

Goniopora Rocks!!

Aquarium Culture
of Goniopora





**Goniopora are
impossible to keep**

The Goniopora Situation


- Most people who have tried to keep Goniopora have failed
- Dozens of reported successes with Goniopora
- What many had in common :
 - **No mechanical filtration**
 - **Deep Sand Beds**
 - **Refugiums**
 - **Little or no Protein Skimming**
 - **Addition of phytoplankton supplements**

The Goniopora Situation

- System designs encourage growth of zooplankton
- Invertebrate egg and larvae increase
- System design also makes available more dissolved organics and possibly bacteria as a food source
- Many commonly imported species of Goniopora found in turbid, nutrient laden water

The Science and Technology Magnet High School of Southeastern Connecticut

SCIENCE & TECHNOLOGY MAGNET SCHOOL OF SOUTHEASTERN CONN







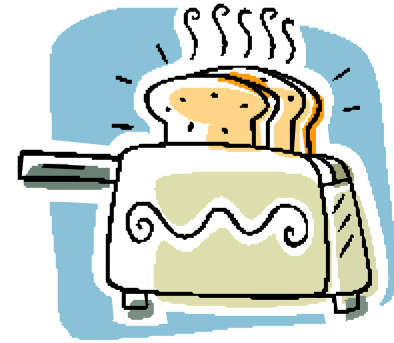
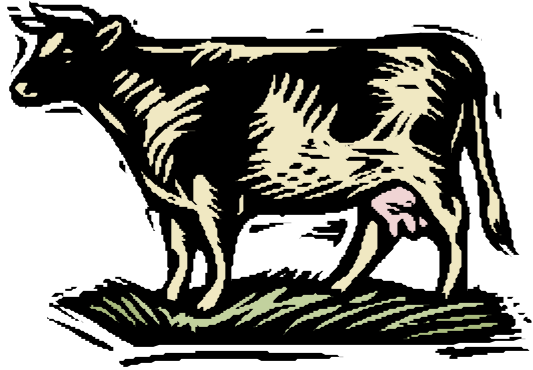








Notes on Food



#\$* @%!! Shrimp!

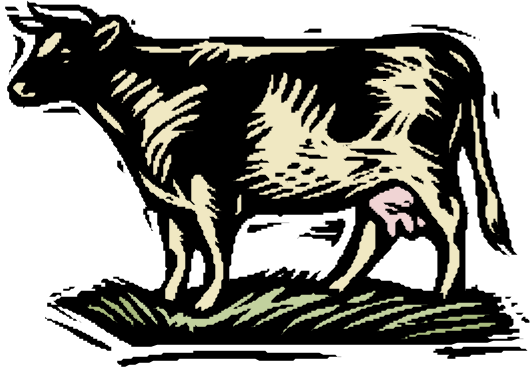


Things that will eat your Goniopora's food

- Nassarius snails
- Serpent and Brittle stars
- Shrimp (which can be quite destructive)
- Fish

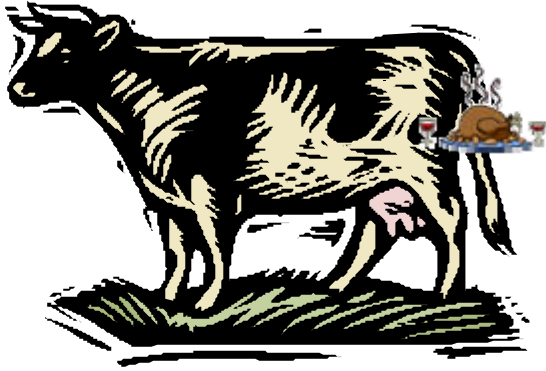
Foods I Feed My Goniopora





Food

- **In my observations, feeding Goniopora with smaller sized food items leads to faster growth.**



Food



- **Some hobbyists have reported *Goniopora* eating fish feces**

Promising Food Sources

- **Most Goniopora showed strong feeding responses to Peppermint Shrimp eggs, and sea urchin eggs.**

No feeding response to dead shrimp eggs



Promising Food Sources

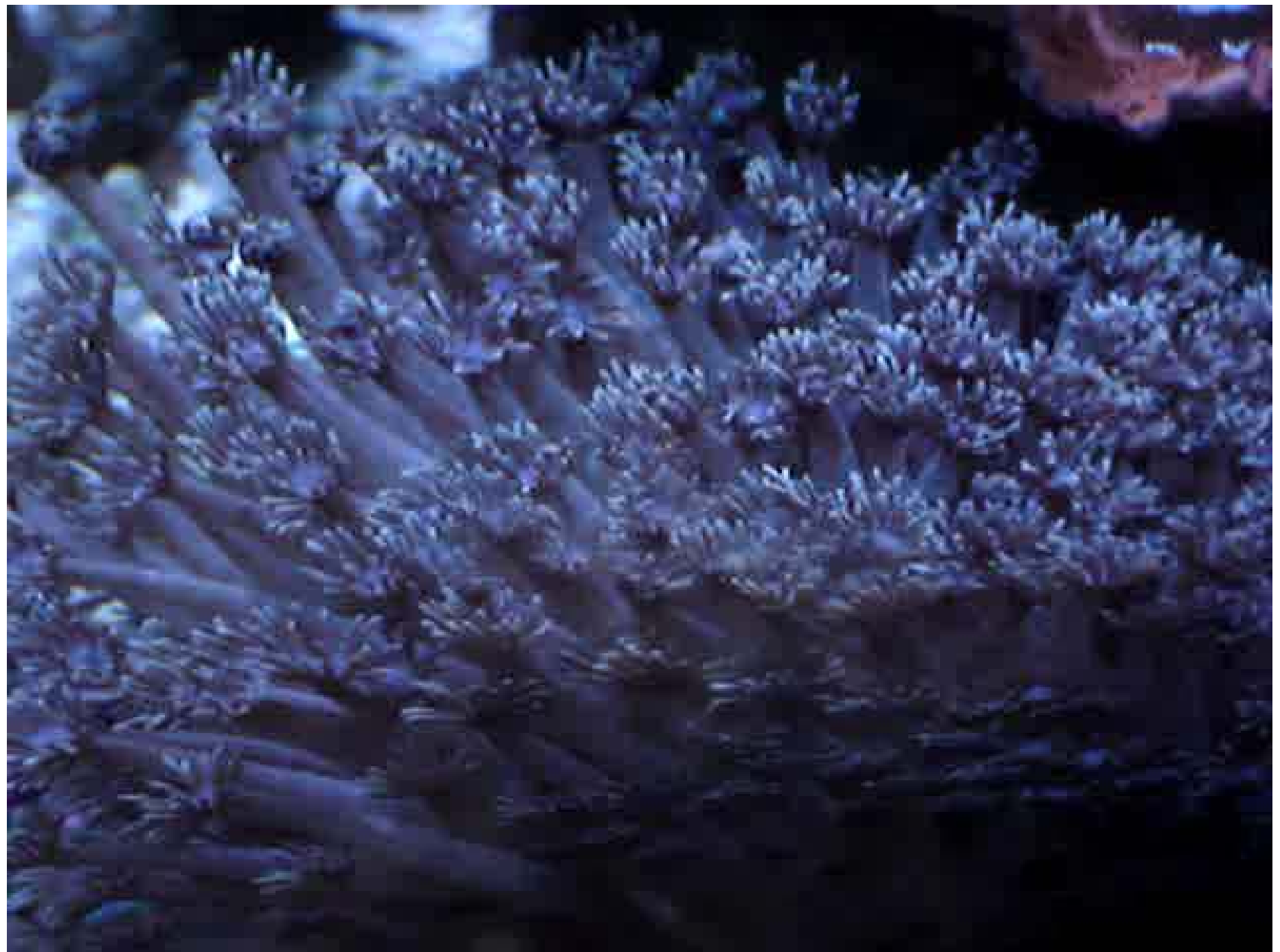
A large, pale yellow sea anemone with many tentacles, growing on a sandy seabed next to a purple coral. The anemone is the central focus of the image, with its tentacles spread out. The background shows a variety of other marine life, including purple coral and a brownish, textured surface.

- **Commercial plankton feed**
- **Invertebrate eggs/larvae**
- **Other farmed zooplankton**



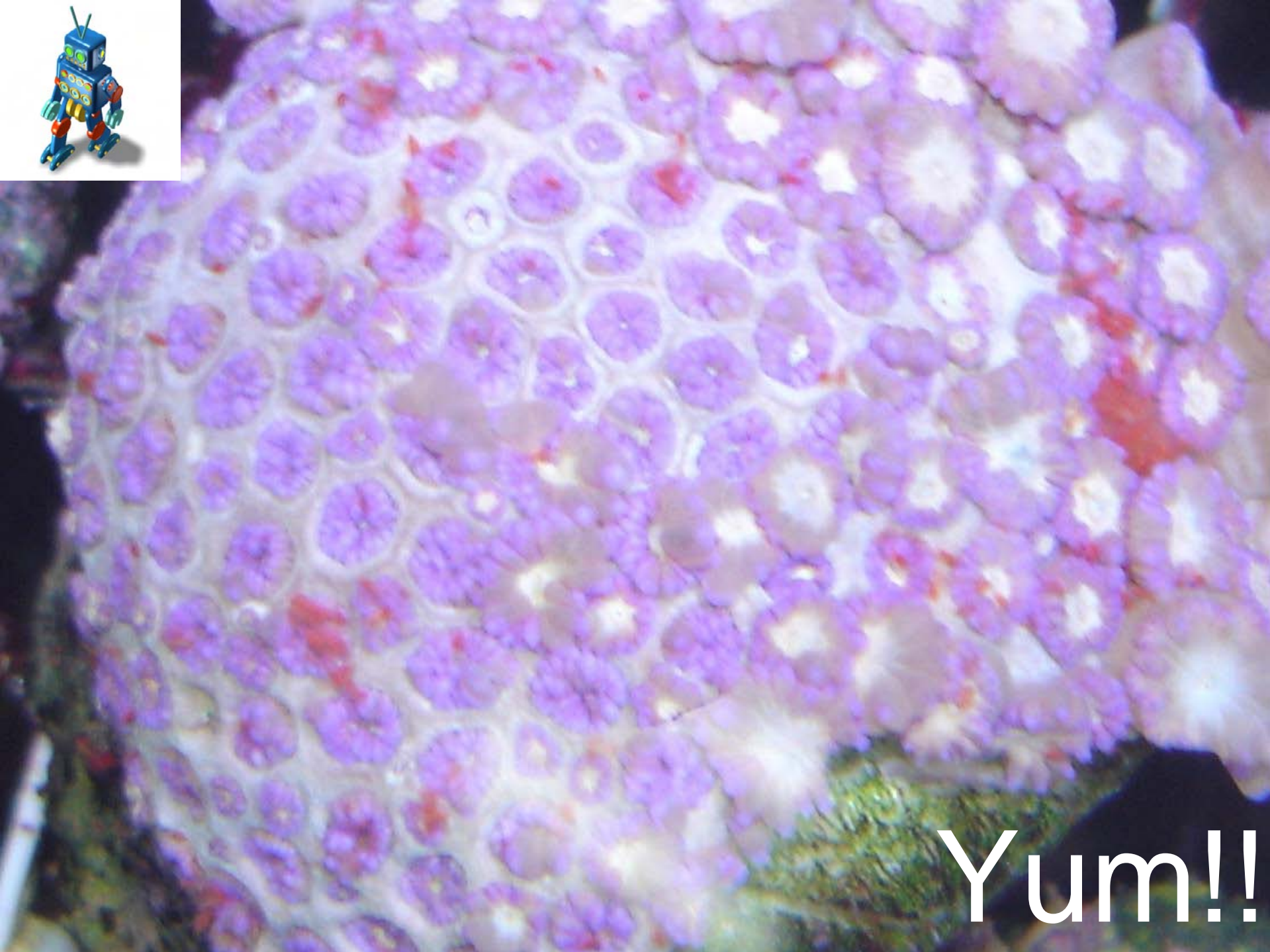
Promising Food Sources of the Future

- **Introduction of additional small zooplankton foods available in a frozen or flake form**

