

TRACHEOPHYTES

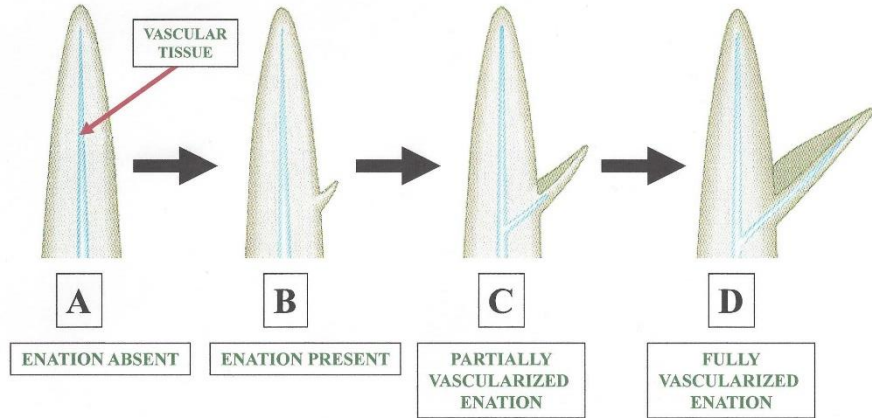
RHYNIOPHYTA

STEM ENATIONS

ZOSTEROPHYLLOPHYTA

**MICROPHYLLS
ENATION THEORY**

ENATION THEORY



MICROPHYLL

TRACHEOPHYTES

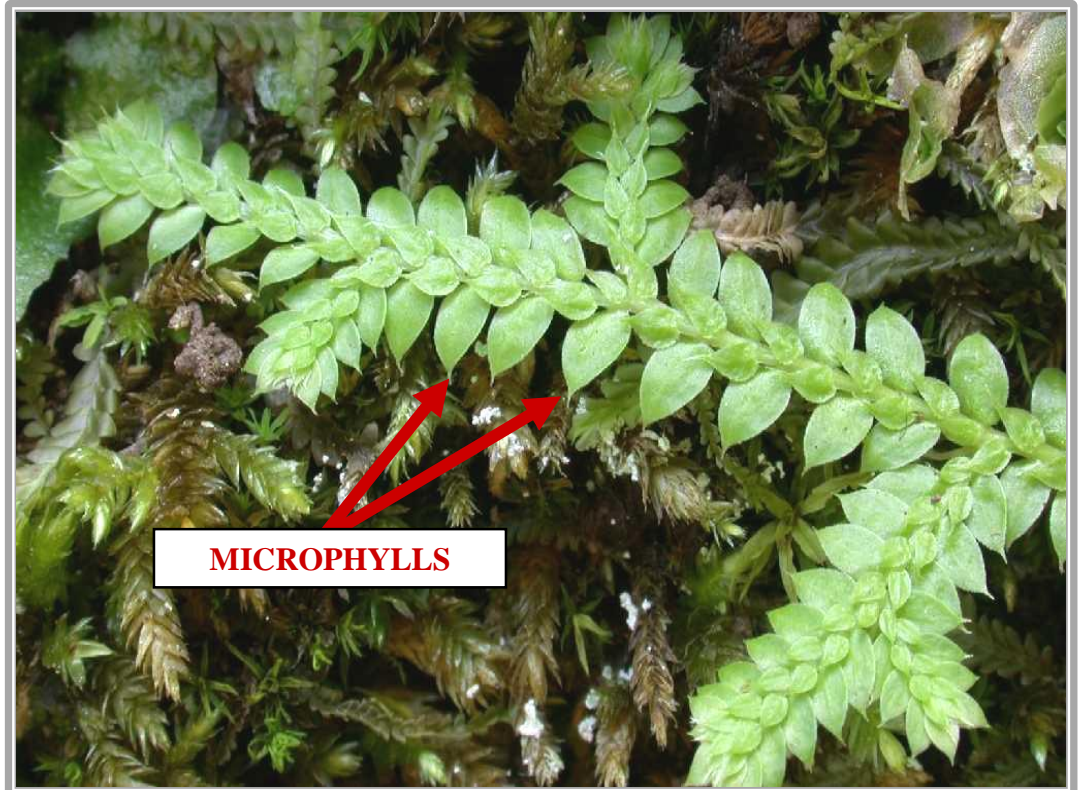
RHYNIOPHYTA

STEM ENATIONS

ZOSTEROPHYLLOPHYTA

**MICROPHYLLS
ENATION THEORY**

?



TRACHEOPHYTES

RHYNIOPHYTA

STEM ENATIONS

ZOSTEROPHYLLOPHYTA

**MICROPHYLLS
ENATION THEORY**

LYCOPODIOPHYTA



TRACHEOPHYTES

RHYNIOPHYTA

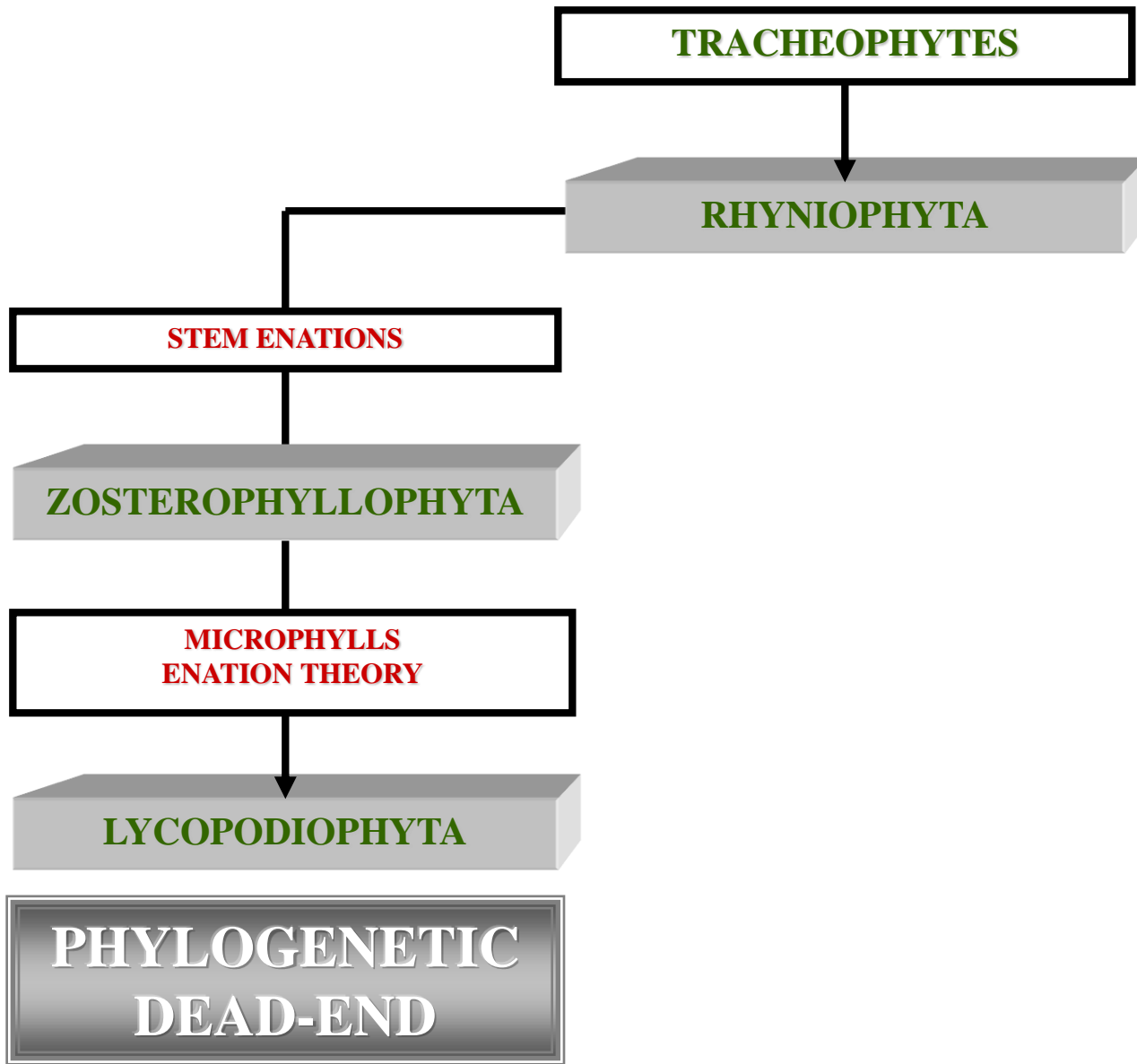
STEM ENATIONS

ZOSTEROPHYLLOPHYTA

**MICROPHYLLS
ENATION THEORY**

LYCOPODIOPHYTA

**PHYLOGENETIC
DEAD-END**



TRACHEOPHYTES

RHYNIOPHYTA

STEM ENATIONS

ZOSTEROPHYLLOPHYTA

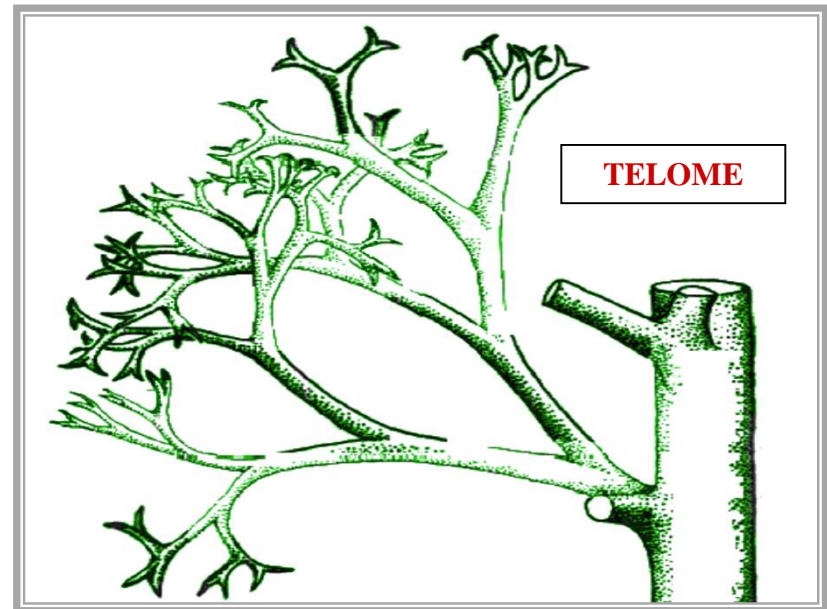
**MICROPHYLLS
ENATION THEORY**

LYCOPODIOPHYTA

**PHYLOGENETIC
DEAD-END**

COMPLEX TELOMES

TRIMEROPHYTOPHYTA



TRACHEOPHYTES

RHYNIOPHYTA

STEM ENATIONS

ZOSTEROPHYLLOPHYTA

**MICROPHYLLS
ENATION THEORY**

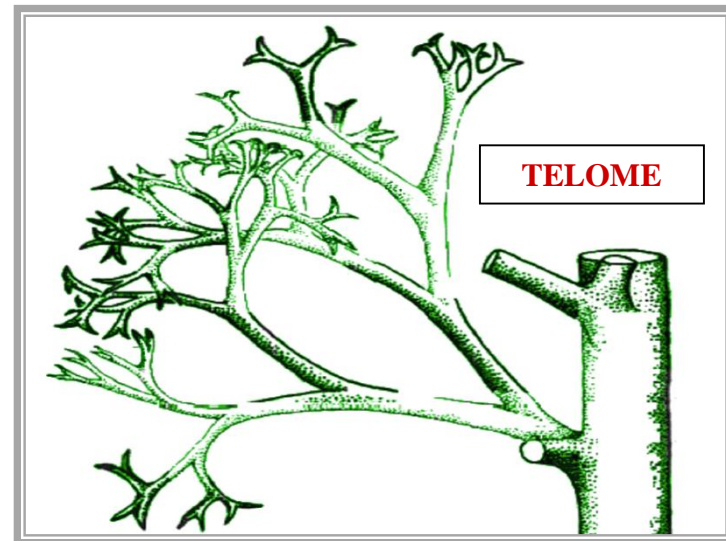
LYCOPODIOPHYTA

**PHYLOGENETIC
DEAD-END**

COMPLEX TELOMES

TRIMEROPHYTOPHYTA

MEGAPHYLLS



TRACHEOPHYTES

RHYNIOPHYTA

STEM ENATIONS

ZOSTEROPHYLLOPHYTA

**MICROPHYLLS
ENATION THEORY**

LYCOPODIOPHYTA

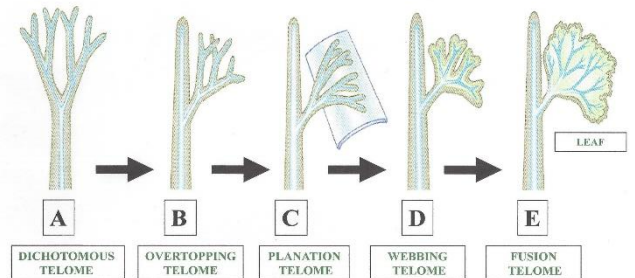
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DEAD-END**

