

# Biologia reprodutiva de plantas\*

## O que é?

Estudo da reprodução sexual e assexuada

Mecanismos de polinização

Fluxo genético

Variabilidade genética

Dispersão de pólen e sementes

## Por que estudar? Importância?

\*Traduzido e Adaptado de Michael G. Simpson

# Reproducao sexual

Plantas nao produtoras de sementes

Produtoras de sementes:

**Polinizacao** – transferencia do polen do microsporangia to estigma (angiosperms) ou ovulo (gymnosperms)

Wind pollination - ancestral (all gymnosperms)

Animal pollination - derived for angiosperms

Some angiosperms secondarily wind pollinated

**Fertilizacao** - fusion of esperma e ovo → embryo (new sporophyte)

# Estrategia de polinizacao animal: Atrativos e Recompensas

## Atrativos

### Visual

perianto

estame (e.g., Myrtaceae, Mimosoideae)

estaminoides (e.g., Zingiberaceae, Cannaceae)

corona (e.g., *Narcissus*)

inflorescence

### Olfato – geralmente do perianto

doce

apodrecimento: geralmente polinizadas por moscas f

# Strategia de polinizacao animal: Recompensas e atracao

## Recompensas

Nectar

Pollen

Waxes

Resins

ou “Pegadinha” ao invés de uma “recompensa”

Insect trapped (*Aristolochia*) or drowned (*Nymphaea* sp.)

Mimicry

E.g., fooling male insect into “mating” with orchid

# Mecanismos de polinizacao

INSETOS (entomophily)

**Abelhas**

(melittophily/hymenopterophily):

fls. showy, colorful, fragrant, with:

**nectar guides**

**landing platforms**



**Borboletas** (psychophily):

fls showy, colorful, fragrant

no nectar guides

**long tubes or spurs**



# Mecanismos de polinizacao

Mariposas (phalaenophily):

**large, white, fragrant**

no nectar guides

**usually tubes or spurs**



# Mecanismos de polinizacao

Moscas (sapromyophily)

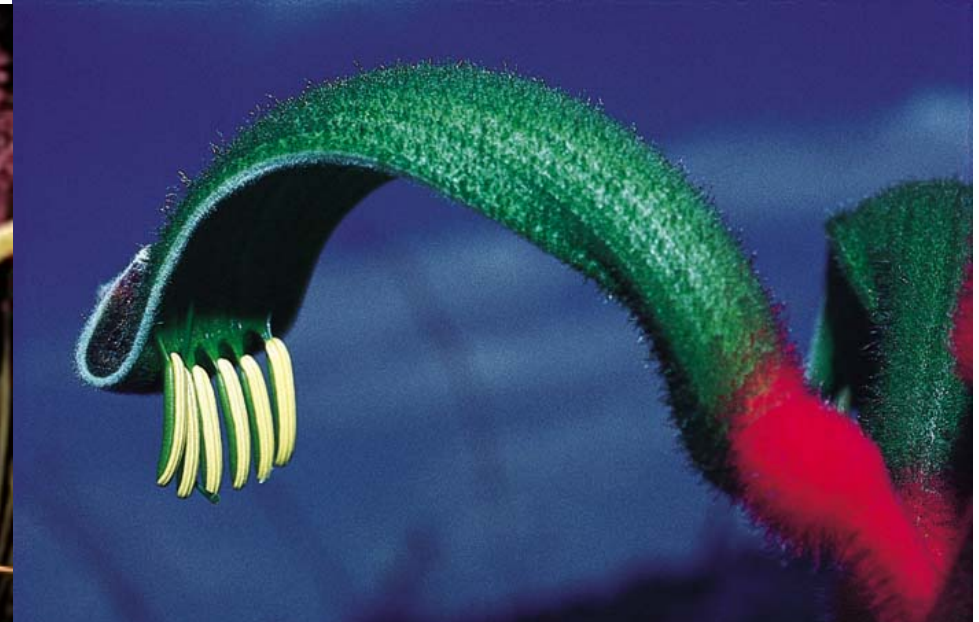
**maroo /brown in color**

**foul smelling** (like rotting flesh)



# Mecanismos de polinizacao

Passaros (ornithophily):  
**red** (often, not always)  
tubular (often)