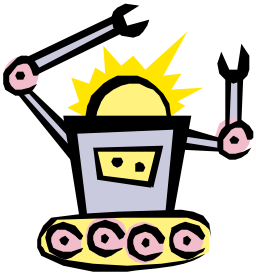




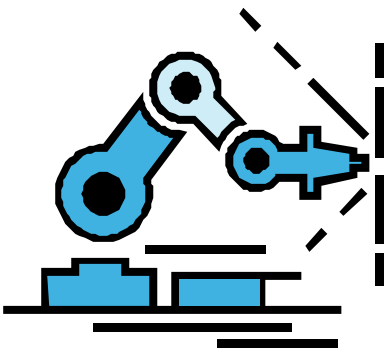




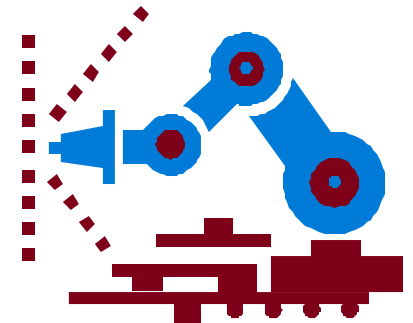
Yum!!



Food Mixtures



- You may need to tweak your formula to get the desired consistency
- If it's too thick for a particular species, it can make it hard to ingest or even smother tissue and leave necrotic areas



Light Food Mix

A photograph of a laboratory microscope. The microscope is positioned vertically, with its base on a dark surface. A white, rectangular container is placed on the stage of the microscope. The background is a plain, light-colored wall.

- Good food for:
- *G. stutchburyi*
- *G. burgosi*
- *G. somaliensis*



Medium Food Mix



- *G. stokesi*
- *G. planulata*
- *G. polyformis*
- *G. norfolkensis*
- *G. tenuidens*
- *G. djiboutiensis*

Goniopora Varieties



“Carpet of Love”

Goniopora stutchburyi

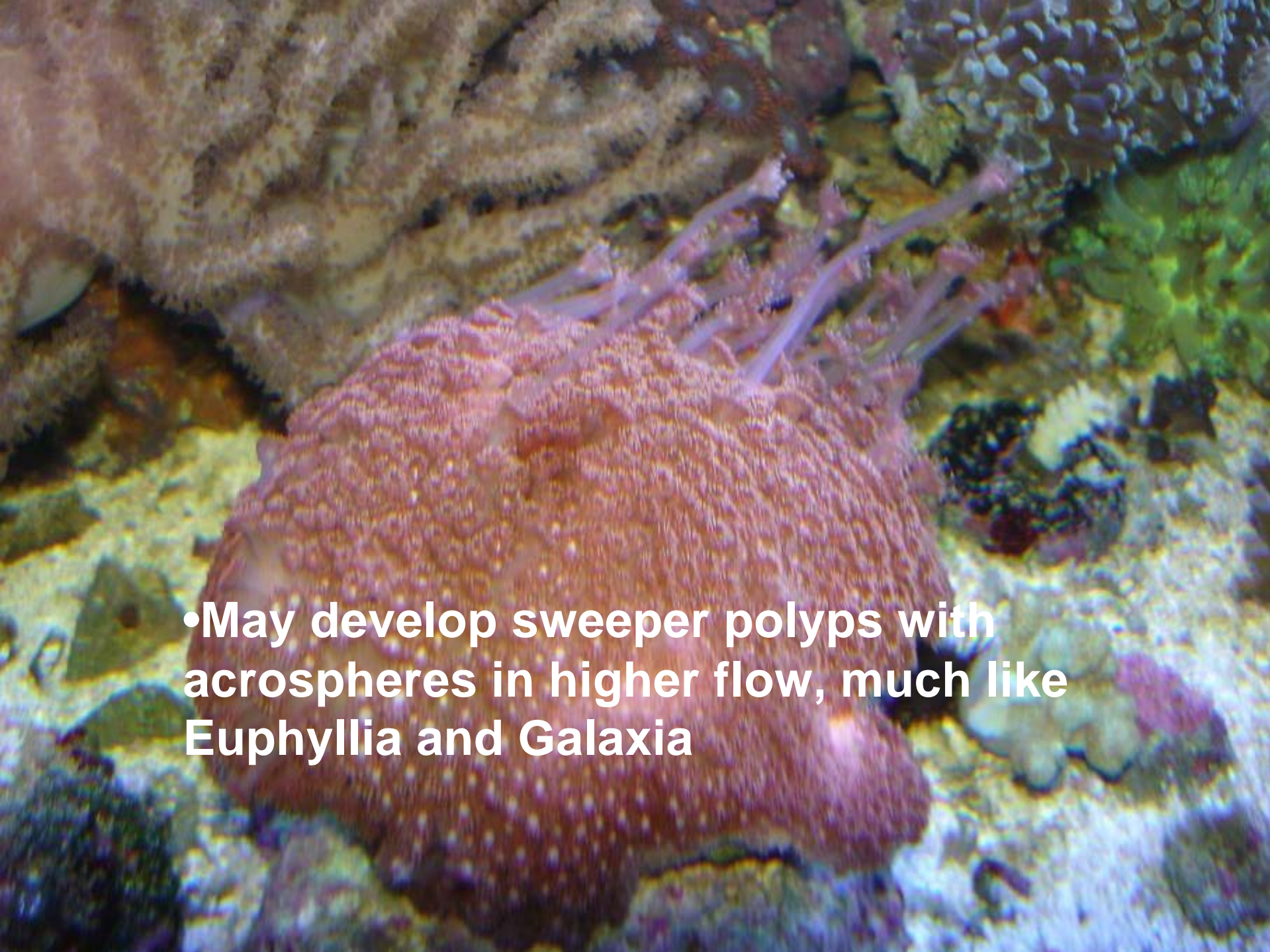


Goniopora stutchburyi

- **Small polyps compared to other Goniopora**
- **Closest to Porites than any other Goniopora**
- **From shallow water environments**
- **Does well with high flow regimens**
- **Developed darker color upon addition of Kent Iron supplement as per directions**

Goniopora stutchburyi

- **Feedings: Many colonies thriving without direct feeding. Oyster eggs, phytoplankton and other foods are added to system.**
- **Improved growth with direct feeding.**
- **Recommend feeding oyster eggs, shrimp larvae food, and other small sized foods**



•May develop sweeper polyps with acrospheres in higher flow, much like *Euphyllia* and *Galaxia*

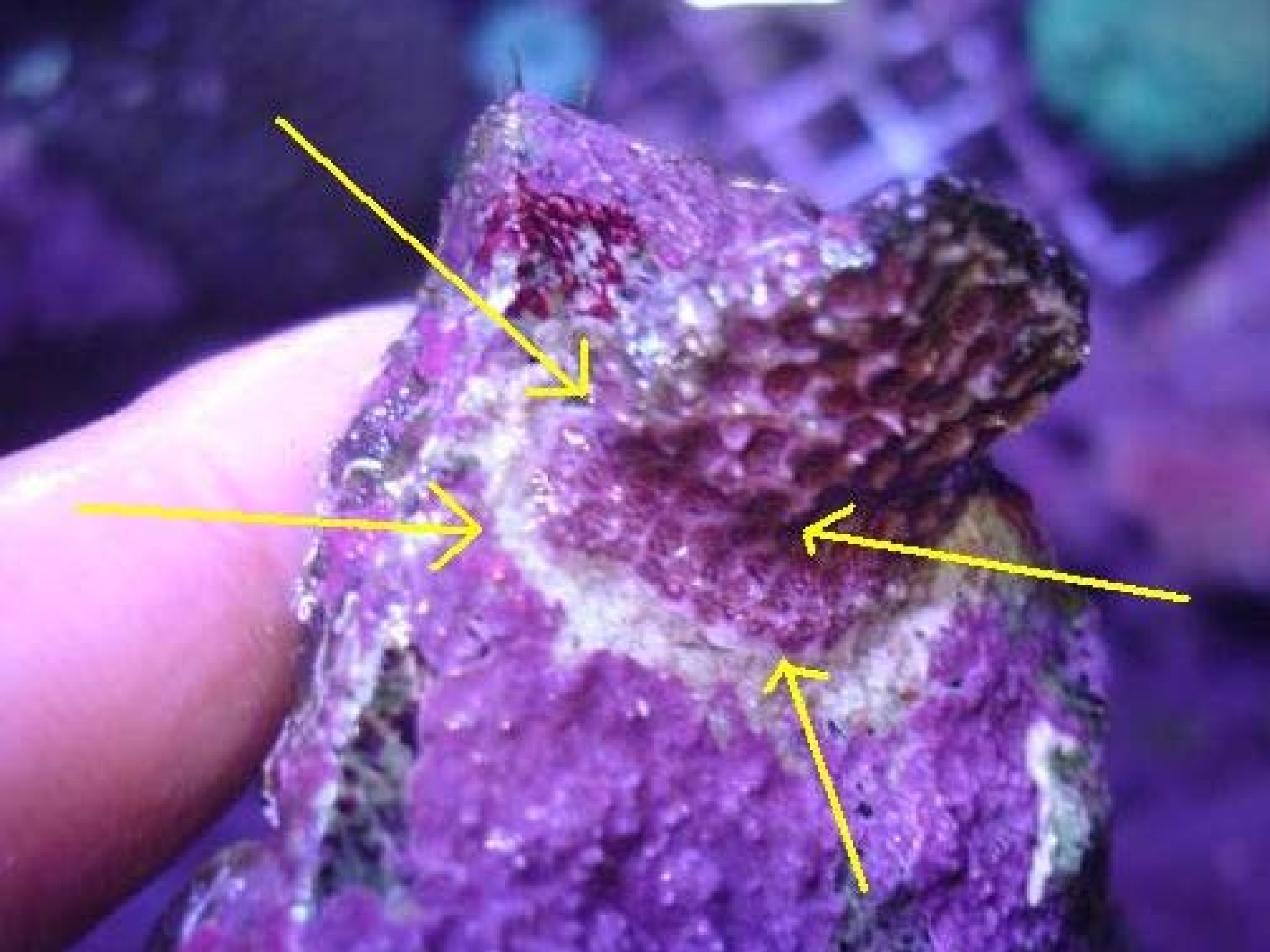
Goniopora stutchburyi



- Fastest encrusting growth of any of my currently kept Goniopora. Some of the fastest growth right after fragging may be living tissue imbedded in skeleton growing to the cut surface and developing polyps









Die Die Die!!!

