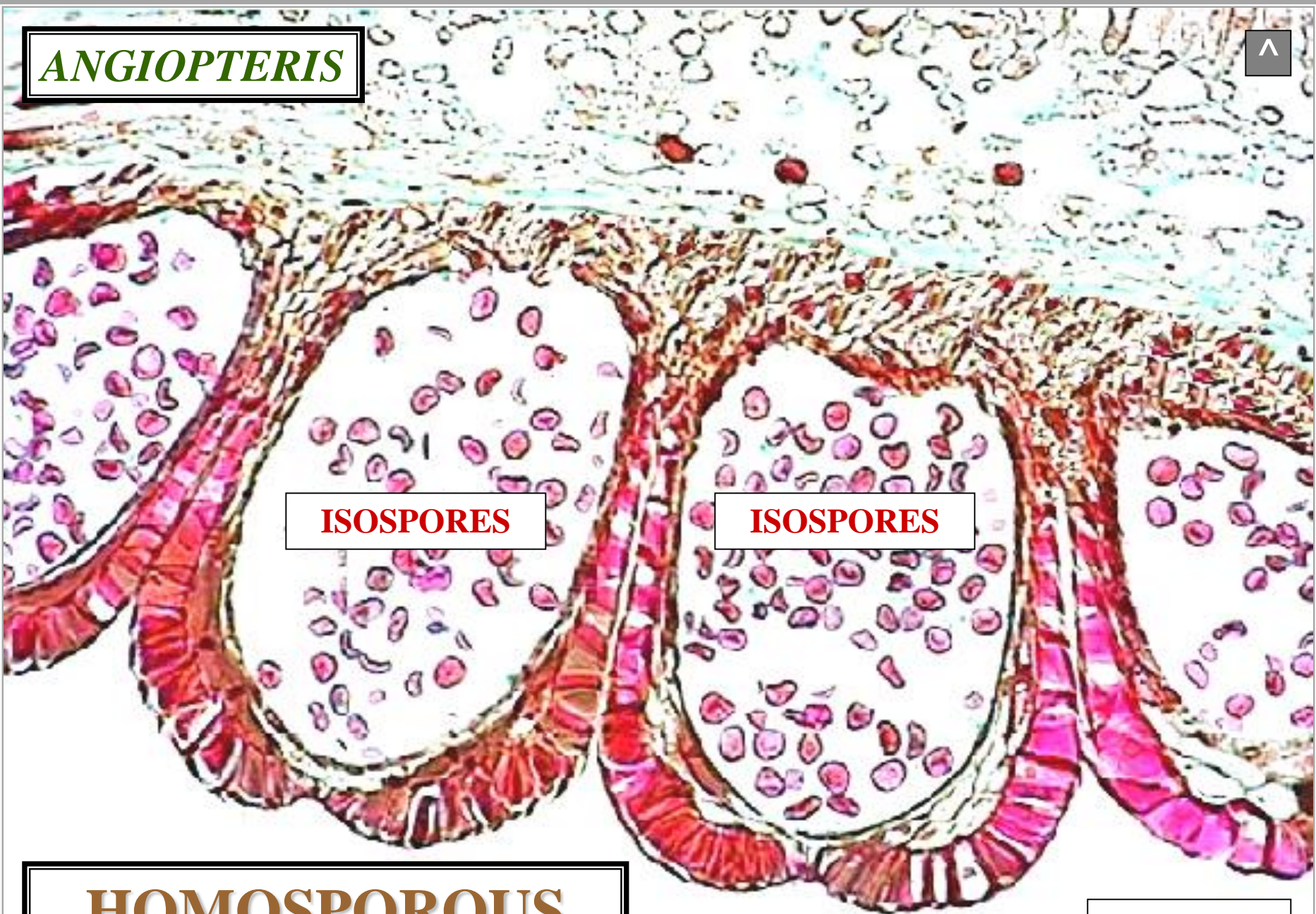




GAMETOPHYTE CHARACTERS

ANGIOPTERIS



ISOSPORES

ISOSPORES

HOMOSPOROUS

L.S.



