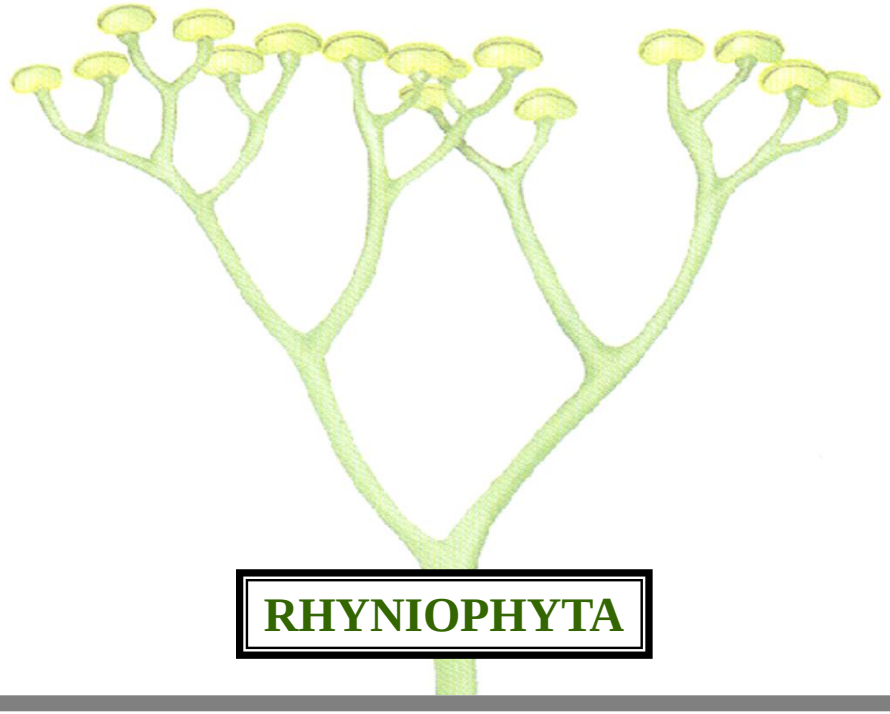
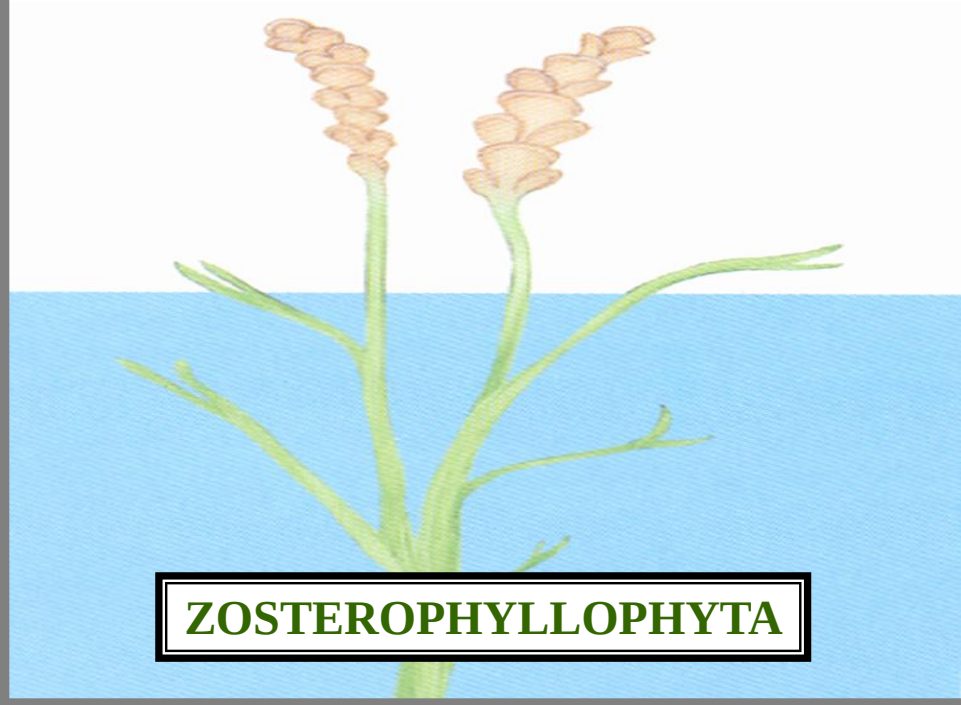
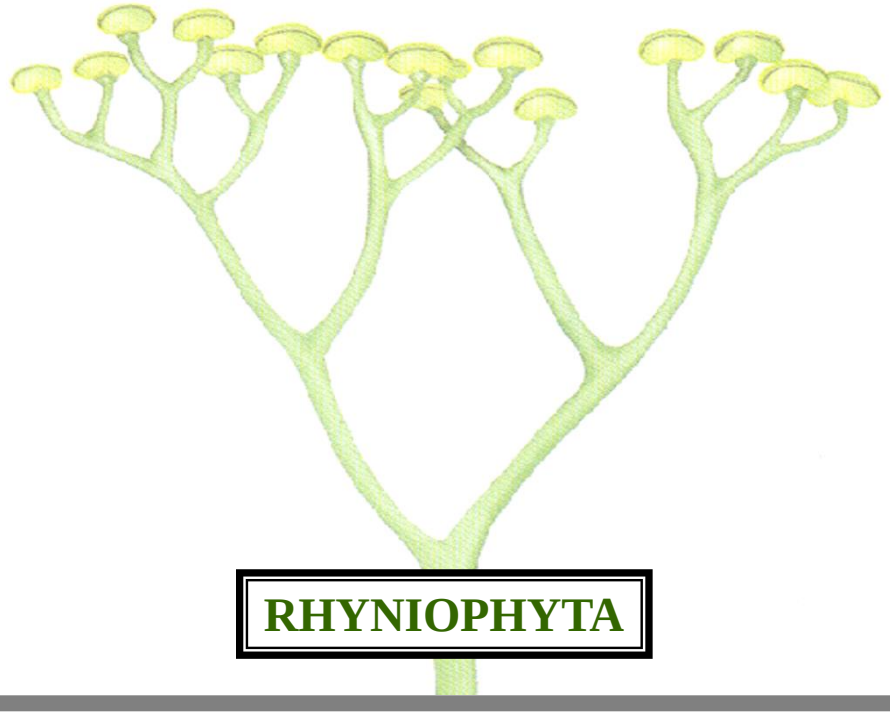


RHYNIOPHYTA

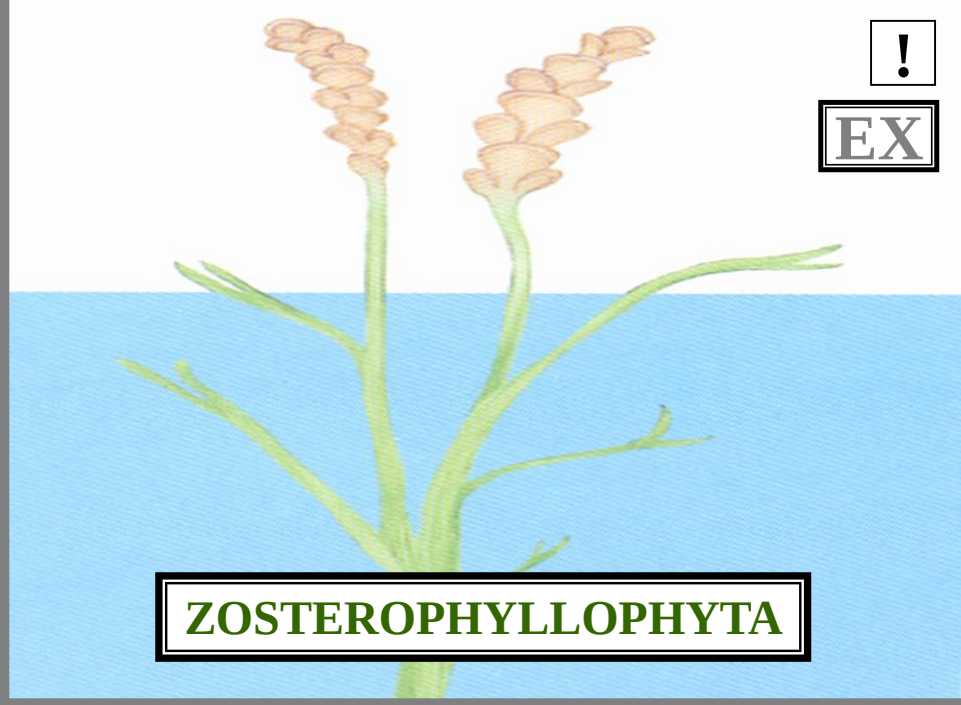


ZOSTEROPHYLLOPHYTA

TRIMEROPHYTOPHYTA



RHYNIOPHYTA



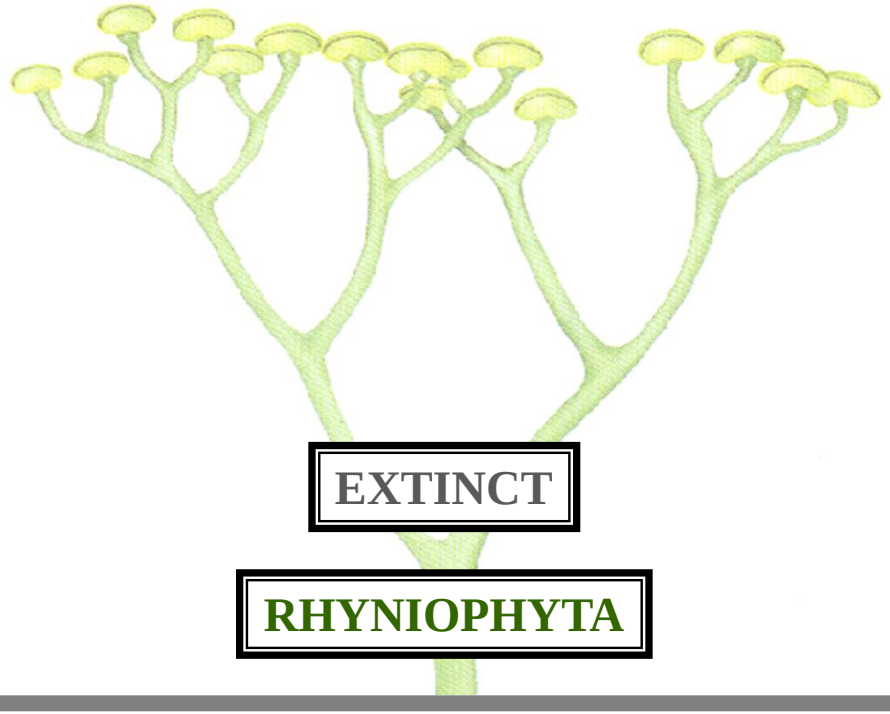
!

