

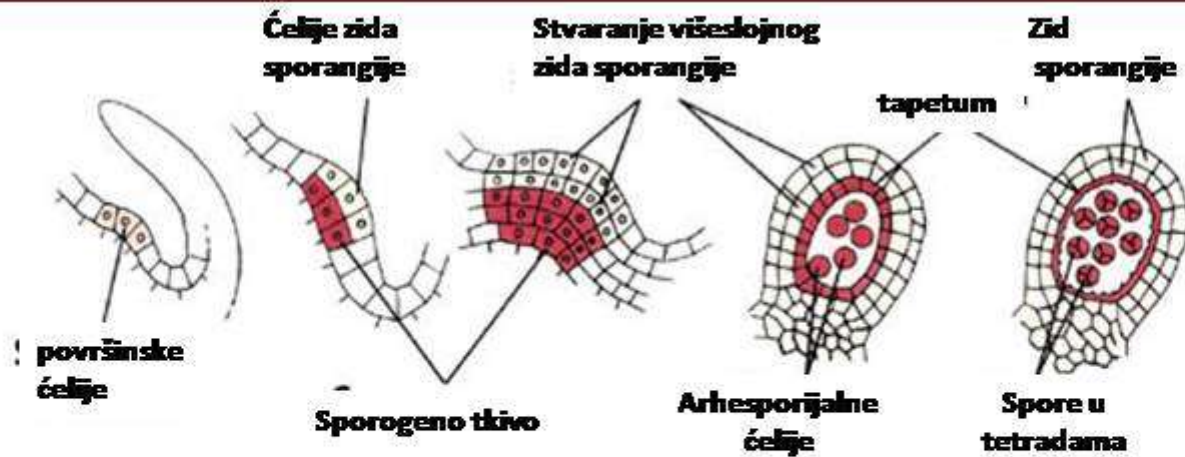
Euphyllphyta

Monilophyta

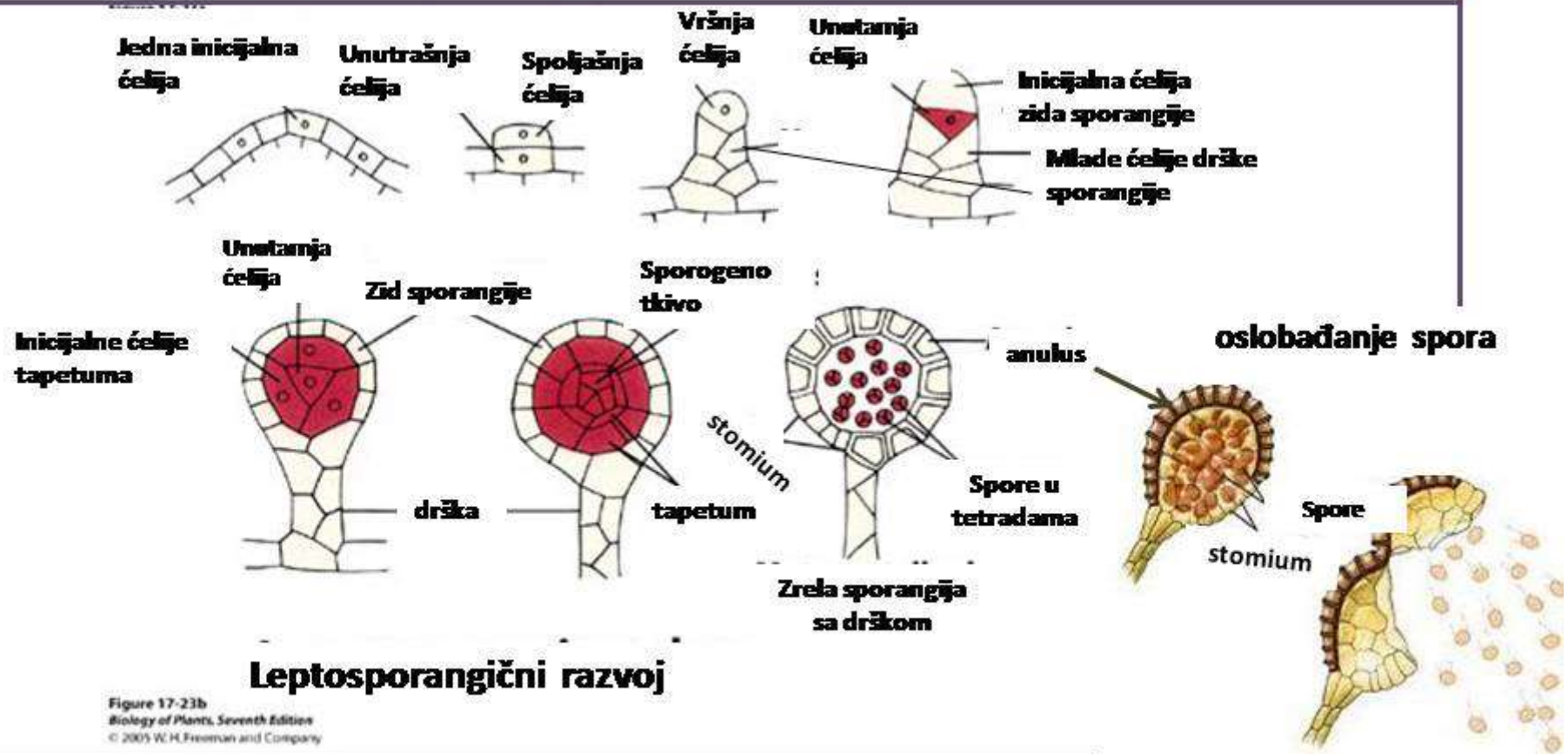
Spermatophyta

Monilophyta

- Psilotidae
 - Equisetidae
 - Marattiidae
 - Polypodiidae
- Eusporangiatae
- Leptosporangiatae
-
- ```
graph LR; A[Monilophyta] --- B[Psilotidae]; A --- C[Equisetidae]; A --- D[Marattiidae]; A --- E[Polypodiidae]; B --- F[Eusporangiatae]; C --- F; D --- G[Leptosporangiatae]; E --- G;
