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The Good, the Bad and the Ugly : How to photograph echinoderms in the field for identification

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The Good, the Bad and the Ugly :

How to photograph echinoderms in the field for identification.



Dr. Frédéric Ducarme (MNHN), 2025

(based on L. Harris, 2016)

All pictures by the author

What experts want to see

- **One species** per observation, either a single individual or several (for example if gregarious)
- **Isolated animals on simple background**
- Good, sharp **focus**
- Natural **colors** (use flash, artificial light or photo editing for dives deeper than 2m)
- Animals fully submerged **in water** so appearance is natural, not flat or clumped
- Bright even **light**, no glare or shadows (you can edit by computer)
- Subject occupies at least **75%** of photo (you can **crop** the image)
- **Multiple images** to show both overall appearance & details
- Use **macro** setting for small animals or details of body.



The Good, the Bad and the Ugly

The good : Sharp focus on
1 subject, good light &
color.



The bad : Poor focus,
subject too small, too
much contrast, poor light



The ugly : Out of focus,
badly lit, color wrong,
unsure of subject



The Good, the Bad and the Ugly

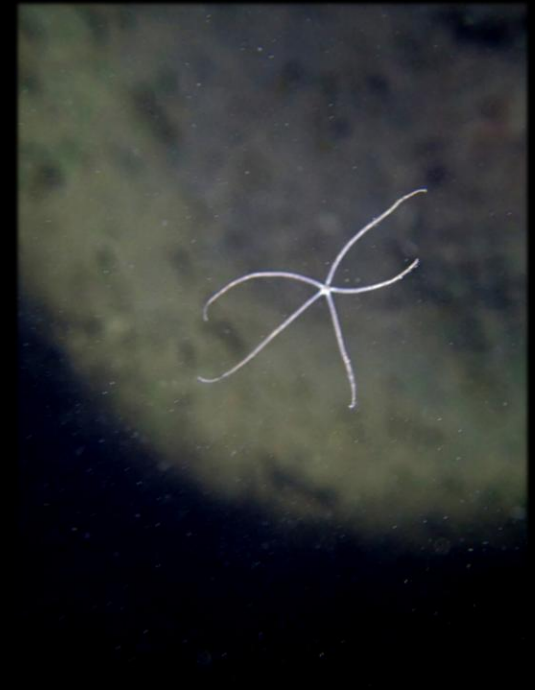
Excellent lab macro on
clean background



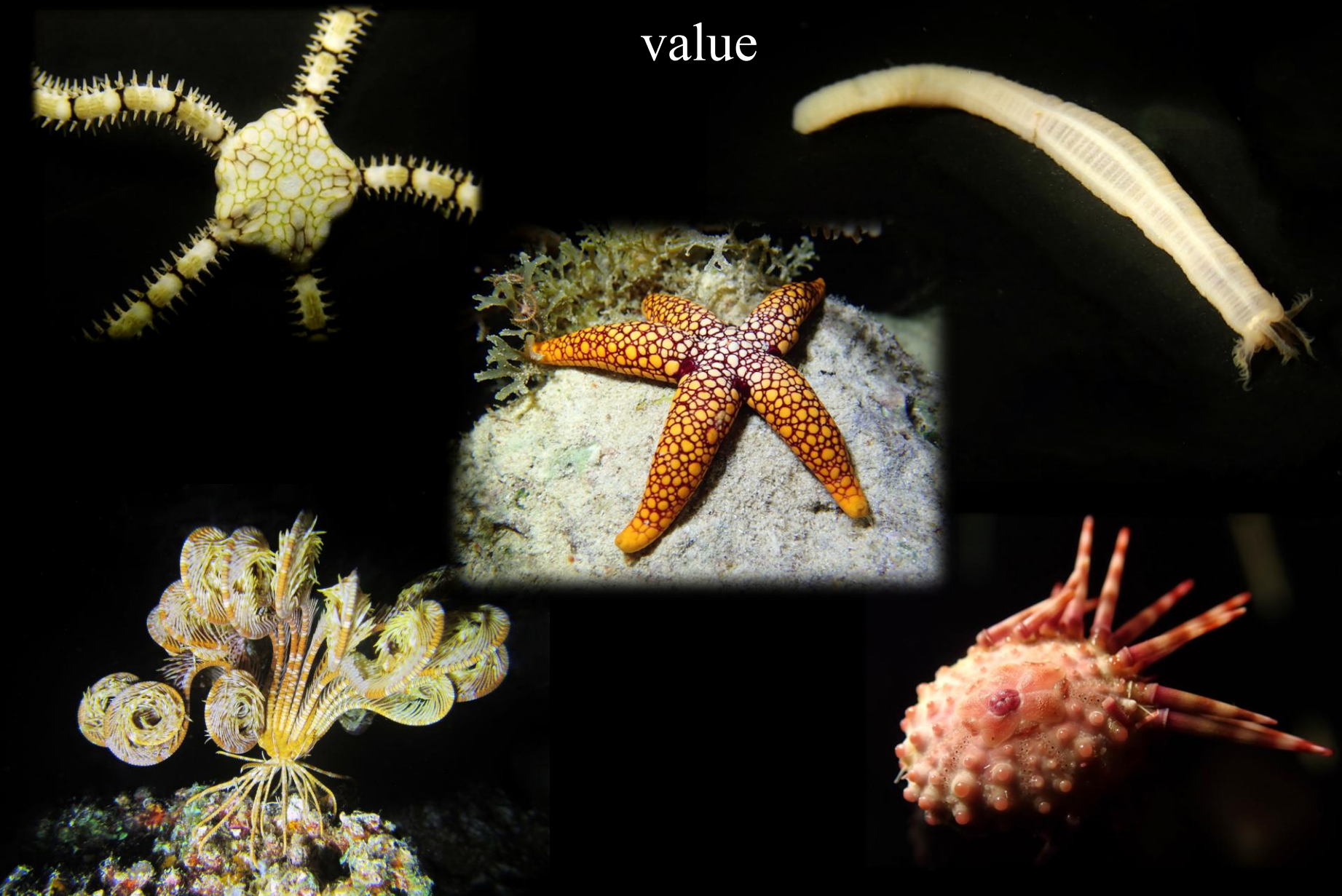
Where's the animal?



Too small, no focus, no
detail



How to photograph the 5 classes of echinoderms for maximum value



How to photograph sea stars (Asteroidea)

One general picture in natural
habitat with good light



A good and sharp close-up
of the aboral face



A good and sharp close-up
of the oral face, showing
ambulacral spines



How to photograph sea stars (Asteroidea)



Some species (Goniasteridae, Oreasteridae...) may need an additional lateral view to show the marginal plates or tuberculation



Some others (Paxillosida...) may need close-ups of marginal spines

Other organs such as pedicellariae may also be useful when visible



How to photograph brittle stars (Ophiuroidea)



One general picture in natural habitat with good light



A good close-up of the central disc showing plates, granulation, radial shields, arm plates and arm spines

