

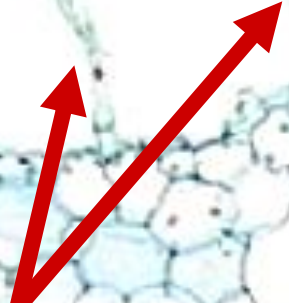
+/-

**CORTICAL
CAVITY**



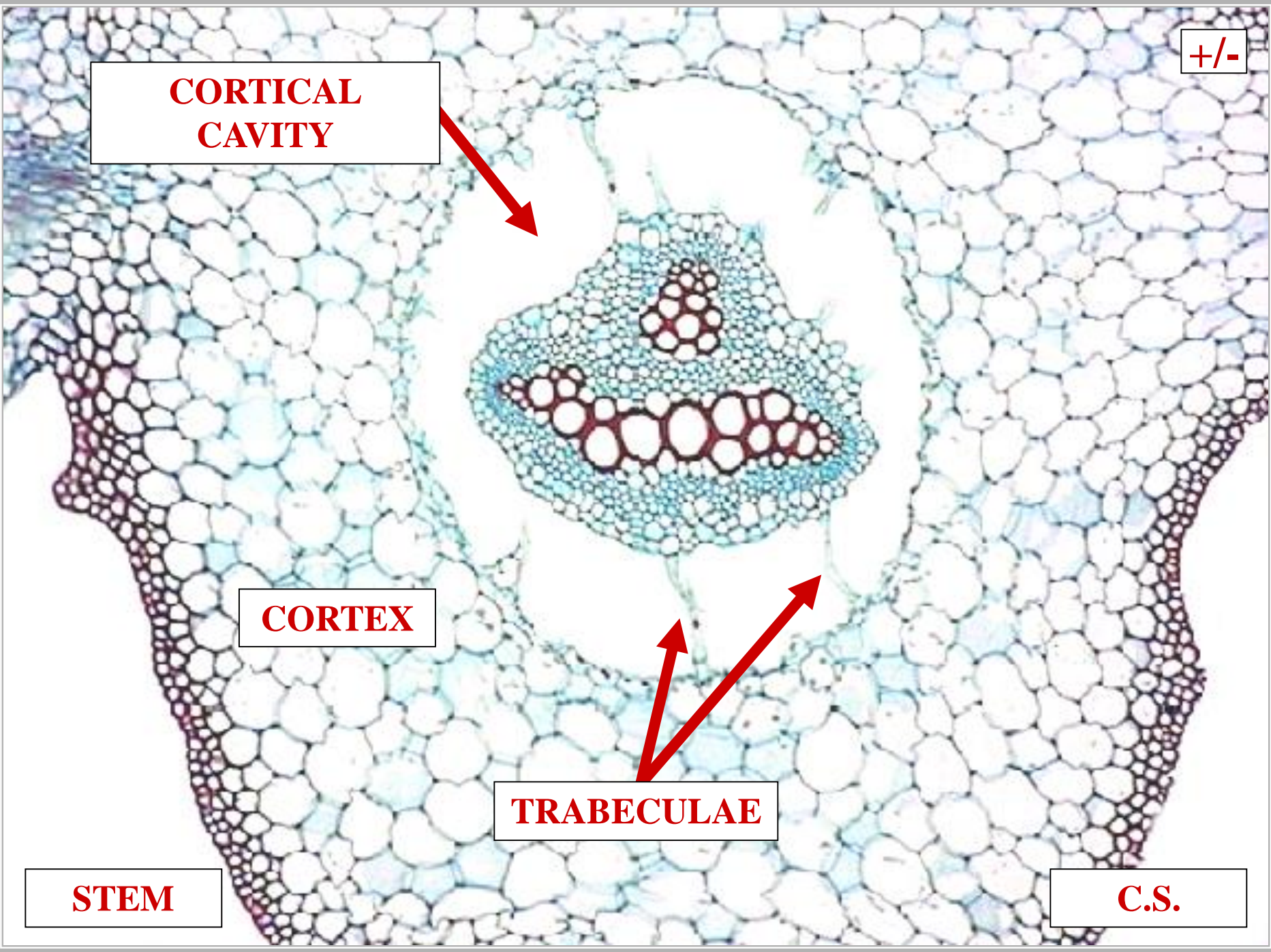
CORTEX

TRABECULAE



STEM

C.S.



T

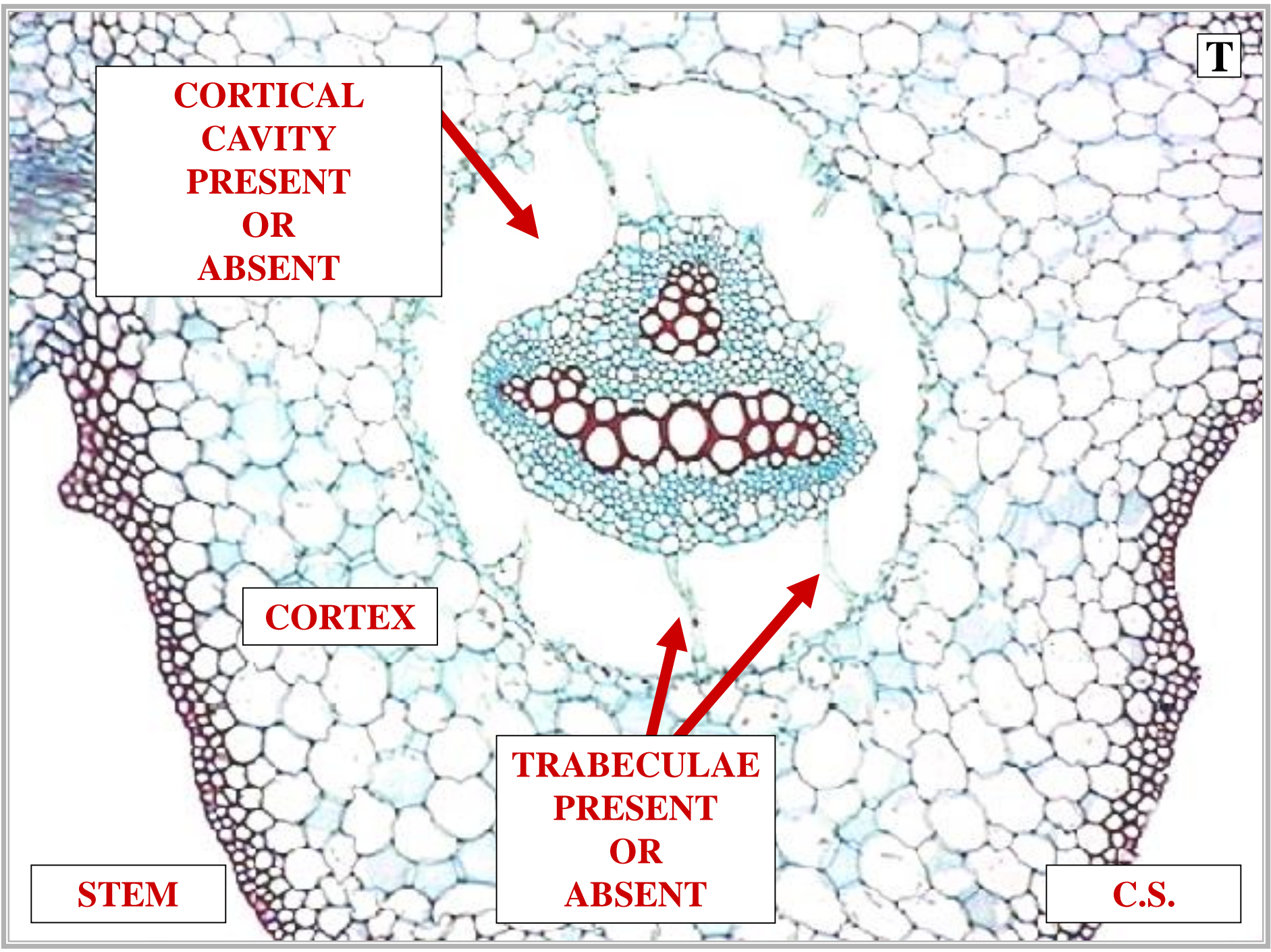
**CORTICAL
CAVITY
PRESENT
OR
ABSENT**

CORTEX

**TRABECULAE
PRESENT
OR
ABSENT**

STEM

C.S.



TRABECULAE



TRABECULAE

CORTEX CELLS
THROUGH CORTICAL
CAVITY TO STELE

TRABECULAE

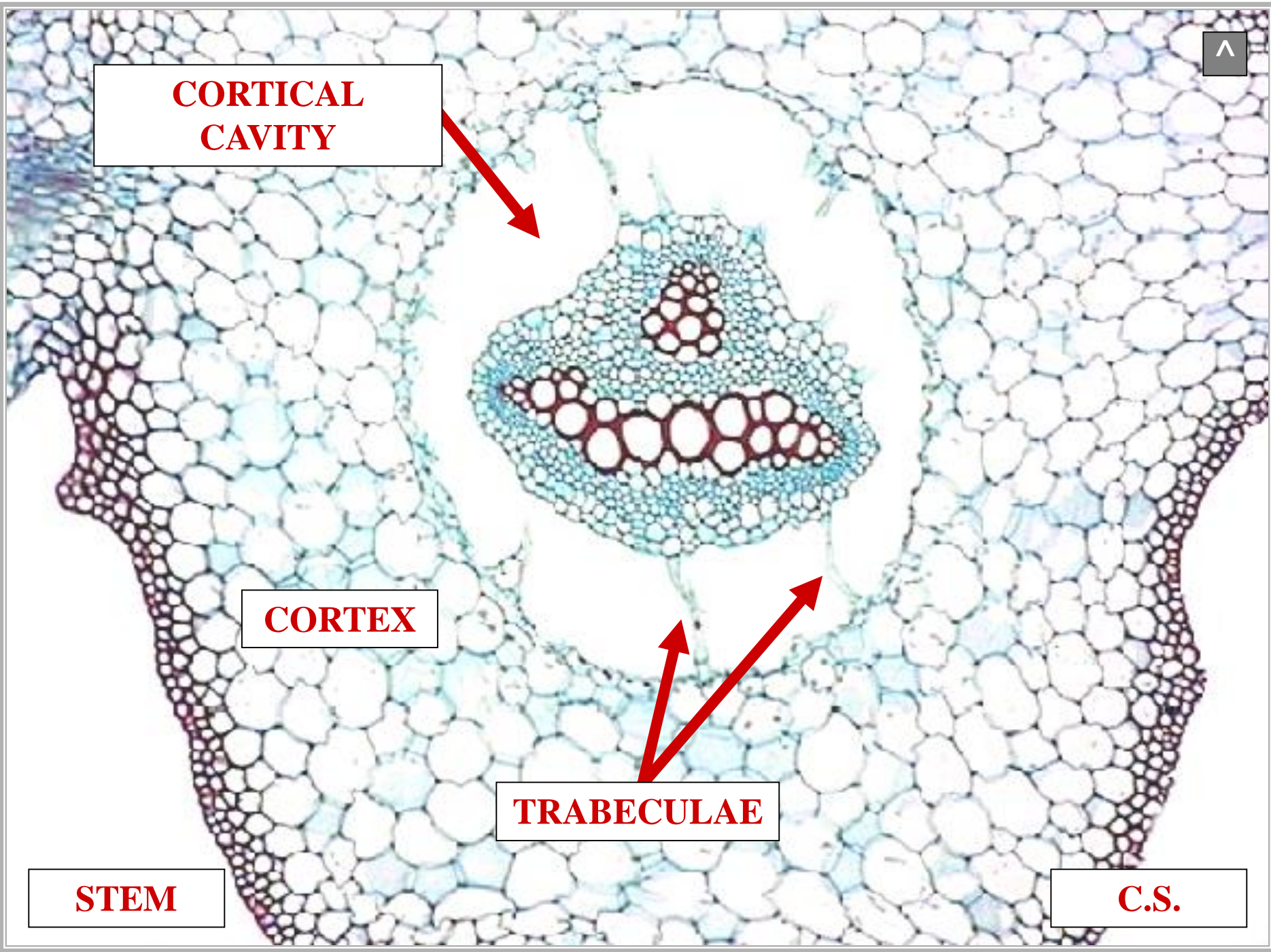
**CORTICAL
CAVITY**

CORTEX

TRABECULAE

STEM

C.S.



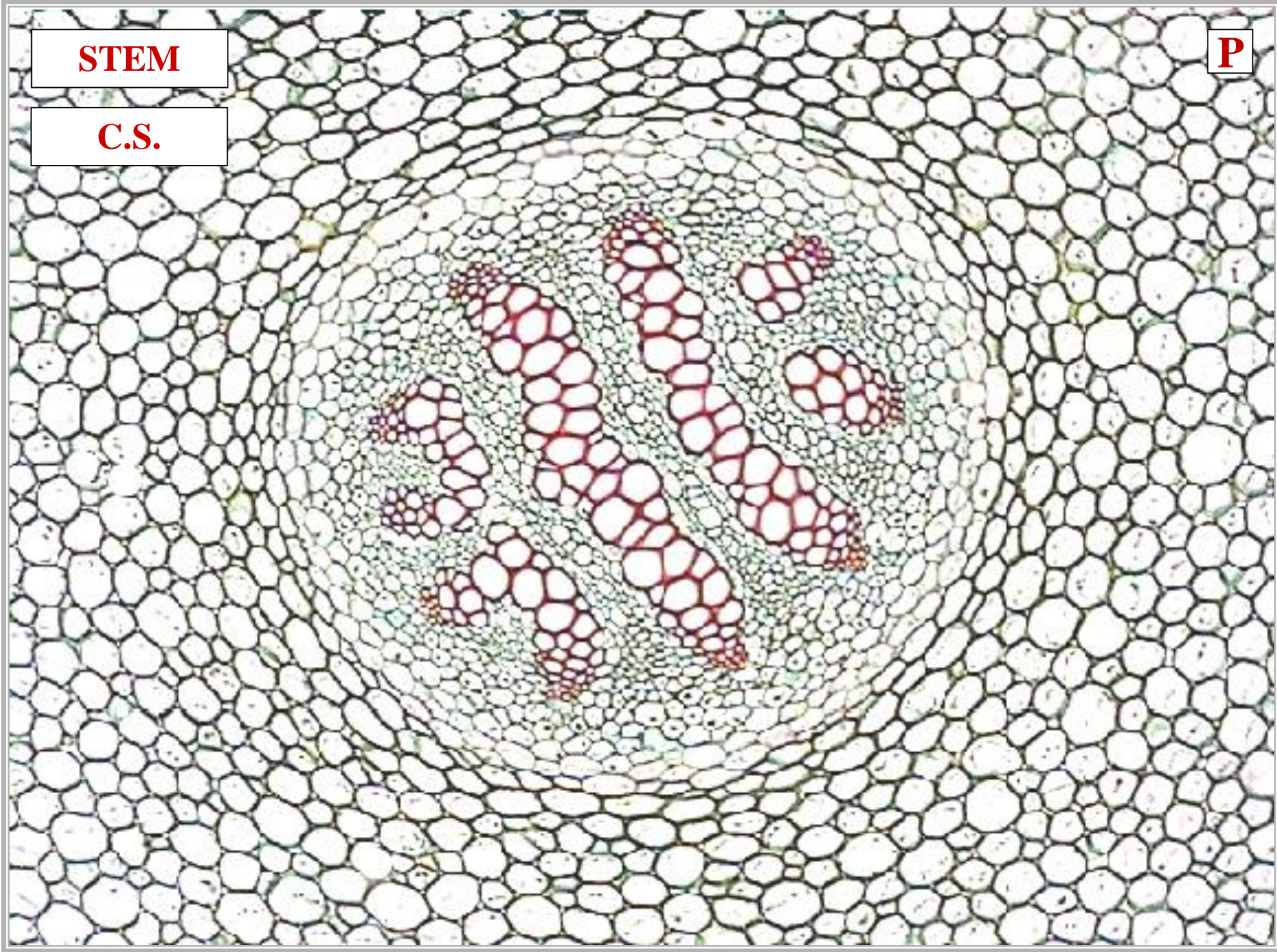


STEM STELE

STEM

C.S.

P

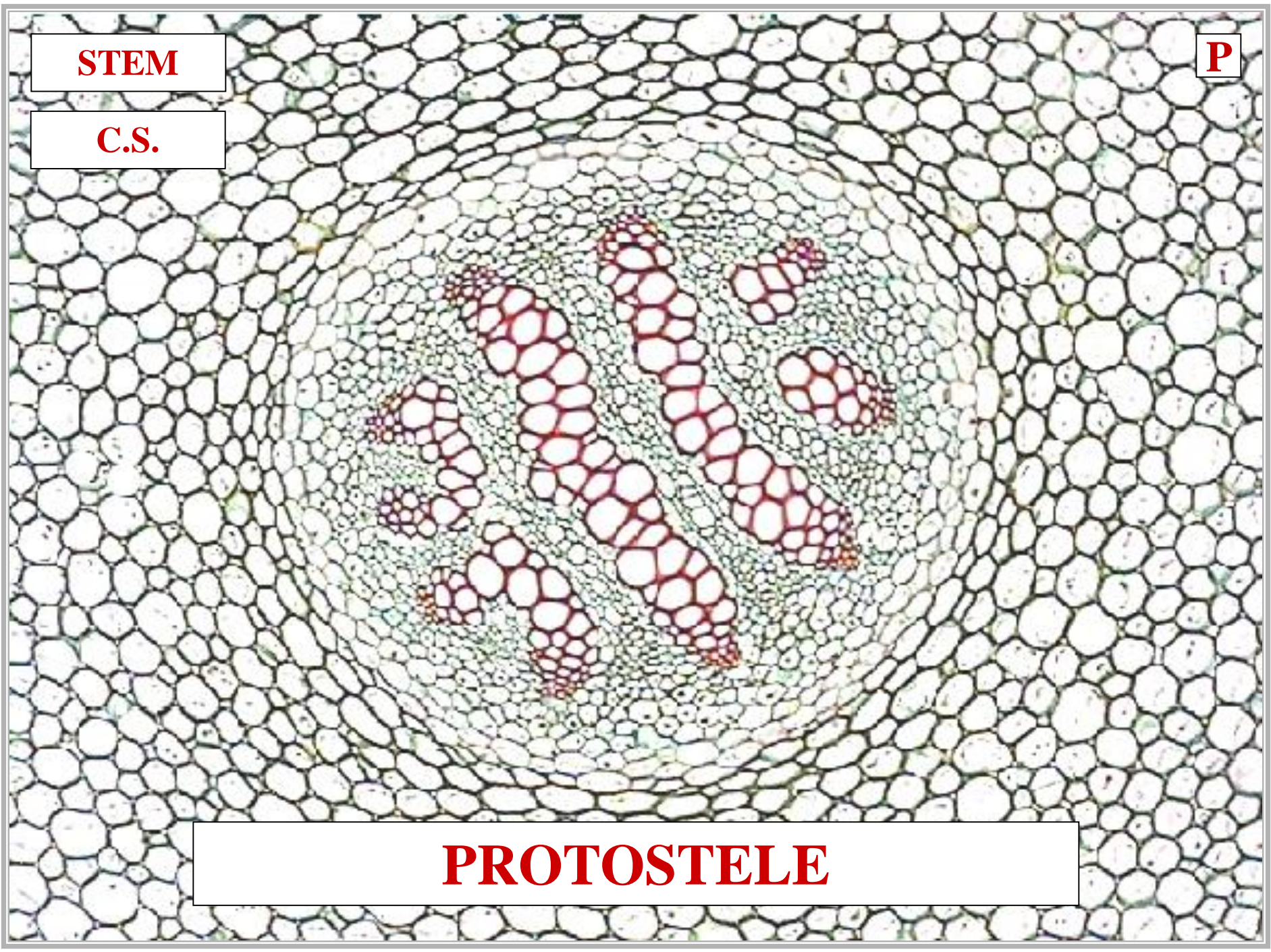


STEM

C.S.

P

PROTOSTELE

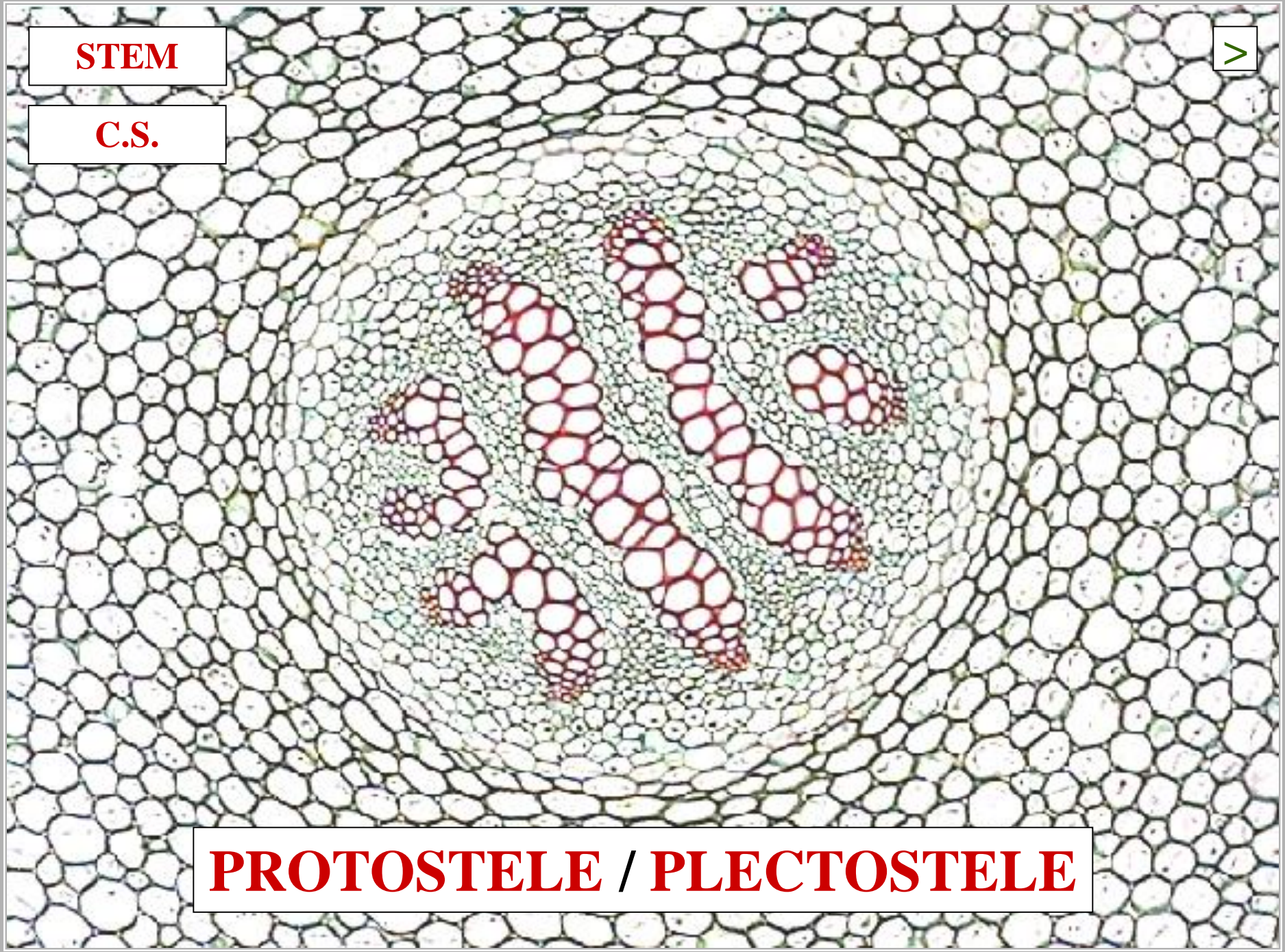


STEM

C.S.



