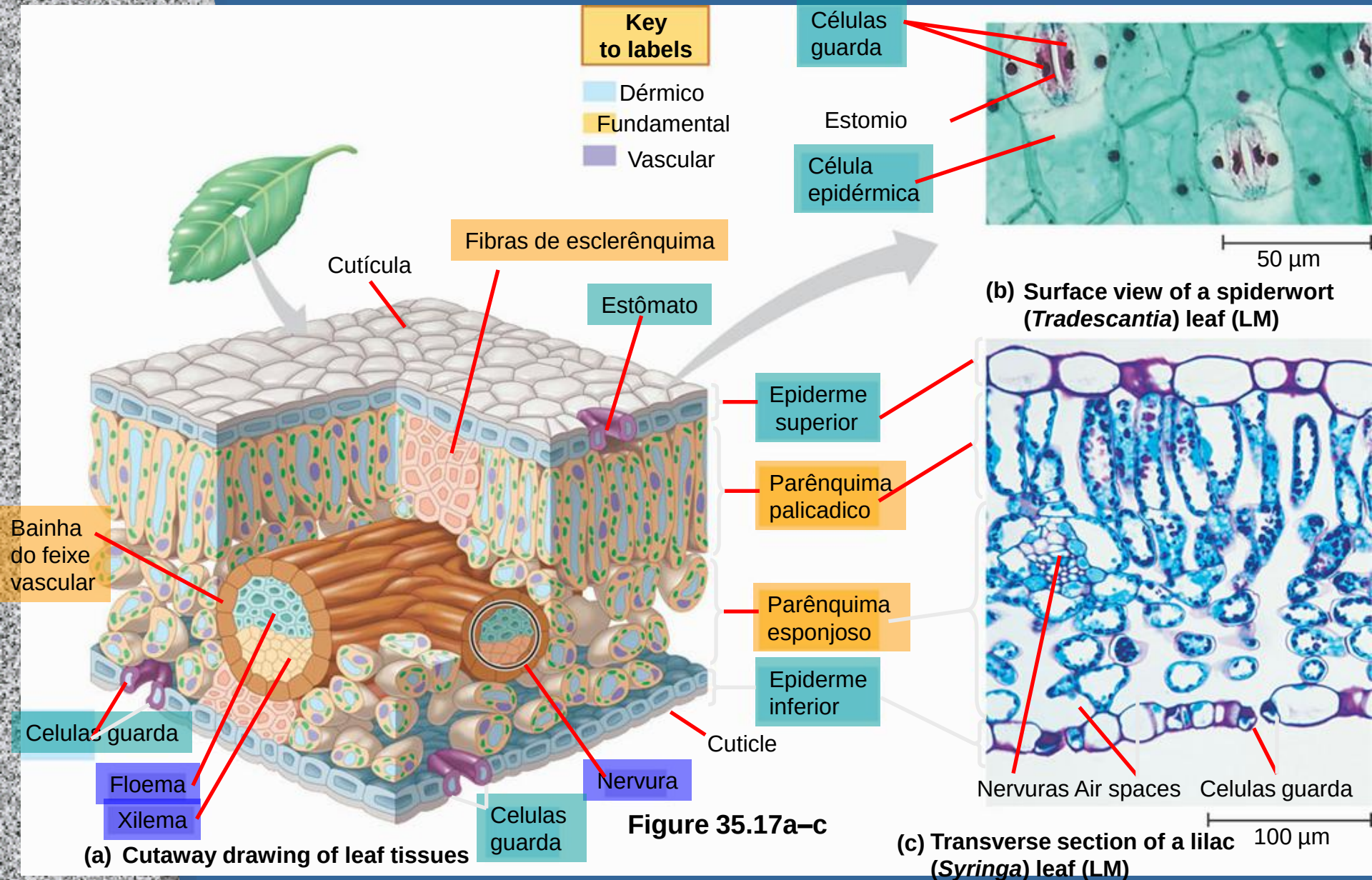
Pulvino



Mimosa pudica
Fabaceae-Mimosoideae
© G. D. Carr

Mimosa pudica
Fabaceae-Mimosoideae
© G. D. Carr

Anatomia foliar



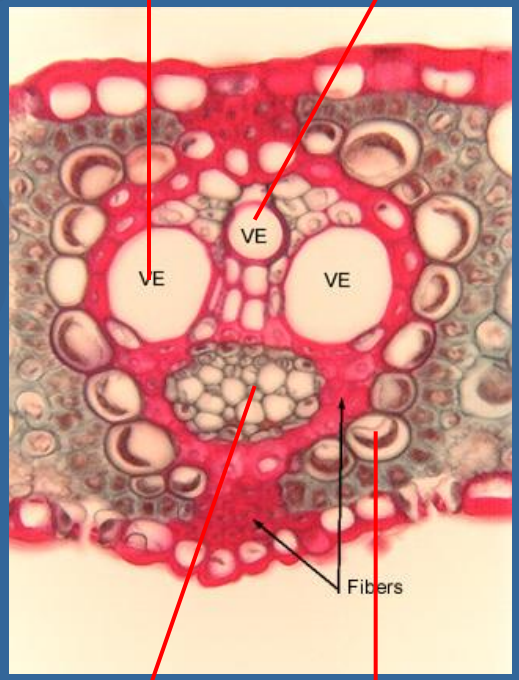
(a) Cutaway drawing of leaf tissues

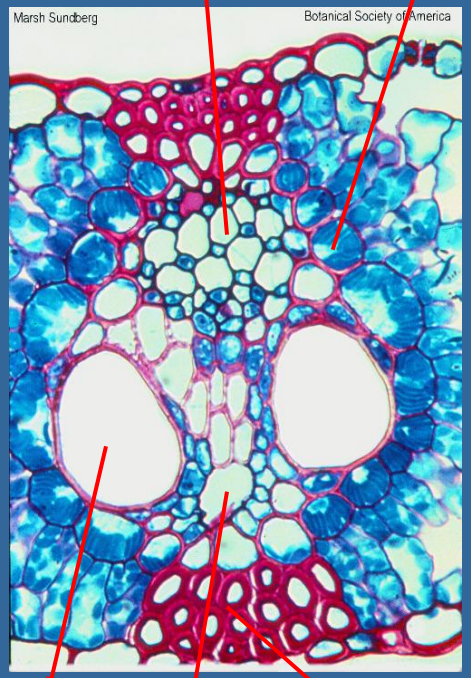
(b) Surface view of a spiderwort (*Tradescantia*) leaf (LM)

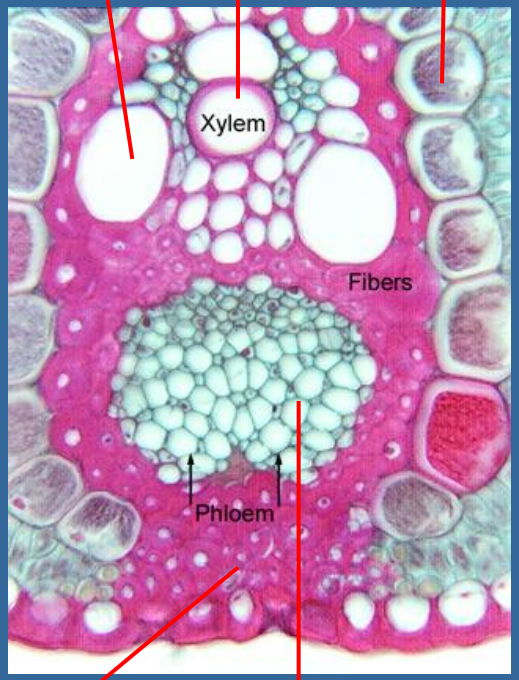
(c) Transverse section of a lilac (*Syringa*) leaf (LM)

