

SOROPHORE



MARSILEALES
SPOROCARP SOROPHORE

DERIVED VIA
GELATINOUS TISSUE

MARSILEALES
SPOROCARP SOROPHORE

MARSILEALES
SPOROCARP SOROPHORE

DERIVED VIA
GELATINOUS TISSUE

BEARS EMERGED
SPORANGIA
MARSILEALES
SPOROCARP SOROPHORE



**SPOROCARP
"GERMINATION"**

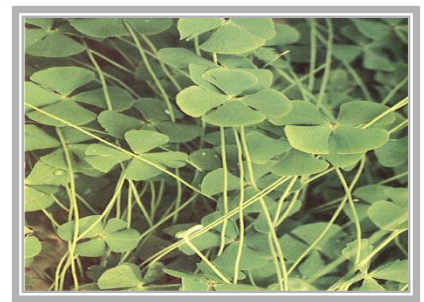


SOROPHORE

SPOROCARP



LEPTOSPORANGIA



MARSILEA





SPORE HABIT

M

+

INDUSIUM



PINNA WALL

GELATINOUS TISSUE

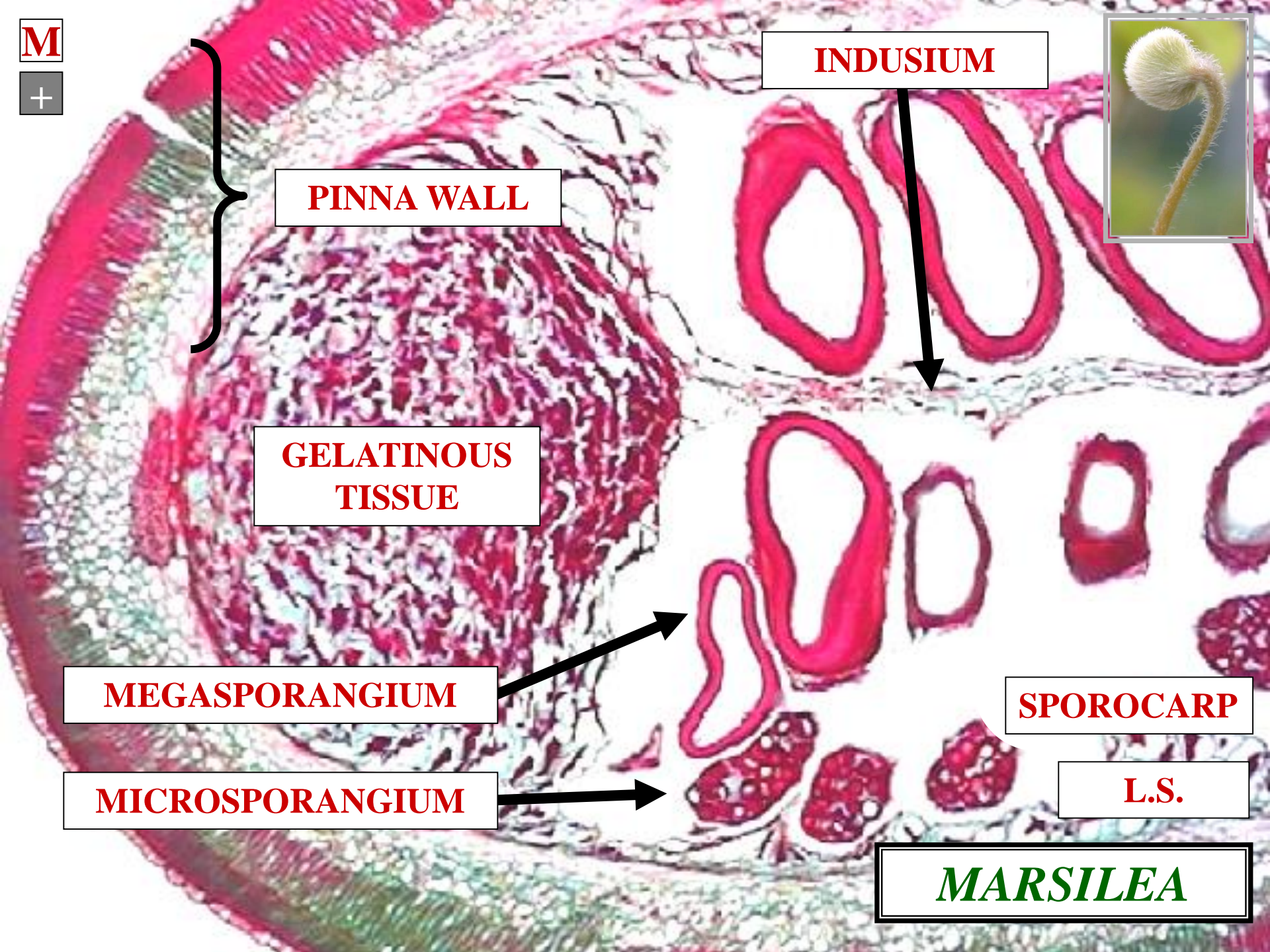
MEGASPORANGIUM

MICROSPORANGIUM

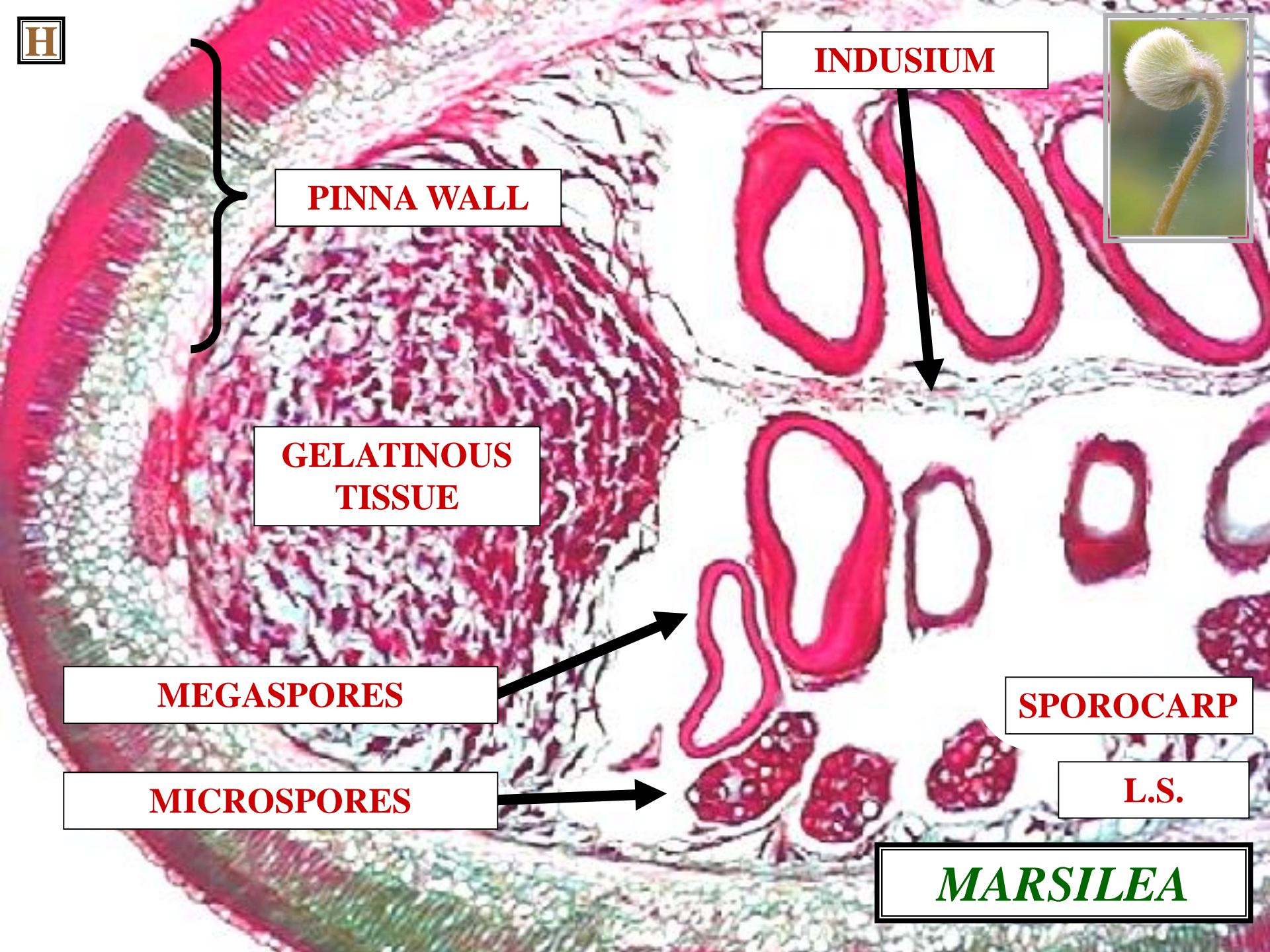
SPOROCARP

L.S.

MARSILEA



H



INDUSIUM

PINNA WALL

**GELATINOUS
TISSUE**

MEGASPORES

MICROSPORES

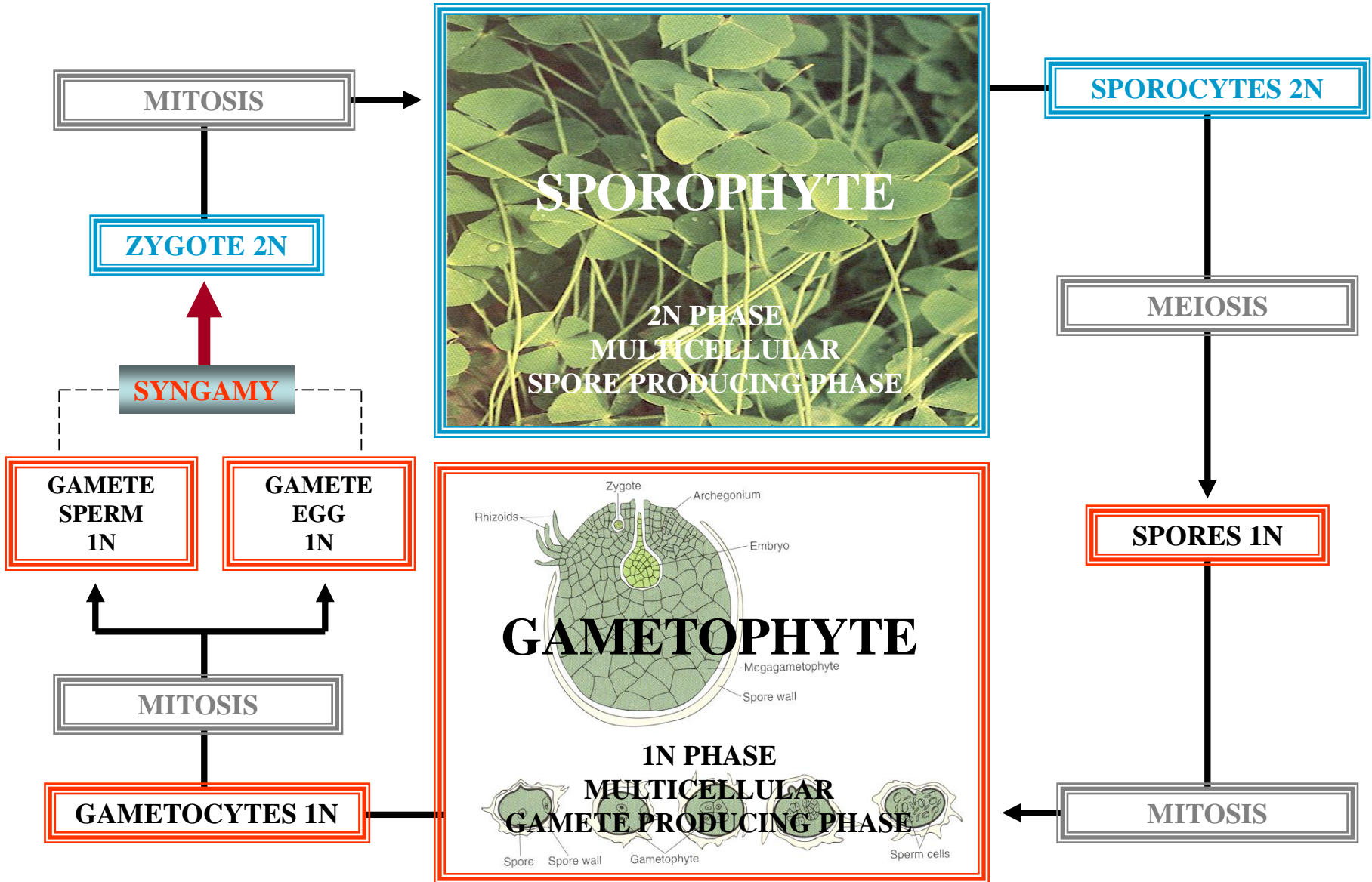
SPOROCARP

L.S.

MARSILEA

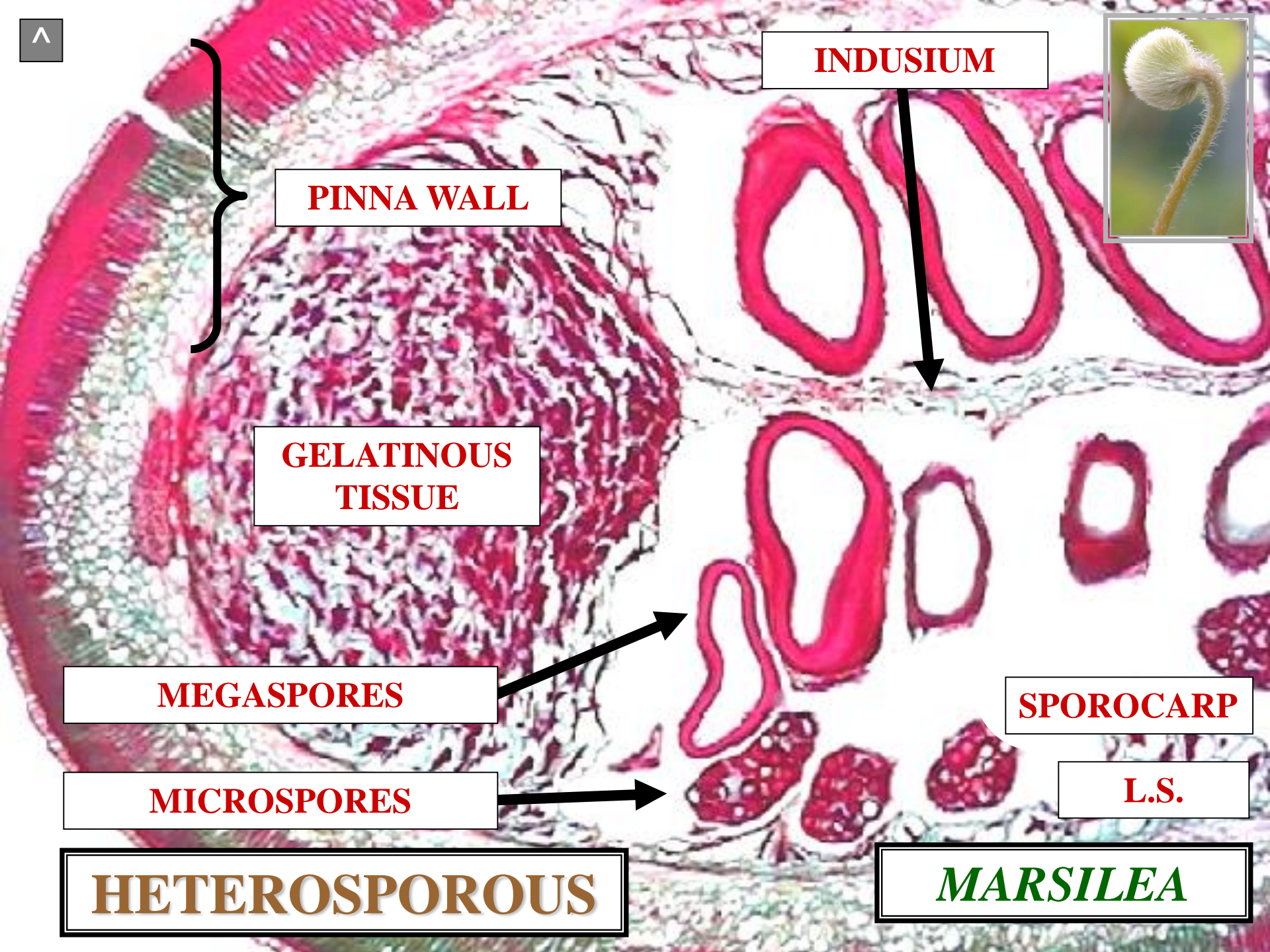


MARSILEALES LIFE CYCLE





GAMETOPHYTE CHARACTERS



INDUSIUM

PINNA WALL

**GELATINOUS
TISSUE**

MEGASPORES

MICROSPORES

SPOROCARP

L.S.

