SOUTH AMERICAN COMPOSITAE MEETING

FAPESP

South American Compositae Meeting
FAPESP - 5-7th December 2011

The importance of Palynology for the Taxonomy of Compositae

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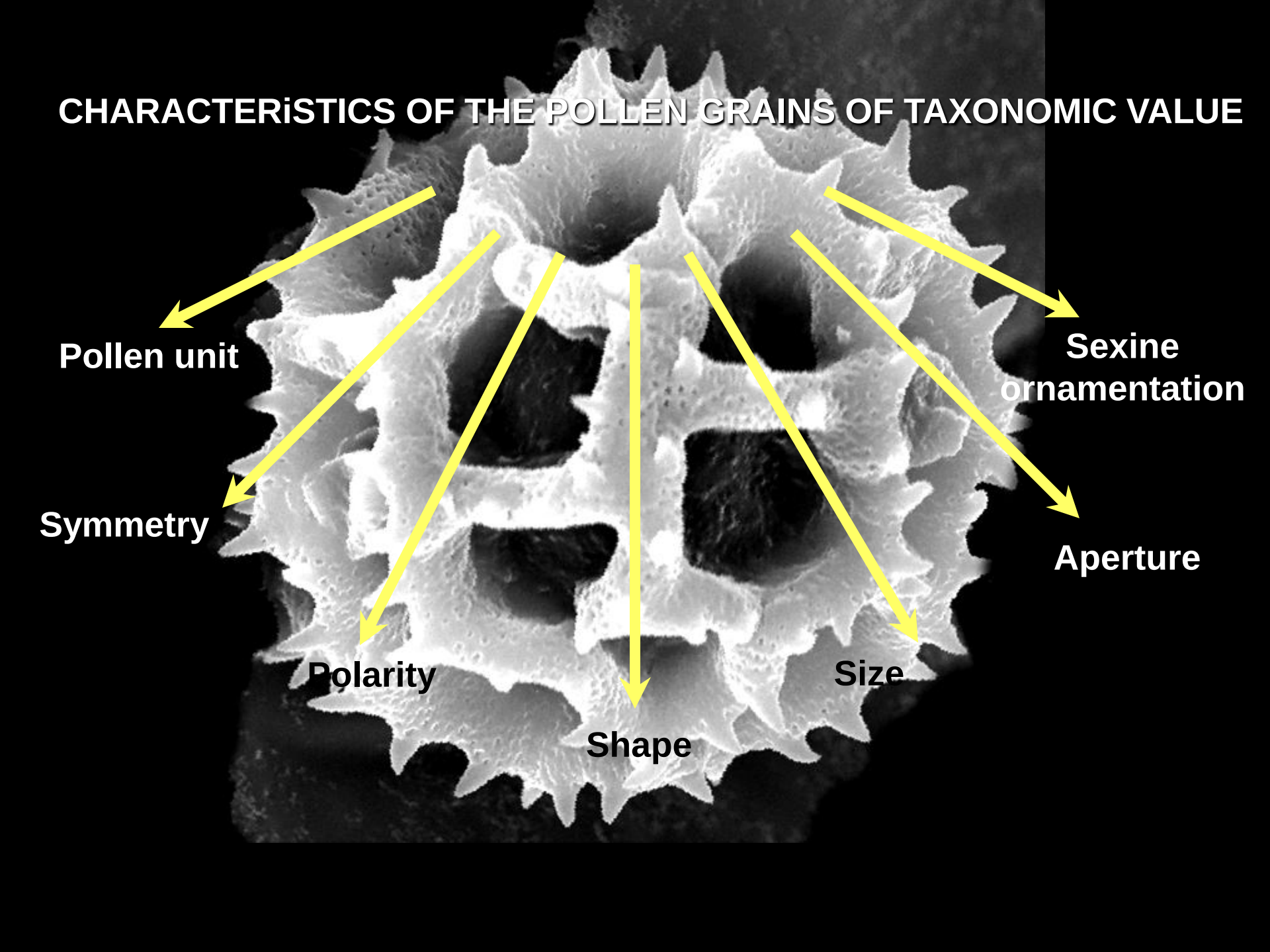
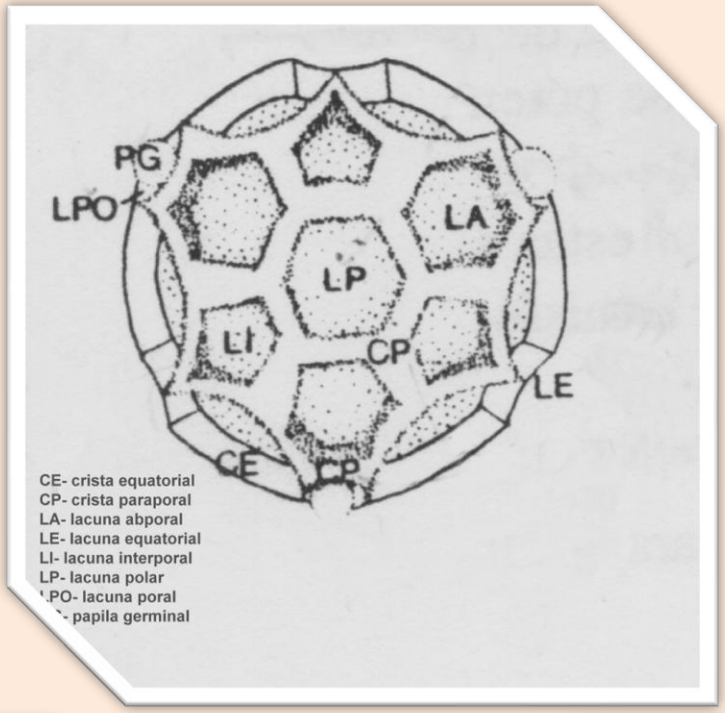
LABORATÓRIO DE PALINOLOGIA