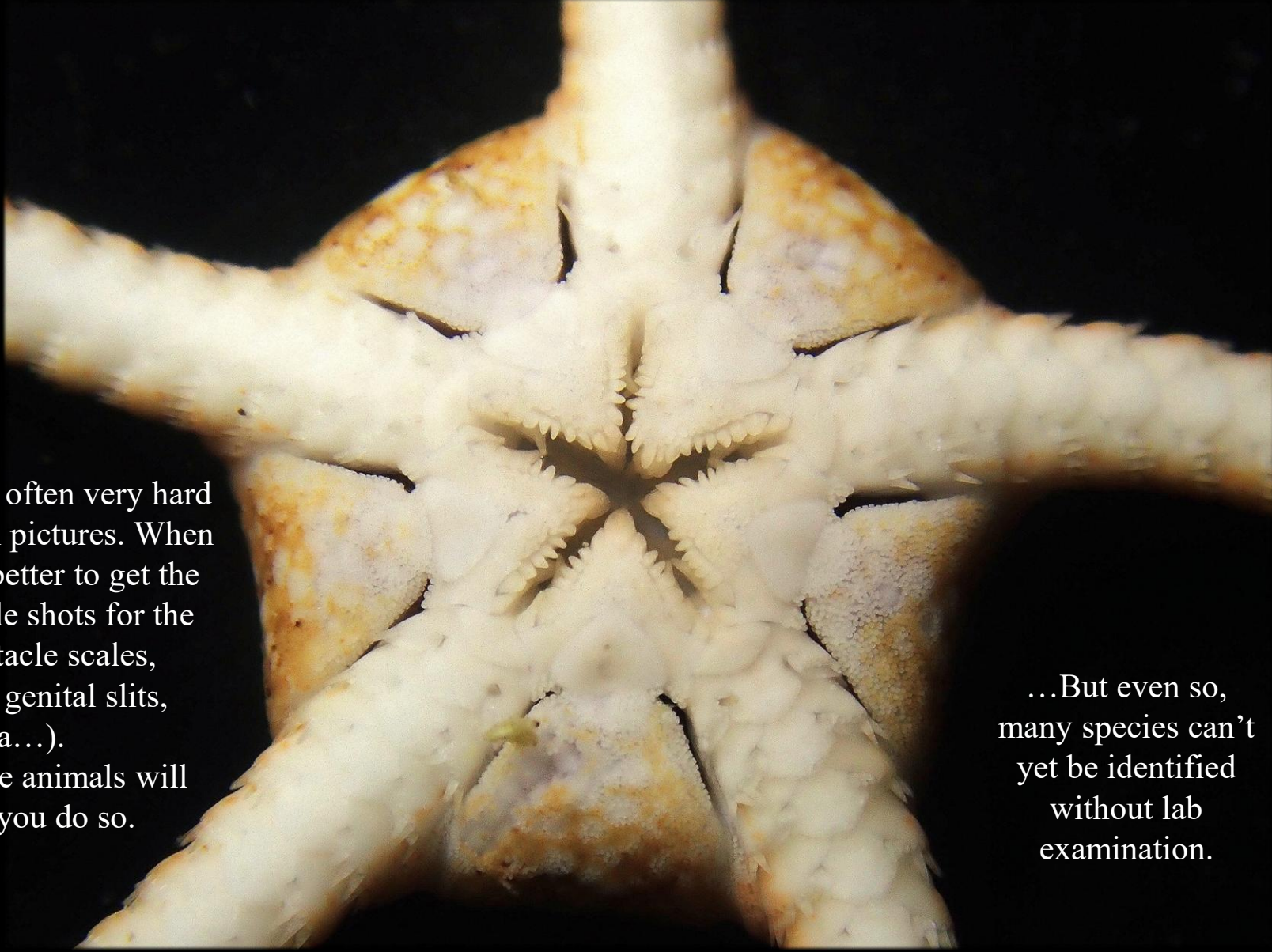


A good close-up of the oral face showing buccal shields, jaws, teeth and underside of arms. The teeth are minute, but they are very useful for determination !

The number and shape of arm spines can be useful too.



How to photograph brittle stars (Ophiuroidea)



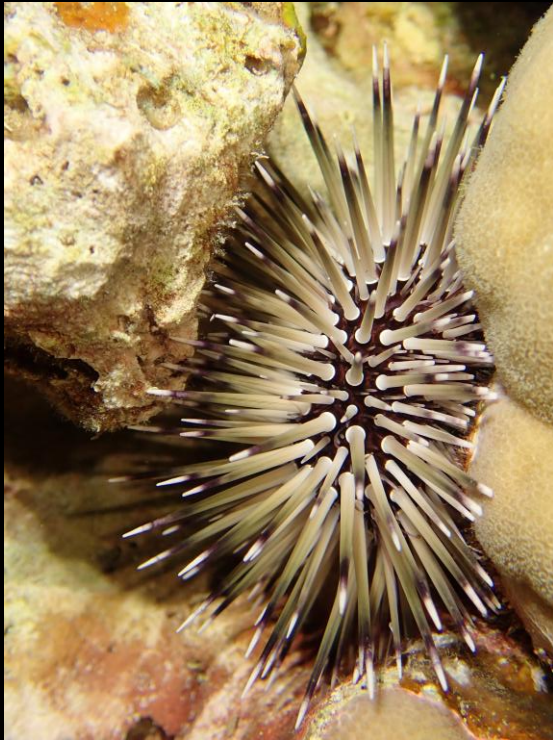
Brittle stars are often very hard to identify from pictures. When possible, it is better to get the closest possible shots for the details (tentacle scales, granulation, genital slits, podia...).