PROTOSTELE / PLECTOSTELE



STEM

C.S.

X



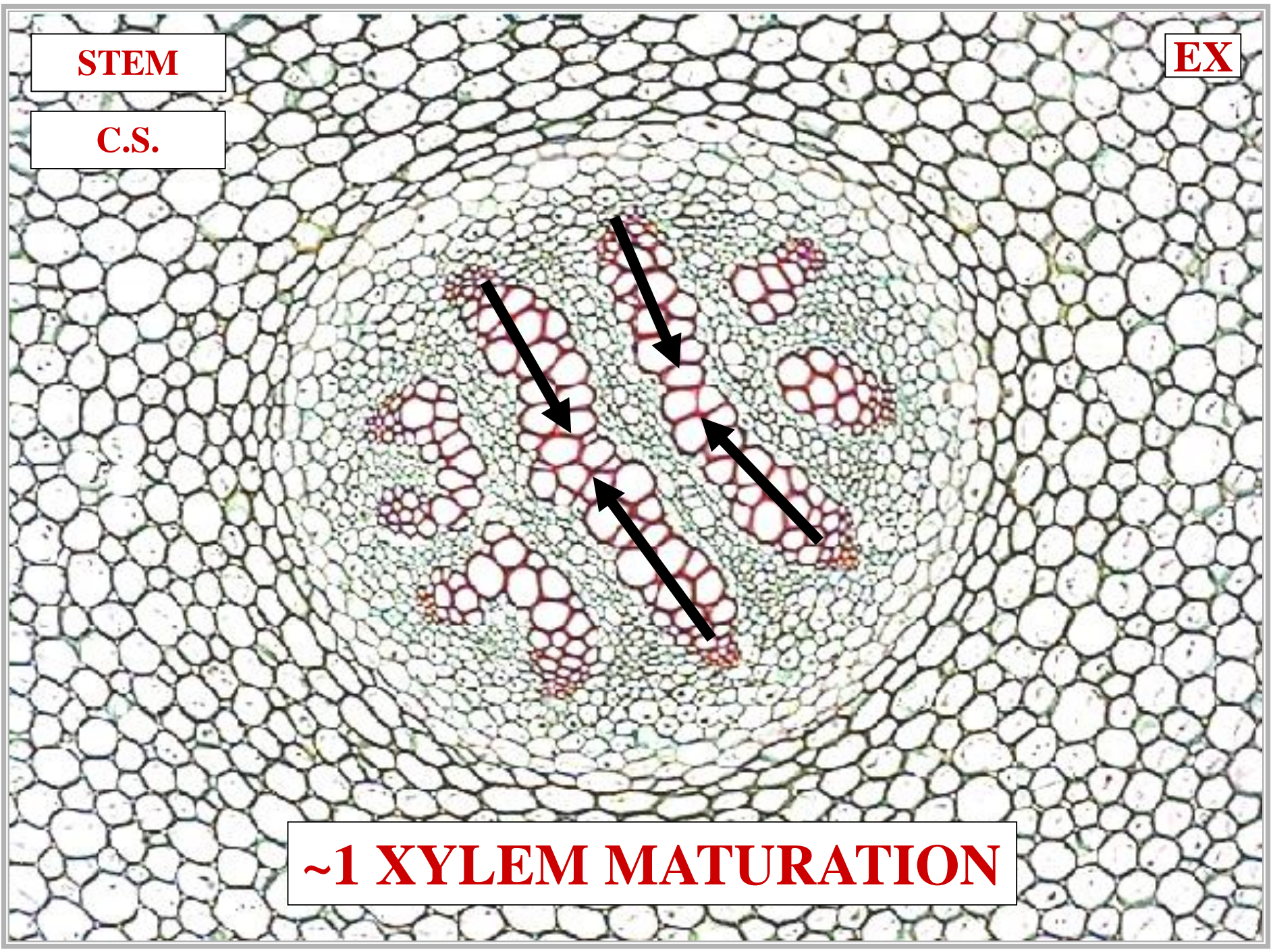
PLECTOSTELE / DIAGNOSTIC

STEM

C.S.

EX

~1 XYLEM MATURATION

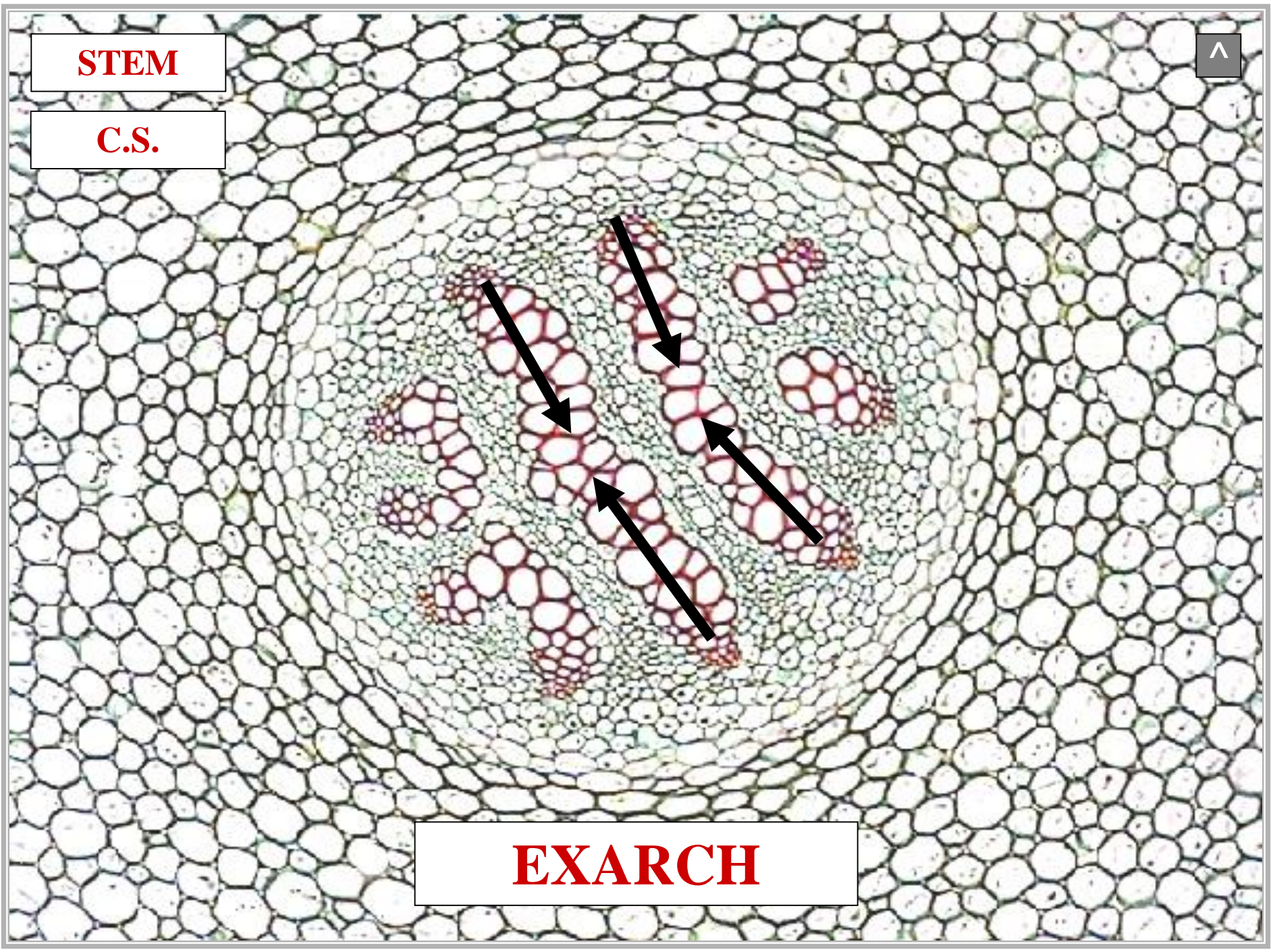


STEM

C.S.