COMPLEX TELOMES

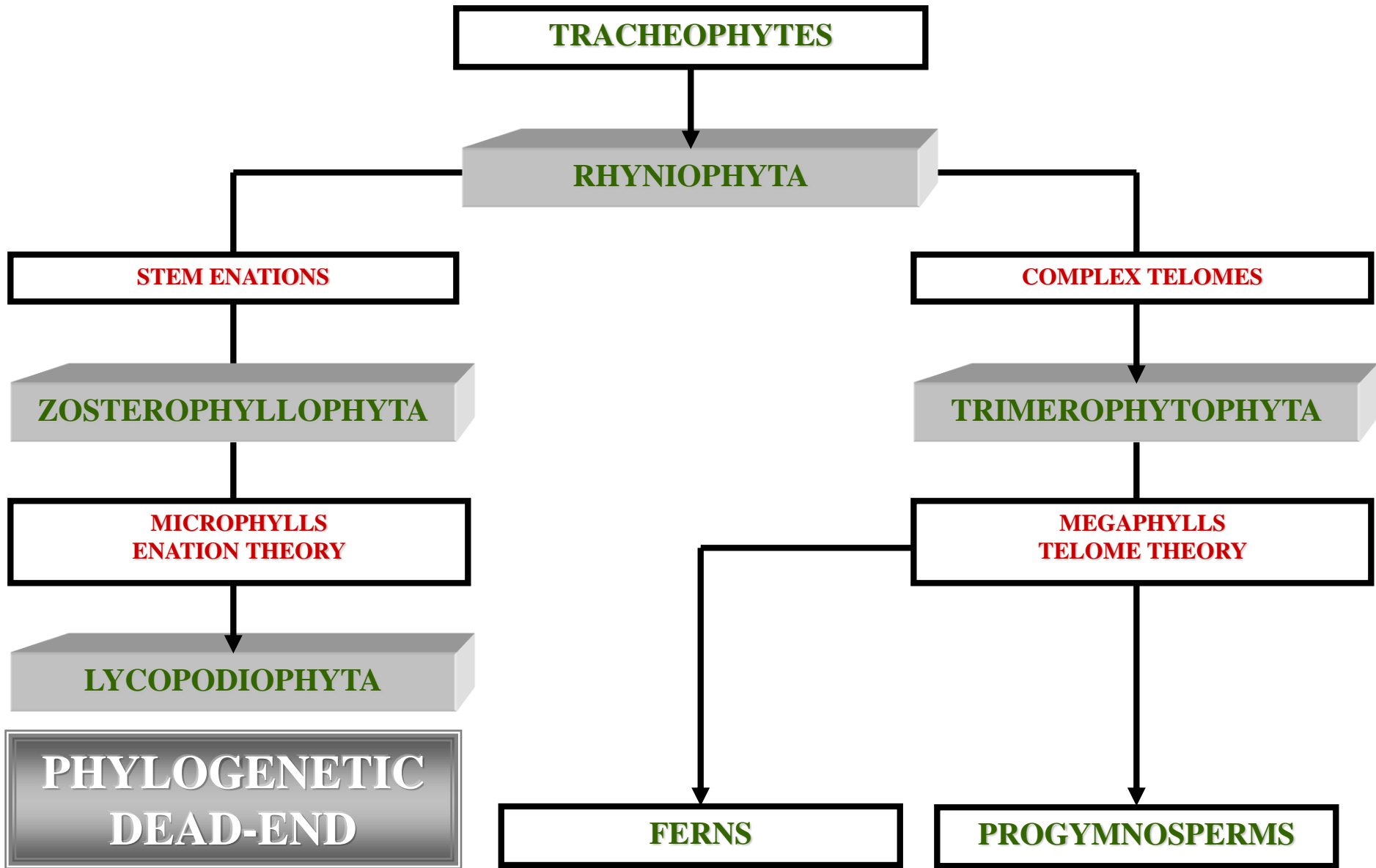
TRIMEROPHYTOPHYTA

**MEGAPHYLLS
TELOME THEORY**

**TELOME THEORY
COMPONENTS**



MEGAPHYLL



FERNS



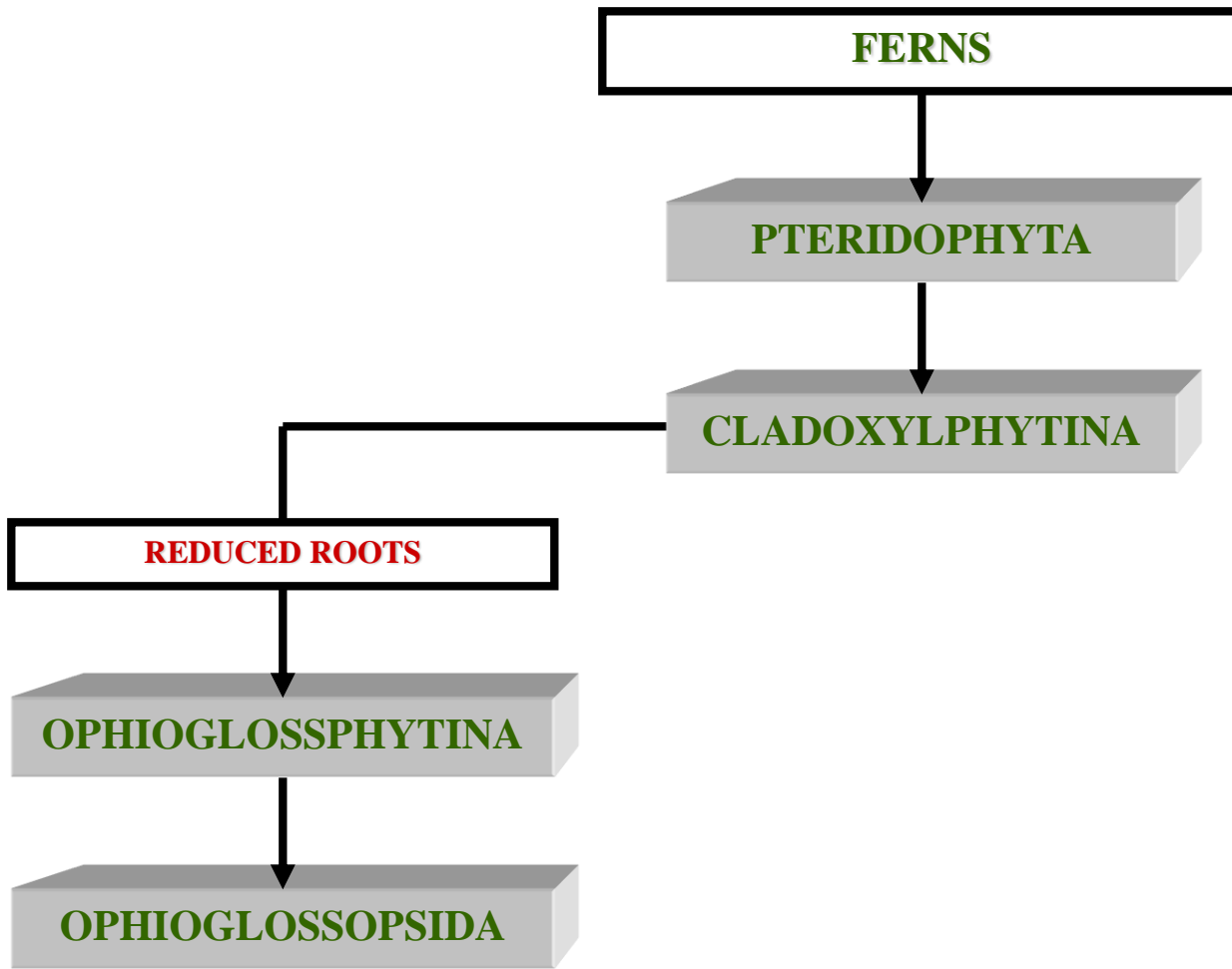
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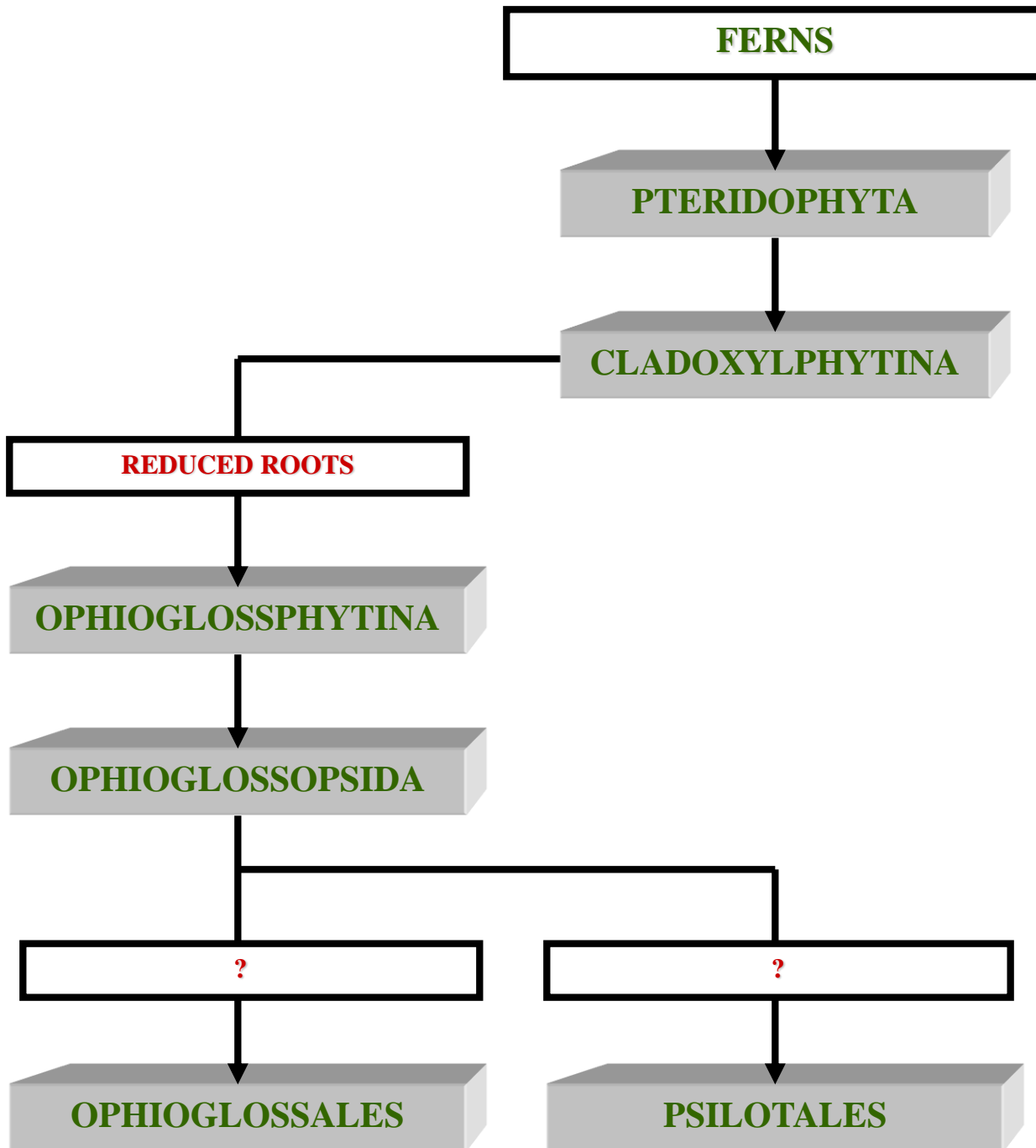
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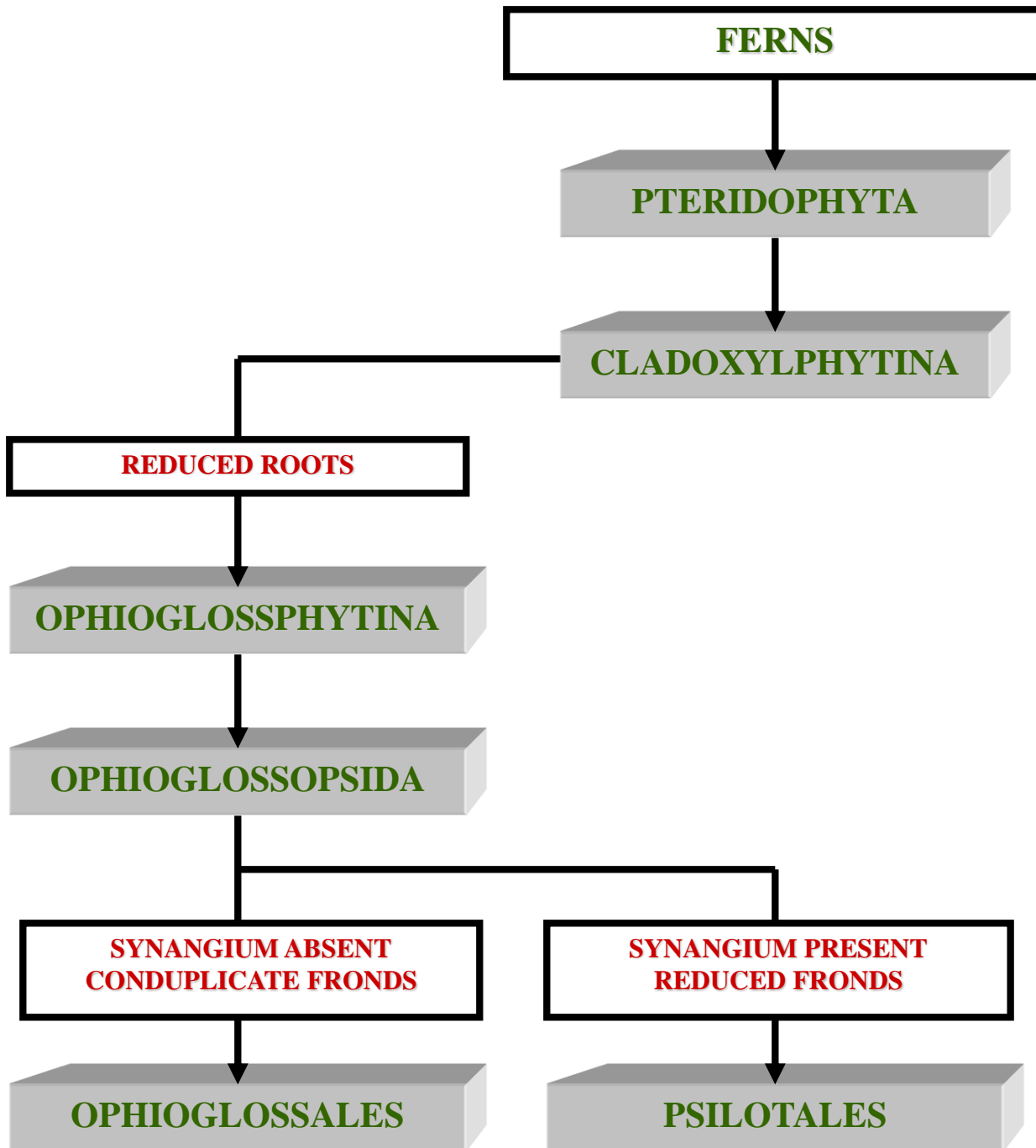
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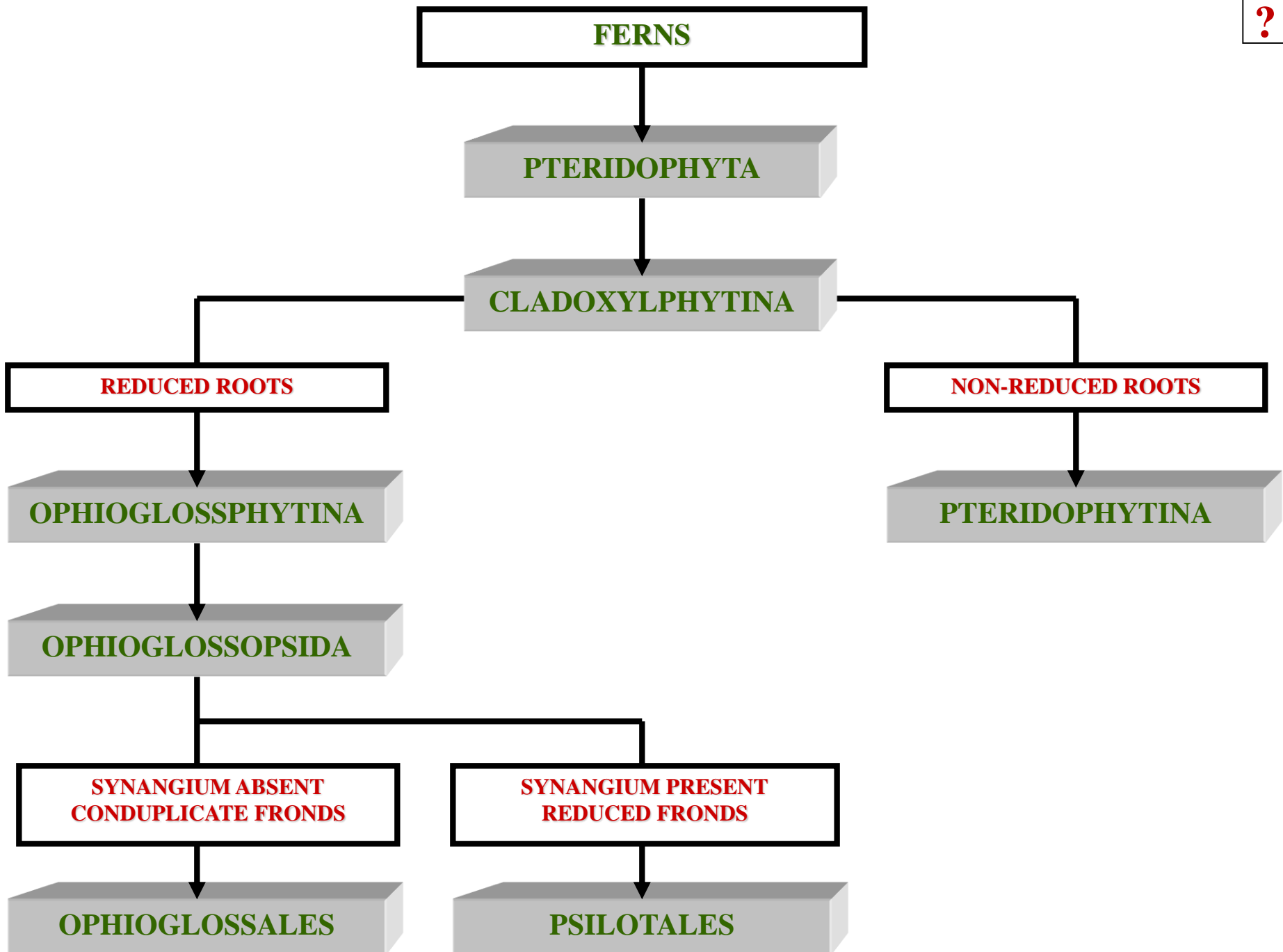


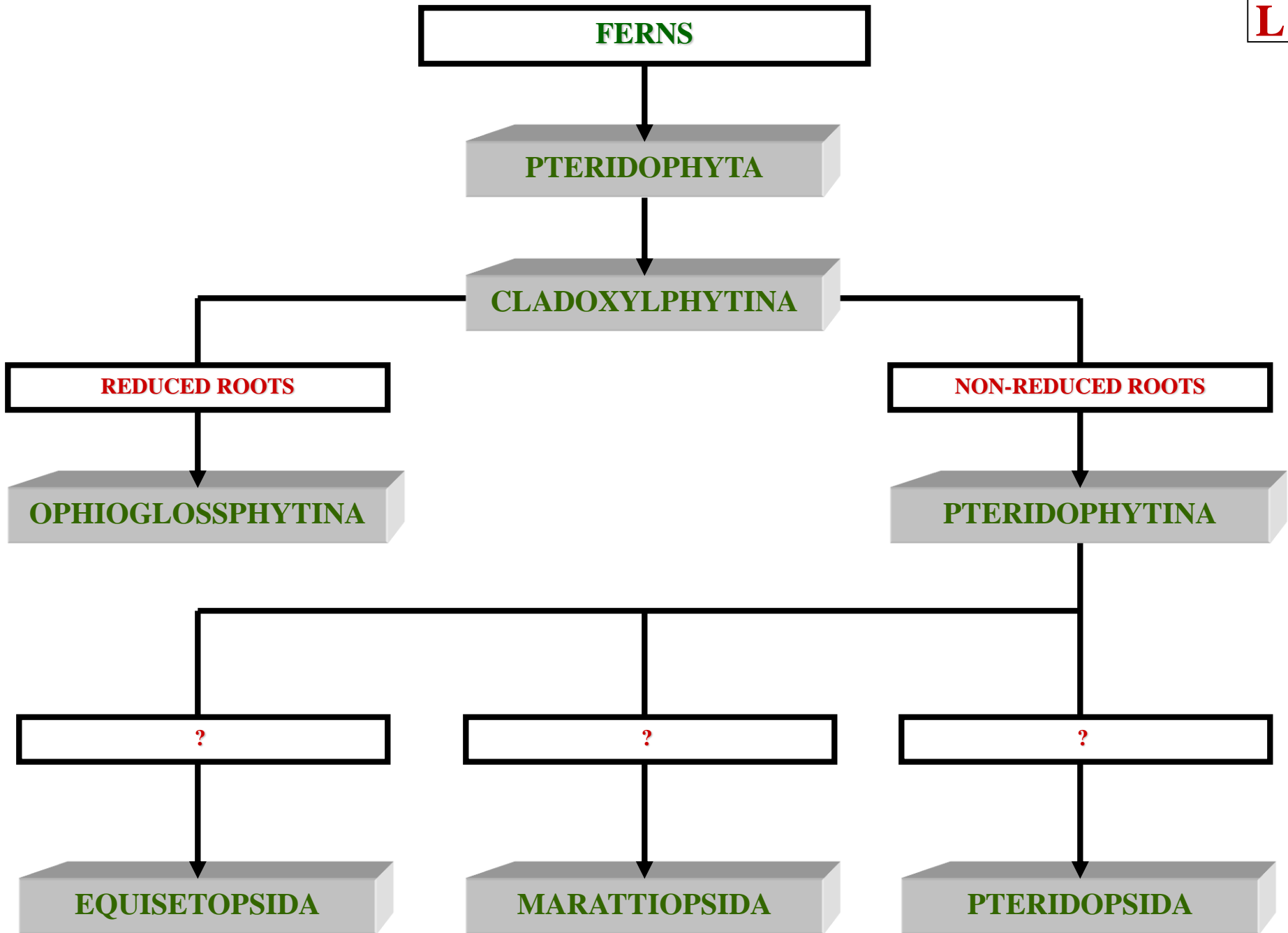
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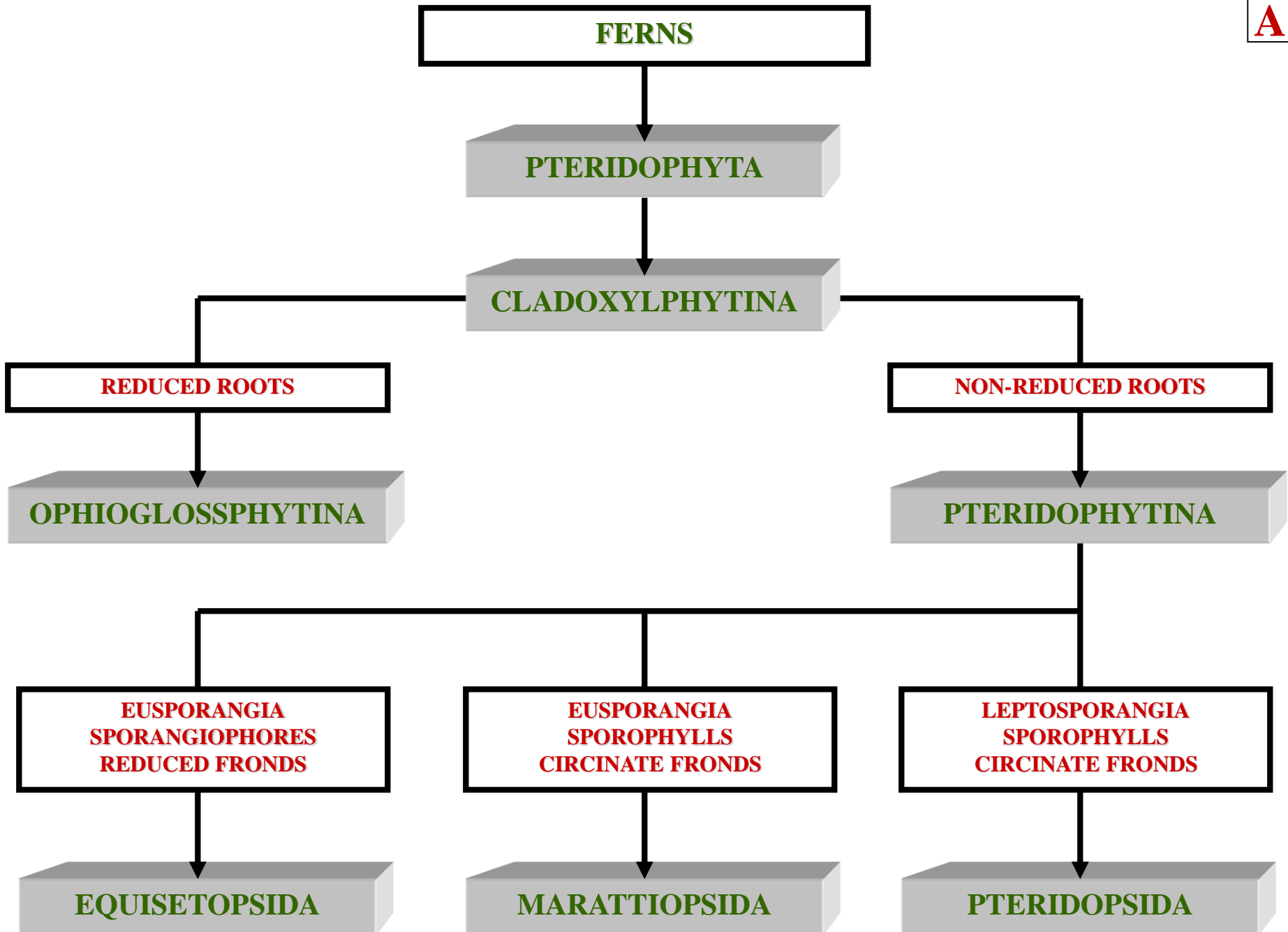


