

Aula 6

ANGIOSPERMAS BASAIS E A5; BC @ 895 G

META

Objetivo geral: Conhecer a diversidade e a importância das angiospermas basais e suas relações com os outros grupos de plantas vasculares.

OBJETIVOS

Objetivos específicos: Identificar as principais características morfológicas e anatômicas das angiospermas basais; compreender a importância das angiospermas basais na diversidade e na evolução das plantas vasculares; reconhecer representantes no Brasil.

DEFINIÇÃO

As angiospermas são plantas vasculares que possuem flores com carpelos e estames protegidos por um tecido chamado pericarpio.



: cf XY5 ga]bUlf]cVzi a Ua U]bc]PXU
(Fonte: <http://pt.wikipedia.org>)

=B HFC 8I uÈC

5 dC]hf Ygi XLXc'c Wd]h `c'g'VfYWFUMf]nU ~c Ycf][Ya XLg5b[]c!
gdYfa Ugj cW.z'Xj Yhf'c Wb\W]a Ybte Vz]W'g'VfYUg5b[]cgYfa Ug
]bW]bXc XLXcg'g'VfYUg Ua cfZ`c[]ZÙc[]b]UYcf][Ya `dchbVU""8 Y
dcggYXgg'g'Wb\W]a Ybte'zj cW.z' dcXYfYgcbXf'UdYf[i bhUg[i]bhY'
CeI Yg'c' Ug5b[]cgYfa Ug3; cgUf]Uei Yj cW a YXggY Y Ya d'cg'XY
Angiospermas que conhece plantas do seu cotidiano... Por que as Angio-
gdYfa Ug'g'c'h'c'Xca]bUhg3E i Ug Ug WfUMf]g]Wg'ei YXU]Ya `YgY'
[fi dc37ca c YYg'z Xj]Xc'Ui Ua Ybh3J Ua cgfYgcbXf'UhcXUgYggUg
dYf[i bhUgXi fubhUdYfYg]bU ~c XLg5b[]cgYfa Ug6UgYA U bc]XUg'



9gi XcgWUg]Wgg g]bhU]a UgXi Ug`dC]hgYgdUcf][Ya X]gUb[]cgYfa Ug UfUj fgX]gdU
YeYfj UgWa 7`cfU]bUWUYf] Ygei YfX]Xj Yf[]bXc bUWgYX]gUb[]cgYfa Ug]Udc]UbXc Uhc]U
Xc dgi X]bte'zYUfUj fgX]gdUYczfj cfYg]Udc]UbXc Uhc]U]U]bte'gfcV]Uf"
(Fonte: <http://www.freewebs.com>)

ANGIOSPERMAS

5gUb[]cgdYfa UgWbHá Wa VWXY& S'SSSYgdVWgZ]bW]bXc i a U enorme diversidade de formas. Trata-se do grupo mais representativo de gYg] j cgYa `b•a Yfc`XYgdVWgZ]gYbXc`g dYUxc`UdYbUgdYcg]bgYfcg` C`b•a Yfc`XYVWUWV]g]WgWa dUf]`UXgfi a Uy]XbVWUWUUYei Y UgUb[]cgdYfa UgZcfa Uá i a `]fi dc`a cbcU`f]W"9`Ugg-c`ZUWa YbhYfY! Wb\WVXUgdYUdfcX, ~c`XYUcfYgci za UgYgdVWUWá YbhZdYU]bWg-c` Xcg]ei`cgYa i a `cj zfc]zei Yei UbXc`a Uá fc`hUbgZcfa UgYYa`Zi hc"5` cf]]Ya`Xc`cj zfc]c`UbxUf`Wb]fc`Yf]XZa UgU\]dUgY`a UgUM]Ug`d"Y ei YcgWfdYcgXc`cj zfc]c`hf]]á`cf]]Ya`Zc`]U"

5g5b[]cgdYfa Ugg-c`a cbcU`f]WgWa`UgYbUgbcj Yg]bUdca cfUg` descritas a seguir:

%`9`Ya`Yb]cgXYh`Vc`Wj`Uxc`YVfi`UgWa`dU\`YfUgXf]j`UXgXUga`Yga`Ug` Vfi`Ug]b]WUg`

&"; f-c`XYdCEyb`Wa`YMM`]bUW`i a`YUXUWá`UXUc`dfZW`i a`YUYhYcE"

'`"9g]á`YgWa`Xc]gdUfYg`UmfUgXYgUWgdc`b]Wg`

("9bXchYMc`\]dcXfa`U`bUUbhfU`

)"; Uá`YUcEhc`a`UgW]bc`Wa`UdYbUg`Vfi`Ug`

*"7UfdYc`ZWUXc`Wa`fY]`-c`Yg]]`a`zh]WcbXYc`WffYU]`Yfa`]bU`-c`Xc` [f-c`XYdCEyb`

+`DUfYXc`a`Y]zgcfc`UblZgYa`Ygdcfc`Yb]bU`

,`; Uá`YUcEhc`Zá`]b]bc`Wa`+U%`Vfi`UgZgYa`Ufei`Y]`b]cg`

-`"8`i`d`UZMmXU`~czUgg`VWU]`Zcfa`U`-c`Xc`YbXcg]Yfa`U`

5gUb[]cgdYfa UgVWUWV]nLá !gYHá Vfa`dYUXi`dUZf]`]nU`-c`YU` WbgYei`YbhZcfa`U`-c`Xc`YbXcg]Yfa`Uf]d`c]XY`5a`Vcgcg[`Uá`YUcEhc`gg-c` fYX`n]XcgYa`fYU`-c`UcgXUg[]a`bcg]Yfa`UgZc`Zá`]b]bc`f]UW`Ya`V]cb!` zfc]ZbUWbX],`-c`a`Ug]hd]WZf`Wbg]h`]Xc`dcf`UdYbUg]hc`b•WVcg]Xc]g` b•WVcgdc`UfYgZi`Ug]gbff[]Xg`1`brc`{`ccgZfUzc`[`Uá`YUZA`]b]bcZ`Yf.`g` Ub]dcXUgYc`a`UgW]bc`f]f]W]i`U`C`Qei`c`f[]fUa`YbhV]h]i`a`Yb]Xc`" C`[f-c`XYdCEyb`dcgg]`c`hrc`fY]WUXc`Y`f`fYW]Xc`bc`Yg]]`a`UY`Yb-c` YbhUYa`Wb]hc`Wa`Ua`]WCE]`UáWa`c`c`WffYbUg[]a`bcg]Yfa`Ug`C`h`Vc` dc`b]W`WVgY`YdYbYfUbc`Qei`c`dYUa`]WCE]`U`U`b`U`Xc`Xc]g[]Uá`YUg` bc`gUW`Ya`V]cbzfc`"I`a`XYgZf]`]nUc`[]Uá`YUZA`]b]bcZ`dfcX`n]bXc` c`n]]`c]c`X]d`c]XZ`Ybei`Ubc`c`ci`hc`gY`i`bY`{`g`Vfi`Ug`dc`UfYgZcfa`UbXc` c`YbXcg]Yfa`Uf]d`c]XY`ei`Y`bi`h]fz`c`Ya`V]`-c`YgdcfcZ]hW`Xi`fubY`g]i` desenvolvimento.

5`a`Ucf]]UXUgUb[]cgdYfa Ugdcgg]j`Ug`gUgg`VWUcg`UUMUg`XYg`g` h]b]U`-c`bc`l`]Ya`UYh`Vcg`Wbg]h`]Xcg`XY`Ya`Yb]cg`XY`h`Vc`Wj`Uxc`Ug` g`VWUcg`UY`fi`Ug`Wa`dU\`YfUg]bc`Uc`Ya`U`UdYfYg]b]bXc`a`Ucf`YUW]bWU` bUWbX],`~c`XY`fei`]XcgYa`fYU`-c`{`g[]a`bcg]Yfa`Ug`5gUb[]cgdYfa Ug` Há`Vfa`dcgg`Ya`i`a`j`Ug`c`UfYbU`ei`]a`]W`UWc`]XgZ`CEcg`Yg]b]WUgZ` h]b]bcg]]Xc`XgZ[]Wg]Xcg]WVXZg]gá`Yb]WgWa`c`fz`UXg`XYc]`Uuc`

XYWVt' hLa Vfa 'dcXa 'hcfbz! U'g]a dUuzj YgUcg\YVj cfcg'
 5g'UcfYg'Uhi La 'bUUFU ~c'XY dc']bnUXcfYg' [YfUa YbhY UggV]bXc'
 cores vistosas e odores intensos a um sistema de incompatibilidade e re-
 Wb\Wá Ybhc"5]bXUgg]a zj zf]cg[fi dcg'Wa c U'g] fLa]bYg' [YfUa YbhY
 Wa 'UcfYg']bWbglMg'g-c' dc']bnUXcg' dYc' j Ybhc" I a U'Ucf' dYfZ]HU
 fLYfa UZcX]Hf' f' Wa dcg'Udcf' i a 'Wb' bhc' XY' gfdU'g' fW]VMz d'fU'g'
 (corola), estames (androceu) e carpelos (gineceu), frequentemente orga-
 nizados em verticilos.

C W]Wf[YfUa YbhY dci Wj]g'cg' Yg'z UggV]bXc' { d'fchY, ~czU' dUgg'
 ei YUWfc U[YfUa YbhY]g'cg' Yg'z UggV]bXc' UfU ~c' XYdc']bnUXcfYg' C g'
 Yg'La Ygg-c' [YfUa YbhY Wa dcg'cg'XYU'Yhg' cb[cg'Yg' i]cg'dcgg']bXc' Ya'
 gá' zd]WUbhYfU' 7UXUbhYUdfYg'bhUei Ufc' gU'g'dc']bWg' ca Cc[cg'
 U'ga]M'cg'dcf[b[]cg' C g'WfdYcg'g-c' [YfUa YbhY U'UXcg'dU'c' zd]WZcf!
 mando um estilete, apresentando uma zona receptiva na ponta, o estigma.
 9 Y'Ybj c j Ya 'cg'Ce' 'cg'YWa d" Ya 'c'cj zf]c" B Ua Ucf]UX]g' Ygd'fWg'Ug'
 U'cfYg'g'YbWbhlá U' fi dUX]g'Ya 'Xj Yfg'ghdcg'XY]bUcfYg'WbWg'

8 i U'ghcf]Ug'dfc'WfU'La 'Y d']M'Ucf] Ya 'X]g'UcfYg'5 h'cf]U5 bhc'g'fc!
 V]UzfYU'cbj U'g'UcfYg'Wa 'Ygf]c'cg'Vgg' i U'cg'XY6 YbYH]U'Yg' [fi dc'
 Y]hbc'zYg' di b\Uei YU'g'UcfYg'a U'g'df]a]h' U'g'gf]La ' [fubXYg'Wa 'a i]h'g'
 dUfh'g'g'a 'a U'cfYg'Yg'YU]nU" Yg'Xc' UbX'c'W' YXc' []bW] z'g'a Y\Ubh'g'
 {g'YbWbhlUX]g'b]g'Uhi U'g'A U' bc']UMY'9gg'U'ghcf]UYfU'dc']UXU'dcf' Z]gg'Yg'
 XYdCEb'Ya h'f]UXg'W'UMf'gh'W'XYK]bhfUMU'ZYXY5 fWU]bhi g'z' d' cb'
 Y]hbc' Wa 'UcfYg'g'a Y\Ubh' {g'X]g'A U' bc']UMY'

5 h'cf]UXc' Dg'Y' X]bhc'z'dcf' ci h'c' 'UXcz'U'fa Uei YU'g'df]a Yf]g'UcfYg'
 YfLa]bWbglMg'Yi b]gg' i U'X]g'Yi b]X]g'Ya]bUcfYg'WbWg'g'a Y\Ubh'g'
 {g'YbWbhlUX]g'Ya '5a Ybh'Z]fU'g' [fi dc' \c' Y'g'U]X]La Ybh'XYf]j U'Xcz'U'fY!
 g'bhU'Xc' dCEb' h'f]W' dUXc"9gg'U'ghcf]UZc']dcg'Yf]cfa Ybh' a cX]UMXUXY
 a cXc' UfYU'cbU'f U'g'df]a Yf]g'UcfYg'XYUb]]cg'dYfa U'g' [ei YU'g'YbWbhlUX]g'
 Ya '7\cfUbh'UMU'z' Yg'U'Y'WbXc' Uf]j fg'X]g'Y' [fi dc' U'fYU ~c' Ybh'Y'
 U'g'; bYU'Yg'YU'g'Ub]]cg'dYfa U'g'5]bg'f, ~c' X]g'7\cfUbh'UMU'XYbhfYU'g'
 df]a Yf]g'Ub]]cg'dYfa U'g'YU'W'ff'c'Vcf'UXU'dcf' Z]gg'Yg'XYdCEb' W'fU'bc']X]g'
 ei Y'Yg'hc' Ybh'Y'cg'a U'g'Ub]]cg']bei Yg']cb]j Ya Ybh' dYf]h'WbW]h'g' {g'Ub!
 giospermas, apresentando columelas e teto reticulado.