EXARCH



RHIZOME

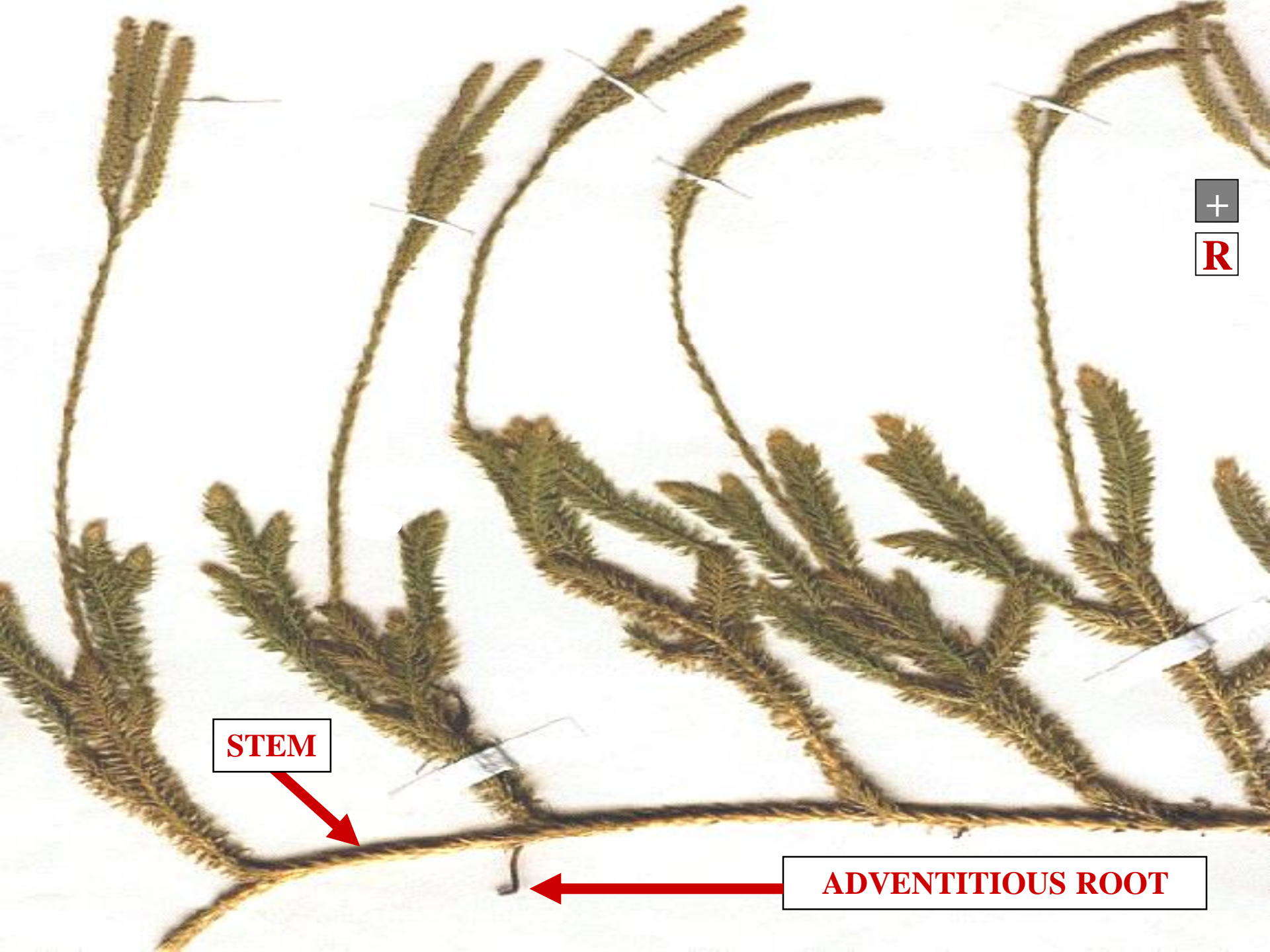
RHIZOME



RHIZOME

**UNDERGROUND
STEM**

RHIZOME

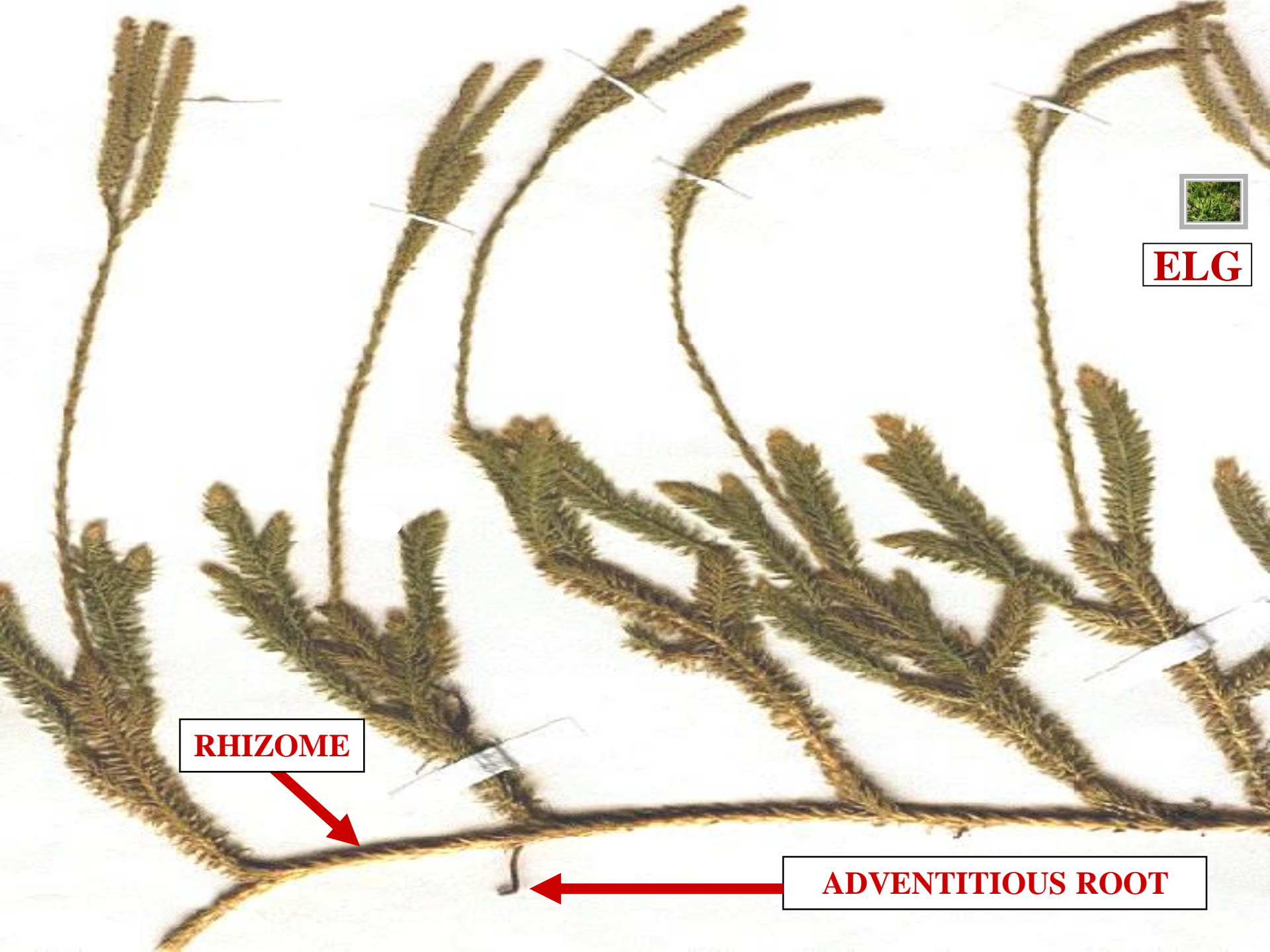


+

R

STEM

ADVENTITIOUS ROOT



ELG

RHIZOME



ADVENTITIOUS ROOT

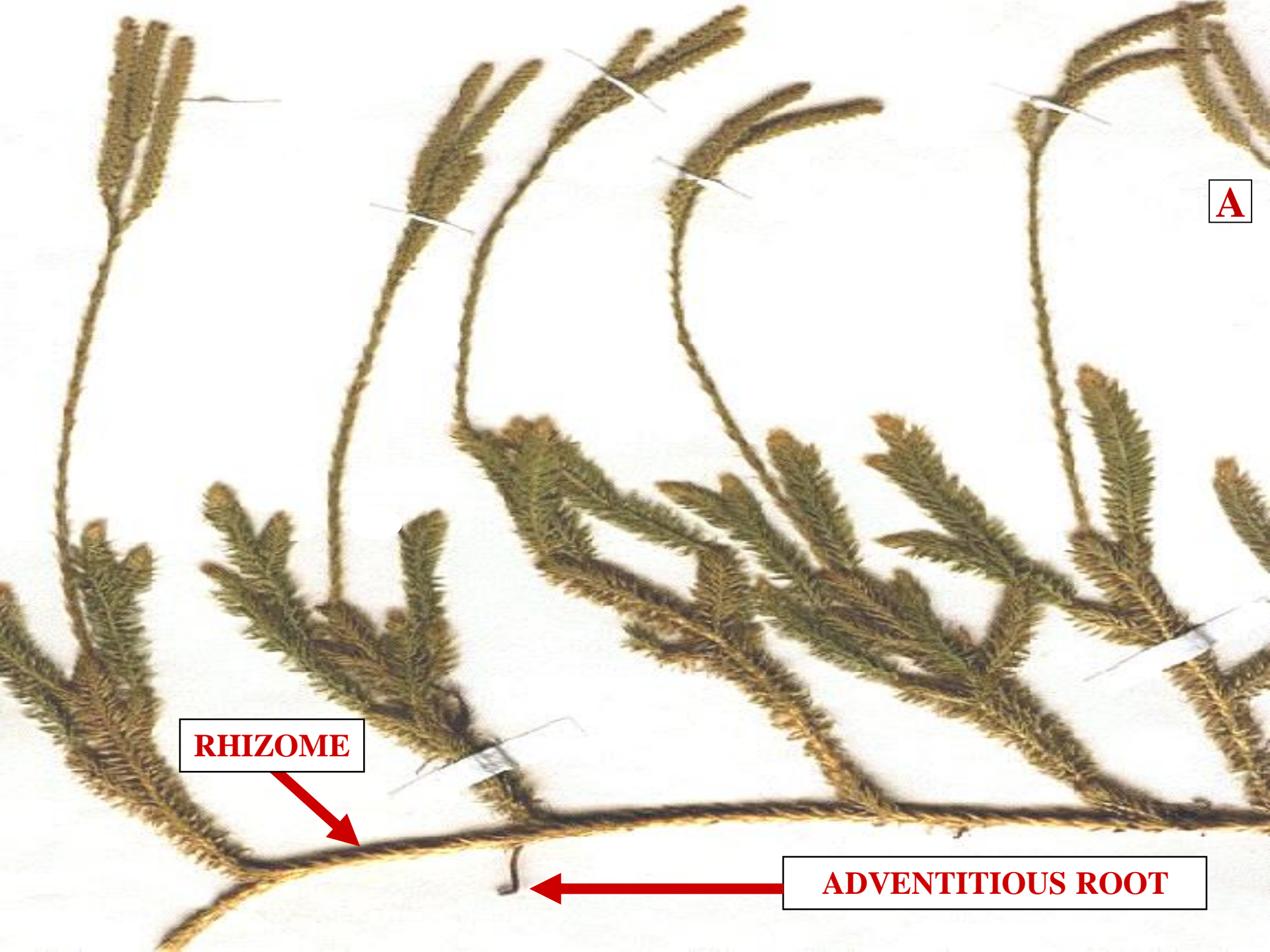


**RHIZOME
EXTENSIVE
LATERAL GROWTH**





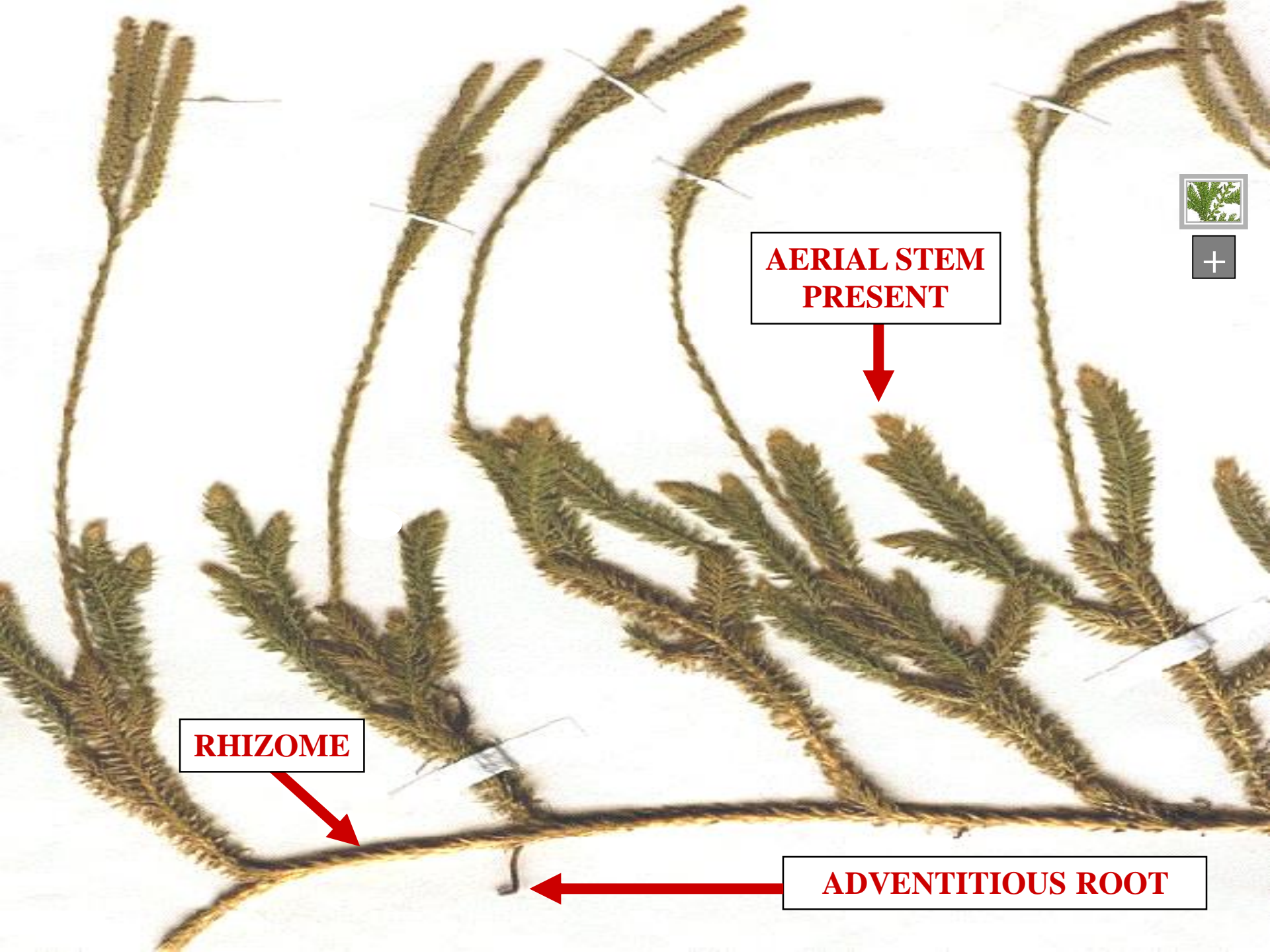
AERIAL STEM



A

RHIZOME

ADVENTITIOUS ROOT



**AERIAL STEM
PRESENT**



RHIZOME



ADVENTITIOUS ROOT

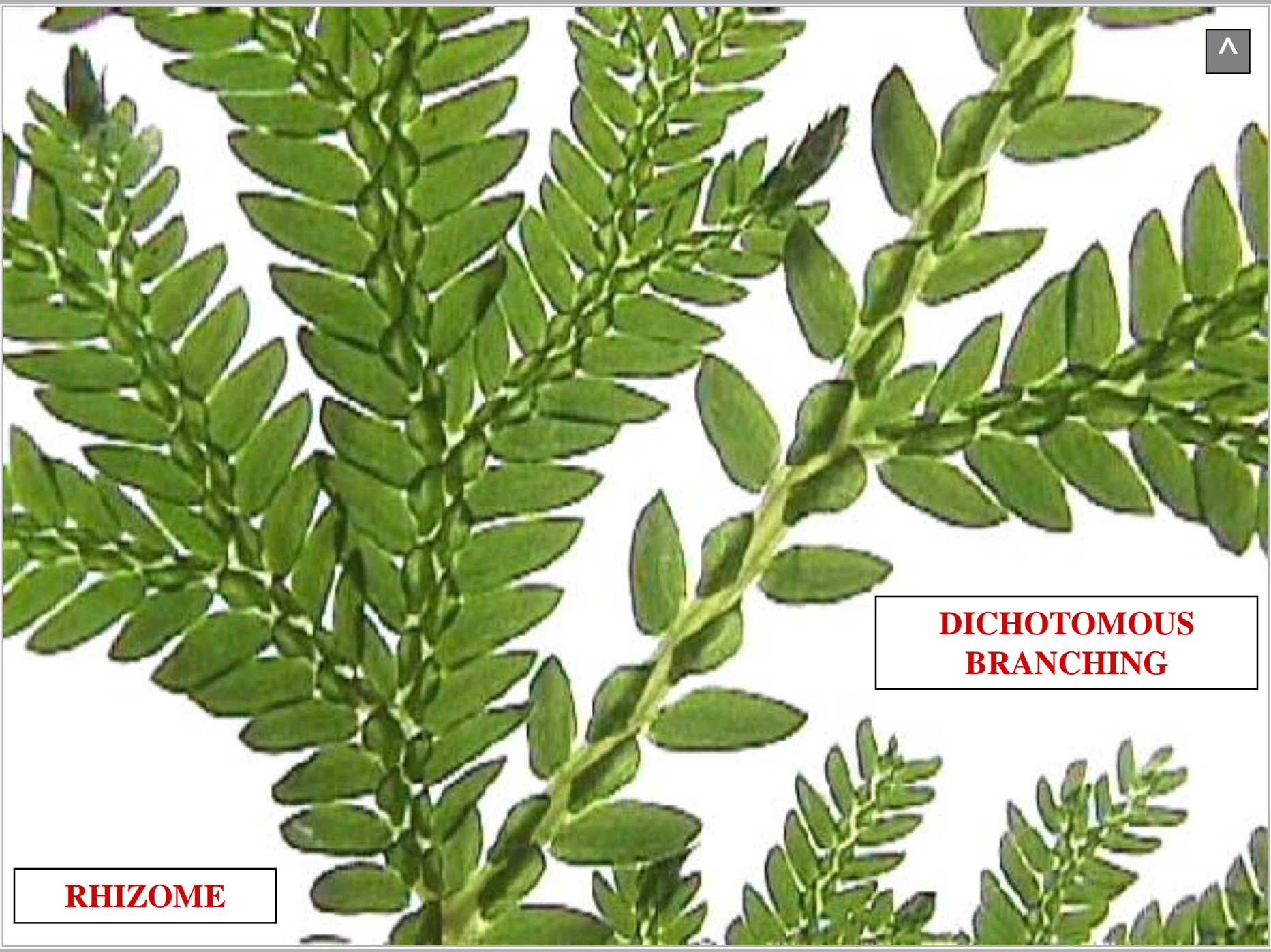


D



**AERIAL STEM
BRANCHING**

RHIZOME



**DICHOTOMOUS
BRANCHING**

RHIZOME



LEAF

L

LYCOPODIOPHYTA





LYCOPHYTES

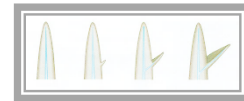
LYCOPODIOPHYTA



MICROPHYLLS

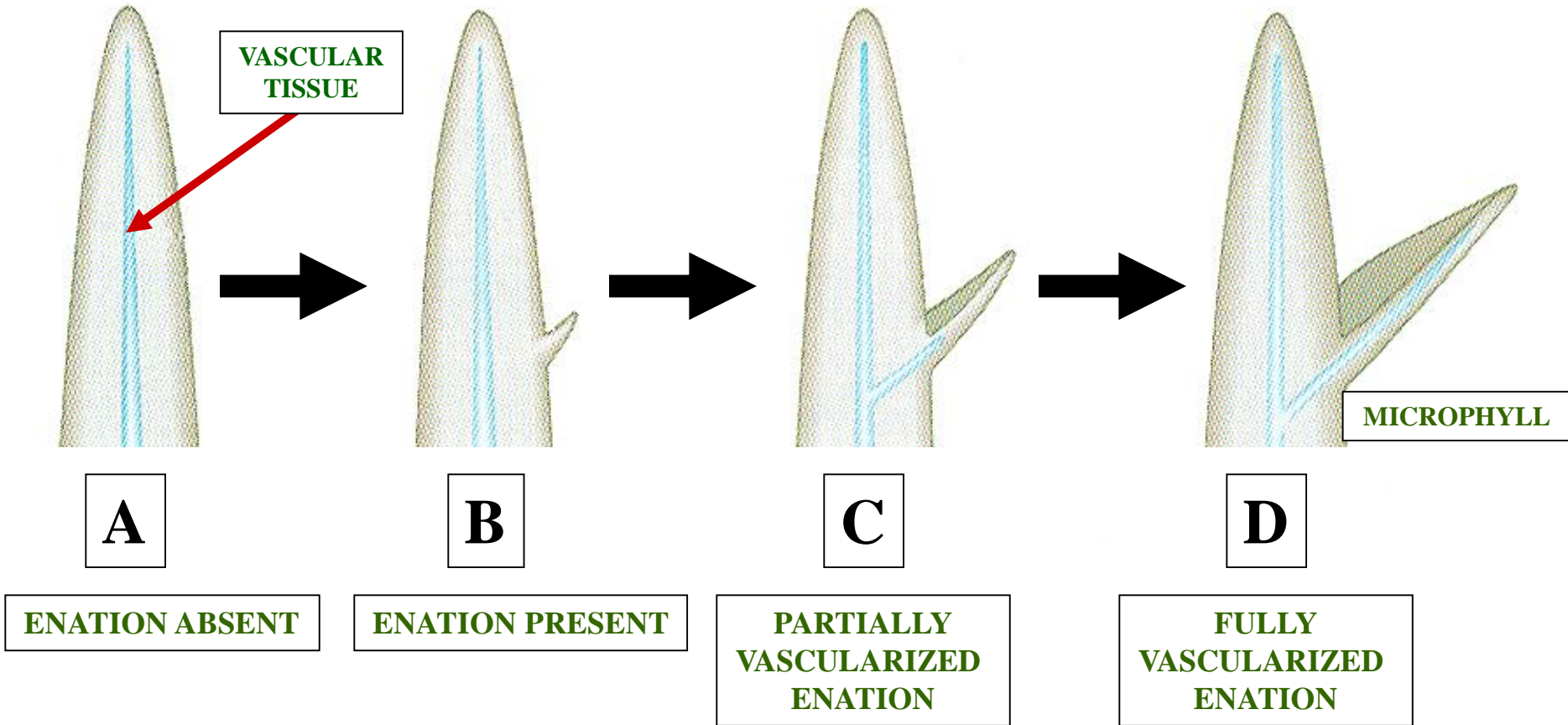
LYCOPHYTES

LYCOPODIOPHYTA



LEAF EVOLUTION

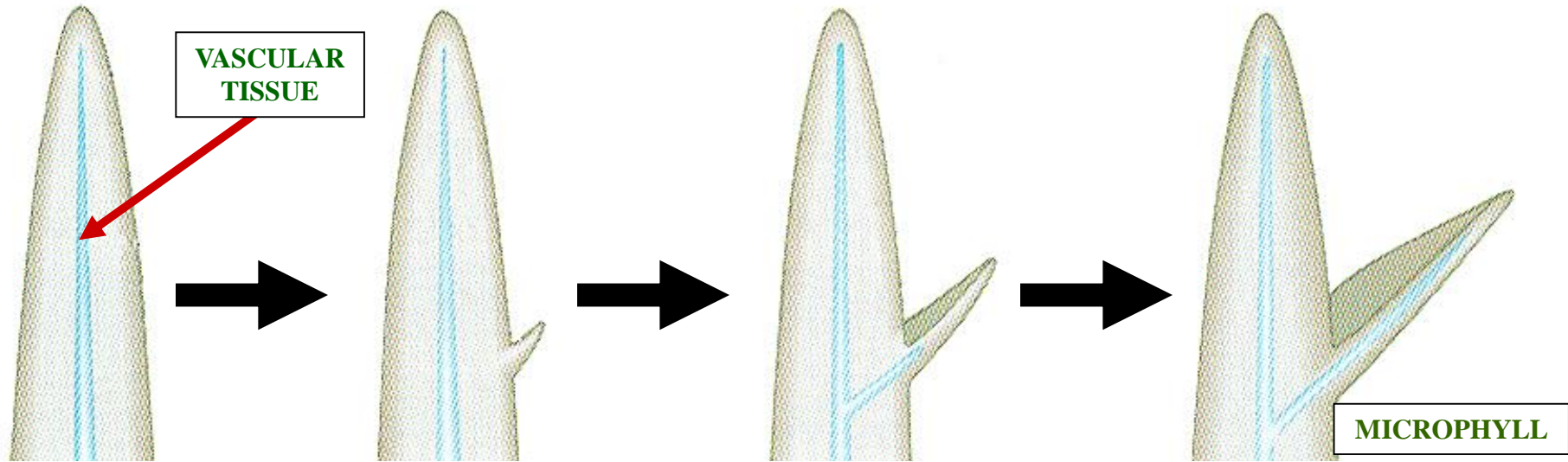
THEORY



➔ = TIME

MICROPHYLL

ENATION THEORY



A

B

C

D

ENATION ABSENT

ENATION PRESENT

PARTIALLY
VASCULARIZED
ENATION

FULLY
VASCULARIZED
ENATION

➔ = TIME

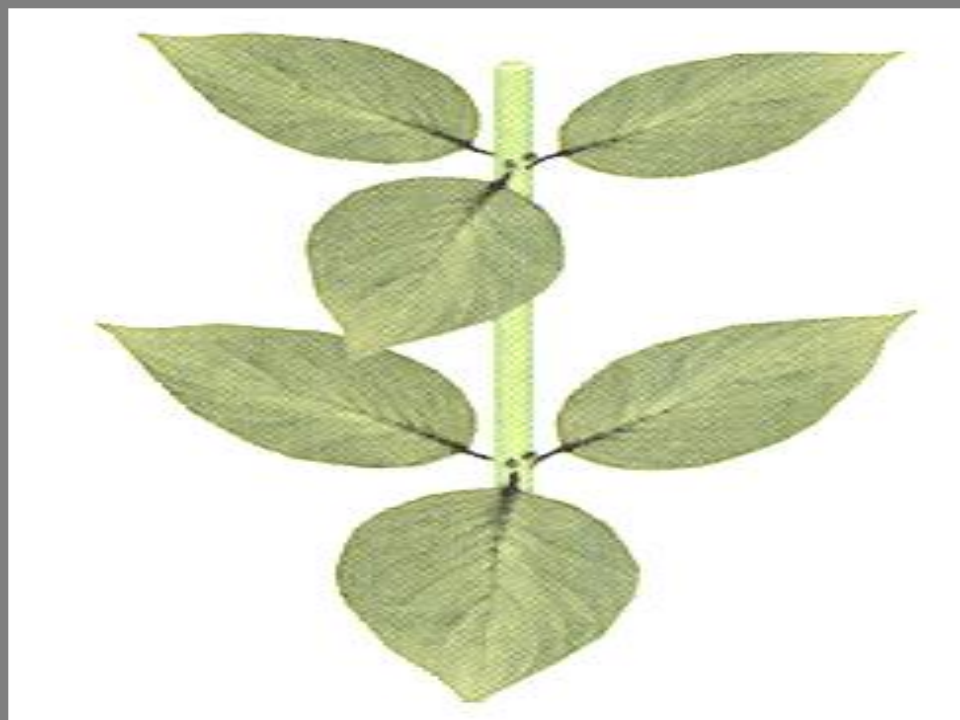
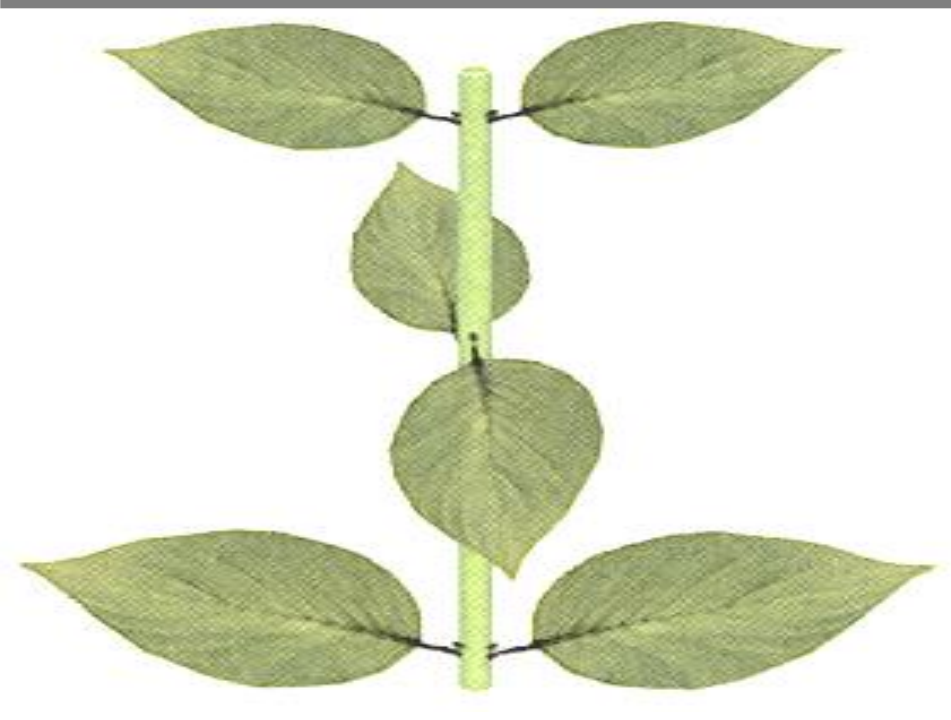
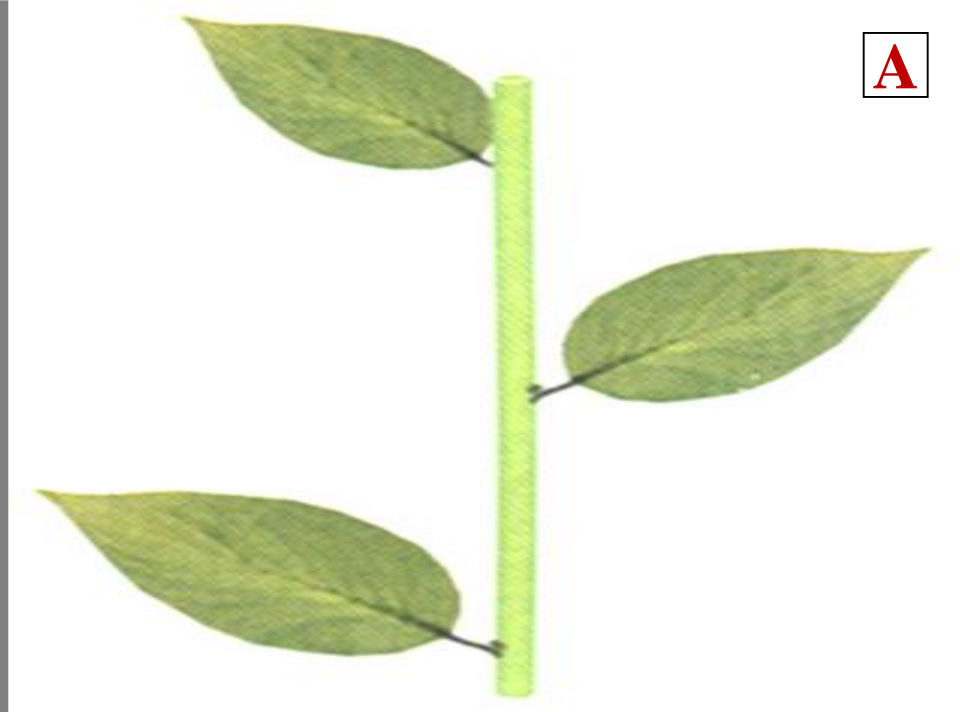
MICROPHYLL



LEAF PHYLLOTAXY



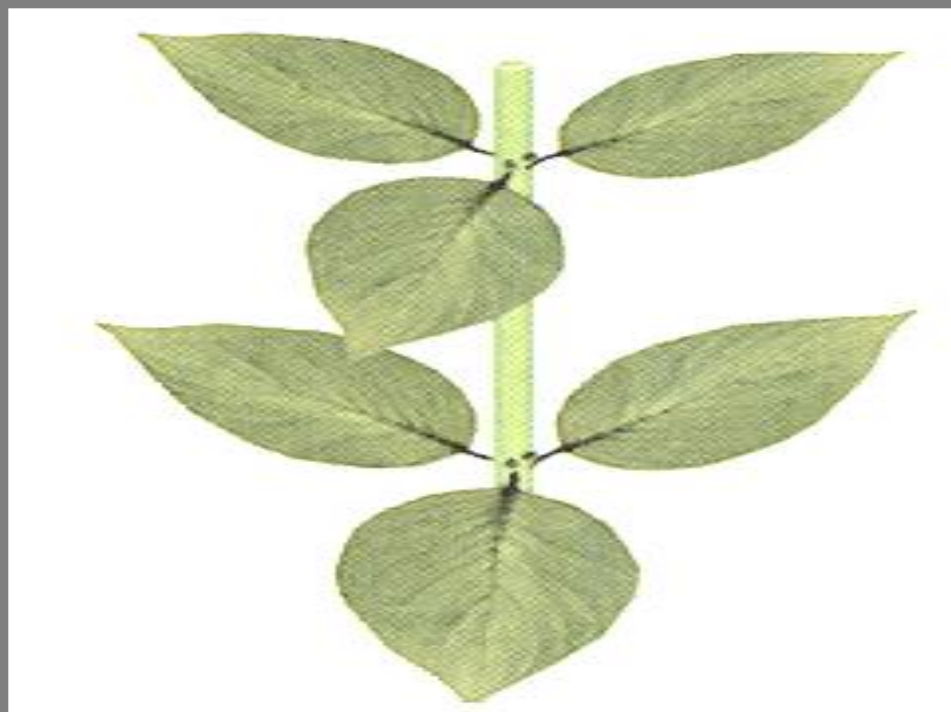
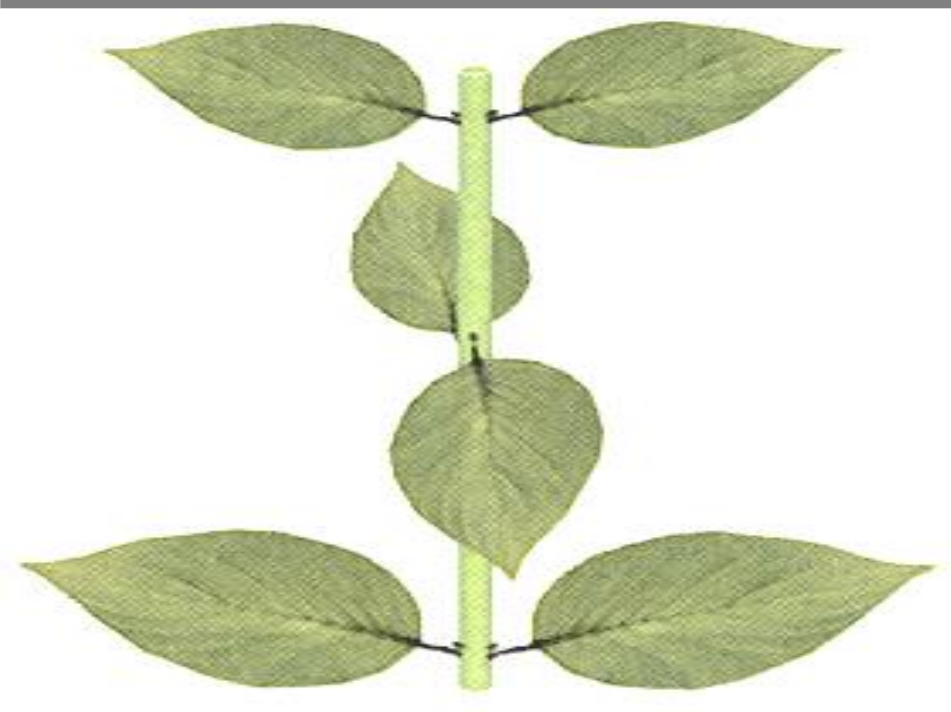
LYCOPHYTES





