

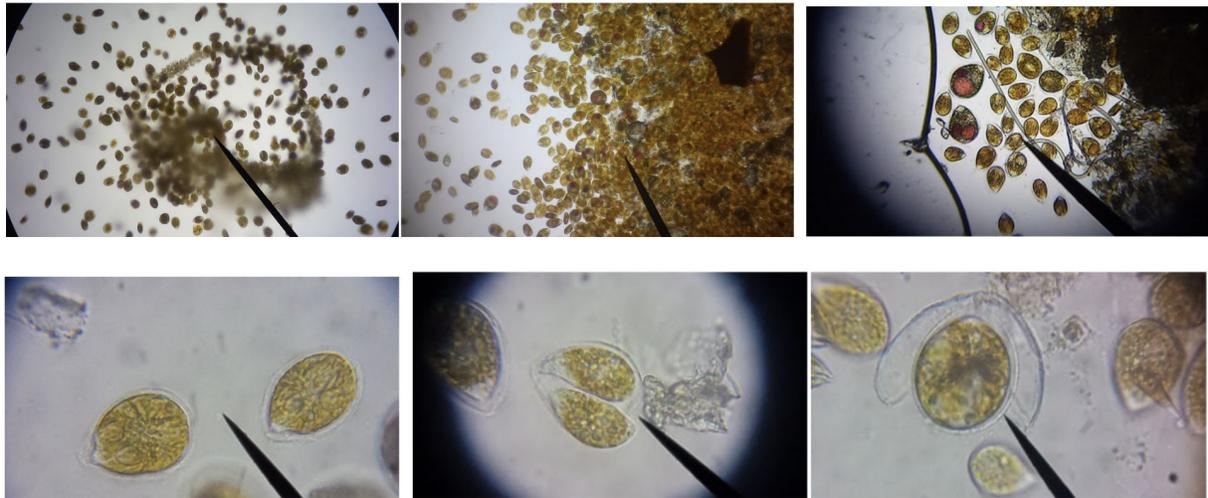
A Guide to Dinoflagellate Identification in Reef Aquaria

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Version: 12/12/2019

The Big 3

Ostreopsis



Top left and center: *Ostreopsis* populations. Top right: abnormal cells with red accumulation bodies compared to normal cells. Bottom Left: normal cells. Bottom center: cell division taking place within theca. Bottom right: cell either shedding theca to enter cyst state, or shedding short term cyst to resume normal growth.

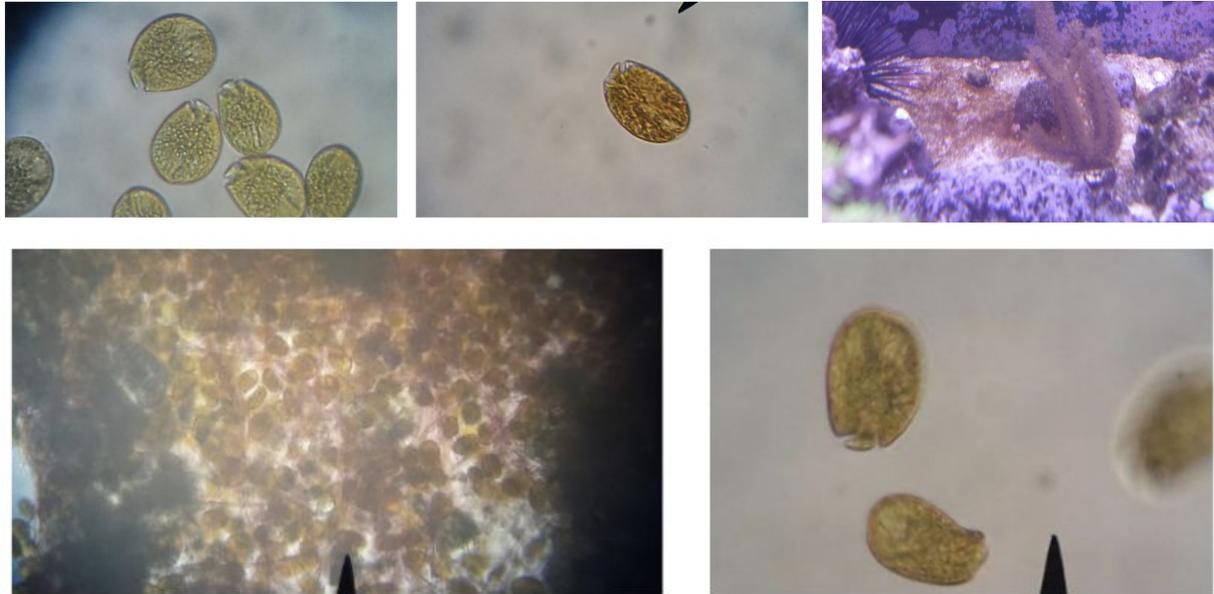
[Videos \(AlgaeID\)](#)

[Videos \(Author\)](#)

Size:~40-80µm	Mucus: Medium	Tank Position: High
Toxin: High	Strands: Long >1" (microfibers)	Cysts: 2 kinds
Night Migration: Into Water	Bubbles: High	Surfaces: Rock, Macros, Coral skeleton, rough etc
Armor: Yes	Flow: High	
Similar Described Species: Ostreopsis Ovata	Sesame seed shape with lighter colored pointed end. Often spins in circle with point toward the center of spin. Clear cellulose shell (theca) often visible as outline of the cell.	