Figure 35.17a–c

Nervura central







Metaxilema

Protoxilema

Floema

Colênquima

Floema

Colênquima

Metaxilema

Protoxilema

Esclerênquima

Metaxilema

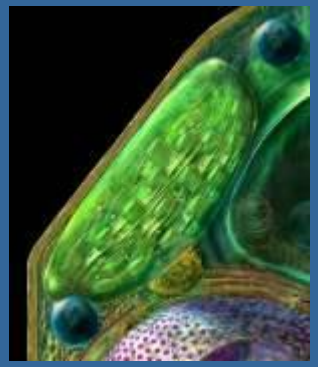
Protoxilema

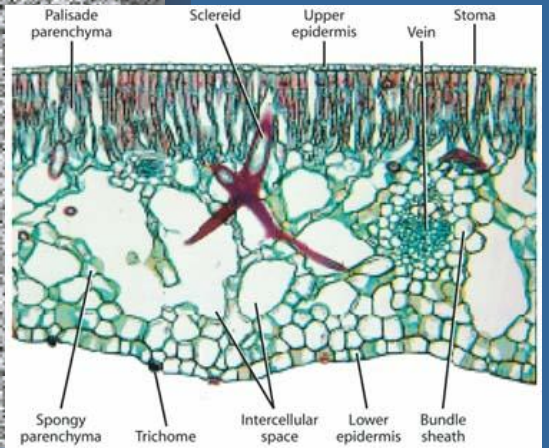
Floema

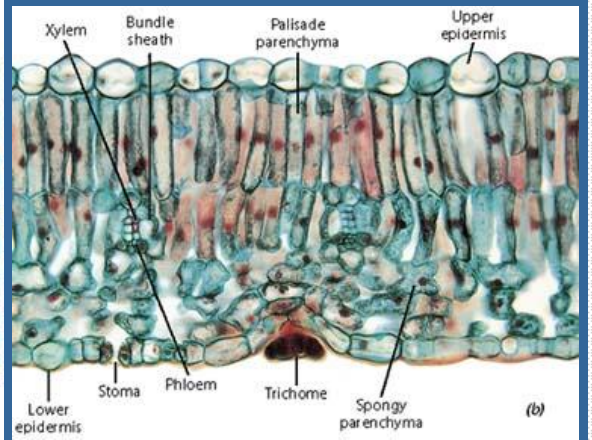
Colênquima

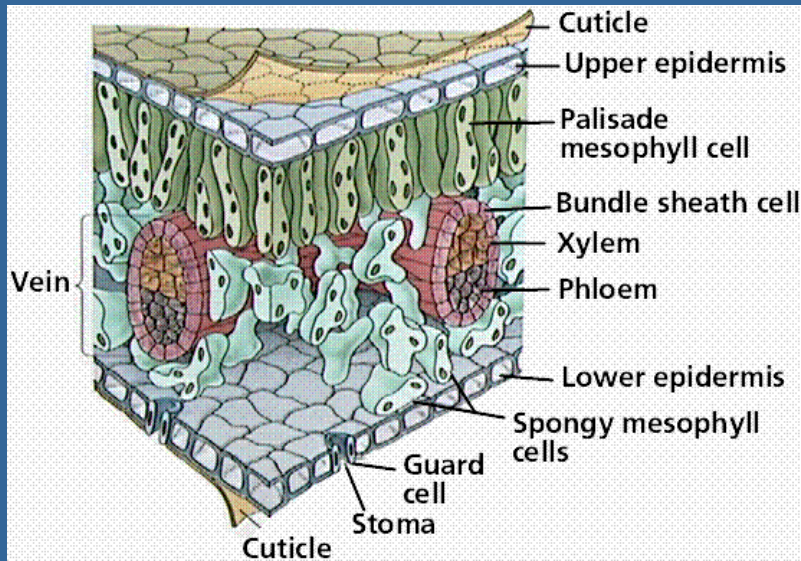
Clorênquima

- Fotossintese (cloroplastos)
- Formas variadas
- Disposicao – captacao de luz
- Vacuolo desenvolvido
- Varios tipos:
  - Palicadico
  - Lacunoso