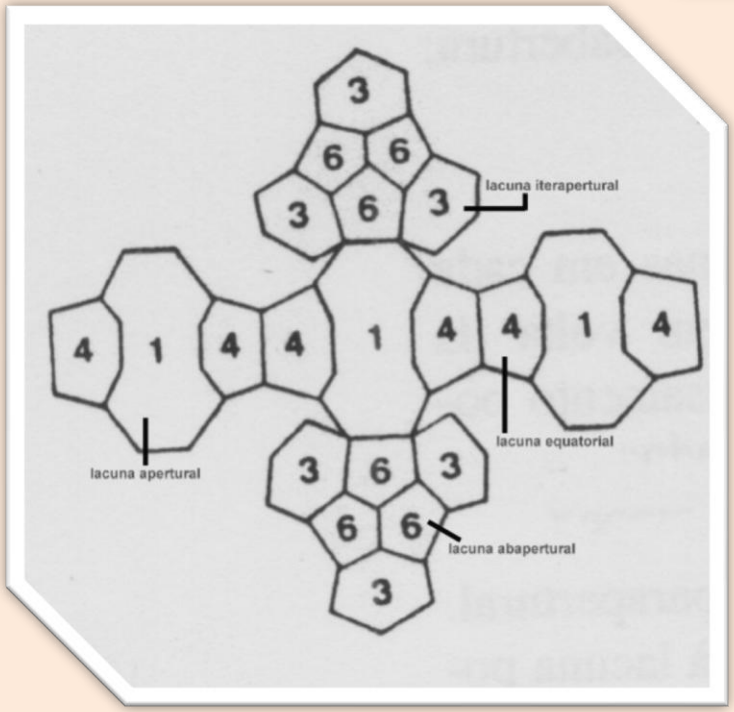
MUSEU NACIONAL
UFRJ

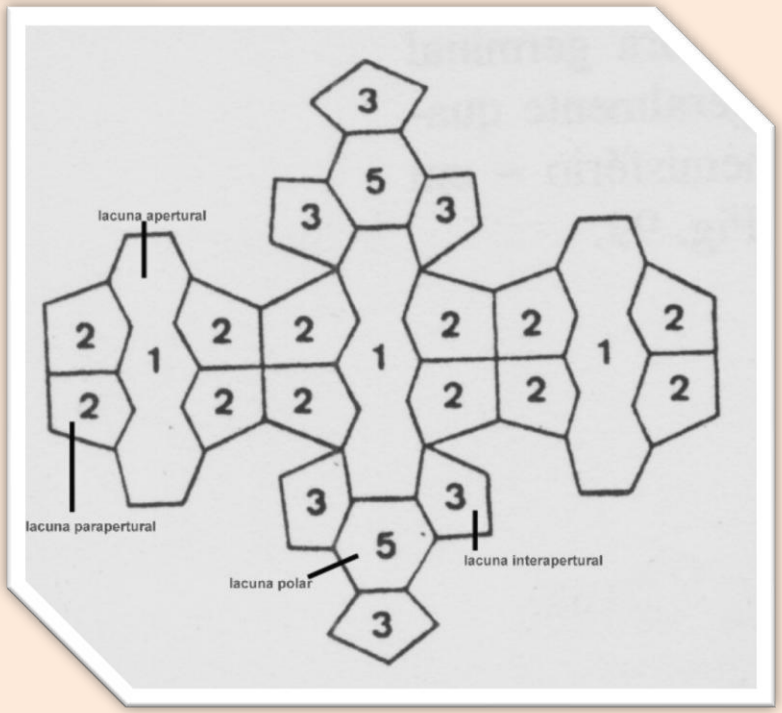
CHARACTERiSTICS OF THE POLLEN GRAINS OF TAXONOMIC VALUE



Stix (1960)


PG
LPO
LA
LP
LI
CP
LE
CE
CP
CE- crista equatorial
CP- crista paraporal
LA- lacuna abporal
LE- lacuna equatorial
LI- lacuna interporal
LP- lacuna polar
LPO- lacuna poral
papila germinal

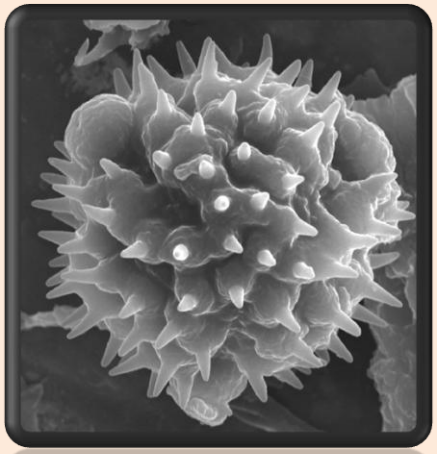

lacuna iterapertural
lacuna apertural
lacuna equatorial
lacuna abapertural


lacuna apertural
lacuna parapertural
lacuna polar
lacuna interapertural

Kingham (1975) – PolinicType (6)

Porate - (psilolophate/echinolophate, with or without microperforation);

Vernonanthura brasiliana



Colporate-

- ❖psilolophate, without microperforation;
- ❖echinolophate, with microperforation;
- ❖echinolophate - subequinolophate, with microperforation;
- ❖ subechinolophate - echinate, with microperforation.

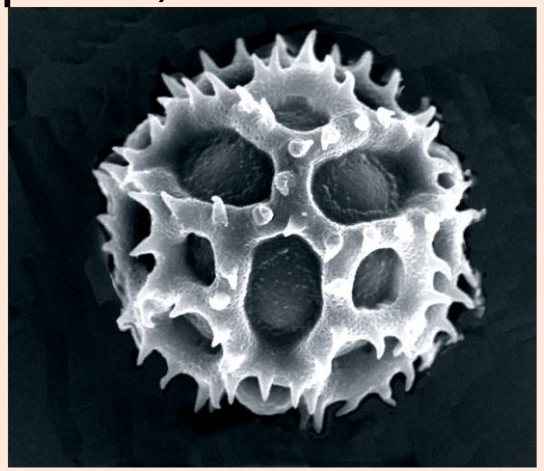
Keeley & Jones (1977, 1979): Polinic types in *Vernonia*

A, B, C- colporate

echinate to subechinolophate, prominent spines;

echinolophate, coincident polar muri;

echinolophate, prominent polar muri;