The most common bloom culprit and accounts for the majority of tank losses due to dinos, can make long strands by combination of microfibers and mucus. Two types of cysts: short term - hours to days, or long term - months until warmth and nutrients are favorable. In wild, forms huge blooms covering macroalgae.

Amphidinium (Large-Cell)



Top left and center & bottom right: Large Cell Amphidinium. Top right: outbreak on sandbed. Bottom left: Large Cell Amphidinium colonizing a cyano mat.

[Videos \(Author\)](#)

[Video \(AlgaeID\)](#)

Size: ~30-60µm	Mucus: Low	Tank Position: Bottom
Toxin: No/Low	Strands: None	Cysts: None
Night Migration: Into Sand	Bubbles: Low	Surfaces: Sand, Rock, Cyano Mats
Armor: No	Flow: Low	
Similar Described Species: A. operculatum(?) A. mootonorum(?)	Oval shape with a "beak" at the front. In some populations, beak tilts left / right. No armor, and cells can be slightly flexible in shape. Moves "like a roomba" -Jason_1982	

Brown dusty appearance resembles diatoms to the eye. Due to staying in/under sand, less susceptible to chemical kill methods than other species, and cannot be targeted by UV or other water filtration methods. Unharmed by extended darkness and metronidazole (antibiotic that affects chloroplast). May be susceptible to grazing (snails, amphipods etc) due to low toxins. Least harmful type of dino, so aggressive "treatments" kill much more livestock than the dinos.

Prorocentrum



Left: Prorocentrum. Right: Prorocentrum with Ostreopsis cells

[Video1](#)

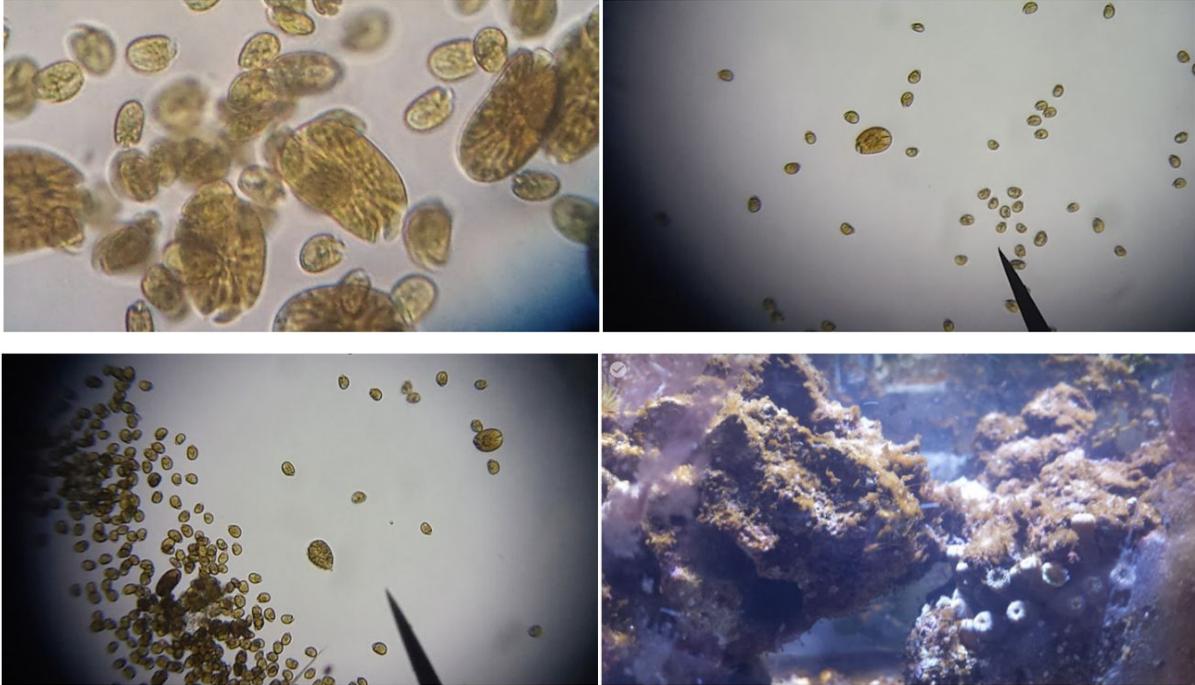
[Video2](#)

