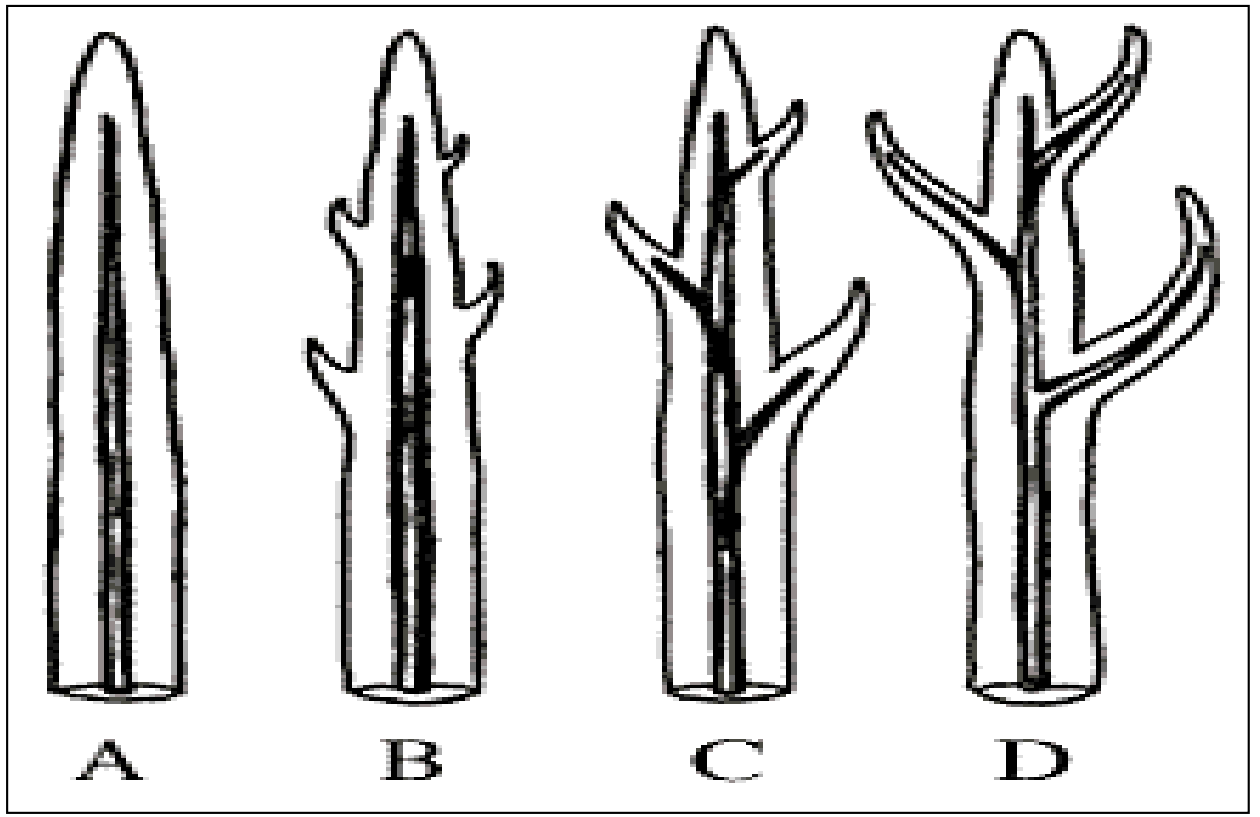
Lycopodiidae

- Enacije (nisu vaskularizovane ili jesu samo pri osnovi), mikrofili
- Ligula
- Sporofili, trofofili
- Bubrežaste sporangije
- Strobilusi, sporonosne zone
- Izospore (dvopolni gametofit), heterospore (jednopolni gametofit)
- Dihotomija, nejednaka dihotomija
- Adventini korjeni, bez korjenovih dlaka

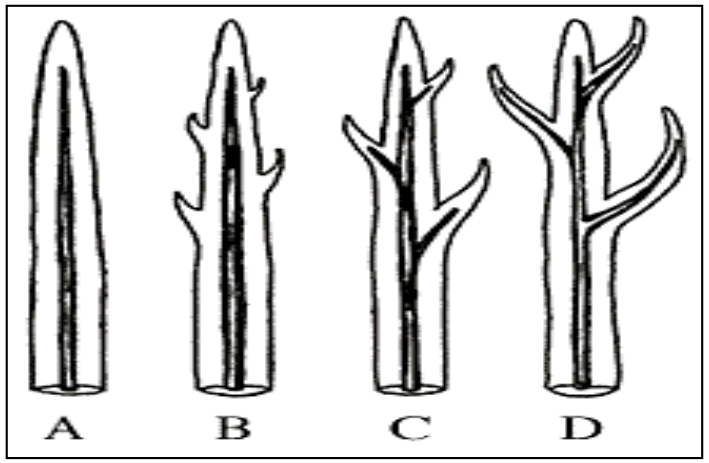
Vaskularizacija kod *Zosterophyllum, Sawdonia, Asteroxylon* i *Leclercqia* (Kenrick i Crane, 1997).
(A) *Zosterophyllum* (gola osovina, ovalna protostela),
(B) *Sawdonia* (enacije, bez provodnih elemenata)
(C) *Asteroxylon* (enacije sa provodnim elementima koji zalaze u njenu osnovu),
(D) *Leclercqia* (osovina sa vaskularizovanim mikrofilima).

