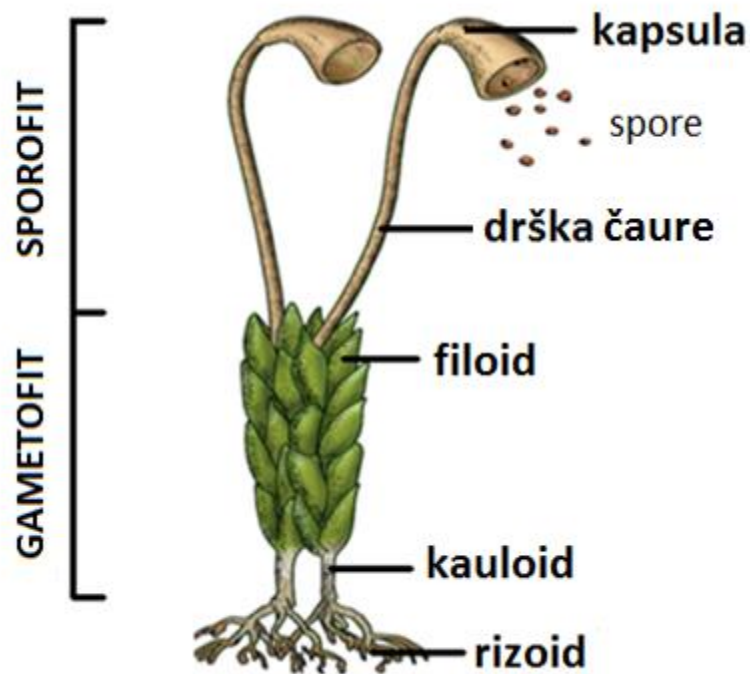
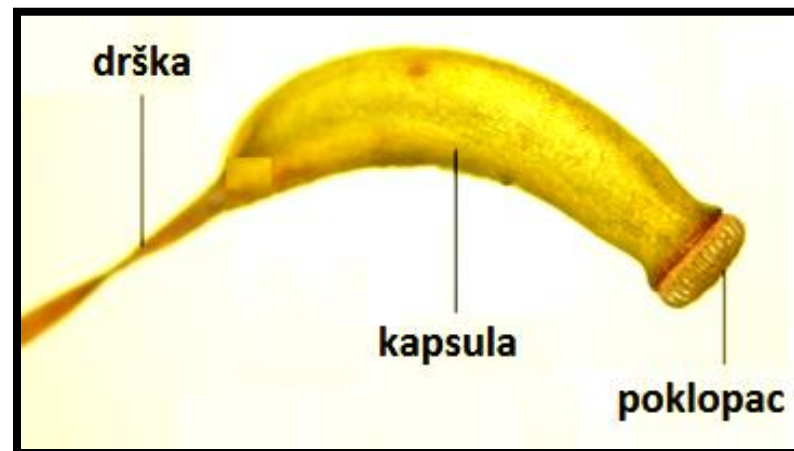