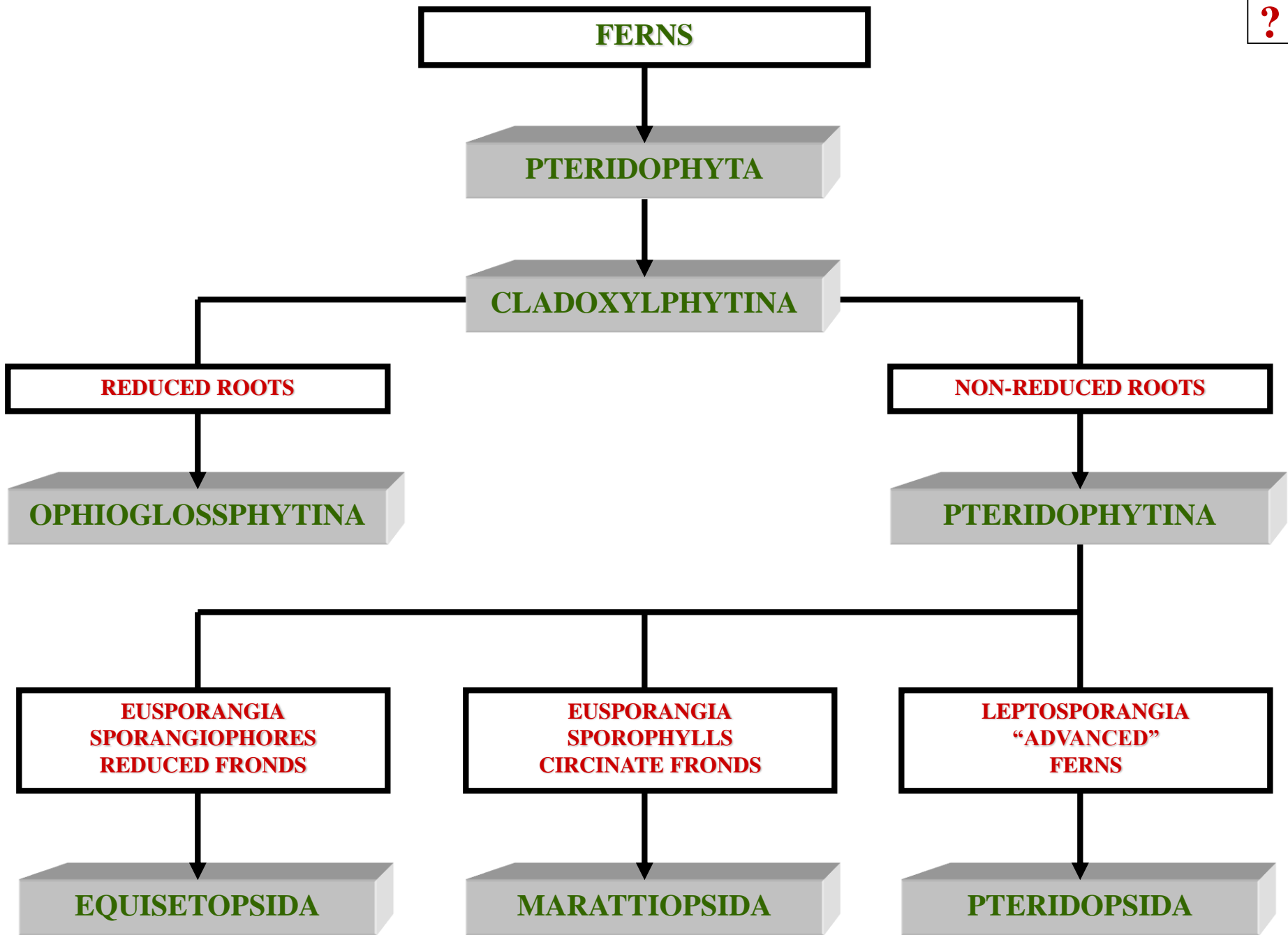


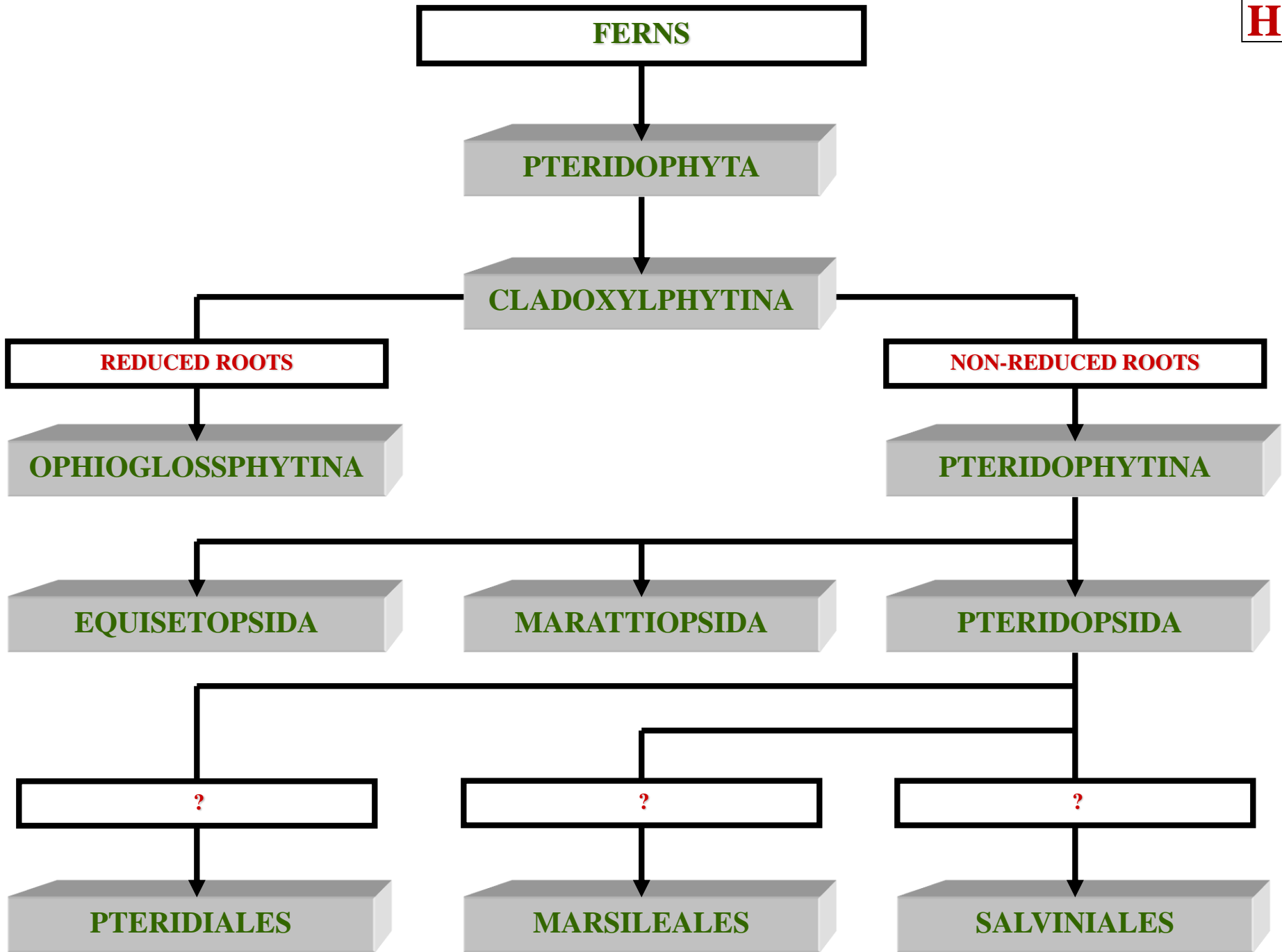


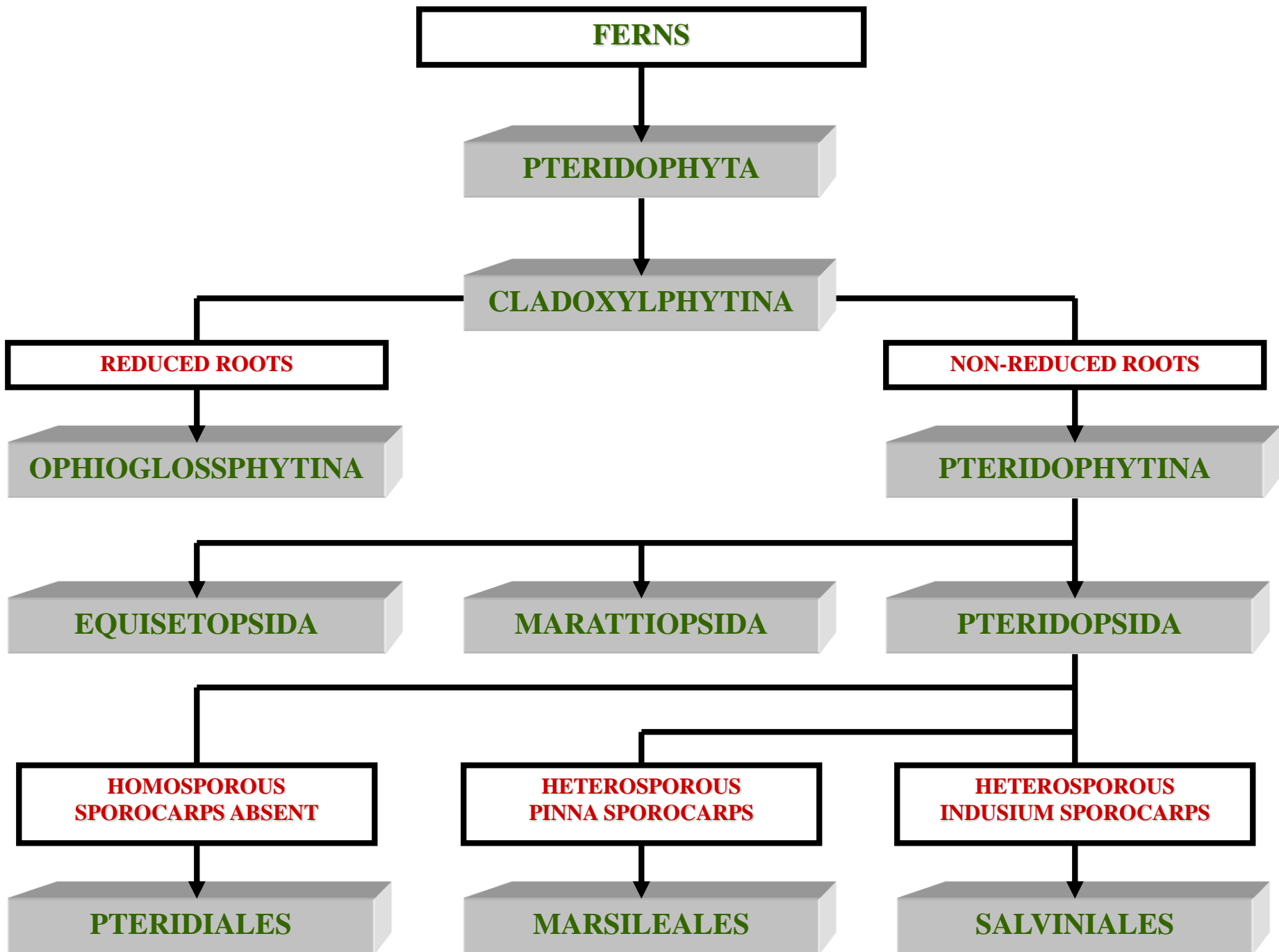


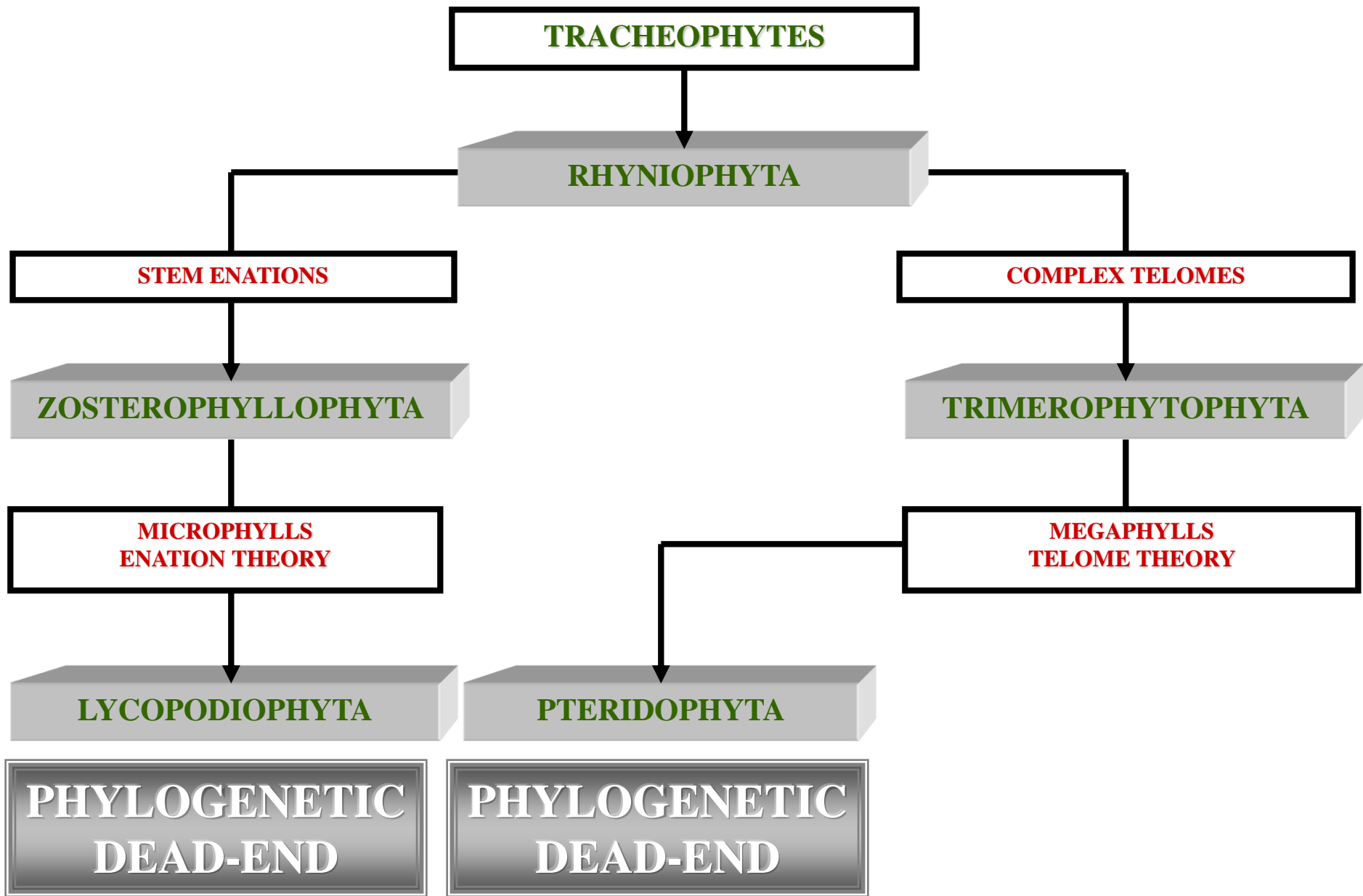


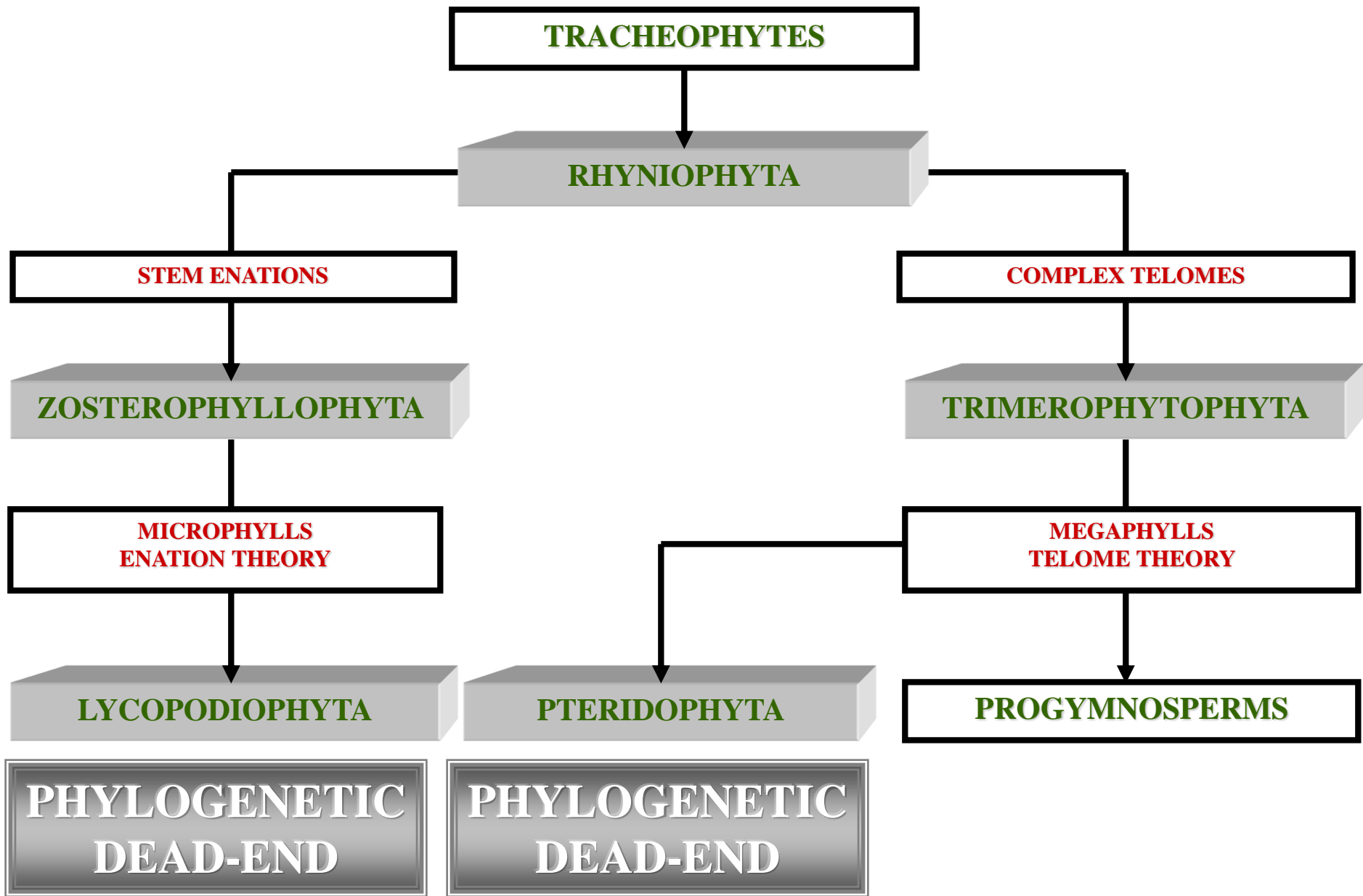


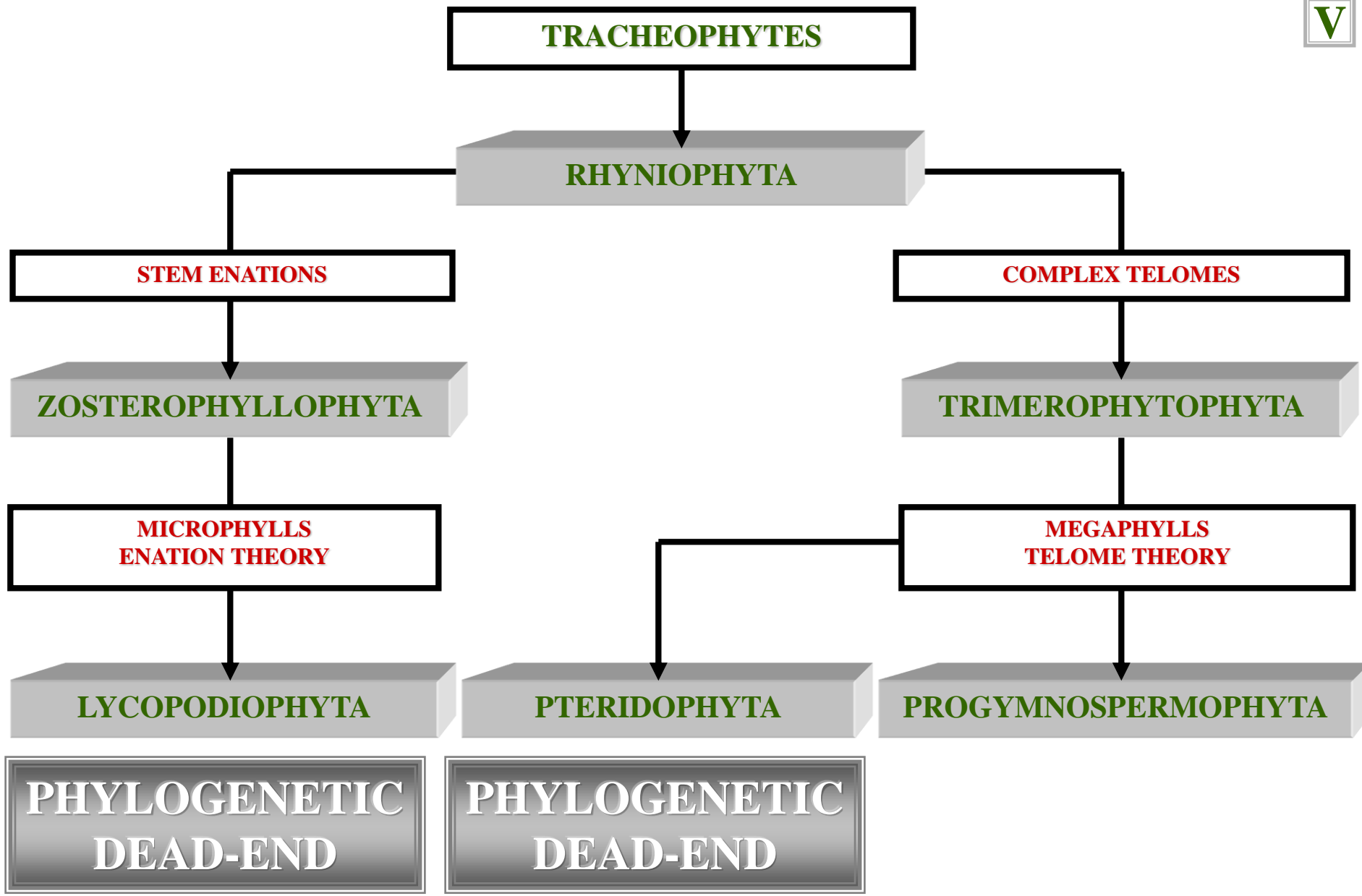














VASCULAR PLANT EVOLUTION

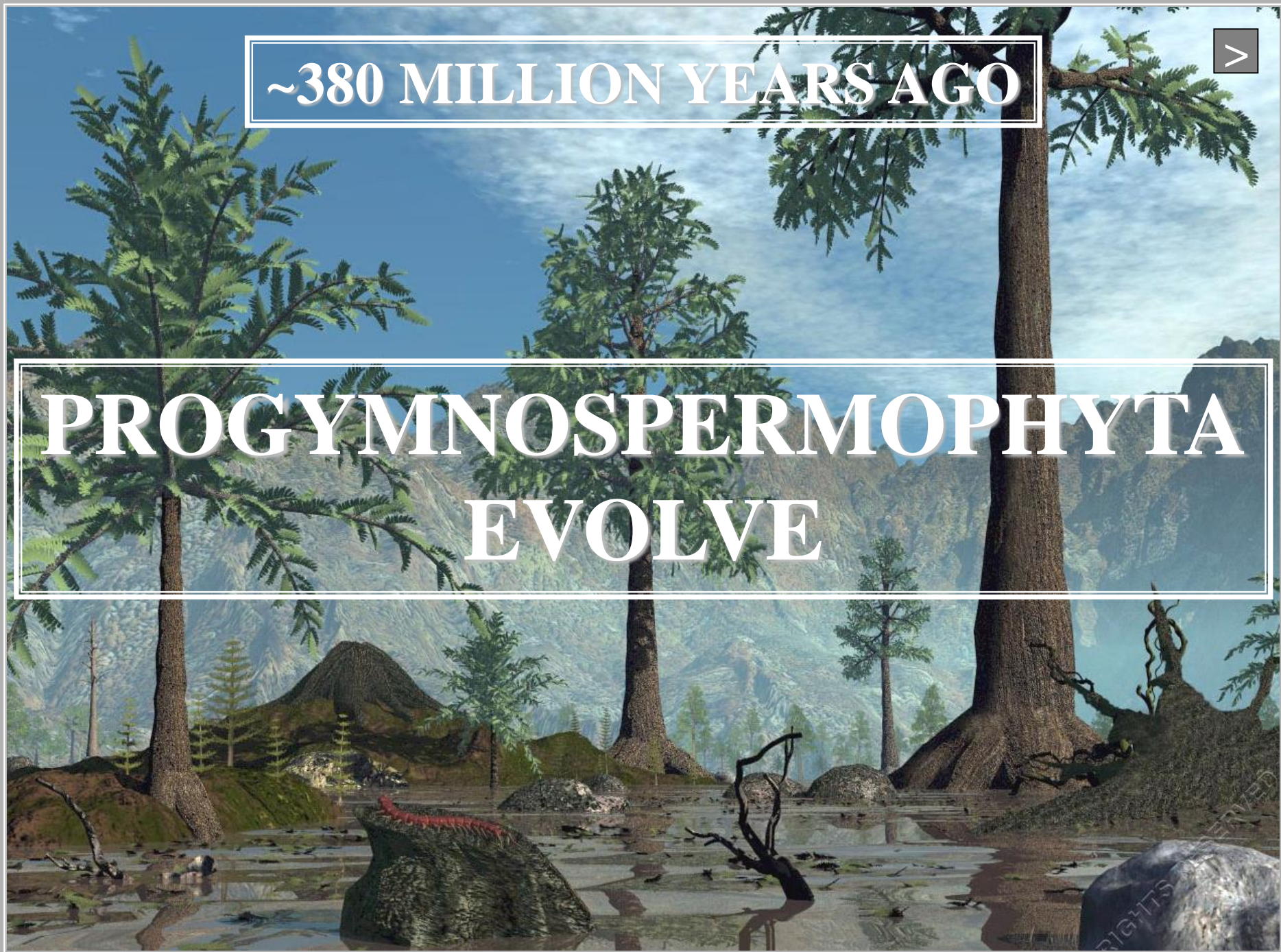


~380

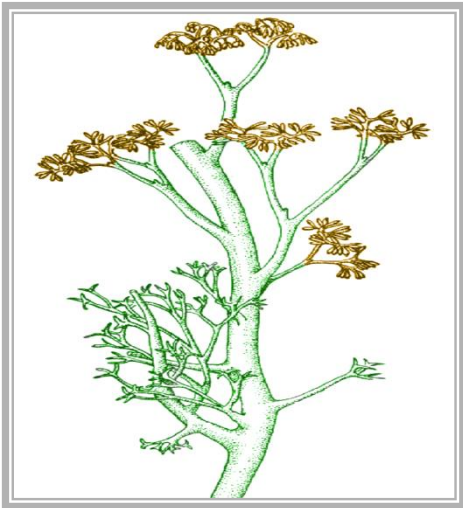
MILLION YEARS

~380 MILLION YEARS AGO

PROGYMNOSPERMOPHYTA
EVOLVE

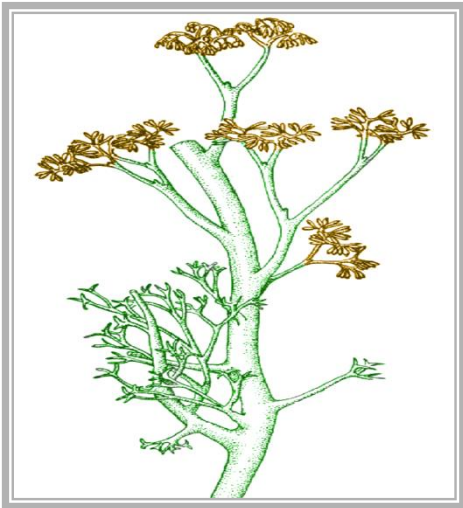


PROGYMNOSPERM EVOLUTION



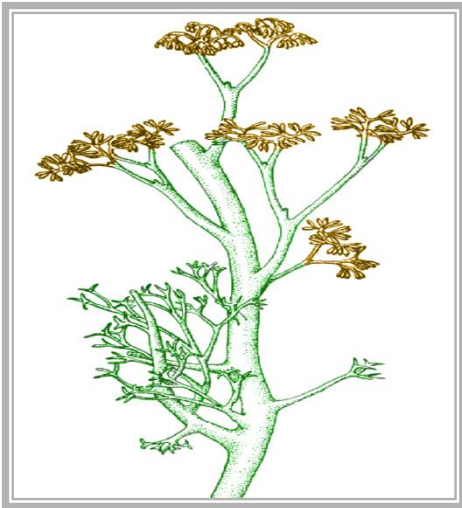
PSILOPHYTON

PROGYMNOSPERM EVOLUTION

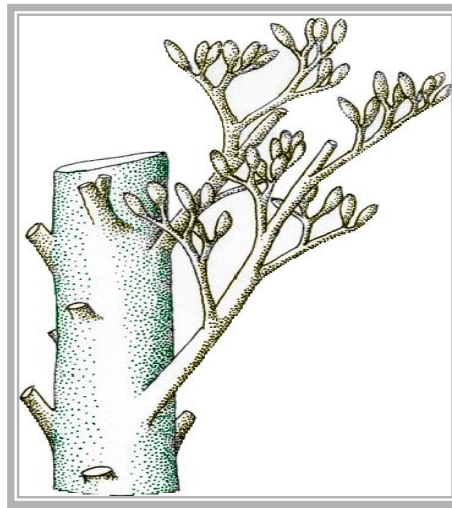


TRIMEROPHYTE

PROGYMNOSPERM EVOLUTION



PSILOPHYTON

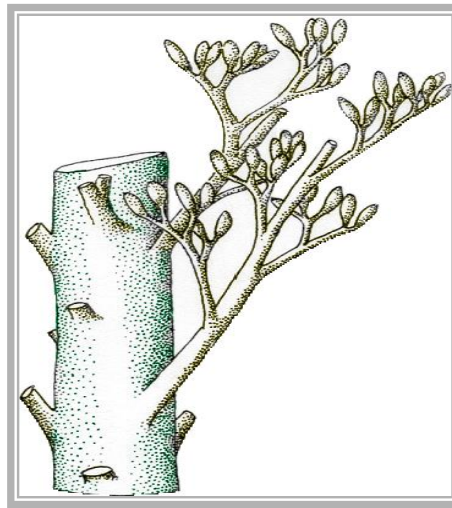


OOCAMPSA

PROGYMNOSPERM EVOLUTION

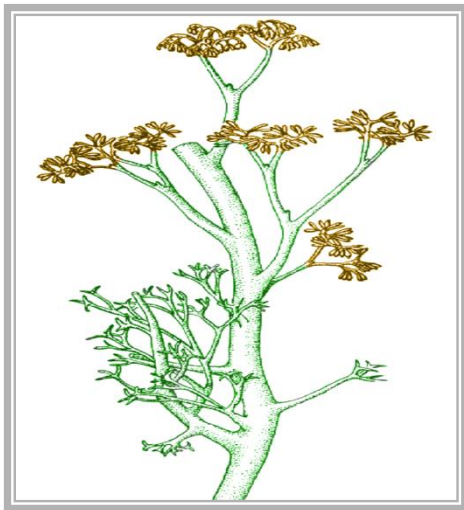