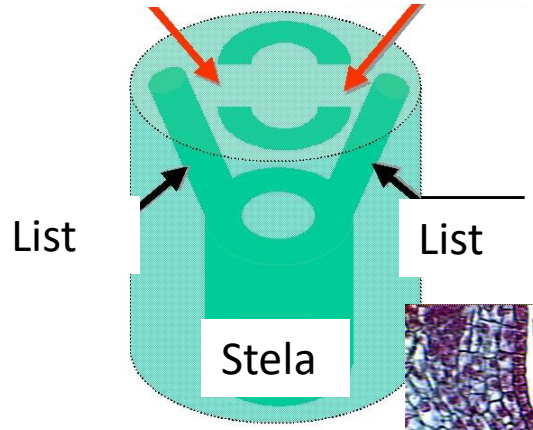


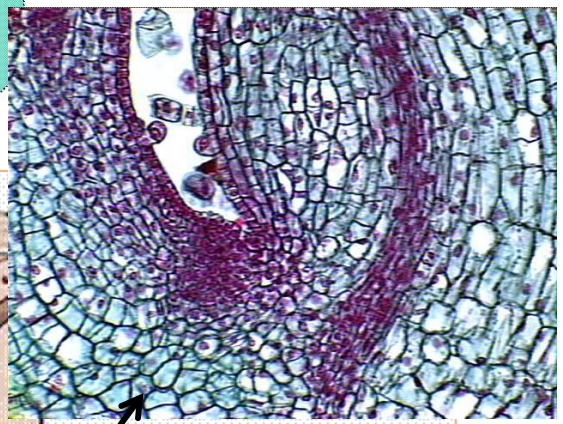
Enacije i mikrofili- bez lakuna u steli

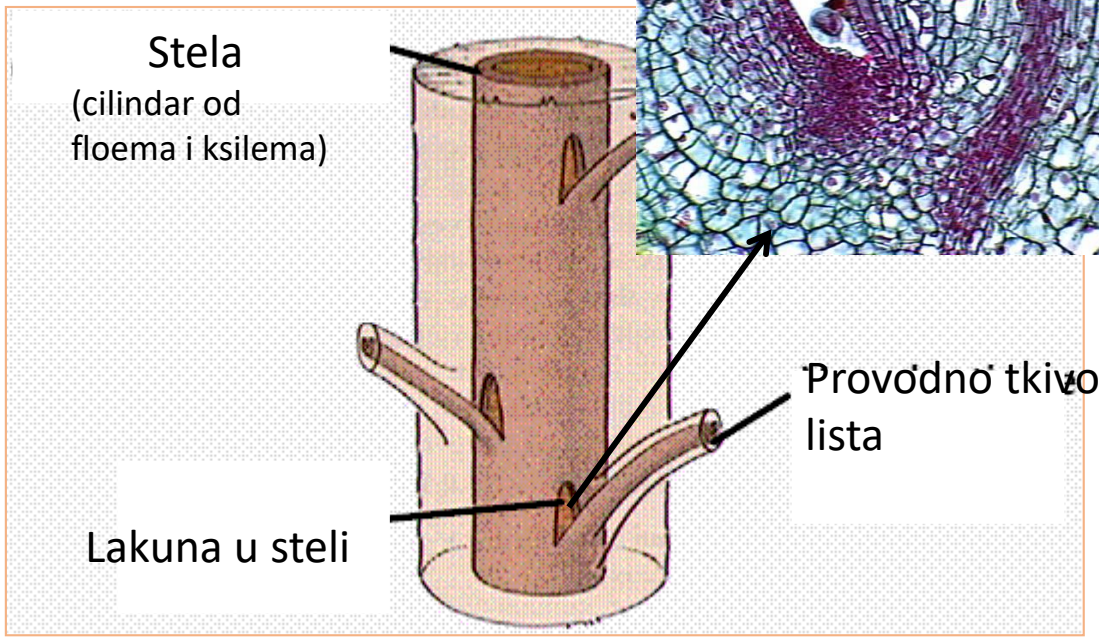
Telomni listovi- sa lakunama u steli

Enacije, mikrofili- bez lakuna u steli

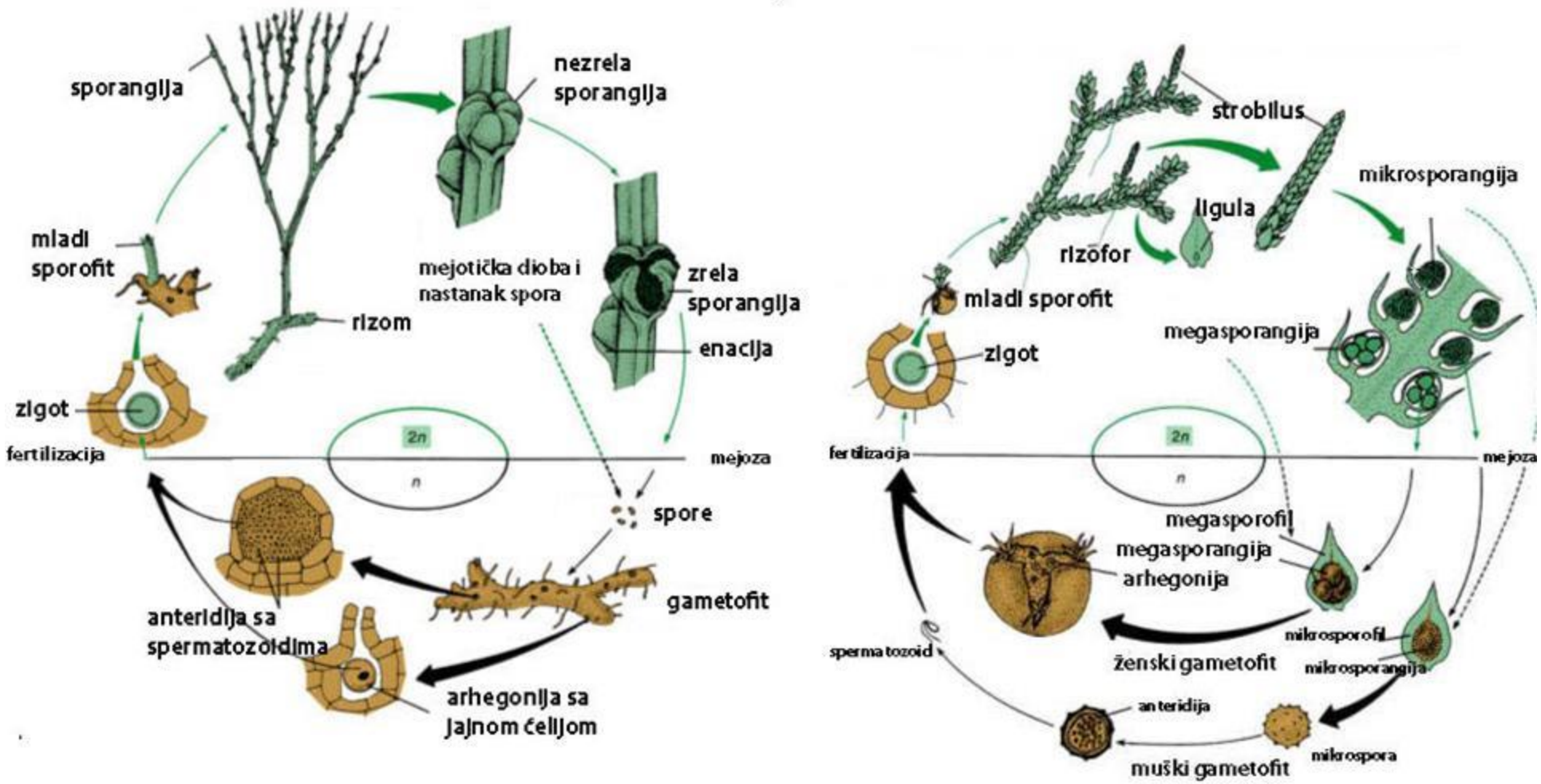








Ciklus razvića izo- i heterospornih prečica



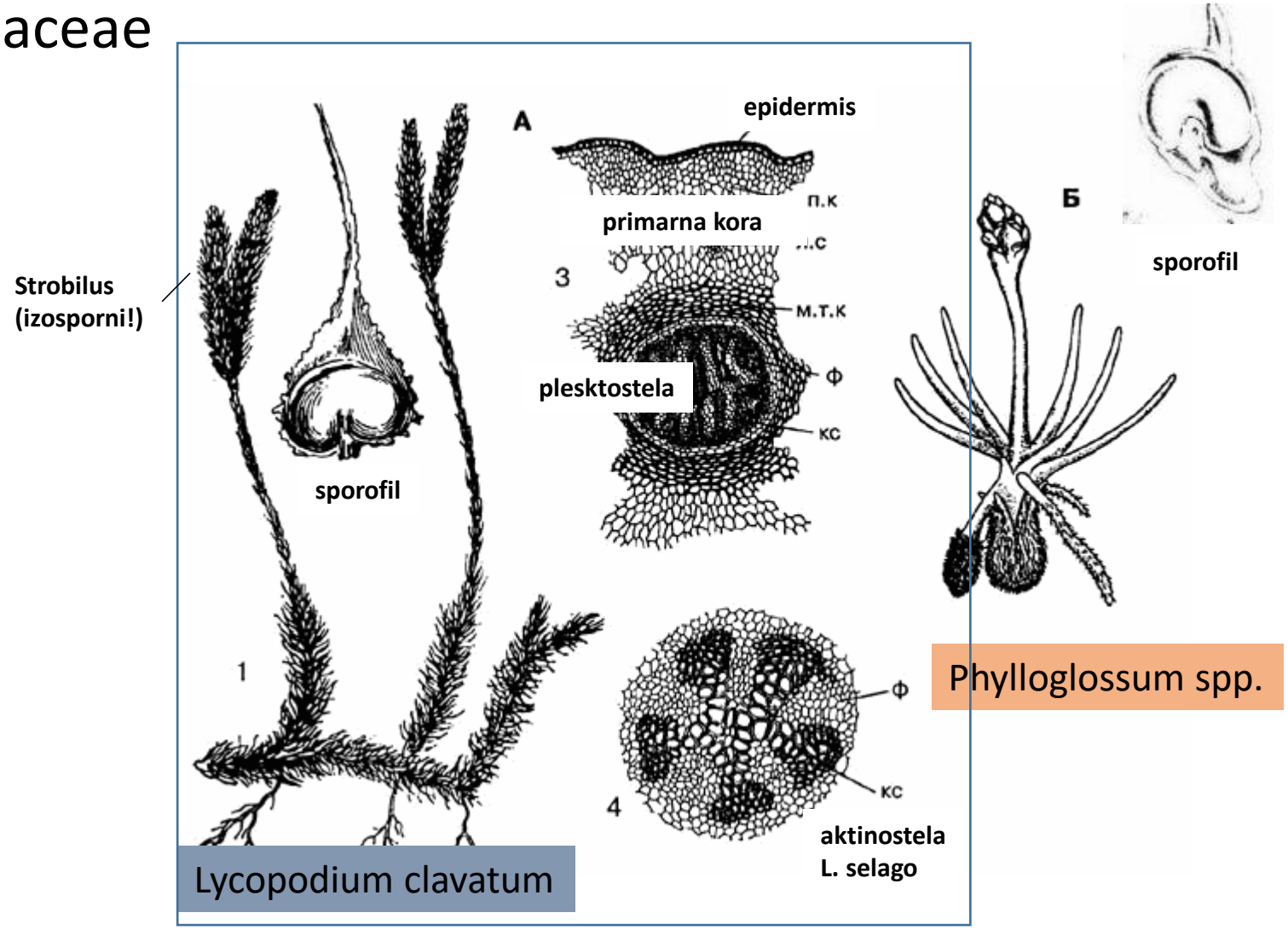
Jednodomo, jednopolno

Sporofit: ..... Gamatofit generacija: .....

