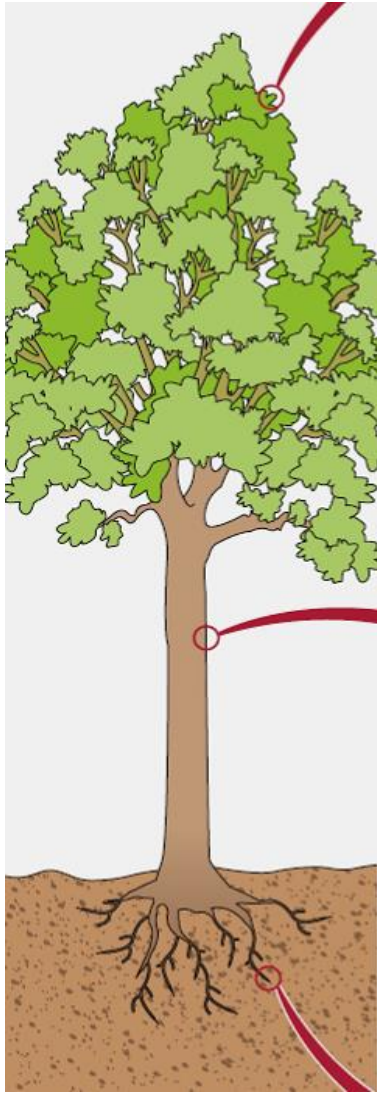




# MORFOLOGIA VEGETAL

# Folhas

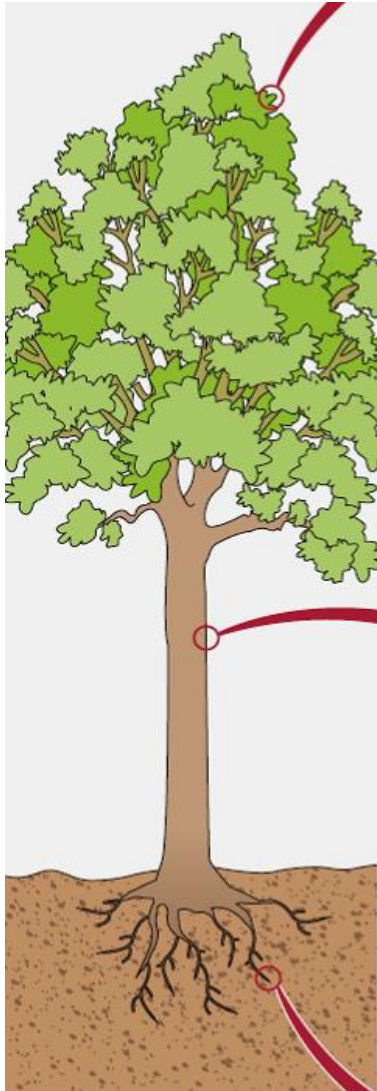


Caule

Raiz

Pteridófitas,  
Gimnospermas,  
Angiospermas

# Folhas



Caule

Raiz

Apenas Angiospermas

Flores



Frutos

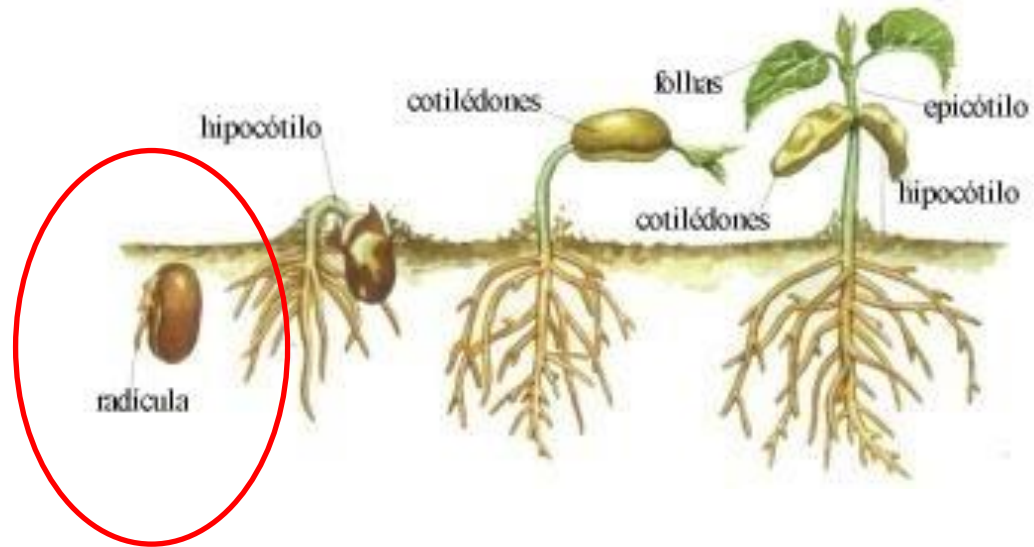
# RAIZ

- parte do eixo da planta que geralmente projeta-se abaixo do solo
- fixação do vegetal e absorção de água e nutrientes inorgânicos
- crescimento apical
- medula rara (monocotiledôneas)
- pode crescer em espessura