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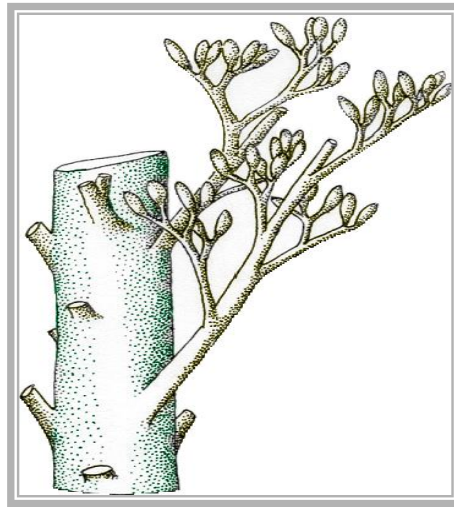


TRIMEROPHYTE

PROGYMNOSPERM EVOLUTION



PSILOPHYTON

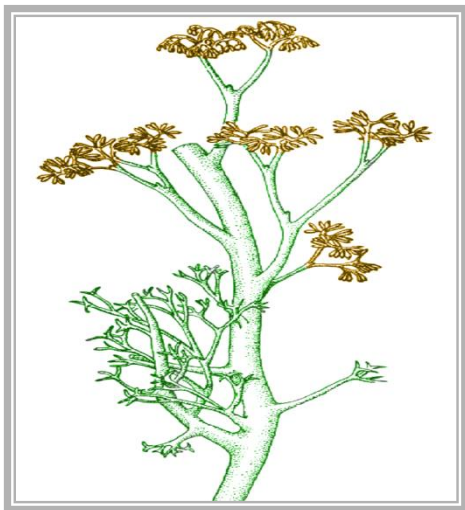


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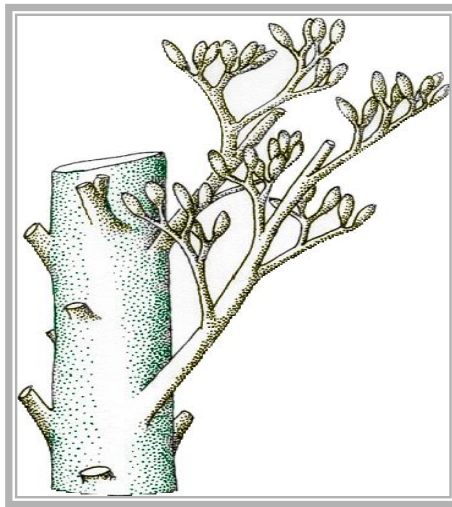


ARCHAEOPTERIS

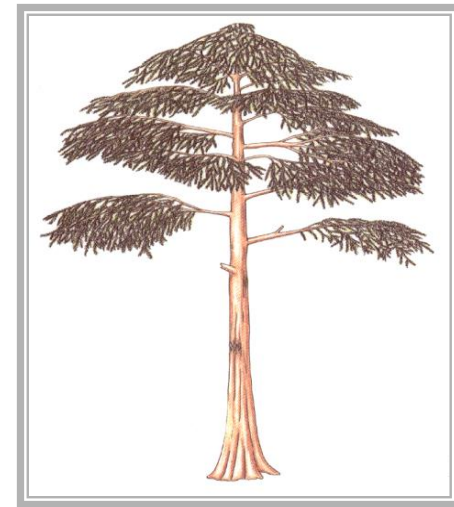
PROGYMNOSPERM EVOLUTION



PSILOPHYTON



OOCAMPSA



PROGYMNOSPERM



EX

PHYLUM

PROGYMNOSPERMOPHYTA



**EXTINCT
PHYLUM**

PHYLUM

PROGYMNOSPERMOPHYTA

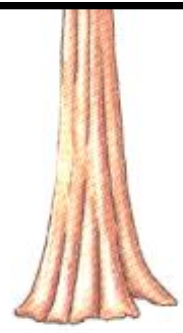
**EXTINCT
PHYLUM**



COMMON NAME



PROGYMNOSPERMS



**PROGYMNOSPERM
DISCOVERY**

**MAJOR
PALEOBOTANICAL
EVENT**

PALEOBOTANICAL NOMENCLATURE

FOSSIL BEDS

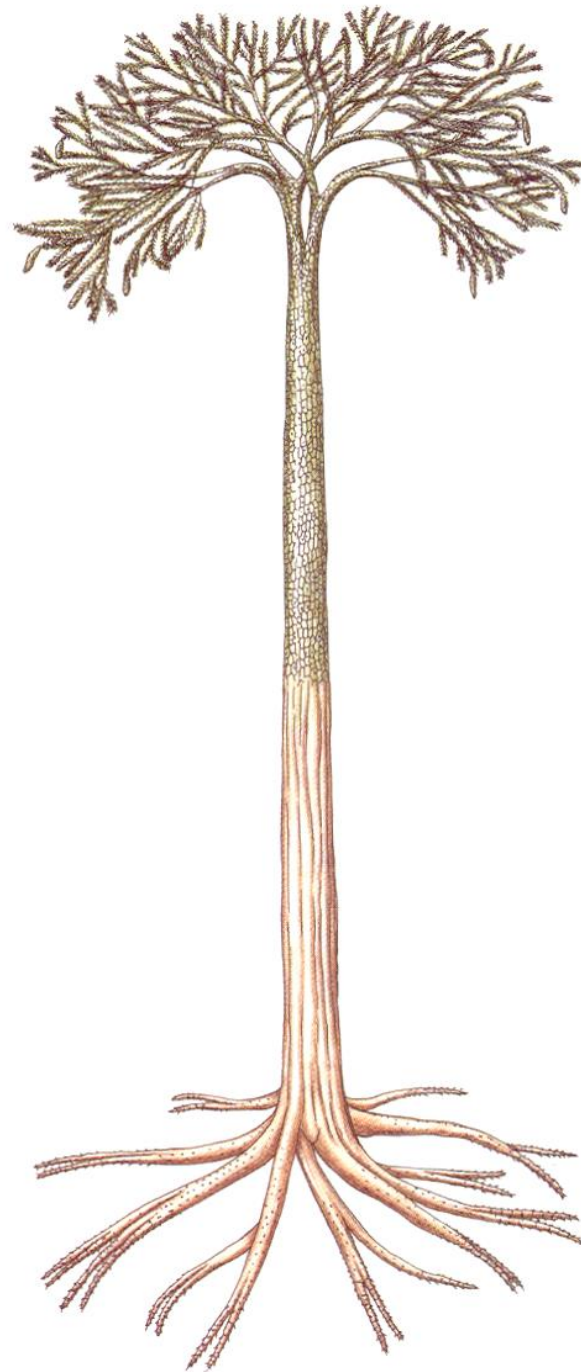
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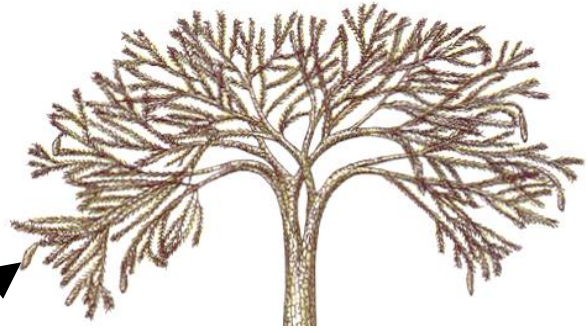
INTACT