EXOSPORIC GAMETOPHYTE

EX

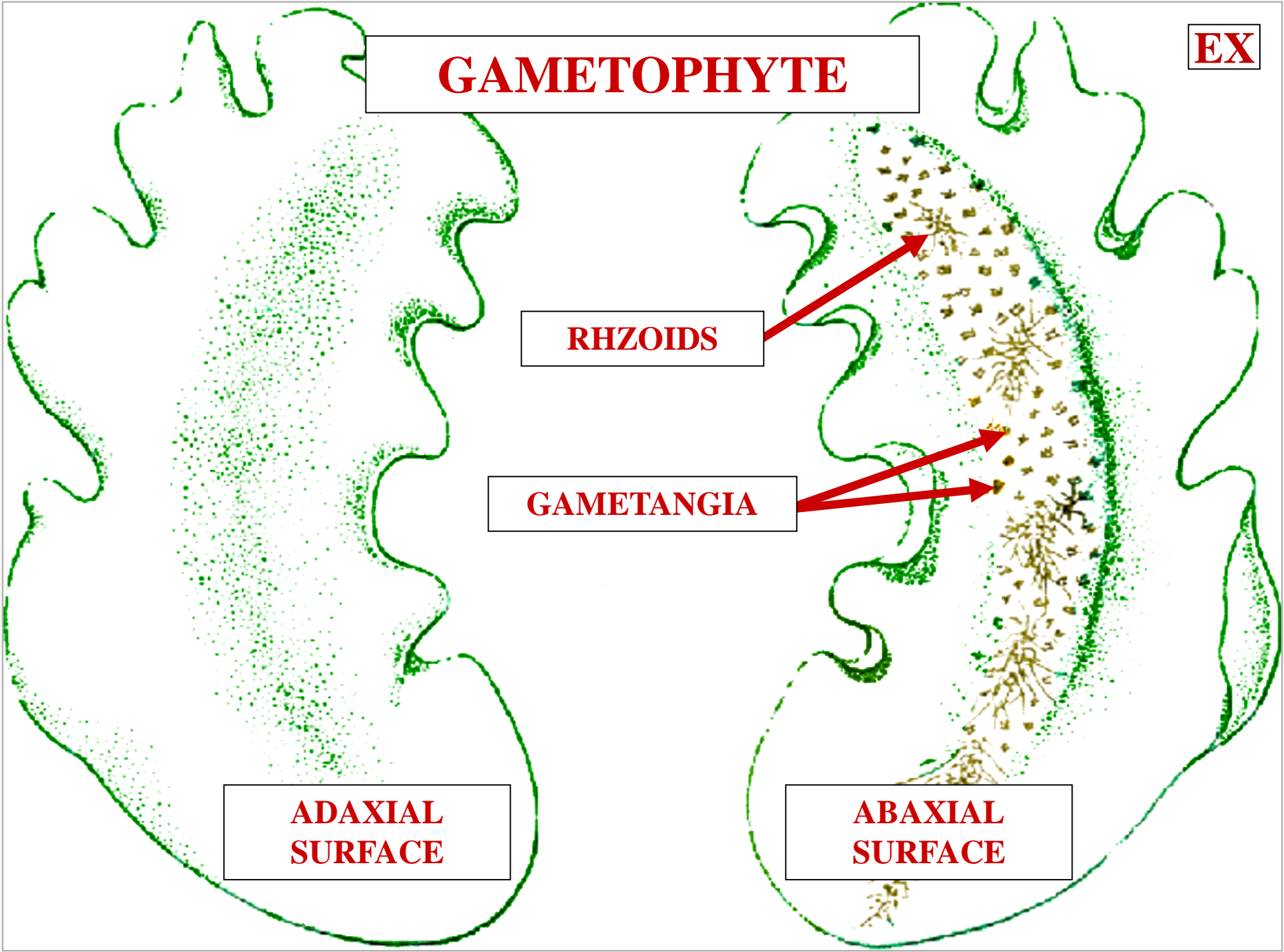
GAMETOPHYTE

RHZOIDS

GAMETANGIA

**ADAXIAL
SURFACE**

**ABAXIAL
SURFACE**



L

EXOSPORIC

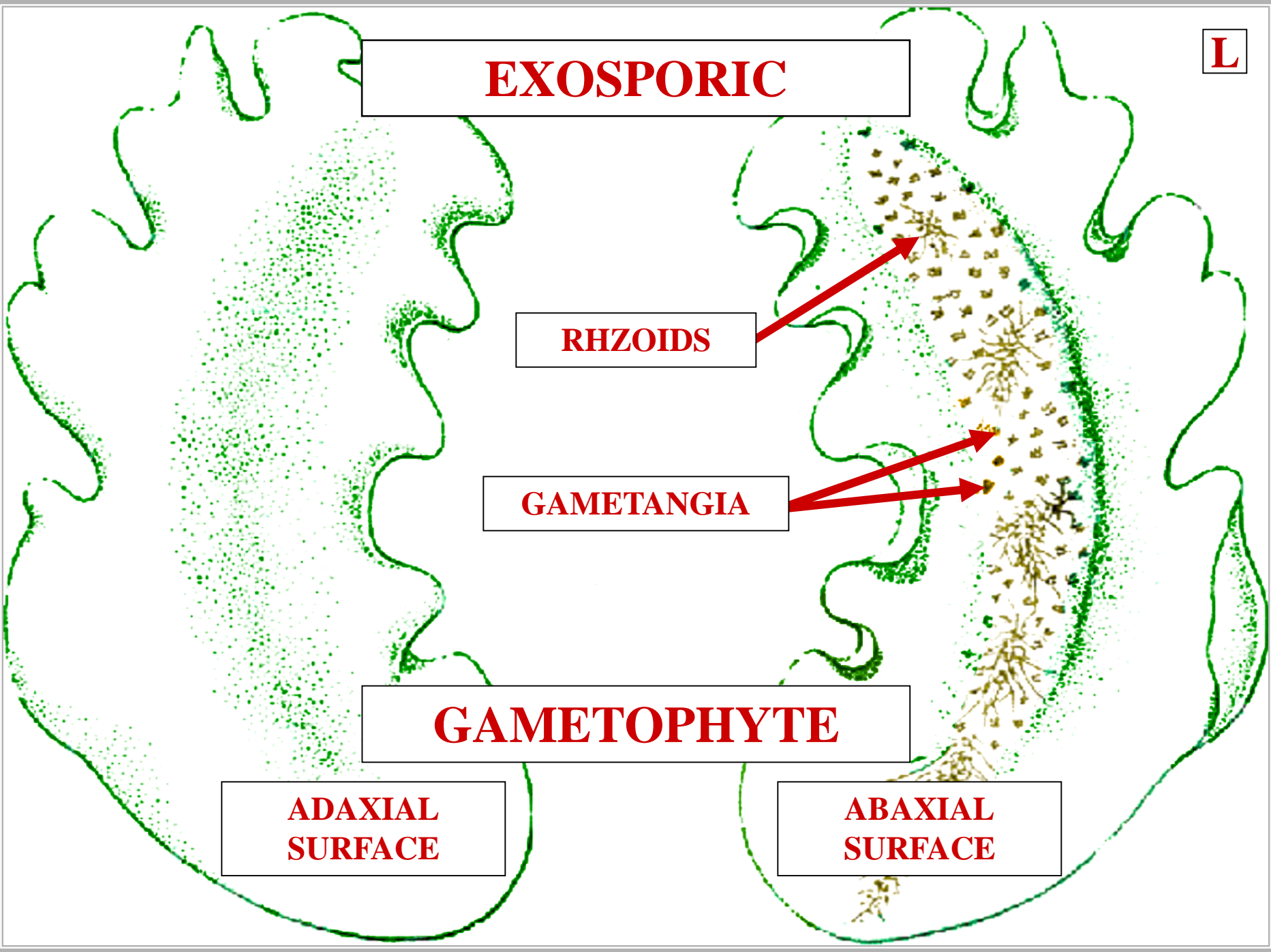
RHZOIDS

GAMETANGIA

GAMETOPHYTE

**ADAXIAL
SURFACE**

**ABAXIAL
SURFACE**



EP

LARGE RIBBON SHAPED

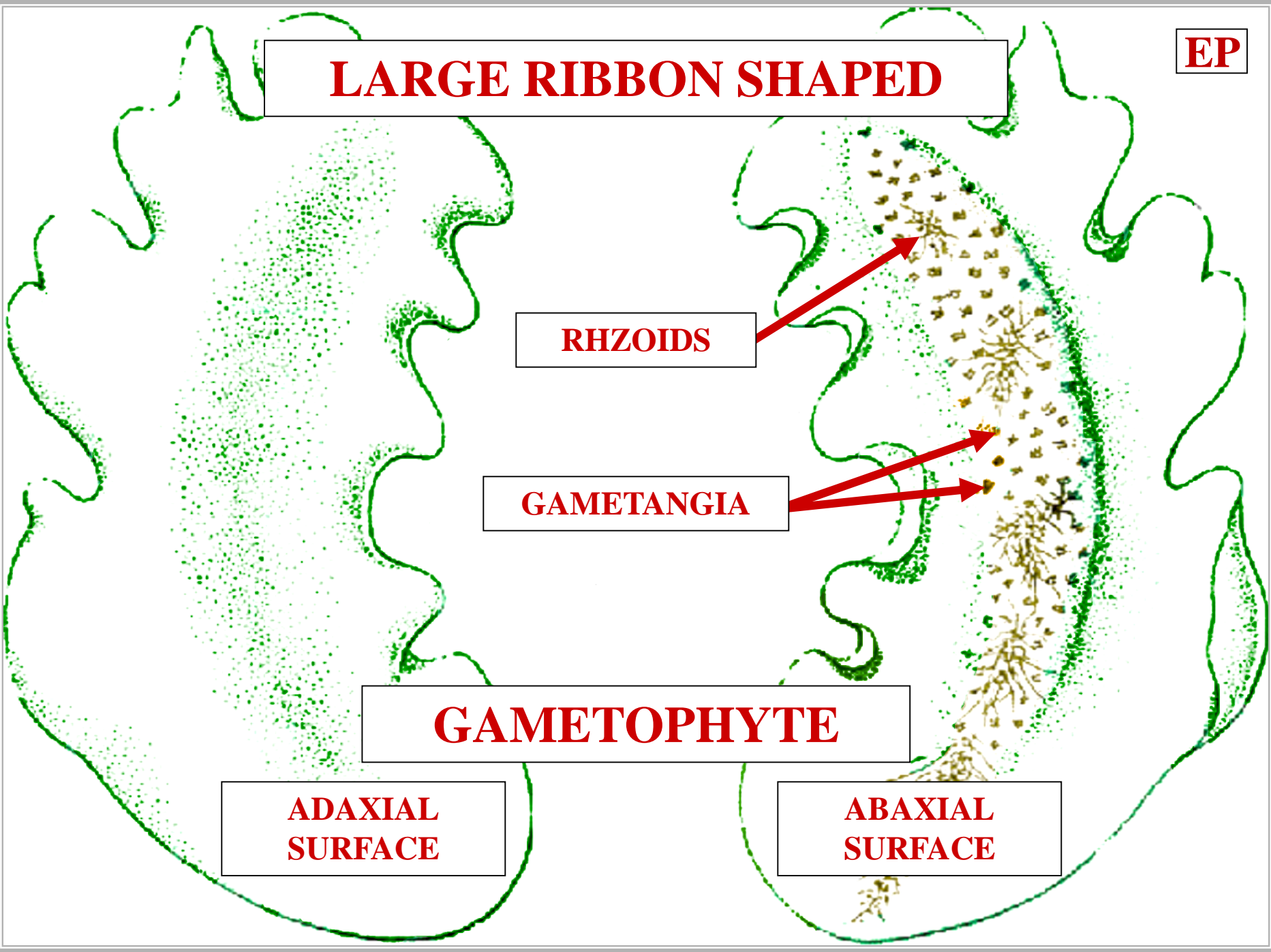
RHZOIDS

GAMETANGIA

GAMETOPHYTE

**ADAXIAL
SURFACE**

**ABAXIAL
SURFACE**



EPITERRANEAN

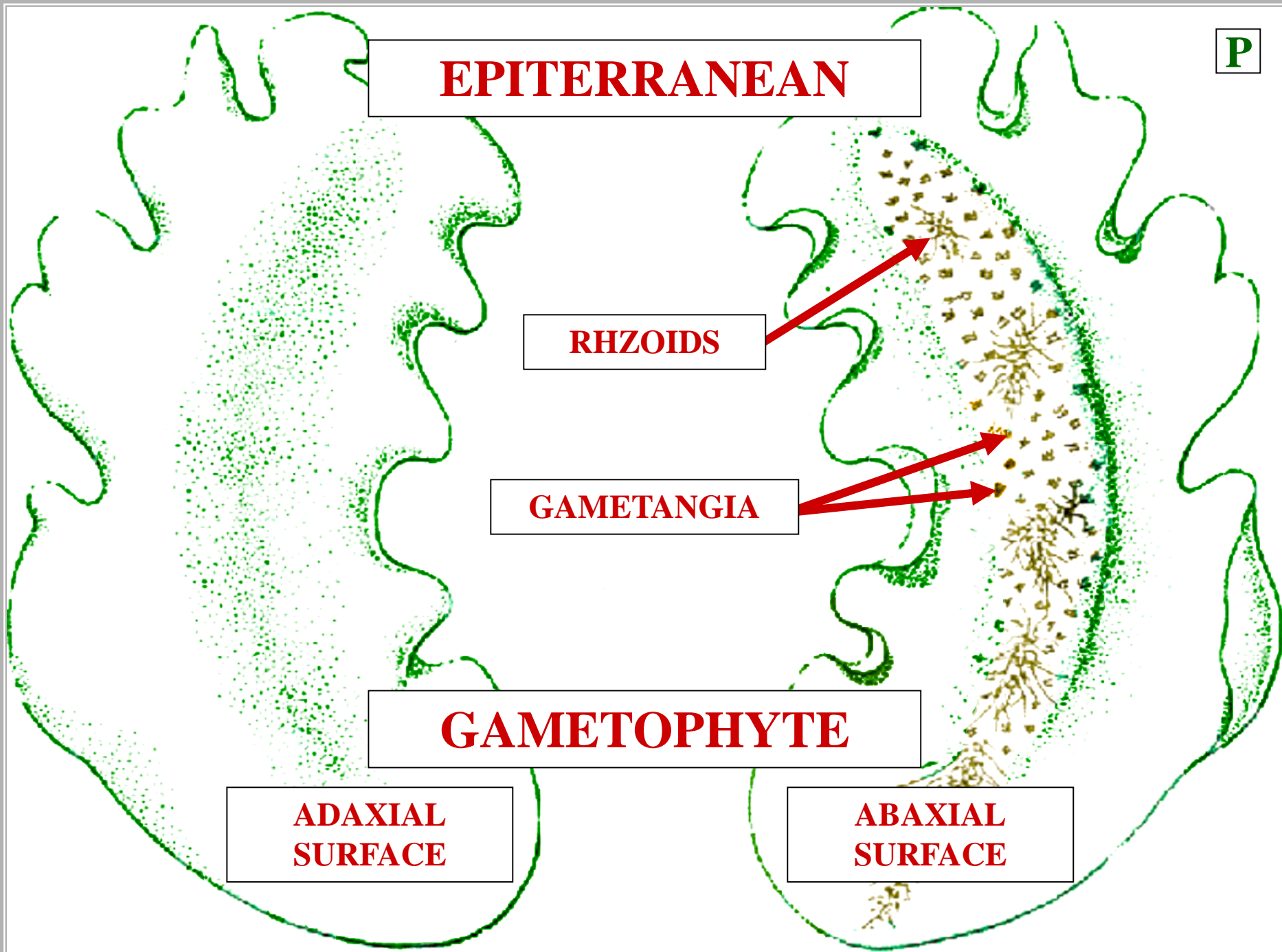
RHZOIDS

GAMETANGIA

GAMETOPHYTE

**ADAXIAL
SURFACE**

**ABAXIAL
SURFACE**



EX

PHOTOSYNTHETIC

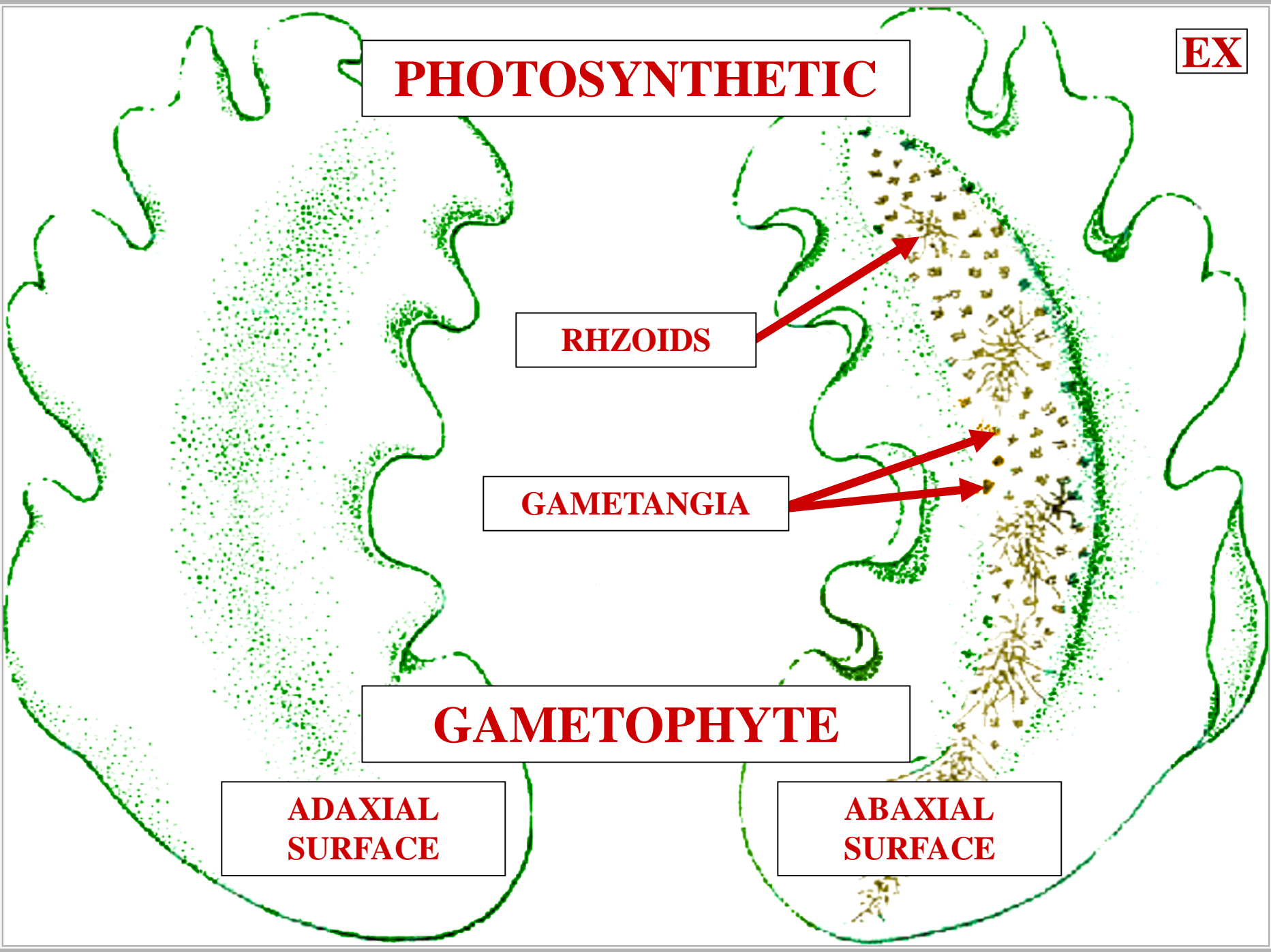
RHZOIDS

GAMETANGIA

GAMETOPHYTE

**ADAXIAL
SURFACE**

**ABAXIAL
SURFACE**



B

EXOSPORIC

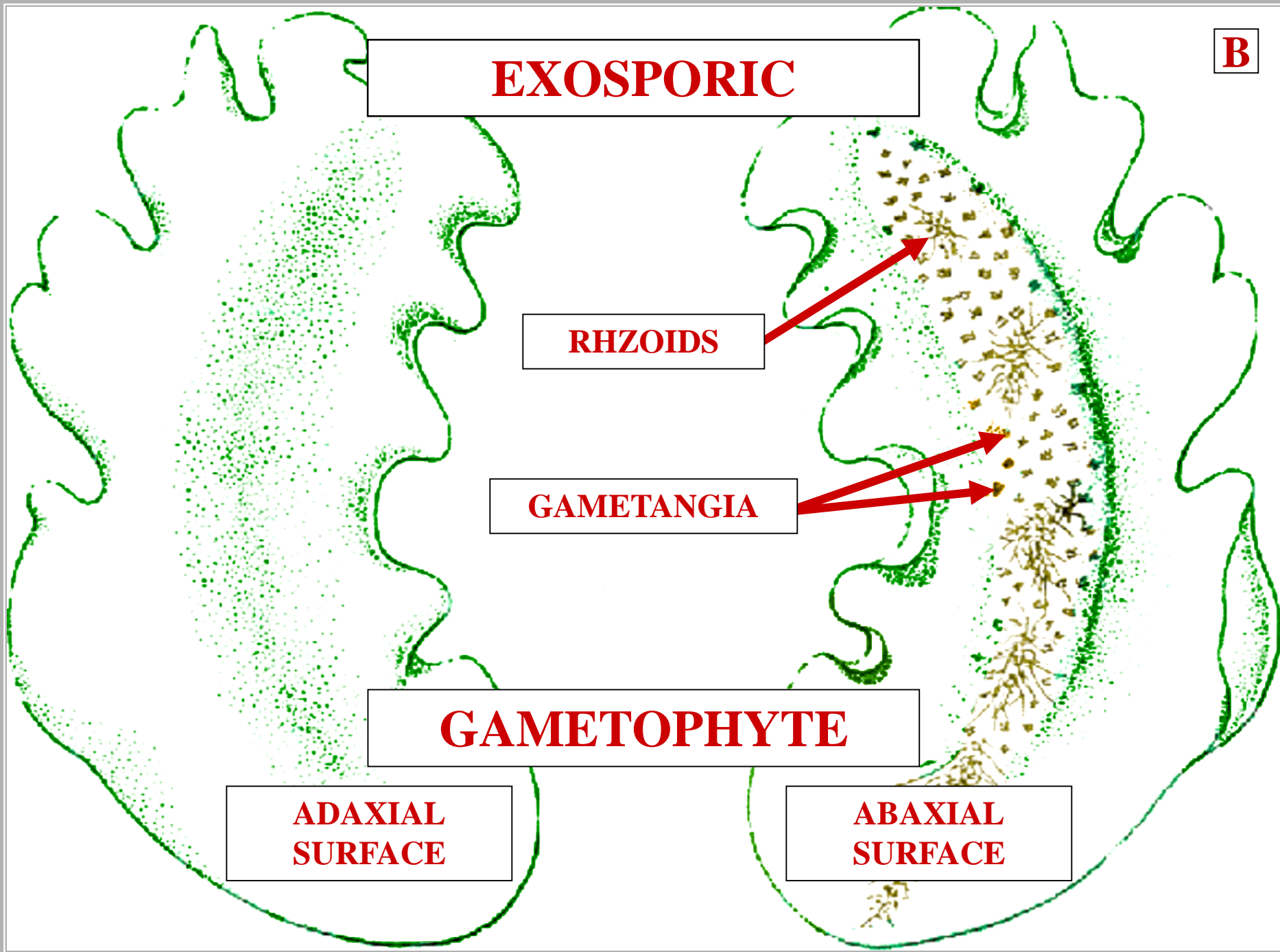
RHZOIDS

GAMETANGIA

GAMETOPHYTE

**ADAXIAL
SURFACE**

**ABAXIAL
SURFACE**





BISEXUAL

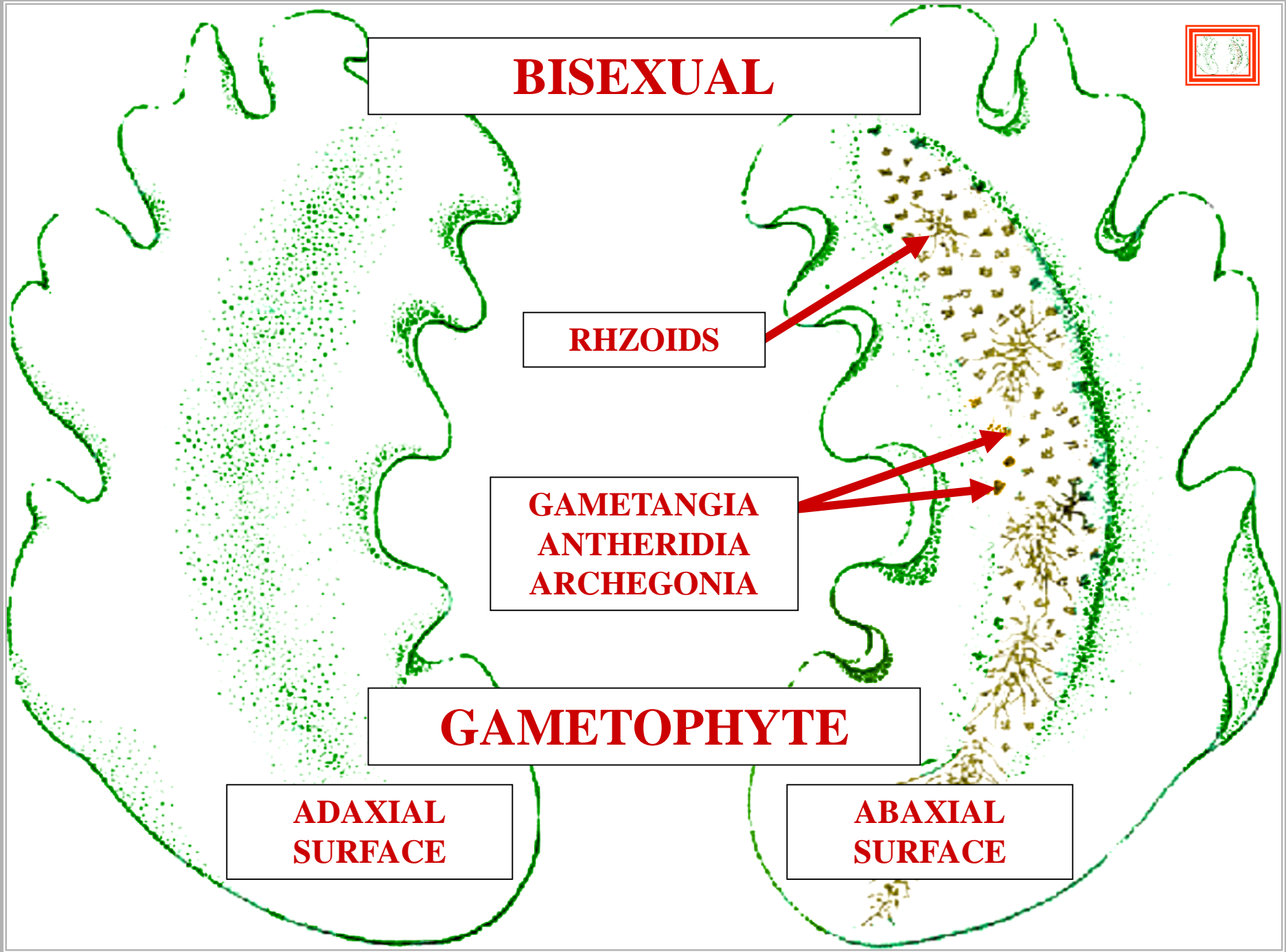
RHZOIDS

**GAMETANGIA
ANTHERIDIA
ARCHEGONIA**

GAMETOPHYTE

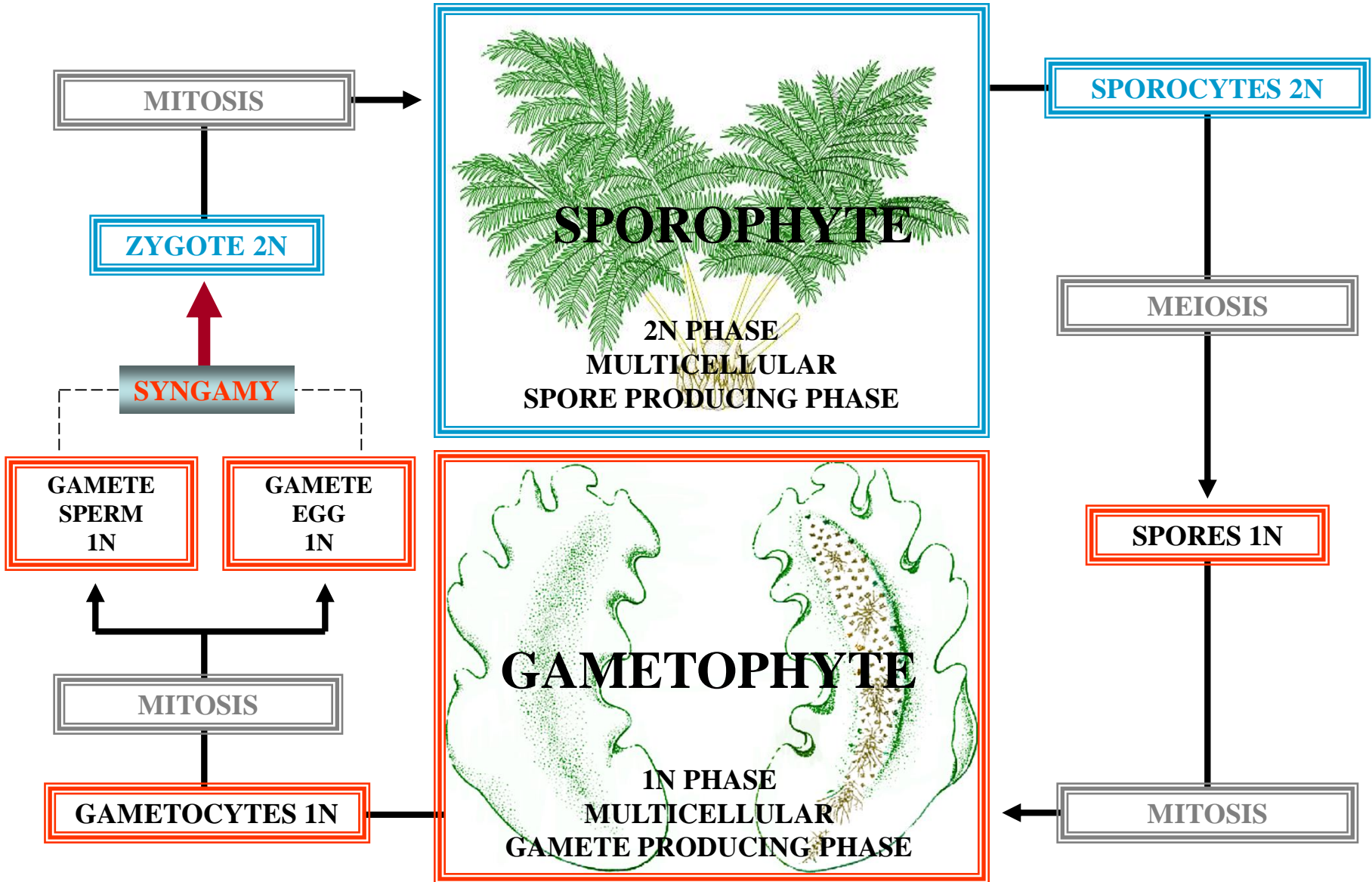
**ADAXIAL
SURFACE**

**ABAXIAL
SURFACE**



MARATTIALES

LIFE CYCLE





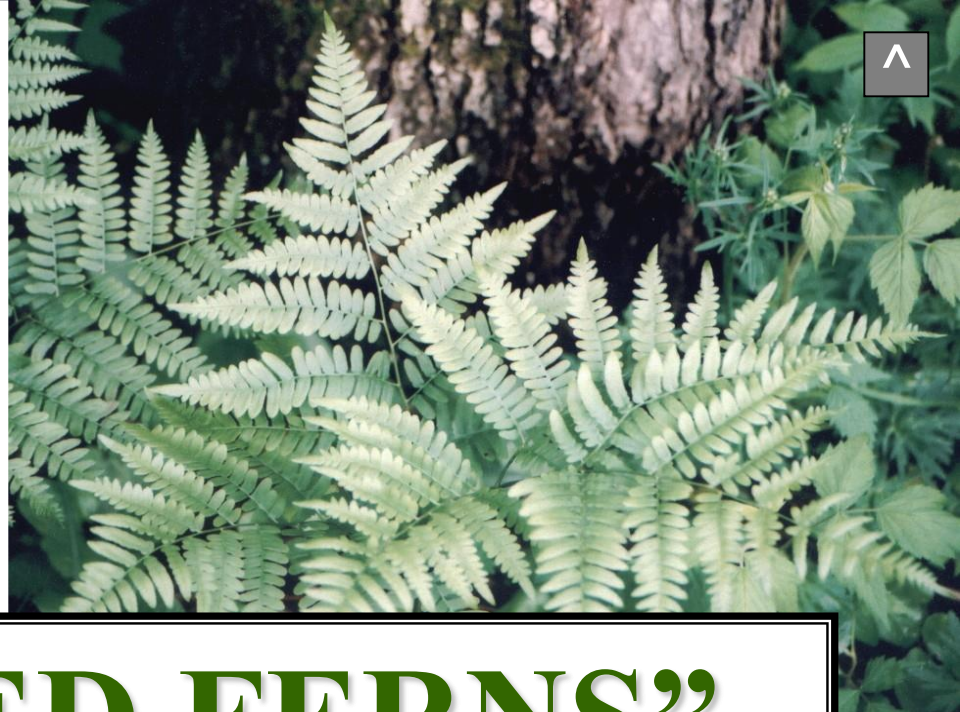
PTERIDOPHYTA CLASSIFICATION

**EXTANT
CLASS**

PTERIDOPSISIDA

**EXTANT
CLASS**

COMMON NAME



“ADVANCED FERNS”



PTERIDOPSISIDA CHARACTERS

PTERIDOPSISIDA CHARACTERS

TERRESTRIAL OR AQUATIC

