



**Depto. de Biologia, FFCLRP, USP**  
**Ribeirão Preto,**

# **Flor**

**Milton Groppo**







[http://radio.weblogs.com/0105910/images/rafflesia\\_inhands.jpg](http://radio.weblogs.com/0105910/images/rafflesia_inhands.jpg)









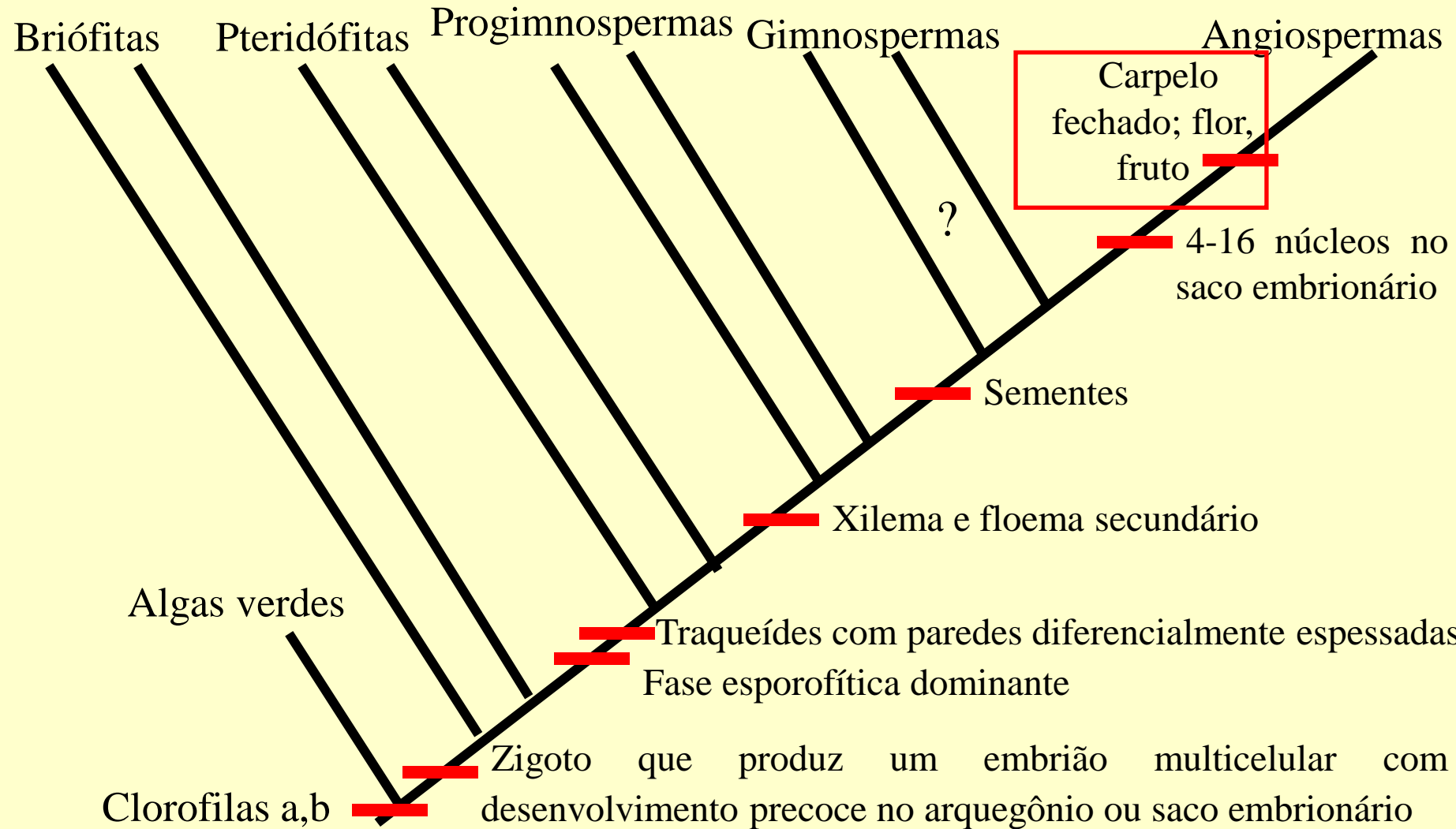


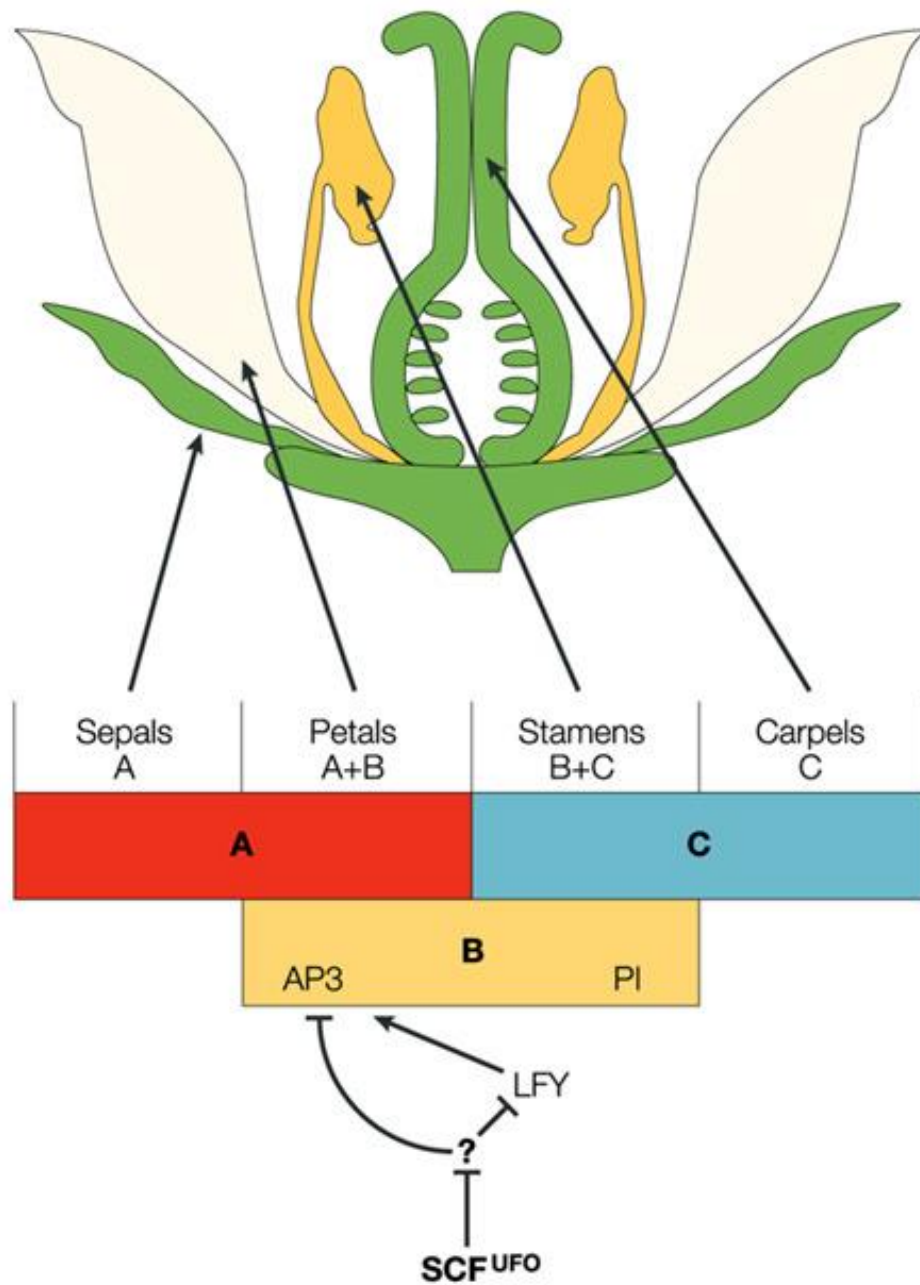


# Embriófitas

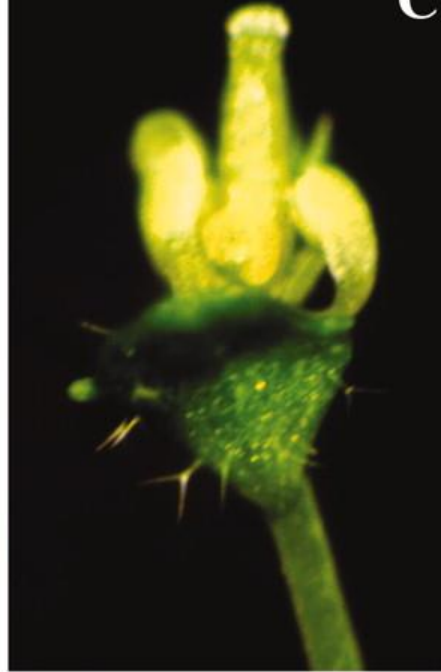
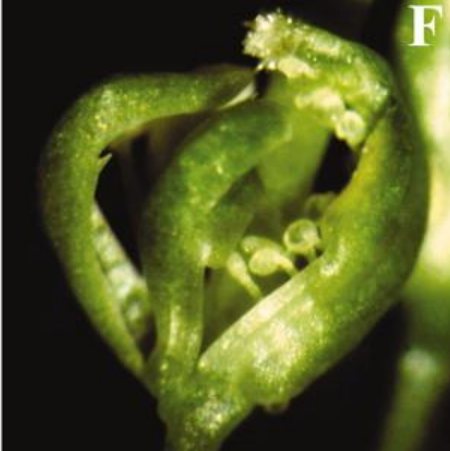
## Plantas vasculares (traqueófitas)

### Plantas com sementes (espermatófitas)

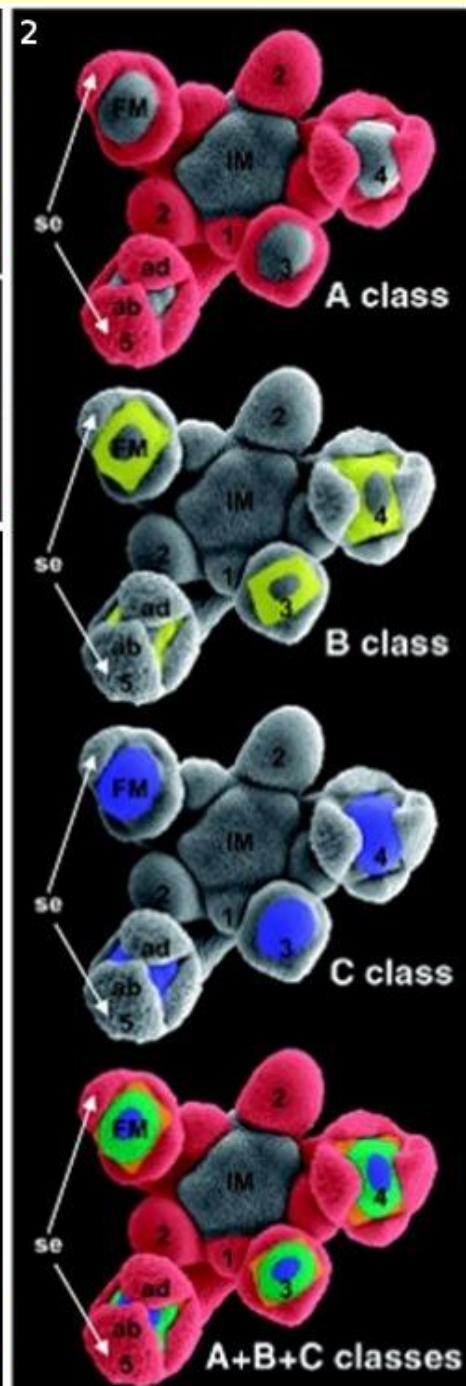
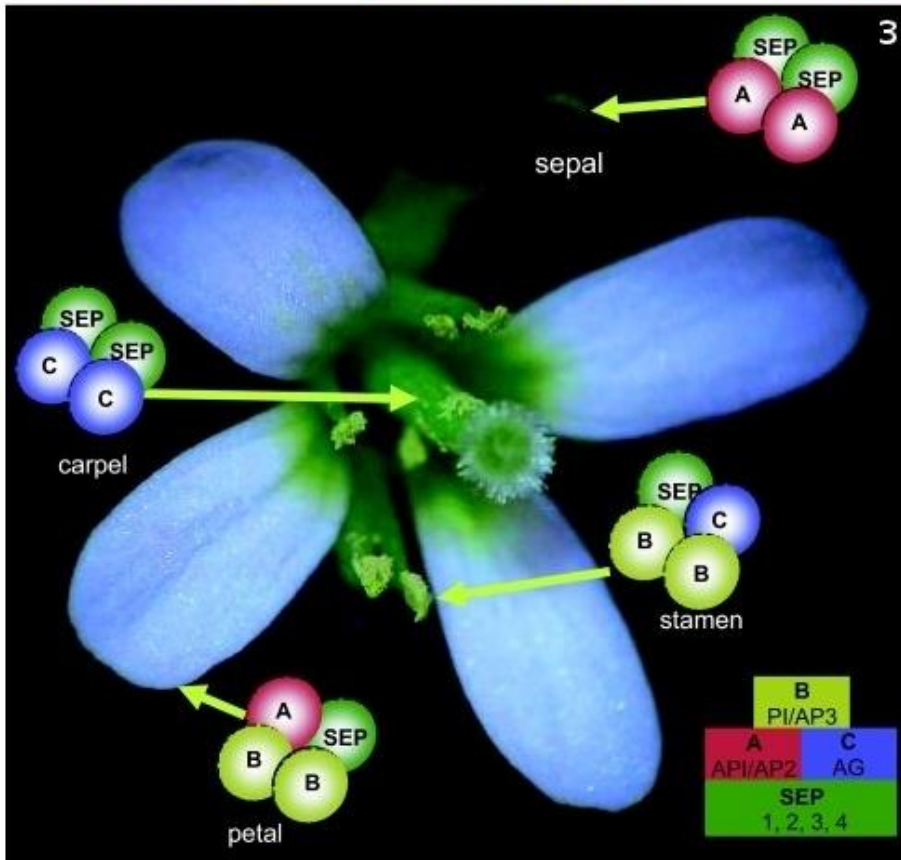
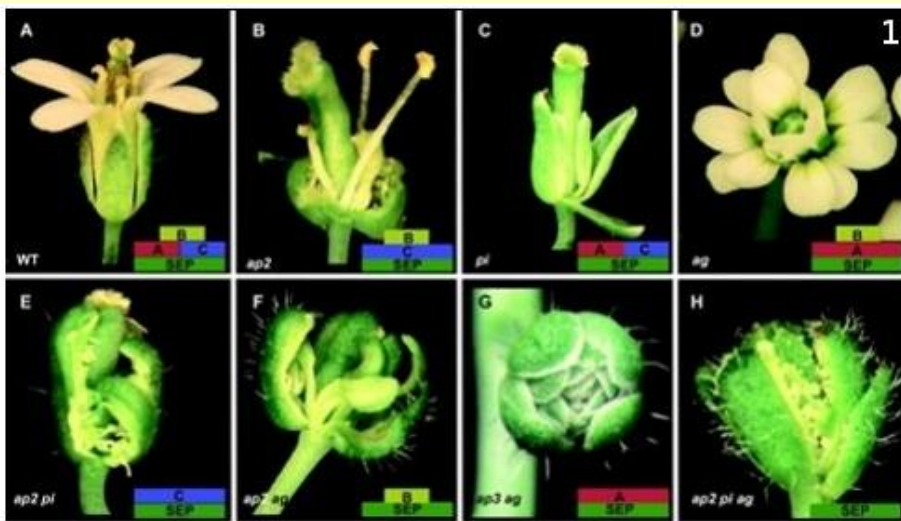


