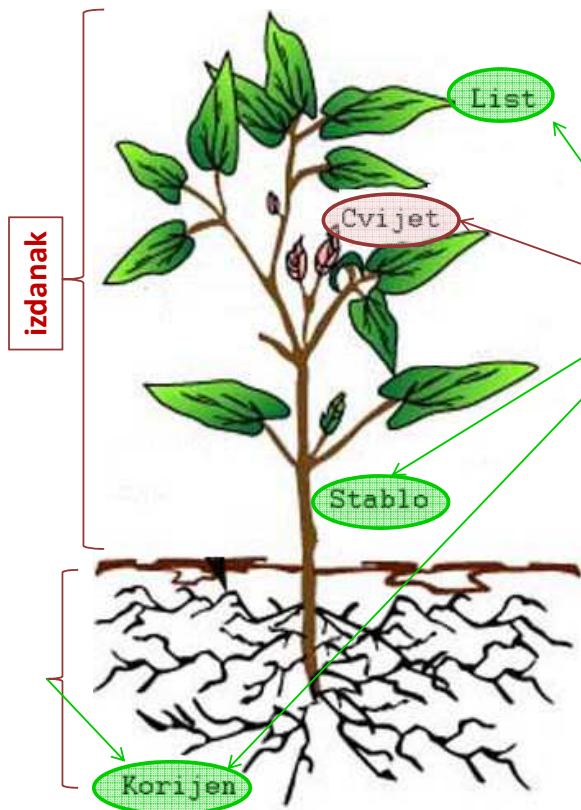


# ORGANOGRAFIJA



**Organ**- dio biljnog tijela koji vrši određenu funkciju!

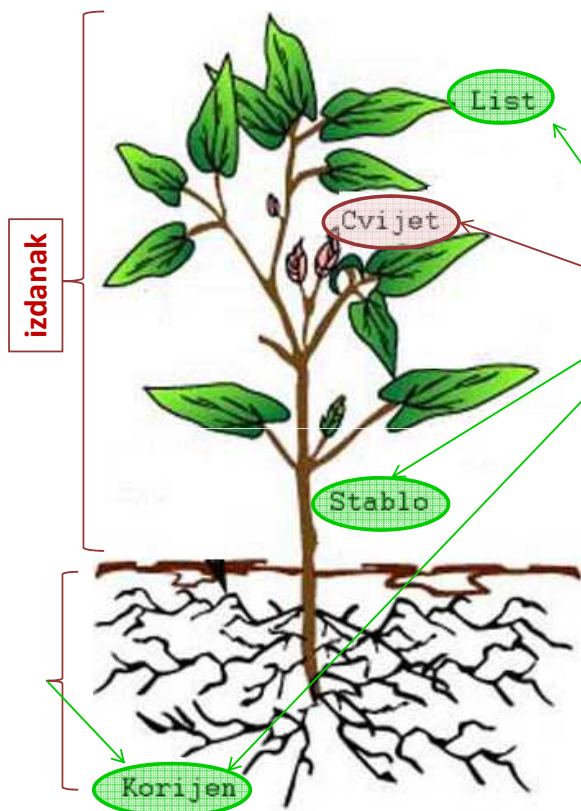
**Vegetativni i reproduktivni!**

**Adventivni!**

(adventivan= sporedan, ne raste na svom mjestu, pridošao)

**Analogni** (ista funkcija),  
**homologi** (isto porijeklo).

**Metamorfzirani ...**

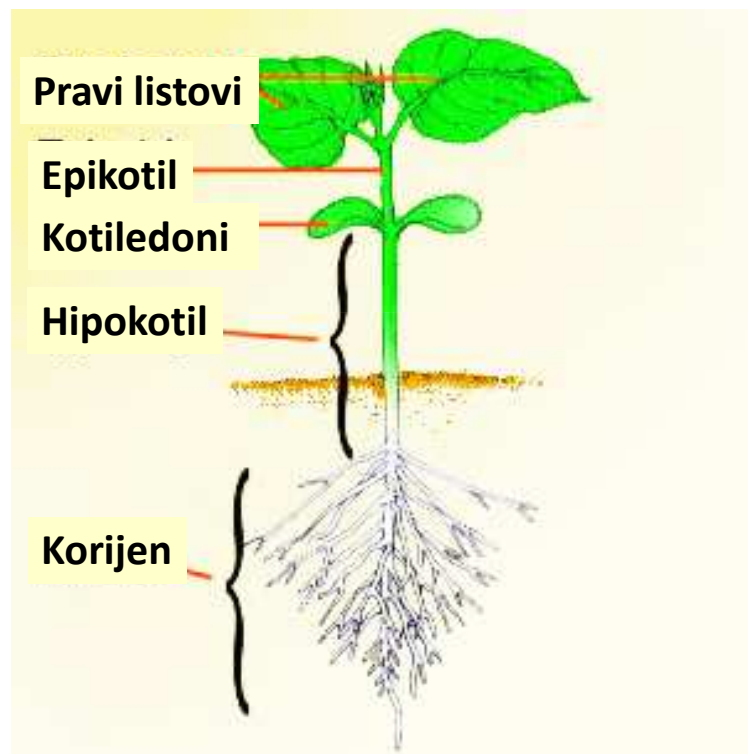


**Izdanak**  
(stablo + listovi +  
reproduktivne strukture)

**Korijen**

# Razviće biljaka

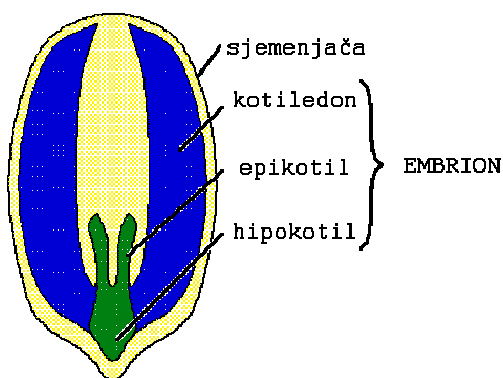
sjeme (zigot-embrion-klica)- **klijanac**- biljka - sjeme



# Razviće biljaka

sjeme (zigot-embrion-klica)- **klijanac**- biljka - sjeme

## DIKOTILEDONE BILJKE



**Sjemenjača**- ovojnica sjemena

**Endosperm**- hranljivo tkivo

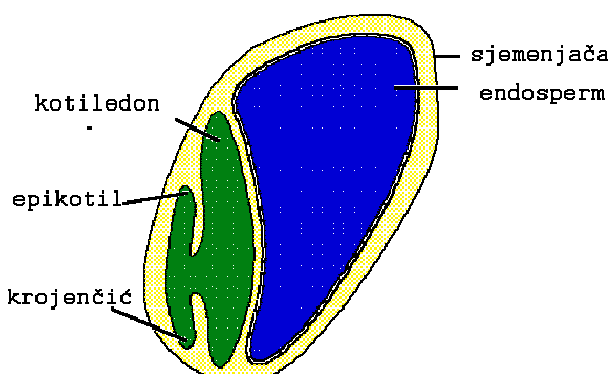
**Klica**- začetak biljke u sjemenu/sjemenom zametku

**Kotiledoni**- klicini listići

**Epikotil**- vršni dio stabaoceta klice

**Hipokotil**- donji dio stabaoceta klice, od kotiledona do korijenka

## MONOKOTILEDONE BILJKE



## Vrste hranljivog tkiva

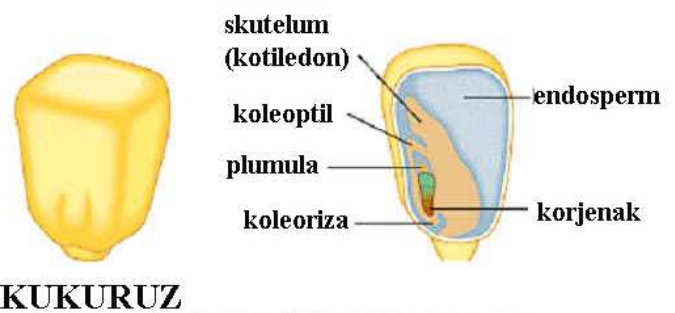
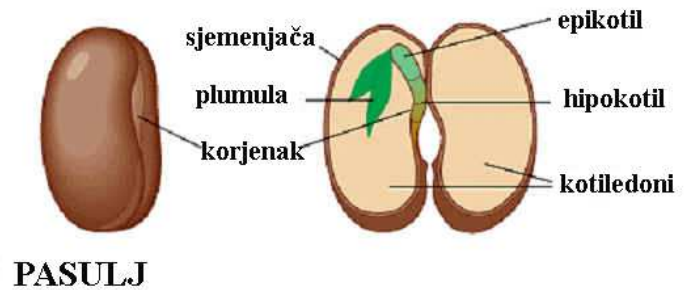
Endosperm- vodi porijeklo od ćelija embrionove kese, dio je gametofit generacije (reproduktivno porijeklo).

Perisperm- vodi porijeklo od nucelusa, dio je sporofit generacije (vegetativno porijeklo).

