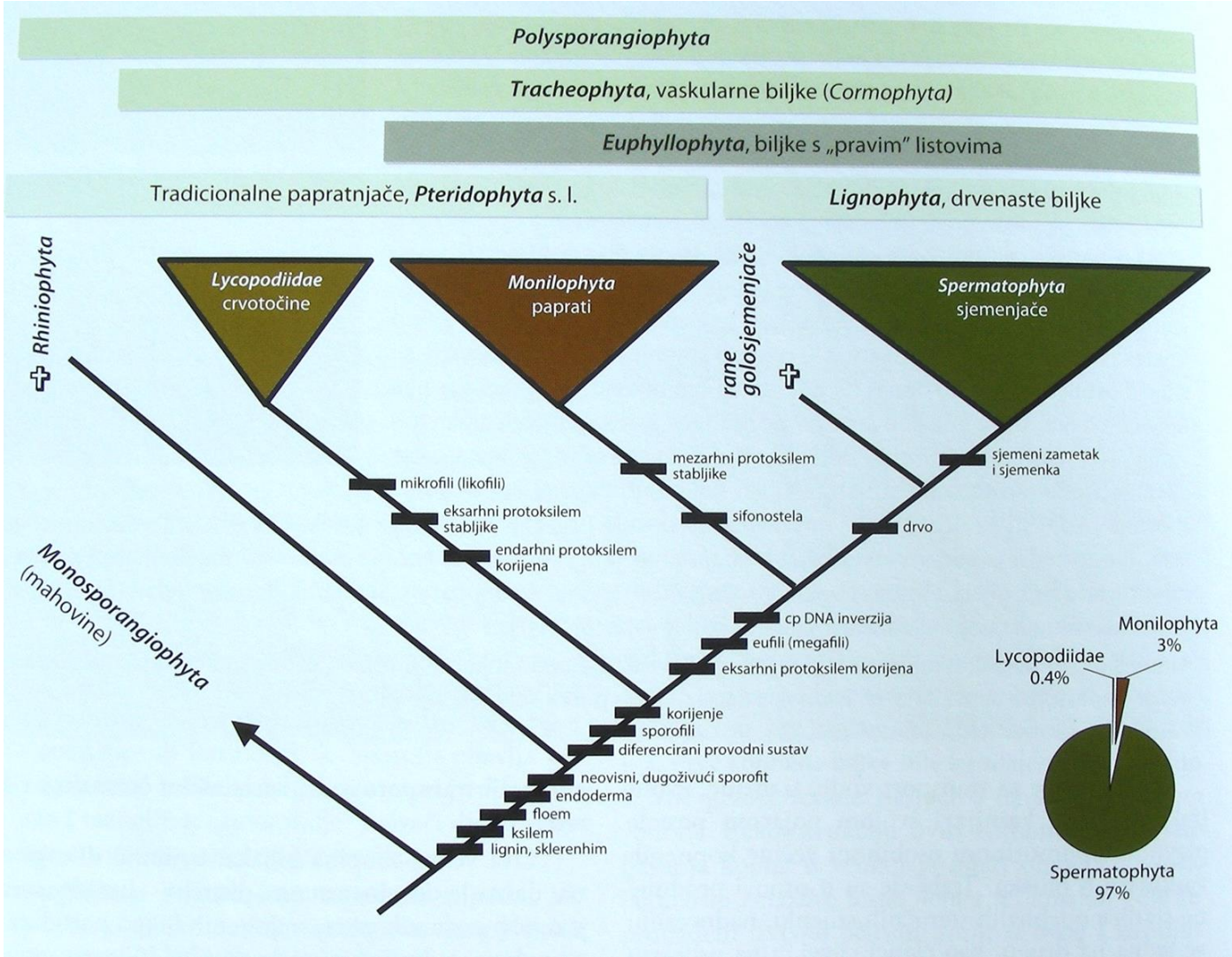


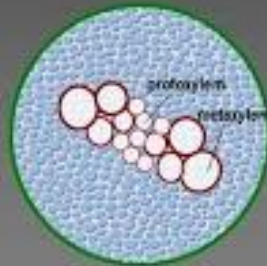
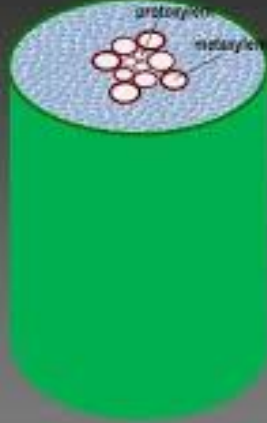
# Polysporangiophyta

Tracheophyta, dominacija sporofita,  
lignifikacija, mehaničko tkivo, provodno tkivo,  
endoderm ...