•Coraline Killer

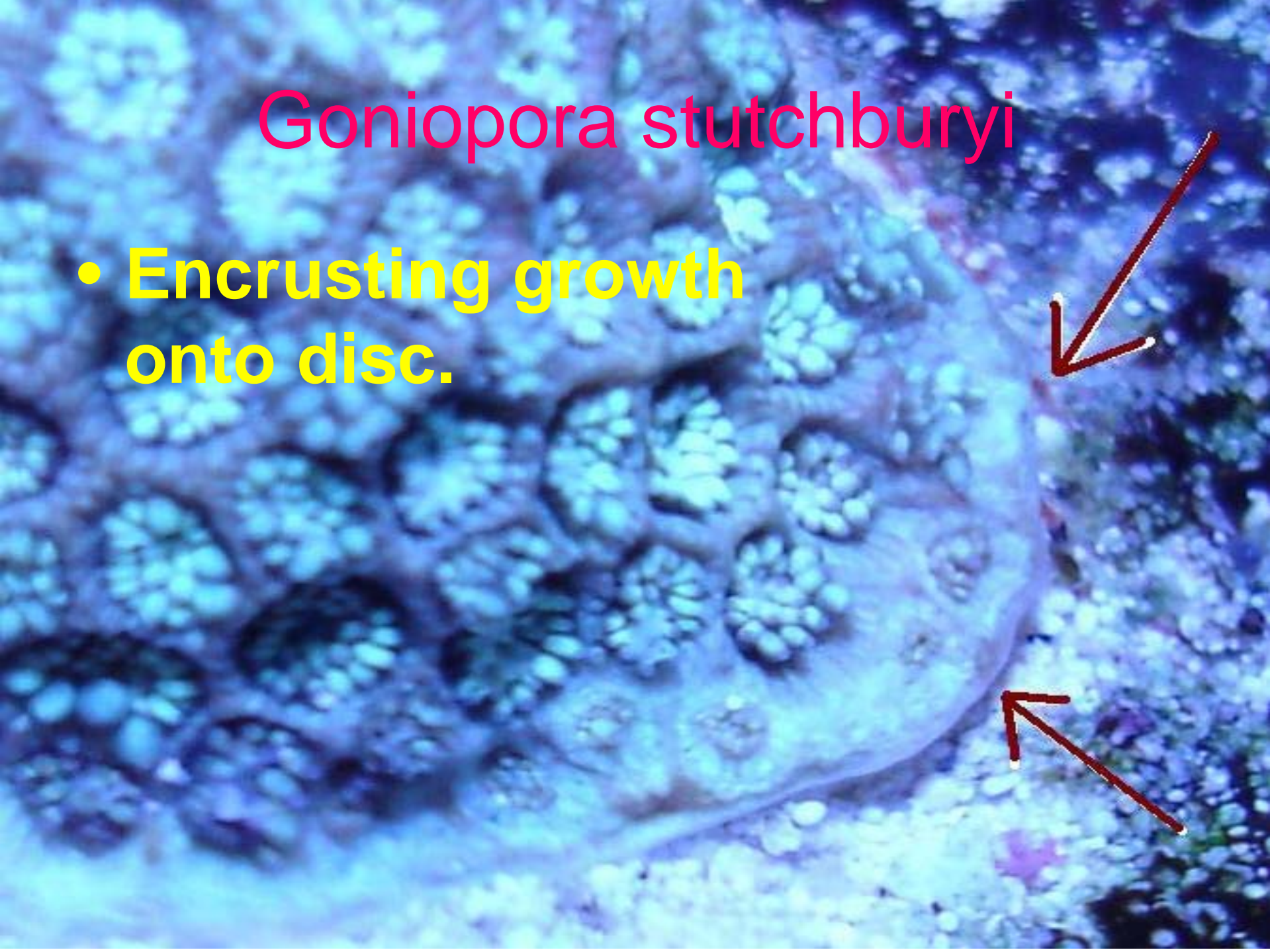


“Green Carpet of Love”
Goniopora stutchburyi



Goniopora stutchburyi

- Encrusting growth onto disc.




“The Hitchhiker”





“The Hitchhiker”

- Looks very much like Porites
 - Polyps very small 1/3 size of “Carpet of Love”
 - Corallites .5 - 1mm across
 - Possibly because it is a young colony
- 

Bright Red *Goniopora somaliensis*



Bright Red Goniopora

- My longest captive strain, 5+ years
- Does well from high to low flow. Polyps are longer in lower flow
- A frag has survived hyper and hypo-salinity episodes in hobbyists' tank
- Has been left exposed in air (with lights off) for several hours. Fully recovered after several days

Bright Red Goniopora

- Food: Shows weak feeding response only large size foods
- I believe this species may eat only very small foods such as plankton, bacteria and other small organic material

Bright Red Goniopora

- Hardy Coral
- Slow Growing
- Goniopora somaliensis are from shallower reef environments