## Tipovi sjemena- u donosu na vrstu hranljivog tkiva

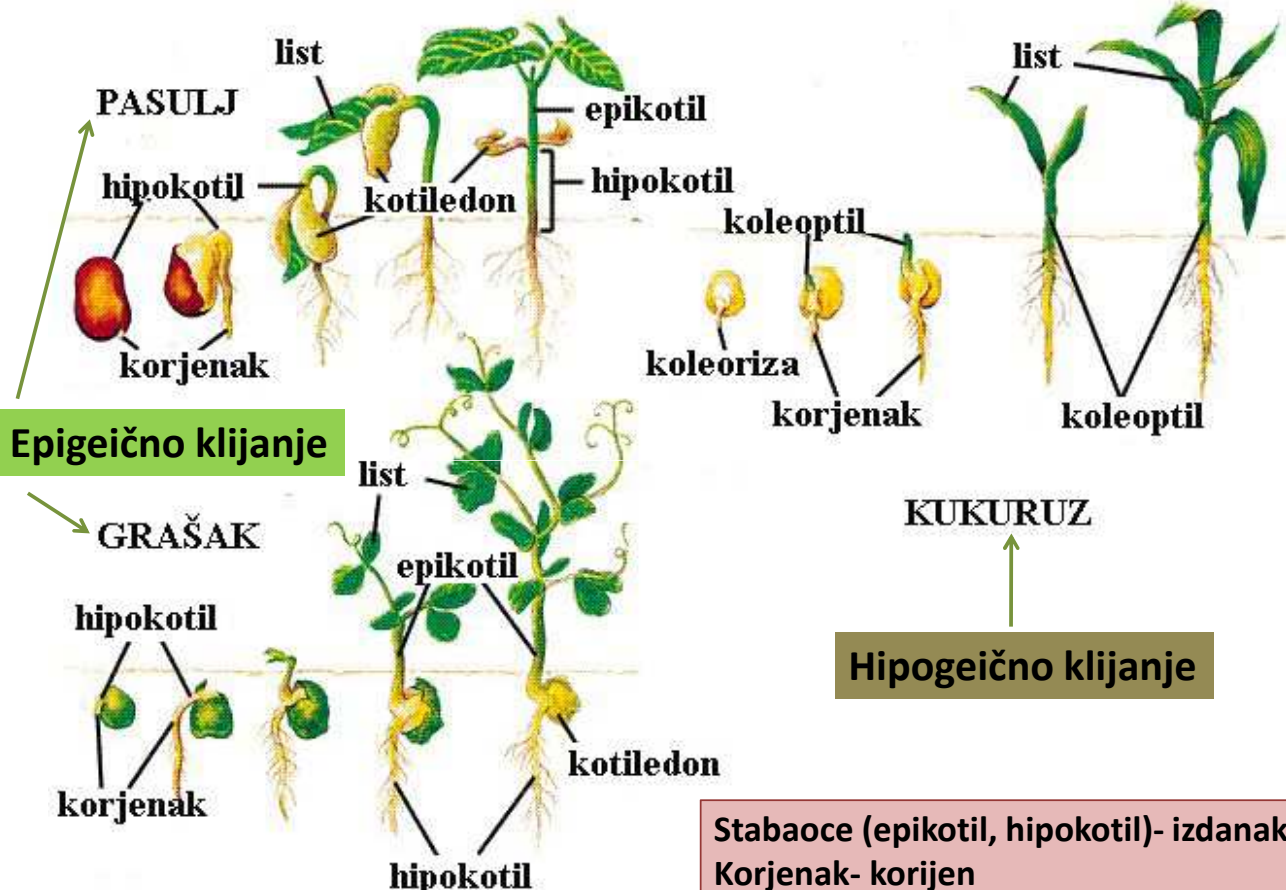
- 1. Sjemeni bez endosperma-** kotiledoni apsorbiraju sav ili skoro sav endosperm tako da on ne postoji ili se nalazi u vidu jednog ili dva sloja ćelija (pr. leptirnjače (*Fabaceae*), glavočike (*Asteraceae*), ruže (*Rosaceae*), krstašice (*Brassicaceae*)).
- 2. Sjemeni sa endospermom-** endosperm čini glavnu masu, a klica samo neznatan dio sjemena (žitarice i sve ostale trave, biljke iz porodice pomoćnica (*Solanaceae*), ljiljana (*Liliaceae*) i dr.
- 3. Sjemeni sa perispermom** koji predstavlja hranljivo tkivo vegetativnog porijekla jer nastaje od nucelusa; imaju ga predstavnici porodice karanfila (*Caryophyllaceae*), lobode (*Chenopodiaceae*) i dr.
- 4. Sjemeni sa endospermom i perispermom** sadrže hranljivo tkivo dvojnog porijekla i ređe se javljaju; ima ga npr. biber (*Piper*).

- **Plumula**- vršni pupoljak klice
- **Skutelum**- kotiledon monokotila, nalik na cjevčicu
- **Koleoptil**- prvi list kod klice trava, koji se javlja kao tanka opna koja obuhvata plumulu
- **Koleoriza**- opnasti omotač koji obavija korjenak klice trava.



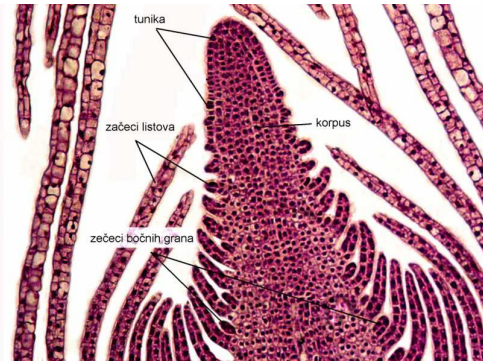
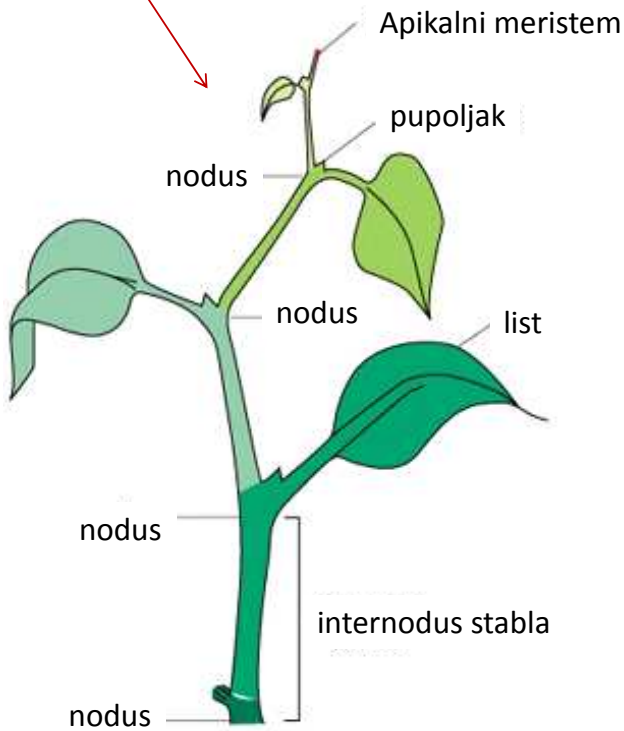
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Randy Moore, Dennis Clark, and Darrell Vodopich, Botany Visual Resource Library © 1998 The McGraw-Hill Companies, Inc. All rights reserved.



# Izdanak

Fotofilni izdanak



Zašeci bočnih grana = zašeci pupoljaka

Pupoljak = vegetativna kupa + listovi koji je opkoljavaju

Geofilni izdanak rizom



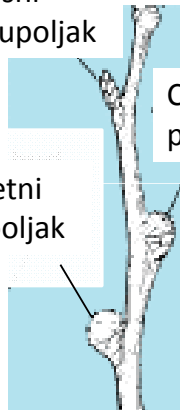
## Pupoljci....