```



### Eusporangični razvoj



### Leptosporangični razvoj

Figure 17-23b  
Biology of Plants, Seventh Edition  
© 2005 W.H. Freeman and Company

# Marattiidae

- Eusporangijatne paprati, sinangije
- U vegetativnim djelovima postoje smoni hodnici, nalik četinarima!

## Marattiales

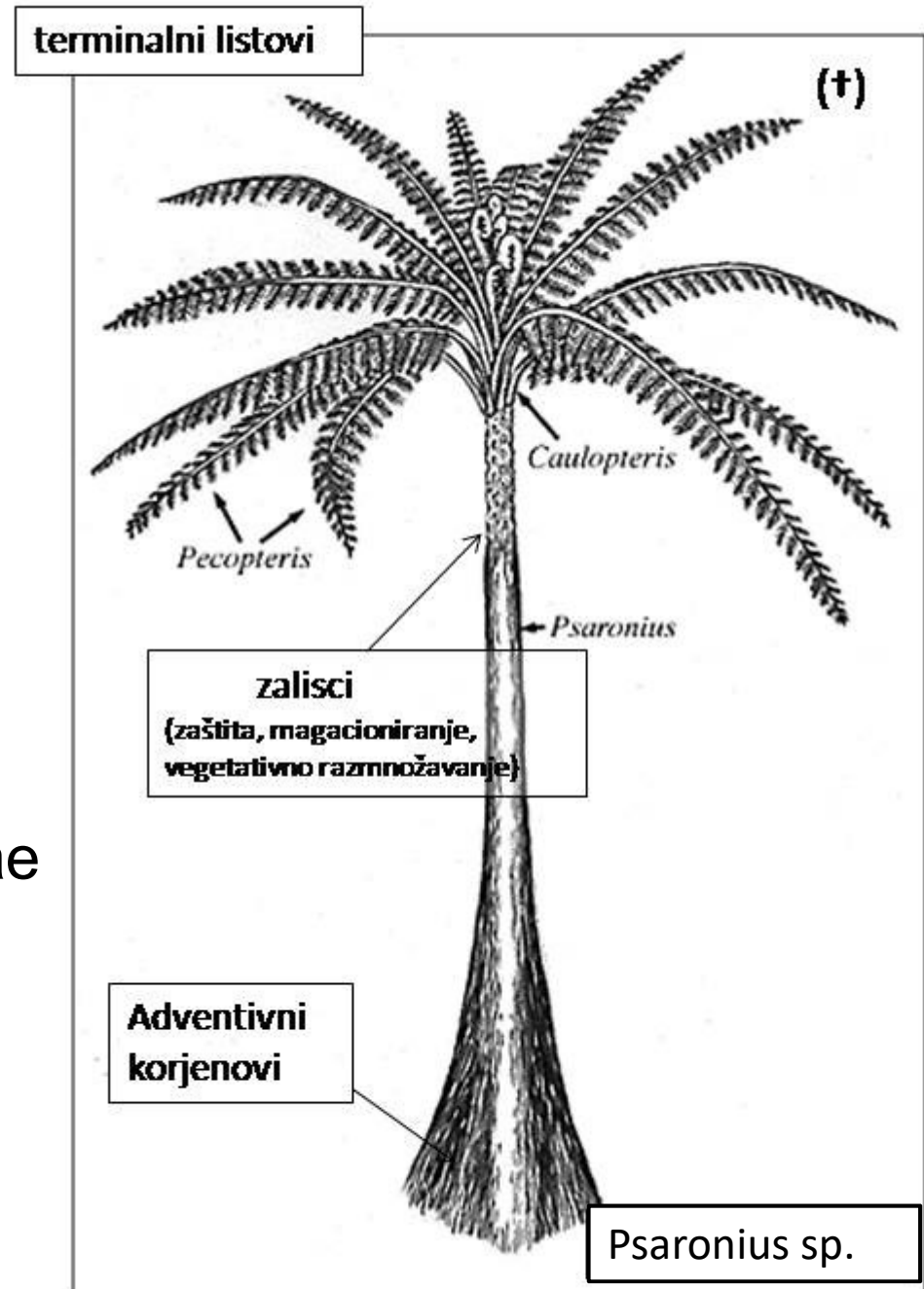
Marattiaceae

Marattia sp.

Angiopteris sp.

Psaroniaceae

Psaronius sp.