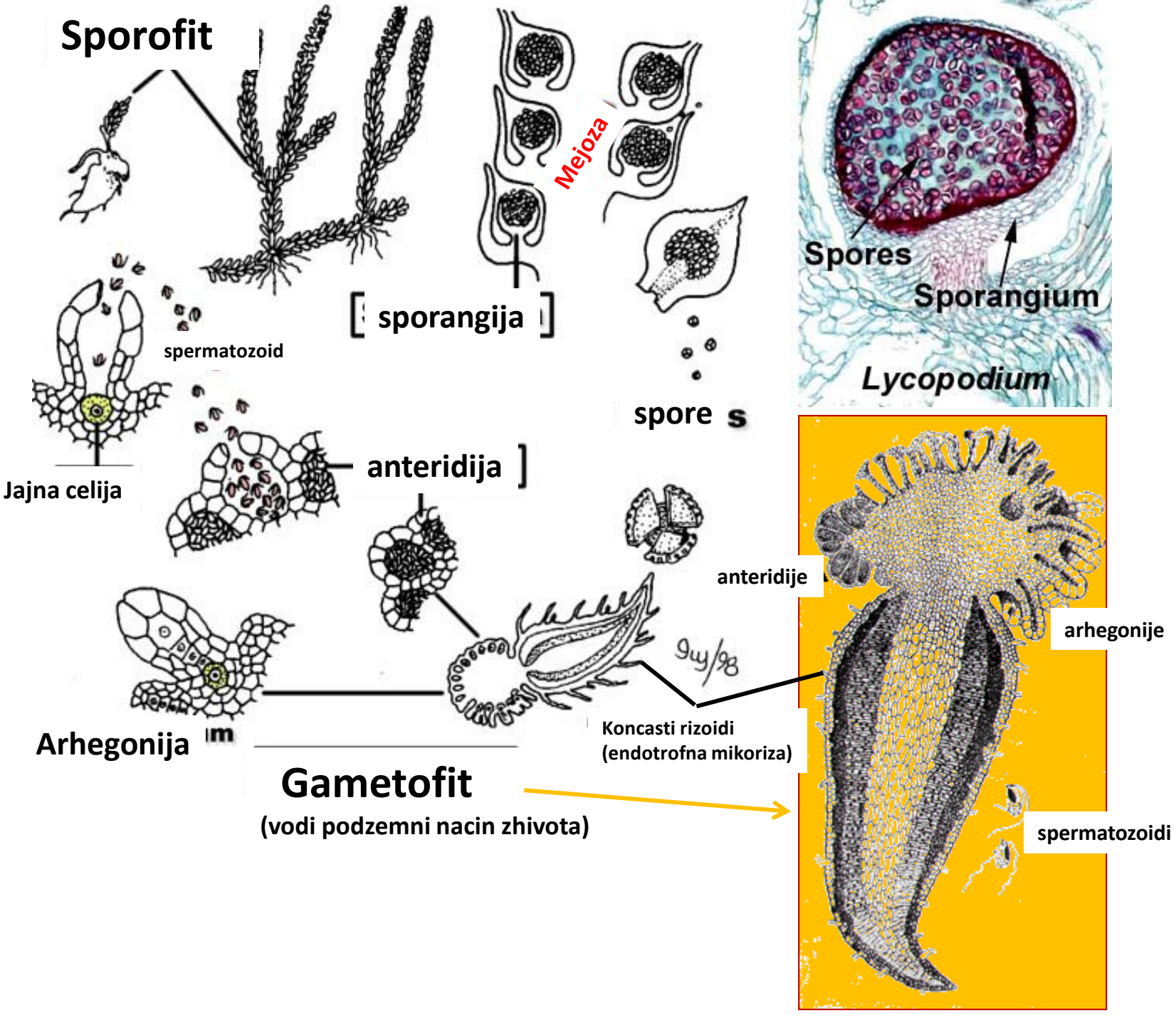
Recentni predstavnici

- o. Lycopodiales
- o. Selaginellales
- o. Isoetales

o. Lycopodiales
fam. Lycopodiaceae



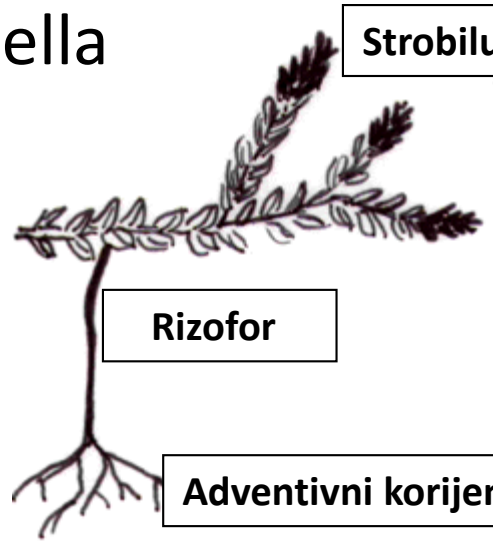
Lycopodium (*Huperzia, Phlegmariurus*), Phylloglossum ...

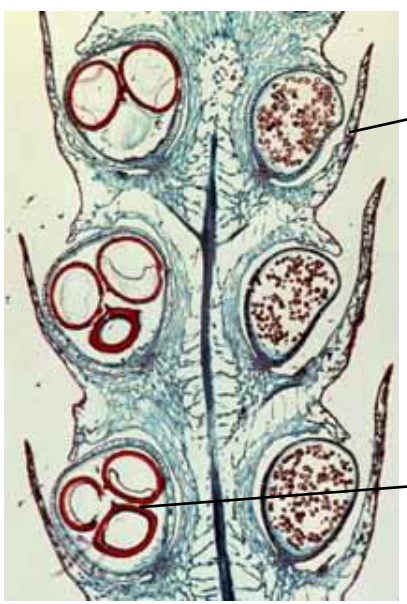

Sporofit
Mejoza
sporangija
spermatozoid
spore
Jajna celija
anteridija
Arhegonija
Gametofit
(vodi podzemni nacin zhivota)
Koncasti rizoidi
(endotrofna mikoriza)
Spores
Sporangium
Lycopodium
anteridije
arhegonije
spermatozoidi

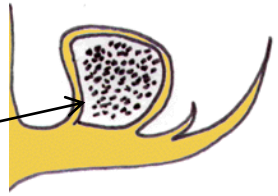
Huperzia selago (syn. *Lycopodium selago*)

Lycopodium annotinum

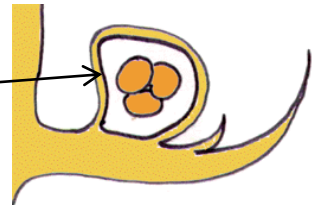
o. Selaginellales
fam. Selaginellaceae
g. Selaginella