Terminalni pupoljak



Bočni pupoljak

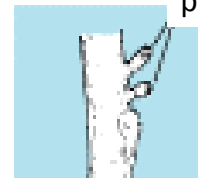
Lisni pupoljak



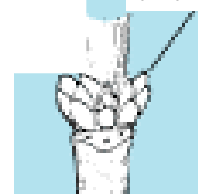
Cvjetni pupoljak

Cvjetni pupoljak

Serijalni pupoljak

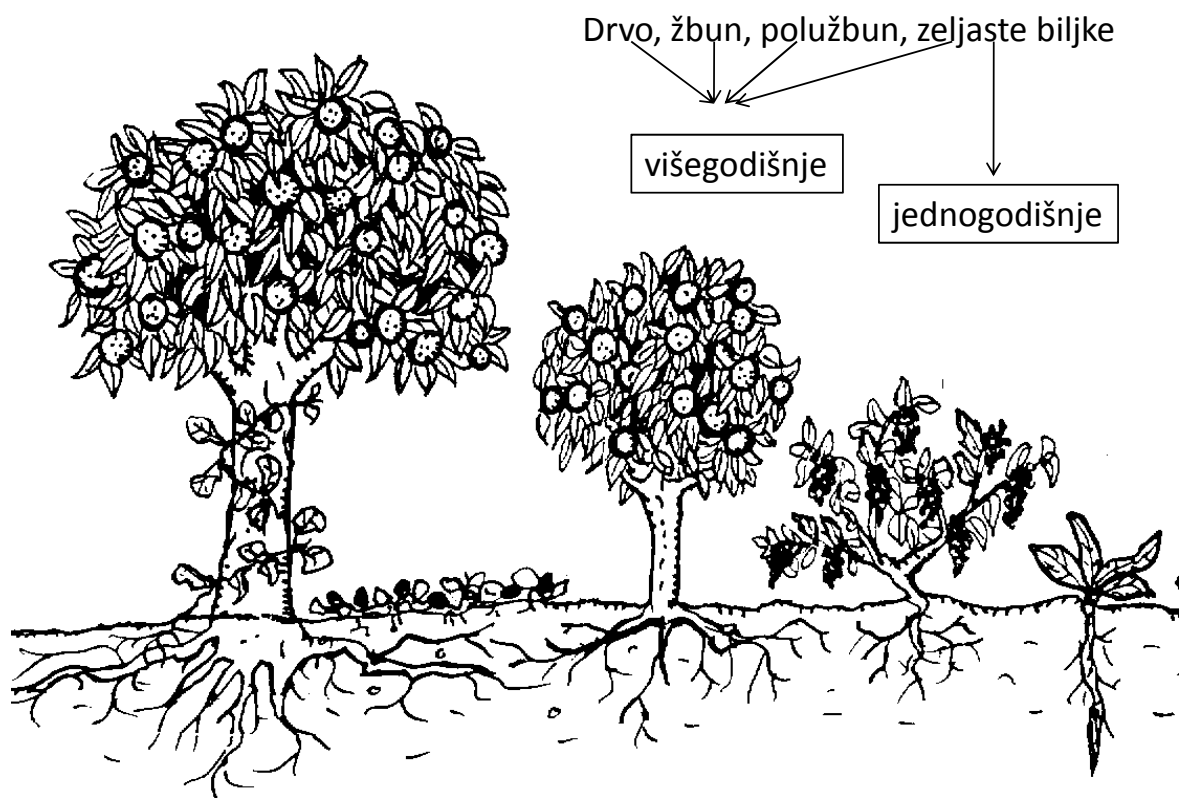


Kolateralni pupoljak

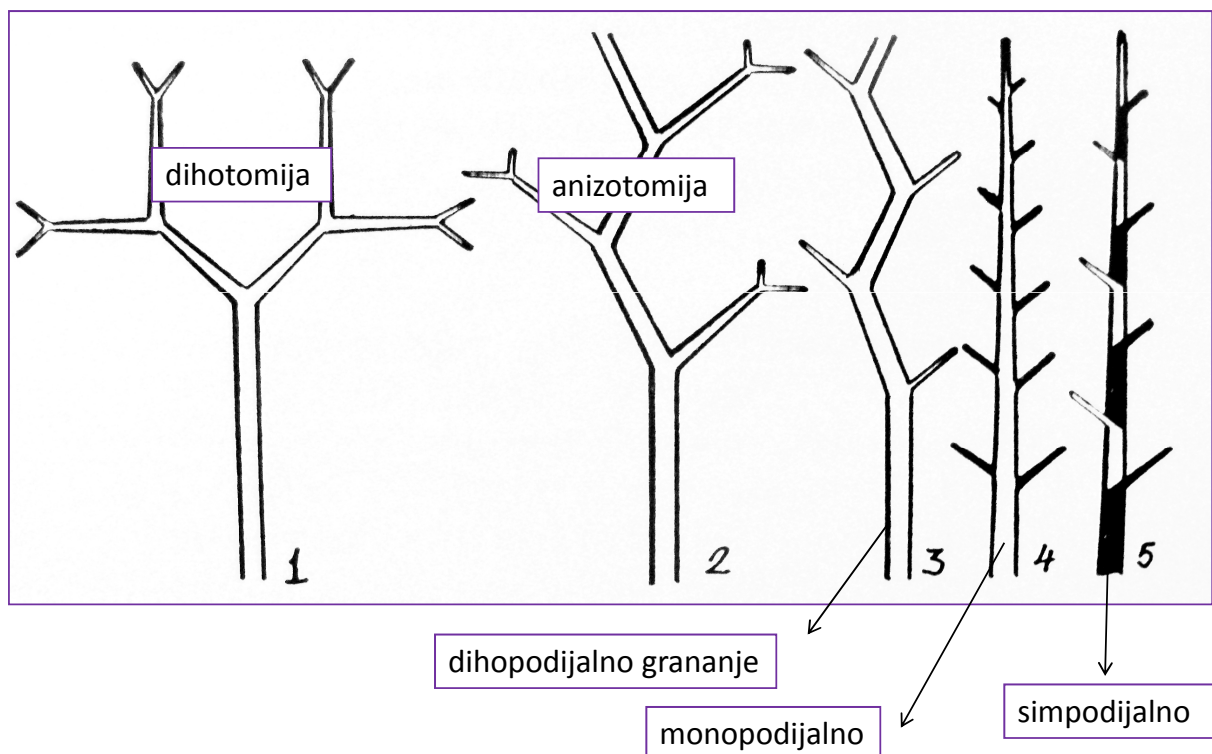


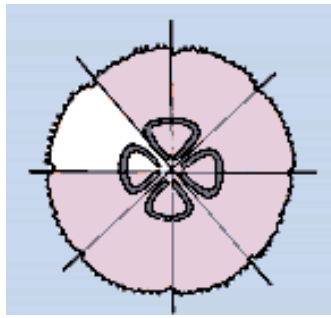
Zimski pupoljci, pupoljci za obnavljanje, uspavani pupoljci, kauliflorija .... adventivni pupoljci

# Forme stabla

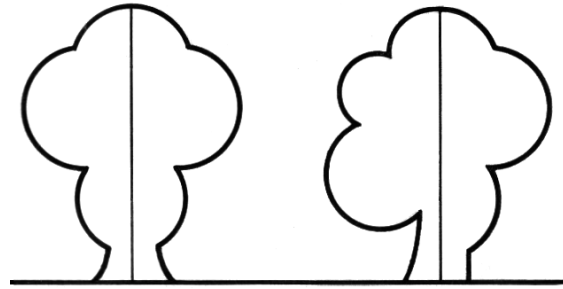


# Tipovi grananja





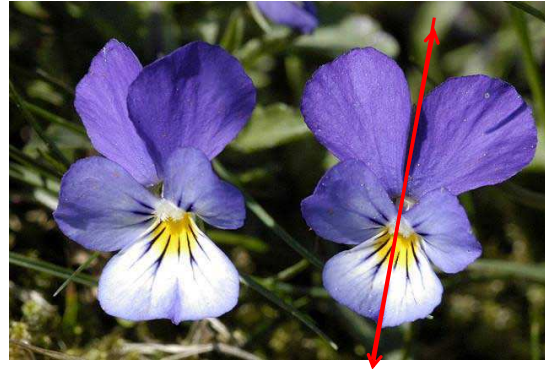
Polisimetrija =  
(radijalna simetrija)



Bilateralna simetrija

Asimetrija

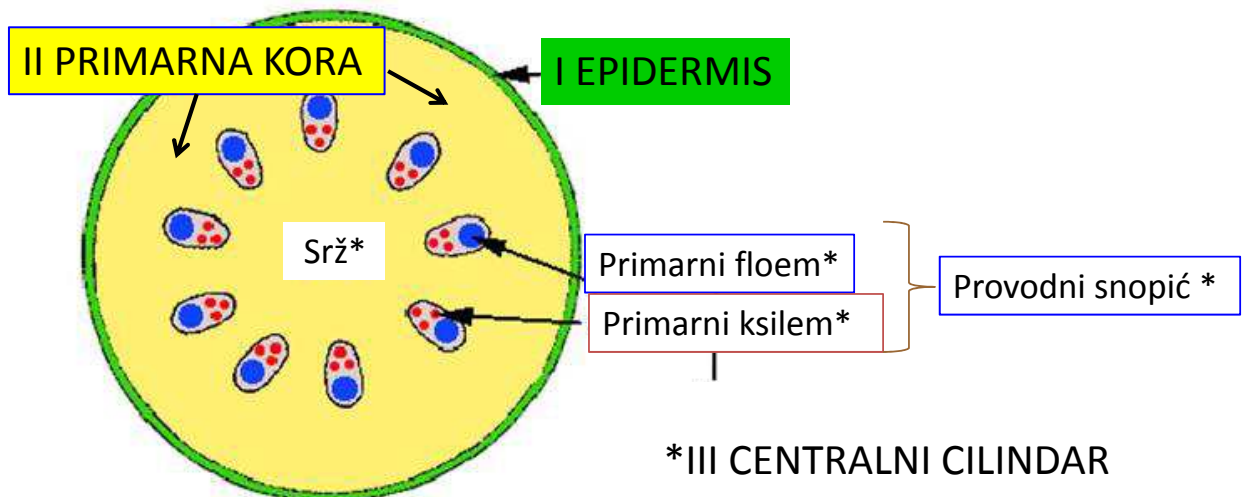
- Simetrija cvijeta: polisimetričan= aktinomorf, pravilan;  
monosimetričan= zigomorf, nepravilan cvijet



## Stablo- primarna građa

Opšta primarna građa:

Epidermis, primarna kora, centralni cilindar



Dikotiledone biljke!

## Elementi primarne kore

- Parenhimske ćelije
- Mehaničke ćelije
- Endodermis=  
skrobna sara

## Elementi centralnog cilindra

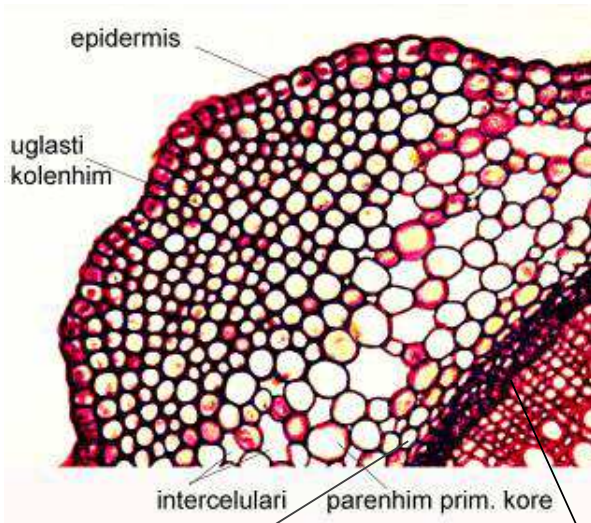
- Pericikl
- Provodni snopići  
ili provodni  
cilindar
- Srž

- **Pericikl:**

- a) Parenhimske ćelije
- b) Prsten od sklerenhimskog i parenhimskog tkiva
- c) Trake sklerenhima i parenhima koje se naizmjenično smjenjuju