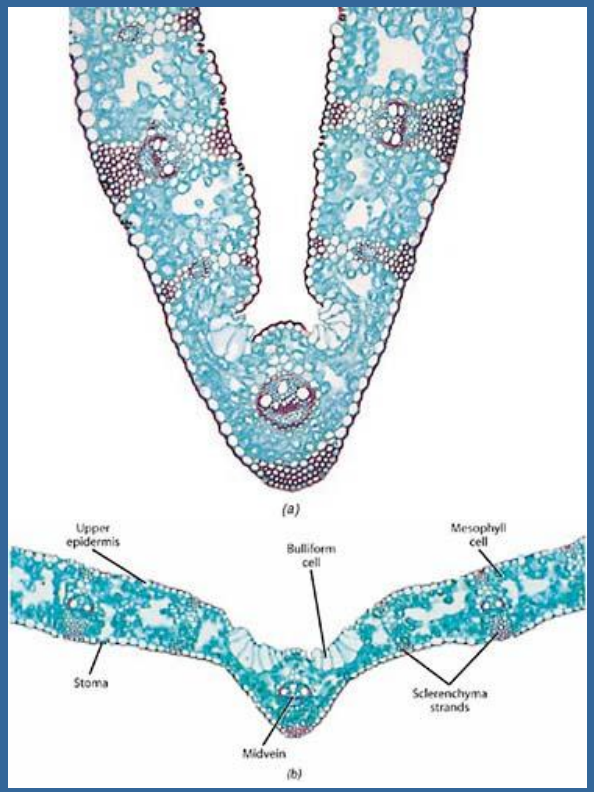






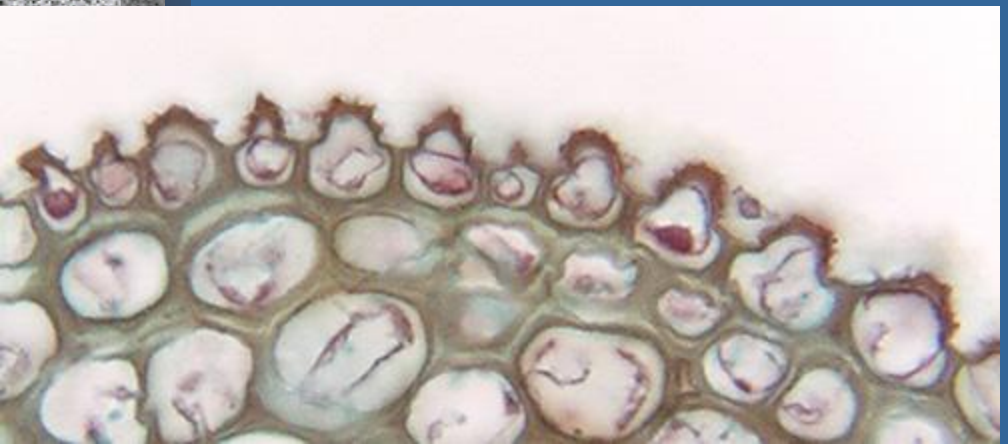
Celulas buliformes

- Células buliformes
  - Perda de água



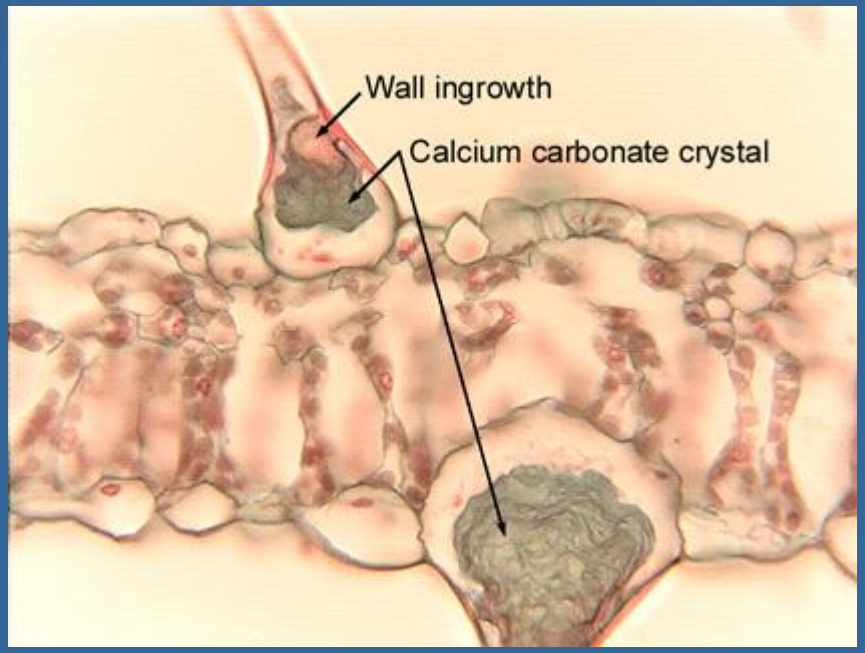
Papilas

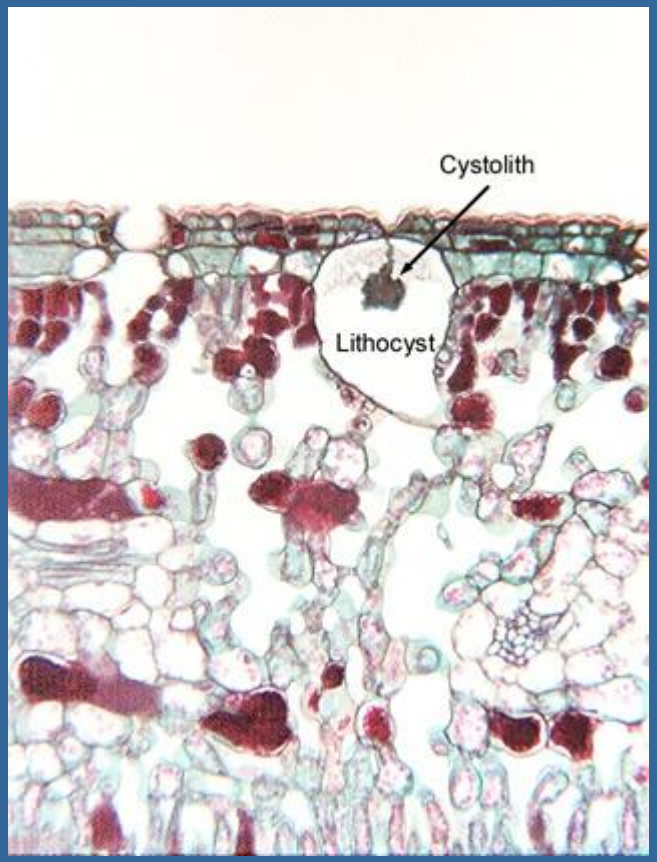
- Projeções da parede
- Epiderme
- Varias funções:
- Proteção
- Refletir luz solar



Litocisto

- Cistolito (carbonato de cálcio)
- Função incerta (predação)
- *Ficus* spp.
- *Cannabis sativa* (base dos tricomas)





