Order Spatangoida

The first spatangoids evolved in the Lower Cretaceous – about 130 million years ago.
Today they are one of the most diverse orders of extant echinoids.

Their preferred habitats are soft bottoms, from coarse shell grit and sand to fine and even muddy sediments, where they live buried shallowly or to depths of more than 20 cm.
To be able to live in this environment the spatangoids have developed some important adaptations:
The **fascioles** are bands of small, densely packed spines with a ciliated shaft. The tiny cilia, very small hairs, beat coordinatedly to create water currents in the burrow, which brings fresh water to the respiratory podia in the paired petals – and sweeps away the "waste material". The spines of the fascioles end in fleshy tips which secrete a mucous coat, which infaunally living heart urchins require to prevent sandy particles from falling onto the test. The mucus is also used by the long funnel-building spines for plastering the base of the funnel that connects to the surface, and for transporting the food particles in a string to the mouth.
On naked tests the position of fascioles can easily be recognized as continuous bands of very small and closely-packed tubercles.
The **anterior ambulacrum** on the aboral side has become modified: The tube feet no longer serve for respiration, but are more or less differentiated for food manupulation or funnel-building.

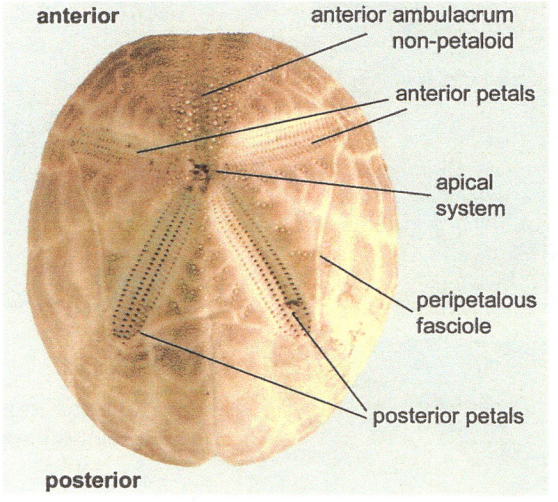

Fig.700. Aboral side of a brissid spatangoid:
The anterior ambulacrum is non-petaloid. The pore-pairs, in an uniserial or biserial row, are associated with specialized podia. They serve for food gathering, for funnel building, or as sensory podia.
The petals are sunken. The peripetalous fasciole surrounds the distal ends of the petals. (*Metalia spatangus*)

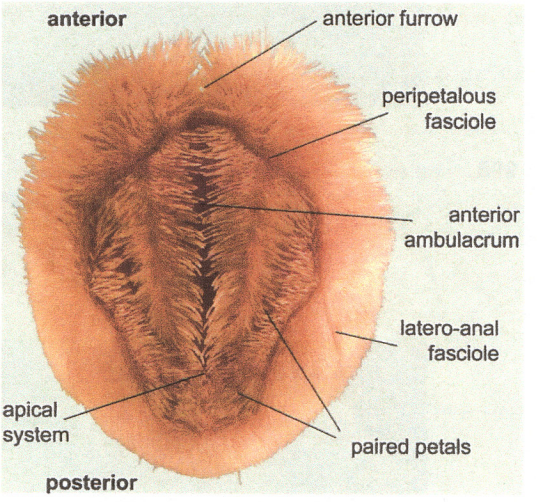

Fig. 701. Aboral side of a schizasterid spatangoid:
The fasciole bands are clearly visible between the spines. The paired petals and the anterior, non-petaloid ambulacrum are deeply depressed, and covered by long spines.
The peripetalous fasciole passes around the petals, the latero-anal fasciole leads around the posterior end. (*Ova canaliferus*)

On the **oral side** the plates of the posterior interambulacrum IA 5 have become differentiated:
The **labrum**, a single plate, lies just behind the peristome more or less covering the mouth like a lip.
The **sternum**, a pair of plates, follows posteriorly. Eventually there are paired **episternal** plates between the sternum and the periproct.