Of course, live animals will rarely let you do so.

...But even so, many species can't yet be identified without lab examination.

How to photograph sea urchins (Echinoidea)

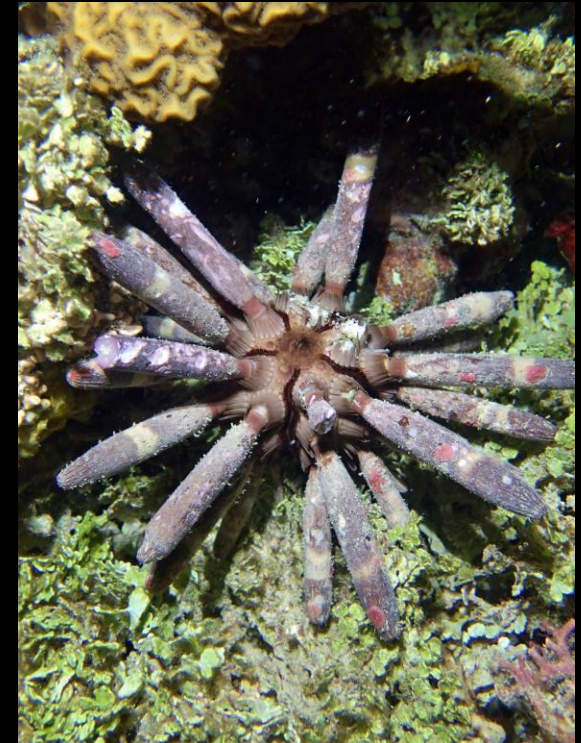
There are 3 major morphological groups of sea urchins :



“Regular” sea urchins :
Spherical to sub-spherical shape,
tapering spines



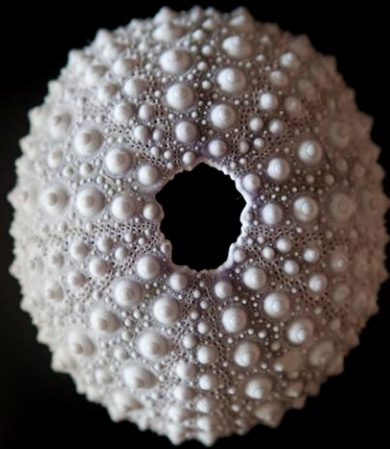
“Irregular” sea urchins :
Potato or flat shape, short spines,
mostly sand dwellers



“Cidaroid” sea urchins :
Large, blunt, naked spines, often covered
with greyish algae, scale-like secondary
spines covering the body

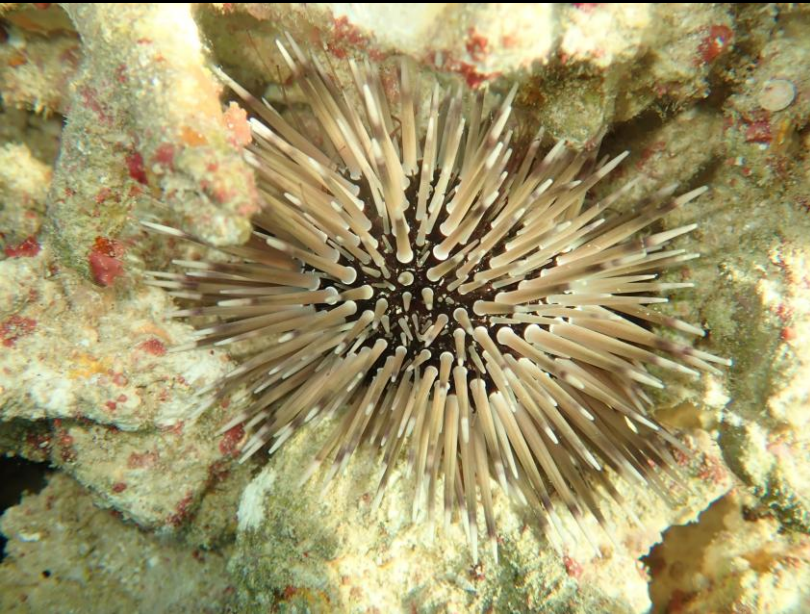
How to photograph sea urchins (Echinoidea)

The identification of sea urchins is mostly based on dead, naked “tests” (shells)



⇒ Some species (mostly irregulars) can't be identified from live animals.