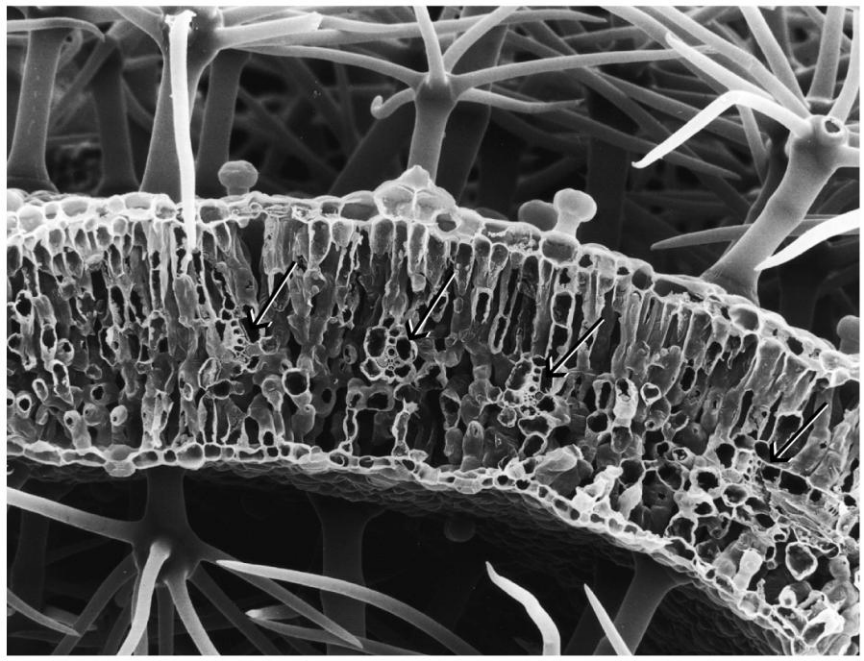
Epiderme - Tricomas

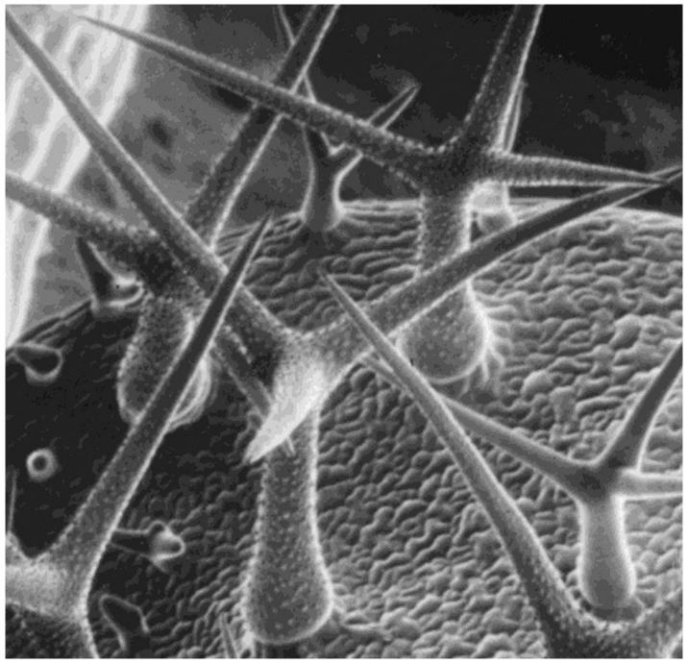
- **Funções:**

  - Absorção

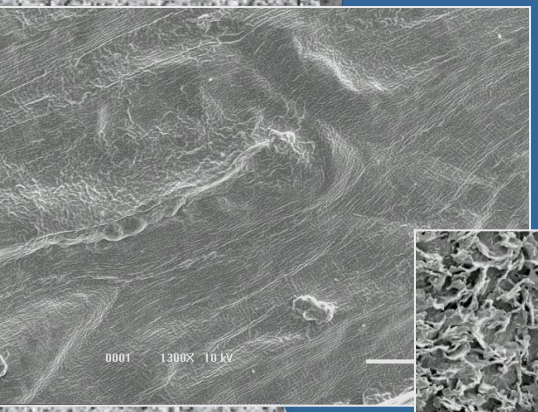
  – **Proteção**

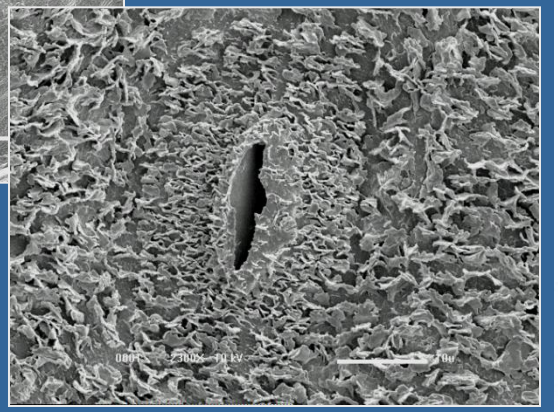
  – **Secreção**

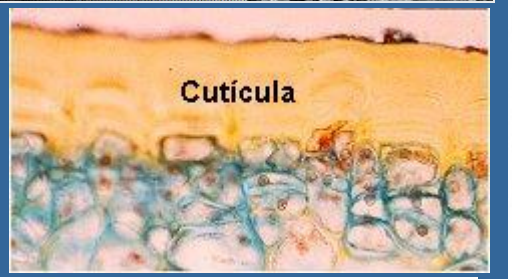


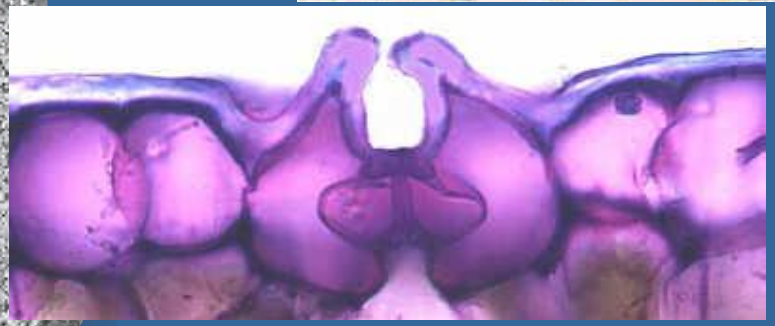


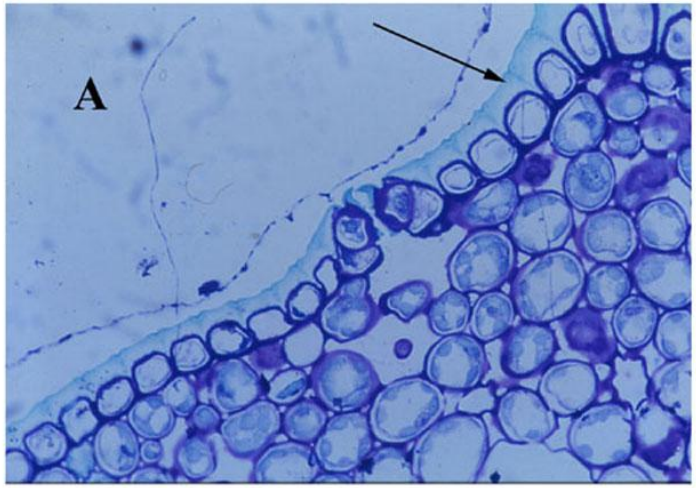
Cuticula e ceras epicuticulares

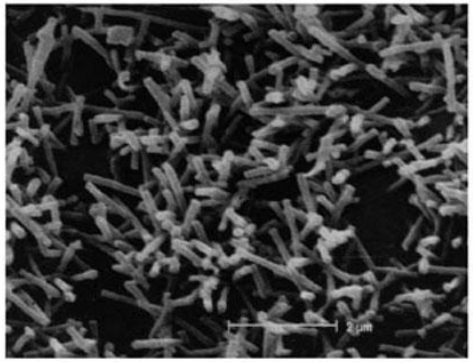


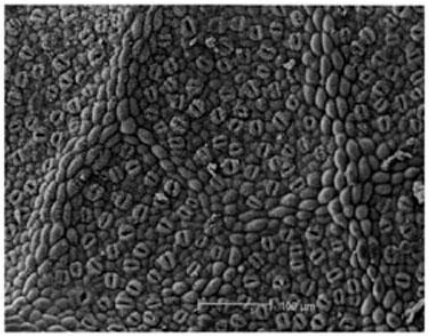












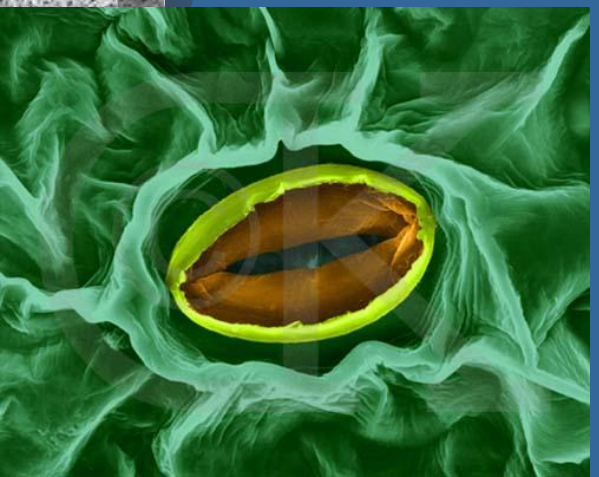
C B

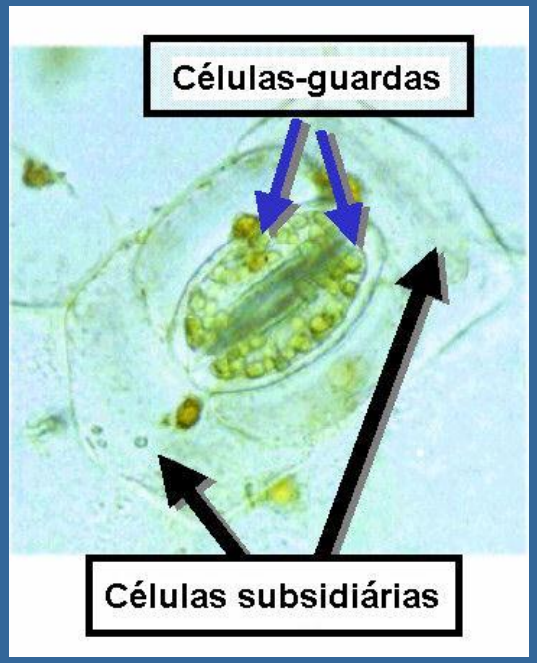
Tav.17 - Epidermide - A: sezione trasversale di fusto di Ruscus. L'epidermide è provvista di una spessa cuticola (freccia). Nell'epidermide è visibile un apparato stomatico; B: epidermide di Quercus sp. al microscopio elettronico a scansione(SEM). Riconoscibili le cellule epidermiche e le cellule di guardia dello stoma; C: cere, in forma di bastoncelli, che ricoprono l'epidermide