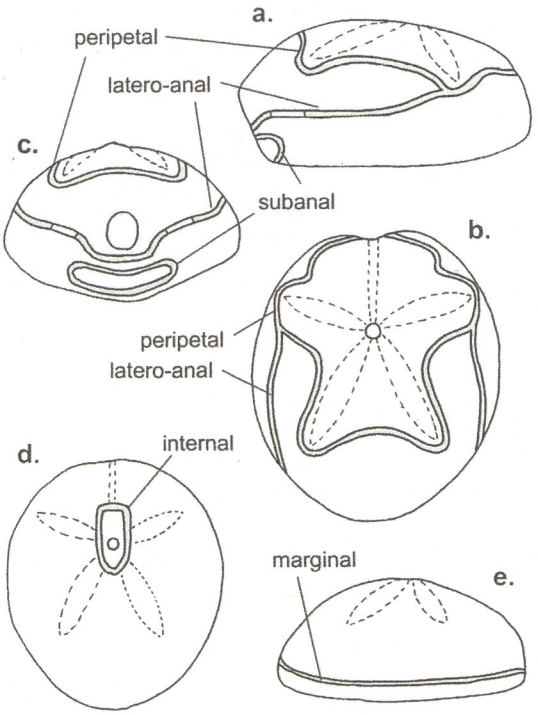

Fig. 702. Arrangement of fascioles:
a. profile, b. aboral side, c. posterior side.
The **peripetalous fasciole** sourrounds the petals close to their distal end.
The **latero-anal fasciole** branches from the peripetalous fasciole behind the anterior petals and passes beneath the anus.
The **subanal fasciole** is ring-shaped, bilobed or formed like a shield. It encloses often one or two tufts of longer spines and/or larger podia specialized to discharge the waste to the posterior end. In some species **anal branches** expand to both sides of the anus.
d. Aboral side: The **internal fasciole** runs around the apical disc within the petals, more or less expanding at the anterior ambulacrum A III.
e. Profile: The **marginal fasciole** follows the margin and passes beneath the anus
(After Durham et al. 1966)

Several combinations are possible.

The composition of the enlarged sternal and episternal plates is called the **plastron**, the different patterns are important for specific determination. The plastron is covered to a various degree by tubercles set with spines specialized for locomotion in the sediment. They are often spatulate. The adjacent ambulacra A I and A V are more or less naked

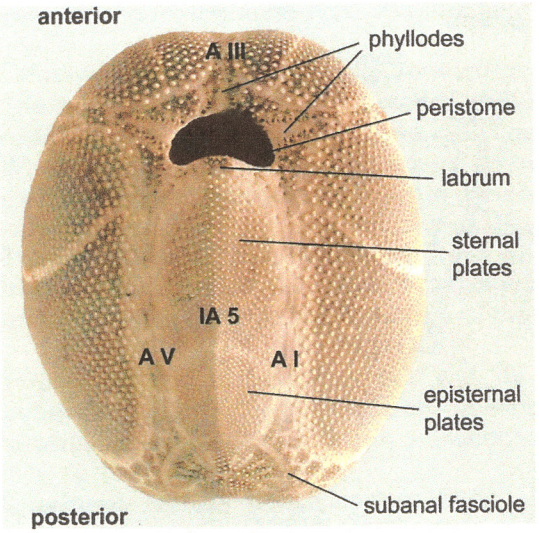

Fig. 703. Oral side of a brissid spatangoid:
The plastron is built by the paired sternal plates and, in some groups only, the paired episternal plates. The subanal fasciole lies at the posterior end below the periproct, and is shield-shaped.
(*Metalia spatagus*)

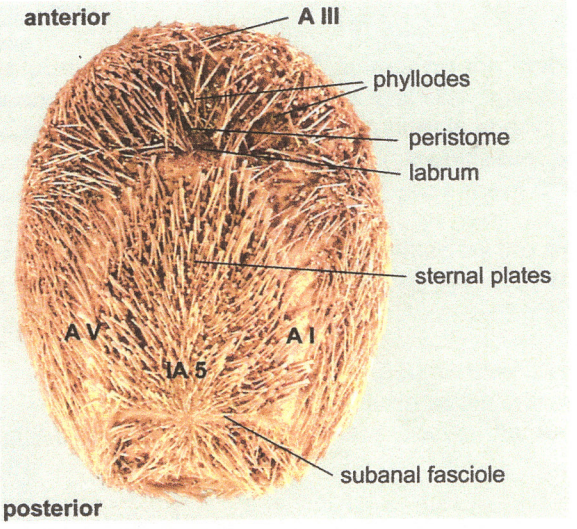

Fig. 704. Oral side of a brissid spatangoid:
The labrum partly covers the peristome. The sternum is set with spatulate spines, specialized for burrowing, the adjacent ambulacra A I and A V are more or less naked. The subanal fasciole is bilobed.
(*Brissus latecarinatus*)