### Centrarhni tip

(protoksilem- stariji i manji elementu su u **centru** cilindra, a mlađi i voluminozniji naokolo)



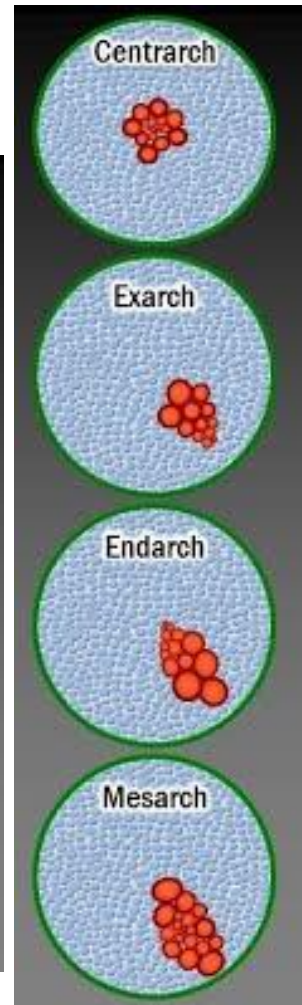
### Endarhan tip

(protoksilem je u **unutrašnjem dijelu**, a metaksilem ka periferiji)

## Razvoj ksilema

### Egzarhan tip

(protoksilem je na **periferiji**, a metaksilem u unutrašnjosti)