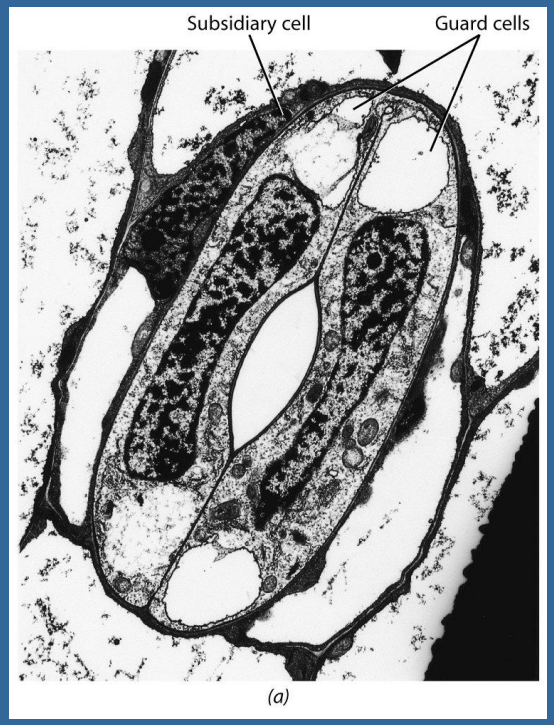
Nelumbo

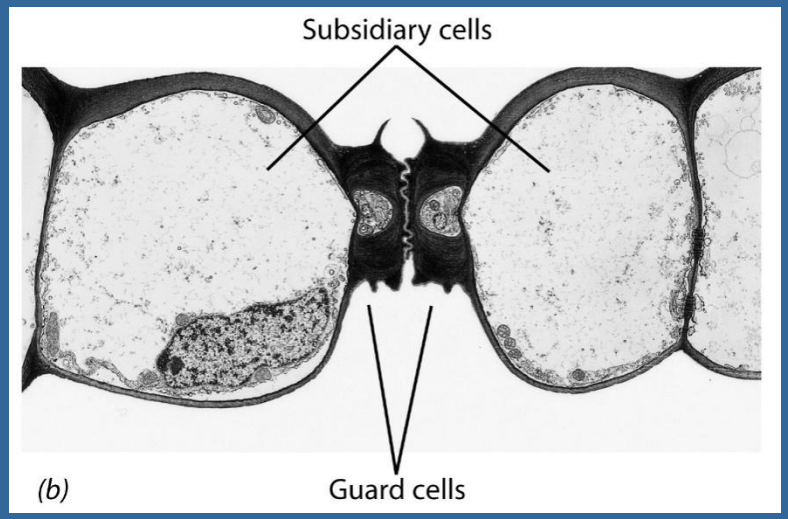
Estômato

- Folhas (outros orgaos)
- Trocas gasosas (Água – Hidatódios)
- Fenda estomática (Ostíolo)
- Células guarda
- Células subsidiarias