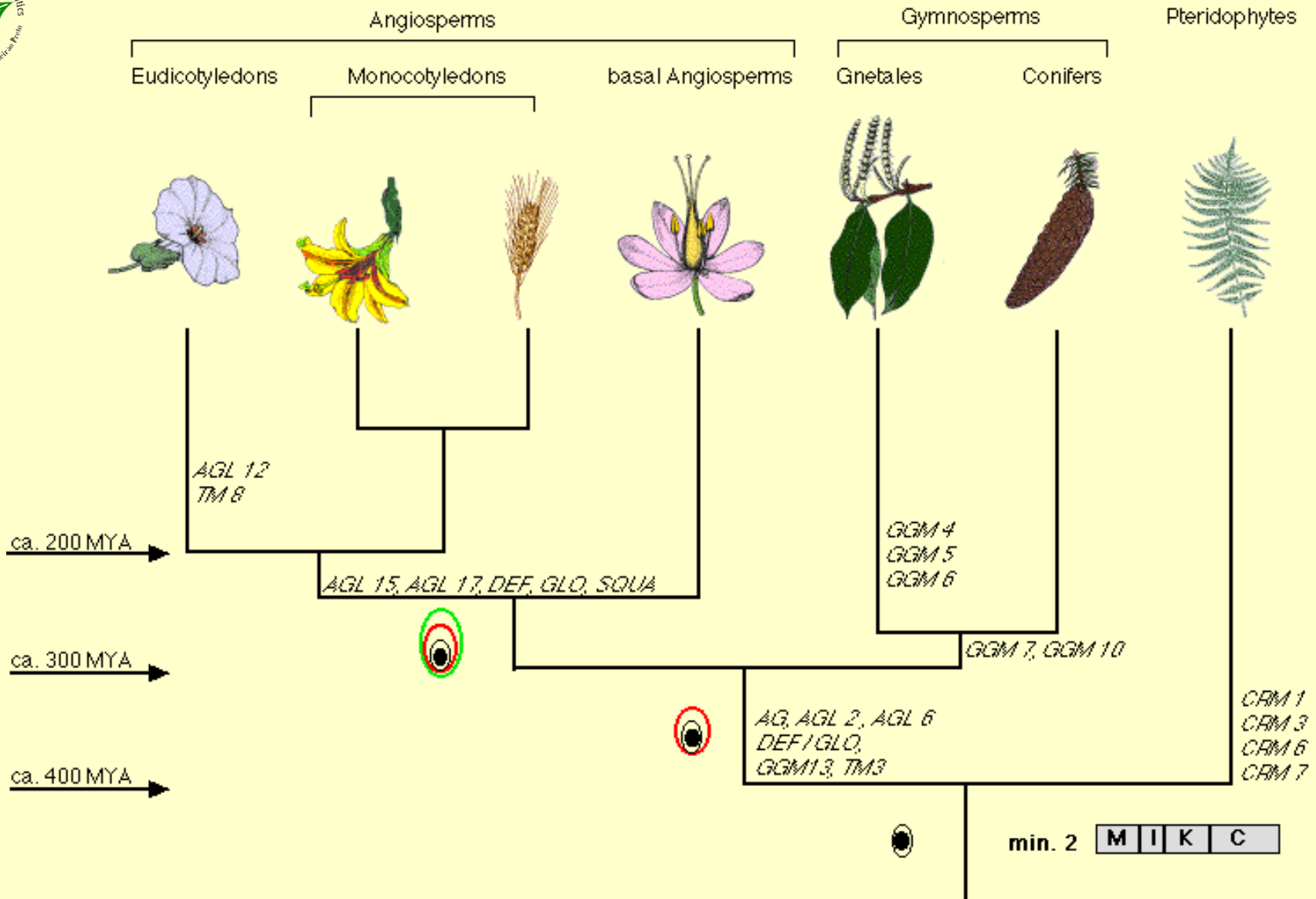


## Sistema ABC

**A****B****C****D****E****F****G****H**

Flores em *Arabidopsis*

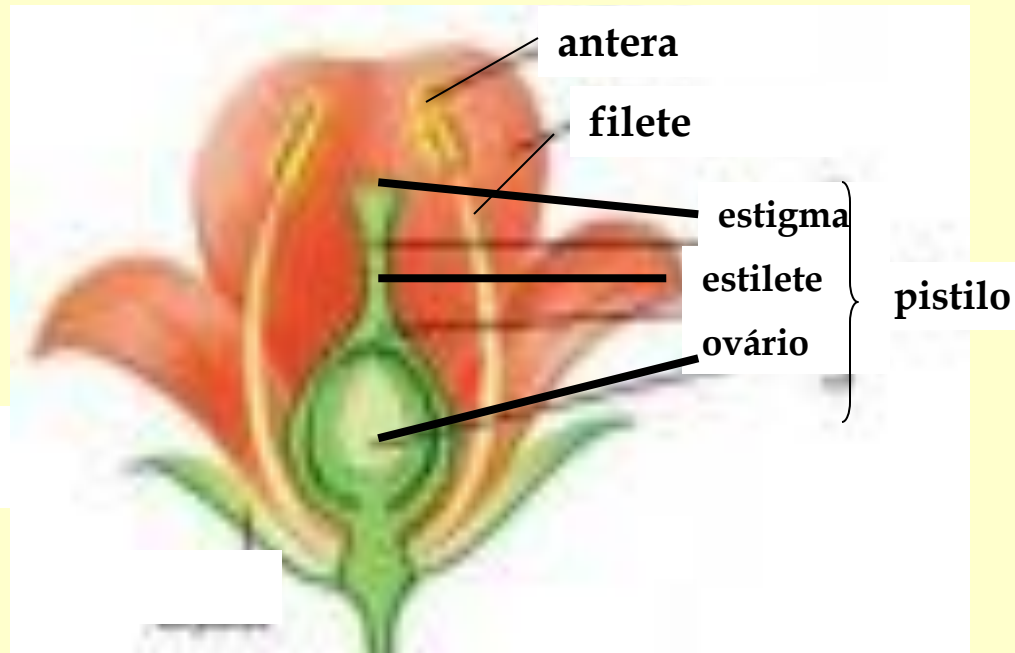
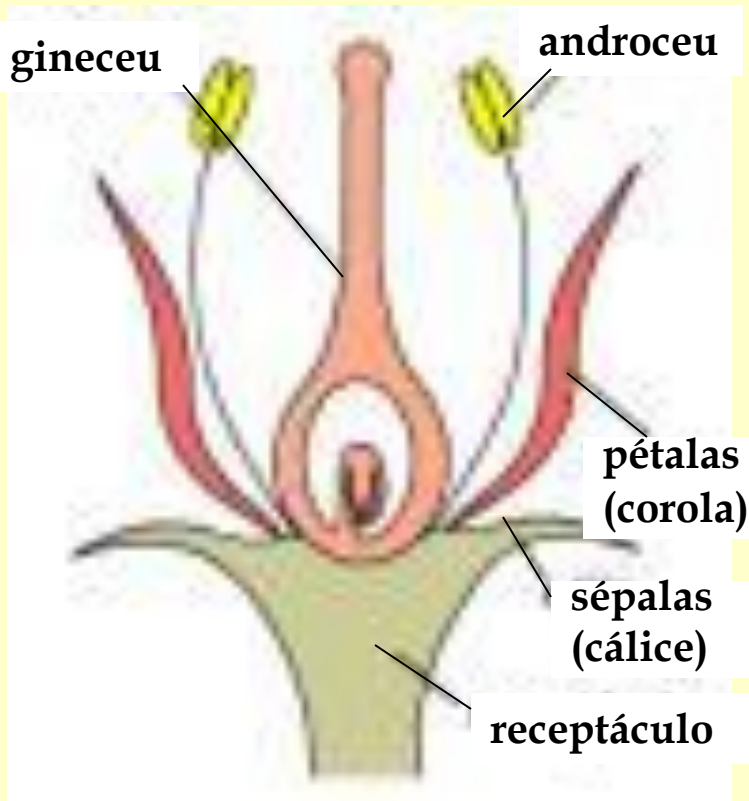




Genes Mad Box genes e filogenia

# FLOR - plano básico

- ramo de crescimento determinado com folhas modificadas
- estrutura que reúne os caracteres reprodutivos das angiospermas