# Mecanismos de polinizacao

Morcegos (cheiropterophily):

**nocturnal anthesis**

**large, colorful or white**

**produce copious nectar or pollen**



# Mecanismos de polinizacao

Vento (anemophily):

**flowers small**, numerous, often unisexual

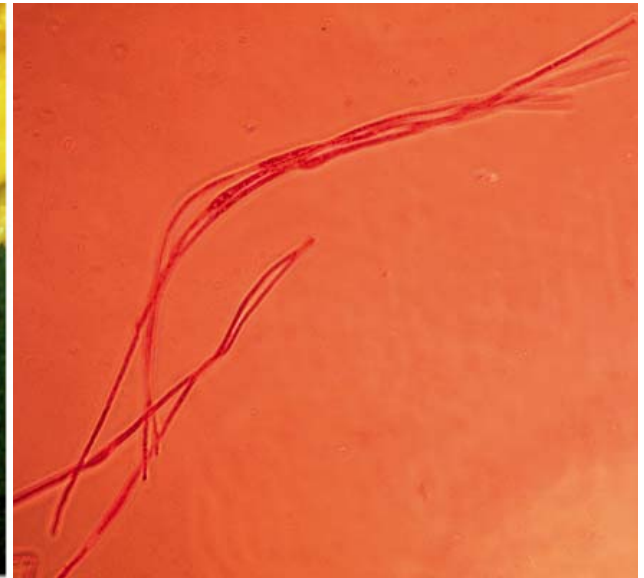
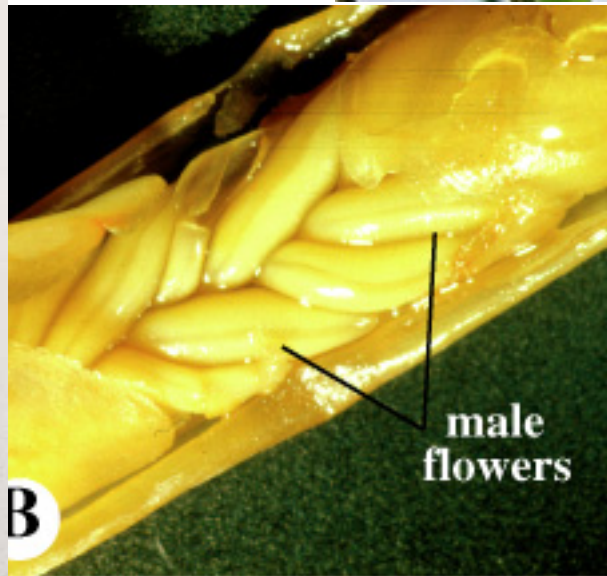
**perianth absent or non-showy**

flowers often produced **in mass**



# Mecanismos de polinizacao

Agua (hydrophily):



# **Sistemas de cruzamento**

Fecundacao cruzada versus Autofecundacao vs. Mistos

# Sistemas de cruzamento

**Fecundacao cruzada** = outcrossing / allogamy / xenogamy:

**Como e promovido ou estimulado?**

- 1) Estrutura sexual: **dioicismo** (incl. gynodioecy, androdioecy, trioecy)

