Echinoid taxonomy

By Zoleka Filander (DEA)

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Outline

1. Background
2. State of knowledge of South African echinoids.
3. How to identify echinoids.
4. Summary.
5. Questions?

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1. Background to Echinodermata.

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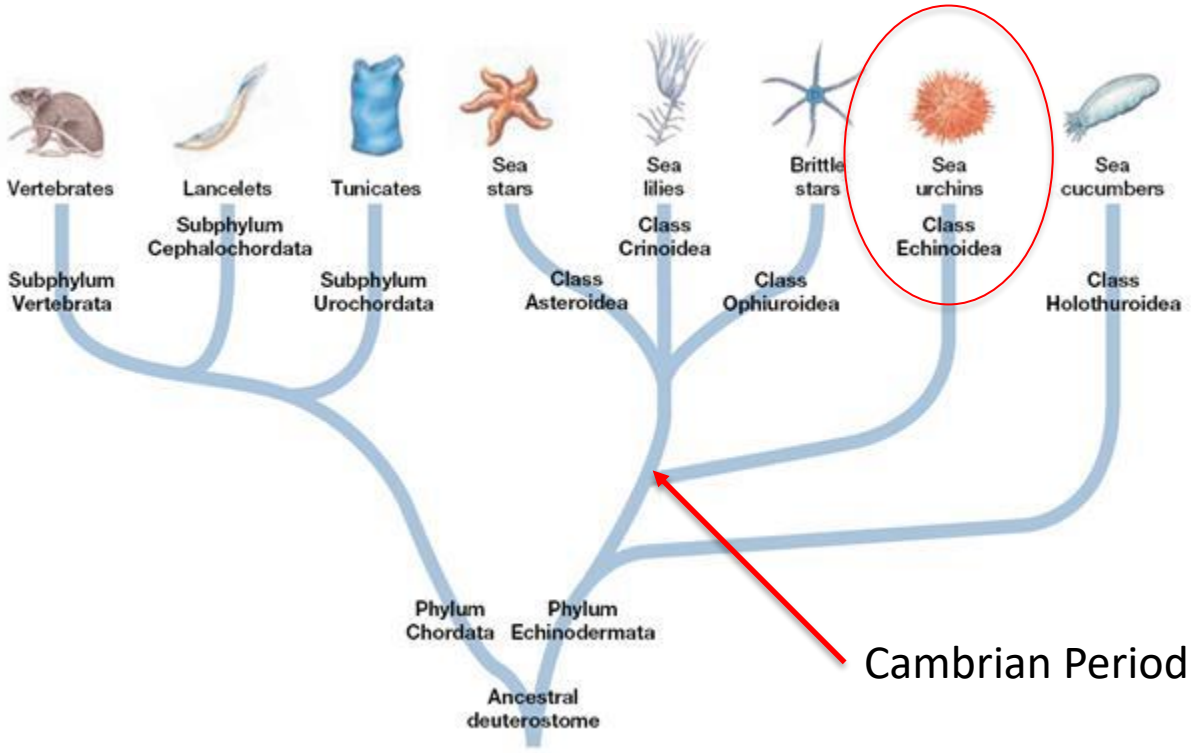
Echiniodea in the tree of life.



Why are we grouped together?

- Similarities
  - Five-fold symmetry.
  - Calcareous skeleton.
  - Internal hydrostatic system.





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Summary of the phylum.

- Globally estimated to be the 8th most diverse invertebrate group (Appeltans et al., 2012).
- South African fauna contributes 6 % to the total described species.
- Of this 6 %, 4 % represents endemic records within the region (Filander & Griffiths, 2013).