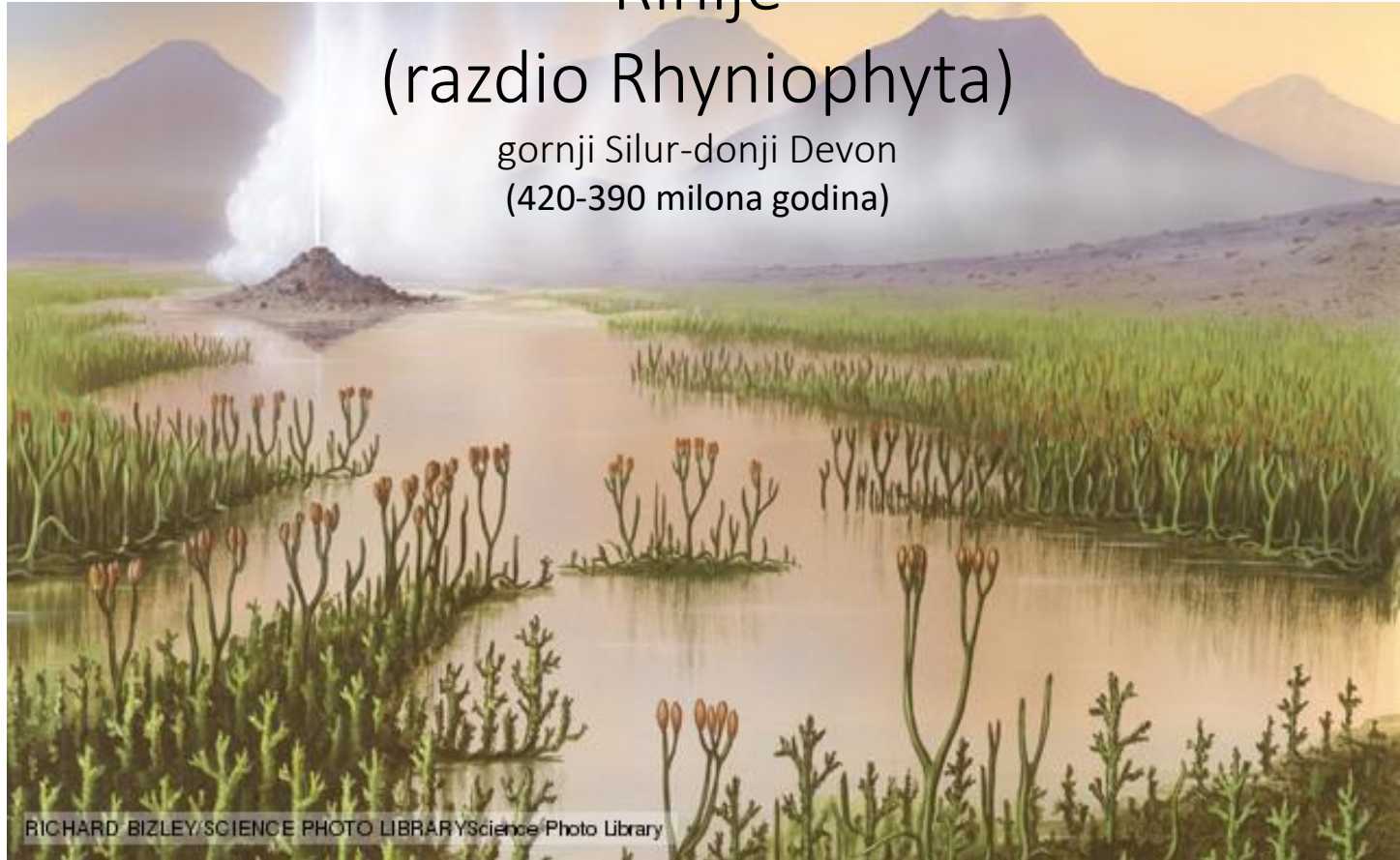


- **Centrarhan tip stele:** rinije.
- **Egzarhni:** stablo prečica, korijen sjemenjača.
- **Mezarhni:** listovi i stablo monilofita.
- **Endarhni:** stablo sjemenjača

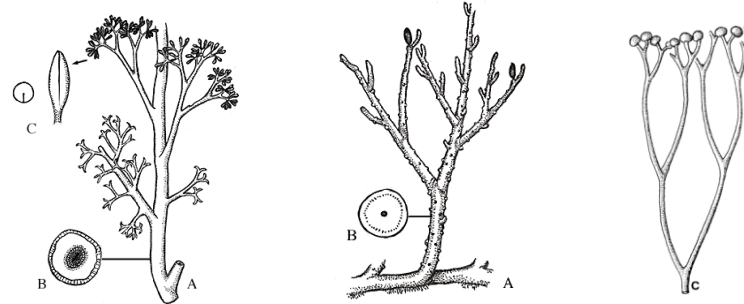
# Rinije

## (razdio Rhyniophyta)

gornji Silur-donji Devon  
(420-390 milona godina)



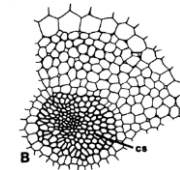
RICHARD BIZLEY/SCIENCE PHOTO LIBRARY Science Photo Library



- Bezlisne niske zeljaste biljke (od nekoliko do 10tak cm visoke- max 50cm)  
(samim tim sekundarnog debljanja nema!

- Nemaju razvijeno mehaničko tkivo!