O

ALTERNATE

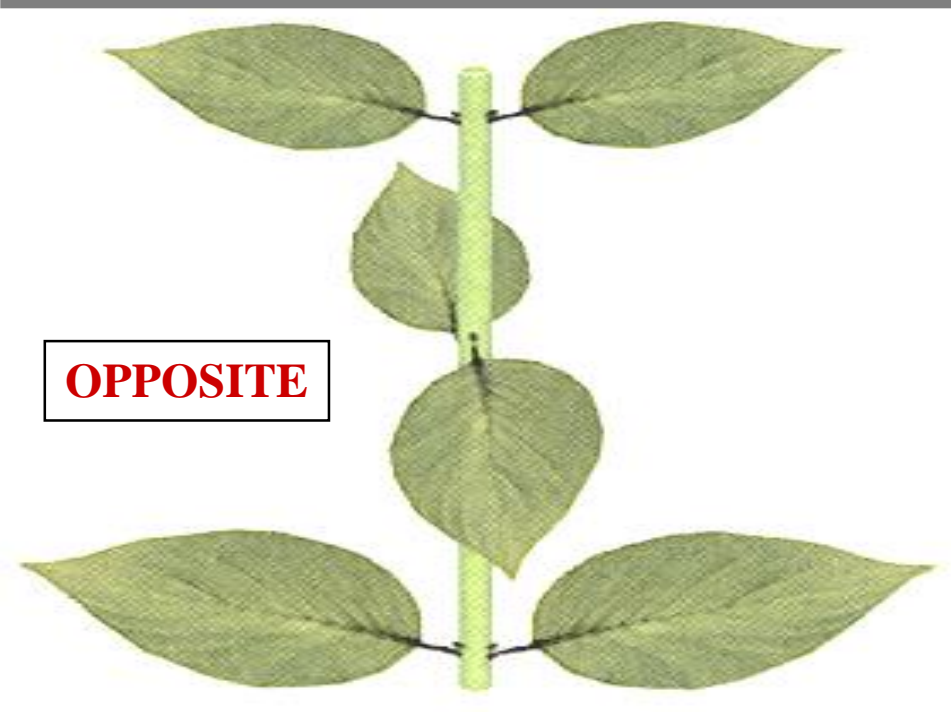




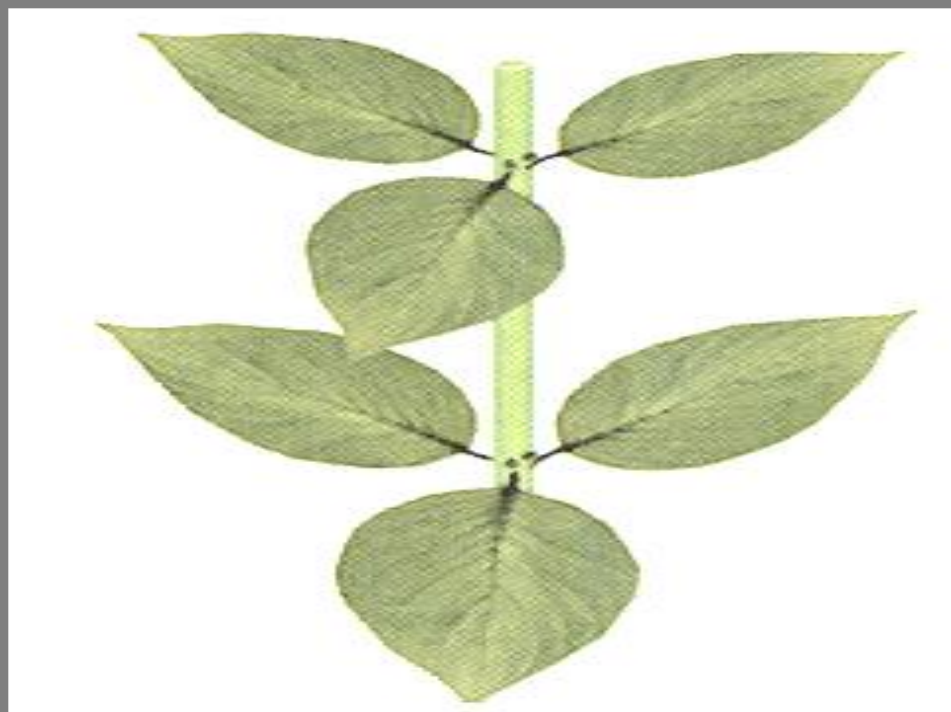
LYCOPHYTES



ALTERNATE



OPPOSITE

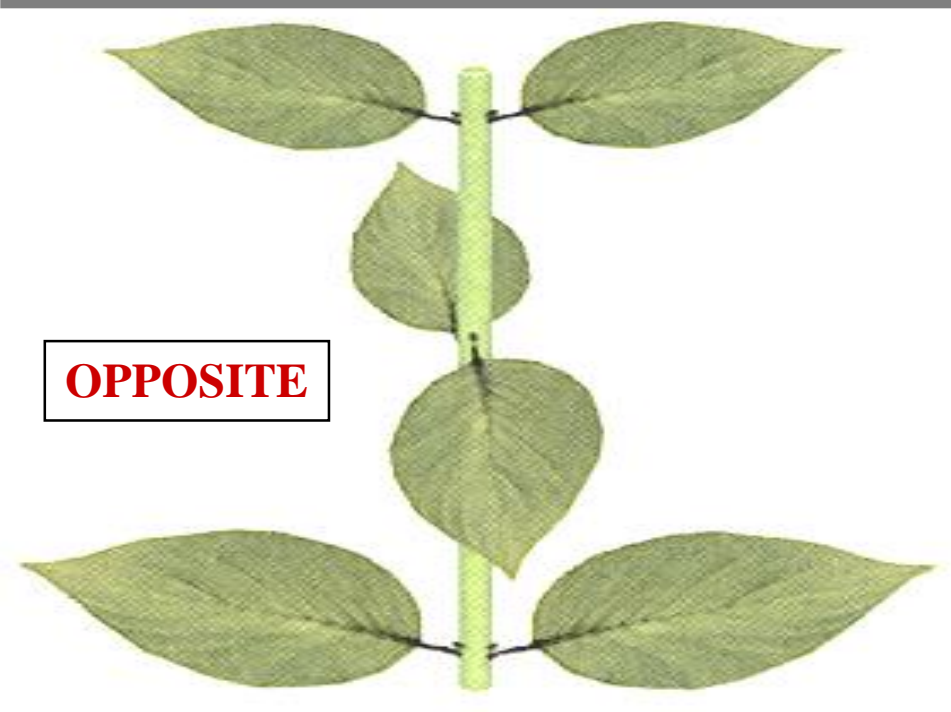




LYCOPHYTES



ALTERNATE



OPPOSITE



WHORLED

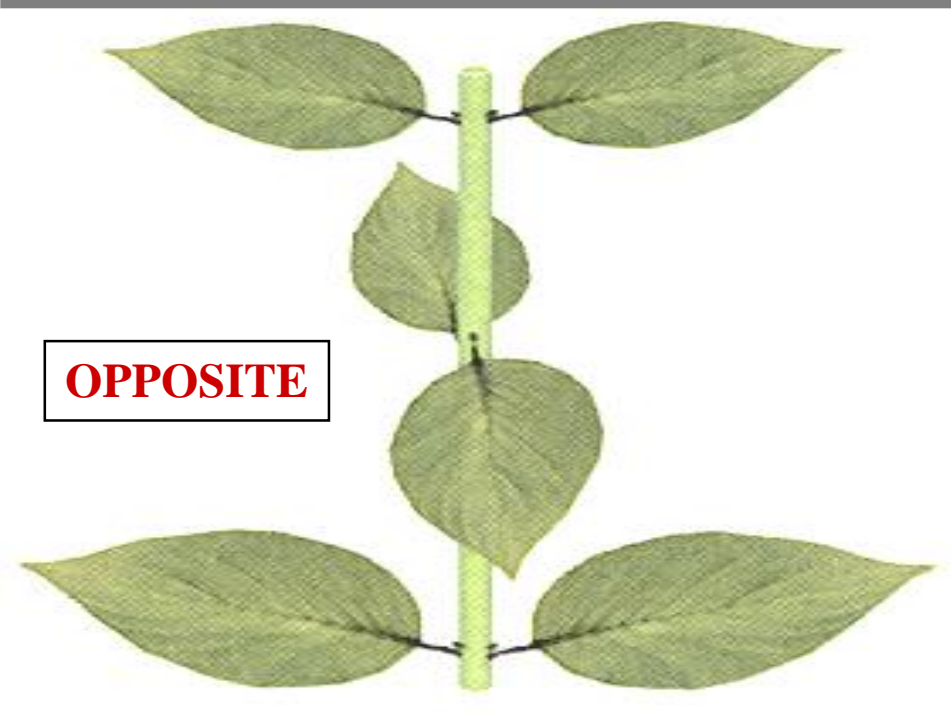


ALTERNATE

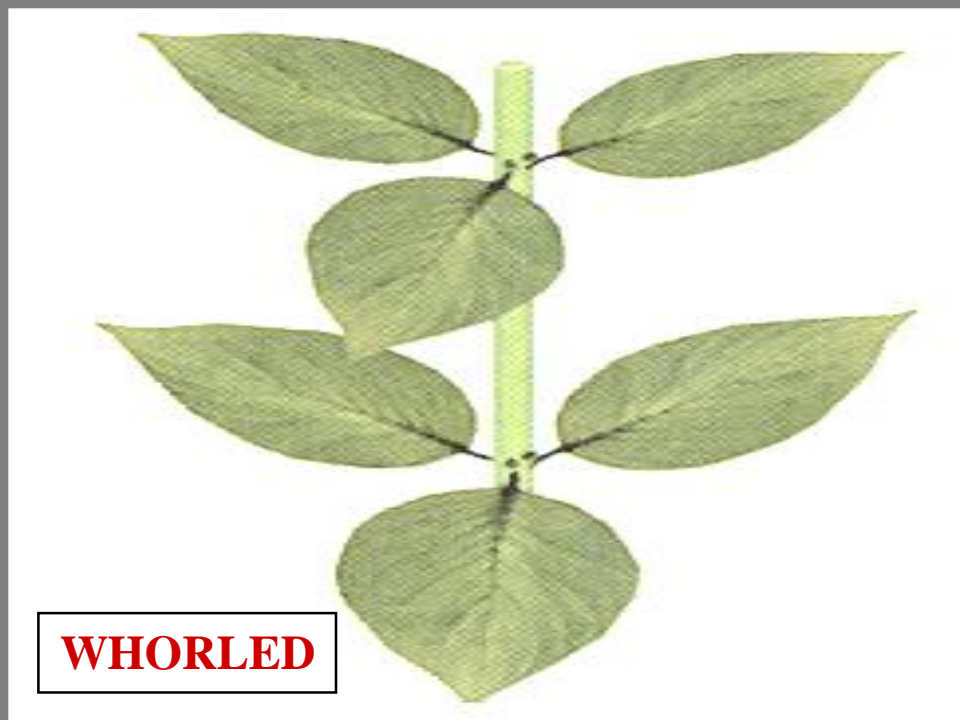
LYCOPHYTES



ALTERNATE



OPPOSITE



WHORLED



LEAF MORPHOLOGY

**ISOPHYLLOUS
LEAVES**

VS

**ANISOPHYLLOUS
LEAVES**

ISOPHYLLOUS LEAVES

ISOPHYLLOUS LEAVES



1 MORPHOLOGICAL LEAF FORM

ISOPHYLLOUS LEAVES

A

ISOPHYLLOUS LEAVES



ANISOPHYLLOUS LEAVES

ANISOPHYLLOUS LEAVES



**2 MORPHOLOGICAL
LEAF FORMS**

**ANISOPHYLLOUS
LEAVES**

L

ANISOPHYLLOUS LEAVES

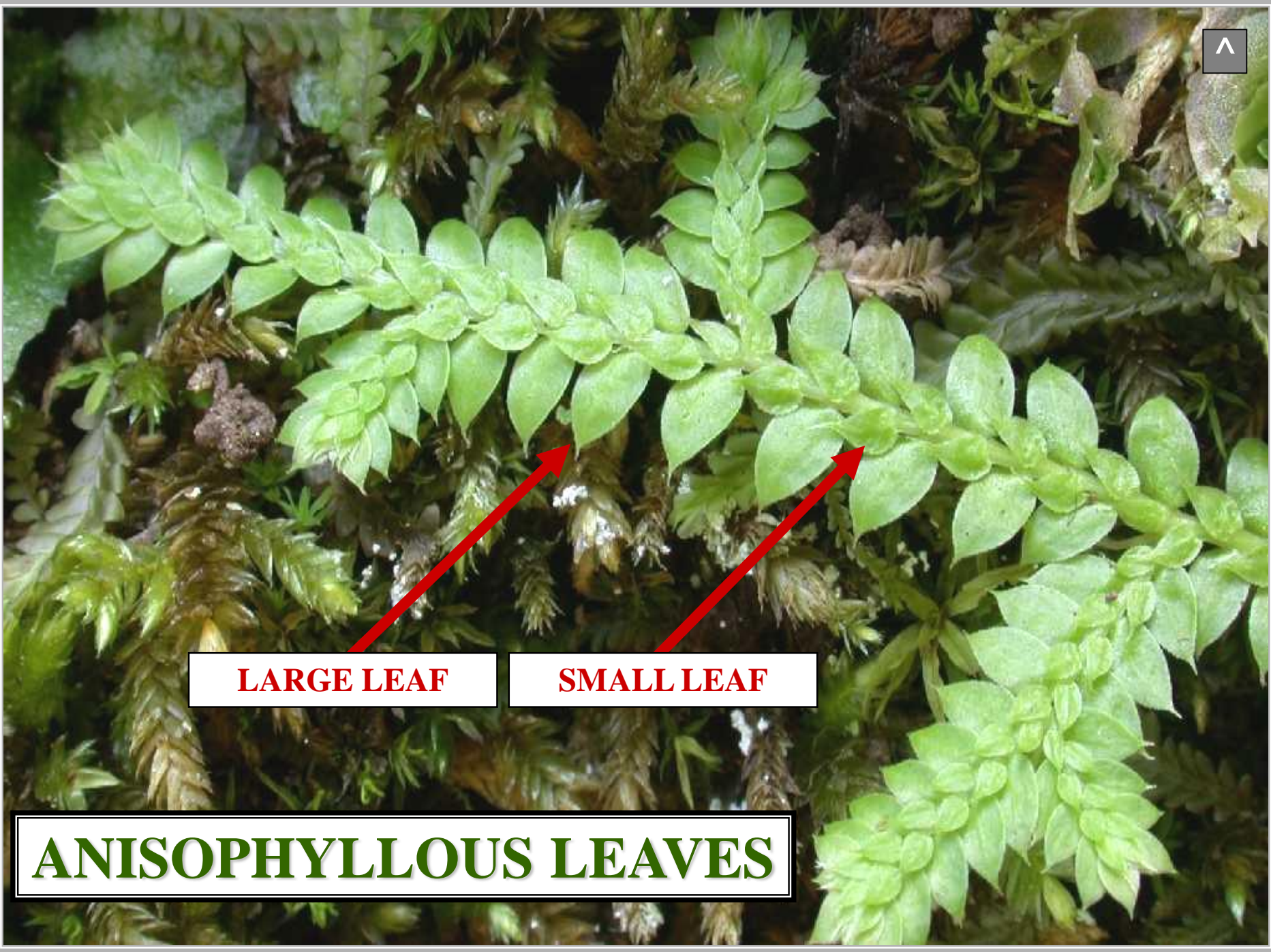


S



LARGE LEAF

ANISOPHYLLOUS LEAVES



LARGE LEAF

SMALL LEAF

ANISOPHYLLOUS LEAVES

LIGULE

LIGULE

LIGULE