Size: ~30-60µm	Mucus: High	Tank Position: Middle to Low
Toxin: Med/High	Strands: Short or none	Cysts: Yes
Night Migration: Into Water (less willing)	Bubbles: Med	Surfaces: Macros, Any Surface
Armor: Yes	Flow: Medium	
Similar Described Species: Prorocentrum Lima	Perfectly left/right symmetric ovals with small indentation at the front. Circular structure in center of cell (pyrenoid). Theca not usually visible unless it's been shed. Movement style like amphidinium, but less. Most likely dino to be motionless.	

Least common of the “common” varieties. Can colonize any surface - even live copepods - by heavy mucus production. Swims almost identically to Large Cell Amphidinium, though frequently seen motionless in mucus. Goes into water but needs some change in conditions (like short blackout) to trigger large nightly migration into UV.

Others Rarely Found in Aquaria

Amphidinium (Small Cell)



Top left & right: Small Cell Amphidinium with Large Cell Amphidinium. Bottom left: Small Cell Amphidinium with *Ostreopsis* cell center and Large Cell Amphidinium upper right. Bottom right: Mixed Small/Large Cell Amphidinium outbreak on rocks.

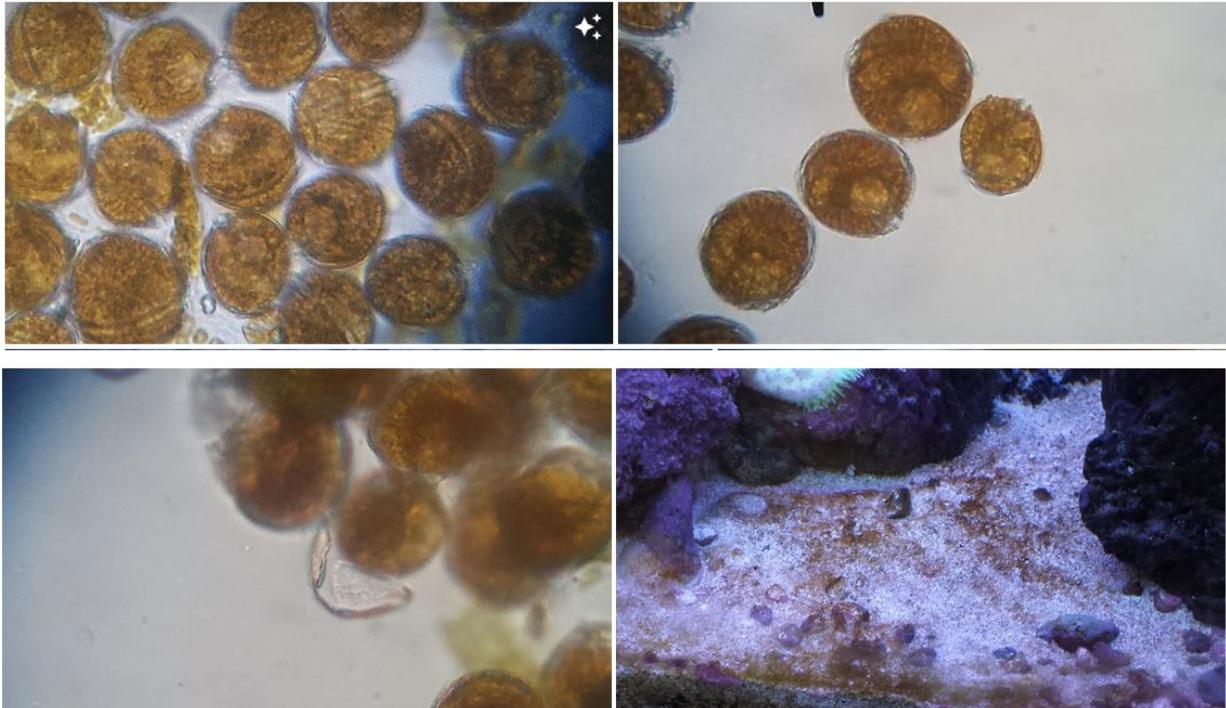
[Pics and Vids \(author\)](#)

[Video \(author\)](#)

Size:~10-15µm	Mucus: Low	Tank Position: All
Toxin: Low-Medium	Strands: Short	Cysts: No
Night Migration: Into Water	Bubbles: Low	Surfaces: Rock, Any
Armor: No	Flow: Medium	
Similar Described Species: Amphidinium Carterae	Appears like the more common Large-Cell Amphidinium, except roughly a third or fifth of the size, and much faster and more active swimmer. Beak always with a sideways bend.	