Goniopora norfolkensis





Goniopora norfolkensis

This coral has been kept in various lighting and water flow schemes

Fullest polyp extension under gentle flow regimens



Goniopora norfolkensis

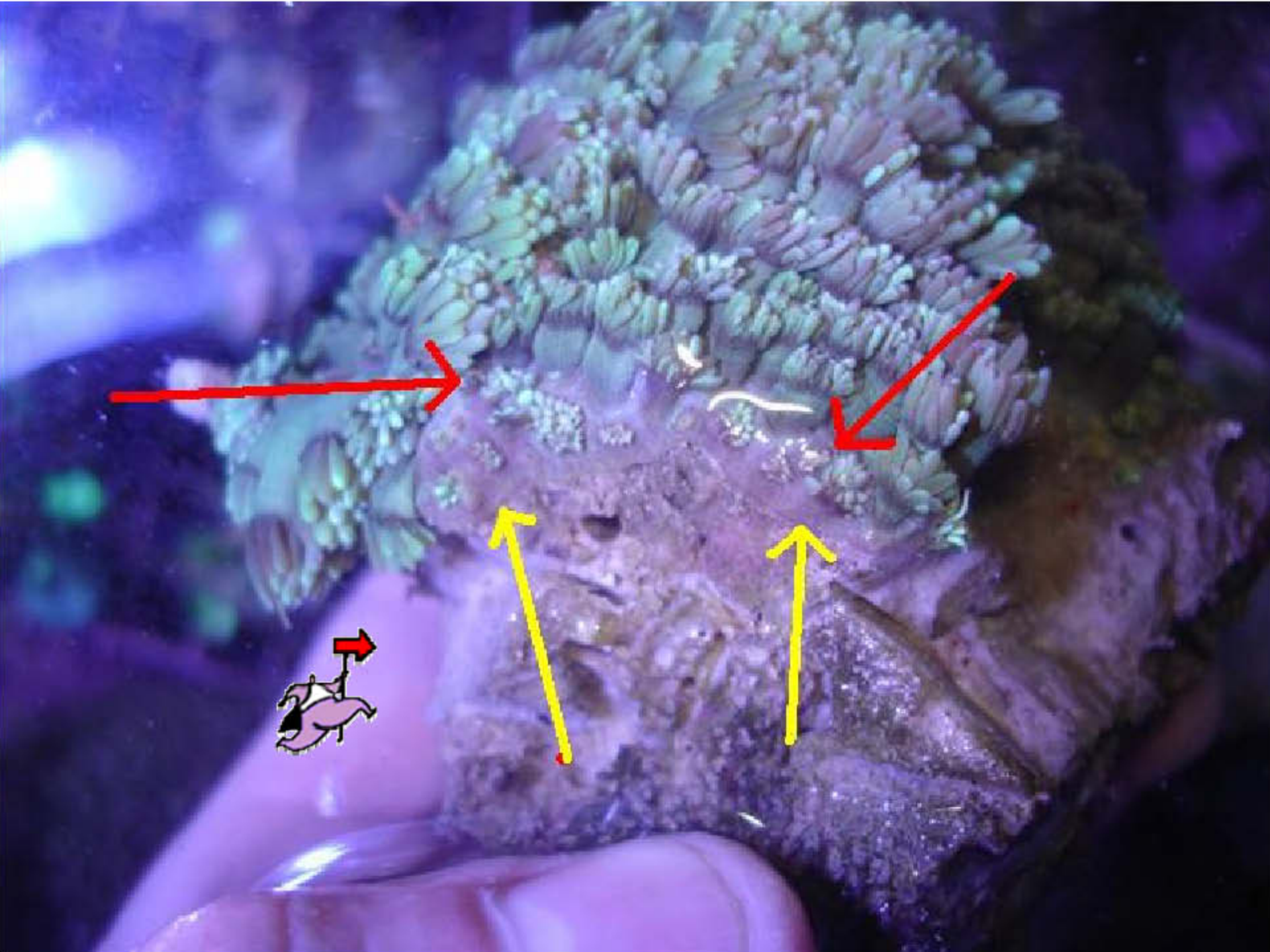
Comes from shallow reef environments

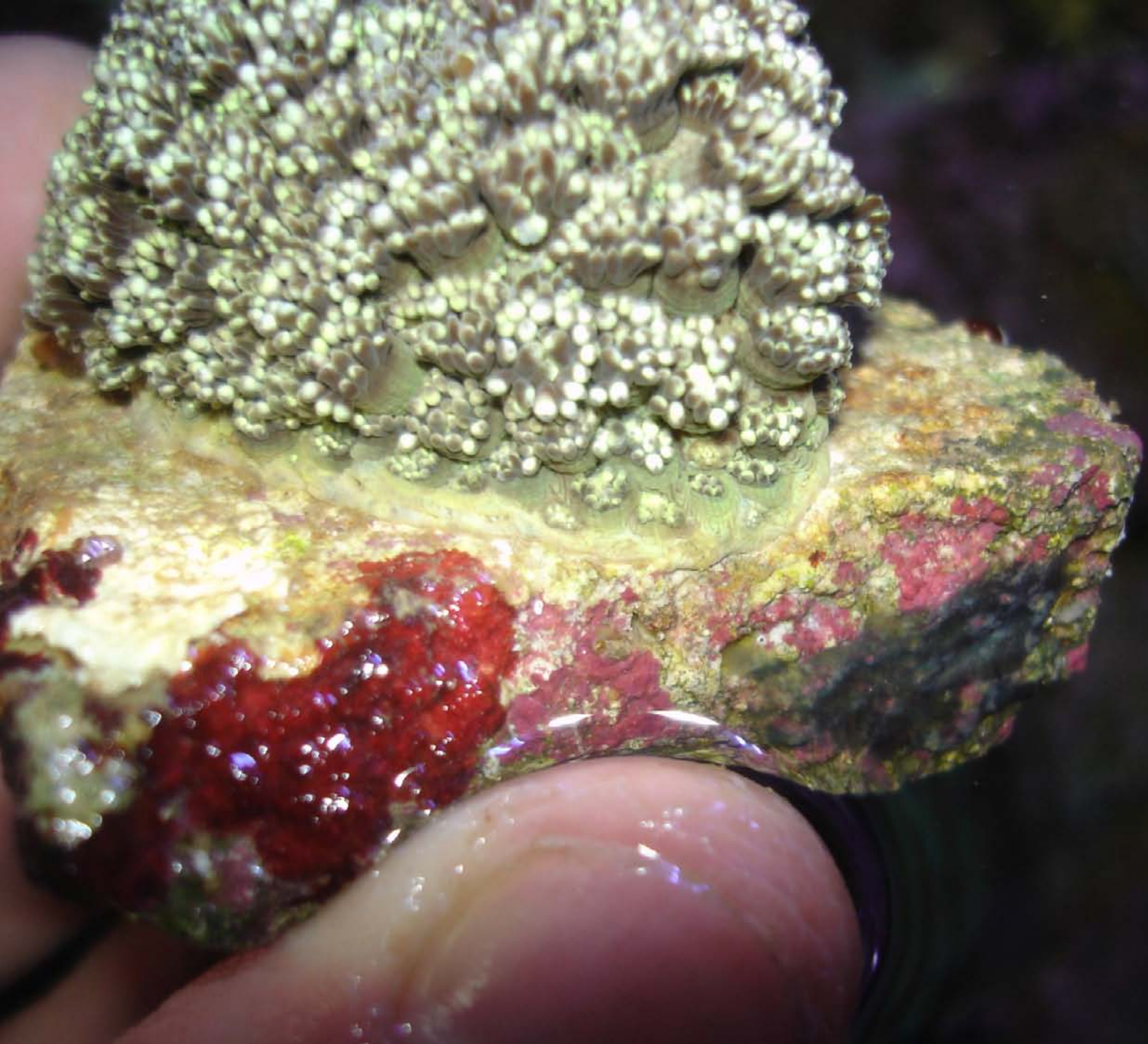
Goniopora norfolkensis

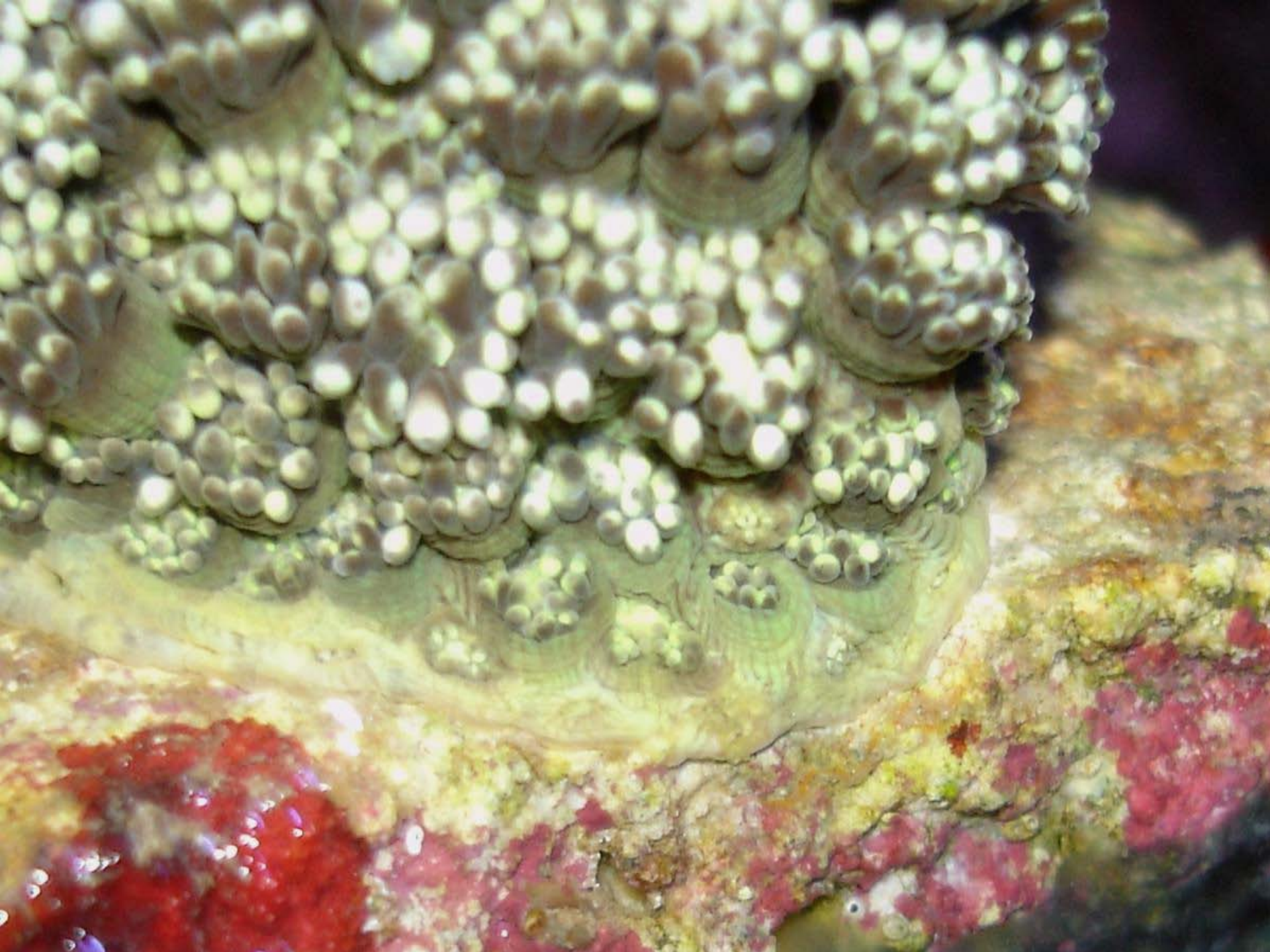
May be a good candidate for captive propagation due to its readiness to eat many types of food and steady speed of growth.



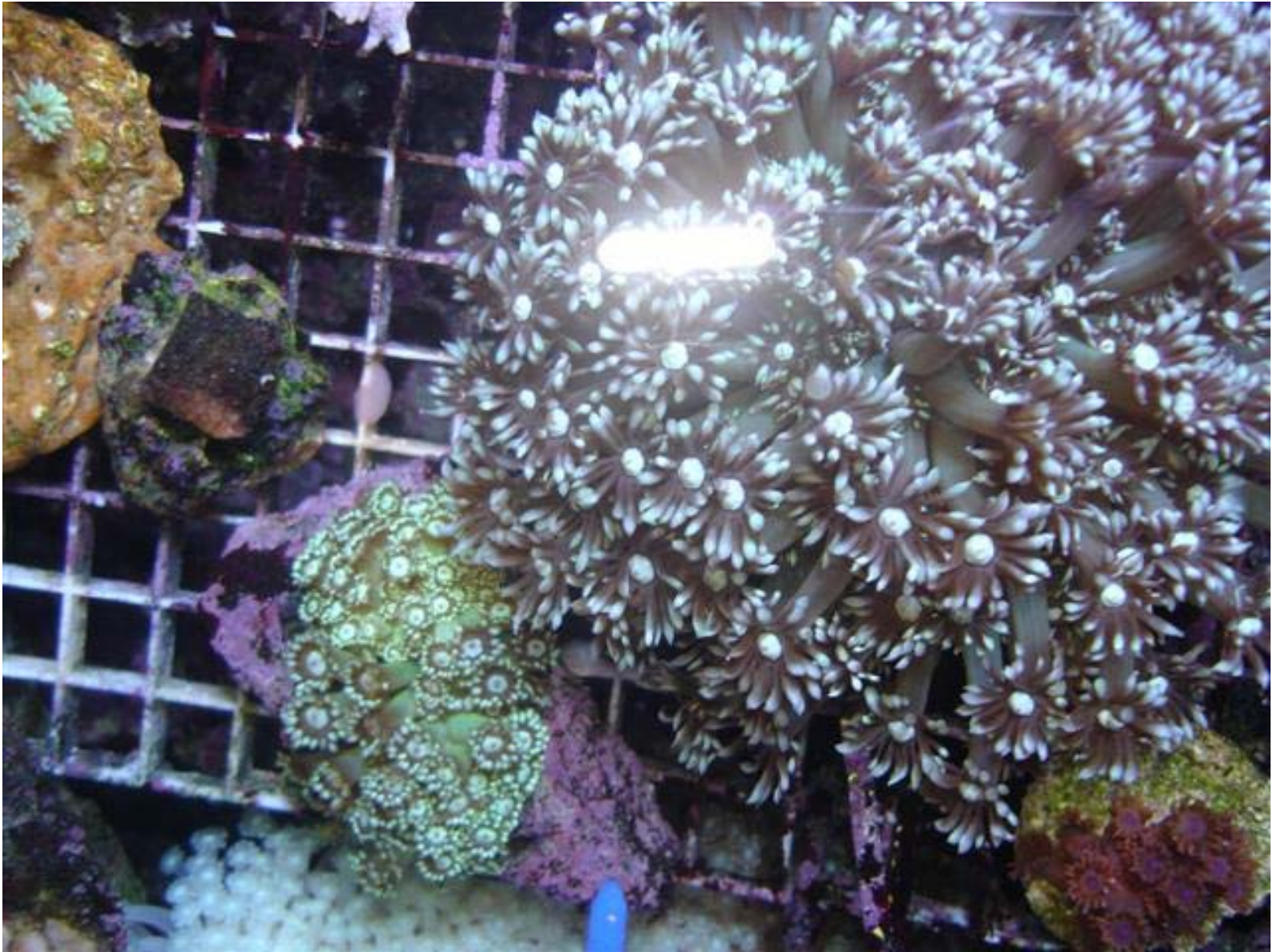








Differences in Clone colonies





1 1/2 months later

Are we related ?

- Fragged 15 months ago
- Initially placed in different systems
- In same system for last 5 months

Goniopora planulata



Goniopora planulata



- **A good choice for beginner Goniopora.**
- **Easy to feed**
- **Medium to High Light (T5's, MH)**

Goniopora planulata



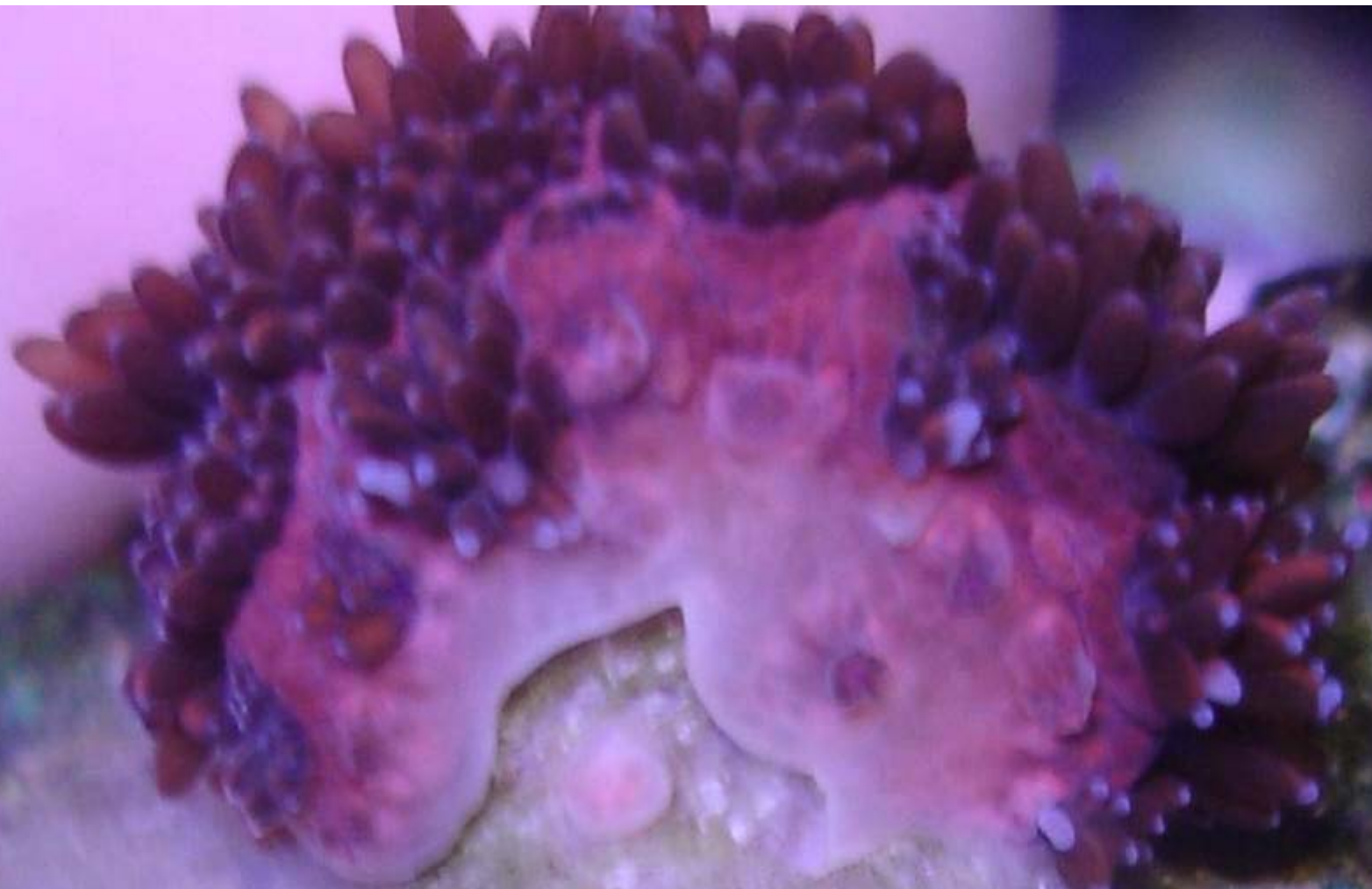
- **Medium to High Light (T5's, MH)**
- **Med to High Alternating flow**