**SMALL TONGUE-LIKE
LEAF OUTGROWTH**

LIGULE

LIGULE



SMALL TONGUE-LIKE
LEAF OUTGROWTH

FUNCTION UNKNOWN

LIGULE

LIGULE



SMALL TONGUE-LIKE
LEAF OUTGROWTH

FUNCTION UNKNOWN

PRESENT OR ABSENT

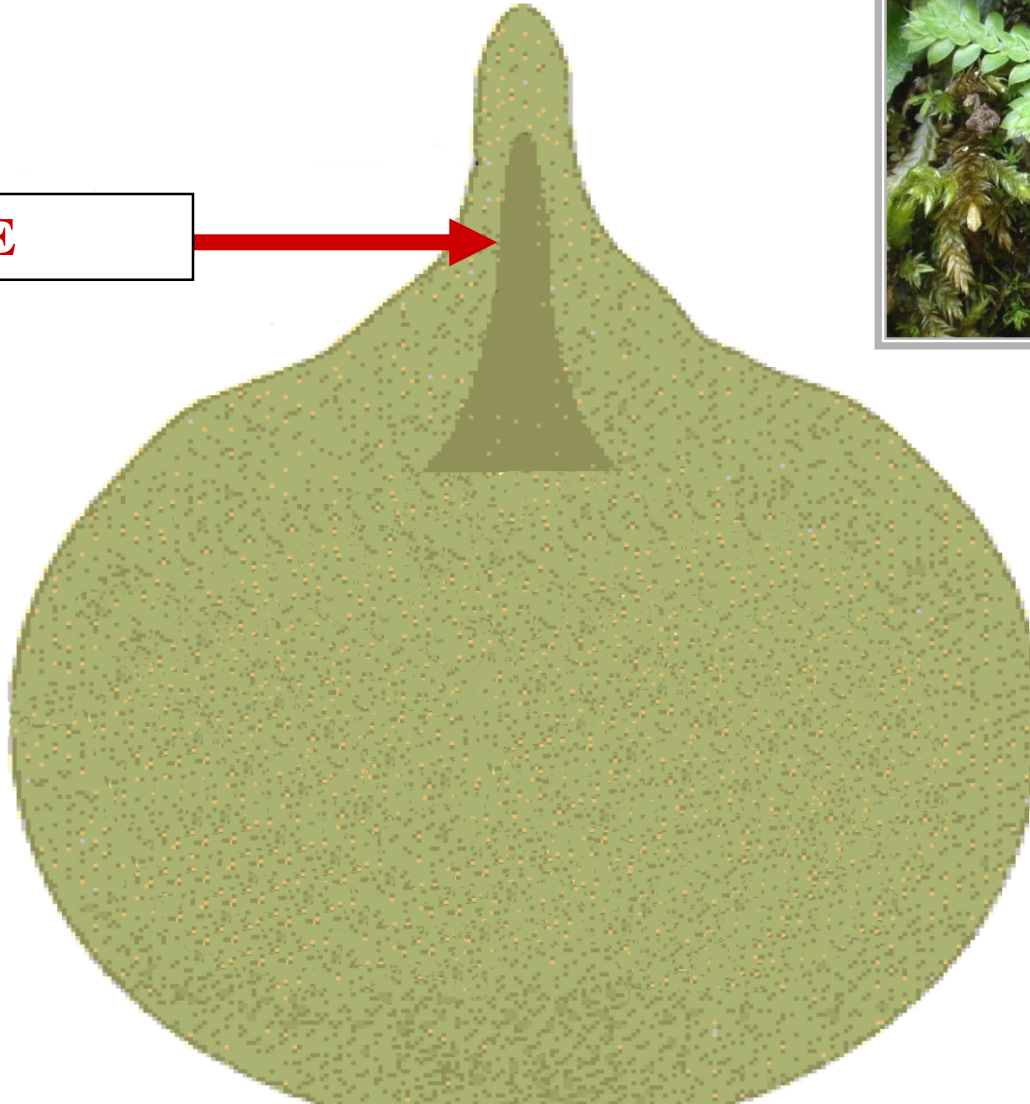
LIGULE

LIGULE

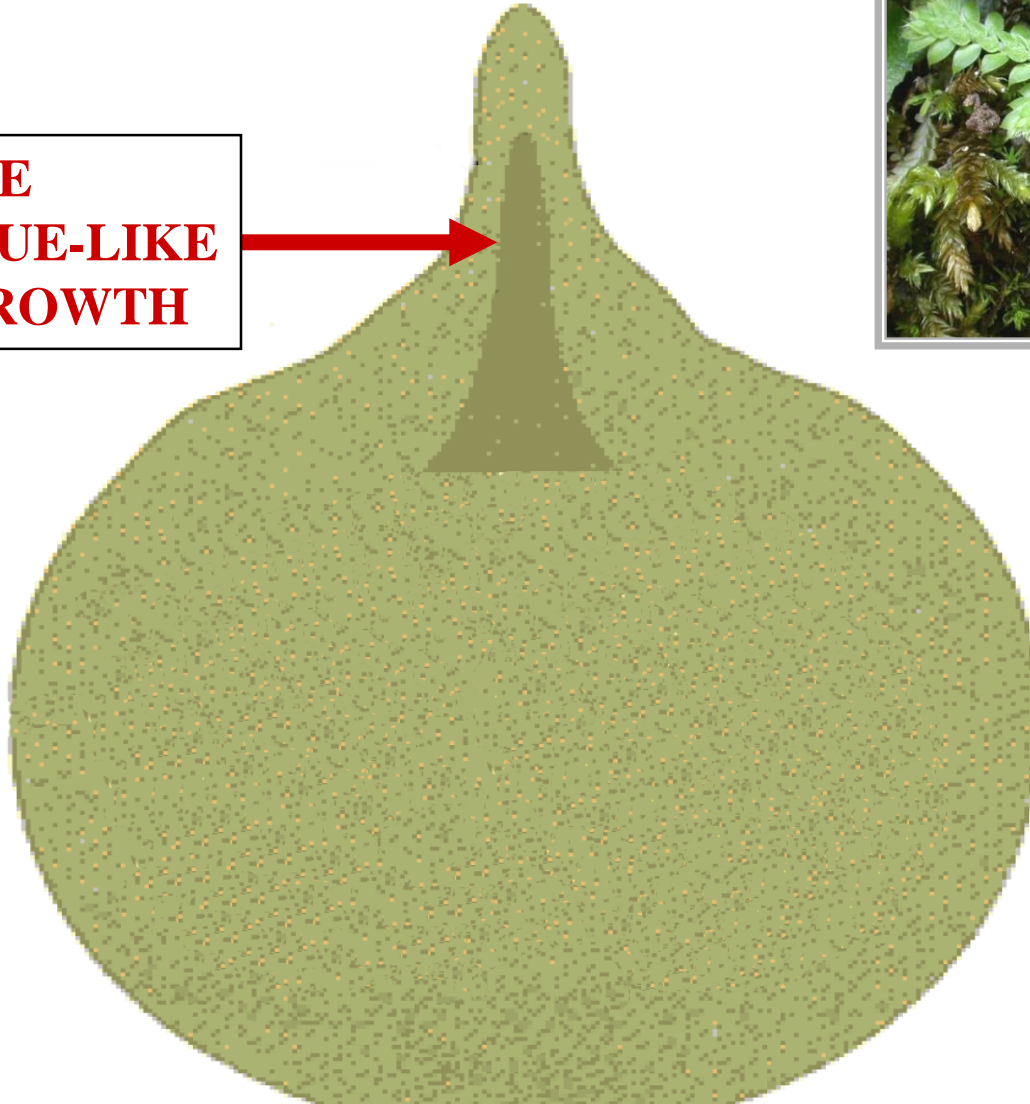


S

MICROPHYLL



LIGULE
SMALL TONGUE-LIKE
LEAF OUTGROWTH



MICROPHYLL

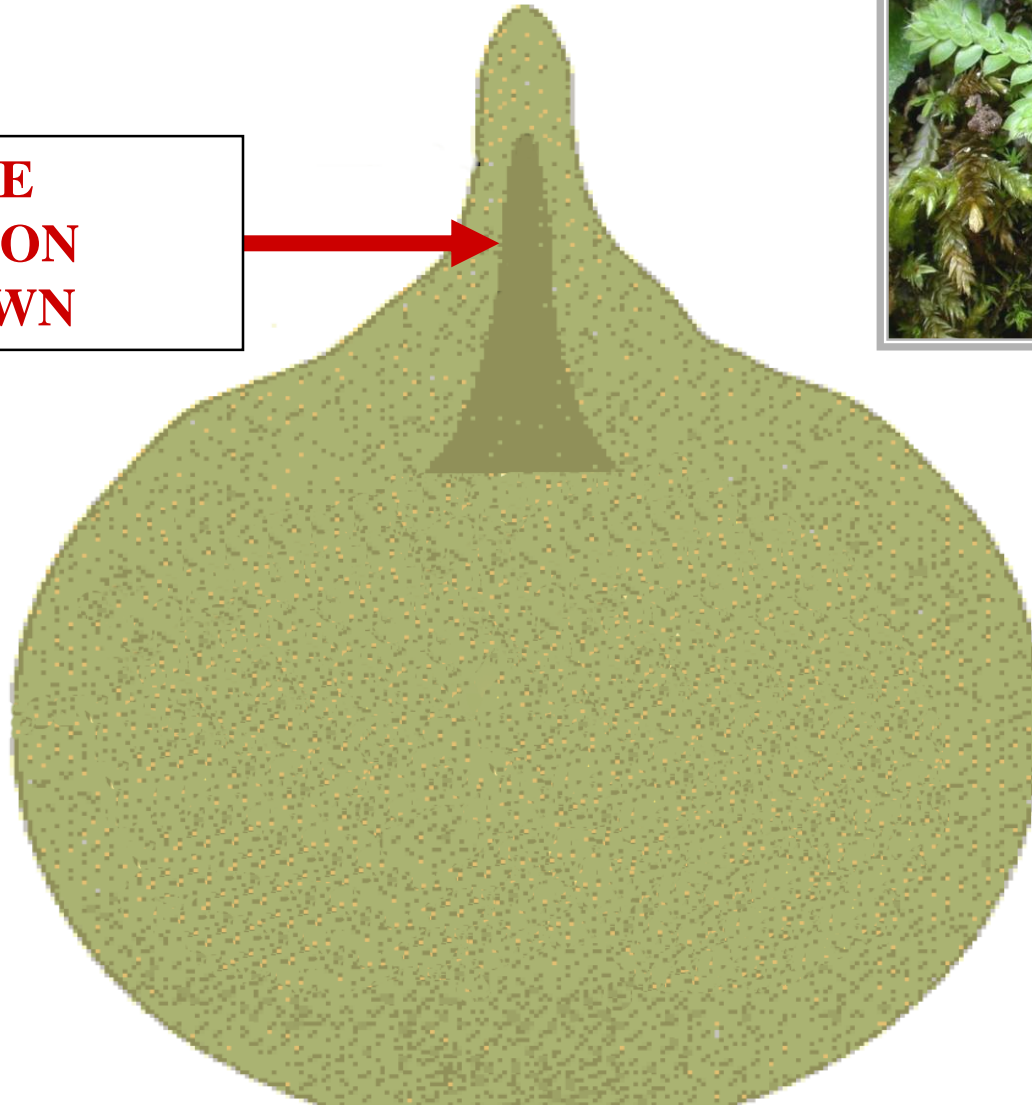


F

**LIGULE
FUNCTION
UNKNOWN**

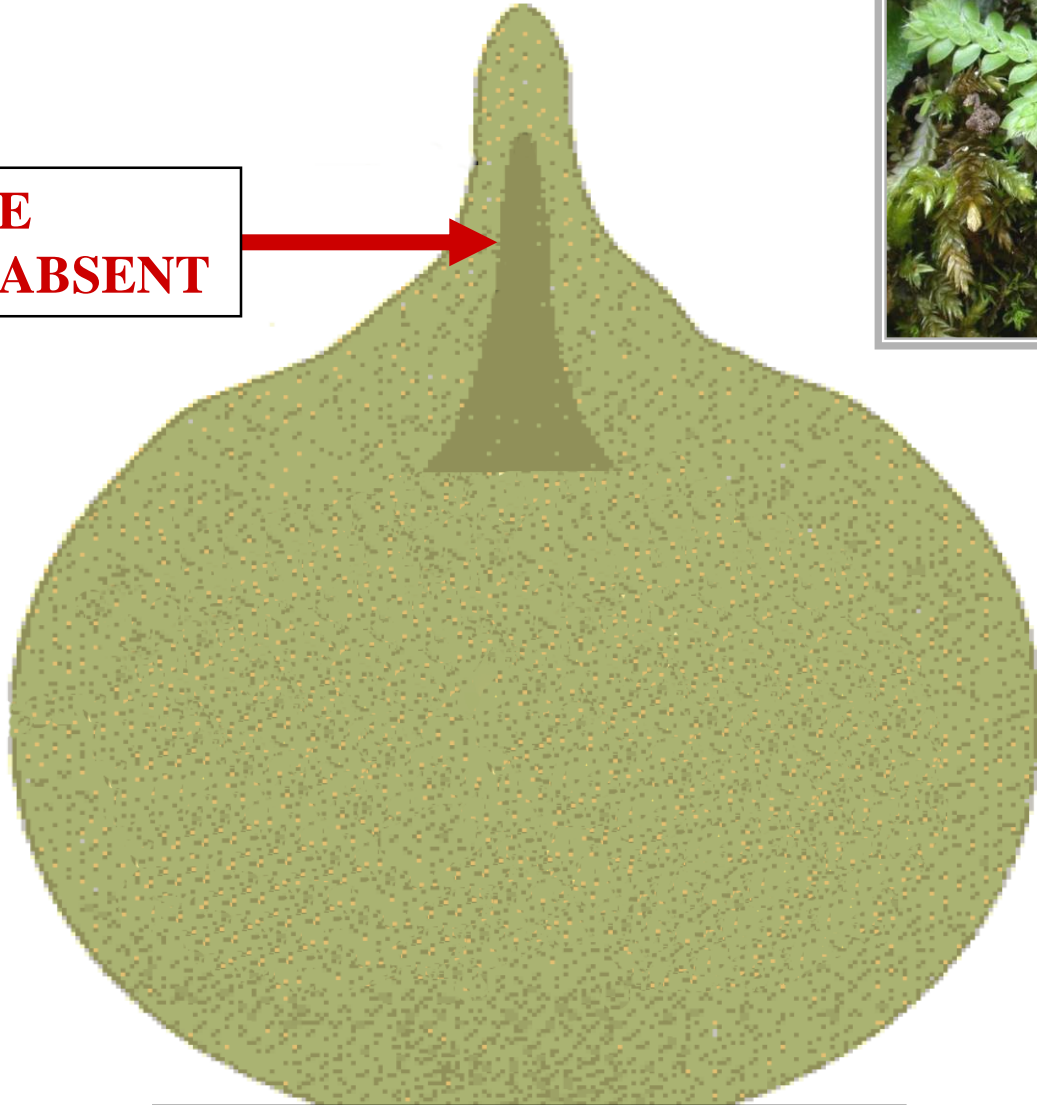


+/-



MICROPHYLL

**LIGULE
PRESENT OR ABSENT**



MICROPHYLL



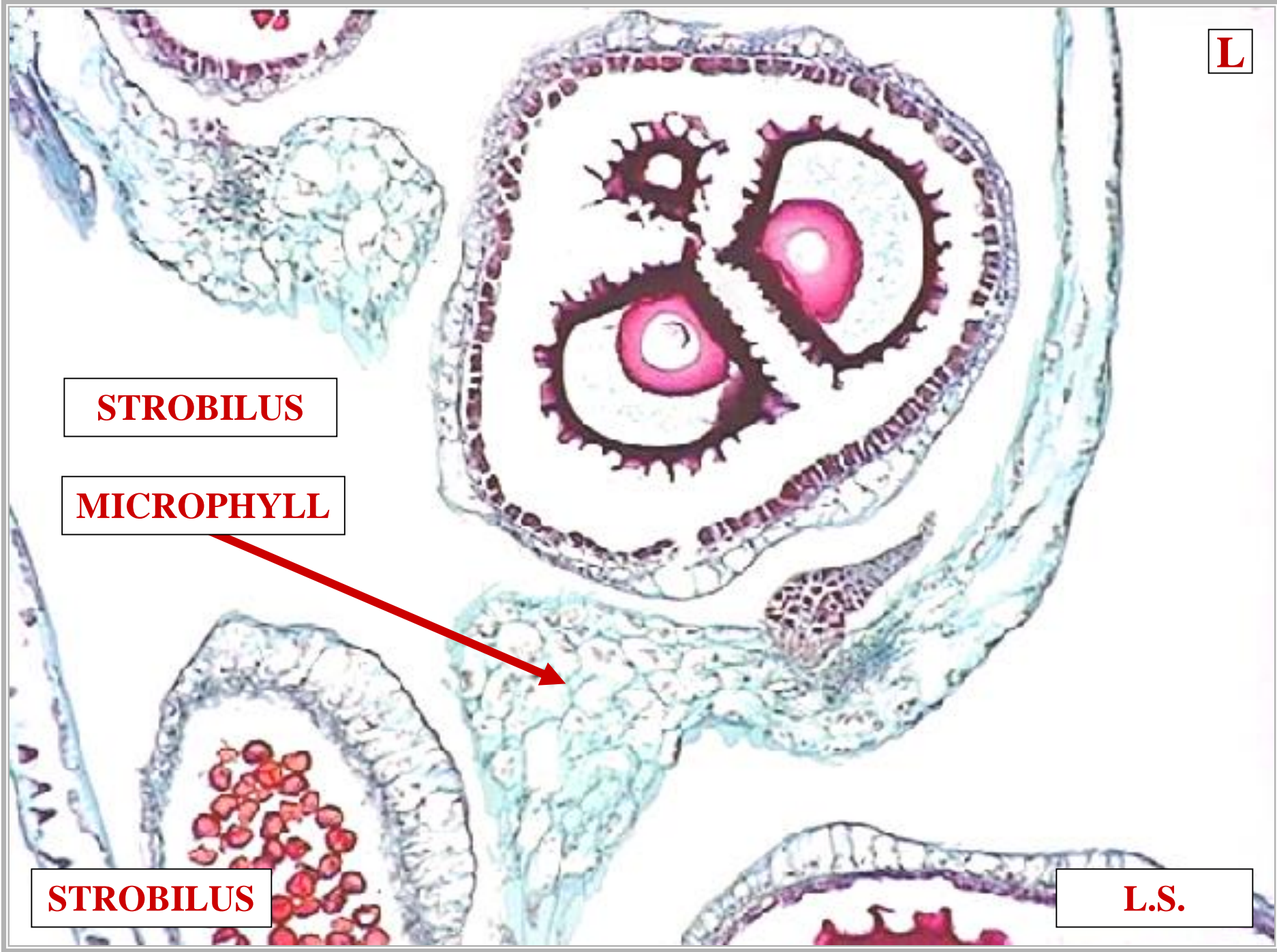
L

STROBILUS

MICROPHYLL

STROBILUS

L.S.





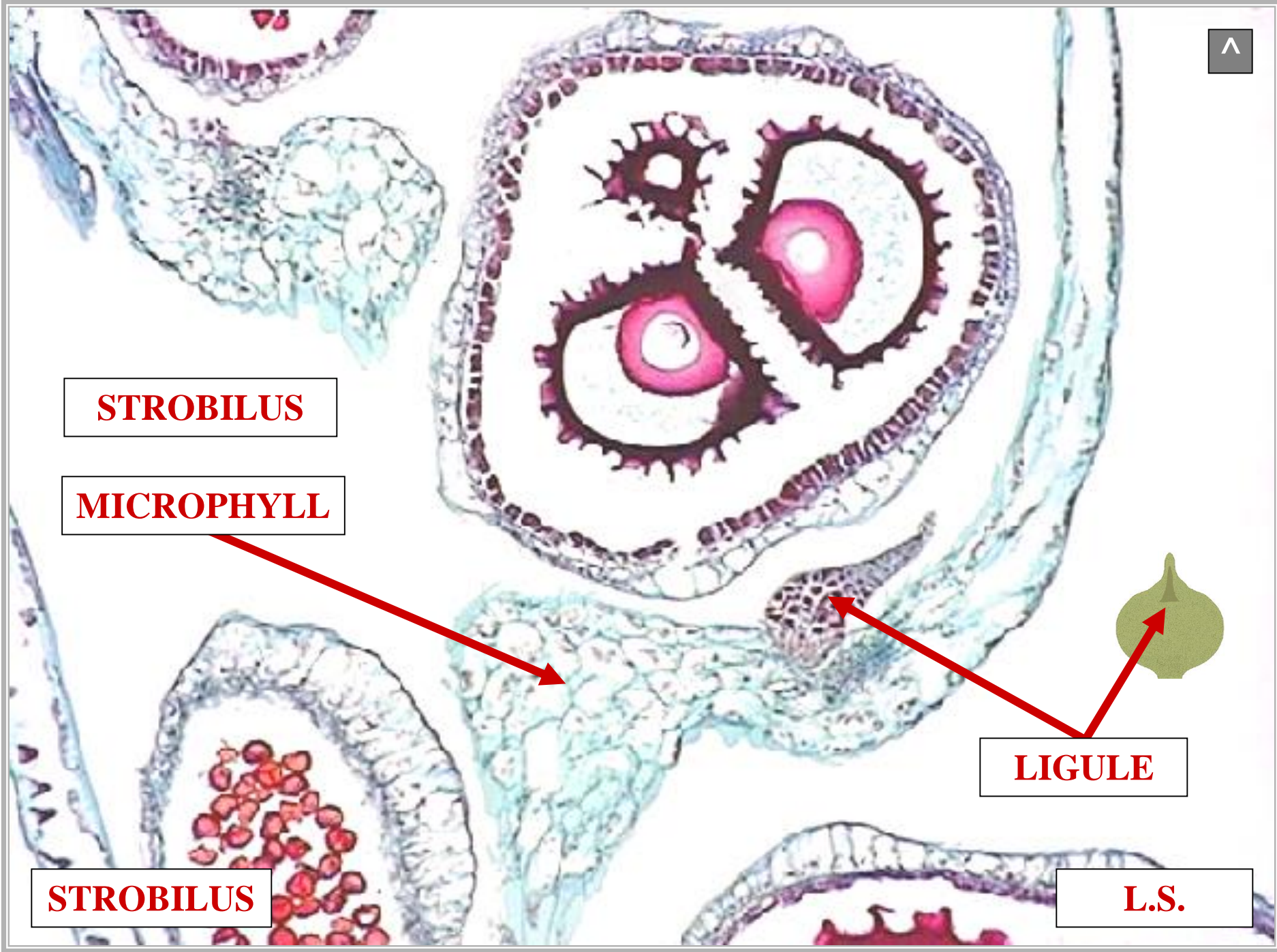
STROBILUS

MICROPHYLL

LIGULE

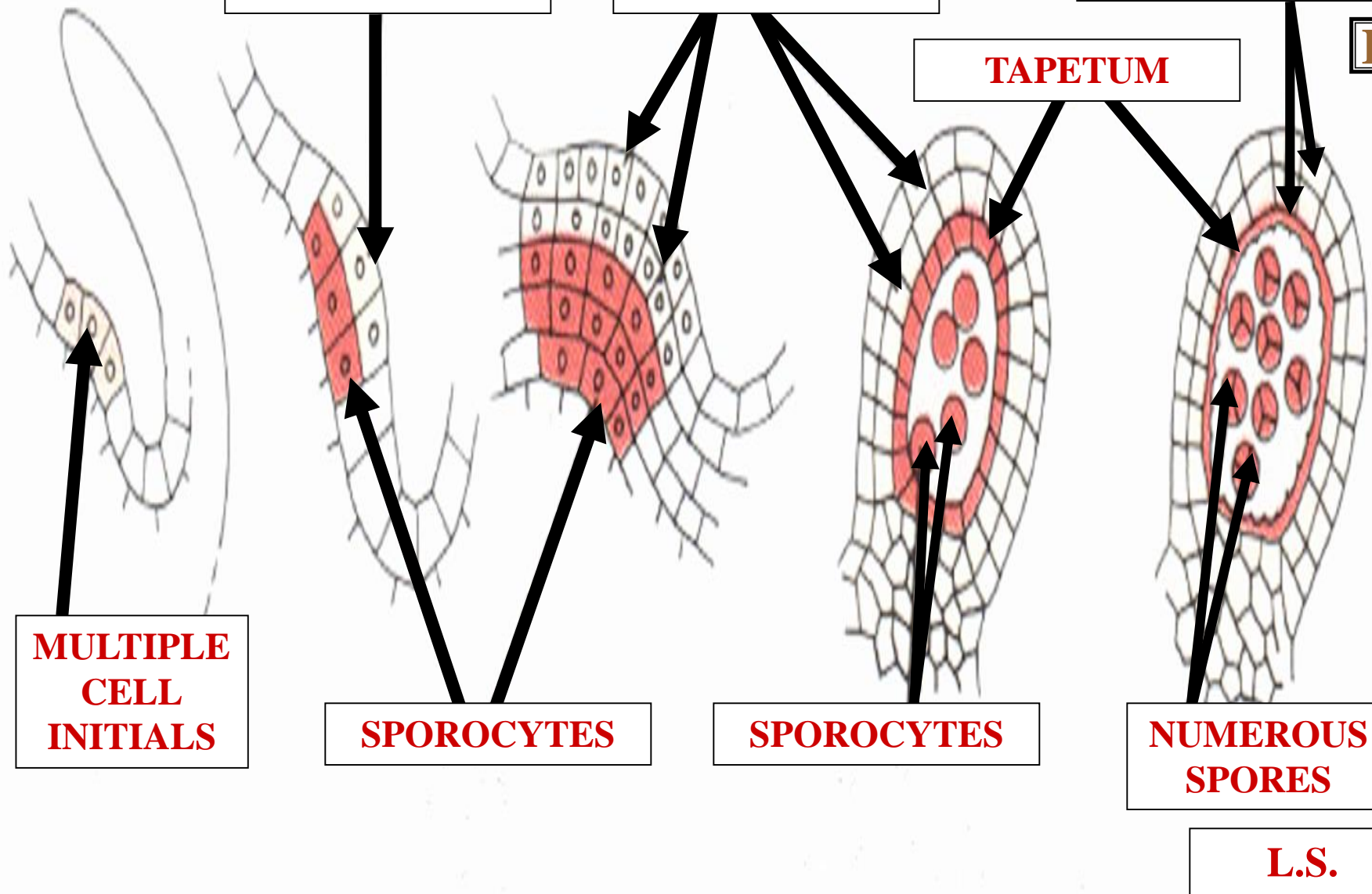
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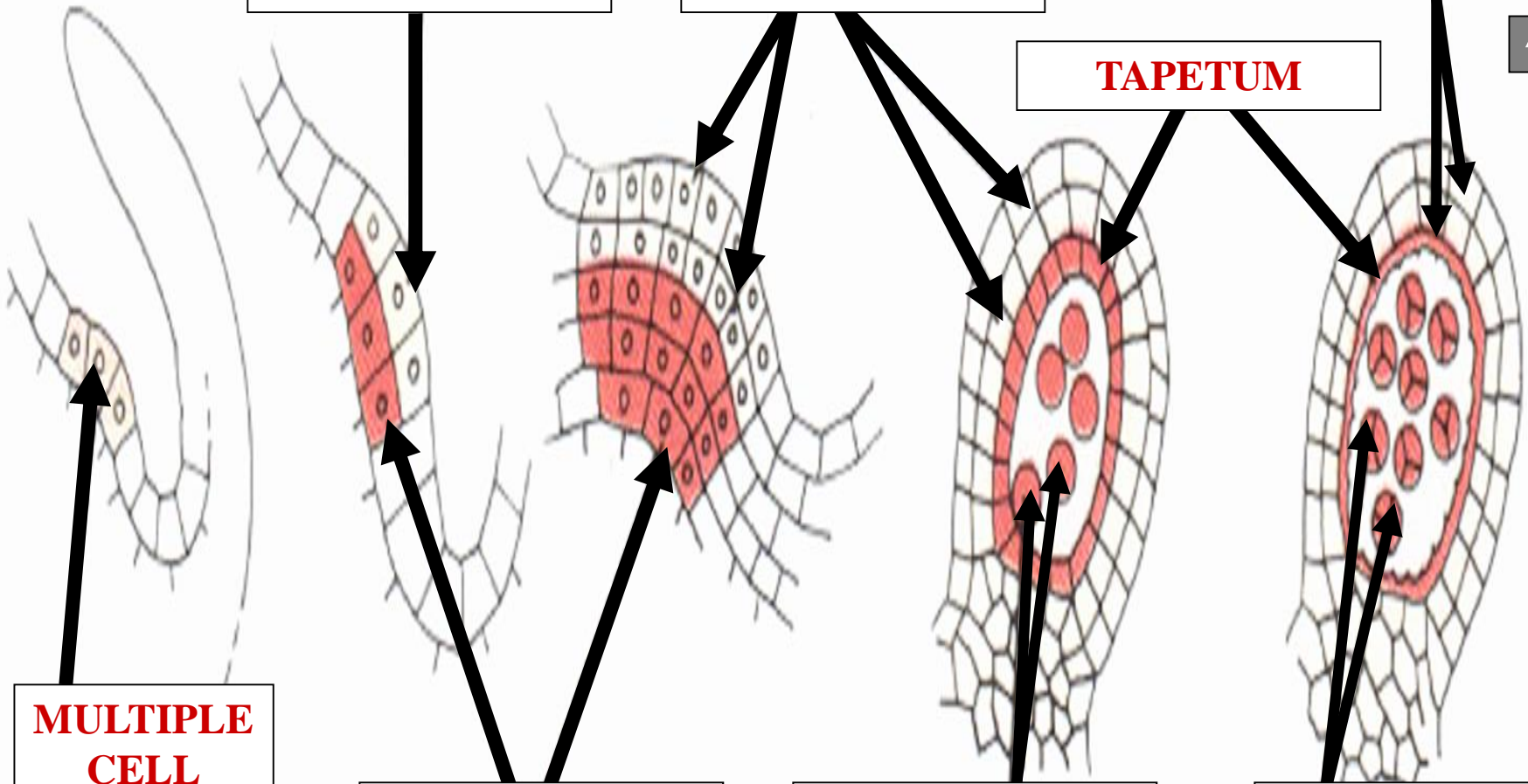
L.S.