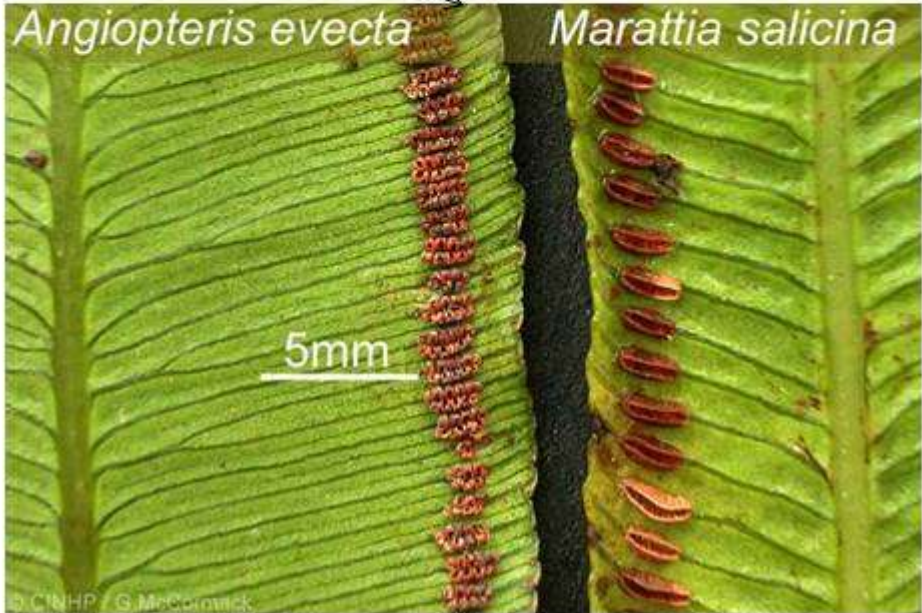
Doba karbon-perm



**Angiopteris evecta**

Sorusi na naličju

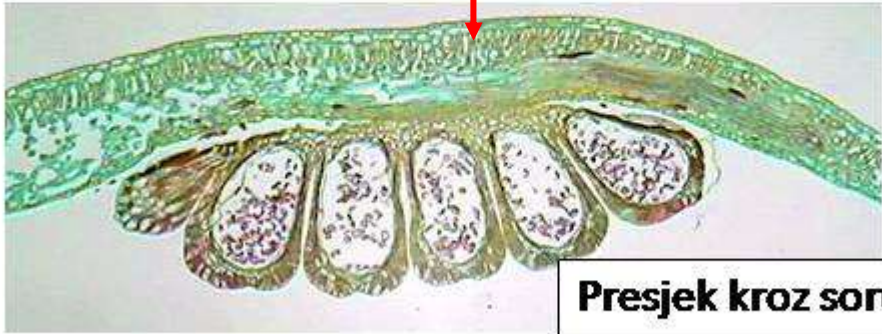
Sinangije...



© CNHP / G. McCornick



**Marattia attenuata**

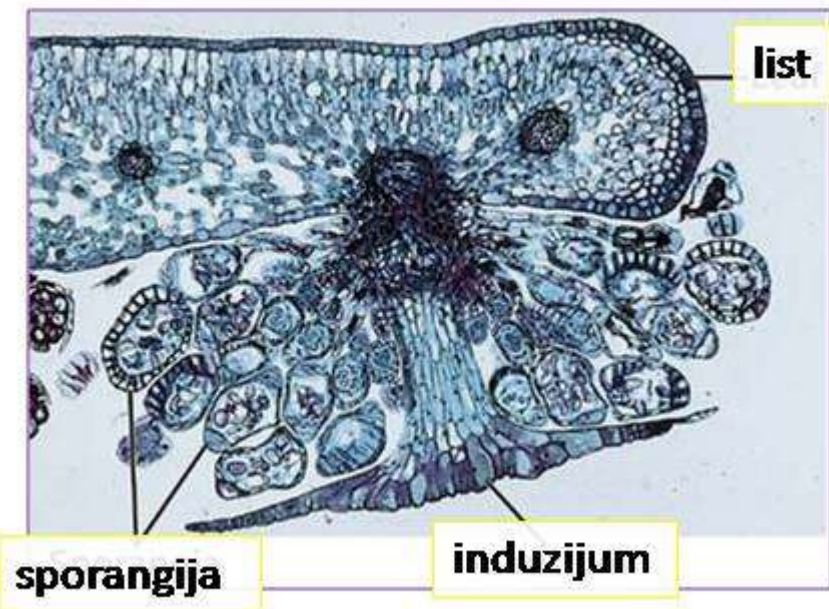
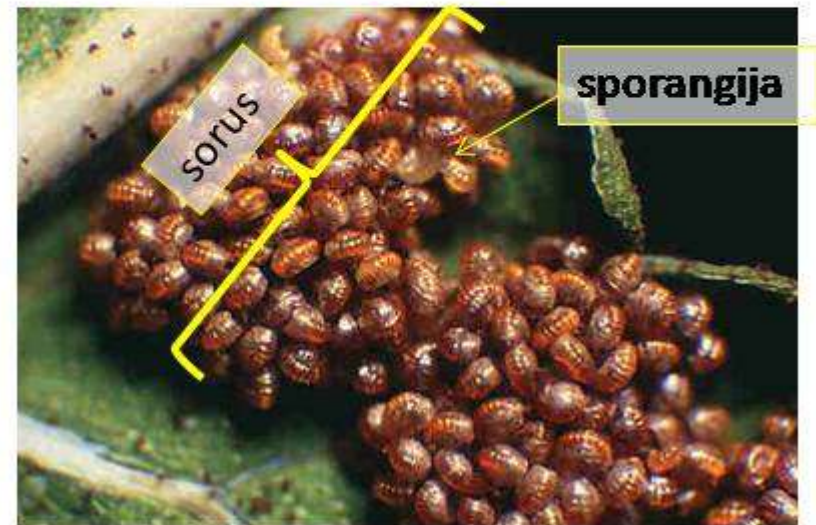