=bh'f'dfYU" Ygg'VfYZ]gg'Yg'Ya 'dfYg'fj U'Xc'g'XUM]bhU5 fWU'Zi WU
 ceae podem sustentar tanto a teoria do pseudanto (Sun et al. 2002) quanto a
 h'cf]UUbhc'g'fcV]U'f' f]gg'YhU" &S' E'Dcf'ci h'c' 'UXcz'U'dcgl, ~c' XY'5a Vc!
 fY'U'z' . bYfc' a cbc'Yg'YU'W'XUB'cj U7UYX b]UbU'f]UnX]g'Ub]]cg'dYfa U'g'
 g' [YfYei YU'U'cf' X]g'df]a Yf]g'Ub]]cg'dYfa U'g'gf]U]bh'fa YX]f]U' [ei YU'g'
 esperadas segundo essas duas teorias contrastantes. Isso porque Amborella
 UdfYg'bhU'U'cfYg'XYhLa Ub'c' a YX]U'bc'z] b]gg' i U'X]g'Wa 'dY, U'g']j fYg'Yb-c'
 muito numerosas.

6U'YU'Xc' b'cg'fY]g'f'cg'Z]gg'Yg'U'g'Ub]]cg'dYfa U'g'Uhi U'g'hf]La 'g' f]]Xc'
 bc'7fYzWc' =bZf]cfz\z' W'WXY% \$'a]\ " Yg'XY'U'bcg"5 dUfh'f' XU'fY]]c'
 Yei U'cf]U'ZYU'g'hf]La 'g'YX]g'Yf]g'Xc' Ya 'X]fY, ~c' U'g'dc' cg' B c' Hf]W'f]c'z'z'

WVWXY- S'a]\` Yg'XYUbcg'YUg'z'Xca]bU] Lã 'cgLã V]b]h]g]h]f]y]g]f]y]g]'C'g
 Ygi Xcg'Úc[Yb]f]W]g'a Ug'f]Y]W]b]h]g'U]d]C]Lã 'c'a cbc'Ú]Y]h]a c'X]g'[]a bc!
 gdYfa Ug'U]h Ug'Y]g]i 'dcg]M]c]b]Lã Yb]h' W]a c [fi dc]fa ~c X]g]U]b[]c]g]Y]fa Ug'
 7cb]g]X]f]U]b]X]c'ei Yc'f]Y[]g]f]c' Z]E]g]' W]b]Ú]fa U]c' U]d]f]Y]M]ã Yb]h' X]U]'b]U]Y]ã
 X]g'[]a b]c]g]d]Y]fa Ug'U]h Ug'bc' 7U]f]v]c]b]Z]f]c]z'z'WVWXY" SS'a]\` Yg'XYUbcg'
 f]B'cn]Y%' - ,]z]]g]g']b]X]W]i a U]X]j Y]f[. b]V]U]X]U]'b]U]Y]ã X]g]U]b[]c]g]Y]fa Ug'
 X]g]X]Y]g]g]Y]d]Y]f]c'X]c [Y]c'Ú]E]W]z' Y] U]b]X]c Ug' d]c]f]i a U]c]f][]Y]ã 'a i]h' U]b]h]f]c]f'
 d]f]U]U]g]U]b[]c]g]Y]fa Ug'X]c'ei Yc']b]X]W]X]c'bc'f]Y[]g]f]c' Z]E]g]' "C' b]X]Y]g]h]f]U]
 Y]g]W]b]X]U]U]'b]U]Y]ã X]g]U]b[]c]g]Y]fa Ug'X]i f]u]b]h]Y]c]g]e]i U]g]Y]SS'a]\` Yg'XY'
 U]bc]g]e]i Y]g]d]f]U]ã U]X]j Y]f[. b]V]U]X]Y]g]g]g]'b]U]Y]ã Y]b]g]Y]c' U]d]f]Y]M]ã Yb]h' X]g]U]b!
 []c]g]Y]fa Ug'bc'f]Y[]g]f]c' Z]E]g]' 3C'i U]'b]U]Y]ã X]g]U]b[]c]g]Y]fa Ug'h]f]U]g]X]c'
 d]c]i W'f]Y]d]f]Y]g]b]h]U]j U]z]f]Y]g]f]U]U]'c'W]g]X]Y]Z]c]g]g]']n]U ~c' X]Z]M]Z]W]ã c'f]Y[]' Yg'
 montanhosas (e.g. Axelrod 1952, Takhtajan 1969), ou os representantes
 U]b]X]U]b~c' h]f]U]ã 'U]X]e]i]f]X]c' W]U]M]M]g]h]M]g'ei Y]d]Y]fa]h]g]Y]ã 'U]f]M]]f]g' U]
 f]Y]U~c' Y]j c'i h]j U]W]ã Ug'U]b[]c]g]Y]fa Ug'X]i f]u]b]h]Y]g]g]Y]d]Y]f]c'X]c]z'W]ã c'c'W]f]f]Y]
 W]ã X]j Y]f]g]g'Z]E]g]Y]g'X]Y]d]c]g] .~c']b]W]f]U]f]Y]' "7f]U]b]Y]h]U]"% -) E'

7@5GG= =75uÈC'85G'5B ; =C'GD9FA 5G

As angiospermas eram tradicionalmente classificadas em Dico-
 h]YX b]Y]g] W]U]M]M]]n]U]g' d]c]f]i a' W]Y]M]ã Yb]h' g]M]b]X]z]f]c' Z]c]fa U]b]X]c' i a'
 U]b]Y'bc' `Y]b]c]z]j Y]b]U ~c' f]Y]W]U]X]Z]X]c'g'W]h]]f]X]c]b]Y]g]z]]f]U]ã Y]b]h]W]ã Ú]c]f]Y]g'
 d]Y]b]h]U]c]i 'h]f]Y]f]a Y]f]U]g] Y]A'c]b]c]W]h]Y]X' b]Y]g]z' W]ã 'U]d]Y]b]U]g]i a' `W]h]]f]X]c]b]Z]
 g]g]Y]ã U]j U]g]W]U]f' X]g]d]Y]g]c]z]j Y]b]U ~c' d]f]U]Y]]b]f]j]U]Y' Ú]c]f]Y]g' h]ã Y]f]U]g' 9gg]U]
 X]W]h]c]a]U]Z]c]]f]Y]Z]]h]X]U]Y]ã 'a Y]U]X]c]g'X]c]g'U]bc]g%' - S]z]e]i U]b]X]c' Y]g]i X]c]g'Ú]c!
 [Y]b]f]h]W]g' W]b]Ú]fa U]f]Lã 'ei Y]Z]U]d]Y]g]f' X]g]A'c]b]c]W]h]Y]X' b]Y]g]z'c]f]a U]f]Y]ã 'i a'
 [fi dc' a' cbc'Ú]]h]W]z]U]g]X]W]h]Y]X' b]Y]g]g]f]U]ã d]f]U]Ú]]h]W]g]Y]ã f]Y]U~c' U]Y]U]g'
 H]c]f]b]c]i]g]Y]ã d]c]f]U]b]h]Y]c' f]Y]W]b]W]ã Yb]h' X]g]Y] X]W]h]Y]X' b]Y]g]z'c]f]h]ã Y]b]h]Y]
 g] g]h]b]h]X]g]Y]ã 'U]z]]g]Y]g' W]X]g]h]M]g' Y]f]Y]W]b]W]ã X]g]d]Y]c]g [f~c]g' X]Y' d]C]E]b'
 tricolpados ou derivado desse.

Entre 1991 e 1992, Douglas Soltis e Mark Chase iniciaram um grande
 d]f]c' Y]c' d]f]U]]b]j Y]g]h]]f' U]g' f]Y]U" Y]g' Ú]c [Y]b]f]h]W]g' Y]b]f]Y' U]g' U]b[]c]g]Y]fa Ug'
 Quarenta e dois pesquisadores se integraram ao projeto, e juntos publi-
 W]U]ã 'c' d]f]a Y]f]c' h]f]U]U]~c' f]f' U]g]Y]h]U]"% - ' E]f]Y]j U]b]h]Y]W]ã d]f]Y]b]g]j Y'
 Y]ã 'g]g]Y]ã z]h]W]ã c' Y]W]U]f' b]U]V]c]h]b]W]z]i h]]n]U]b]X]c' c' [Y]b]Y]d]U]g]h]X]U]f]W]g'

5]b]j Y]b, ~c' X]U]D]7]F' Z]U]M]h]c]i 'Y]b]c]f]a Y]ã Y]b]h]Y]U]Lã d']Ú]M] ~c' X]g]g]Y]e]i . b!
 W]g]z' d]Y]fa]h]b]X]c' U]]b]h]b]g]Ú]M] ~c' X]c]g' g]Y]e' Y]b]W]Lã Y]b]h]c]g' 9gg]U]f]Y]j c'i , ~c'
 laboratorial foi acompanhada de perto por progressos computacionais
 ei Y]d]Y]fa]h]f]U]ã 'U]b]U]g]f' X]Y]ã U]b]Y]f]U]ã Ug'Y]U]M]Y]b]h]i a' [f]U]b]X]Y]b'•a Y]f]c' X]Y'
 g]Y]e]i . b]W]g]z' U]g]g]ã 'W]ã c' i h]]n]f' U]]c]f]h]ã c]g]ã Ug' W]ã d]Y] c]g]z' h]b]h' d]f]U]
 V]i g]M]X]Y]z]f]c]f]Y]g]W]ã c' d]f]U]j U]U] ~c' Y]g]h]g]h]W]X]U]W]b]Ú]b, U]X]c]g]f]Y]g' h]X]c]g'

5g]U]z]]g]Y]g' X]Y]f]W]z'c]f]Lã 'g]h]i X]g]d]Y]U]g' X]Y]8]B]5]f]%' G]f]B]]W]f]Y]b]h] /
 Soltis 1995, Soltis et al. 1997) e de atpB (Savolainen et al. 2000). Mathews

/ '8 cbc[\i Y f% - - Li h] n]fLá [YbYg d]fz`c[cg d]fU X]M]M]f UfU]n' X]Lg angiospermas sem que para isso tivessem que fazer uso das gimnospermas bUdc`f]nU ~c` X]U]hdc`c[]U' 9 Yg`c]M]j YfLá `5a VcfY`U]Wá c`df]a YfU]b\U]Yá U]X]j Yf]f]bU]Y]c`i, ~c`Xc`[fi dc`5bz]gYg`Wá V]bU]LgXYfY]` Yg]bW`X]Lgbcg]f. g[Ybca U]g]f]c`h]g`YhU`%--ž&SSŠZE]i`YhU`%--ž&SSŠZ Wb]fa U]fLá YggYfYg`h]Xc`z]bX]WbXc`i a [f]U]Xc`Zcfa U]Xc`dcf`5a VcfY`U]g]i]X]Udcf]B ma d\U]UYg`Yi a W]Xc`Wb]g]h]i Xc`XY`=]M]UYg]H]a Yb]UMU] e Austrobaileyaceae, que passou a ser conhecido como grado ANITA.