SPORANGIUM





WALL CELLS

WALL CELLS

LARGE SIZE

THICK WALL



TAPETUM

**MULTIPLE
CELL
INITIALS**

SPOROCTYES

SPOROCTYES

**NUMEROUS
SPORES**

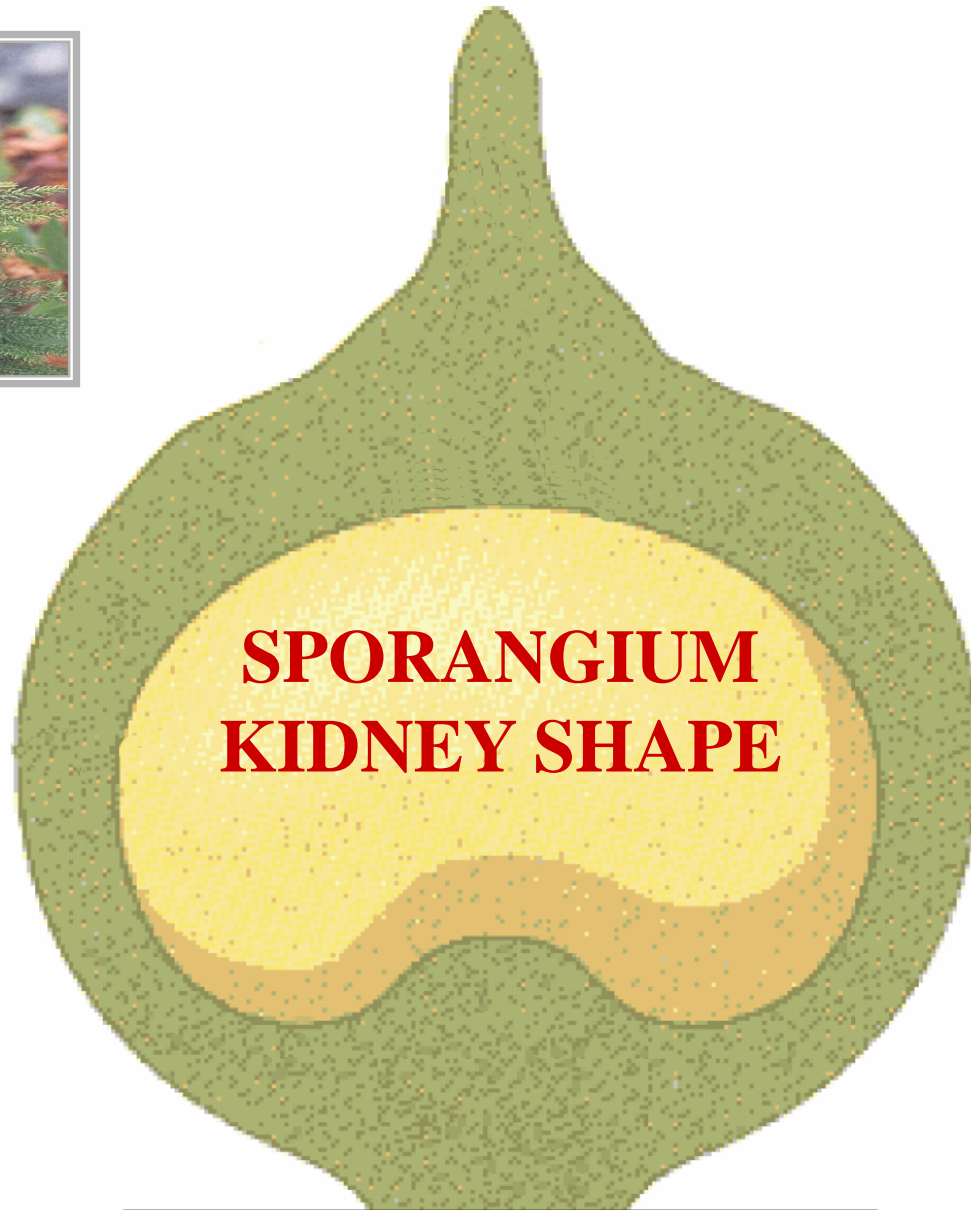
EUSPORANGIUM

L.S.



K

SPORANGIUM SHAPE



**SPORANGIUM
KIDNEY SHAPE**

SPOROPHYLL



**SPORANGIUM
RENIFORM**

SPOROPHYLL



SPORANGIUM POSITION



LEAF



LEAF

FOLIAR

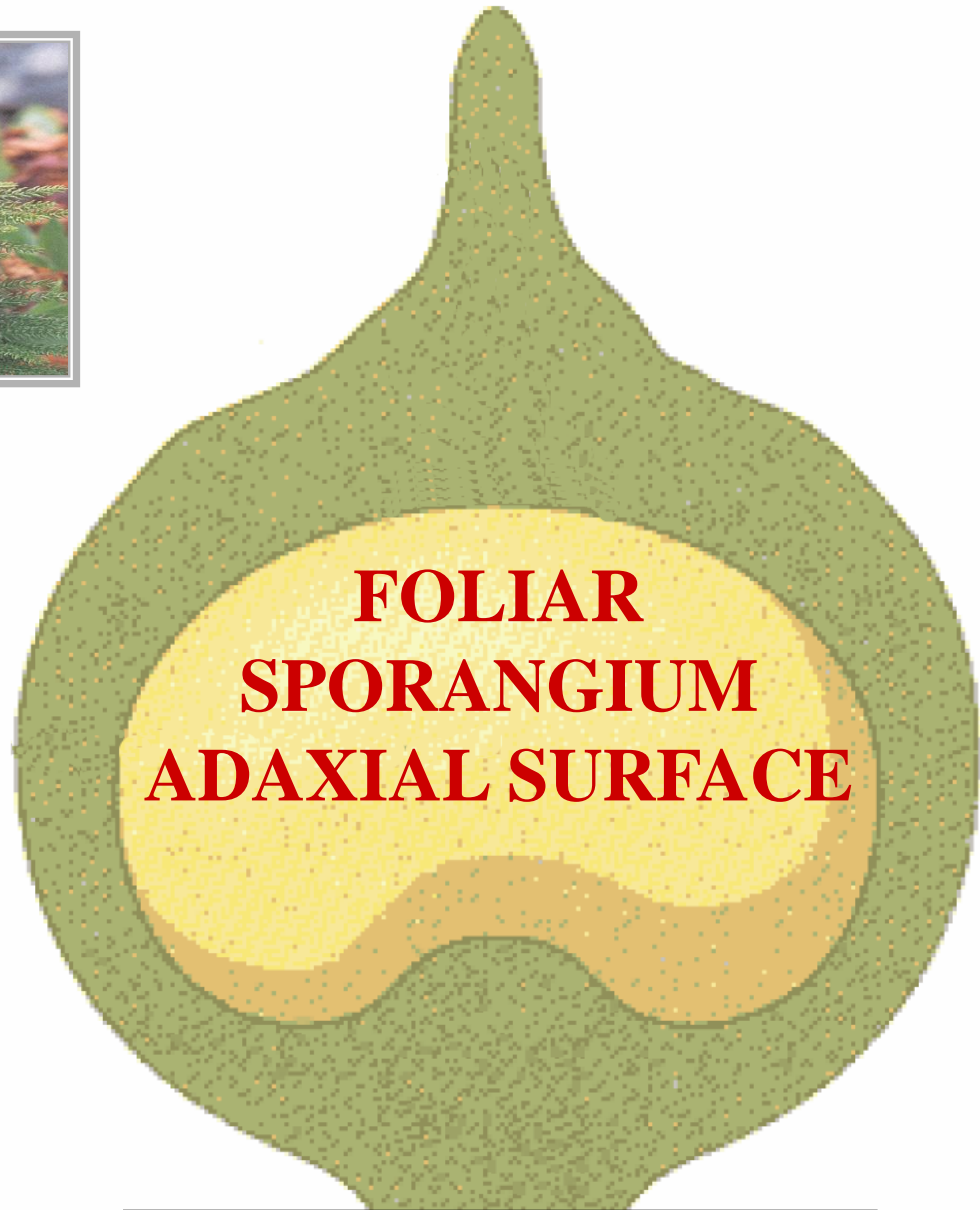
FOLIAR SPORANGIUM



A

LEAF DERIVED
SPORANGIUM

FOLIAR SPORANGIUM



LEAF

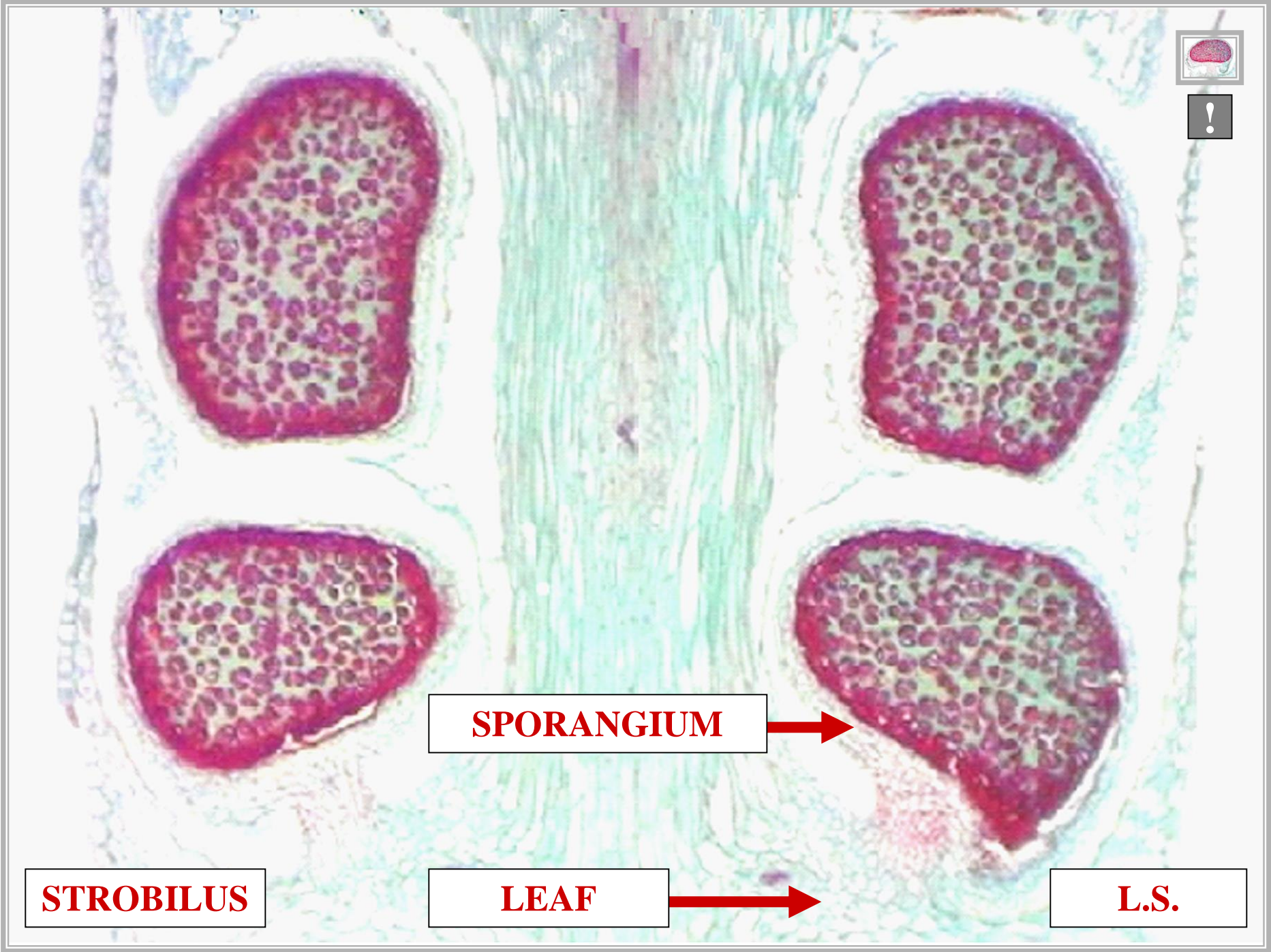
ADAXIAL SURFACE



**ADAXIAL
SPORANGIUM**

**UPPER
LEAF
SURFACE**

**ADAXIAL
SPORANGIUM**

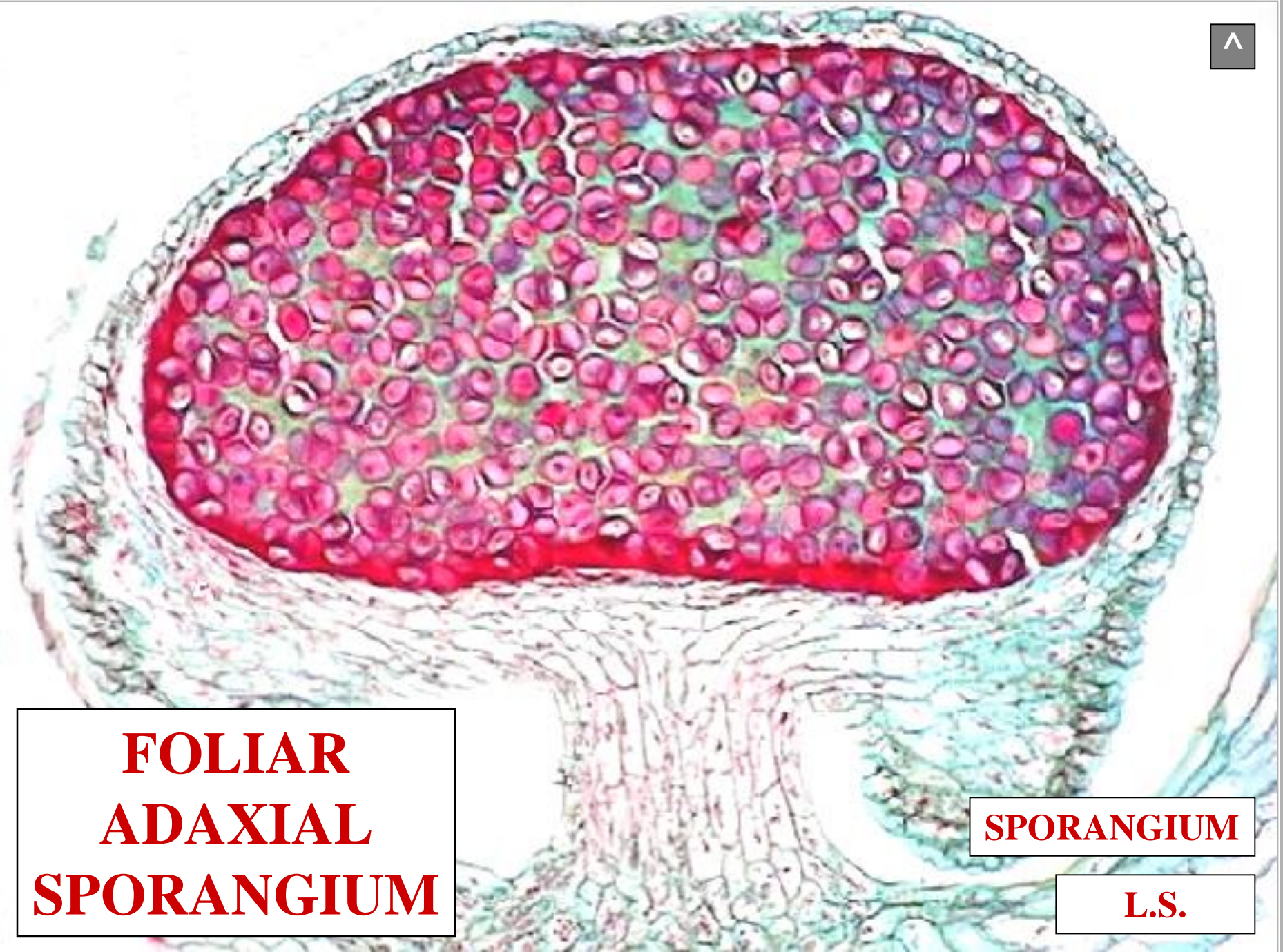


STROBILUS

SPORANGIUM

LEAF

L.S.



**FOLIAR
ADAXIAL
SPORANGIUM**

SPORANGIUM

L.S.



SPORE HABIT

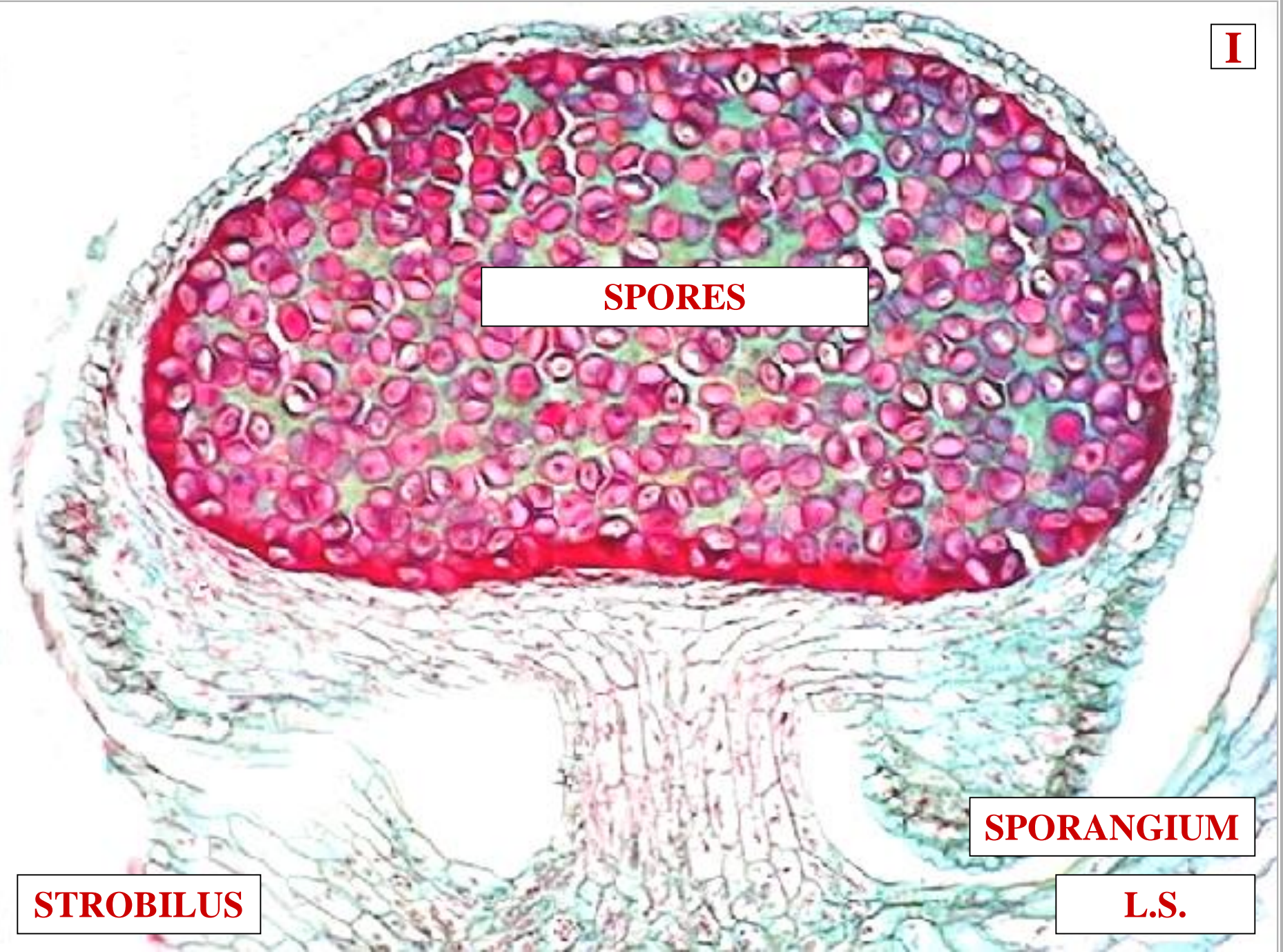
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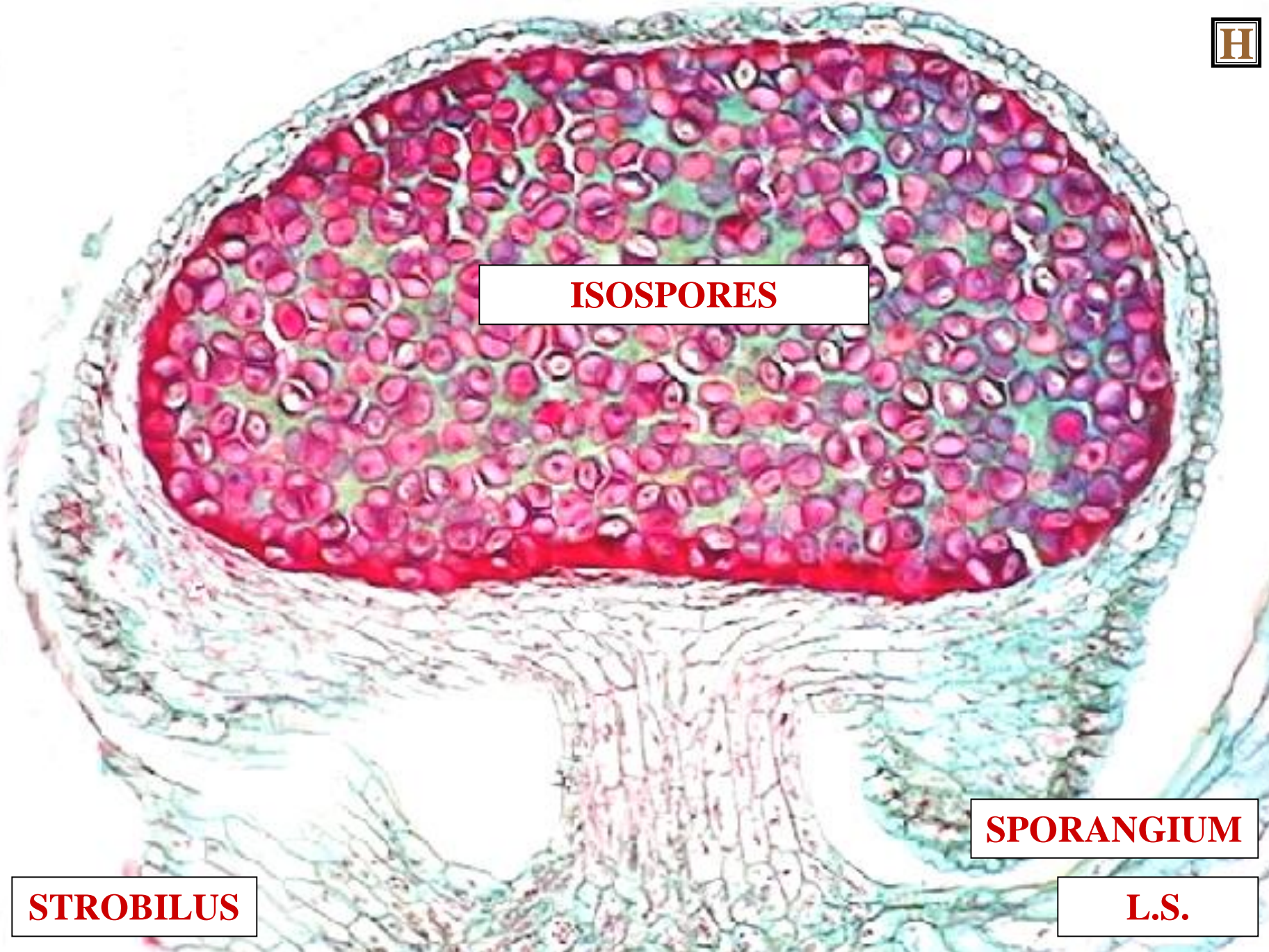
SPORES

SPORANGIUM

STROBILUS

L.S.