*Lamium purpureum*-  
mrtva kopriva

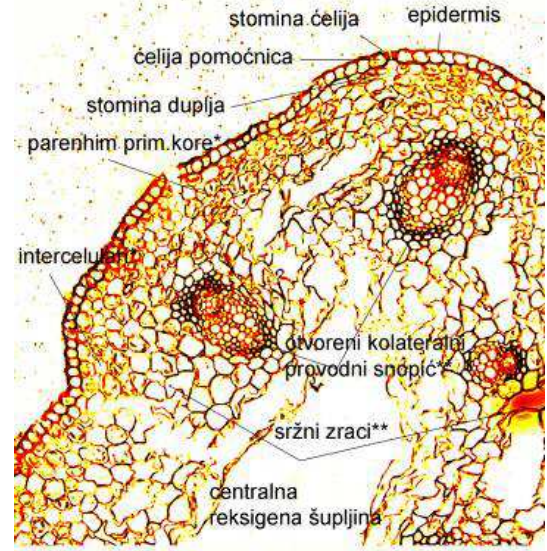


Primarna kora

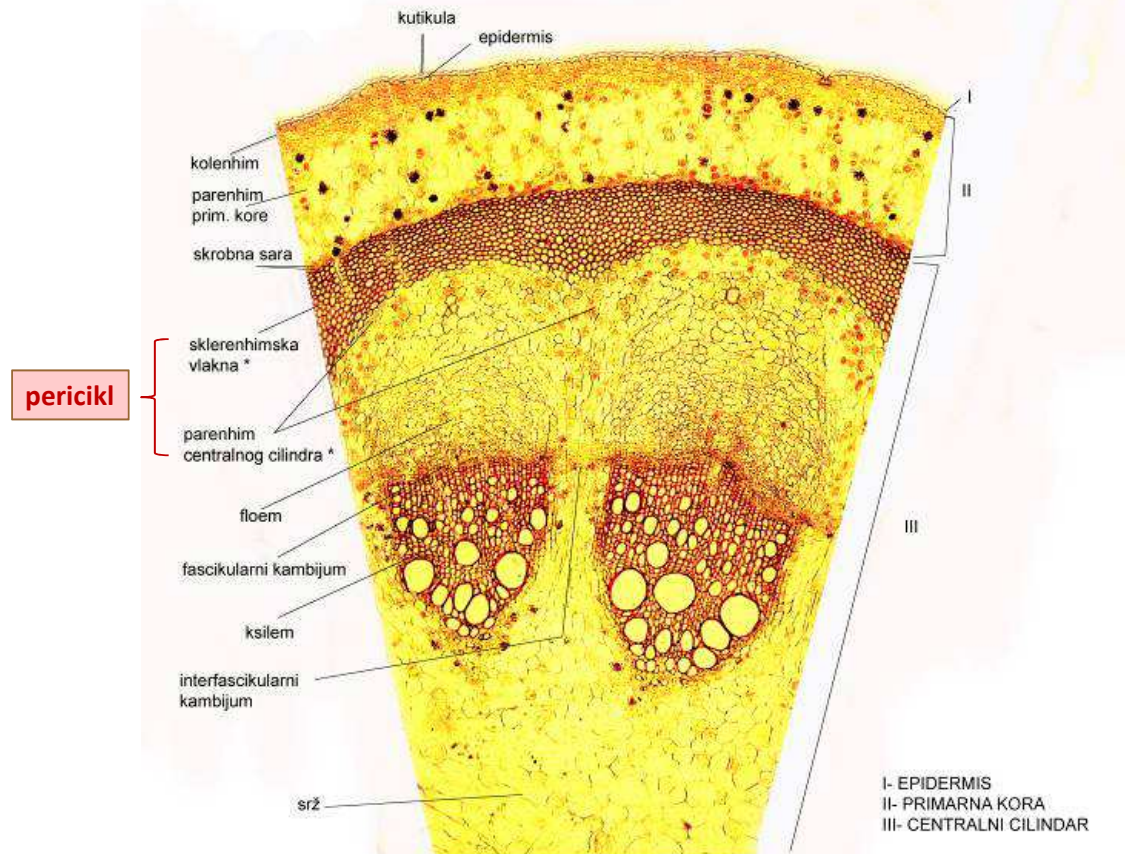
Centralni cilindar

Pericikl  
Provodna tkiva  
Srž

*Ranunculus* spp.- ljutić

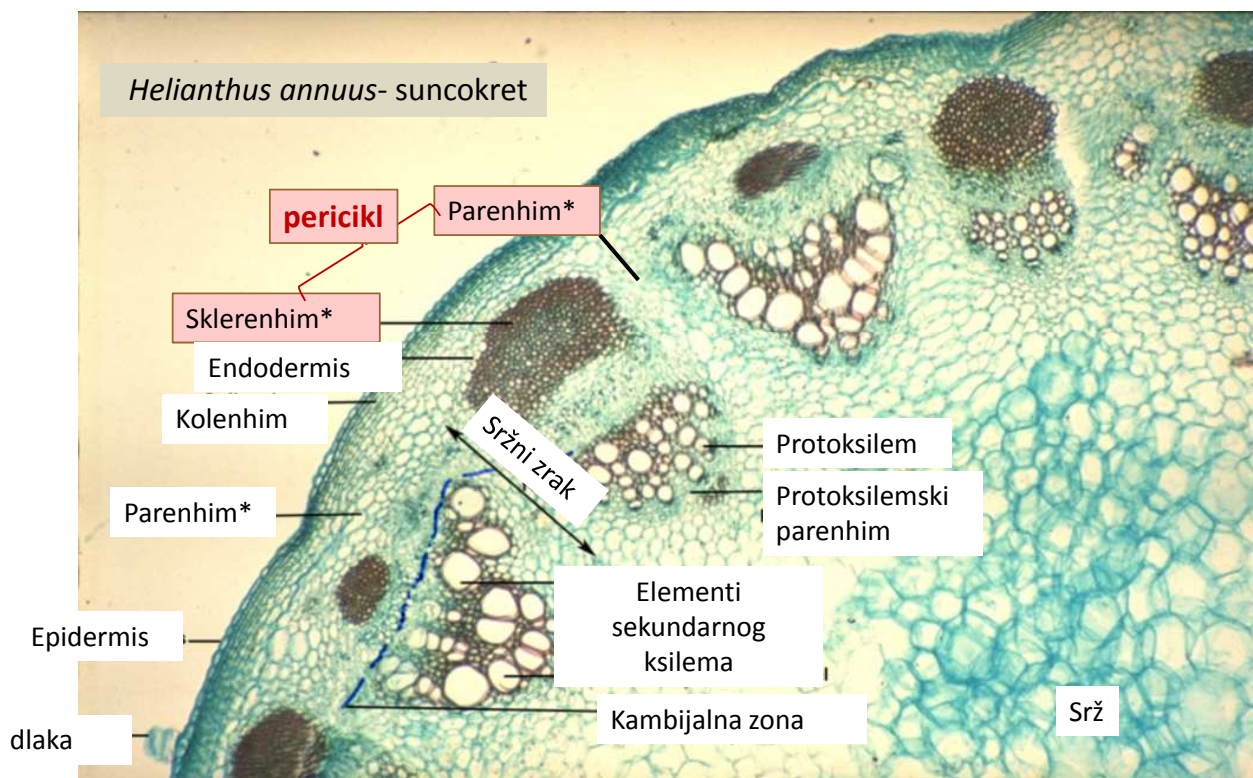


I- EPIDERMIS  
\*- PRIMARNA KORA  
\*\*- CENTRALNI CILINDAR

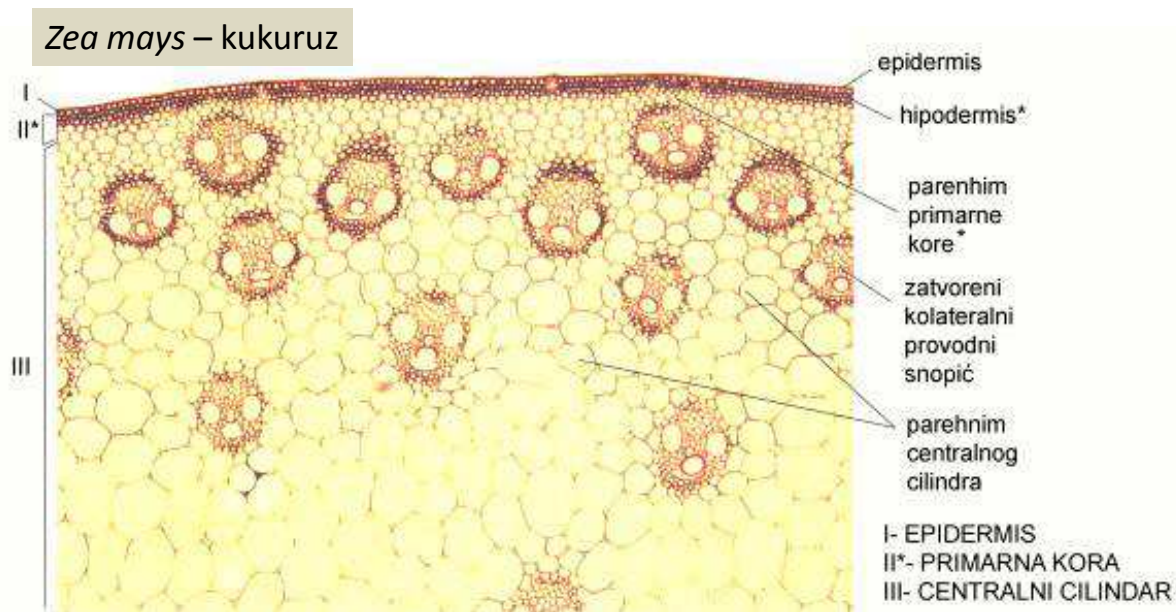


\* pericikl

*Aristolochia siphon*- vučja jabuka

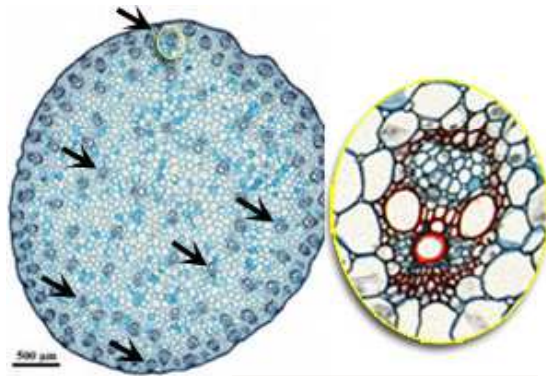


## MONOKOTILEDONE BILJKE!!!



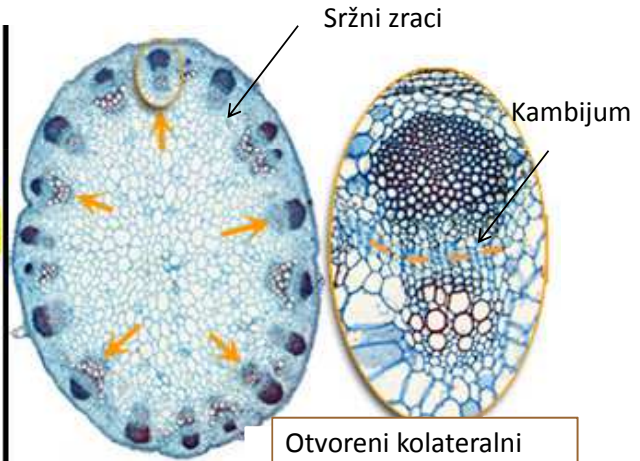
# Uporedna shema primarne građestabla mono- i dikotiledonih biljaka

PRIMARNO STABLO MONOKOTILA



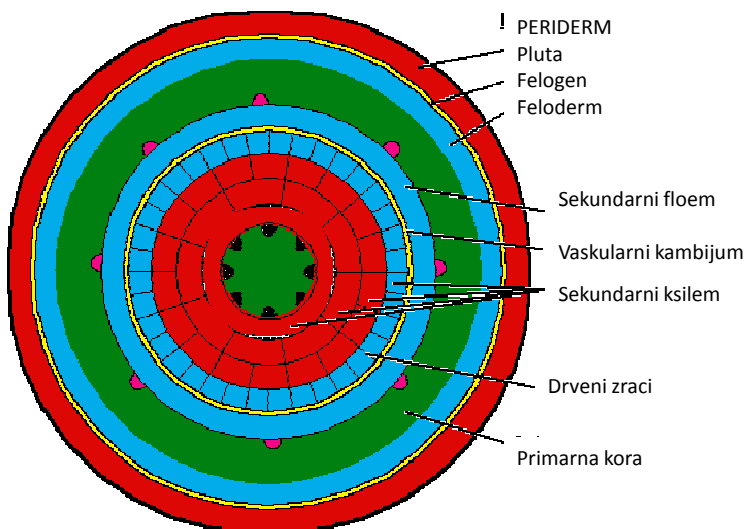
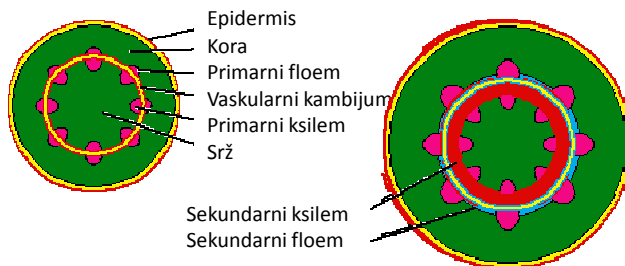
Zatvoreni kolateralni provodni snopić