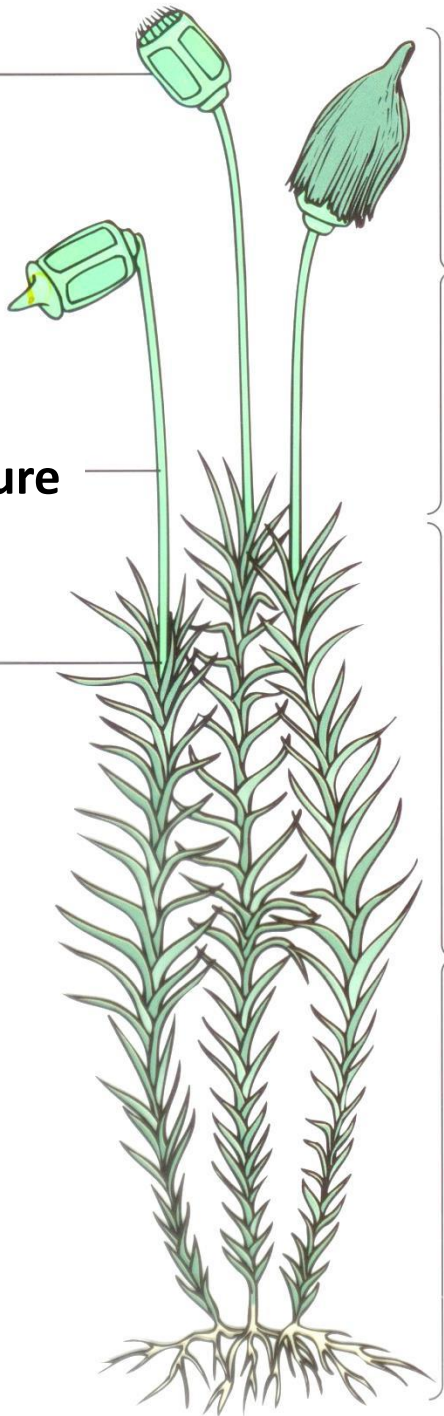
Divisio: ***BRYOPHYTA***

- MAHOVINE -





kapsula



**SPOROGON/SPOROFIT**

držka čaure

stopalo

**GAMETOFIT**





***Sphagnum squarrosum* - sfagnum**



***Sphagnum squarrosum***



***Polytrichum commune* - busenjača**

***Polytrichum commune***





***Marchantia polymorpha* - jetrenjača**



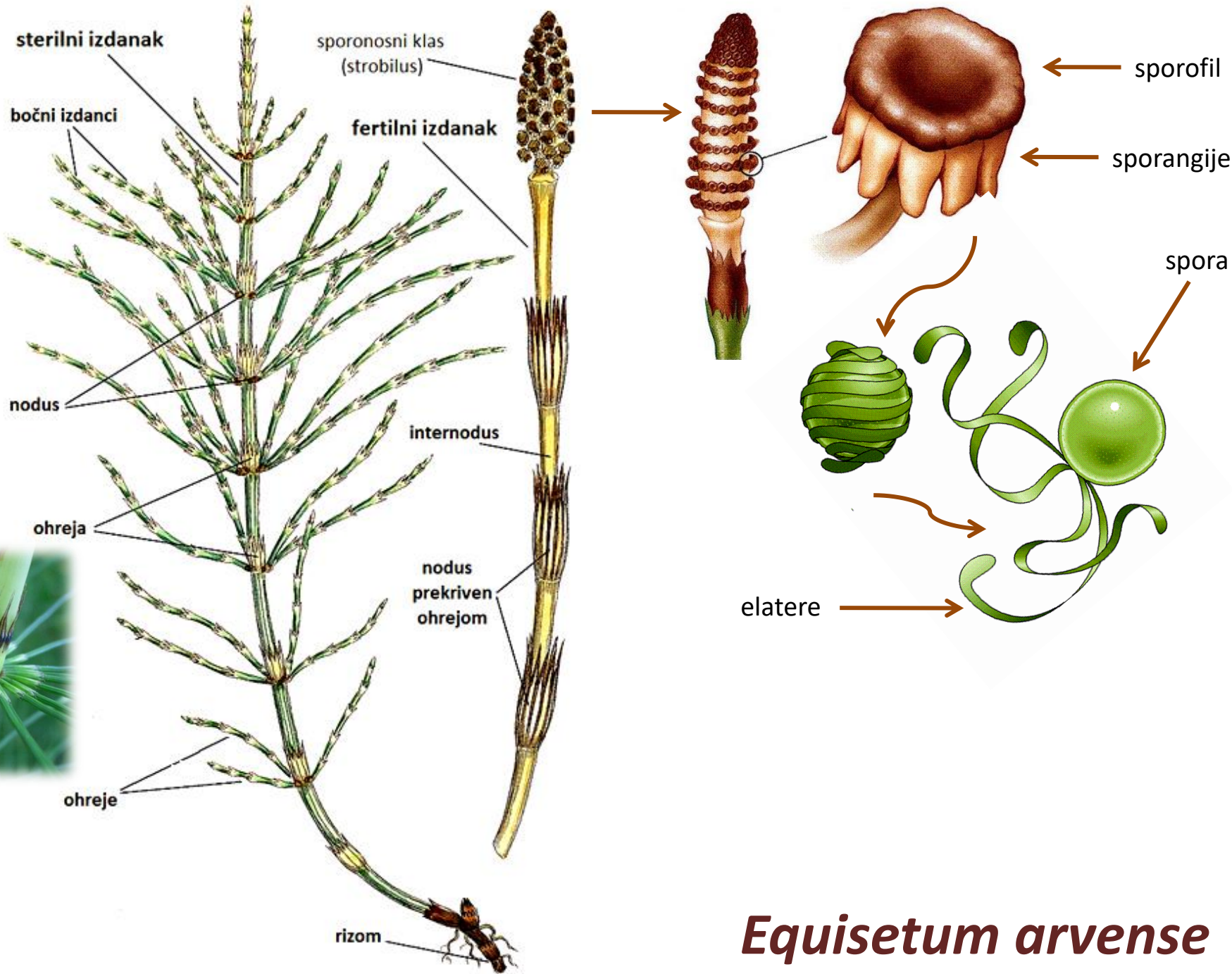


***Marchantia polymorpha***

# Divisio: *EQUISETOPHYTA*

- RASTAVIĆI -





*Equisetum arvense*



***Equisetum arvense* - preslica**



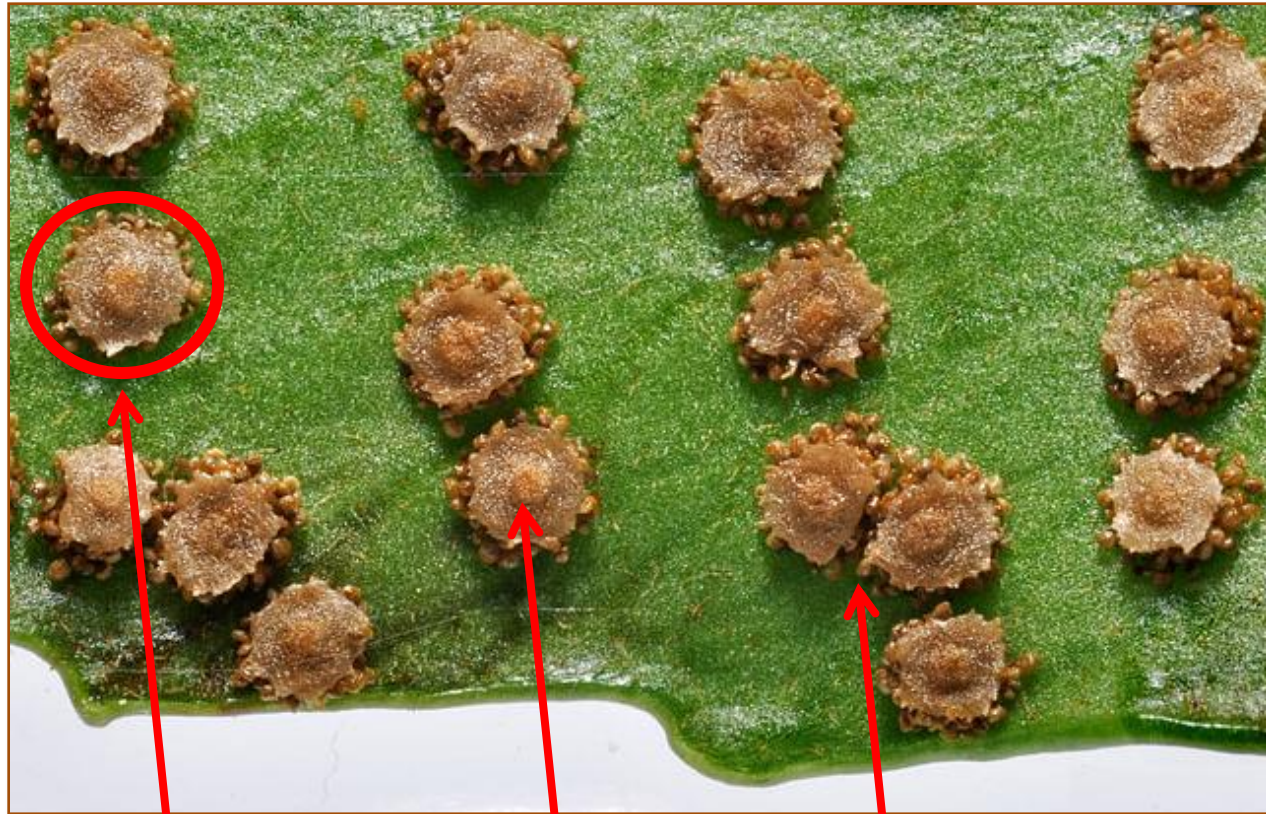
***Equisetum arvense***



Divisio: ***POLYPODIOPHYTA***

- **PAPRATI** -

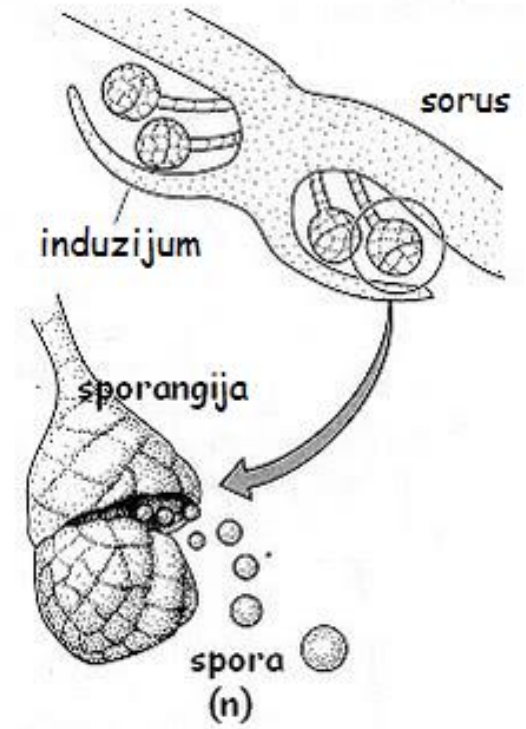




sorus

induzijum

sporangije







**sorusi bez  
induzijuma**

**sorusi sa  
induzijumom**