INTACT

INTACT



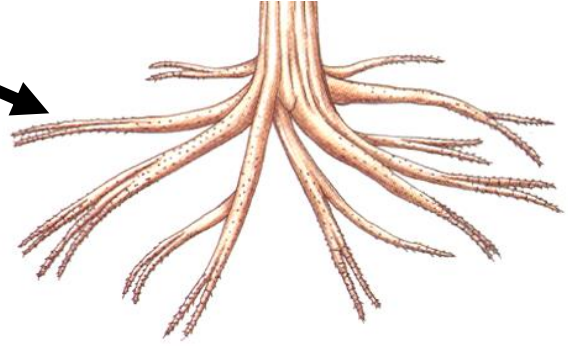
FOSSIL BEDS FRAGMENTS



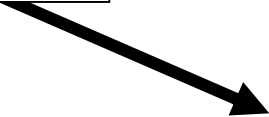
FRAGMENT



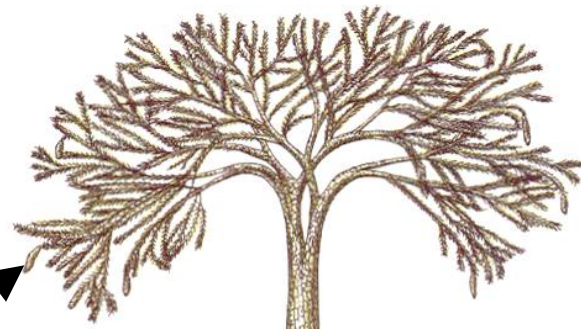
FRAGMENT



FRAGMENT



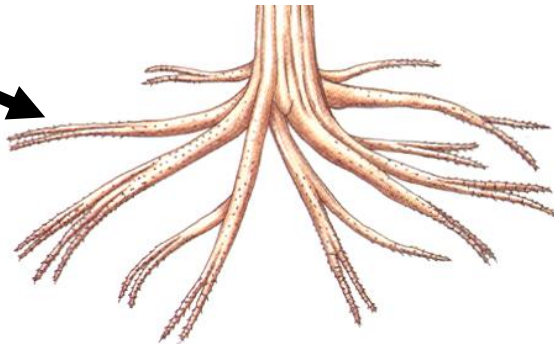
**FOSSIL BEDS
FRAGMENTS**



STROBILUS



STEM



ROOT



FORM GENUS

FORM GENUS

**PALEOBOTANICAL
FORM GENUS**

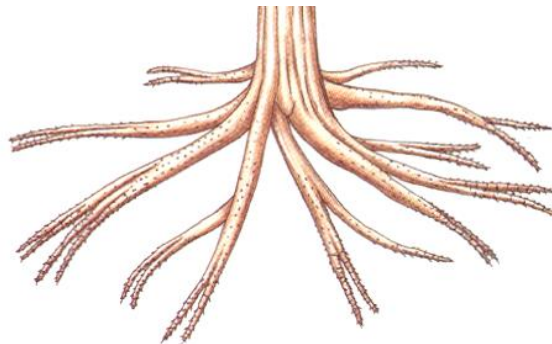
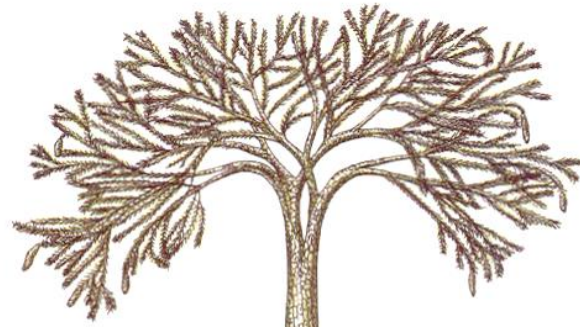


**PALEOBOTANTICAL
PLANT ORGAN
WITH UNIQUE
CHARACTERS**

**PALEOBOTANICAL
FORM GENUS**

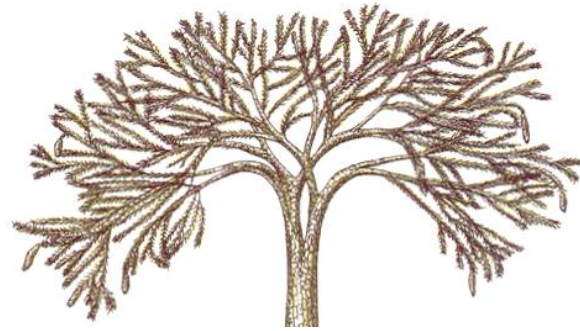
**FOSSIL BEDS
FORM GENUS**

S

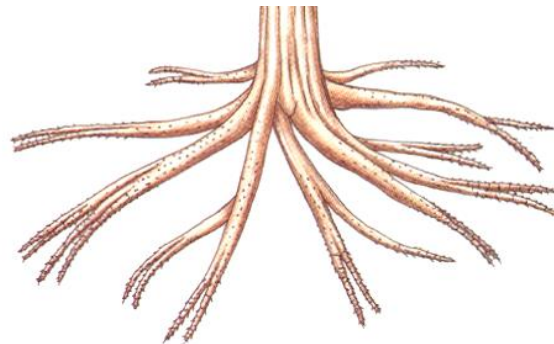


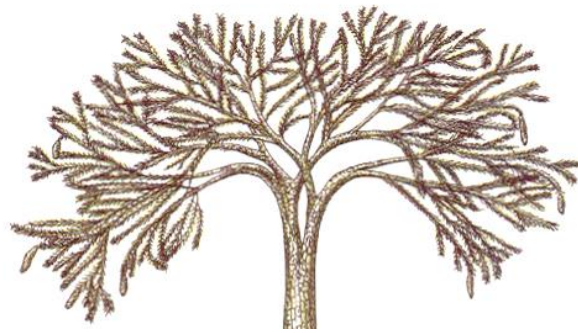
**FOSSIL BEDS
FORM GENUS**

L



STEM





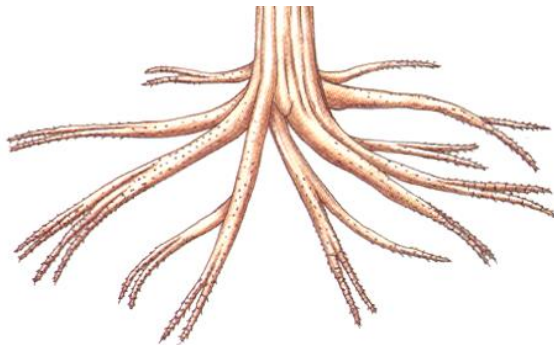
**FOSSIL BEDS
FORM GENUS**

R

STEM

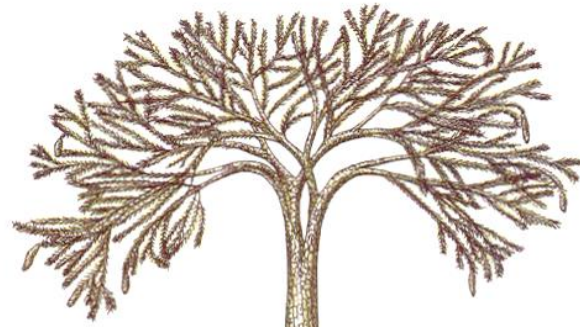


LEPIDODENDRON



**FOSSIL BEDS
FORM GENUS**

S

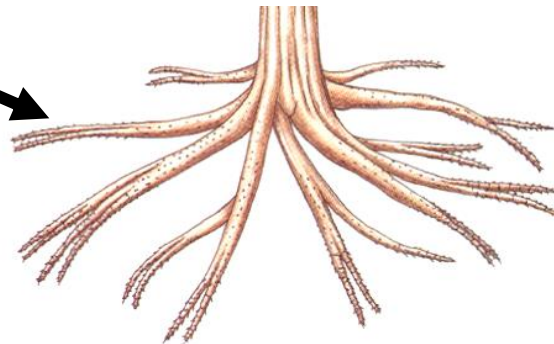
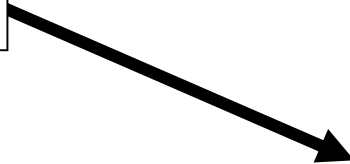


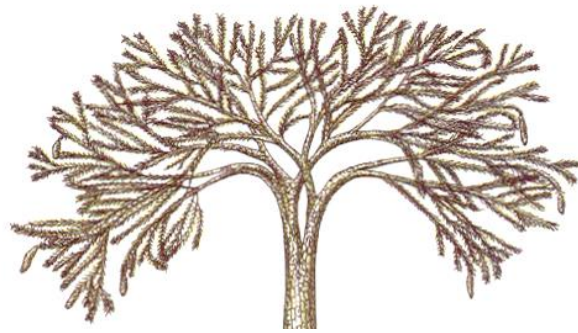
STEM



LEPIDODENDRON

ROOT





**FOSSIL BEDS
FORM GENUS**

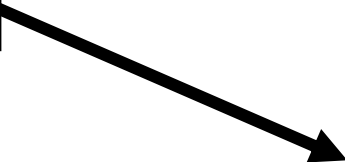
S

STEM

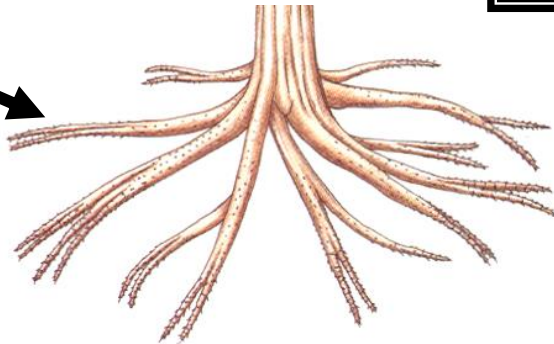


LEPIDODENDRON

ROOT

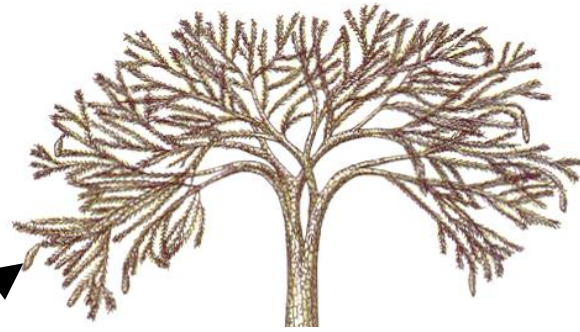


STIGMARIA



**FOSSIL BEDS
FORM GENUS**

L

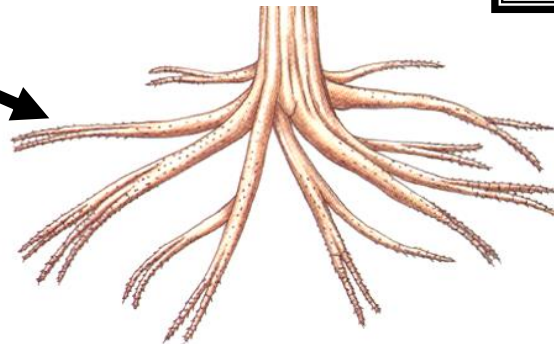


STROBILUS



STEM

LEPIDODENDRON

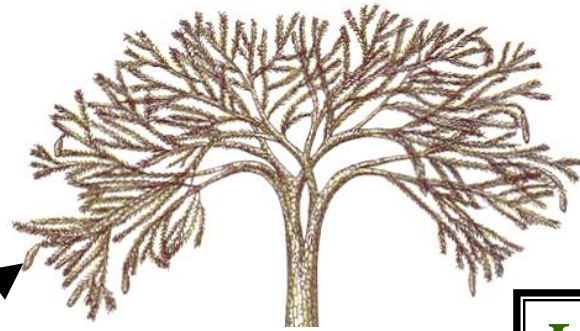


ROOT

STIGMARIA

**FOSSIL BEDS
FORM GENUS**

PA



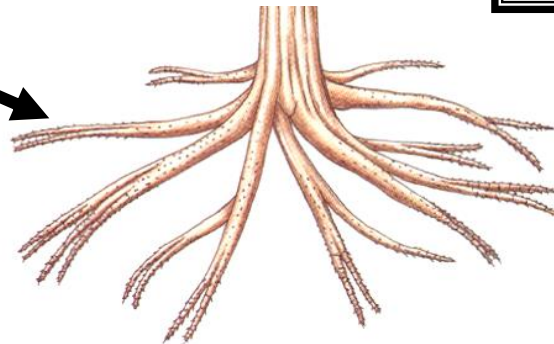
STROBILUS

LEPIDOCARPON



STEM

LEPIDODENDRON

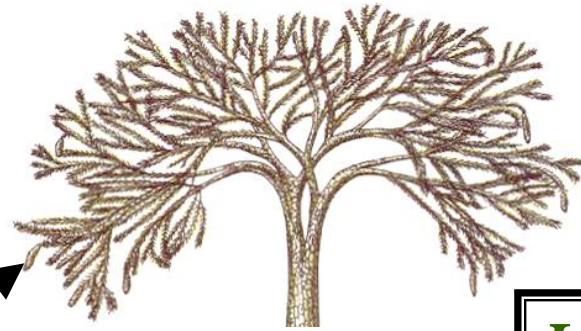


ROOT

STIGMARIA

**FOSSIL BEDS
FORM GENUS**

PA



STROBILUS

LEPIDOCARPON

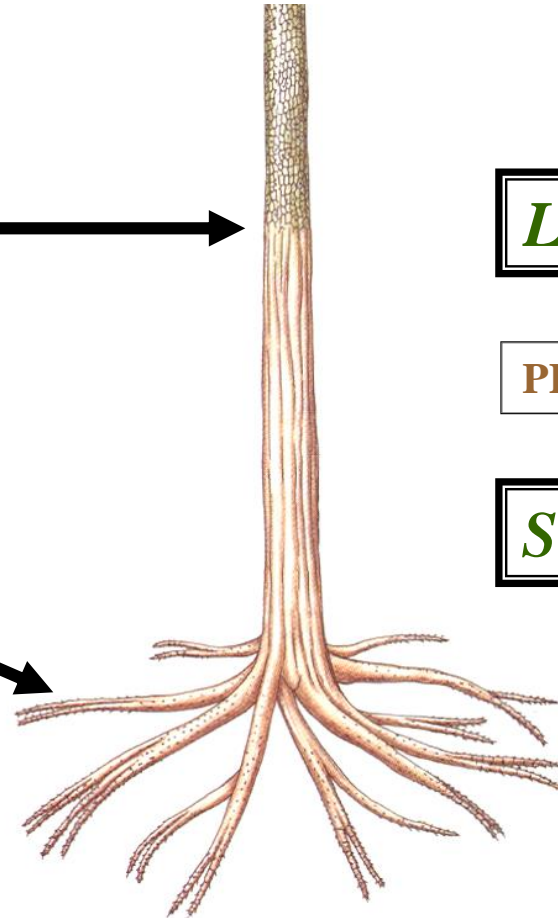
STEM

LEPIDODENDRON

PHYSICALLY ATTACHED

ROOT

STIGMARIA



**FOSSIL BEDS
FORM GENUS**

?

STROBILUS

LEPIDOCARPON

PHYSICALLY ATTACHED

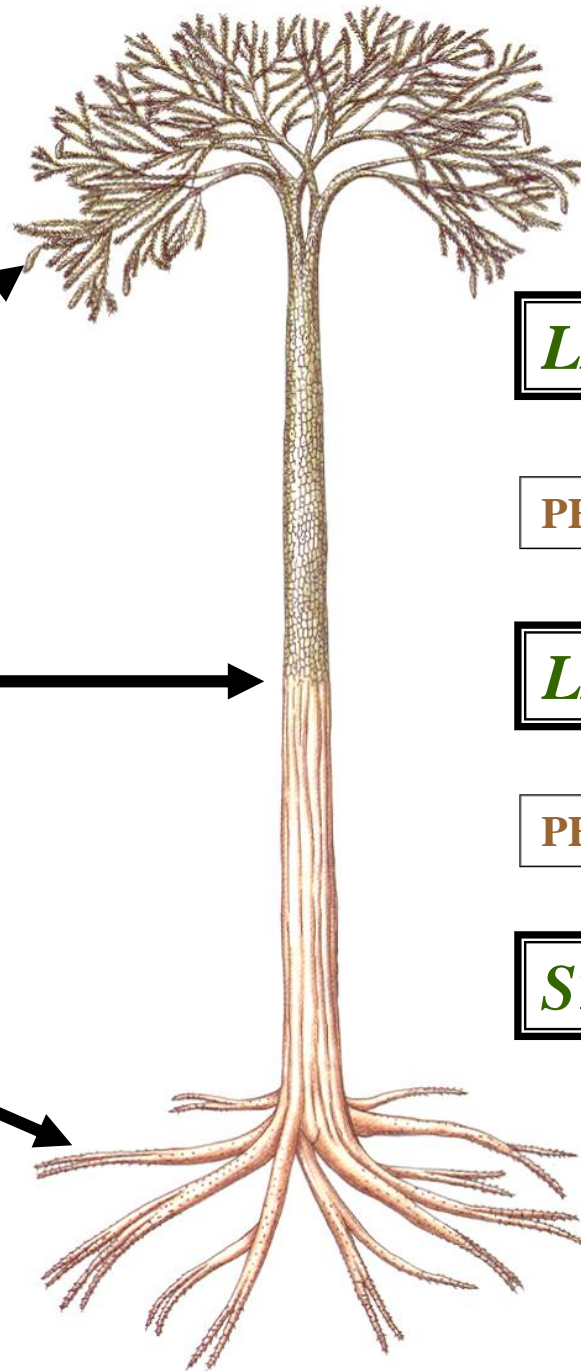
STEM

LEPIDODENDRON

PHYSICALLY ATTACHED

ROOT

STIGMARIA



QUESTION

WHAT IS THE

ENTIRE

PLANT'S NAME?