EX

ZOSTEROPHYLLOPHYTA

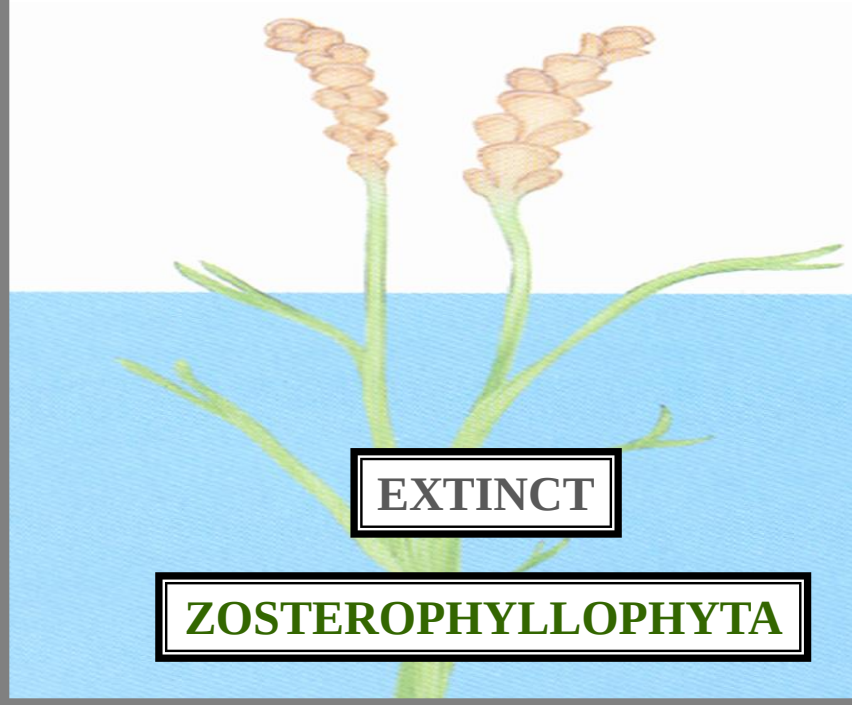
TRIMEROPHYTOPHYTA

PROGYMNOSPERMOPHYTA



EXTINCT

RHYNIOPHYTA



EXTINCT

ZOSTEROPHYLLOPHYTA

EXTINCT

TRIMEROPHYTOPHYTA

EXTINCT

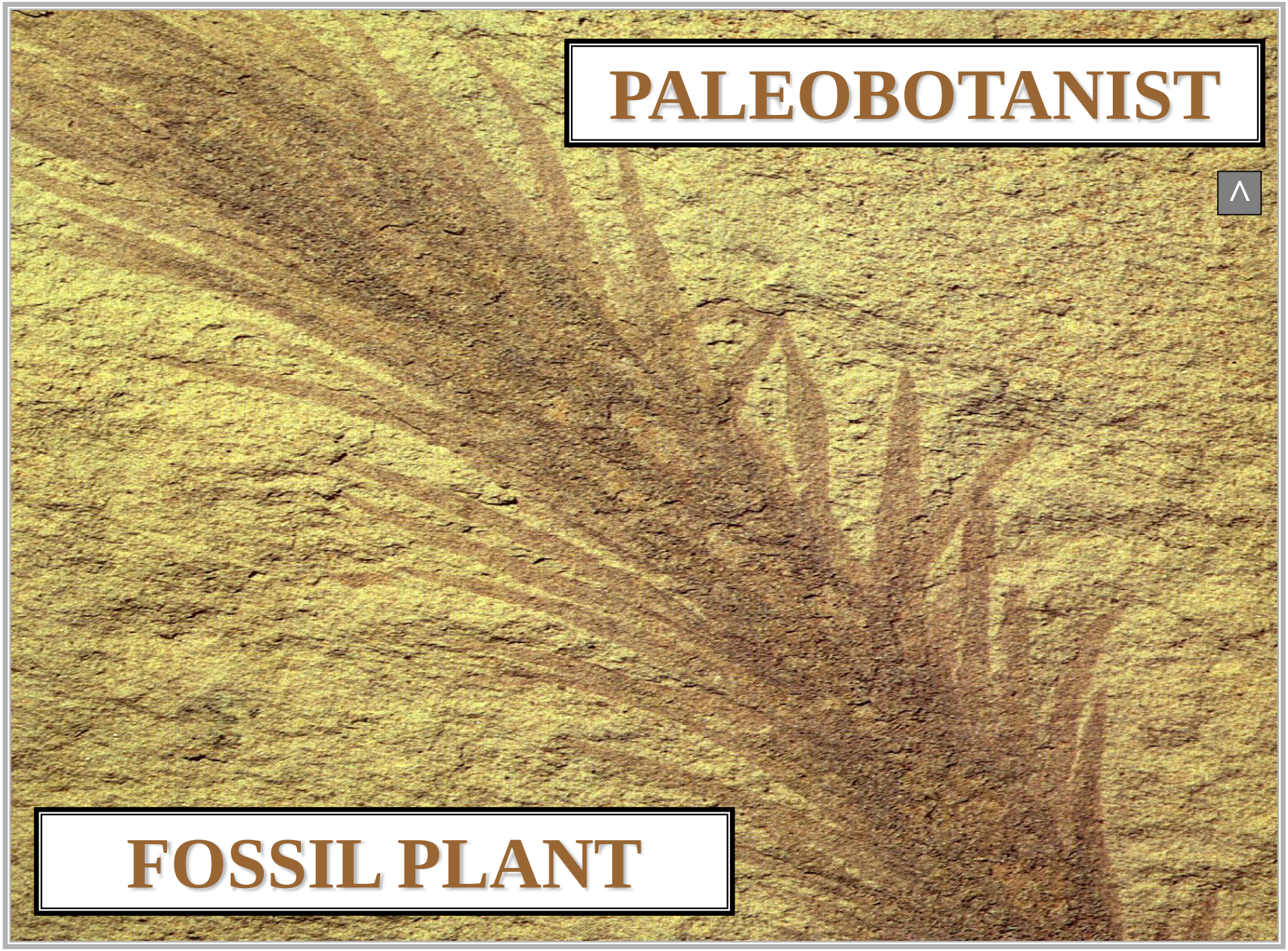
PROGYMNOSPERMOPHYTA

PALEOBOTANIST

PALEOBOTANIST

STUDIES
PLANT FOSSILS
AND
PLANT PHYLOGENY

PALEOBOTANIST


PALEOBOTANIST
FOSSIL PLANT

EXTANT PTERIDOPHYTE PHYLA

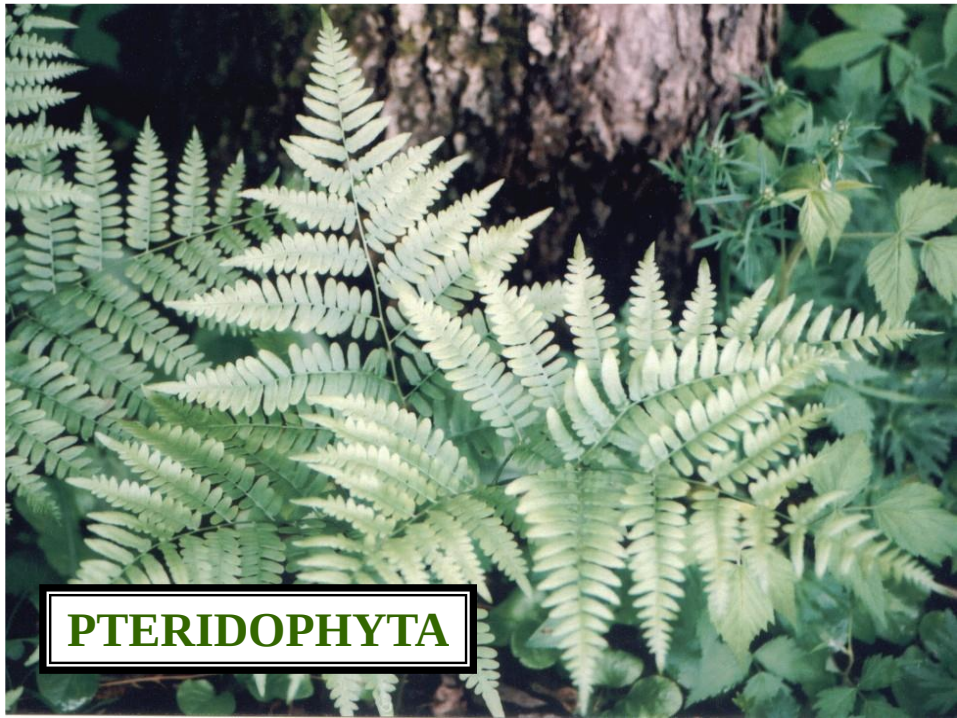

LYCOPODIOPHYTA


P

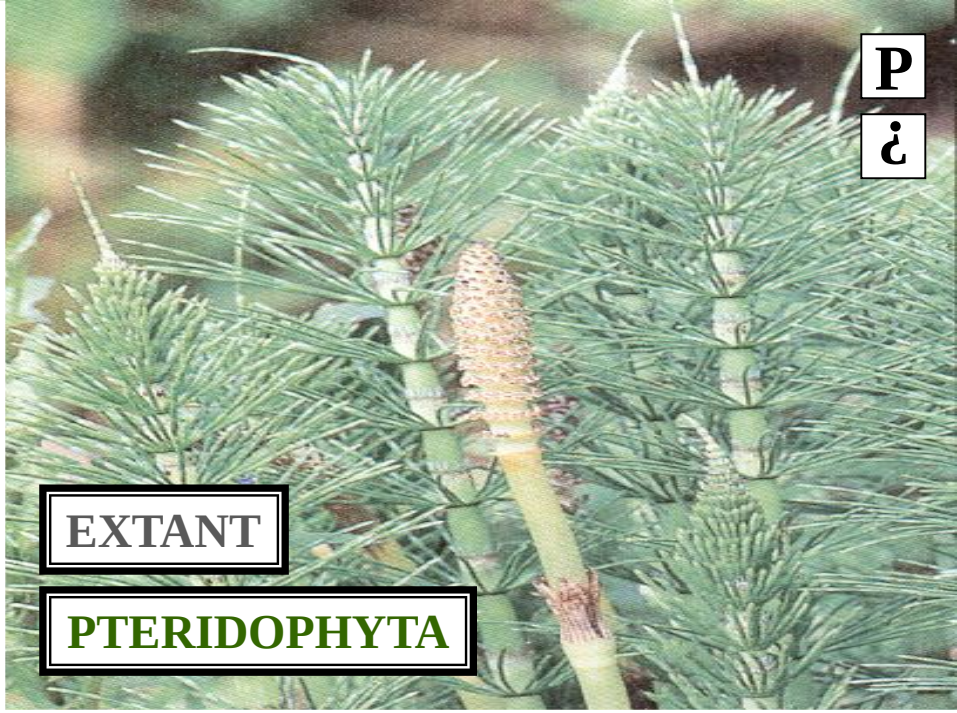

LYCOPODIOPHYTA


!
ET
PTERIDOPHYTA

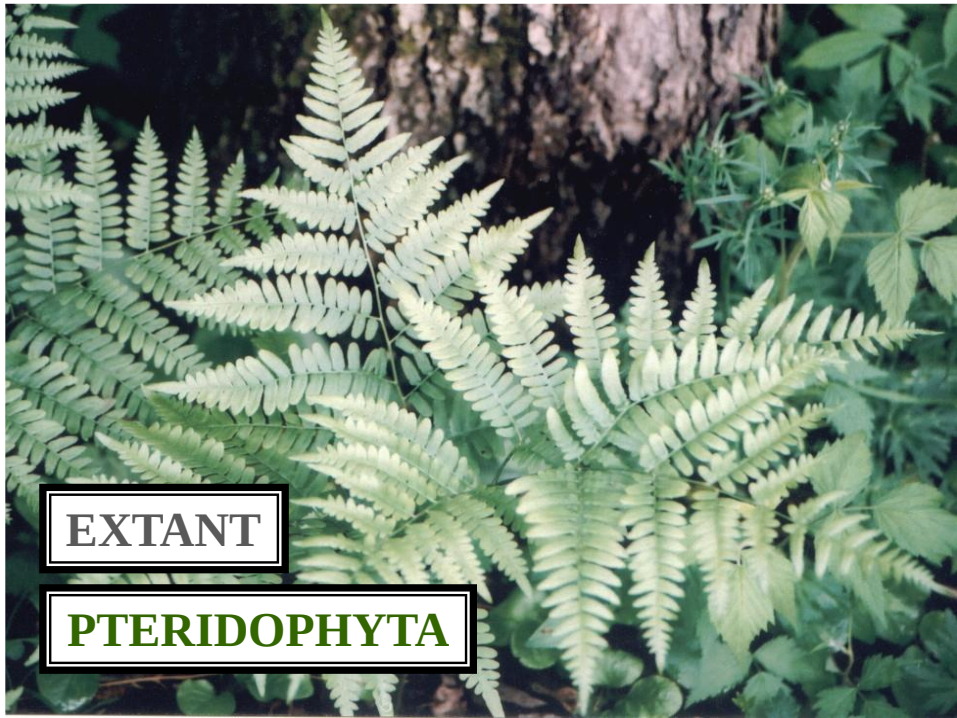

PTERIDOPHYTA


PTERIDOPHYTA


EXTANT
LYCOPODIOPHYTA


EXTANT
PTERIDOPHYTA


EXTANT
PTERIDOPHYTA


EXTANT
PTERIDOPHYTA

PTERIDOLOGIST

PTERIDOLOGIST

STUDIES LYCOPHYTES AND FERNS

PTERIDOLOGIST

PTERIDOPHYTES

COMMON NAMES

LYCOPHYTES

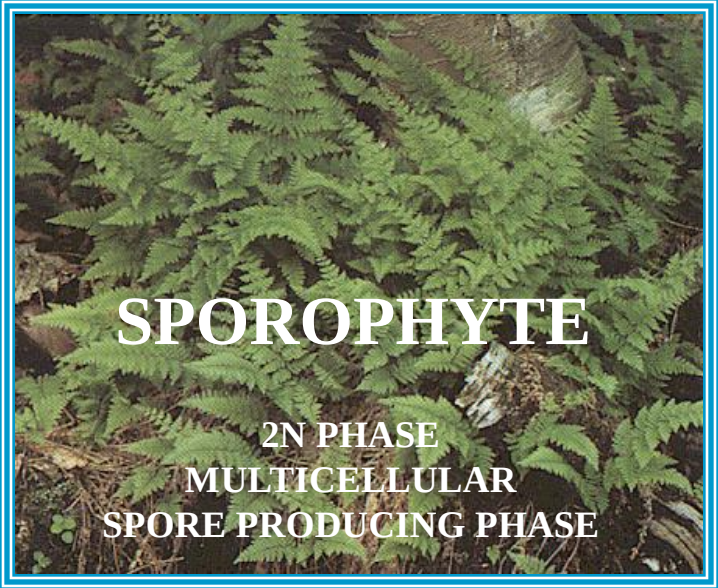
FERNS

DIVERSITY


~12,000 SPECIES
EARTH

GENERAL CHARACTERS

PTERIDOPHYTE LIFE CYCLE



MITOSIS

ZYGOTE 2N

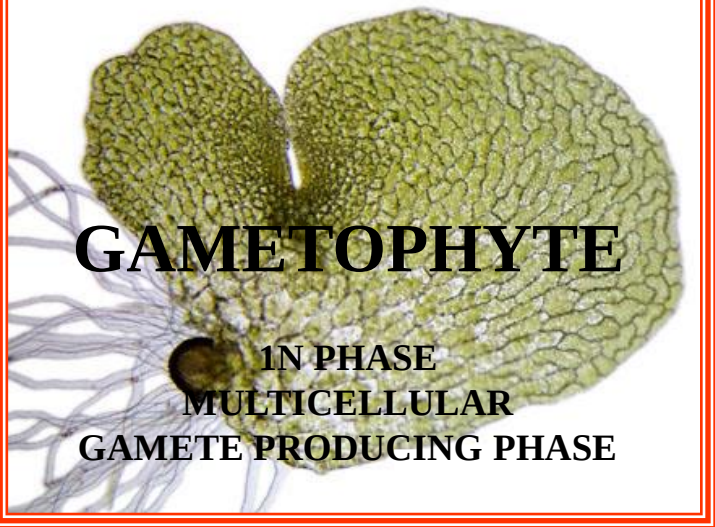
SYNGAMY

GAMETE SPERM 1N

GAMETE EGG 1N

MITOSIS

GAMETOCYTES 1N



SPOROCYTES 2N

MEIOSIS

SPORES 1N

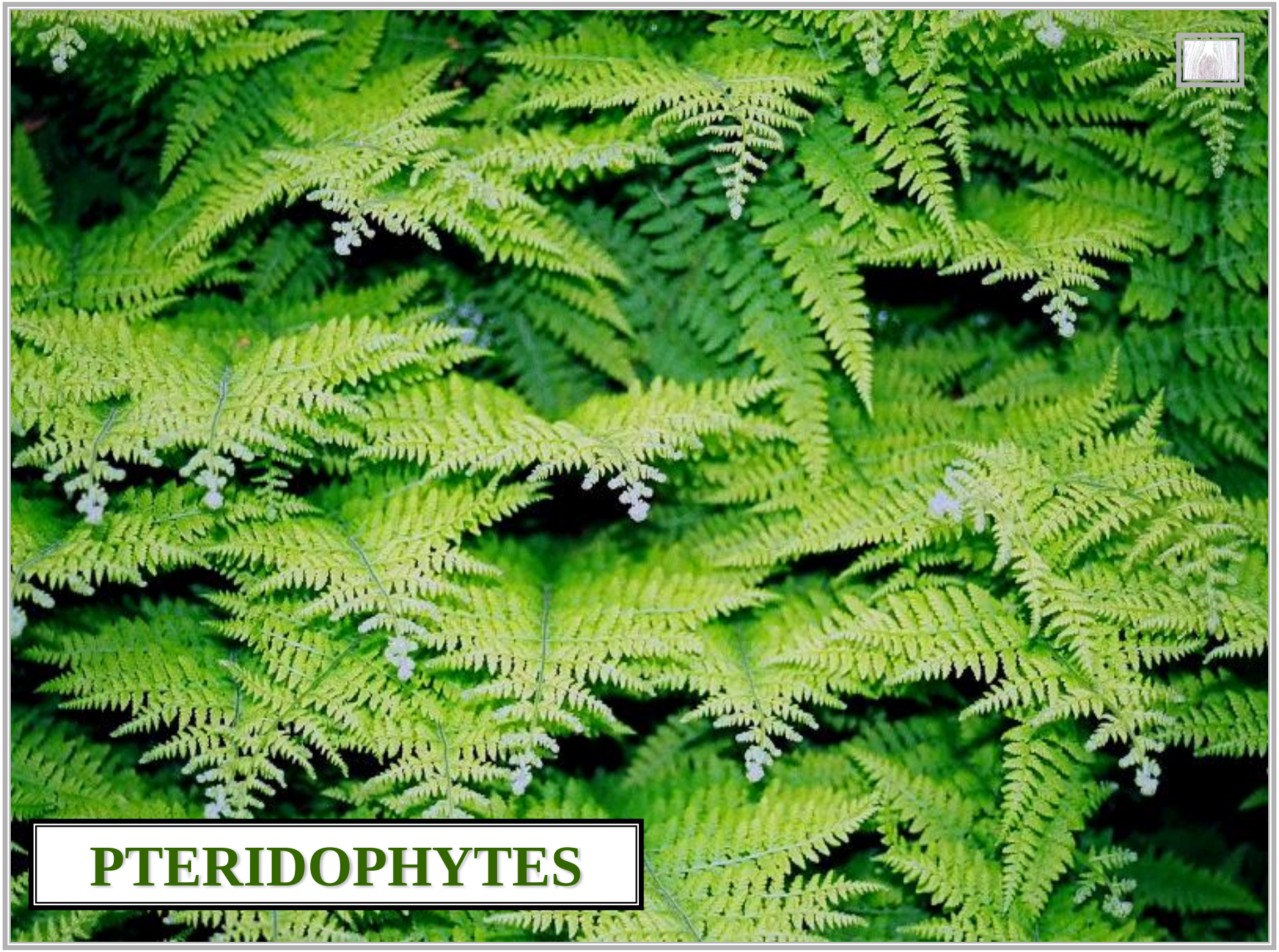
MITOSIS

SPOROPHYTE CHARACTERS

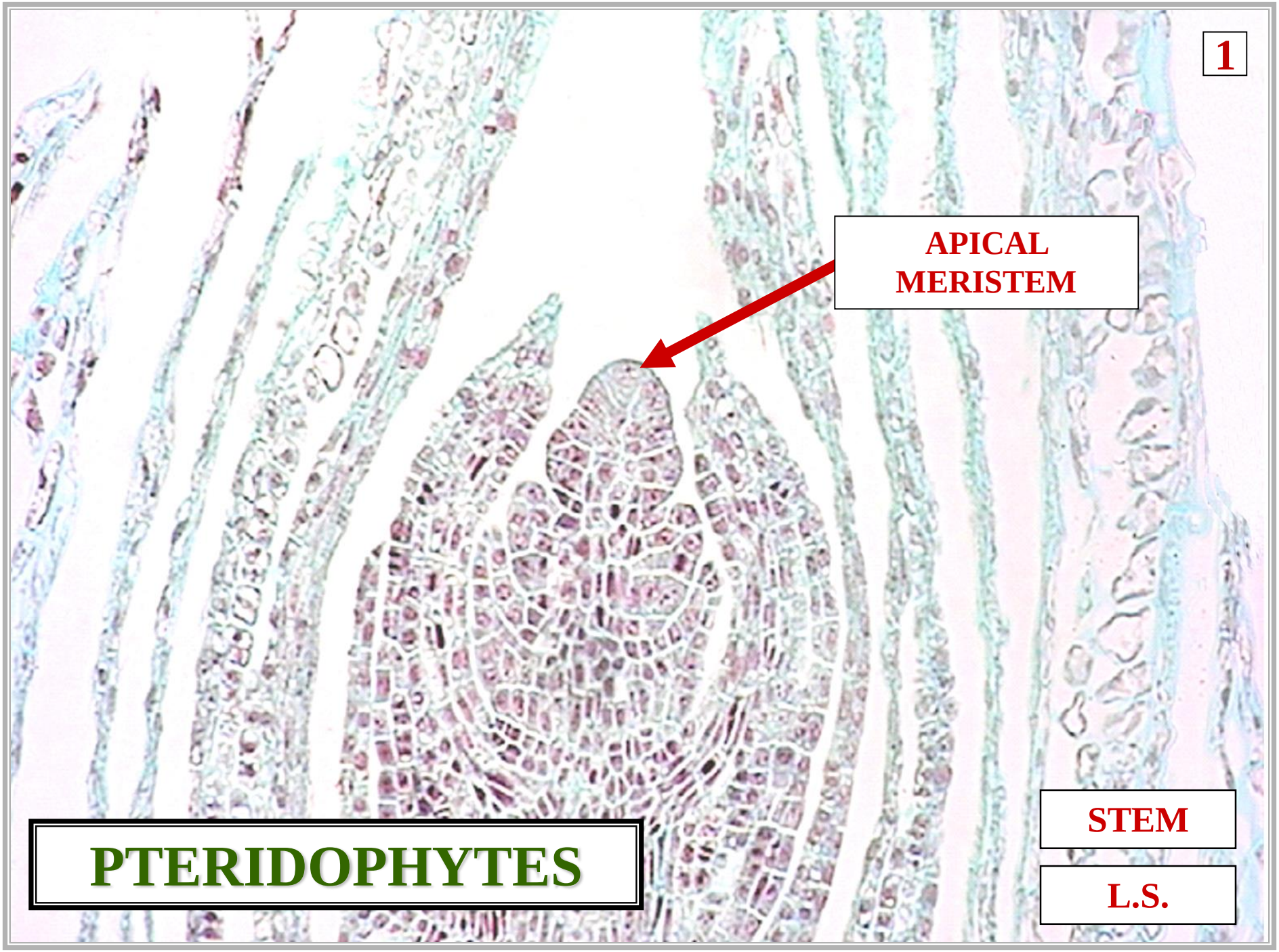
AP

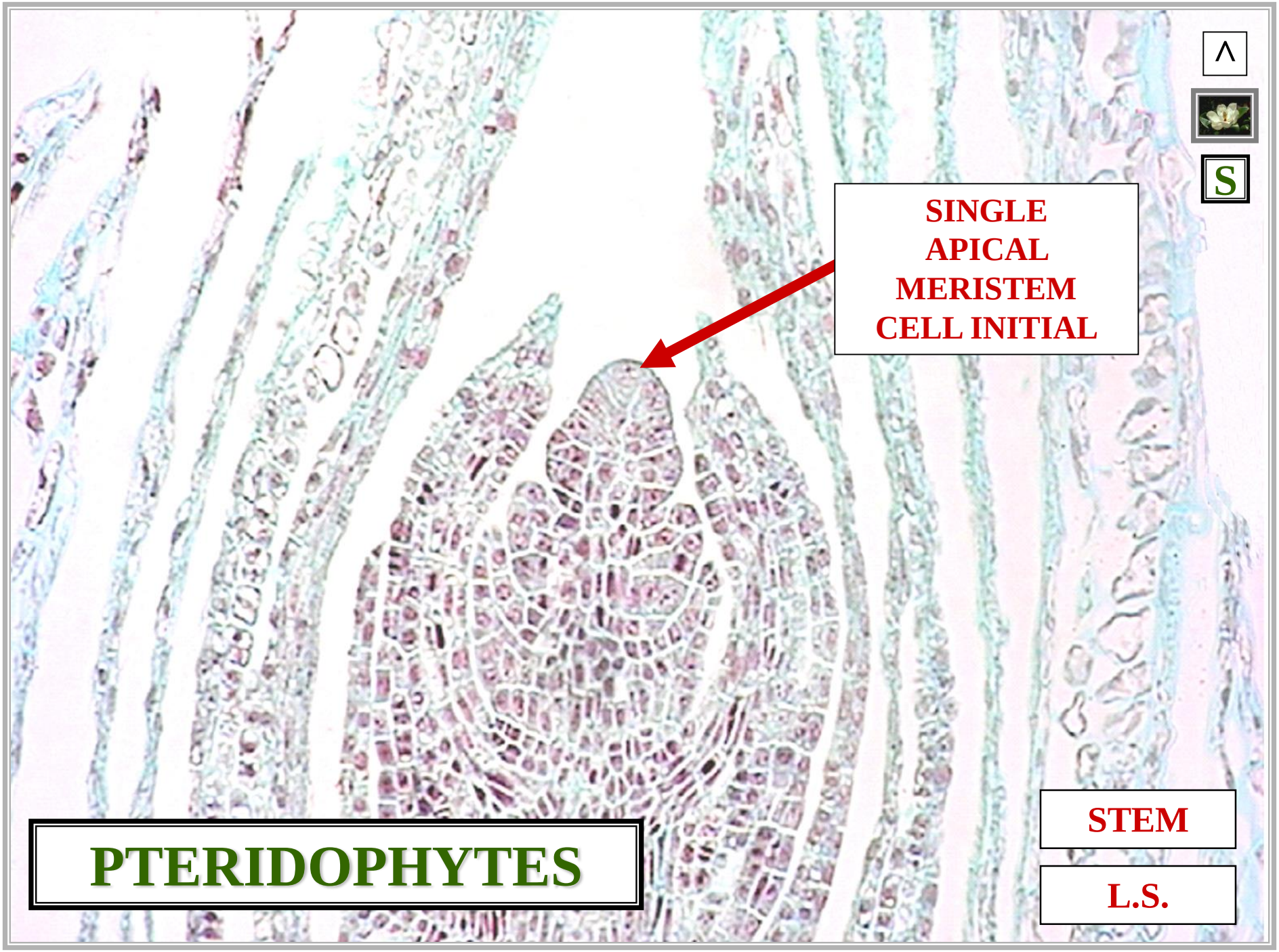
MERISTEM

APICAL MERISTEM



PTERIDOPHYTES

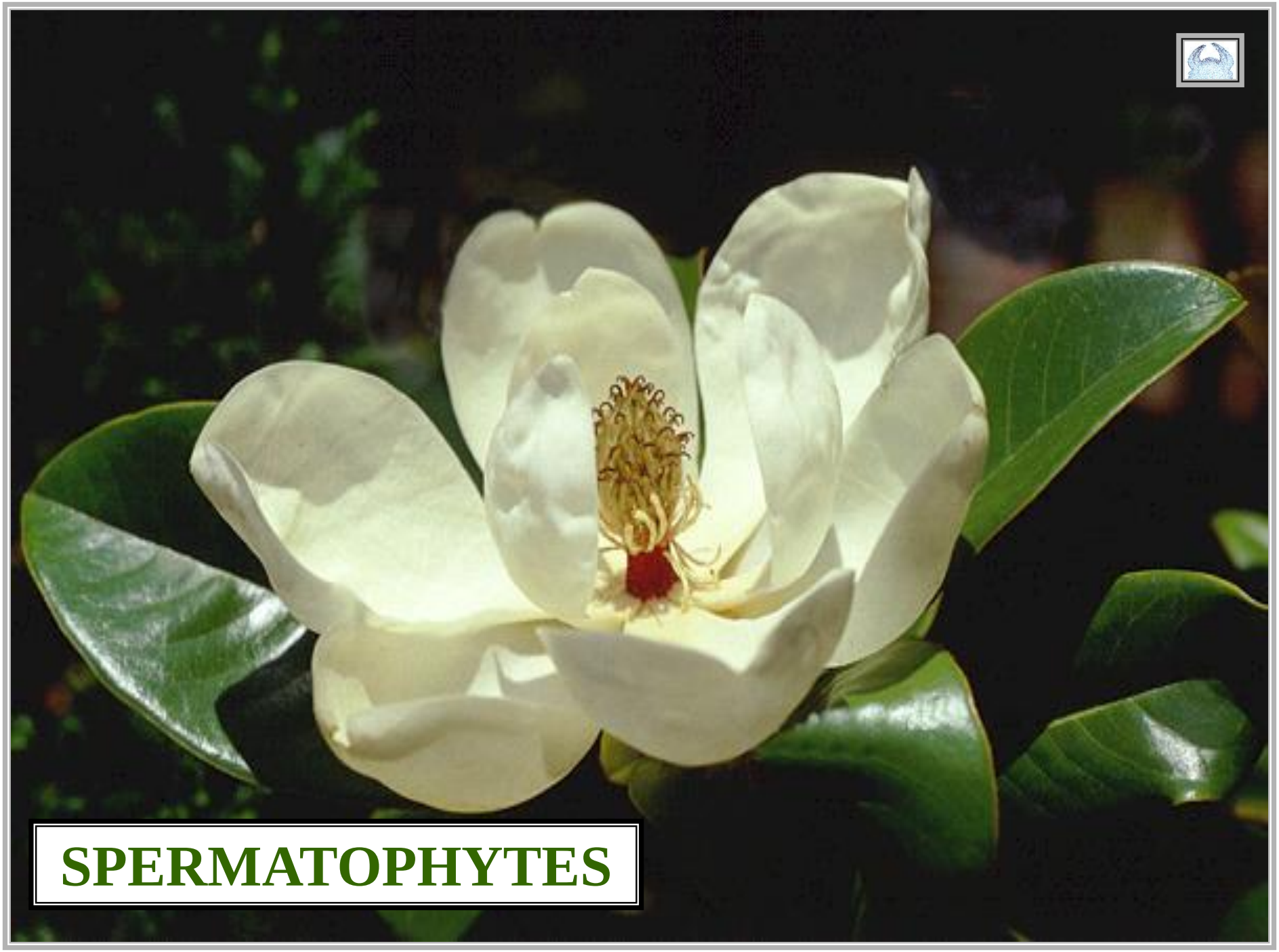

1
APICAL
MERISTEM
PTERIDOPHYTES
STEM
L.S.

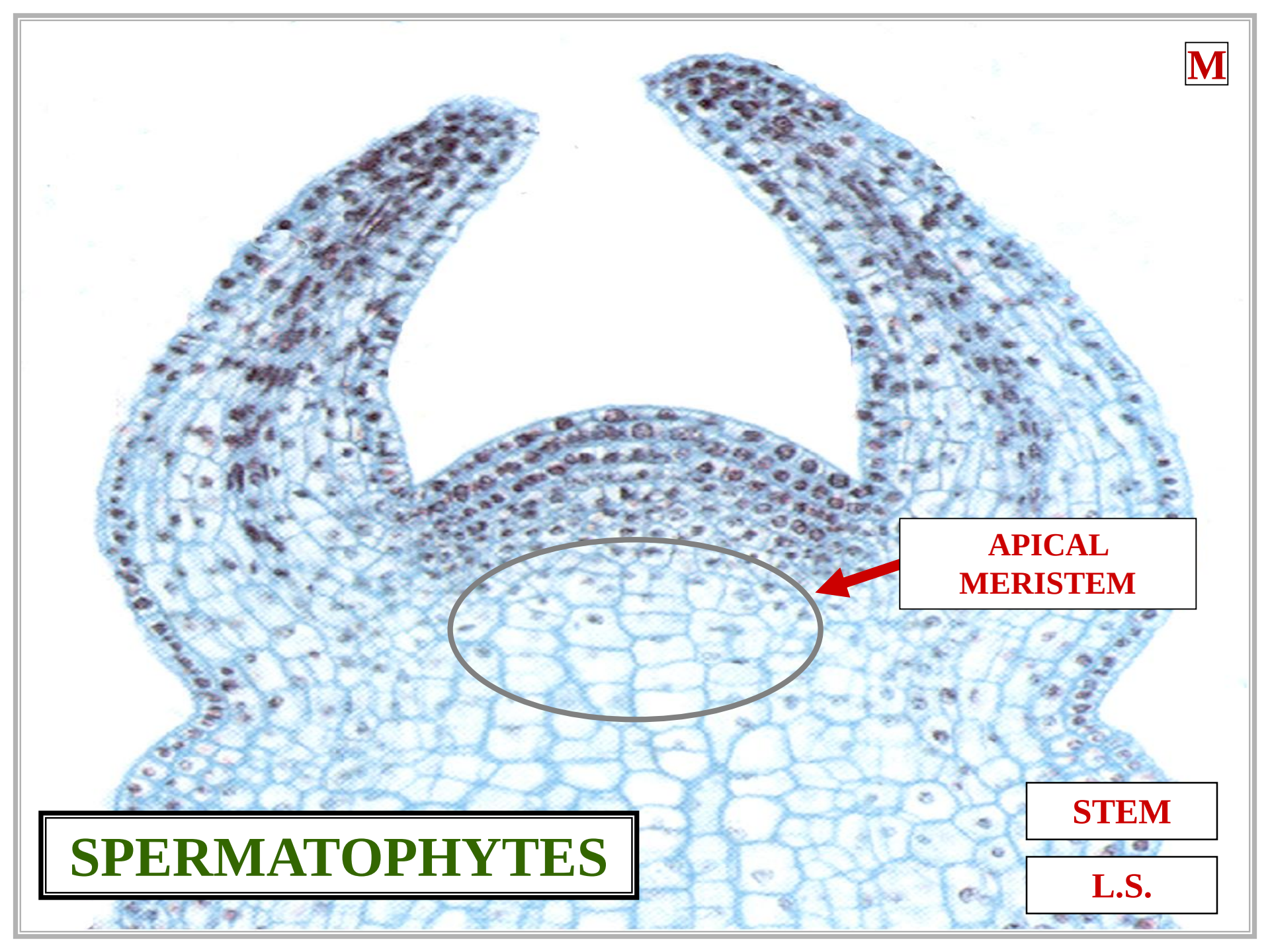


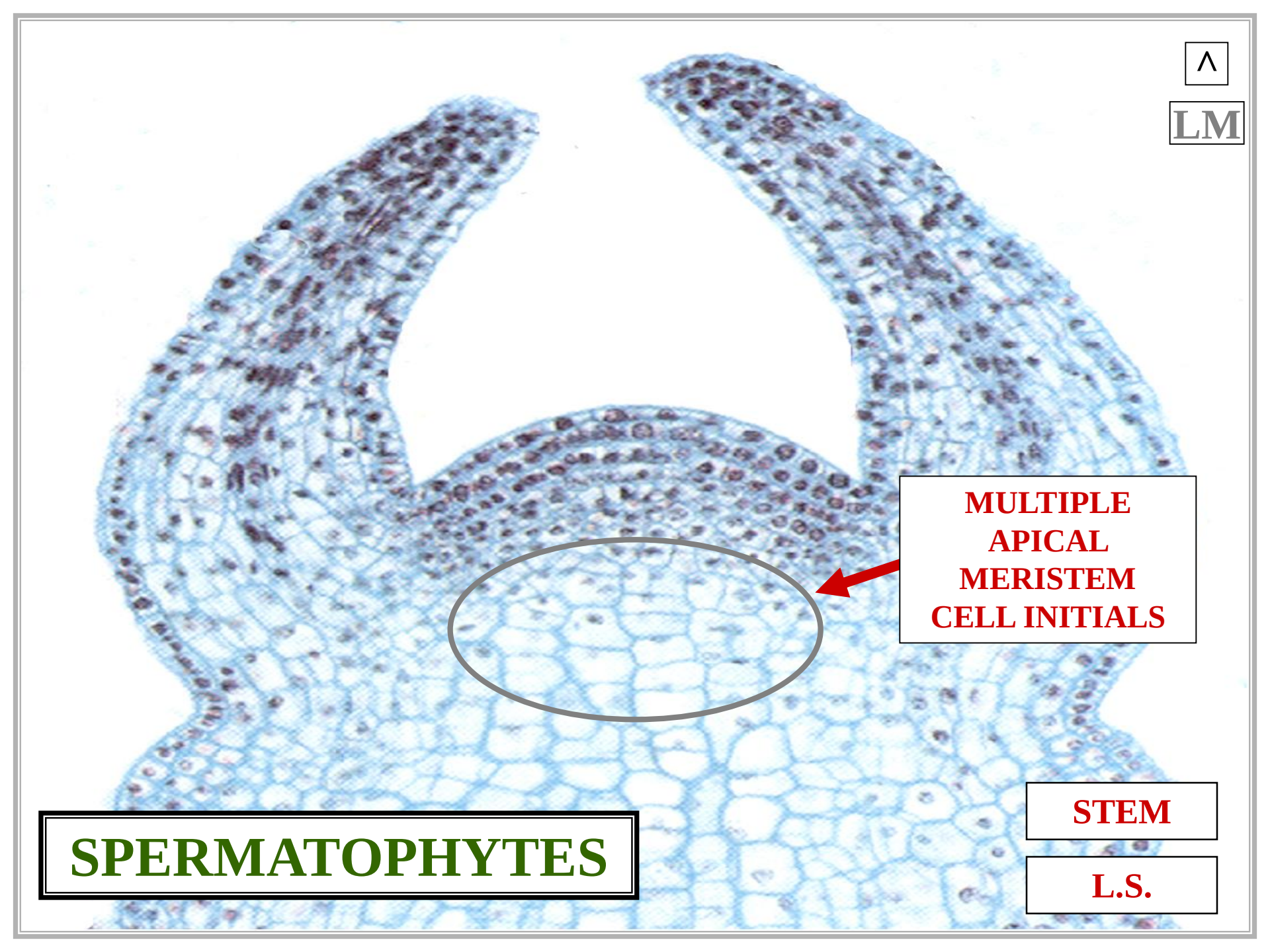
PTERIDOPHYTES

STEM

L.S.


SPERMATOPHYTES


M
APICAL
MERISTEM
SPERMATOPHYTES
STEM
L.S.



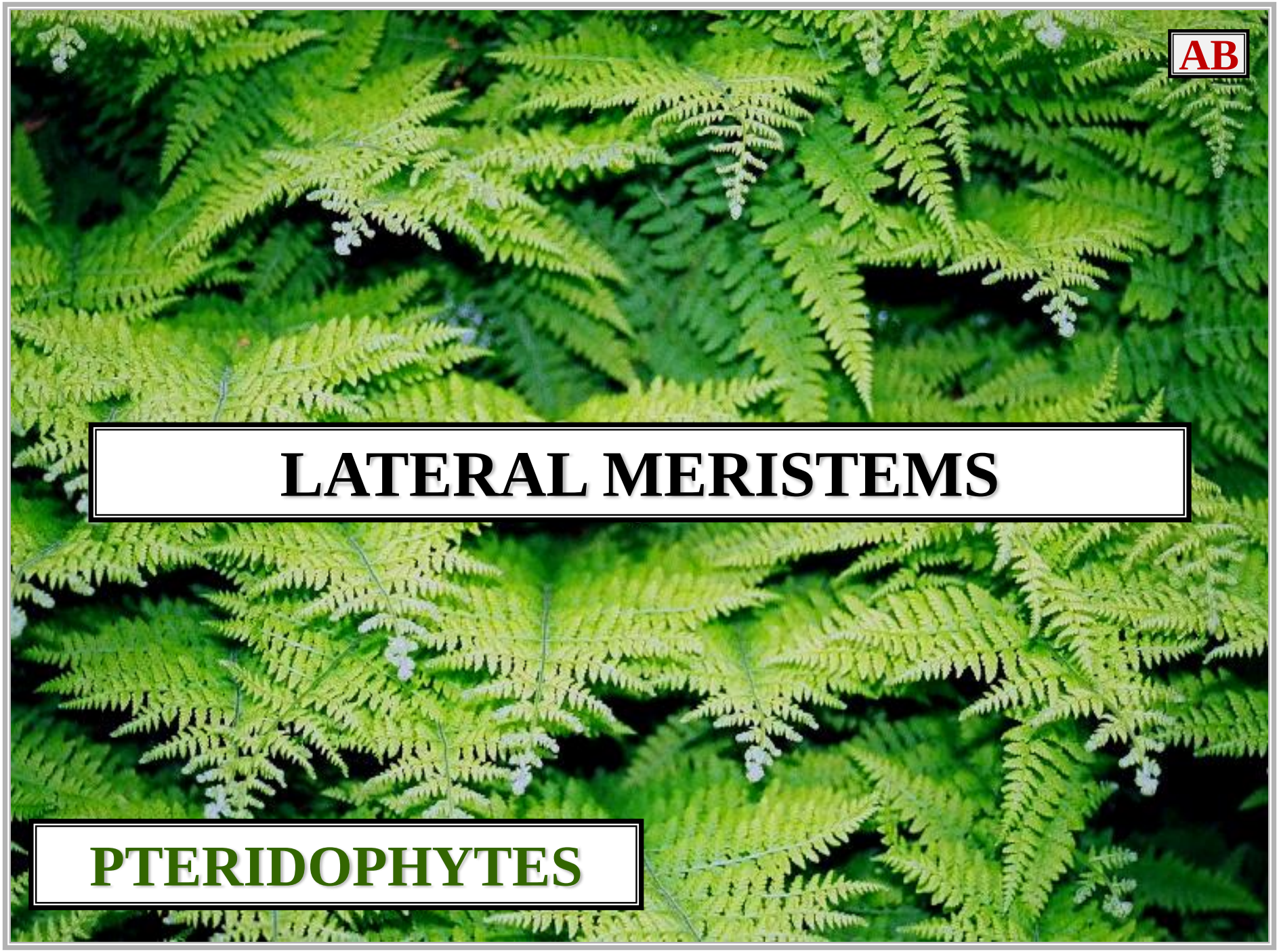
LM

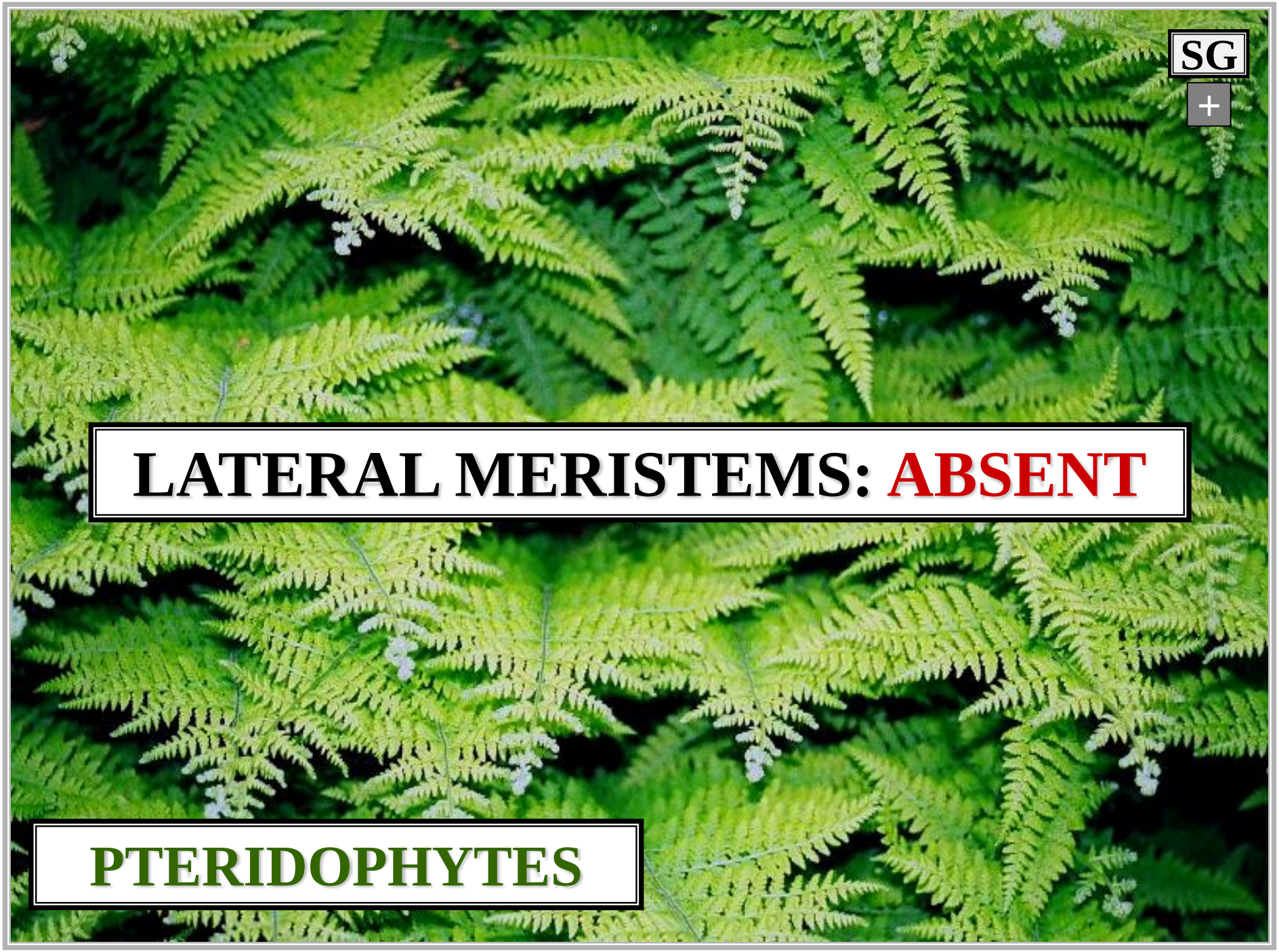
SPERMATOPHYTES

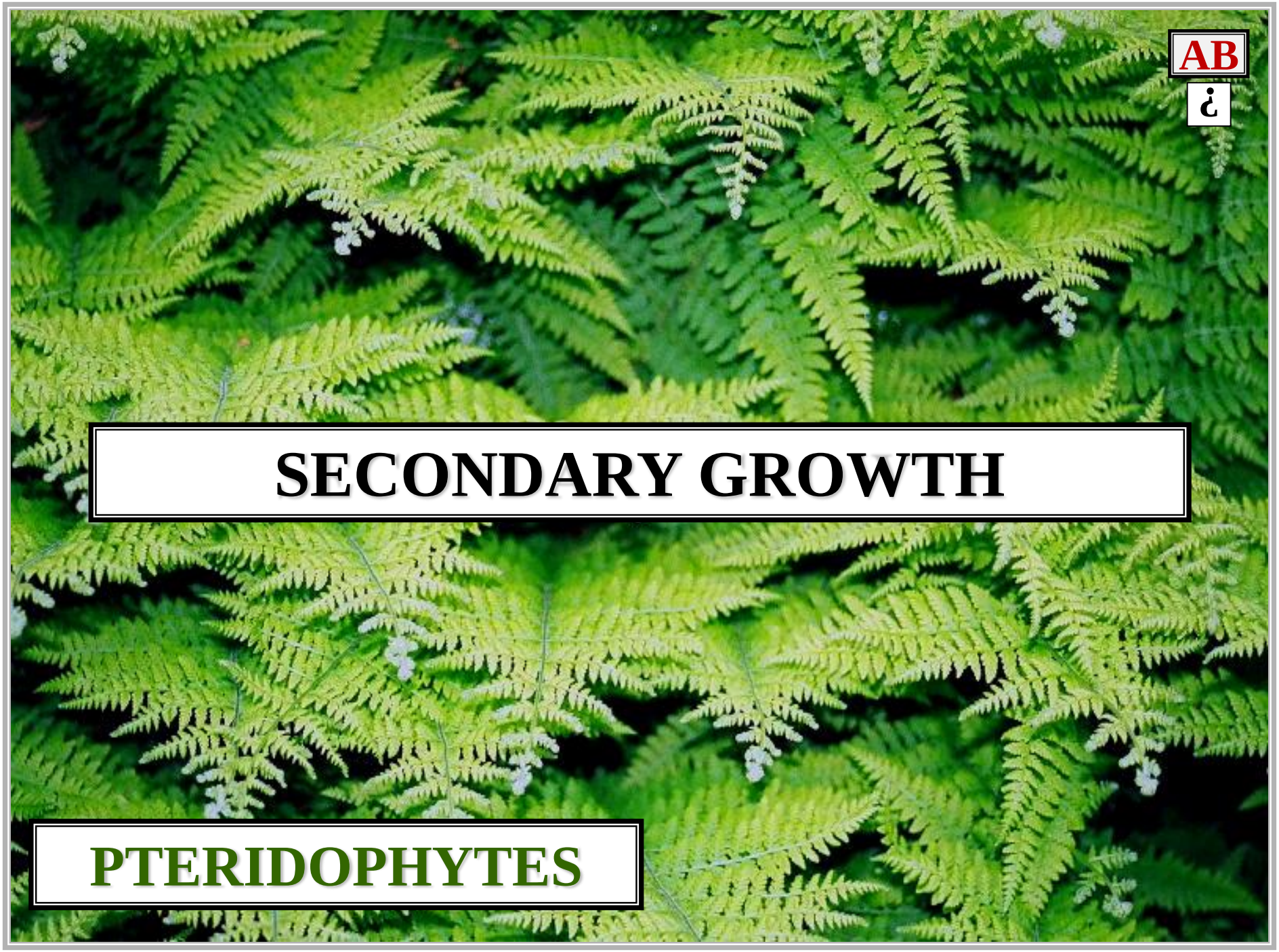
STEM

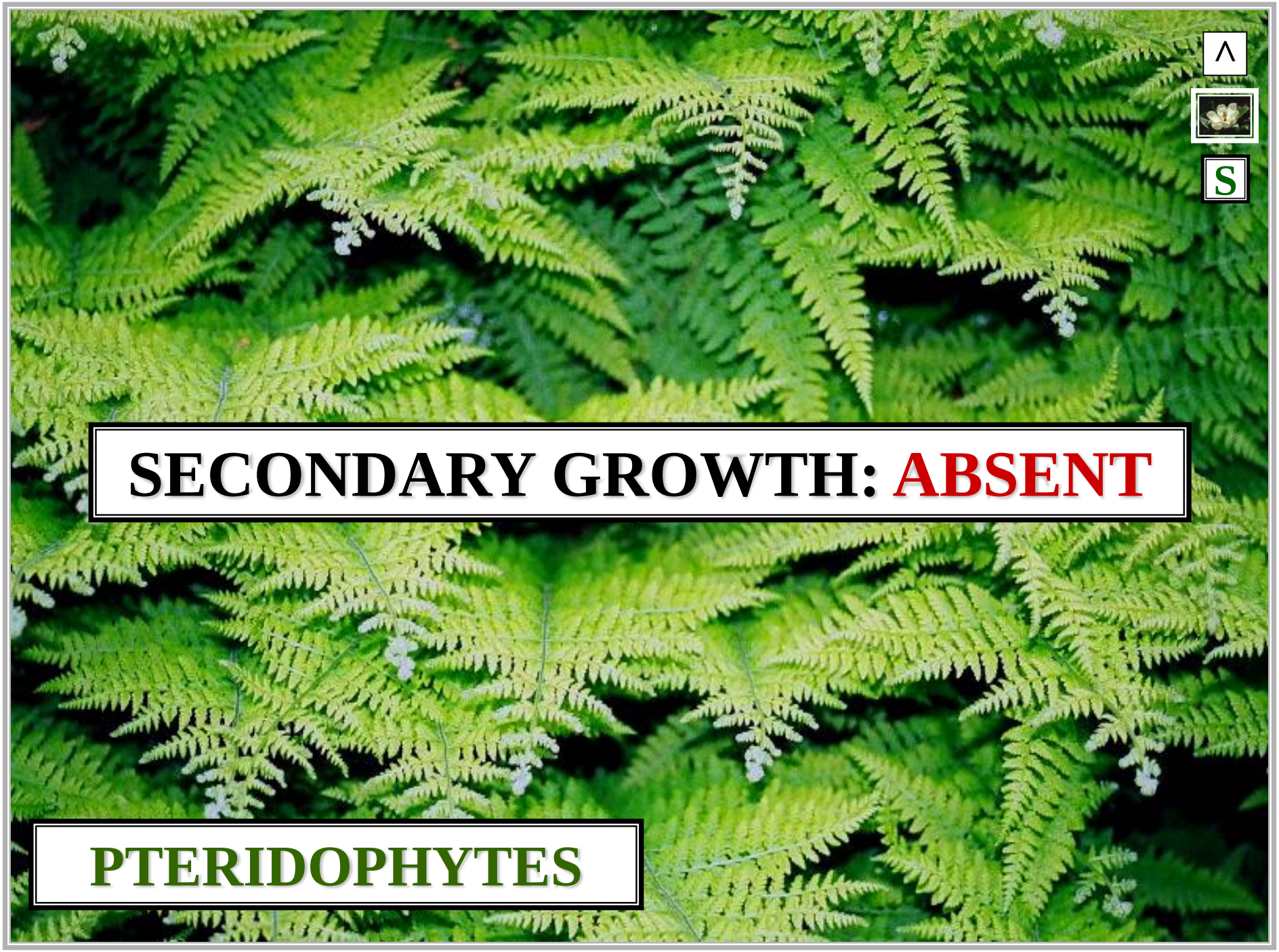
L.S.