ISOSPORES

SPORANGIUM

STROBILUS

L.S.

<

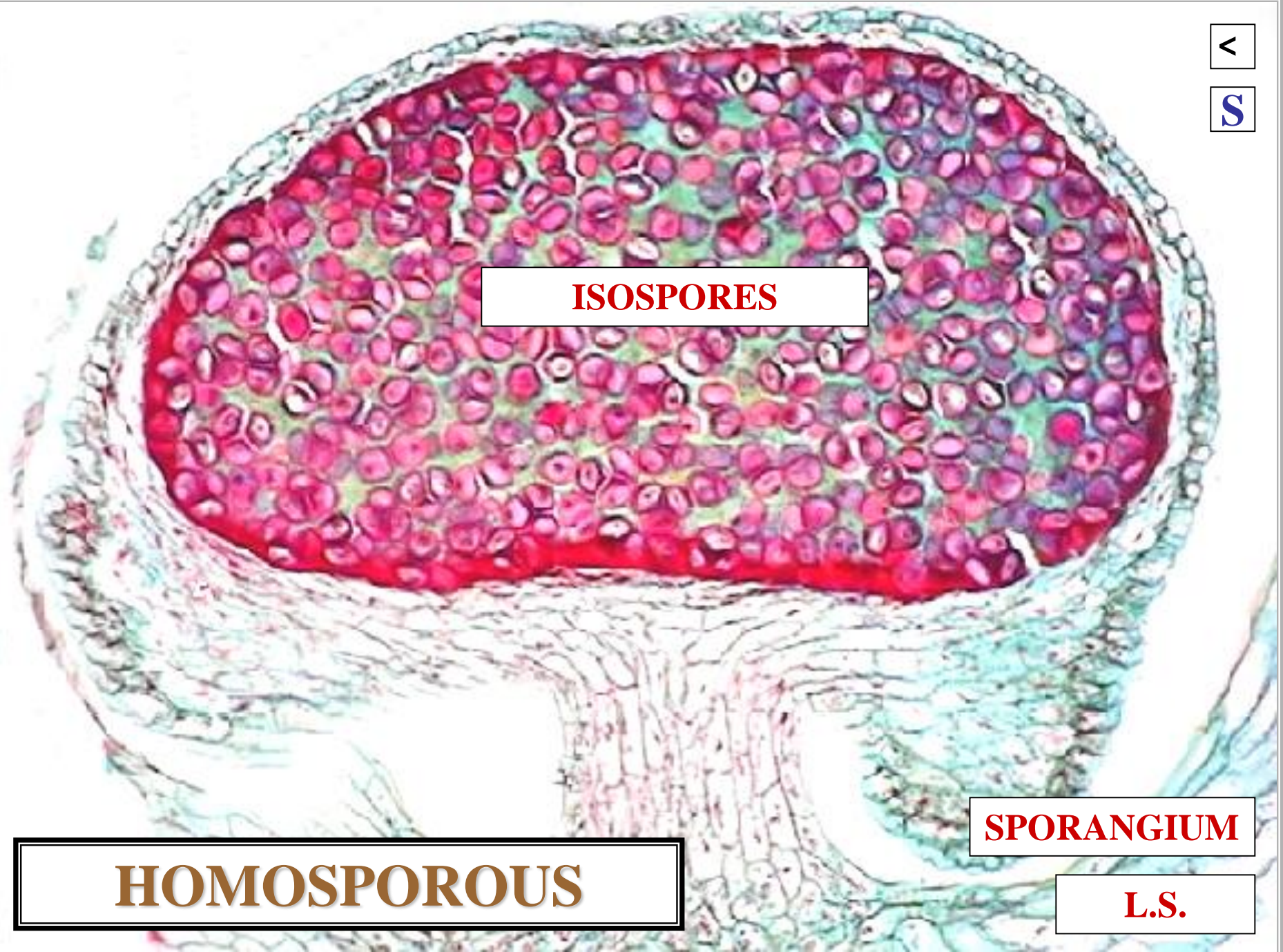
S

ISOSPORES

SPORANGIUM

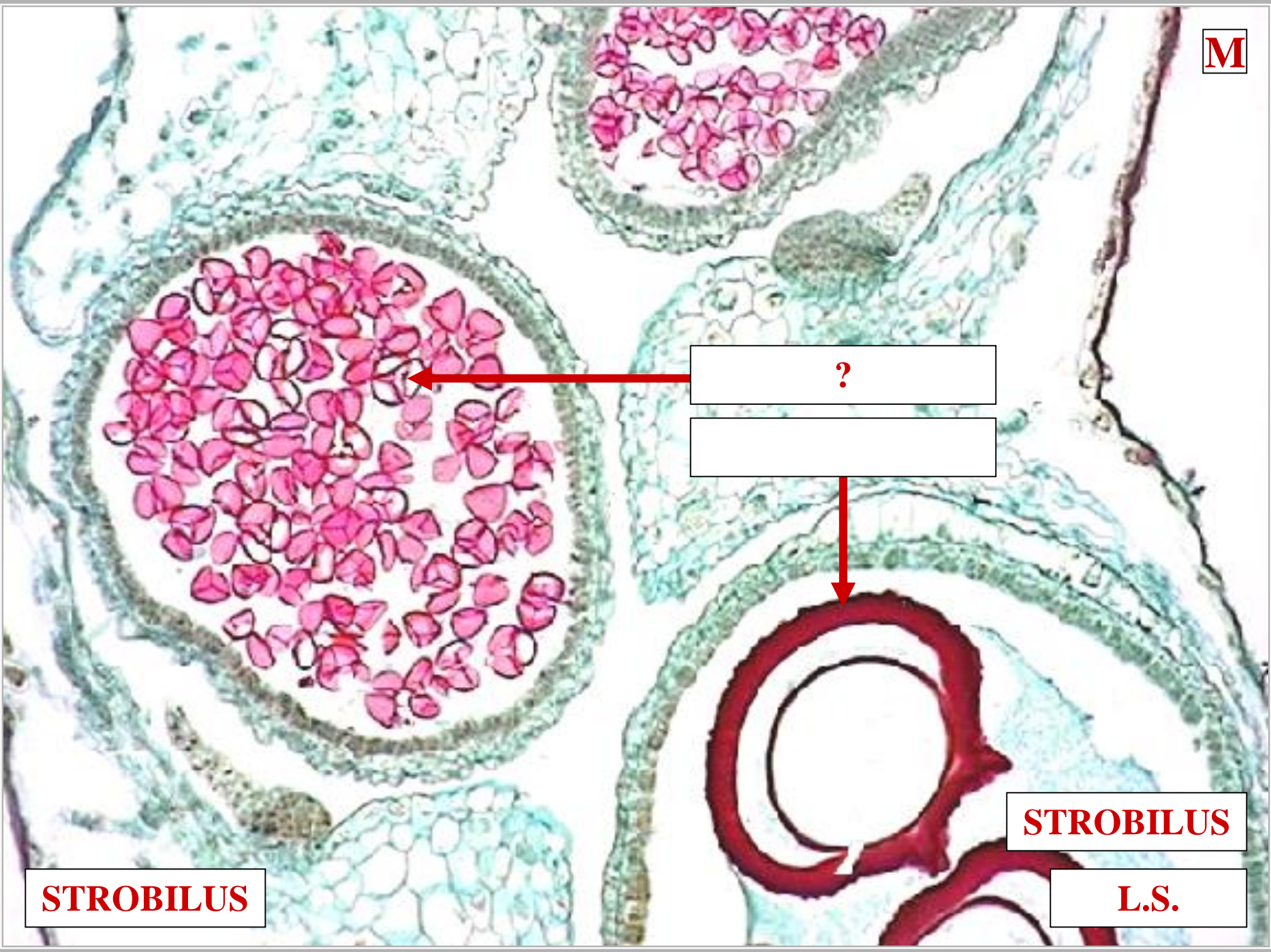
HOMOSPOROUS

L.S.





SPORE HABIT

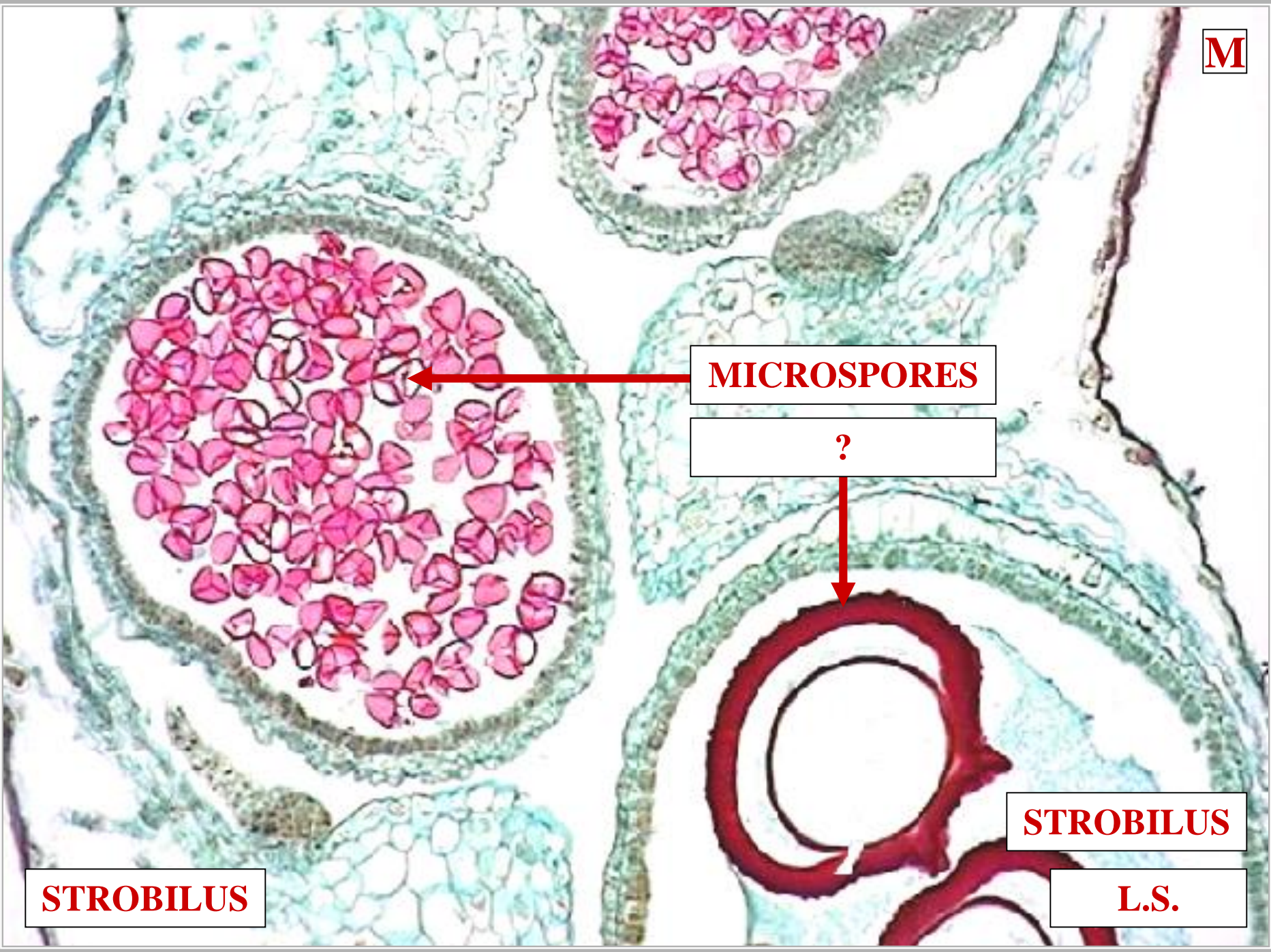


?

STROBILUS

STROBILUS

L.S.



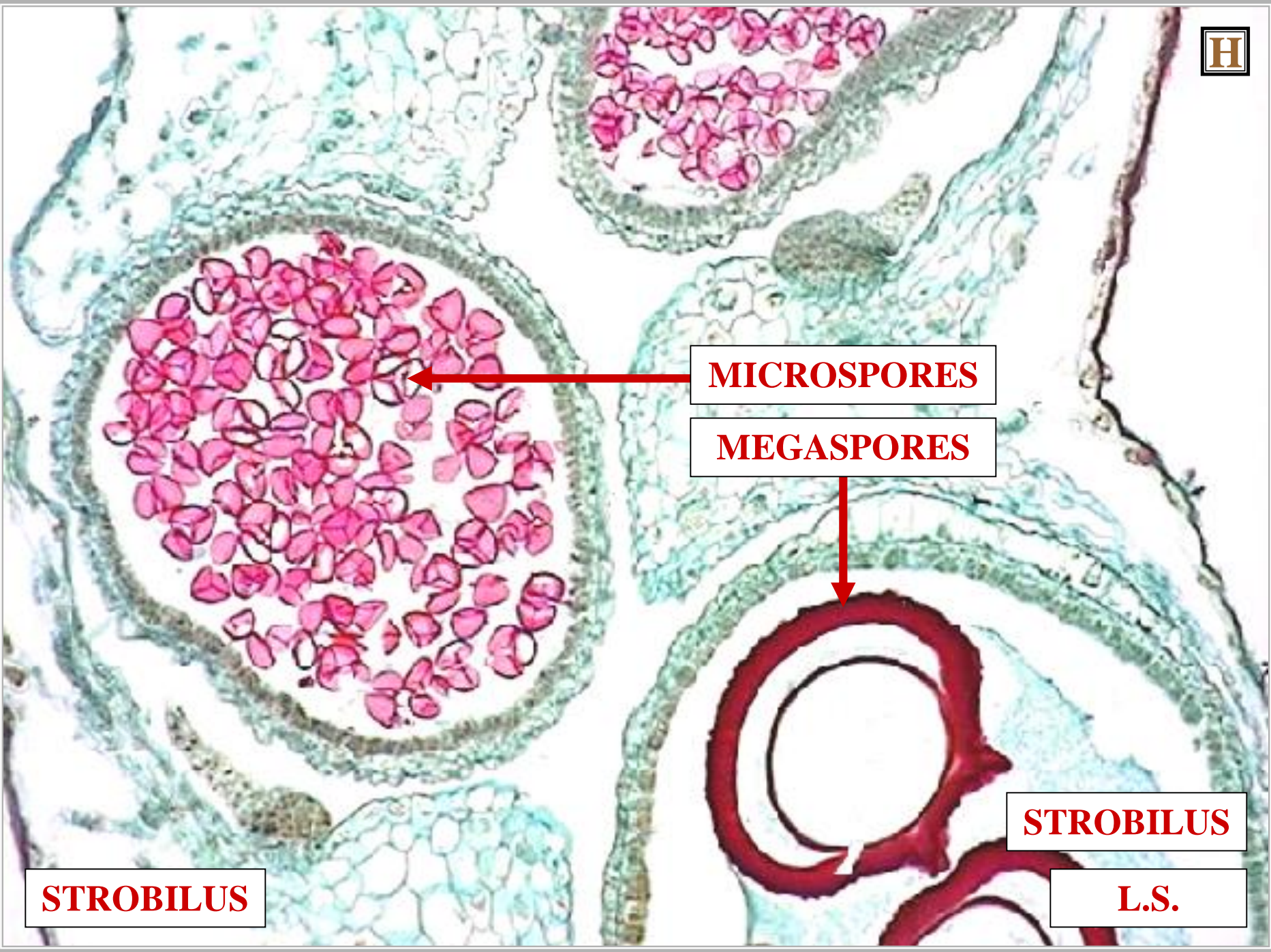
MICROSPORES

?

STROBILUS

STROBILUS

L.S.



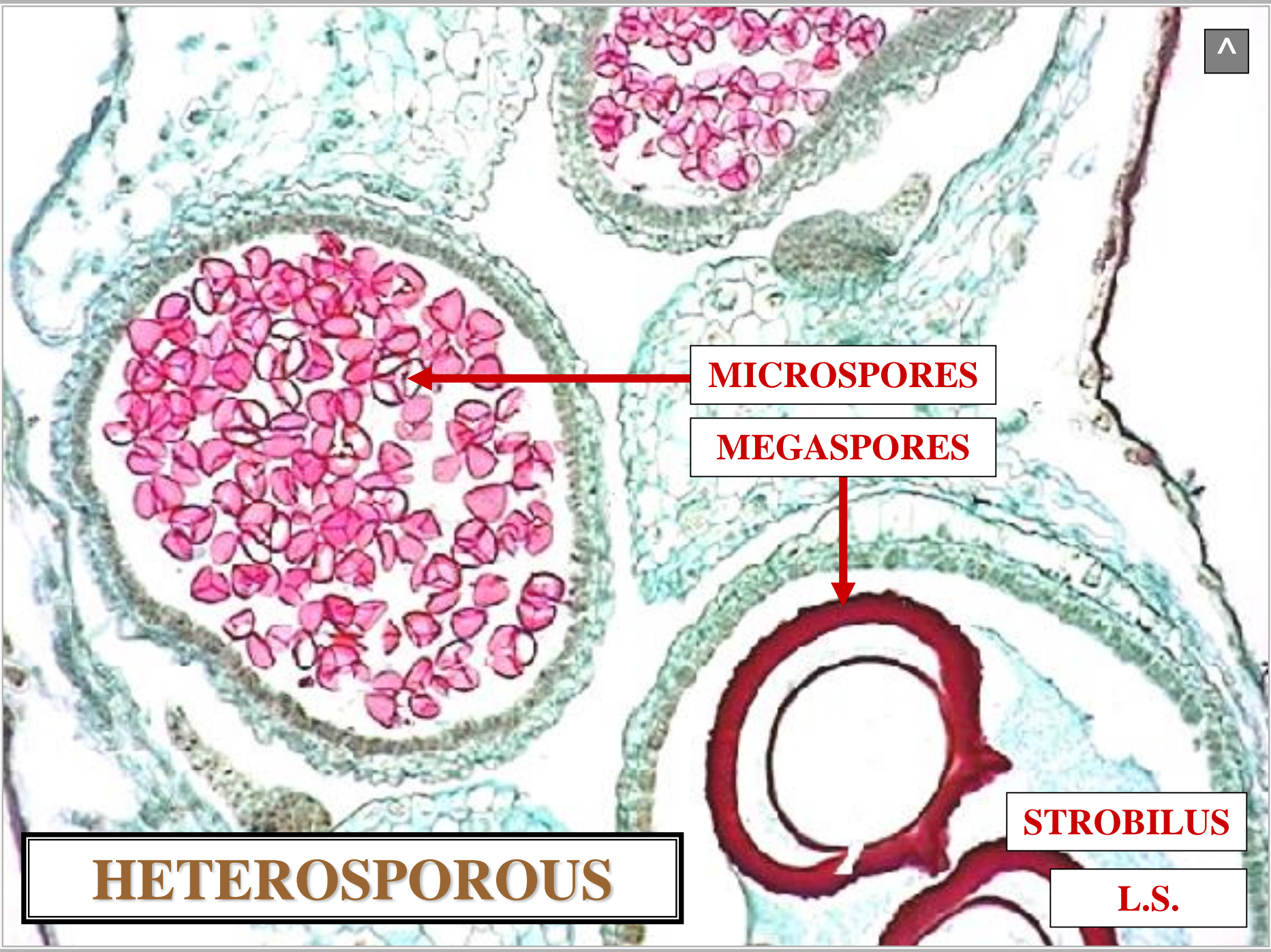
MICROSPORES

MEGASPORES

STROBILUS

STROBILUS

L.S.



MICROSPORES

MEGASPORES

STROBILUS

HETEROSPOROUS

L.S.