**Presjek kroz sorus**

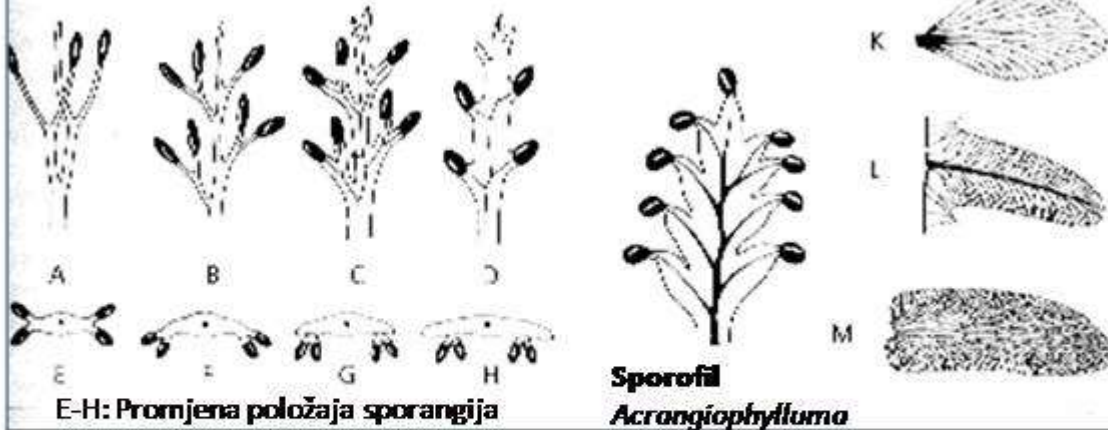
# Polypodiidae

Leptosporangične paprati, rizom, izo-, heterosporija .....

List uvijen u obliku puževe kućice



**A-D: Nastanak sporofila od fertilnih grana teloma**

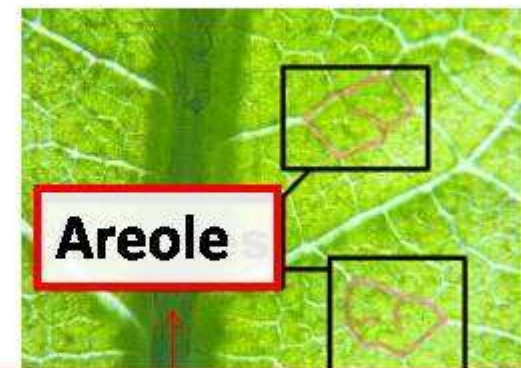
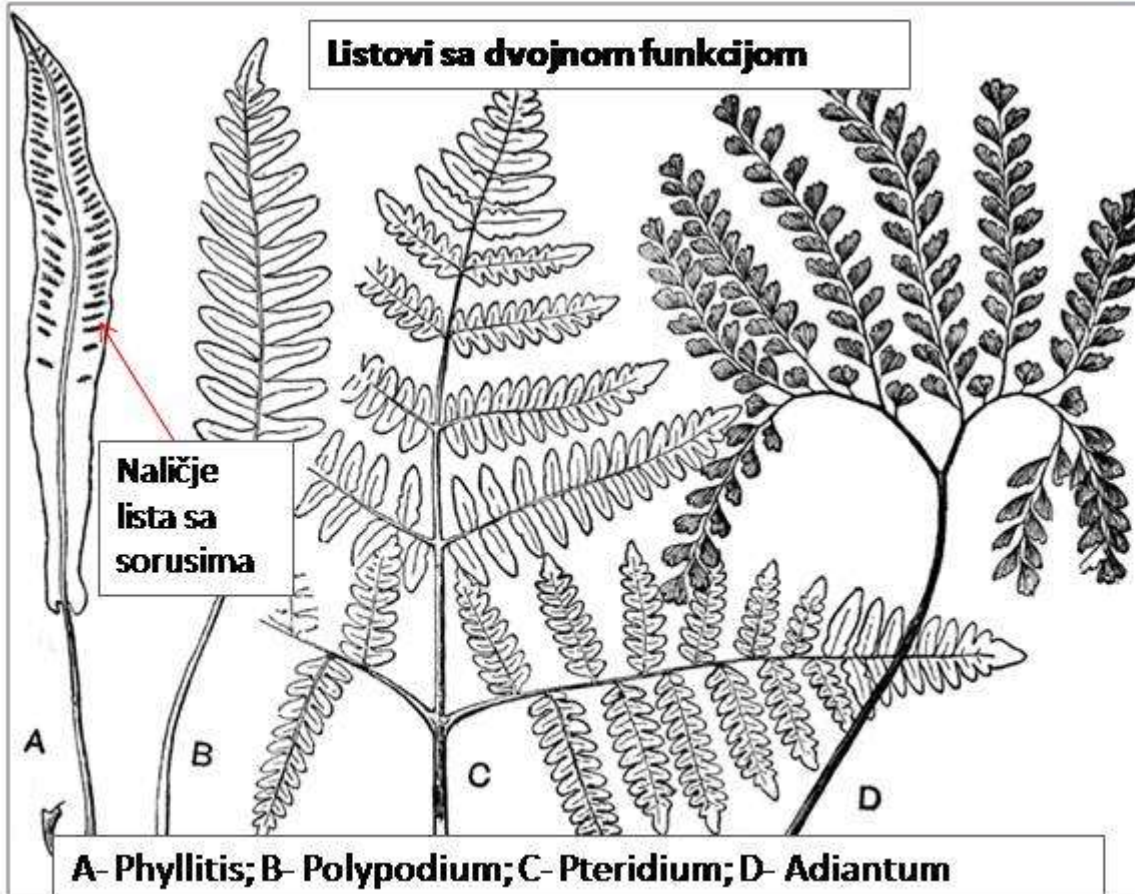