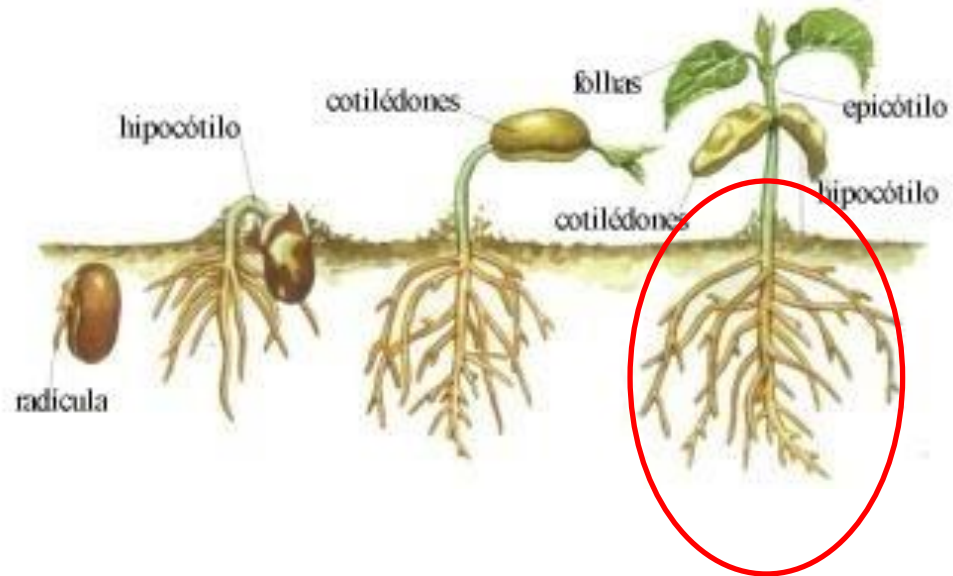
Surgimento no embrião

radícula

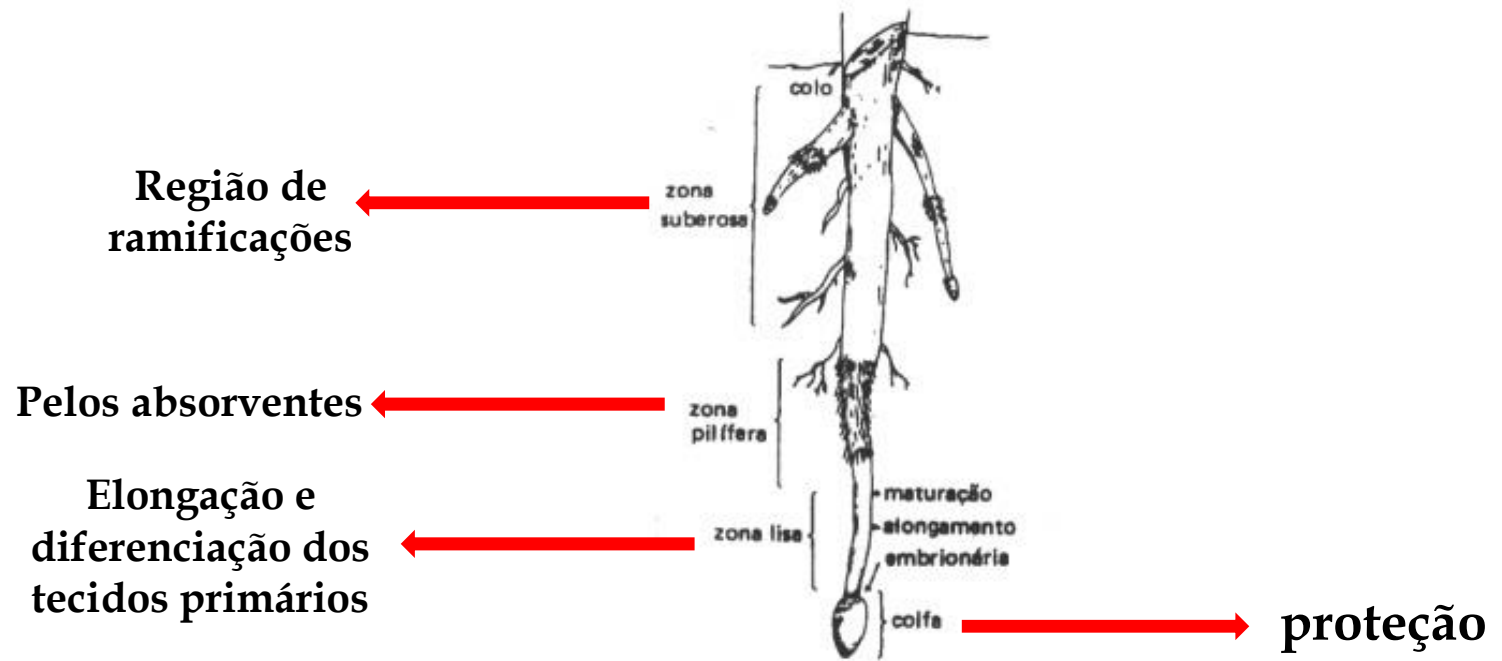


Após germinação

**raiz  
primária**



## Partes da Raiz



# Anatomia

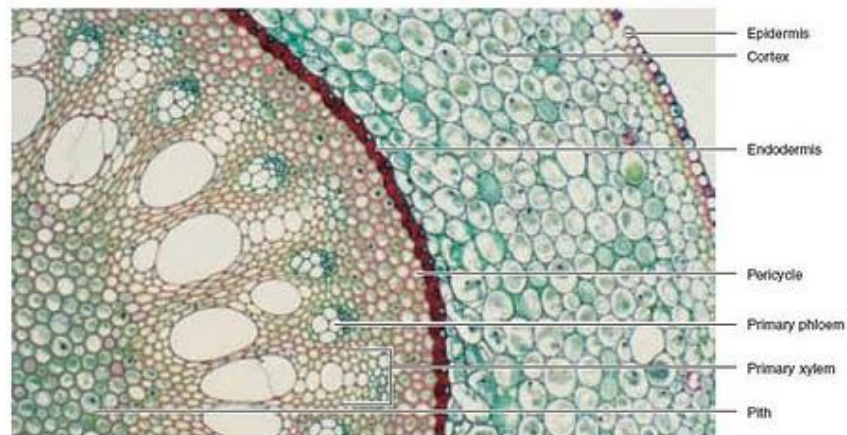
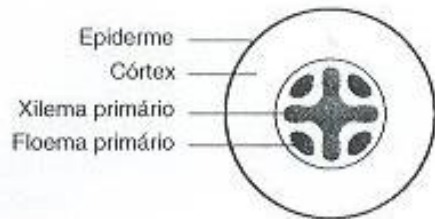
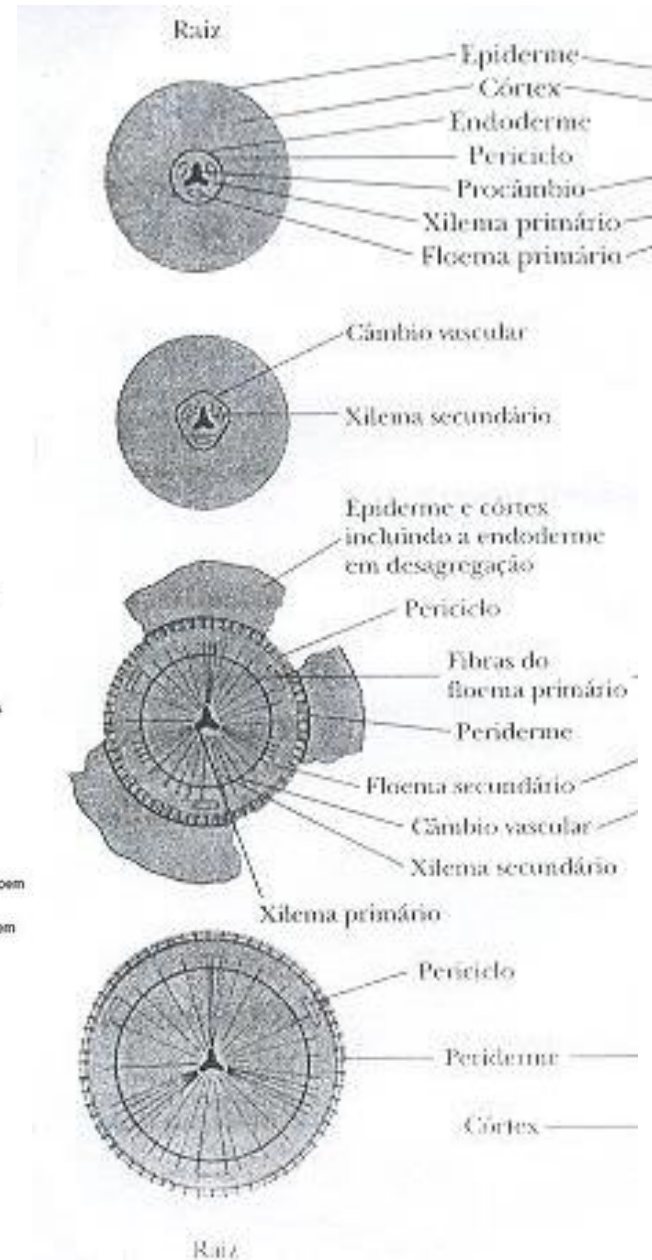


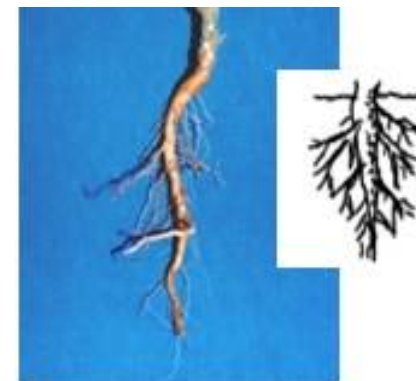
FIGURE 38.17 Cross-section of the zone of maturation of a young monocot root. Greenbrier (*Smilax*, a monocot) (100X).