HETEROSPOROUS

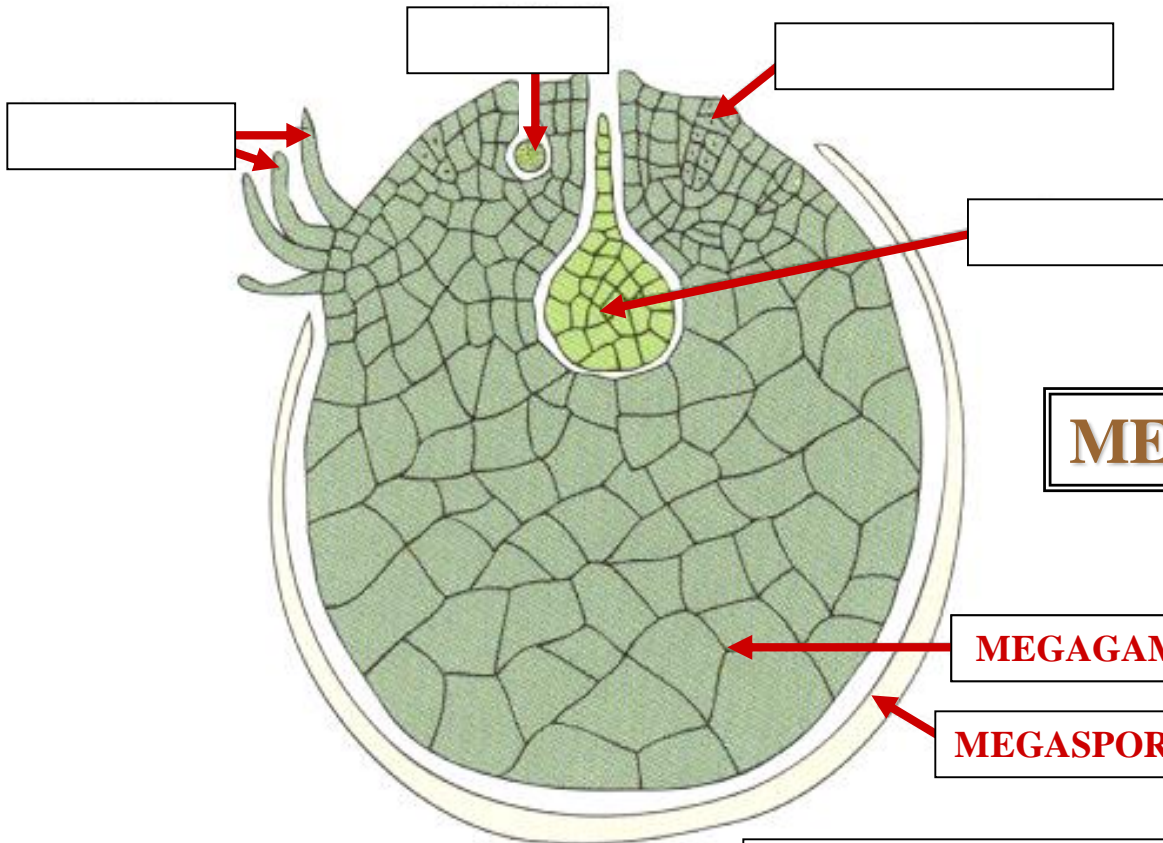
MARSILEA



ENDOSPORIC GAMETOPHYTE

MARSILEA

EN



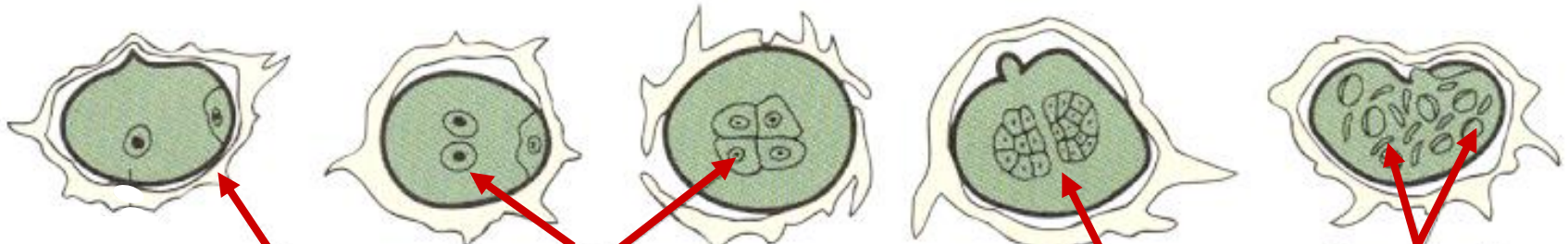
MEGASPORE

MEGAGAMETOPHYTE

MEGASPORE WALL

MICROSPORE

GAMETOPHYTE



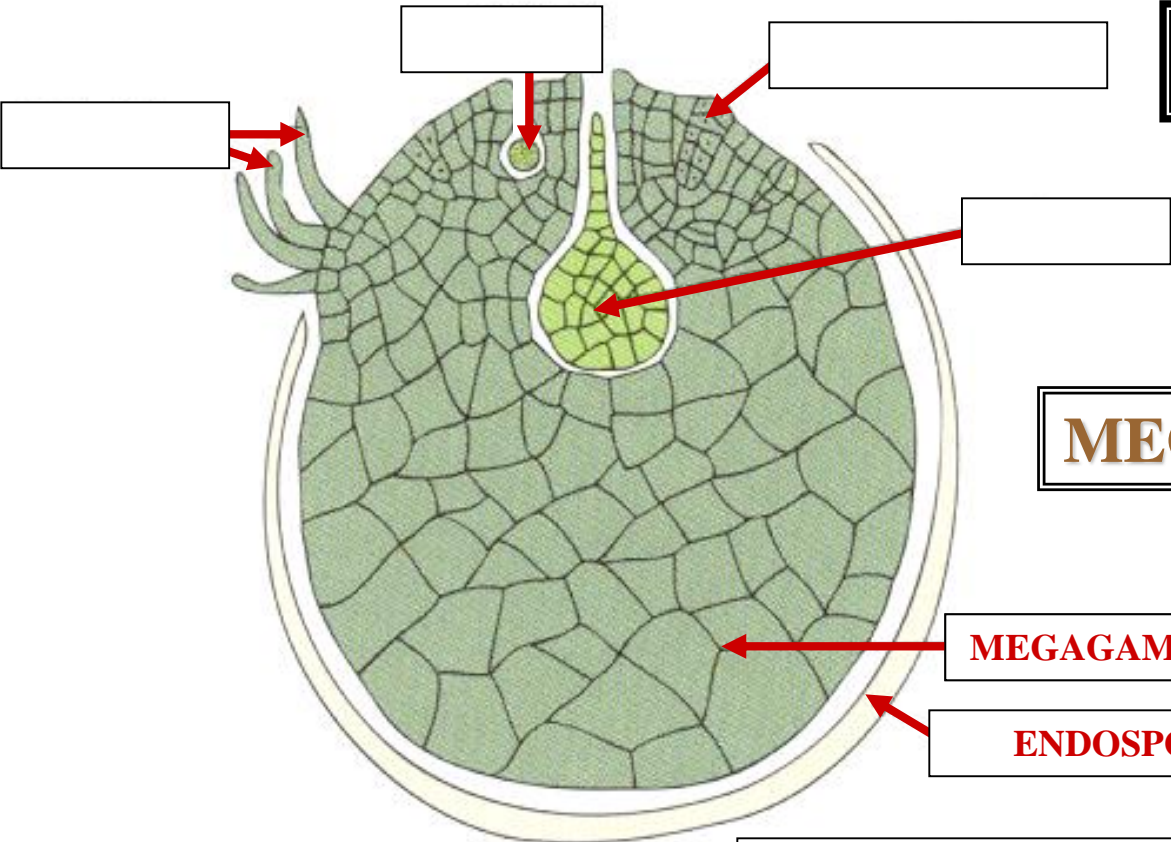
MICROSPORE WALL

MICROGAMETOPHYTE



MARSILEA

W



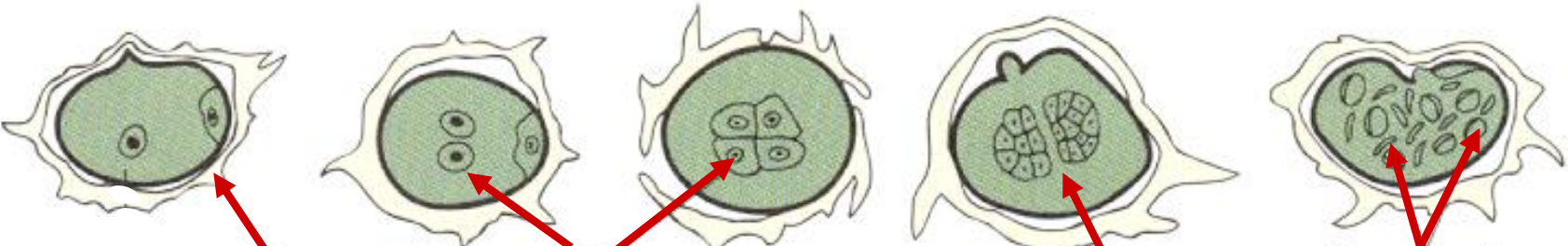
MEGASPORE

MEGAGAMETOPHYTE

ENDOSPORIC

MICROSPORE

GAMETOPHYTE

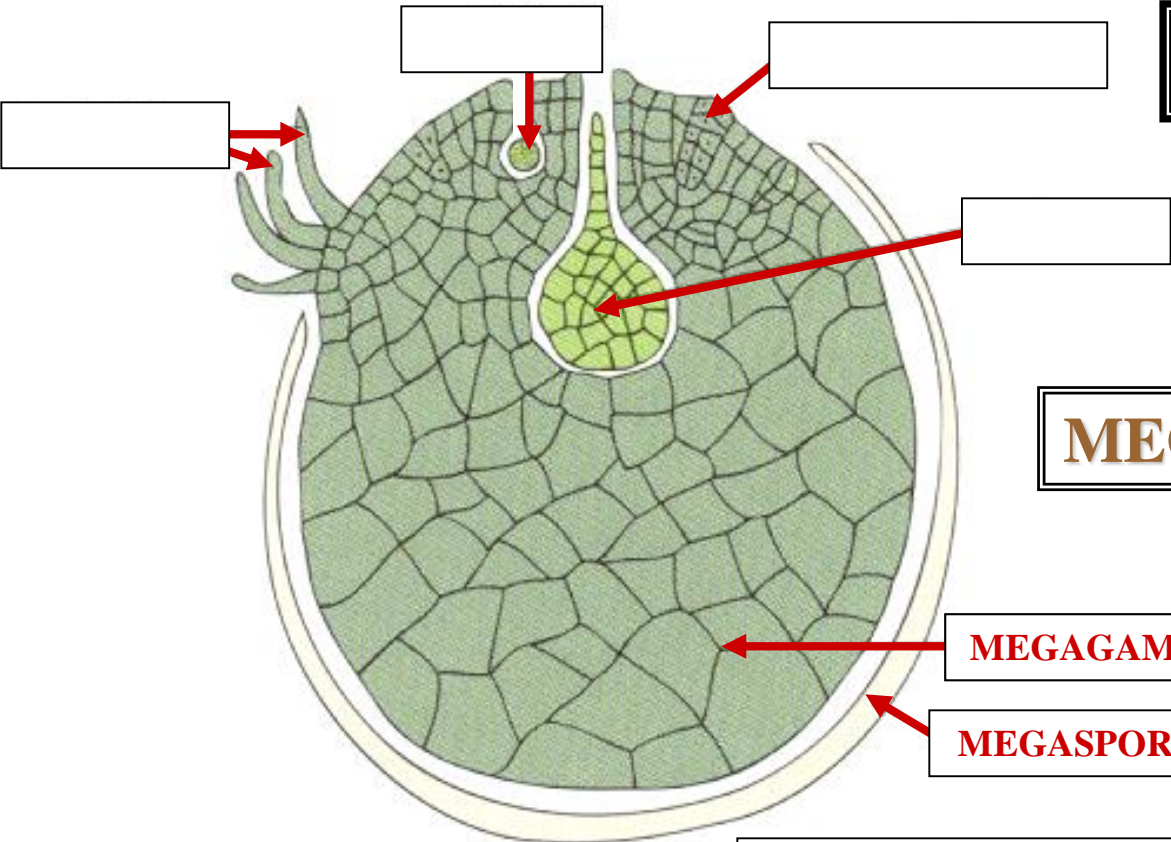


ENDOSPORIC

MICROGAMETOPHYTE

MARSILEA

N



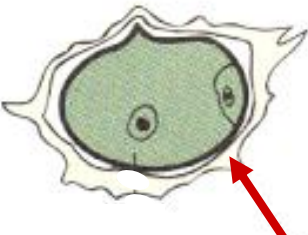
MEGASPORE

MEGAGAMETOPHYTE

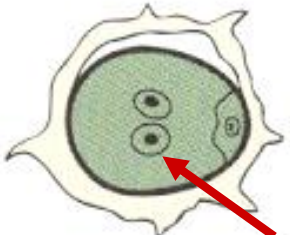
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MICROSPORE

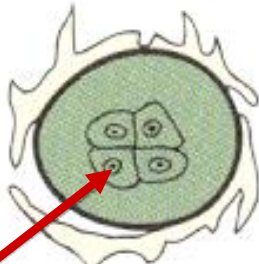
GAMETOPHYTE



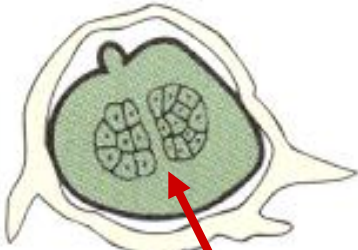
MICROSPORE WALL



MICROGAMETOPHYTE



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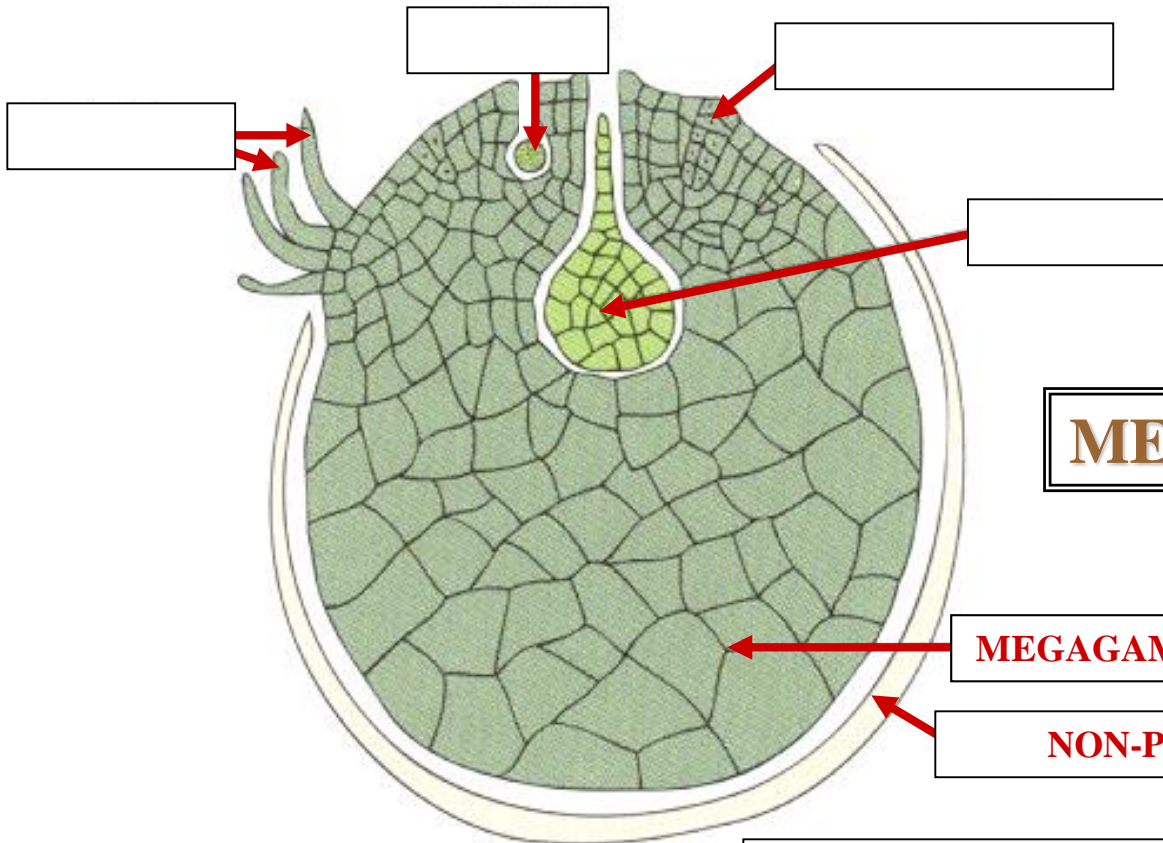


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MARSILEA

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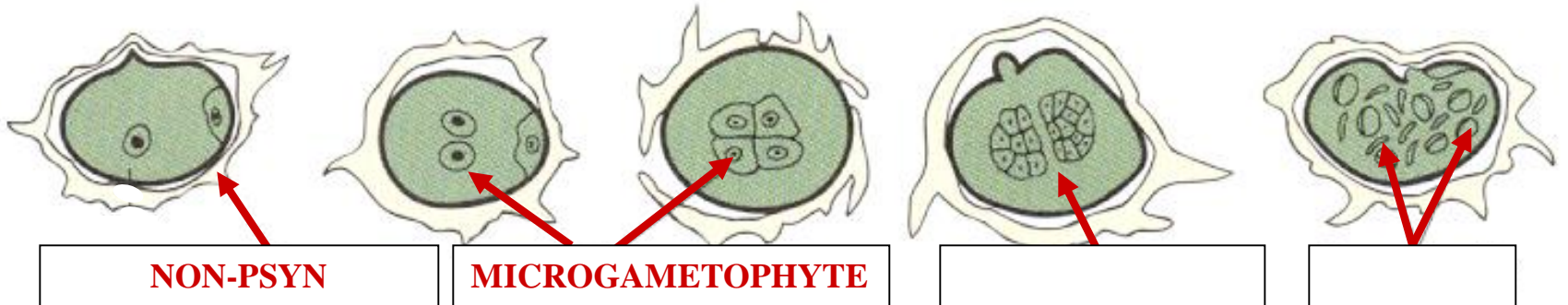
MEGASPORE