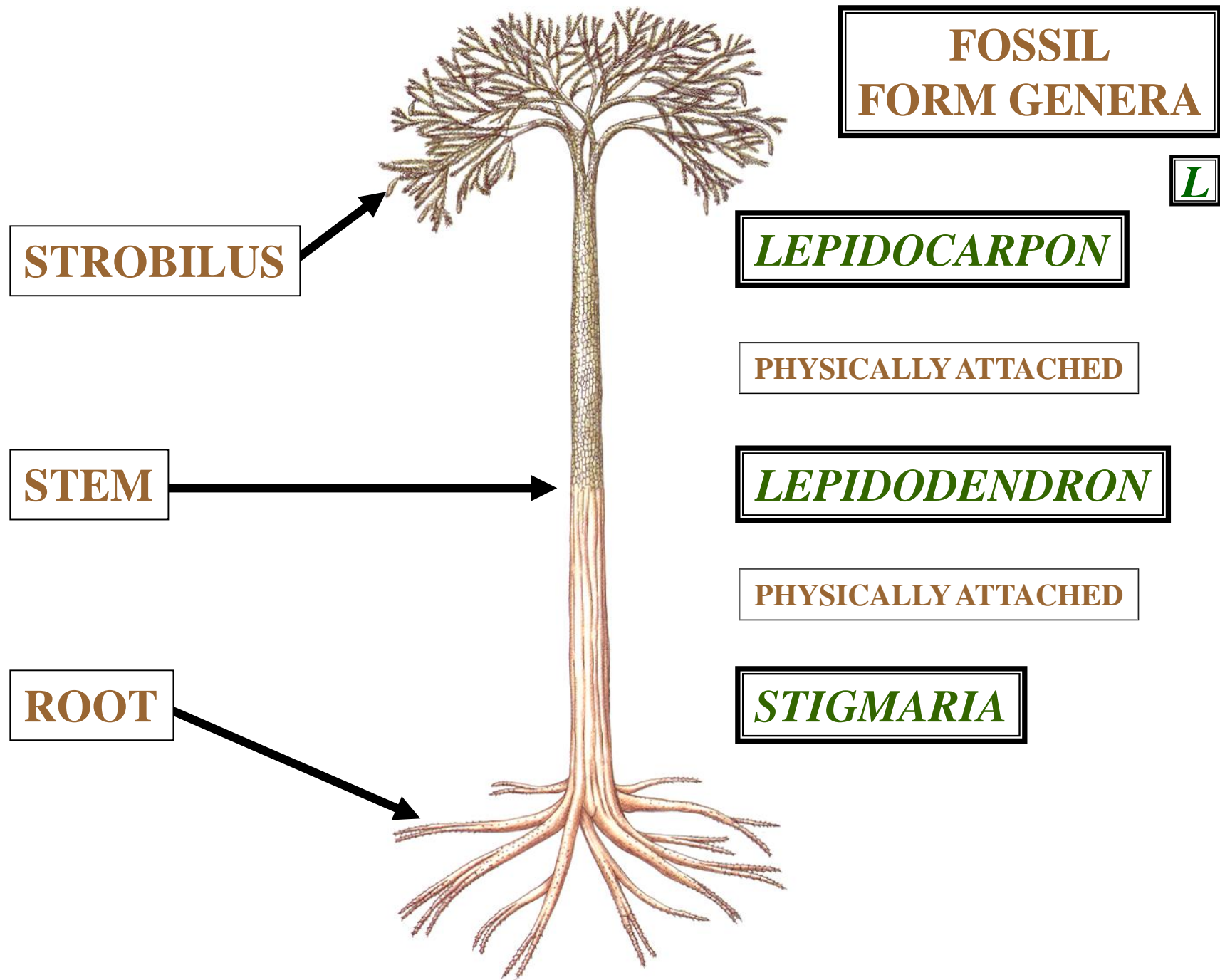
QUESTION

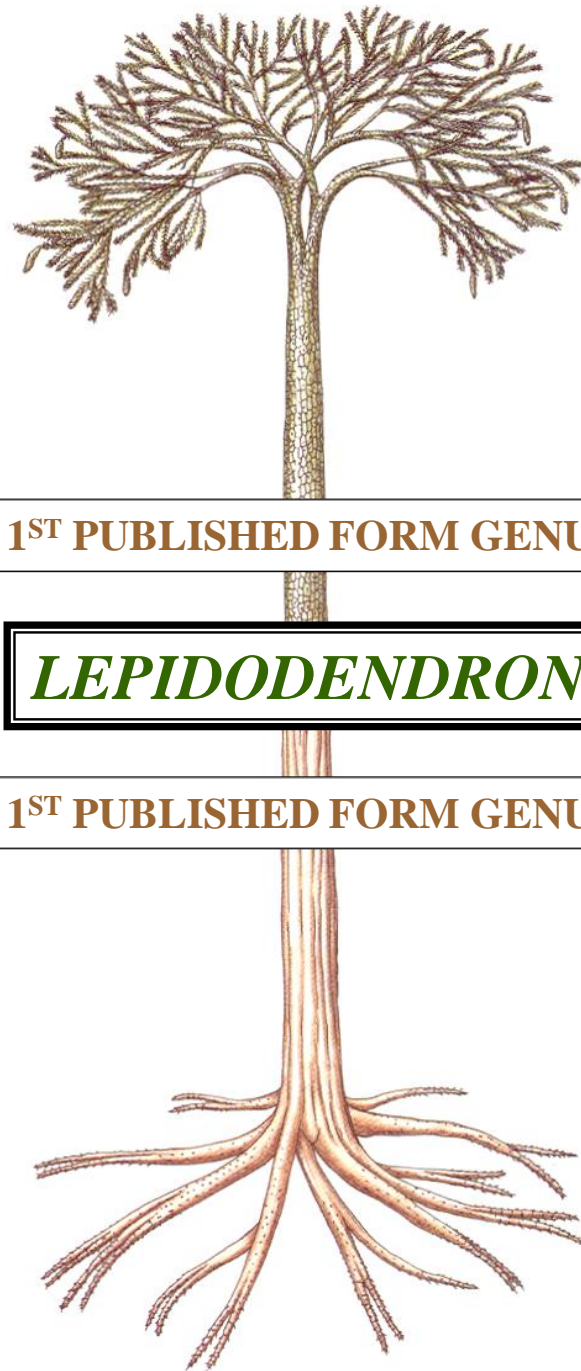


ANSWER

**FIRST PUBLISHED
FORM GENUS**

ANSWER





1ST PUBLISHED FORM GENUS

LEPIDODENDRON

1ST PUBLISHED FORM GENUS



PROGYMNOSPERMS DISCOVERY

PRIOR 1960

FOSSIL BEDS

FOSSIL BEDS



LEAF

ARCHAEOPTERIS

FOSSIL BEDS



LEAF

ARCHAEOPTERIS



STEM

CALLIXYLON



LEAF

ARCHAEOPTERIS

FOSSIL BEDS

**FOUND SAME
FOSSIL BEDS**



STEM

CALLIXYLON

ARCHAEOPTERIS



FOSSIL BEDS



**FERN
FROND MORPHOLOGY**

ARCHAEOPTERIS

FOSSIL BEDS



**FERN
REPRODUCTION**

ARCHAEOPTERIS

FOSSIL BEDS



FERN CHARACTERS

ARCHAEOPTERIS

^

FB

FOSSIL BEDS



FERN CHARACTERS

ARCHAEOPTERIS
FERN

+

V

FOSSIL BEDS

**FOUND SAME
FOSSIL BEDS**



STEM

CALLIXYLON



***ARCHAEOPTERIS*
FERN**

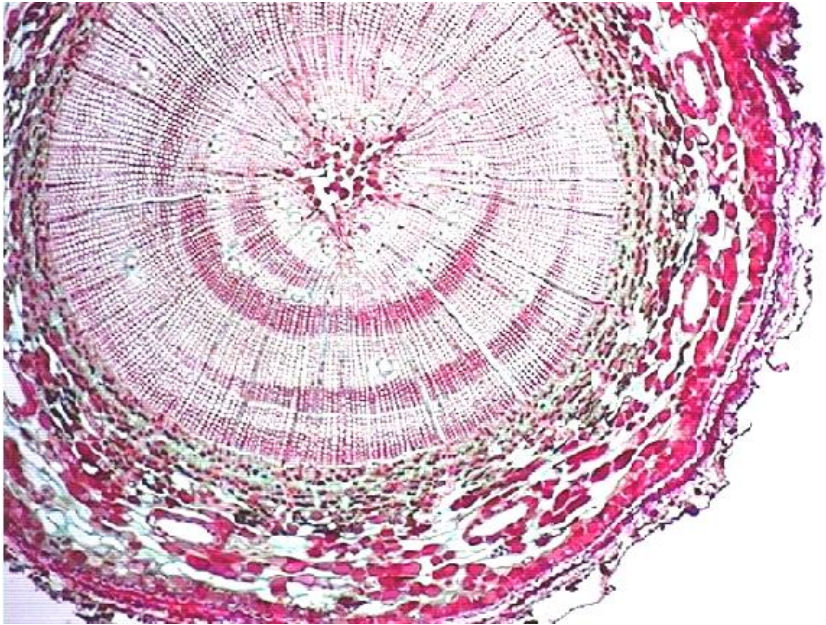
FOSSIL BEDS



**STEM
VASCULAR CAMBIUM**

CALLIXYLON

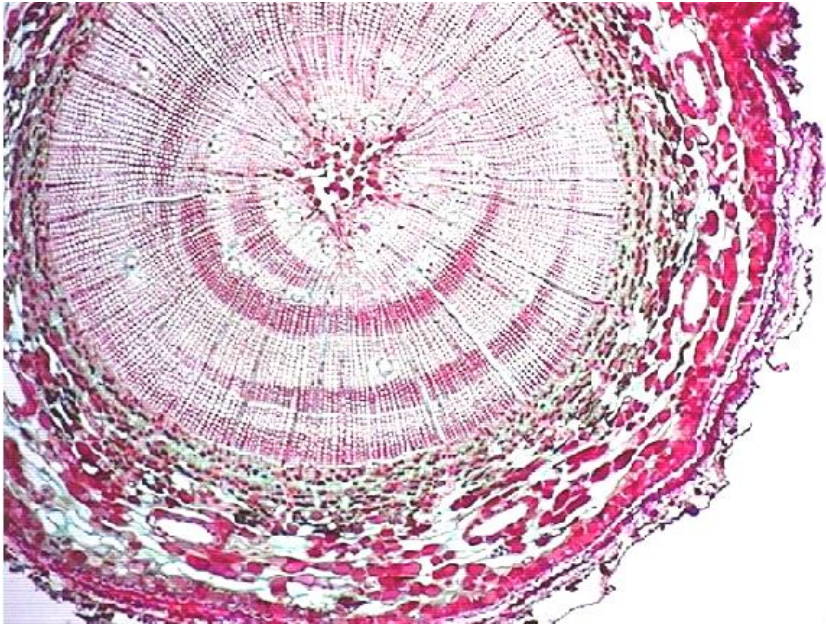
FOSSIL BEDS



**STEM
VASCULAR CAMBIUM
SECONDARY GROWTH**

CALLIXYLON

FOSSIL BEDS



**STEM
VASCULAR CAMBIUM
SECONDARY XYLEM**

CALLIXYLON

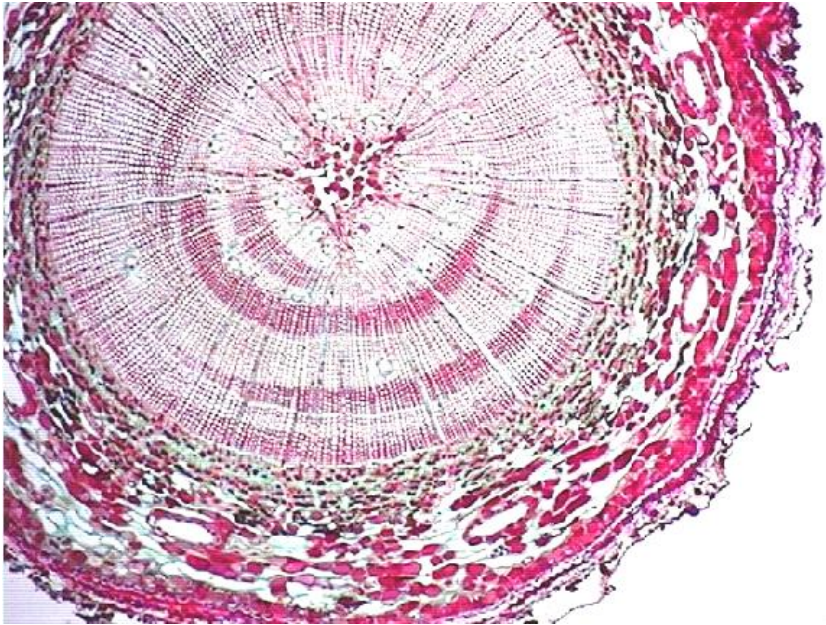
FOSSIL BEDS



**STEM
VASCULAR CAMBIUM
SECONDARY XYLEM
WOOD**

CALLIXYLON

FOSSIL BEDS



GYMNOSPERM WOOD ANATOMY

CALLIXYLON

FOSSIL BEDS



**GYMNOSPERM
CHARACTERS**

CALLIXYLON

FOSSIL BEDS



**GYMNOSPERM
CHARACTERS**

CALLIXYLON
GYMNOSPERM



FOSSIL BEDS

**FOUND SAME
FOSSIL BEDS**

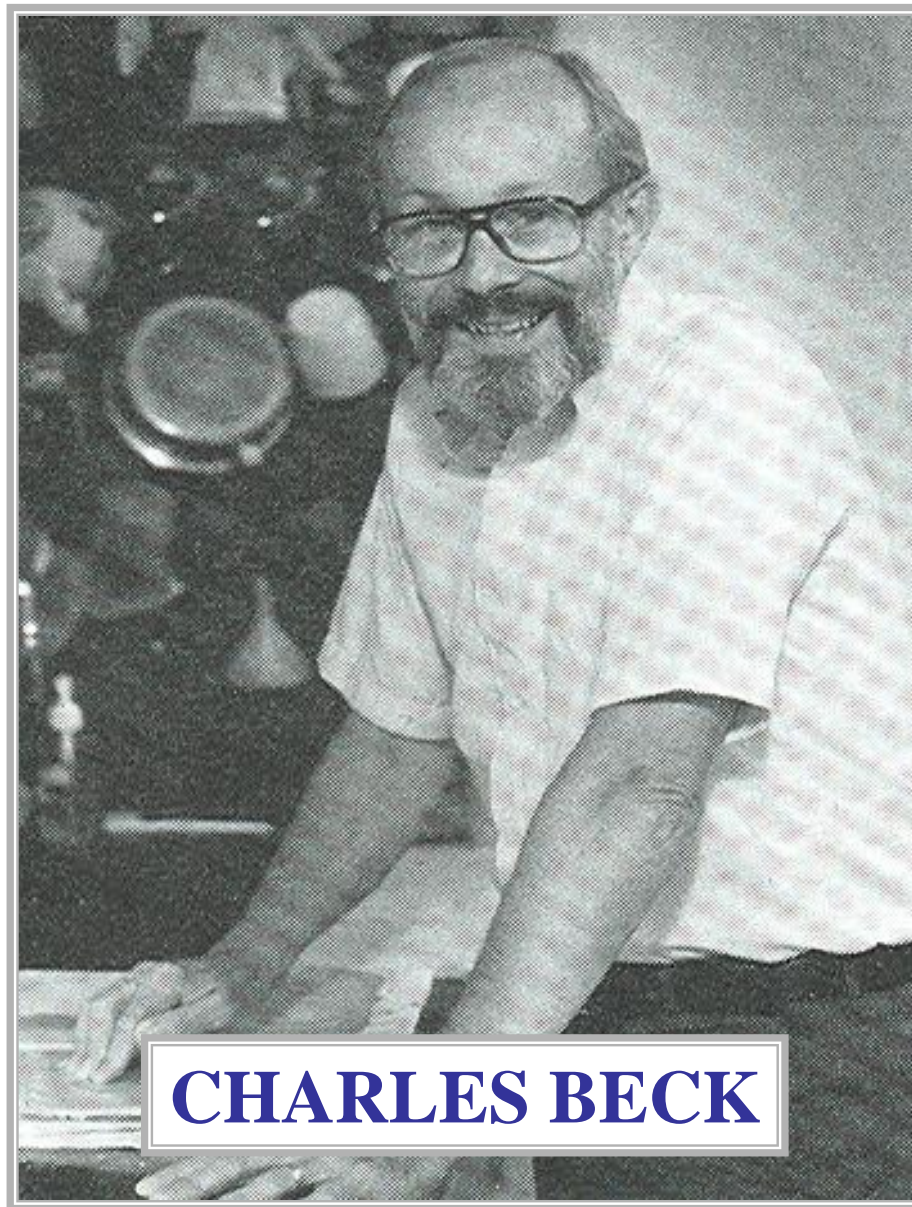


ARCHAEOPTERIS
FERN LEAF

CALLIXYLON
GYMNOSPERM STEM



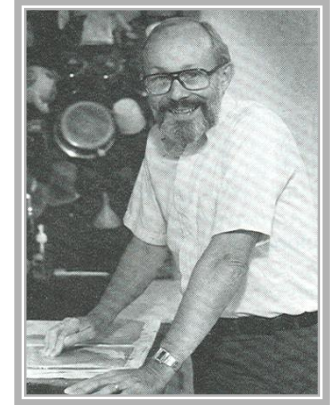
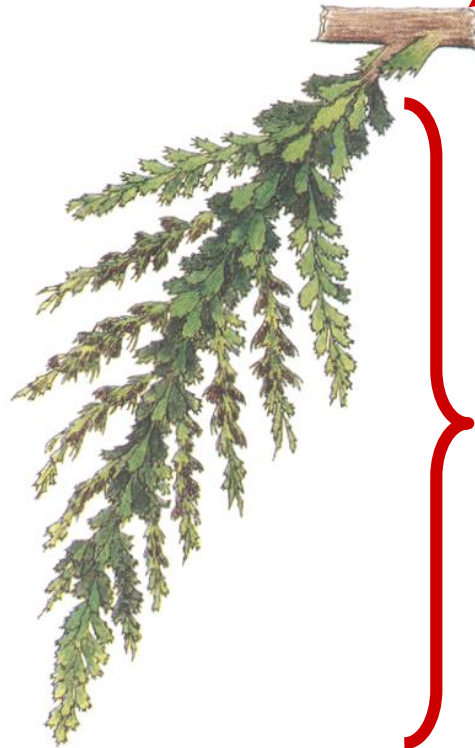
DURING 1960



PALEOBOTANIST

CHARLES BECK DISCOVERY

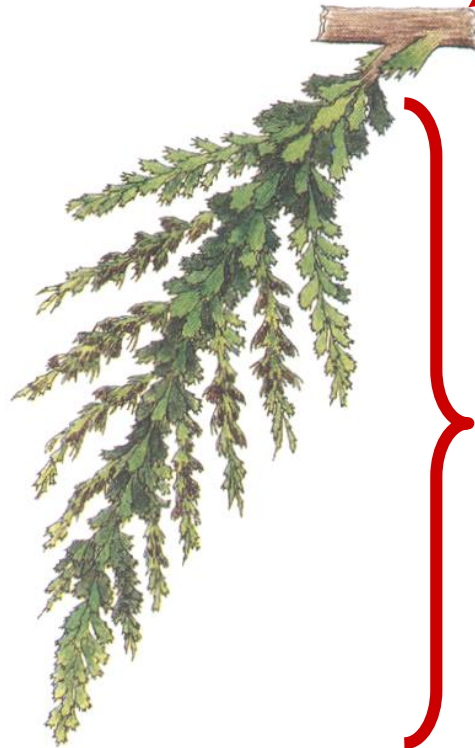
CALLIXYLON



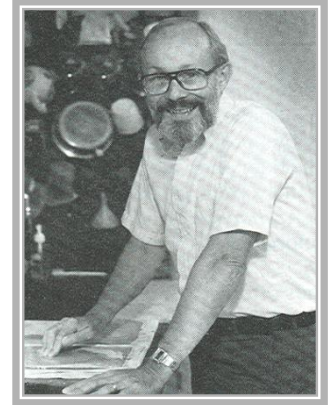
ARCHAEOPTERIS

**CHARLES BECK
DISCOVERY**

CALLIXYLON



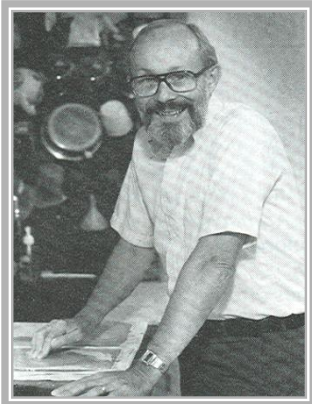
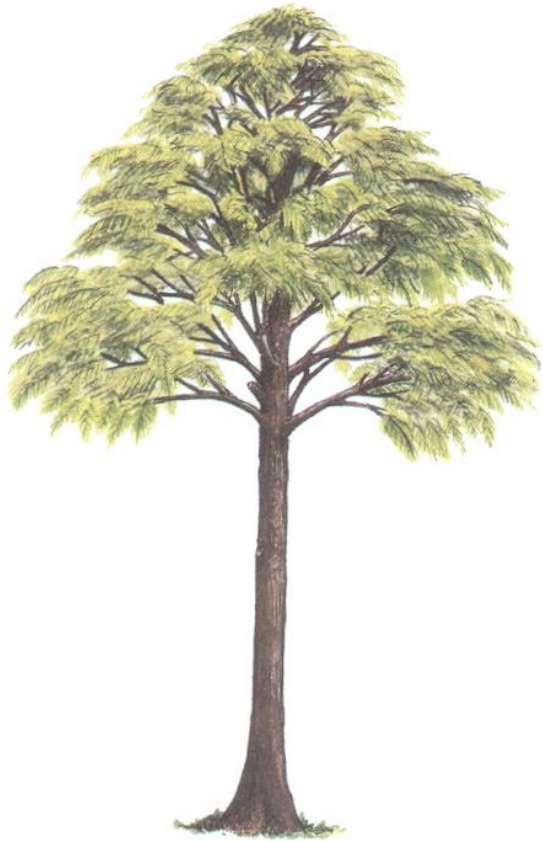
ARCHAEOPTERIS