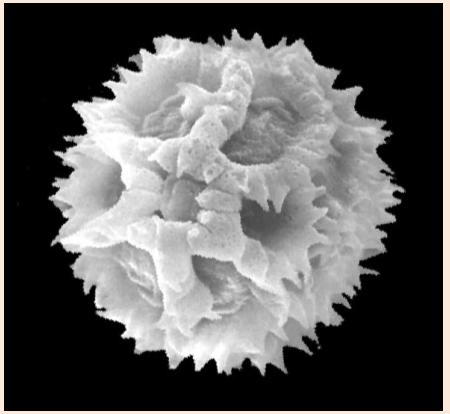
Lepidaploa spixiana

D, E, F- porate

echinolophate, 1 lacuna surrounding the pore;

lophate or subechinate, pori without this lacuna;

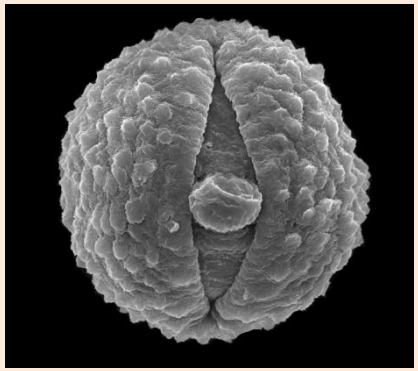
lophate or echinolophate, pori with lacuna split.



Sonchus oleraceus

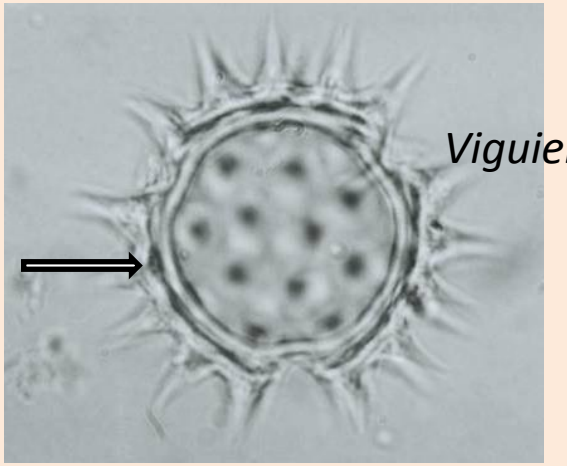
Wagenitz (1976) - 3 evolution lines:

1. Reduction of spine;



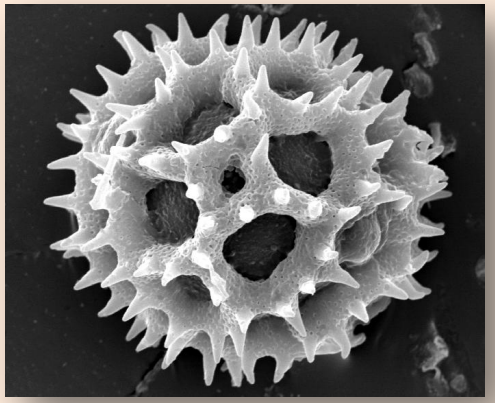
Stifftia parviflora

2. Reduction and lost of inner columella (formation of the cavity);



Viguiera onchusaefolia

3. Formation of the pattern of bridges (= lophate pattern).



Lepidaploa helophila

Robinson (1999): *Generic and Subtribal Classification of American Vernonieae*

Mendonça, 2006. Palynotaxonomy of the species of Vernoniinae subtribe (Vernonieae-Compositae) occurring in southeastern Brazil

Vernoniinae (94 spp., 10 genera)

Grupe I

Echinolophate

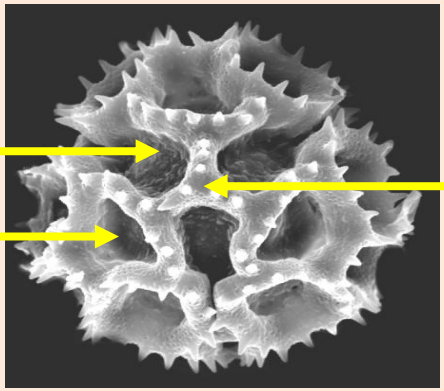
Chrysolaena (4spp), *Echynochorine* (4 spp), *Lepidaploa* (23 spp.), *Lessingianthus* (31 spp.), *Stenocephalum* (3 spp.)

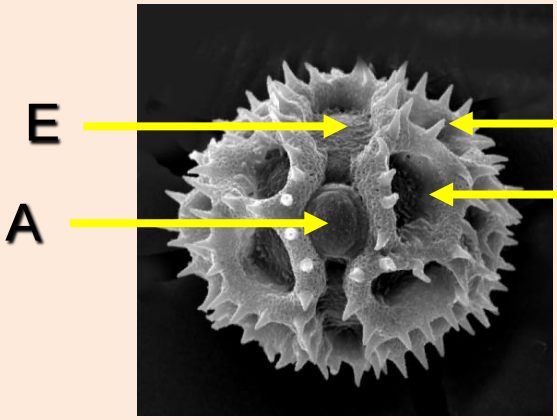
Grupe II

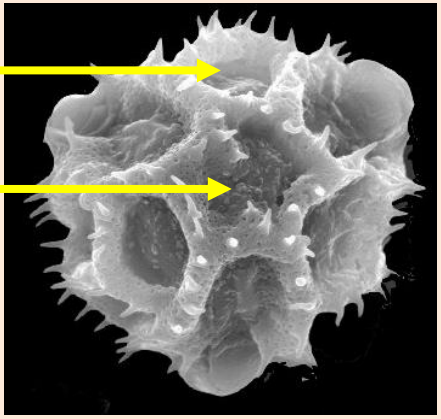
Subechinolophate

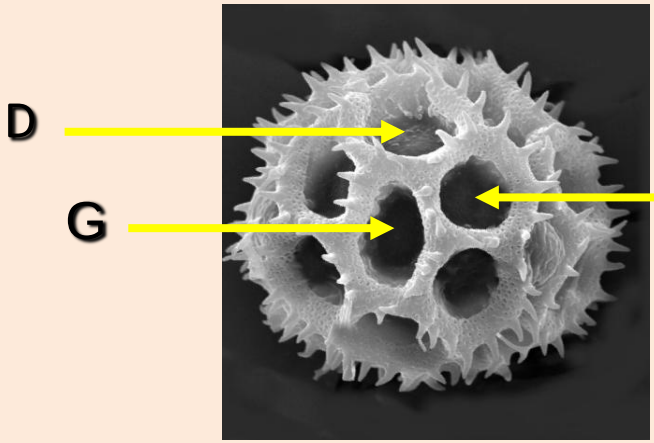
Albertinia (1 sp.), *Cololobus* (3 spp.), *Cyrtocymura* (2 spp.), *Dasyanthina* (1 sp.), *Vernonanthura* (22 spp.)