- Nemaju korijen ali imaju absorbtivne rizoide



- Stablo granato- dihotomo, anizotomno, pseudomonopodijalno

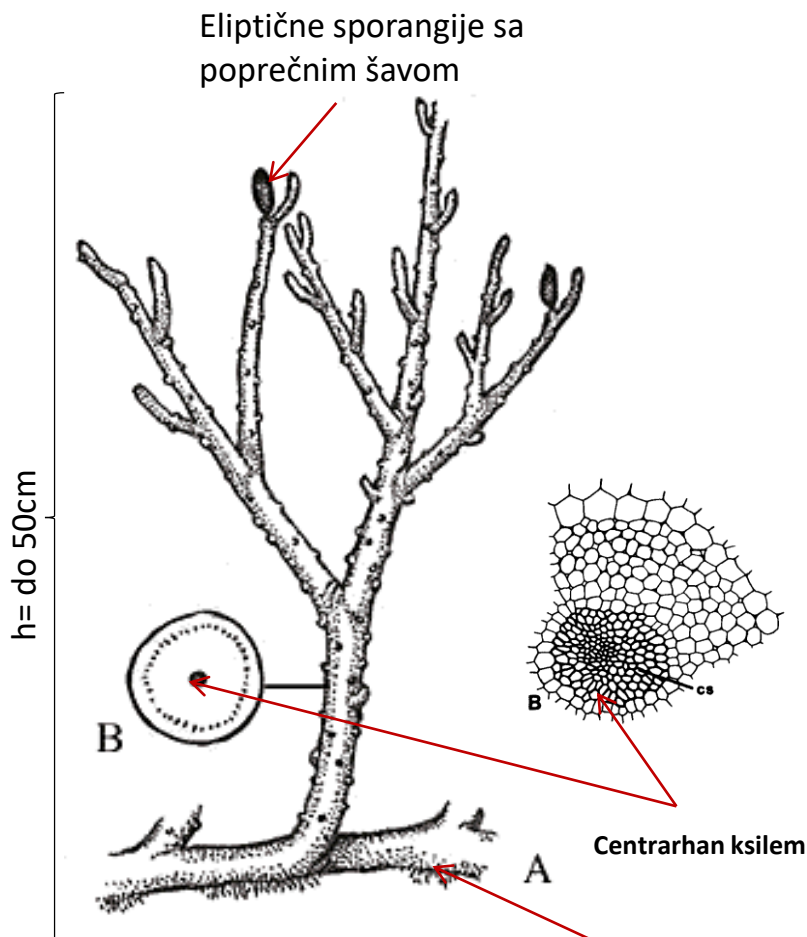
- Ksilem centrarhan

- Traheje sa prstenastim zadebljanjima



- Sporangije terminalne, okruglaste.... uglavnom izosporne

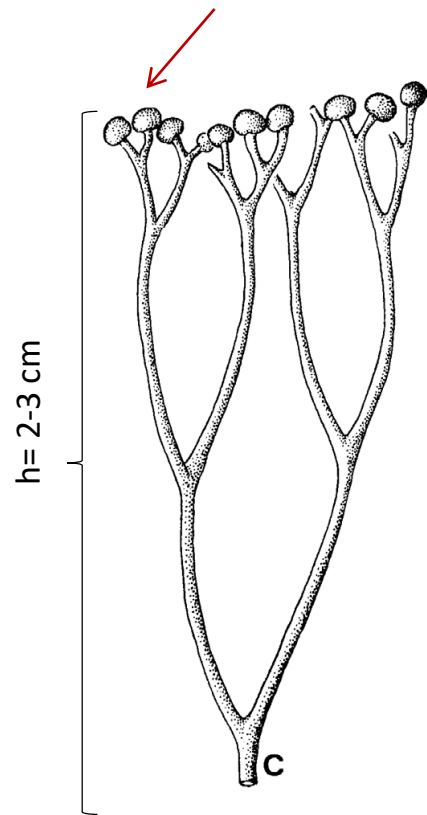




**Rhynia**  
(donji-srednji devon)

Horizontalno podzemno  
stablo- rizomoid sa  
apsorptivnim rizoidima

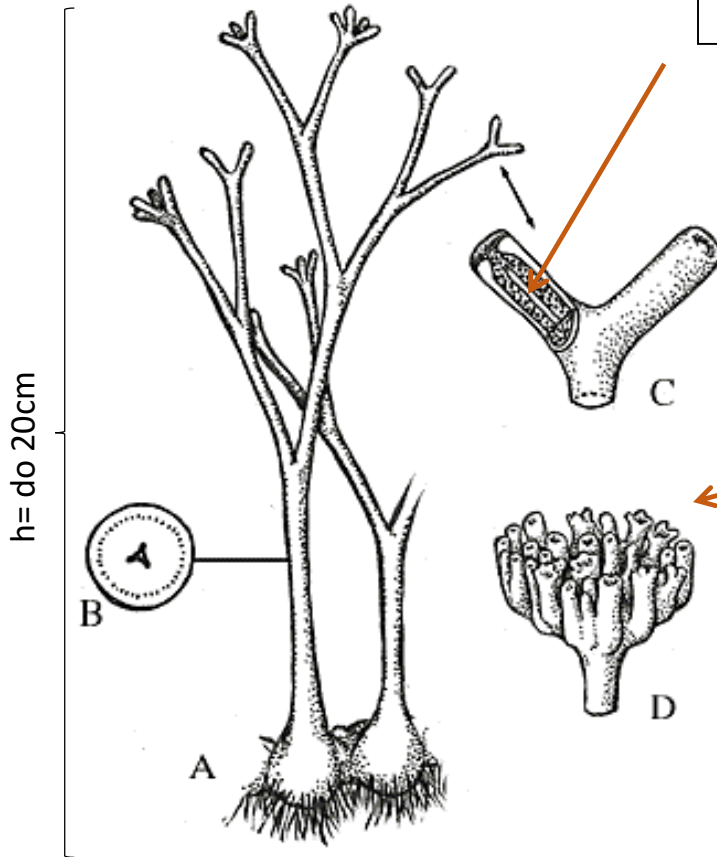
Bubrežaste sporangije  
sa uzdužnim šavom