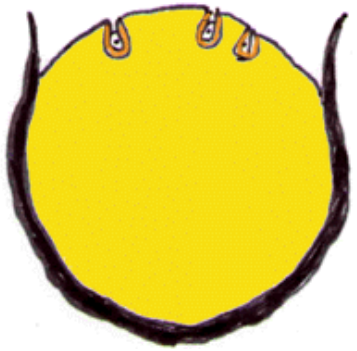


mikrosporangija

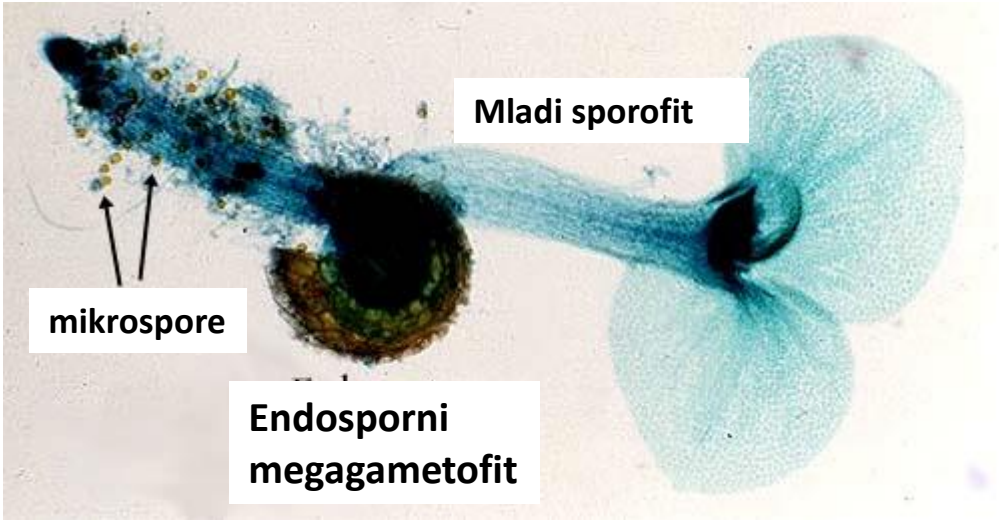


megasporangija

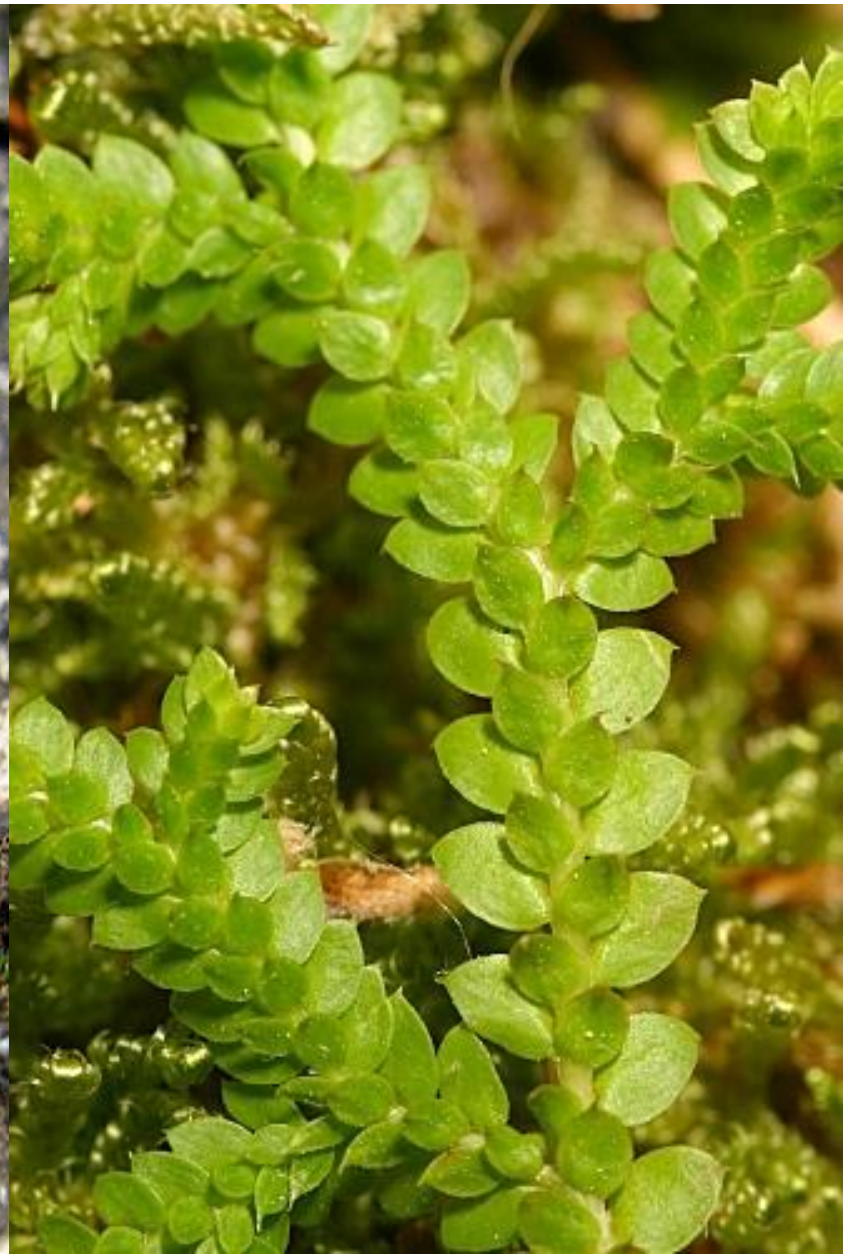
Mikrospore kojoj nastaje 128 ili 256 miliona spermatozoida

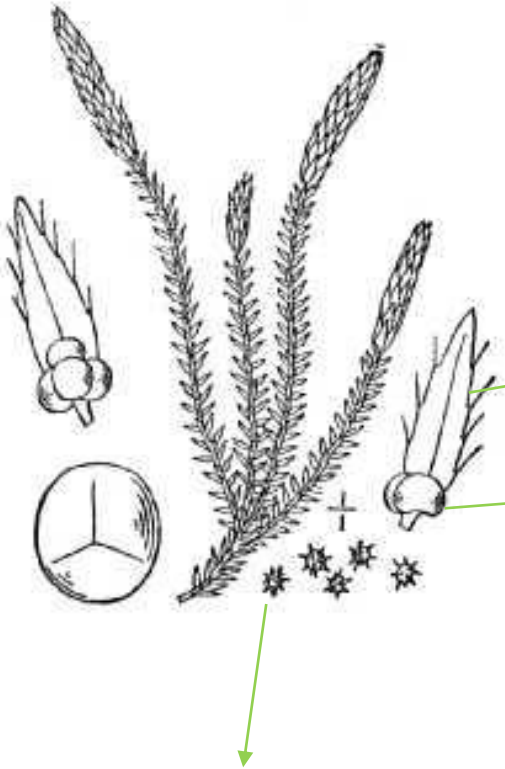


Megaspora sa megagametofitom (protalijum sa arhegonijama)