Grupe I : Echinolophate









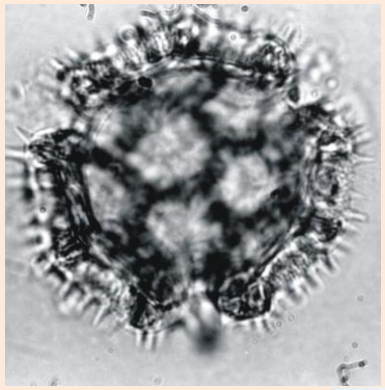
A- Apertural Lacunae;
B- "Y" formed by the muri of the abapertural lacunae
C- Polar Lacunae;
D- Interapertural Lacunae;
E- Abapertural Lacunae;
F- Parapertural Lacunae;
G- Equatorial Lacunae.

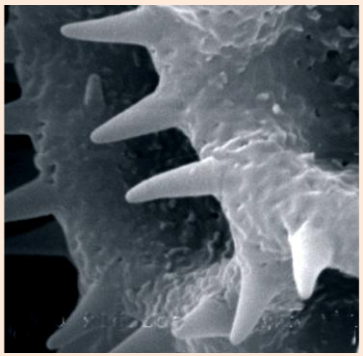
Pollen Groups of the Vernoniinae studied:

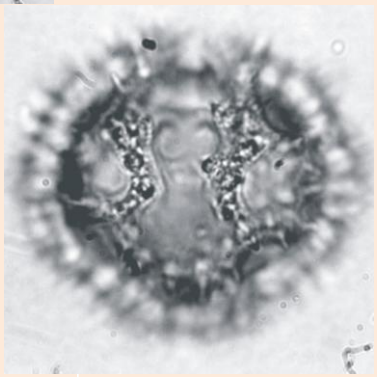
Group I: Echinolophate

✓ Sexine with polar and equatorial lacunae– 32 lacunae.

Lepidaploa (*L. obtusifolia*) e *Lessingianthus* (*L. simplex*)



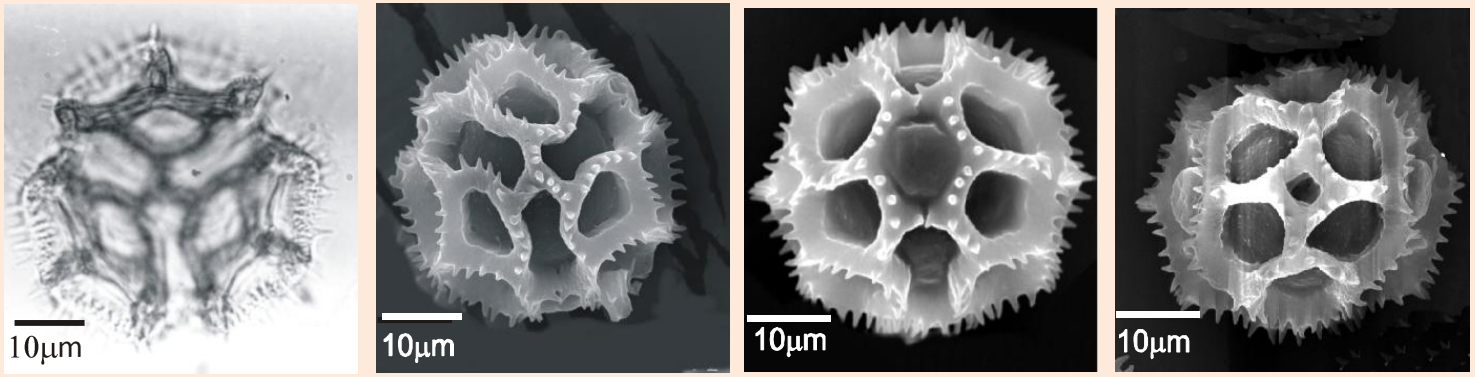




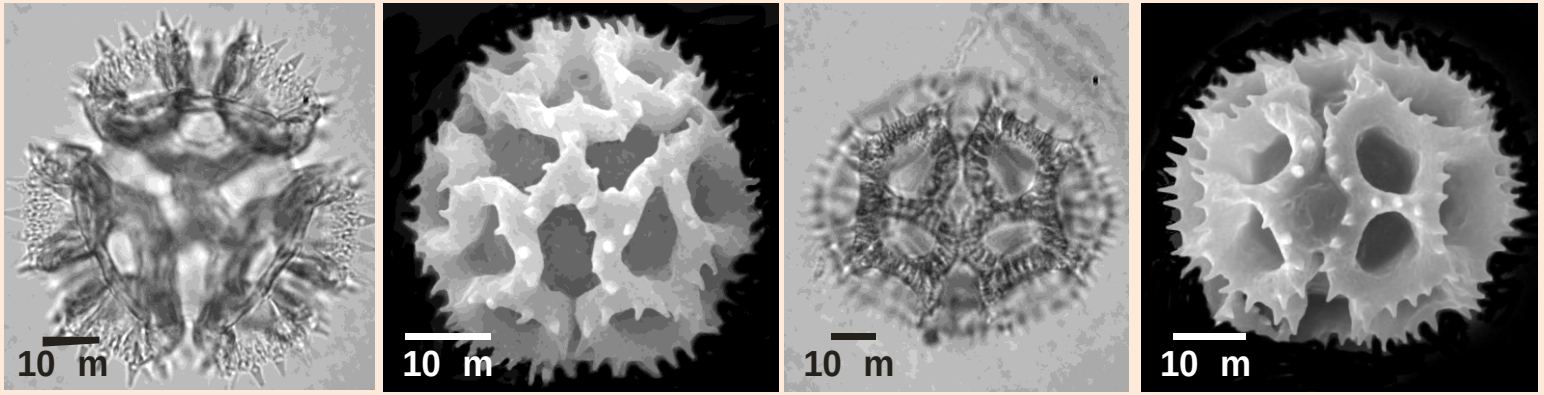
L. obtusifolia

Group I : Echinolophate

✓ Sexine without polar lacunae and with equatorial lacunae – 30 lacunae. *Echynochorine* (*E. holosericea, E. pungens, E. schwenkiaefolia, E. stricta*), *Lepidaploa* (*L. heliofila, L. eriolepsis, L. gnaphalioides, L. sericea*) e *Lessingianthus* (20 spp).