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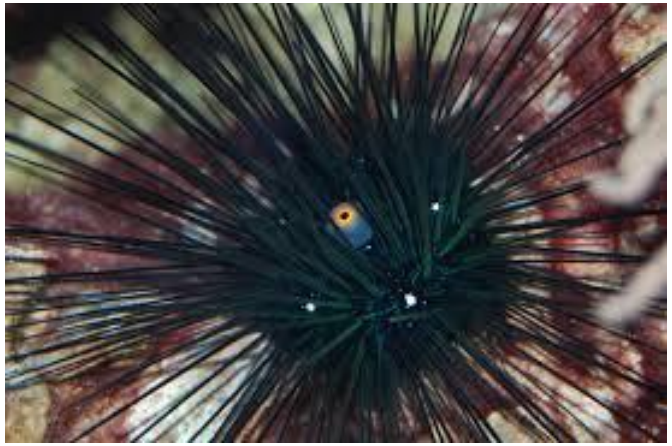
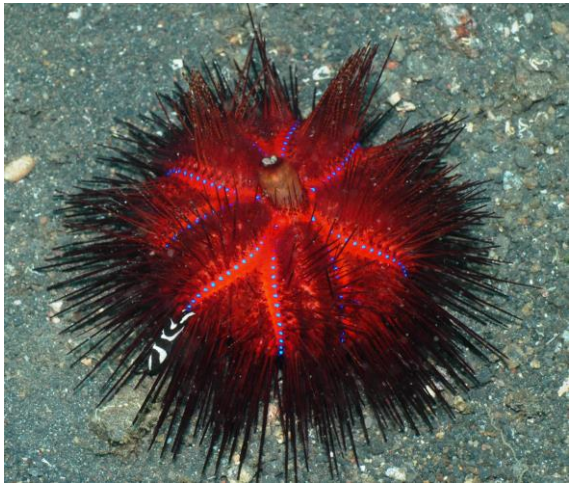
2. South African Echinoidea fauna

- Highly diversified group, inhabiting a range of marine environments.
- Large number of ecological studies have been done on common species of the class.
- Recent regional taxonomy limited to the work done by Filander & Griffiths (2013).





3. Taxonomy of echinoids

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“Regulars vs Irregulars”

Two categories based on test shape, symmetry and life-style

Astropyga radiata (Leske, 1778)

Regular sea urchins

- Globular test
- Mouth (peristome) situated on the underside (oral) and anal opening (periproct) situated on the upperside (aboral).
- Mostly grazers

Colobontrotus (Podophora) atratus (Leske, 1778)

Sand dollars

Echinodiscus bisperforatus(Leske, 1778)

Irregular sea urchins

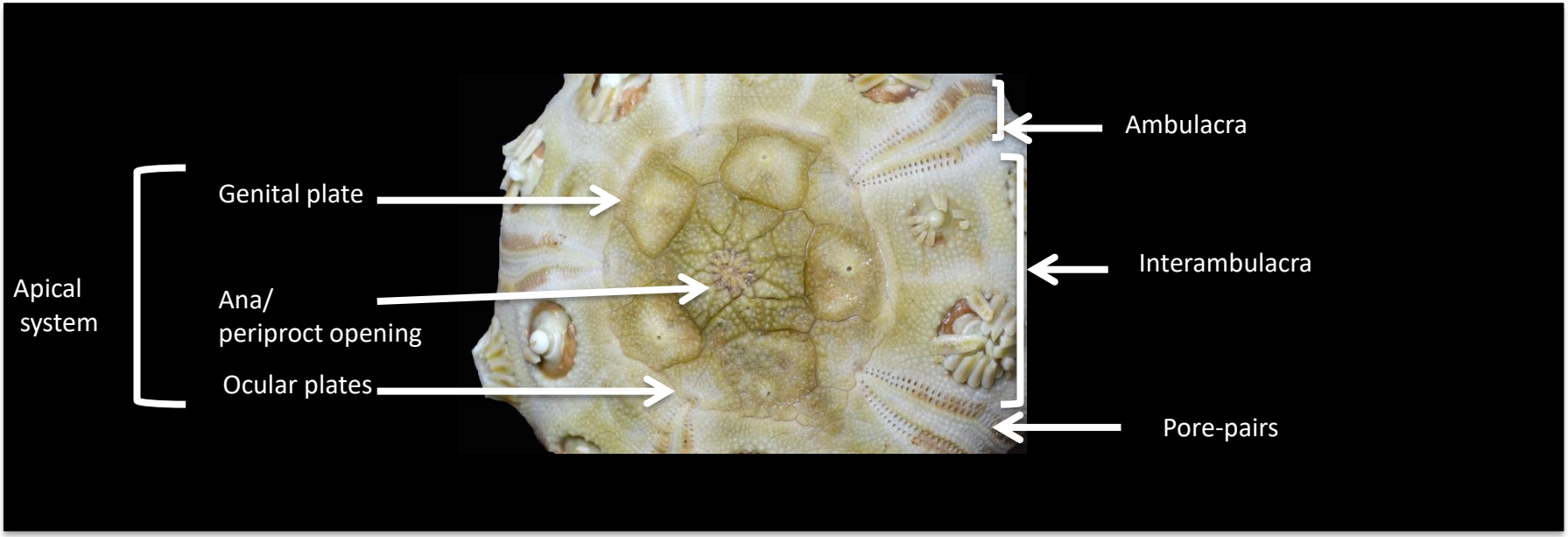
- Flattened test
- Mouth (peristome) moved to the front and anal opening (periproct) towards the rear end.
- Mostly detritus feeders