LATERAL MERISTEM


AB
LATERAL MERISTEMS
PTERIDOPHYTES


SG
+
LATERAL MERISTEMS: ABSENT
PTERIDOPHYTES


AB
¿
SECONDARY GROWTH
PTERIDOPHYTES

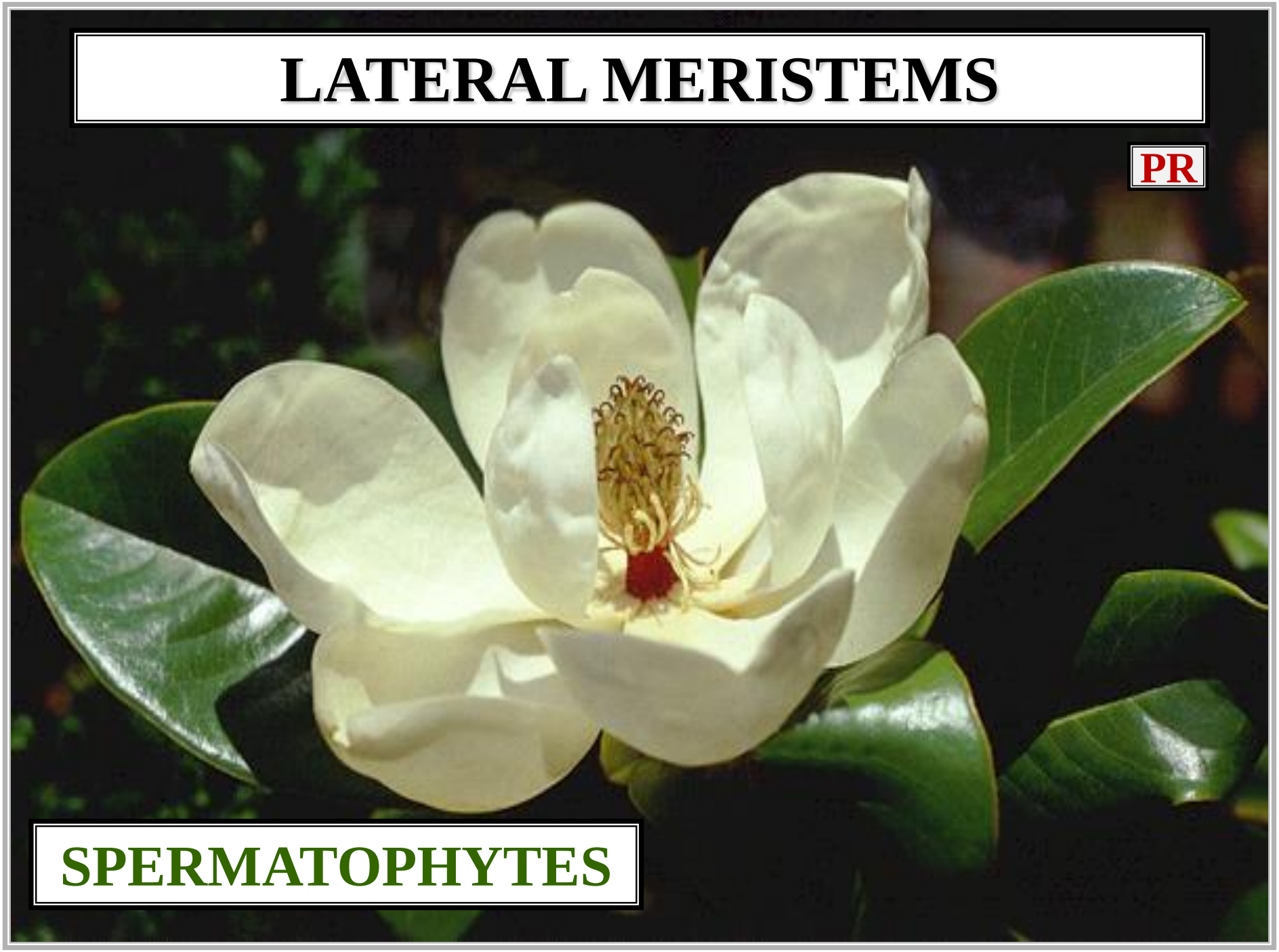


SECONDARY GROWTH: ABSENT

PTERIDOPHYTES

LATERAL MERISTEMS

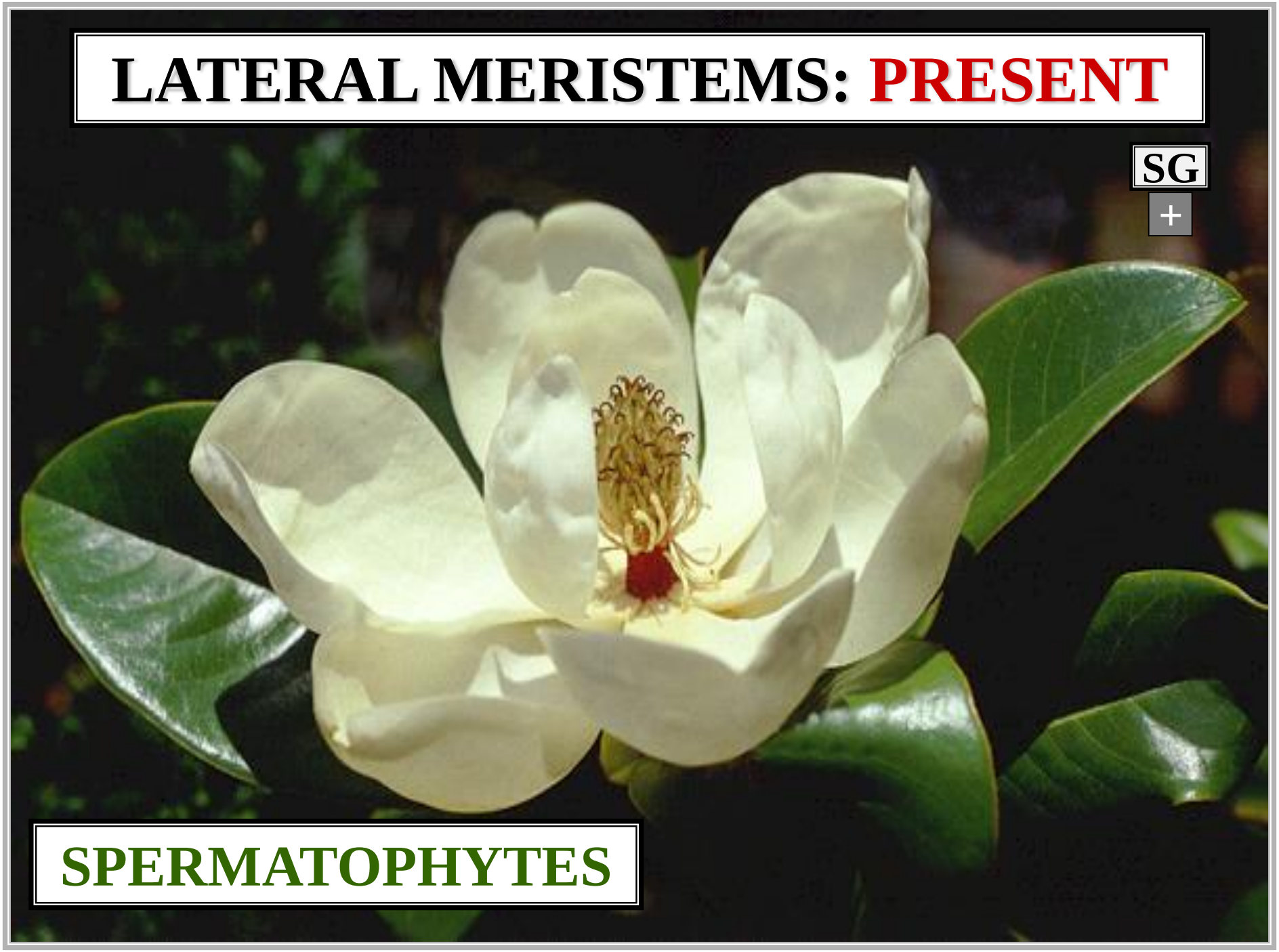
PR



SPERMATOPHYTES

LATERAL MERISTEMS: PRESENT

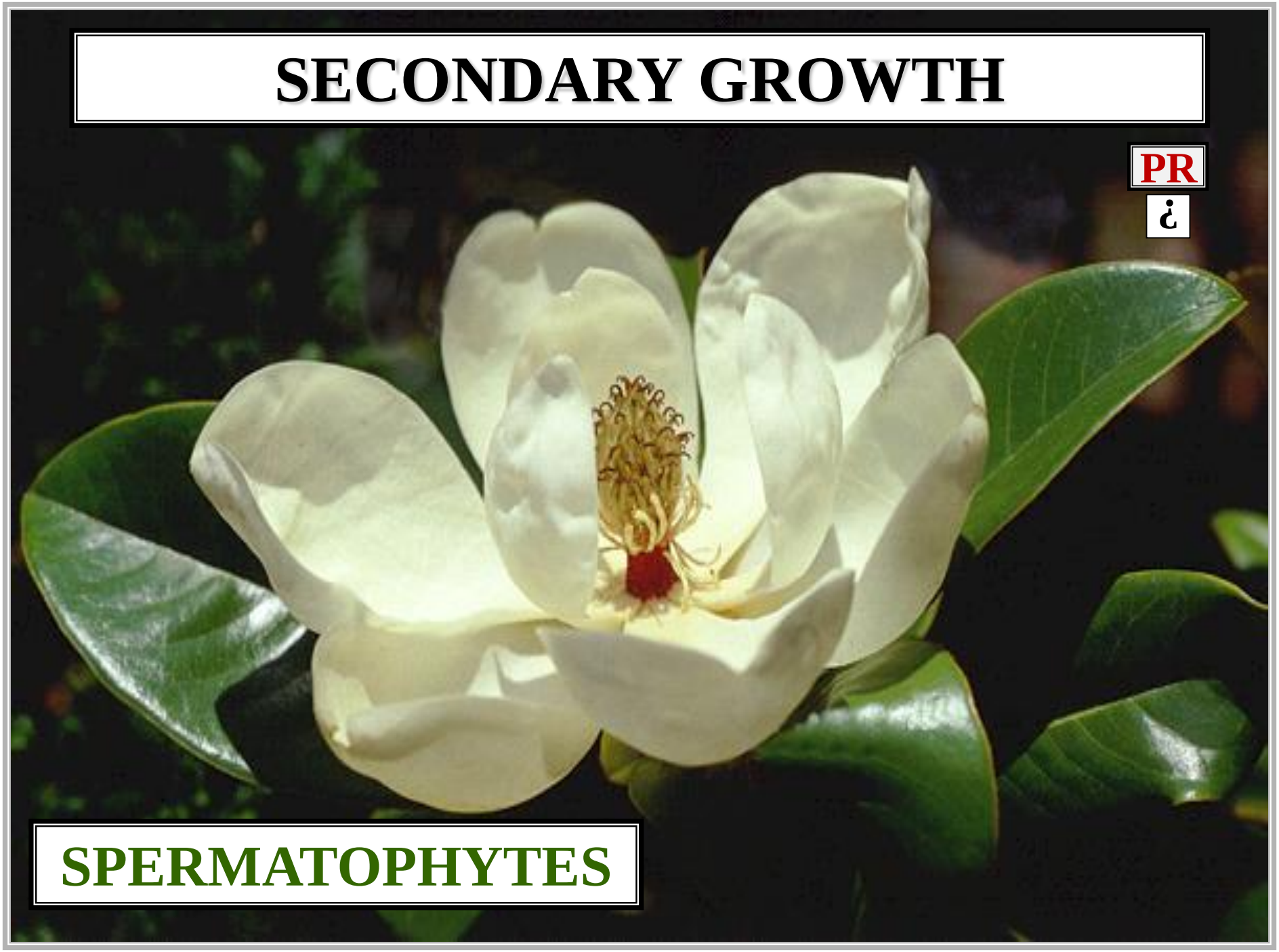
SG
+



SPERMATOPHYTES

SECONDARY GROWTH

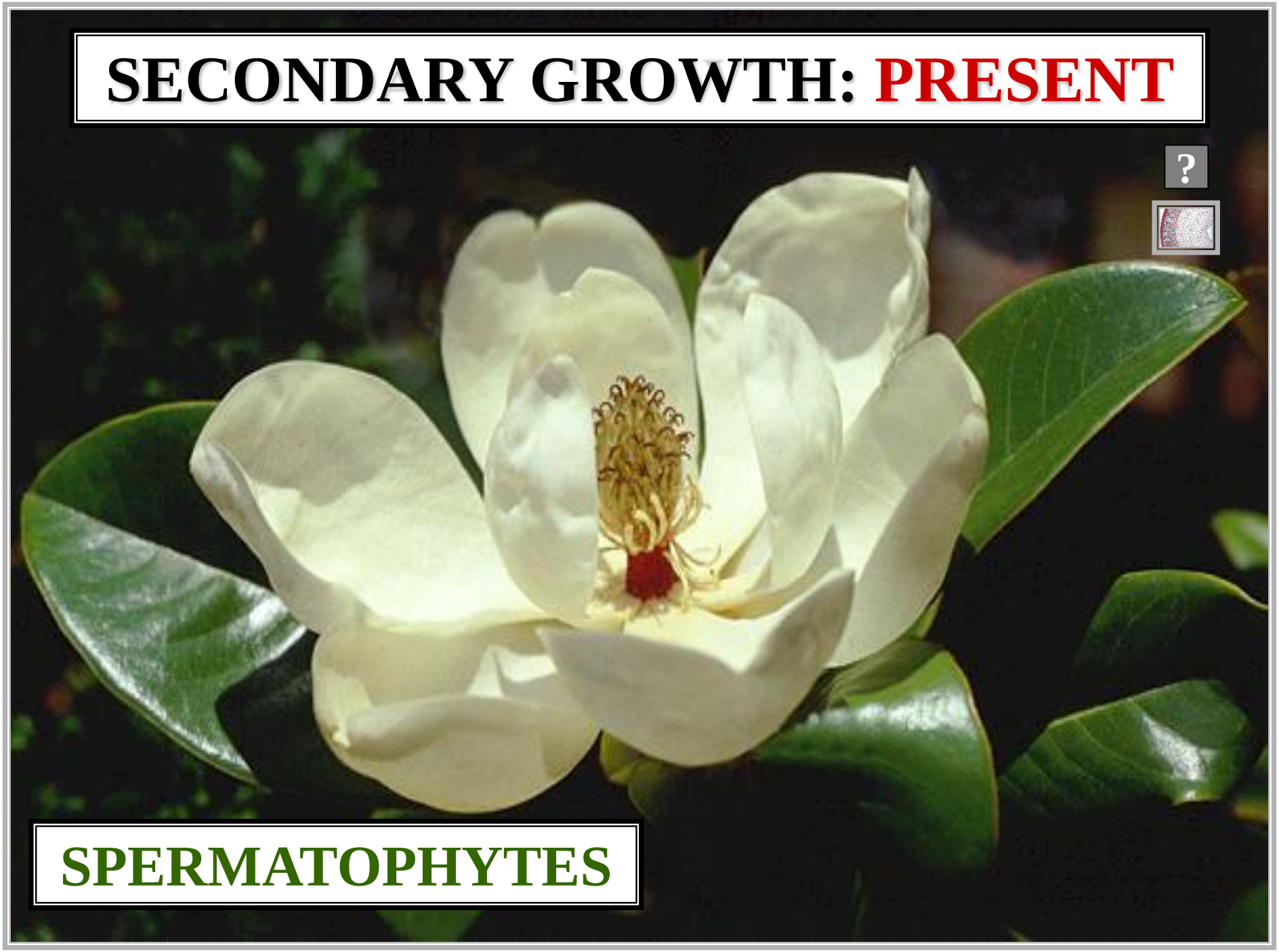
PR
¿



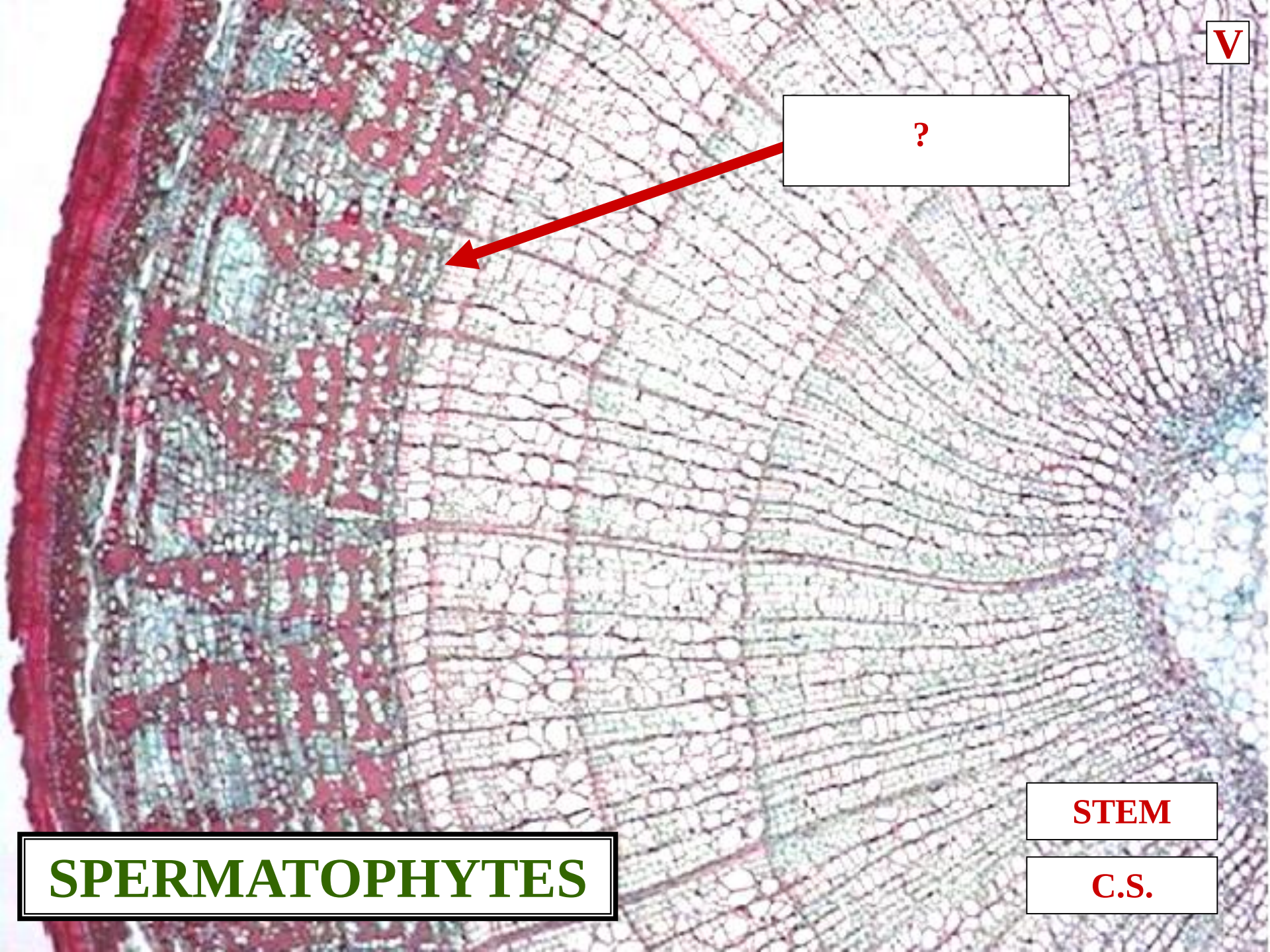
SPERMATOPHYTES

SECONDARY GROWTH: PRESENT

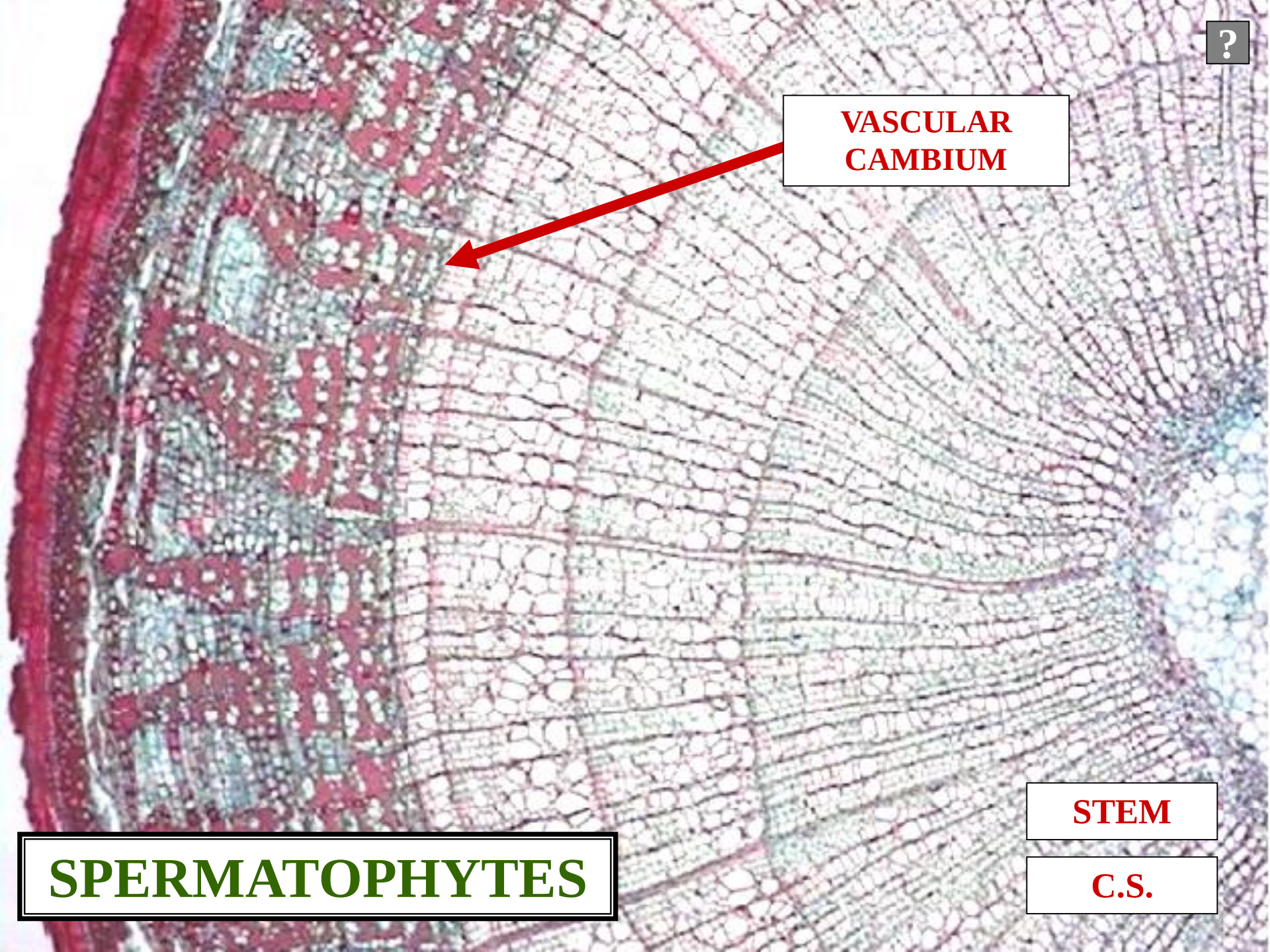
?