How to photograph regular sea urchins



A good general picture with good lighting
(not always easy with dark body, spines, etc)



If relevant/visible, close-ups on any details :
apical system, anal papilla, iridophores,
different types of spines...

...And of course
if available, good
pictures of all
sides of the test.



For collection
purpose, the best is a
partially denuded test.

How to photograph irregular sea urchins



A good live picture is always nice, but rarely useful here. These species are seldom seen alive.



Good pictures of a clean test showing all the details and ornaments that we need to see.



For some spatangoid groups, the subanal shield is also useful, along with the fascioles (thin lines surrounding some parts of the test)

How to photograph cidaroid sea urchins



A good general view



Close details of the apical system



The spines are very useful here, especially if ornamented

If possible, the best is to get a clean test showing all the minute details.



How to photograph sea cucumbers (Holothuroidea)

Sea cucumbers are a very difficult group to identify, as they rarely display many external traits. For some groups (Synaptidae, many small *Holothuria*, burrowing Dendrochirotida...) it is often impossible to get any lower than the family from pictures, and identification requires lab examination of the dermal spicules or DNA analysis.



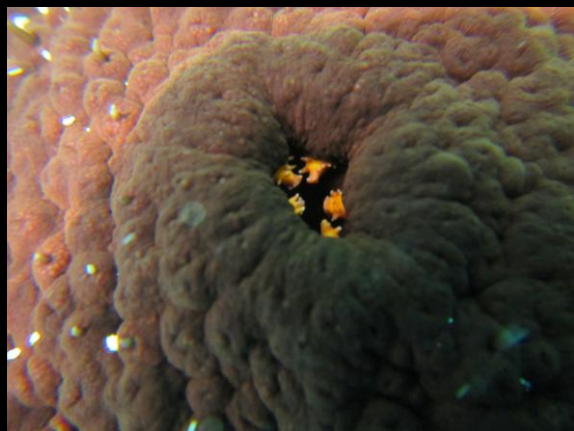
A good general view is a nice start, even if it does not always help much for very plain-looking species.



A close, lateral view with proper lighting can also show more details (but don't disturb them, otherwise they will retract all appendages)

How to photograph sea cucumbers (Holothuroidea)

Useful details include :



The cloaca (anus), especially if it displays anal teeth like here



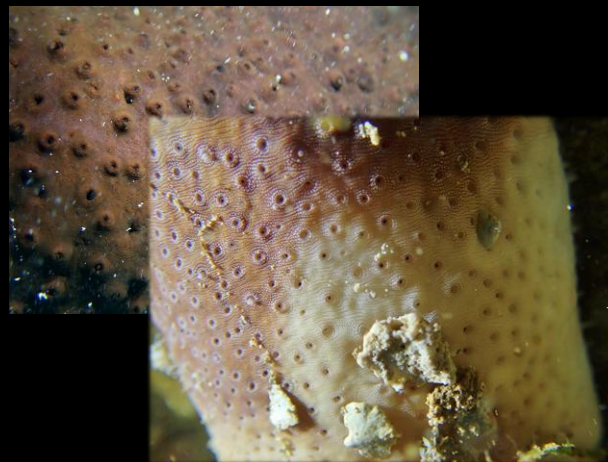
Podia (tube feet), extended if possible, macro if possible



When visible, the oral tentacles are a useful trait (but they will retract them if disturbed)



Some Holothuriidae can expel Cuvierian tubules from their cloaca when disturbed, which can be diagnostic



For some species, closer details of the dorsal papillae can be useful too.