Dihotomo granati listovi i dihotoma, otvorena nervatura



Fam. Hymenophyllaceae

**Listovi sa dvojnóm funkcijom**



Rasperan list sa mrežastom, zatvorenom nervaturom i areolama!

David Webb

# Recentne paprati

Osmundales

Hymenophyllales

Gleicheniales

Schizaeales

Salviniales- **imaju predstavike u flori CG!**

Cyatheaales

Polypodiales- **imaju predstavike u flori CG!**



# Osmundales

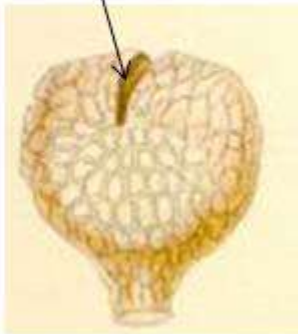


Osmunda regalis



Osmunda regalis L. var. spectabilis (Willd.) Gray  
Loc.: Roosevelt, Monmouth Co., New Jersey  
Date: 8 July 1999  
Photo: R. E. Tulloss  
Copyright 1999 by Rand for Roosevelt, Inc.

tjemena pukotina na izosporangiji



trofofil

Sporofil

Nemaju soruse, niti induzijum!  
Anulus ili ne postoji ili je jednostran.