*Ophioglossum azoricum*



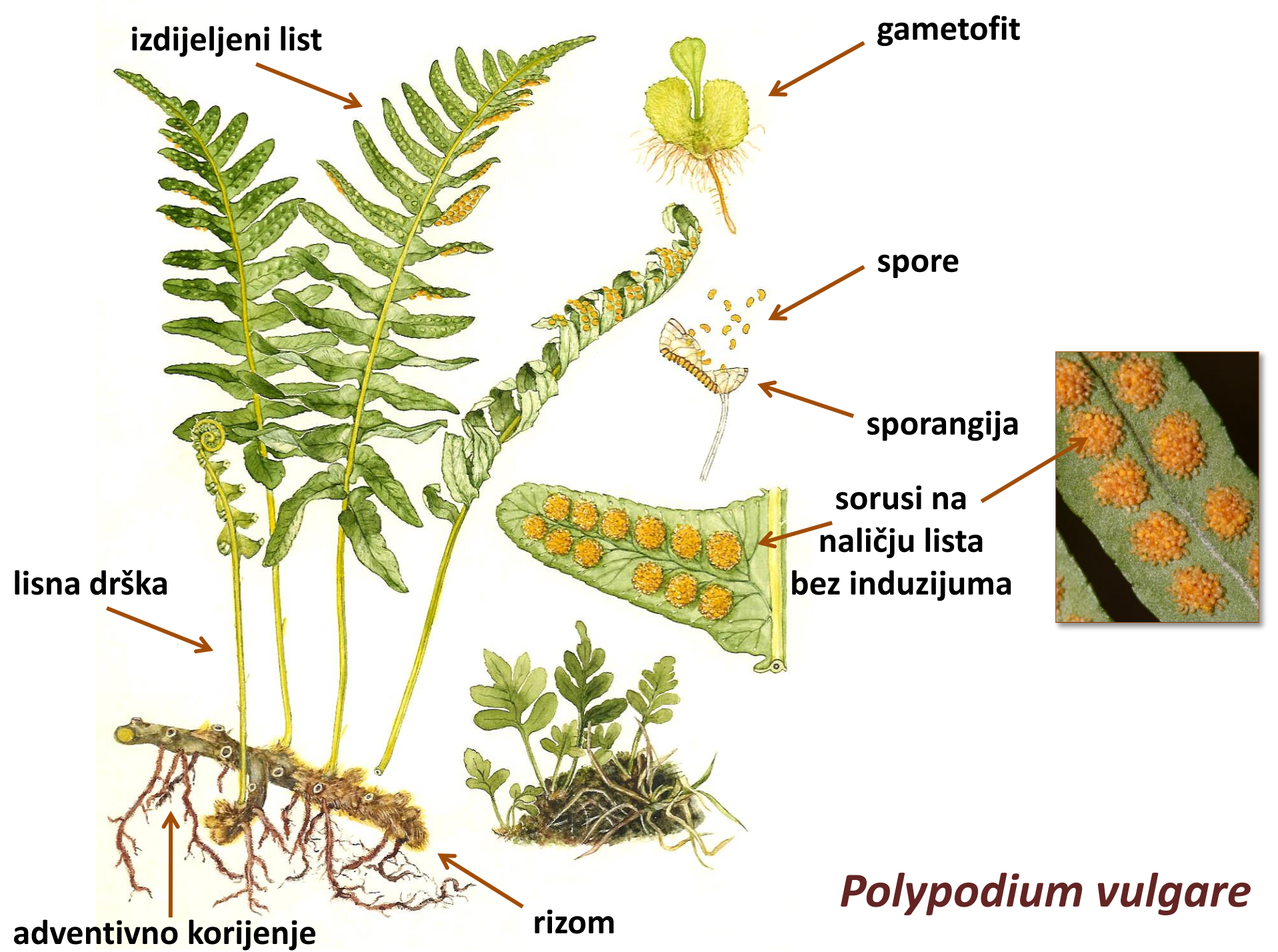


***Botrychium lunaria***





***Polypodium vulgare* – slatka paprat**





***Scolopendrium vulgare* – jelenji jezik**

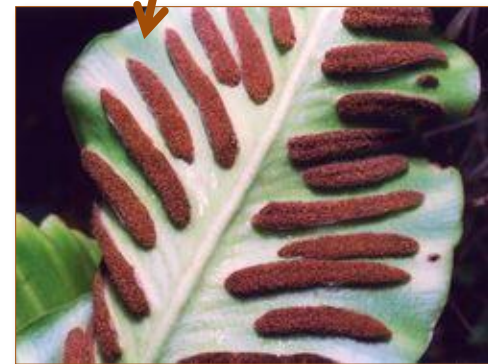


**cijeli listovi**

**linearni  
sorus**



**induzijum po  
obodu sorsa**



***Scolopendrium vulgare***

*Pteridium aquilinum* - bujad





***Pteridium aquilinum***







***Dryopteris filix-mas* - navala**

Fig. 3 *Pinna* - upper surface



Fig. 2 *Leaf* - under surface



Fig. 1 *Underground Stem*  
covered with snags of Old Leaves



Fig. 4 *Fertile Pinnae* - under surface ( $\times 10$ )



Fig. 6 *Sporangia*

a. unopened

b. opened

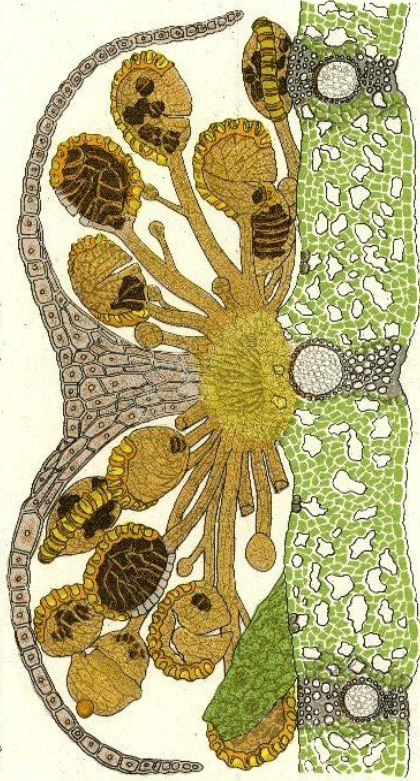


Fig. 7 *Spores* ( $\times 500$ )