**Cooksonia**  
(srednji silur-srednji devon)

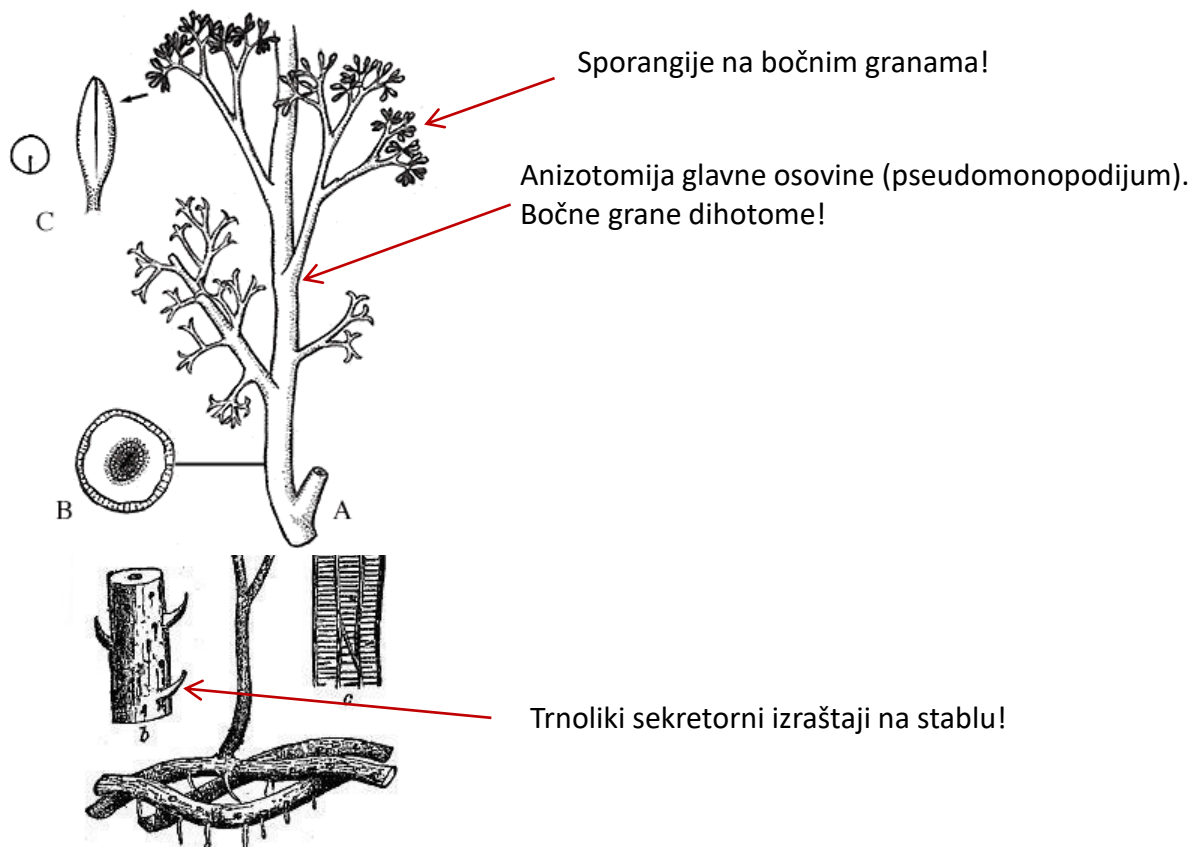
# Horneophyton (donji devon)

Sporangija je uvučena ispod površine!!!  
U centralnom dijelu sadrži sterilno tkivo kolumelu (svojstvenu nekim mahovinama!).