Selaginella denticulata



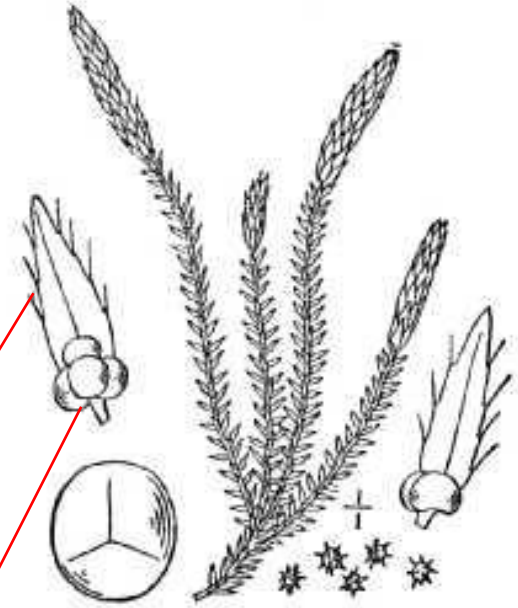


mikrosporofil

mikrosporangija

mikrospora

Selaginella selaginoides



megasporofil

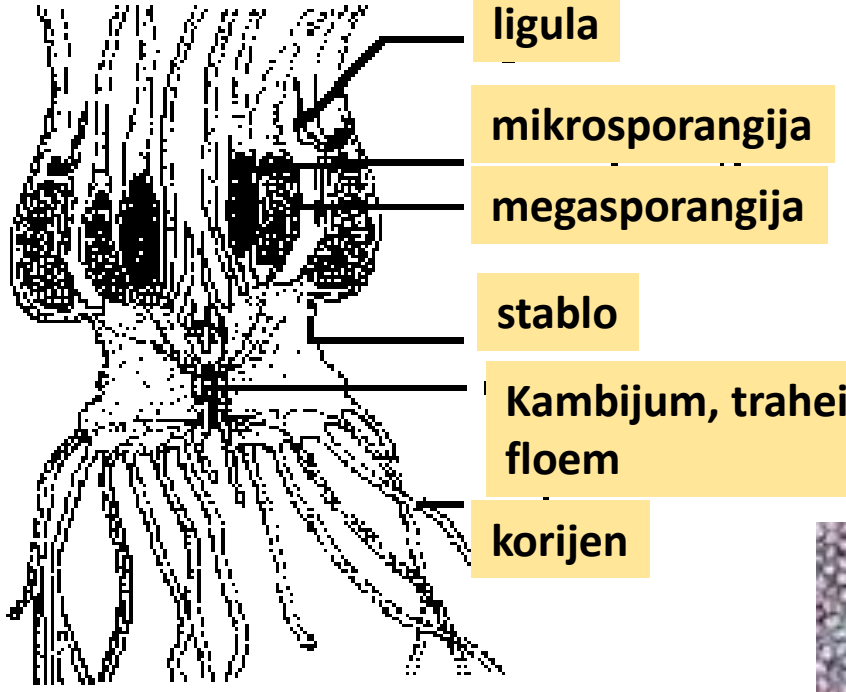
megasporangija

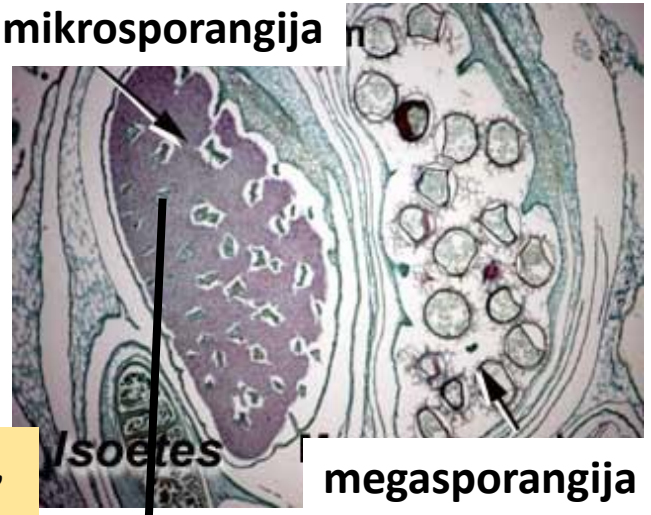
megaspora

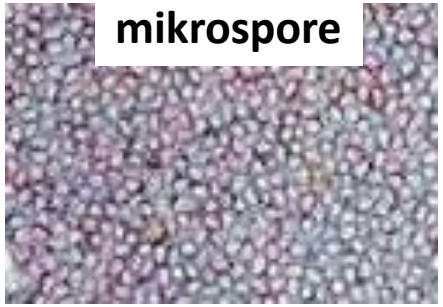
o. Isoetales

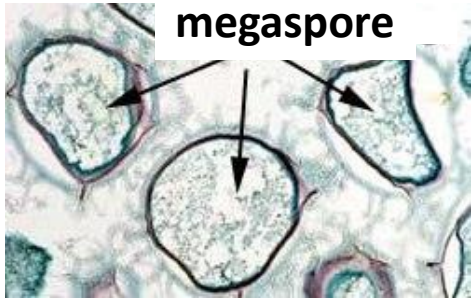
fam. Isoetaceae

g. Isoetes





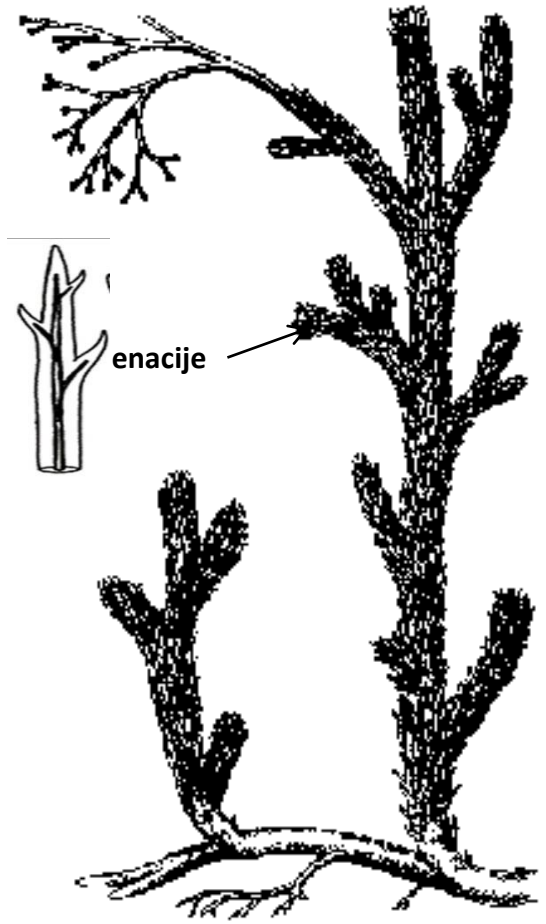




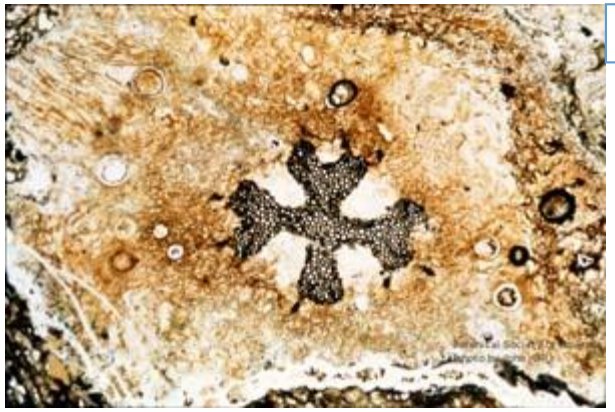
Fosilni predstavnici

- o. Asteroxylales (†)
- o. Protolepidodendrales (†)
- o. Lepidodendrales (†)

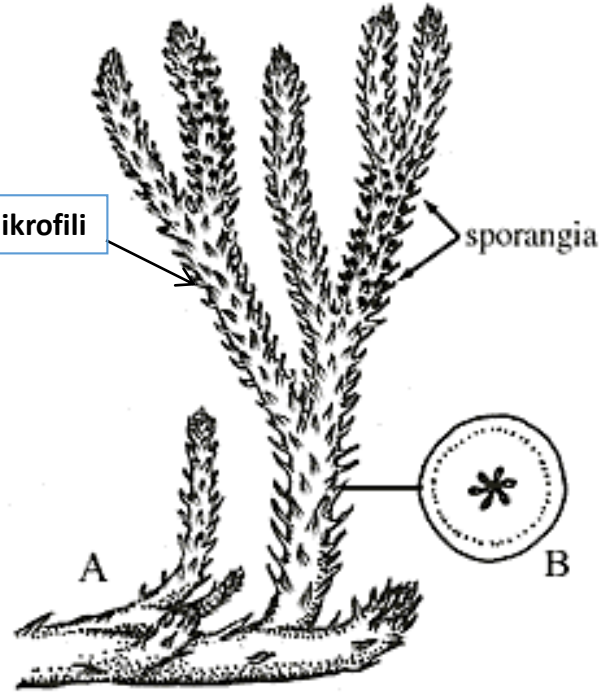
o. Asteroxylales (†)



Asteroxylon sp.



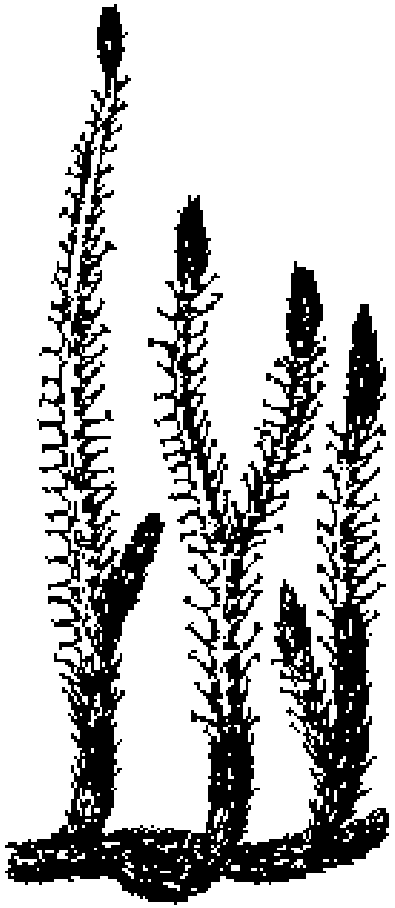
Presjek kroz stablo
(zvjezdasti ksilem, drvo).



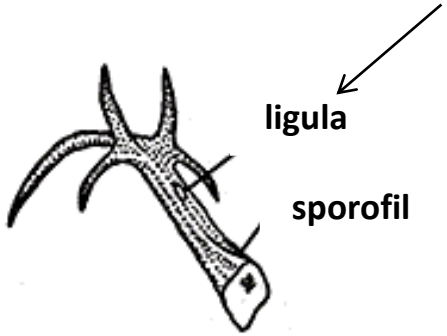
Drephanohycus sp.

o. Protolepidodendrales (†)

(viljuškasti listovi)



Protolepidodendron sp.



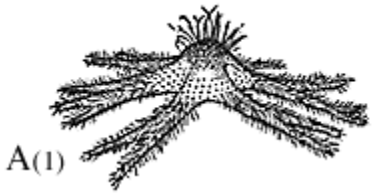
Kod recentnih prečica iz klase Lycopodiopsida ligula ne postoji!!!