Echinocoryne stricta

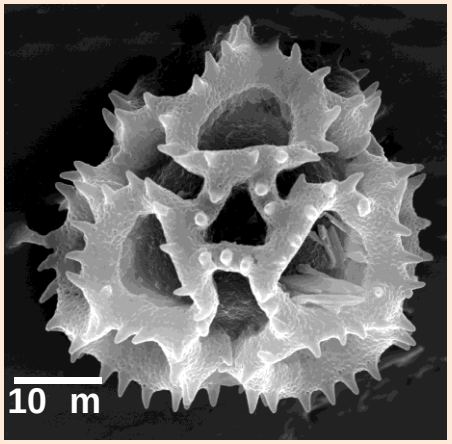


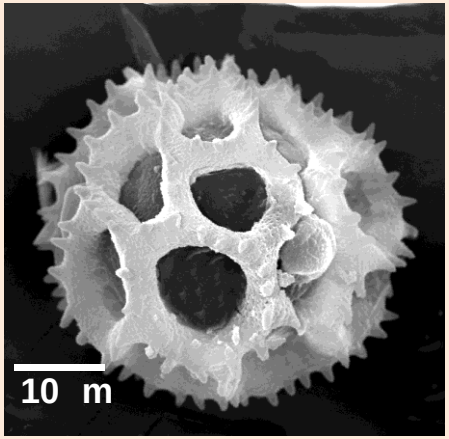
Lessingianthus warmingianus

Group I : Echinolophate

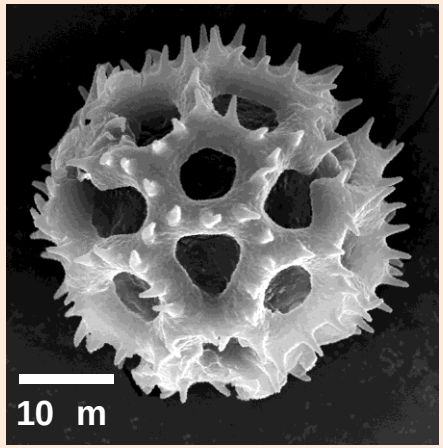
✓ Sexine with polar lacunae and without equatorial lacunae – 29 lacunae.

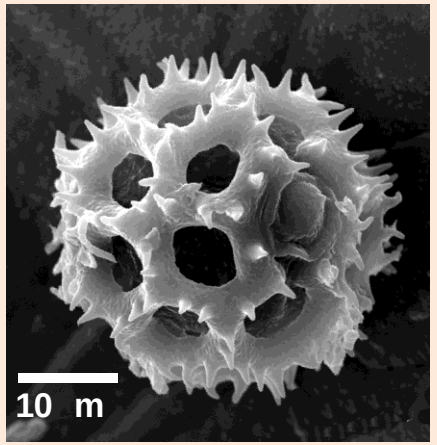
Chrysolaena (*C. herbacea, C. oligophylla, C. lithospermiaefolia, C. platensis*), *Lepidaploa* (*8* spp.), *Lessingianthus* (*L. desertorum, L. virgulatus*), *Stenocephalum* (*S. apiculatum, S. megapotamicum, S. tragiaefolium*).