How to photograph sea cucumbers (Holothuroidea)

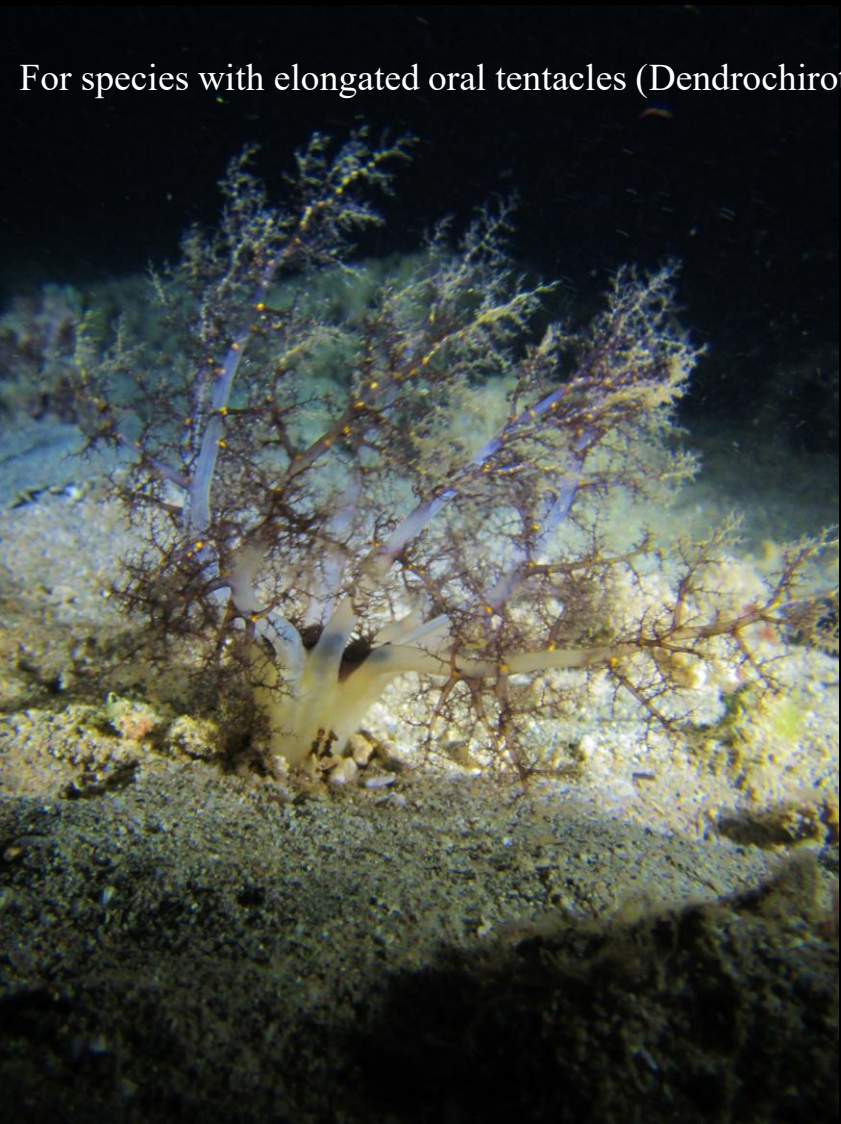
You may want to clean them from their sand covering to see them better : this can be useful in some cases, however the particular way they cover with sand can also be diagnostic, like here for *Holothuria atra*.



Also, such operation is stressful for them and will cause contraction and very often the expulsion of their Cuvierian tubules, so handle them sparingly.

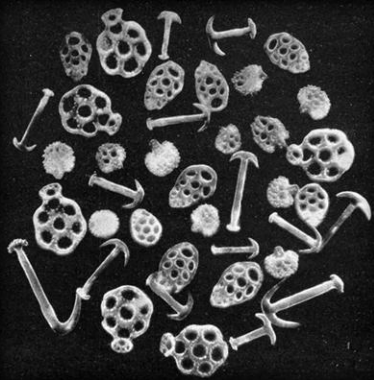
How to photograph sea cucumbers (Holothuroidea)

For species with elongated oral tentacles (Dendrochirotida, some Apodida), good details of these structures are always useful.



How to photograph sea cucumbers (Holothuroidea)

In some rare cases, a very good macro camera will allow you to picture the spicules, but don't count on it too much.