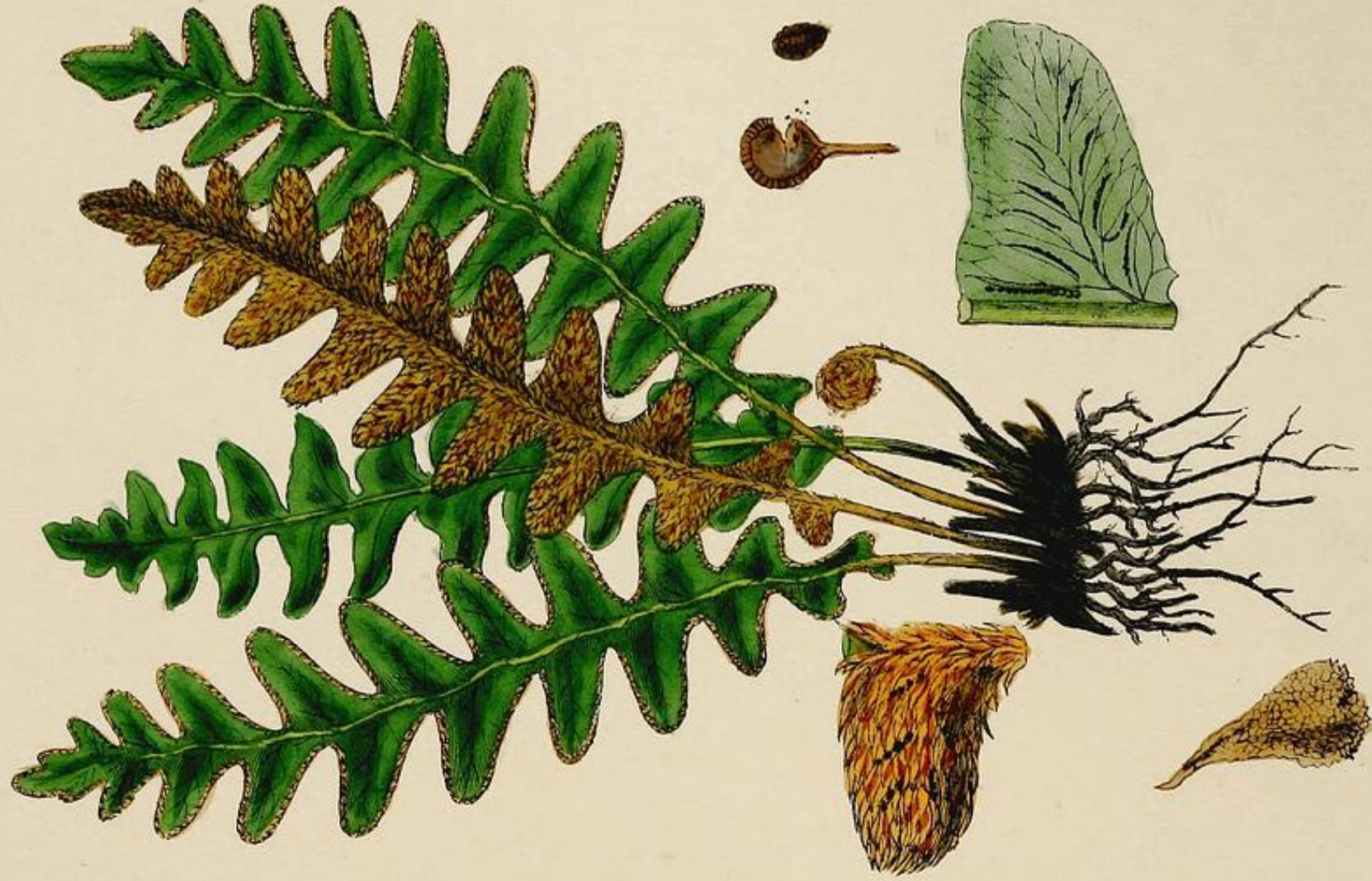
Eusporangium with warty projections

Fig. 5 *Transverse section of Sorus & overlying portion of Pinnae*



*Ceterach officinarum* – zlatna paprat





*Asplenium trichomanes*





E. B. 576.

*Asplenium Trichomanes.*

Maidenhair Spleenwort.



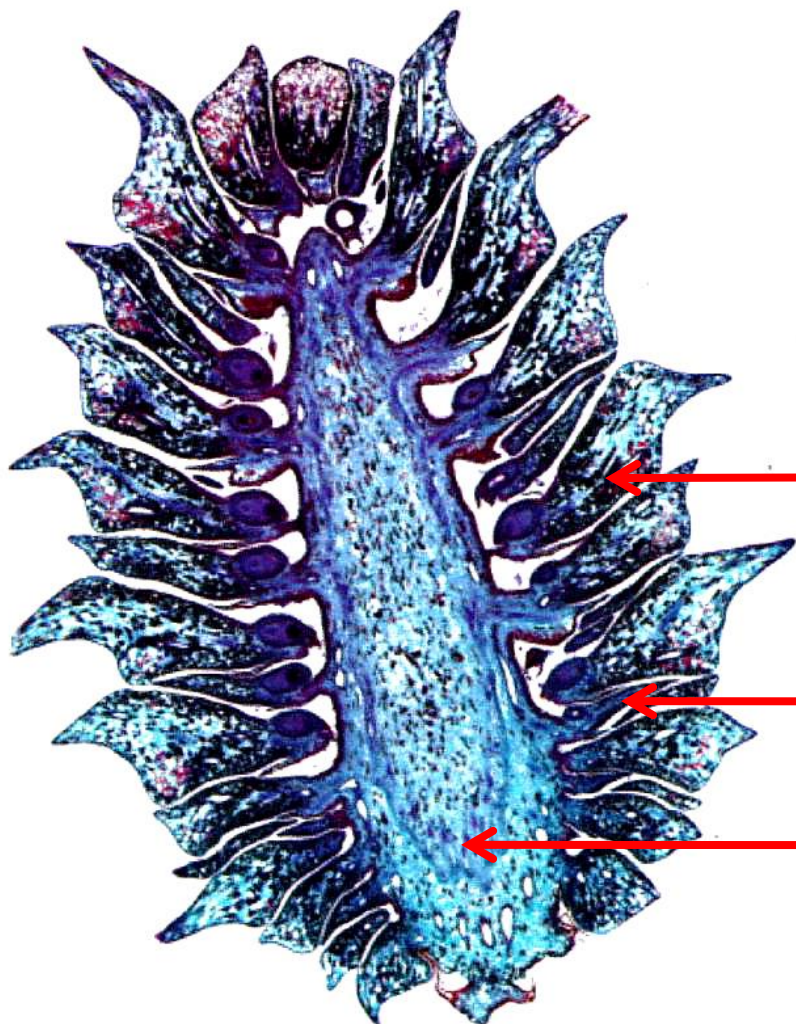
# Divisio: PINOPHYTA

## - GOLOSJEMENJAČE -



# *Pinus sp.*

*građa ženske šišarke*



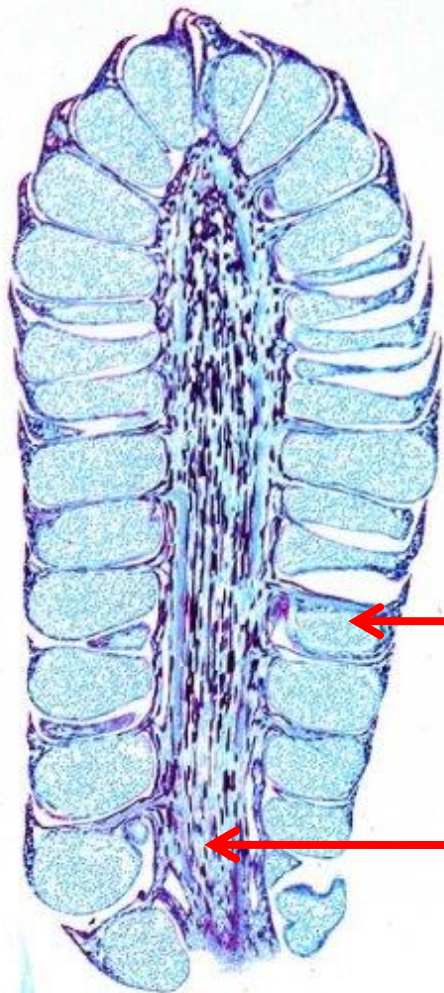
**plodna ljuspa (megasporofil)  
sa sjemenovim zametkom  
(megasporangijom)**