Chrysolaena platensis



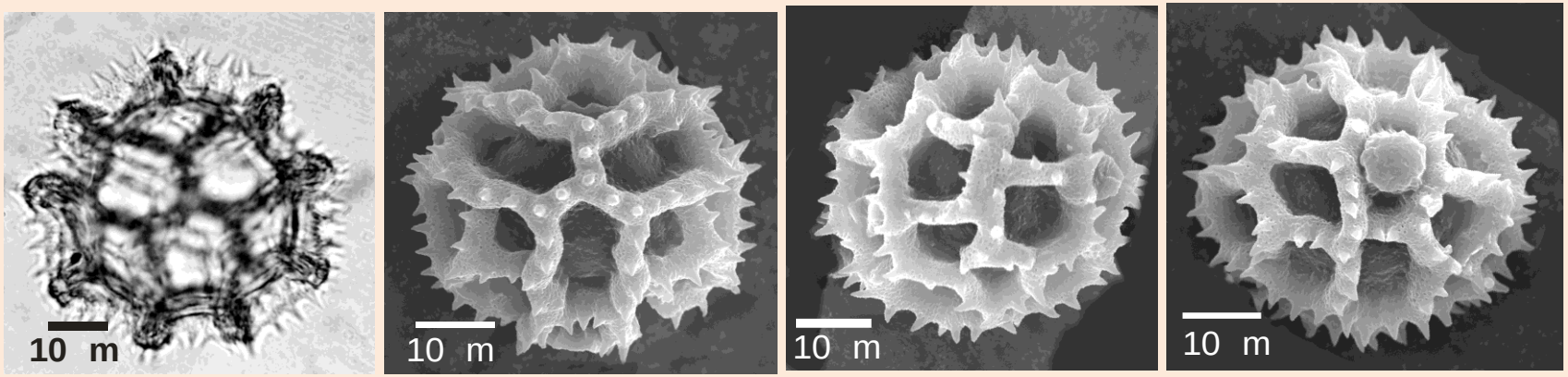


Stenocephalum apiculatum

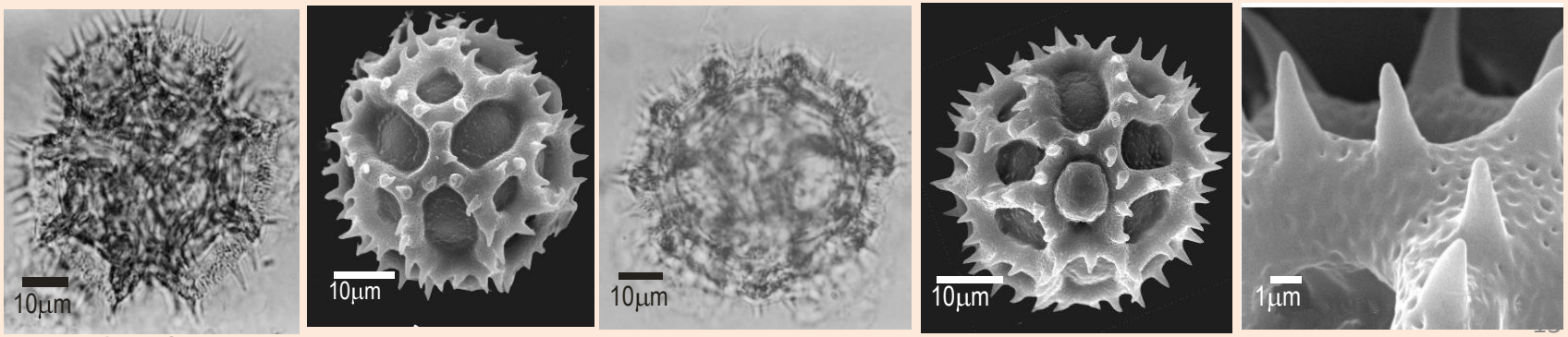
Group I : Echinolophate

✓ Sexine without polar and equatorial lacunae– 27 lacunae

Lepidaploa (10 spp.), *Lessingianthus* (*L. adenophyllus, L. durus*).



Lessingianthus durus



Lepidaploa spixiana

Group I : Echinolophate

✓Size:

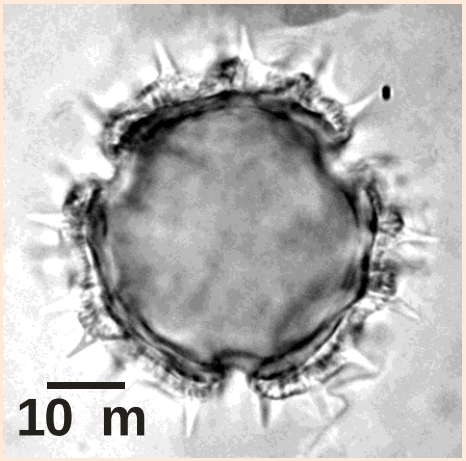
- Large – *Chrysolaena, Lepidaploa, Lessingianthus, Stenocephalum*
- Medium – *Echynochorine, Lepidaploa, Stenocephalum*

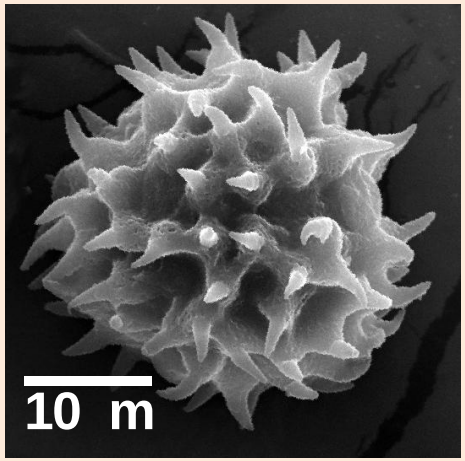
✓Shape:

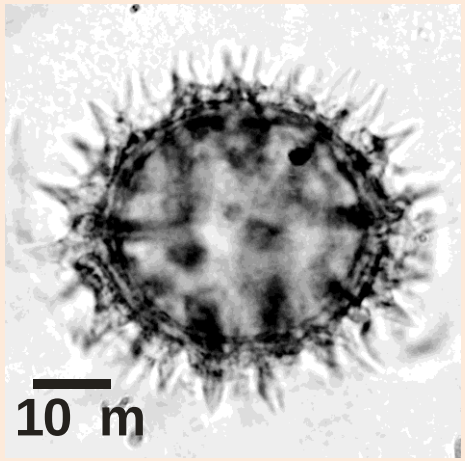
- Suboblate – *Lepidaploa* (3 spp.), *Lessingianthus* (18 spp.),
- Oblate spheroidal - *Chrysolaena* (4 spp.), *Echynochorine* (3 spp.), *Stenocephalum* (1 sp.), *Lepidaploa* (19 spp.), *Lessingianthus* (11 spp.),
- Prolate espheroidal - *Echynochorine* (1 spp.), *Stenocephalum* (2 spp.), *Lepidaploa* (2 spp.), *Lessingianthus* (2 spp.).

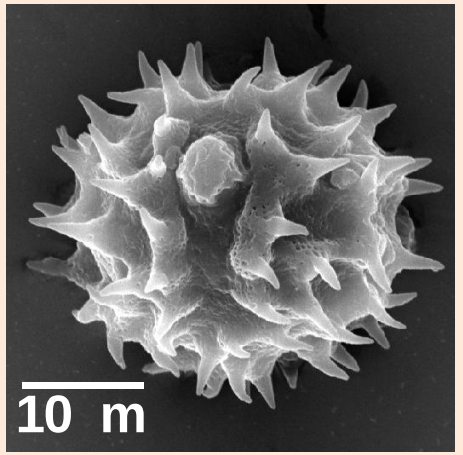
Group II: Subechinolophate

- ✓ Muri in apocolpus, organized remembering a central lacunae - *Albertinia brasiliensis* e *Cololobus hatschbachii*