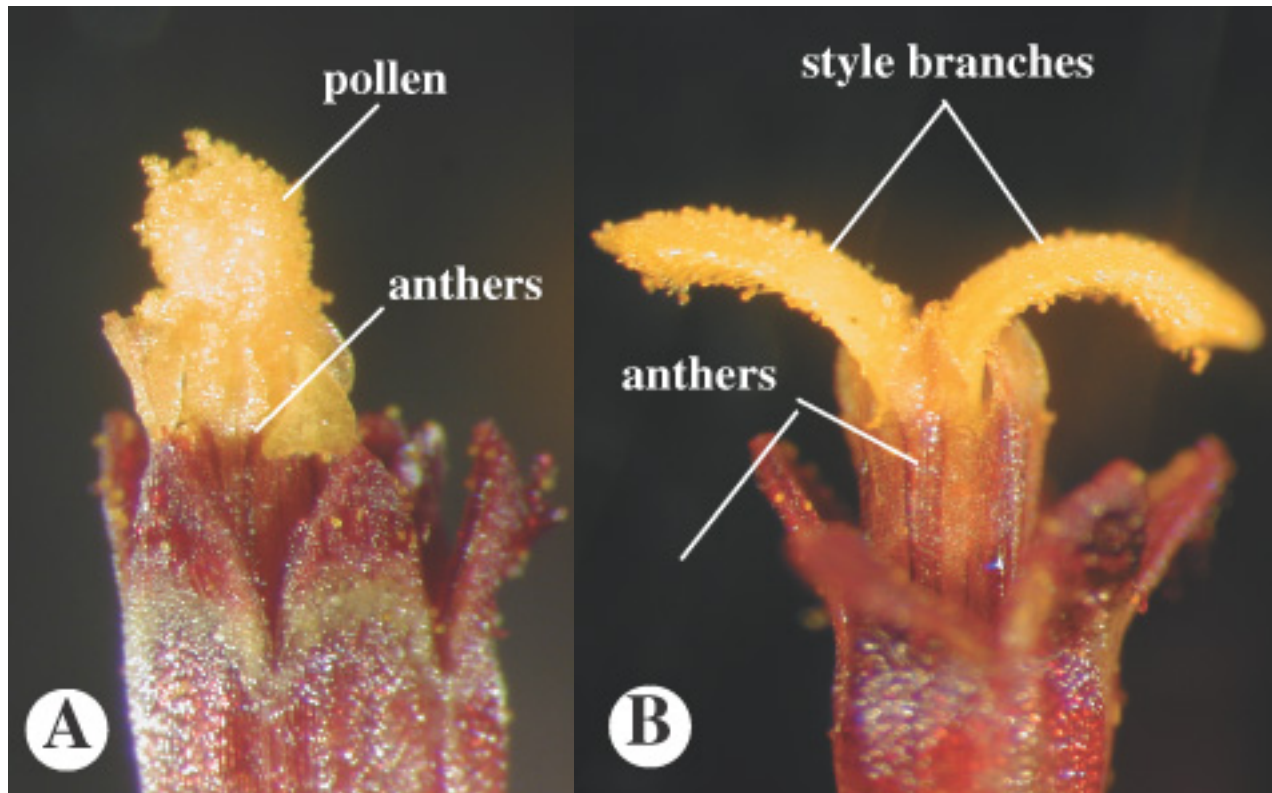
# Sistemas de cruzamento

**Fecundacao cruzada: Outbreeding = outcrossing / allogamy / xenogamy:**

2) Difference in *timing* of floral parts = ***dichogamy***

**protandry** - male first

**protogyny** - female first

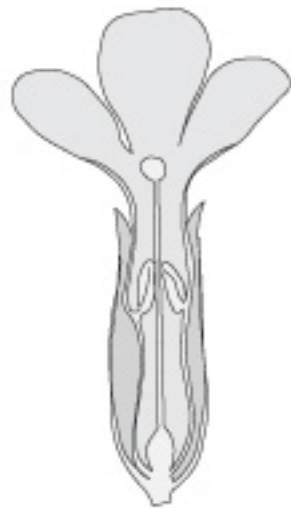


# Sistemas de cruzamentos

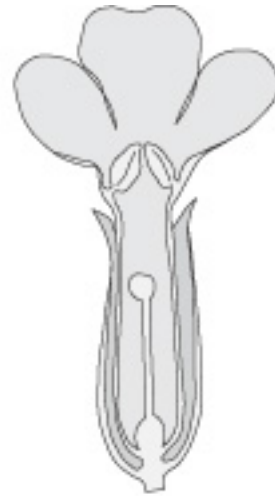
Fecundacao cruzada: Outbreeding = outcrossing / allogamy /