**zaštitna ljuspa**

**osovina šišarke**

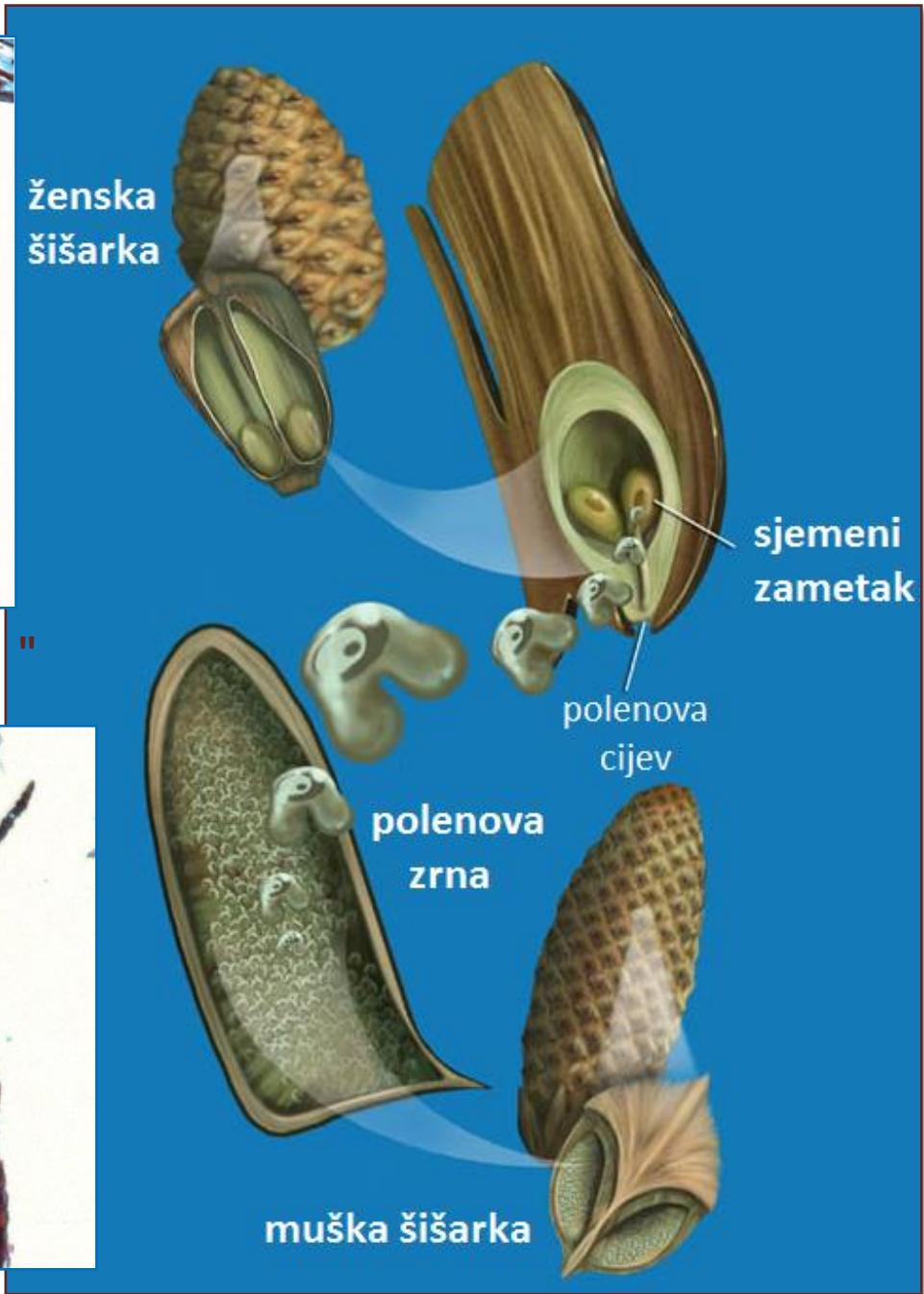
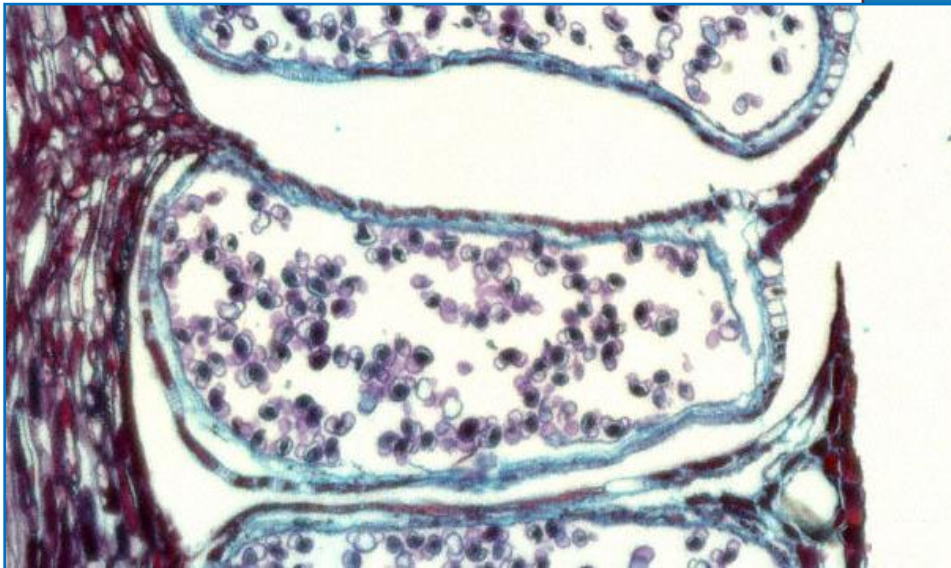
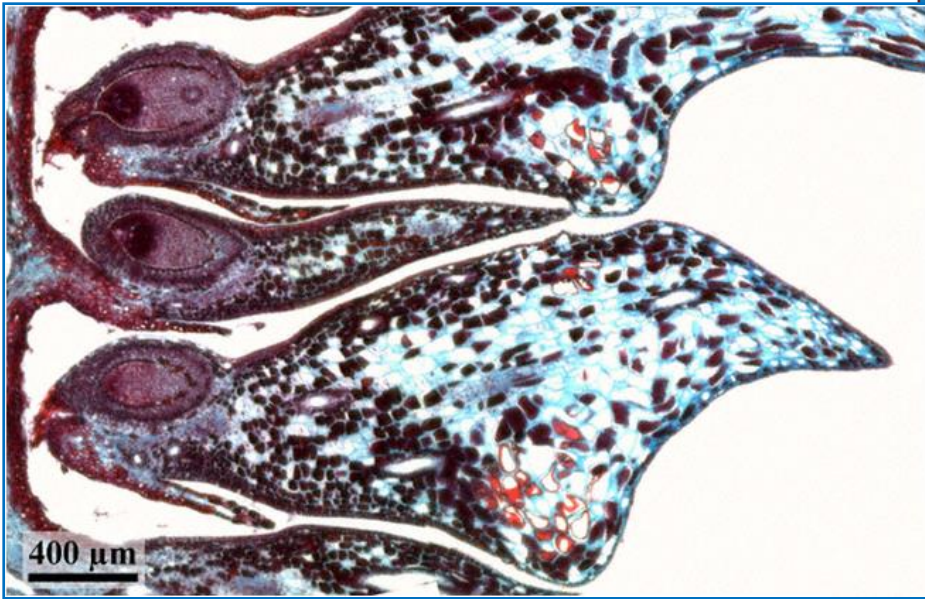
# *Pinus sp.*