## Sistemas radiculares

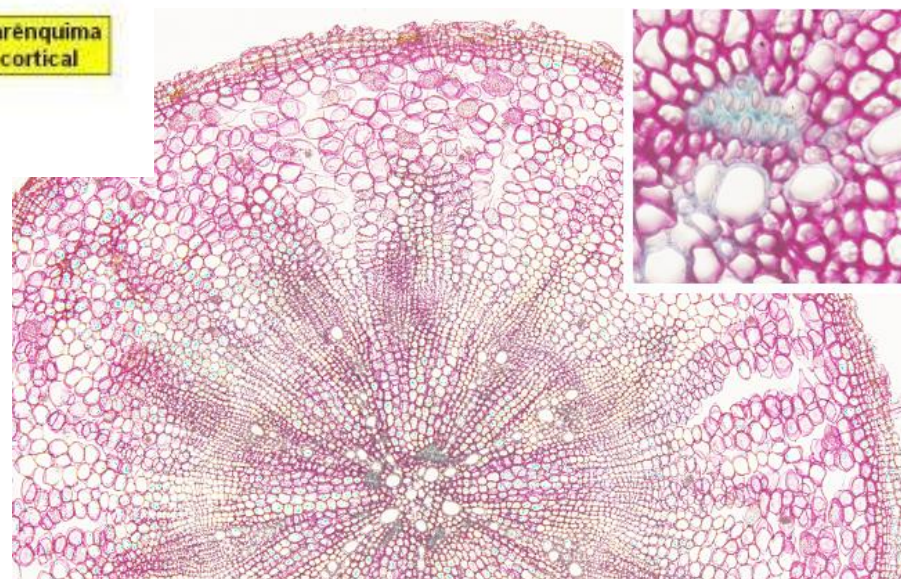
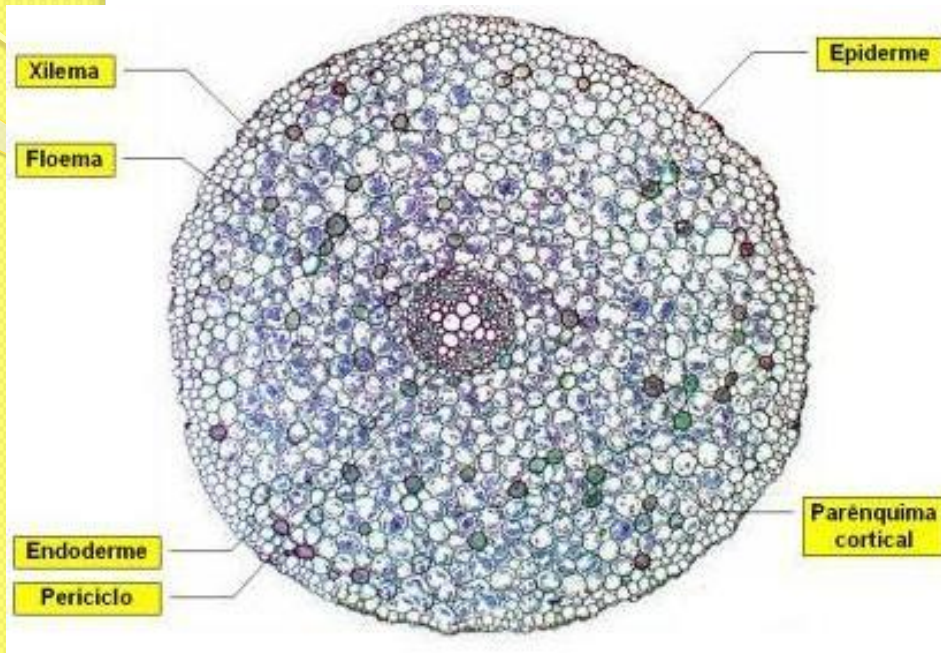
**Pivotante: raiz principal e raízes secundárias**



**“Dicotiledôneas”**

# Sistemas radiculares

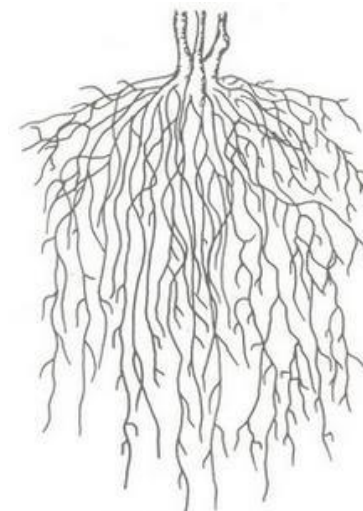
“Dicotiledôneas”



## Sistemas radiculares

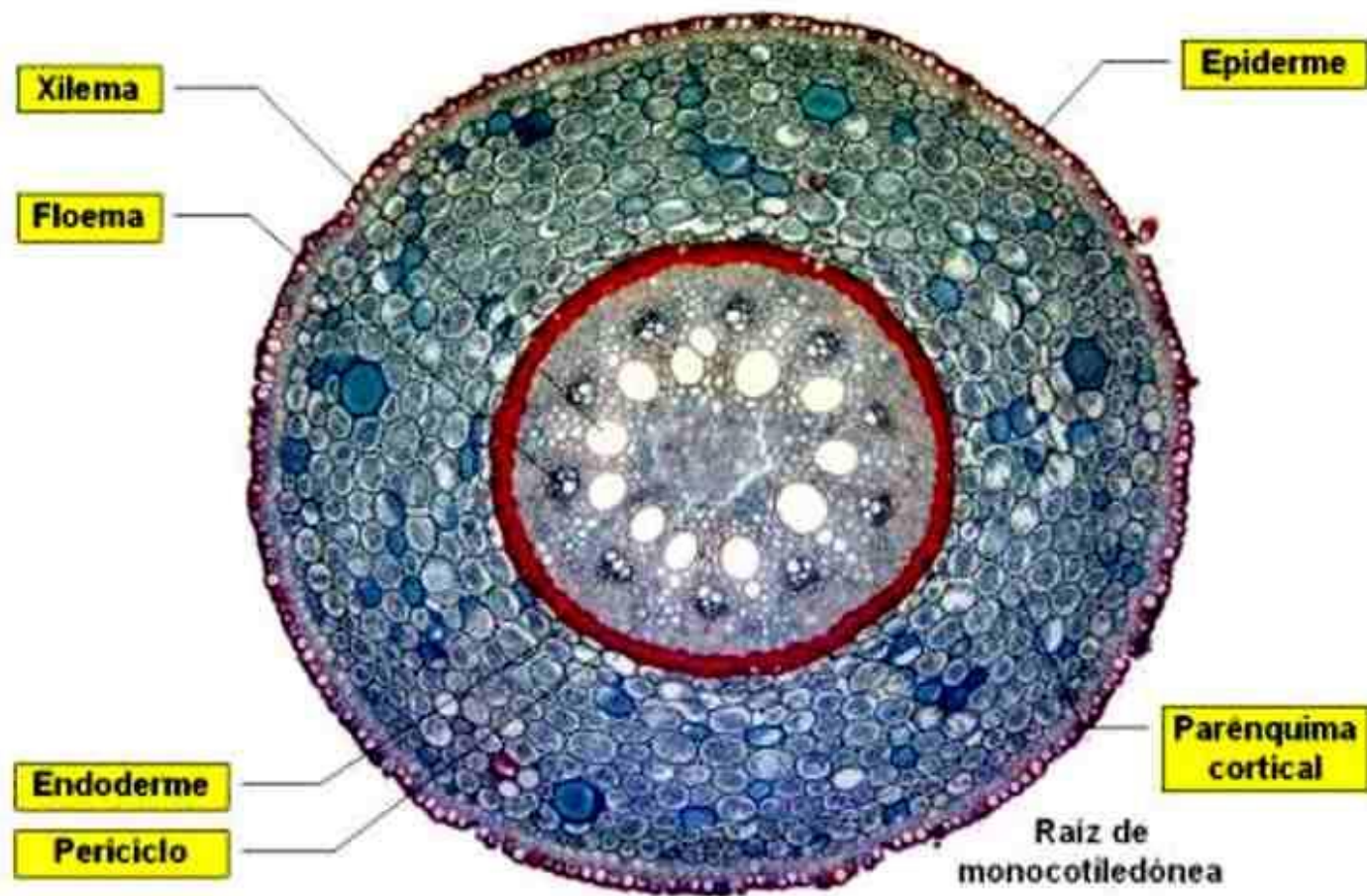
**Pivotante: raiz principal e raízes secundárias**