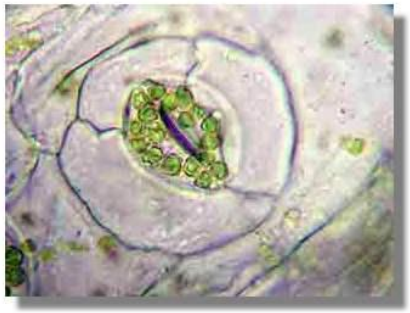


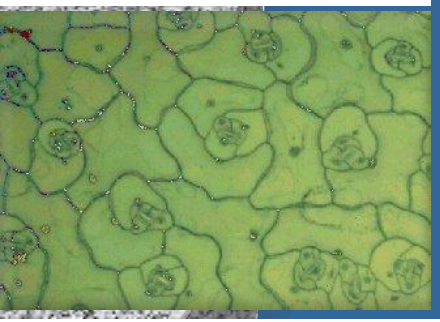




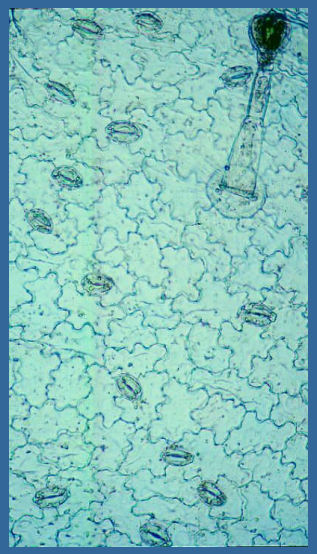


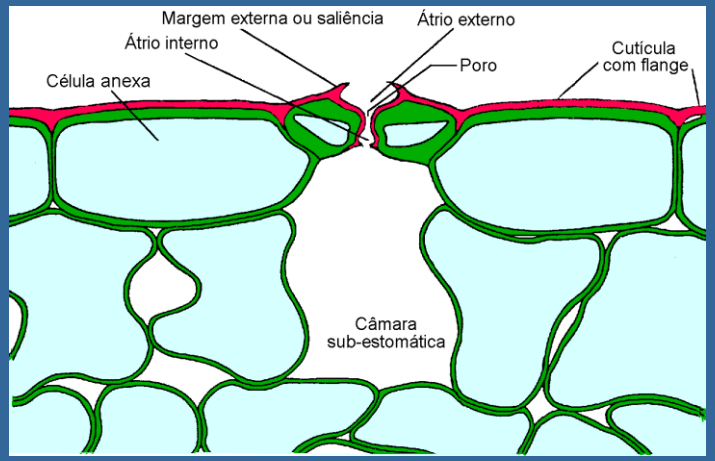
Tipos de Estômatos

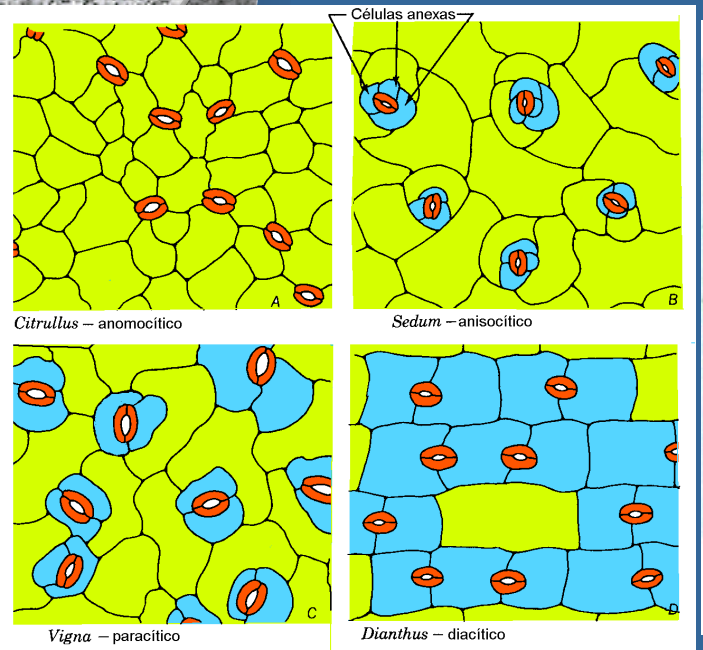




- Anomocitico
- Anisocitico
- Paracitico
- Diacitico