MEGAGAMETOPHYTE

NON-PSYN

MICROSPORE

GAMETOPHYTE

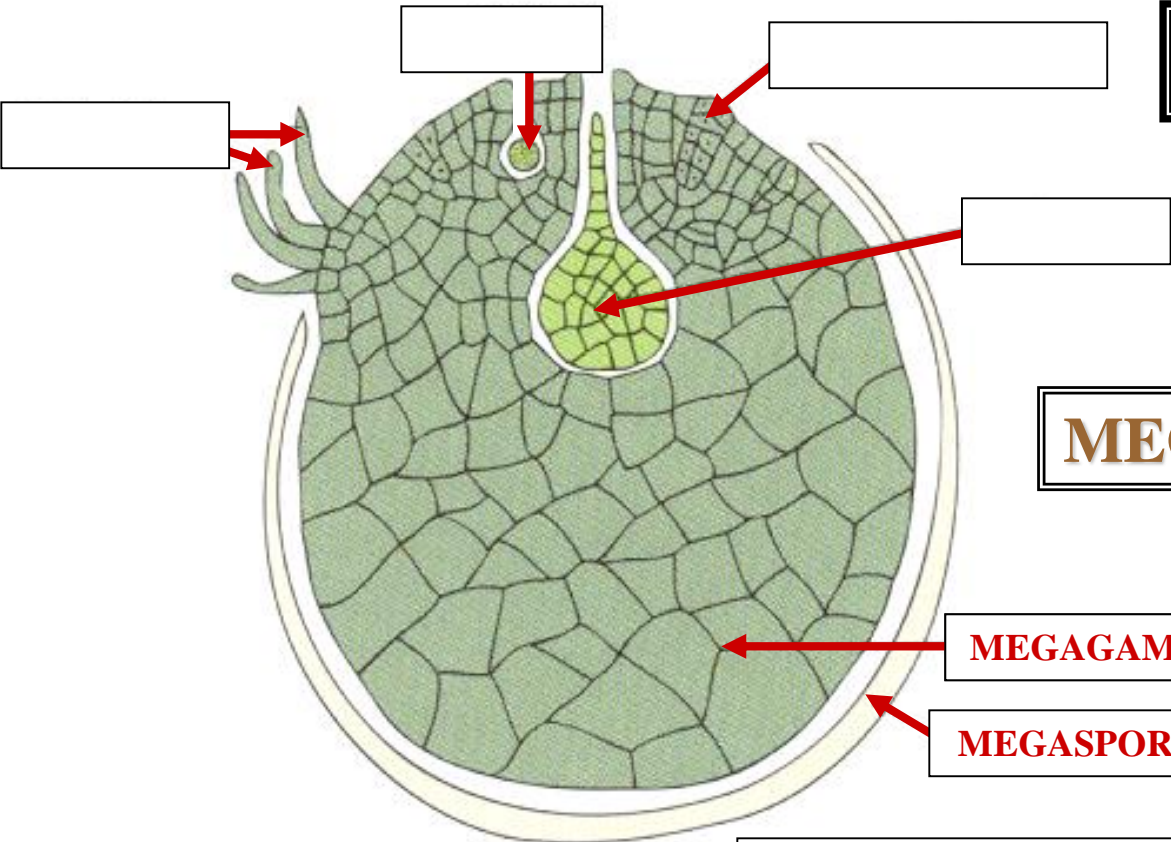


NON-PSYN

MICROGAMETOPHYTE

MARSILEA

M



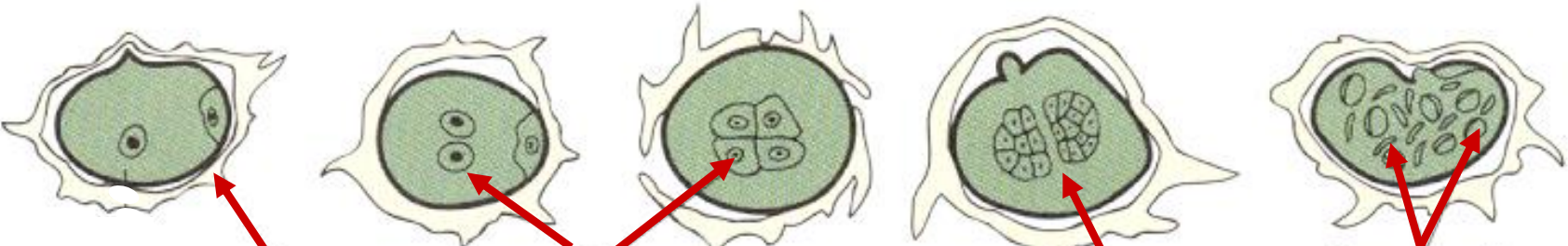
MEGASPORE

MEGAGAMETOPHYTE

MEGASPORE WALL

MICROSPORE

GAMETOPHYTE



MICROSPORE WALL

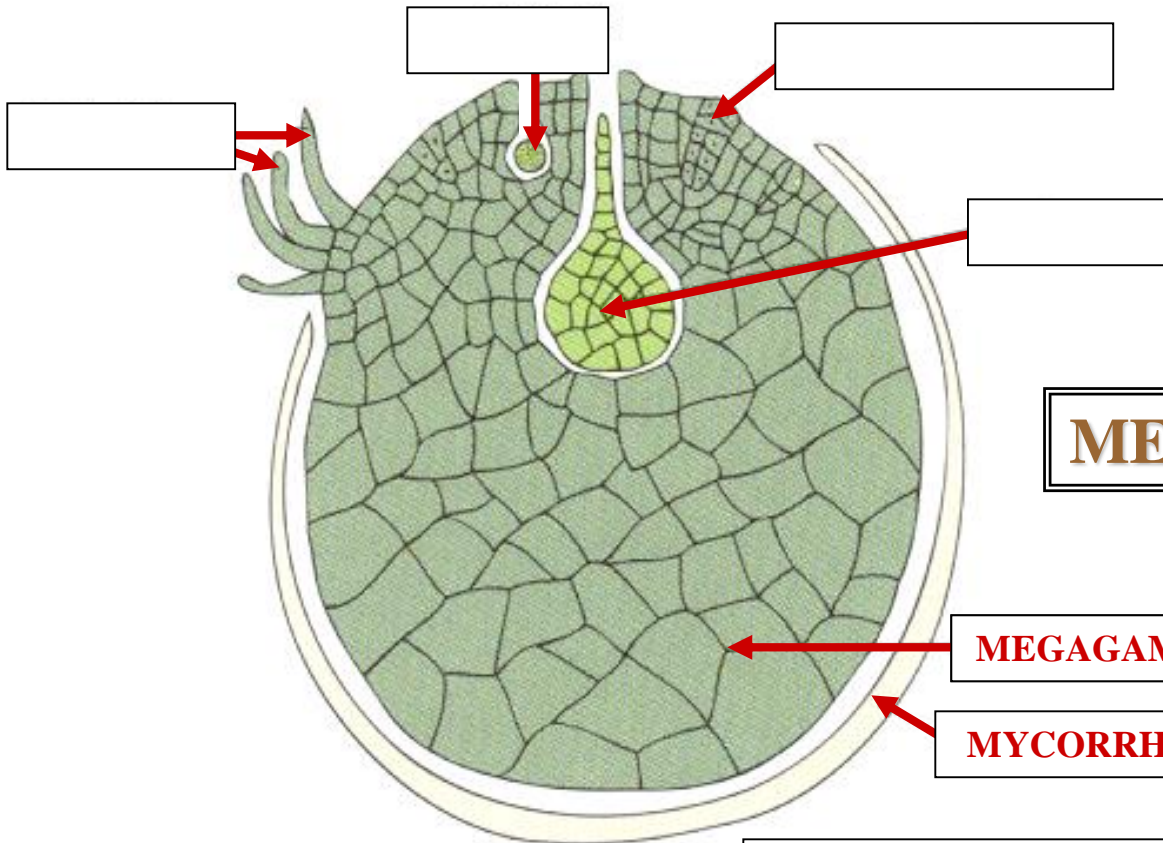
MICROGAMETOPHYTE

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MARSILEA

EN



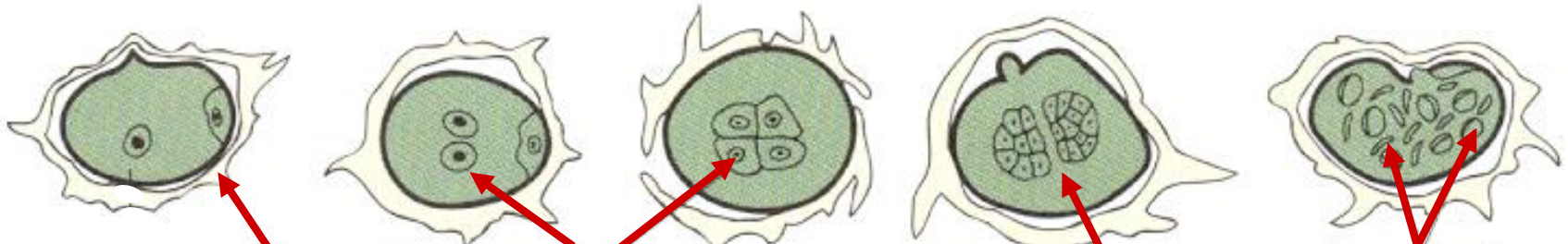
MEGASPORE

MEGAGAMETOPHYTE

MYCORRHIZAE ABSENT

MICROSPORE

GAMETOPHYTE



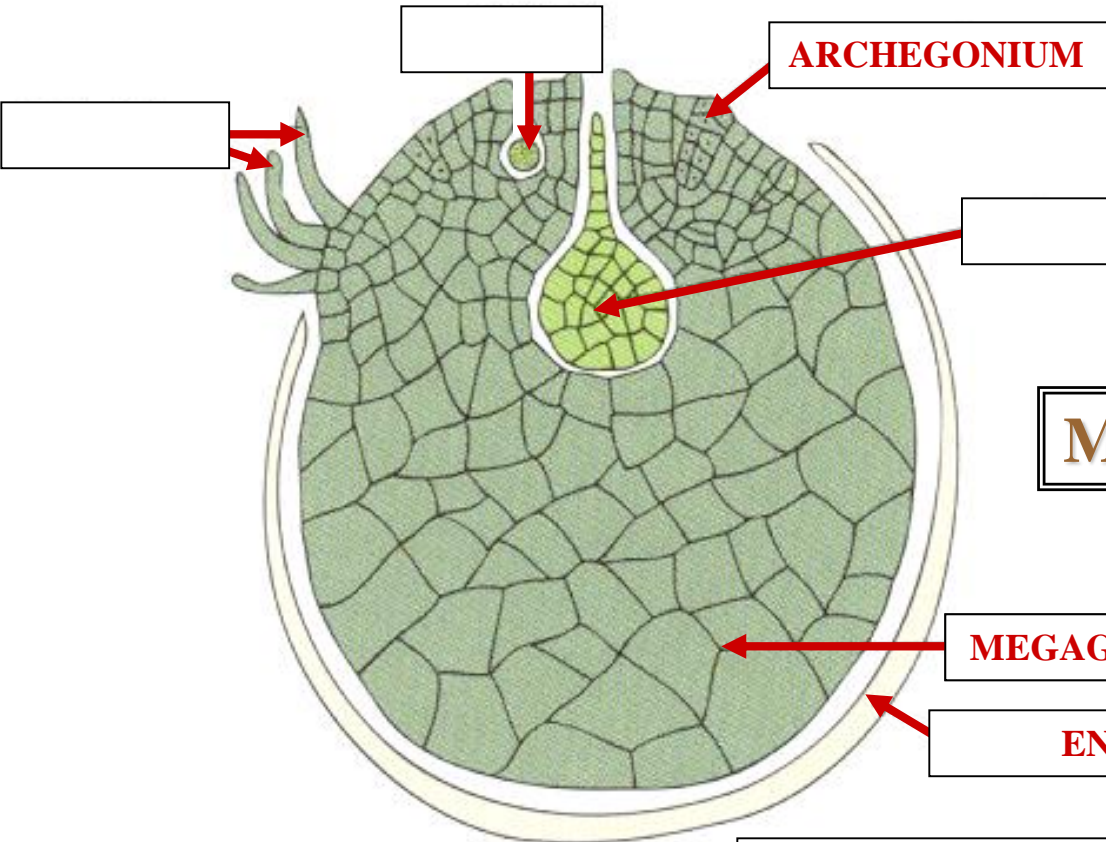
MYCORRHIZAE ABSENT

MICROGAMETOPHYTE



MARSILEA

U



ARCHEGONIUM

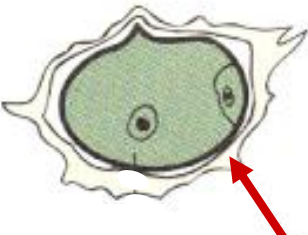
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MEGAGAMETOPHYTE

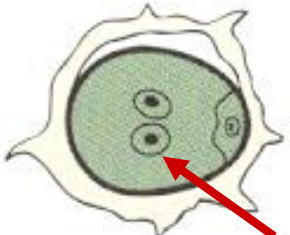
ENDOSPORIC

MICROSPORE

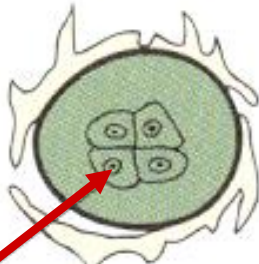
GAMETOPHYTE



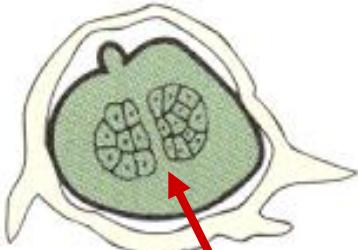
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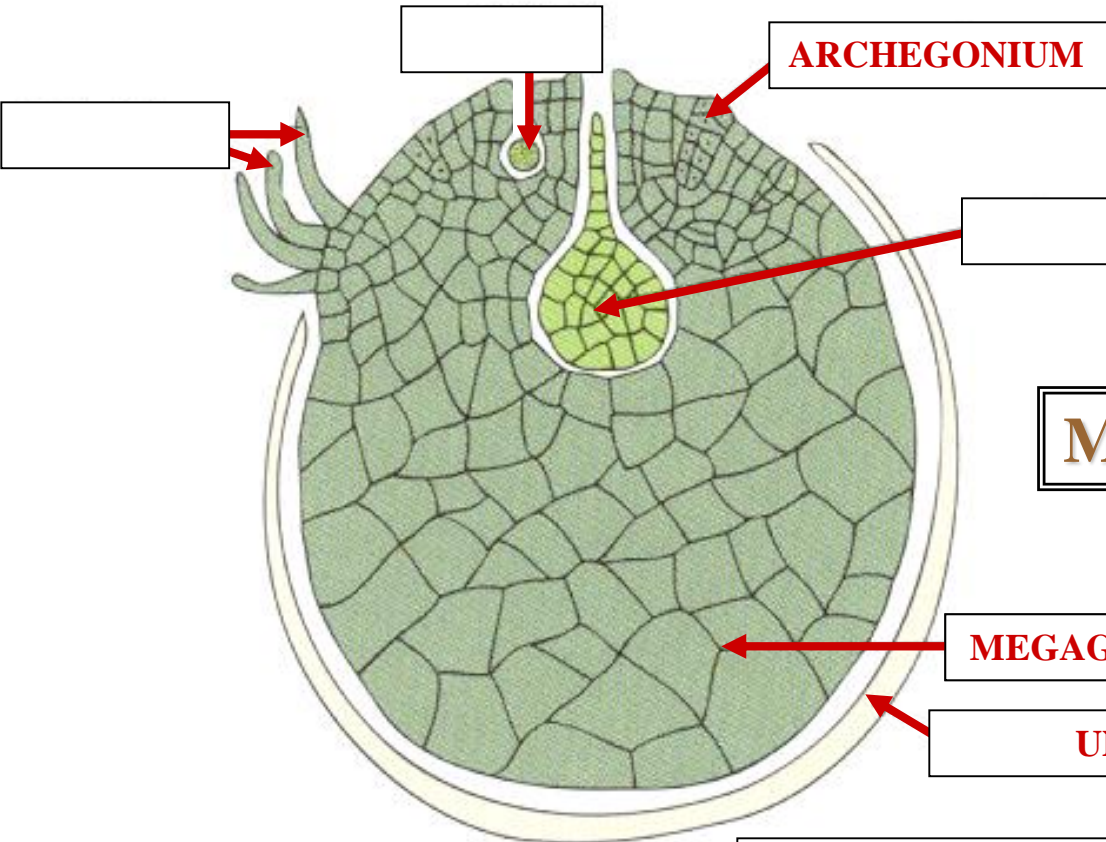
MICROGAMETOPHYTE



ANTHERIDIUM

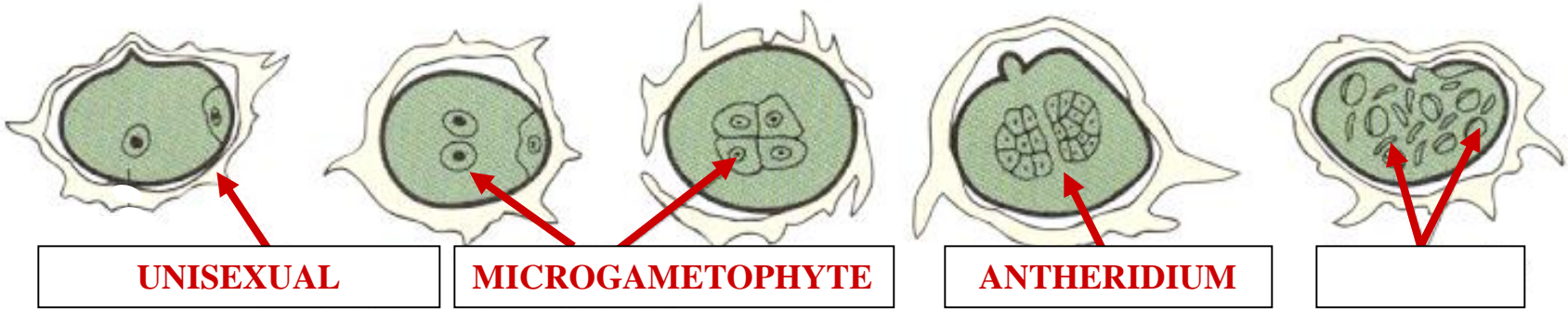


MARSILEA



MICROSPORE

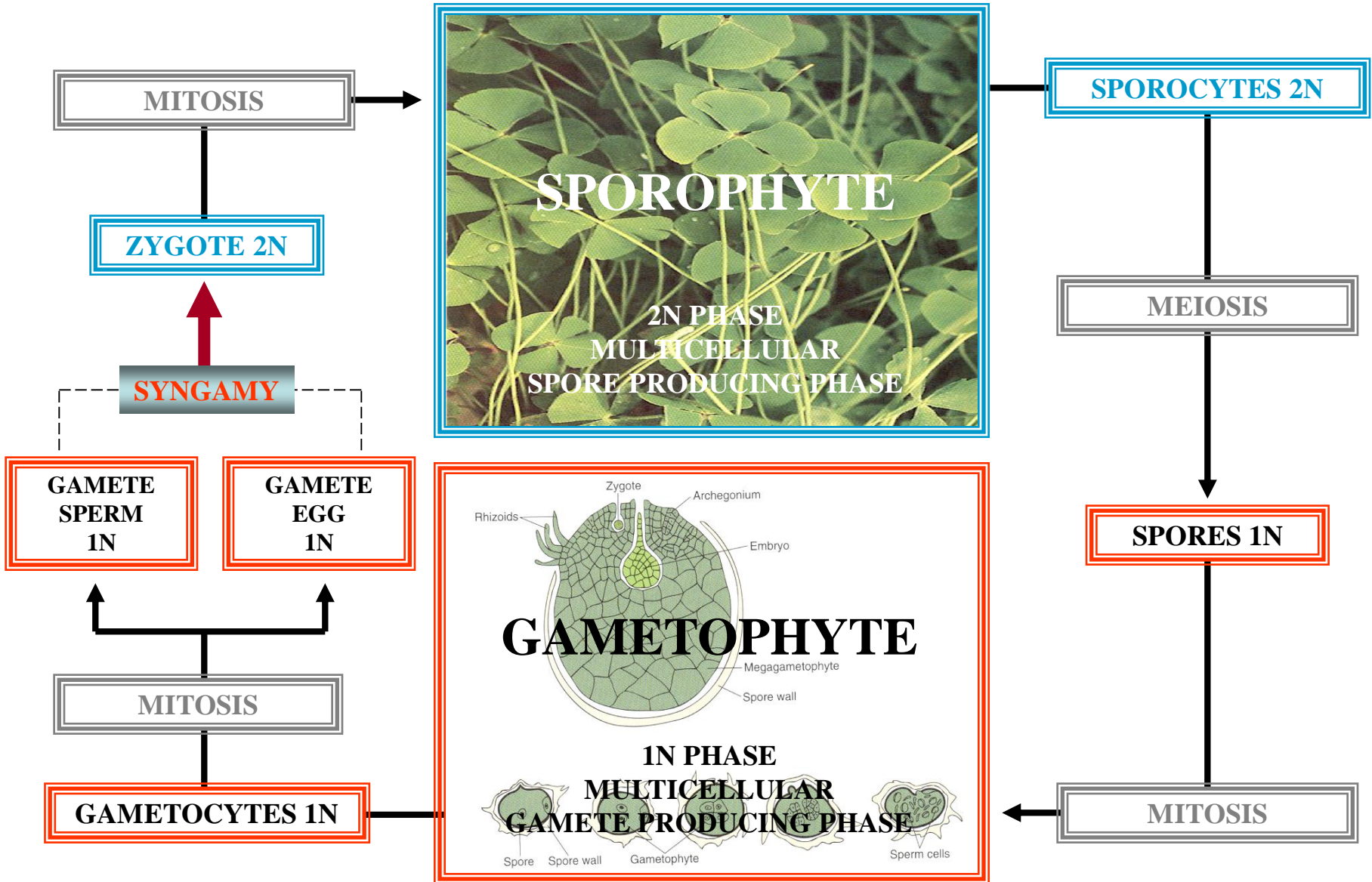
GAMETOPHYTE





MARSILEALES

LIFE CYCLE





PTERIDOPHYTA CLASSIFICATION



ALABAMA
TRACHEOPHYTE

SALVINIALES

ALABAMA
TRACHEOPHYTE



COMMON NAME

ALABAMA LAKE OR ALABAMA POND



WATER FERNS

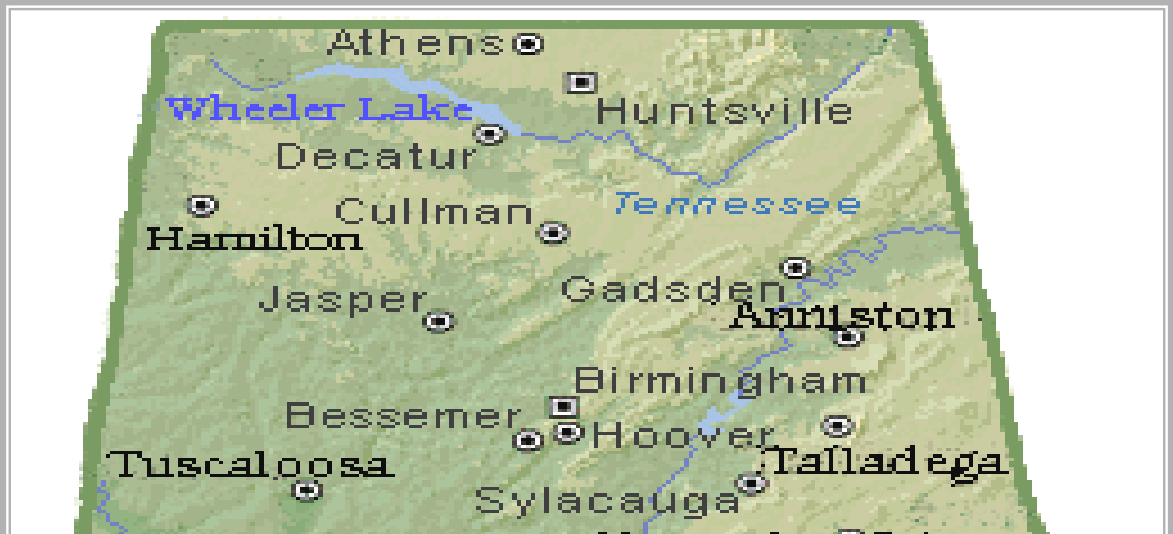


DIVERSITY



~17 SPECIES

EARTH



2 SPECIES





SALVINIALES
VERY MINOR
COMPONENT
ALABAMA FLORA



REPRESENTATIVE GENERA

S

?



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SALVINIA

A

?