- **quanto ao perianto:**

- aclamídeas

- monoclamídeas

- diclamídeas

- . heteroclamídeas

- . homoclamídeas

- dialissépala

- gamossépala

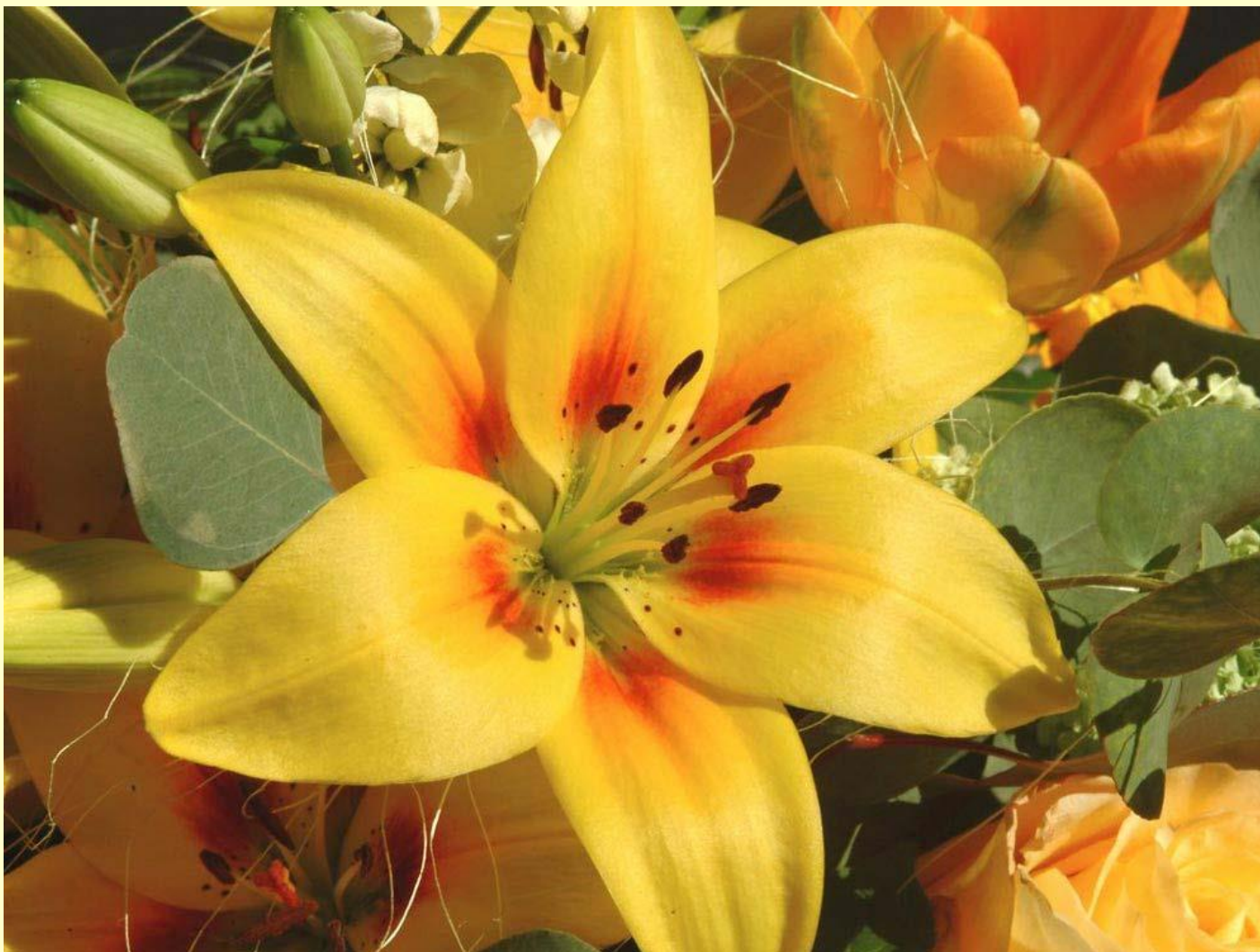
- dialipétala

- gamopétala

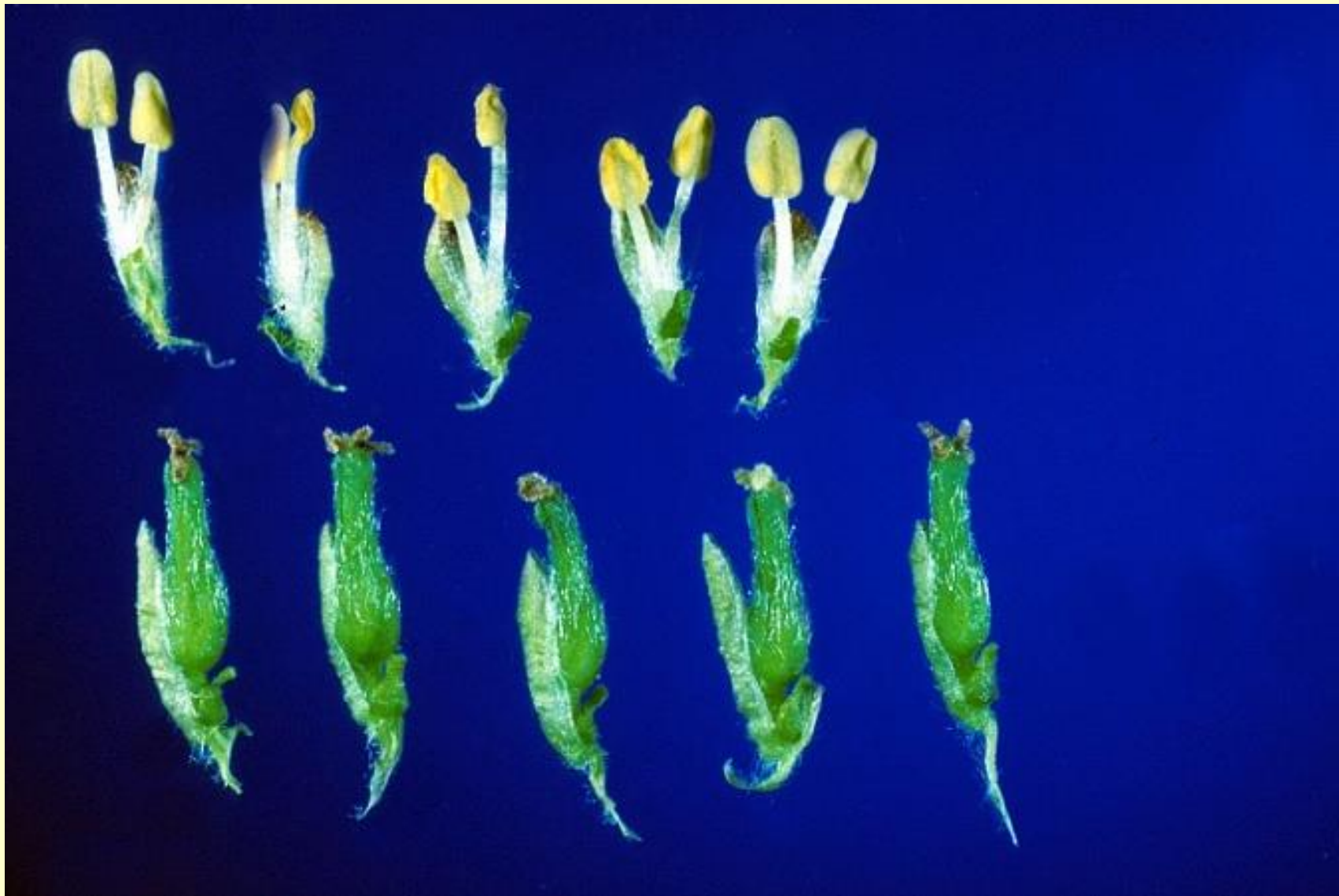




flor diclamídea – heteroclamídeas (com cálice e corola, diferentes entre si)



flor diclamídea – homoclamídea (com  
cálise e corola, semelhantes entre si)



flores acamídeas (sem perianto)



- *Fuchsia* sp. – flor monoclamídea



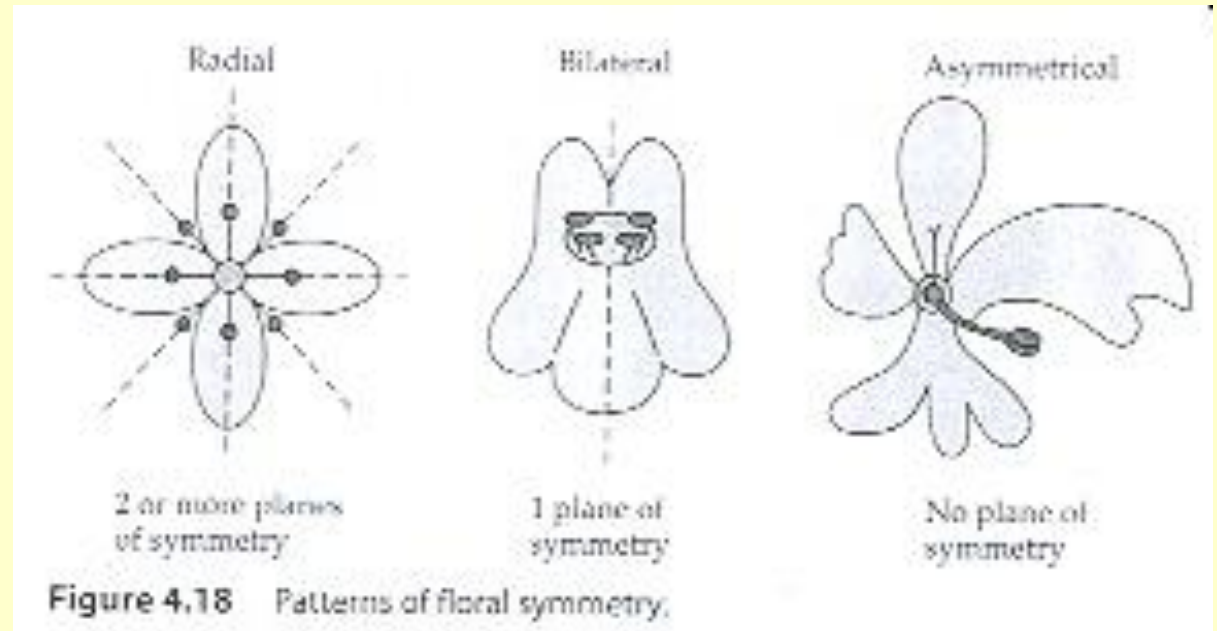
*Corola dialipétala*



Corola gamopétala

- quanto à simetria

- radial (actinomorfa)
- bilateral (zigomorfa)
- assimétrica



- quanto à sexualidade

- unissexuada, ou diclinas (“imperfeitas”)

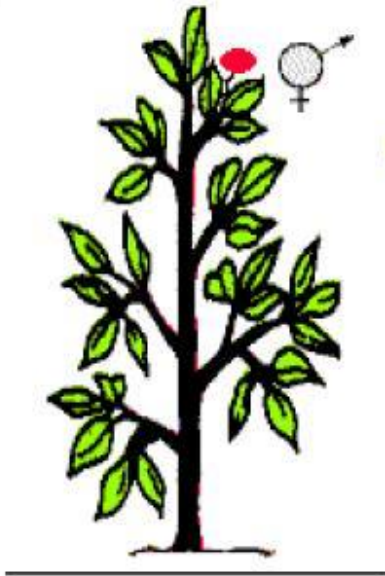
- bissexuada, ou monoclina (“perfeitas”)

} plantas monoicas, dioicas ou hermafroditas





Flores monóclinas



**PLANTA  
HERMAFRODITA**

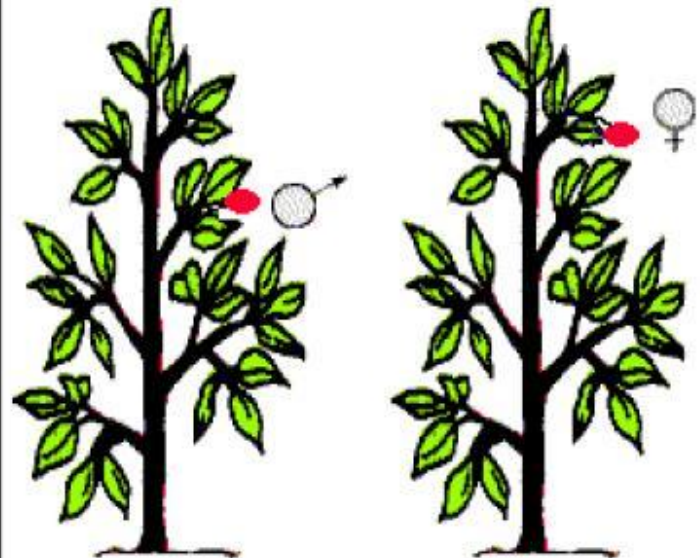
(Eucalipto)

**PLANTA  
MONÓICA**



(*Pinus*, *Sequoia*)

**PLANTA  
DIÓICA**



(*Araucaria*, *Ginkgo*)

Ambas com flores díclinas

# Mamão macho ou mamão fêmea?

# Mamão macho ou mamão fêmea?







Mamão macho

Flores masculinas (estaminadas) e  
bissexuadas na mesma planta



Mamão fêmea

Flores femininas (pistiladas) e bissexuadas  
na mesma planta



Mamão hermafrodita:  
Todas as flores bissexuadas

- **quanto à sexualidade**

- unissexuada, ou diclinas (“imperfeitas”)
  - bissexuada, ou monoclina (“perfeitas”)
- } plantas monoicas, dioicas ou hermafroditas

Plantas poligâmicas: flores unissexuadas e bissexuadas na mesma (exemplo mamão macho e mamão fêmea)





Fruto de mamão fêmea e mamão macho:

Sem valor comercial



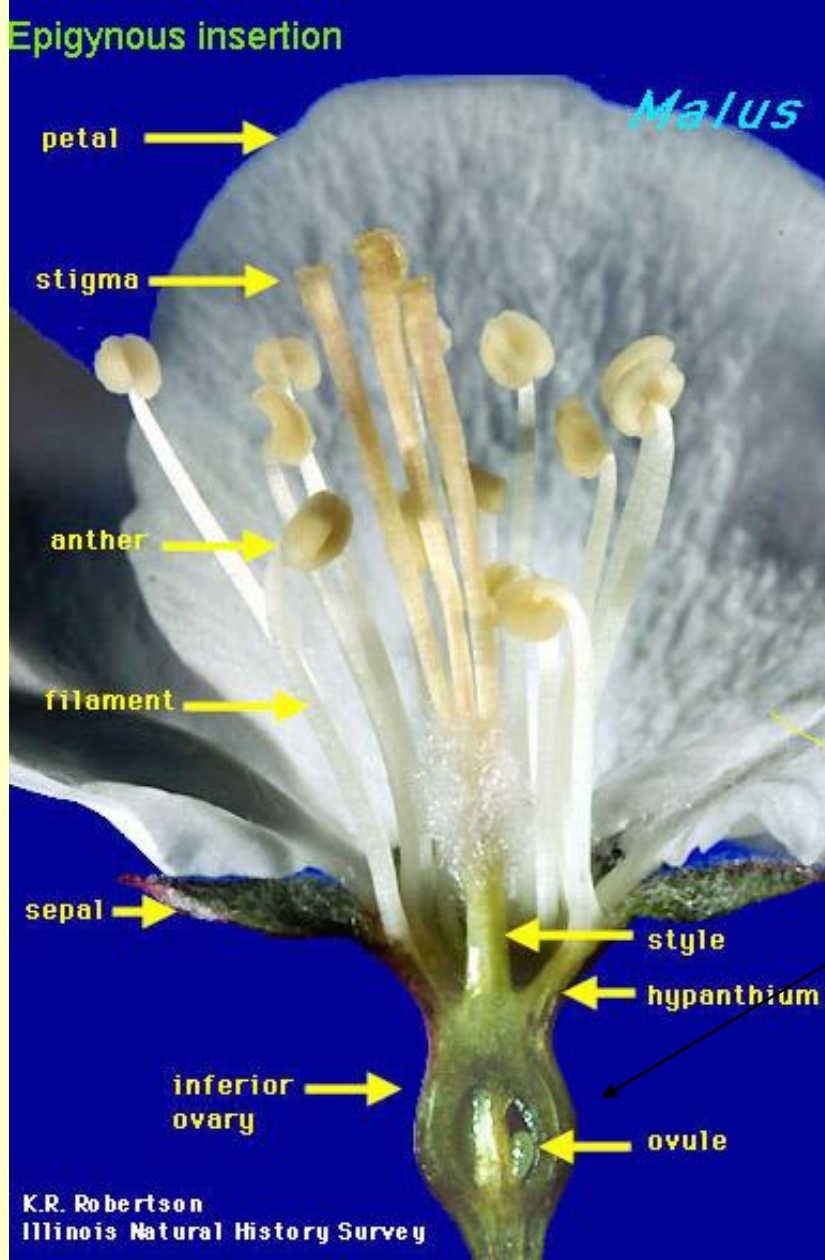
Fruto de mamão hermafrodita:

Com valor comercial



*Prunus* sp.  
Rosaceae  
© G. D. Carr

ovario supero [http://www.botany.hawaii.edu/faculty/carr/images/pru\\_sp.jpg](http://www.botany.hawaii.edu/faculty/carr/images/pru_sp.jpg)

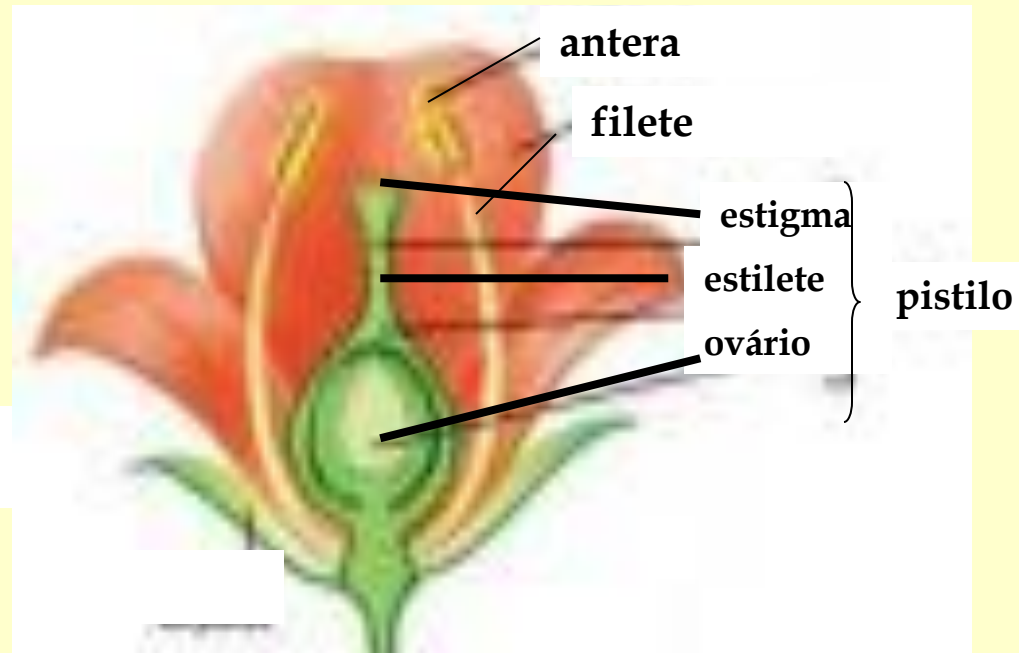
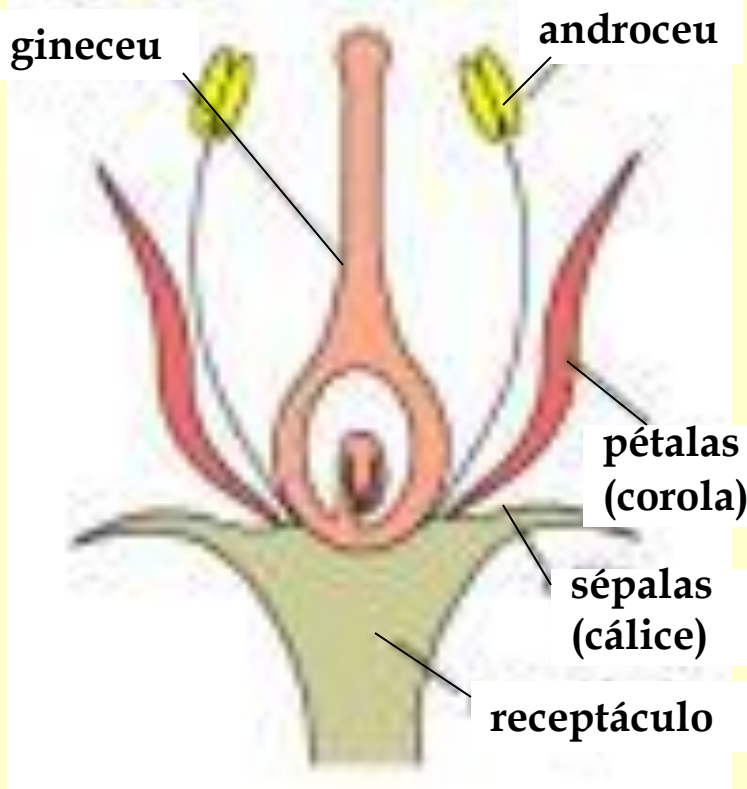