ARCHAEOPTERIS & CALLIXYLON
PHYSICALLY ATTACHED

**CHARLES BECK
DISCOVERY**

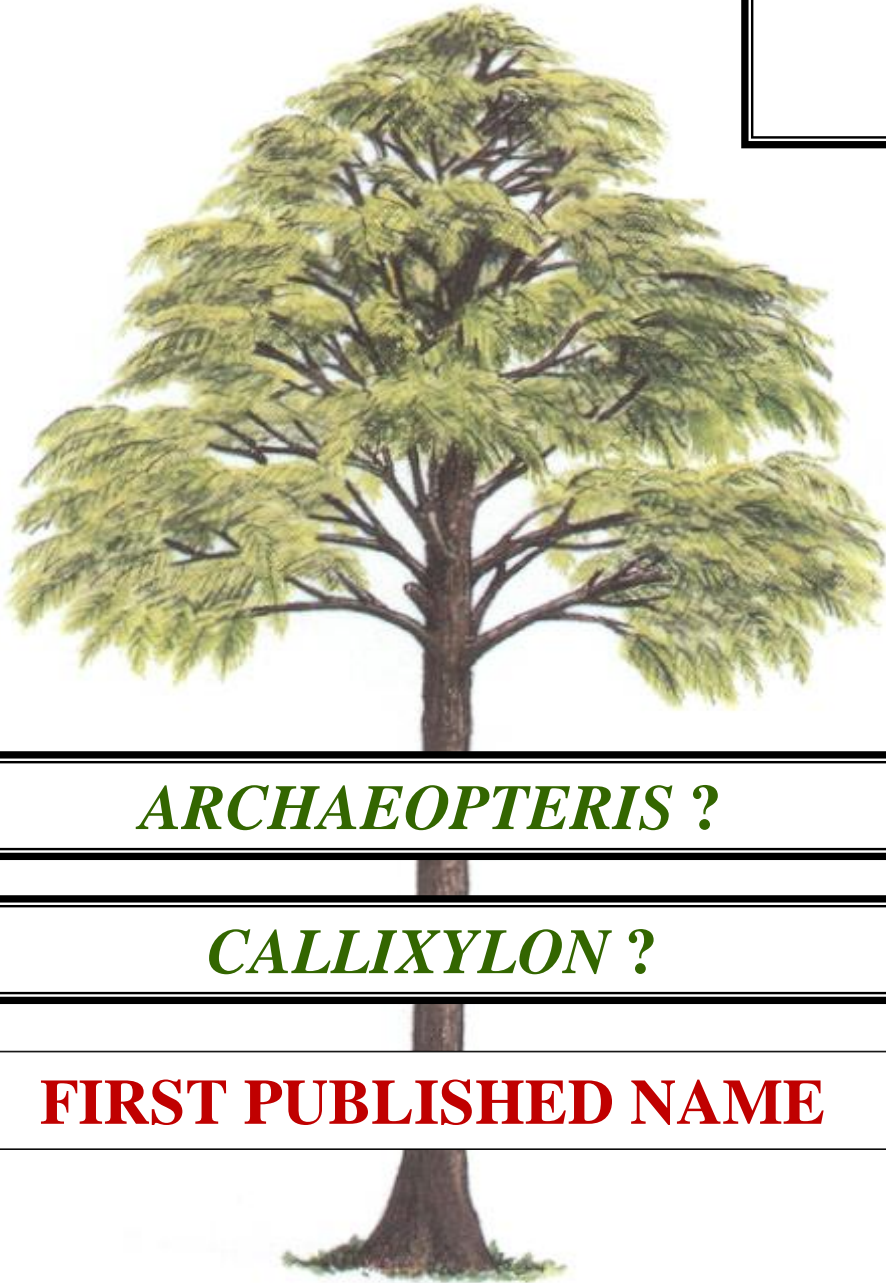
CALLIXYLON



ARCHAEOPTERIS

ARCHAEOPTERIS & CALLIXYLON
SAME PLANT

**CHARLES BECK
DISCOVERY**



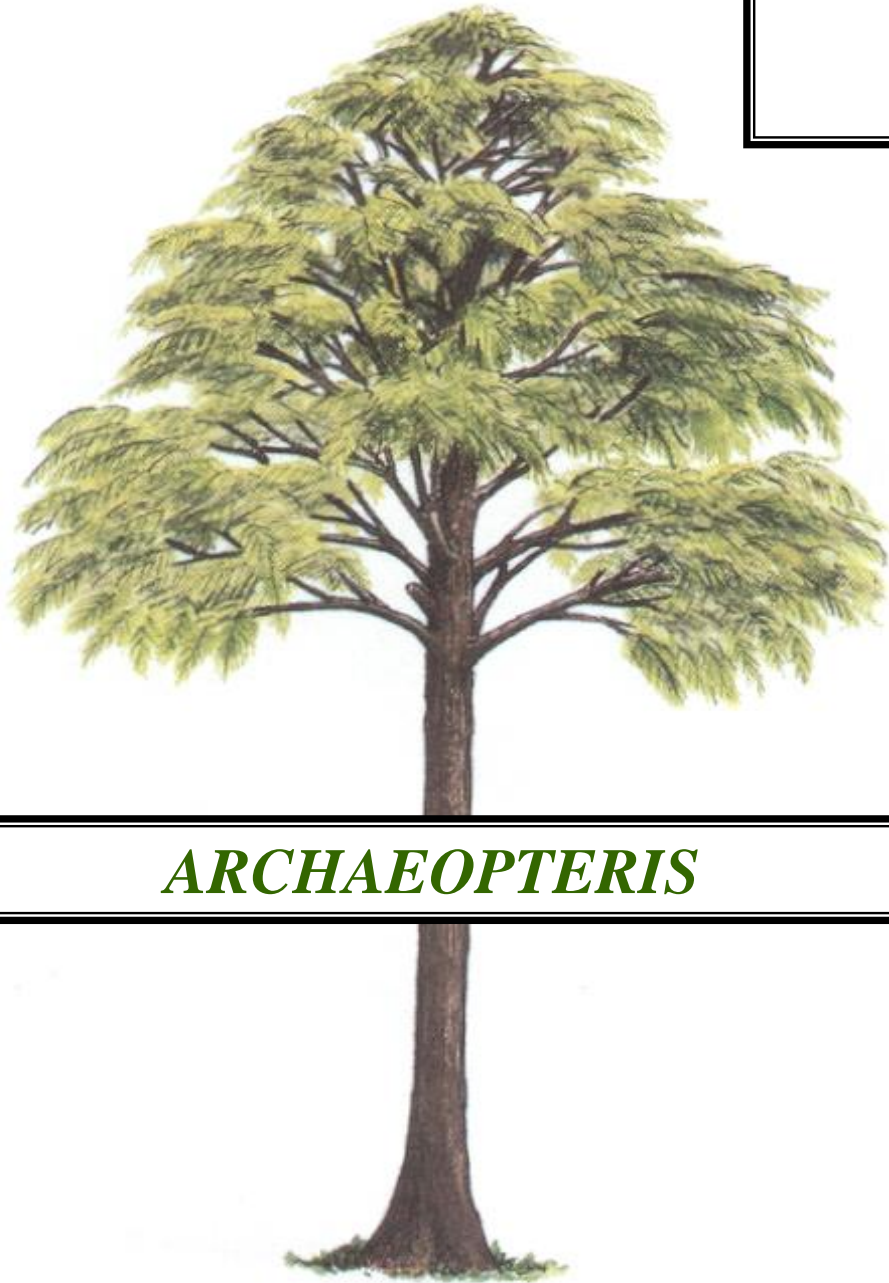
ARCHAEOPTERIS ?

CALLIXYLON ?