PRIMARNO STABLO DIKOTILA



Otvoreni kolateralni provodni snopić

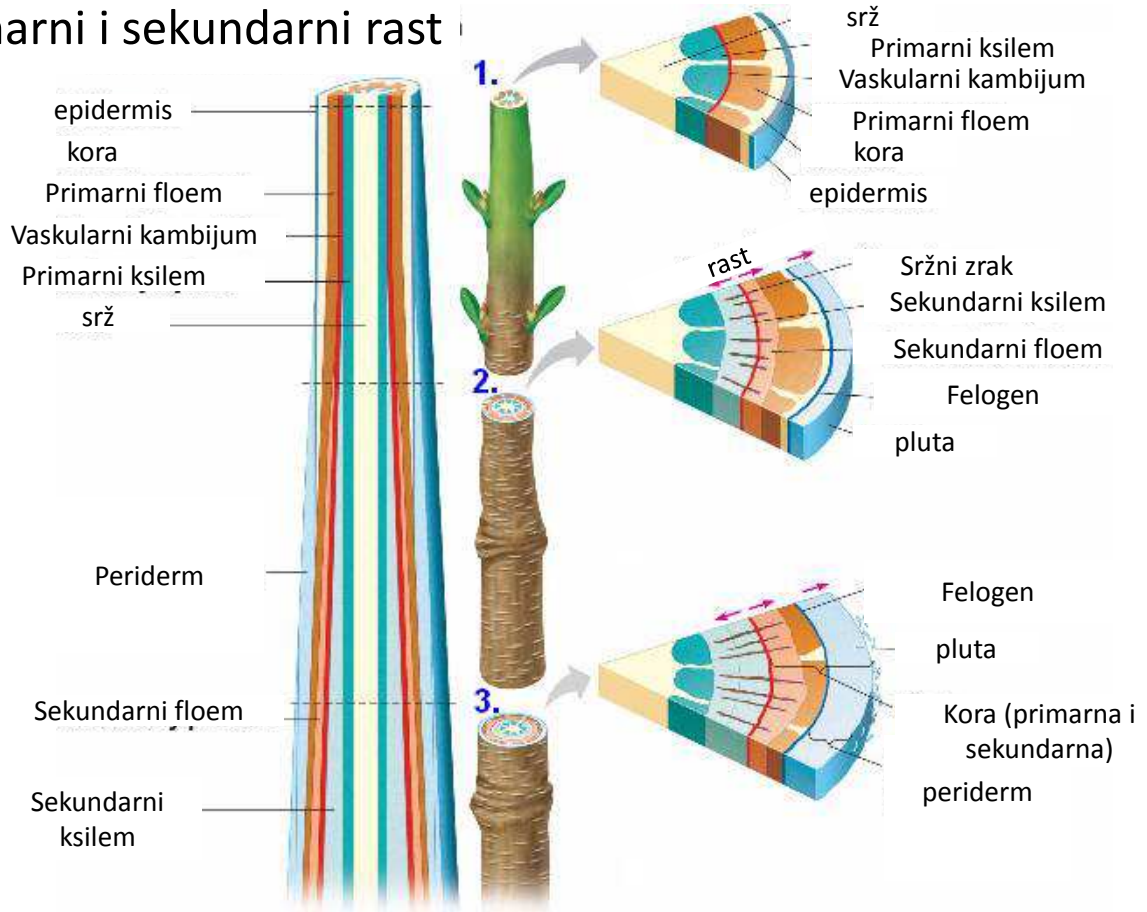
## Sekundarna građa stabla



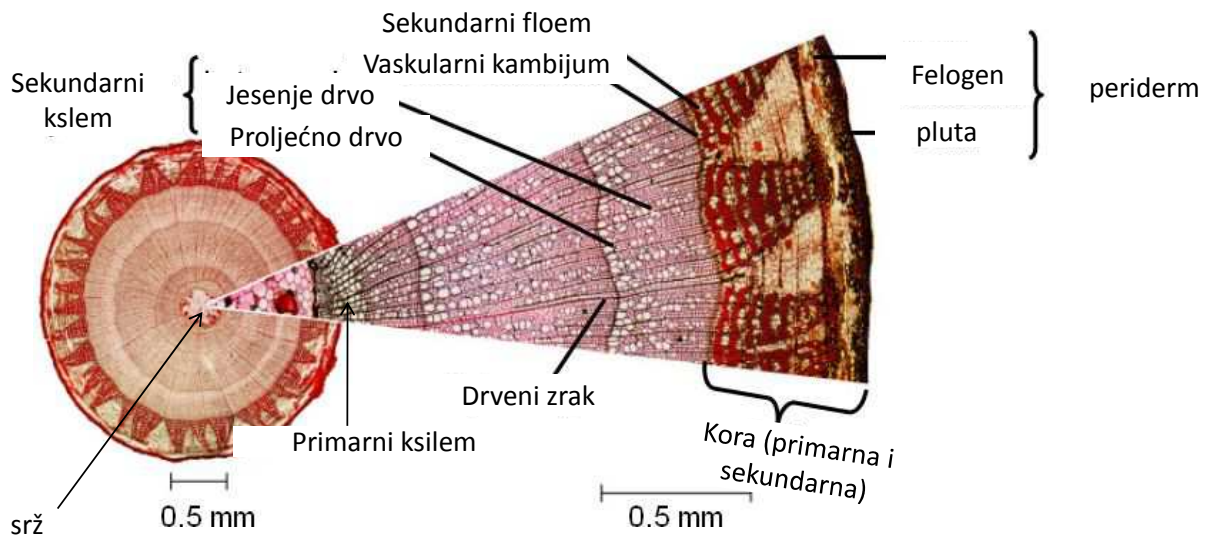
Tipovi sekundarnog debljanja:

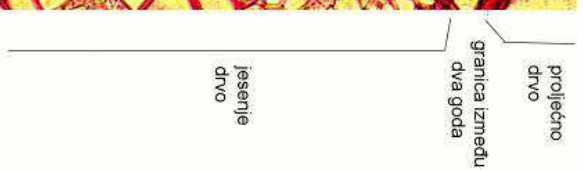
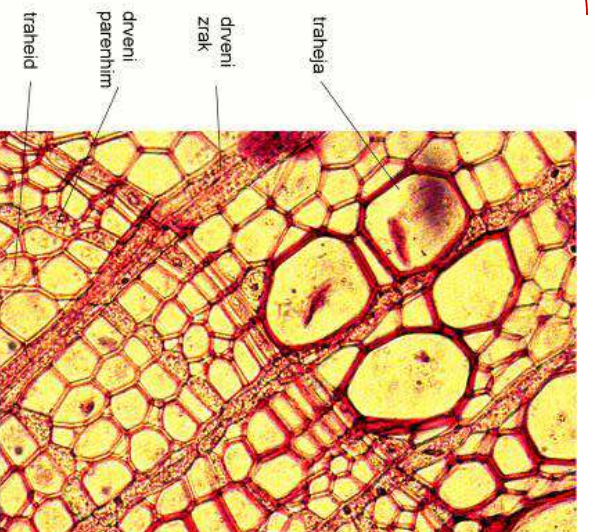
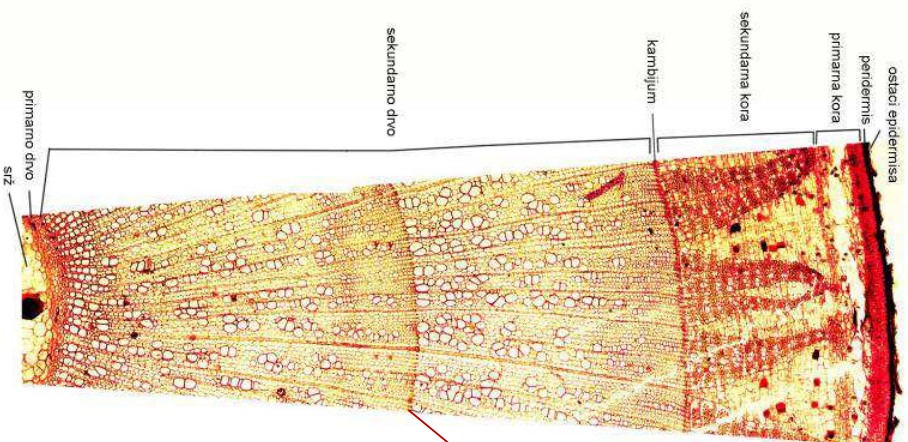
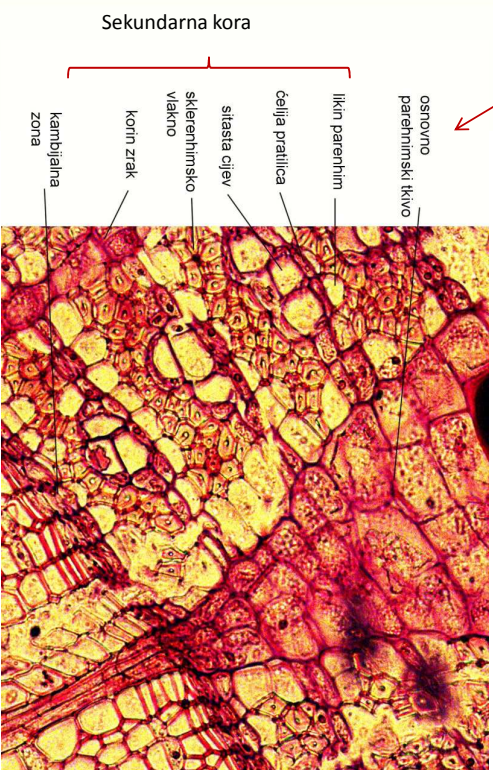
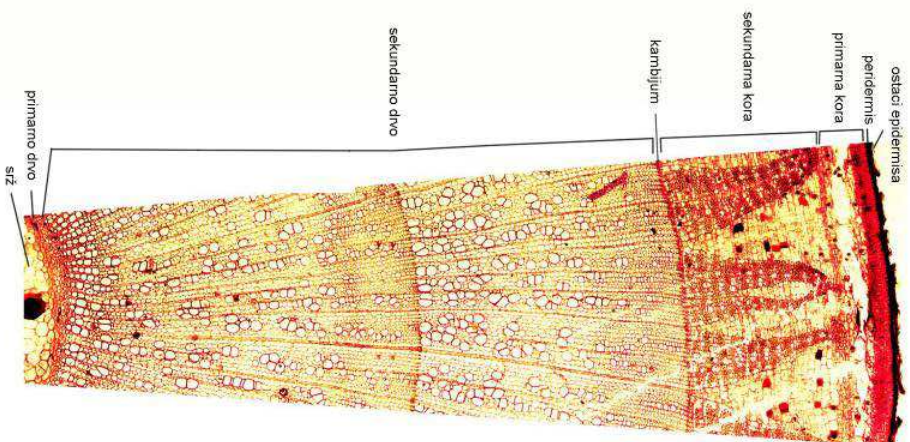
1. Tilia tip
2. Aristolochia tip
3. Helianthus prelazni tip