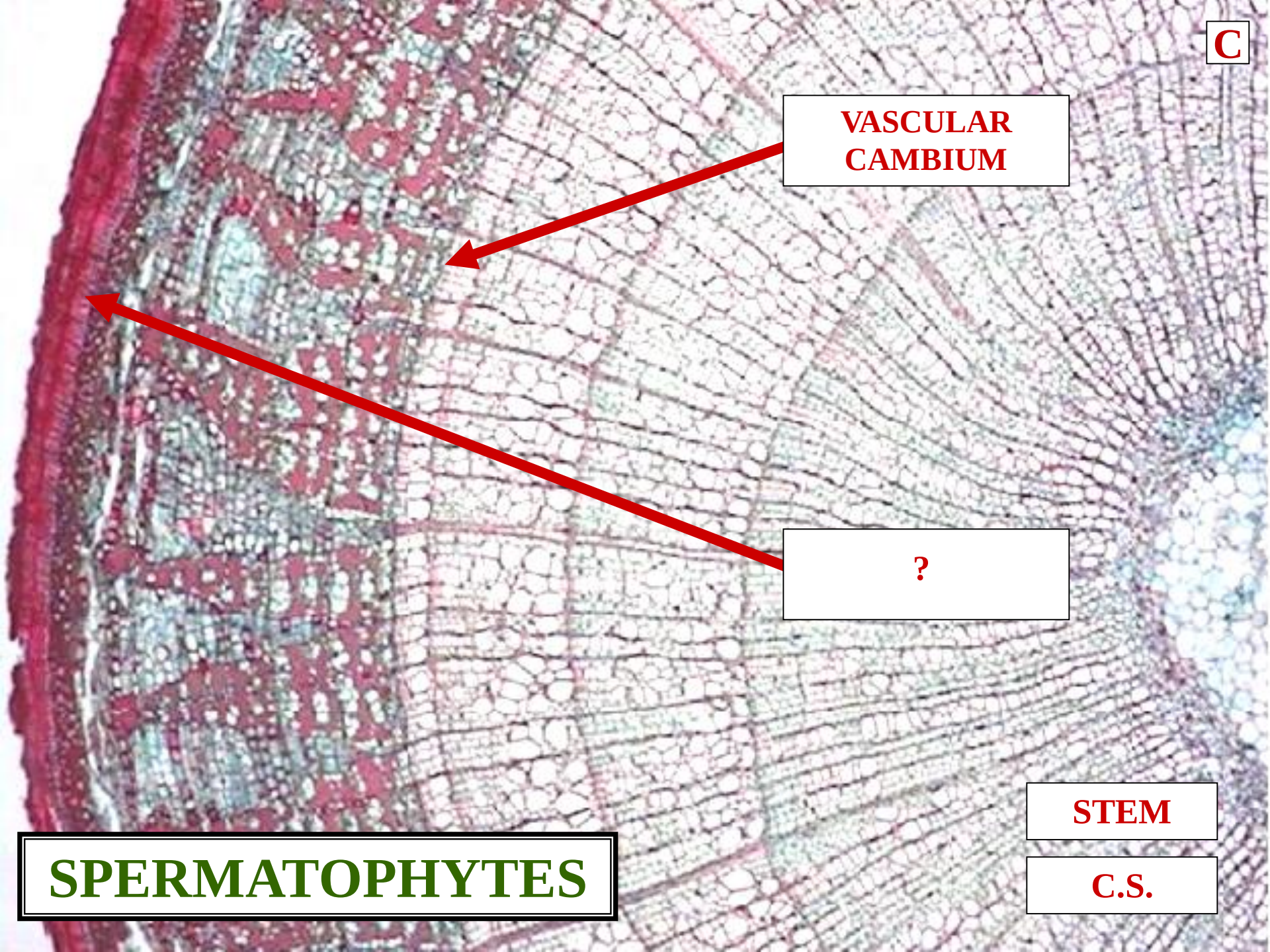


SPERMATOPHYTES

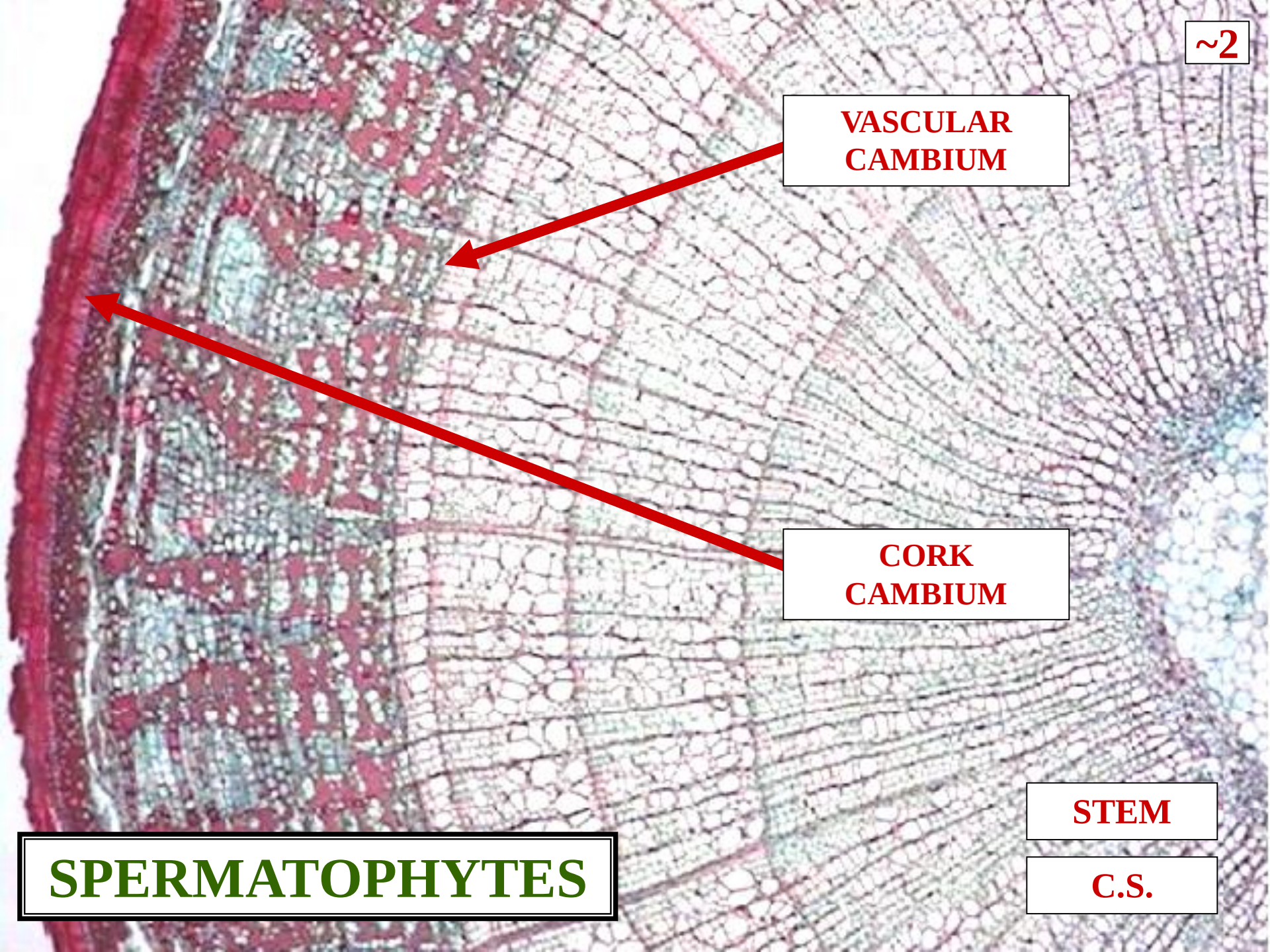


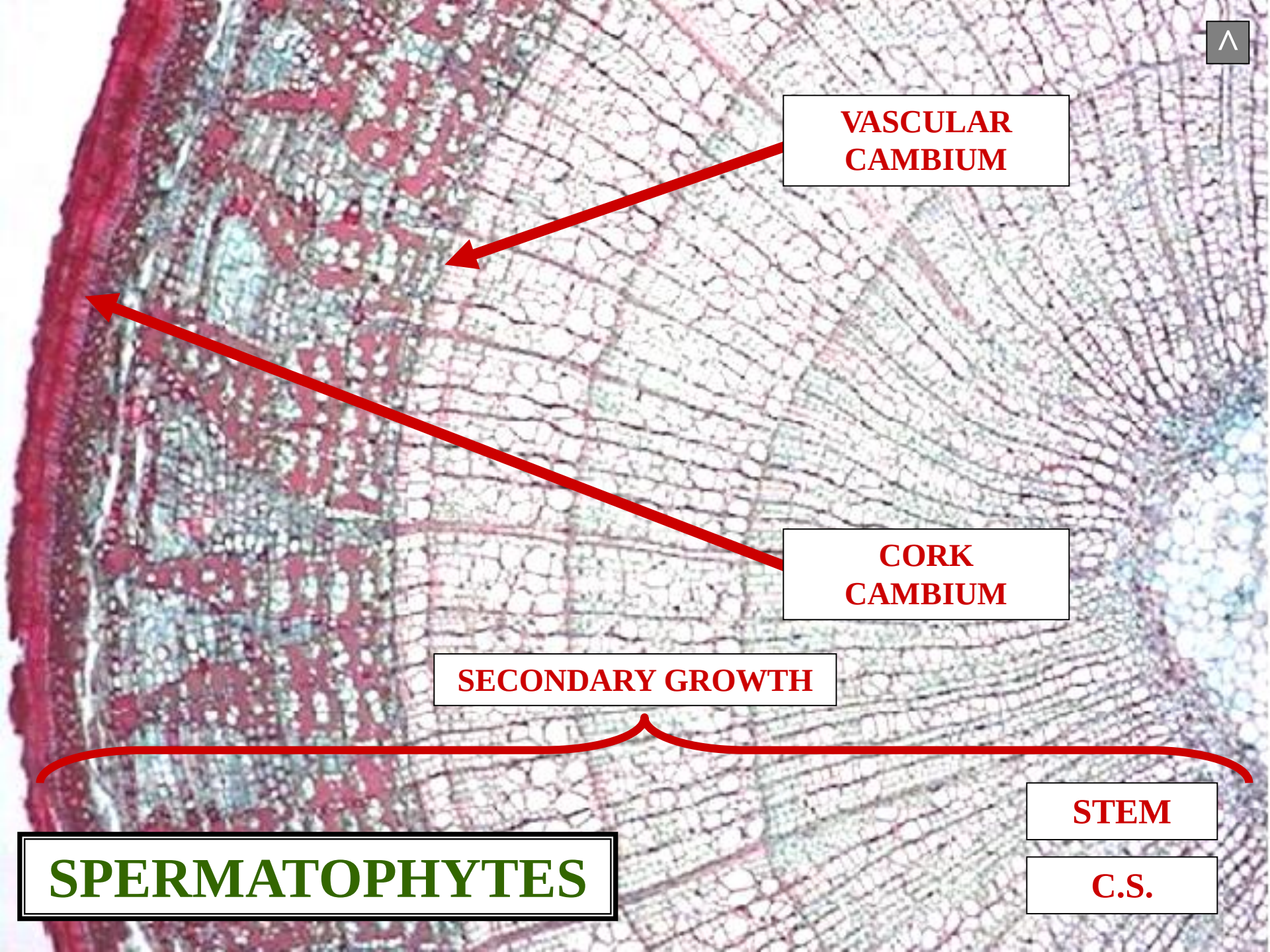
SPERMATOPHYTES


?
VASCULAR CAMBIUM
STEM
C.S.
SPERMATOPHYTES



SPERMATOPHYTES

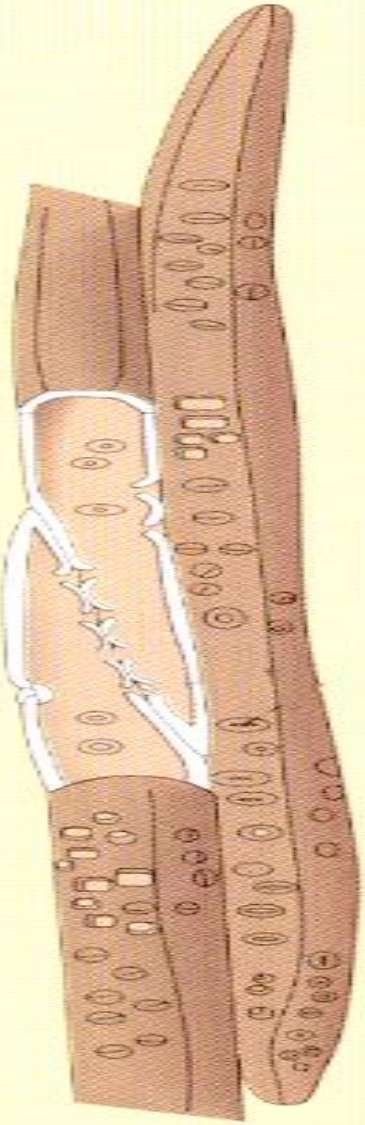

~2
VASCULAR CAMBIUM
CORK CAMBIUM
STEM
C.S.
SPERMATOPHYTES

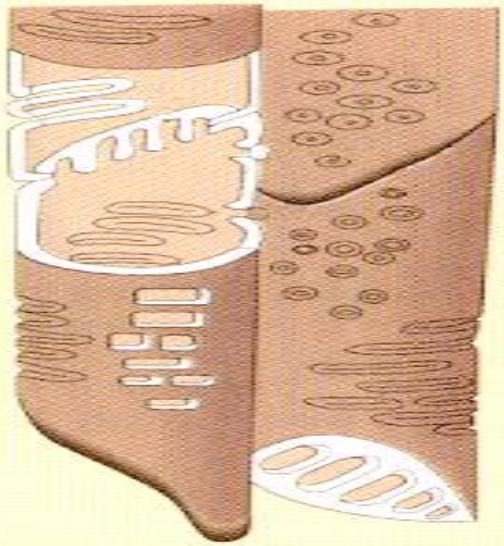

VASCULAR CAMBIUM
CORK CAMBIUM
SECONDARY GROWTH
STEM
C.S.
SPERMATOPHYTES

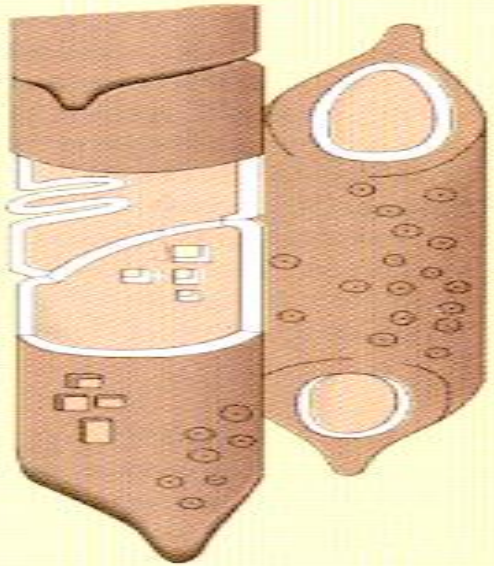
VASCULAR TISSUE

XYLEM

TE

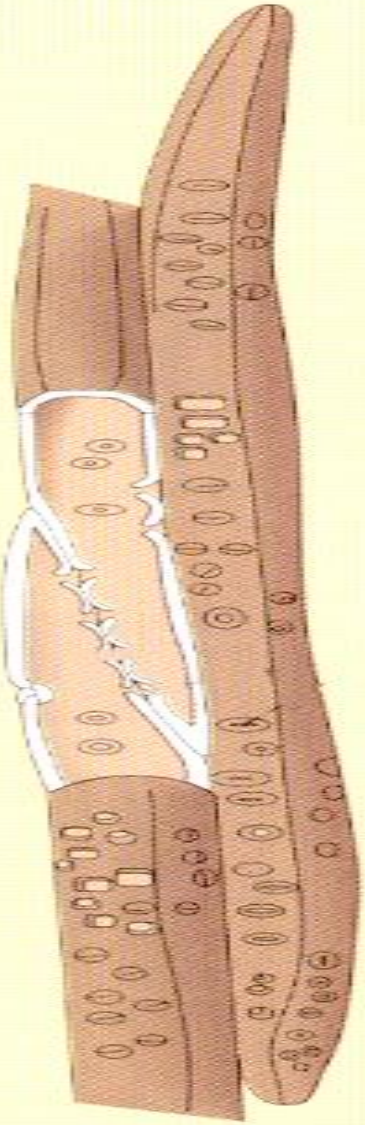


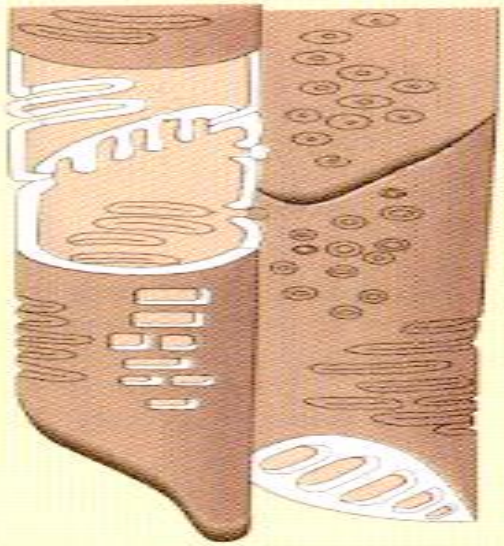


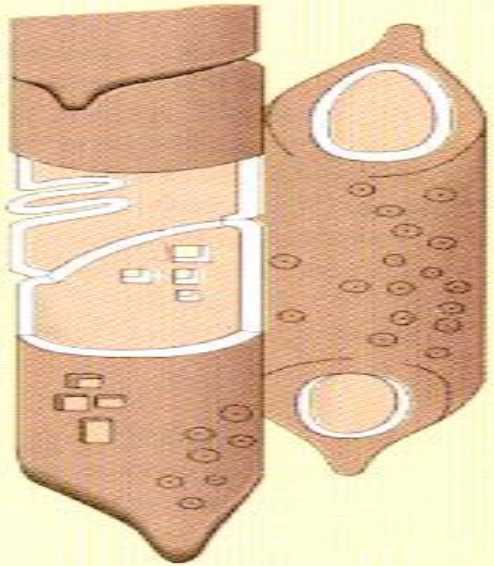


XYLEM CELLS

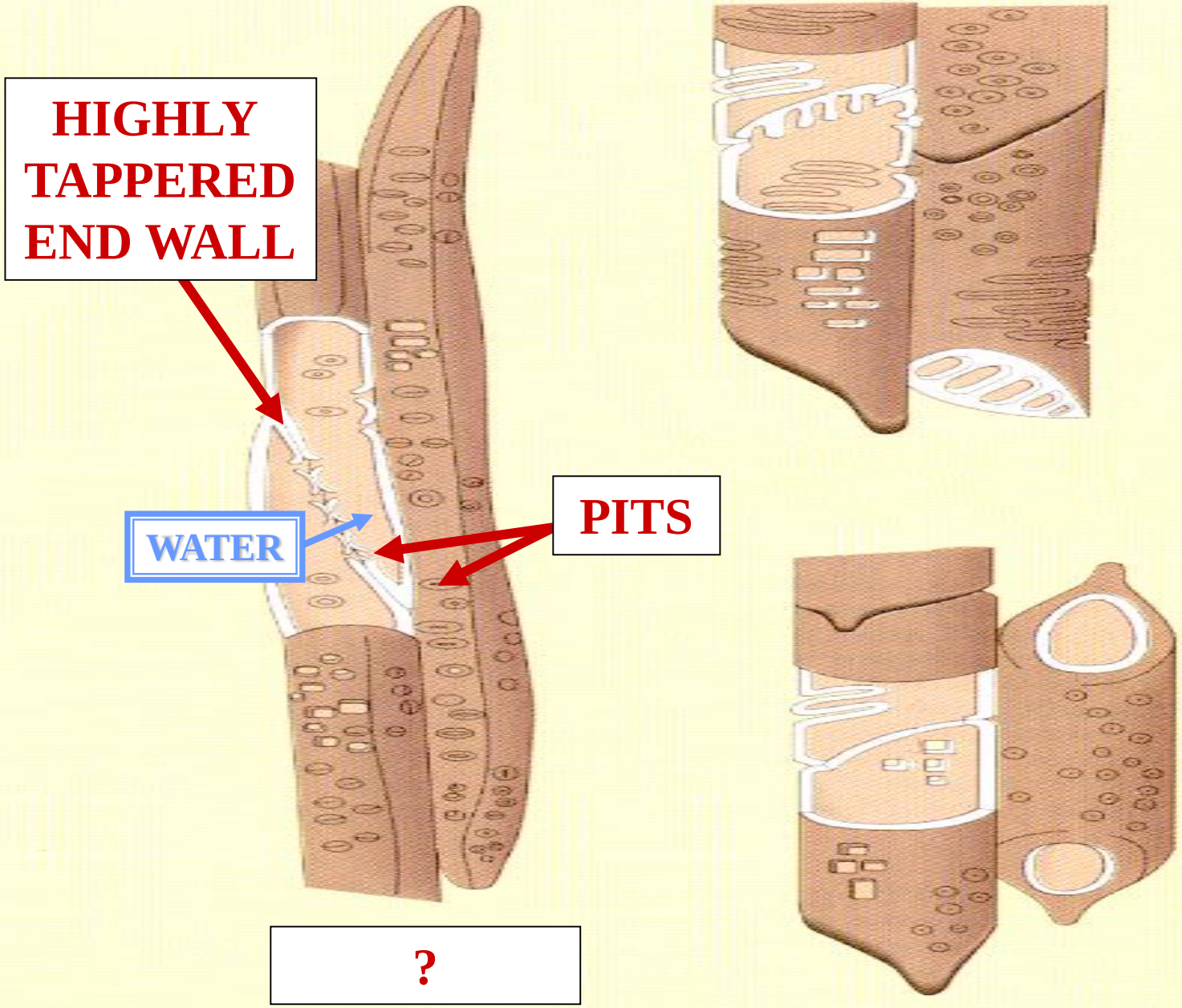
?

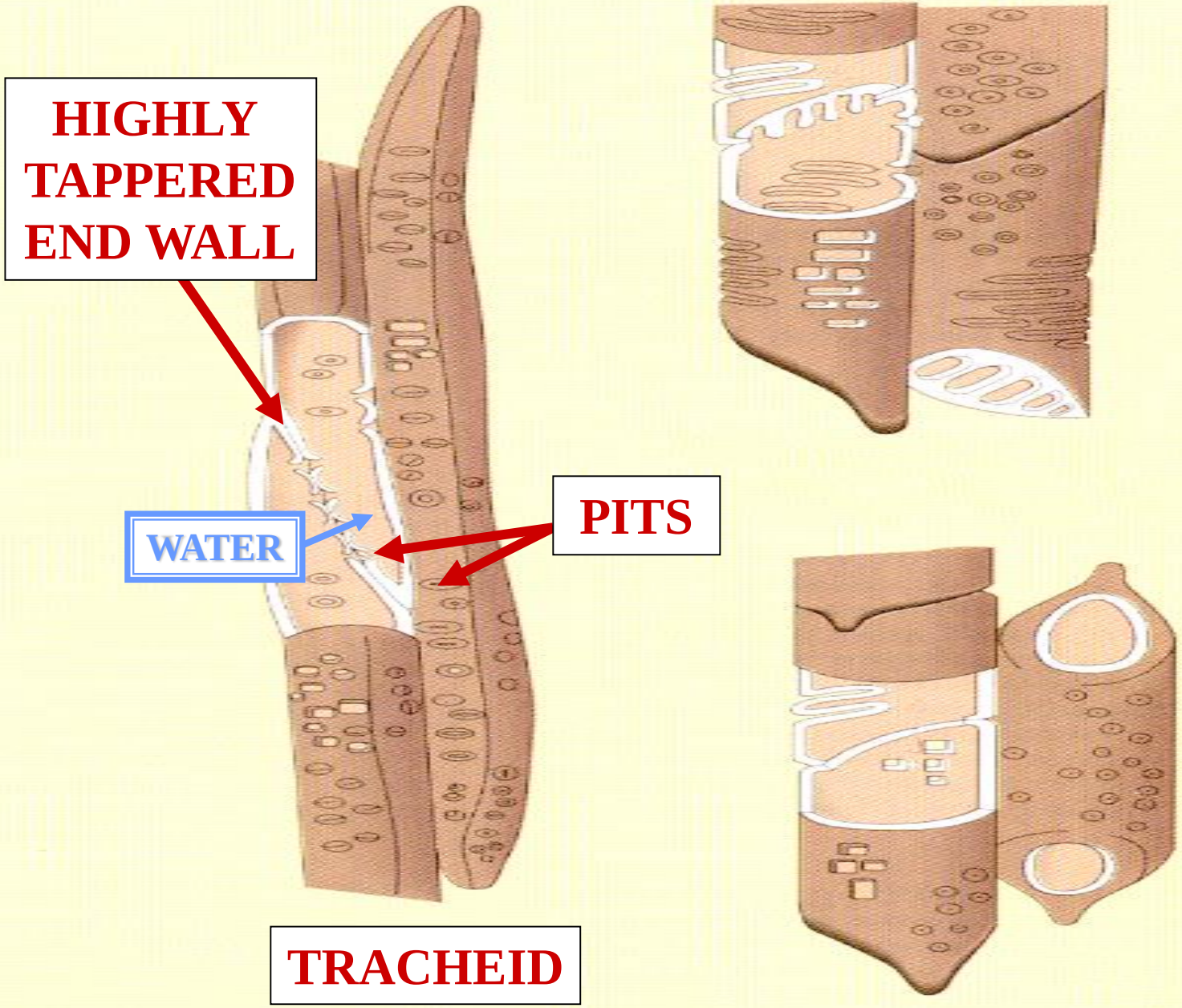






TRACHEARY ELEMENTS

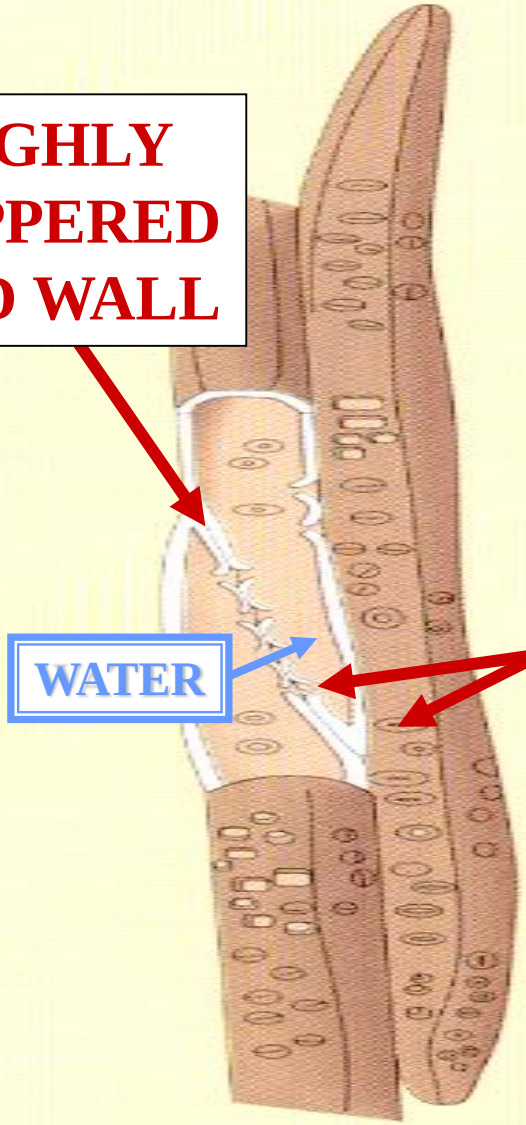

HIGHLY TAPPERED END WALL
WATER
PITS
?


HIGHLY TAPPERED END WALL
WATER
PITS
TRACHEID

HIGHLY TAPPERED END WALL

LESS TAPPERED END WALL

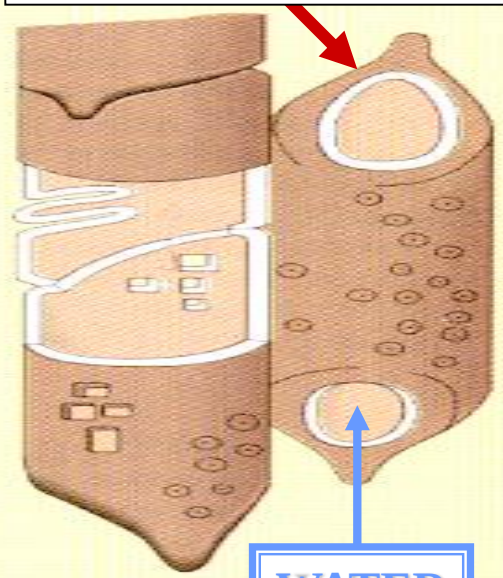
?