AZOLLA



HABITAT

ALABAMA LAKE OR ALABAMA POND



AQUATIC HABITAT

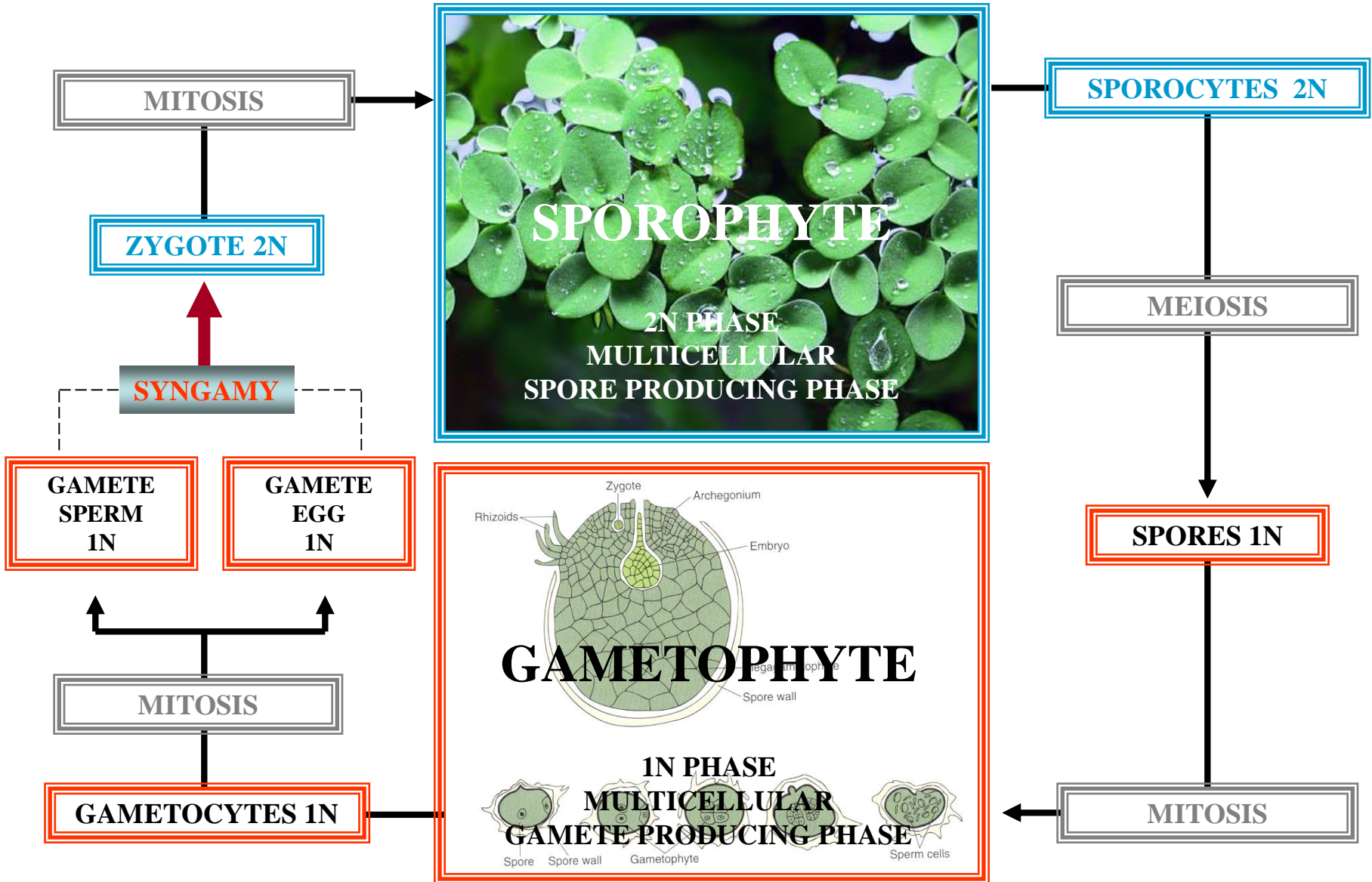


GENERAL CHARACTERS



SALVINIALES

LIFE CYCLE





SPOROPHYTE CHARACTERS



GROWTH HABIT

ALABAMA LAKE OR ALABAMA POND

SALVINIA



FREE FLOATING



ALABAMA LAKE OR ALABAMA POND

AZOLLA



FREE FLOATING





MORPHOLOGY



**TYPICAL
FERN
MORPHOLOGY**



**TYPICAL
FERN
MORPHOLOGY**



SALVINIA



AZOLLA



**TYPICAL
FERN
MORPHOLOGY**



**TYPICAL
FERN
MORPHOLOGY**



**ATYPICAL
FERN
MORPHOLOGY**

SALVINIA



**ATYPICAL
FERN
MORPHOLOGY**

AZOLLA



**TYPICAL
FERN
MORPHOLOGY**



**TYPICAL
FERN
MORPHOLOGY**



**MORPHOLOGY
NOT
FERN-LIKE**

SALVINIA



**MORPHOLOGY
NOT
FERN-LIKE**

AZOLLA



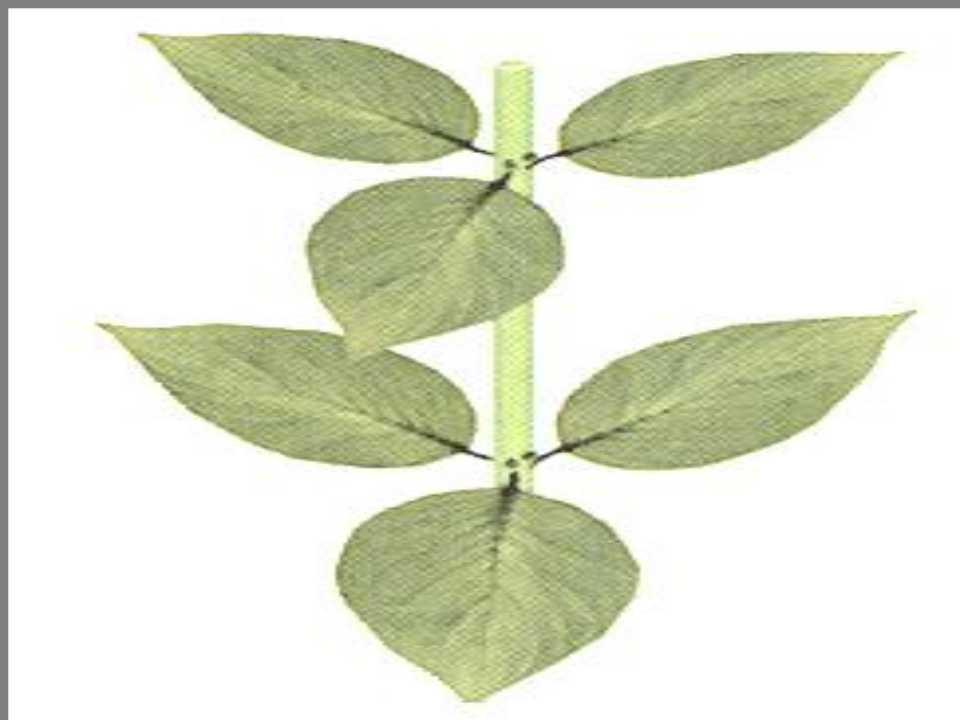
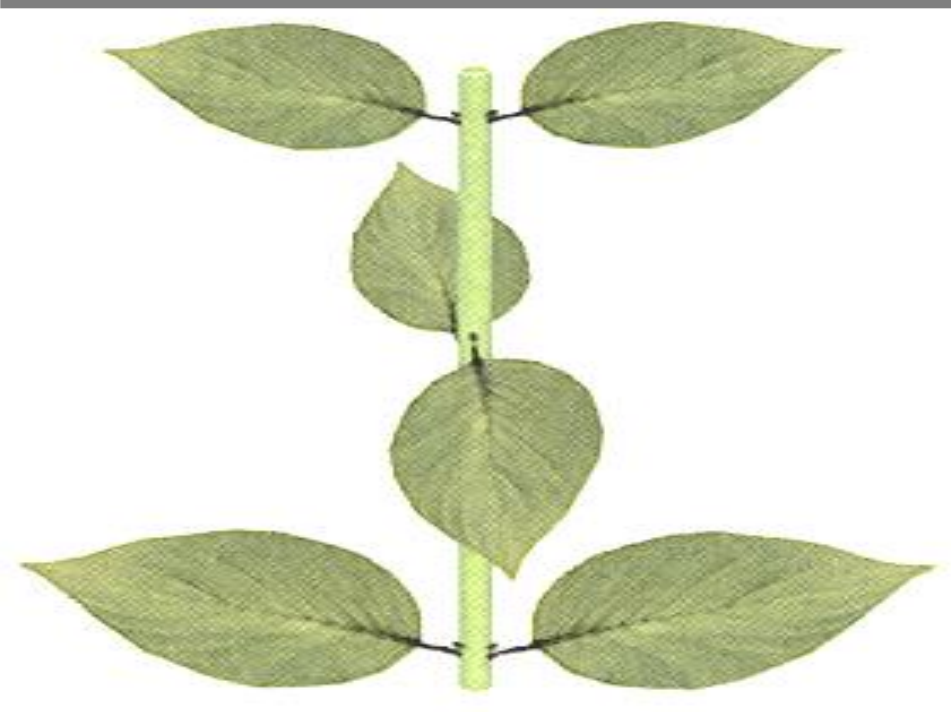
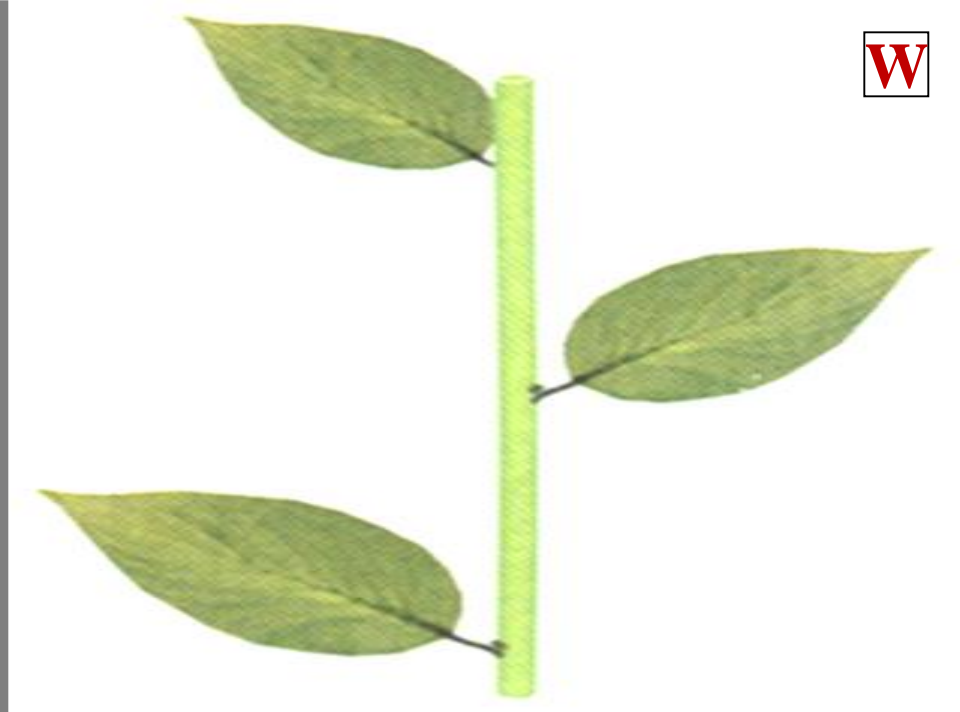
FROND



PHYLLOTAXY

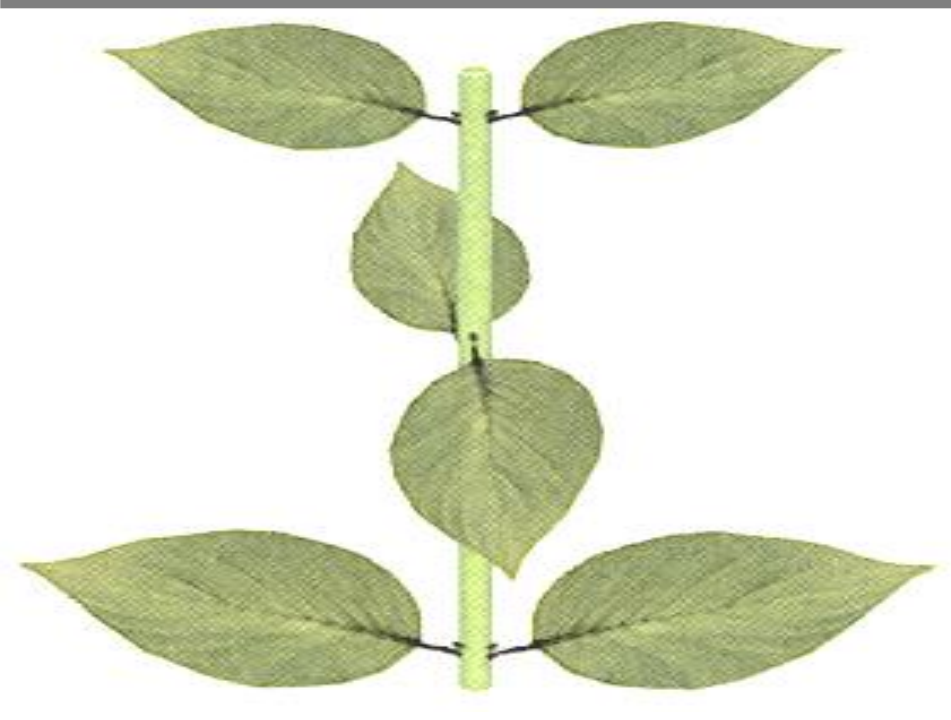
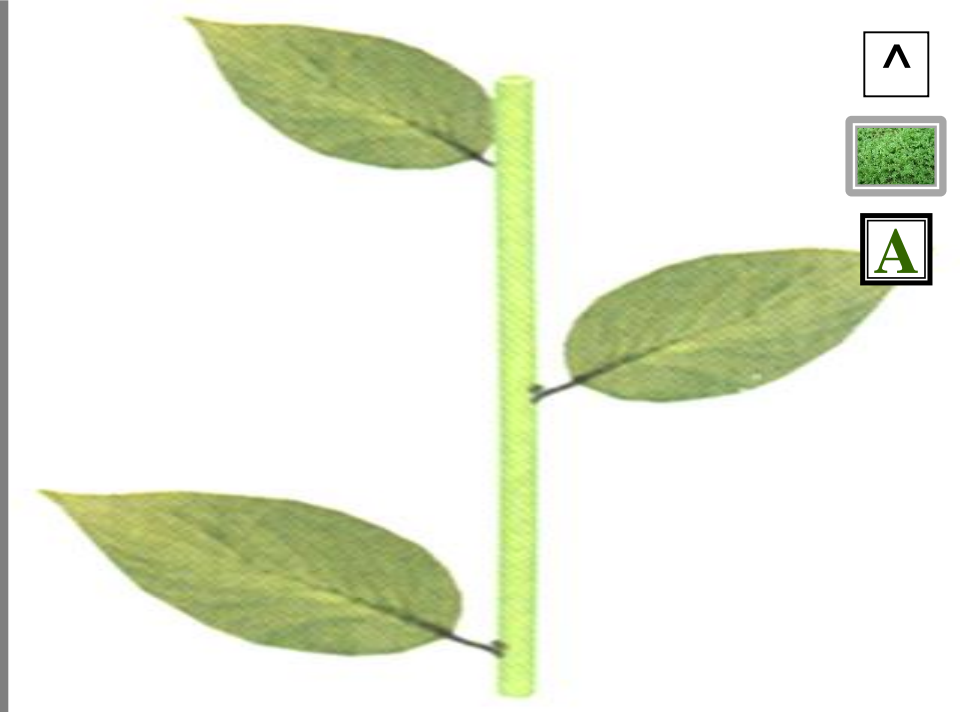


SALVINIA





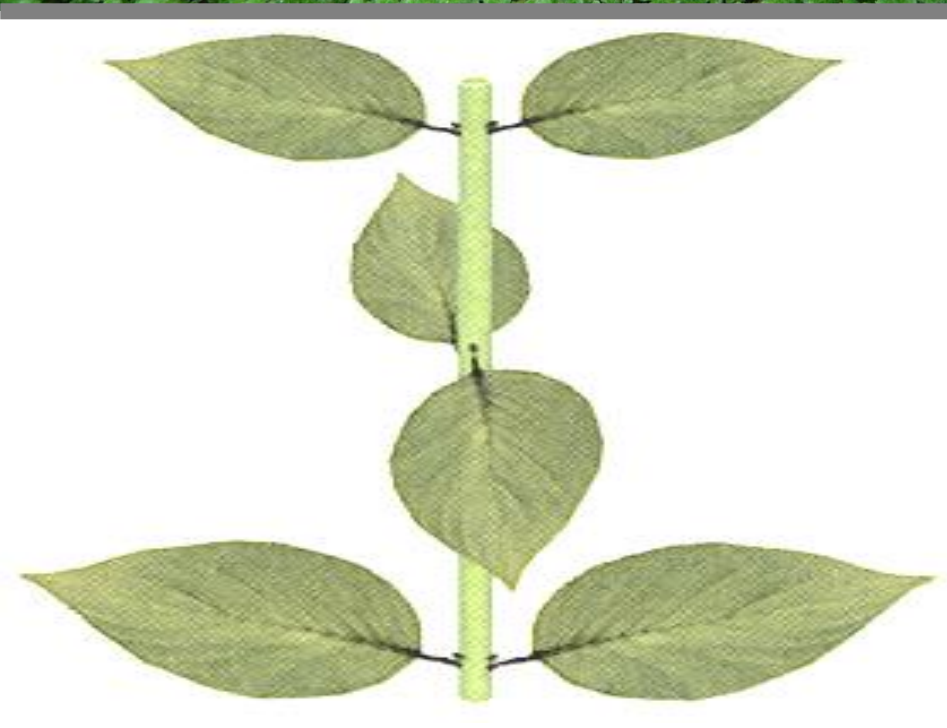
SALVINIA



WHORLED



AZOLLA

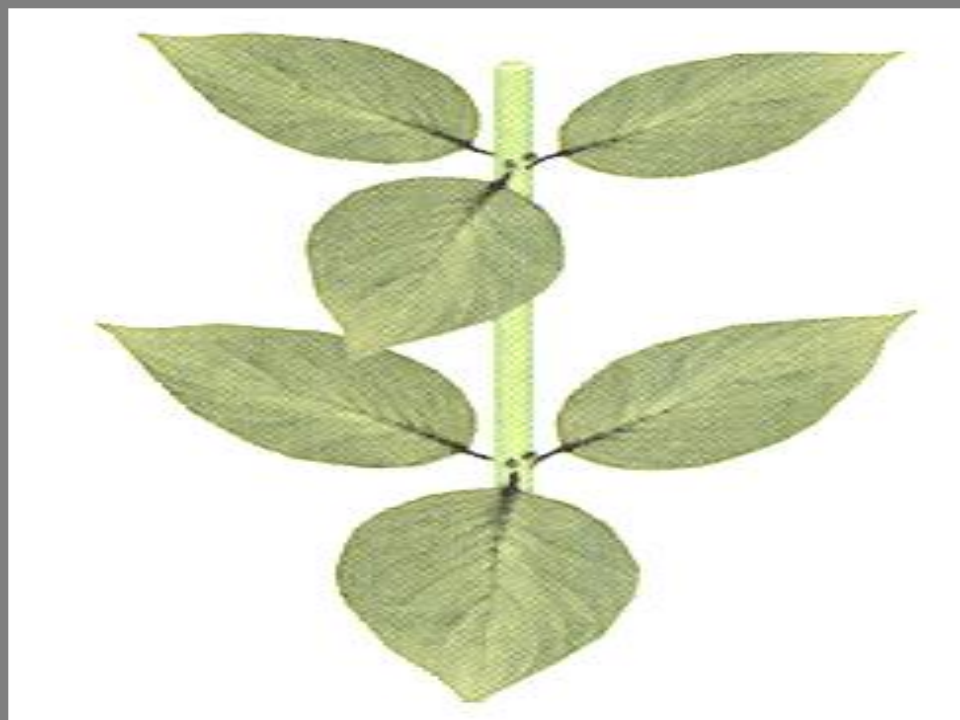
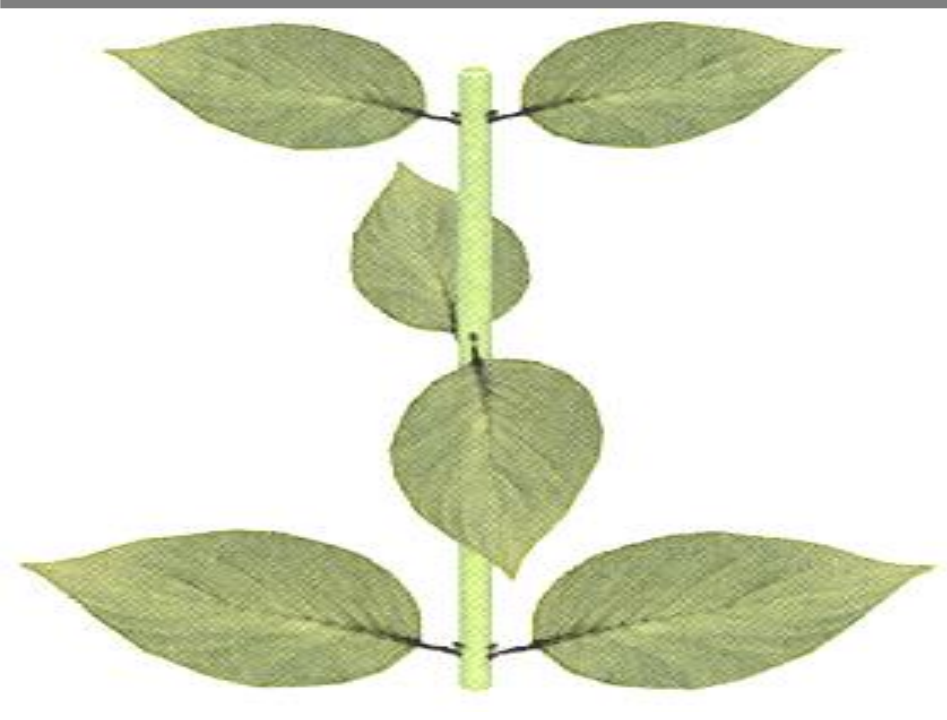