STROBILUS

STROBILUS



STROBILIUS

**SPOROPHYLL
AGGREGATE**

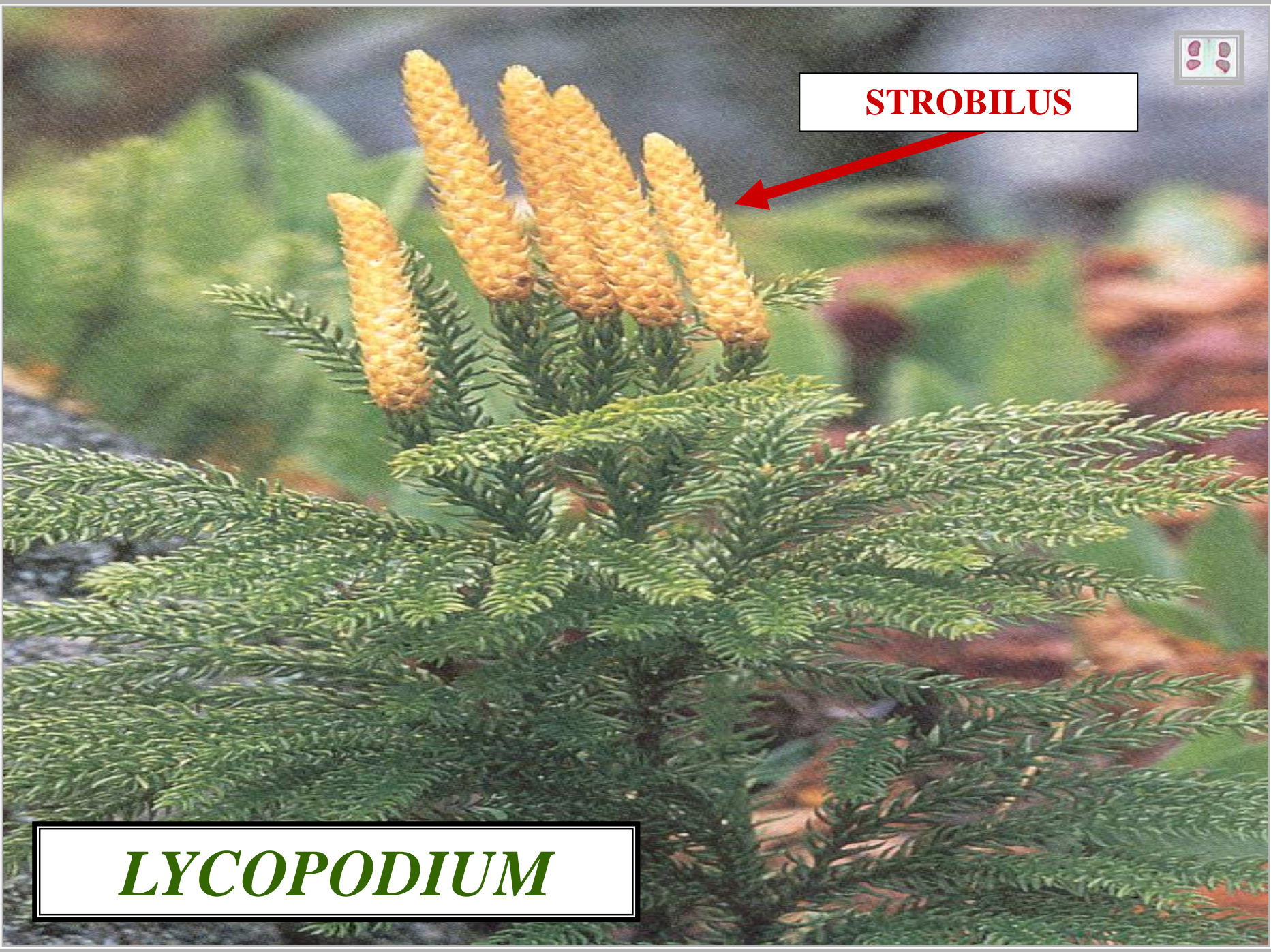
STROBILUS

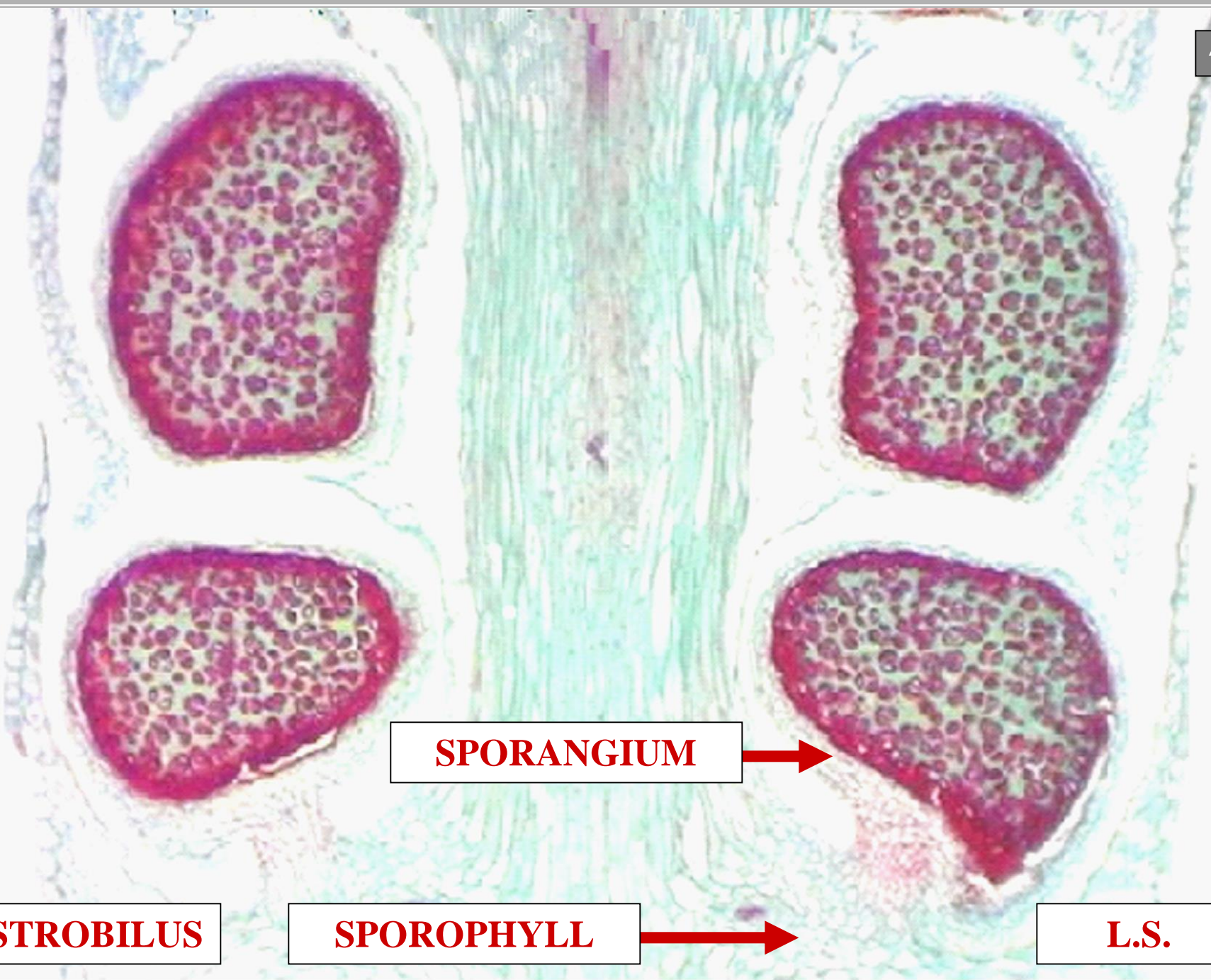


STROBILUS



LYCOPODIUM





SPORANGIUM →

STROBILUS

SPOROPHYLL →

L.S.

SPOROPHYLL

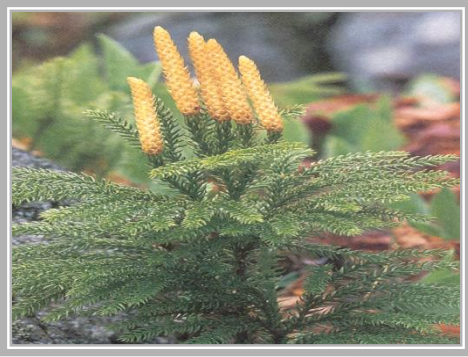
SPOROPHYLL



SPOROPHYLL

**LEAF
BEARING
SPORANGIUM**

SPOROPHYLL



S

+



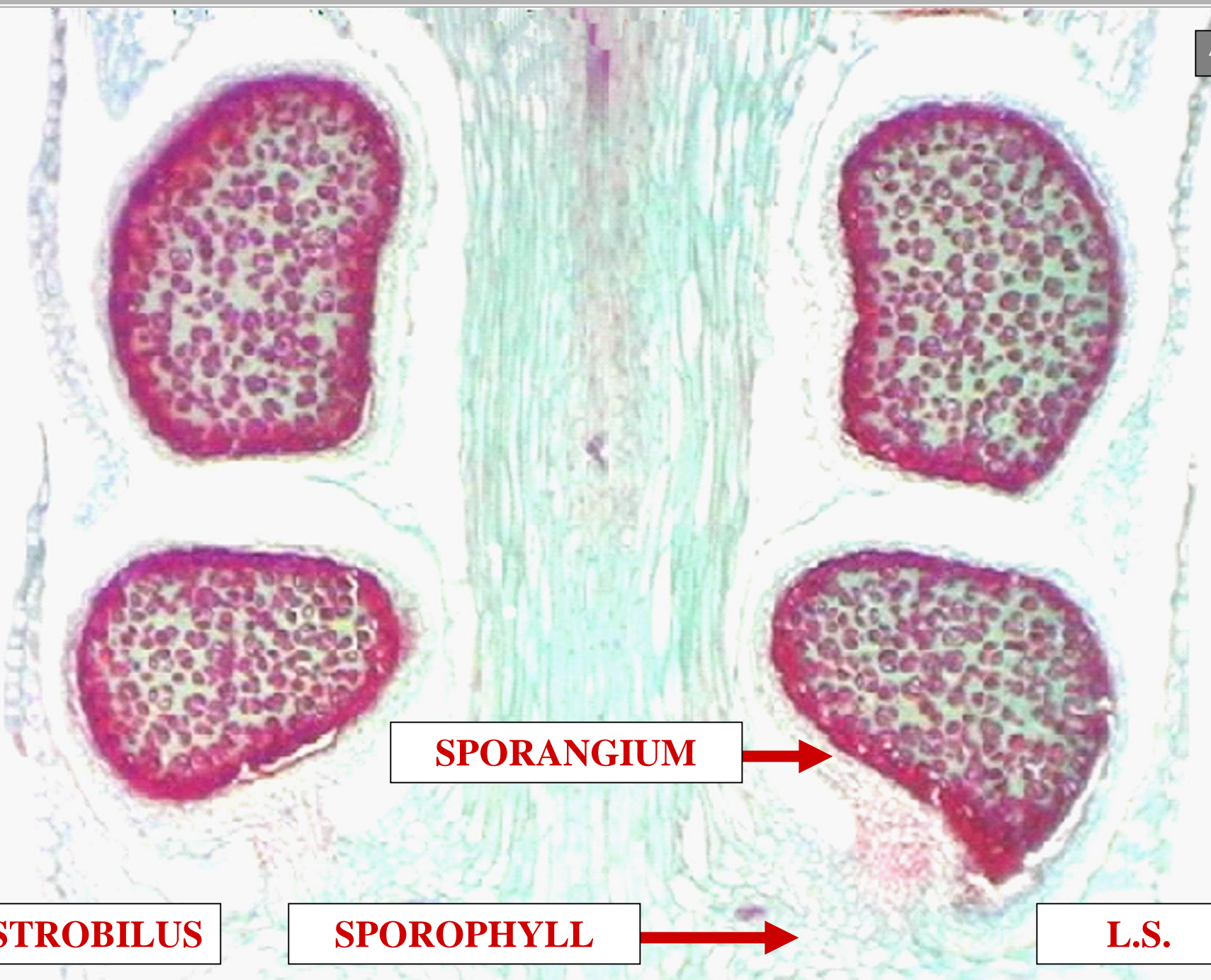
SPORANGIUM

LEAF



SPORANGIUM

SPOROPHYLL



SPORANGIUM →

STROBILUS

SPOROPHYLL →

L.S.



HETEROSPOROUS PLANTS

SPOROPHYLL TERMS

?

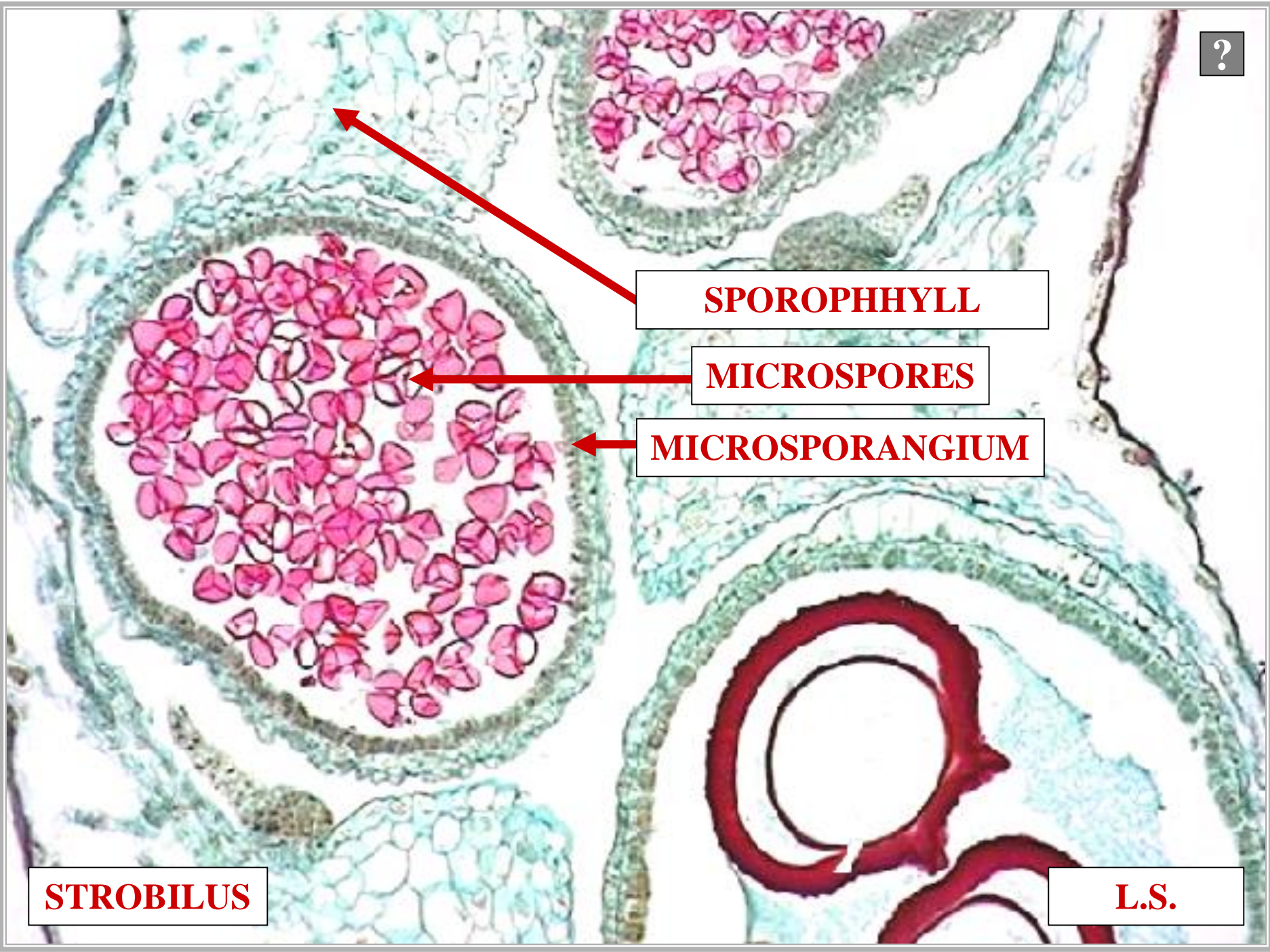
SPOROPHYLL

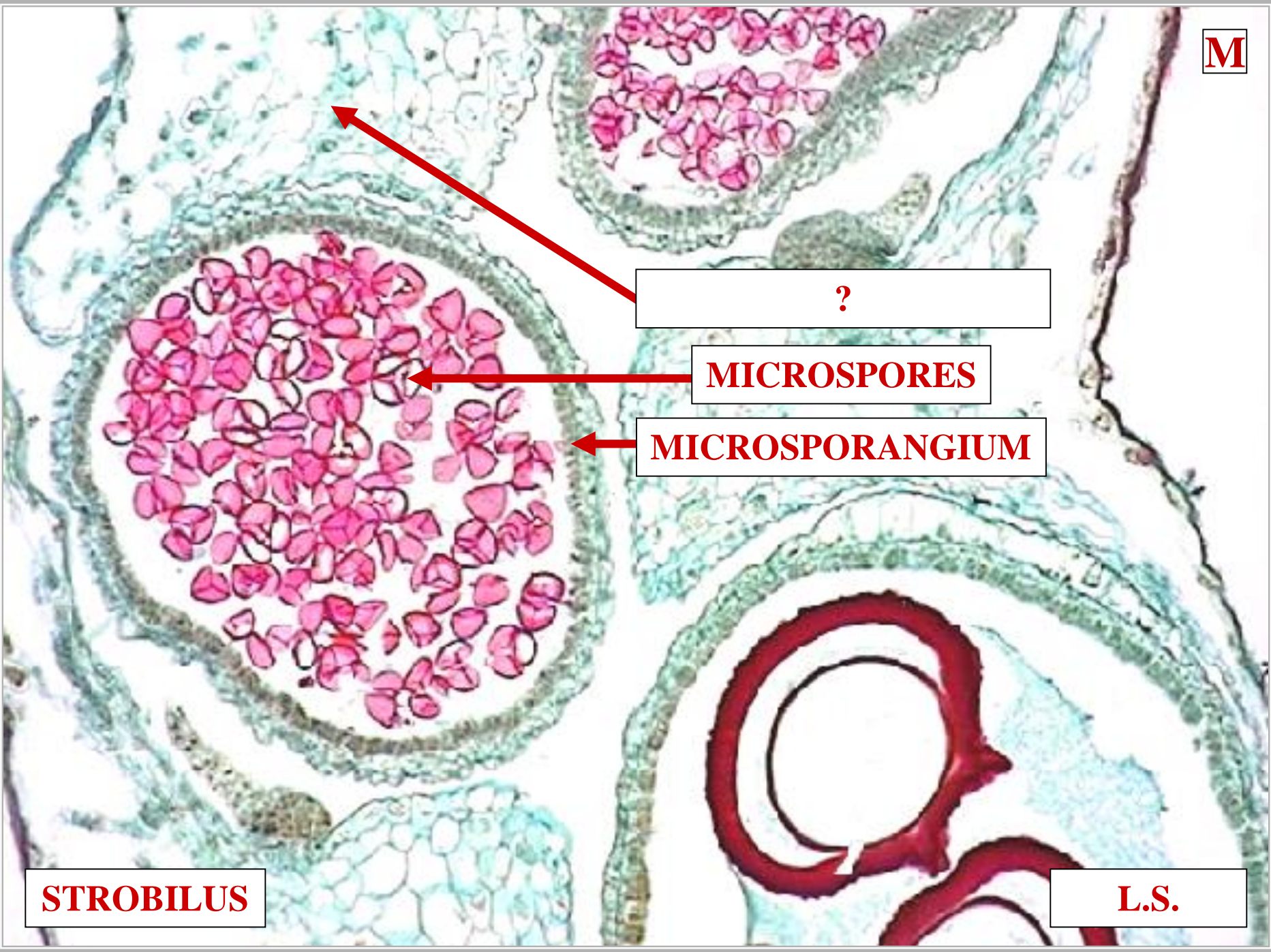
MICROSPORES

MICROSPORANGIUM

STROBILUS

L.S.





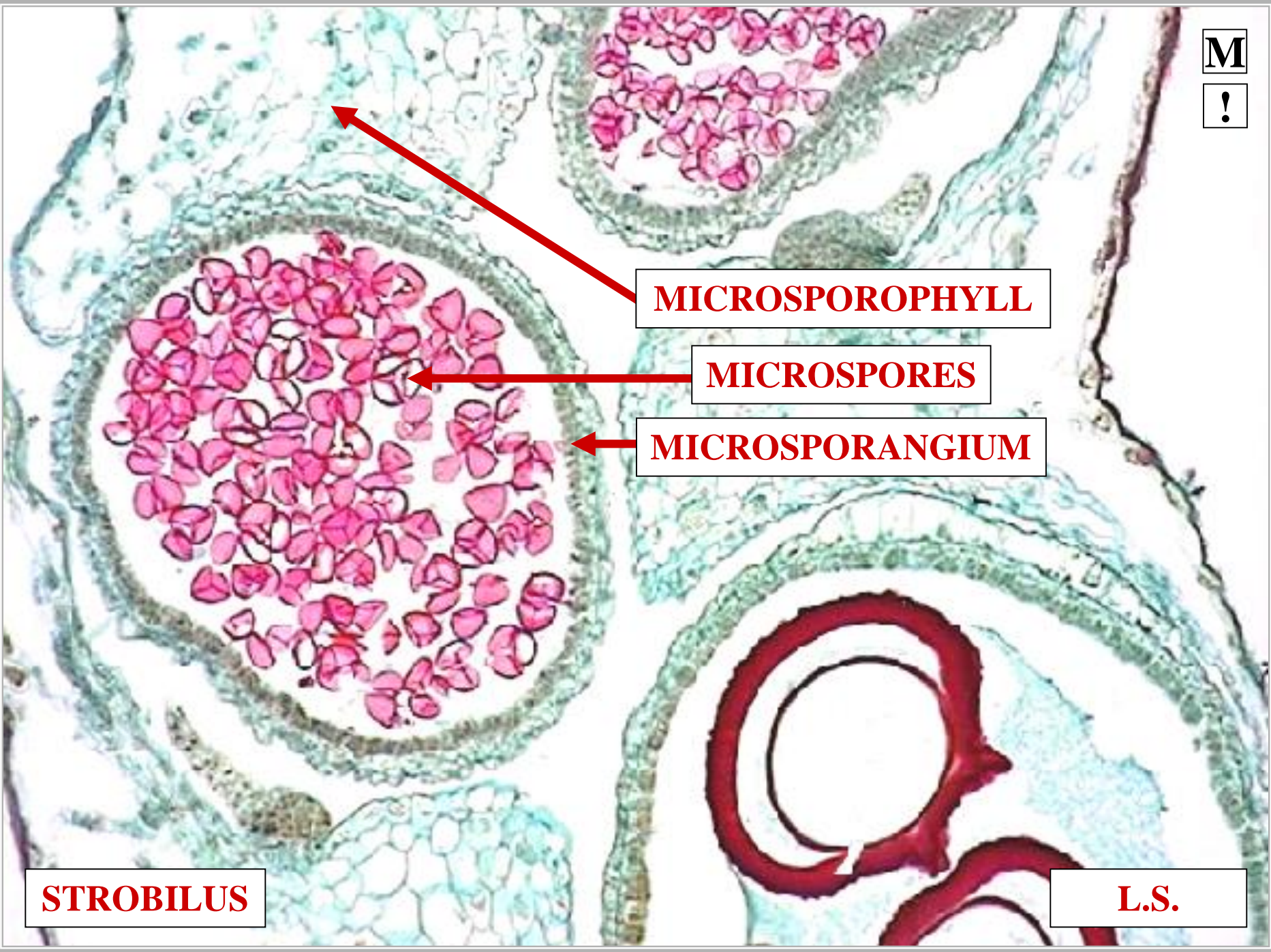
?

MICROSPORES

MICROSPORANGIUM

STROBILUS

L.S.



MICROSPOROPHYLL

MICROSPORES

MICROSPORANGIUM

STROBILUS

L.S.

MICROSPOROPHYLL

MICROSPOROPHYLL



**LEAF
BEARING
MICROSPORANGIUM**

MICROSPOROPHYLL

?

MEGASPORES

MEGASPORANGIUM

SPOROPHYLL

STROBILUS

L.S.