3) Spatial separation of anthers and stigmas = *hercogamy*

**heterostyly**: different style/stigma & correlated anther heights

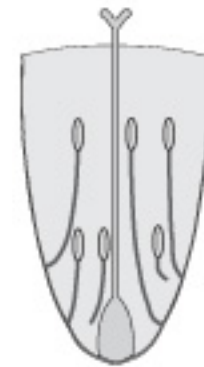


*long*  
*(pin)*

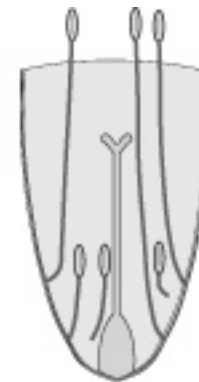


*short*  
*(thrum)*

*Distyly*



*long*



*mid*



*short*

*Tristyly*

Outbreeding = outcrossing / allogamy / xenogamy:

3) Spatial separation of anthers and stigmas = *hercogamy*

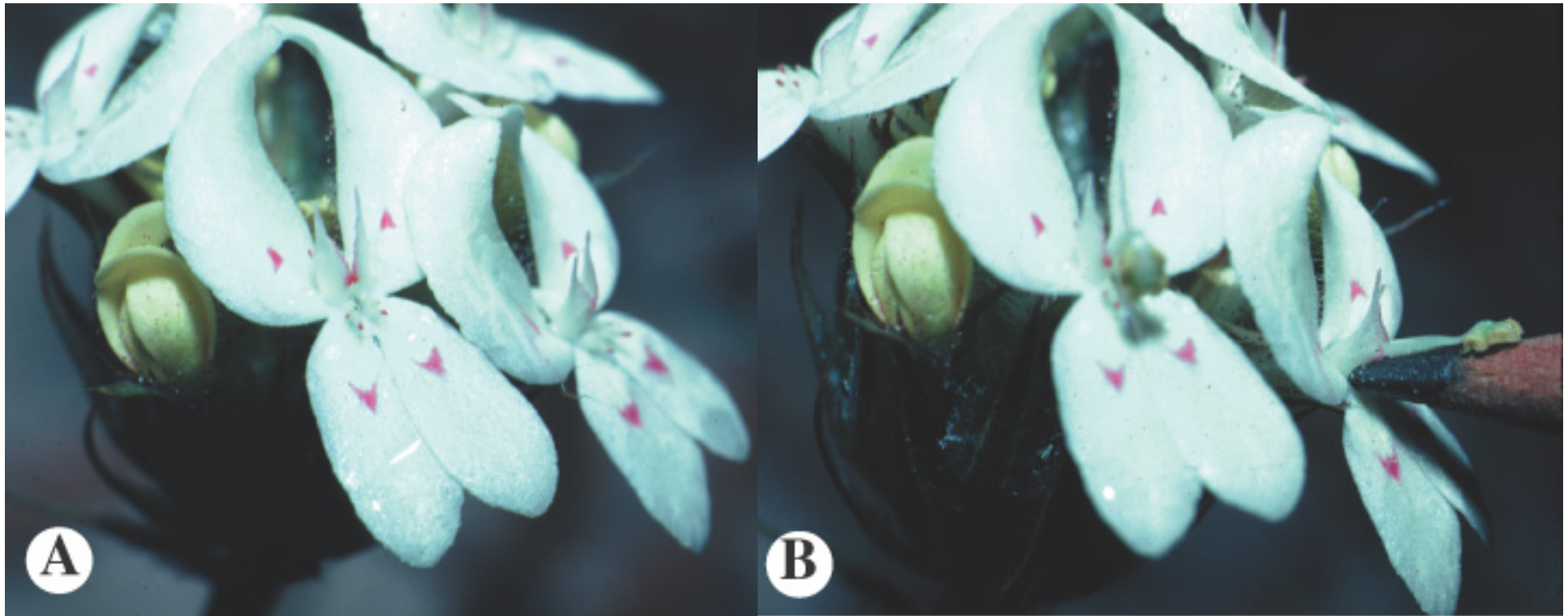
**enantiostyly**: left & right-handed flowers





Fecundacao cruzada: Outbreeding = outcrossing / allogamy /  
3) Spatial separation of anthers and stigmas = *herkogamy*

**movement herkogamy:** trigger mechanisms



Outbreeding = outcrossing / allogamy / xenogamy:

3) Spatial separation of anthers and stigmas = *hercogamy*

**movement hercogamy:** e.g., stigma movement

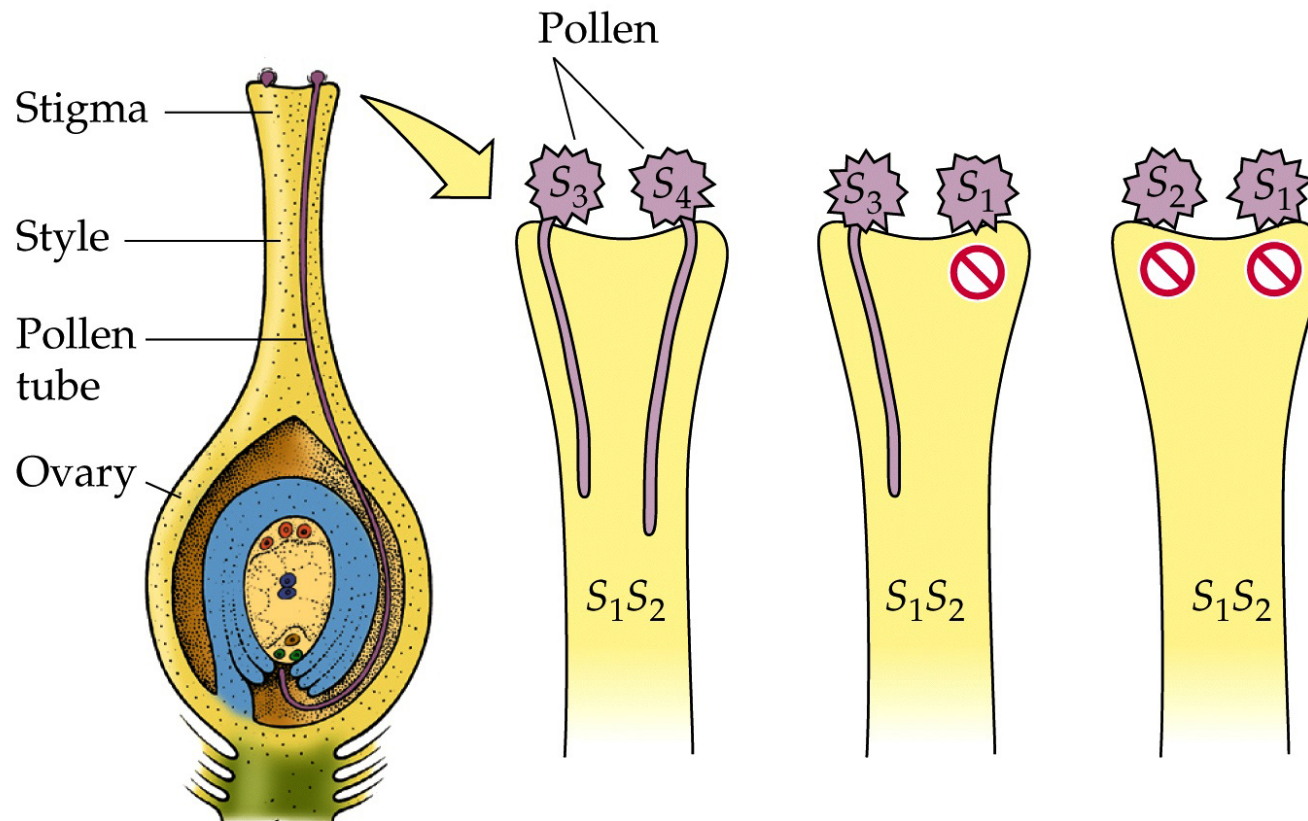


*Diplacus [Mimulus] aurantiacus* (Phrymaceae)

**Fecundacao cruzada: Outbreeding = outcrossing /  
allogamy**

#### 4) Self-incompatibility

Genetically determined, inability for fertilization to occur between gametes derived from one individual.