PTERIDOPSISIDA CHARACTERS

PTERIDOPSISIDA CHARACTERS

**TERRESTRIAL OR AQUATIC
FROND CIRCINATE**

PTERIDOPSISIDA CHARACTERS

PTERIDOPSISIDA CHARACTERS

**TERRESTRIAL OR AQUATIC
FROND CIRCINATE
LEPTOSPORANGIATE**

PTERIDOPSISIDA CHARACTERS

PTERIDOPSISIDA CHARACTERS

**TERRESTRIAL OR AQUATIC
FROND CIRCINATE
LEPTOSPORANGIATE
NON-SYNANGIATE**

PTERIDOPSISIDA CHARACTERS

PTERIDOPSISIDA CHARACTERS



TERRESTRIAL OR AQUATIC
FROND CIRCINATE
LEPTOSPORANGIATE
NON-SYNANGIATE
HOMOSPOROUS OR HETEROSPOROUS

**PTERIDOPSISIDA
CHARACTERS**



DISTRIBUTION

T

TEMPERATE

EARTH

A satellite view of Earth showing the tropical region. The image captures the equatorial area, with the Indian Ocean to the left and the Pacific Ocean to the right. A large, well-defined cyclone is visible in the southern hemisphere, characterized by a dense, white eye and a swirling pattern of clouds. The word "TROPICAL" is overlaid in a large, bold, black serif font within a white rectangular box with a black border. The word "EARTH" is overlaid in a blue serif font within a white rectangular box with a thin blue border.

TROPICAL

EARTH

A satellite view of the Earth showing the Western Hemisphere, including North and South America, the Atlantic Ocean, and the Pacific Ocean. The image is framed by a thin white border.