**Fasciculado: apenas raízes secundárias (adventícias)**



**Monocotiledôneas**

## Sistemas radiculares



## Tipos de raízes

- aéreas
- suporte/escoras
- grampiformes
- respiratórias/  
pneumatóforos

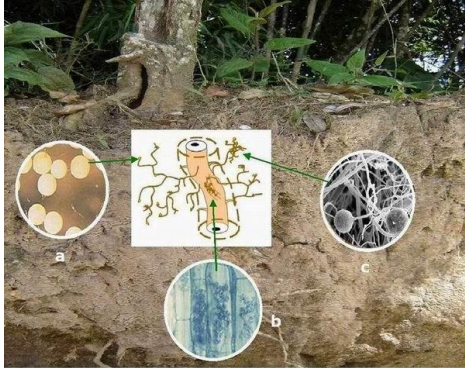


## Tipos de raízes

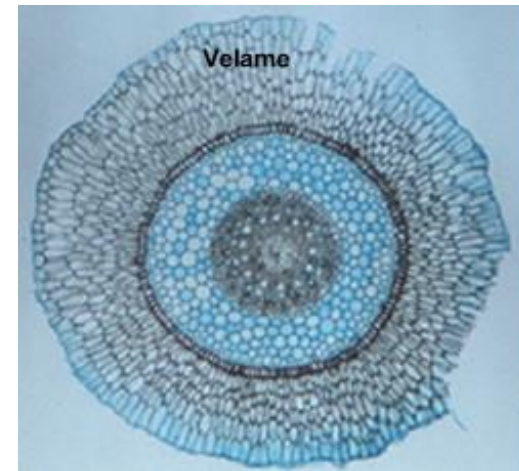
→ subterrâneas  
- tuberosas



## Tipos de raízes



- outras
- micorrizas
- nódulos radiculares
- haustórios
- velame



## Modificações radiculares

- gavinhas
- espinhos

# CAULE

- parte do eixo da planta que geralmente projeta-se acima do solo
- ligação entre raízes e folhas
- suporte mecânico
- crescimento apical (gemas apicais e axilares)
- nós/entrenós
- presença de medula
- pode crescer em espessura

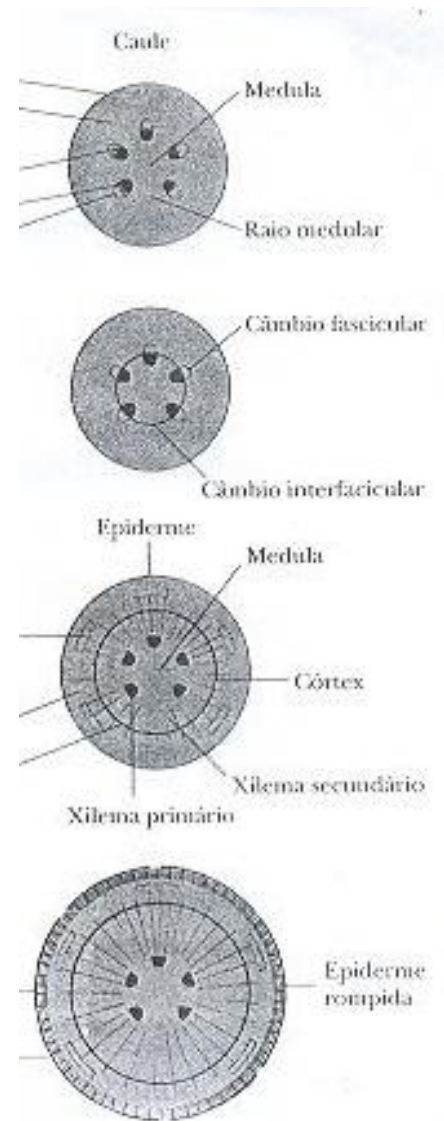
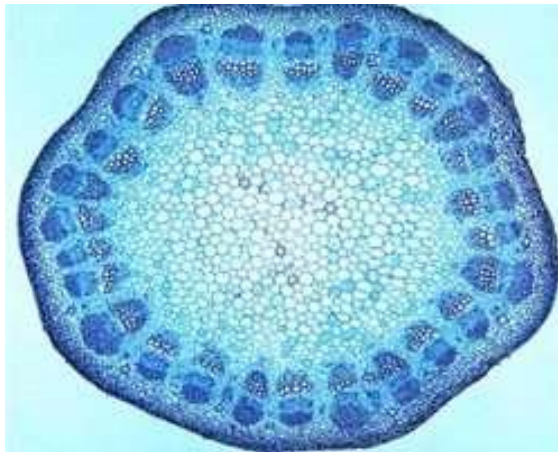
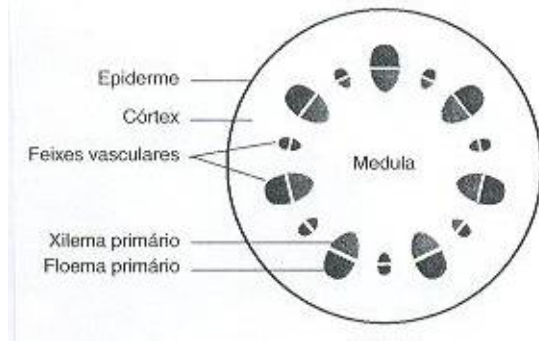