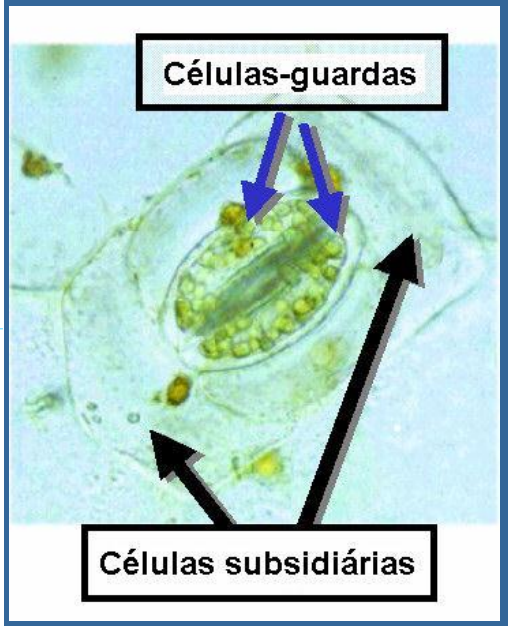


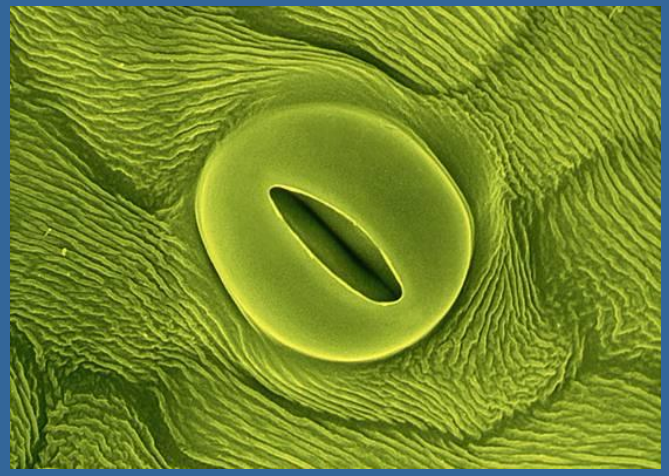
Citrullus – anomocítico

Sedum – anisocítico

Vigna – paracítico

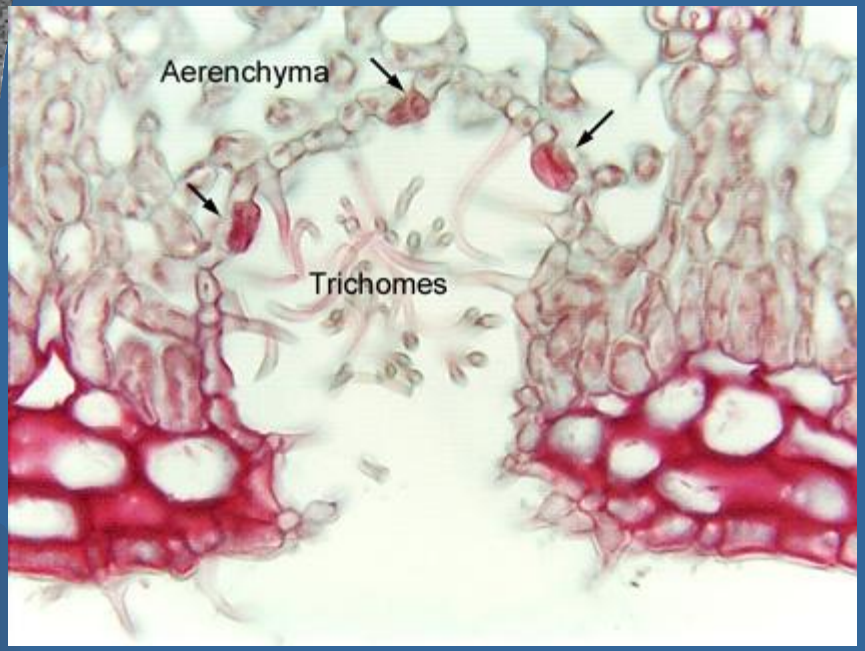
Dianthus – diacítico

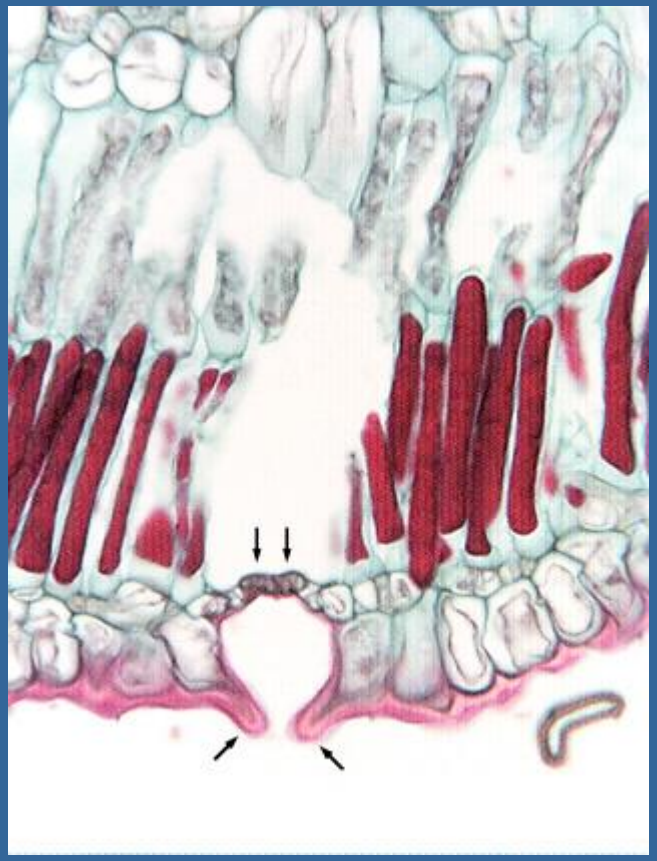




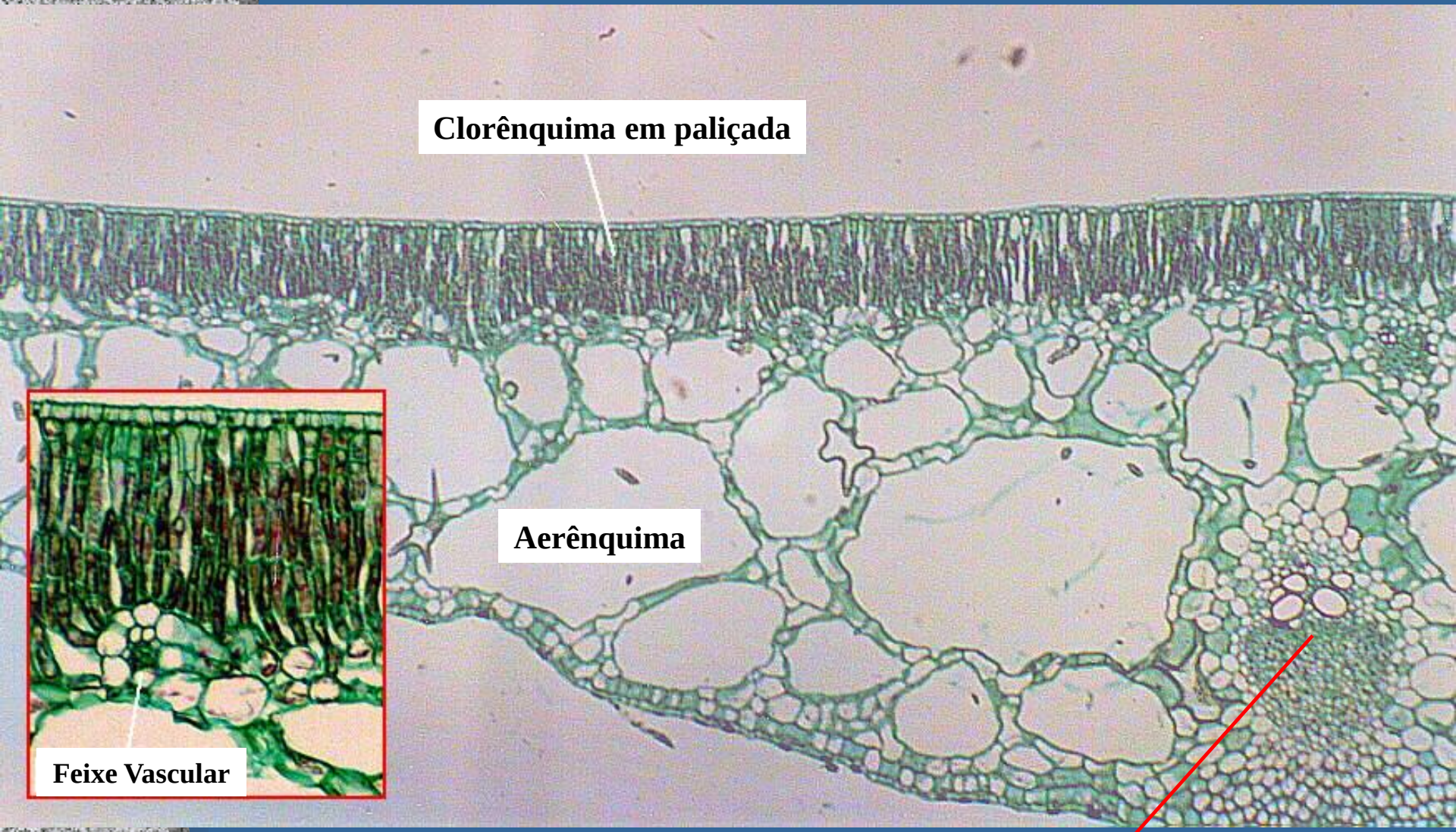
Estômatos em criptas