DOMINATELY TROPICAL

EARTH



PTERIDOPSISIDA FOSSIL RECORD

~370

MILLION YEARS

~370 MILLION YEARS AGO

E

DEVONIAN

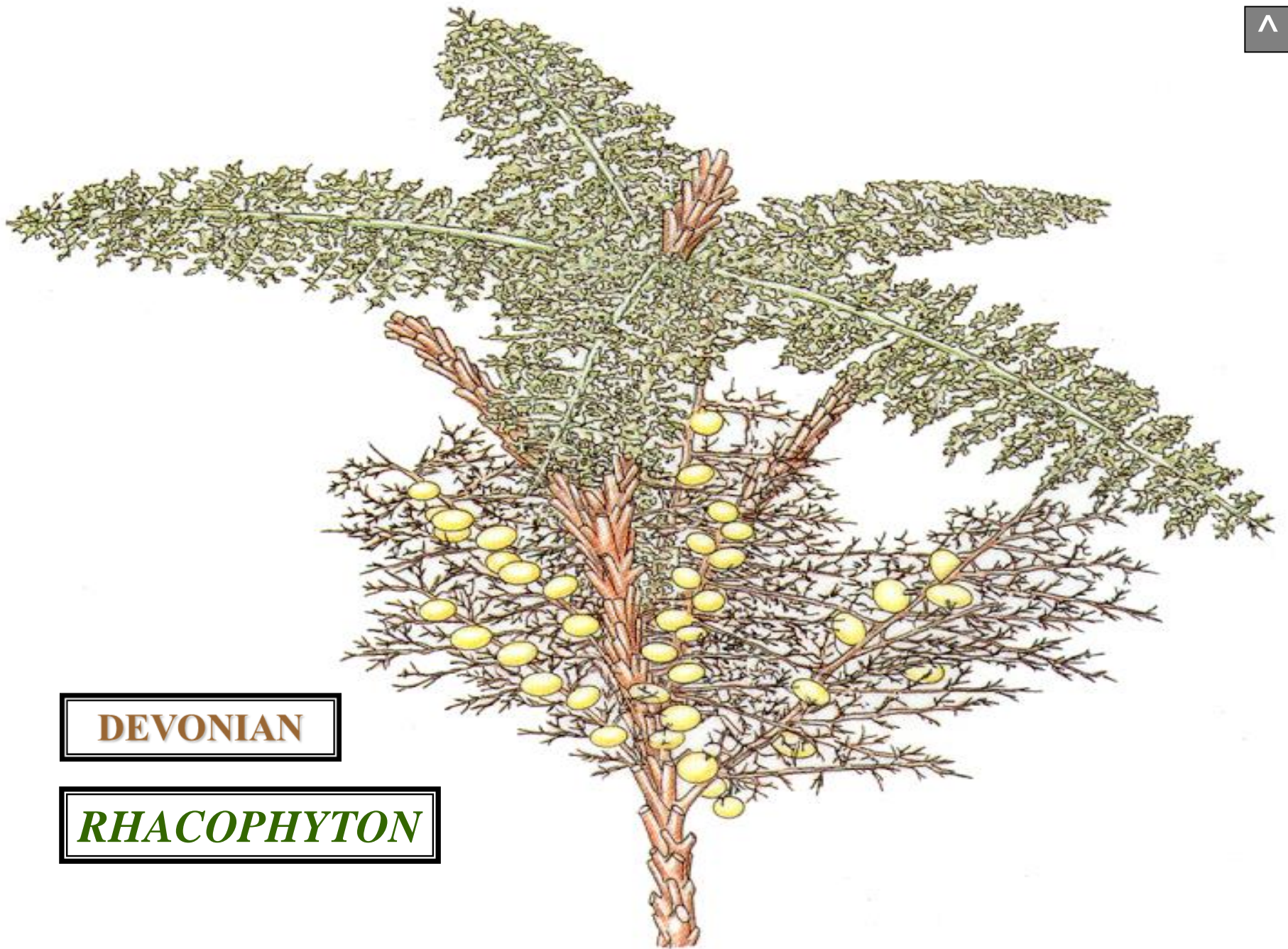


~370 MILLION YEARS AGO



“ADVANCED FERNS”
EVOLVE





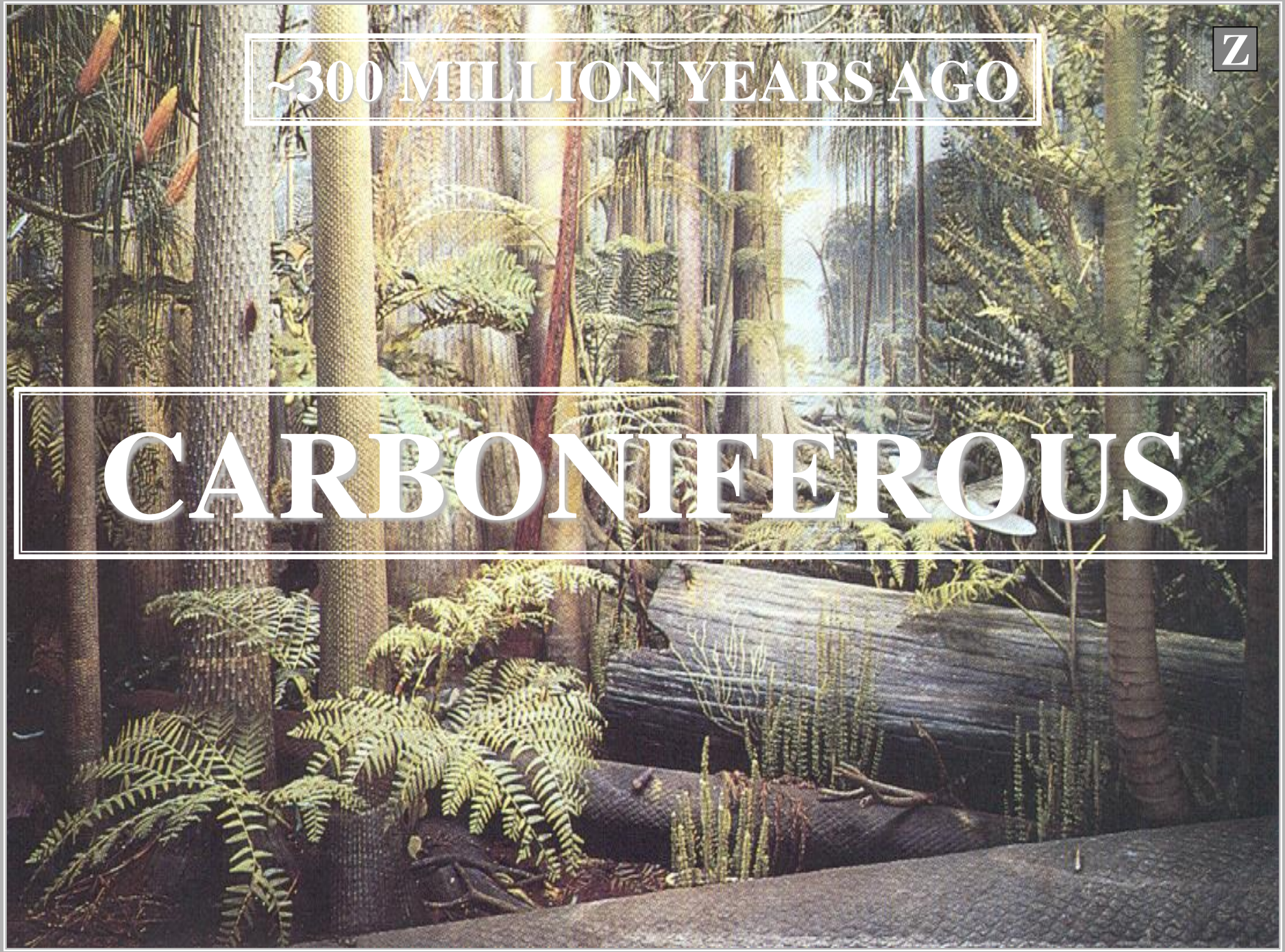
DEVONIAN

RHACOPHYTON

**~300
MILLION YEARS**

~300 MILLION YEARS AGO

CARBONIFEROUS



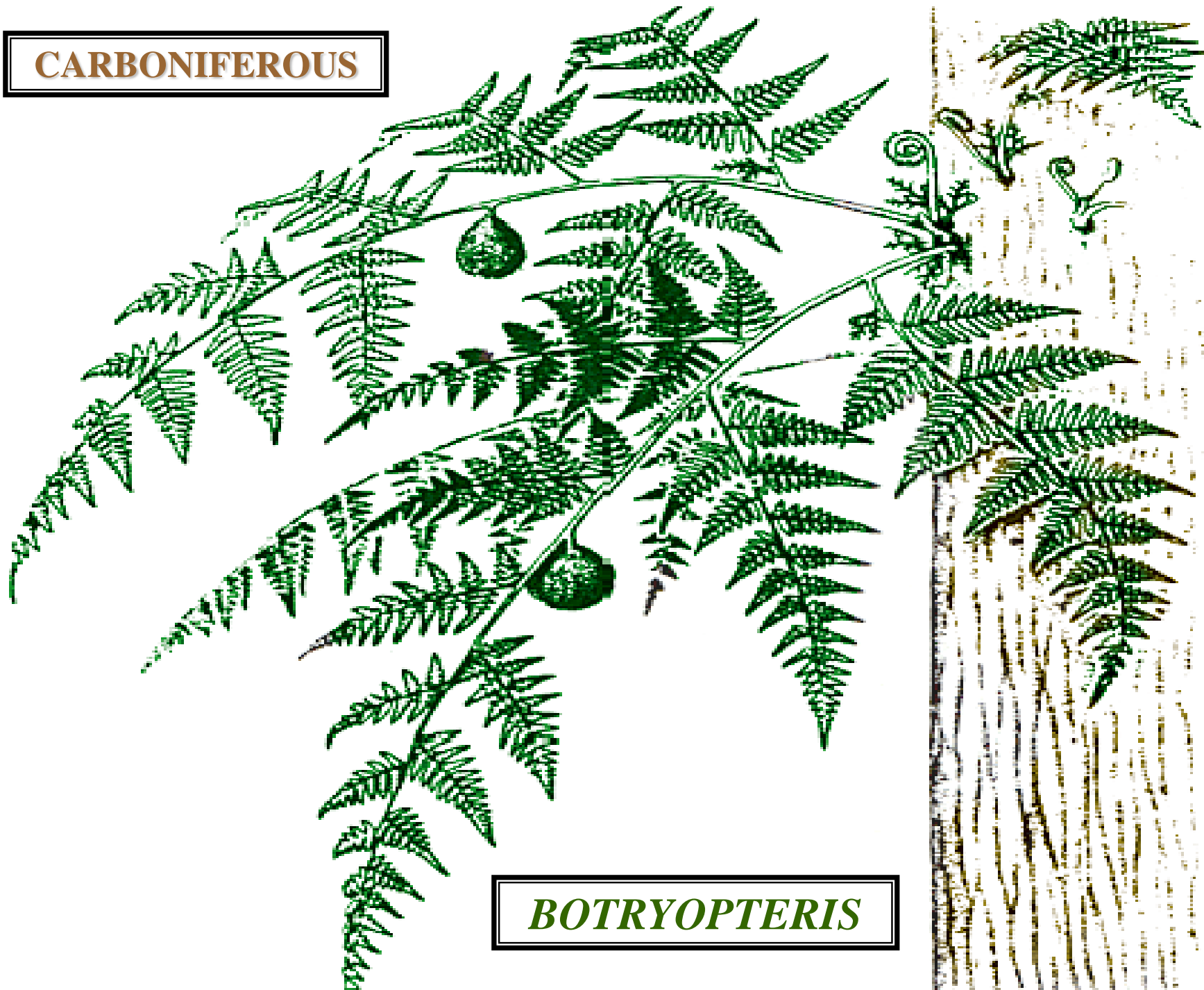


~300 MILLION YEARS AGO



“ADVANCED FERNS”
ZENITH

CARBONIFEROUS



BOTRYOPTERIS

CARBONIFEROUS

?



**EUSPORANGIATE
TREE-FERN**

BOTRYOPTERIS

PSARONIUS

?

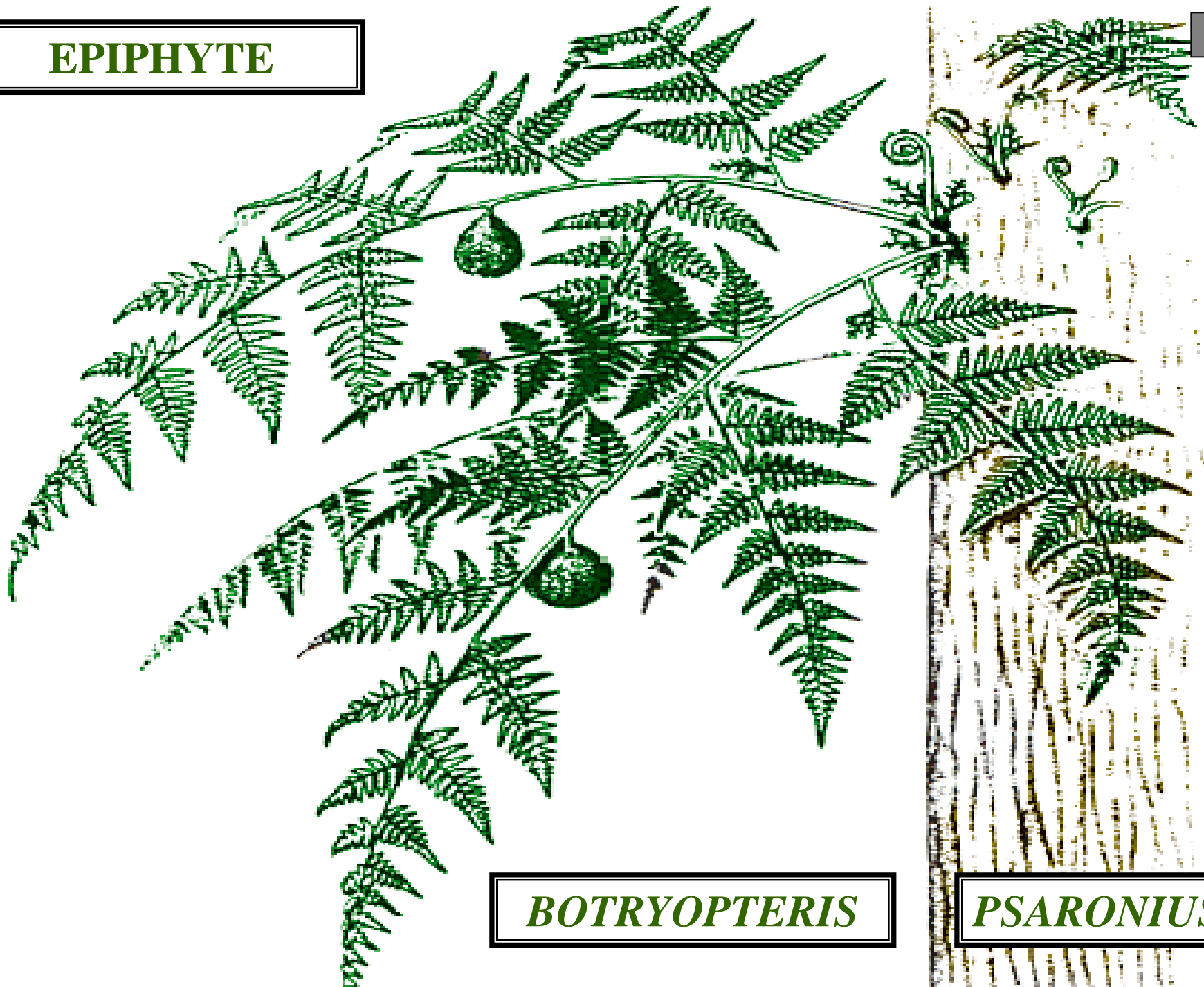
E



BOTRYOPTERIS

PSARONIUS

EPIPHYTE



BOTRYOPTERIS

PSARONIUS

PTERIDOPSISIDA ORDERS

**PTERIDOPSISIDA
ORDERS**

PTERIDALES

**PTERIDOPSISIDA
ORDERS**

PTERIDOPSISIDA
ORDERS

PTERIDALES

MARSILEALES

PTERIDOPSISIDA
ORDERS

PTERIDOPSISIDA

ORDERS



PTERIDALES

MARSILEALES

SALVINIALES

PTERIDOPSISIDA

ORDERS

**EXTANT
ORDER**

PTERIDALES

**EXTANT
ORDER**

COMMON NAME



“TRUE FERNS”



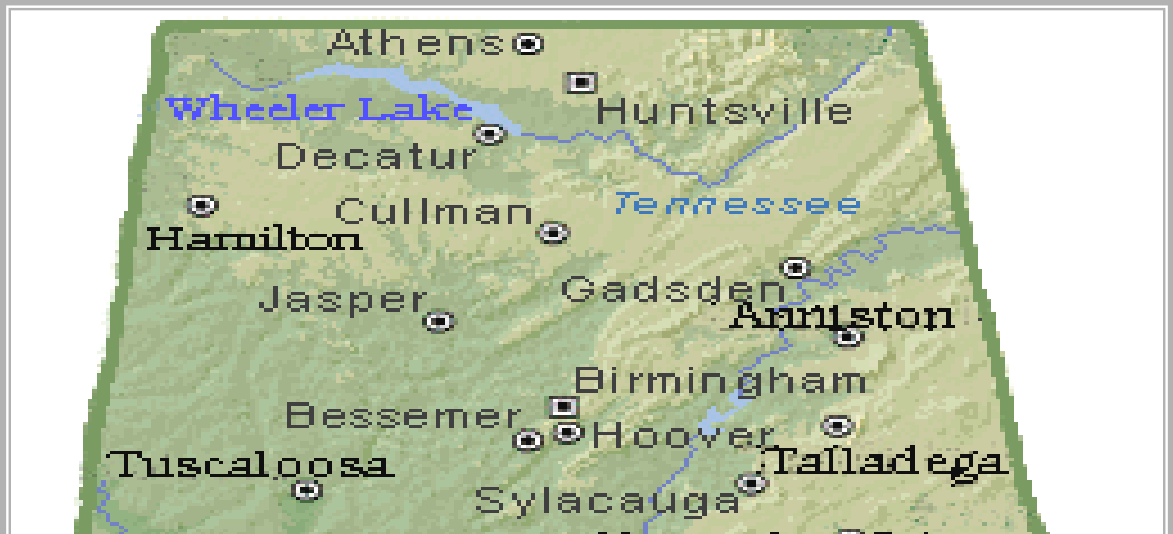


DIVERSITY



~9,000 SPECIES

EARTH



~35 SPECIES



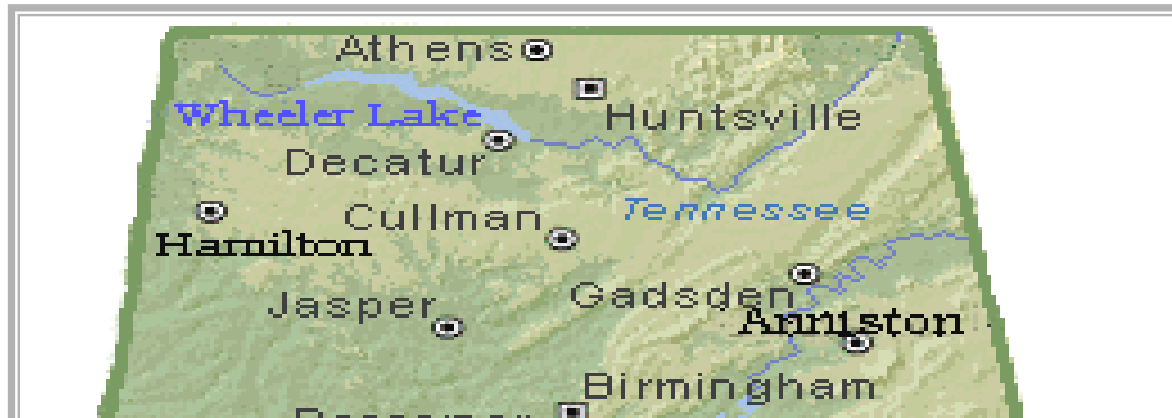


**PTERIDALES
MOST DIVERSE
PTERIDOPHYTA
ORDER**

EARTH



REPRESENTATIVE GENERA



ALABAMA INDIGENOUS



ASPLENIUM



ASPLENIUM

ASPLENIUM



WALKING FERN

ASPLENIUM



DRYOPTERIS

A close-up photograph of a dense cluster of bright green wood fern fronds. The fronds are finely divided and have a serrated edge. The lighting is bright, highlighting the texture and color of the leaves. The background is dark, making the green foliage stand out.

WOOD FERN

DRYOPTERIS



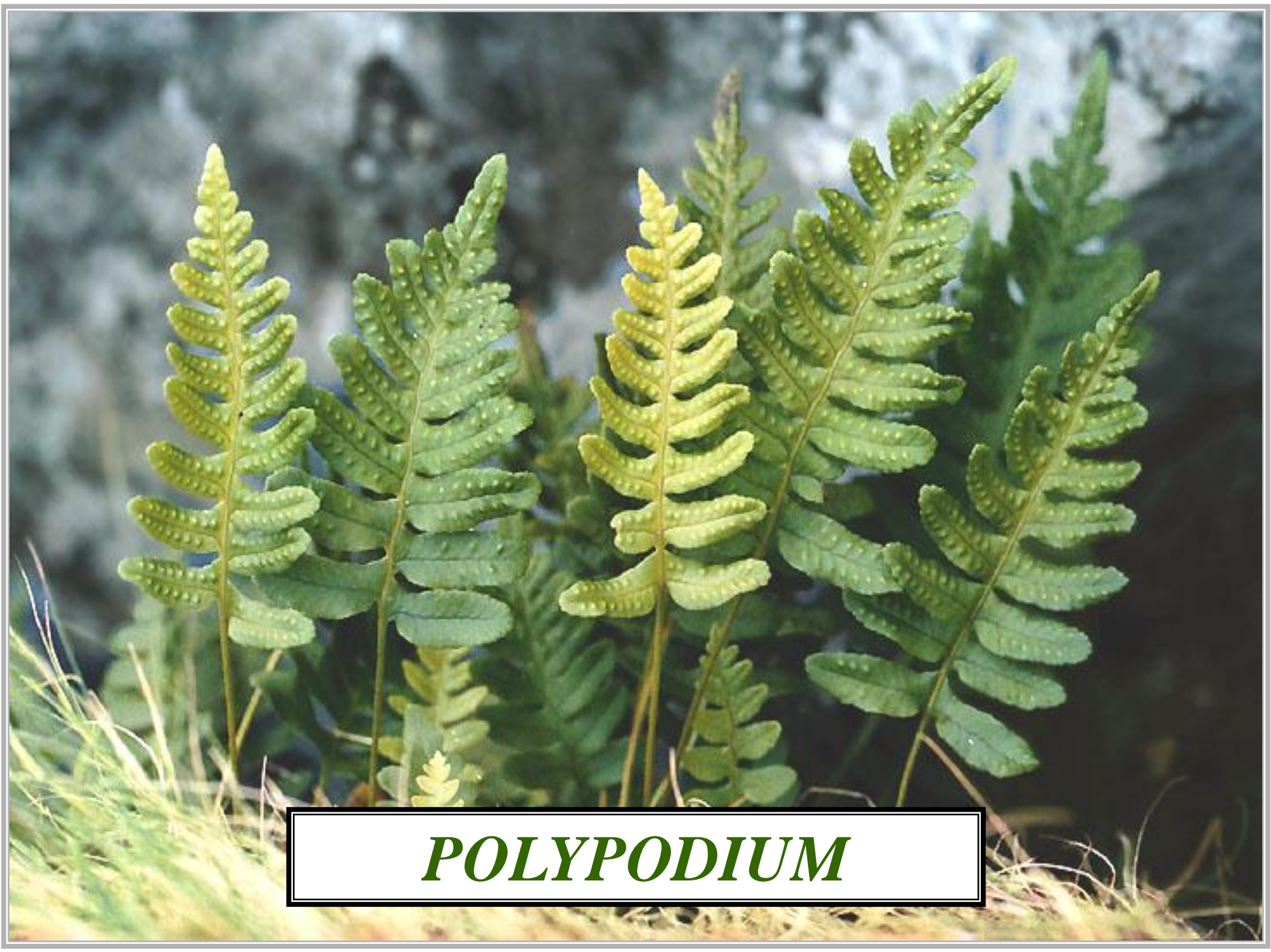
ONOCLEA



SENSITIVE FERN

ONOCLEA





POLYPODIUM

A photograph of several fronds of a Rock Fern (Polypodium) growing in a natural setting. The fronds are pinnate and have a distinct yellowish-green color, indicating they are young or immature. The background is a blurred natural environment with rocks and foliage.