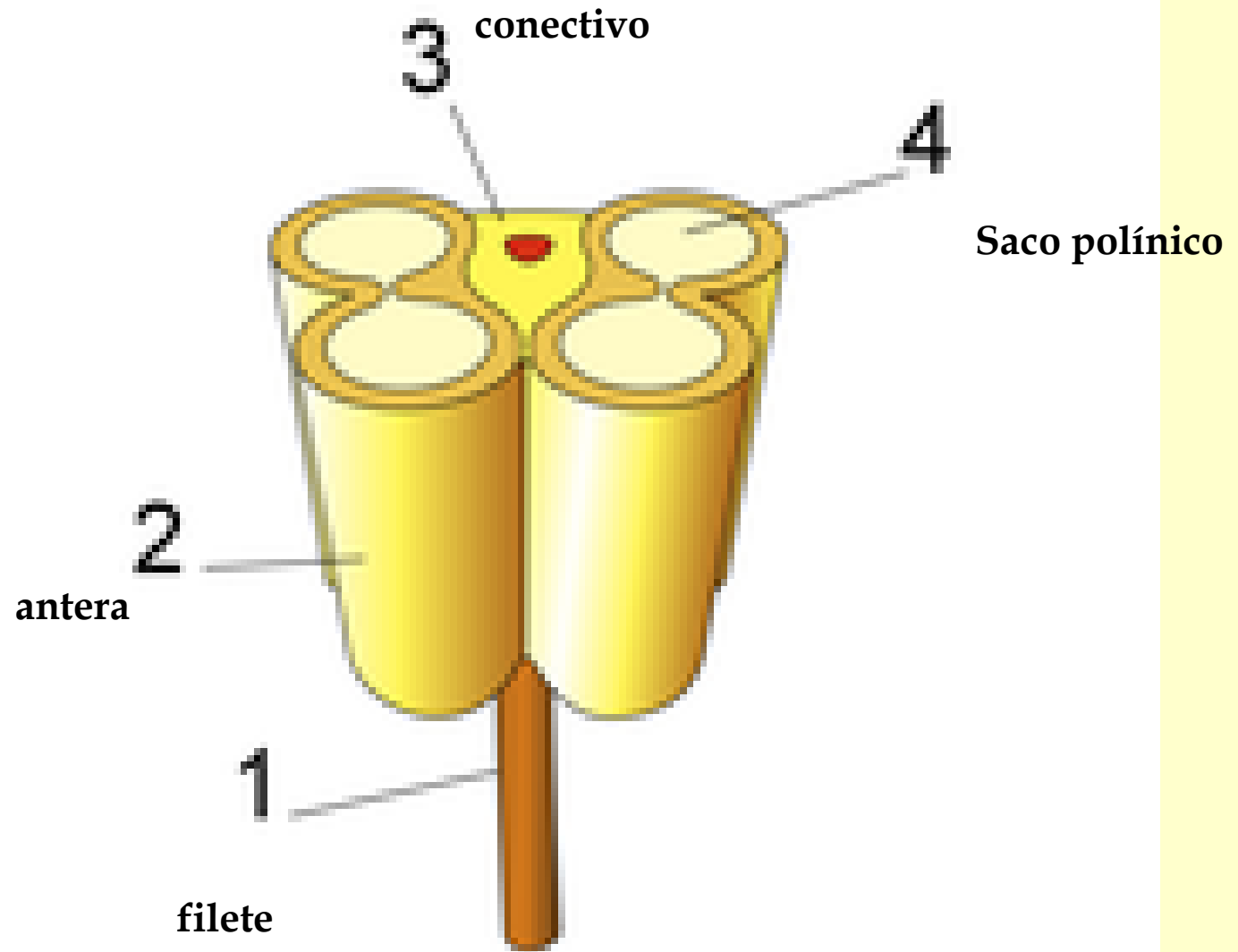
**ovario infero**

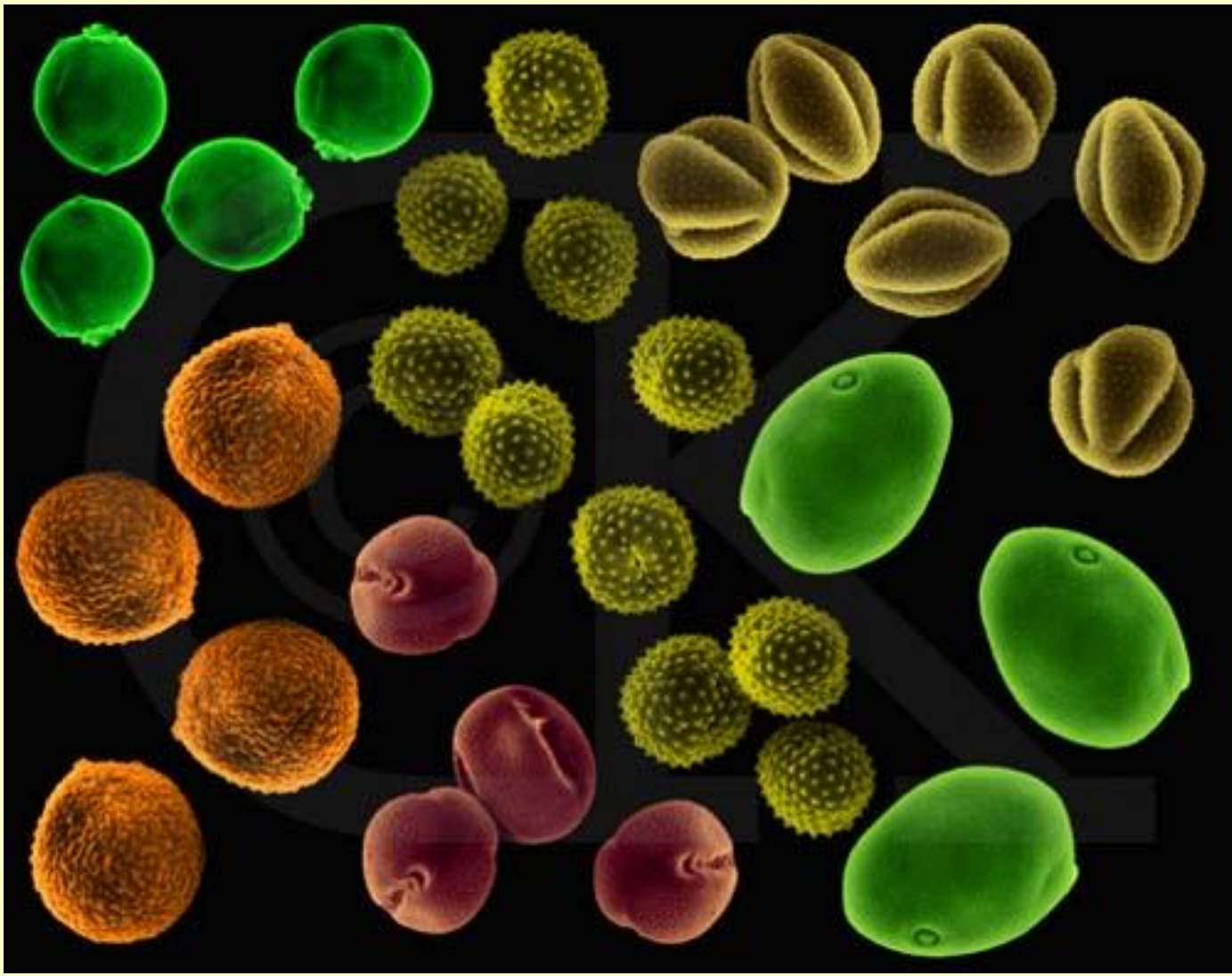
**hipanto**

# FLOR - plano básico

- ramo de crescimento determinado com folhas modificadas
- estrutura que reúne os caracteres reprodutivos das angiospermas



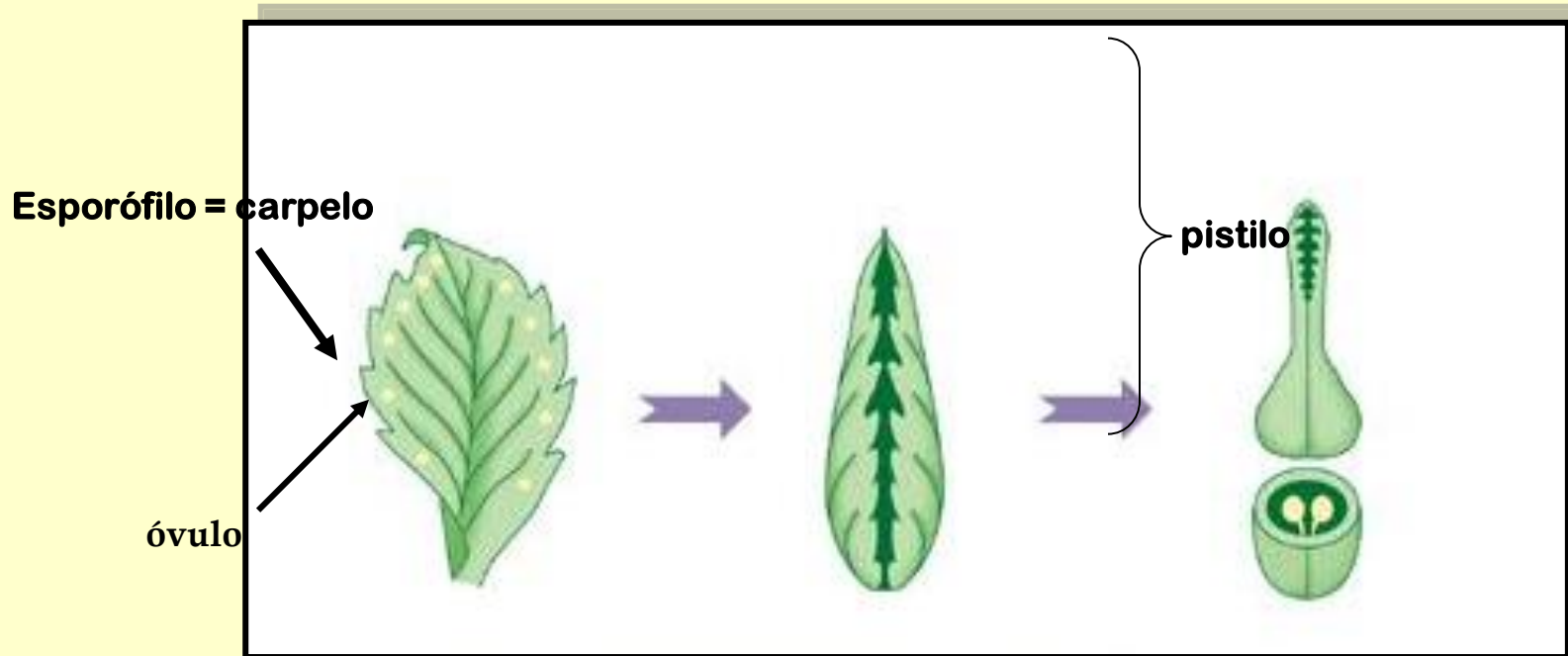
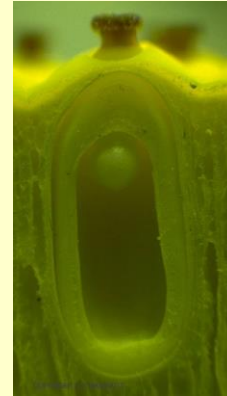




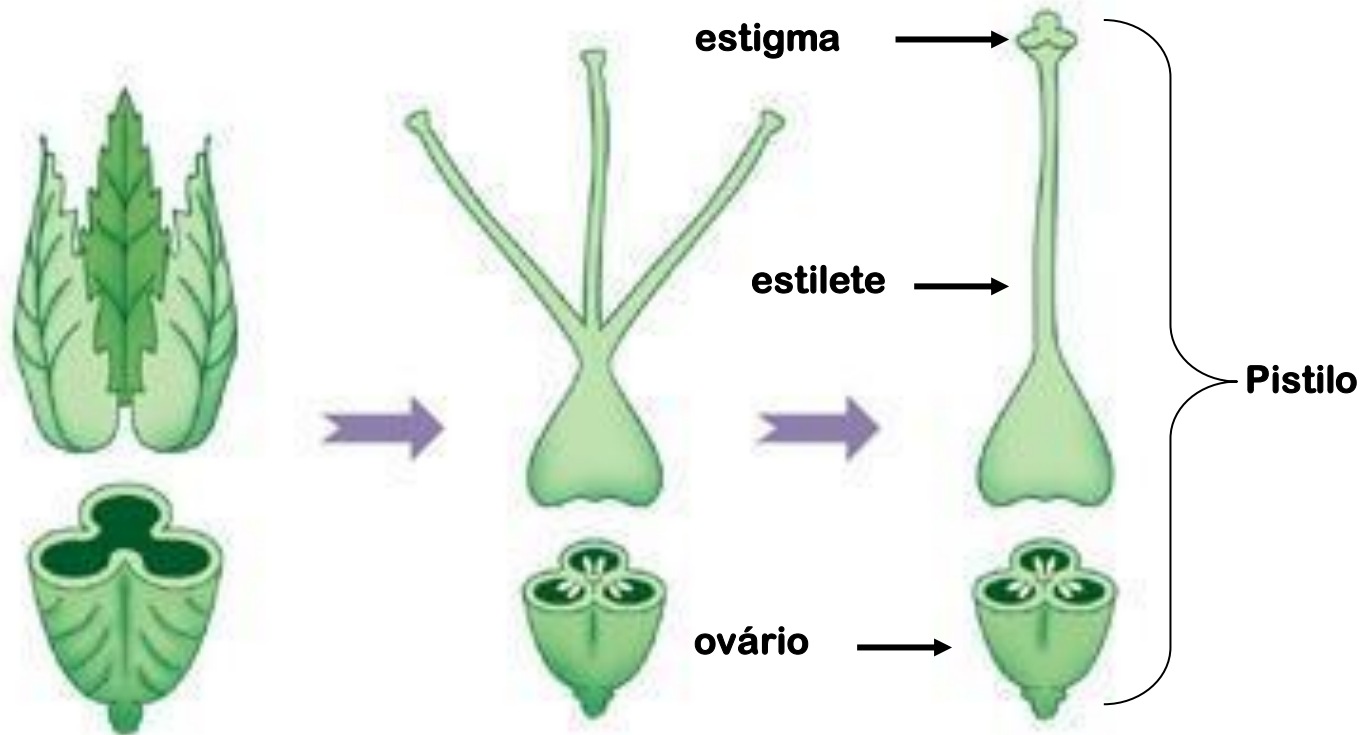


As Angiospermas são caracterizadas pelo fechamento da folha carpelar (esporófilo) com os óvulos protegidos em seu interior.