Heart urchins

Lovenia elongata (Leske, 1778)

Regulars

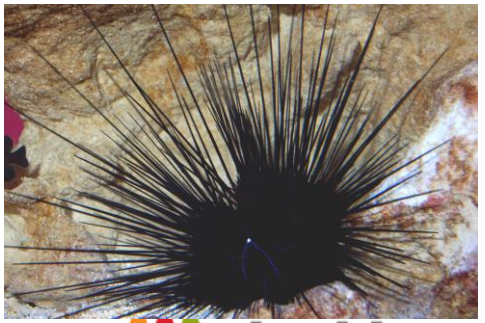
- Spines
- Apical system
- Tubercles



Spines

- Shape and size: sharp needle-like, stout blunt, flat tessellated etc
- Texture: ridged (all throughout, distally), smooth etc
- Pattern: spotted collar or not



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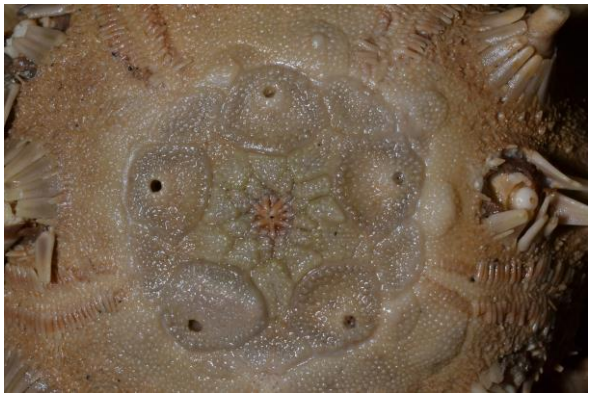
Apical system

Ocular plates not in contact with anal plating (dicyclic)

Histocidaris elegans (A. Agassiz, 1879)

Oculars in contact with anal plating (monocyclic)



Stereocidaris excavata (Mortensen, 1932)

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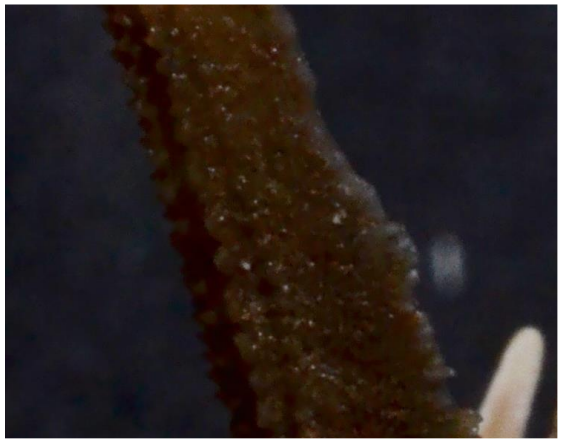
Tubercles