*građa muške šišarke*



**mikrosporofil sa  
polenovom kesom  
(mikrosporangijom)**

**osovina šišarke**



**EPHEDRACEAE**

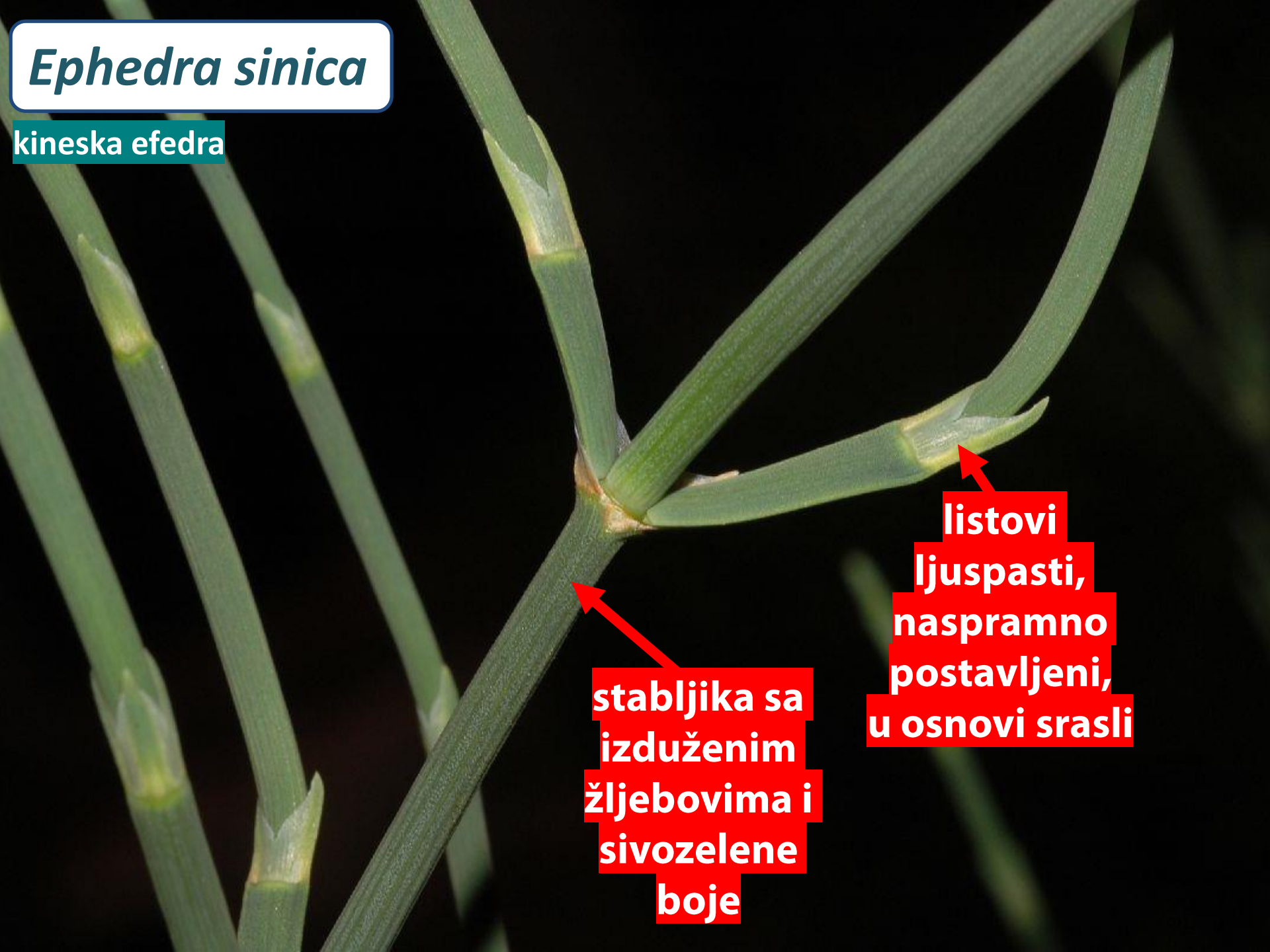
# *Ephedra distachya*

atlanska efedra (syn. *E. vulgaris*)



# *Ephedra sinica*

kineska efedra



stabljika sa  
izduženim  
žljebovima i  
sivozelene  
boje

listovi  
ljustasti,  
naspramno  
postavljeni,  
u osnovi srasli

**muške  
šišarice**



**ženske  
šišarice**



***Ephedra* spp.**



**formirano  
sjeme**



**GINKGOACEAE**



**dvorežnjeviti  
listovi lepezastog  
oblika sa  
dihotomom  
nervaturom**

***Ginkgo biloba***

**muški**  
**"cvjetovi"**

*Ginkgo biloba*

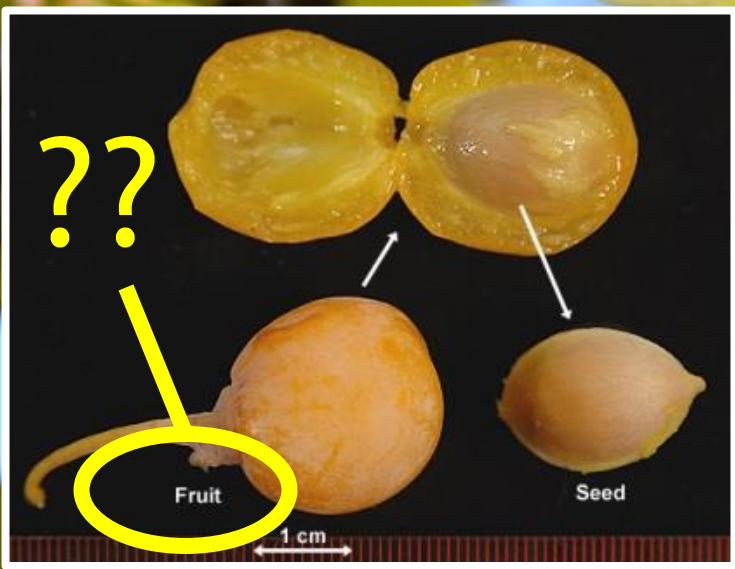


*Ginkgo biloba*

ženski  
"cvjetovi"

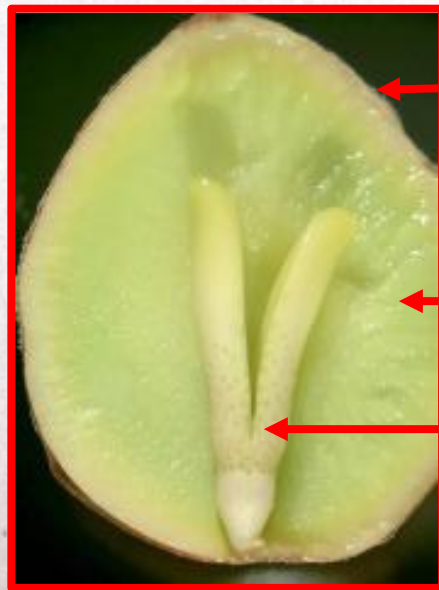


po 2 sjemena  
zametka na dugim  
drškama



***Ginkgo biloba***

*Ginkgo biloba*



sjemenjača

endosperm

klica

sjeme



**PINACEAE**

# EVROPSKA JELA

zimzeleno drvo  
visine i do 65 m



ženske  
šišarke  
(stoje uspravno)

muške  
šišarke  
(žute, resolike)

*Abies alba*



*Abies alba*

pljosnate četine  
sjajne sa lica i sa  
2 bijele pruge sa  
naličja

muške  
šišarke



ženske  
šišarke



zimzeleno drvo  
visine do 50 m

*Picea excelsa*

EVROPSKA SMRČA  
(syn. *Picea abies*)