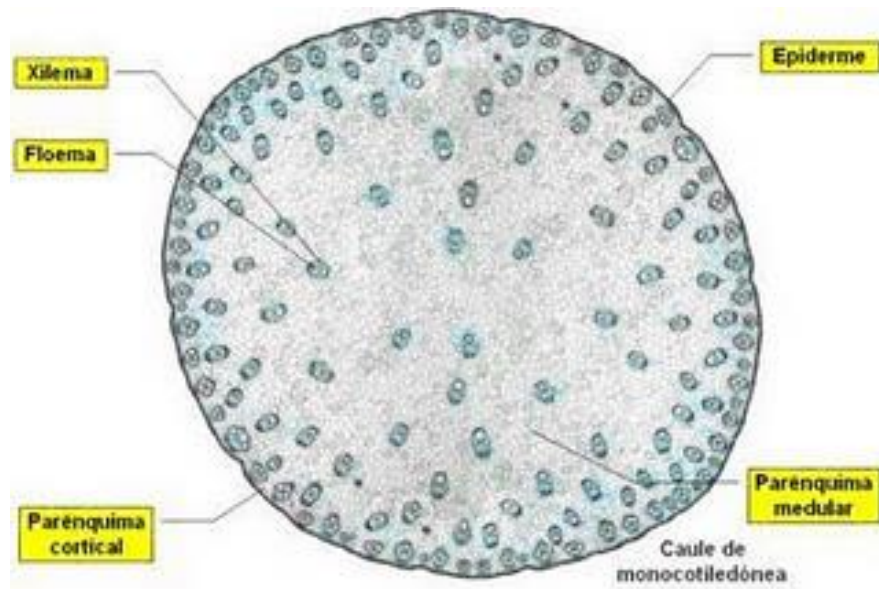
## Partes do Caule



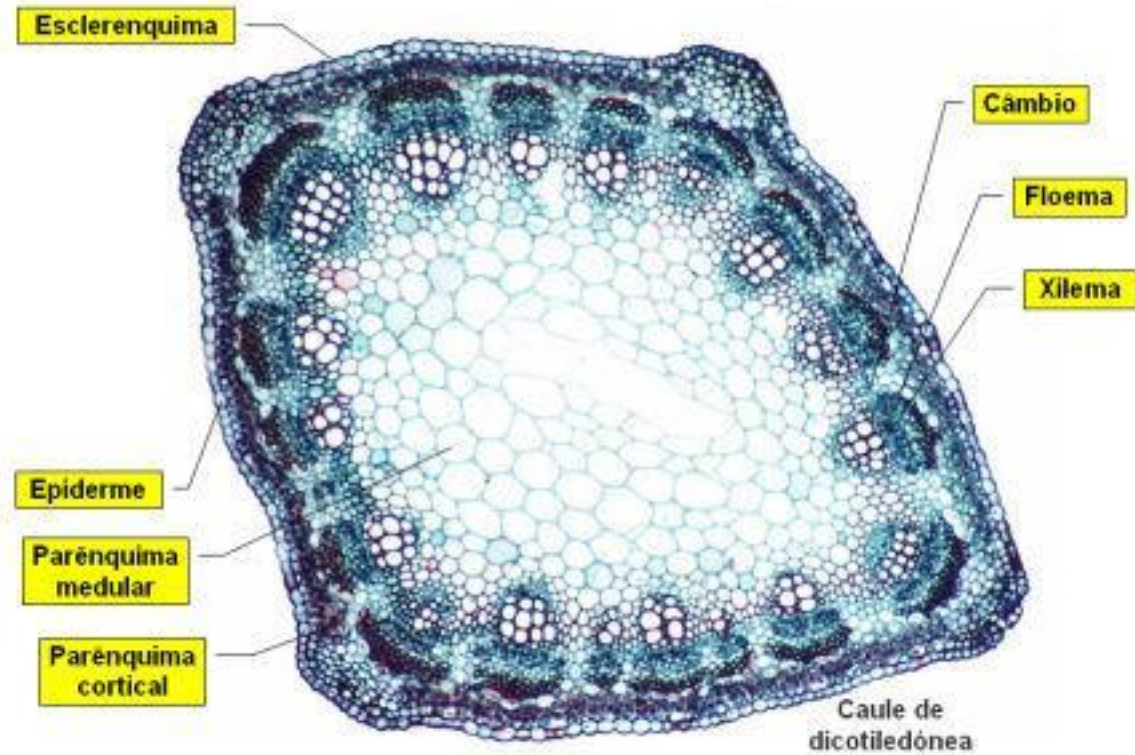
# Anatomia



# Anatomia

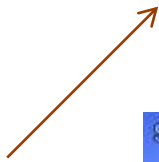


# Anatomia



# Sistemas de organização e ramificação

**Monopodial:**



## Sistemas de organização e ramificação



**Simpodial**



# Tipos de Caules

## ▪ aéreos



**haste**



**tronco**



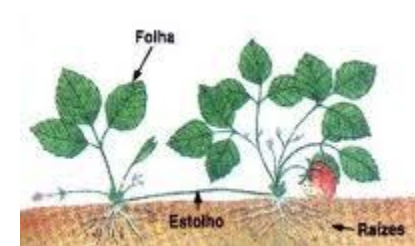
**estipe**



**colmo**



**sarmento**



**estolho**



**volúvel**



**cladódio**



**rizóforo**

## Tipos de Caules

- subterrâneos  
(armazenamento/propagação)



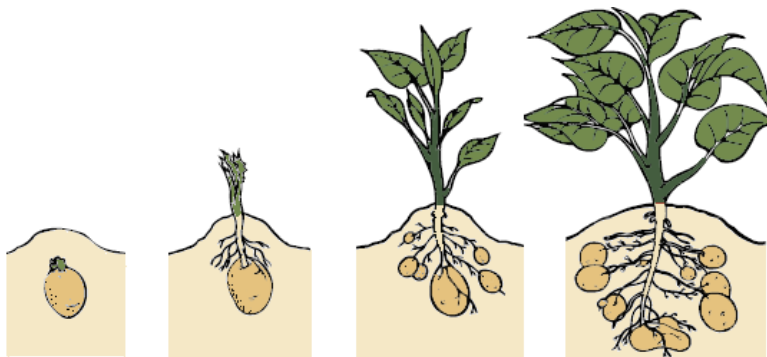
**rizoma**



**cormo**



**bulbo**



**tubérculo**



**xilopódio**



## Tipos de Caules

### ▪ modificações caulinares



**gavinha**



**espinho**

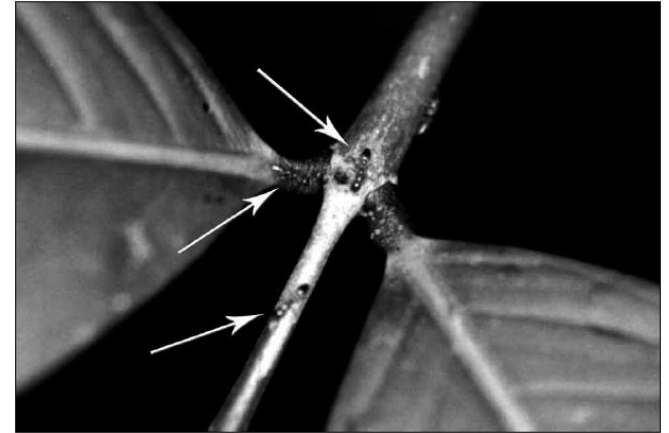


Figure 1. General view of a stem domatium of *Myrcia madida*. Arrows indicate the presence of *Myrcidris epicharis* workers on the stem and leaves. Photo: L. V. Ferreira.