AZOLLA



ALTERNATE





MORPHOLOGY



SIMPLE FROND

SALVINIA



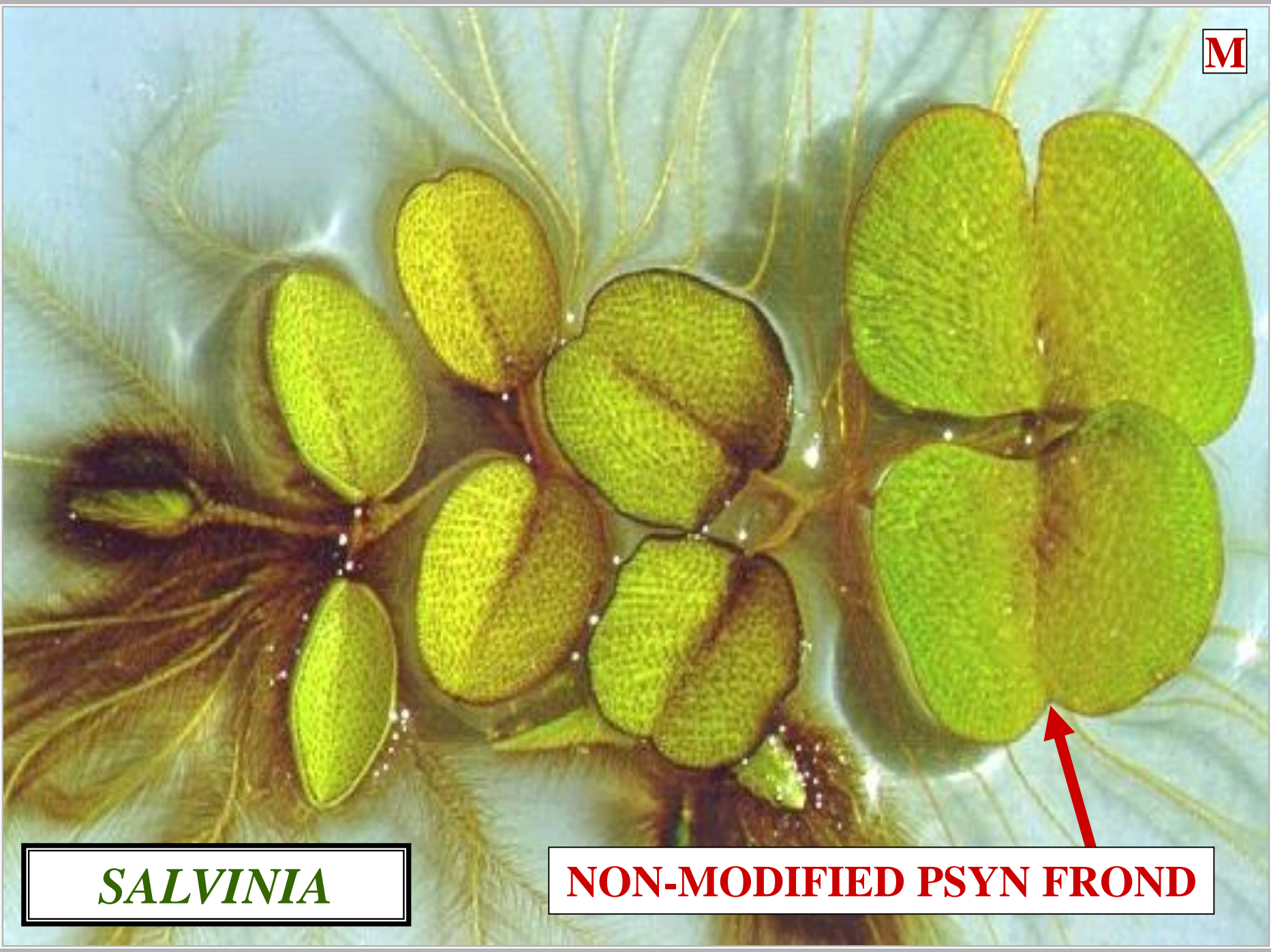


SIMPLE FROND

AZOLLA



MODIFIED SIMPLE FROND

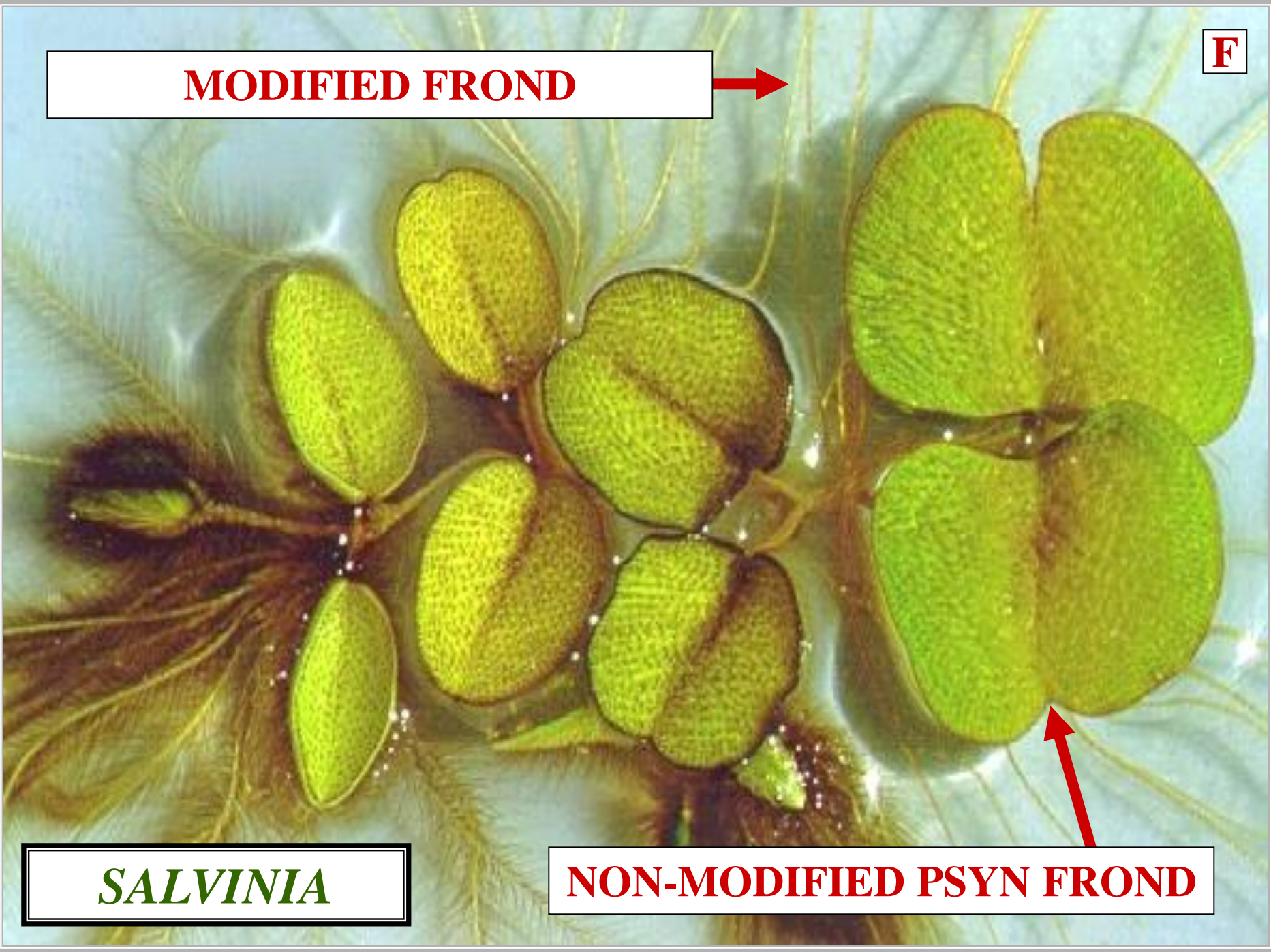


SALVINIA

NON-MODIFIED PSYN FROND

F

MODIFIED FROND

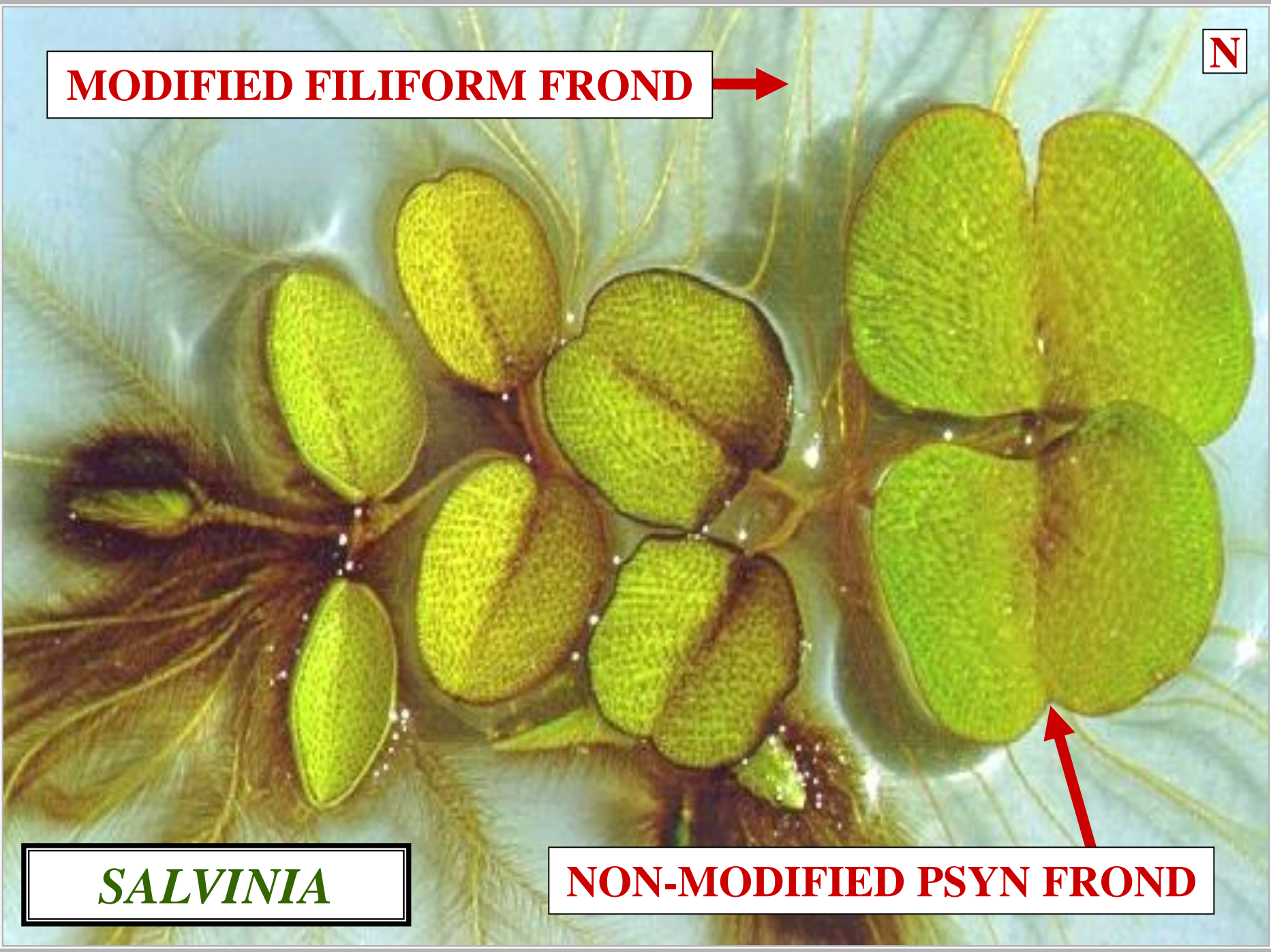


SALVINIA

NON-MODIFIED PSYN FROND



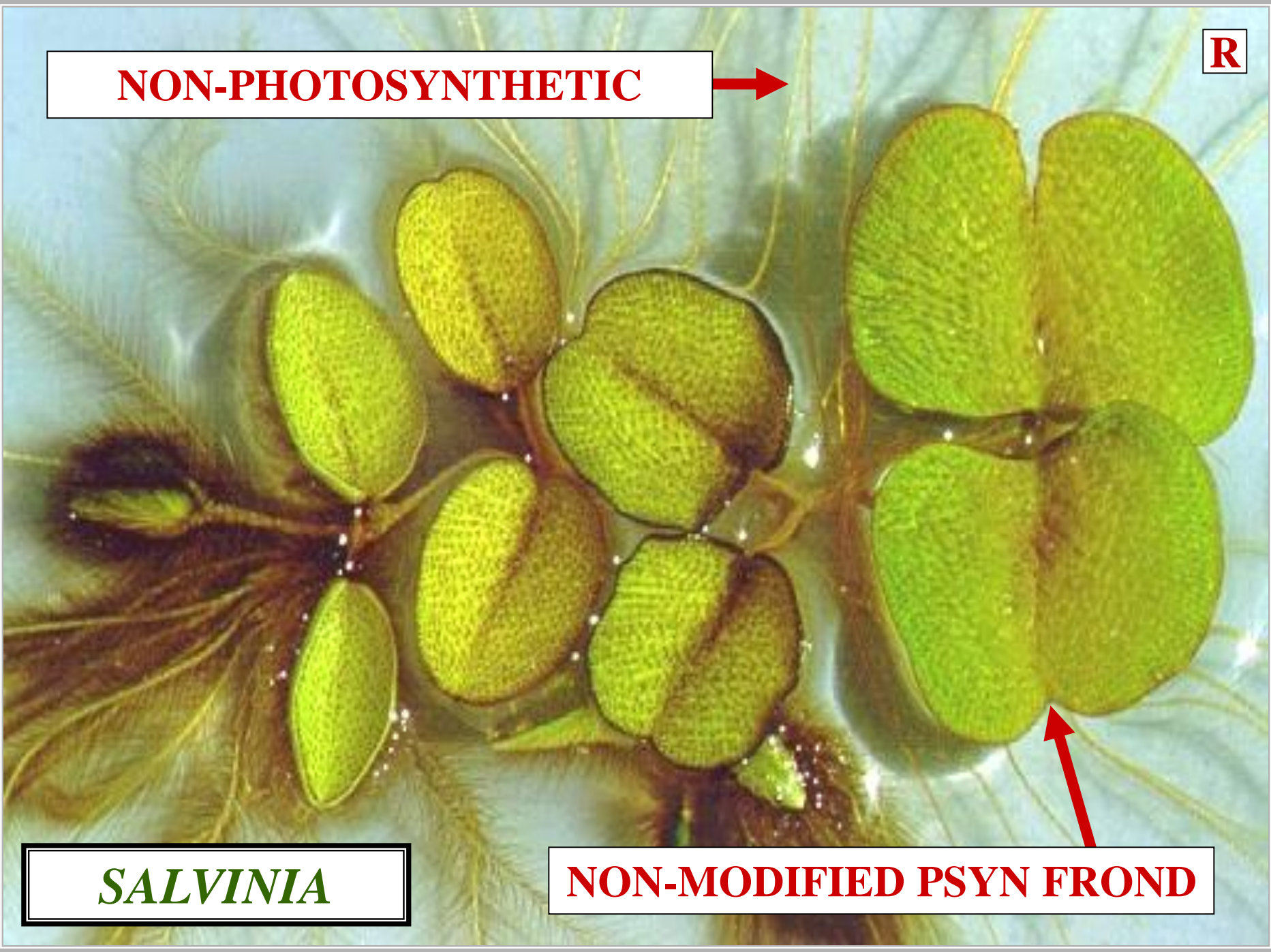
MODIFIED FILIFORM FROND →



SALVINIA

NON-MODIFIED PSYN FROND

NON-PHOTOSYNTHETIC →



SALVINIA

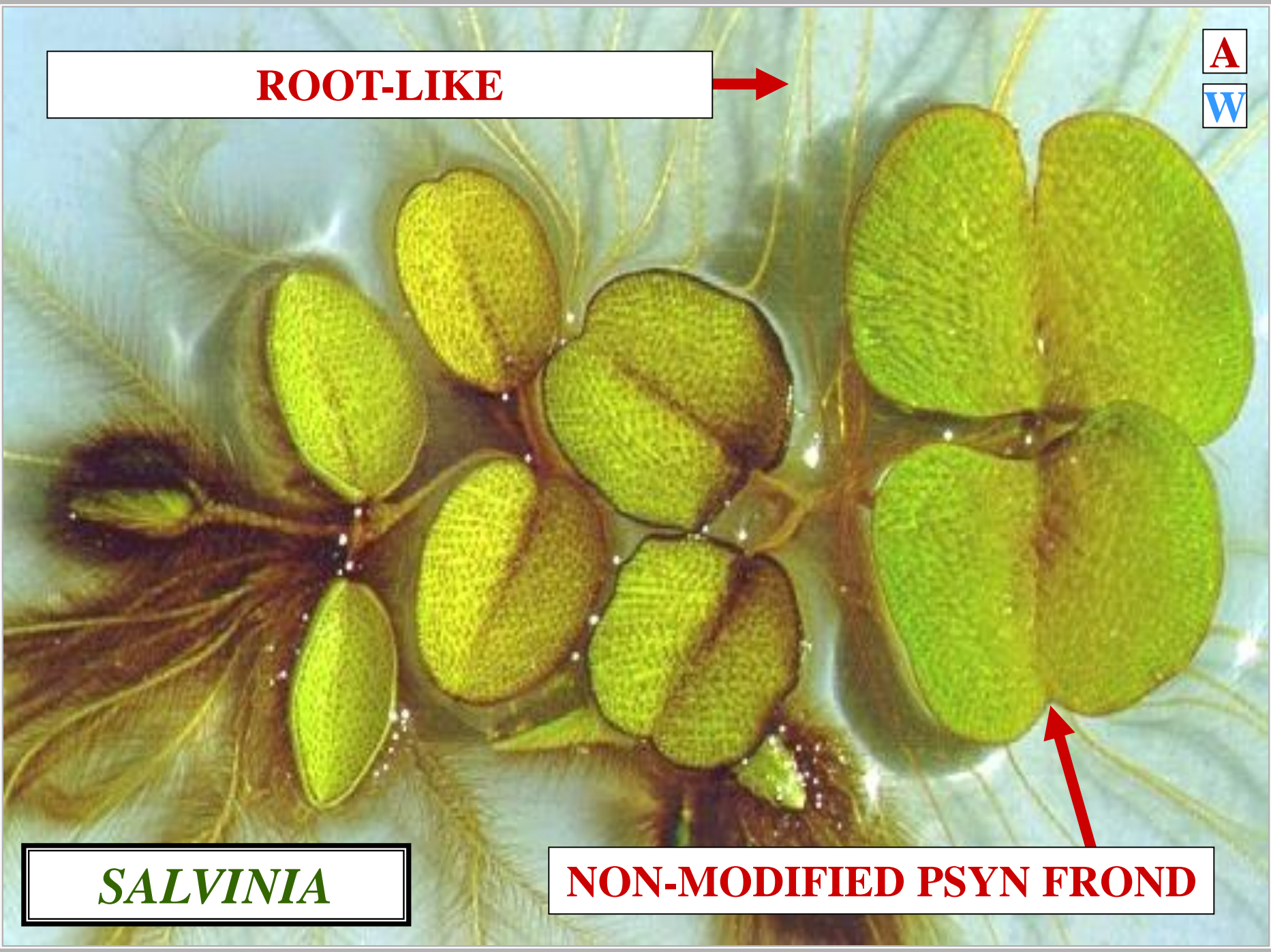
NON-MODIFIED PSYN FROND ←

ROOT-LIKE

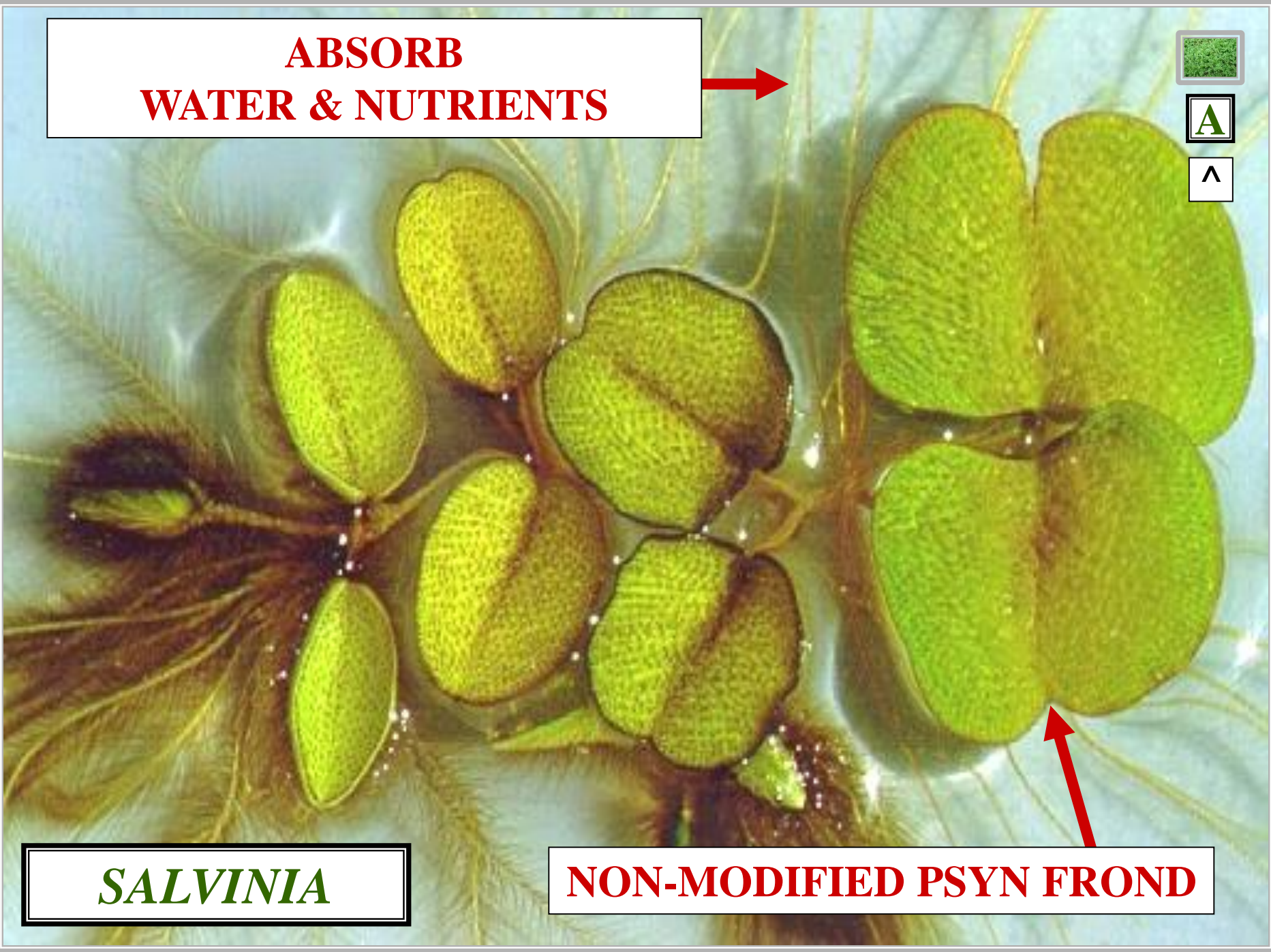


SALVINIA

NON-MODIFIED PSYN FROND



**ABSORB
WATER & NUTRIENTS**



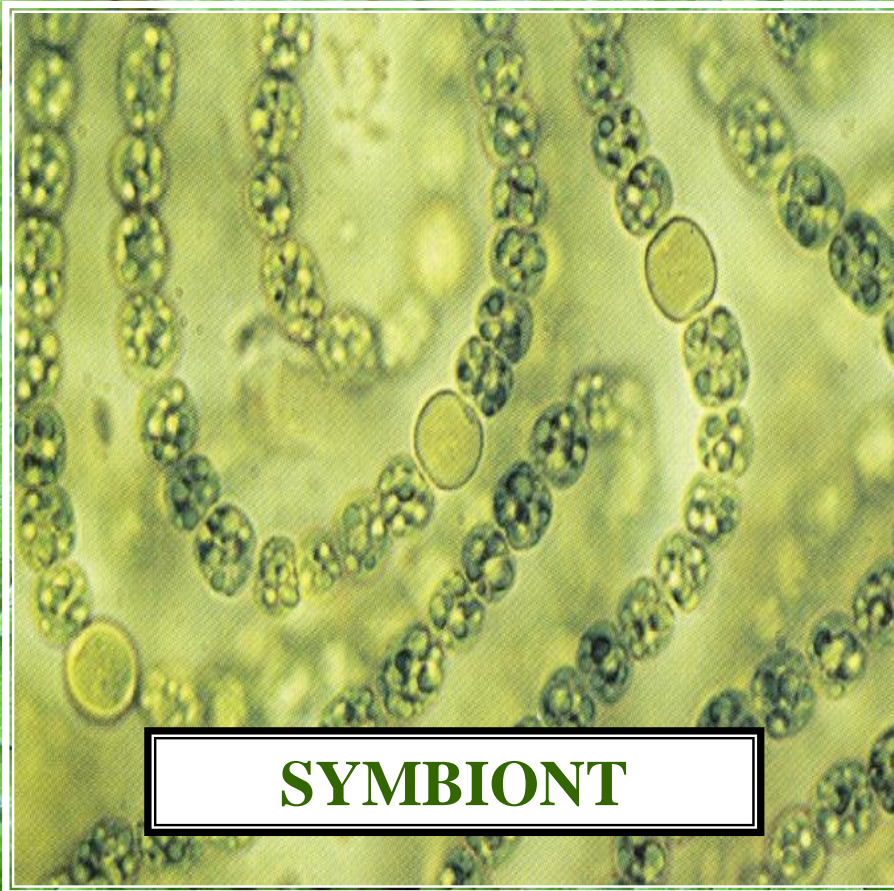
SALVINIA

NON-MODIFIED PSYN FROND



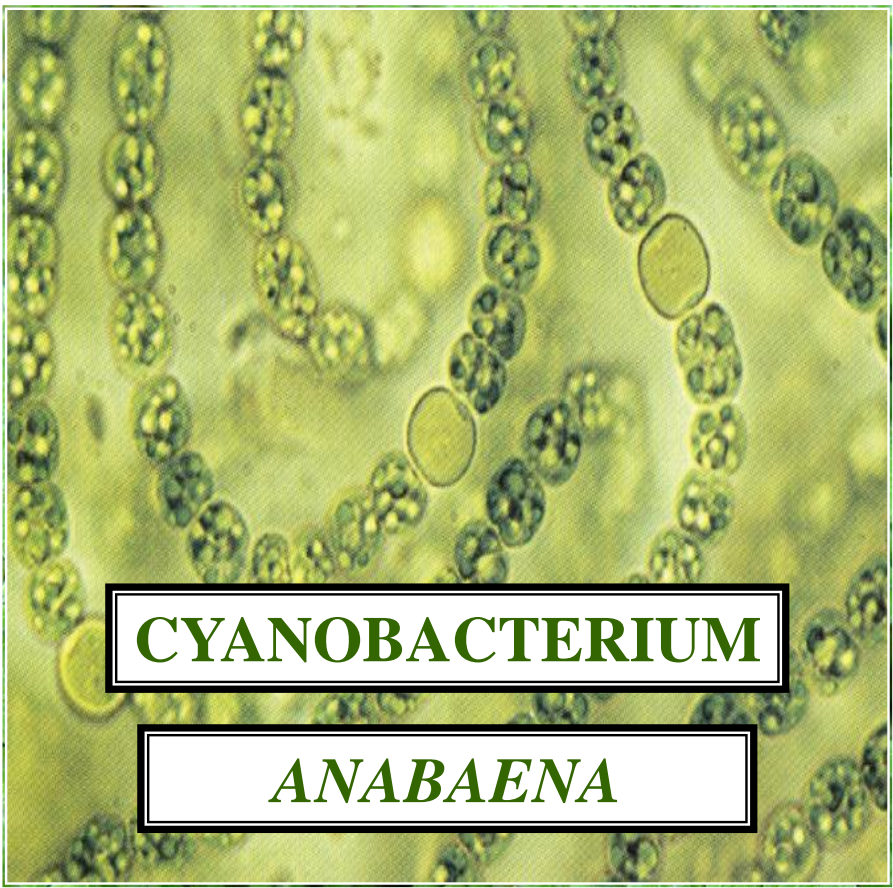
AZOLLA

A



SYMBIONT

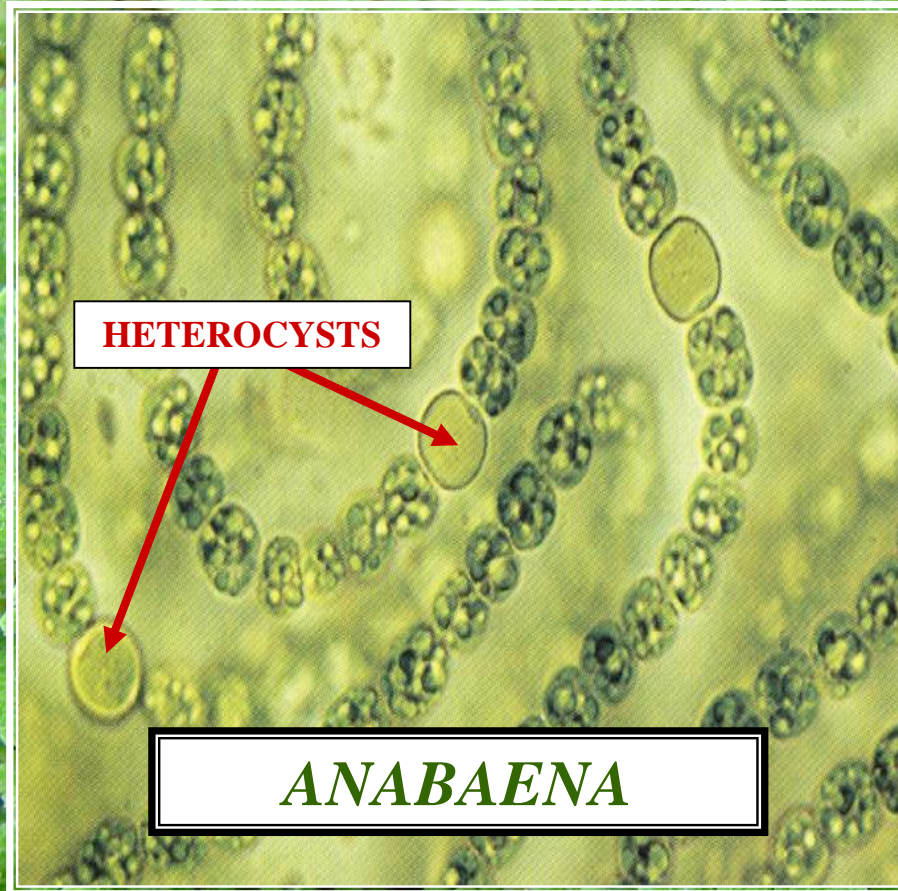
AZOLLA



CYANOBACTERIUM

ANABAENA

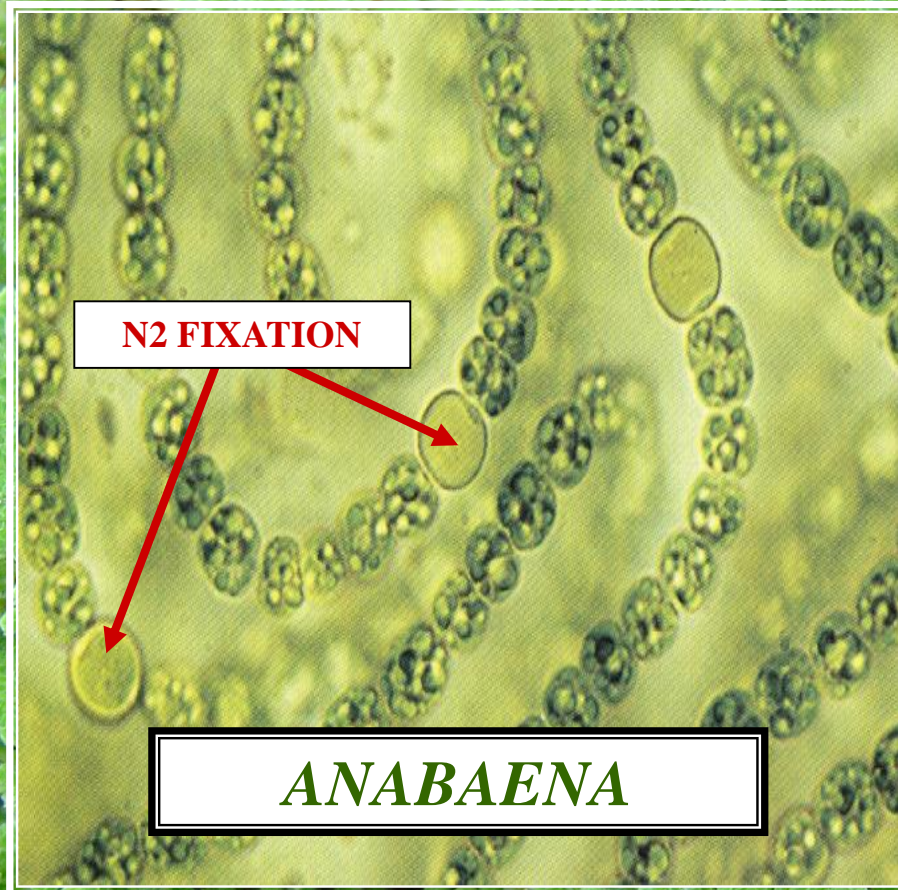
AZOLLA



HETEROCYSTS

ANABAENA

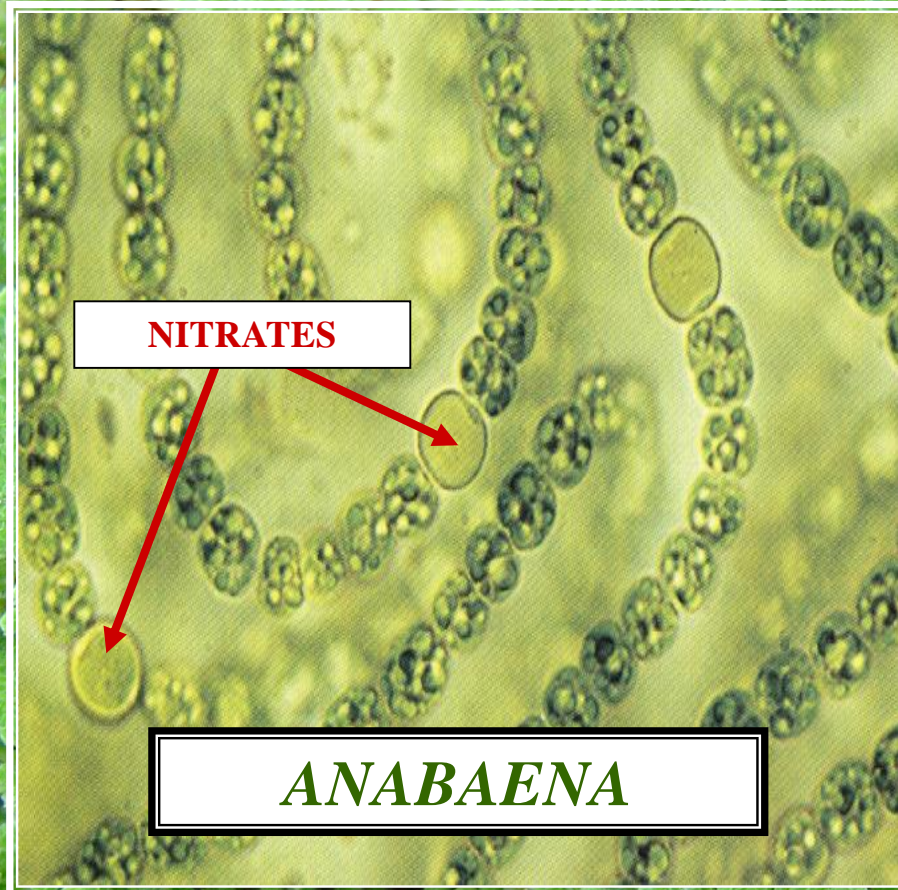
AZOLLA



N₂ FIXATION

ANABAENA

AZOLLA



NITRATES

ANABAENA

AZOLLA



FERTILIZER SUPPLEMENT

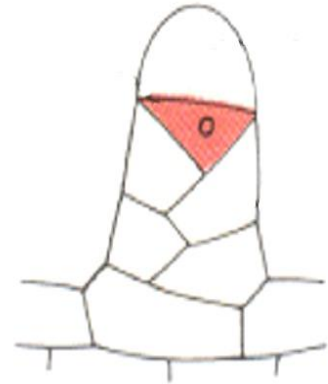