ROCK FERN

POLYPODIUM



POLYSTICHUM



CHRISTMAS FERN

POLYSTICHUM



PTERIDIUM



BRACKEN FERN

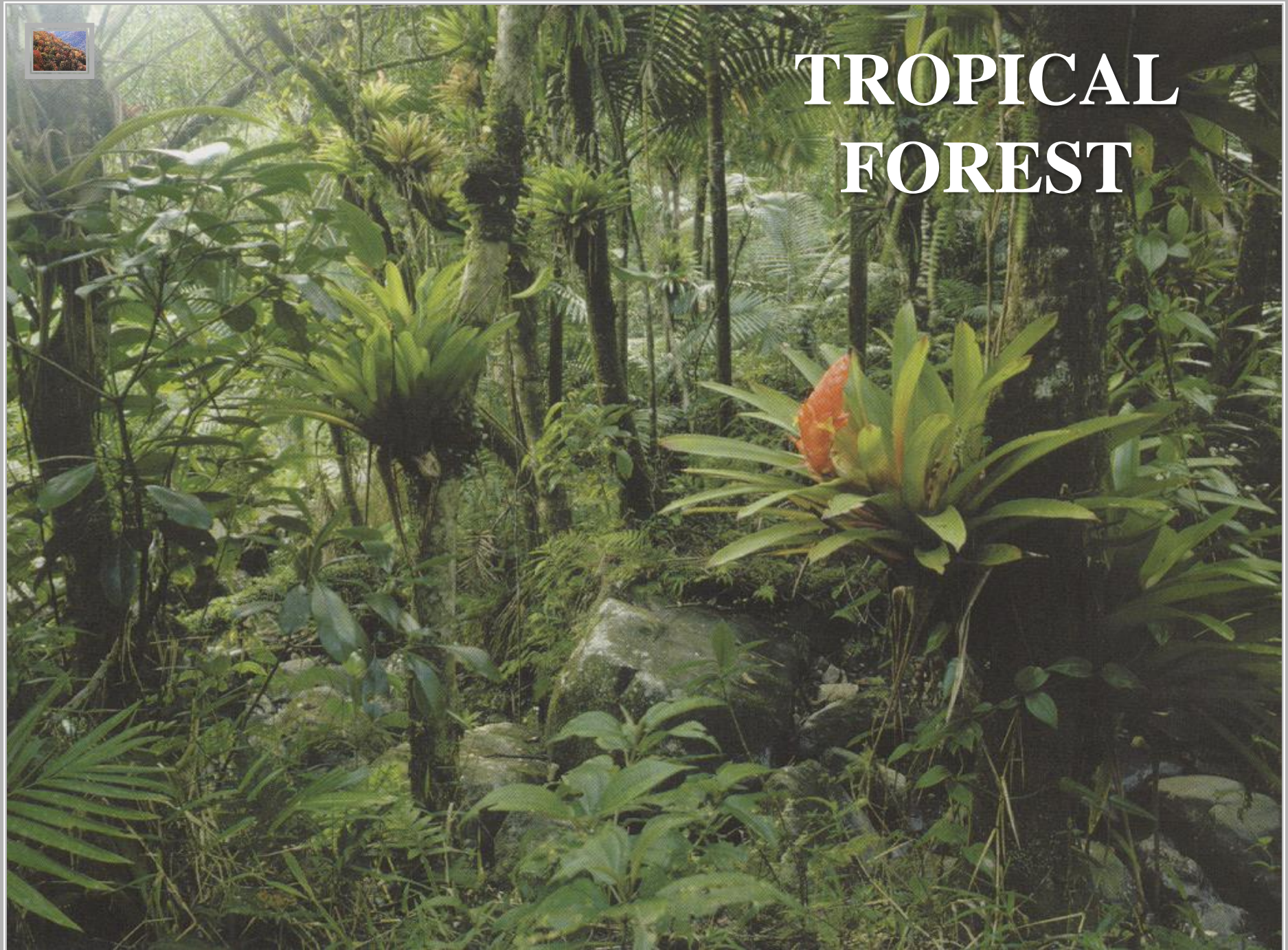
PTERIDIUM



HABITAT

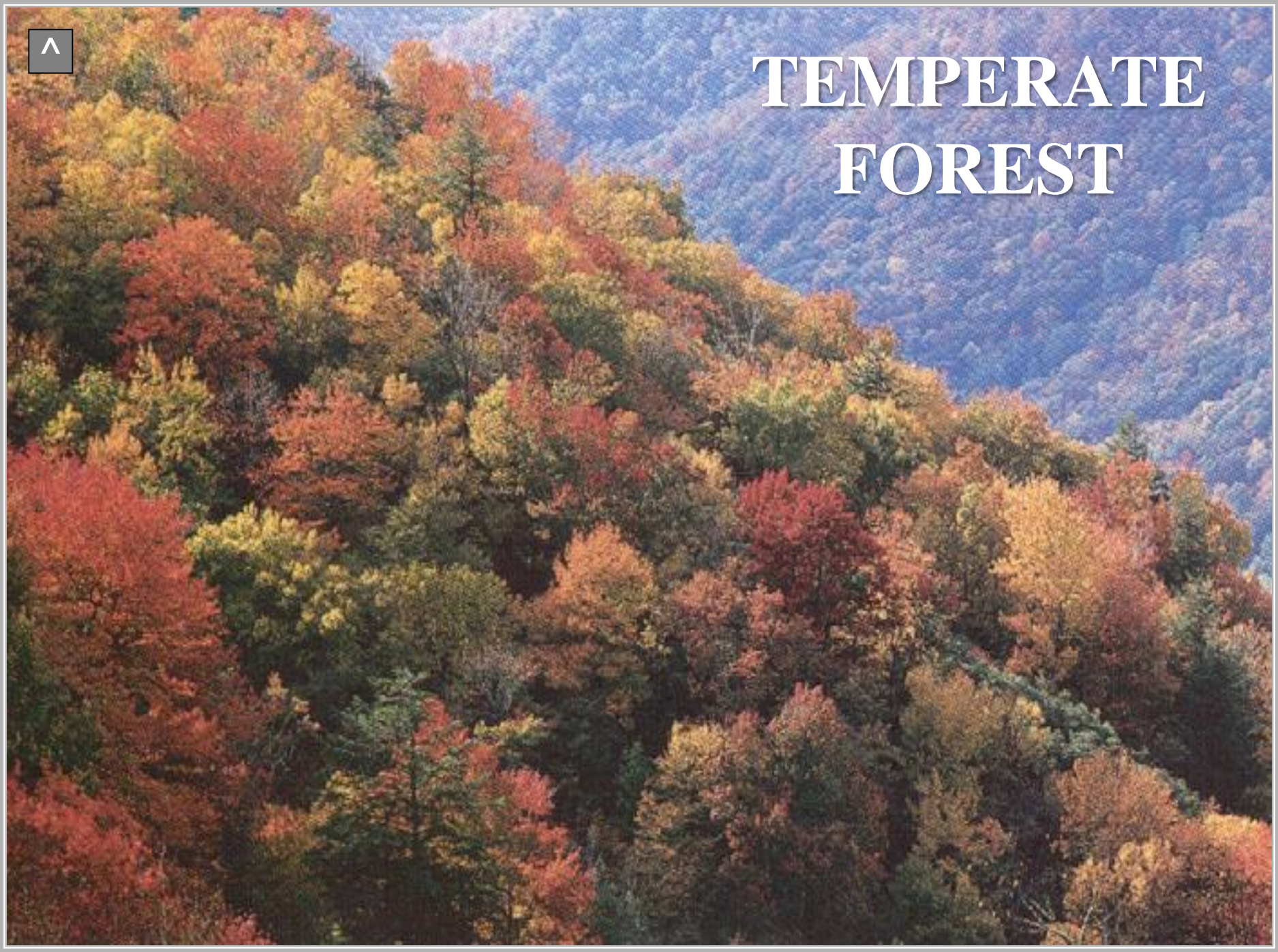


TROPICAL FOREST





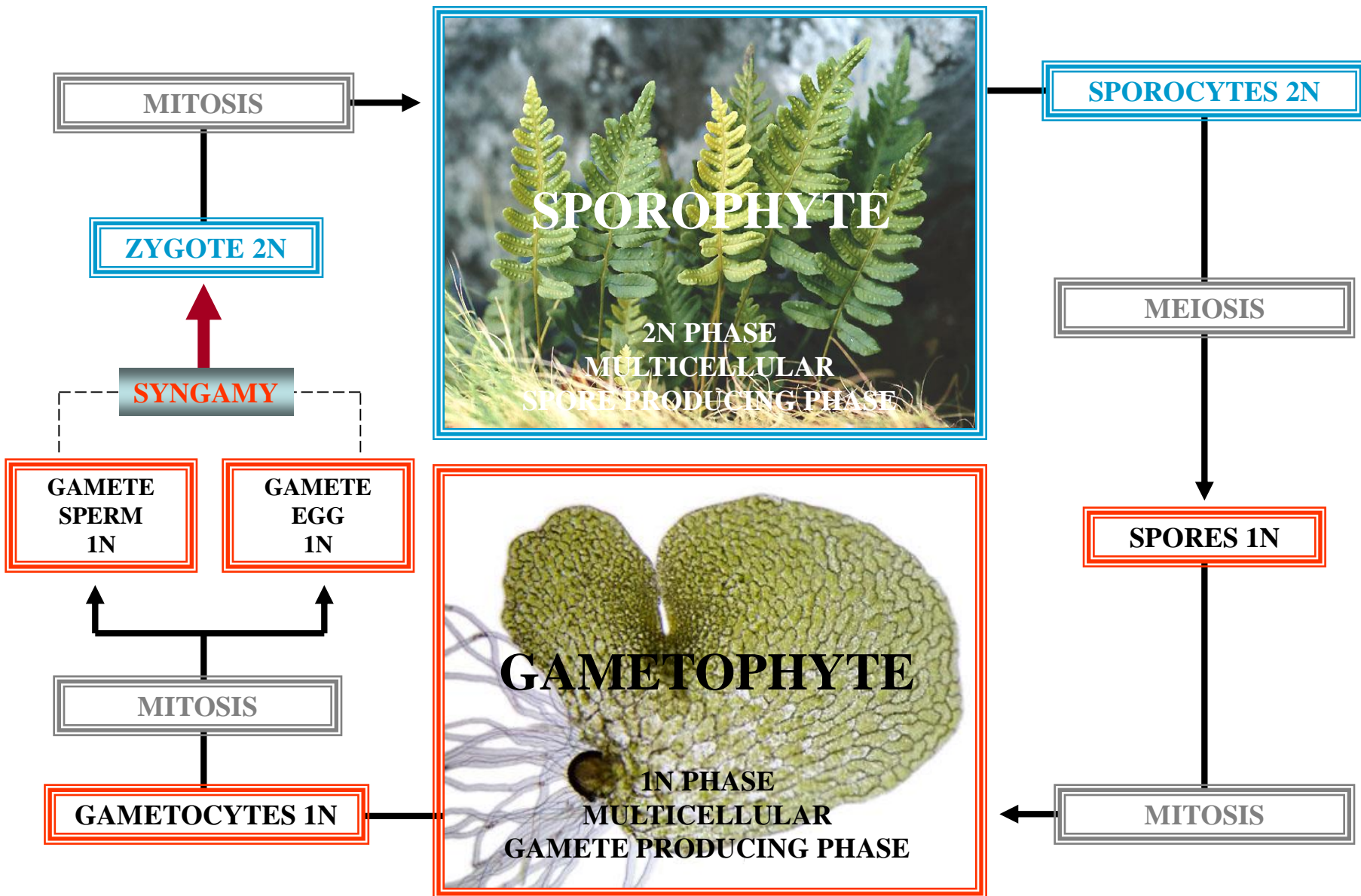
TEMPERATE FOREST





GENERAL CHARACTERS

PTERIDALES LIFE CYCLE

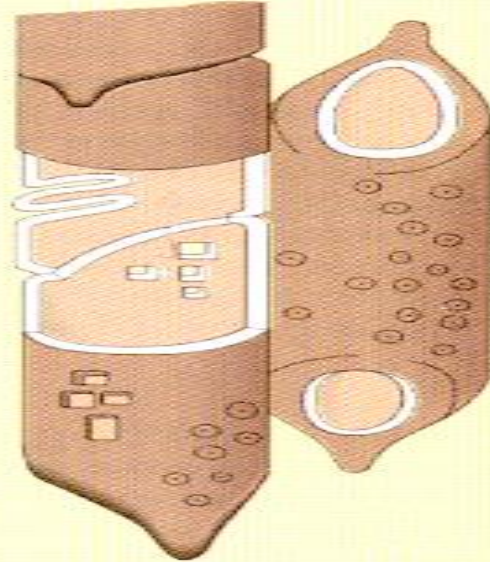
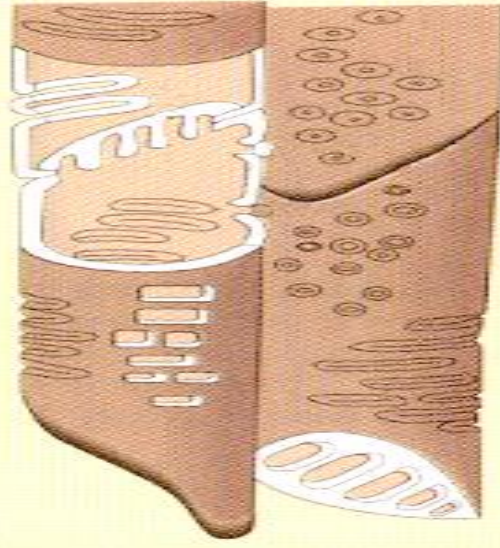
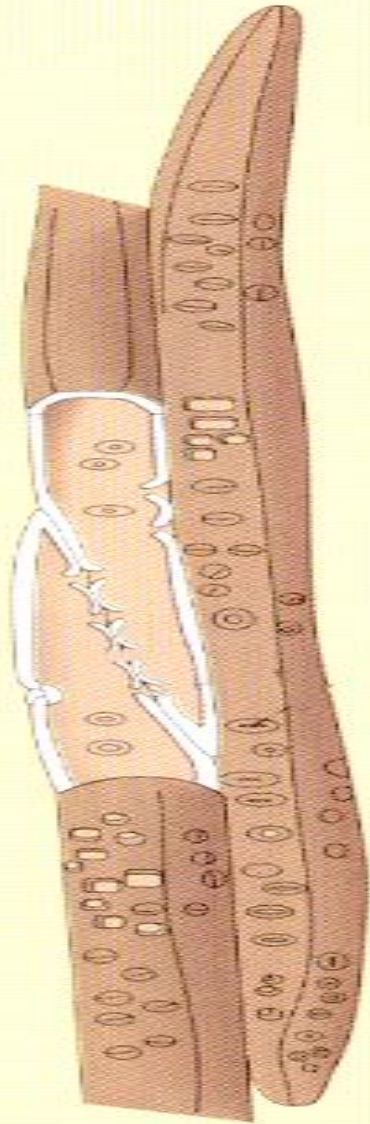