**domácea**

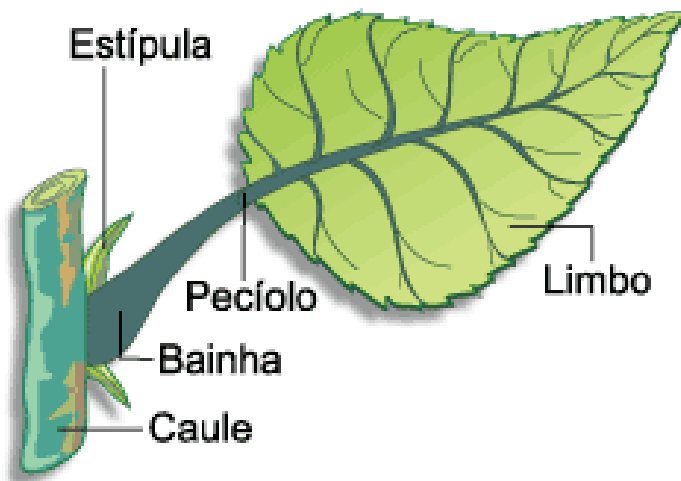
# FOLHAS

- expansões caulinares laterais
- origem na região do nó
- continuidade com o caule
- fotossíntese
- crescimento em espessura raro

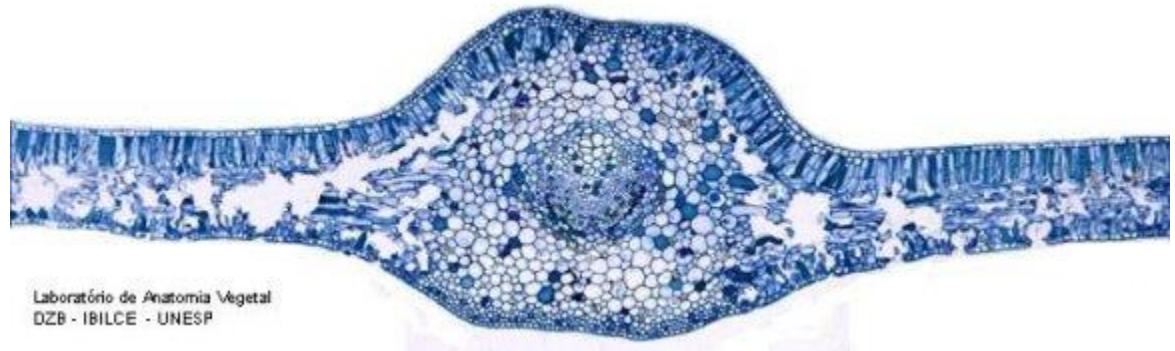
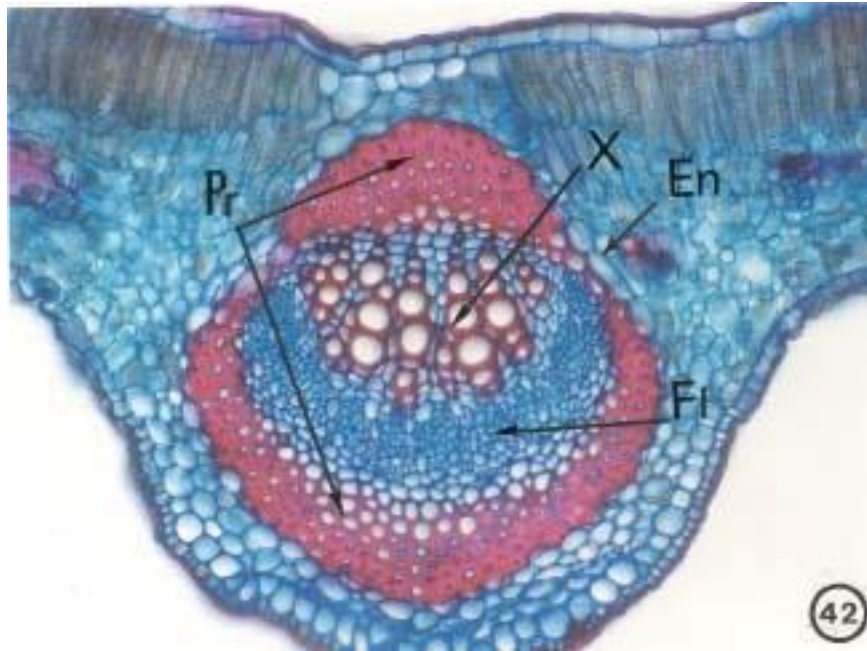


## Partes da Folha

### ❖ Morfologia



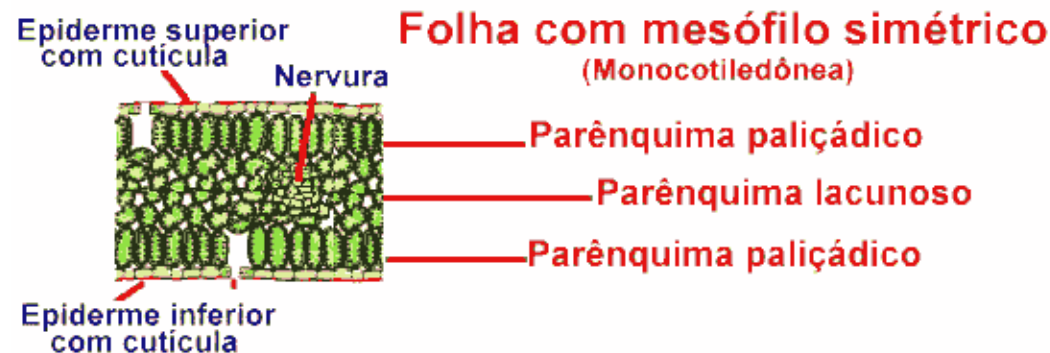
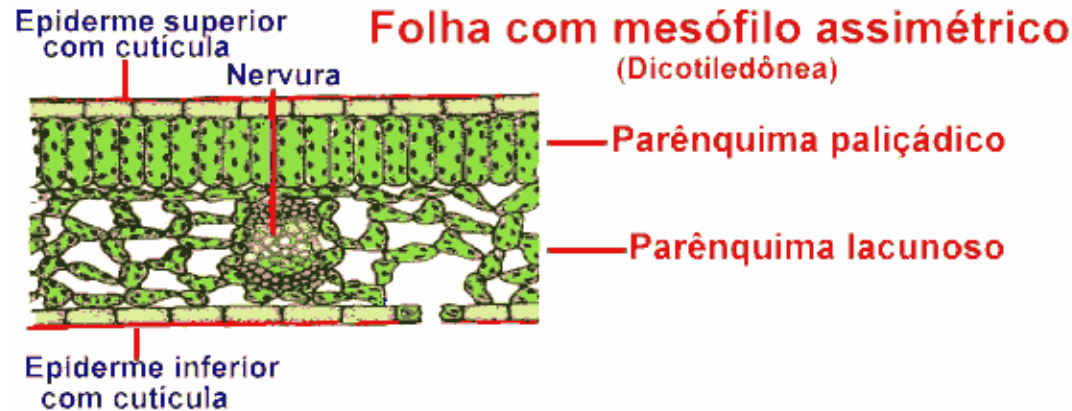
❖ Anatomia