WATER

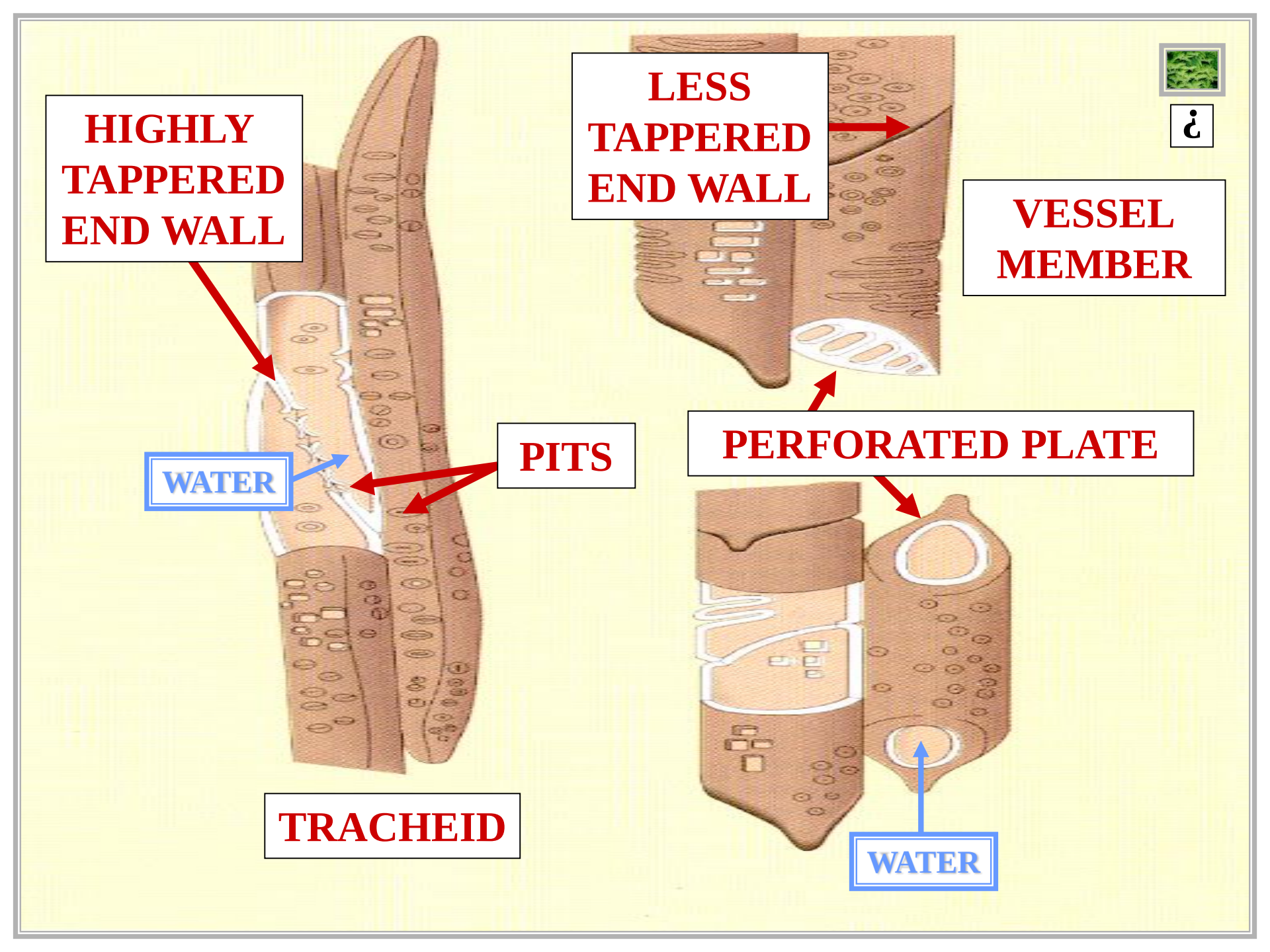
PITS

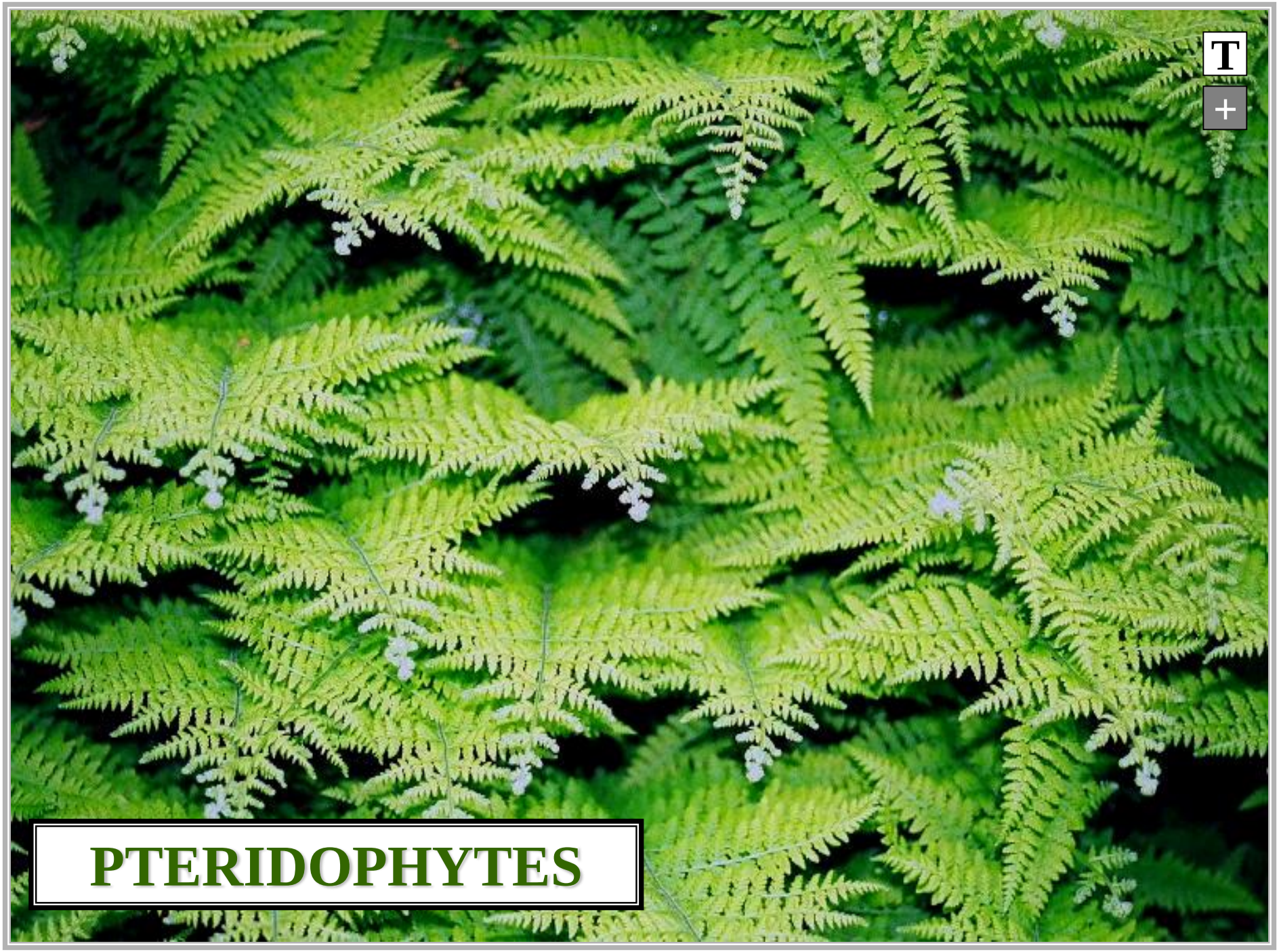
PERFORATED PLATE



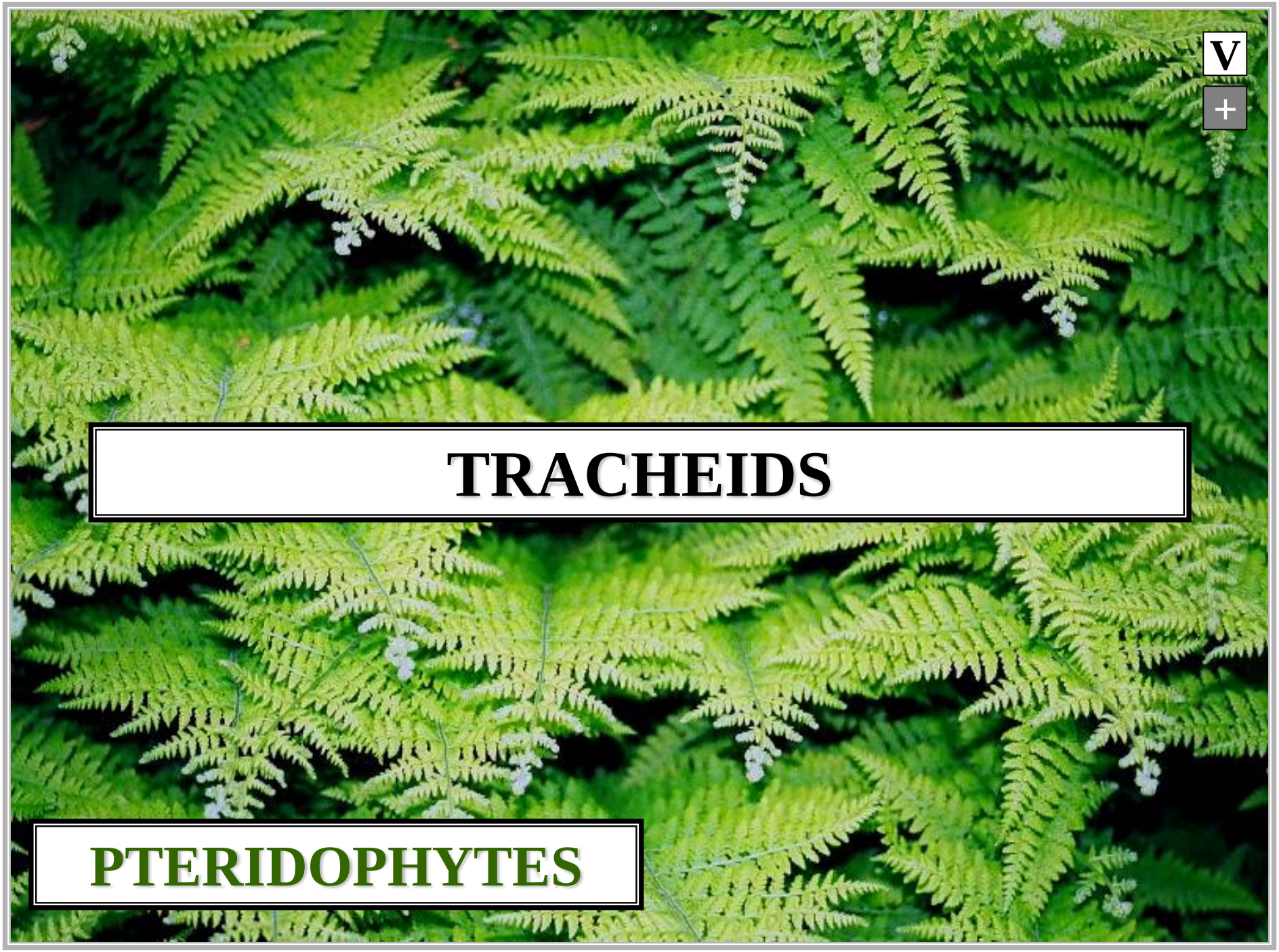
TRACHEID

WATER


HIGHLY TAPPERED END WALL
LESS TAPPERED END WALL
VESSEL MEMBER
¿
WATER
PITS
PERFORATED PLATE
TRACHEID
WATER



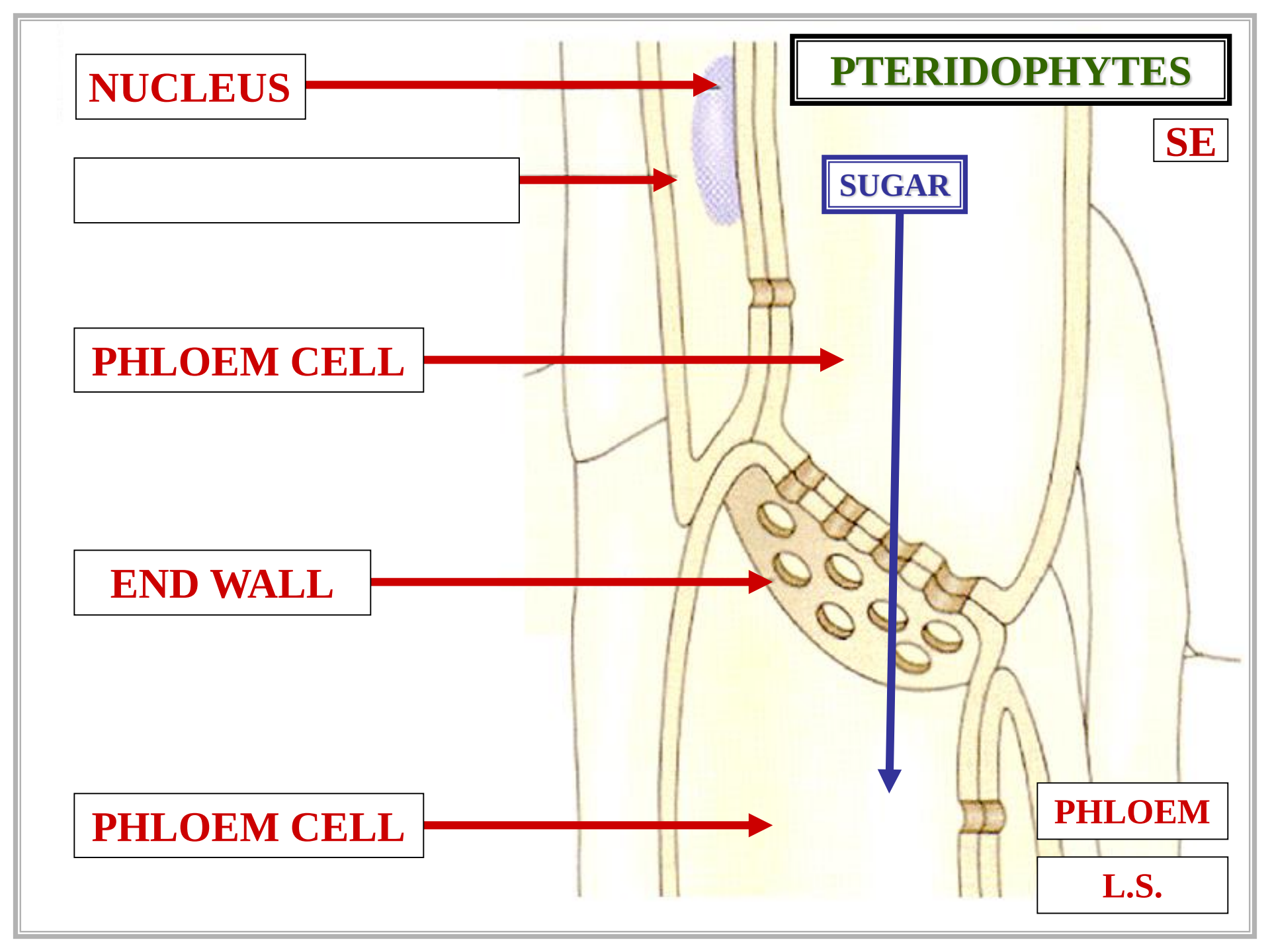
PTERIDOPHYTES

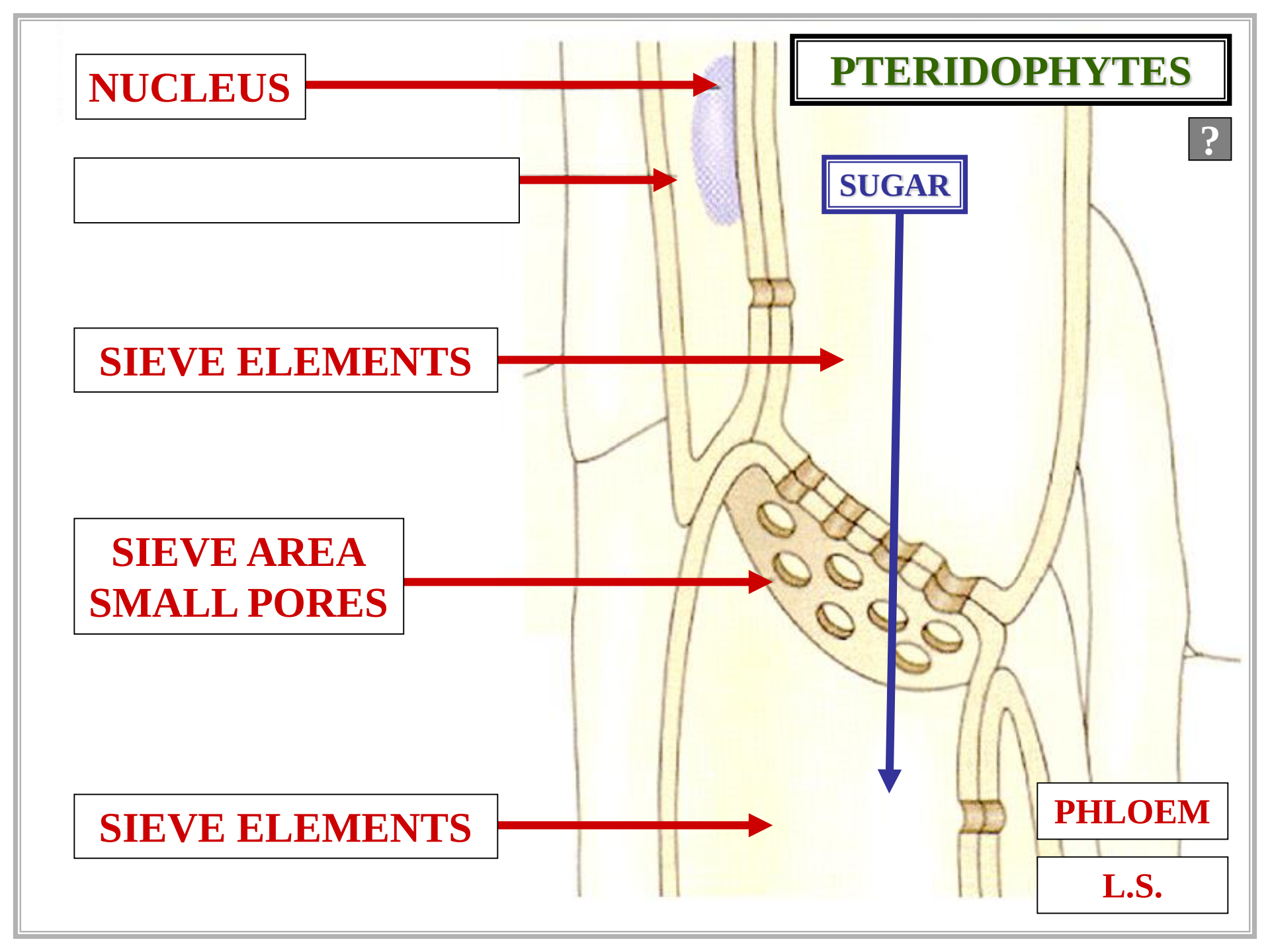

V
+
TRACHEIDS
PTERIDOPHYTES

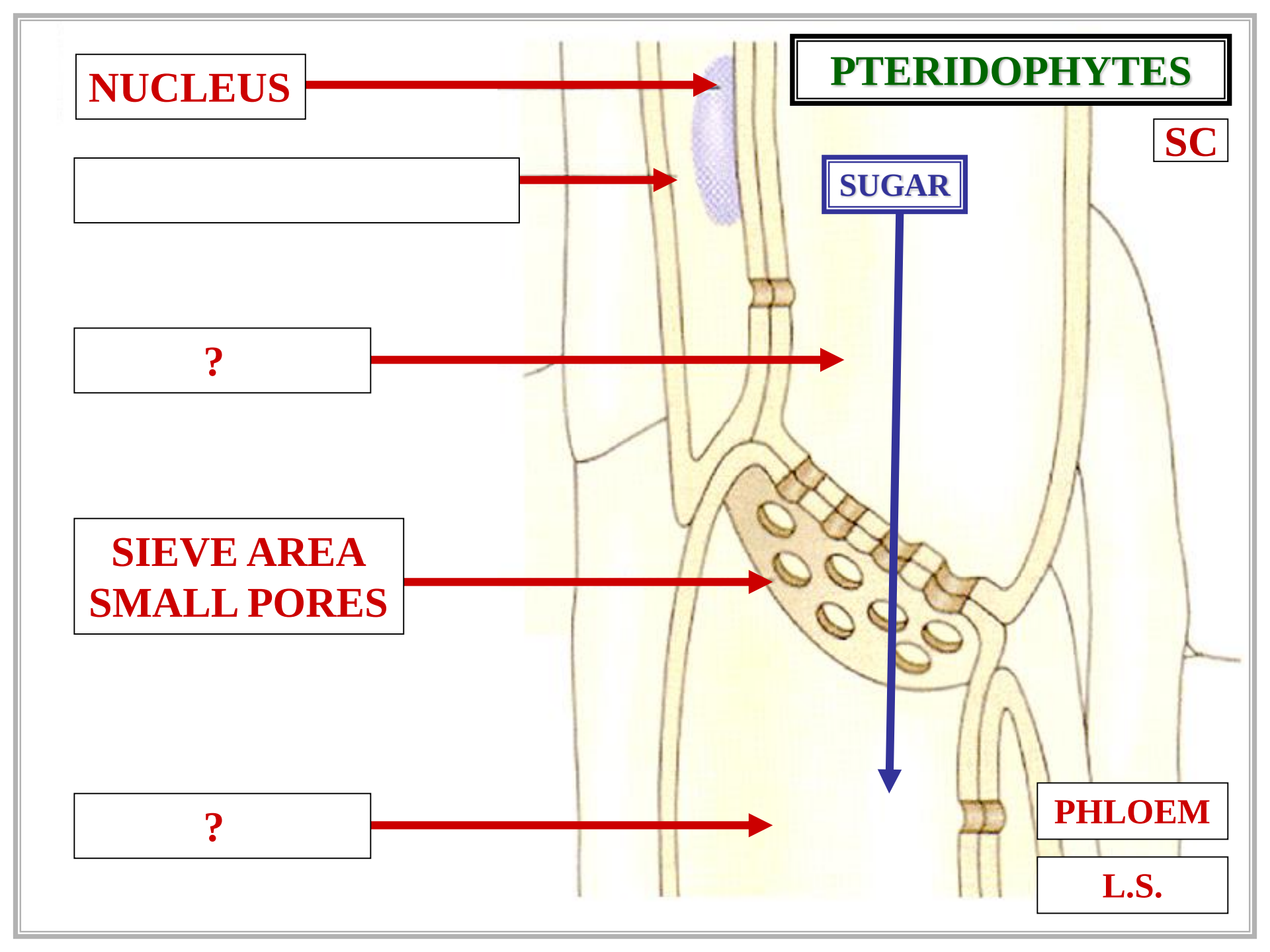
TRACHEIDS
&
VESSEL MEMBERS

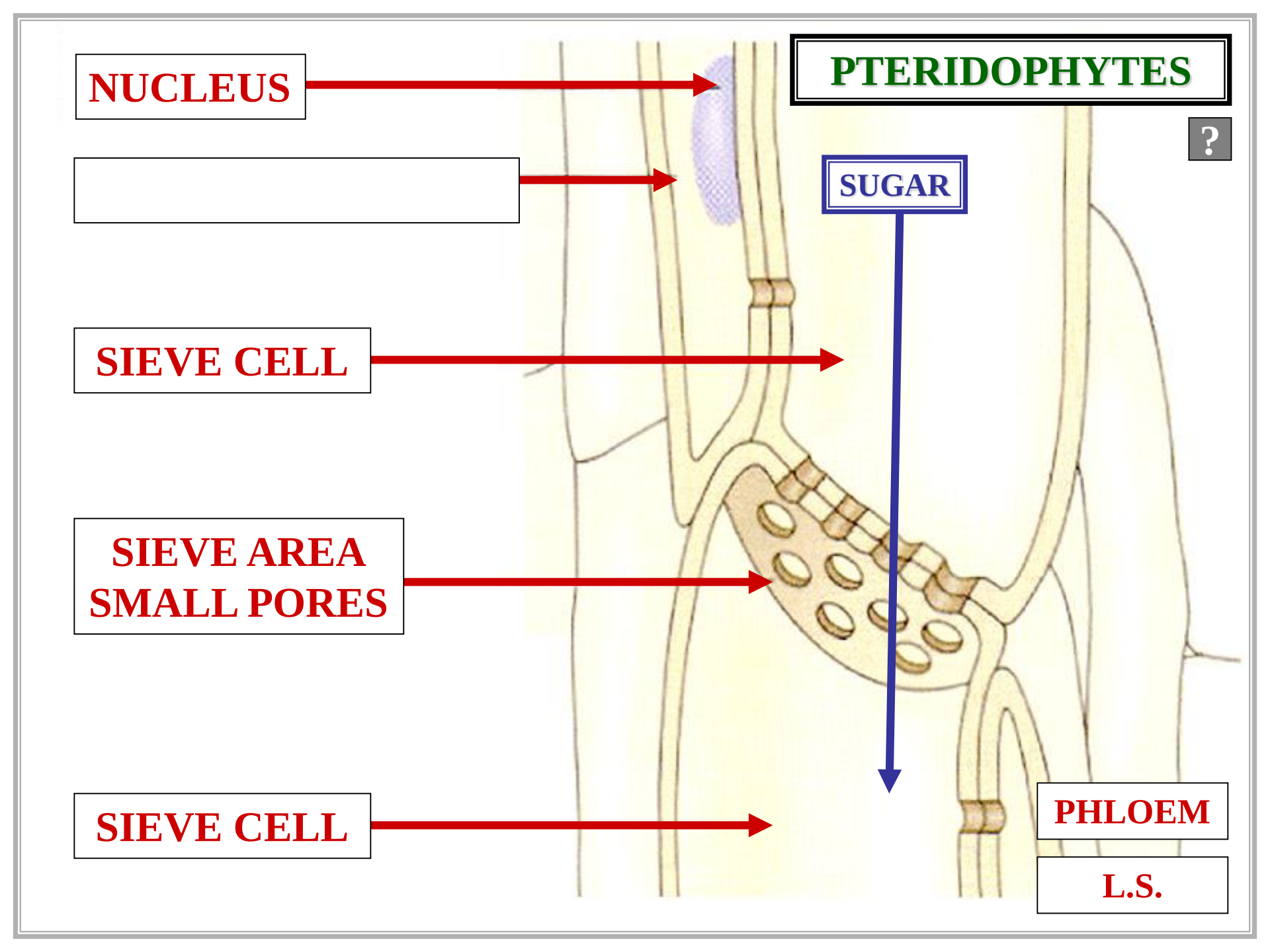
PTERIDOPHYTES

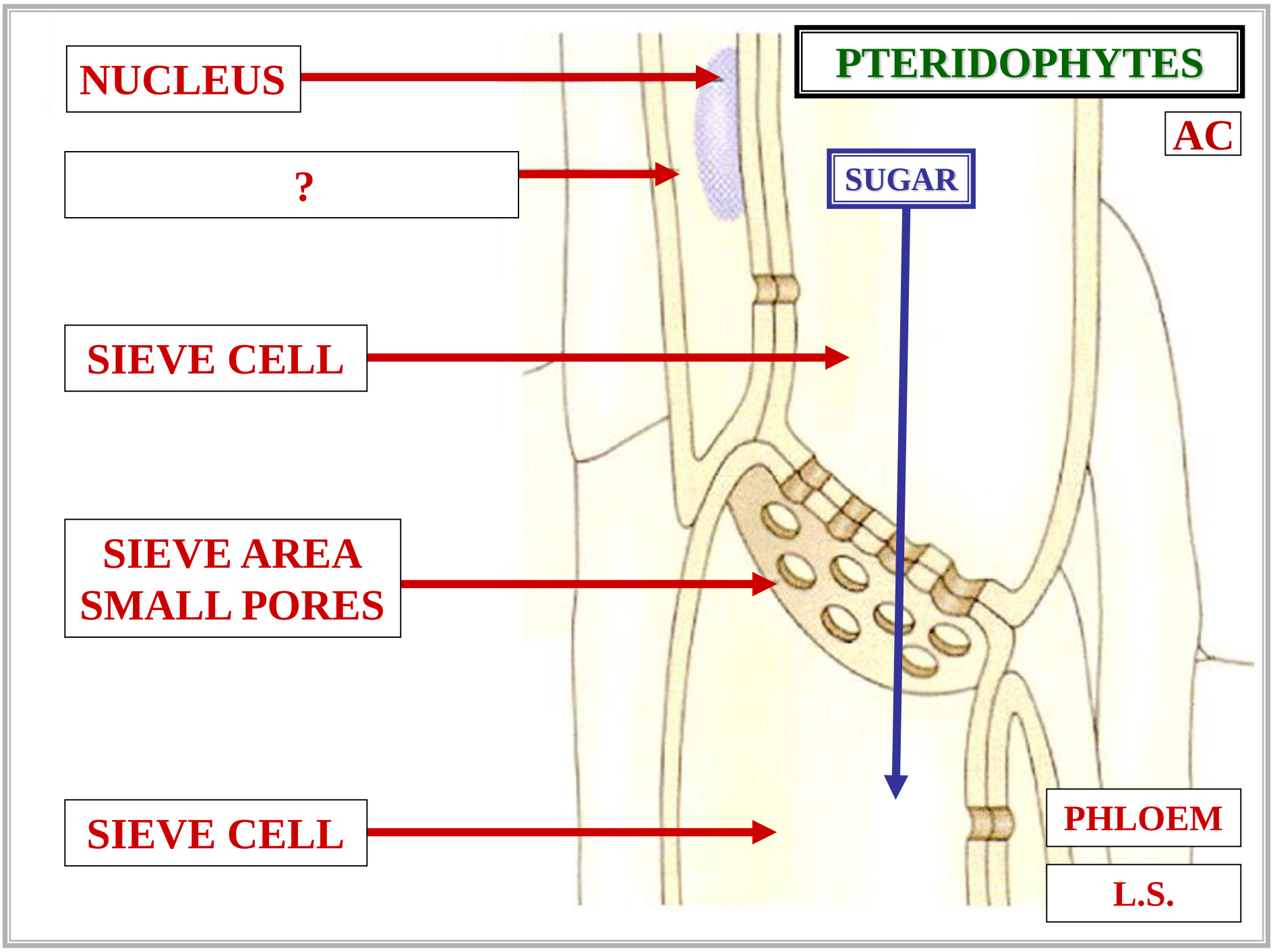
PHLOEM

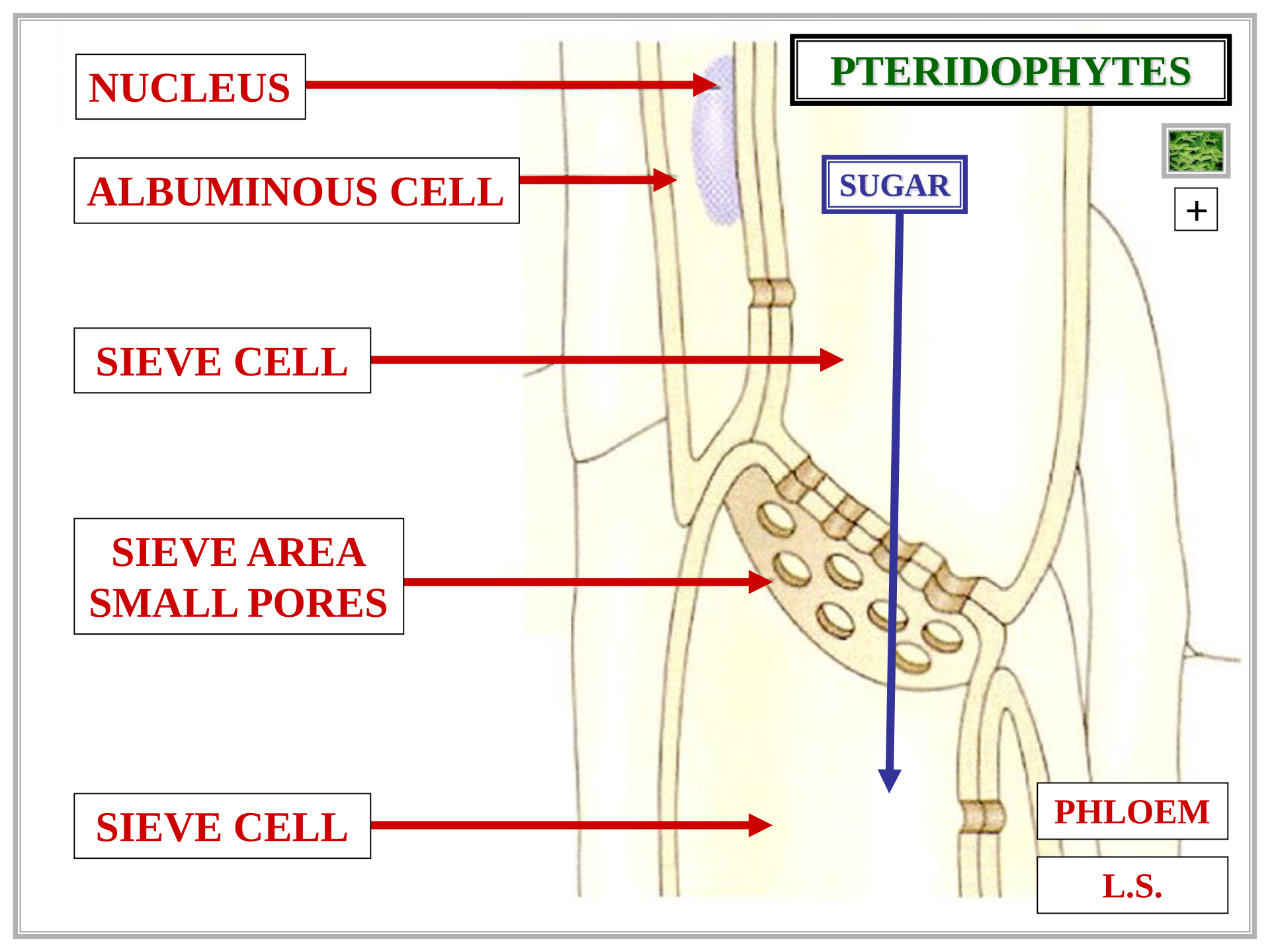

NUCLEUS
PHLOEM CELL
END WALL
PHLOEM CELL
PTERIDOPHYTES
SE
SUGAR
PHLOEM
L.S.

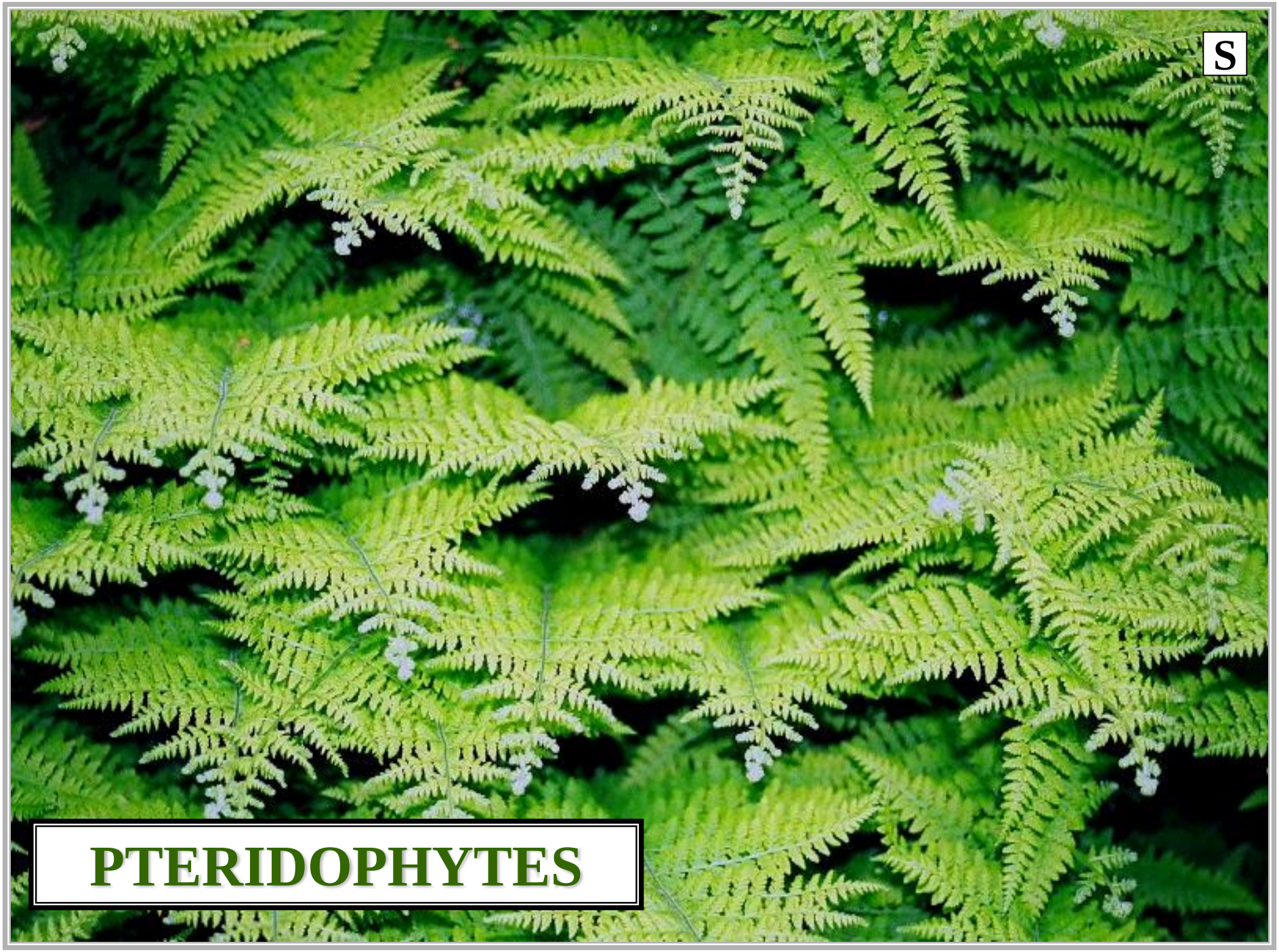

NUCLEUS
PTERIDOPHYTES
?
SUGAR
SIEVE ELEMENTS
SIEVE AREA
SMALL PORES
SIEVE ELEMENTS
PHLOEM
L.S.

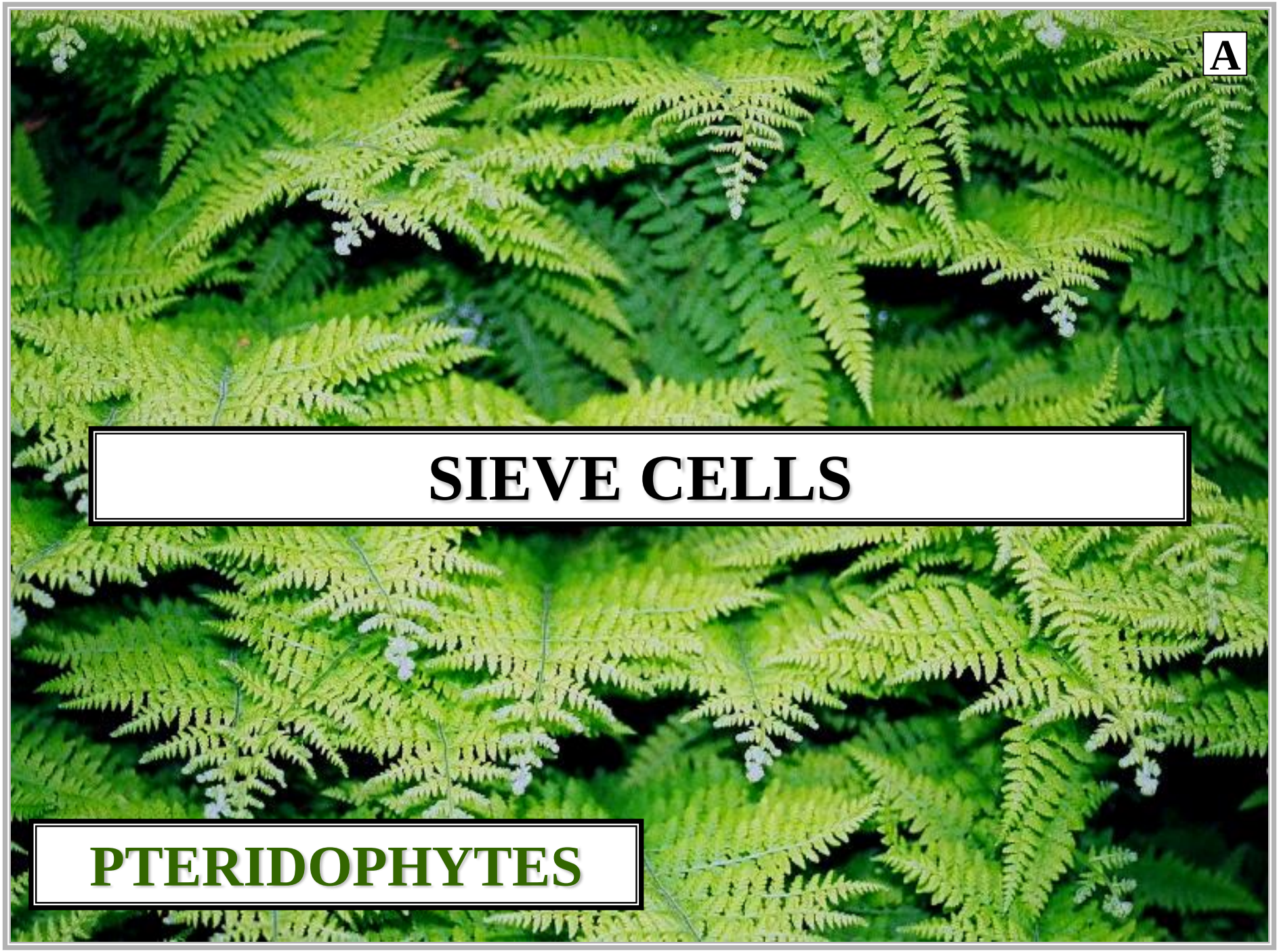

NUCLEUS
?
?
SIEVE AREA
SMALL PORES
?
PTERIDOPHYTES
SC
SUGAR
PHLOEM
L.S.


NUCLEUS
SIEVE CELL
SIEVE AREA
SMALL PORES
SIEVE CELL
PTERIDOPHYTES
?
SUGAR
PHLOEM
L.S.


NUCLEUS
?
SIEVE CELL
SIEVE AREA
SMALL PORES
SIEVE CELL
PTERIDOPHYTES
AC
SUGAR
PHLOEM
L.S.


NUCLEUS
ALBUMINOUS CELL
SIEVE CELL
SIEVE AREA
SMALL PORES
SIEVE CELL
PTERIDOPHYTES
SUGAR
+
PHLOEM
L.S.