Arhegoniofor sa  
cjevastim arhegonijama  
"Langiophyton mackiei"





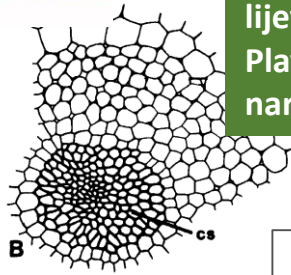
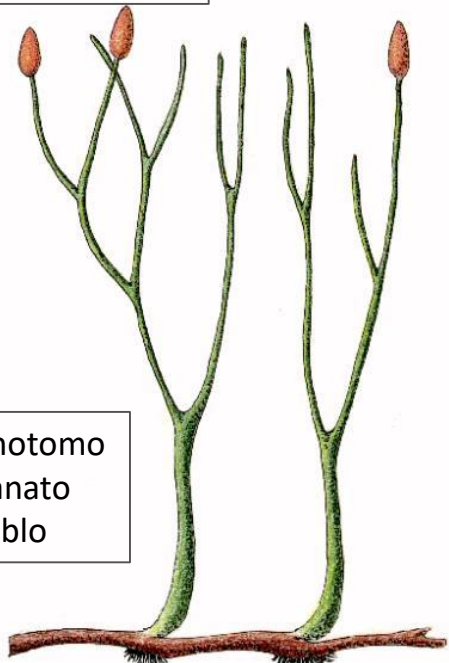
**Psilophyton princeps**  
(devon)

Terminalne sporangije

Dihotomo granato stablo

Rizoidi

**Aglaophyton spp.**



*Aglaophyton*

Taylor et al. (2005)

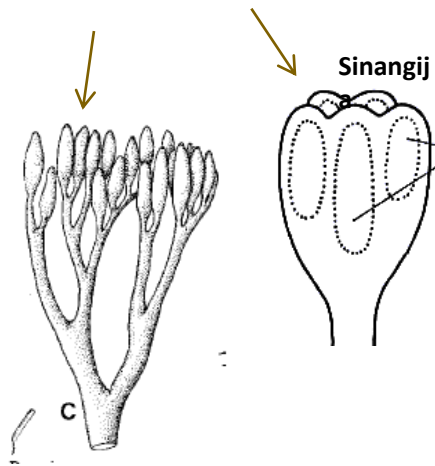
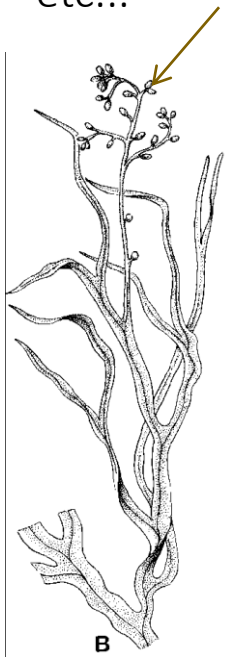


Ciklus razvića Algalophyton major- razviće dimorfnog gametofita. Zreo sporofit (dolje lijevo) nosi sporangije sa dvovrsnim sporama. Plave spore se razvijaju u zrele anteridiofore, a narandžaste u arhegoniofore.

Protostela

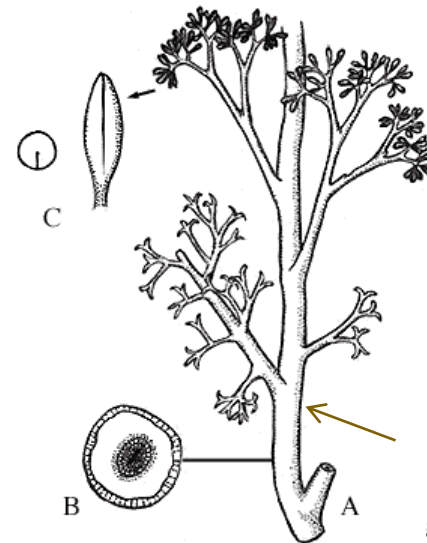
## O. Rhyniales

Rhynia, Cooksonia, Horneophyton,  
Taeniocrada?, Hedeia, Yarravia ?  
etc...