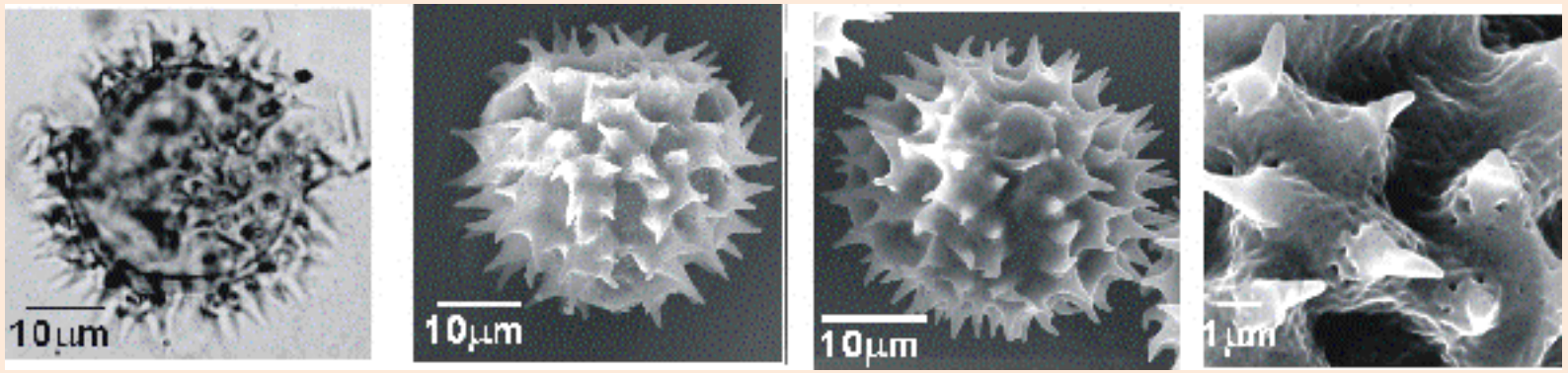




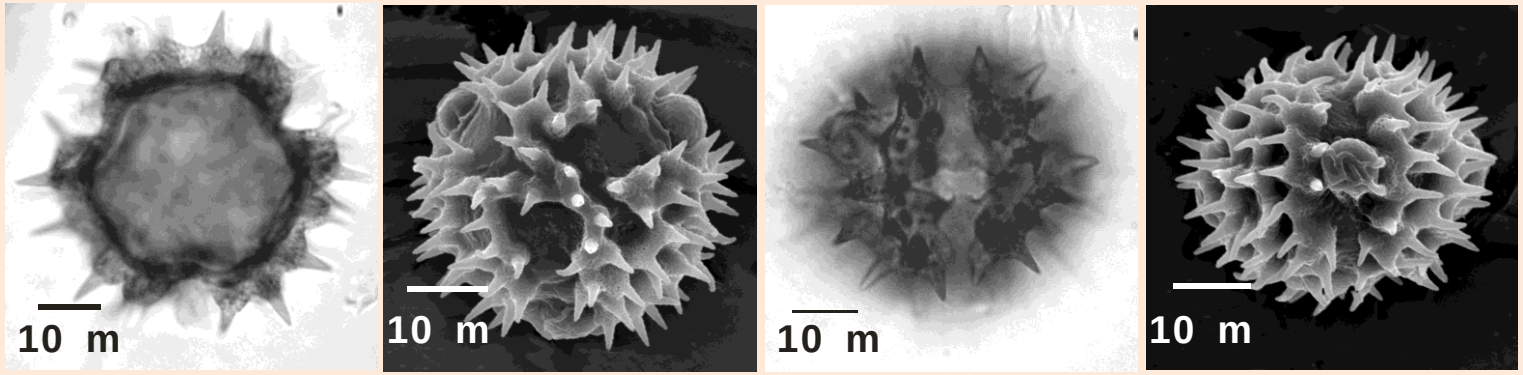
Albertinia brasiliensis

Group II: Subechinolophate

✓ Muri in apocolpus, organized remembering a "Y" *Cololobus* (2 spp.), *Cyrtocymura*, *Dasyanthina*, *Vernonanthura*



Cyrtocymura scorpioides



Dasyanthina serrata

Group II –Subechinolophate

✓Size:

- large – *Albertinia, Cololobus, Dasyanthina, Vernonanthura* (5 spp.)
- Medium – *Cyrtocymura, Vernonanthura* (17 spp.)

✓Shape:

- Oblate espheroidal - *Albertinia, Cololobus, Cyrtocymura, Dasyanthina, Vernonanthura*

Jeffrey (2007) → **pollen atribute reinforce the division into 5 subfamilies: Asteroideae, Barnadesioideae, Carduoideae, Cichoroideae e Mutisioideae.**

•Spinous surface – plesyomorphic state shared, of the Calyceraceae.

• Carduoideae and Mutisioideae (basal group): predominate the pollen ecaveate, spinous or spinulate.

•Asteroideae e Barnadesioideae: tricolporate, spinous, with or without cavea.

•Cichorioideae: palynological diversity.

Esteves (1994); Esteves & Gonçalves-Esteves (2003); Robinson (1999) – sp. nov+ *Strophopappus= Caatinganthus*