S
PTERIDOPHYTES


A
SIEVE CELLS
PTERIDOPHYTES

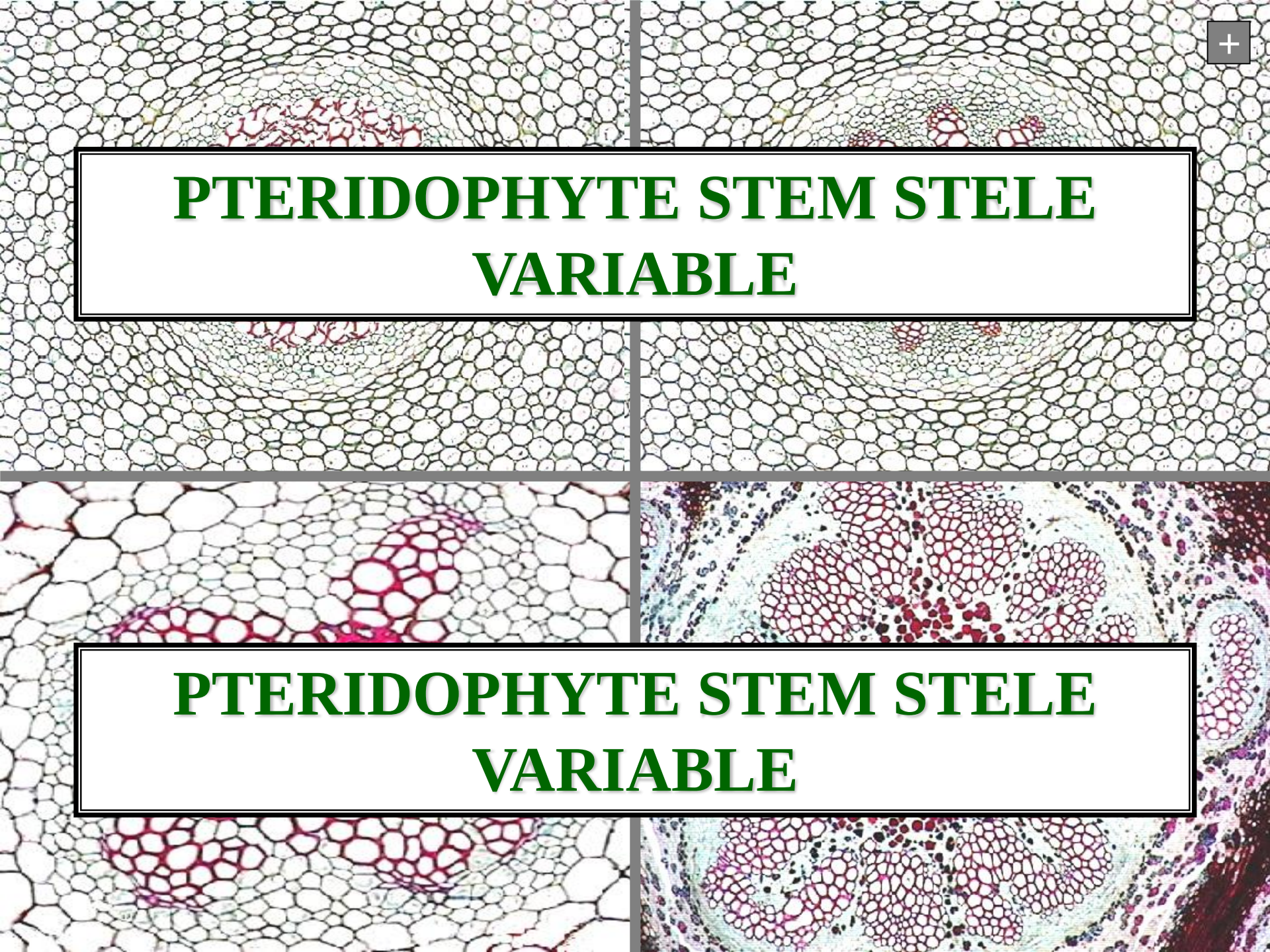
SIEVE CELLS
&
ALBUMINOUS CELLS

PTERIDOPHYTES

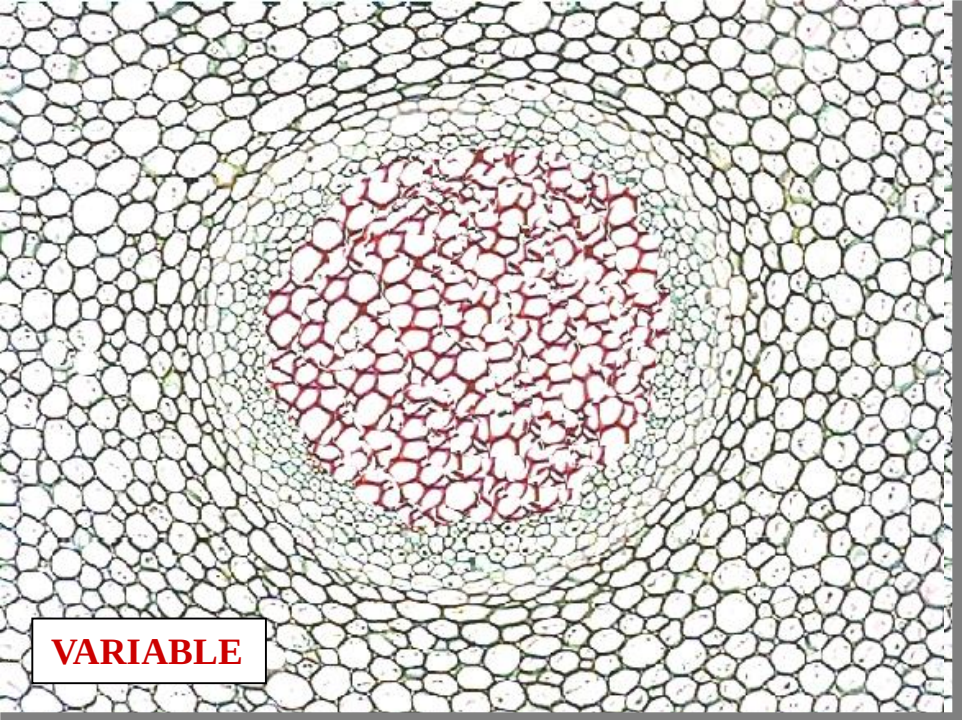
STEM

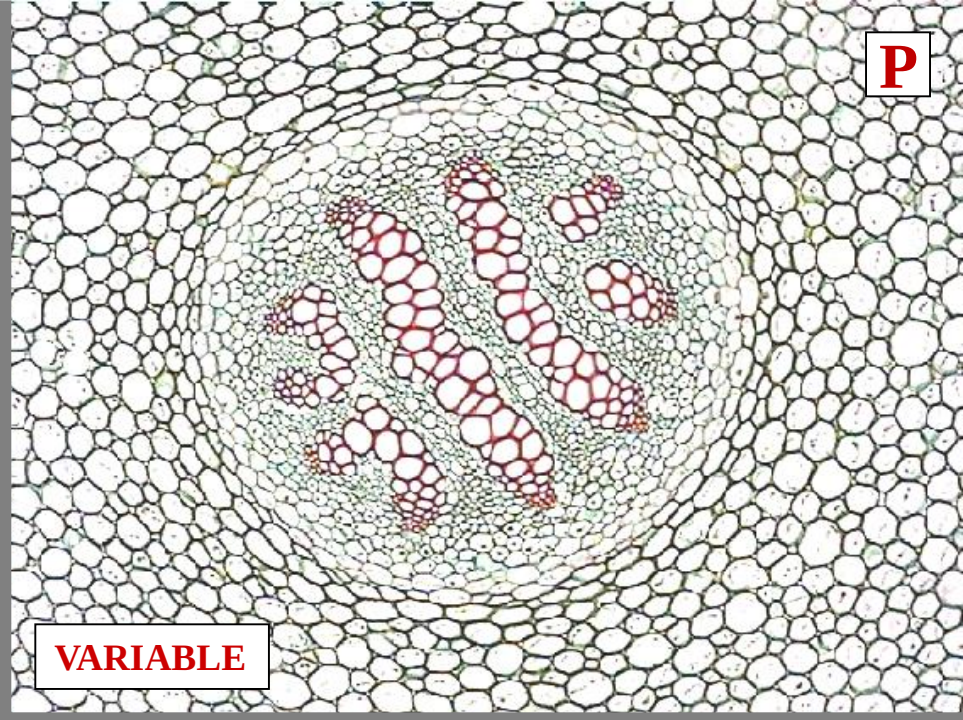
STEM STELE

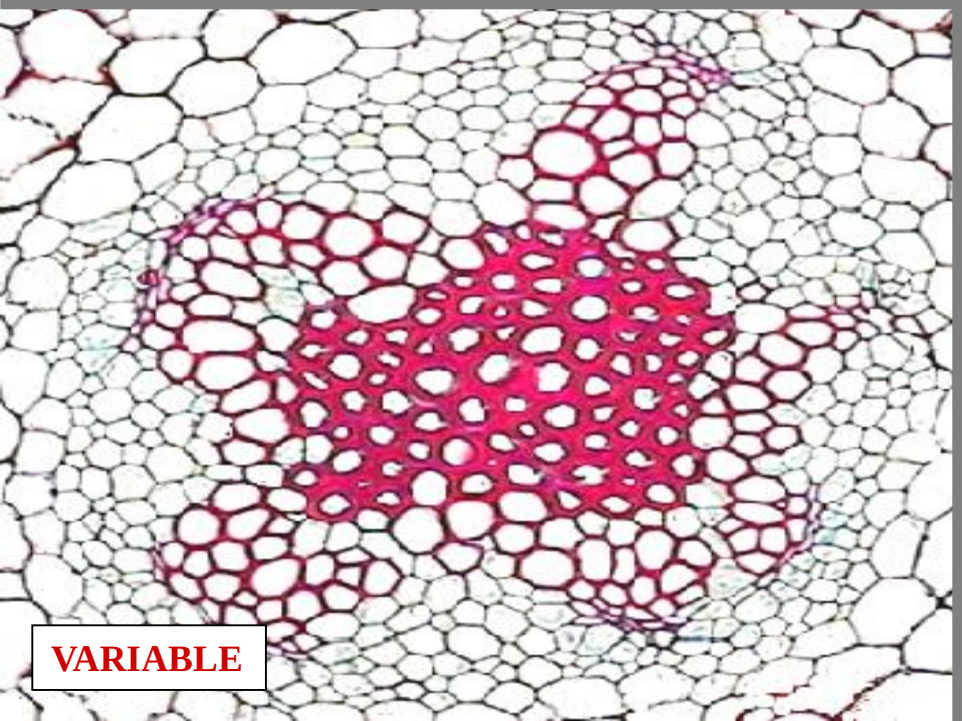
PTERIDOPHYTE STEM STELE VARIABLE

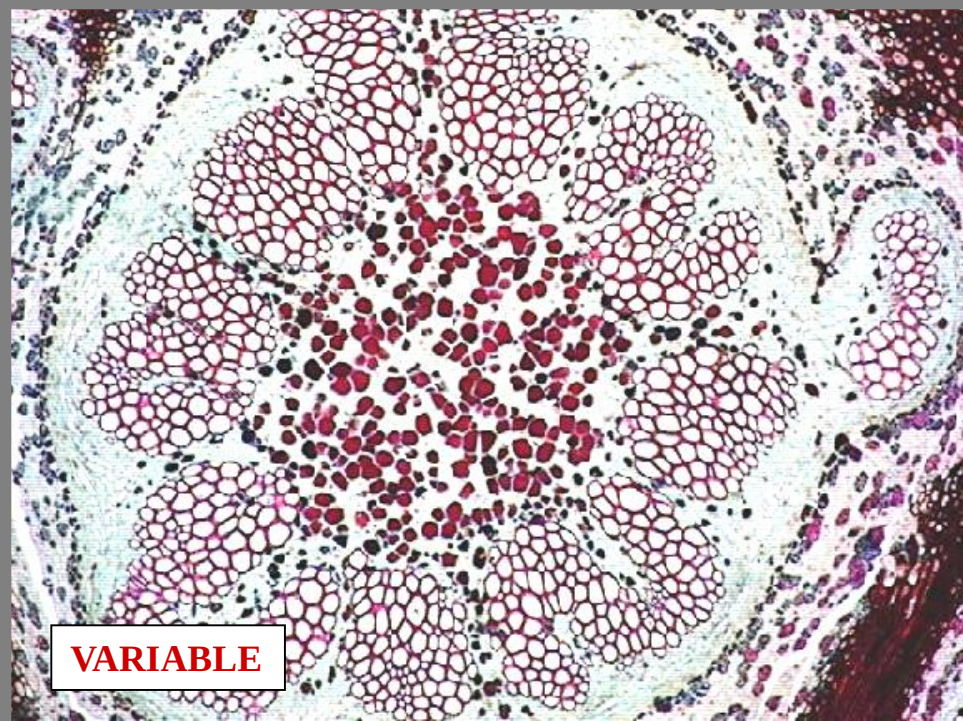


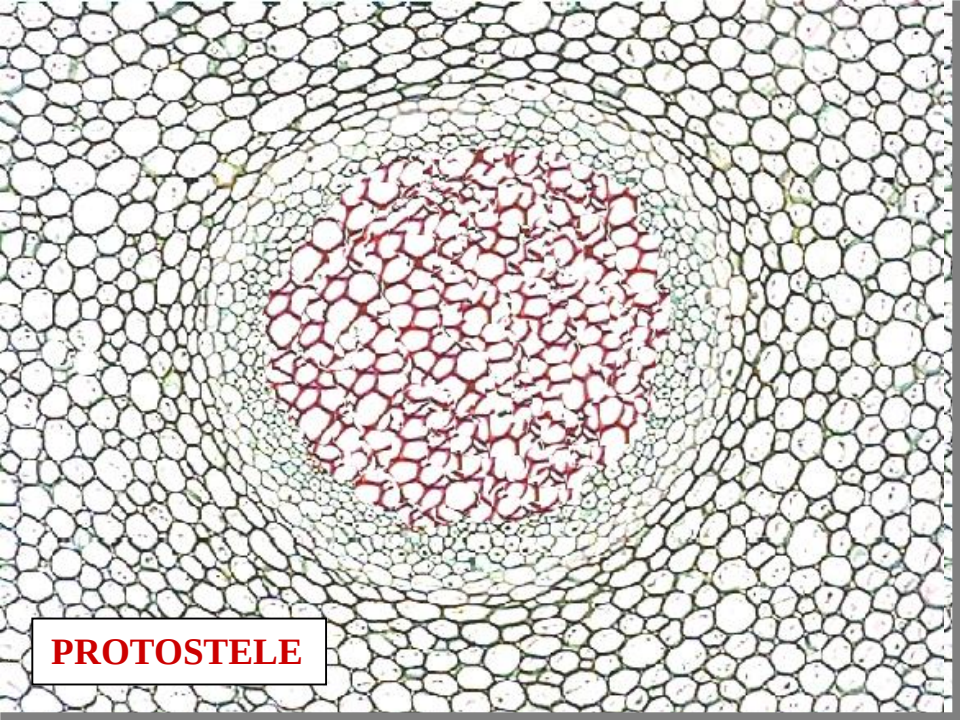
PTERIDOPHYTE STEM STELE VARIABLE

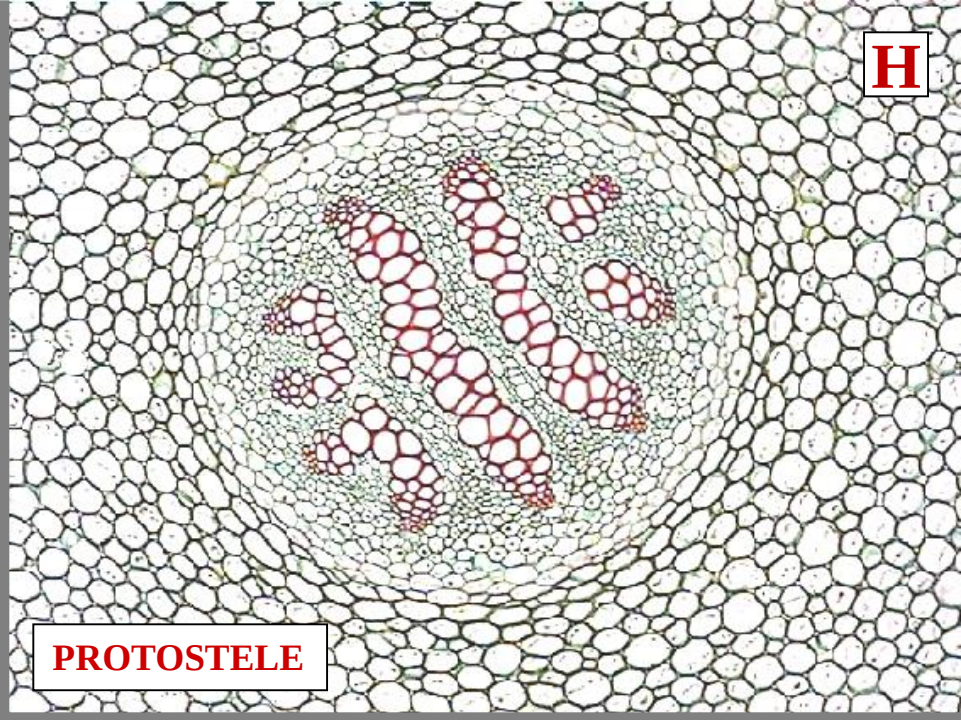

VARIABLE

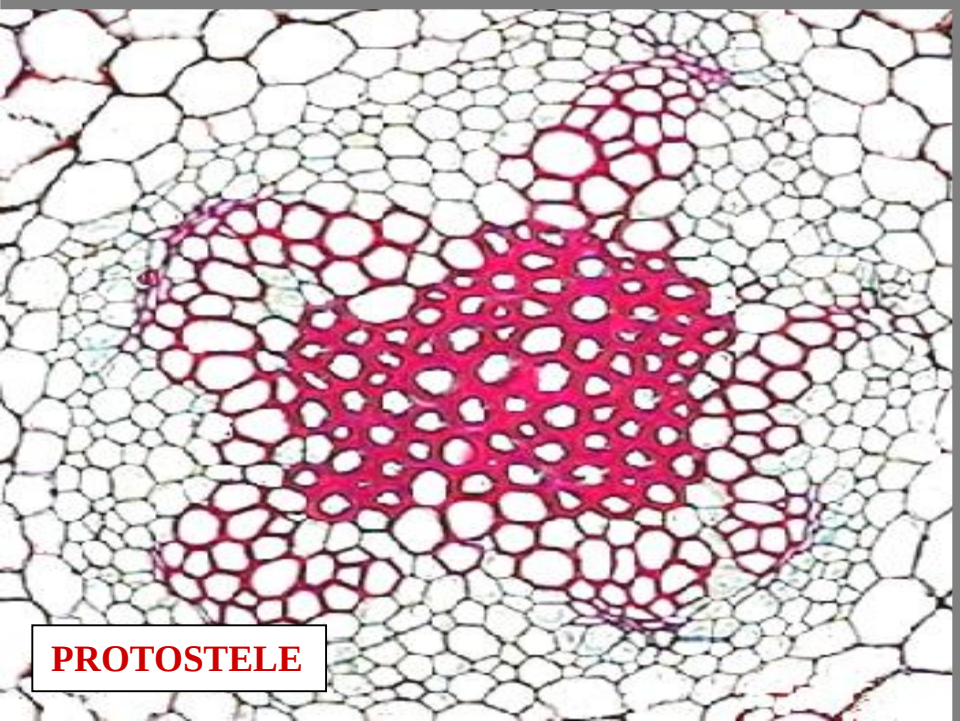

P
VARIABLE


VARIABLE

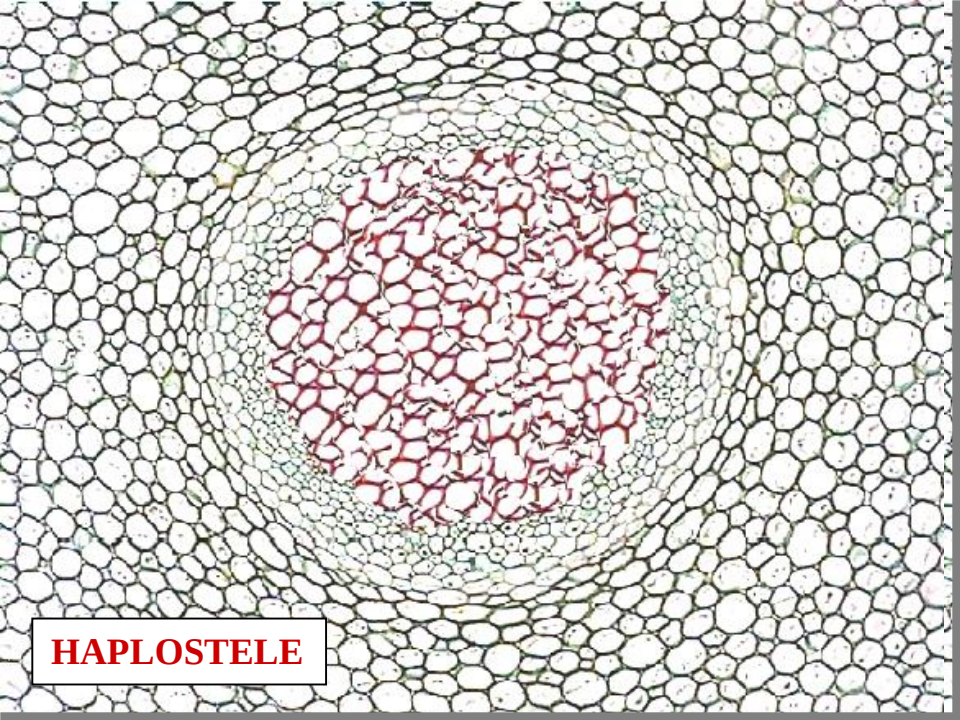

VARIABLE

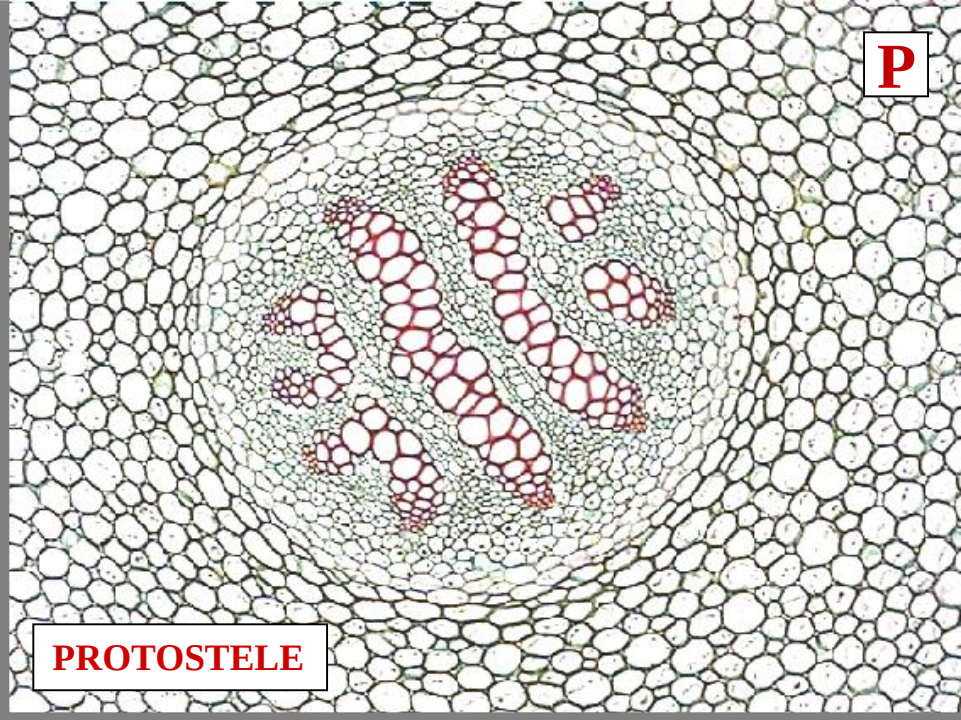

PROTOSTELE

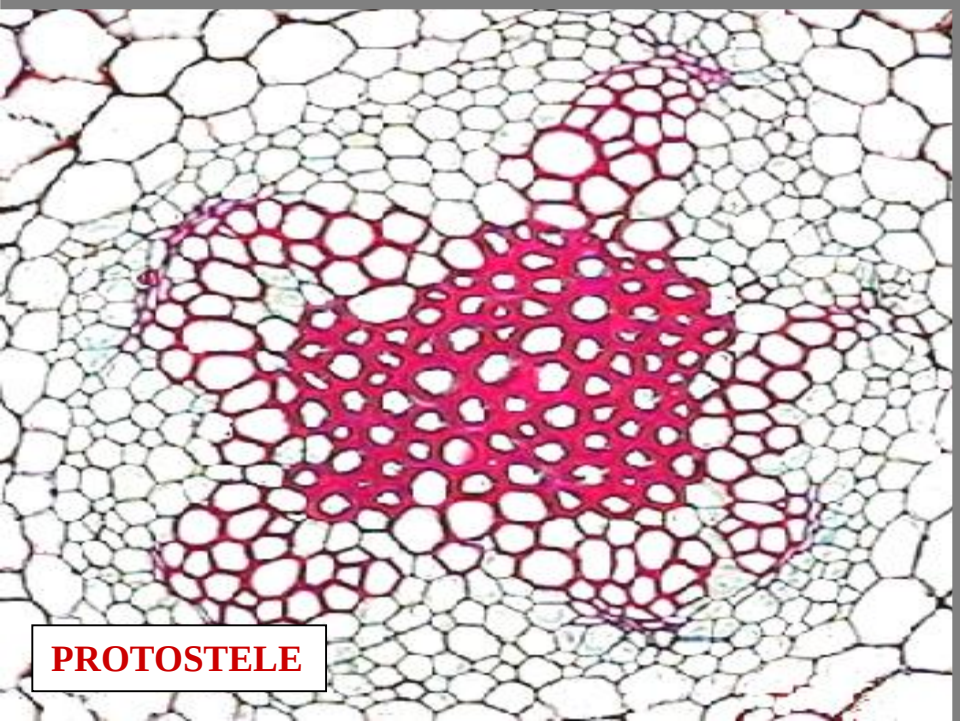

H
PROTOSTELE


PROTOSTELE

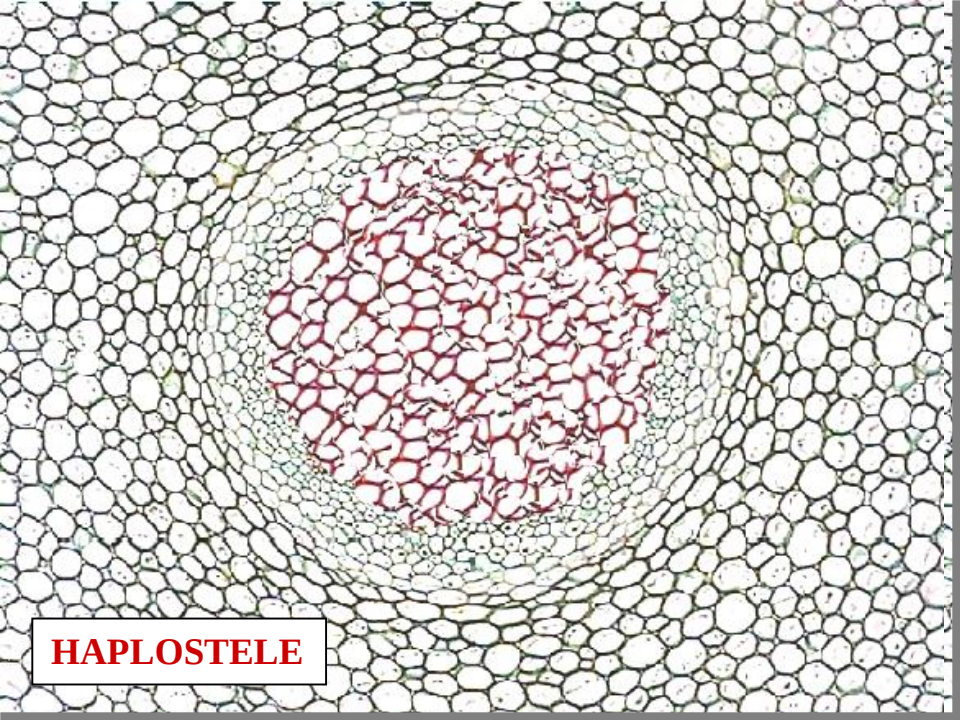

SIPHONOSTELE

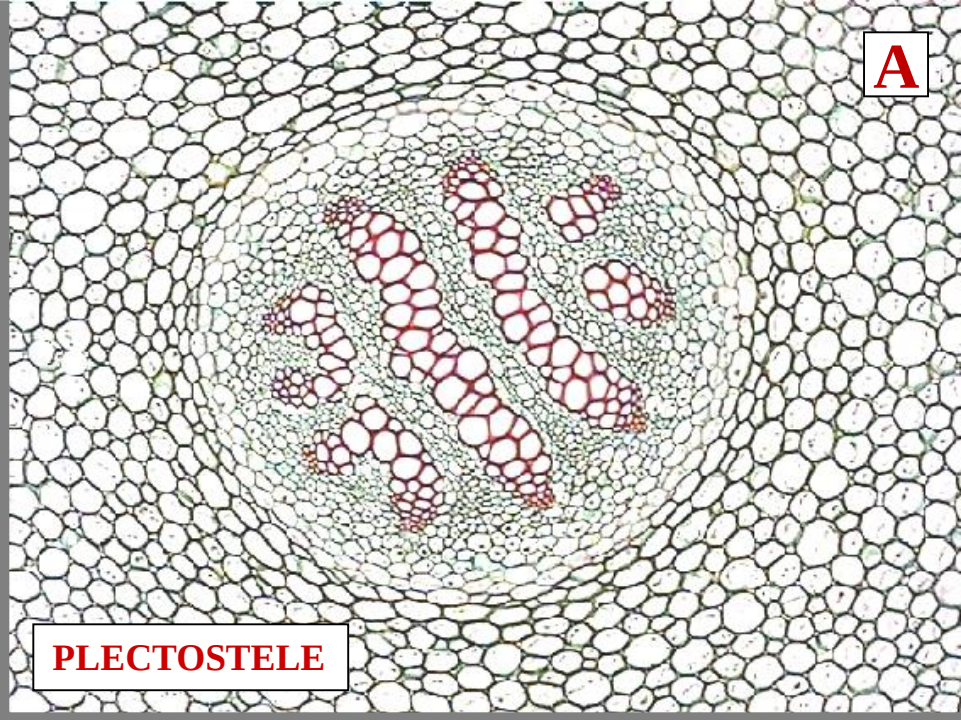

HAPLOSTELE

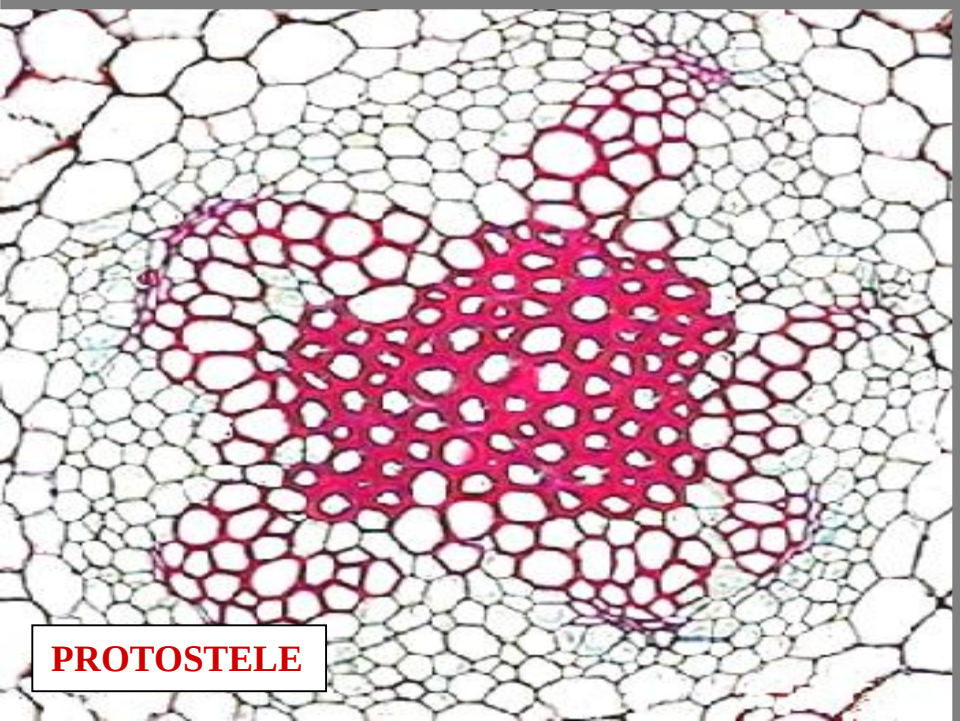

P
PROTOSTELE


PROTOSTELE

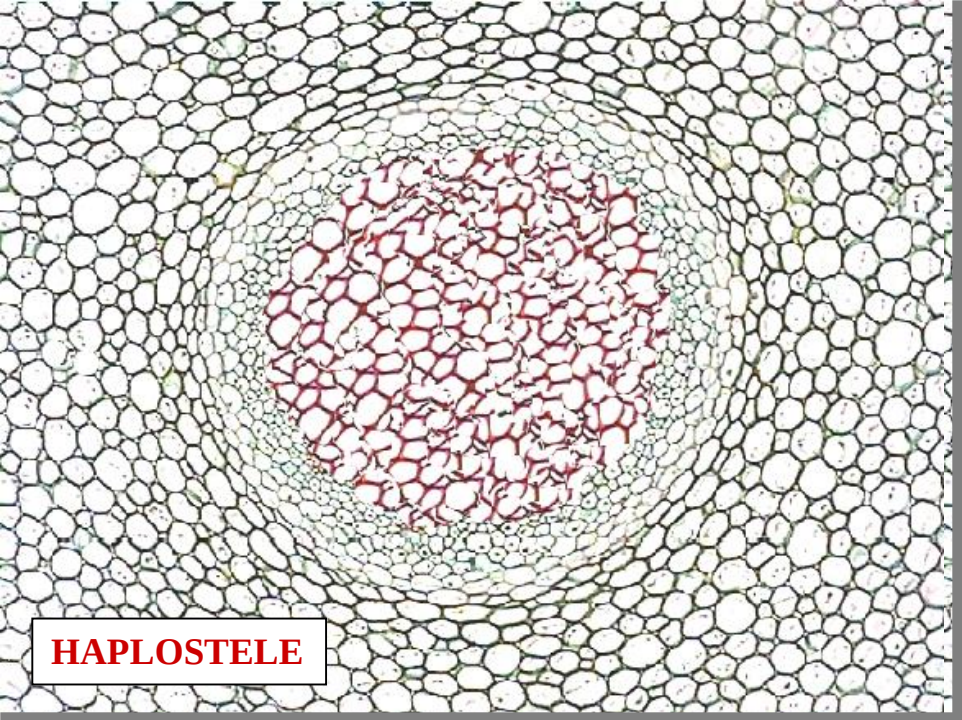

SIPHONOSTELE

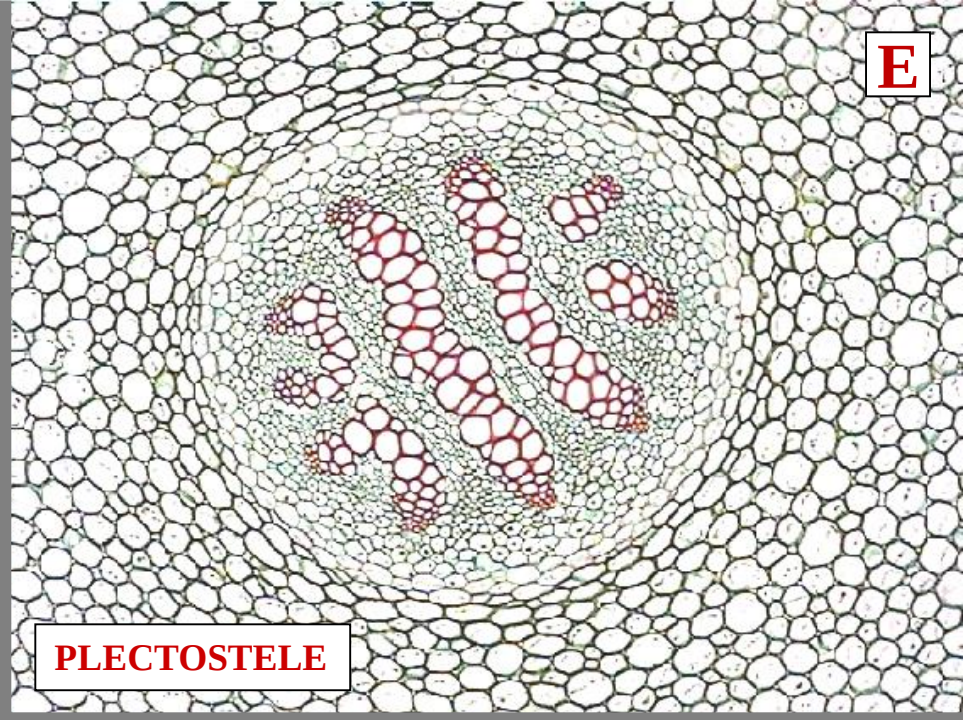

HAPLOSTELE

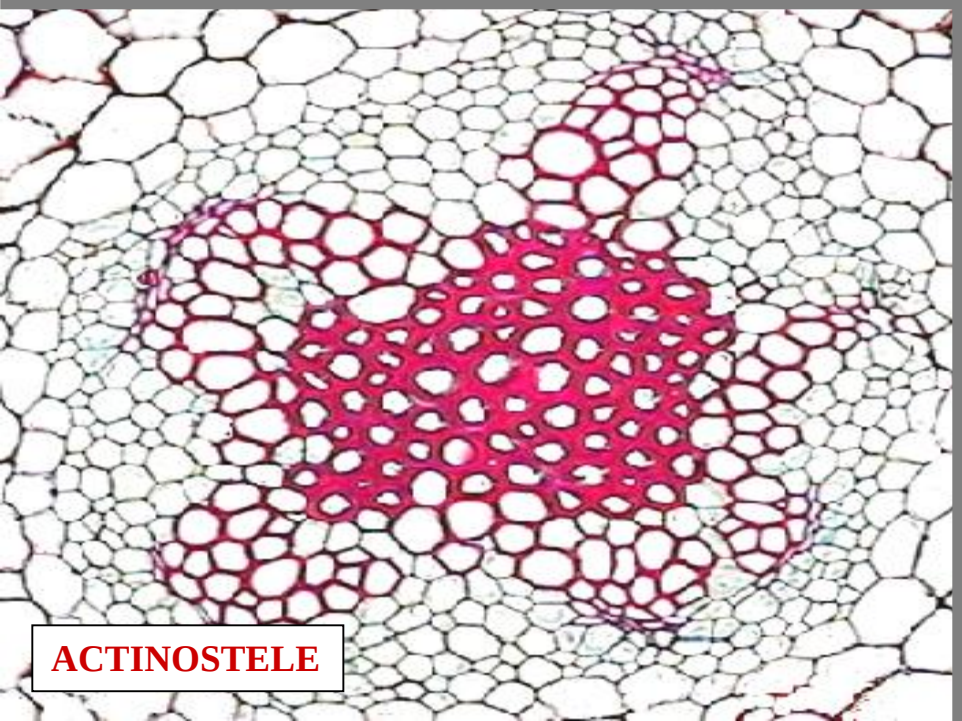

A
PLECTOSTELE


PROTOSTELE