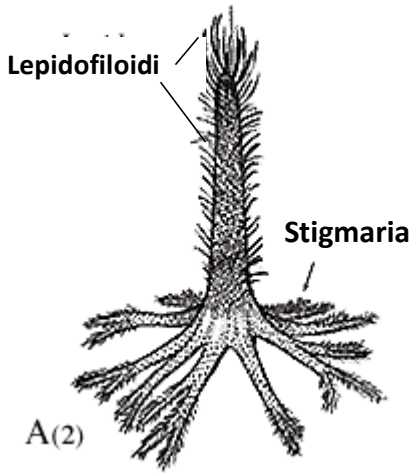
Mikrofili ***Leclercqia sp.,*** sporangija se nalazi adaksijalno tačno ispod jezička **ligule.**

Archaeosigillaria- još jedna izosporna prečica sa ligulom!

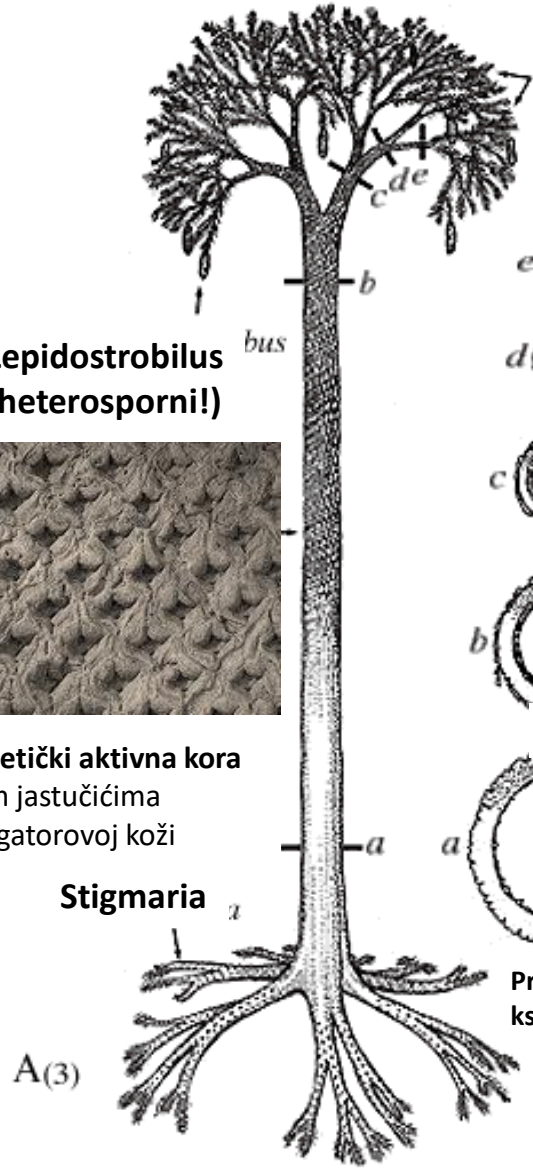
o. Lepidodendrales (†)

Lepidodendron sp. (razviće)



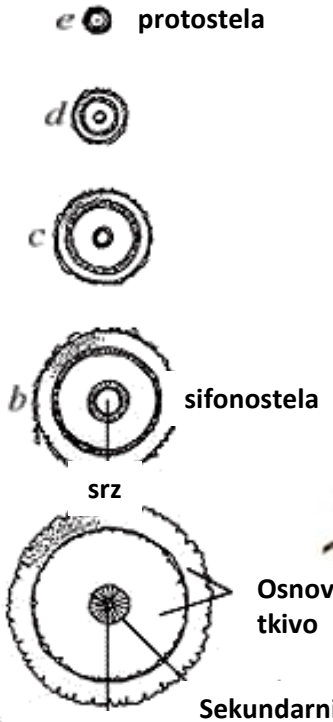


„korasto drveće“



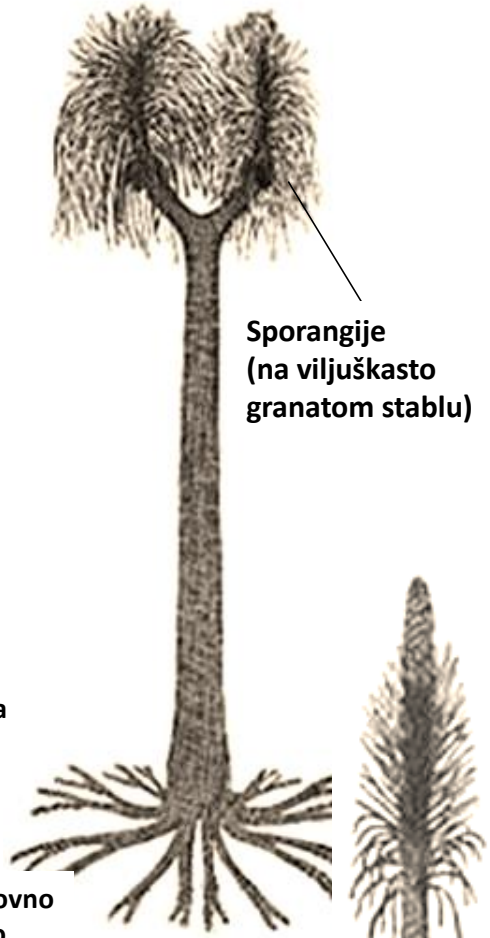
Lepidostrobilus (heterosporni!)

Fotosistetički aktivna kora sa lisnim jastučićima nalik aligatorovoj koži



Monokarpne biljke!!!

Sigillaria sp.

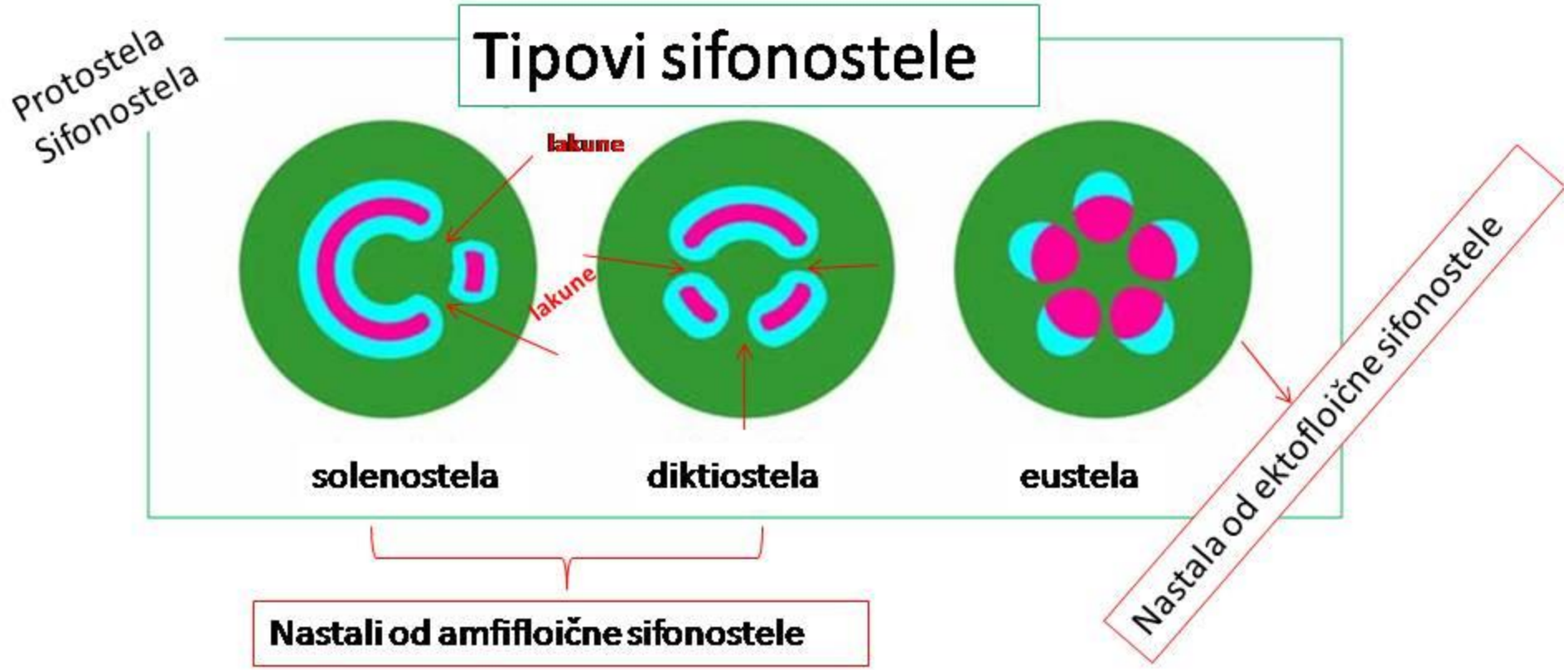


Pleuromeia sp.