*Picea excelsa*



ženske  
šišarke



muške  
šišarke



***Picea omorika***

**PANČIĆEVA OMORIKA**  
tercijerni relik i endem Balkana

zimzeleno drvo  
visine do 50 m



mlade ženske  
šišarke su  
ljubičaste boje

*Picea omorika*

# *Picea omorika*



**zrele ženske  
šišarke su  
crveno-smeđe**

četine po  
2 u rukavcu

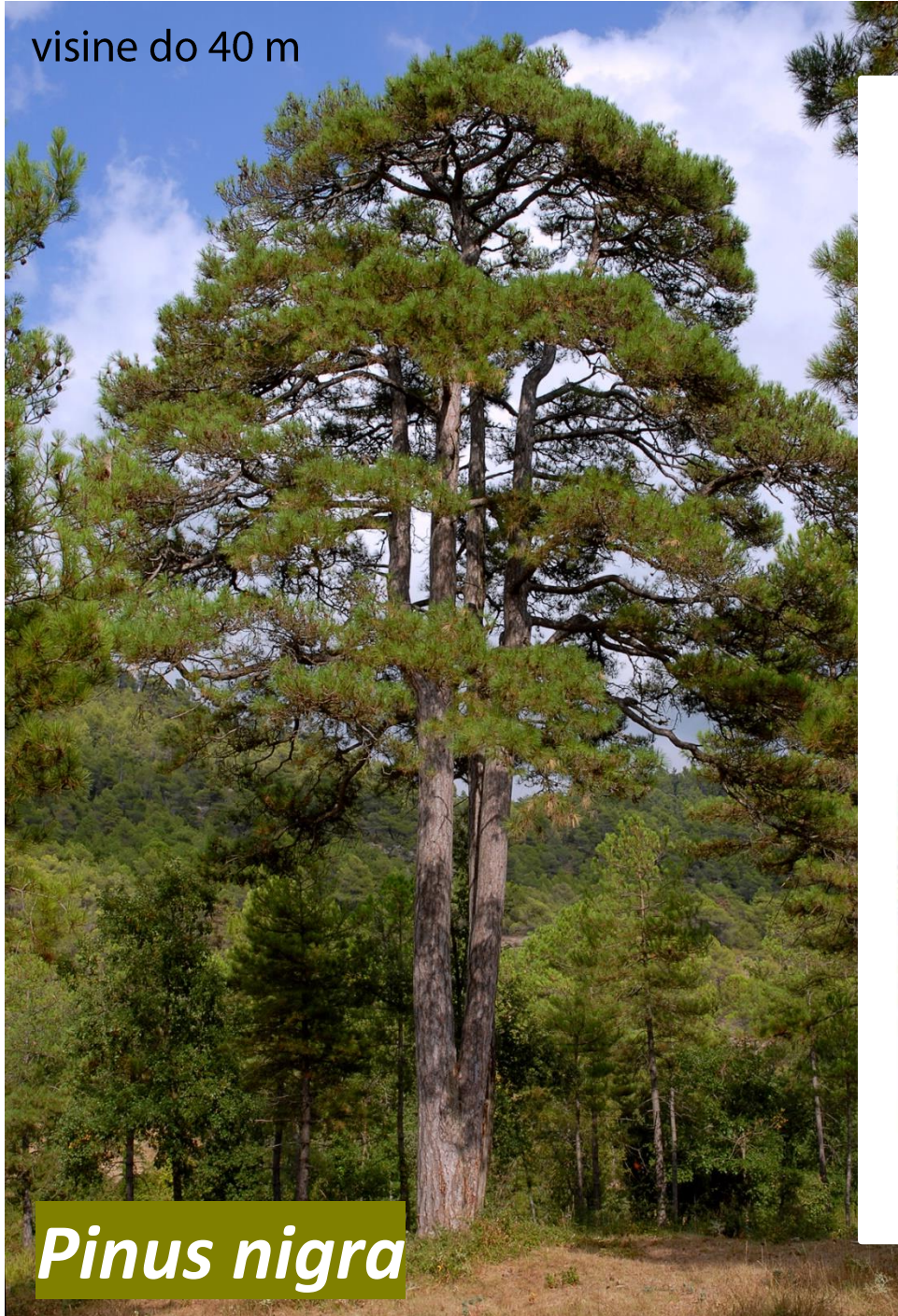


*Pinus nigra*

CRNI BOR

zrela ženska šišarka

visine do 40 m



*Pinus nigra*





**ženska šišarka**

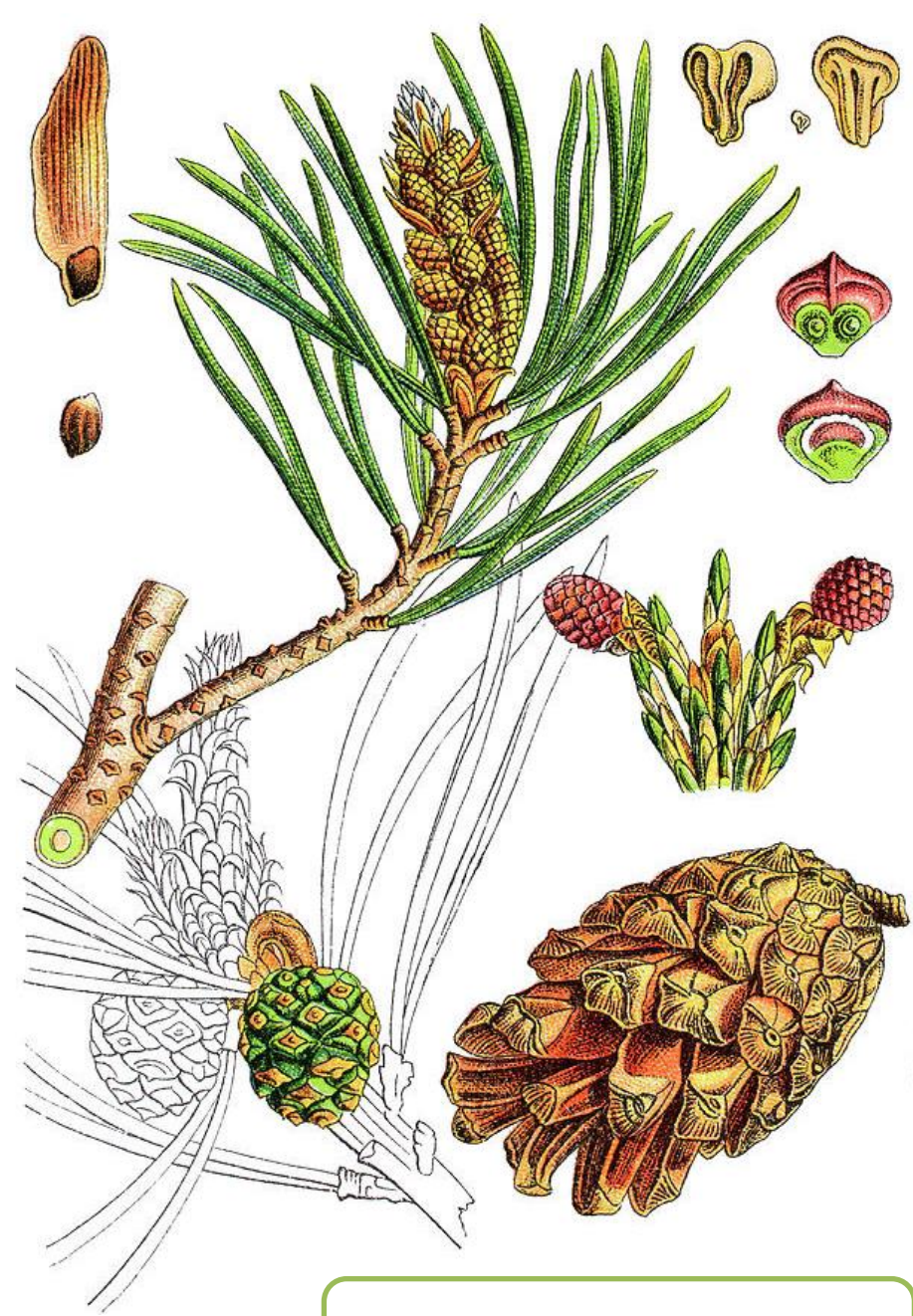
(jajasta, gotovo sjedeća ili sa kratkom drškom)