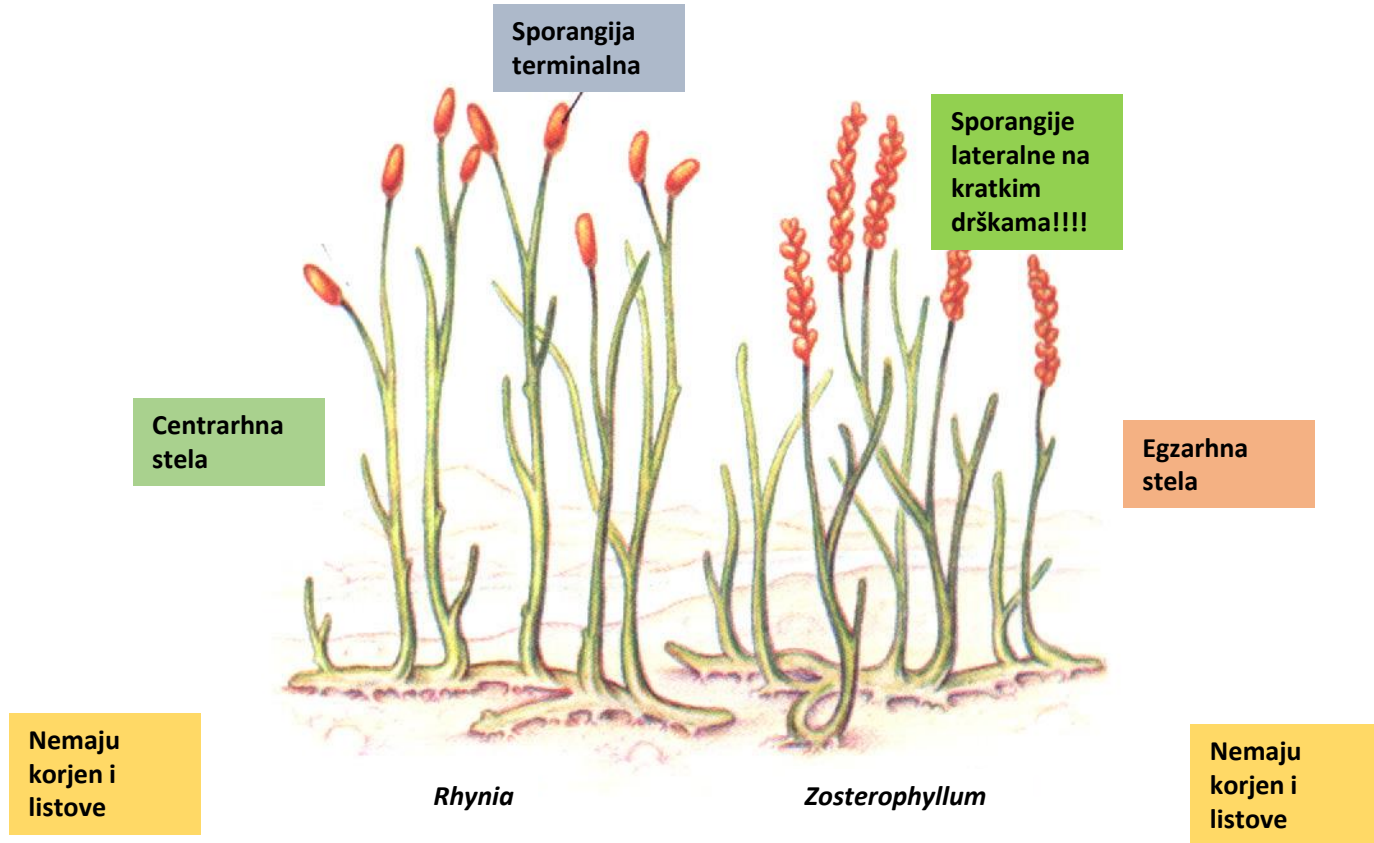
Tendencija izdvajanja  
fertilnog regiona

## O. Psilophytales Psilophyton



Izražena  
glavna  
osovina

# Div. Zosterophyllophyta



## Cl. Zosterophyllopsida

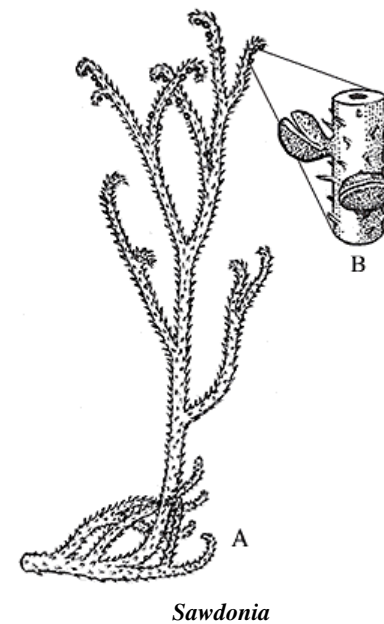
### o. Zosterophyllales

prosta uspravna stabla sa bočno postavljenim sporangijama  
(*Zosterophyllum*, *Wenshania* etc.)