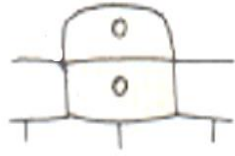
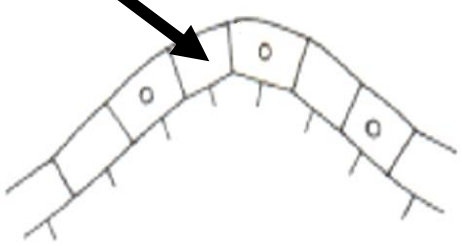


AZOLLA



SPORANGIUM

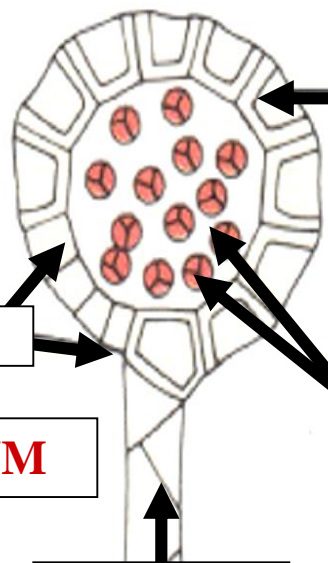
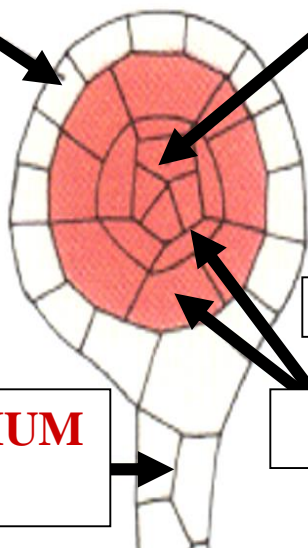
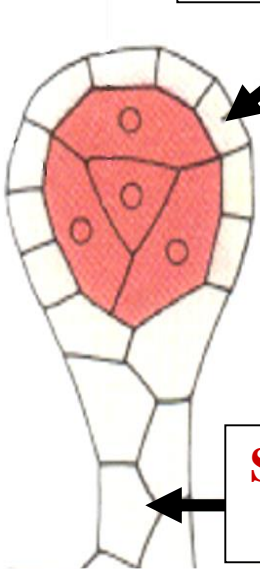
CELL INITIAL



SPORANGIUM WALL

SPOROCYTES

SMALL SIZE



ANNULUS

THIN WALL

FEW SPORES

SPORANGIUM STALK

STOMIUM

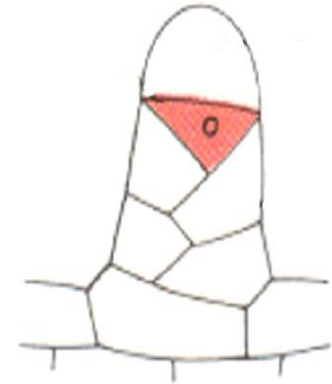
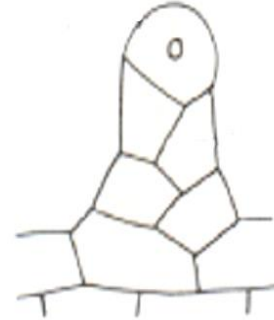
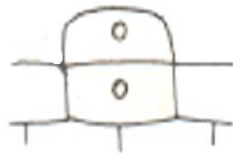
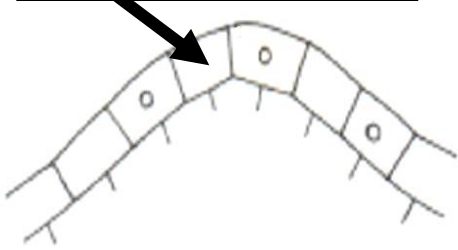
TAPETUM

STALK

L.S.



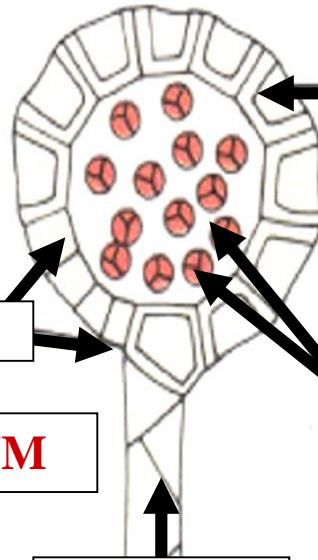
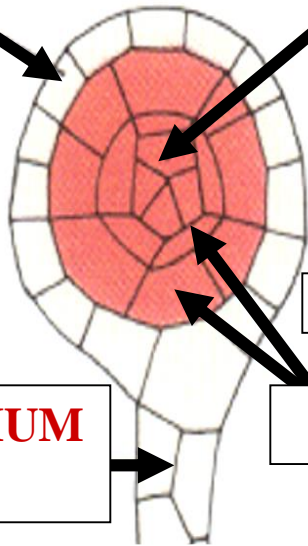
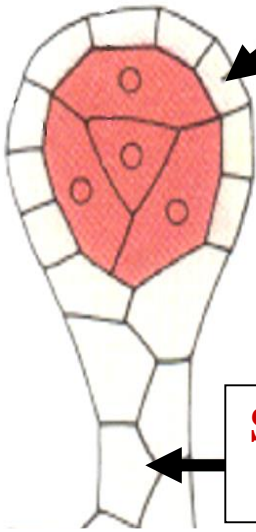
CELL INITIAL



SPORANGIUM WALL

SPOROCYTES

SMALL SIZE



ANNULUS

THIN WALL

STOMIUM

FEW SPORES

SPORANGIUM STALK

TAPETUM

STALK

LEPTOSPORANGIUM

L.S.



F

SPORANGIUM POSITION

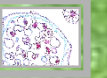
FOLIAR SPORANGIUM



F

AZOLLA

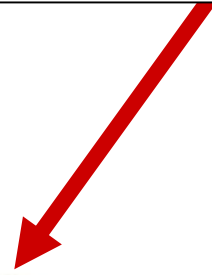
FOLIAR SPORANGIUM



SALVINIA

L.S.

SPOROCARP



SALVINIA



SPOROCARP

SPOROCARP

SALVINIALES

SPOROCARP



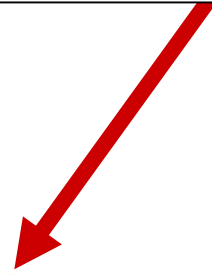
MODIFIED INDUSIUM

SALVINIALES

SPOROCARP

L.S.