Goniopora planulata

- **Appearance has changed quite dramatically from when first imported.**
- **From shallow reefs**









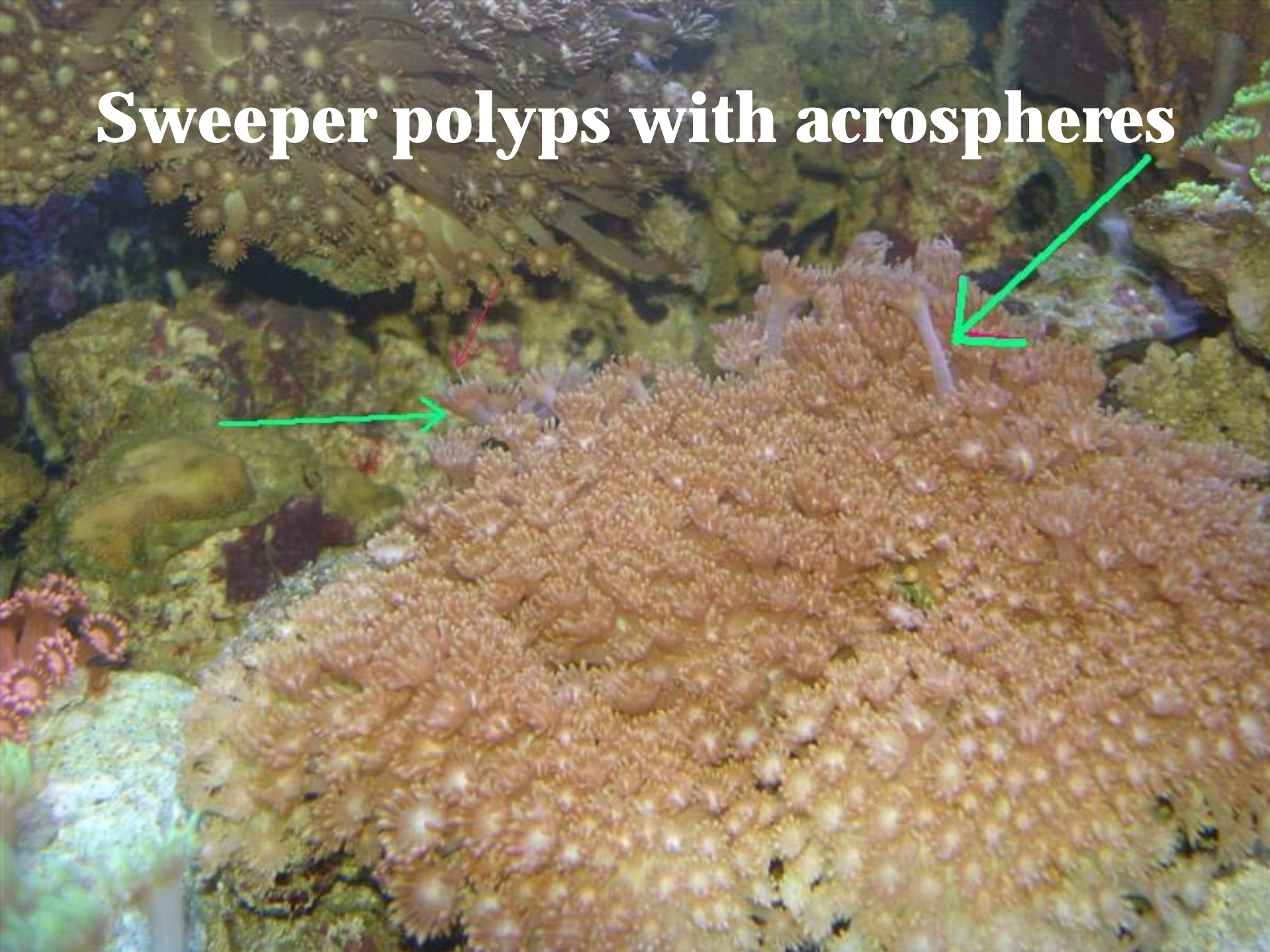
Goniopora polyformis



Goniopora polyformis

- Prefer lower flow regimens. Tissue recession at higher flow. Recovered when moved to gentle flow.
- Had much easier time ingesting food in low flow.
- Very little growth with no direct feedings the first 2 years.

Sweeper polyps with acrospheres



“Nuclear” Goniopora polyformis



“Nuclear” Goniopora polyformis

- **Currently under 250w MH and T5’s**
- **Low to Moderate flow.**
- **Feeding is much easier in lower flow**
- **Brighter green under more intense light**

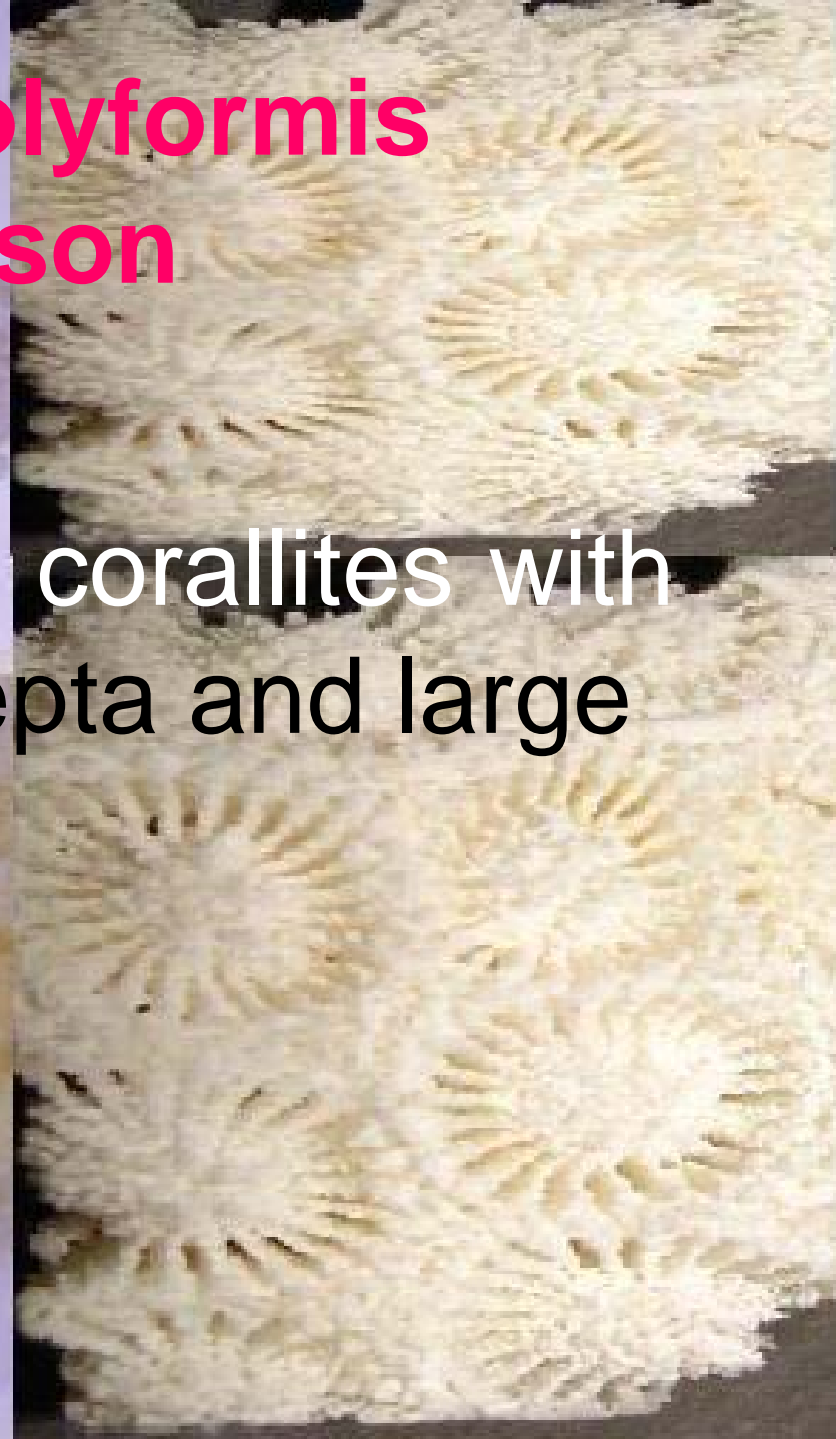
Goniopora polyformis comparison

- Produces long sweeper polyps in high flow (or just high flow areas of larger colony)
- Encrusting growth

- Has not been observed producing sweeper tentacles
- Polyps are 50-100% longer than brown encrusting form's regular polyps
- Massive colony with encrusting growth along edges