Laboratório de Anatomia Vegetal  
DZB - IBILCE - UNESP

❖ Anatomia

## TIPOS DE MESÓFILO

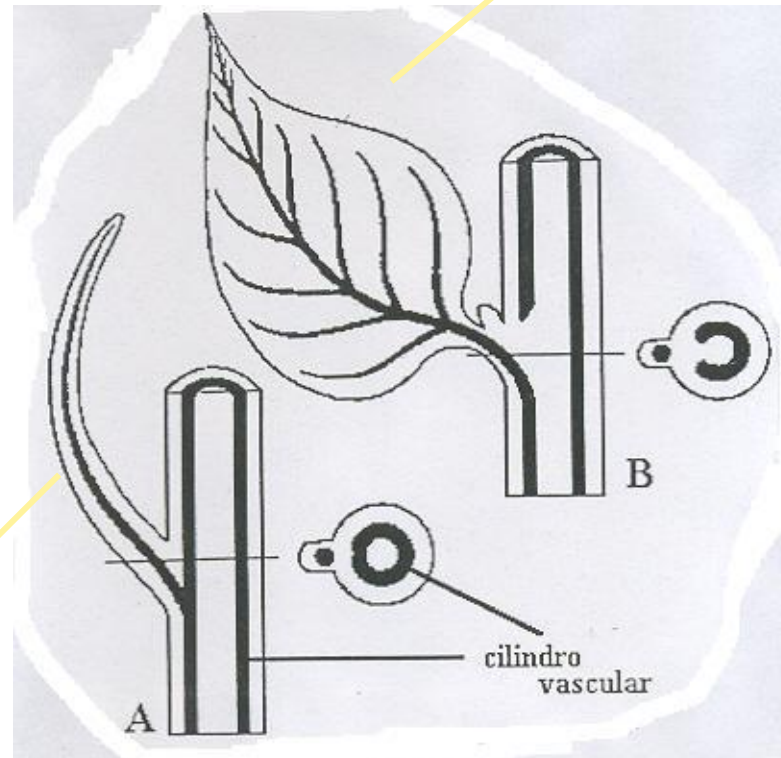


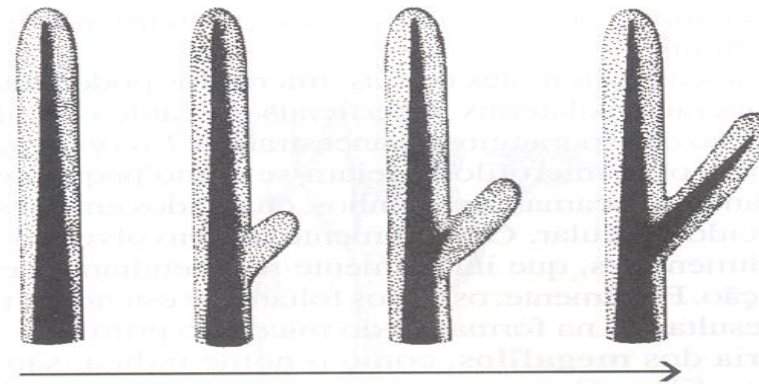
## Origem

- ramos laterais achatados

macrófila

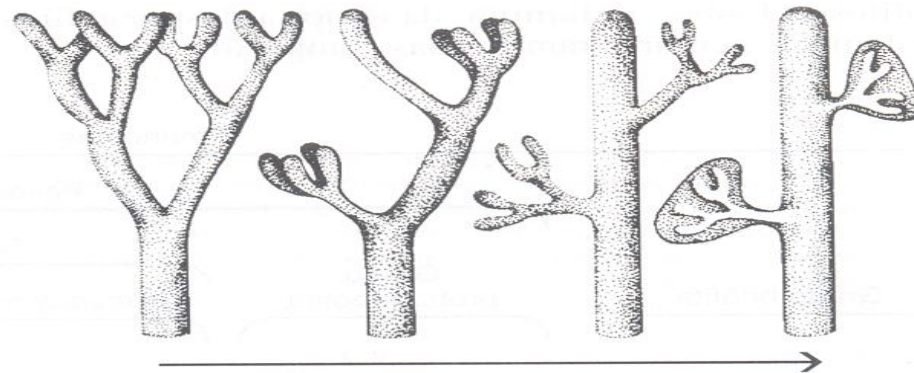
micrófila





Transformação evolutiva

(a)



Transformação evolutiva

(b)

**19.7**

*Evolução de microfilos e megafilos. (a) De acordo com uma teoria amplamente aceita, os microfilos evoluíram como projeções, chamadas enações, do eixo principal da planta. (b) Os megafilos evoluíram pela fusão de um sistema de ramos.*