Alguns estudos (Barkman et al. 2000, Graham & Olmstead 2000), en- h]Y]U]b]h]c`z]Wb]h]g]h]f]Lá Udcg], ~c`XY`5a VcfY`U]Z]i g]U]M]b]Xc`!U]Wá c`U]h]Z]h]c` X]f]j U]Xc`XY`X]g]r`f]V]cg`bU]U]z]g]Y`ci`U]f]U`~c`XY`f]Lá cg`cb[cg]fa U]g]Y`U] E]i`YhU`"&SS%žb~c`X]g]M]H]b]Xc`Udcg]V]]X]X]Y`X]i a U]`b]U]Yá]b]W]U` Zcfa U]U]d]Yc`W]Xc`5a VcfY`U]B ma d\U]UYg`5`df]Y]b, U]X]Y]B ma d\U]UYg` bc`7f]Y]z]Wc`~b]Z]f]c]f]f]f]g]YhU`"&SS%žz]d]f]c`Xc`ei`Ya U]W]c`U]d]U]Y]M]á Y]h]c` Xc]g]d]f]a Y]f]c]g`Z]g]Y]g`]b]W]b]h]g]h]j`Ya Y]b]Y`X]Y]U]b[]cg]d]Y]fa U]g]f]7]f]U]Y`% -) E W]f]f]c]V]c]f]c]i`Y]h]c`Udcg], ~c`X]Y]g]Y[fi dc`df]c]E]a c`U]c`b]C]E]L]g]U]b[]cg]d]Y]fa U]g` D]U]f]U]g`df]Y]g]U]X]Y]h]c]Xc]g]za U]g]f]Y]W]b]h]á Y]b]h]z`< n]X]U]Y`U]W]U]Z]i a U]Z]á]U]X]Y` d`U]b]h]g]L]ei`z]h]W]g]g`Va Y]g]g]g]d]c]g]L]á Y]b]h]Y]U]W]c]b]U]U]g]a c]b]c]W]h]Y]X`b]Y]U]g` [f]Lá]b]c]X]Y]g]Z]c`d]c]g]V]c]b]U]U]Wá c`[fi dc`]f]a ~c`X]L]g]B ma d\U]UYg`f]G]U] f]Y]U]Y]h]U]ž`&SS+E`9]g]U]Z]á]U]U]b]W]]U]h]Y]U]g`%\$`Y]g]d]f]Y]g`Y`f]W]U]M]M]f]n]U]U] dcf`]b]U]c]f]Y]g]M]b]W]g]Wá`Xi U]g]V]z]M]U]g]b]U]M]U]g]Y`U]c]f]Y]g]i`b]g]g]i`i`U]L]g]g]Yá` perianto e com um estame ou um pistilo apenas.

5g]U]b[]cg]d]Y]fa U]g]d]U]g]U]f]Lá ž]Y]h]c`z]U]Y]g]h]f]X]j]X]X]L]g]Yá i a [f]U]Xc`Zcfa U] do pelas chamadas angiospermas basais, seguido por um clado denominado Euangiospermas, composto por grupos de Magnoliideae, contendo 6% das U]b[]cg]d]Y]fa U]g]za U]g]L]g]a c]b]c]W]h]Y]X`b]Y]U]g]Wá`W]W]X]Y`%1`ž]Y]U]b]U]a Y]b]Y` U]g]9i`X]W]h]Y]X`b]Y]U]g`U]d]f]Y]g]b]h]á`U]d]Y]b]U]g`ei`U]f]c`W]Y]i`U]g]Y`ei`U]f]c`Wá`cg` f]Y]g]U]b]h]g+]1`"9]g]i`Xc]g]Wá`i a`b`a`Y]c`a`U]c]f]X]Y]X]Xc]g]f]E`]i`YhU`"&SS%ž` N]U]b]g]Y]hU`"&SS`E]a`cg]f]U]f]Lá`ž]b]c`Y]b]h]b]h]c`ž]ei`Y]U]g]A`U]b]c`]]X]Y]U]Y]g]h]c`a`U]g` f]Y]U]W]c]b]U]U]g]Wá`U]g]9i`X]W]h]Y]X`b]Y]U]g`Xc`ei`Y]Wá`U]g]A`c]b]c]W]h]Y]X`b]Y]U]g`

Os representantes do grado basal das angiospermas cuja embriologia foi Y]g]i`X]U]U]b~c`U]d]f]Y]g]b]h]f]Lá`g]U]W]Yá`V]f]c]b]z]f]c`Xc`h]dc`Dc`n]h]c]bi`a`ž]Zcfa`U]Xc` dcf]g]h]Y]Y]i`U]g]Y]c`]h]c`b`W]c]g]B`ma`d\U]UYg`Y]5i`g]f]c]V]U]Y]h]U]Y]g]b`W]c]g]i`a` b`W]c`dc`U]f`b]U]W]i`U]W]b]h]U]z`U]c]c]g]Z]f]U]Y]X]i`U]g]g]b]f]f[]X]Y]g`8`Y]g]g]U]a`U]b]Y]f]U]ž` f]d]c]g]g]i`Y`ei`Y]b~c`Y]i`g]U]X]i`d`U]Z]M]b]X]U`~c`b]Y]g]g]Y]g`[fi dc]g]c]i`ei`Y]c`Y]b]Xc`!` g]d]Y]fa`U]g]Y]U]X]d]c]X]Y`5a`VcfY`U]ž]d]c]f]c]i`h]c`U]Xc`z]d]c]g]g]i`c]h]c`W]Y]i`U]g]Y]b]c]j`Y` b`W]c]g]z]i`a`U]g]b]f]f[]X]Y]U]a`U]g]Yá`f]Y]U`~c`U]c`h]dc`Dc`n]h]c]bi`a`f]i`f]Y]Xá`U]b` &SS%ž`&SS*E`5]g]g]a`ž]U]Zcfa`U`~c`X]Y]i`a`g]U]W]Yá`V]f]c]b]z]f]c`Wá`g]h]Y]Y]i`U]g` Y]c`Y]b]Xc]g]d]Y]fa`U]h]f]d]c]X]Y]d]c]X]Yá`g]f`g]b]U]d]c]a`c]f]U]g`X]L]g]9i`U]b[]cg]d]Y]fa`U]g` 9]l`W]]b]Xc`5a`VcfY`U]ž]U]g]L]ei`z]h]W]g]B`ma`d\U]UYg`Y]h]f.`g]d]Y]ei`Y]b]U]g]Z]á`]]U]g` (Illiciaceae, Schizandraceae e Trimeniaceae), que formavam ANITA, essas Euangiospermas podem ser divididas em dois grande grupos com circun- g]M], ~c`a`i`]h]c`g]a`]U]f`{g]h]f]U]X]V]c]b]U]g]a`c]b]c]W]h]Y]X`b]Y]U]g`Y]X]W]h]Y]X`b]Y]U]g`

Cg[fi dcgei YZfa Ua `c | fUXc VgU'Ya Ub| |cgdYfa Ug-c' dcVfYg'Ya .
b•a Yfc' XY YgdVWg'Yb-c' Yl |gha' Yj |XbVWg'ZgYg'XYei YYYg'hf|la .
gXc'a UgXj Yfg'gbc' dUgXc" C gWXCg'Wa' hU Ug'Uh'g'XYXj Yfg'UW' -c .
g-c'a Ug'fYVb'h'g'YgdVWUa Ybh'YbWbhfUXc'bcg[fi dcg'XY'5 gmf|XYU' .
Dcf|Ubczi a U|bh'bg'UW' -c bUXj Yfg'UW' -c Xl'g'Ub| |cgdYfa Ug'b-c' hf|U
cWff|Xc' g'b-c' hfX|Ua Ybh'YbUY'ci , -c Xc' | fi dc"

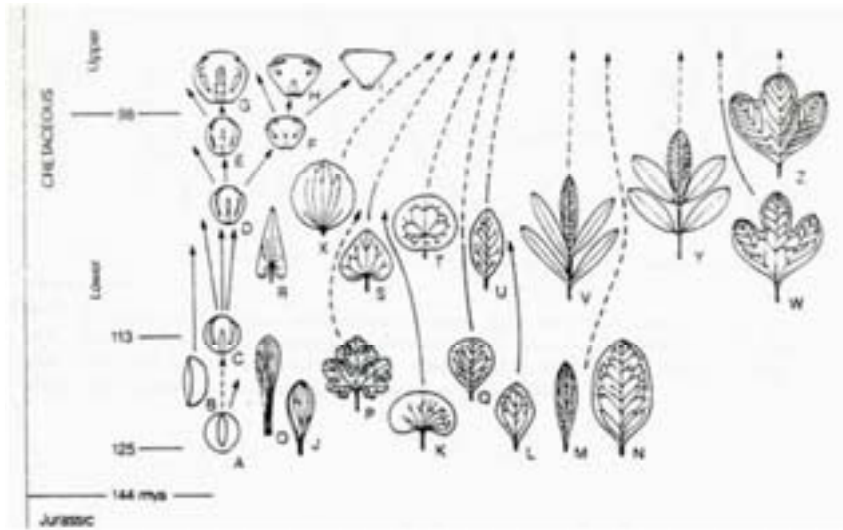
5c' `cb|c' XU'Y'ci , -c' Xl'g' Ub| |cgdYfa Ug' `ci j Yi a UYg'UW' |nU' -c' .
Xc' b•a Yfc' XY'j Yh|W'cg'YXY'dY, Ug'dcf' j Yh|W'c' UcfU'zei Ufc' `ci 'a Ug'
ZYe' Yb'ha Ybh'Yf. g' Wa c' f' c' Wa i a ' bUg' a cbcW'h'YX bYUg' YVbW'z
Wa c' f' a Ug' Wa i a ' bUg' Y' X|W'h'YX bYUg' D'gg'ci ' U' U'j Y' f' i a Ua Ucf'
YgdVWU|nU' -c' Xl'g' Yg' fi h' fUg' Wa c' X|Z'fYbWU' -c' Ybh'Yg'fdUg'Y'dfU'Ug'
dcf' Y' Ya d'c" 5 | Ua cdYU|U' |g'c' f'UZ' g-c' Xcg' `cVcg' XUW'fc' Ud'gg'ci ' U'
g'f' Wa i a ' Yc' `cj z'f'c' d'gg'ci ' Ug'f' b'Z'f'c' Ya ' a i |h'cg' W'cg' U' a Yb'U'Xc' .
Udfch'Y, -c' Ucg' G'f' `cg' 5 ' a Ucf|UXc'g[fi dcg' d'gg'ci ' U'cZ'fYW' b'fM'f'z
fYW'f'g' a Ybcg'Xl'g'YbX'cg' { d'U'bh'Z'Ya j Yn'XY'd'Em'z'Wa c' fY'Wa d'Ybg'U
Ucg'dc' |b|n'UXc'f'Yg'YU'gg'VWU' -c' Wa ' |bg'Y'rga Ug'YgdVWU|n'UXc'g' Y' ci ' Ya '
a i |h'cg' W'cg' |g'a Yf|U'V' U'f'U'z'Y'bei Ubc' Ya ' ci h'cg' Y' ci ' U'U' f'Y' U' -c' XY'
Ucf'Yg'Ya ' |b'U'cf'Yg'W'V'g'W'b| Y'g'U'g' Wa c' bUg'7ca dcg'h'Y"