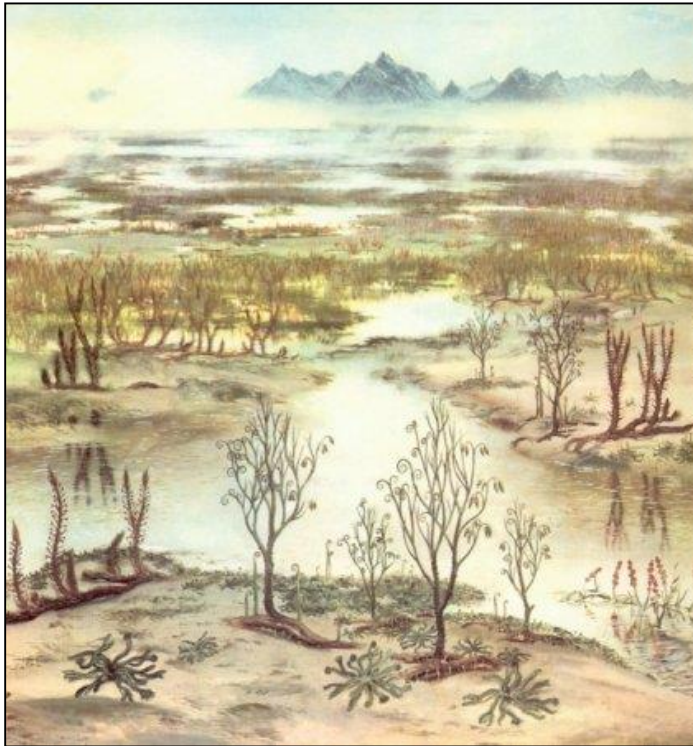


### o. Sawdoniales

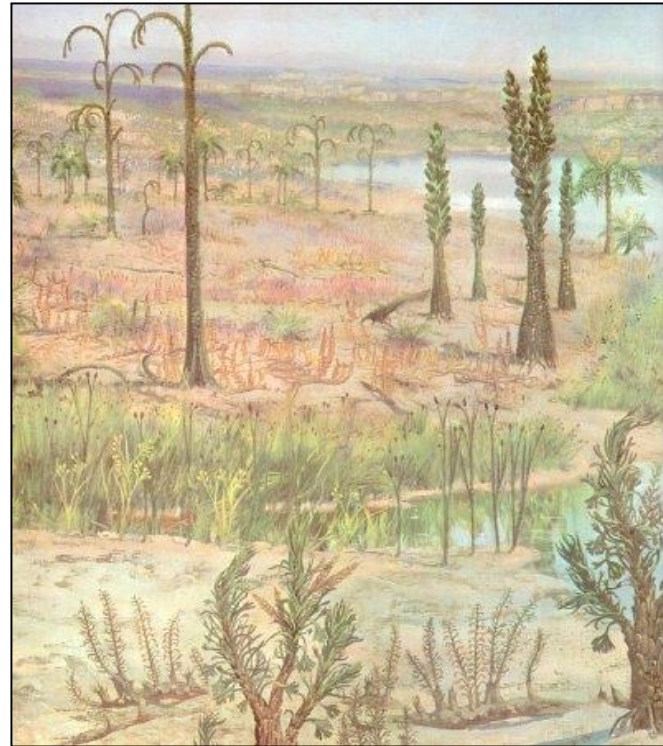
pseudomonopodijalan rast; sporangije  
višeredno poređanje na granama  
(*Sawdonia*, *Gosslingia* etc.)



Silur 425-408 miliona godina



Devon 408-382 miliona godina





Tracheophyta, vaskularne biljke

Lycopodiidae, biljke s mikrofilima

Euphyllophyta, biljke s „pravim“ listovima