FIRST PUBLISHED NAME



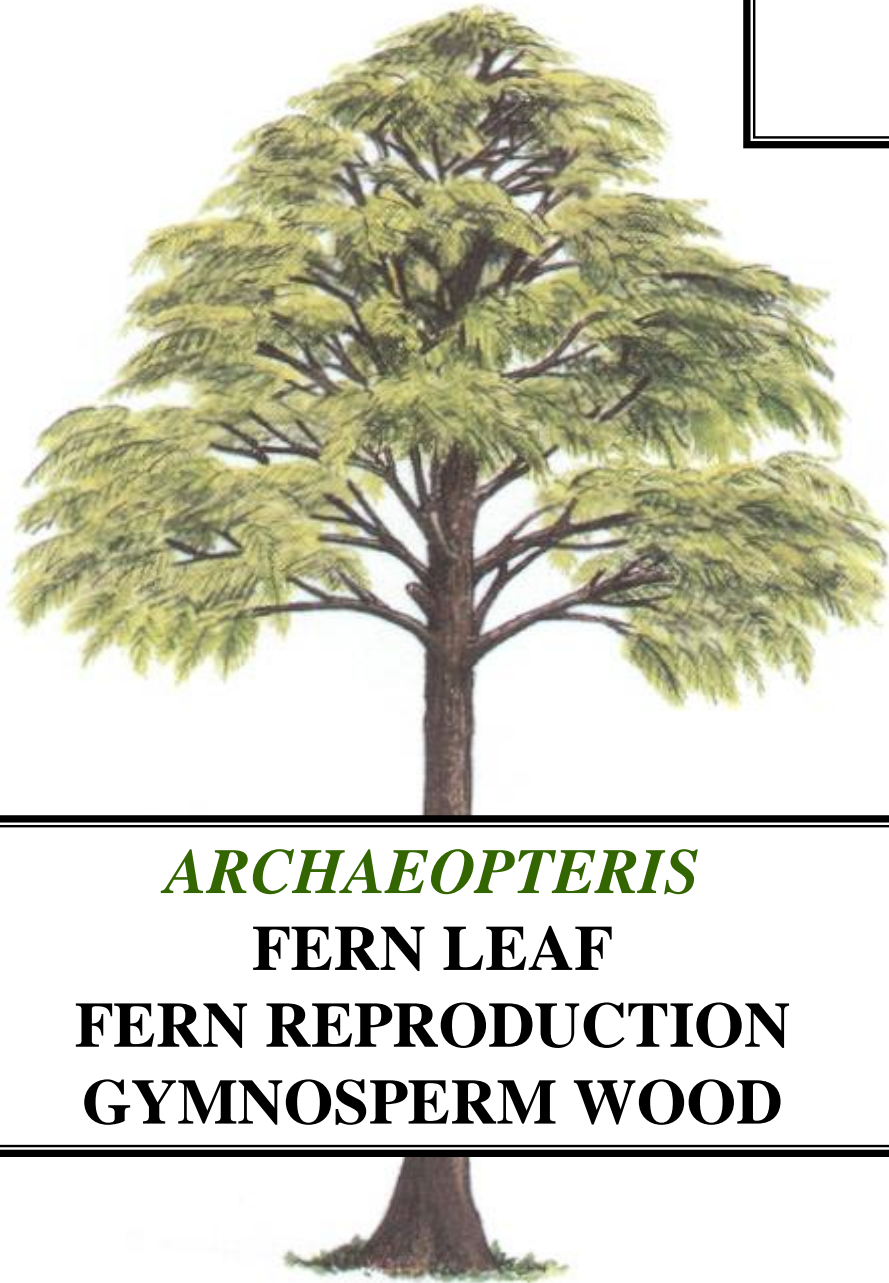
**CHARLES BECK
DISCOVERY**



ARCHAEOPTERIS



**CHARLES BECK
DISCOVERY**



ARCHAEOPTERIS

FERN LEAF

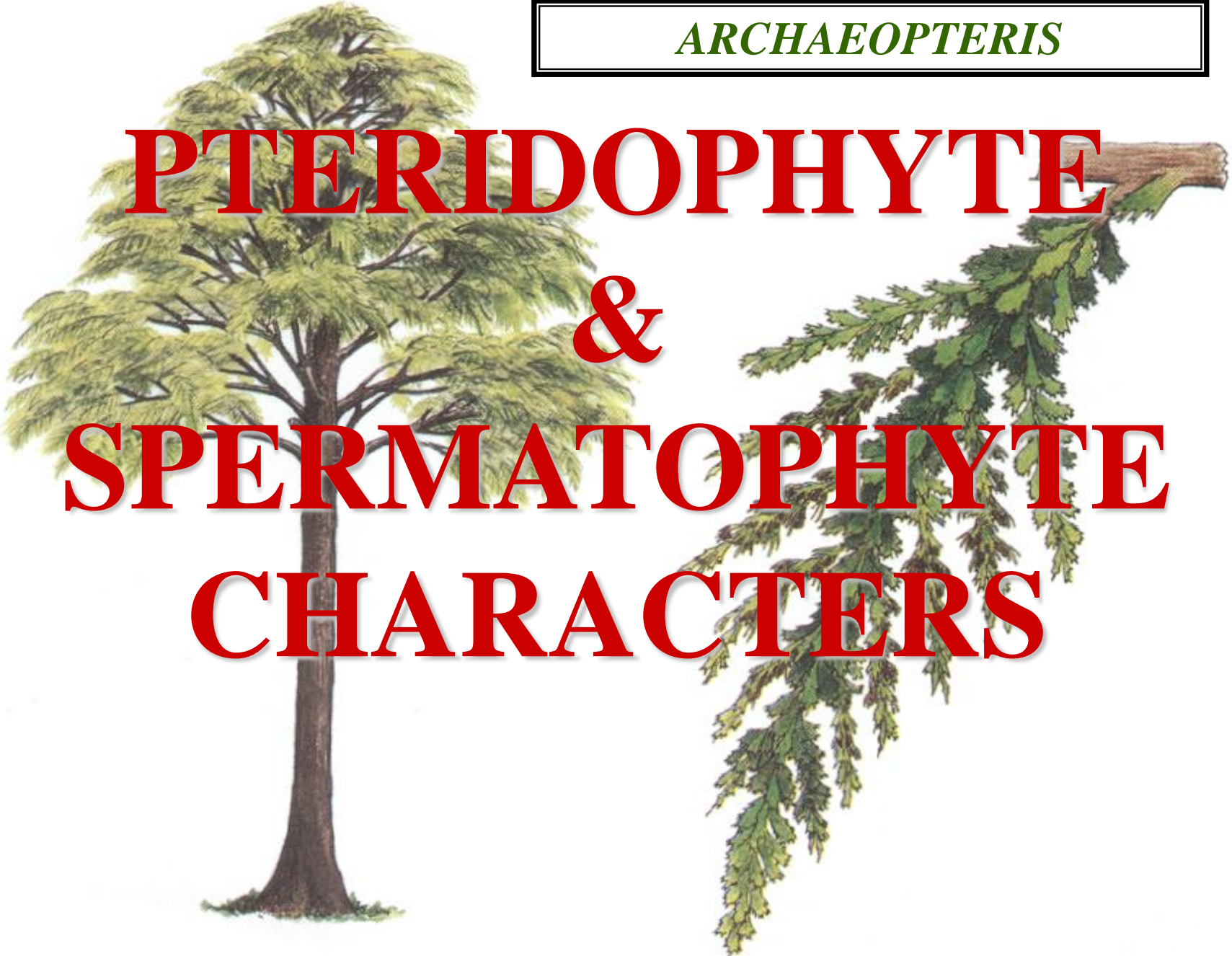
FERN REPRODUCTION

GYMNOSPERM WOOD





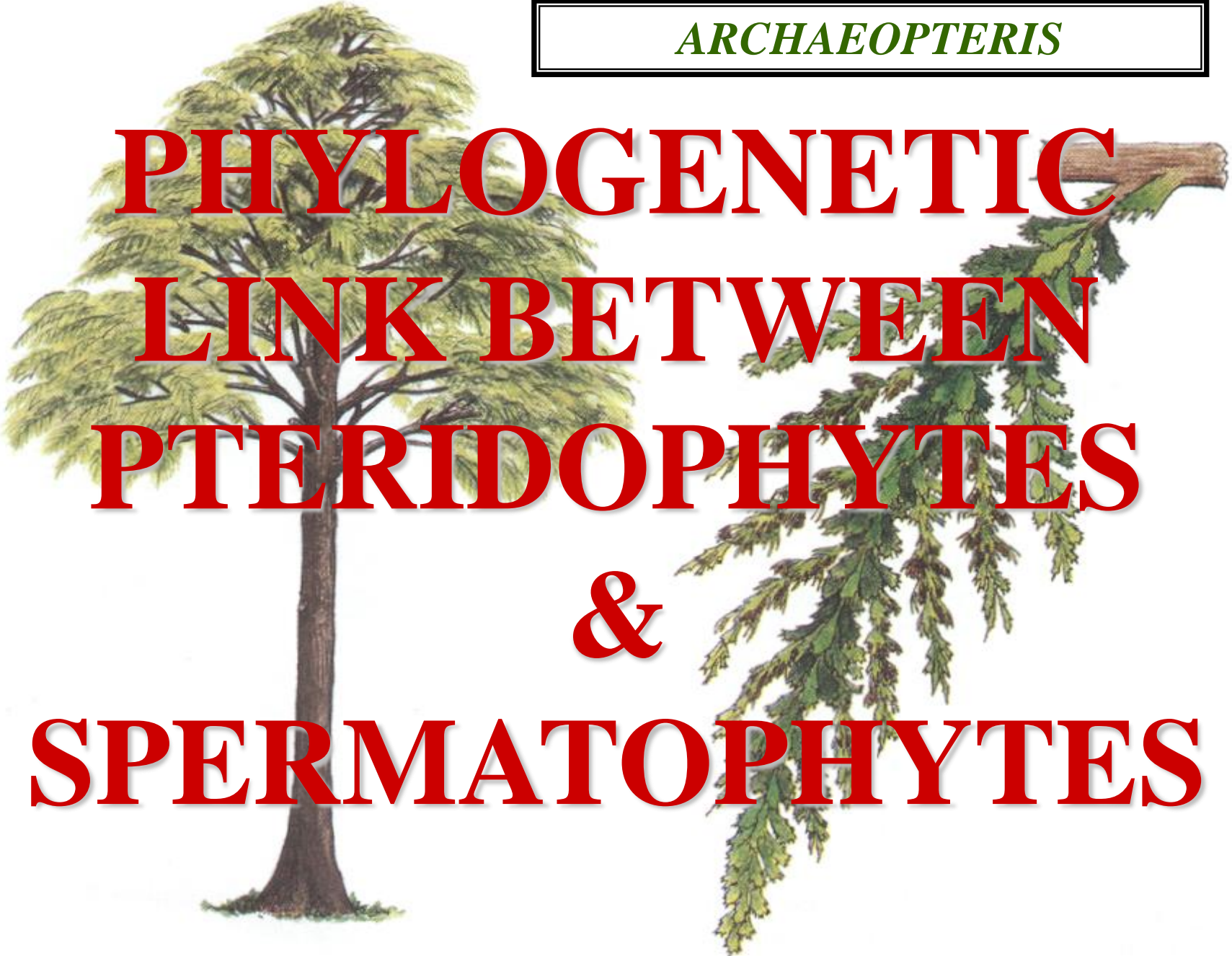
ARCHAEOPTERIS



**PTERIDOPHYTE
&
SPERMATOPHYTE
CHARACTERS**



ARCHAEOPTERIS



**PHYLOGENETIC
LINK BETWEEN
PTERIDOPHYTES
&
SPERMATOPHYTES**



CHARLES BECK'S DISCOVERY CONSEQUENCES

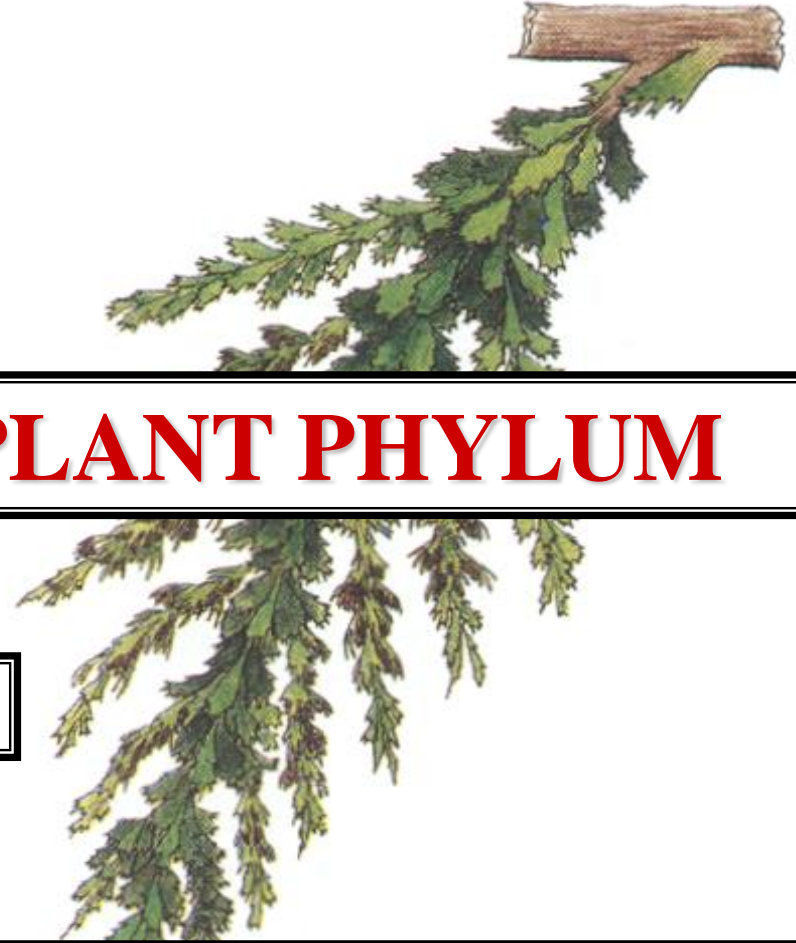
PROGYMNOSPERM

P

REQUIRED NEW PLANT PHYLUM

ARCHAEOPTERIS

**PTERIDOPHYTE & SPERMATOPHYTE
CHARACTERS**





PROGYMNOSPERM

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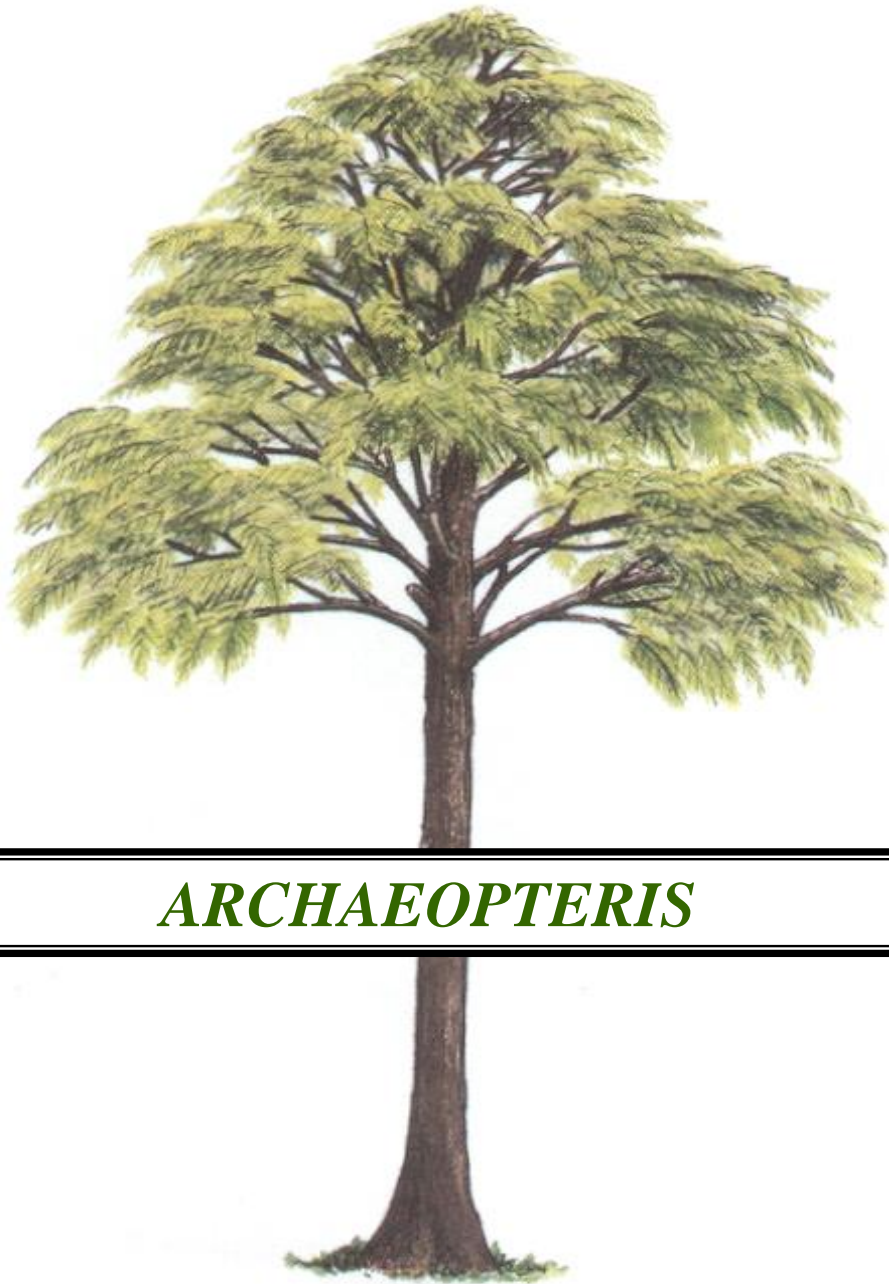
PHYLUM
PROGYMNOSPERMOPHYTA

ARCHAEOPTERIS

PTERIDOPHYTE & SPERMATOPHYTE
CHARACTERS

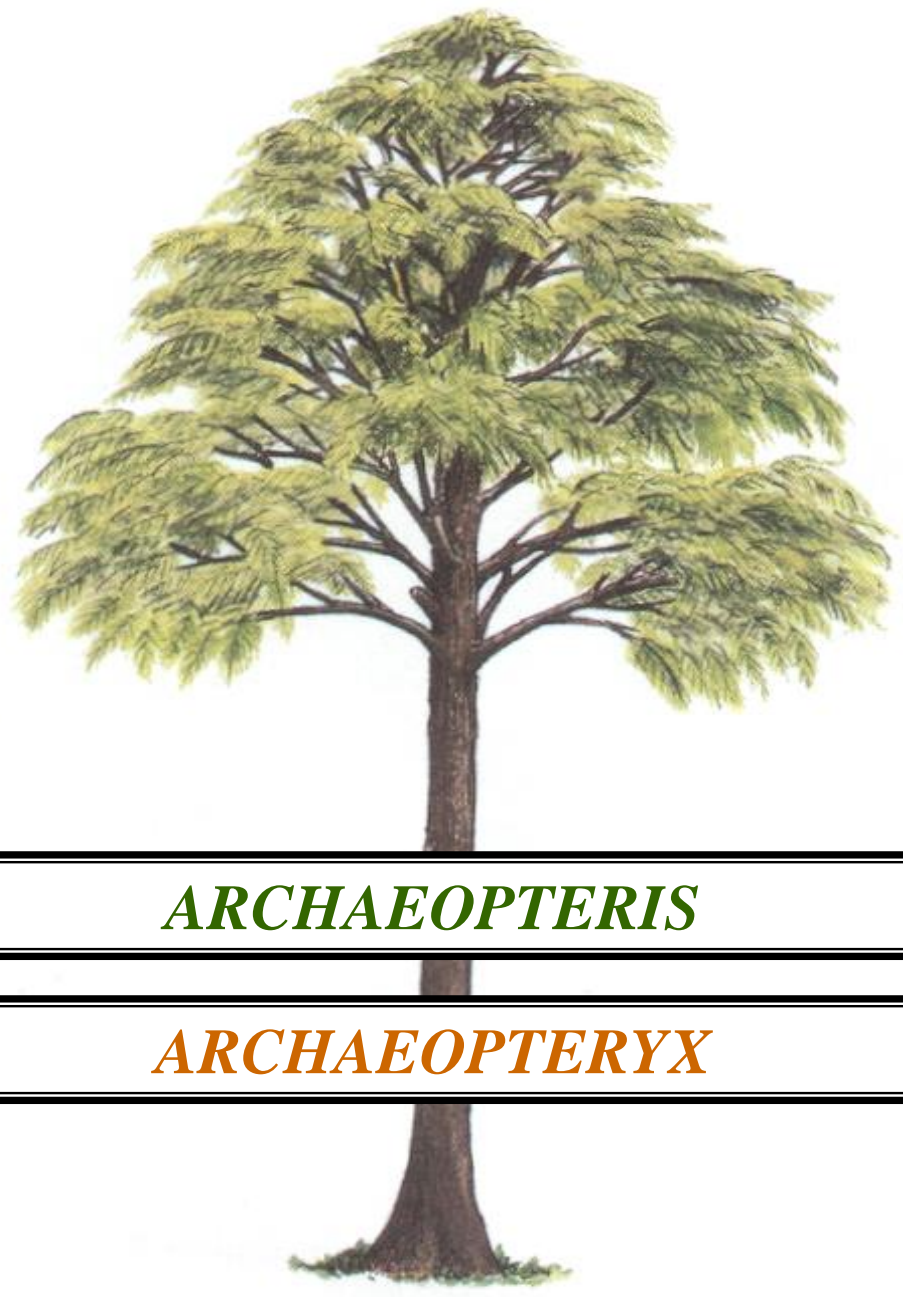


REPRESENTATIVE GENERA



ARCHAEOPTERIS





ARCHAEOPTERIS

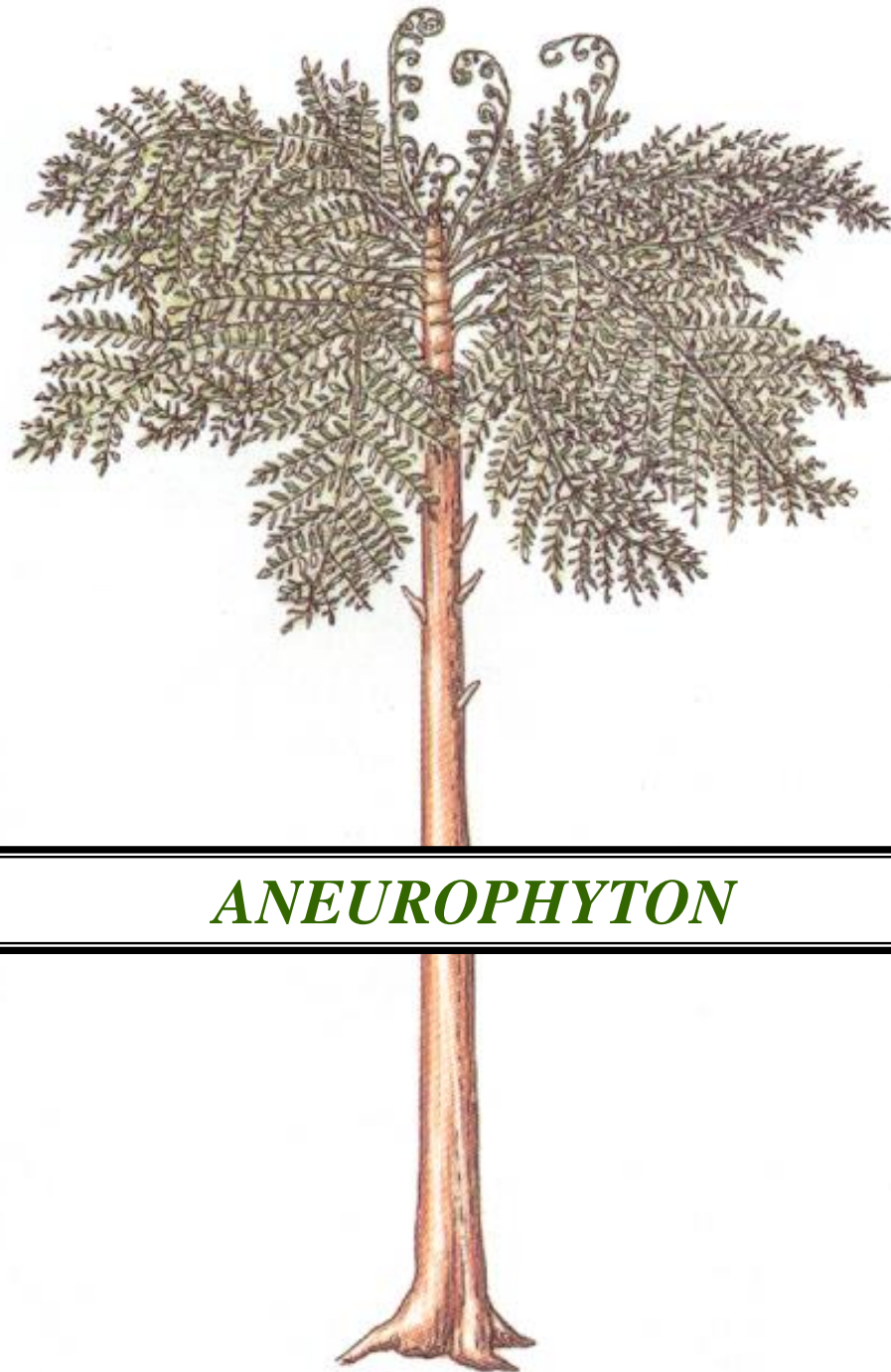
ARCHAEOPTERYX



A detailed illustration of a large tree with a thick, dark brown trunk and a dense, rounded canopy of green, feathery foliage. To the right, a separate branch with a cut end and similar green foliage is shown. The text 'FIRST RECOGNIZED PROGYNMOSPERM' is overlaid in large, bold, red letters with a white drop shadow.

FIRST RECOGNIZED PROGYMOSPERM

ARCHAEOPTERIS



ANEUROPHYTON



OLDEST KNOWN PROGYMNOSPERM

ANEUROPHYTON

PHYLOGENETIC RELATIONSHIP



TRACHEOPHYTES

RHYNIOPHYTA

STEM ENATIONS

COMPLEX TELOMES

ZOSTEROPHYLLOPHYTA

TRIMEROPHYTOPHYTA

**MICROPHYLLS
ENATION THEORY**

**MEGAPHYLLS
TELOME THEORY**

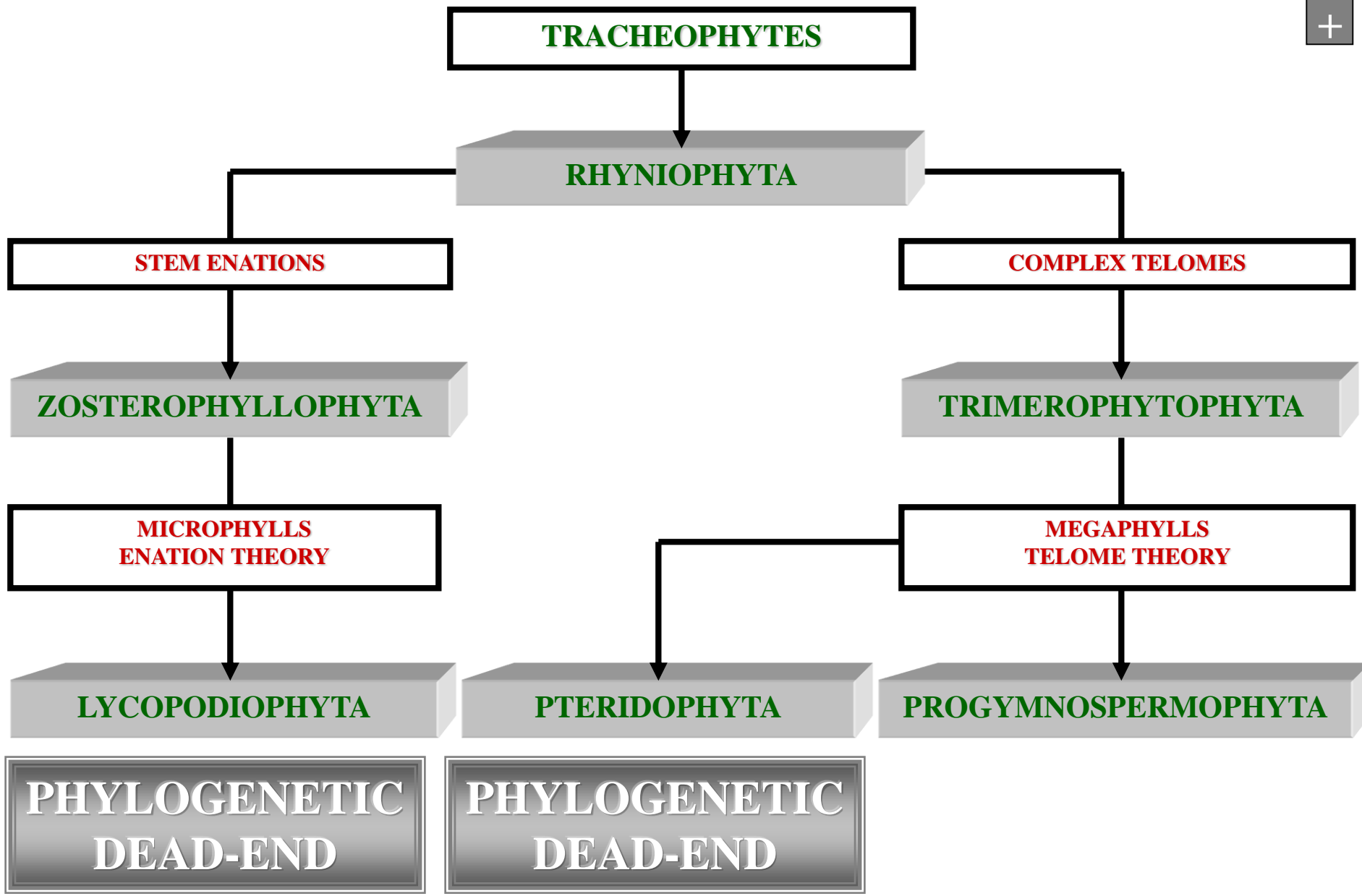
LYCOPODIOPHYTA

PTERIDOPHYTA

PROGYMNOSPERMOPHYTA

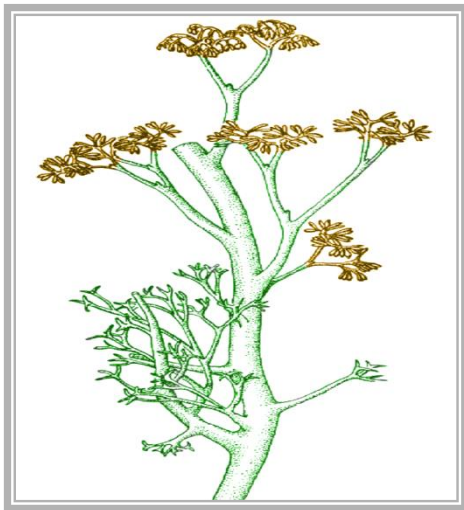
**PHYLOGENETIC
DEAD-END**

**PHYLOGENETIC
DEAD-END**



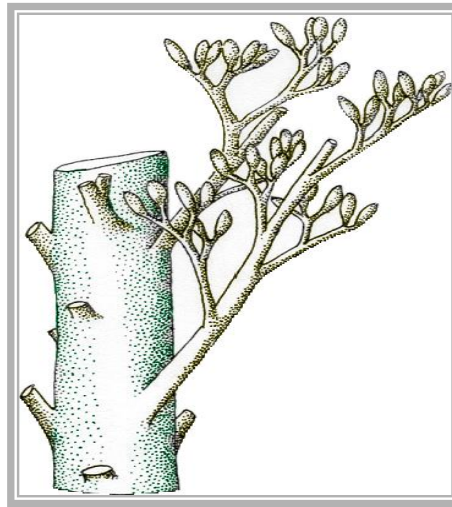


PROGYMNOSPERM EVOLUTION



PSILOPHYTON

TRIMEROPHYTE



OOCAMPSA

TRIMEROPHYTE



PROGYMNOSPERMS