5' dUX'cb|nU' -c' Xc' g'Ye' Yb'W'Ua Yb'c'z' U'U'U'f'Ybh'Y' c'V'h'j |XUXY Xl'g'
Ubz' |g'Yga c' W'W'f'Yg'Yc' df|b'W'U'c' U'c' |Yb'f'W'Ua d'Ua Ybh'Wa d'U'h' \UXc'
entre os sistemas possibilitou que especialistas com diversos pontos de
j |g'U'di X'g'Ya ' h'fU'U'f' Ya ' W'U'cfU' -c' Ya ' Vi g'WXY' i a U'W'gg'UW' -c'
comum (Enderby 2001). Baseadas em resultados moleculares e estruturadas
bcgU|V'W'g'XUa cfZ' `c| |Ug' f| |fUa X'g'Y'g'z'f, c' W'b' i b'c' W'gg'UW' " Yg'
W'bg'Y'g' Ug' d'f'cd'cg' h'g' d'Yc' | fi dc' XY' U'c' | Yb|UXl'g' Ub| |cgdYfa Ug' f'5D, '
1998, 2003).

9a' ei Y'fd'cW'Y'c'W'h'f'g'Y|Ua' cf|| |bUXc' Ug'df|a Y'fUg'5bl |cgdYfa Ug'3
D'U'f'Yg'cbX'f'U'g'U'd'f| i bh'U'f'Y'W'g'z'f'c' UbU'g'f'a cg'cg'Y' |g'f'cg'Z'g'Yg'

EI 5@C'DFCJãJ9@; FI DC'5B79GHF5@'3

5'W'X|U'g'Yei Y'Ug'5bl |cgdYfa Ug'Z'fUa' `cf|| |bUXl'g'bc'7f'Yz'W'c' |bZ'f'c'fz'
U'f'cl' |a U'X'Ua Ybh'Y%) 'a |`" Yg'XY'Ubcg'U'f'z'g'



:]i fU%! 'Gt' . bWUg a f]nLUXY]d cgXYdCEb YZc \UgXY5b]]cg]Yfa UgXc '7fYzWt'

EI 5@'5 : @CF 'D@9G=C A ê F: =75 'A 5=G'DF =A =H=J 53



:]i fU&! '8YUWfXc Wa 'Ug Xi Ug hcf]Ug WbU]ubhgZ UÜcf' dfa]h] Ugf]UgYa Y\ubY { D]dYf j YfUW nifgei YfXLci { 'A U]bc]U]fubX]ÜcfUfX]f]Uf'

Ei U'c' dfej zj Y'] fi dc UbWg]U37ca c'z'Zc] WUXc bc Wdhi 'c'g' Vfy WfUWf]nU ~c' X]g'5b]]cg]Yfa UgXcg] fi d cgXYd'Ub]gei YWb\Ywa cg' UfYbUg]]a bcg]Yfa UgdcXf]Ua]hf'XUXc cf]] Ya {g'Ub]]cg]Yfa Ugza Yga c' Ugg]a 'gy]UbYwggz]Ui a UWa V]bU ~c' XYWfUWf]Yg';]a bcg]Yfa Uz] WbgXYfUXc Wa c' d'cg] Y'UbWg]fU dYc Ygz]]c'z' U] Ub, UXc XYfX] , ~c' Xc'] Ua YÜc' Za]b]bc YUZ'fa U ~c' XYgYa Ybhg'

ANCESTRAIS POTENCIAIS

D]bcdgXU f]g[C]cg'Wa dcg'c'g' 7nWXYcXcd\ntU' 6YbbYh]UYg
 f]g[C]cg'Wa 'a Y]UgdcfcU'cg'Ya]WcgdcfcU'cg'a i]h' Yg]WU]nUXcg:
 @n]bcdhf]XUYg]DM]XcgYfa UYg]fbi a Yfcg]ga cX]UW" Yg"
 ; bYUYg! dgg] YgUbw]fUgX]GA U]bc'cd\ntUdcf'Wa d]fh'\f'Ug
 gY i]bhg'WU]M]f]g]Wg
 ! DfYyb, UXYYYa YbhcgXYj Ug: bc`Yb\c'gYw]Xzf]c
 ! 8cg'W]h'fXcbYg
 - Sifonogamia
 ! B Yfj U~c fY]WUXUX]gZc`Ug

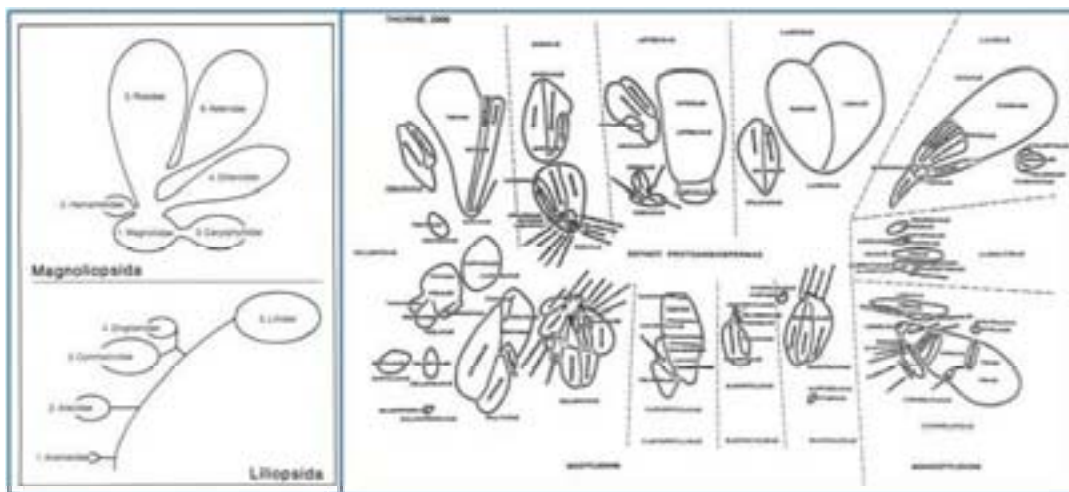


Figura 3 - Gnetum gnemum, Welwitschia mirabilis e Ephedra, representantes de Gnetales.

COMO AS ANGIOSPERMAS FORAM CLASSIFICADAS AO DECORRER DO TEMPO??

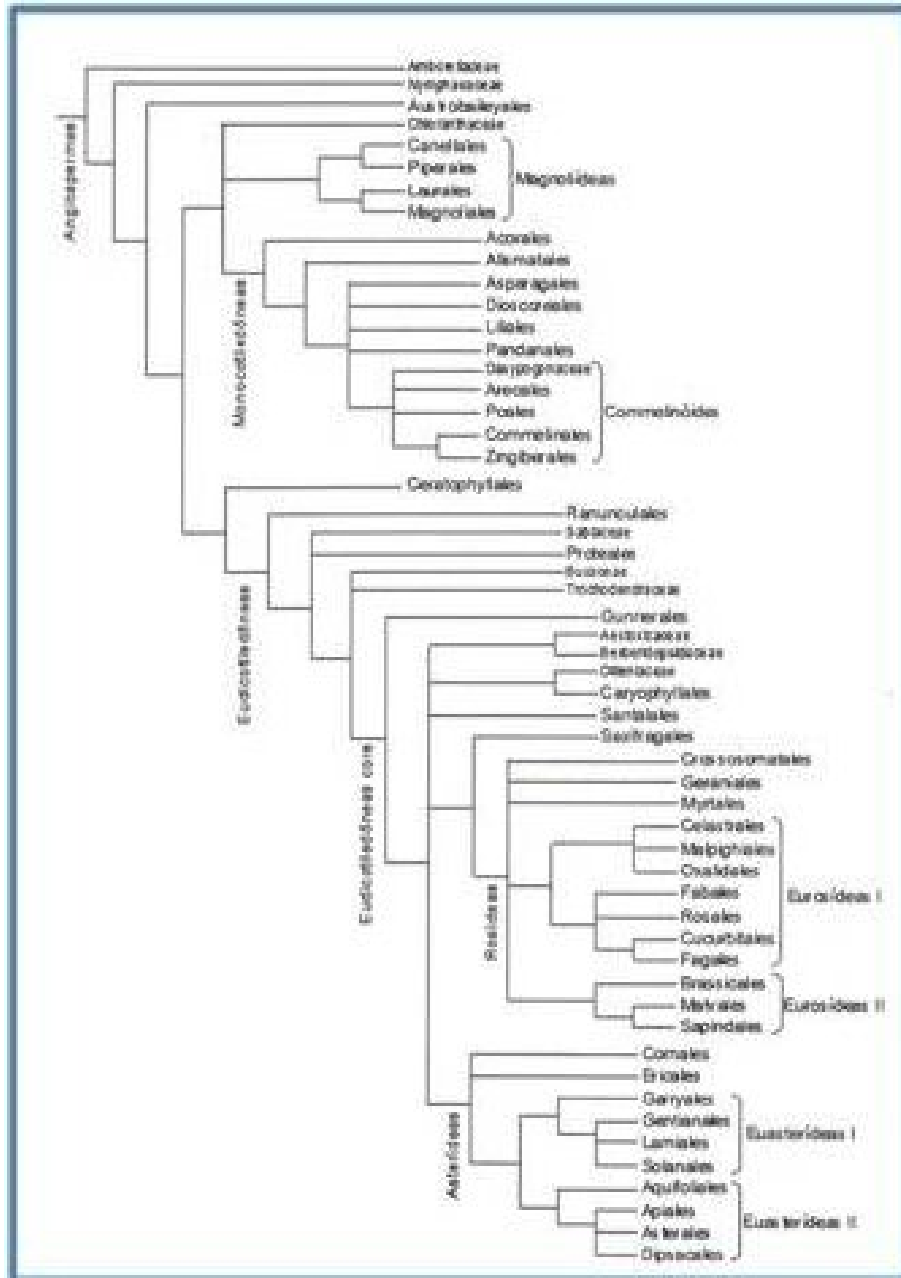
7@5GG= =75uÈC '85G'5B; =CGD9FA 5G!'`

MORFOLOGIA



:]i fU(Ì 9l Ya d'c XUW]g]UW~c X]g5b]]cg]Yfa Ug'Wa 'UgY'a 'a cfZ`c]]U'7 Ug]UW~c XY
 Cronquist (esquerda) e de Thorne (direita).