***Pinus nigra***



**muške šišarke**

(resolike, žućkasto-zelene boje)



*Pinus sylvestris*

visine do 40 m



četine po  
2 u rukavcu  
sivo-zelene boje



ženske šišarke  
sive boje



*Pinus sylvestris*

**BIJELI BOR**

*Pinus sylvestris*

muške  
šišarke



*Pinus sylvestris*



ženska  
šišarka

(sa jasno izraženom drškom)

visine do 35 m

*Pinus heldreichii*

**MUNIKA**  
tercijerni reliktni i subendem Balkana



četine po  
2 u rukavcu



mlade ženske  
šišarke su  
ljubičaste boje



*Pinus heldreichii*

visine do 40 m

*Pinus peuce*

**MOLIKA**  
tercijerni relik i endem Balkana







mlade  
ženske  
šišarke



četine po  
5 u rukavcu



zrele  
ženske  
šišarke

*Pinus peuce*

## EVROPSKI ARIŠ

listovi (četine) opadaju  
svake godine;  
od 20 do 40 m visine



kratki izdanak  
sa čuperkom  
četina



*Larix decidua*



muške  
šišarke



ženske  
šišarke

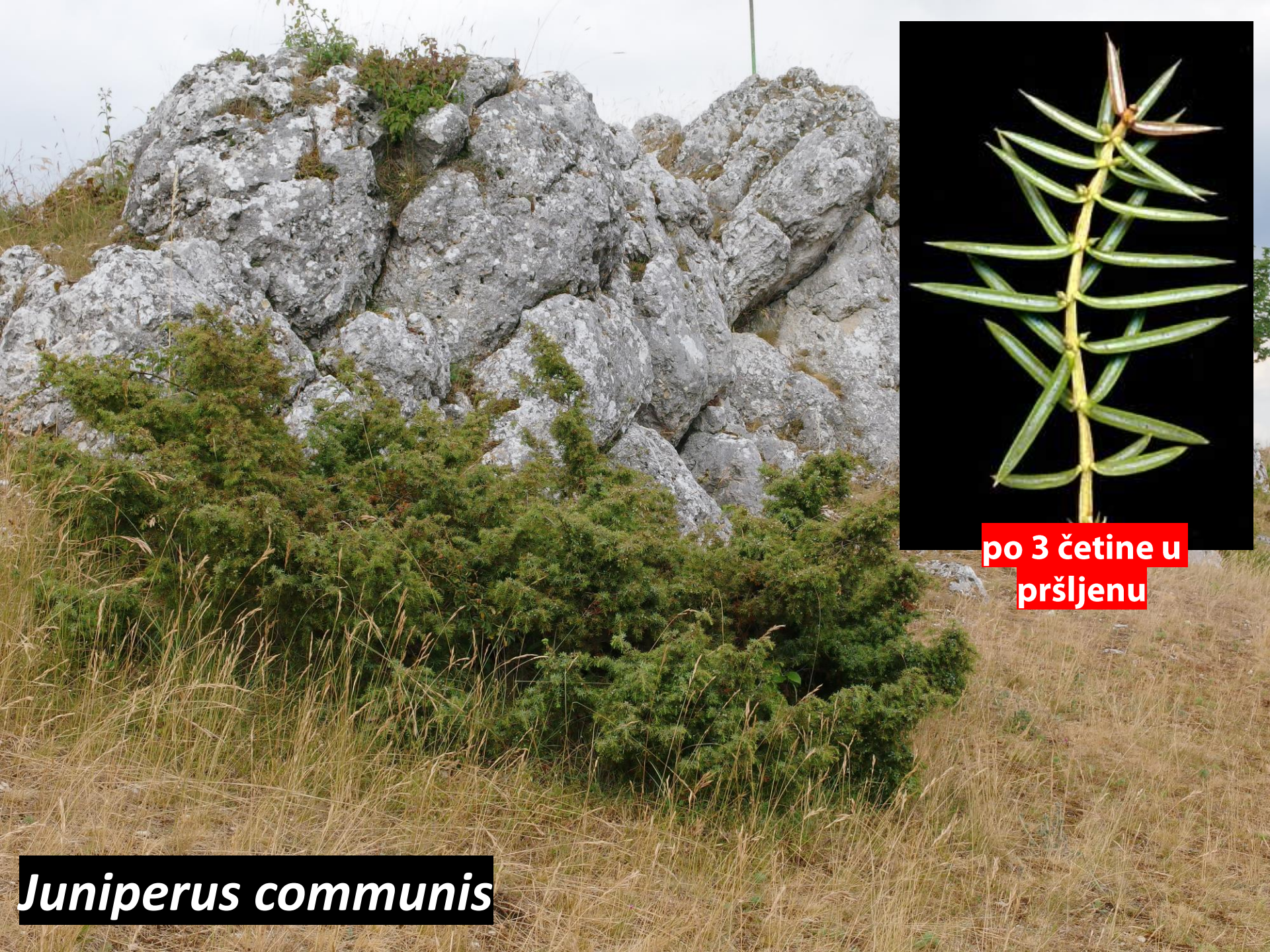
*Larix decidua*

**CUPRESSACEAE**



***Juniperus communis***

**OBIČNA KLEKA/SMREKA**



po 3 četine u  
pršljenu


***Juniperus communis***

**muške  
šišarke**



**ženske bobičaste šišarke**

*Juniperus communis*



**zrele ženske bobičaste  
šišarke crveno-  
ljubičaste boje i sa  
sivom voštanom  
prevlakom**

(često se označavaju kao  
plodovi ili bobice –  
*pseudofructus*)

***Juniperus communis***



A close-up photograph of a Juniperus oxycedrus branch. The branch is covered in dense, green, needle-like leaves. Several mature female cones are visible, which are spherical and have a reddish-brown or orange-brown color. The background is a clear, bright blue sky.

*Juniperus oxycedrus*

**zrele ženske  
bobičaste šišarke  
crveno-smeđe boje**

# SOMINA/SMRDLJIVA BOROVICA/SOMINA

(ima ljuspaste, tupe listove i jako neprijatan miris)



*Juniperus sabina*

# *Cupressus sempervirens*



**ČEMPRES**

(najčešće ima uskopiramidalnu krošnju koja se sužava prema vrhu)

**Ijuskasti/ljuspičasti listovi  
čvrsto su prilegli uz tanke  
grančice i poredani u 4 reda**



***Cupressus sempervirens***

ženske šižarke



muške  
šižarke



*Cupressus sempervirens*

**TAXACEAE**

*Taxus baccata*

**EVROPSKA TISA**

(žbun ili drvo srednje visine, do 20 m)



# *Taxus baccata*



muške  
šišarke



ženske šišarke