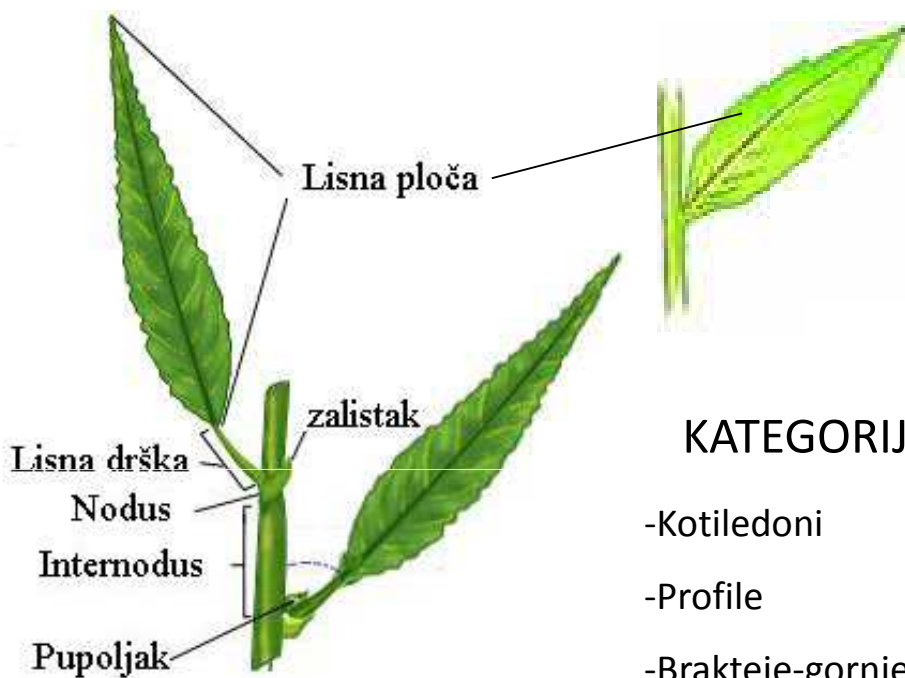
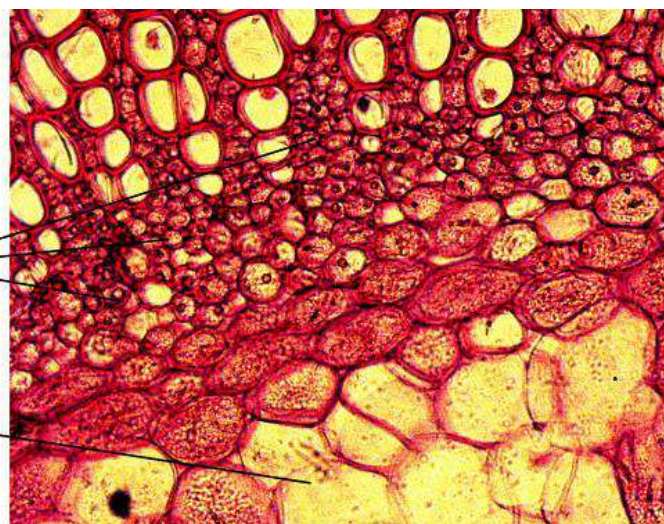
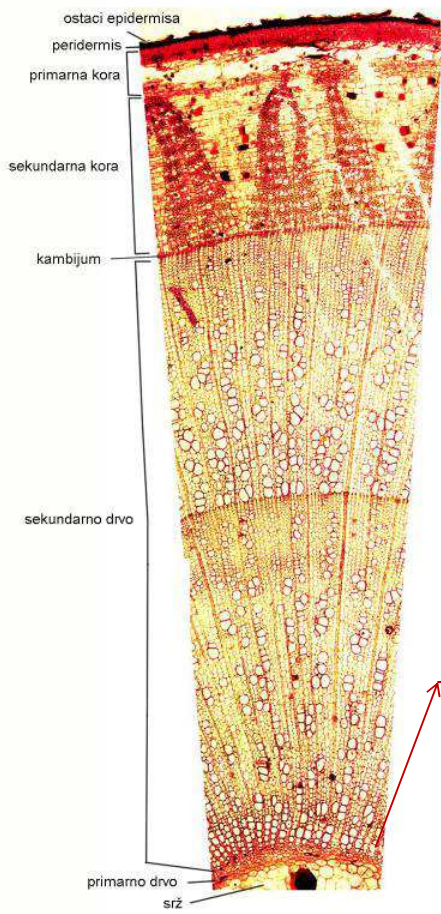
# Primarni i sekundarni rast



# Sekundarna građa stabla lipe



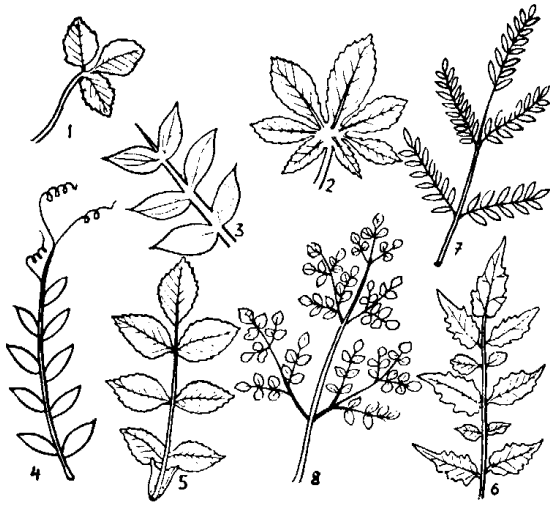




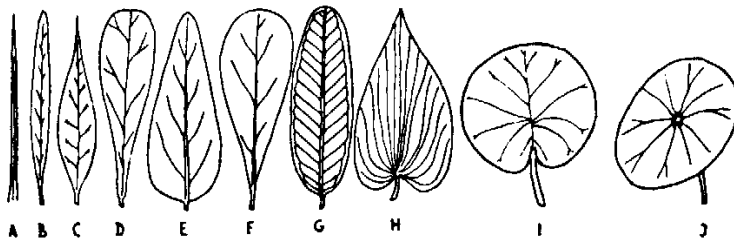
## LIST

### KATEGORIJE LISTOVA

- Kotiledoni
- Profile
- Brakteje-gornje lišće
- Ljuspasto lišće –donje
- Srednje lišće-asimilaciono (pravo)
- Lišće u zoni cvjetova



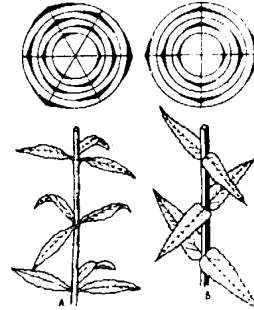
Sl. 308. Složeno građeni listovi: 1 — tročlan; 2 — prstasto složen; 3 — parno perasto složen; 4 — parno perast list sa listićima pretvorenim u rašljike; 5 — neparno perasto složen; 6 — isprekidano perasto složen; 7 — dvojno perasto složen; 8 — trojno perasto složen



Sl. 309. Oblici liske nekih listova: A — igličast; B — linearan; C — lancetast; D — lopatičast; E — jajast; F — objajast; G — eliptičan; H — srcast; I — okrugao; J — peltatan list

## Forma lista

## Raspored listova

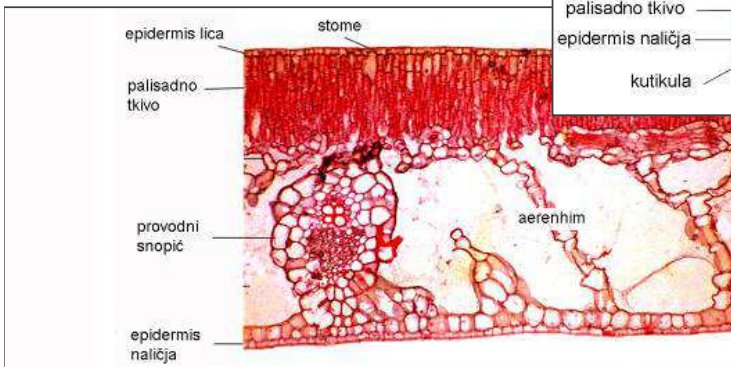
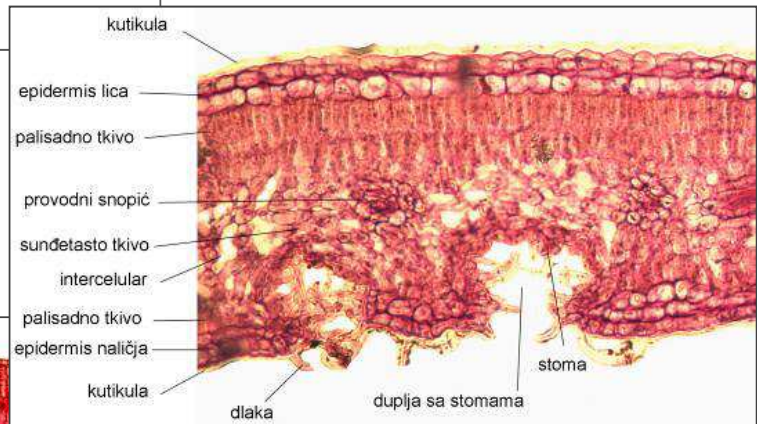
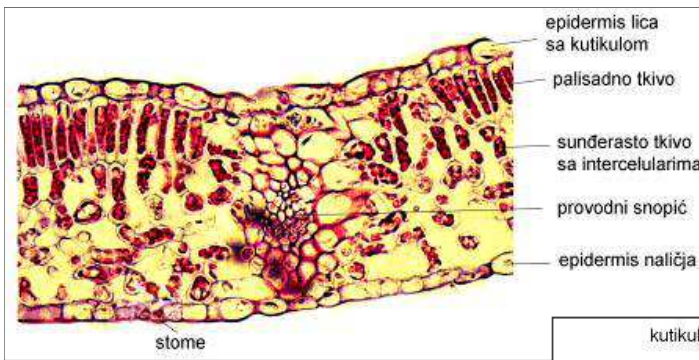


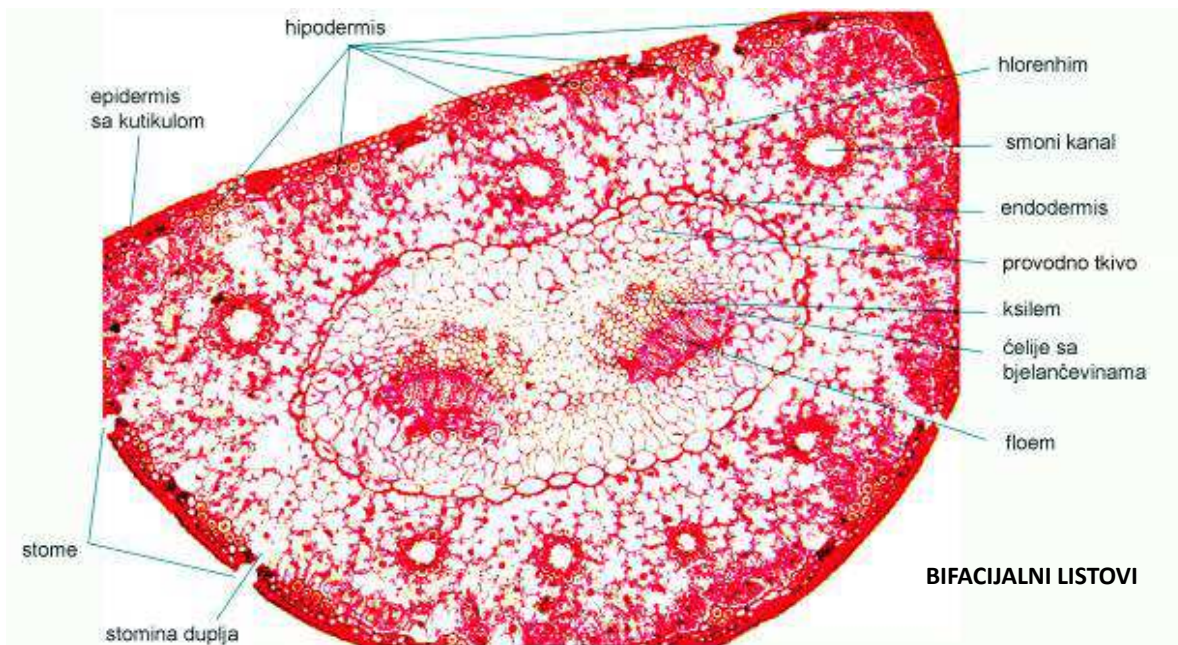
Sl. 109. Pršljenast raspored listova: A — tri lista u pršljenju, B — dva lista u pršljenju (naspraman raspored) (po Tatiću i sar.)