7 Ugg]UW ~c X]g5b]]cg]Yfa Ug!': =@C; 9B=5



:]]iFU) Ì 9]Ya d'c XUW]UW ~c X]g5b]]cg]Yfa Ug]Wa Ugg]Ya '5D; ='

5GÎ5B; =C GD9FA 5G'65G5=GÎ G=GH9A 5'8 C`
 Î5B; =C GD9FA D< M@C; 9B M; FCI DÎ
 DF =B 7=D5=G'A C 8 =: =75uÉ 9G

5bz]gYÚc[Yb]f]WXLg5b[]cgdYfa UgWa`VgYá XLXcga c`YWUfYg
 !=bXYdYbXYbh`XY`WUMfYg`a cfZ`CÉ]Wg
 !`A Ucf`b`•a Yfc XY`WUMfYg]bZcfa Uhj cgXlgcbj] Yg
 Df]b]WUg`a cX]UW`" Yg
 !`5g`X]W]`YX bYg`b-c`g-c`a cbcÚ`f]Wg`g`YXj]X]bXc`Yá`Ubl`]cgdYfa Ug
 VUg] fi dc`g`a U]bc`]c]Xg`Yá X]W]`YX bYg`
 !`5g`a cbcW]`YX bYg`g-c`a cbcÚ`f]Wg`YXj Yf]]f]á`Wxc`bU`]g]U
 evolutiva das angiospermas.
 !`5g`Y X]W]`YX bYg`g-c`i`a`]f]bXY] fi dc`a cbcÚ`f]Wg`g`b]Xc`dYU
 dfYg]b, UXY]f-cgXYdCEb]f]W`dUxc`g`
 c`ei Yg-c`Ug`5b[]cgdYfa UgVUg]g3
)`cfX]bg`Y, Z`á`]Ug]f] bU]j U]g.

1. Amborellales

2. Chloranthales (Chloranthaceae)

"`B`ma`d`U`U`Y`g`Î`&Z`á`]Ug]f]B`ma`d`U`U`W`Y`Y`7`U`ca`V`U`U`L

("`5`i`g`f`c`V`U`]`Y`b`Y`g`Î`(``Z`á`]Ug]f]`"M`W`U`Y`9`b`W`b`h`U`X`Y`á`W`h`j`c`!`U`b`g`
 Y`g`f`Y`U`c`Î`="M`]`a`j`Y`fi`a`L

5B; =C GD9FA 5G; FI DC G'65G5=GÎ`5D;

NYMPHAEACEAE

Dcgg]]WfWXY*\$`Ygd]WgZ`Wa`X]g]f]M], ~c`Wga`cdc`]hZ`]bW`]bXc`
 g]g]. bYfcg`f]bUfW]hZ`9i`f]n]Y`Z`B`i`d`UfZ`B`ma`d`U`U`Z`C`bX]bYU]J`]Mcf]U`E`
 B`c`6`f`U`g]`Z`c`W`ff`Y`á`X`c`g]. bYfcg`Y`Udfcl`]a`U`L`á`Y`bh`%\$`Y`gd]W`g`

G-c`Yf]`Ug]Uei`z]WgZ`Yei`Y`b`há`Y`bh`U`h`g`W`b`h`g`Z`c`U`g`U`h`f]b]U`g`d`a`d`Y`g`
 Ú`h`U`b`h`g`d`Y`h`U`g`W`f`X`U`g`c`i`g`U`]h`U`g`Z`W`a`c`i`g`á`Y`g`d`i`U`g`W`h`j`U`L`g`
 W`a`c`c`f`b`L`á`Y`b`U`g`Y`á`U`c`g`U`f]U`U`g`Z`Y`Y`n`U`X`U`g`Ú`c`f`Y`g`Y`]b`h`b`c`U`f`c`a`U`
 :`c`f`Y`g`c`]h`z`]U`g`]f]U`b`X`g`z`]g`c`g`U`g`V`g`g`i`U`L`g`Y`g`L`á`Y`g`b`i`a`Y`f`c`g`g`C`W`f`!
 f`Y`á`Y`á`z`f`U`g`U`U`z`j`Y`g`X`c`6`f`U`g]`Z`d`U`f]W`U`f`a`Y`b`h`b`c`d`U`b`h`U`"

G`U`g`Ú`c`f`Y`g`c`]`Y`f`U`a`Y`b`h`h`f`a`c`]. b]W`g`Y`c`X`c`f]Z`f`U`g`Z`W`a`]b`h`g`Y`X`i`f`b`U`
 c`i`b`c`h`f`b]U`f]U`]b`X`c`V`y`c`i`f`c`g`c`i`U`Y`U`g`G-c`b`U`a`U`c`f]U`X`c`g`W`g`c`g`d`f`c`!
 h`c`]b]W`g`Z`a`U`g`d`c`X`á`U`d`f`Y`g`b`h`f`X]Z`f`Y`b`h`g`]f]U`g`X`Y`U`h`c`W`a`d`U`f]V`]X`U`Y`
 5`g`Ú`c`f`Y`g`d`c`X`á`X`i`f]U`f`U`d`Y`b]U`g`i`a`U`b`c`]h`Z`W`a`c`Y`á`J`]M`c`f]U`L`á`U`h`c`b]W`
 c`g`V`y`c`i`f`c`g`U`W`a`U`d`]g`c`b`U`X`c`g`b`c`]b`h`f]c`f`X`U`Ú`c`f`Z`e`i`Y`b`c`]b]M`c`f`Z`b]M`c`!
 nalmente feminina, passando a masculina ao longo da noite. Em outras
 Y`g`d]W`g`f]f]!"`B`ma`d`U`U`fi`X]`Y`U`Z`U`Ú`c`f`d`c`X`Y`X`i`f]U`f`X`Y`X`i`U`g`U`h`f`g`b`c`]h`g`Z`

gYbXc' Z bWcbUa YbhY'Za]b]bUdYbUg' bUdf]a YfUbc]hY" C i hfUg' Ygd]WYg' dcXYa' d'cg]]f'UcfYg'XYX] fU~c'a Ugdfc'cb[UXU'9a B ma d\UUA d'Uzdcf' Yl Ya d'czU'cf Xi fUYbhYf. gYei Ufc X]Ug'Yc dCEyb'UWX]g]cb]j Y'Ubhg'XU UWfhi fUXU'cfz]j cfYWbXc UU hc! ZWbXU~c" C h'a dc XYU'cfU~c' dUFYWz dcf]hbc'zYh]f'Ugg'V]XU{ YUM'b]UXUdc]b]nU~c' V]i nUXU'Ya d'Ub]g'cbXY dfYXca]bUUU hc[Ua]Uc h'a dc XYU'cfU~c' fa UcfzU a YbhXc Ug'WUbWg' de cruzamentos ocasionais (Prance & Anderson 1976).



:]i fU+]' 9l Ya d'cgXYf'dfYg'bh]hg'XYB ma d\UWU'Y'



:]i fU+]' 9l Ya d'cgXYf'dfYg'bh]hg'XYB ma d\UWU'Y'

5I GHFC 659=@9M5@9GÌ '(: 5A a@-5G'

ILLICACEAE

9bWbhUXU'Ya 'W'h]c' flbg'Yg'fYU'c']' '=']W'a 'j Yfi a L" C']5b]g' Yg'fYU'c']' fUd'Ub]Ud]f]h' XUei U' fdfcXi n]Xc' c' Zfa UW'a Ug'Xg'YU'c' Xc'a ca Ybh' f]5A = @]zW]h'XY'f]U'f'Udfc[fYgg-c' XUa Ug'df]]cgU

YghfdYXUJ ffdYUj lzf[Uzc <) B%Dcggj |YZ|hc Ubhgg/dhWzUbh!|bÚá UCE|cz
Wla UbhZx| Yghj c YXi f f|W": c|i gUxc Xi fubh'ya]\UfygXYUbcgbUã g|U
Oriental como tempero para alguns pratos de aves e, mais tarde, como
hfUá Ybhc Wgyfc dFUWE]Wg'Ya W|Ub, Ug'



: ||i fU- Ì'9l Ya d'cgXYfdfyg|b|hgXY5i gfcVUj]UYwUg'

A 5; BC@-895G

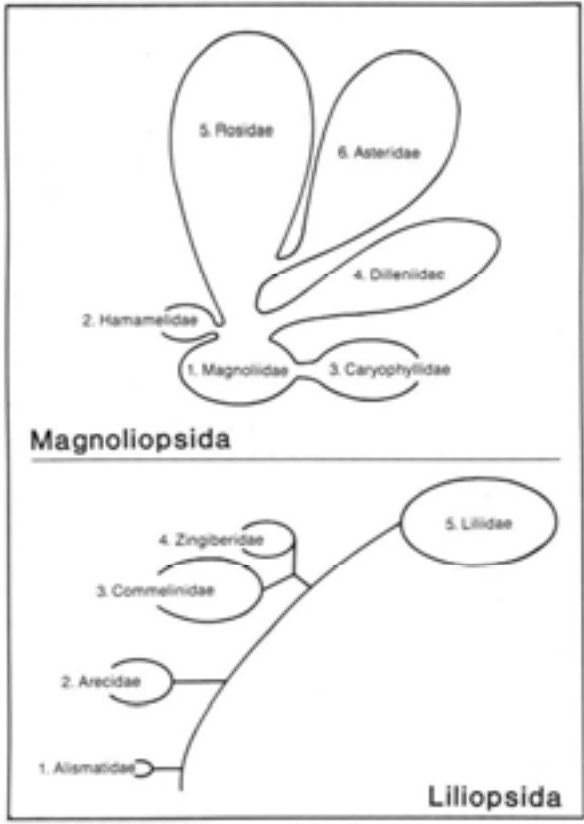


: ||i fU- Ì'9l Ya d'cgXc X|U fUá UXUWggjUW -c XY7fcbel |ghif%, %LYXYA U[bc]U[fubX|Úc fUz
bca YXc lz| cb i h]rUXc dFUZihf UXf|j U -c X|gAU bc]XYUg'

- 1. Flores 3-meras
 - 2. Flores com muitos elementos espiraladamente arranjados
- ' "5i g bWUXYYa YbhcgXYj Ug' Ya 'U[i bg[fi dcg'
("5 Wc]XgVbn]]gcei]bc `b]Wg'
) "DCEYb i b|Uyfhi fUXc

MAGNOLIA GRANDIFLORA

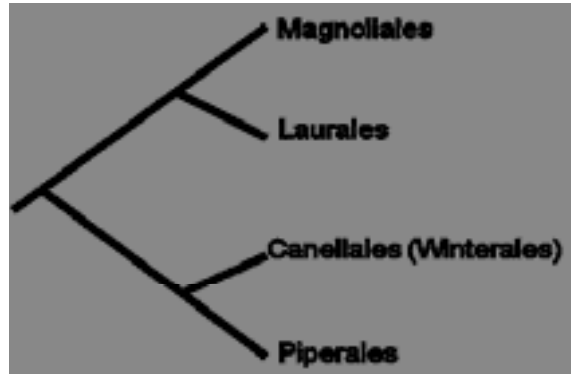
GYi YUWUWUWU~c`Xlg AU bc`]]XY XYUWfXc`Wa`Ug`WggUW`"Yg`
 I [fUX]gUg`
 %AU bc`]]XY;`cfXYbgz`- Zla`f]UgY%&\$\$\$Ygd]Wg":`cfYgWa`[]bYWM`
 UdcWfd]Wzd]fUg`]j fYgYZYa`[YUzdYf]Ubc`VYa`Yj]XbhY`
 %DYf]Ubc`VYa`XgYbj`c`j]Xcza`i]Hugj`YnYg`gla`X]ZYbWU`~c`Ya`W]W`
 e corola
 &"7UbfUcU`]Ufd`]b]nU`~c`dcf`Vgci`fcg`
 ' "Bi a`Yfcg`gYgHa`Yg`Wbft]Yrcg`
 (": `cfYgUdcWfd]Wg`
)"9a`V]-c`dYei`Ybc/U`i`bXbhY`YbXcg]Yfa`U`
 *"DCEY`i`b]UdYfi`fUX`cza`cbcgj`WXC`
 +"7`fi`Ugc`Y]ZfUg`YZff]Wg`
 , "5`Wc]Xg`Vbn]`!]gci`]bc`]b]Wg`
 AU bc`]UYg`I`@U`fUYg`D]dYfUYg`Y`B`ma`d\UUYg`fDCEY`b`!]UdYfi`fUX`
 (Ranunculales e Papaverales)
 ;]bYWM`UdcWfd]W`Y`YYa`Ybrcg`Ygd]fUUX`cg`Y`UWU`Q]Xg`Vbn]`!]gci`
 ei]bc`]b]Wg`



:]i fU%\$I`GgYa`UXY`WggUW`~c`XY7fcbci`]hd]fUg`AU bc`]cdg]XUfB`]W]`X`bYUg`Y@]cd!`
 gXUfA`cbcW]`YX`bYUg`

A 5; B C @=8 9 5 G'

A U[bc`]XYUg`cfXYbg'Ydf]bVdUg'Zã ð]Ug



Magnoliales: 6 fam., ca. 2500 spp.