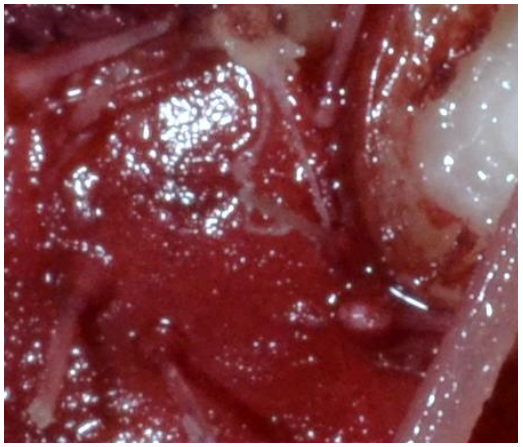
- Appearance

- Perforated
- Non-crenulated



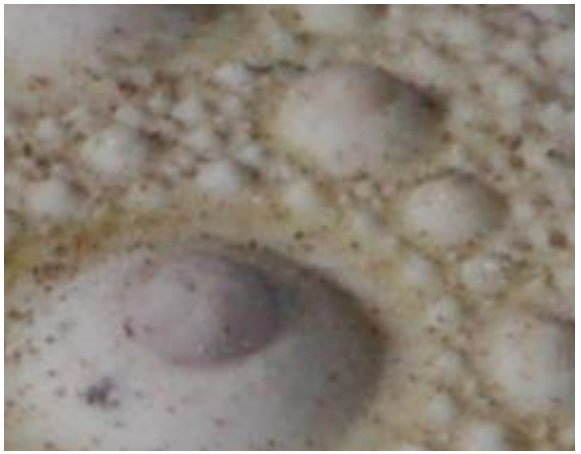
Stereocidaris alcocki (Anderson, 1984)

- Perforated
- Crenulated



Chaetodiadema africanum (Clark, 1924)

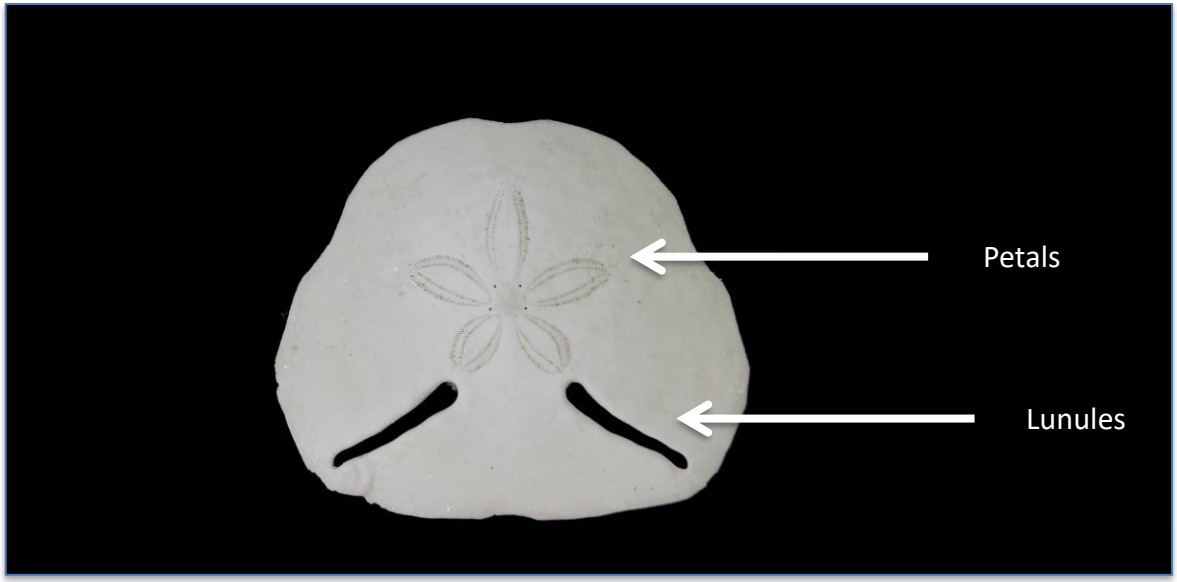
- Not perforated
- Non-crenulated



Stomopneustes variolaris (Lamarck, 1816)