SPOROCARP



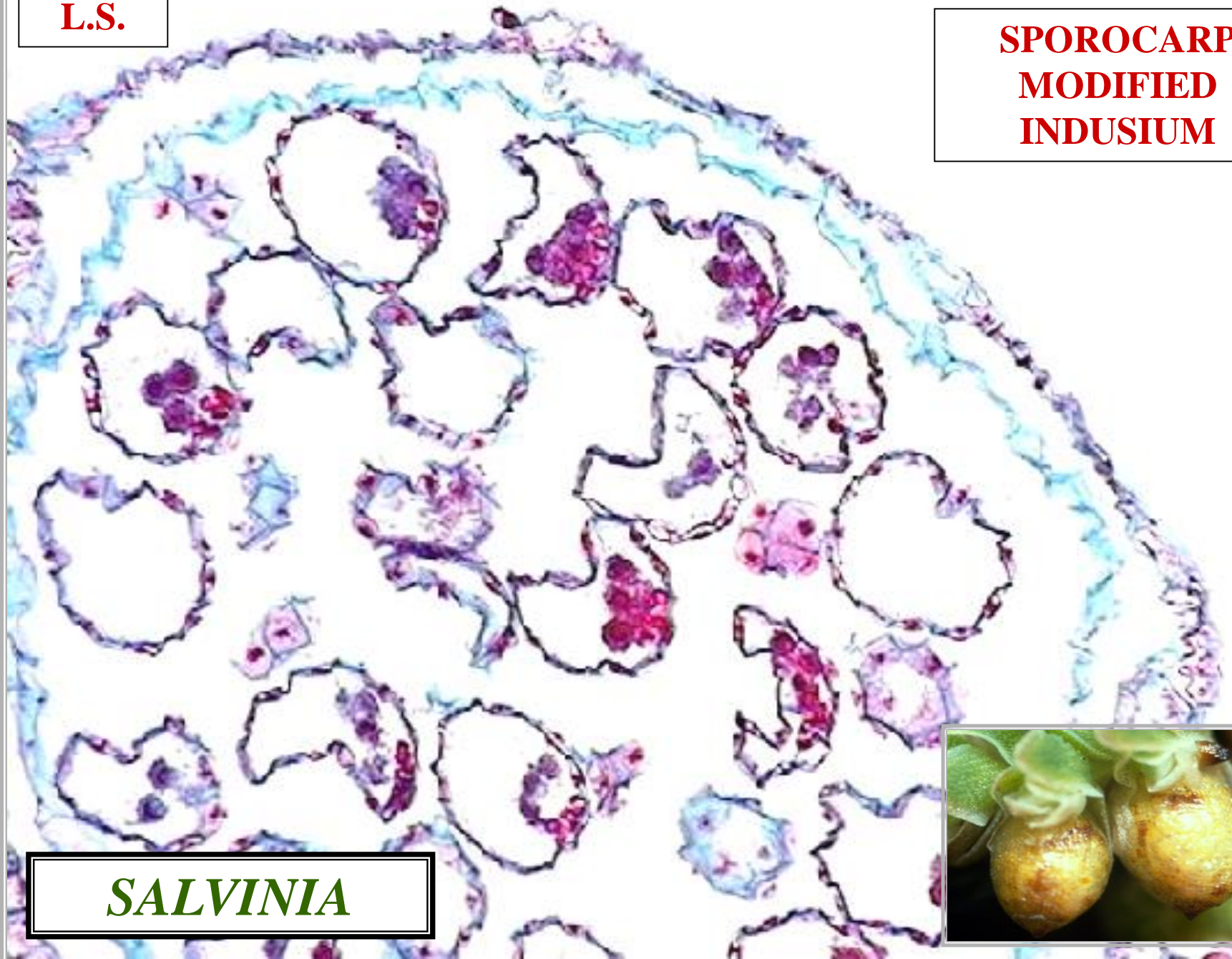
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SALVINIA



L.S.

**SPOROCARP
MODIFIED
INDUSIUM**



SALVINIA





SALVINIA

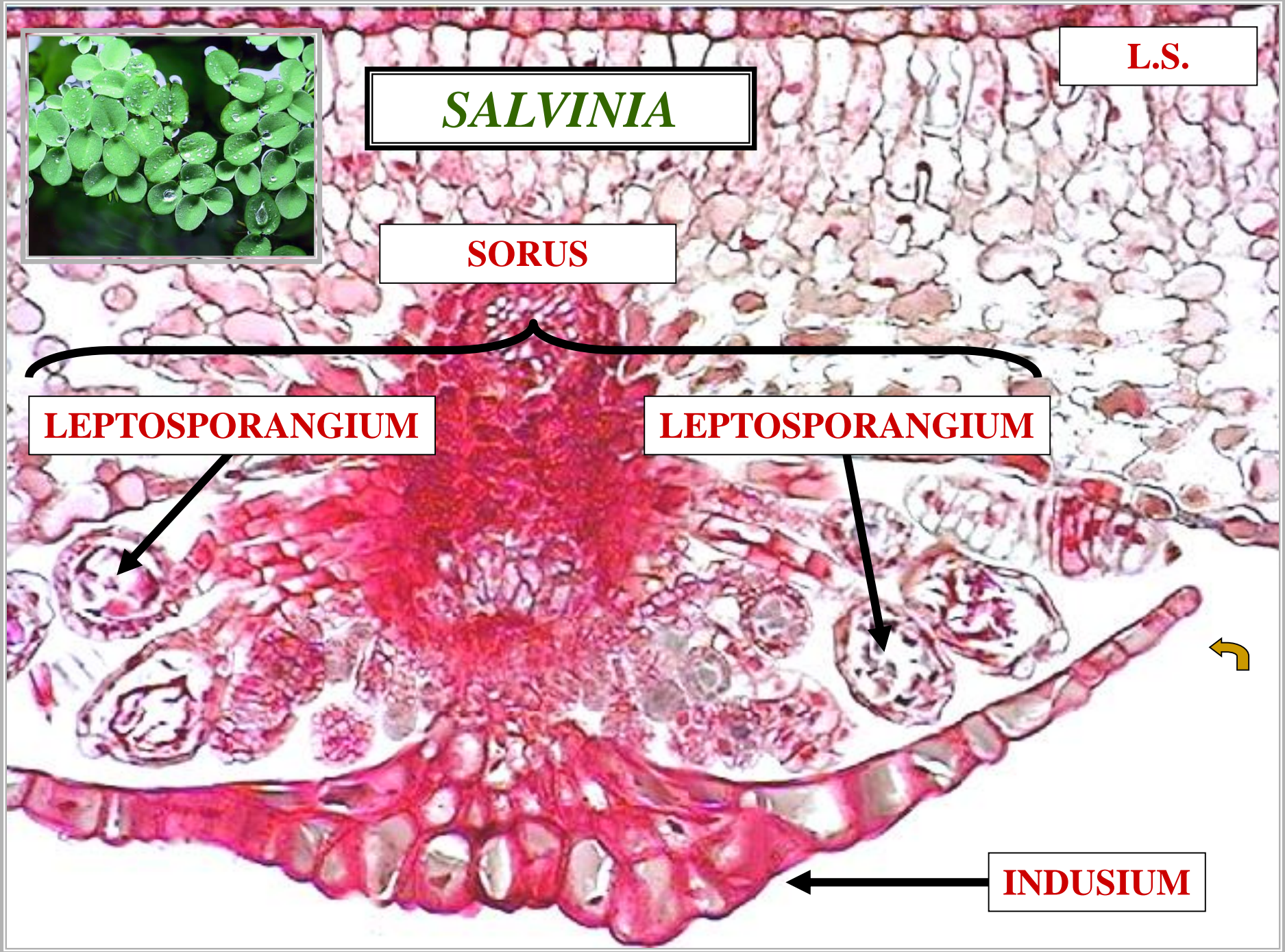
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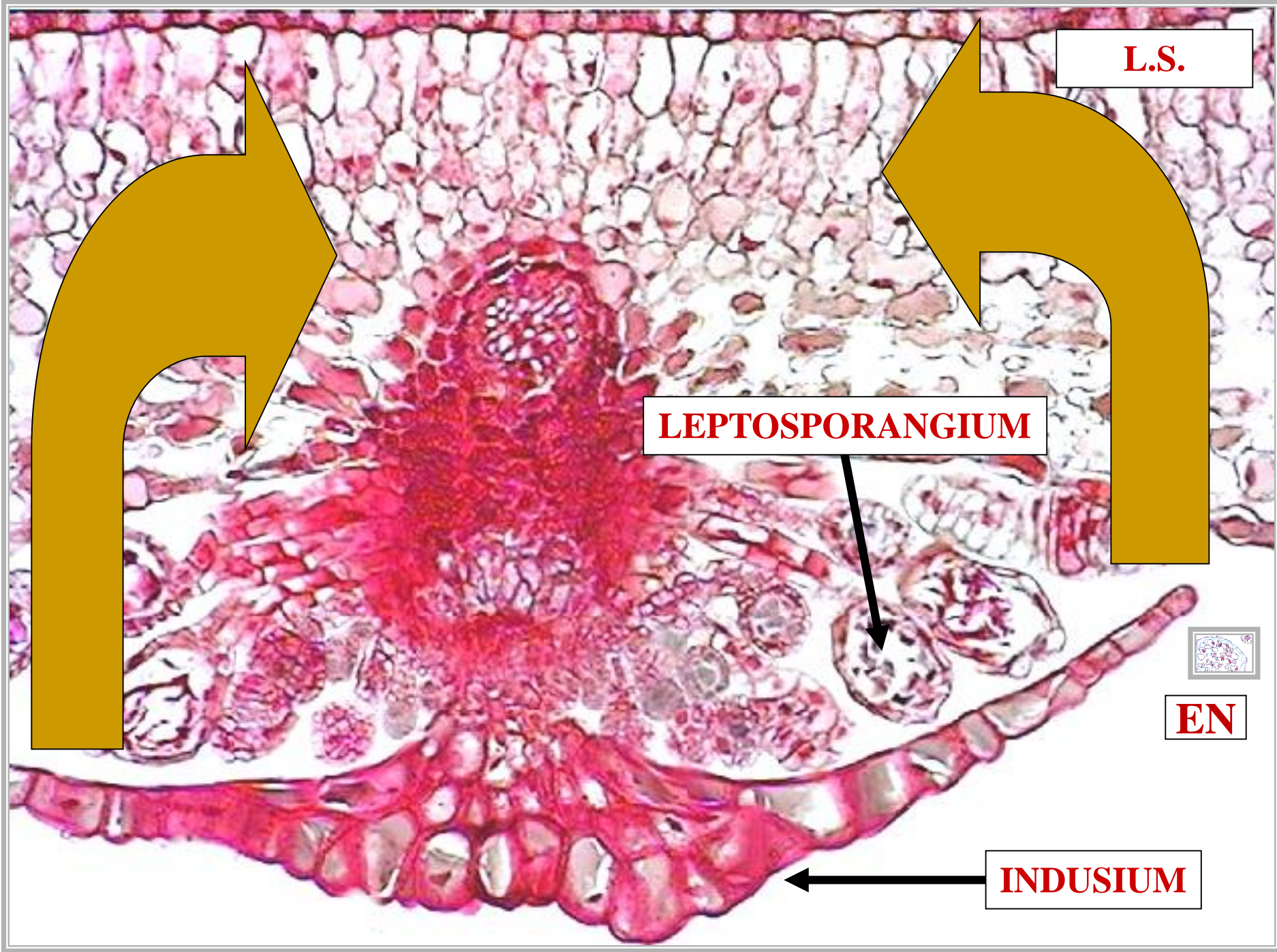
SORUS

LEPTOSPORANGIUM

LEPTOSPORANGIUM

INDUSIUM





L.S.

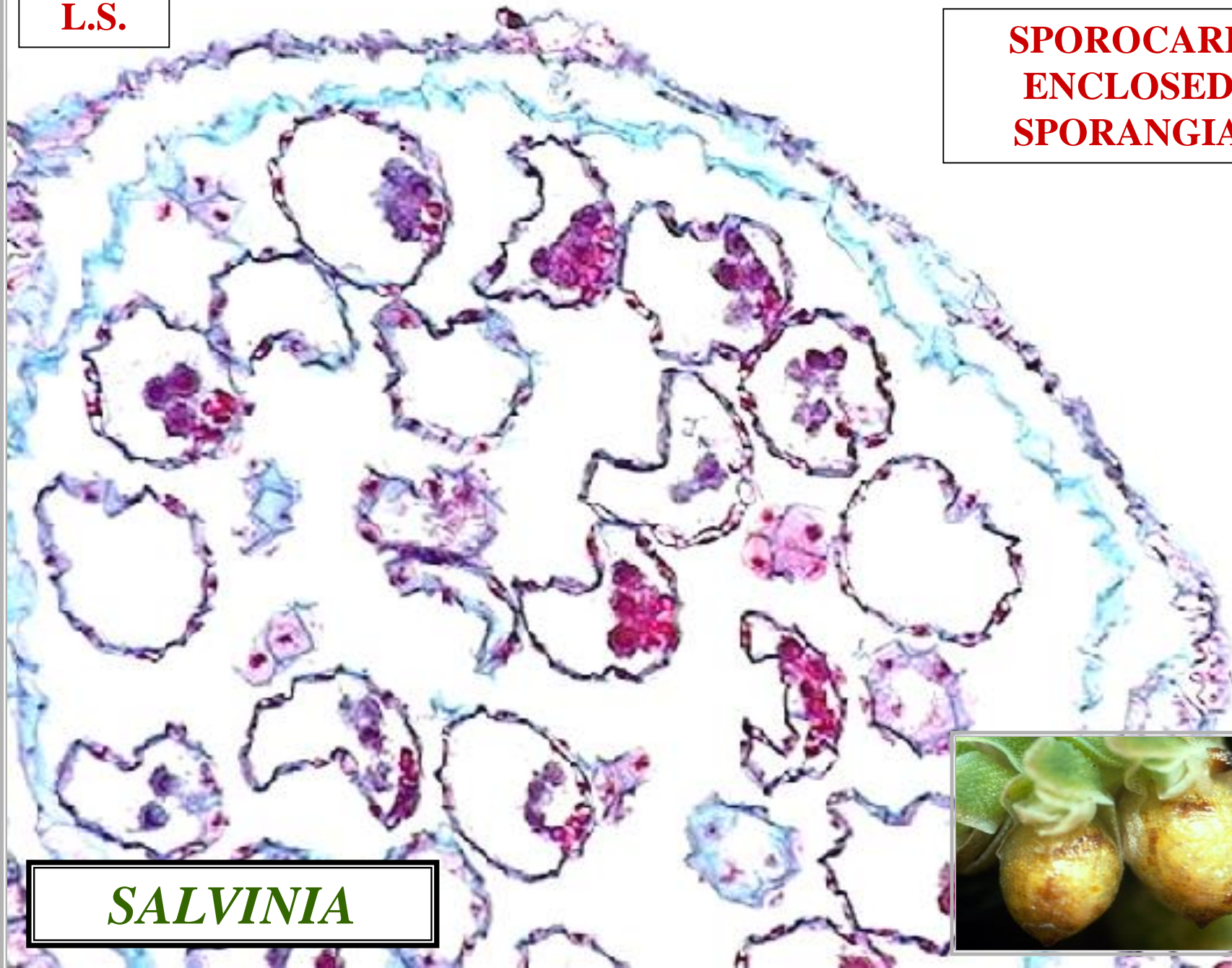
LEPTOSPORANGIUM

EN

INDUSIUM

L.S.

**SPOROCARP
ENCLOSED
SPORANGIA**



SALVINIA



L.S.

**SPOROCARP
DROUGHT
RESISTANT**



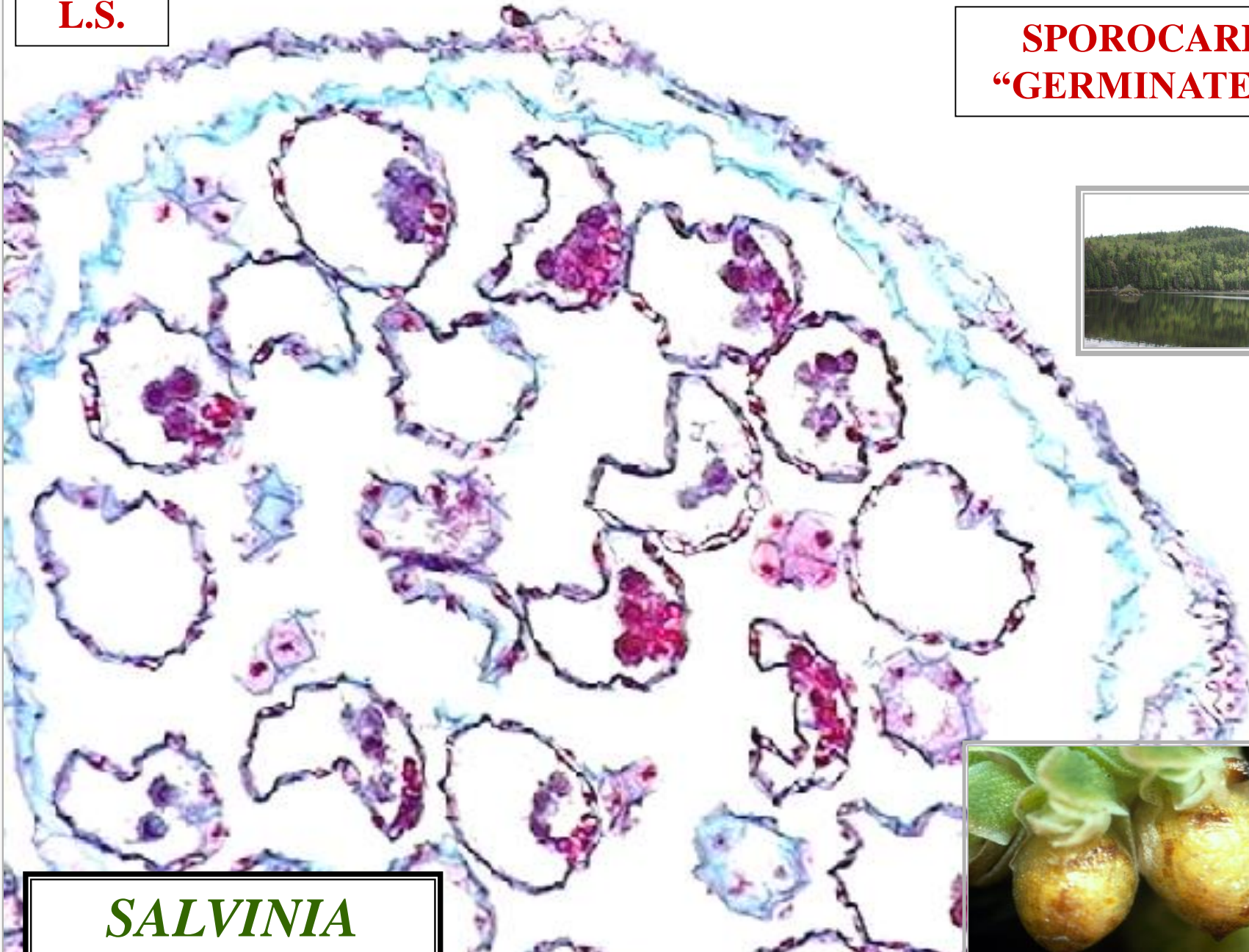
SALVINIA

L.S.

SPOROCARP
“GERMINATES”



SALVINIA





SPOROCARP STRUCTURE

L.S.

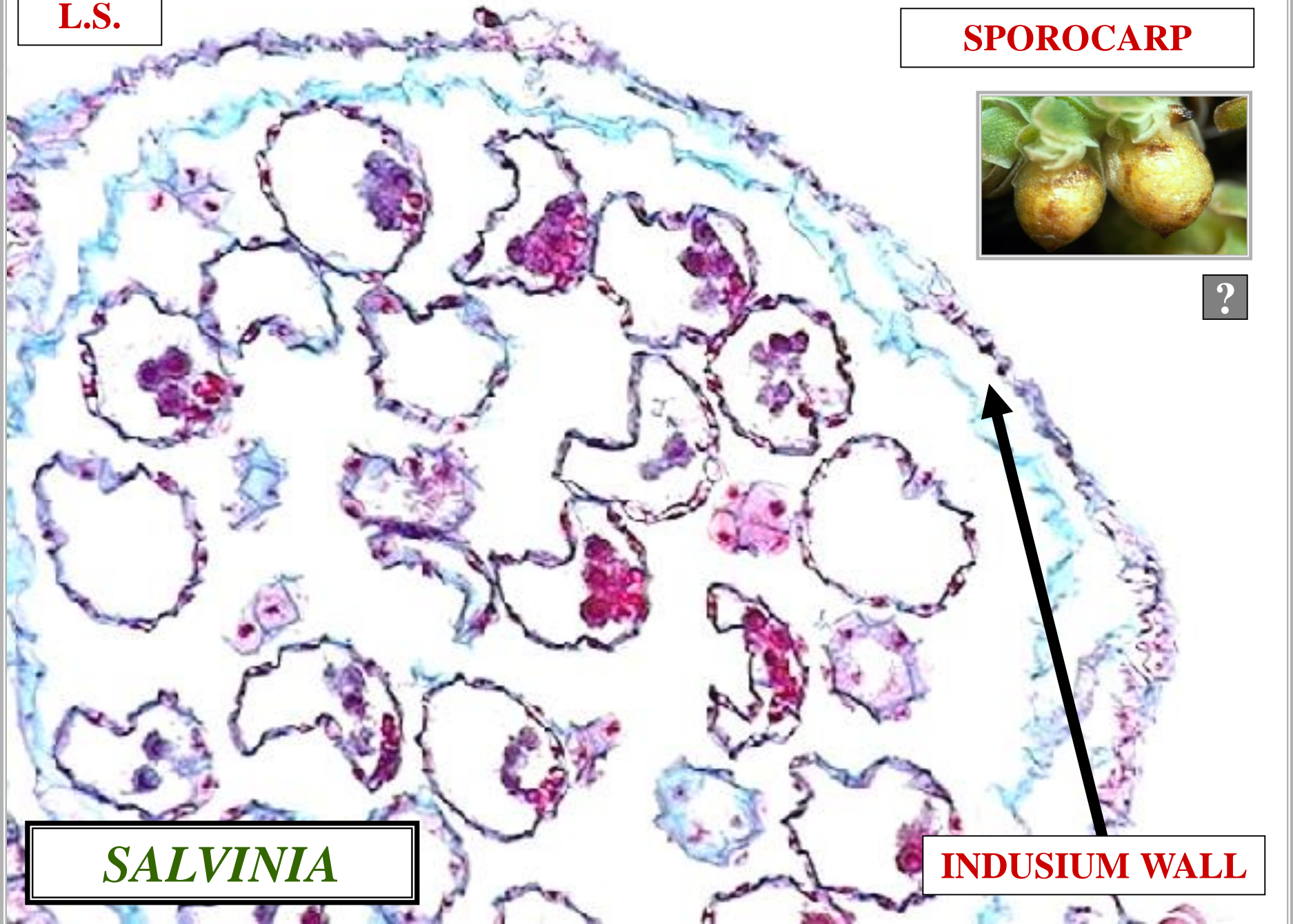
SPOROCARP



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SALVINIA

INDUSIUM WALL



L.S.