# Hymenophyllales



Hymenophyllum nephrophyllum – bubrežasta paprat



sorusi

dvostrani induzijum

Hymenophyllum tunbrigense

# Gleicheniales



*Dicranopteris linearis*



# Schizaeales



fam. Lygodiaceae  
g. Lygodium – puzeća paprat



# Cyatheaales- drvenaste paprati



**Cyathea dealbata**

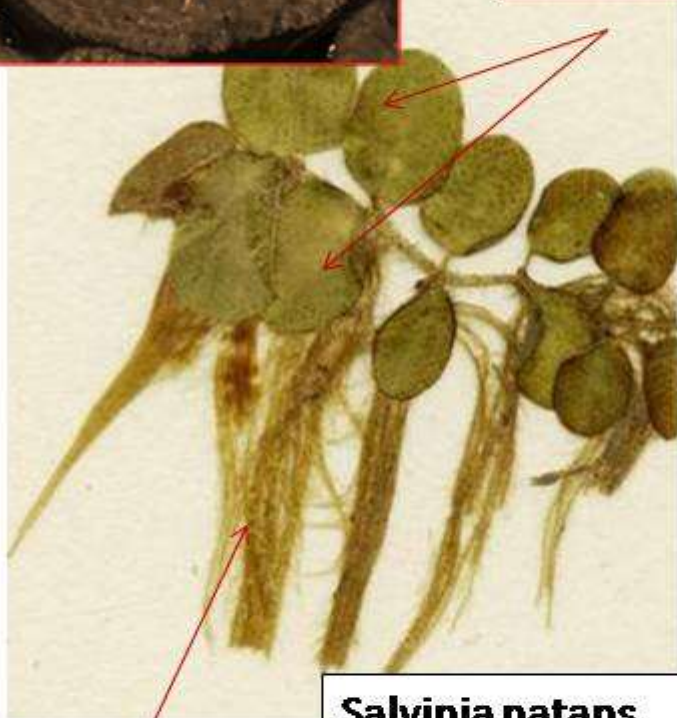


# Salviniales



Bradavice i  
dlačice na listu

Flotantni listovi

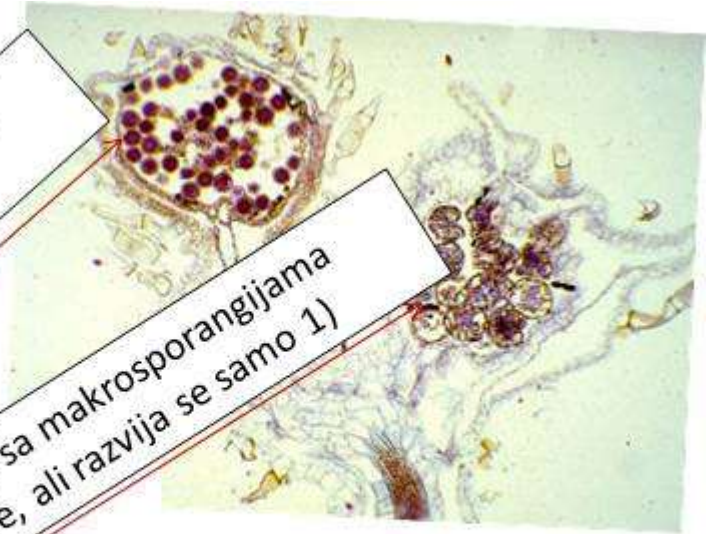


Salvinia natans

Podvodni  
končasti listovi!



Sporokarp sa mikrosporangijama  
u kojima nastaje po 63 spore



Sporokarp sa makrosporangijama  
(32 spore, ali razvija se samo 1)



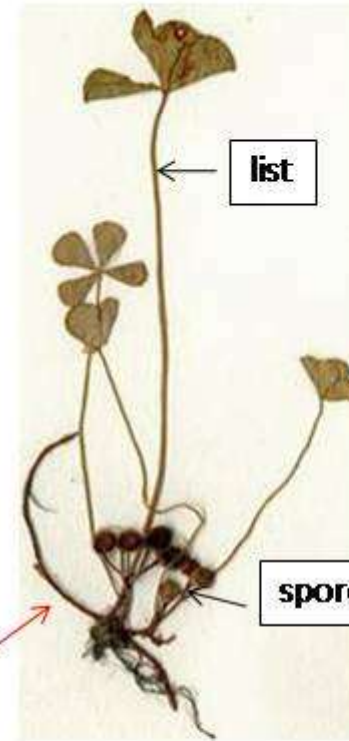
Sporokarp (sorusi)

- Čaura sporokarpa dvojna
- Zid sporangija jednoslojan!
- Muški gametofit= protalijum sa 2 anteridije
- Ženski gametofit= protalijum sa 1 arhegonijom