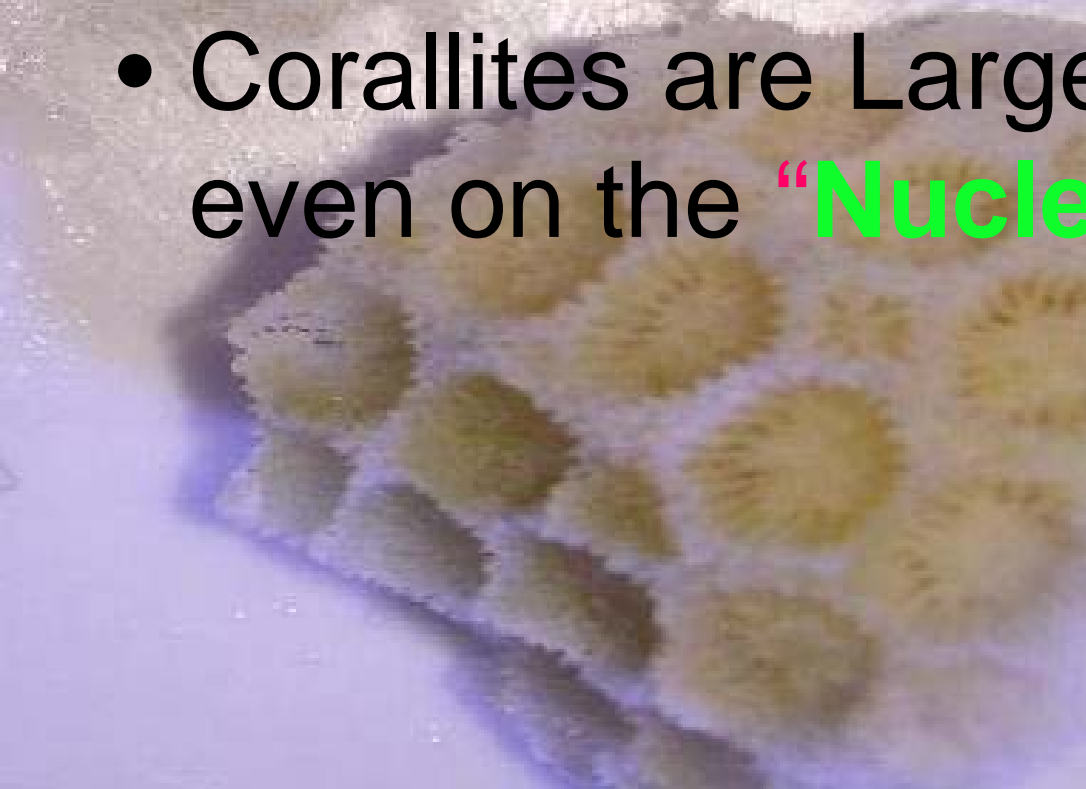
Goniopora polyformis comparison

- Both colonies have corallites with prominent, even septa and large columellae



Goniopora polyformis comparison

- Corallites are Larger and more even on the “**Nuclear**” variety



Goniopora polyformis



- **Possibly due to geographic or environmental differences**

Goniopora djiboutiensis



Goniopora djiboutiensis



- Has done well for years at high flow
- Tends to mucus up more than other Goniopora when fed food









- **Goniopora**
burgosi

Goniopora burgosi

- **Active, strong feeding response, tentacles curl quickly towards mouth when direct fed**
- **Small polyps compared to most Goniopora except G. stutchburyi**



Goniopora Burgosi

**Comes from
shallow water**


Goniopora burgosi

- **Excellent candidate for aquaculture due to strong feeding and growth**
- **Grows without direct feeding (oyster eggs and phytoplankton added to system)**
- **Grows faster with more direct feeding**

Green *Goniopora burgosi*



Goniopora burgosi



- **Large amount of filter feeding organisms among old skeleton**
- **Indicates high amount of small particle size food**





Goniopora burgosi

- **Green colony shows feeding reaction to phytoplankton (DT's, Phycopure)**
- **Red burgosi colonies show no reaction to phytoplankton**
- **Only Goniopora to show feeding response to phytoplankton**

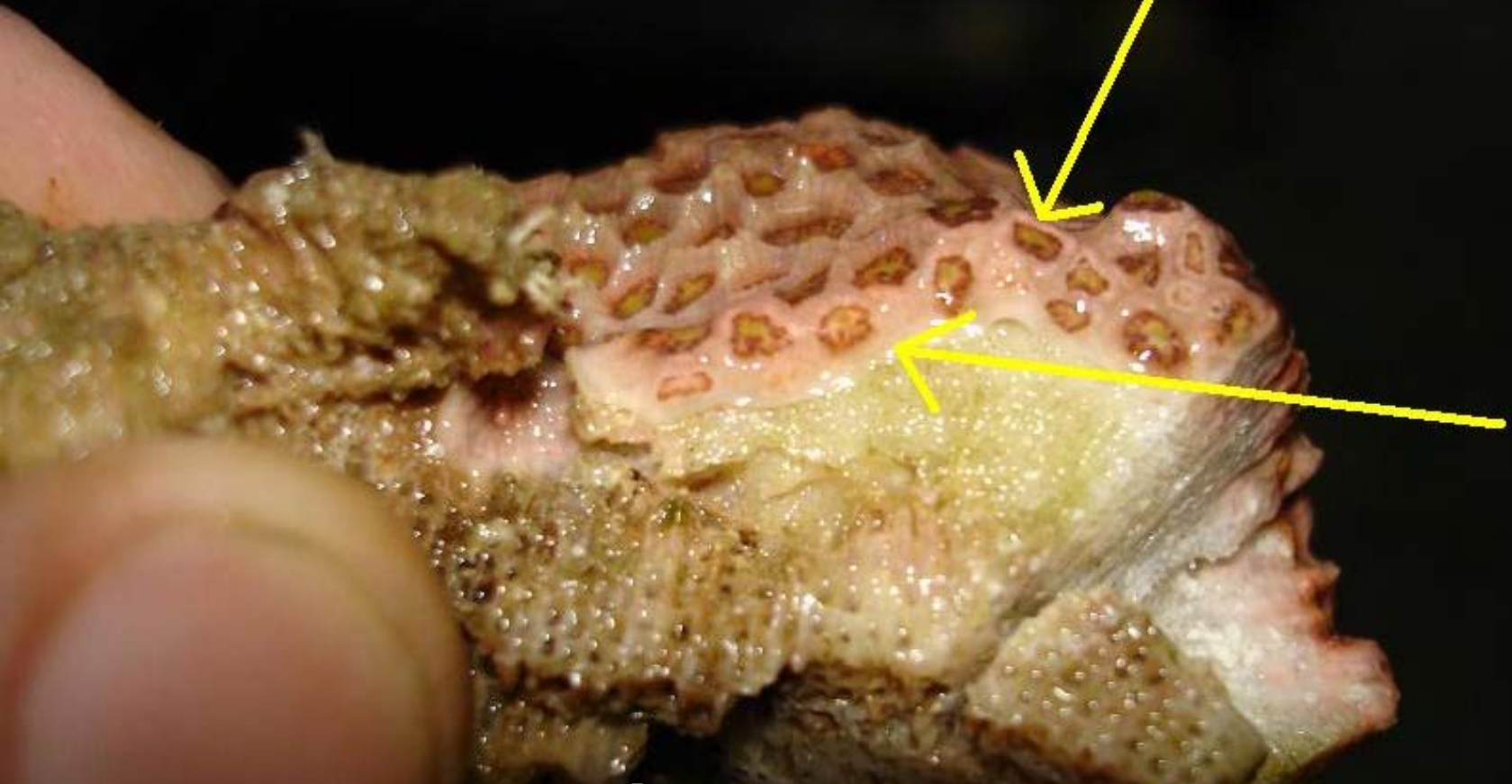
Goniopora palmensis



Goniopora palmensis

- **From shallow reef environments**
- **Shows no feeding response to food given**
- **Feed oyster eggs several times a week anyway**

Goniopora palmensis

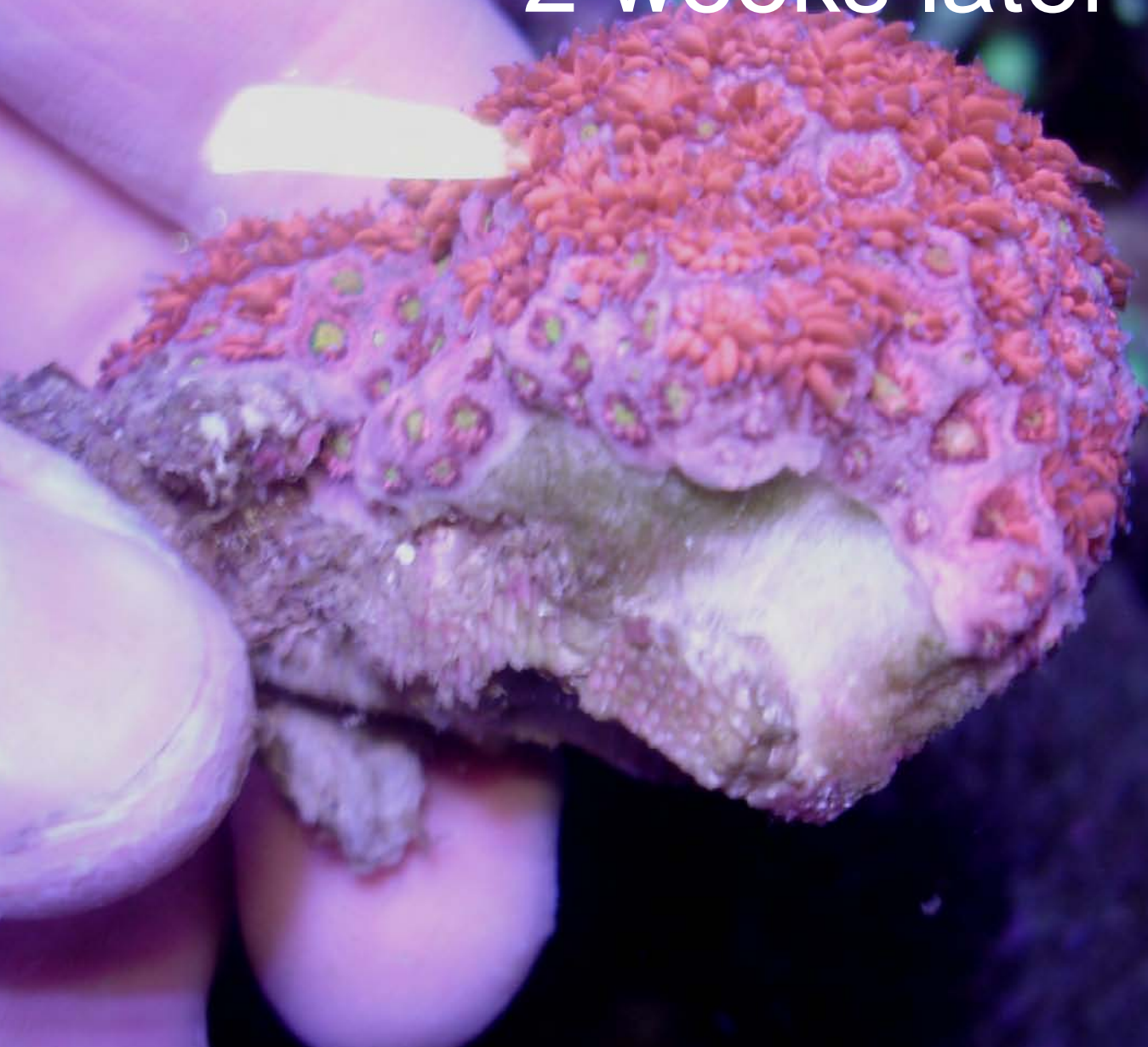


- **Fast encrusting growth over wound**

1 month after initial cut



2 weeks later



2 weeks later



This Thing Rocks!!