- 1. Lenhosas
- 2. Folhas simples
- 3. Flores isoladas, 3-meras
("Dyf]Ubr b-c XZfYb]Xc`Ya`W]WYWfc`U
)"7UbfU]U
- 6. Estames espiralados
+";]bYM`UdcVfd]WZWfdYcga i]rcgYgd]fUUXcg
, "DCEb%UdYfi fUX`ci`gYa`UWfi fUg`
-"7fi`Ugc`YZfUg`Yzff]Mgbc`dUf.bei]a U



A U[bc`]U[fUbx]UcfU

A U bc]U[fUbX]ÚcfU

A U bc]UYg' df]bVdUg'Za f]Ug' A U bc]UMU'

A 5; BC @-57959 f&[.bž& \$\$'gd'L

%"@b\cg]g'UFVCEUg

2. Folhas simples e alternas

' "9g'di U'gXW'X Ugei Ydfch] Ya [Ya Uu]W

4. Flores isoladas, 3-meras

) "DY]Ubc b-c X]ZfYb]UXc Ya W]WYWfc U

*"7UhfCÚ]U

7. Estames espiralados, muitos, com anteras laterais

, ";]bY] UdcWfd]WzWfdYcg'a i]hg'Ygd]fUUXc'

- "G MfC]Wg'YfY]] Ygh'a dYfUXg'Xc < Ya]g'z]c B cfH

10.No Brasil: Talauma (pinha-do-brejo)



:]i fU%á 9] Ya d'cgXYfd]Yg'bh]hg'XA U bc]UMU' @]cXb]Xcb'hi]d]Zf]ZA U bc]U[fUb] X]ÚcfUf]Zi hcZA U bc]U[fUbX]ÚcfUf]c'f'

A U bc]UYg' df]bVdUg'Za f]Ug' 5bbcbUMU'

5BB CB 57959 f&[.bž& \$\$'gd'L

%"@b\cg]g'UFVCEUg

&: c\Ug'ga d'Yg'YUhf]Ug'Xg]Wg'g'Ya Yg'di U

' "": `cfYg'Ya]bÚcfYg'Wb]Wg']a YfUg' Ya]W]W]Wg

("DY]Ubc 'dci W X]ZfYb]UXc Ya W]WYWfc U

) "7UhfCÚ]U

*"9g'Ha Yga i]hg'X]ZfYb]UXc'g'Ya Uhf]U'Yh'Ywb]W]W]Wj cžYg'Y' h'a c'

espassado

+";]bY] UdcWfd]WzWfdYcg'a i]hg'

, "HfC]Wg'Xc'a i bXc'hc'Xc'

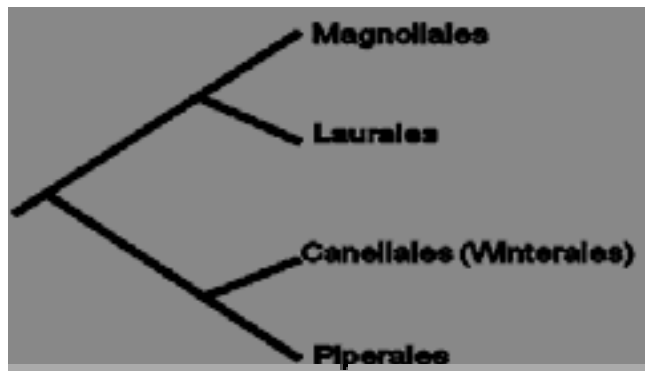
9. No Brasil: Annona (fruto-co-conde, graviola, araticum, pinha), Xylopia

fd]bX]U]Už; i Uhf]U



:]i fU&ì '9l Ya d'cgXYfYdfYgblhg'XY5 bcbUWUY'5 bcbU['UfU7UbU[UcXcfUz5 bcbU
montana e Annona squamosa.

A 5; B C @-8 95G CF89A @5I F5@9G



Laurales: 7-8 fam., ca. 2500 spp.

1. Lenhosas

2. Folhas simples

' " : `cfYg'Ya]bÛcfYgMbWg' !a YfUza YbcfYg'Wa `]dUbc`

("DY]Ubc XZYbWUxc Ya W]WYWfc U

) "DCEyb'gYa `UMfh fUgci `&Udyfh fUxc

*"7 fi `Ugc YZfUgYgZf]Wgbc`dUf. bei]a U



:]i fU% ì UWW]fc Ì ZbhY \hd.##kkk"]]Là UxUwa "Vf

Lurales: Lauraceae

@U fUMYf] S' [. b"ž& SS'gd'L

%@Yb\cg]žUFCEYg

&": c\Ug]ga d'YgYU]mbUžgYa 'Yg]di U

'": `cfYgYa]bUcfYgWbVUž' !a YUždYei YbUg

("DY]U]b]c X]ZfYbVU]Xc `Ya `W]WYWfc U

6. Estames em poucos verticilos, anteras valvares

+";]bY]M]gbV]fd]Wž%WfdYUž%cj i `Užd'UWb]U]~c U]d]W

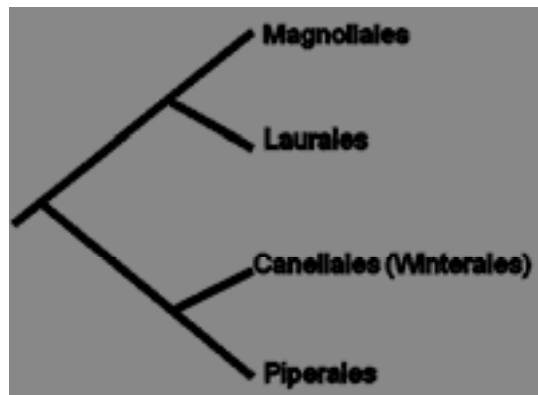
, "HfC]WgXc `a i bXc]cXc`

9. No Brasil: Persea (abacateiro, cultivado), Cinamomum (canela, cultivado),
(Laurus, louro, cultivado), Ocotea, Nectandra (imbuías, canelas, louros)



:]i fU% `Ì`9l Ya d'cg'XYfydfygbhbgXY@u fUMU']bW]bXc` Udfygb, UXYUbfUg`Wa` XYlg` WbWUj Uj Uf`

A 5; B C @ = 8 9 5 G ` C F 8 9 A ` D = D 9 F 5 @ 9 G

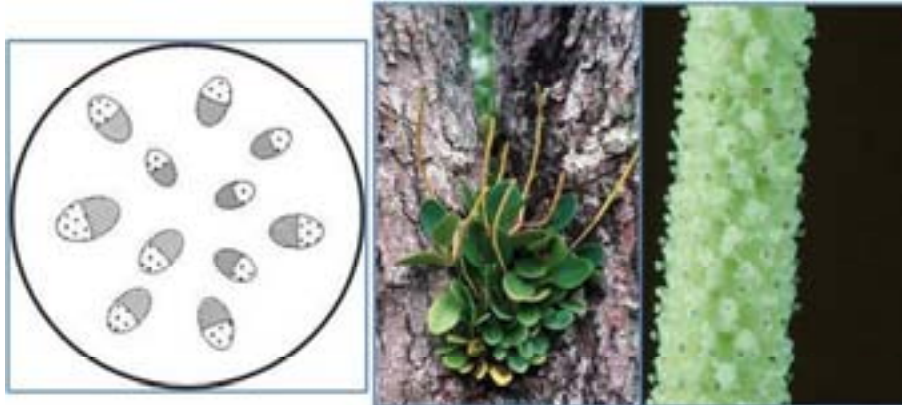


Piperales (4 fam., 2000 spp.)

%`D`U`b`h`g`b`c` `Y`b`c`d`g`

&": Y] Yg`Wa` X]gf]M], ~c` U`H`W`c`g`f`]W

' "": `c`f`Y`g` [Y`f`U`a` Y`b`h`d`y`e`i` Y`b`g`g`y`a` `d`y`]`U`b`c` `c`i` `U`d`Y`b`g` `W`a` `U`g`g`f`d`U`g`g`
reunidas em espigas



:]i fU% î 9l Ya d`cgXYfdYgblbhgXYD]dfWUWY

PIPERALES: PIPERACEAE

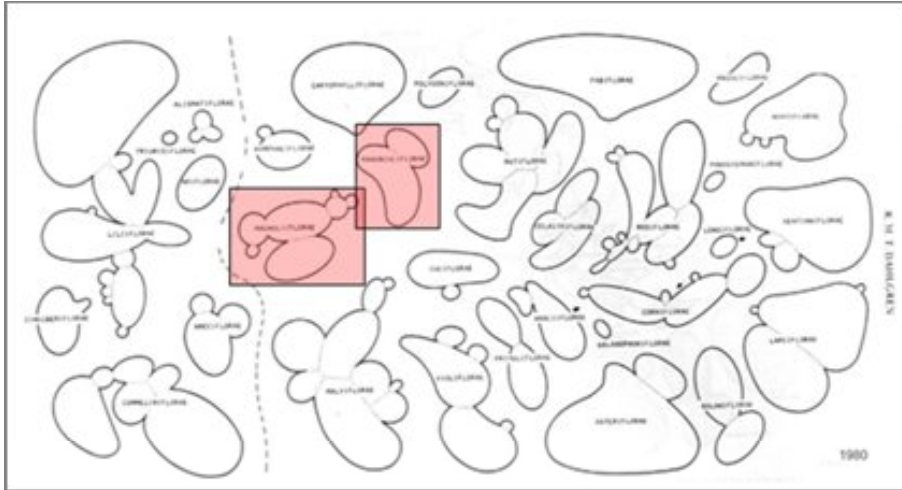
Piperaceae (6 gen, 2020 spp.)
 %D'Ubhg'b-c`Yb\cg'g
 &B Yfj U~c U]bC]ca U
 ' "9g]di Ug'U]U]gUc dWY`c Z'fa UbXc`U]b\U
 (": Yl Yg'Wa`X]gf]M], ~c U]W]cg]f]W
)"': `cfYg]YfUa YbhY dYei YbUg'gYa`dY]U]b'ci`U]YbUg'Wa`Ug'gfdU]g
 reunidas em espigas

Piperales: ARISTOLOCHIACEAE
 Ervas decumbentes ou lianas. Folhas alternas, simples, com ou sem
 dgy Xc!Yg]di Ug`bUcfYgWbWUWa`UcfYg]g]c]g'g]W]W]f'a Yfc]Ua c!
 gfdUcz]YfUa YbhY g]a C]X] YXj]X]c`Ya`i hf]W'c`f]uf]Y V]gU`]bU]M]E
 tubo e limbo (parte expandida).