## Surgimento no Embrião





## Tipos de Folhas

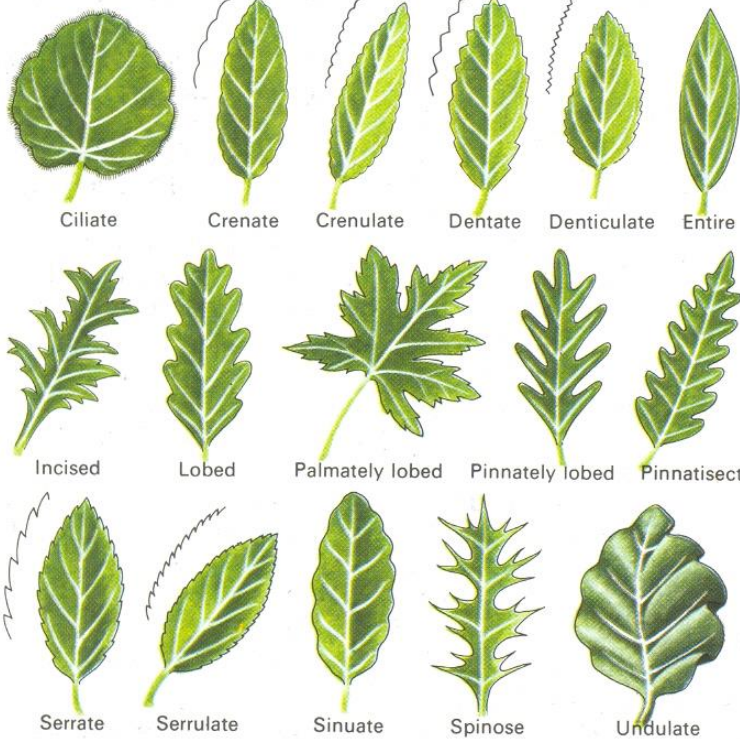


**simples**



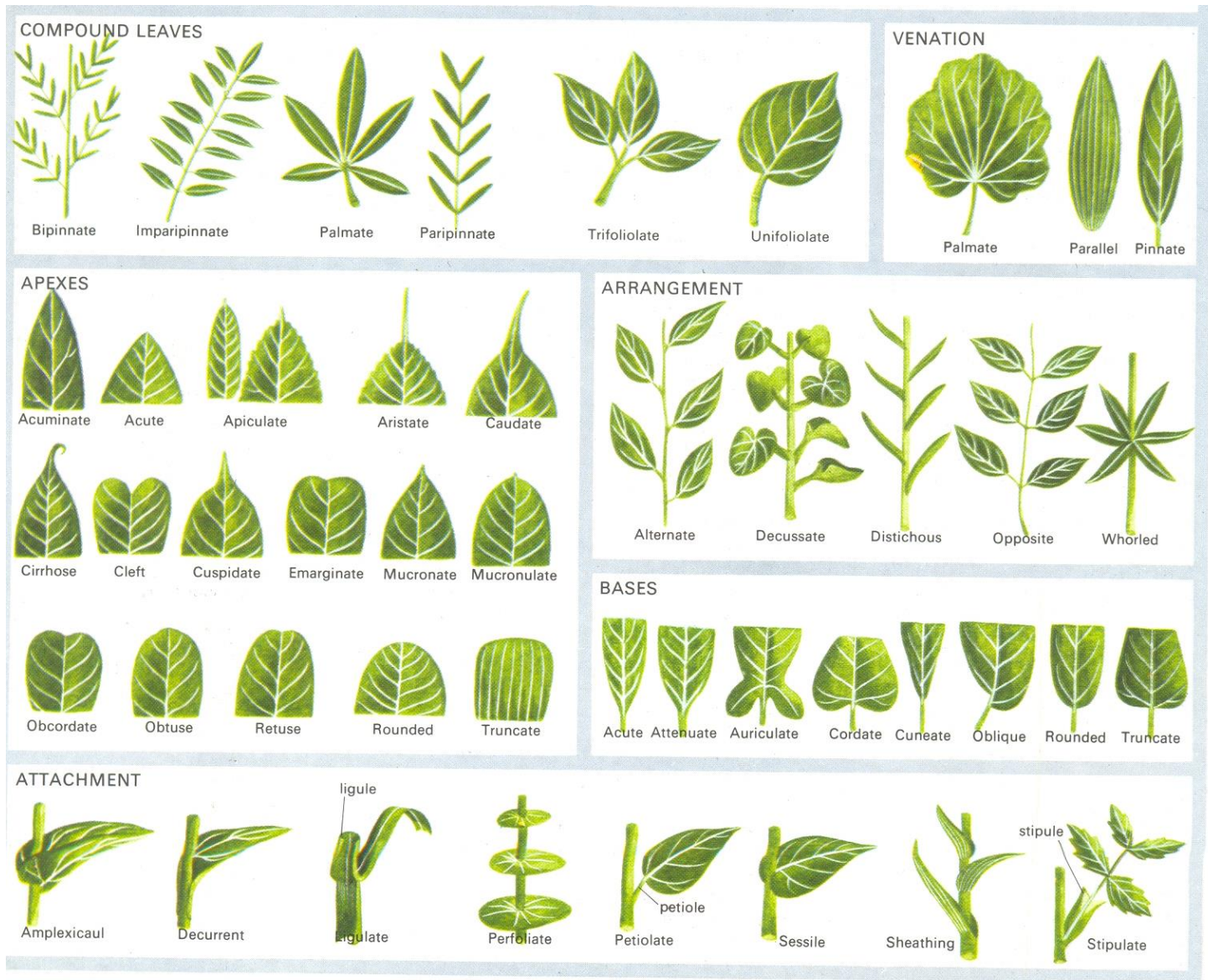
**composta**

MARGINS



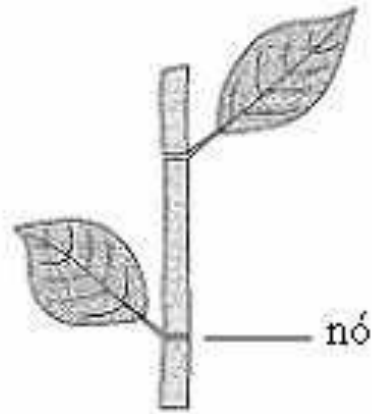
SHAPES



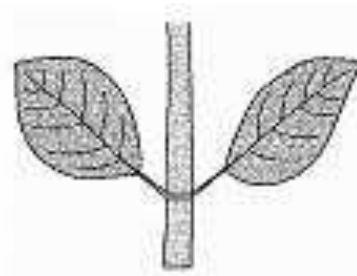


ate IX. Leaf form, arrangement and attachment (partly after Radford *et al.*, 1974).

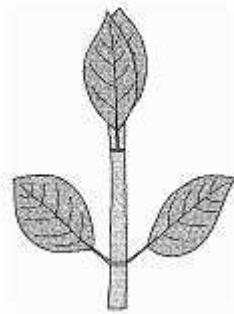
# Filotaxia



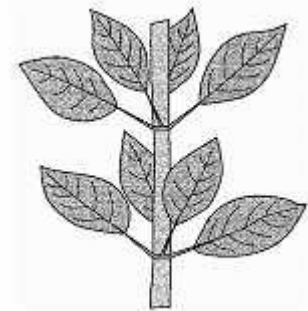
alterna



oposta



oposta-  
cruzada



verticilada

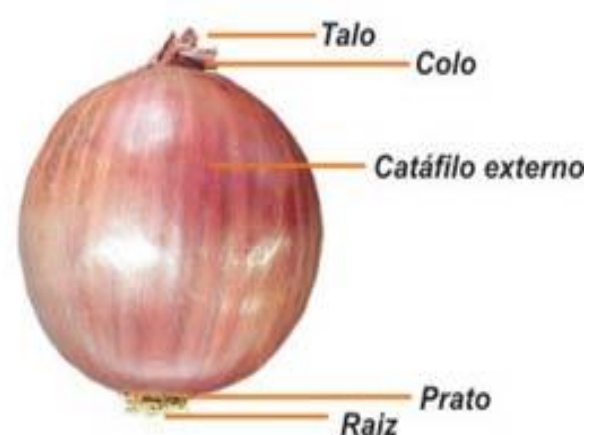
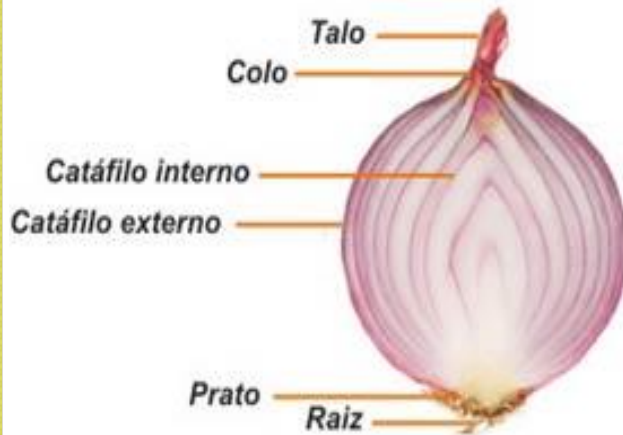
## Funções



Fotossíntese  
(folha típica)



Atração de  
polinizadores  
(brácteas/hipsofilos)



Reserva de nutrientes  
(catáfilos)



Suporte  
(gavinhas)



Redução da perda  
d'água/ proteção  
(espinhos)



Captura de  
pequenos insetos  
(insetívoras)