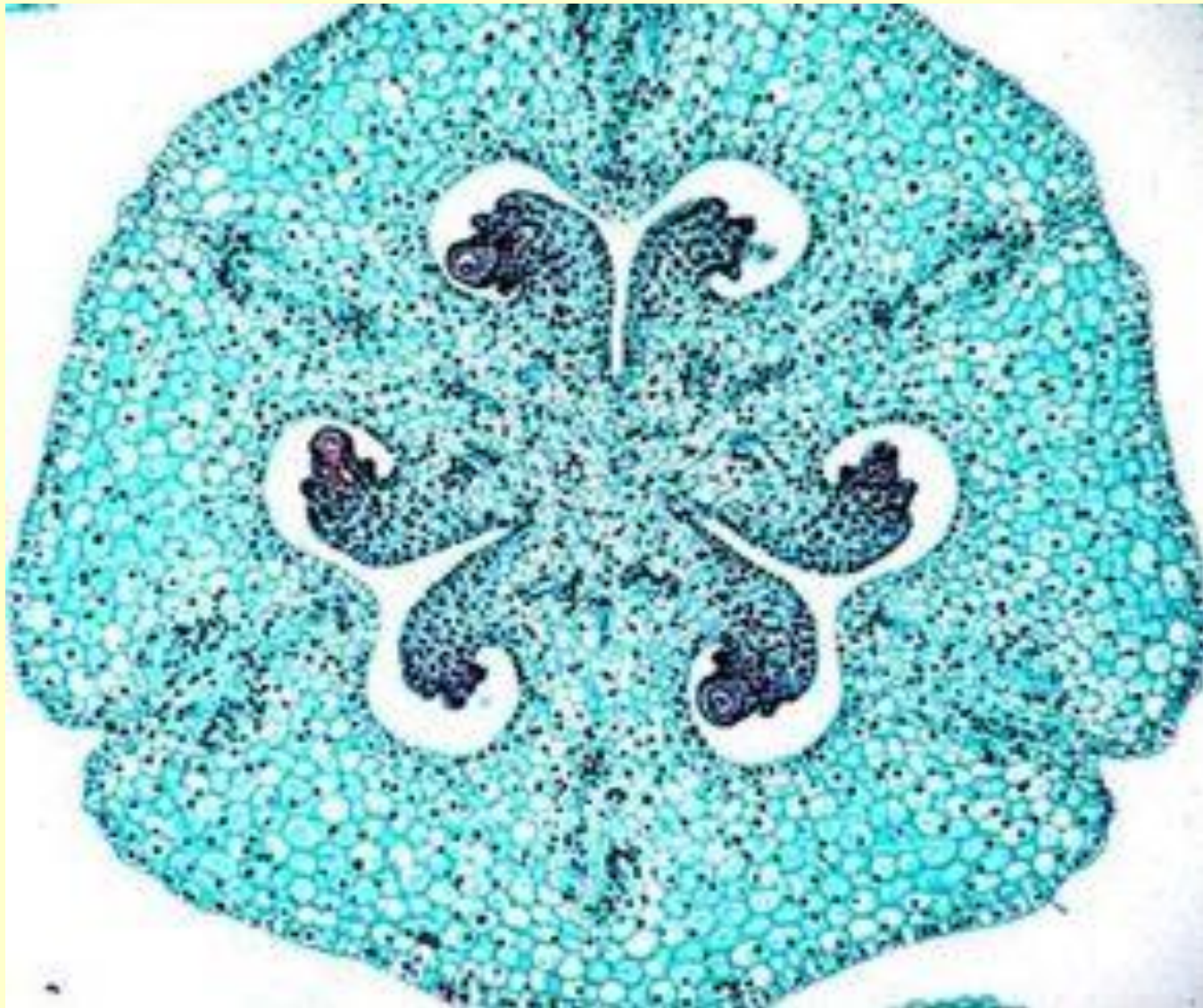
*Angion* = receptáculo, urna, vaso; *sperma* = semente







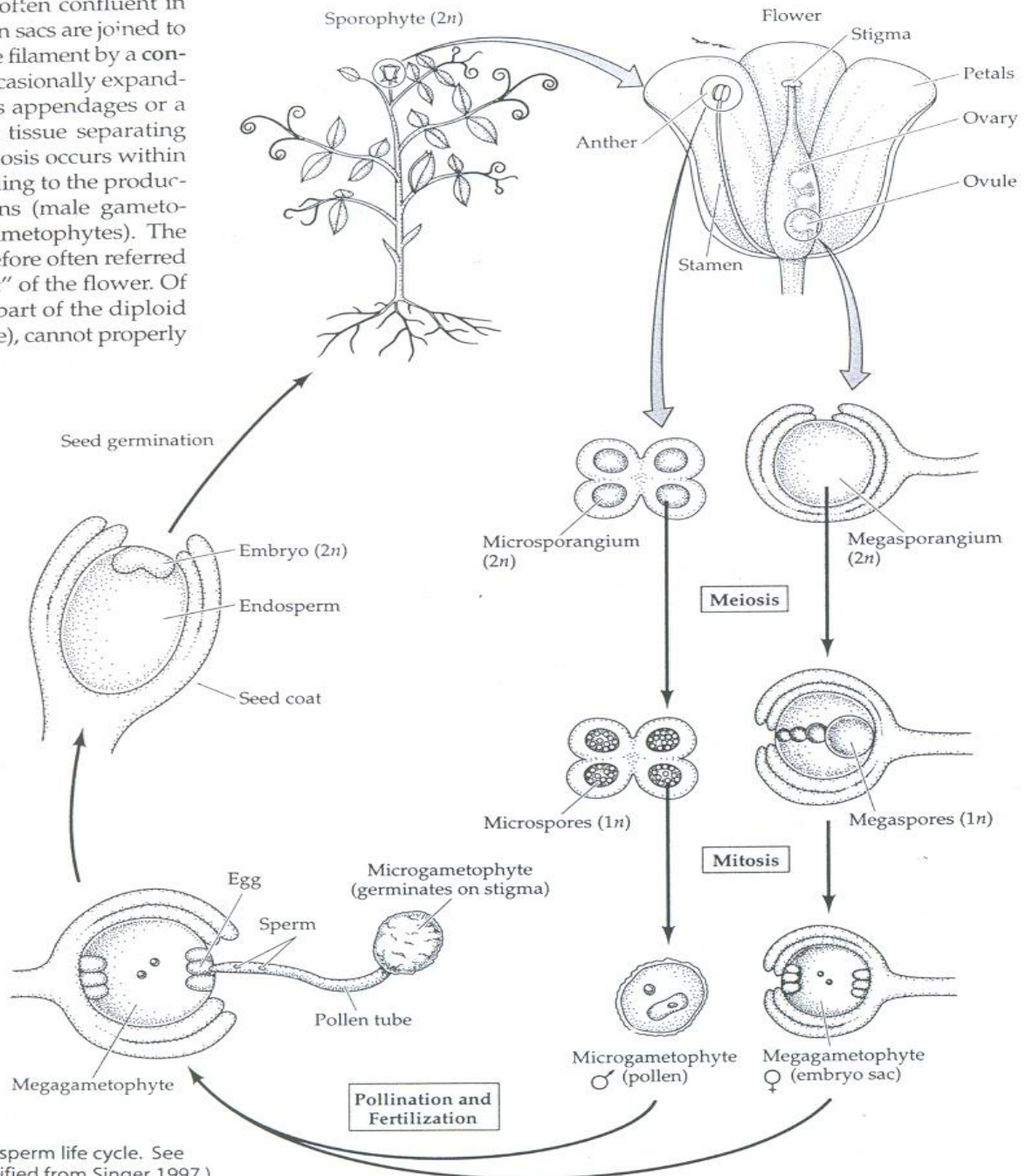
Formação do gineceu sincárpico (3 carpelos, 1 pistilo, 3 ou 1 estiletes)



<http://curlygirl.naturlink.pt/ovario.jpg>

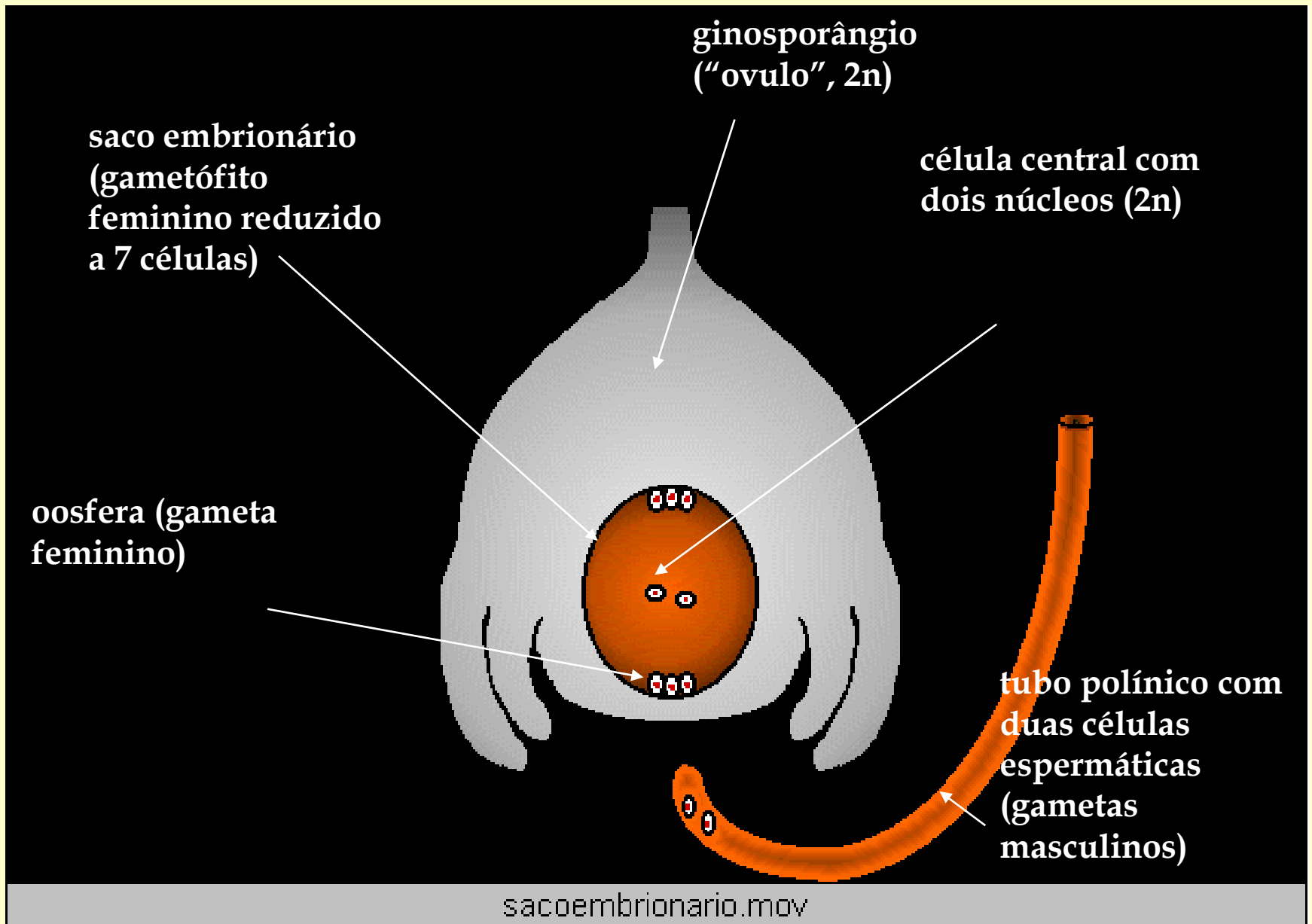
tain four pollen sacs (or microsporangia), and these are often confluent in two pairs. The pollen sacs are joined to each other and to the filament by a **connective**, which is occasionally expanded, forming various appendages or a conspicuous sterile tissue separating the pollen sacs. Meiosis occurs within the pollen sacs, leading to the production of pollen grains (male gametophytes, or microgametophytes). The androecium is therefore often referred to as the "male part" of the flower. Of course, flowers, as part of the diploid plant (or sporophyte), cannot properly