Euphyllophyta

Monilophyta

Spermatophyta



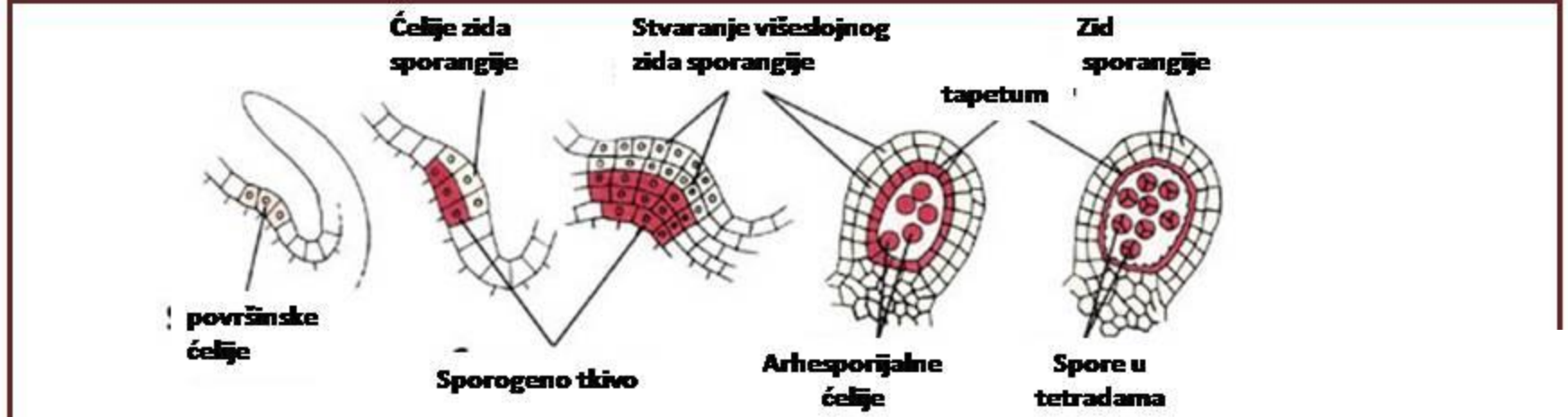
- **solenostela** – najprimitivniji tip sifonostele, u kojoj se javlja srž koja je okružena floemom i ksilemom (tipična za neke primitivne paprati).
- **diktiostela** – slična solenosteli, ali sa više lakuna u prstenu od floema u ksilema, na mjesti kojih se javljaju listovi (sreće se samo kod paprati).
- **eustela** – prsten od floema i ksilema je "razbijen" i diferenciran na provodne snopiće, koji su kružno raspoređeni oko srži (tipičan za biljke sa sjemenom).

Monilophyta

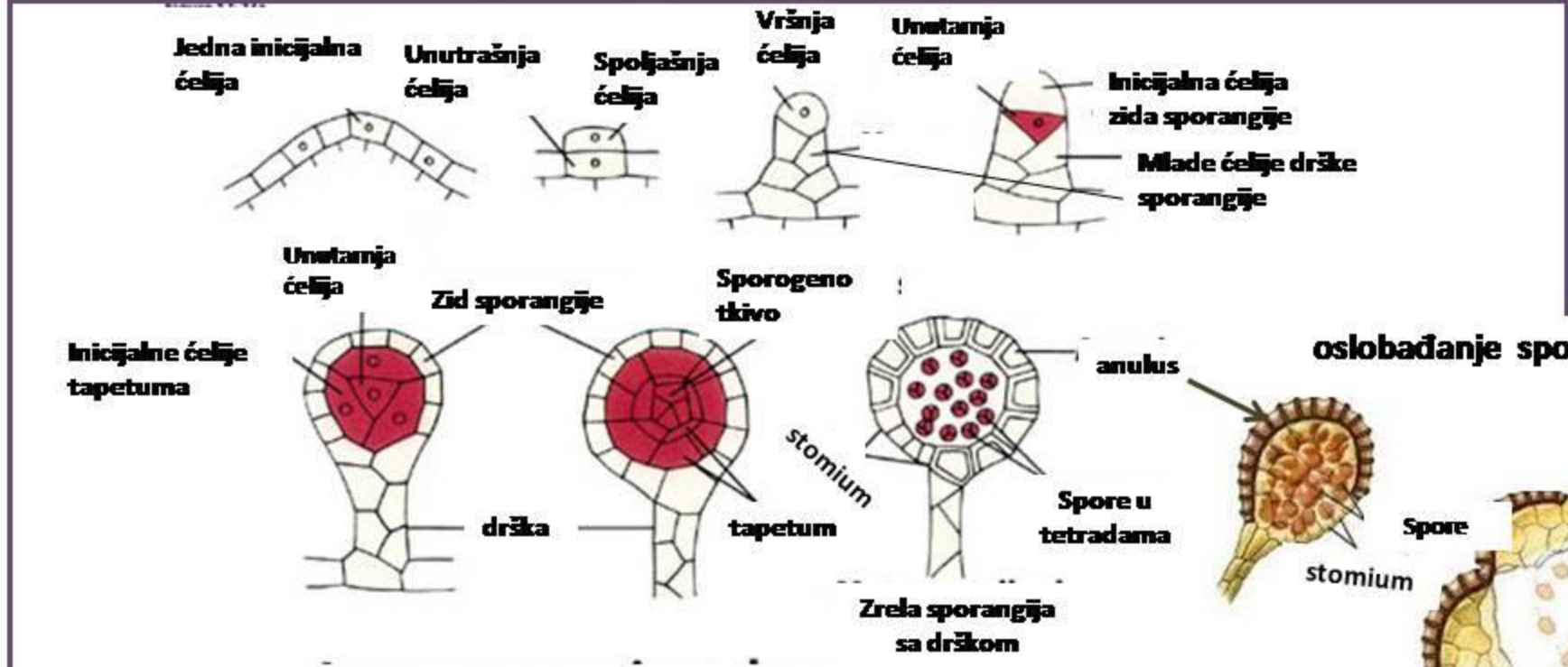
- Psilotidae
- Equisetidae
- Marratiidae
- Polypodiidae

Eusporangiatae

Leptosporangiatae



Eusporangični razvoj



Leptosporangični razvoj

Figure 17-23b
Biology of Plants, Seventh Edition

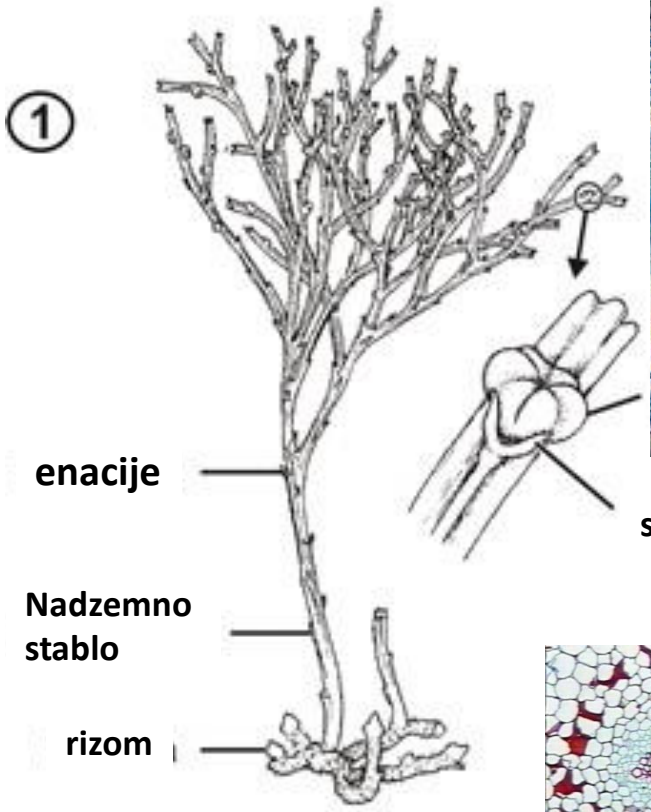
Psilotidae

(Divisio: Psilotophyta)

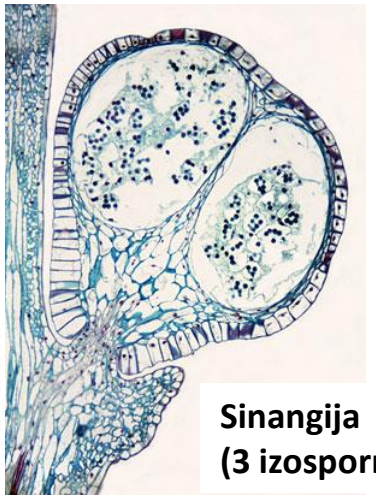
- Psilotales
- Ophioglossales

Psilotales

Potpuno odsustvo korjena!!!