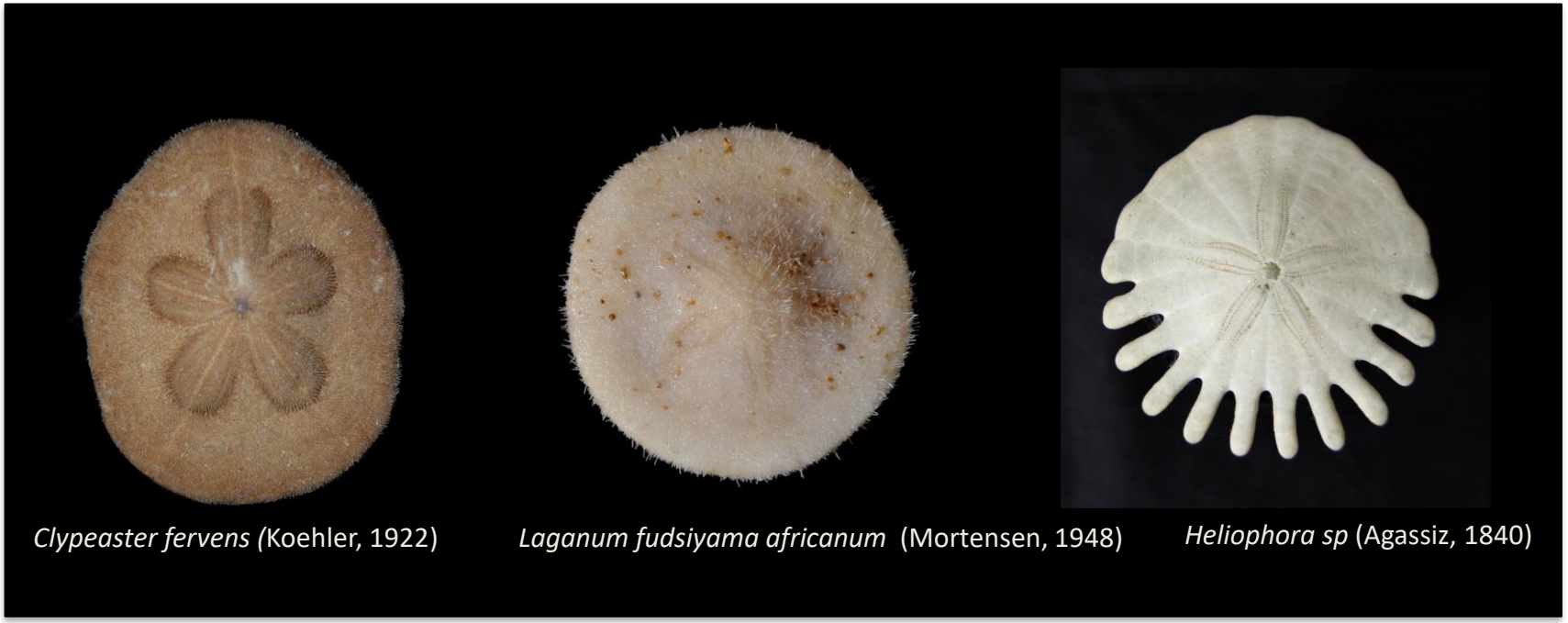
Irregulars: Sand dollars

- Petal
- Lunules



Petals

- Size
- Shape



Clypeaster fervens (Koehler, 1922)

Laganum fudsiyama africanum (Mortensen, 1948)

Heliophora sp (Agassiz, 1840)

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Lunules

- Position

Sculpsitechinus auritus (Leske, 1778)

Echinodiscus bisperforatus (Leske, 1778)

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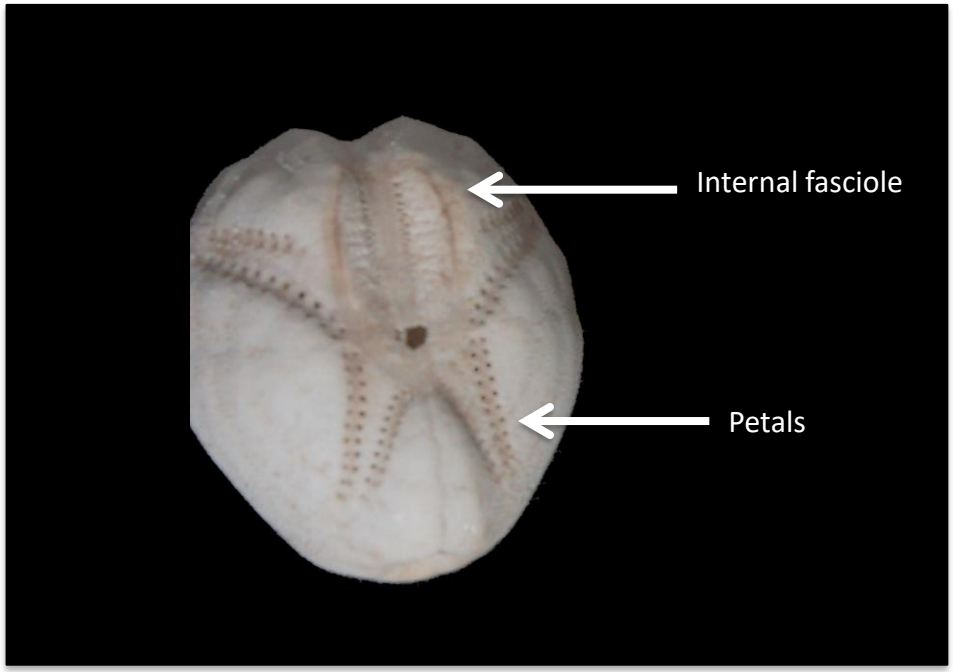
Irregulars: Heart Urchins