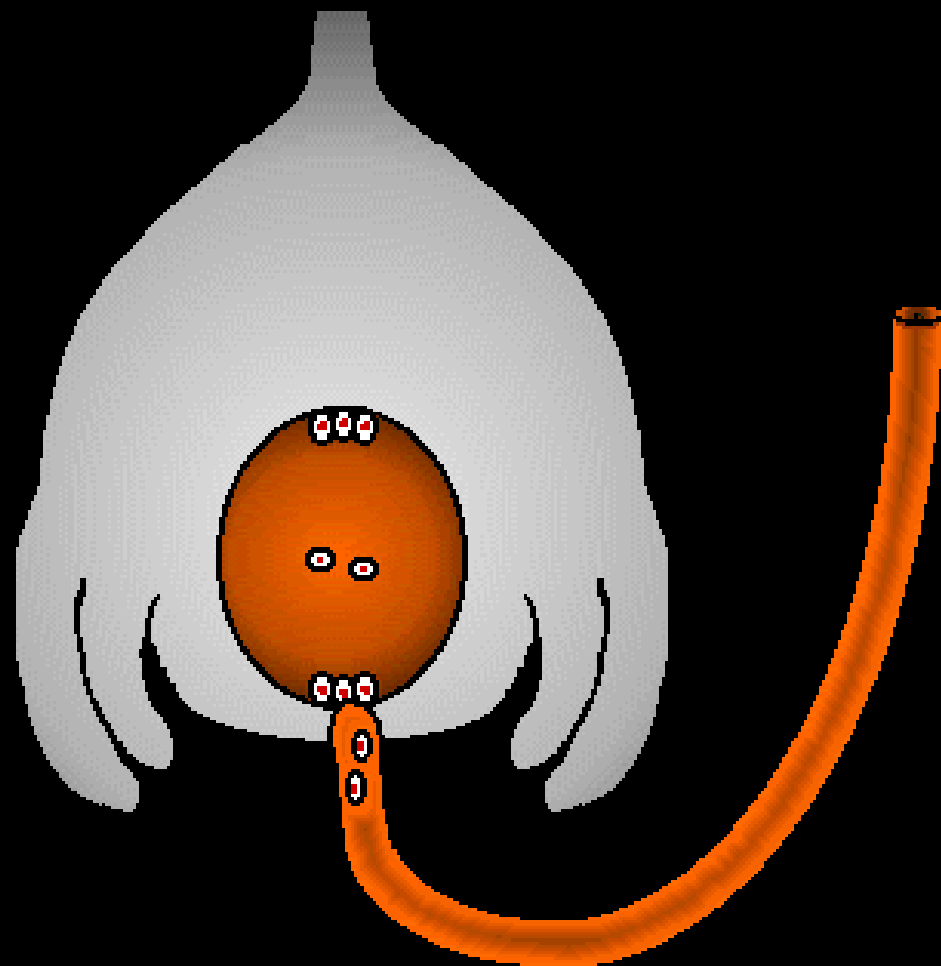
# POLINIZAÇÃO/ FECUNDAÇÃO



**Figure 4.17** Angiosperm life cycle. See also Figure 4.40. (Modified from Singer 1997.)

• Dupla fecundação e saco embrionário reduzido (gametófito feminino)

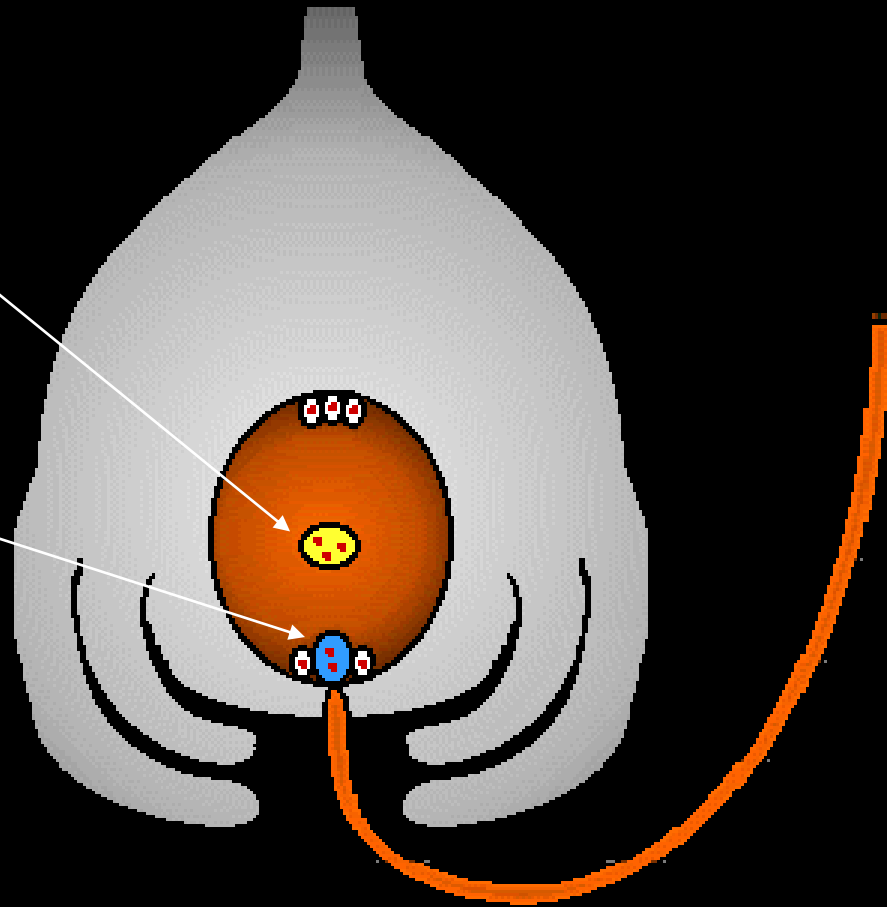


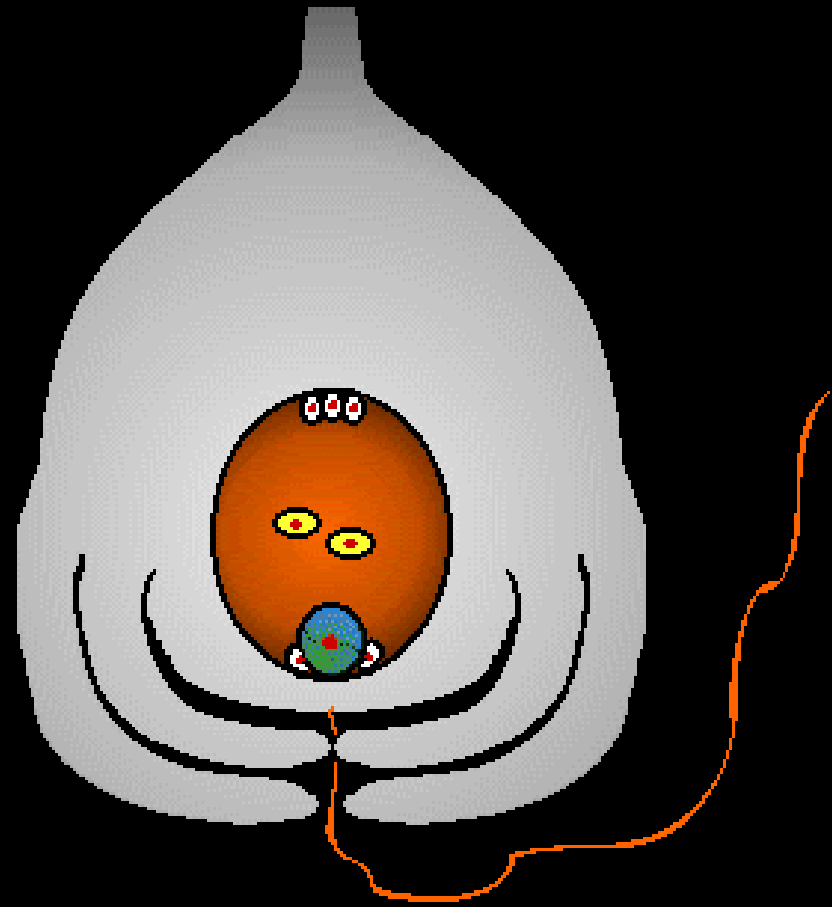


sacoembrionario.mov

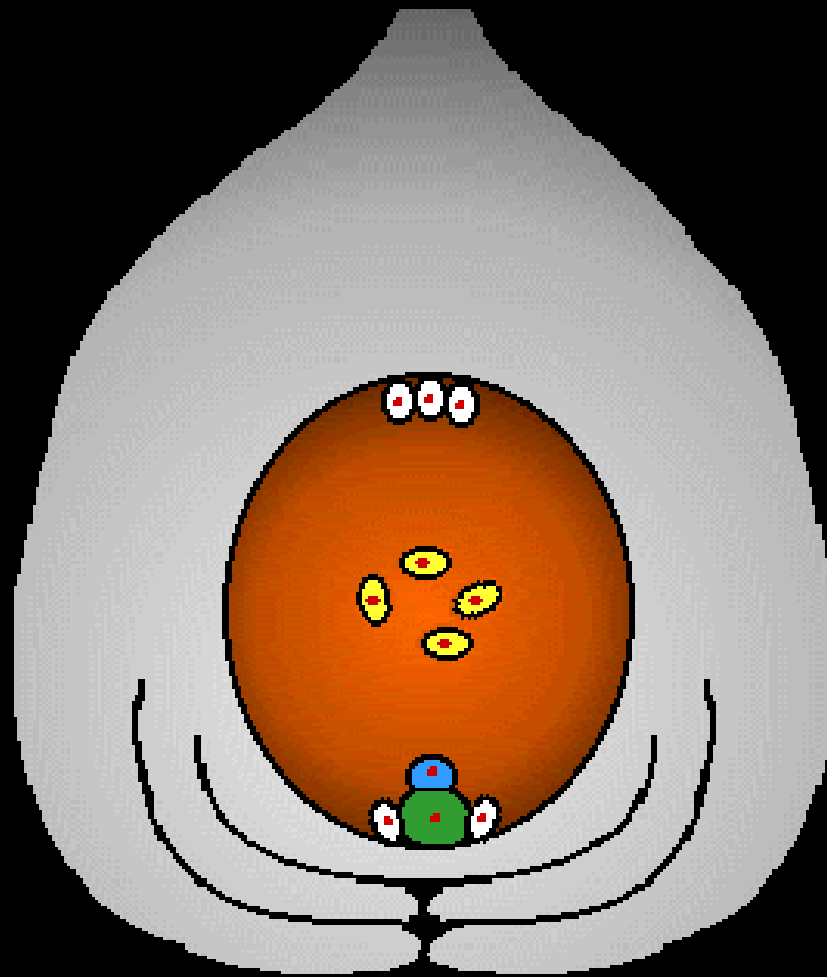
célula central (3n)

zigoto (2n)