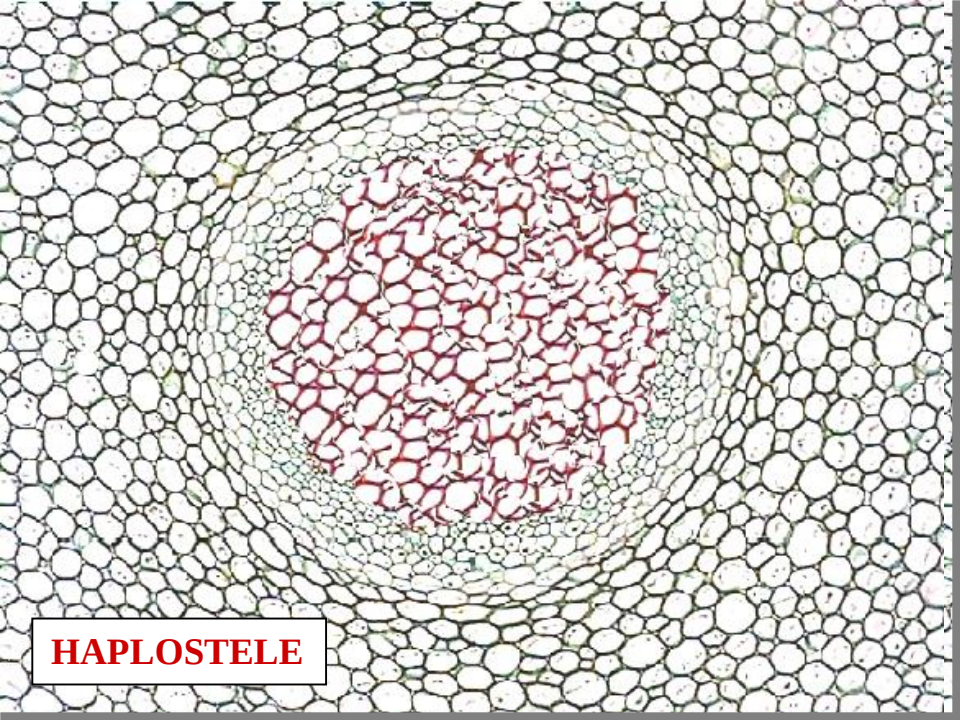

SIPHONOSTELE

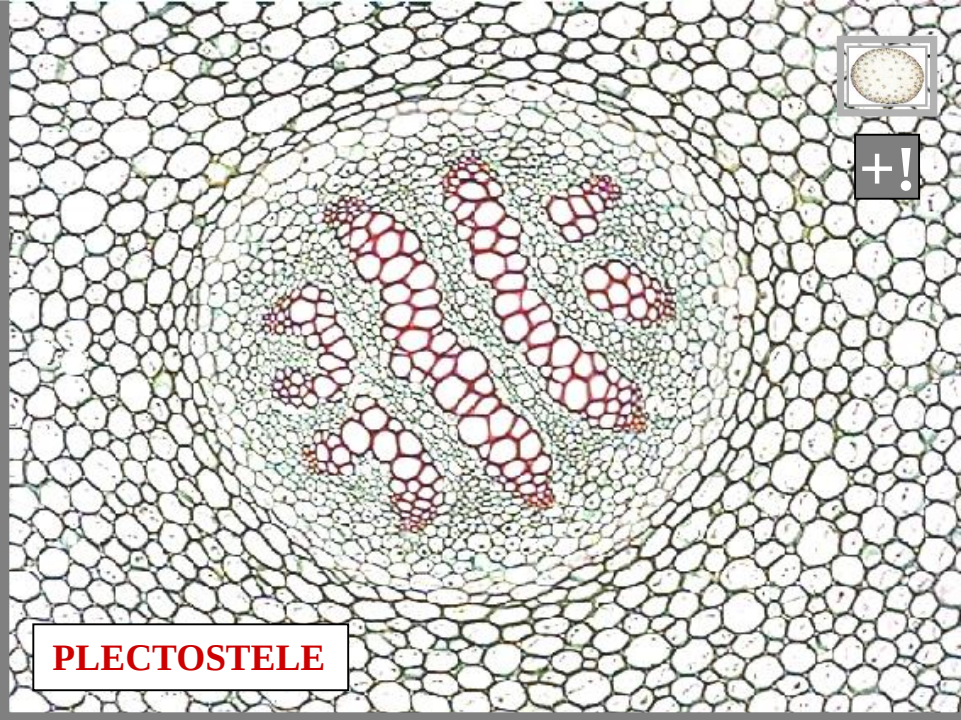

HAPLOSTELE

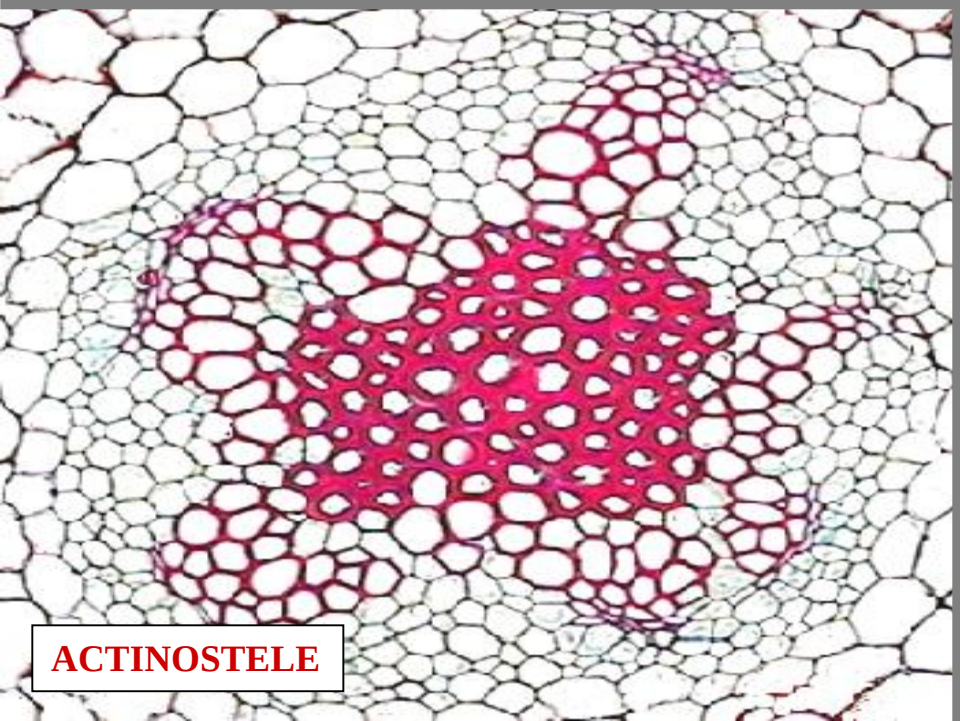

E
PLECTOSTELE

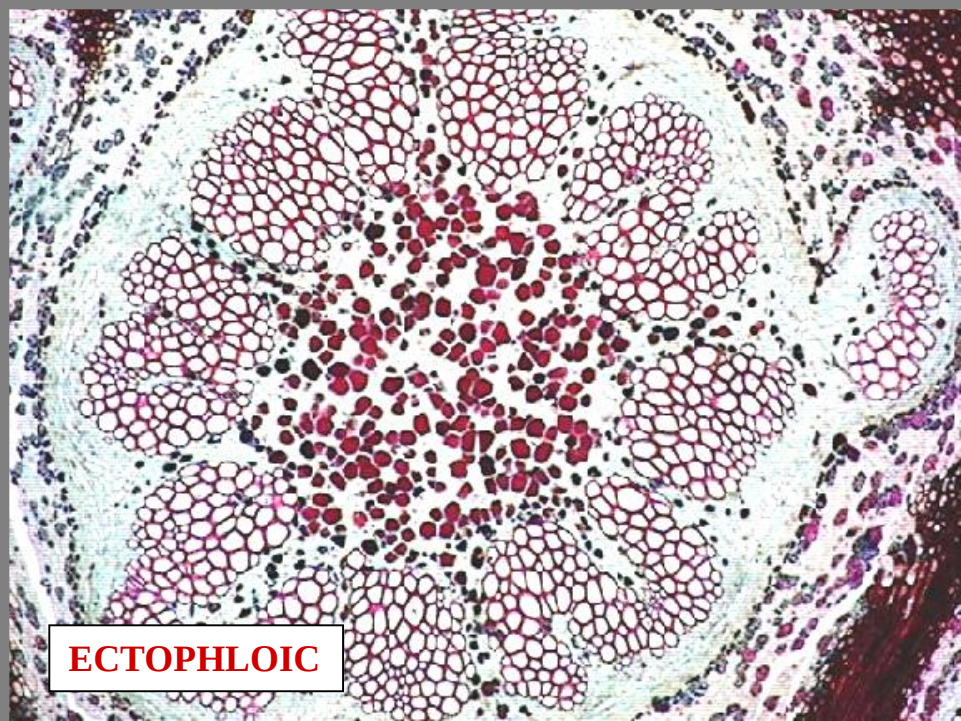

ACTINOSTELE

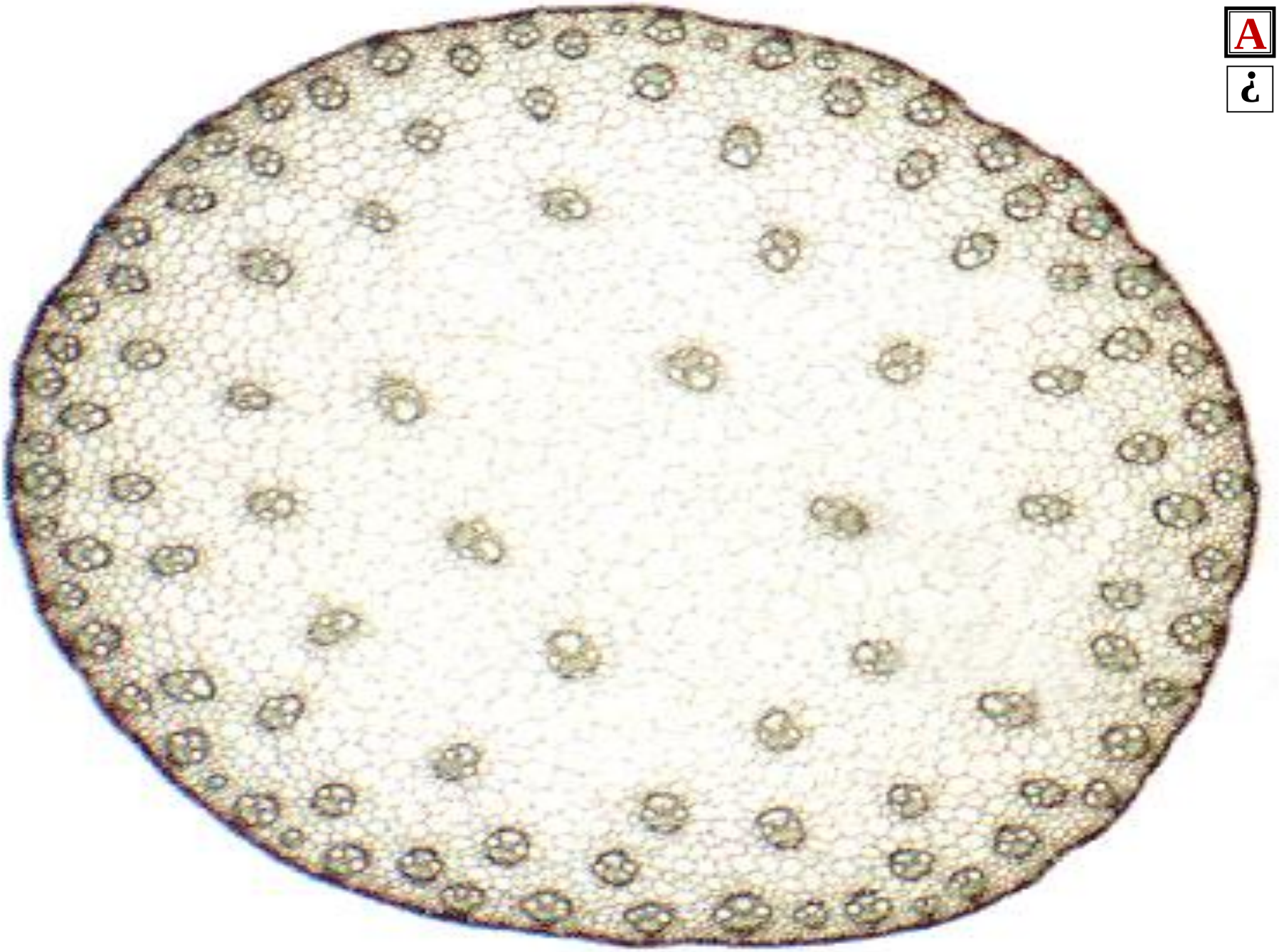

SIPHONOSTELE


HAPLOSTELE


+!
PLECTOSTELE

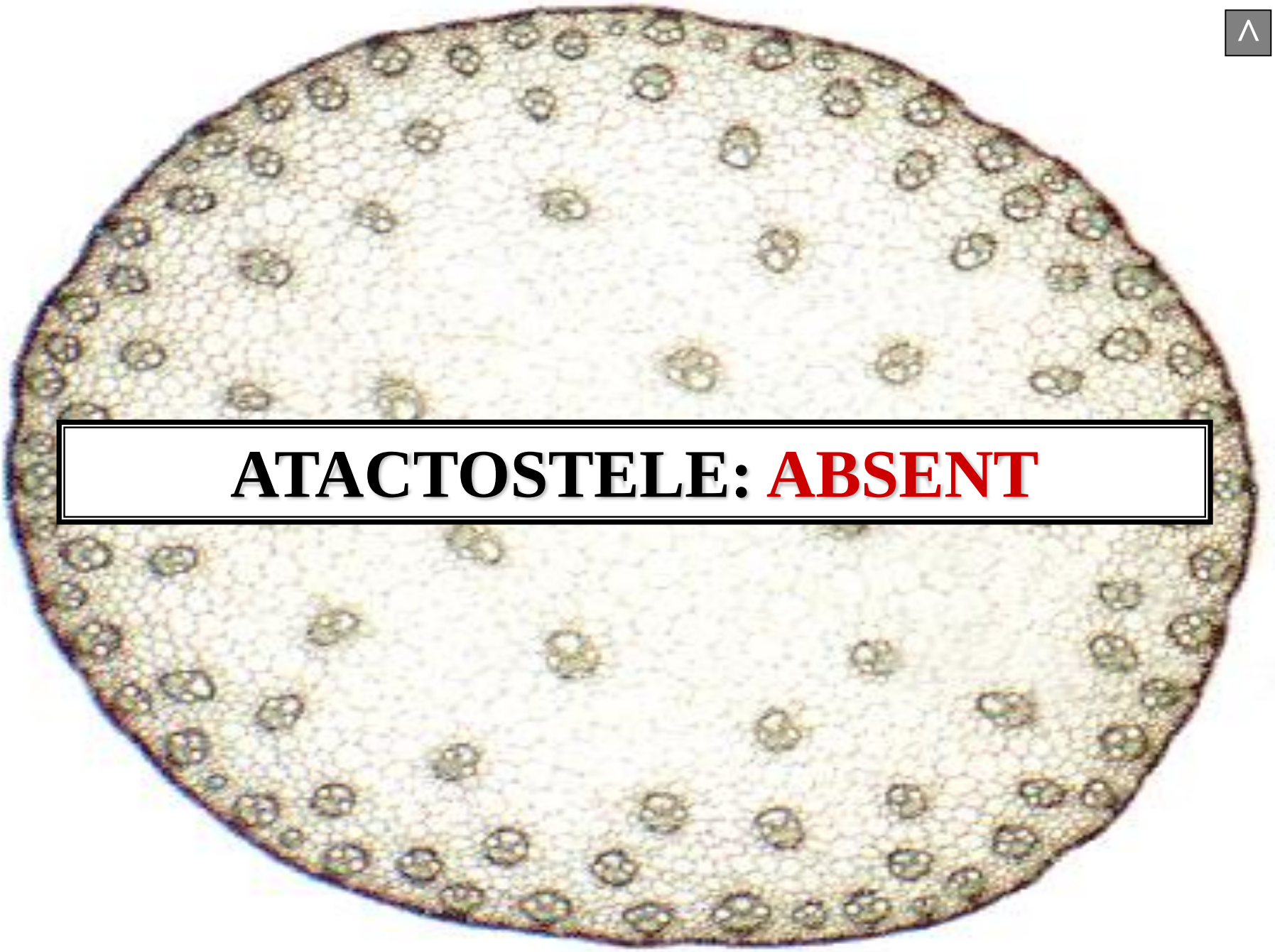

ACTINOSTELE


ECTOPHLOIC



A

¿

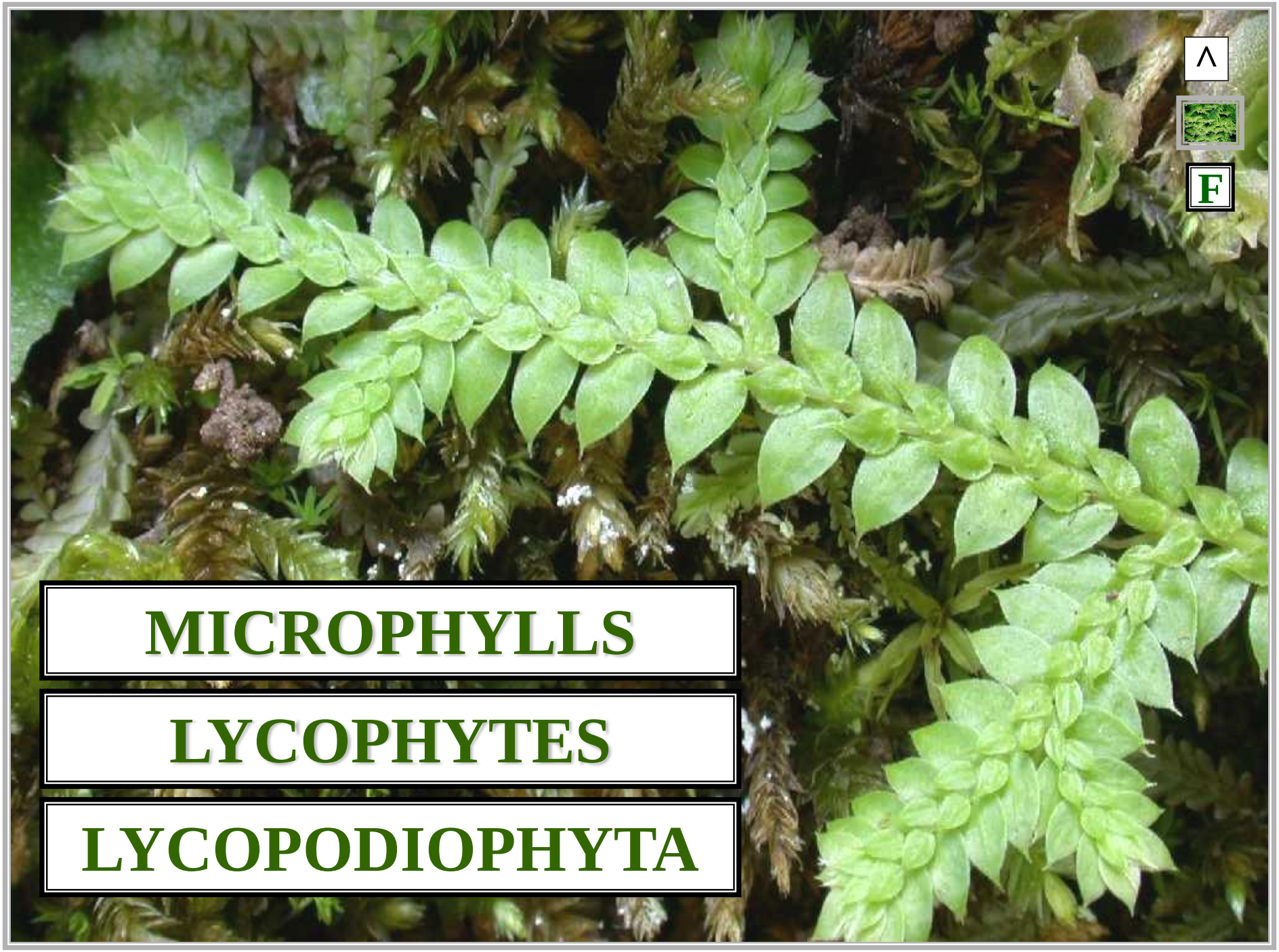


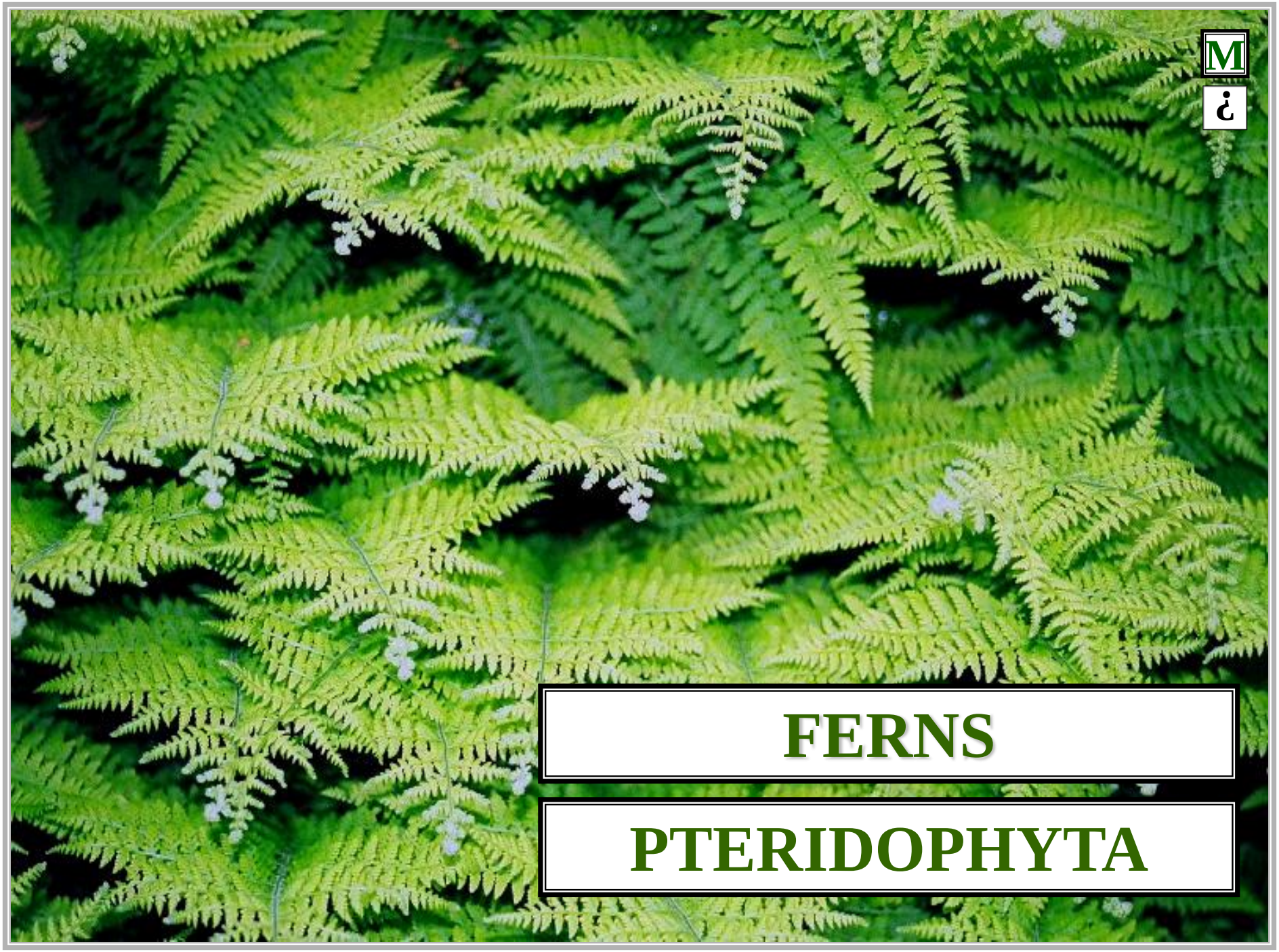
ATACTOSTELE: ABSENT

L

LEAF

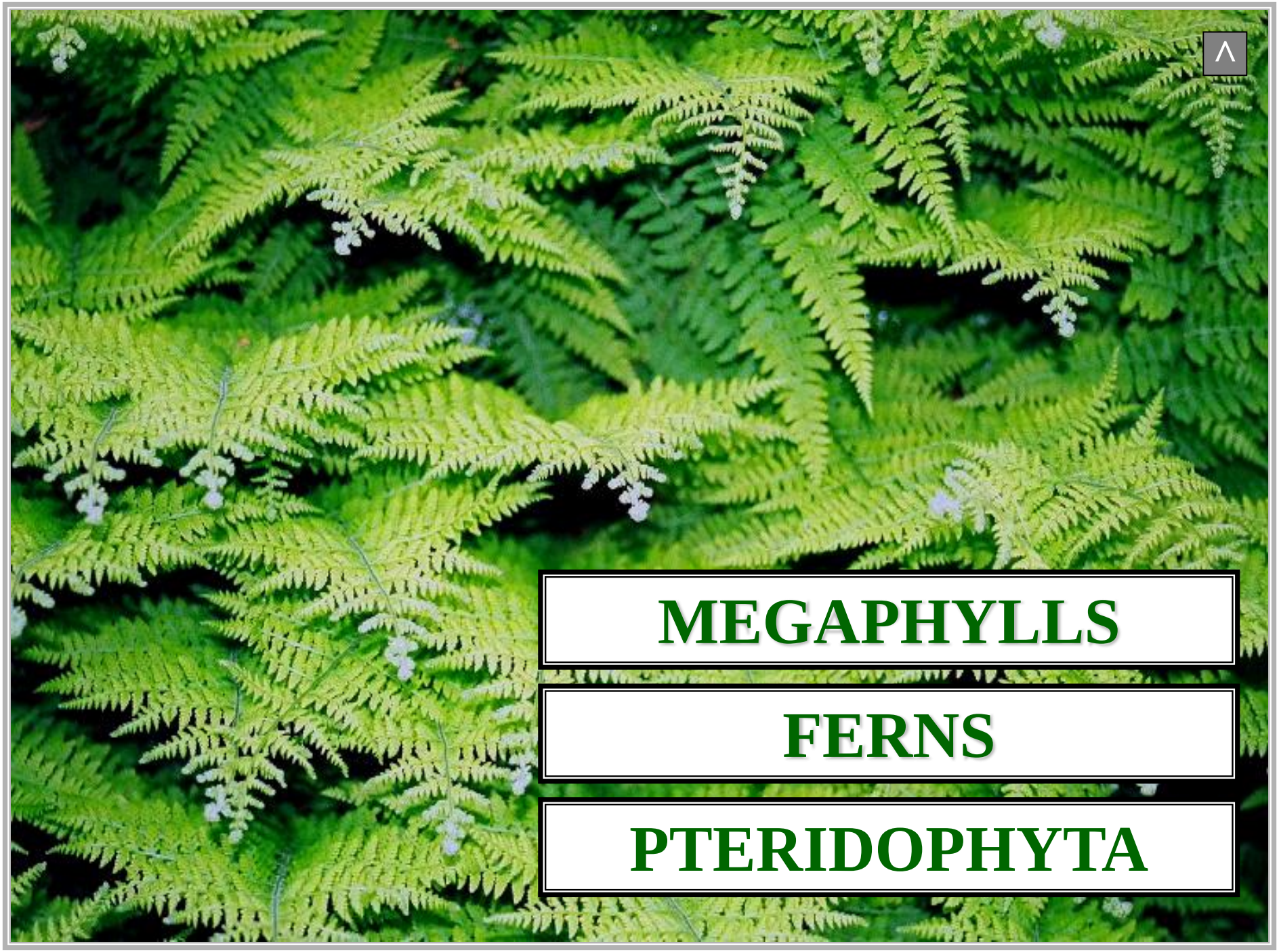

M
¿
LYCOPHYTES
LYCOPODIOPHYTA


MICROPHYLLS
LYCOPHYTES
LYCOPODIOPHYTA

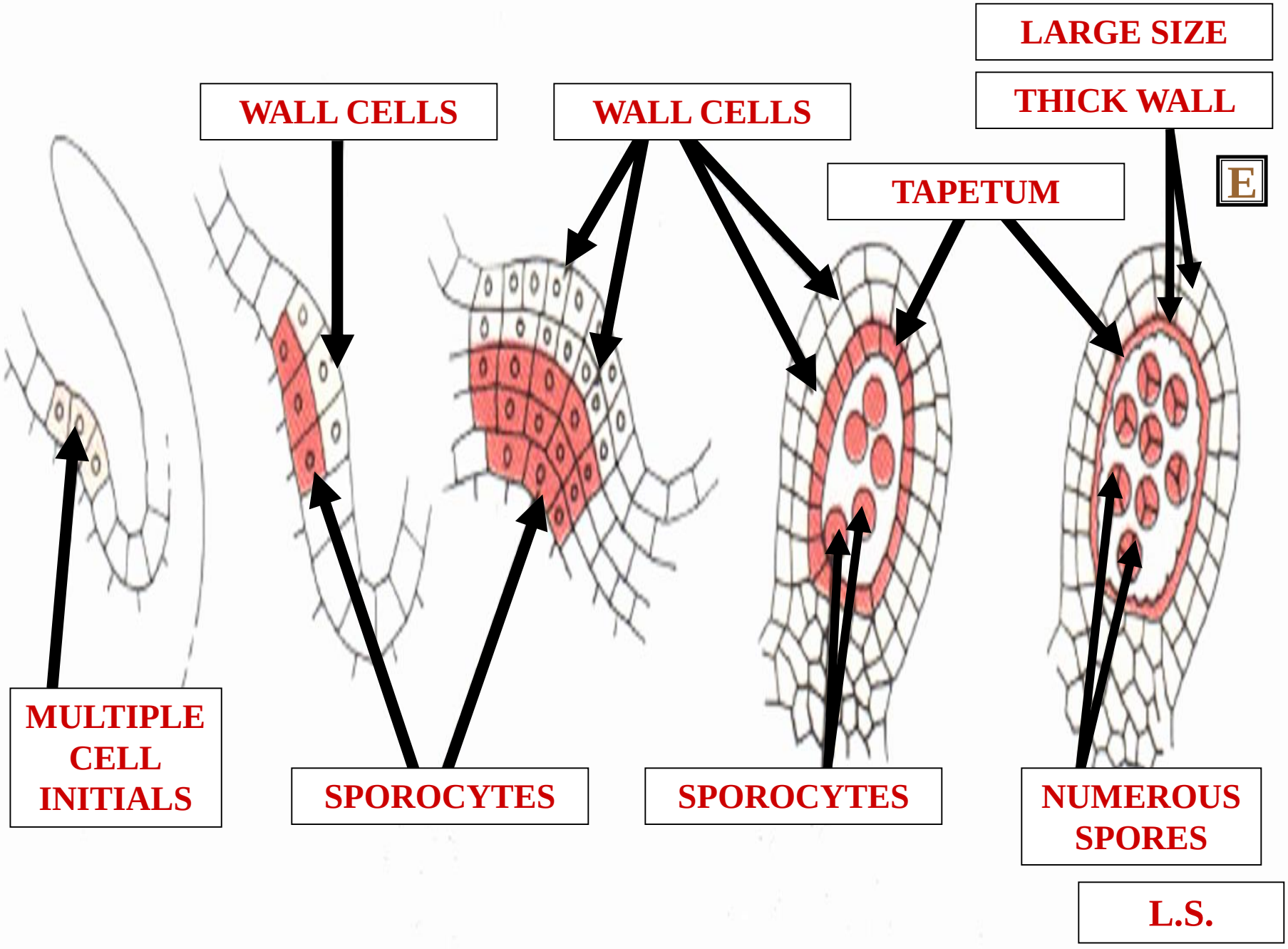


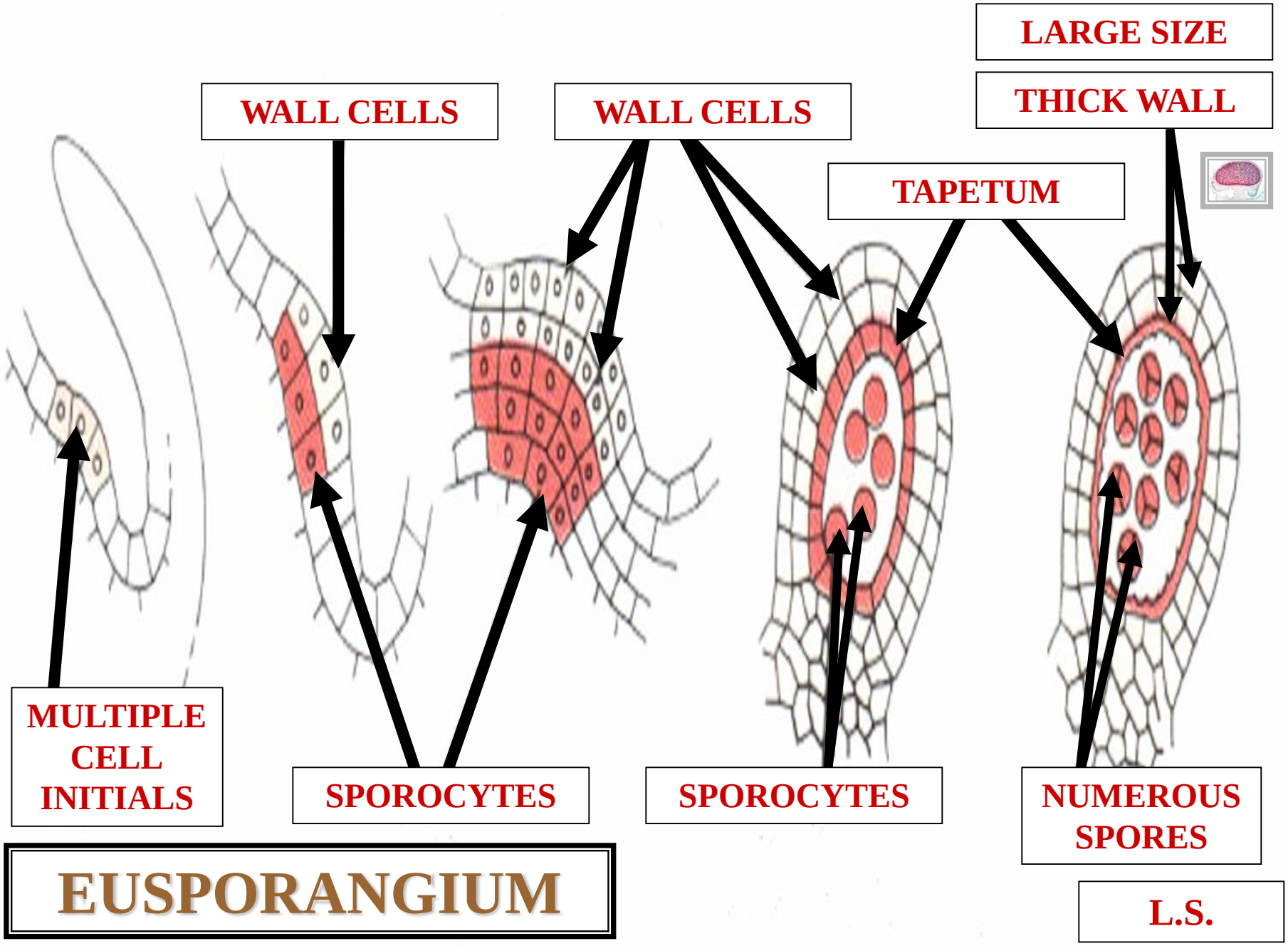
FERNS

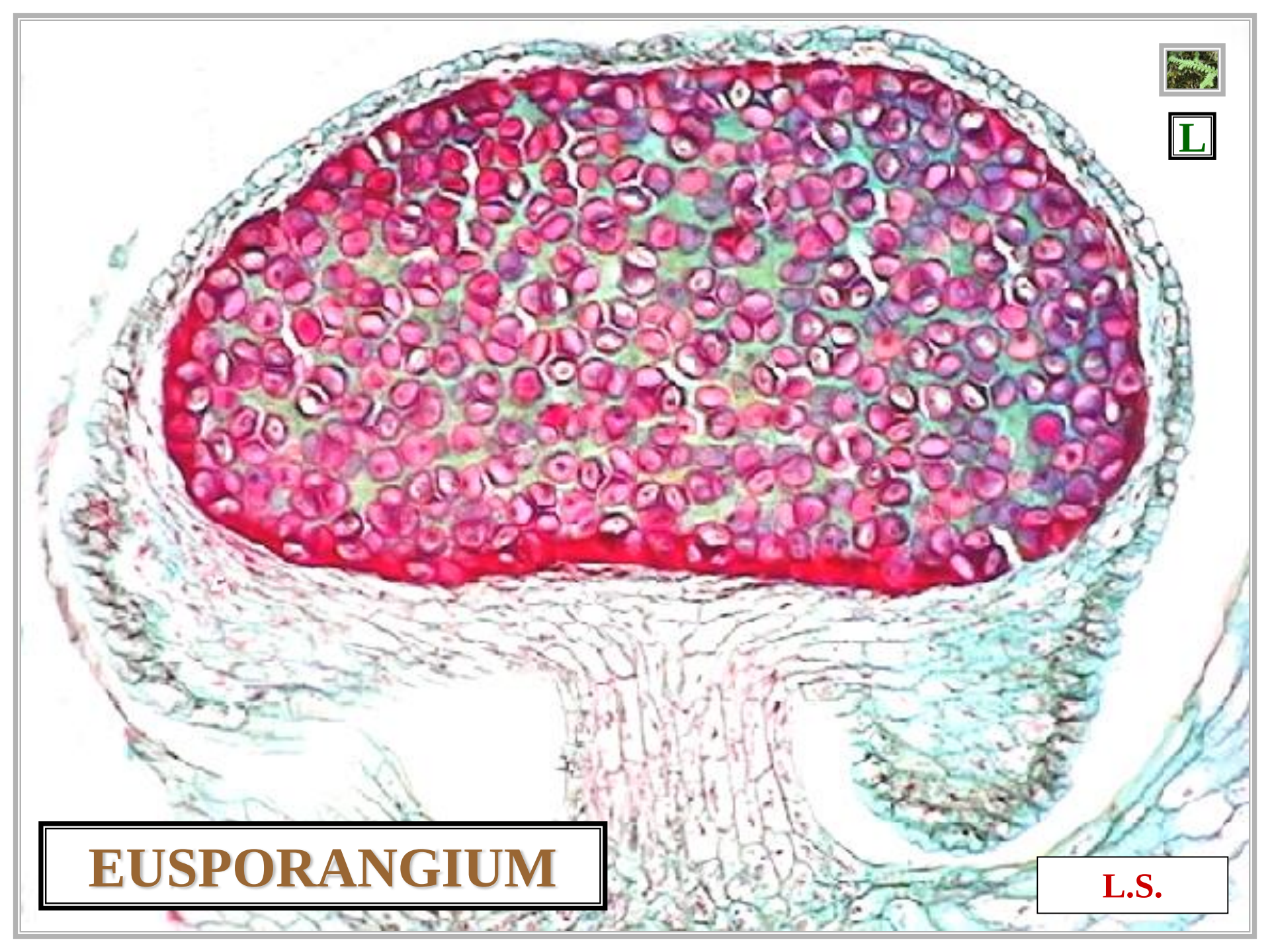
PTERIDOPHYTA


MEGAPHYLLS
FERNS
PTERIDOPHYTA

SPORANGIUM

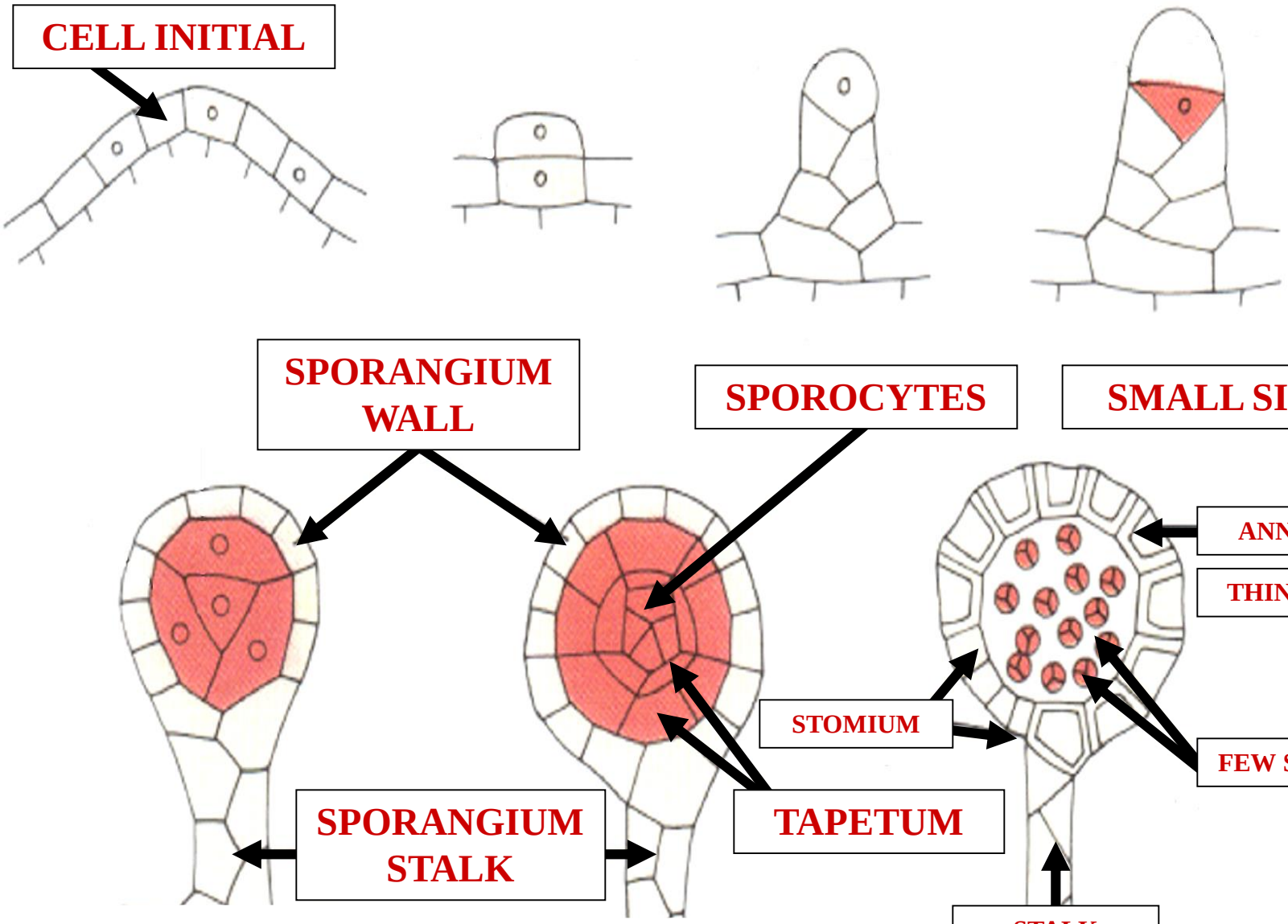

LARGE SIZE
THICK WALL
WALL CELLS
WALL CELLS
TAPETUM
E
MULTIPLE CELL INITIALS
SPOROCYTES
SPOROCYTES
NUMEROUS SPORES
L.S.


LARGE SIZE
THICK WALL
WALL CELLS
WALL CELLS
TAPETUM
MULTIPLE CELL INITIALS
SPOROCYTES
SPOROCYTES
NUMEROUS SPORES
EUSPORANGIUM
L.S.


EUSPORANGIUM
L.S.