## Autofecundacao

**autogamy** (w/in 1 flower) & **geitonogamy** (between fls. of 1 indiv.)

Selective advantage: ensures propagule production

Disadvantage: reduced to absent genetic variability

**allautogamy**: both outcrossing & inbreeding

e.g., *Viola*, *Clarkia*: two flower types:

*chasmogamous* flowers - normal, open

*cleistogamous* flowers - remain closed

# Dispersao de frutos e sementes

Wind - samaras, winged seeds

Water - e. g., *Cocos nucifera* (Arecaceae)

Explosive dehiscence

Self (Autochory, e. g., *Arachis hypogaea*)

Animal

# Reproducao assexuada

Vegetative reproduction: ramets

Rhizomes

Bulbs, bulbels

Corms, cormels

Plantlets

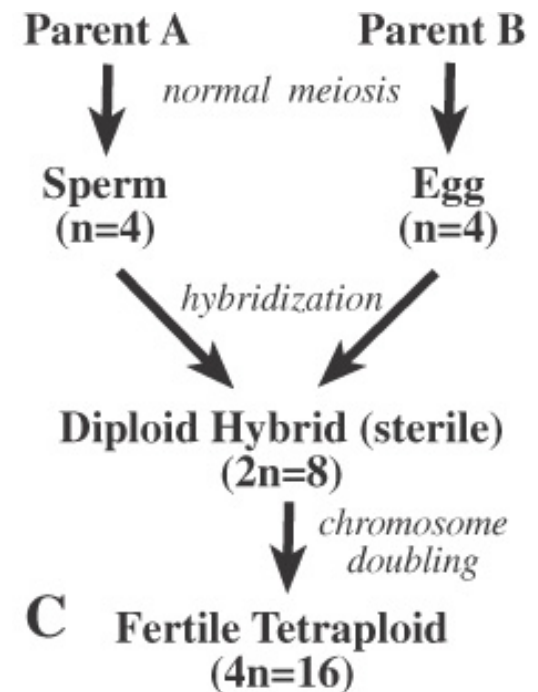
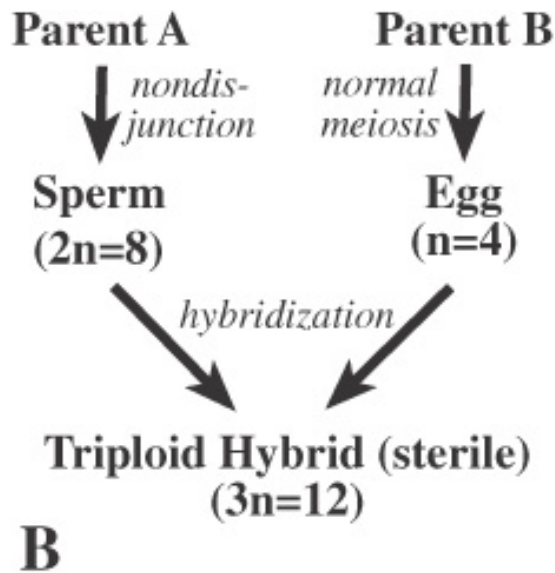
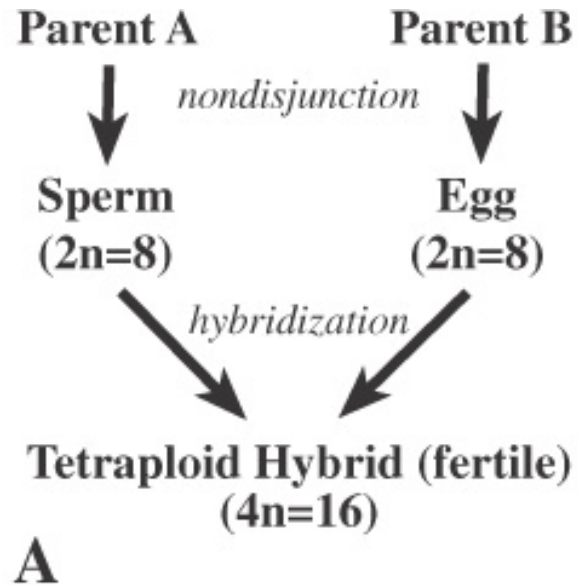
# Reproducao assexuada

**Agamospermy** - seed production without fertilization

**Parthenogenesis** (diploid egg)

Adventive polyembryony (non-egg diploid cell)

# Consequencias: hidridizacao em plantas





**Poliploidia: Polyploidy** – evolution of multiple sets of chromosomes; major mechanism of speciation.