- **Great candidate for aquaculture**
- **Quick growth and typical SPS type care**
- **Attractive**



Goniopora pandoraensis



Goniopora pandoraensis

- Med to high light
- Low to high alternating flow
- Slow growth
- Branching variety
- Feeds more easily with smaller foods

Goniopora tenuidens



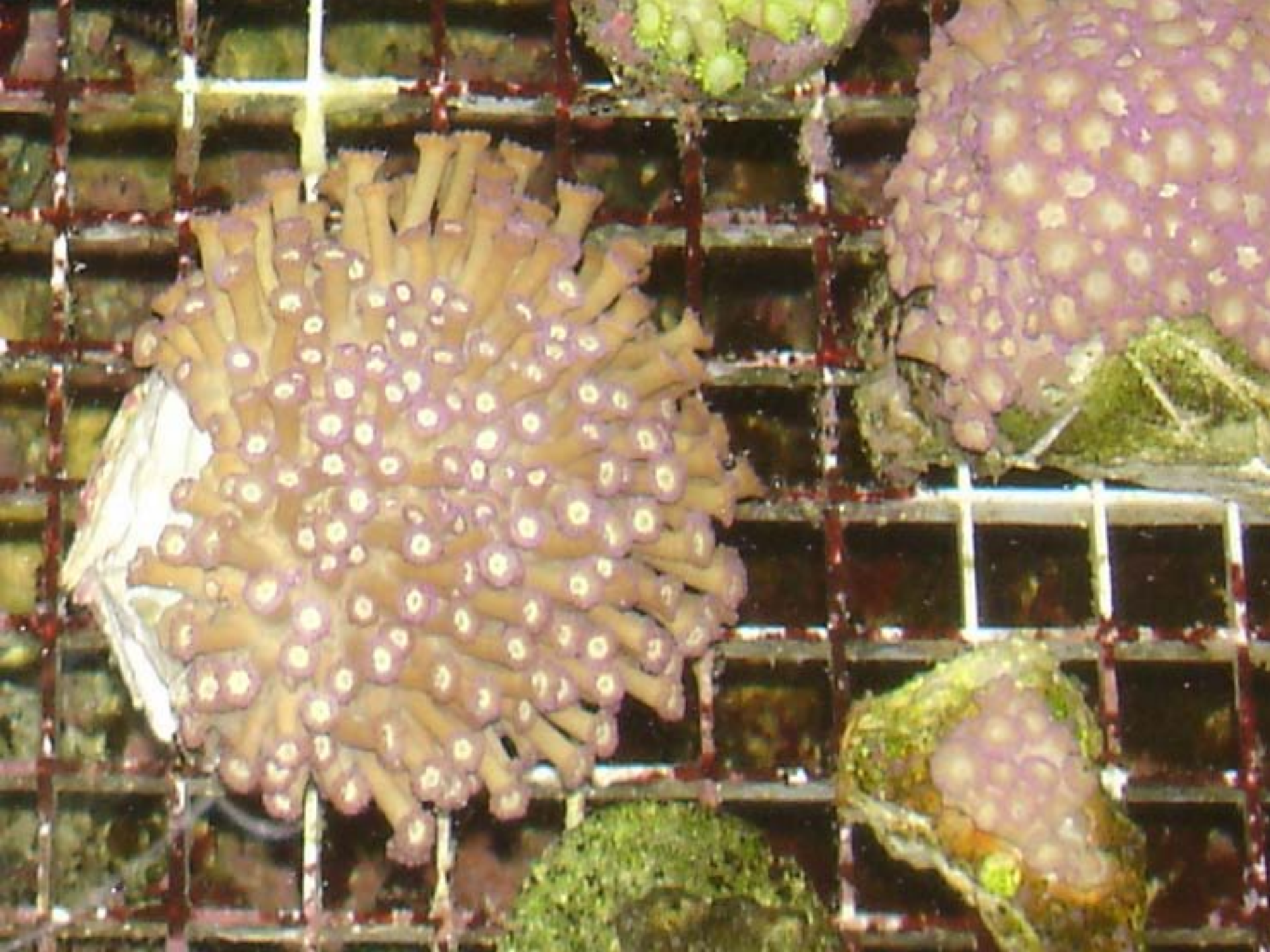
Goniopora tenuidens

- Gentle flow for longest polyp expansion
- Easily seen ingesting many foods
- Polyps retract fast then cilia move food towards mouth.
- Feeding should be done in low flow
- Care similar to *Goniopora stokesi*
- Slow but consistent growth months with heavy feeding.

Goniopora tenuidens

- Does well under moderate to bright light.
- Found most commonly in lagoons and inter-tidal zones





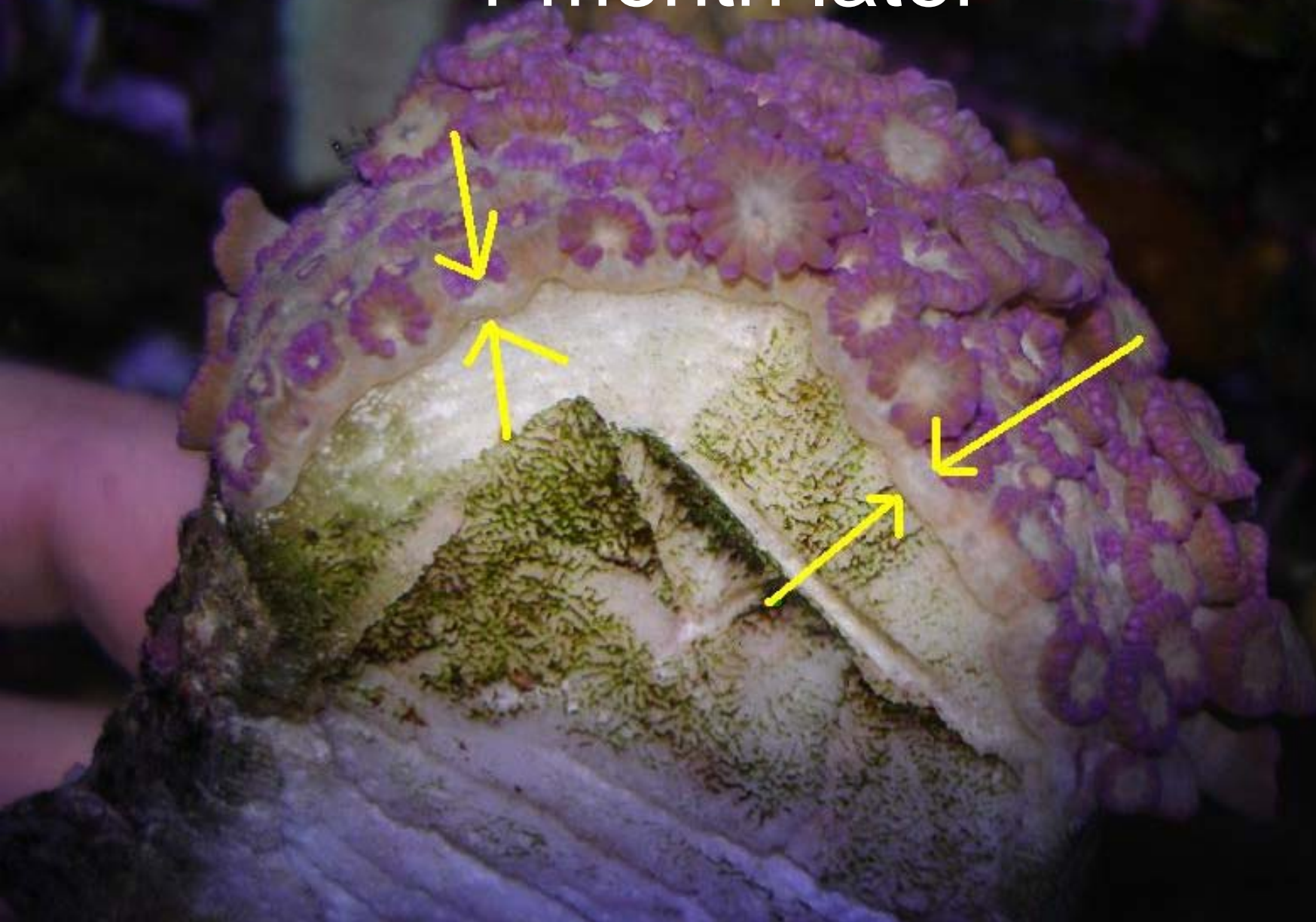




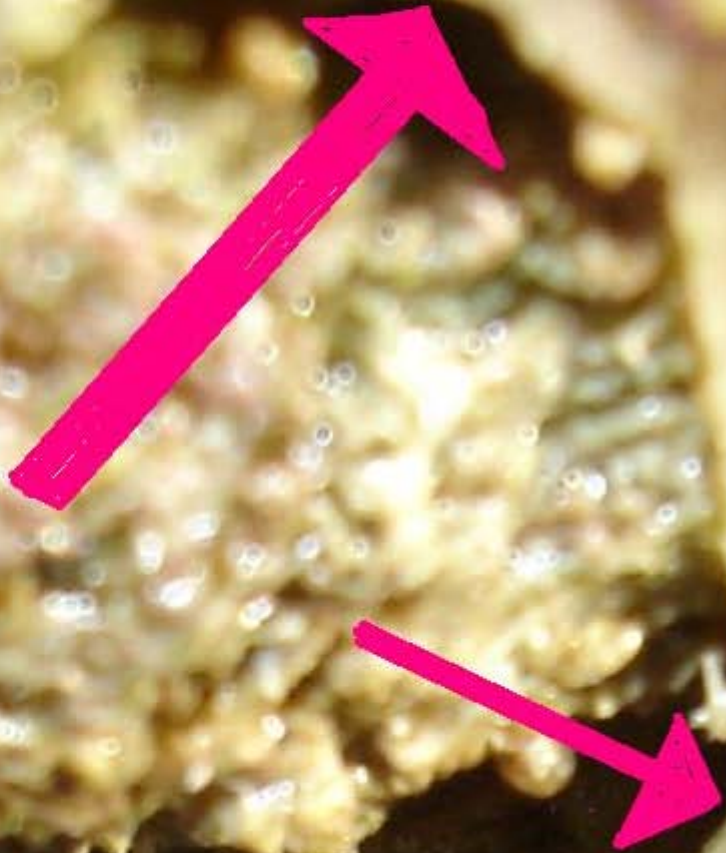
Fragalicious



1 month later



15 month captive





Goniopora eclipsensis









Goniopora eclipsensis

Tolerant of various light and flow schemes

Can handle larger foods items

Goniopora stokesi



Goniopora stokesi



- One of the most commonly imported Goniopora (along with *G. lobata*)
- Free living on soft substrate