How to photograph feather stars (Crinoidea ; Comatulida)

Feather stars are the hardest group after brittle stars : colors are rarely diagnostic, and identification requires very minute details such as oral spines and aboral basal articulations, all details that are difficult to access in live specimens.



A good general view is always a first step, although insufficient. Many species won't even let you get this...

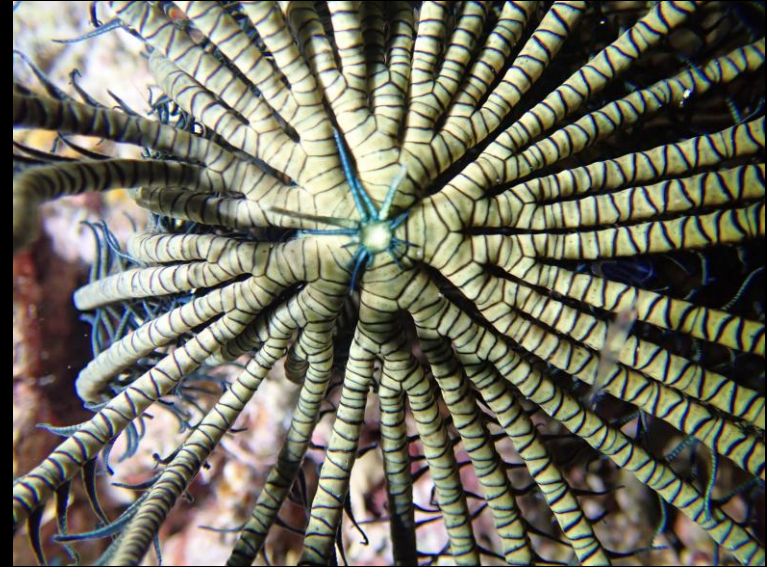
But the habitat and posture can also be diagnostic in some cases.

How to photograph feather stars (Crinoidea ; Comatulida)

Useful details include :



All you can get from the central body, especially proximal spines, but also mouth, anus...



If in reach, good details of the division series of the arms, which constitute the main taxonomic trait. Getting this kind of picture from a live animal is rarely possible...



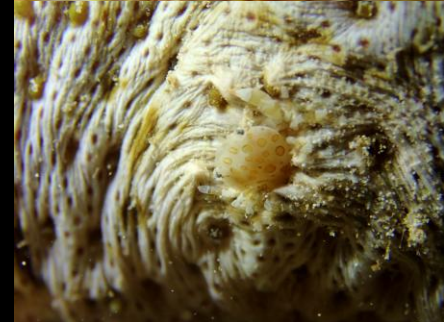
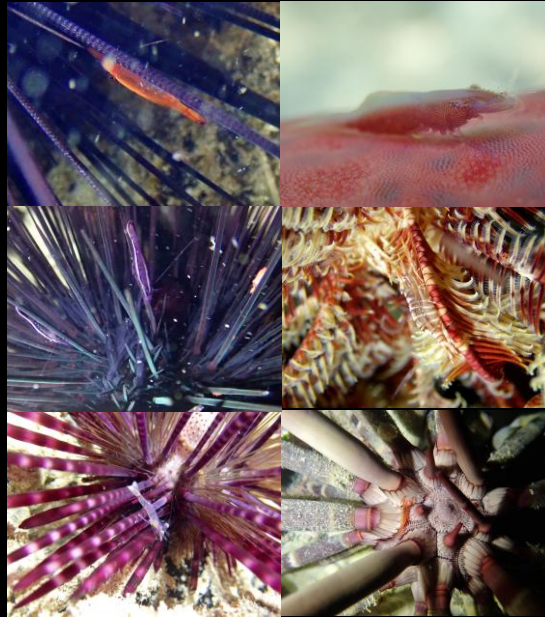
The claws (cirri) are also often useful, when present. (abyssal species have a stem instead)

Except for a handful of species, colors and patterns are mostly random, hence meaningless. Close-ups of the arms are also rarely useful, despite being the only visible part for many species.

Last but not least : keep an eye for symbionts



Many smaller animals love living on big, slow and well-protected echinoderms.



Crabs

Shrimps

Comb jellies

Gastropods

Worms



Etc...



Copepods