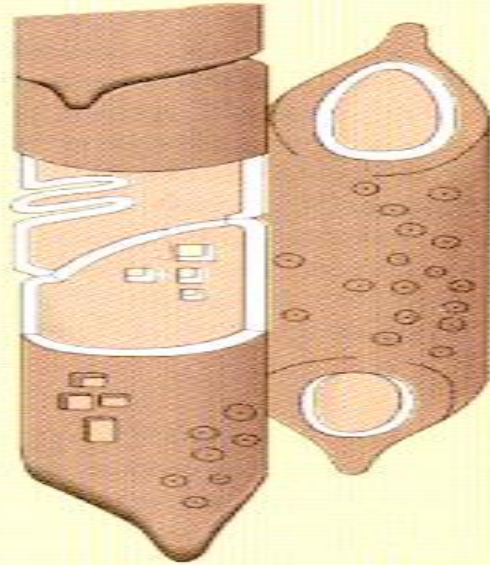
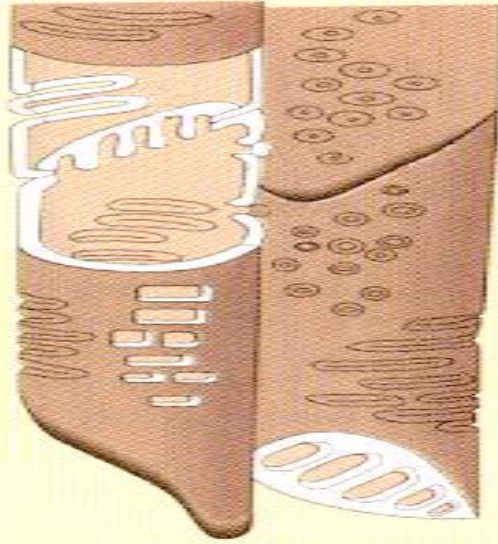
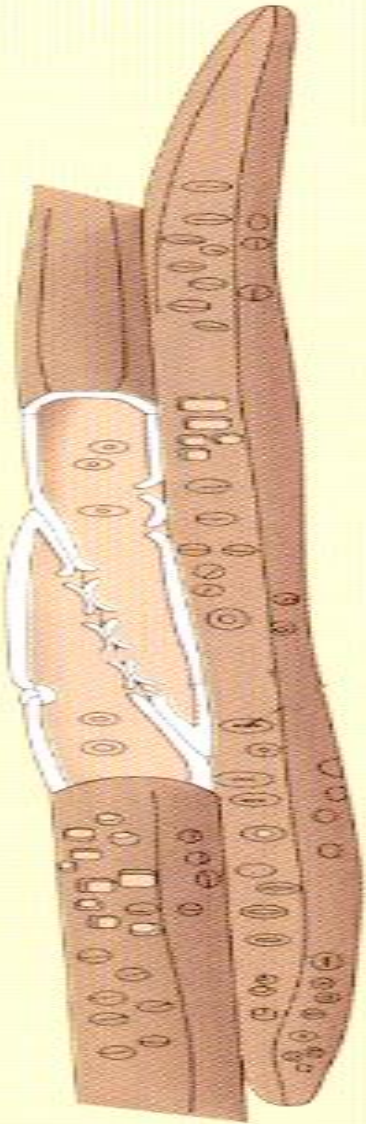
SPOROPHYTE CHARACTERS



XYLEM



XYLEM CELLS



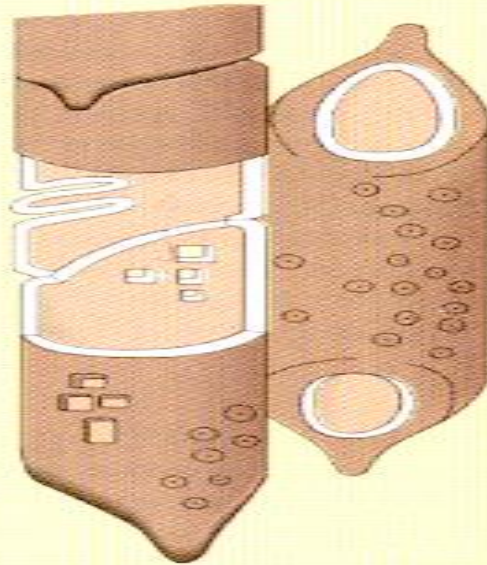
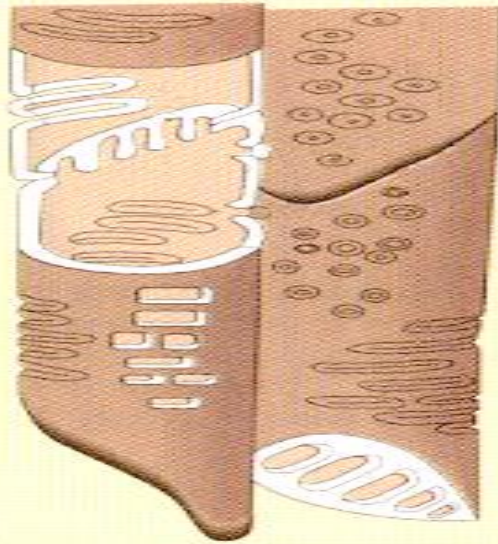
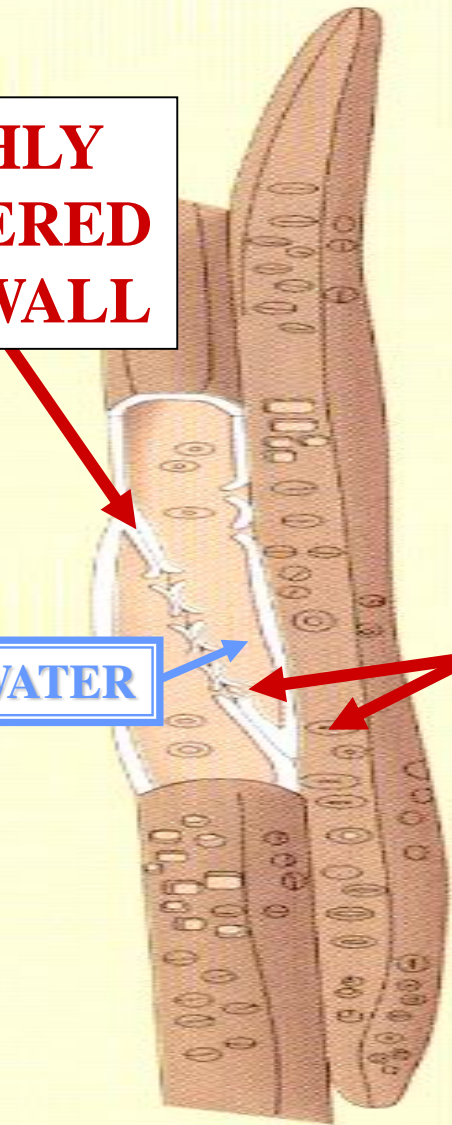
TRACHEARY ELEMENTS

**HIGHLY
TAPPED
END WALL**

WATER

PITS

?

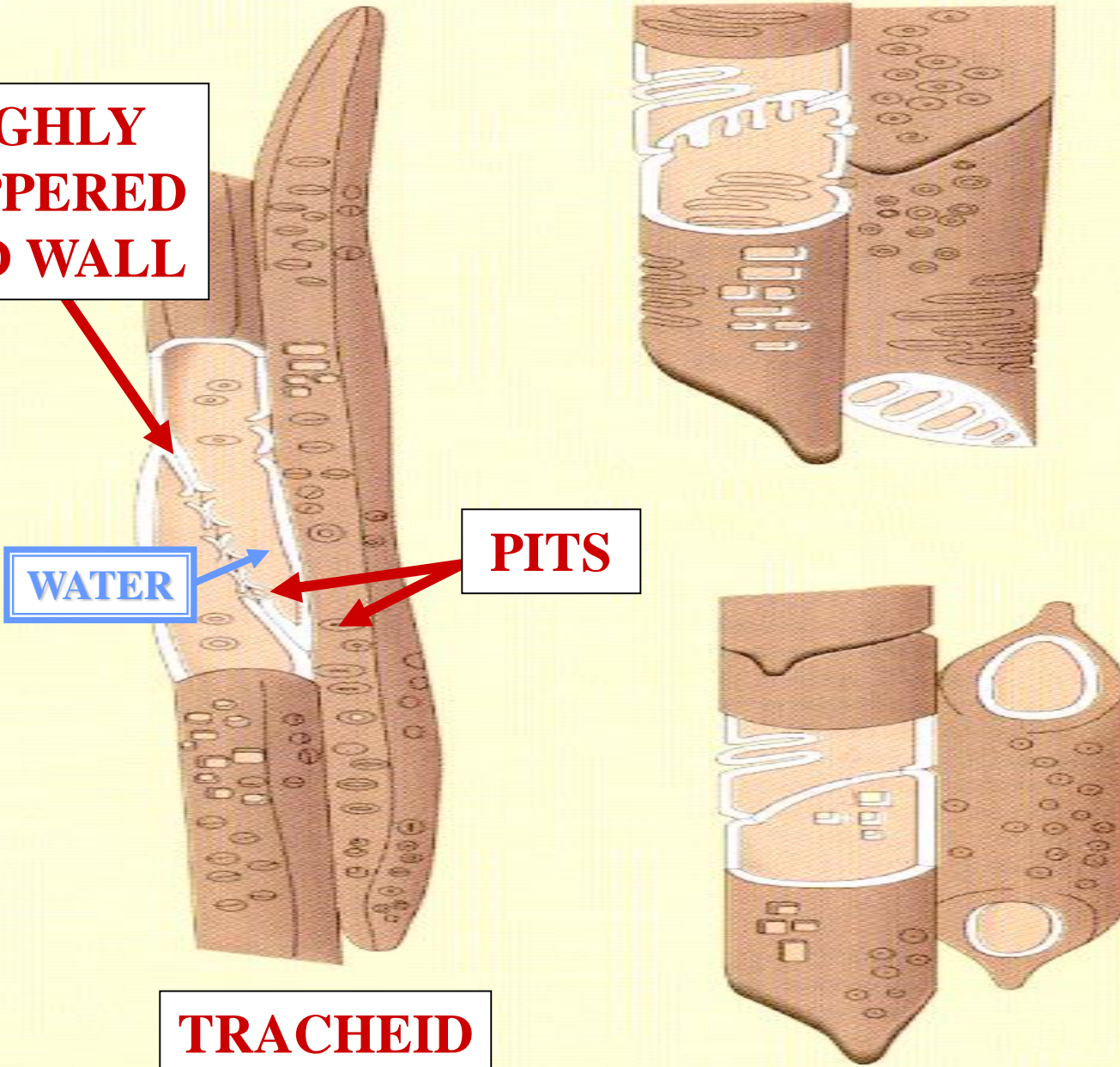


**HIGHLY
TAPPED
END WALL**

WATER

PITS

TRACHEID



**HIGHLY
TAPPED
END WALL**

**LESS
TAPPED
END WALL**

?