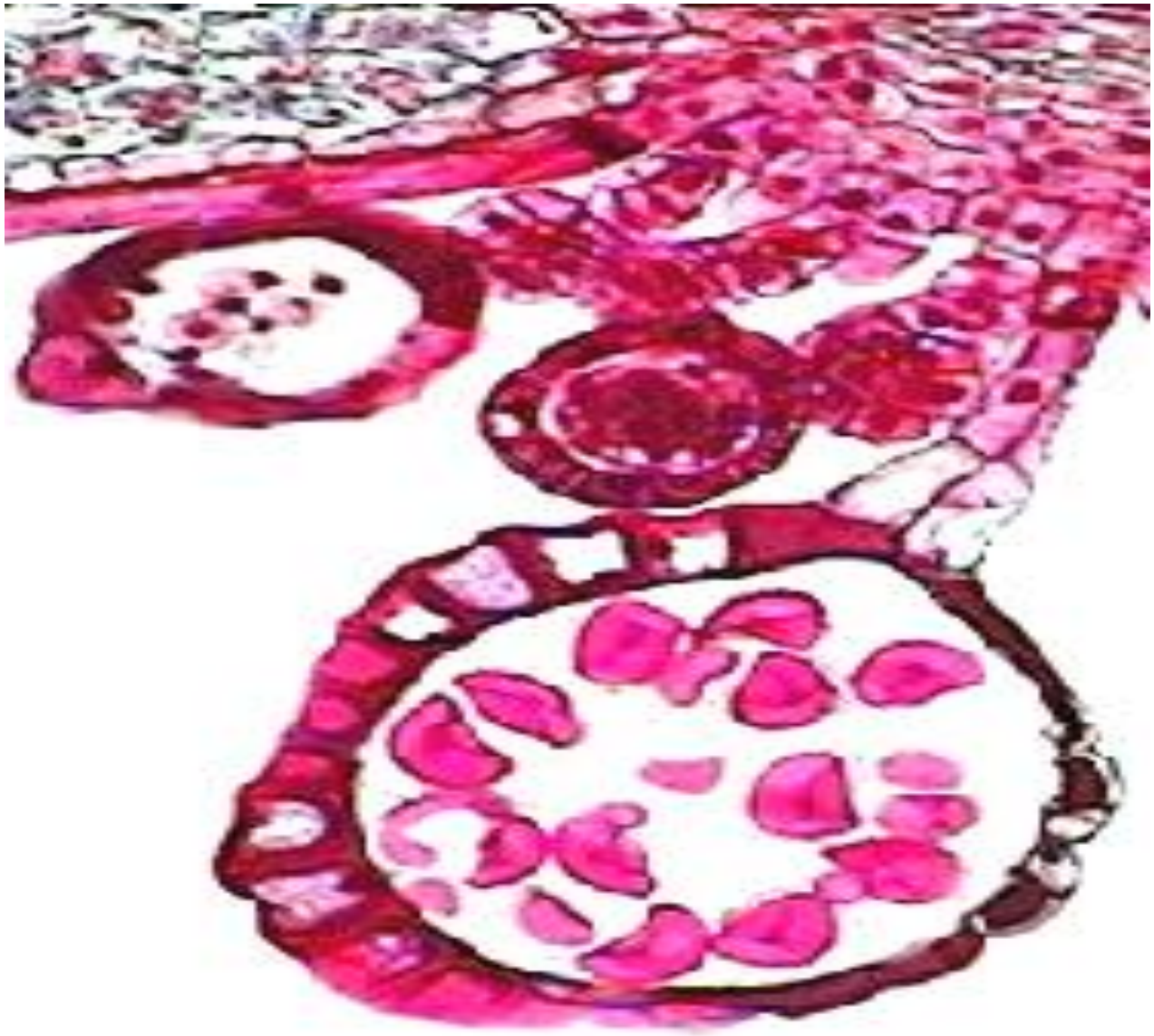

F
EUSPORANGIUM
LYCOPHYTES


SOME FERNS
EUSPORANGIUM



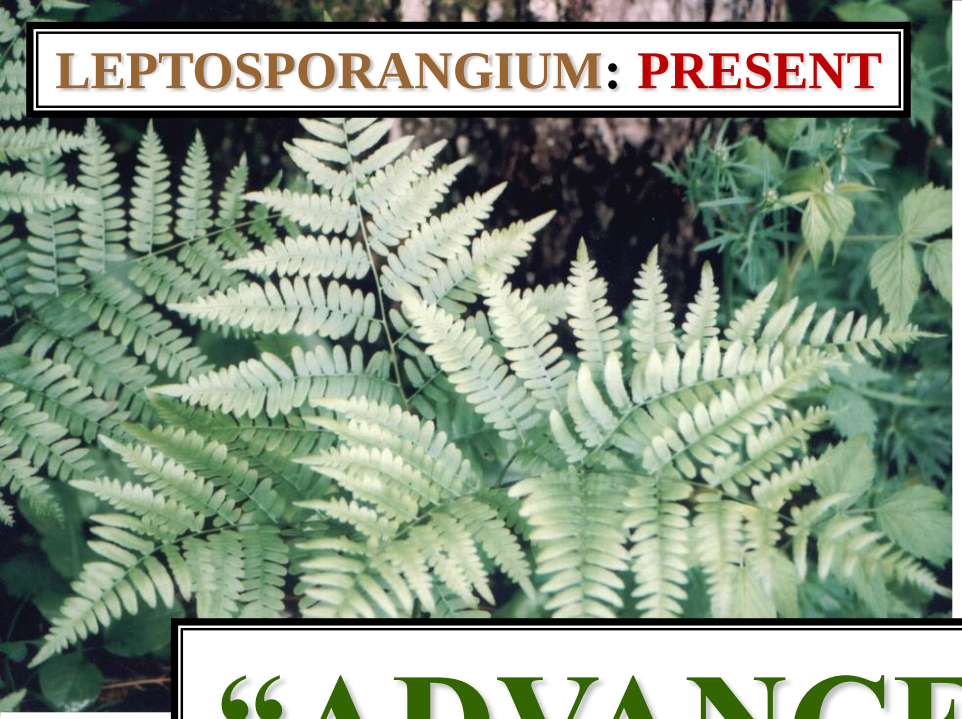
LEPTOSPORANGIUM

L.S.

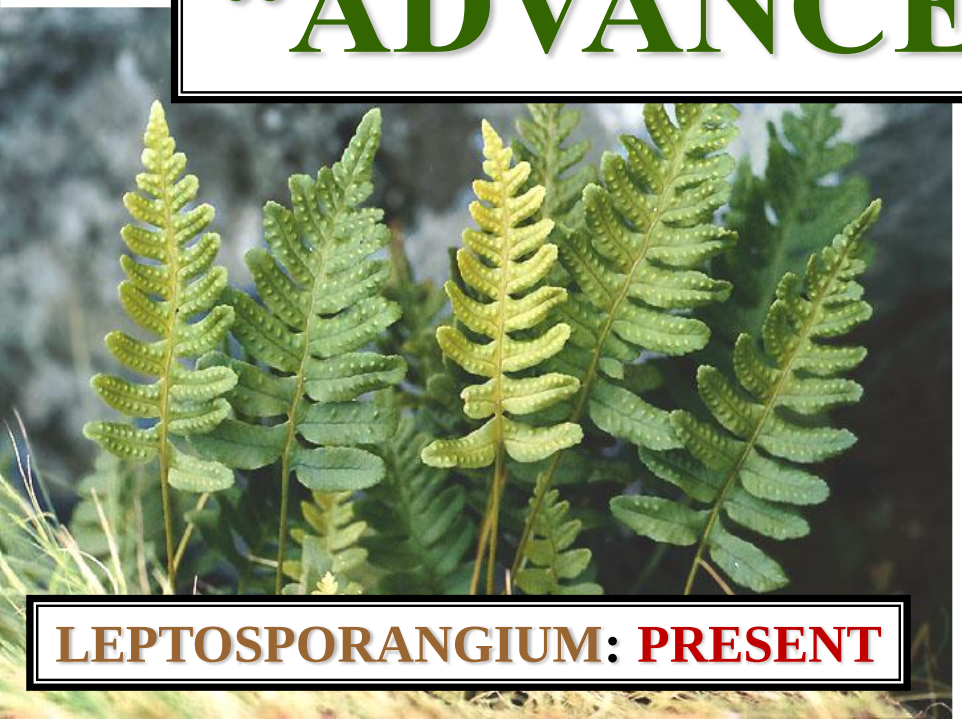


LEPTOSPORANGIUM

L.S.

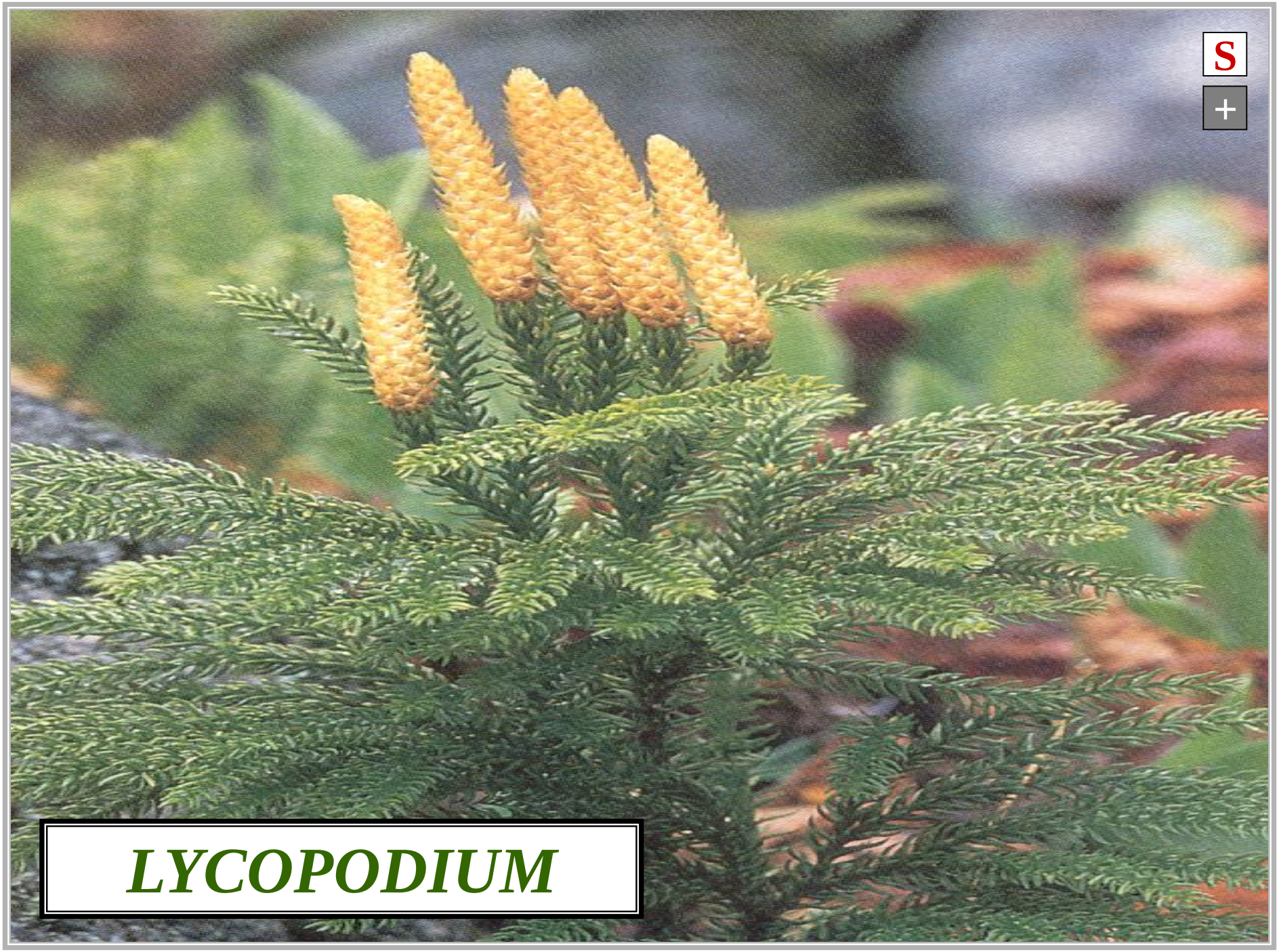


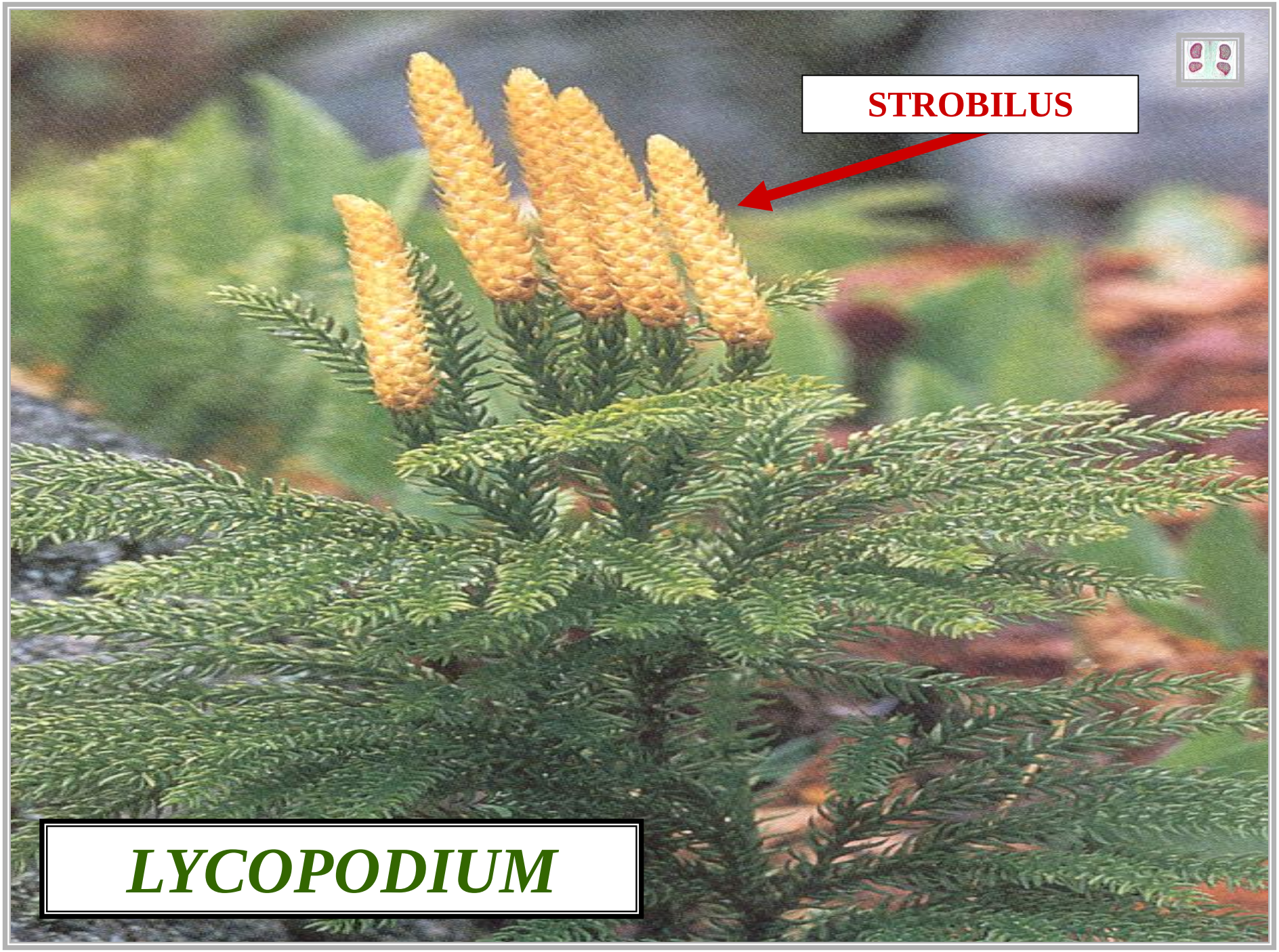
“ADVANCED FERNS”

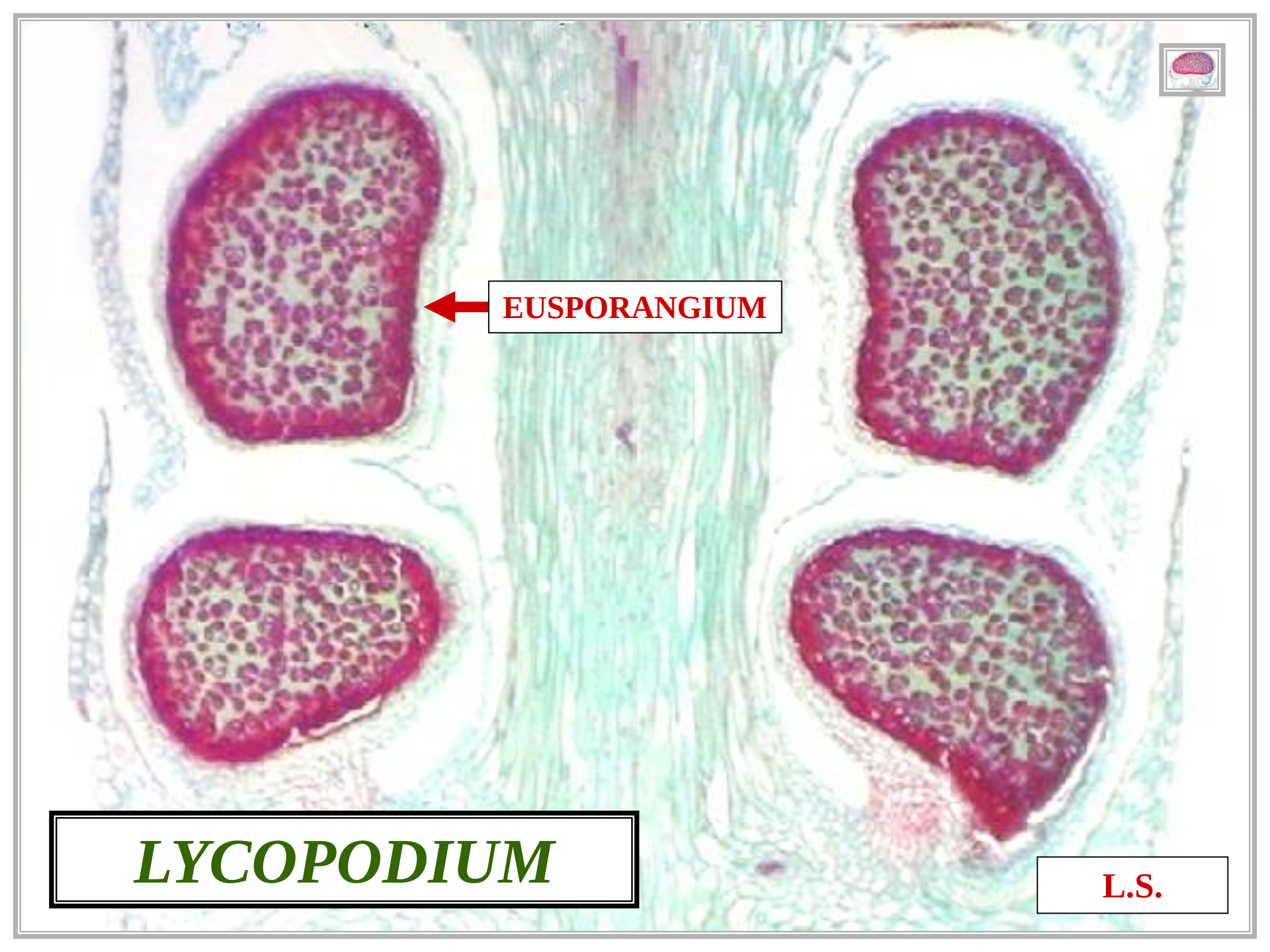


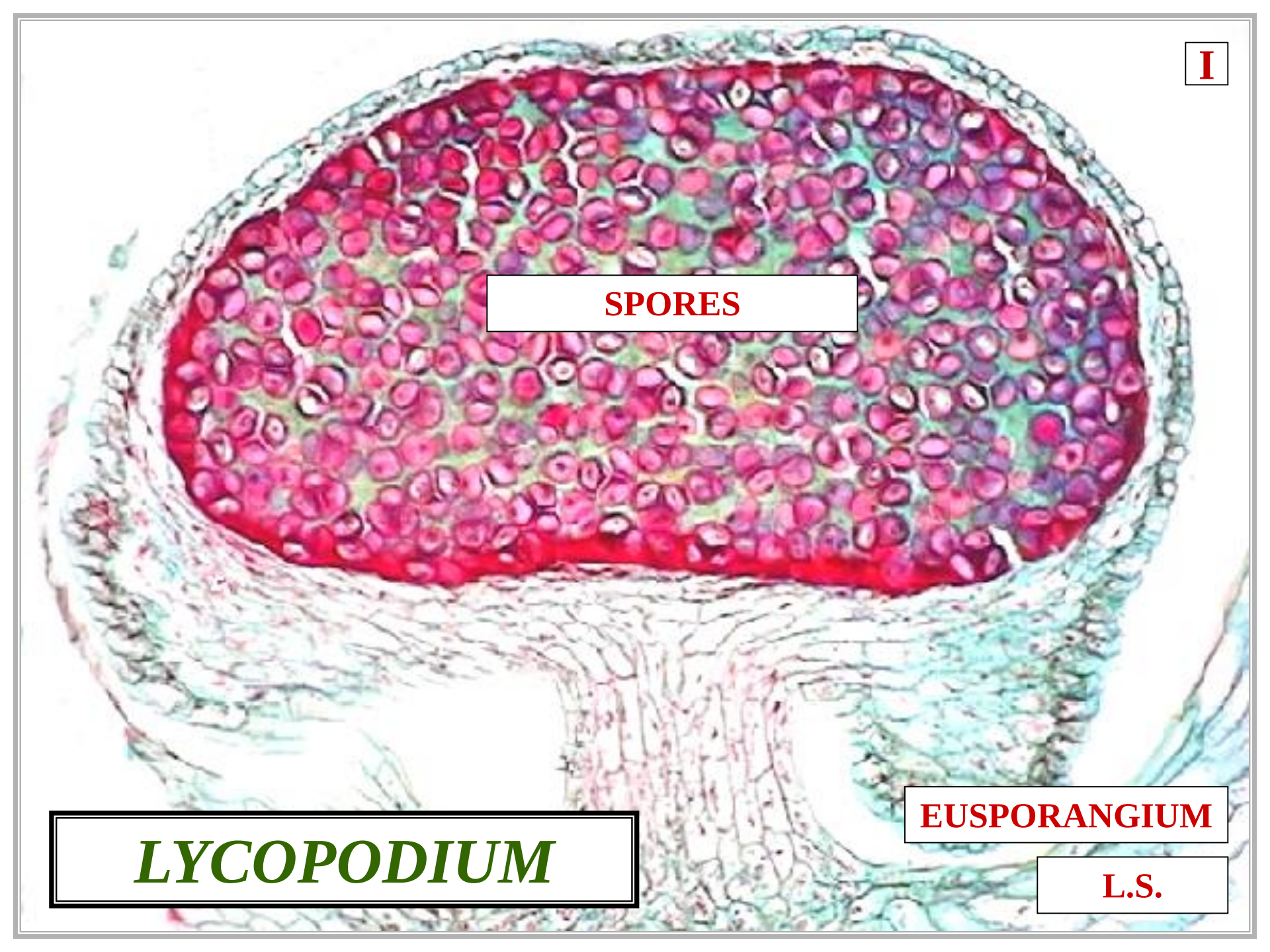
SPORE HABIT


L
?

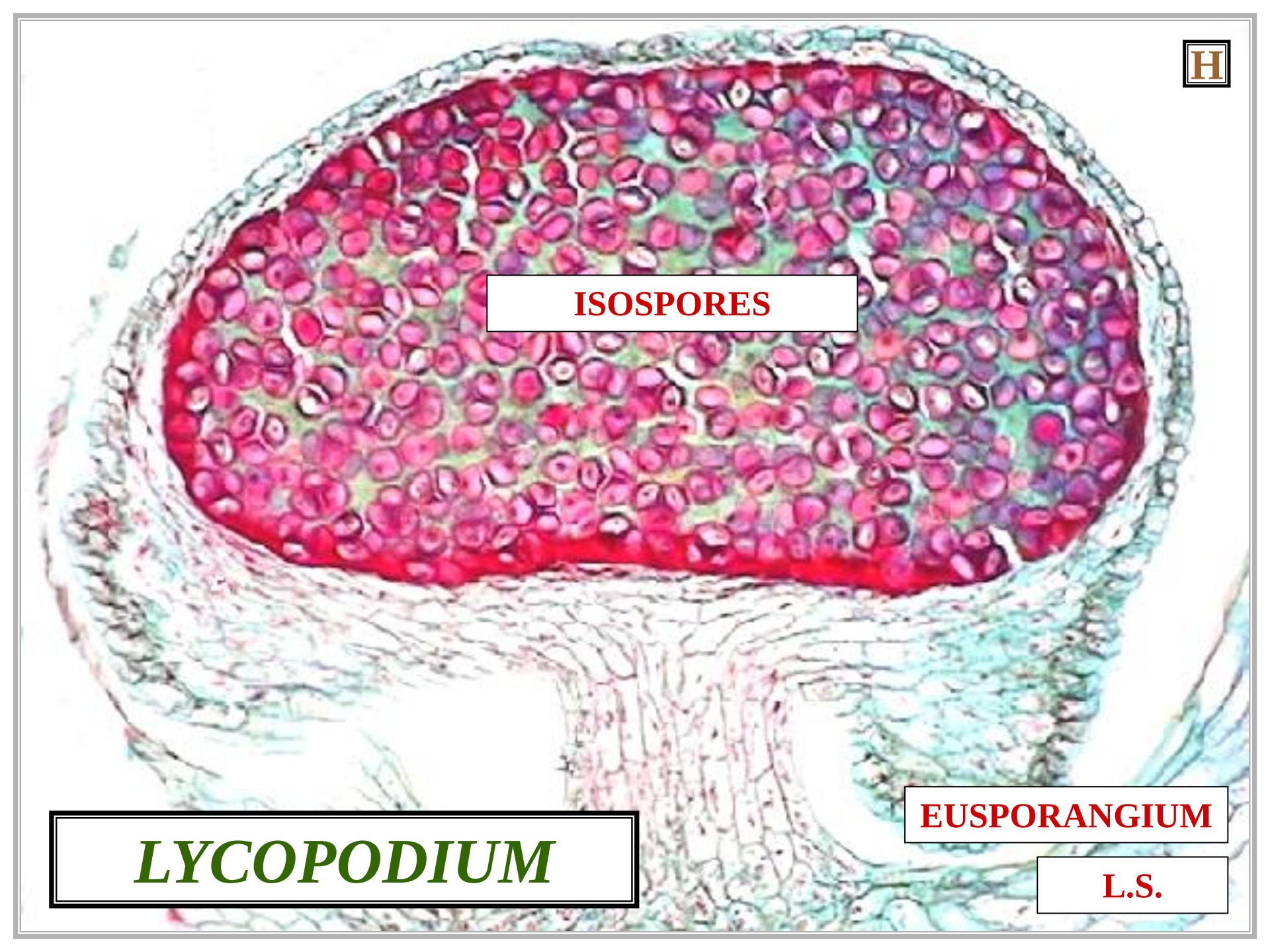

S
+
LYCOPODIUM


STROBILUS
LYCOPODIUM

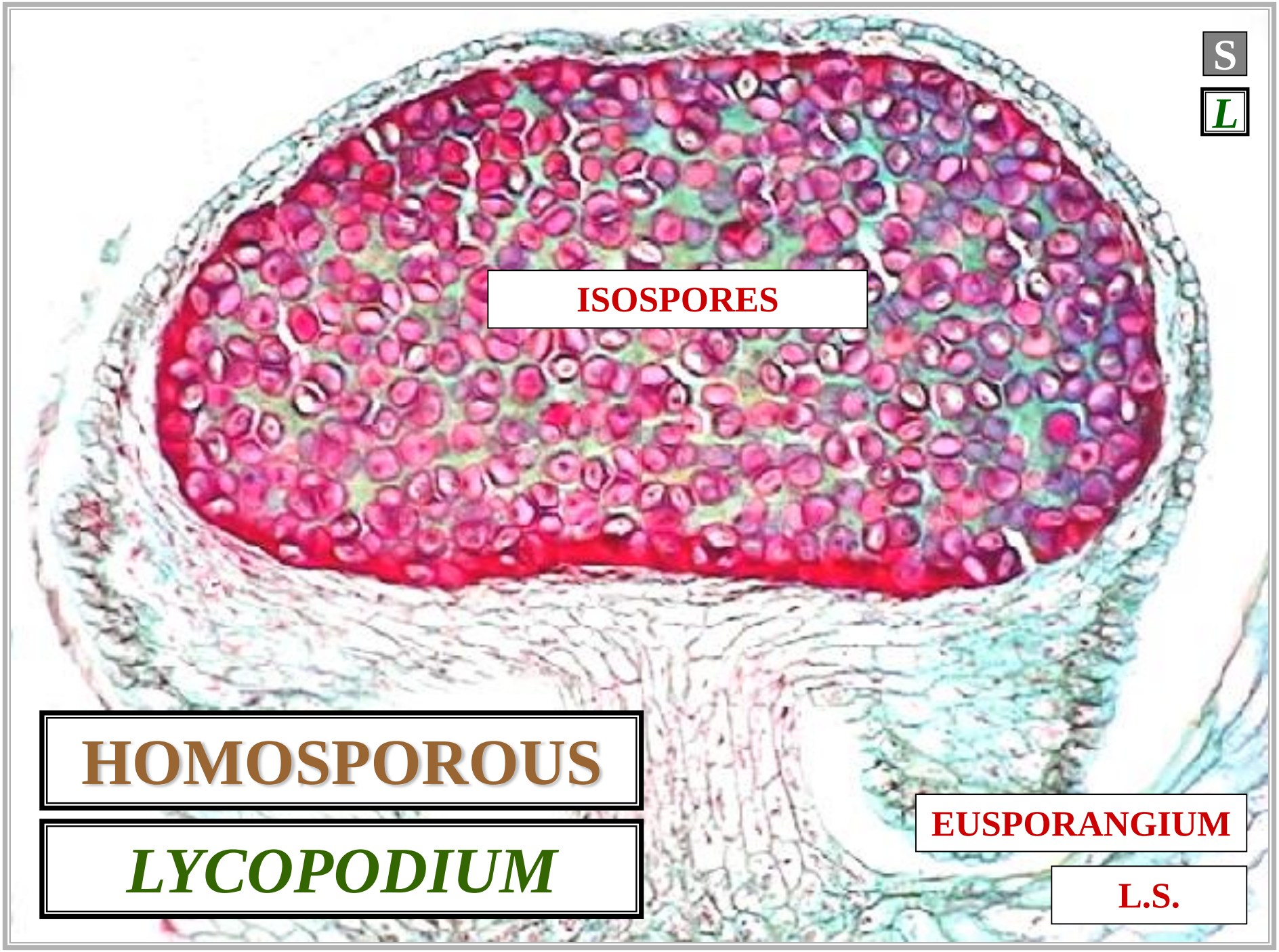

EUSPORANGIUM
LYCOPODIUM
L.S.

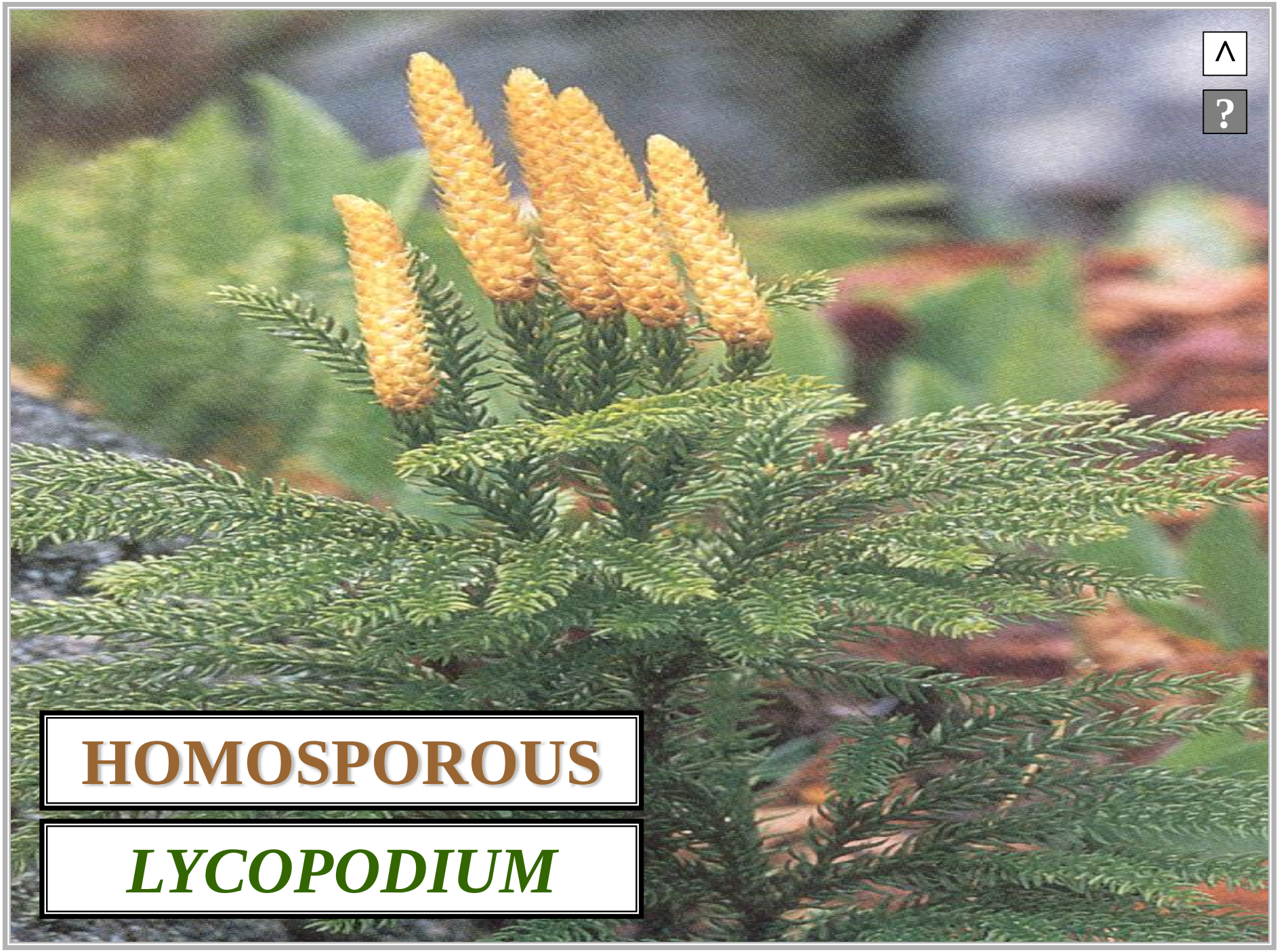


LYCOPODIUM



LYCOPODIUM


S
L
ISOSPORES
HOMOSPORous
LYCOPODIUM
EUSPORANGIUM
L.S.


^
?
HOMOSPOROUS
LYCOPODIUM


S
?