- Test shape
- Fascioles



Test

- Shape
- Height

Schizaster lacunosus (Linnaeus, 1758)

Metalia robillardi (Gray, 1855)

Spatagobrissus mirabilis (Clark, 1923)

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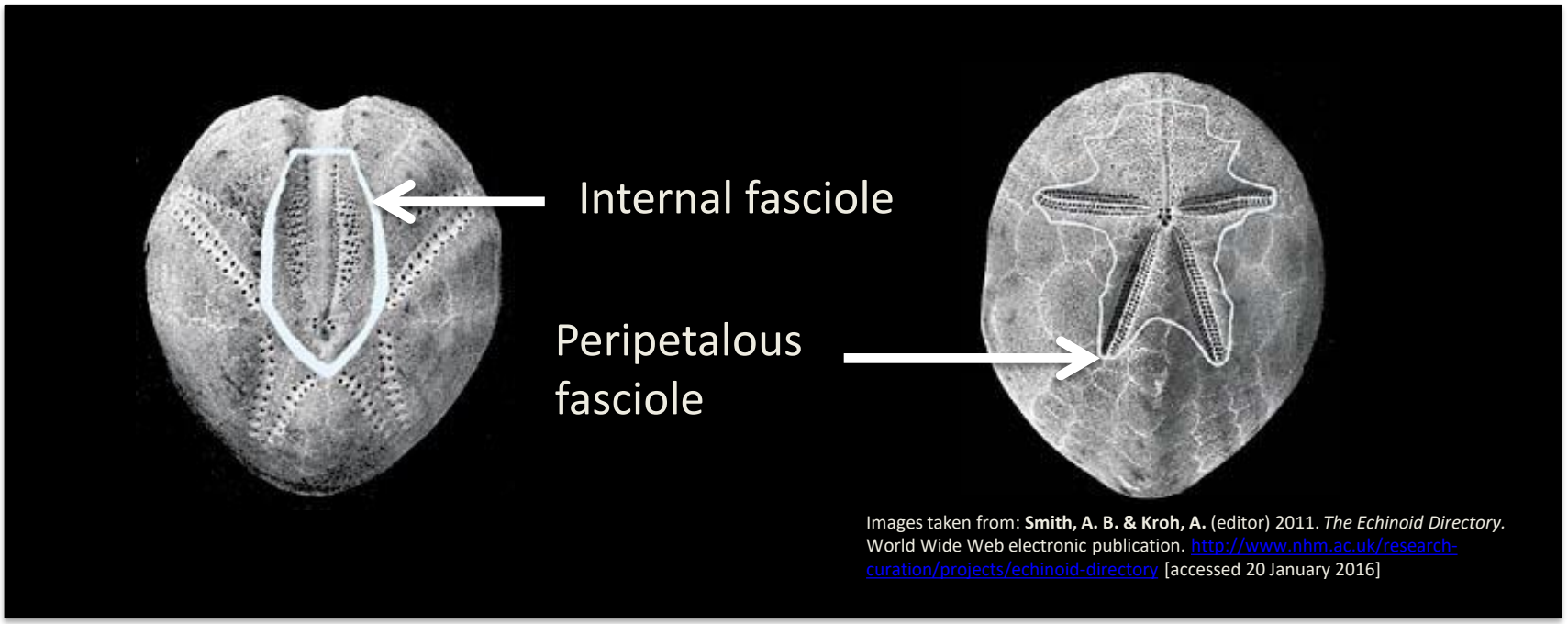
Fasciole

- Arrangement



Images taken from: **Smith, A. B. & Kroh, A.** (editor) 2011. *The Echinoid Directory*. World Wide Web electronic publication. http://www.nhm.ac.uk/research-curation/projects/echinoid-directory [accessed 20 January 2016]

4. Summary.

- Echinoids are benthic marine invertebrates .
- Common both globally and in South Africa
- There is a paucity of local taxonomy researchers.
- Two superficial groups:
  - **Regular.**
  - **Irregular.**

5. Questions ?

Recommended websites

- Echinoid directory
- World echinoid database
- World register of Marine Science
- iSpot
- EchinoMaps

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