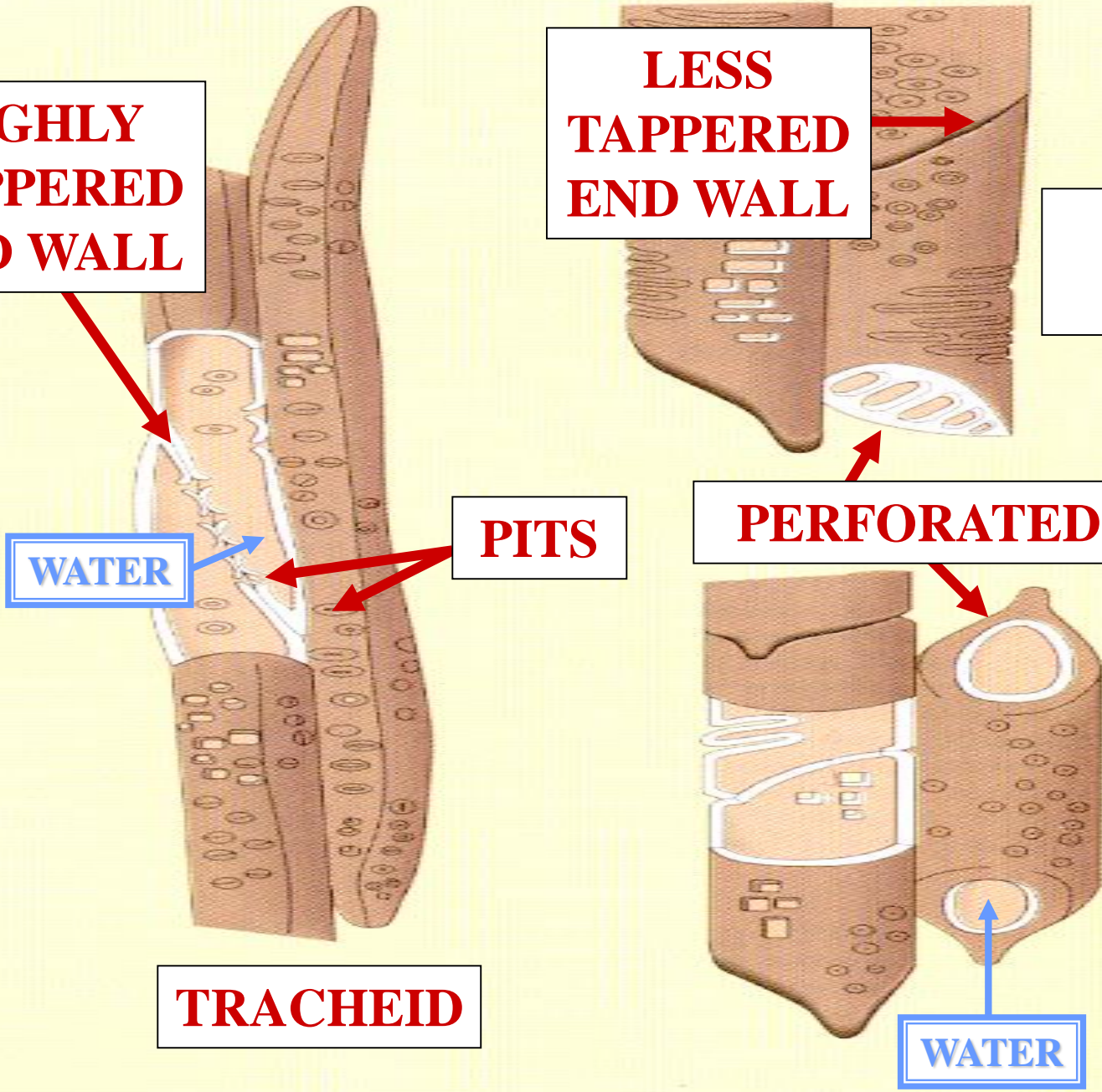
WATER

PITS

PERFORATED PLATE

TRACHEID

WATER





T

**HIGHLY
TAPPERED
END WALL**

**LESS
TAPPERED
END WALL**

**VESSEL
MEMBER**

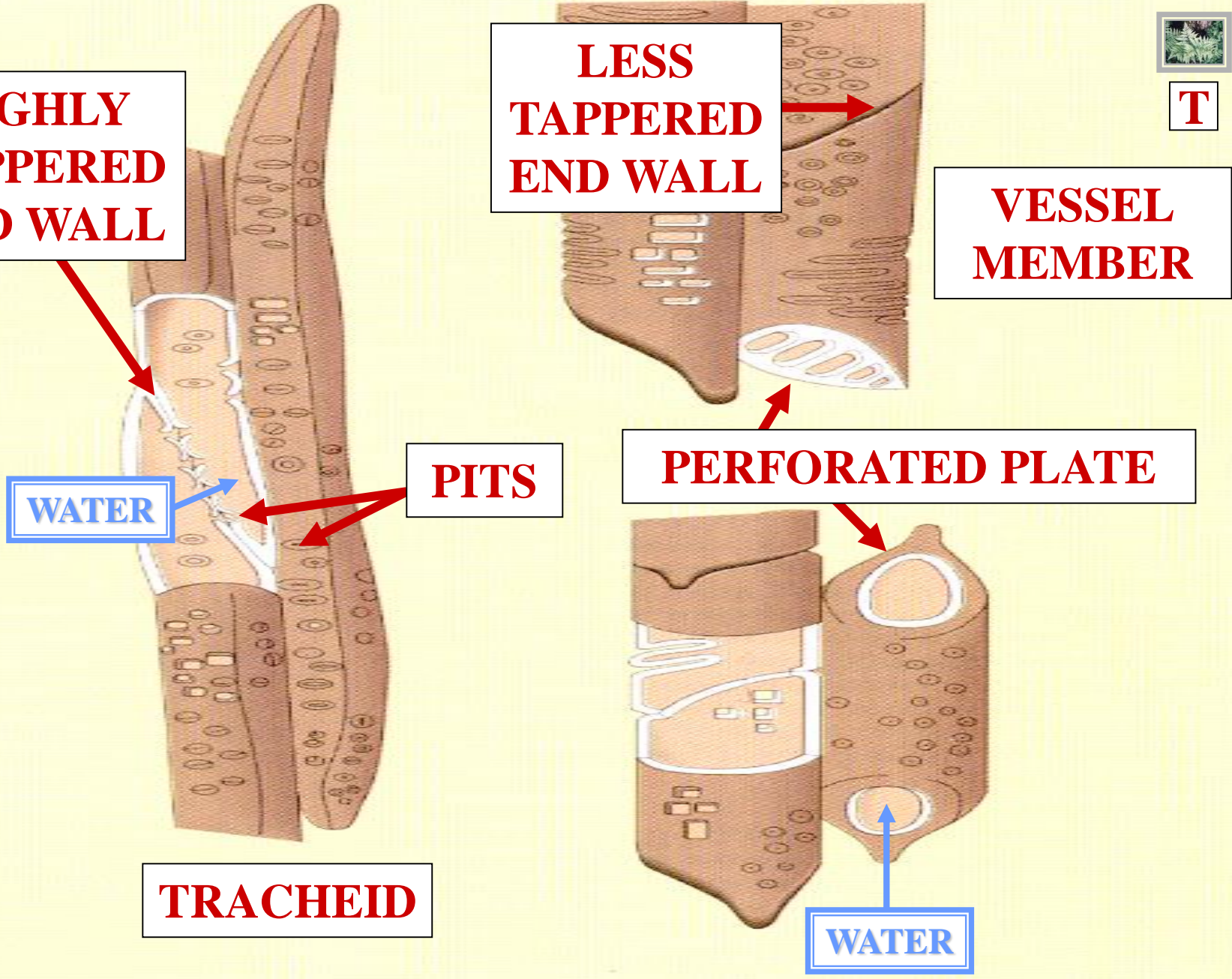
WATER

PITS

PERFORATED PLATE

TRACHEID

WATER





TRACHEIDS

PTERIDIUM



MORPHOLOGY

TYPICAL FERN MORPHOLOGY





TYPICAL FERN MORPHOLOGY





“TRUE FERNS”

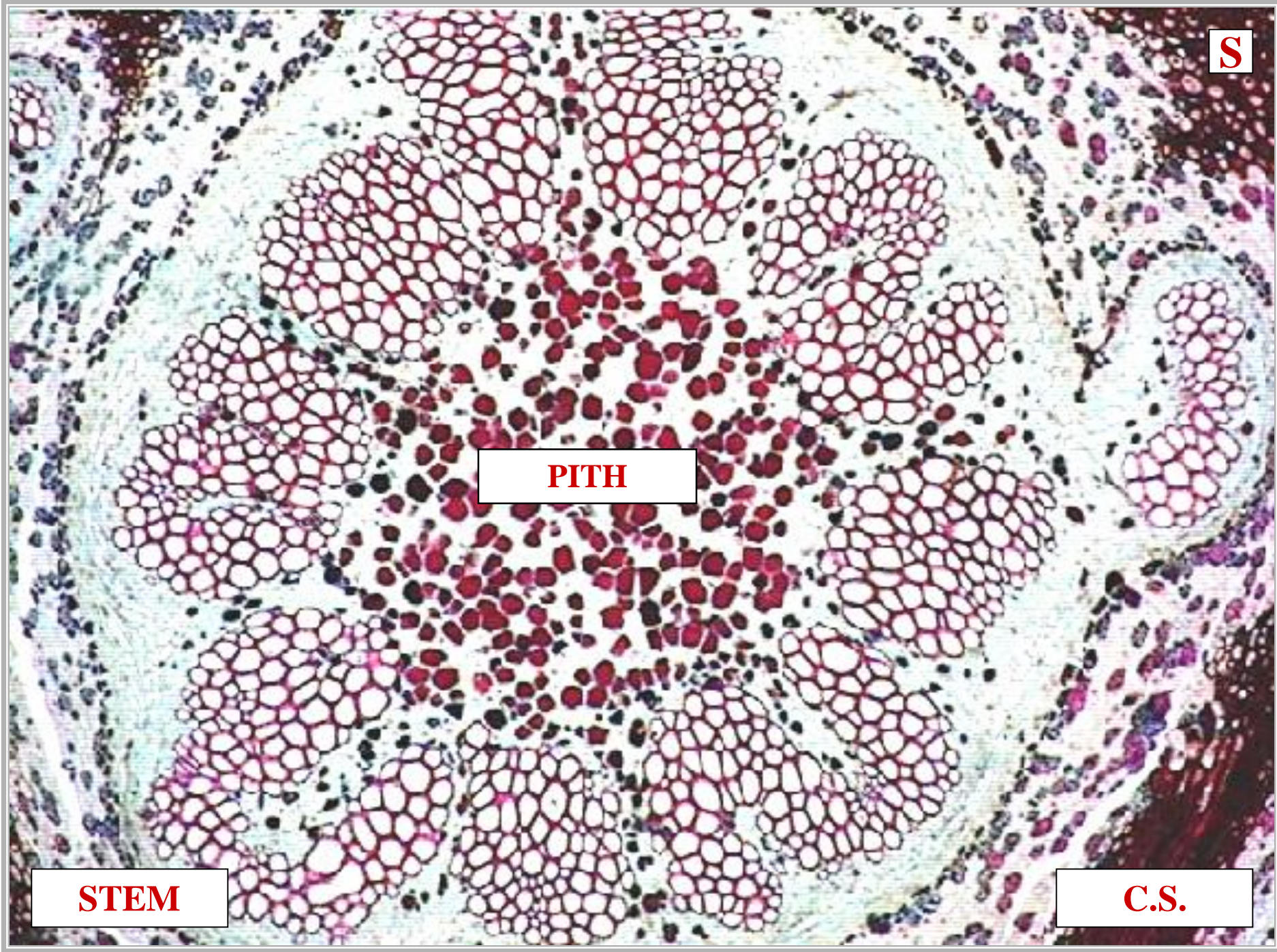




STEM



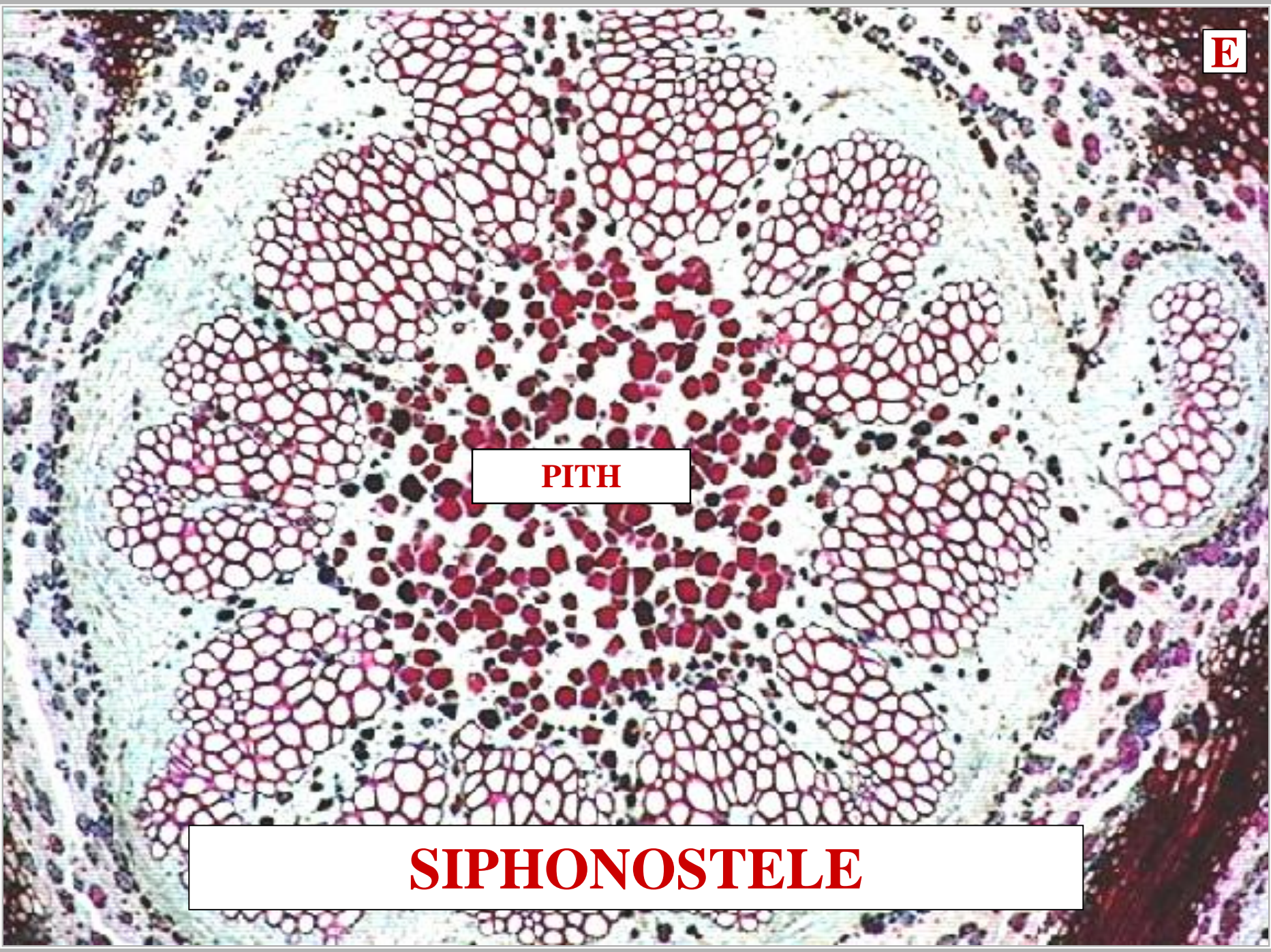
STEM STELE



PITH

STEM

C.S.