Most active, fastest swimmer of our dinos and spreads easily to all surfaces. Due to movement into the water and its toxins, should be treated as similar to all other dinos and not like the large cell amphidinium cousins. Has been reported to self-destruct by 9th day of darkness.

Coolia



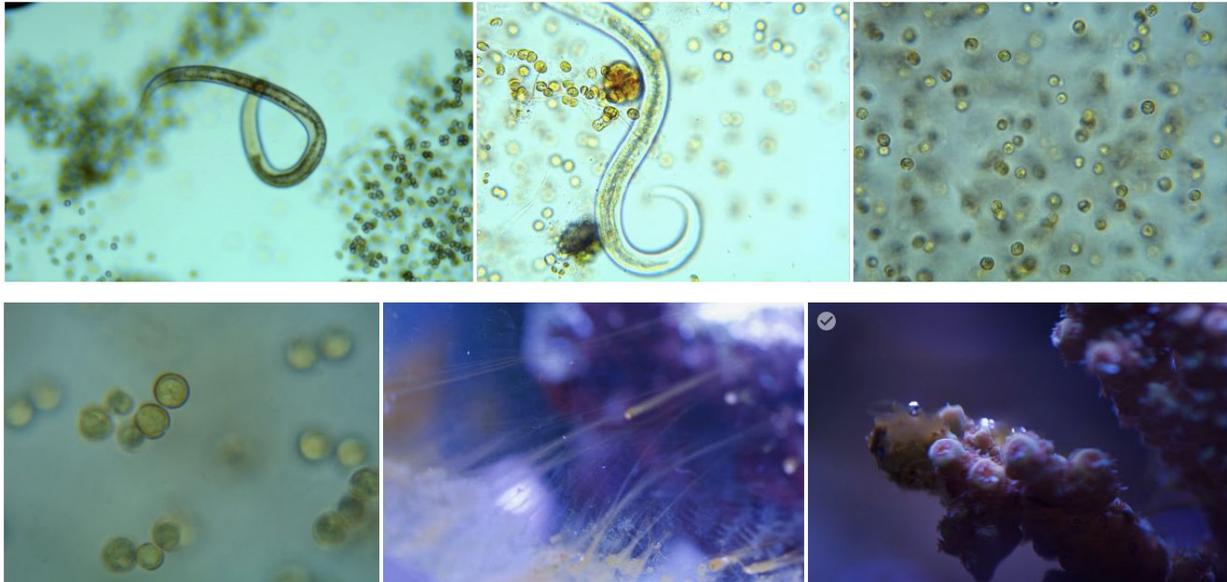
Top left & right: *Coolia* cells. Bottom left: theca being separated from cell. Bottom right: *Coolia* outbreak on sand in a tank.

[Pics and vids](#)

Size: ~30-50µm	Mucus: Medium	Tank Position: Low
Toxin: Low-Med	Strands: Short	Cysts: Yes(?)
Night Migration: Into Water	Bubbles: Low	Surfaces: Rock, Algae, Sand
Armor: Yes	Flow: Low	
Similar Described Species: <i>Coolia Monotis</i>	Almost spherical, strong grooves cut across the cell. Theca (armor) is apparent. Moves in short bursts with change in direction. Overall effect is moving in small circles.	

Very closely related to *ostreopsis*, and should be treated similarly, but is much more likely to be found on the sand. Like *prorocentrum*, may need additional changes to force into the water to be UV susceptible.

Symbiodinium-like (Chrysophyte?)



Top left & center: Symbiodinium-like cells with a nematode - (center also contains a planktonic dinoflagellate - likely Akashiwo).
 Top right and Bottom left: Zoomed in view of cells. Bottom center: cells & mucus forming strands. Bottom right: cells & mucus forming blobs. Pics courtesy user NCreefguy

[Pics](#)

Size:~5-15µm	Mucus: Very High	Tank Position: Middle
Toxin: Low(?)	Strands: Long >1"	Cysts: No(?)
Night Migration: ?	Bubbles: Low	Surfaces: Rock, Any
Armor: No	Flow: Any	
Similar Described Species: Sarcinochrysis marina(?)	Very tiny, entirely motionless golden cells. Embedded in thick mucus. The mucus hold its shape out of water, which is distinguishing from dinoflagellates. Additionally, is more yellow than more brownish dinoflagellates due to pigment differences..	

This is not a dinoflagellate. It is believed to be a chrysophyte, but is included because its blobby mucus-y appearance is only elsewhere seen in dinoflagellates.

Others

There are 2000+ species of dinos so many different species could be present in an aquarium, but people's reef tanks all seem to create similar conditions that allow only the same few species to bloom. If, however you have a non-standard system like no skimmer, then your tank will be habitable by a much wider, totally different population of dinos than those discussed here.