## Nervatura ...

## Zalisci

# list



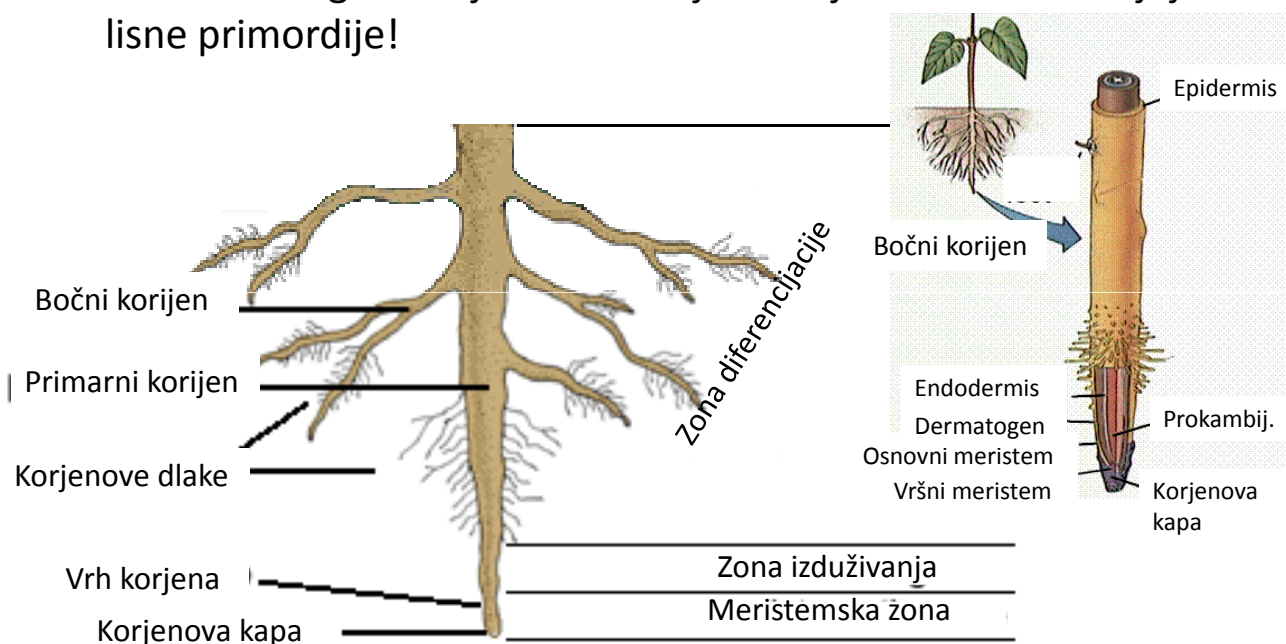


**EKVIFACIJALAN LIST**

**UNIFACIJALA LIST**

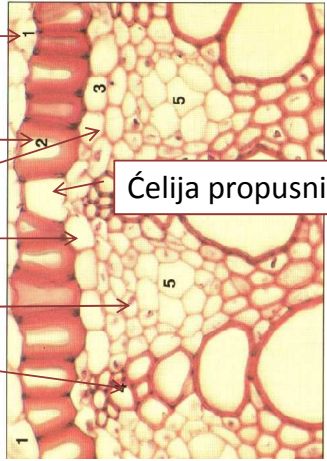
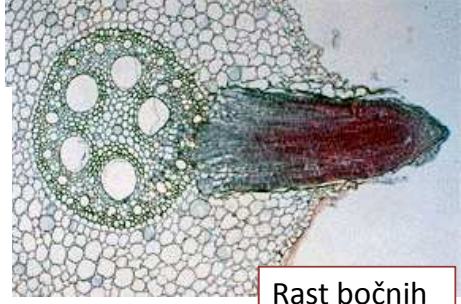
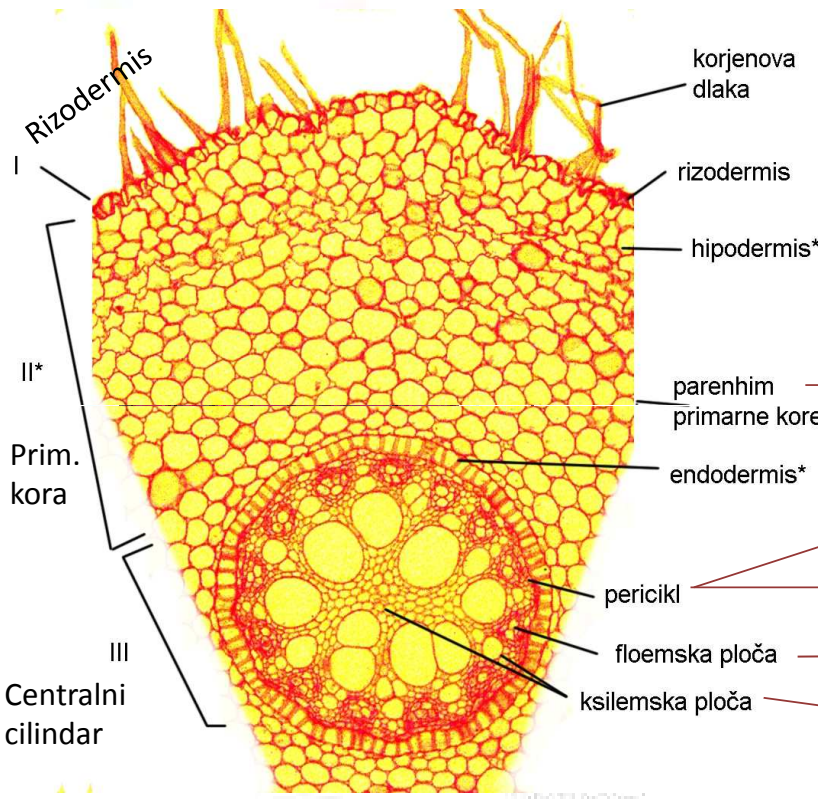
## Korijen

- Podzemni organ radijalne simetrije na kojem se ne obrazuju lisne primordije!





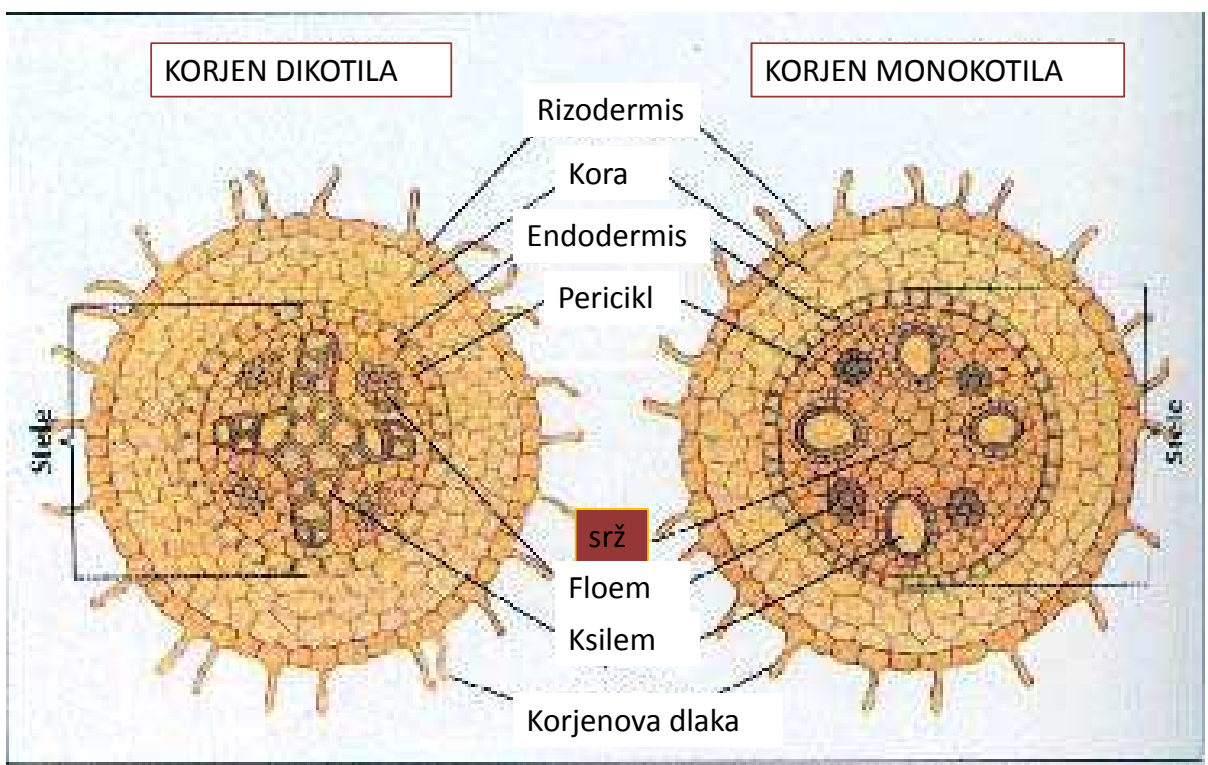
Presjek kroz zonu korjenovih dlaka



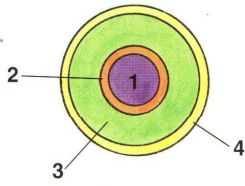
Kasparijeva zadebljanja ...