- Ambientes xericos
- Perda de água
- Tricomas

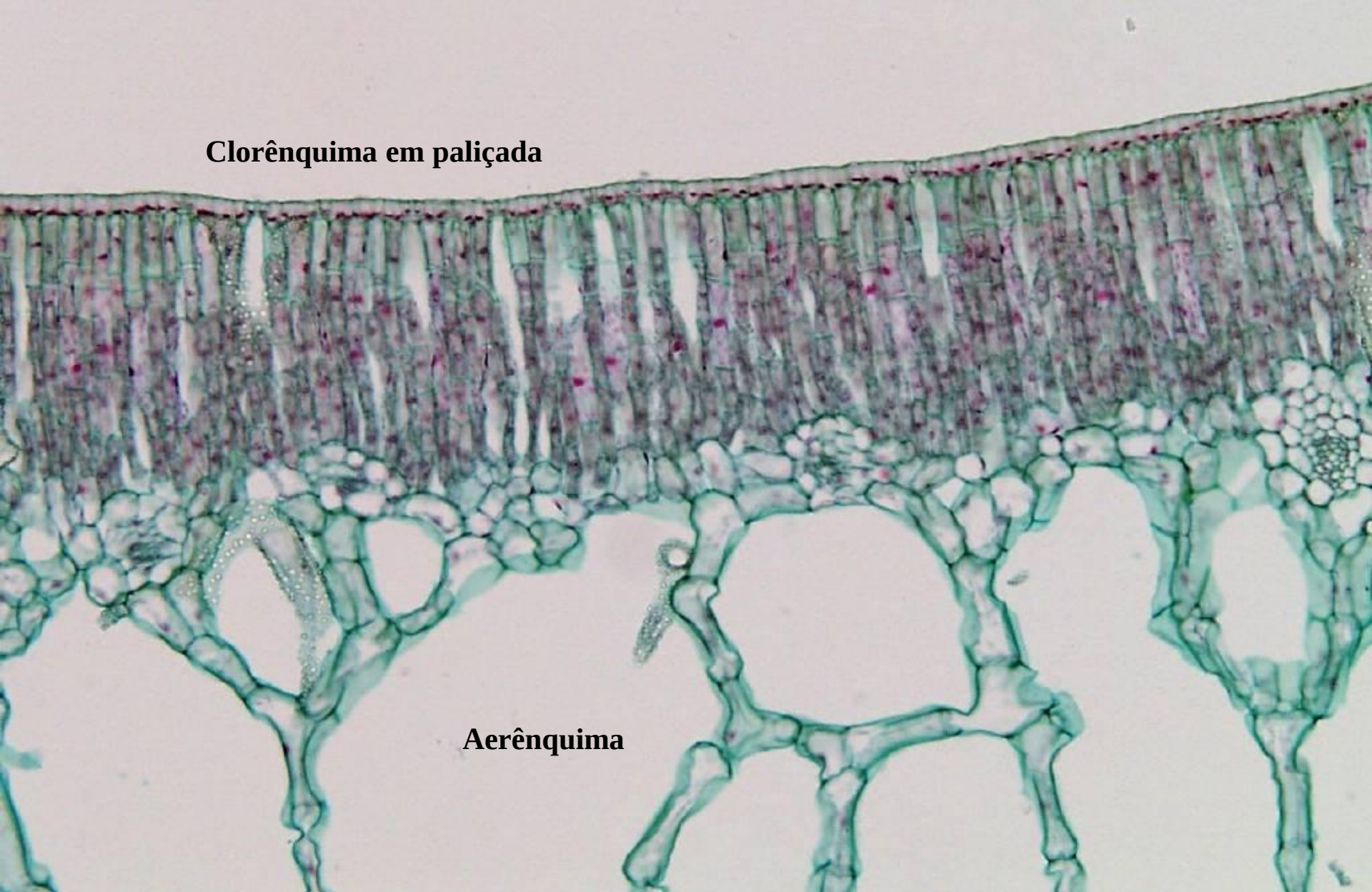




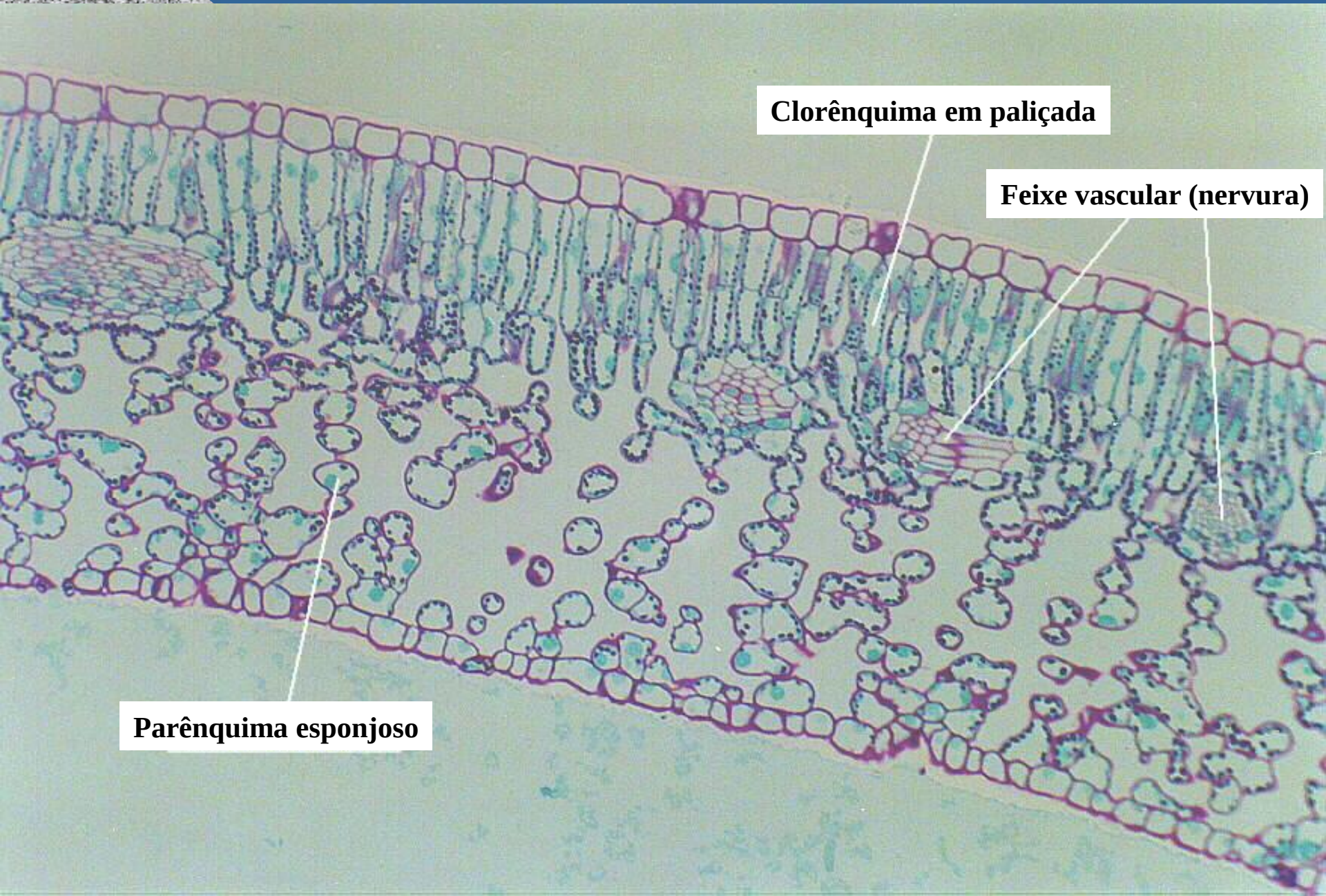
Folhas de plantas aquáticas



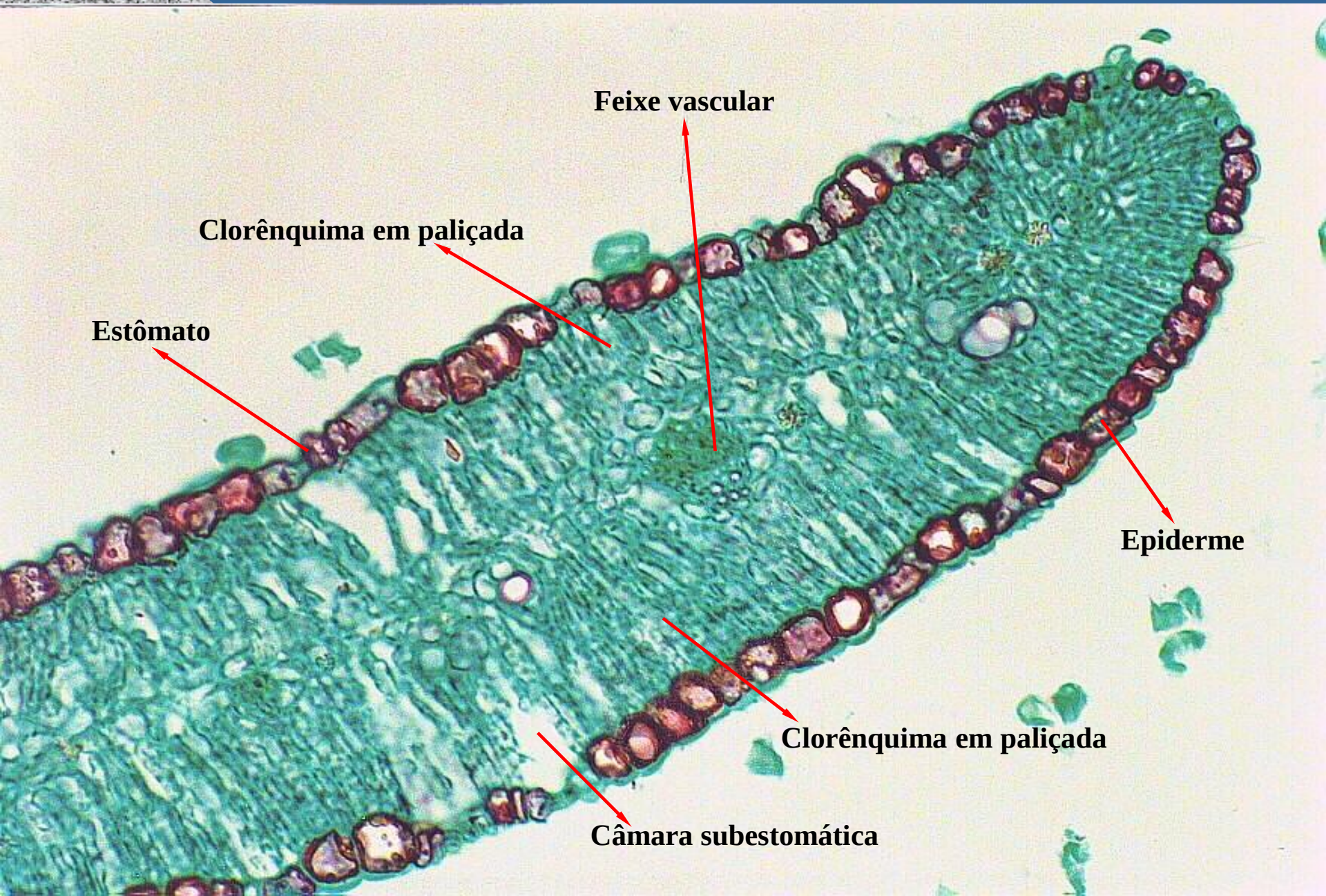
Folhas de plantas aquáticas



Folhas de plantas de mata



Folhas em ambientes xéricos



Folhas de Gimnospermas