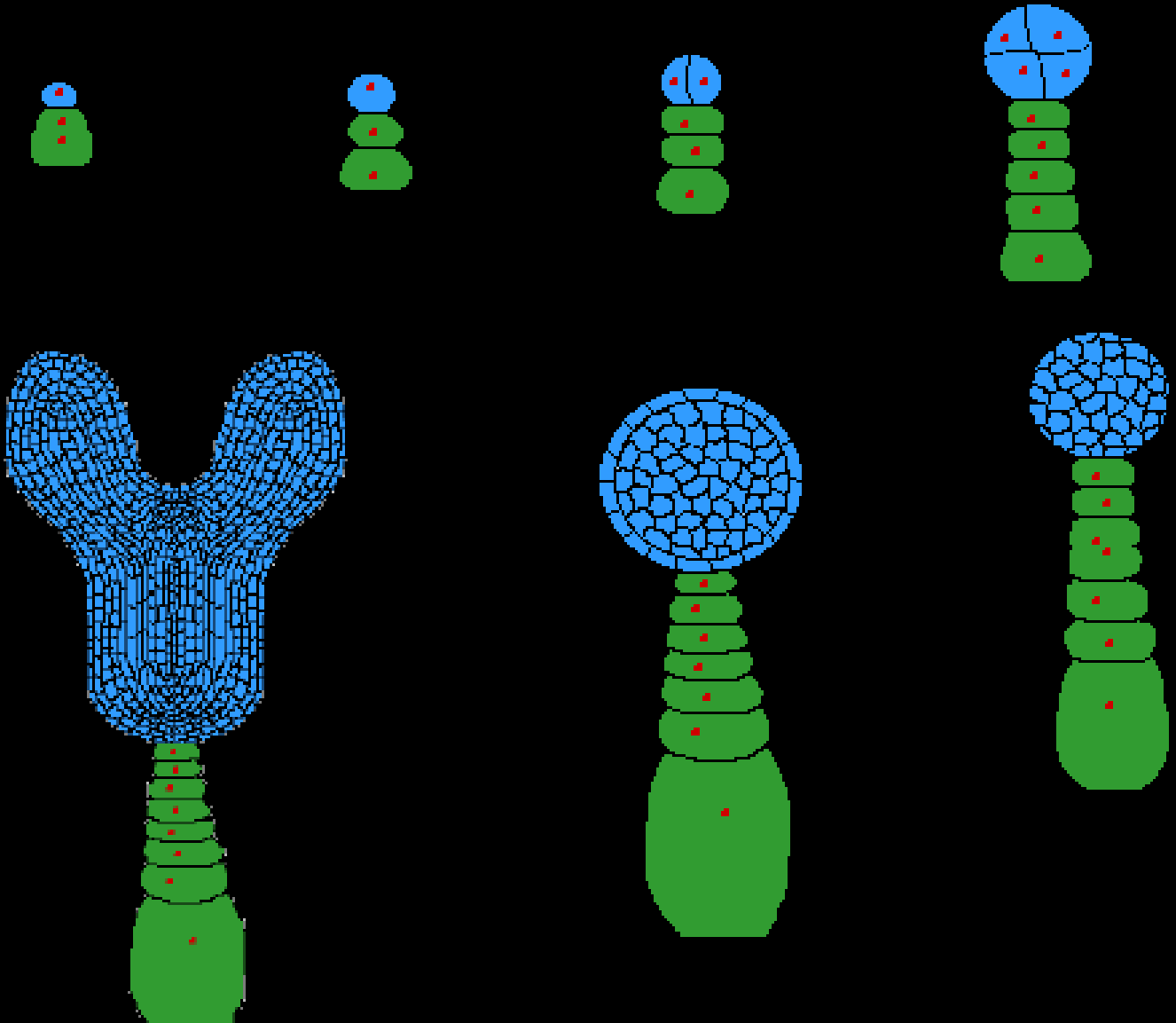


a.mov



a.mov

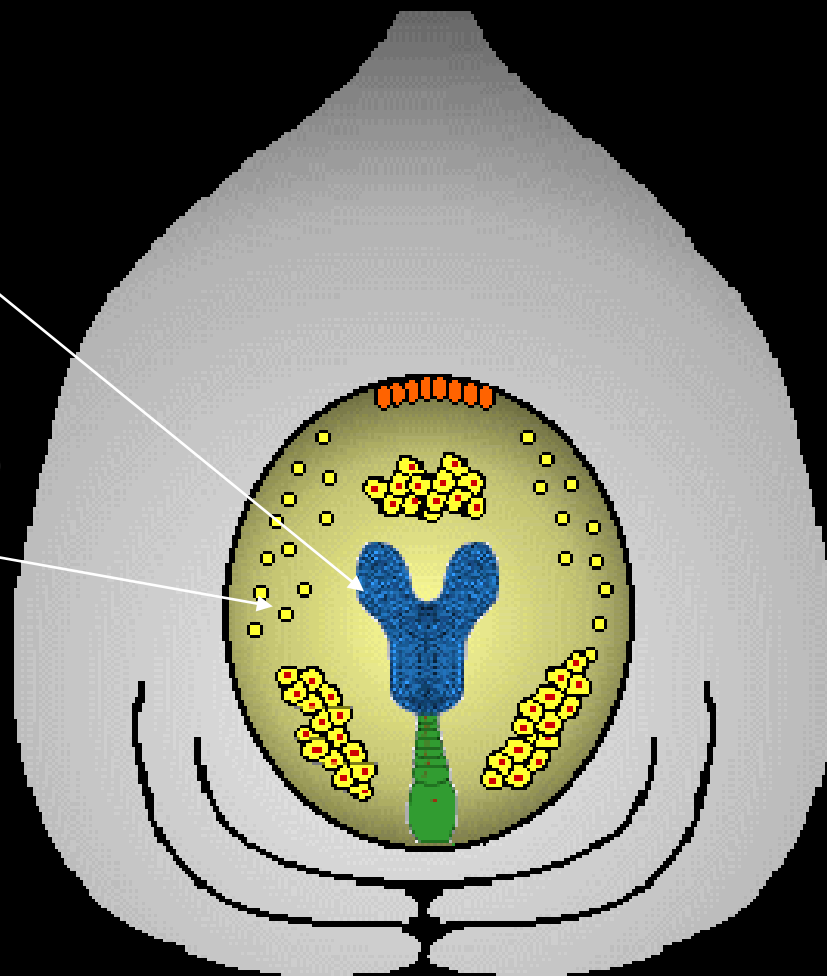




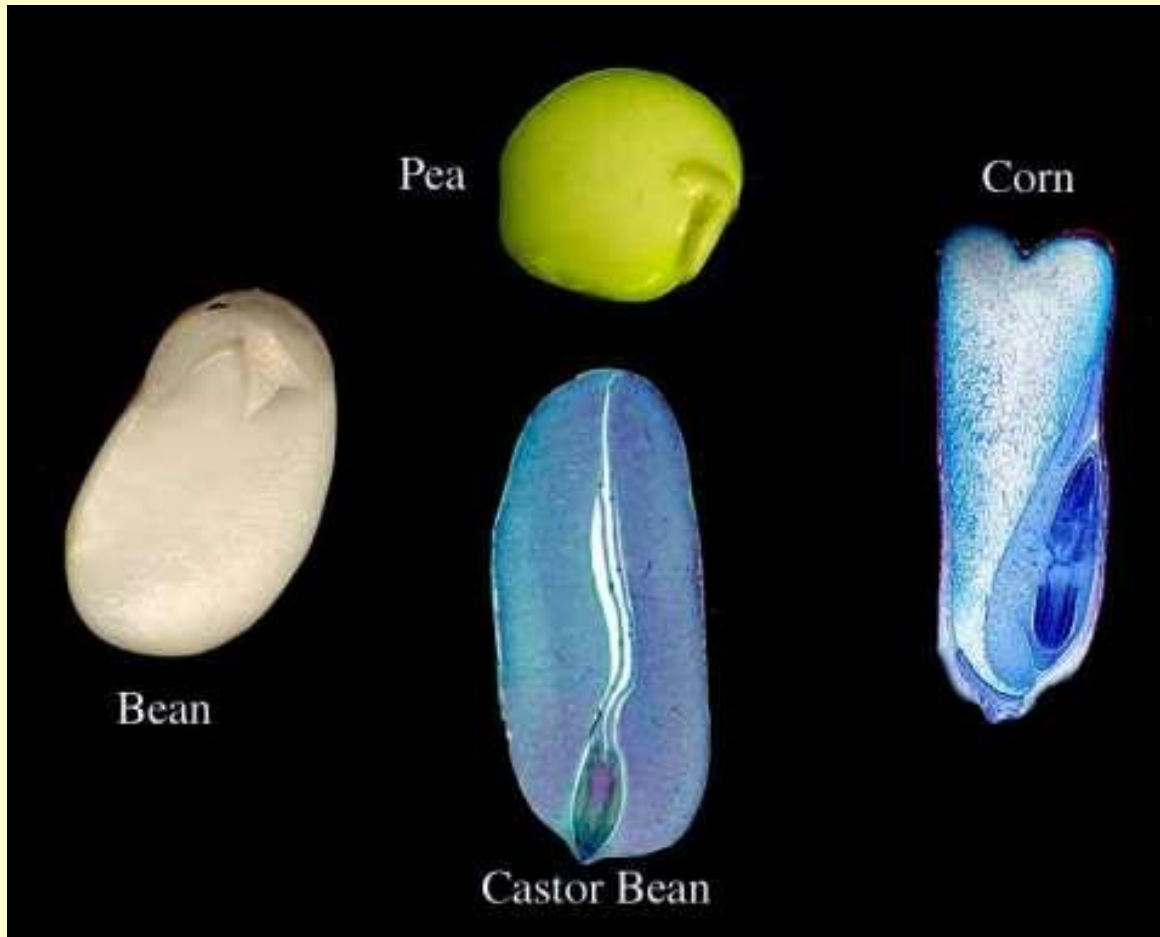
a.mov

embrião (2n)

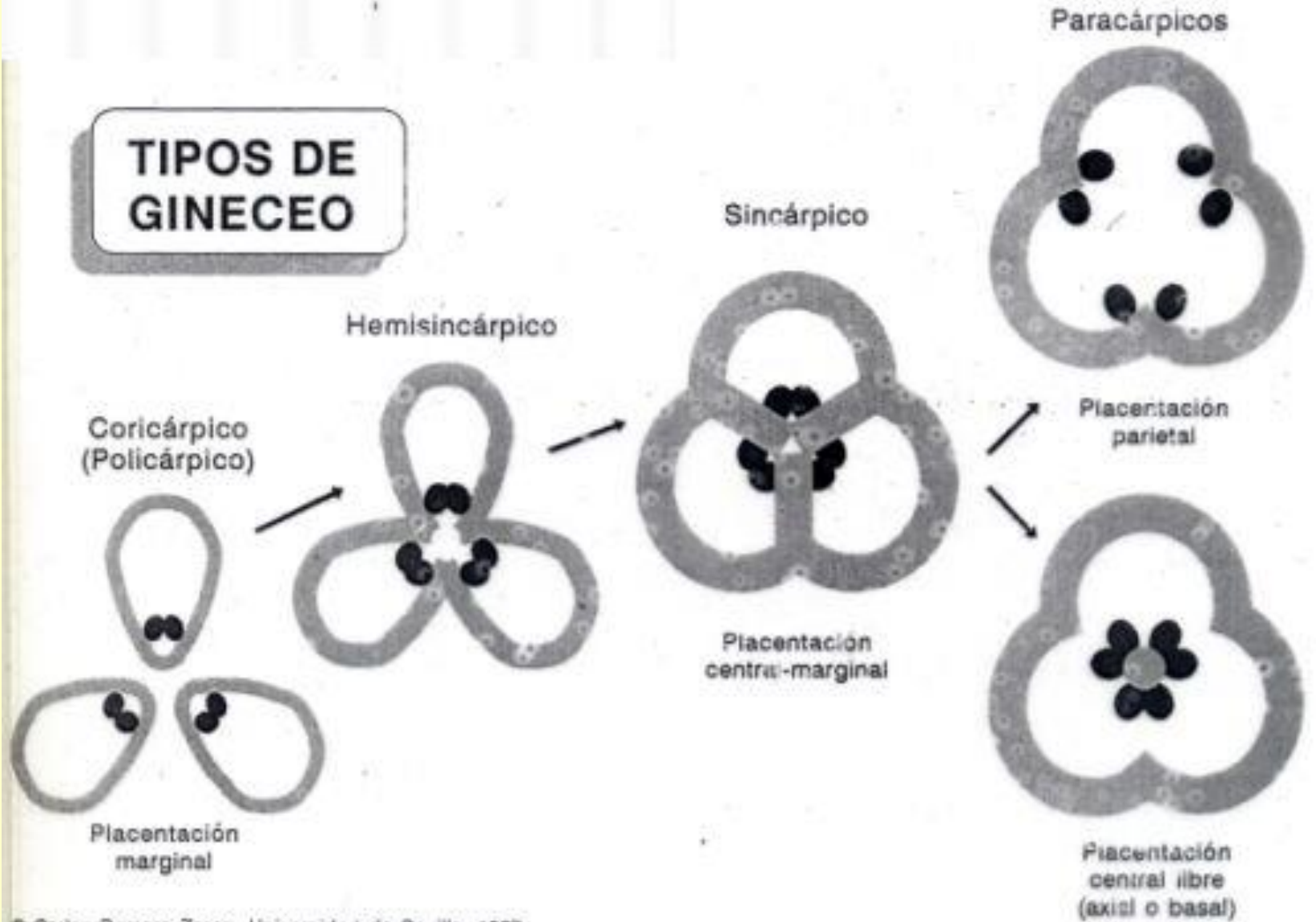
endosperma (3n)



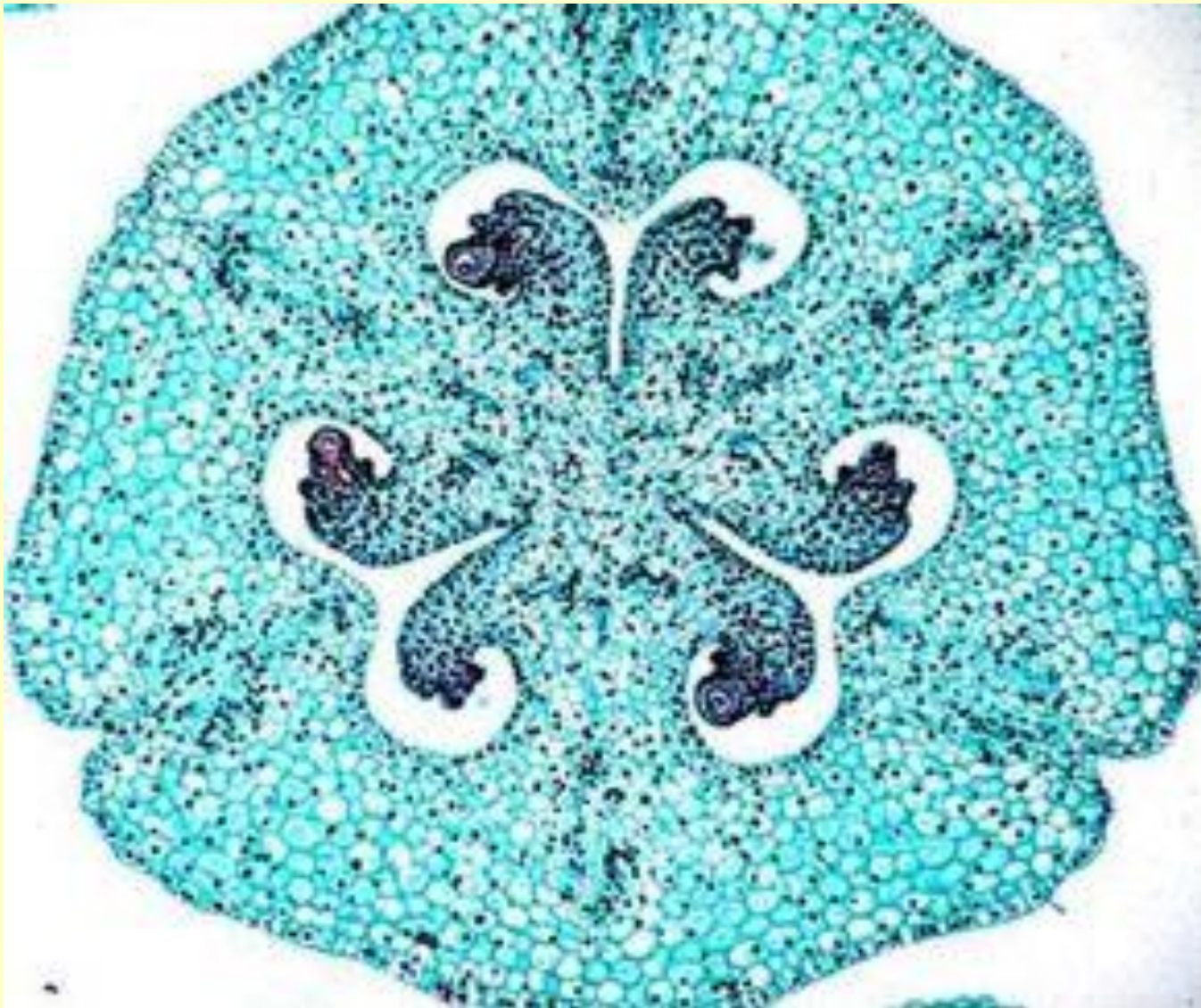
## Plantas com sementes com endoperma: apenas em angiospermas!



# TIPOS DE GINECEO

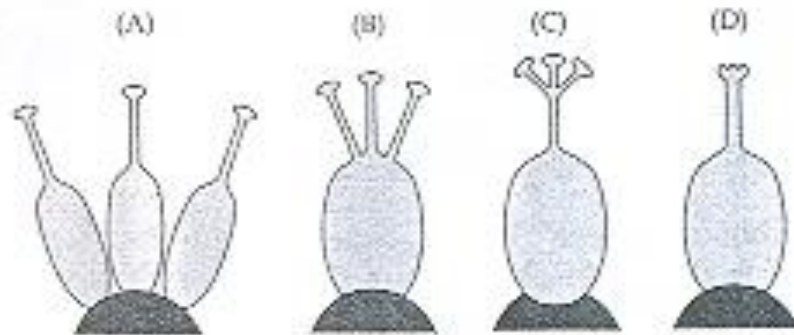


© Carlos Romero Zarco, Universidad de Sevilla, 1997



<http://curlygirl.naturlink.pt/ovario.jpg>

# pistilo X gineceu X carpelo X ovario



**Figure 4.20** Three carpels, variously connate. (A) Three ovaries, styles, and stigmas. (B) One ovary, three styles and stigmas. (C) One ovary and style, the latter apically branched, and three stigmas. (D) One ovary and style, and three stigmas (or stigma lobes).