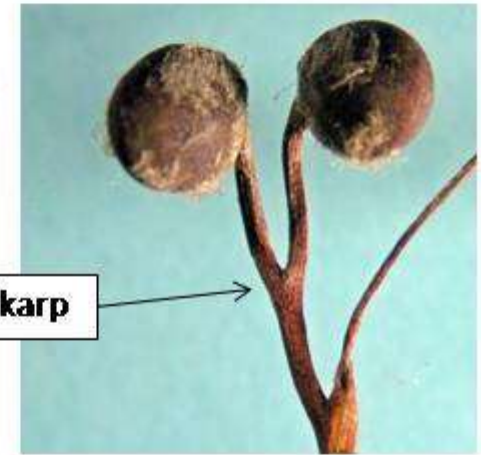
**Marsilea quadrifolia**

**rizom**



**list**

**sporokarp**



Zastupljena u flori CG,  
i na listi zakonom zaštićenih vrsta



**Sporokarp sa sorusima od par makro i puno mikrosporangija**

**Spoljašnji čvrsti zid sporokarpa**

**Galertrni sloj**

# Polypodiales



Obodno postavljeni sorusi



Induzijum razdijeljen



Induzijum cio i u vidu kišobrana

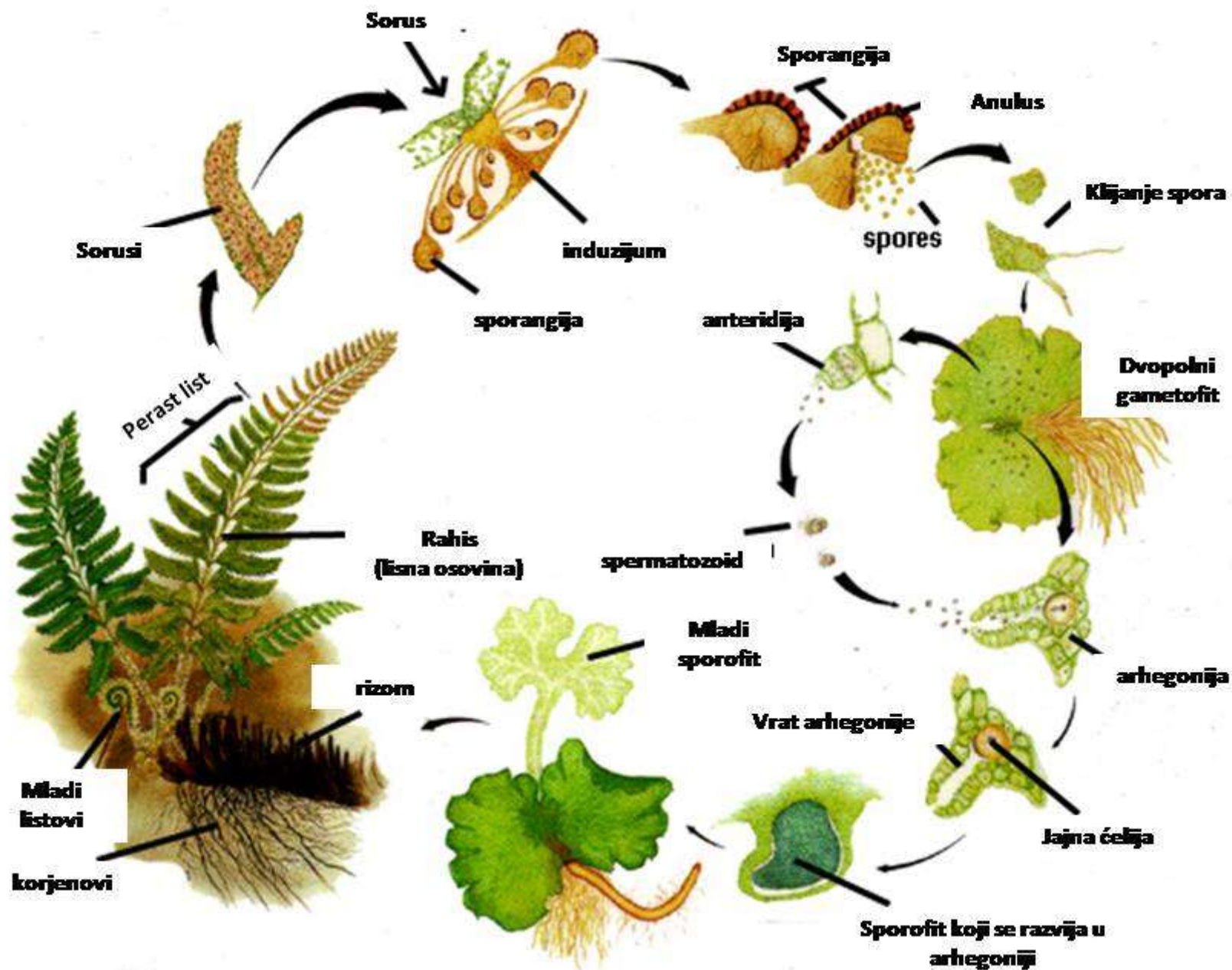


Induzijum jajast i jednostrano pričvršćen

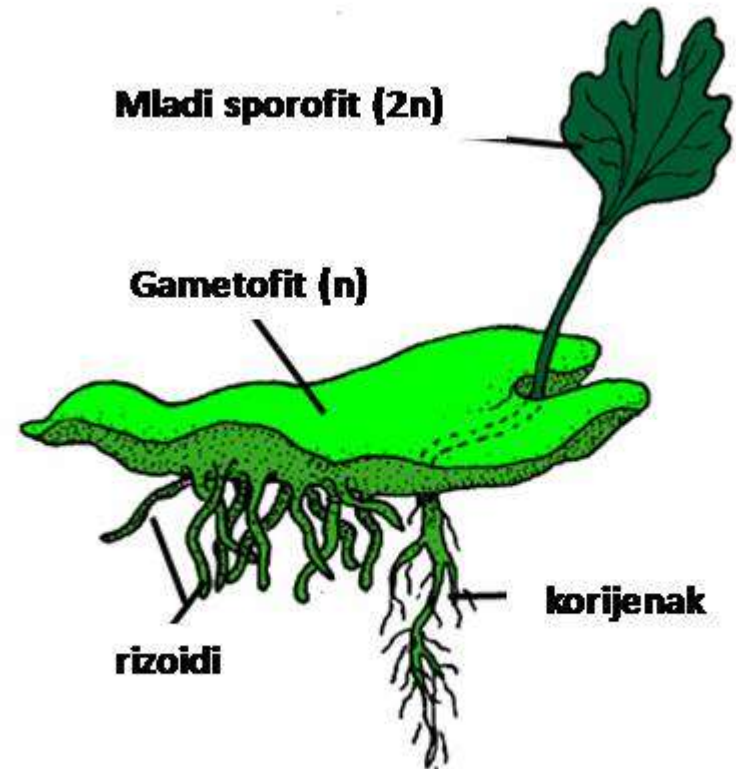
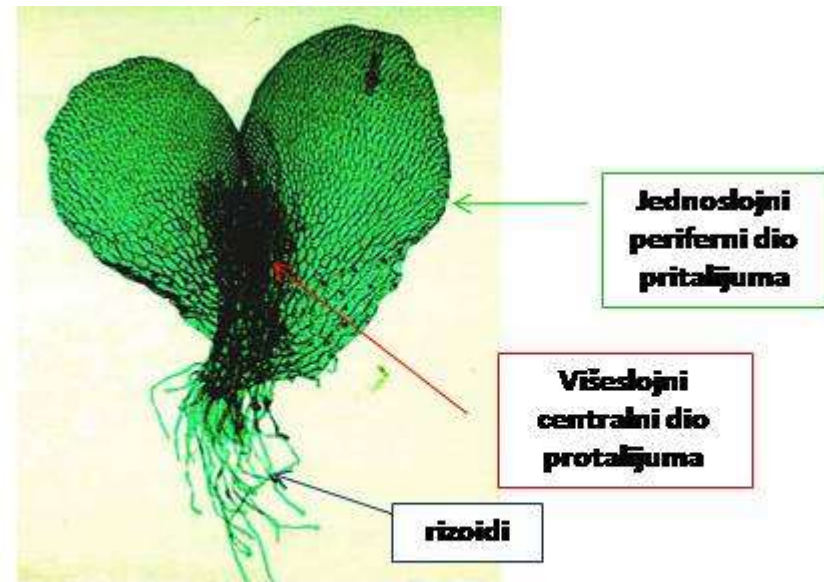