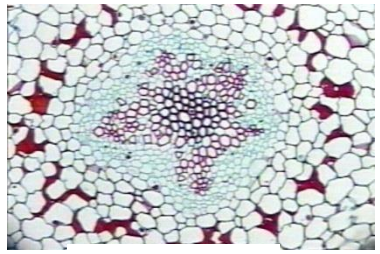


Psilotum sp.



Sinangija
(3 izosporne sporangije)

sinangiofor

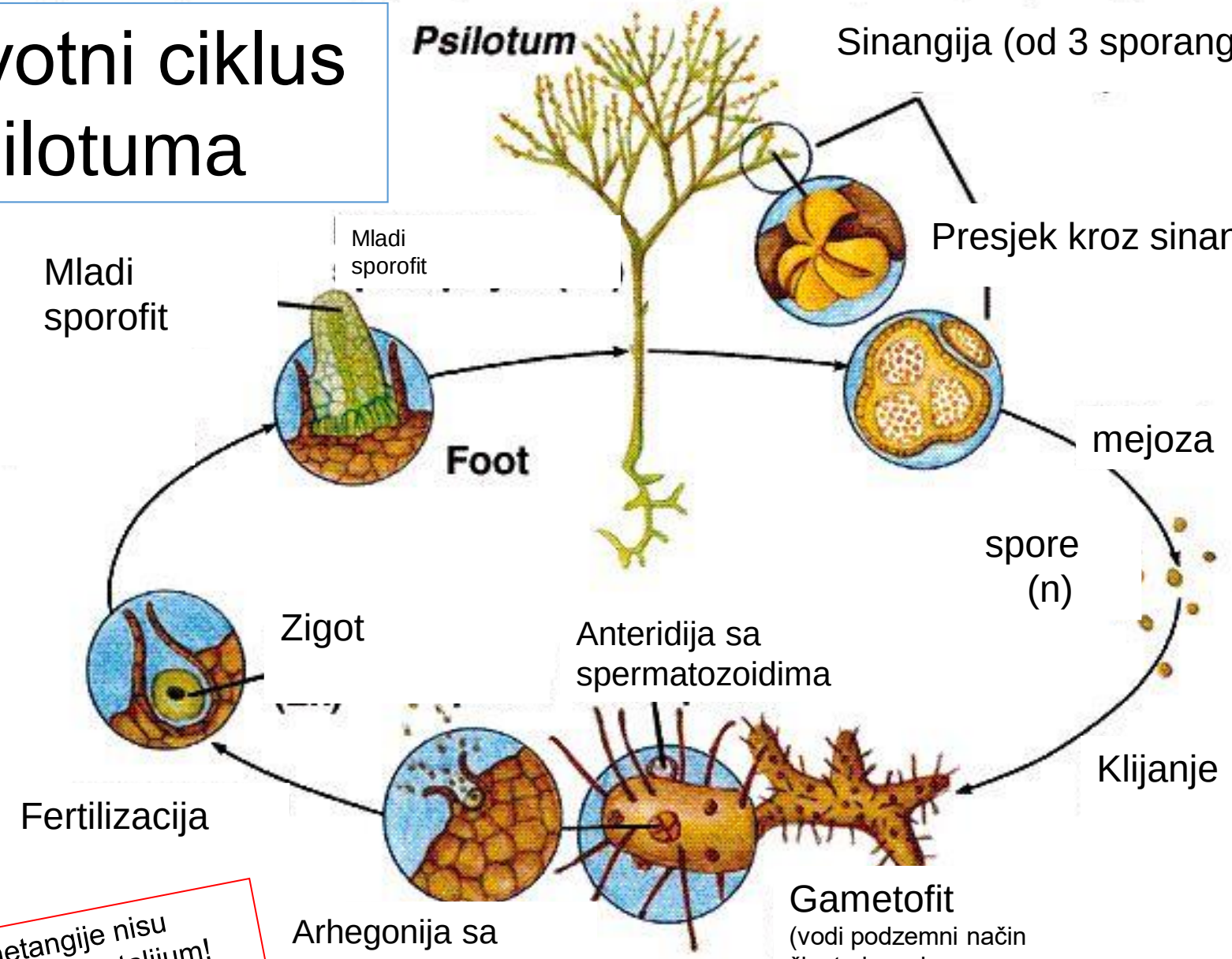


aktinostela

Tmesipteris sp.

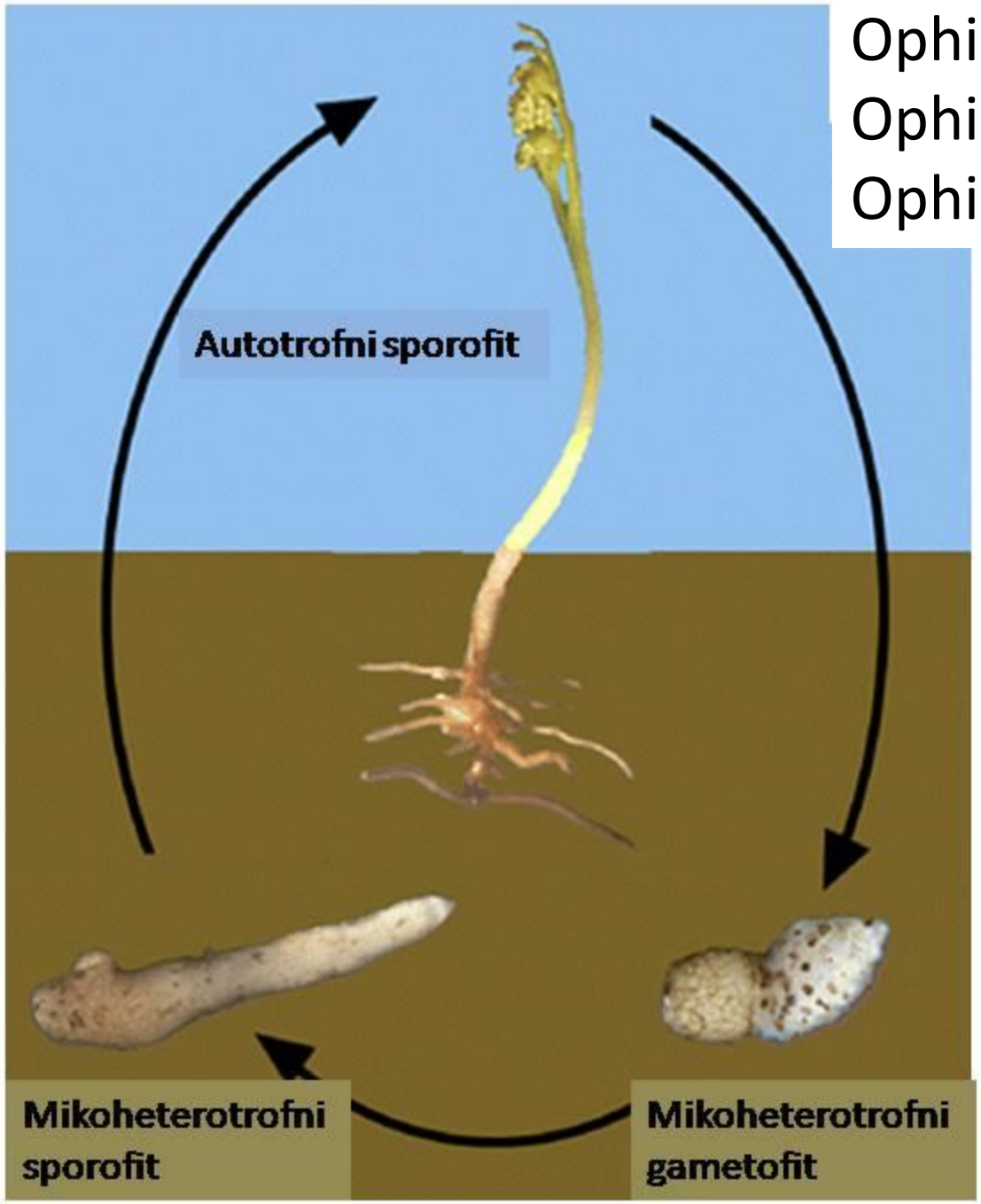
Sinangija
(2 izosporne sporangije)

Životni ciklus Psilotuma



*Gametangije nisu uvučene u protalijum!

Ophioglossales
Ophioglossaceae
Ophioglossum vulgatum



Fam. Ophioglossaceae

Ophioglossum ssp.
Sporofil i trofofil jednostavni!

Botrychium lunaria
Sporofil i trofofil granati!