PITH

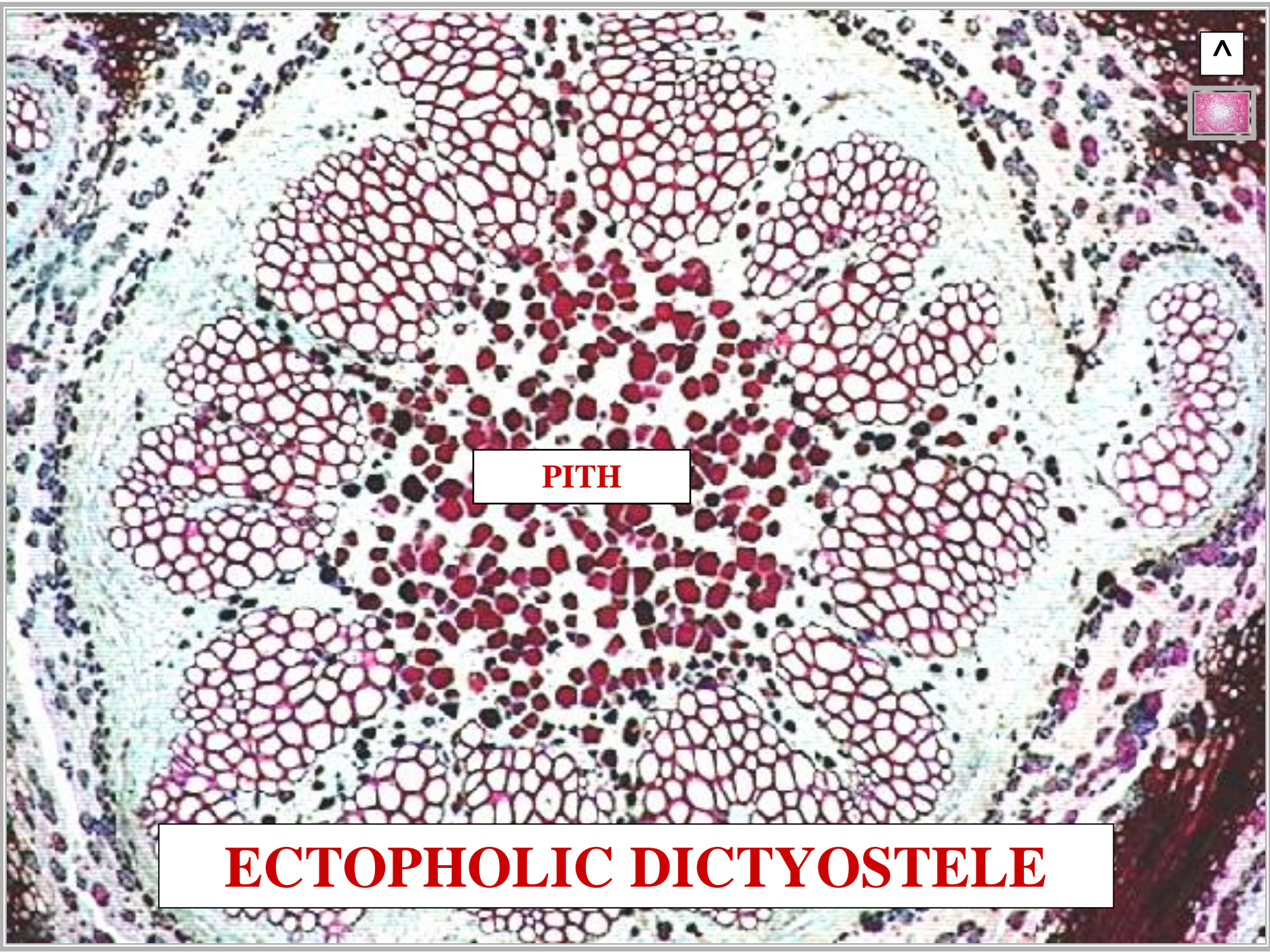
SIPHONOSTELE

D

PITH

ECTOPHOLIC





PITH

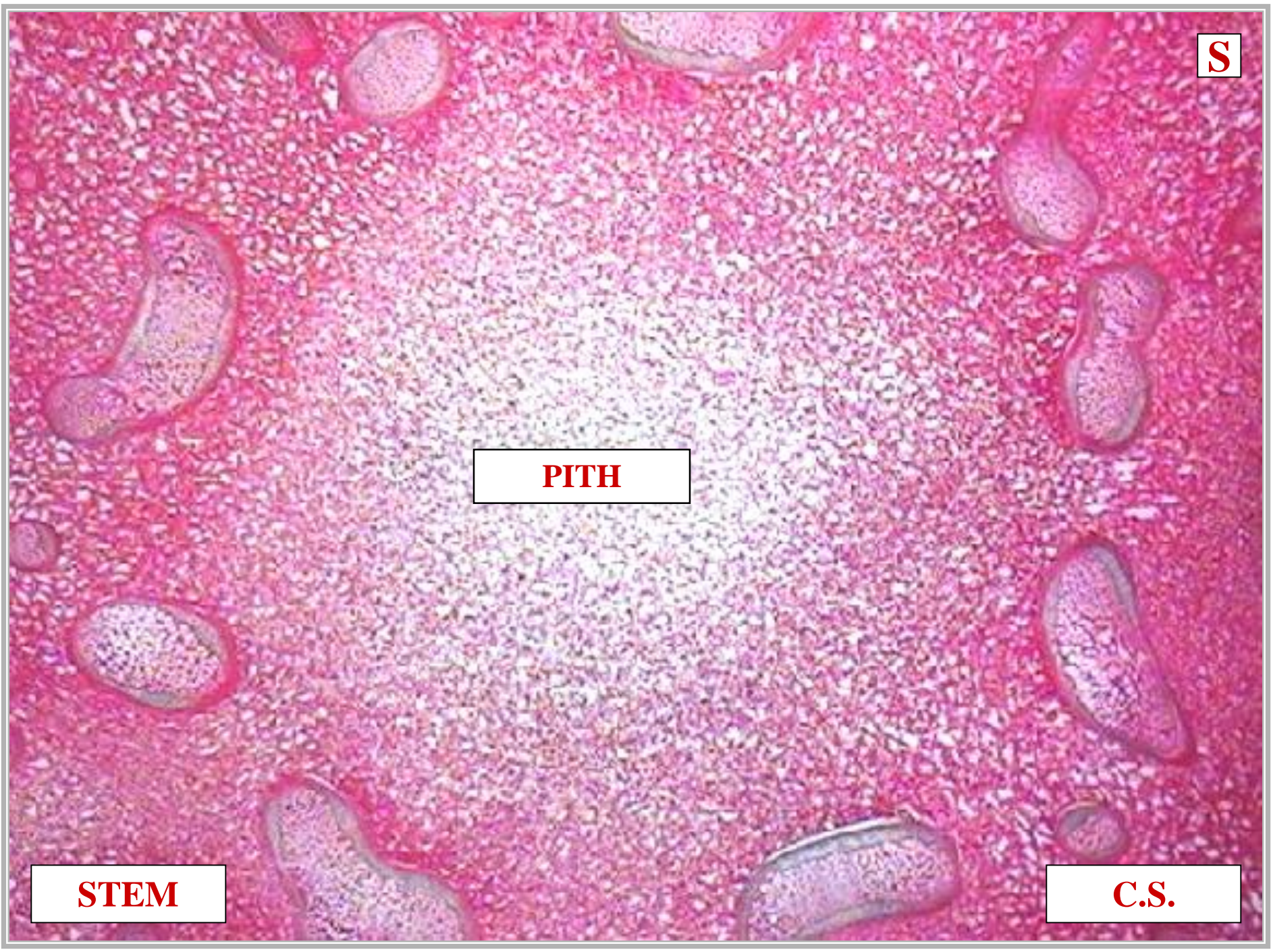
ECTOPHOLIC DICTYOSTELE

S

PITH

STEM

C.S.





PITH

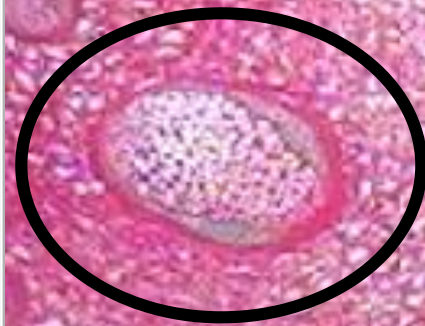
SIPHONOSTELE





PITH

SIPHONOSTELE



A

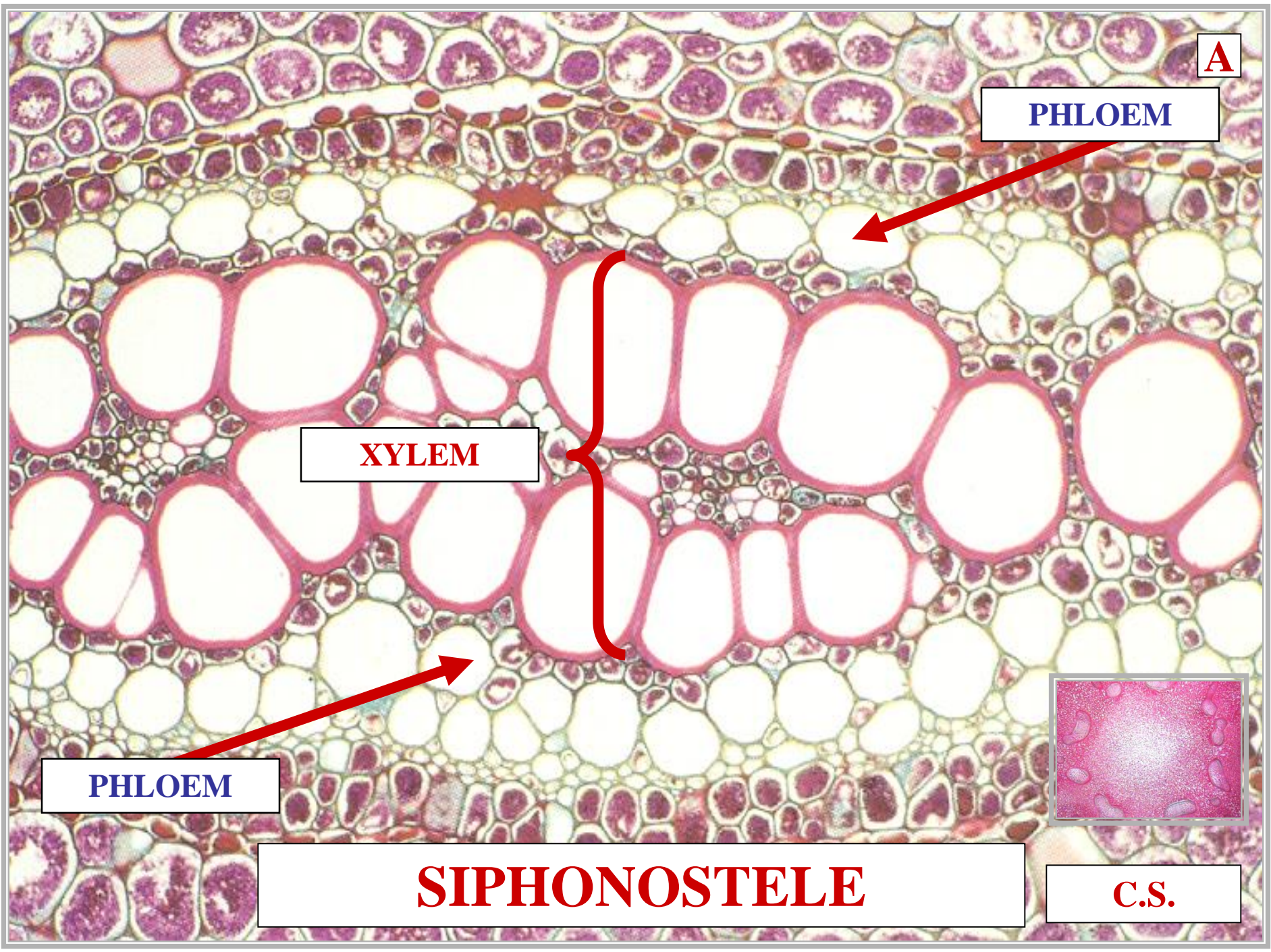
PHLOEM

XYLEM

PHLOEM

SIPHONOSTELE

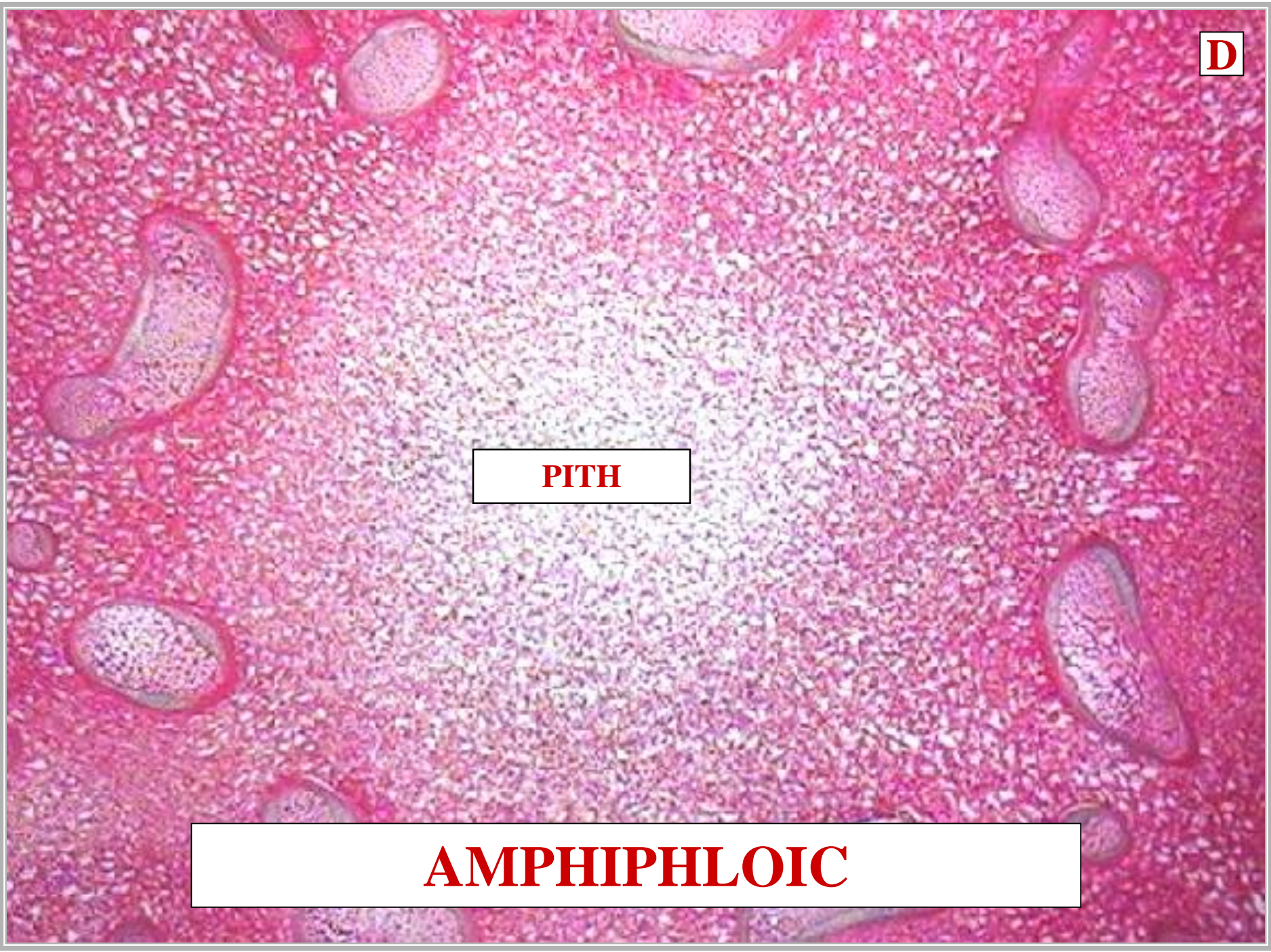
C.S.



D

PITH

AMPHIPHLOIC





PITH

AMPHIPHLOIC DICTYOSTELE

DICTYOSTELE

DICTYOSTELE

**PTERIDALES
DICTYOSTELE**

**SIPHONOSTELE
WITH
MERISTELES**

**PTERIDALES
DICTYOSTELE**

MERISTELE

DICTYOSTELE MERISTELE



**DICTYOSTELE
“VASCULAR BUNDLE”**

**DICTYOSTELE
MERISTELE**



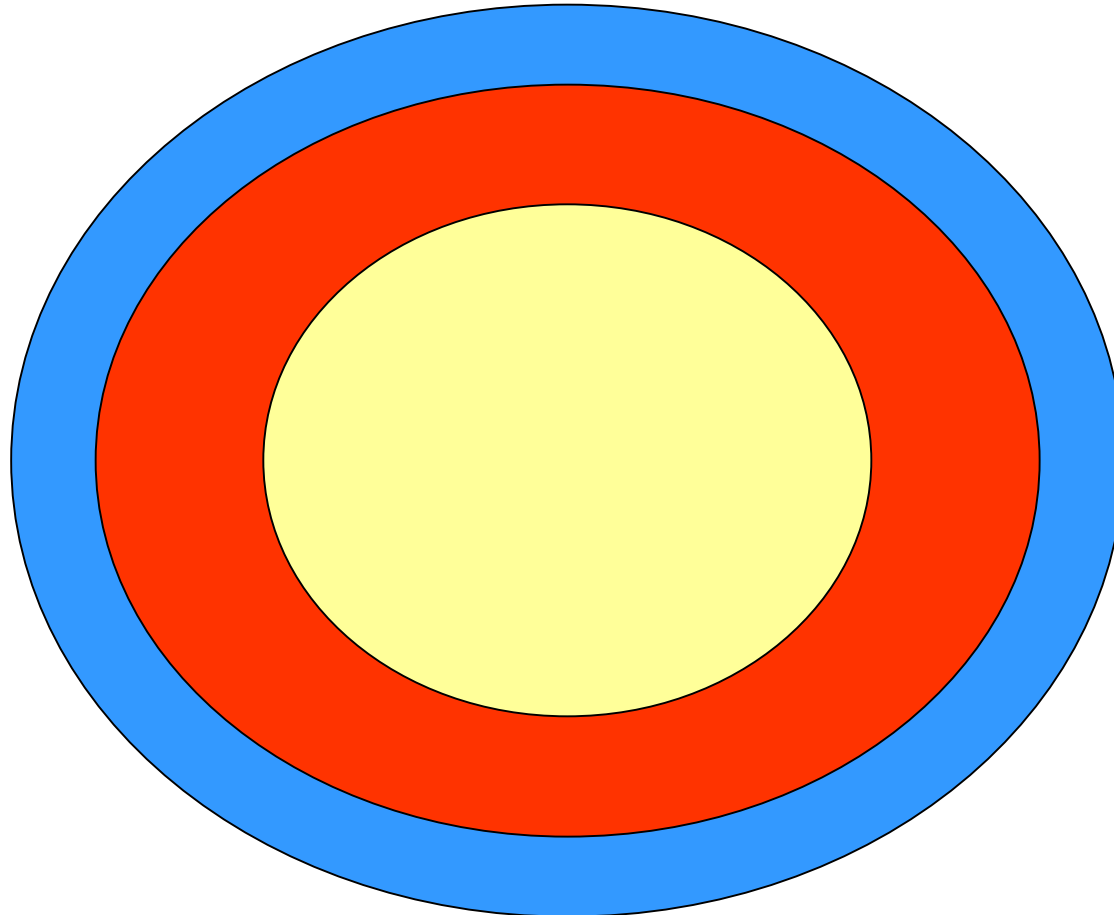
“TRUE FERN”







MG

MEGAPHYLLS





-  = CORTEX
-  = PITH
-  = XYLEM
-  = PHLOEM

C.S.

RHIZOME