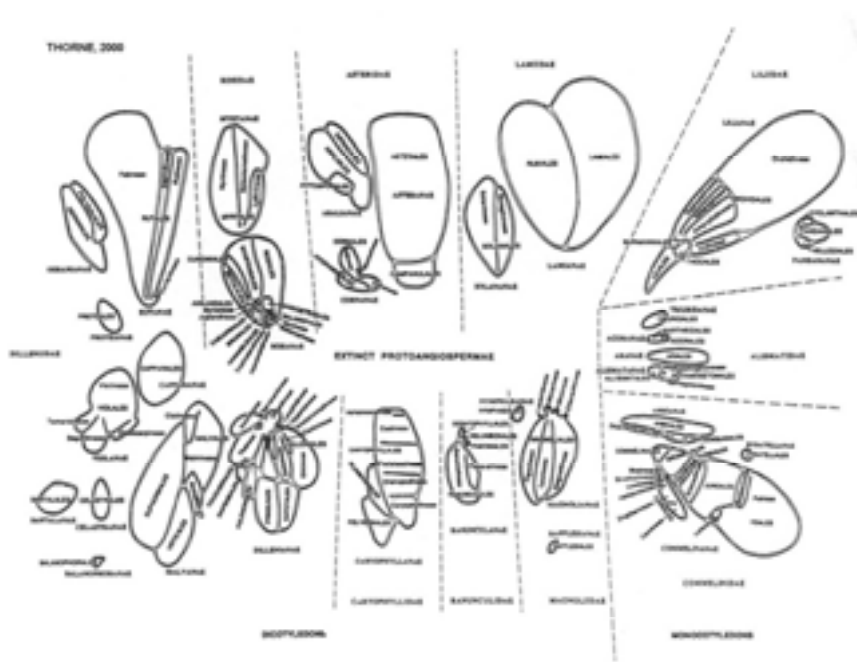


:]i fU% î 9l Ya d`cgXYfdYgblbhgXY5]g]c`W]WUWY

A 5; B C @-a8 95G DC G=7=CB 5A 9B HC B CG
SISTEMAS GRADISTAS

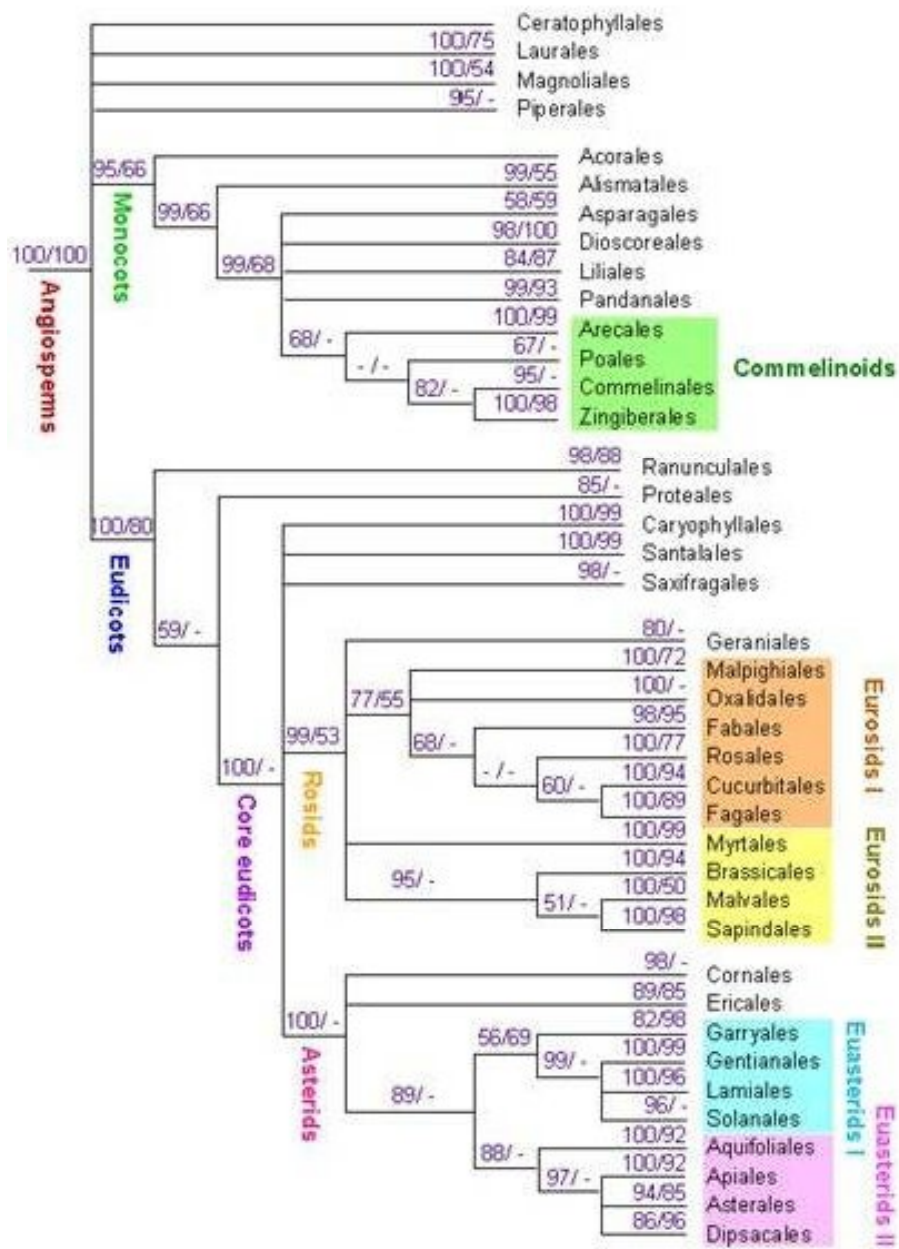


Dahlgren (1980)



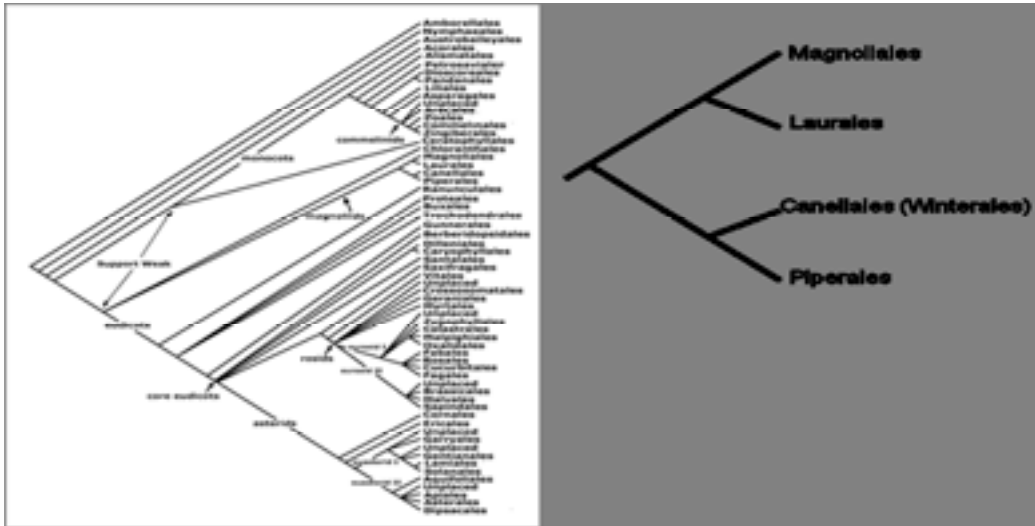
Thorne (1976)

A U[bc`]XYUg` dcgVcblá Ybrc`bcg`ggha Ug WXghUg VgYUxg`Ya`
dados moleculares



5bz]gYwa fW@Ud6. A U]bc]XUg-b-c Zcfa Ua [fi dc'a cbcU]f]W
 fa cX]UWc XY'6fYa Yf'YhU" &SSS' ! XUXcga c YW'UfYg]fW@Ud6L
 A U]bc]XUg' dcg]V]c]b]a Y]bc' b]cg' g]ghYa U]g' W]X]g]U]g' V]g]U]X]c]g' Ya
 dados moleculares

SISTEMA APGII (2003)



5 bz`lgY Wa `fW@z Ud6ž% g f8 B 5. A U[bc`]XYUg Zcfa Ua ` [fi dc` a cbcÚ f]W`

A U[bc`]XYUg ybg `5D; `f&S` L

A U[bc`]XYUg Wa dU U ~c`YbhY7fcbei]ghf%, %LY5D; `=f&S` L

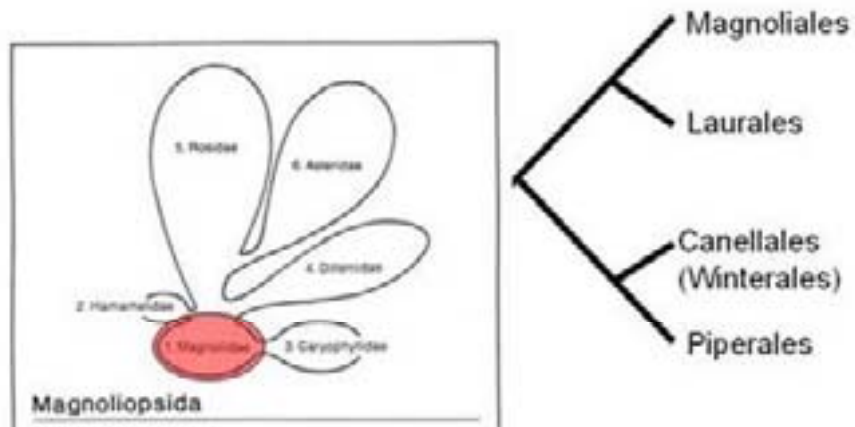
7UfUWf]g]WgXY7fcbei]ghf%, %L

- 1. Flores 3-meras
- 2. Flores com muitos elementos espiraladamente arranjados

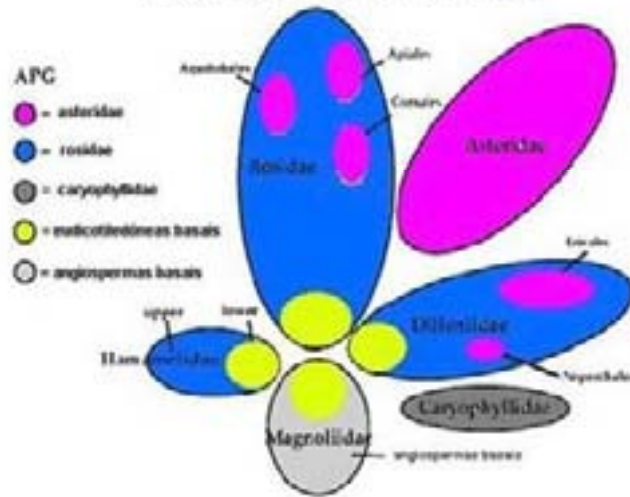
' "5i g b]UXYYa YbhgXYj Ug`Ya` U[i bg[fi dcg`