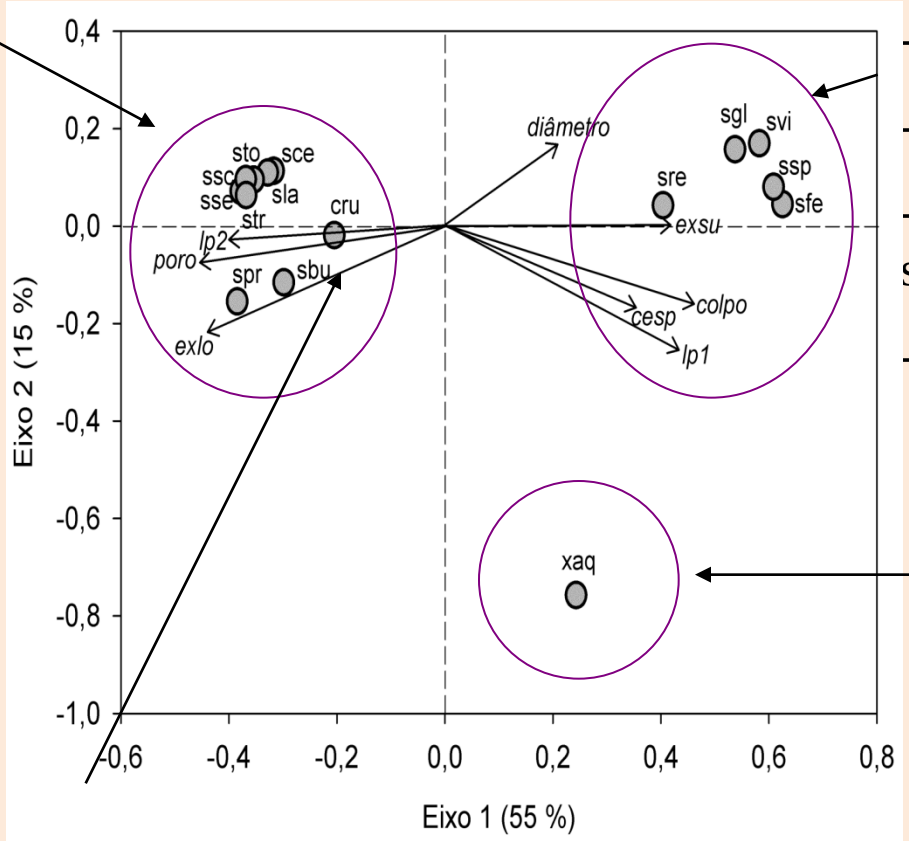
Caatinganthus e *Stilpnopappus*

- exine: lacunae with straight muri

-lacunae apertural closed

- pori

- polar lacunae



Caatinganthus

- apertural lacunae with interruption

Strophopappus

- spine with greater length

-lacunae apertural open

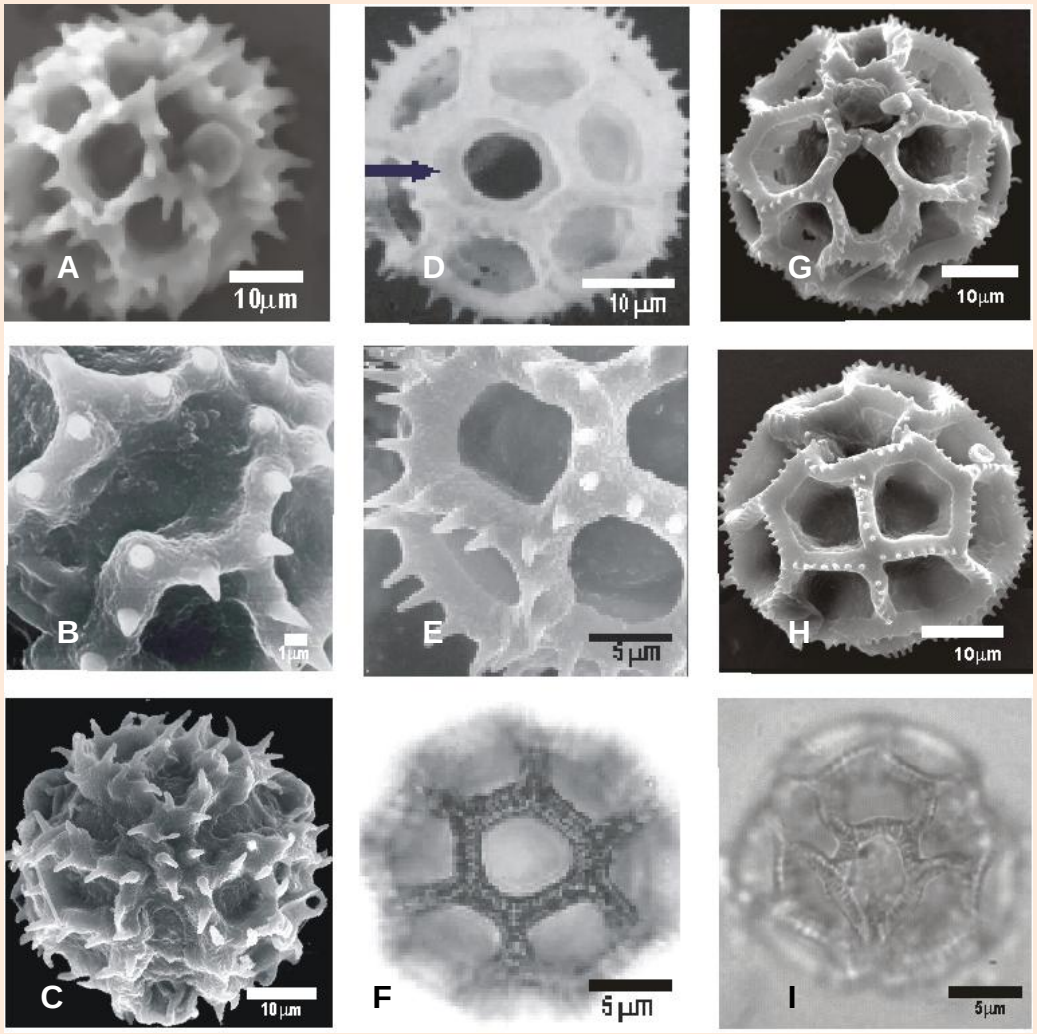
- exine: lacunae with muri sinuous

-colpori

Xiphochaeta

- pollen with smaller size

Principal Coordinates Analysis (PCoA) showing the main characters associated with genera *Caatinganthus, Stilpnopappus, Strophopappus* e *Xiphochaeta.* Axis 1 is significative for *P* = 0,04.



A–C. *Strophopappus*: **A.** *S. villosus*; **B.** *S. regnelli*; **C.** *S. bullatus*;D-F. *Stilpnopappus*: D. *S. cearensis;* E. *S. pratensis*; F. *S. tomentosus*. G-I. *Caatingathus rubropappus* – G. vista equatorial, abertura; H. mesocolpo; I. vista polar, lacuna no apocolpo.

Conclusion

Palynology is a tool that can contribute to more robust cladistic analysis in the search for establishing the relationships and degrees of relationship between different groups of plants.

The morphology and ultrastructure of the pollen grains are useful in the systematics of Compositae, especially at the level of tribe, subfamily and subtribe.

Agradecimentos