3 carpels, distinct  
 3 simple pistils

3 carpels, connate  
 1 compound pistil

**Figure 4.19** The difference between the terms *carpel* and *pistil*.

• quanto à posição do ovário

- hipógina
- perígina
- epígina

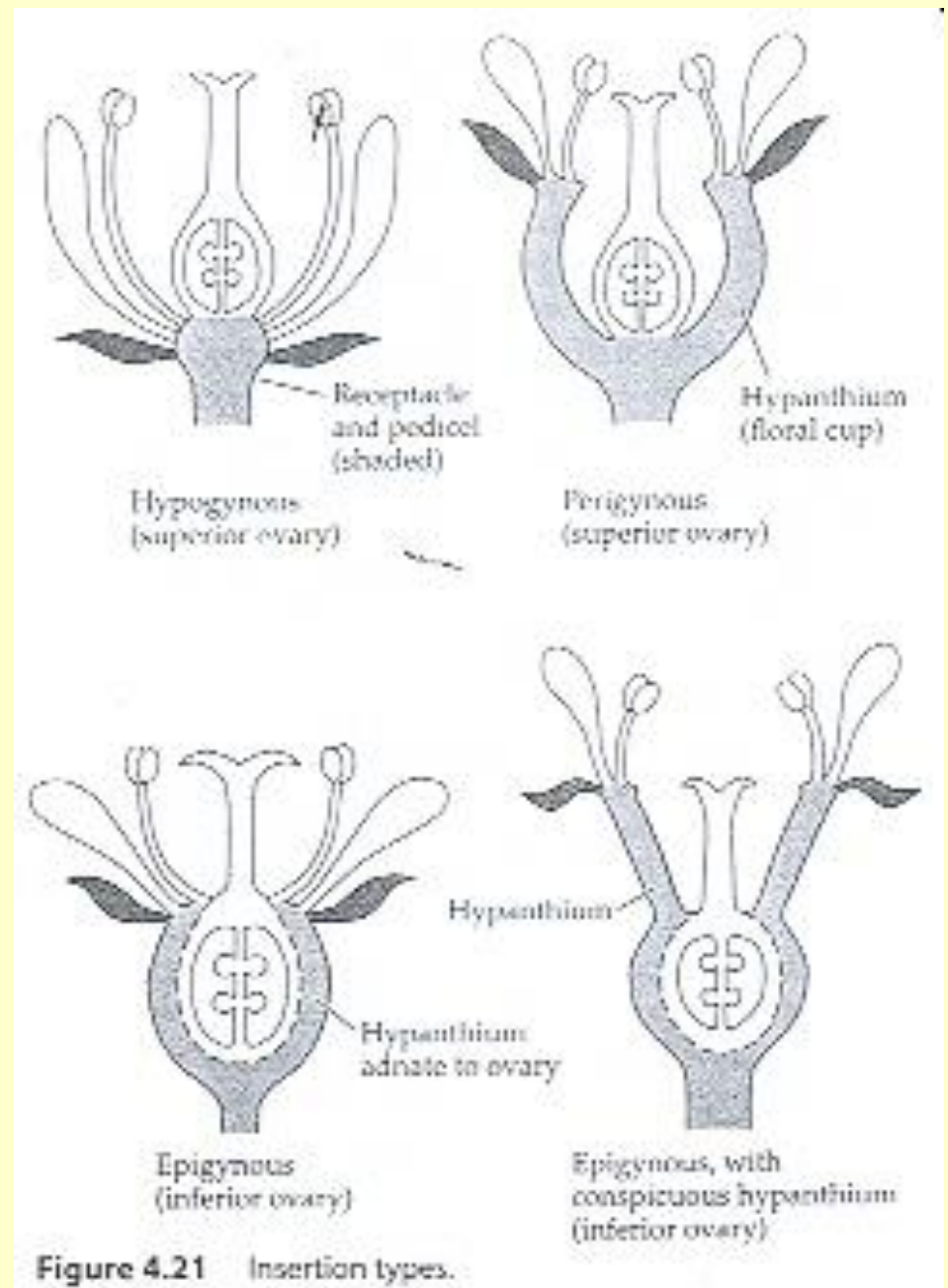


Figure 4.21 Insertion types.



Flor com hipanto

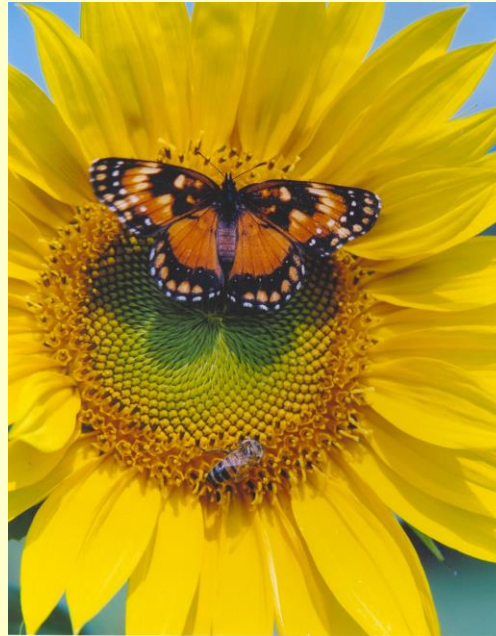




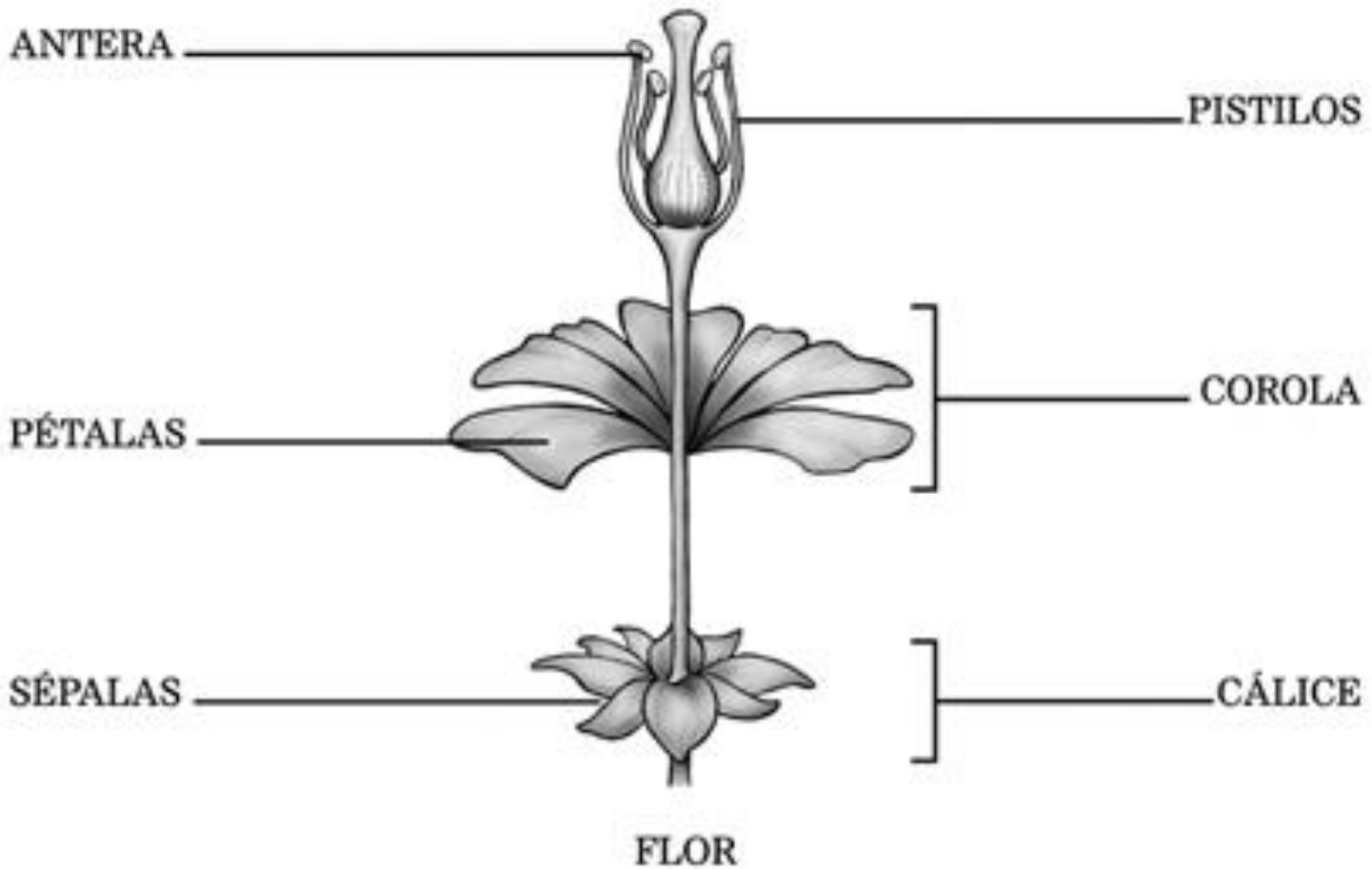


- isoladas

- inflorescências

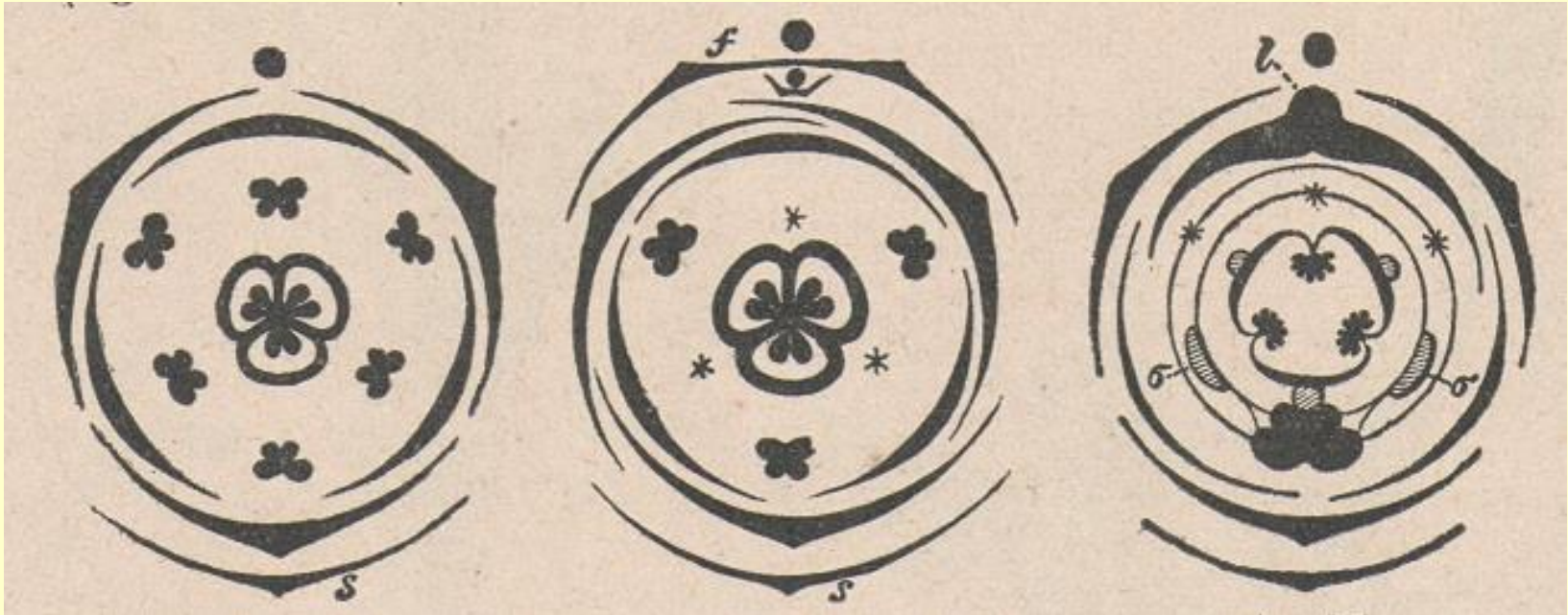


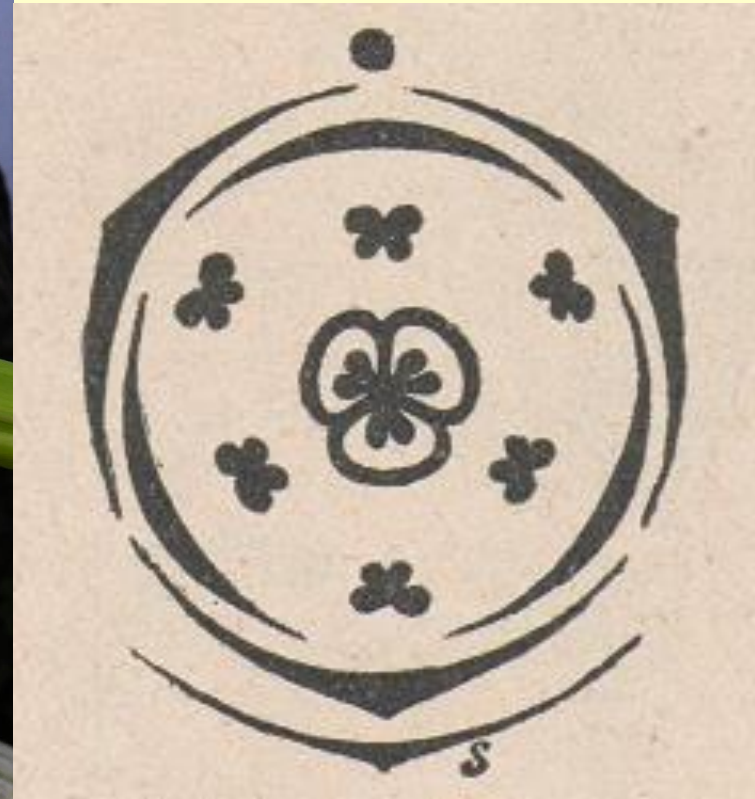
# O CONCEITO DE VERTICILOS FLORAIS





# Diagramas florais





Fórmula floral:  $K_6 C_6 A_{3+3} G_{(3)}$