("DCEyb`i b]Udfh fUxc`

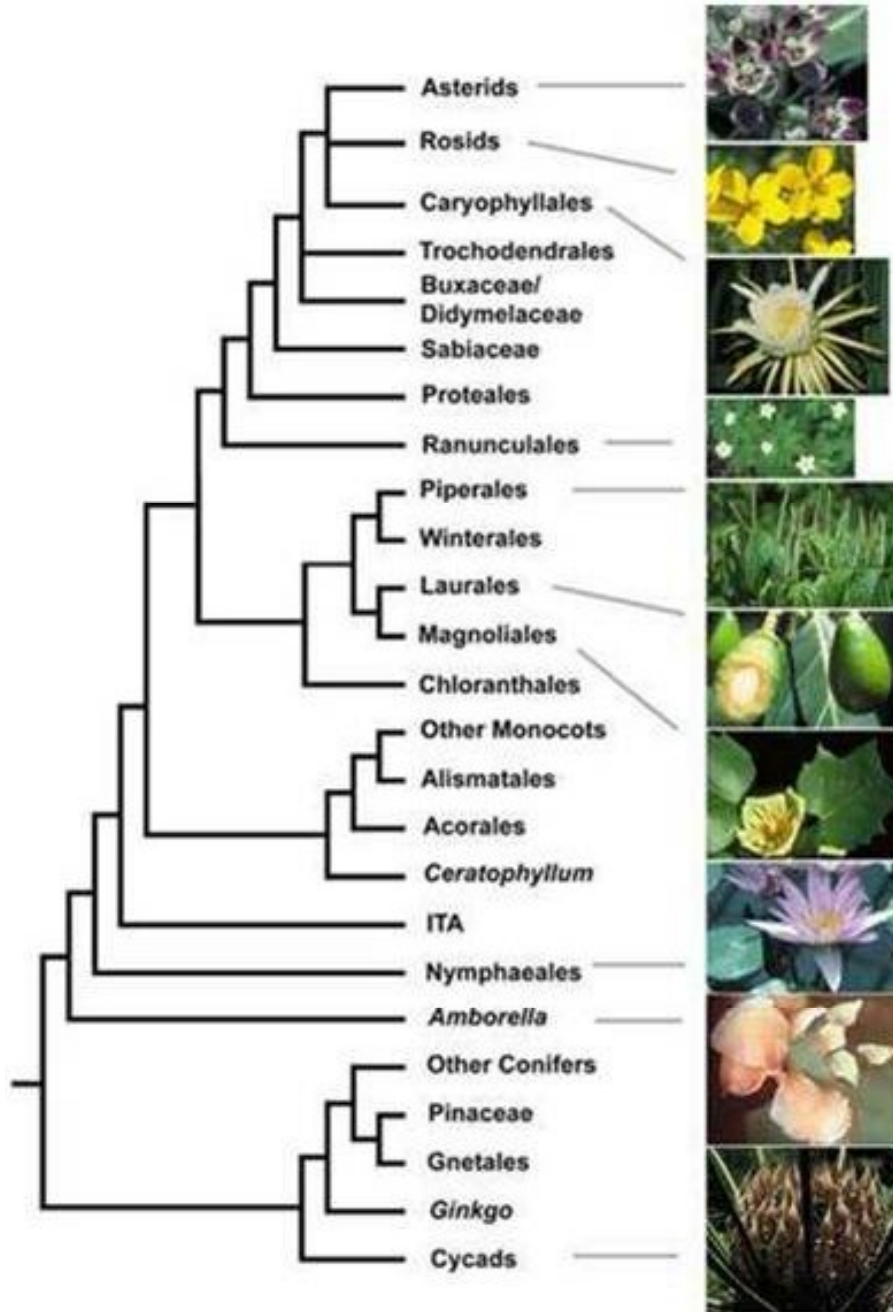
) "5 Wc[XgVbn]]gcei]bc`]b]Wg] •b]Wg] Udca cfUdfcj zj YUfa` Xcg` dados moleculares



Magnoliopsida de Cronquist x APG



- O grupo ANITA
- O clado ITA
- Illiciales - Trimeniaceae - Austrobaileyaceae



:][i fU%+î 9l Ya d'cgXYfd'ngbhgXc [fi dc 5B=H5 f5a VcfY'UMUZZ=']MUMZH]a YbJU ceae e Austrobaileyaceae).

7CB 7@I GÈC`

5gUb]]cg]Yfa U]gi `d`Ubh]gWa `UcfYg`Wb]gh]i Ya `c`[fi dc`XY`d`Ubh]g` Xca]bUbh]gbc`Ua` V]Ybh]YhffYg]Y`G`Ua` cbc`U`]Uf`Zcf]hYa` Ybh]g` g]bh]XU`5` maior parte das angiospermas se enquadra em dois grandes grupos: as mono- W]h]YX` b]Yg]f]U`bh]g`Wa` i`a` `b]W`W]h]f]Xcb]YY[f-cg]XY`d`CEb`|`YfUa` Ybh]` a` cbc`gg` `WXcg]LYg]Y`X]W]h]YX` b]Yg]f]U`bh]g`Wa` Xc]g]W]h]f]Xcb]Yg]Y[f-cg] XY`d`CEb`df]Xca`]bU]h]a` Ybh]Y]W`d]UX`gci` h]dcg]Xf]j`UX`cg]Xg]M`C`[`f]UX` `5B`-H`5`dc`XY`g]f`W]U]M]f]n]UX`dc`f`Udf]Yg]bh]f`W]d]Ycg]W]U]g]a`Uf`[`Ybg]g`c` g]Y]X]g]dc]f`i`a` U]g]W]Y`-c`Ybei`U]b]c]b]Ua`Ucf]U]X]g]U]b]]cg]Yfa`U]g]f]Yg]U]bh]g` U]g]a`Uf`[`Ybg]Xcg]W]d]Ycg]g]Y`Z]W]L]a` `dc]f`Z`g`c`d]C]g`[`Yb]U`X]U]Y]d]X]Y]fa`Y`5` a`Ucf]U]X]cg]f]Y]d]Y]g]bh]U]bh]g`X]g]g]g`]b`U`Ybg]Udf]Yg]bh]U`U]a`Y]C]È]c]g]Z]a`]b]! nos 4-nucleados e endosperma diploide, mas Amborellaceae apresenta um [U]a`Y]C]È]c`Z]a`]b]!bc`-!bi`W]UX`Y]Yb]Xcg]Yfa`U]f]d]c]X]Y`



RESUMO

As angiospermas eram tradicionalmente classificadas em Dico- h]YX` b]Yg]f]U]M]f]n]UX]g]dc]f`i`a` W]X]g]a`Y]b]c`g]W]b]X]z]f]c`Z]c]fa`U]b]X`i`a`U]b]Y` bc`Y]b`c]z`Y]b]U`-c`f]Y]W]U]L]X]c]g]W]h]f]Xcb]Yg]Y`YfUa`Ybh]W]a`U]c]f]Yg]d]Y]b]U` ci`h]Y]f]a`Y]U]g]Y]A`cbc]W]h]YX`b]Y]g]Z]W]a`U]d]Y]b]U]g]i`a`W]h]f]Xcb]Y]g]g]h]Y]a`U` j`U]g]W]U]f`X]g]d]Y]g]c]z]Y]b]U`-c`d]U]Y]U]b]f]j`]U]Y]U]c]f]Y]g]h]f]a`Y]U]g]9]g]g]U]X]W]h]c]a`]U` Z]c]f]Y]Z]h]X]U]Y]a`a`Y]UX]cg]X]cg]U]bc]g]%-`S]zei`U]b]X`Y]g]i`X]cg]U]c`[`Y]b]f]W]g]W]b]!` Ú]fa`U]U]a` `ei`Y]Z]U]d]Y]g]f`X]g]A`cbc]W]h]YX`b]Y]g]Z]c]fa`U]Y]a` `i`a` `[`fi`dc`a`cbc!` Ú]f]W]Z]U]g]X]W]h]YX`b]Y]g]g]f]U]a` `d]U]U]f]W]g]Y]a`f]Y]U`-c`U]Y]U]g]H]c]f]c]i`!`g]Y`]a`dc]f]U]b]h]c`f]Y]W]b`W]a`Y]b]c`X]g]Y`X]W]h]YX`b]Y]g]Z]c]f]h]a`Y]b]h]g`g]bh]X]U]g` Y]a`U]b]z]g]Y]g]W]X]g]h]W]g]Y]f]W]b`W]X]g]d]Y]cg]Y`f-cg]XY`d`CEb`h]f]W]d]UX`g]ci` `X]f]j`U]c`X]g]g]Y`5`g]Ub]]cg]Yfa`U]g]d]U]g]U]a`z]Y]b]h]c]z]U]Y]g]U]f`X]j`]X]X]U]g]Y]a` `i`a` `grado formado pelas chamadas angiospermas basais, seguido por um clado denominado Euangiospermas, composto por grupos de Magnoliideae, W]b]h]b]X`*1` X]g]U]b]]cg]Yfa`U]g]Z]a`U]g]U]g]a`cbc]W]h]YX`b]Y]g]Z]W]a`W]W]X]Y` %1`z]Y]Ú]b]U]a`Y]b]h]U]g]9]i`X]W]h]YX`b]Y]g]U]df]Y]g]bh]a`U]d]Y]b]U]g]ei`U]f]c`W]Y]i`U]g` Y]ei`U]f]c`W]a` `cg]f]Y]g]U]bh]g+]1` "9]g]i`X]cg]W]a` `i`a` `b`a`Y]c`a`U]cf]X]Y]X]X]cg` a`cg]f]U]a`z]bc`Y]b]U]b]c]z]ei`Y]U]g]A`U]bc`]X]U]Y]Y]g]c`a`U]g]f]Y]U]c]b]U]X]g]W]a` `U]g]9]i`X]W]h]YX`b]Y]g]X`c`ei`Y]W]a`U]g]A`cbc]W]h]YX`b]Y]g`

ATIVIDADES

%'E i Ug'Ug'Za †]U'ei YZcfa Ua 'Ug'Ub []cgdYfa Ug'VUgUg3
 &'E i Ug'Ug'WUUMf]h]Wg'Wa dUfh\UXUgdYUgUb []cgdYfa Ug'VUgUg3
 3.Qual a representatividade das angiospermas basais no Brasil?
 ("7]h'Ug'Za †]U'ei YZcfa 'dUfh'XUg'A U bc`]XYUg'YUg'WUUMf]h]Wg'
 compartilhadas pelo grupo.



DF ê L=A 5'5I @5

B UdfCE]a UU 'UYh'XUfYa cg'Ug'A cbc'Wh'YX bYUzi a '[fi dc'Wbg]!
 h'Xc'dcf'%) 'XUg'Ub []cgdYfa Ug'Wa 'WUWXY) '\$SSS'Ygd]Wg'Za 'Xgd]!
 Vi], -c'Wga cdc]HUYUg'Ug'Yd'WU]f]XUg'a cfZ'CE]Wg'



F 9: 9F â B 7=5G

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 dfU]Xbh]UW -c'XUg'Za †]U'Vch]b]WUg'XUg'Za †]U'XYZb]fCE]a UgbUj Ug'
 YU]CE]Wg'Xc'6fUg'zVUg'XUg'Ya '5D, '= "&'9X'Bcj UC XUg'ZGD. =bg]!
 tuto PLantarum.