KORJEN DIKOTILA

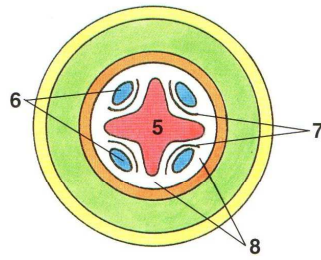
KORJEN MONOKOTILA



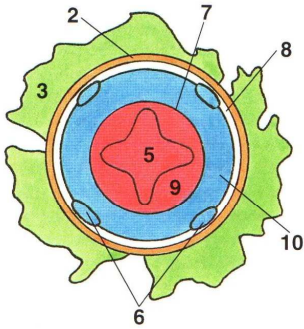
Presjek vrha korijena



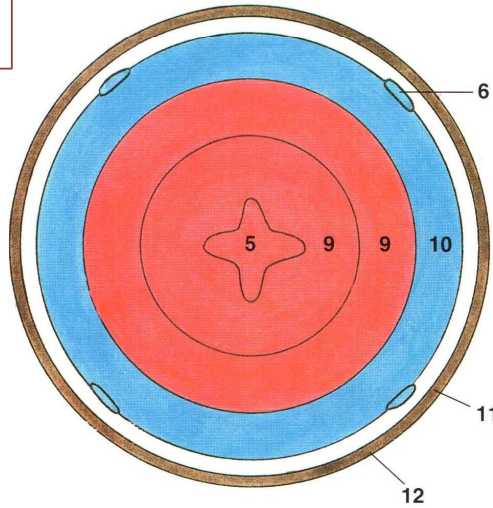
Presjek kroz zonu iznad korijenovih dlaka



Formiranje prstena od vaskularnog kambijuma



Sekundarno debljanje



- 1- prokambijum
- 2- endodermis
- 3- primarna kora
- 4- rizodermis
- 5- ksilem
- 6- floem
- 7- vaskularni kambijum
- 8- pericikl
- 9- sekundarni ksilem
- 10- sekundarni floem
- 11- felogen
- 12- peridermis

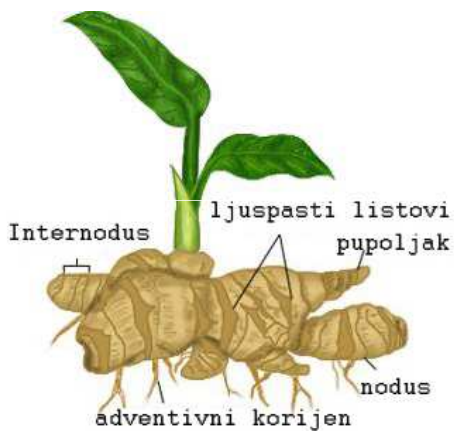
## Metamorfoze izdanka

- Fotofilni

- Geofilni izdanci (rizomi, stolone, krtole i lukovice)

Rizomi

(horizontalni, uspravni, monopodijalni, simpodijalni)

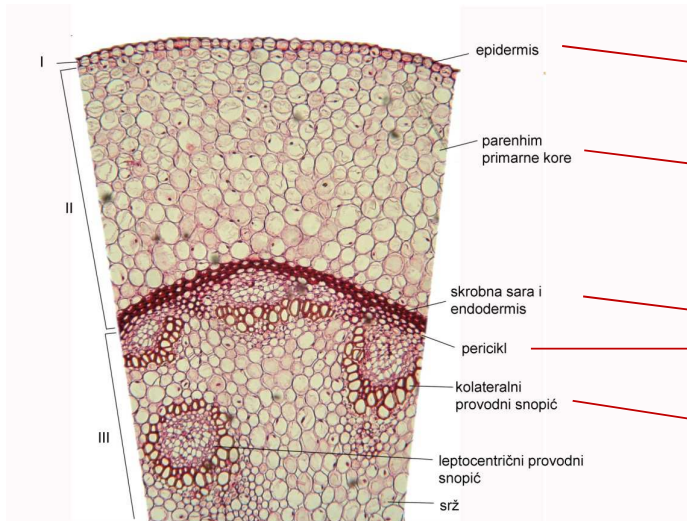


Rizom đumbira

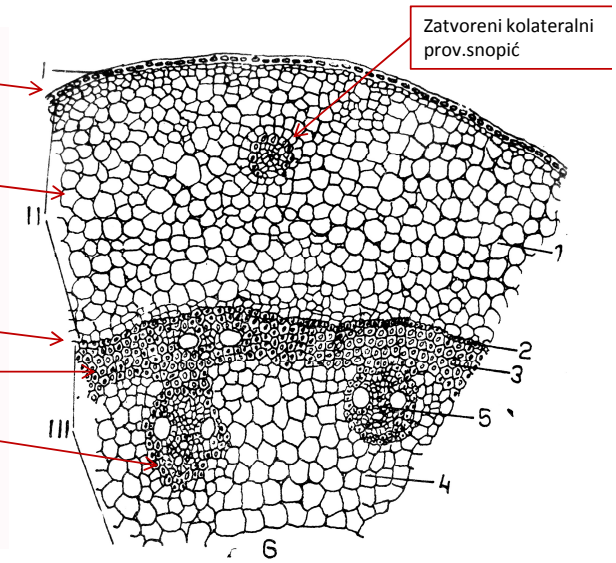


Rizom kisele paprati

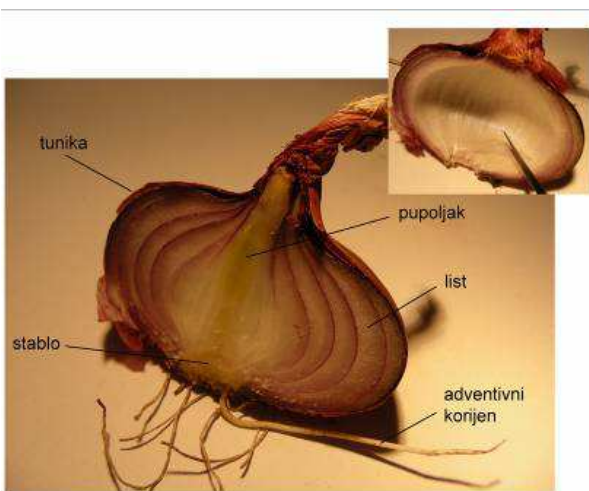
Rizom đurđevka  
(*Convallaria majalis*)



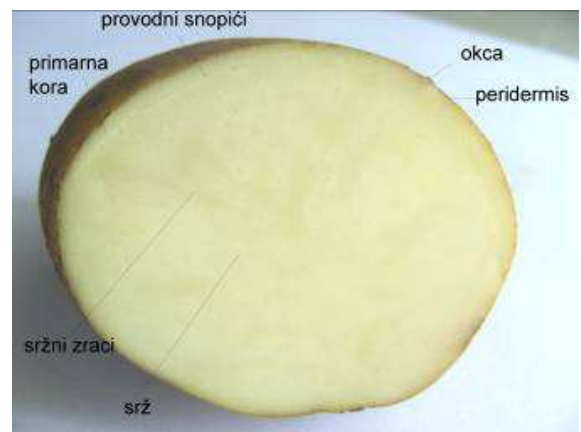
Rizom pirevine  
(*Agropyron repens*)



3- pericikli u vidu mehaničkog prstena



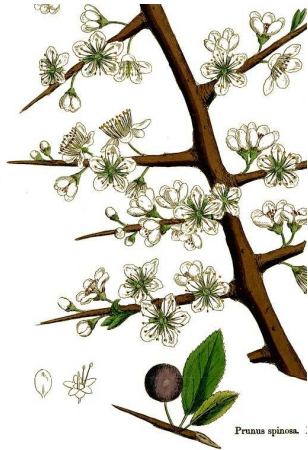
Lukovica



Krtola



Metamorfoza izdanka u trn



Metamorfoza izdanka u rašljike



Filokladije



Sukulente



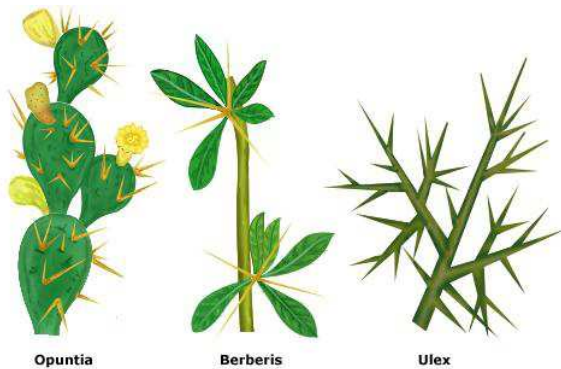
## METAMORFOZE LISTA

*Metamorfoza lista u rašljiku*

*Metamorfoza lista u trn*



rašljika



Opuntia

Berberis

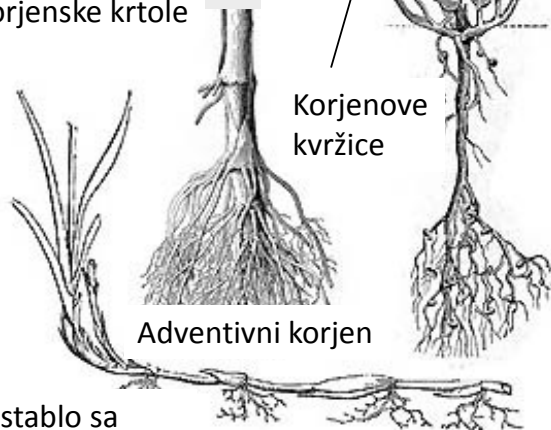
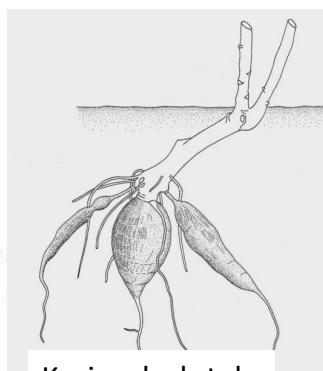
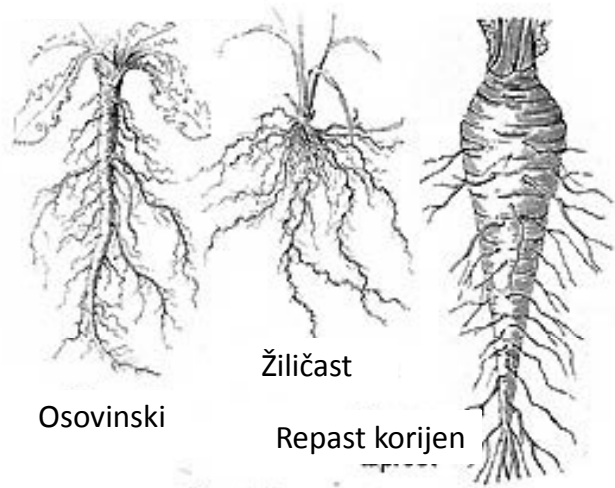
Ulex

*Metamorfoza lisne drške u filodije*



*Listovi kao organi za magacioniranje hrane*

# Tipovi korjena i metamorfoze



Kontraktilni korjenovi  
Vazdušni korjenovi  
Korjenovi za provjetranje  
Daskasti korjenovi  
Asimilacioni korjenovi

Puzeće stablo sa  
adventivnim  
korjenima