# Opšti ciklus razvića paprati



# Protalijum (autotrofan!)



## Odstupanje od opšteg scenarijuma ciklusa razvića:

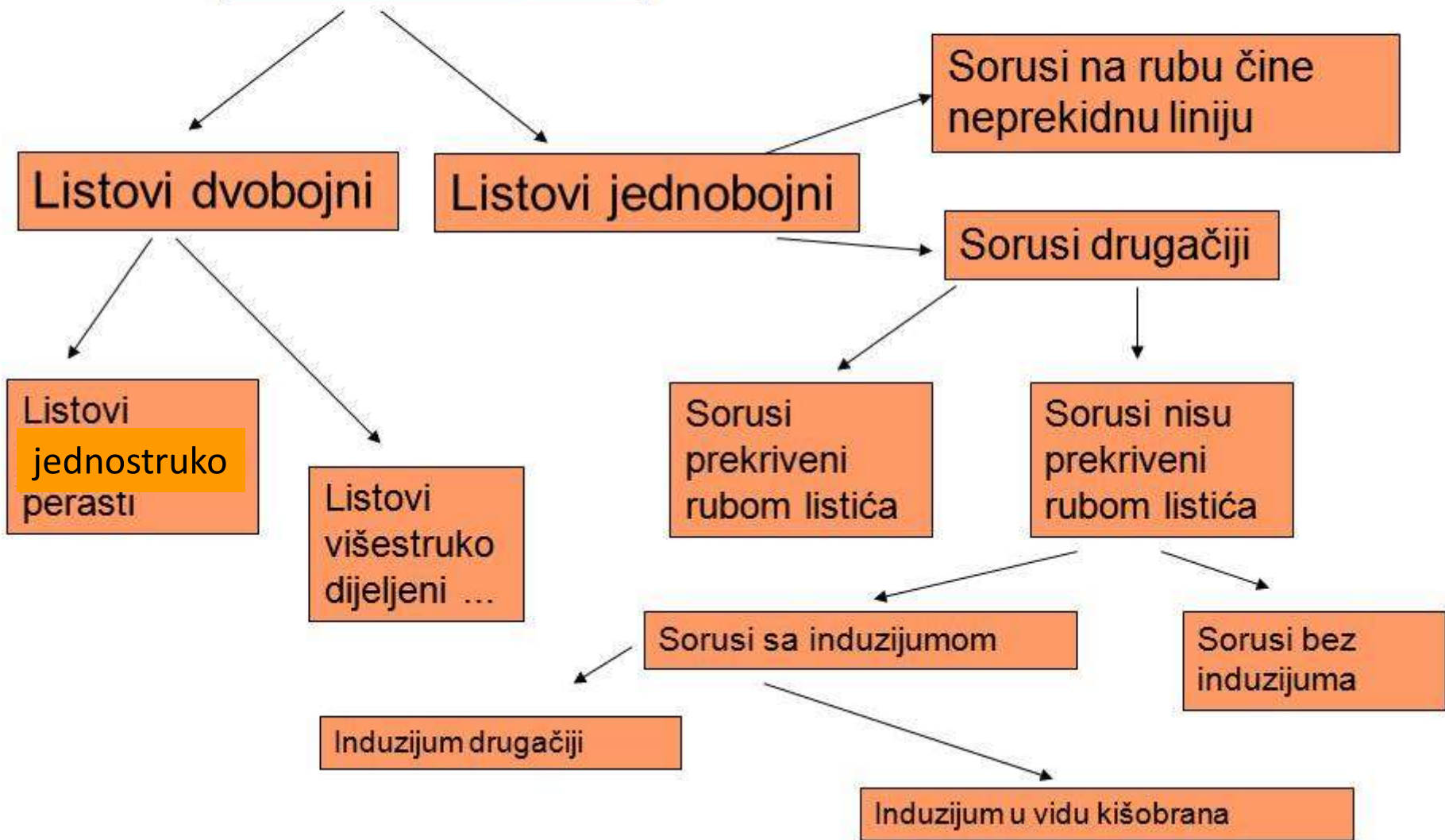
**Apo= bez**

- **Aposporija**- nastanak gametofita ne iz spore, već iz vegetativne ćelije sporofita. Gametofit je  $2n$ .
- **Apogamija**- nastanak sporofita iz ćelija gametofita. Sporofit je  $n$ .
- **Partenogeneza**- razvitak bez prethodnog oplodjenja. Ženski gamet je diploidan i iz njega nastaje sporofit.

Listovi cijeli

Fam: Polypodiaceae  
taksonomski markeri

Listovi dijeljeni



# Predstavnici

- *Scolopendrium vulgare* = *Phyllitis scolopendrium*
  - *Ceterach officinarum*
  - *Asplenium trichomanes*
    - *Cheilanthes persica*
    - *Pteridium aquilinum*
  - *Adiantum capillus-veneris*
    - *Polypodium vulgare*
    - *Nephrodium filix-mas*
    - *Polystichum aculeatum*