SPOROCARP

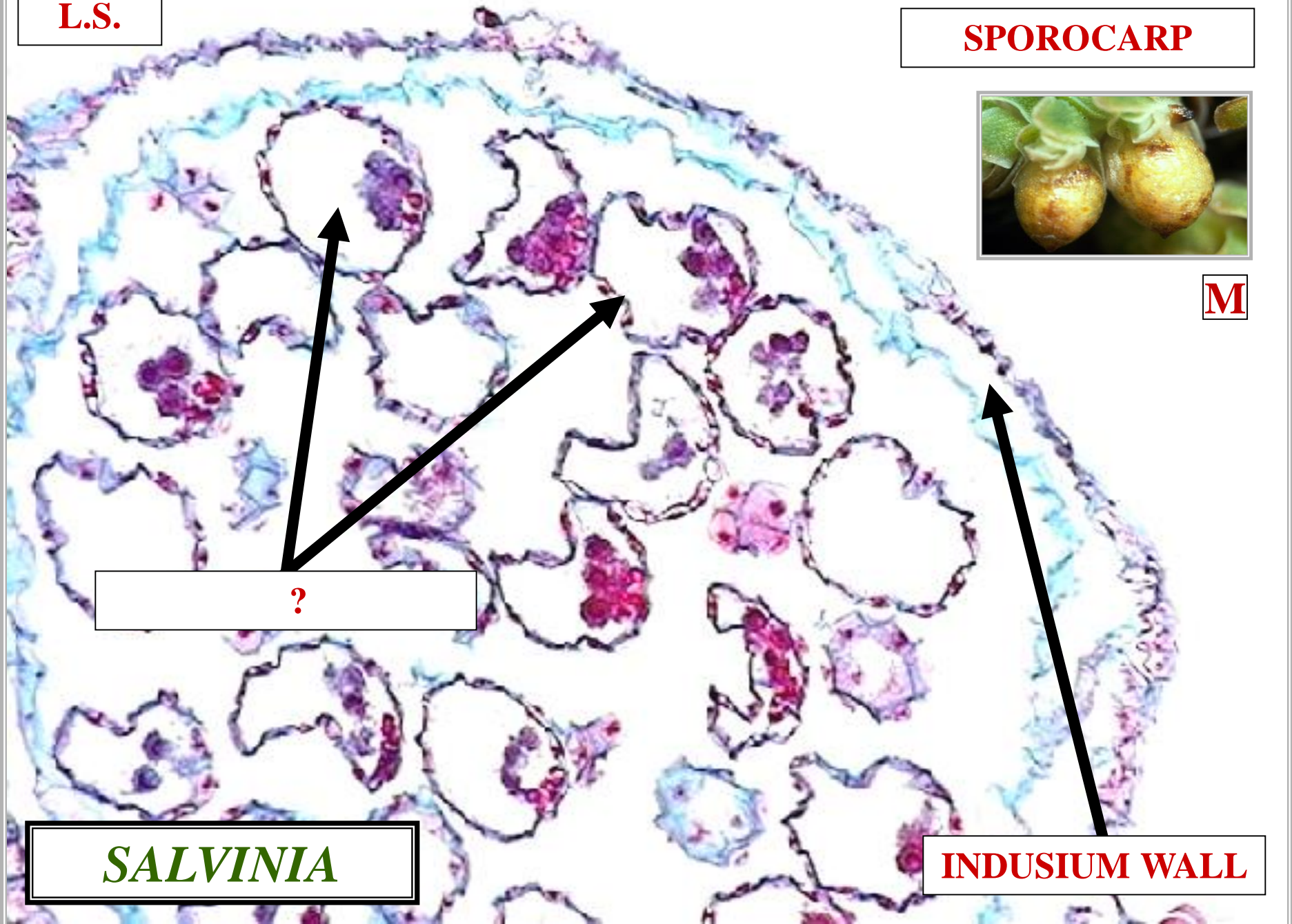


M

?

SALVINIA

INDUSIUM WALL



L.S.

SPOROCARP

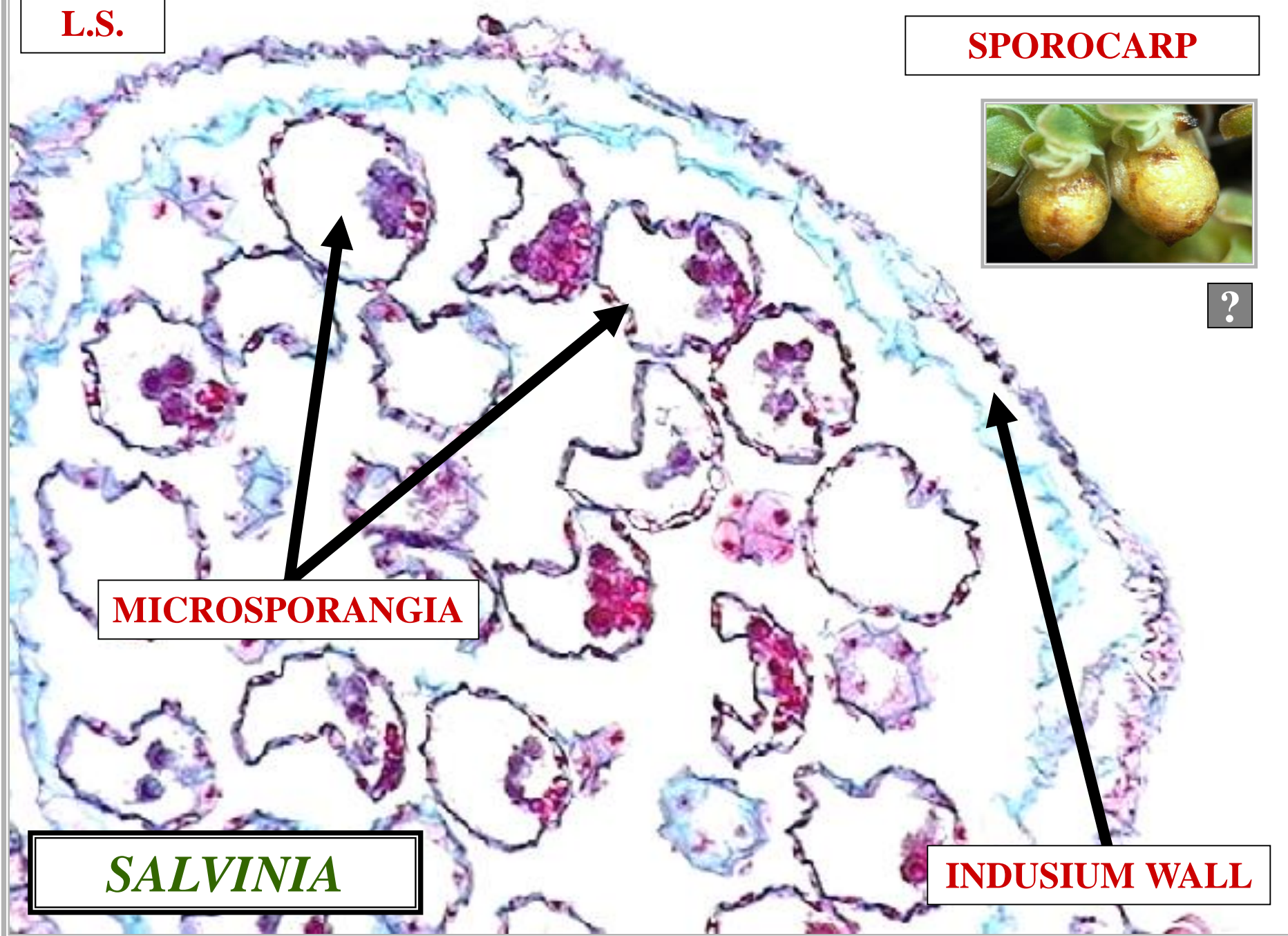


?

MICROSPORANGIA

SALVINIA

INDUSIUM WALL



L.S.

SPOROCARP



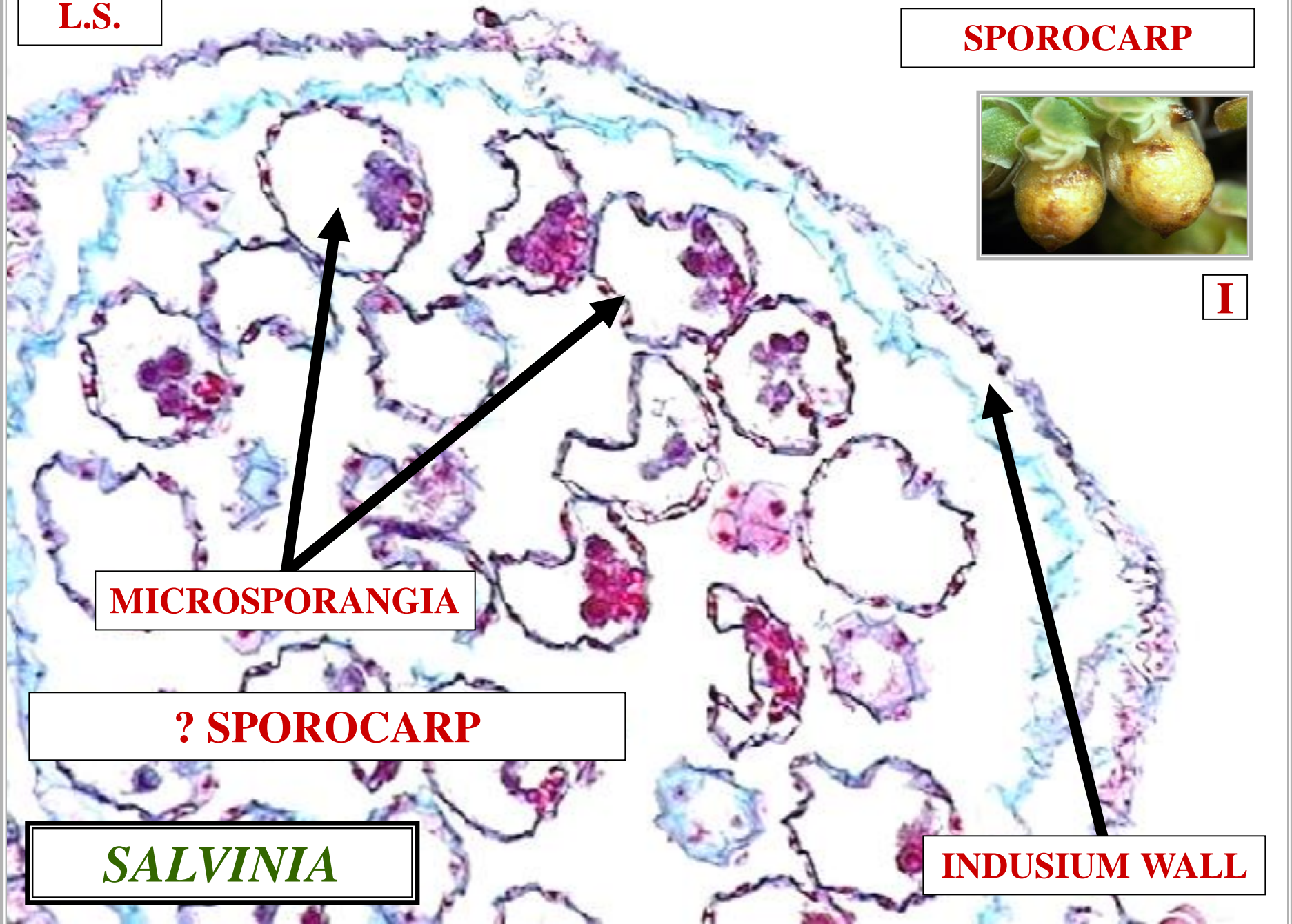
I

MICROSPORANGIA

? SPOROCARP

SALVINIA

INDUSIUM WALL



L.S.

SPOROCARP



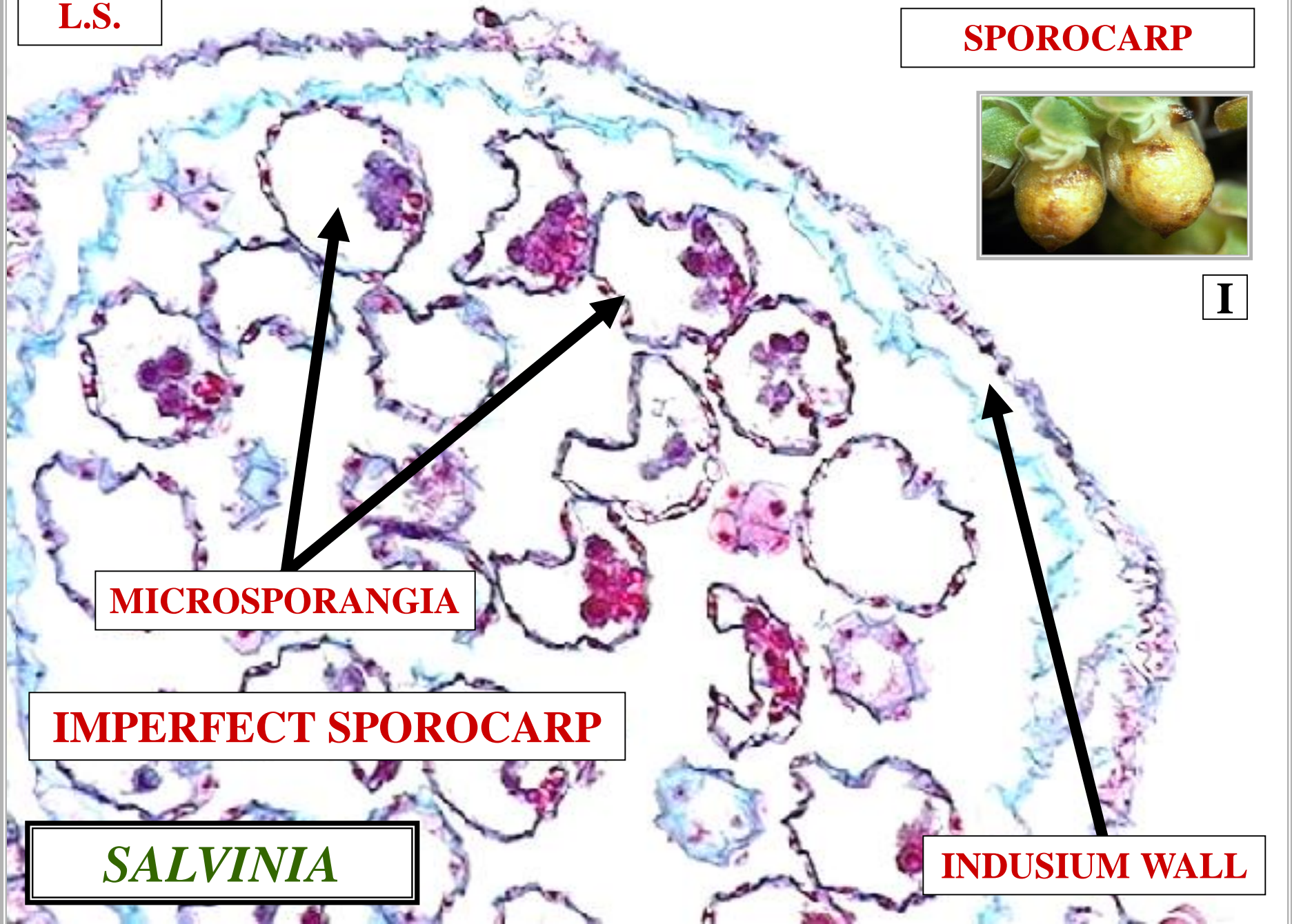
I

MICROSPORANGIA

IMPERFECT SPOROCARP

SALVINIA

INDUSIUM WALL



**IMPERFECT
SPOROCARP**

SALVINIALES
IMPERFECT SPOROCARP

EITHER
MICROSPORANGIA
OR
MEGASPORANGIA
NOT BOTH

SALINIALES
IMPERFECT SPOROCARP



SPOROCARP MODIFIED PINNA

!

AB



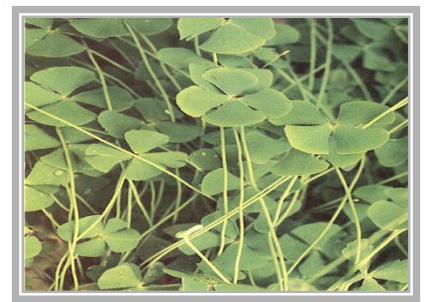
S

SOROPHORE

SPOROCARP

SPORANGIA

MARSILEA



SPOROCARP MODIFIED PINNA

!

AB



A

SOROPHORE ABSENT

SPOROCARP



SPORANGIA



SALVINIA



SPOROCARP MODIFIED PINNA

SOROPHORE ABSENT

SPOROCARP

SPORANGIA



AZOLLA



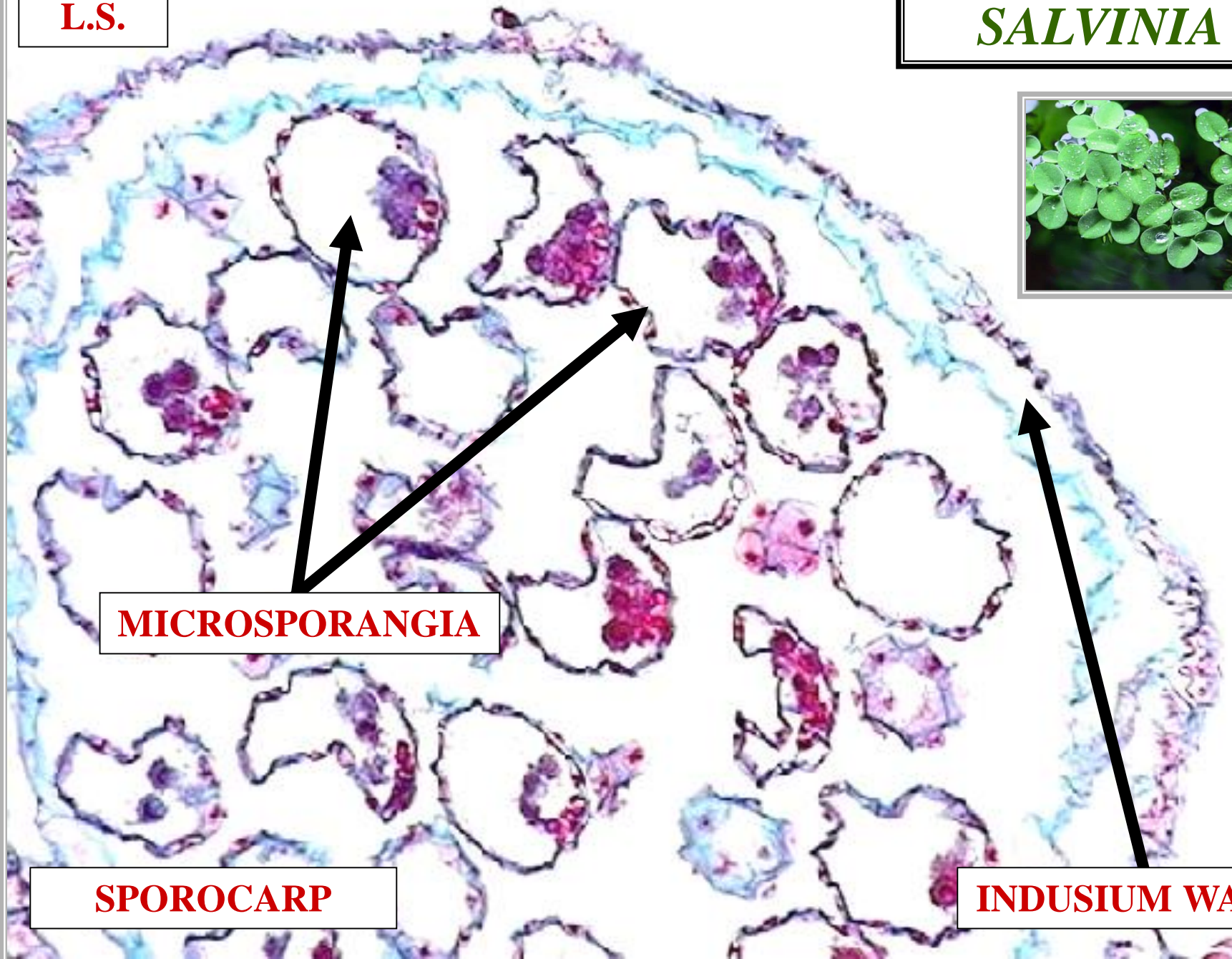
SPORE HABIT

L.S.

SALVINIA



M



MICROSPORANGIA

SPOROCARP

INDUSIUM WALL

L.S.

SALVINIA



H
S

MICROSPORES

SPOROCARP

INDUSIUM WALL