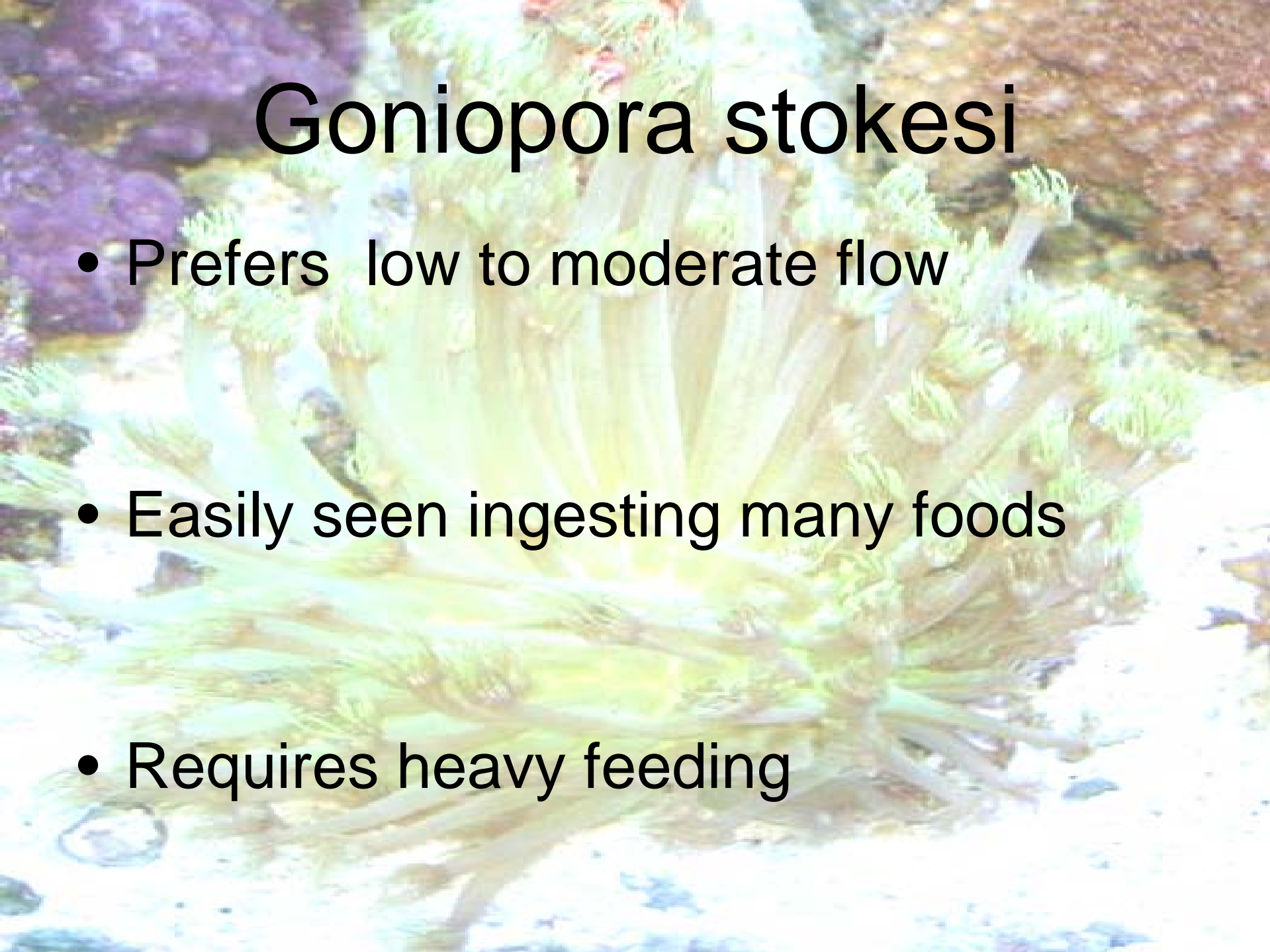
Goniopora stokesi



- One of the hardest Goniopora to keep
- Frags acclimate much better than whole colonies

Goniopora stokesi

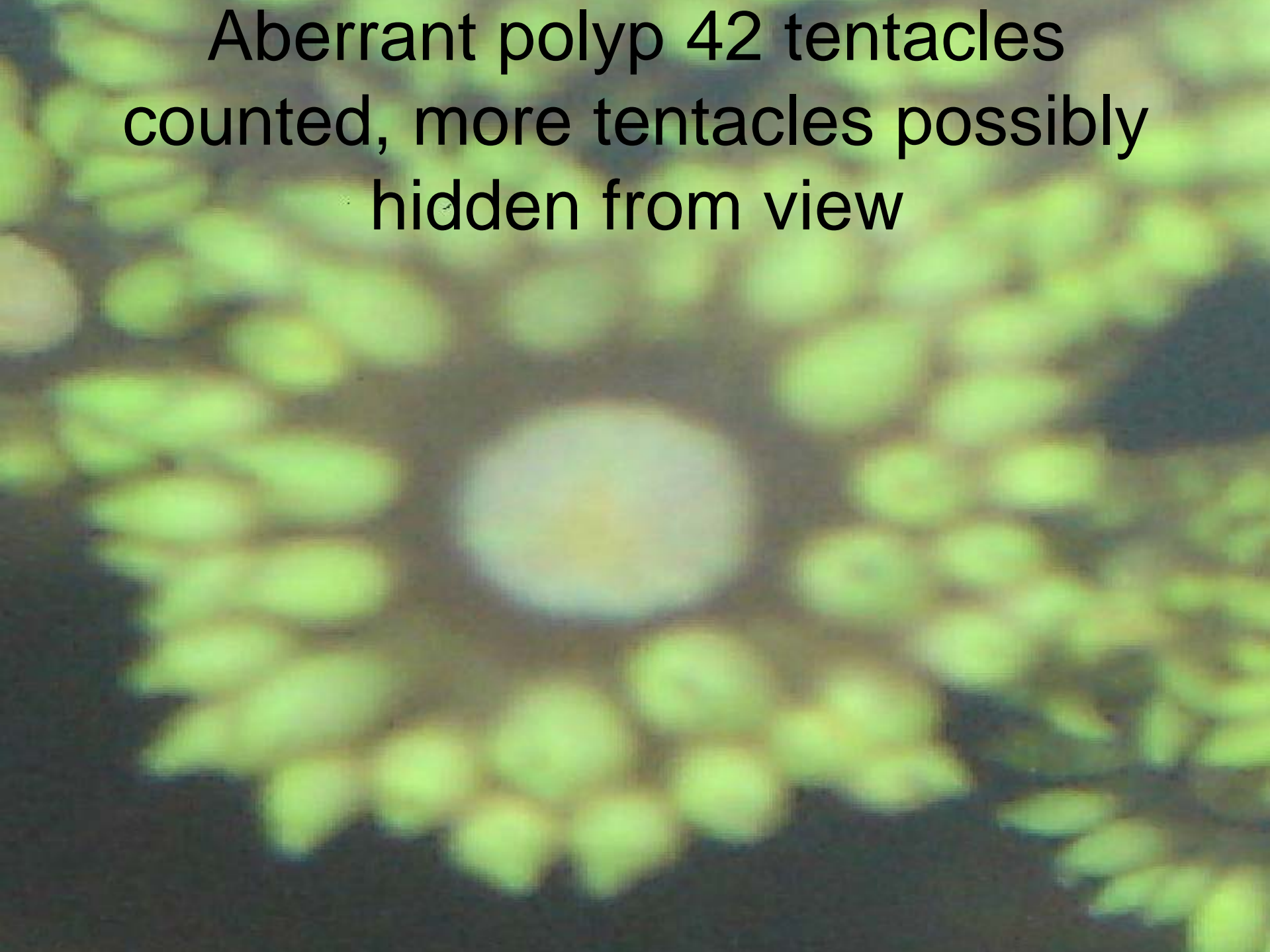
- Prefers low to moderate flow
- Easily seen ingesting many foods
- Requires heavy feeding

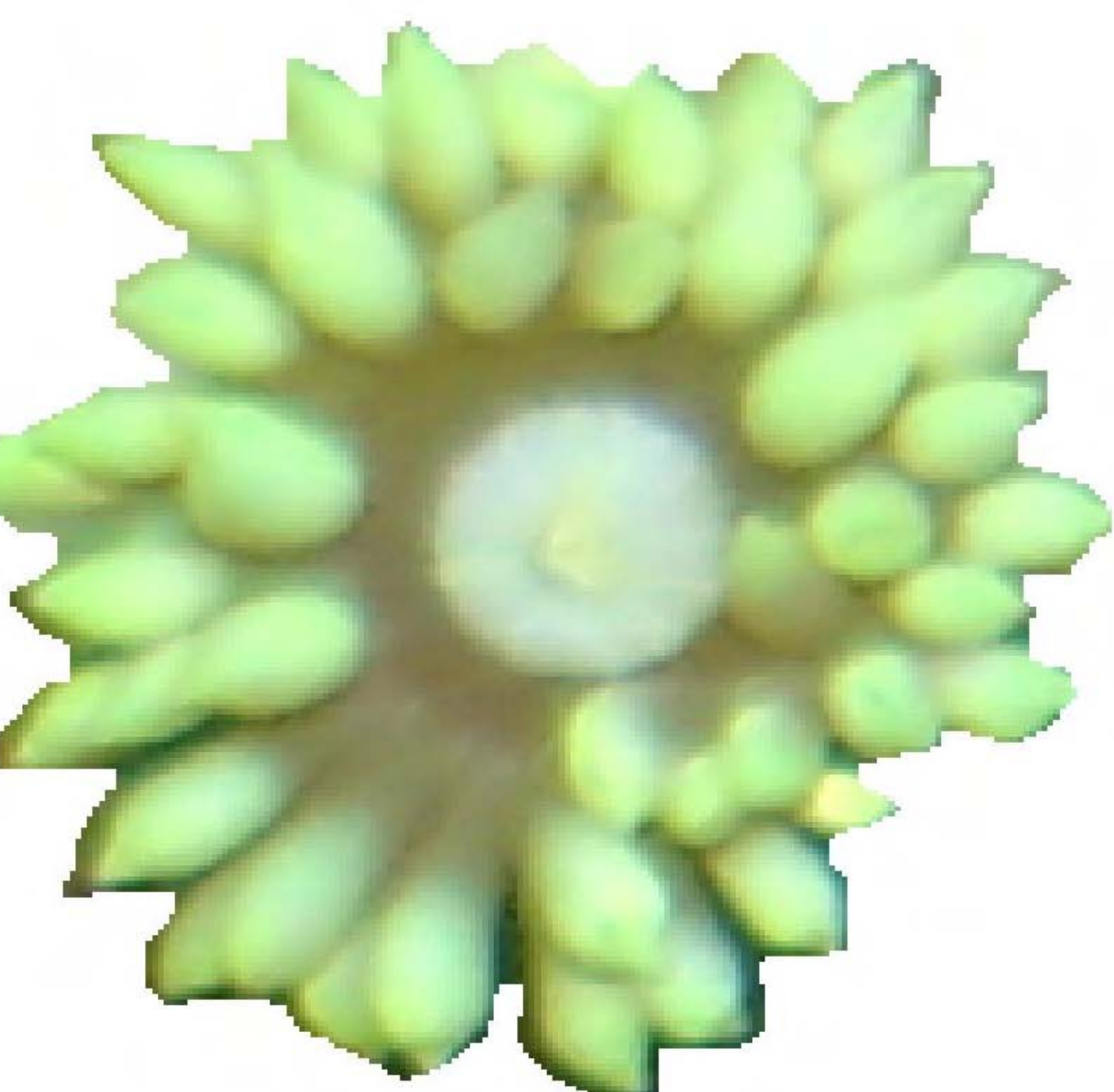


A close-up photograph of a coral reef. The central focus is a large, flat, reddish-pink coral with a porous, honeycomb-like structure. Above it is another coral with a similar pattern but in a darker red hue. To the right, there are greyish-blue corals with a more textured, bumpy appearance. The background shows a sandy seabed with some green and purple algae or smaller coral fragments. The lighting is bright, highlighting the textures and colors of the marine life.

Will the **real** somaliensis please stand up?

Aberrant polyp 42 tentacles
counted, more tentacles possibly
hidden from view





Be Careful They Fight!!



Be Careful They Fight!!



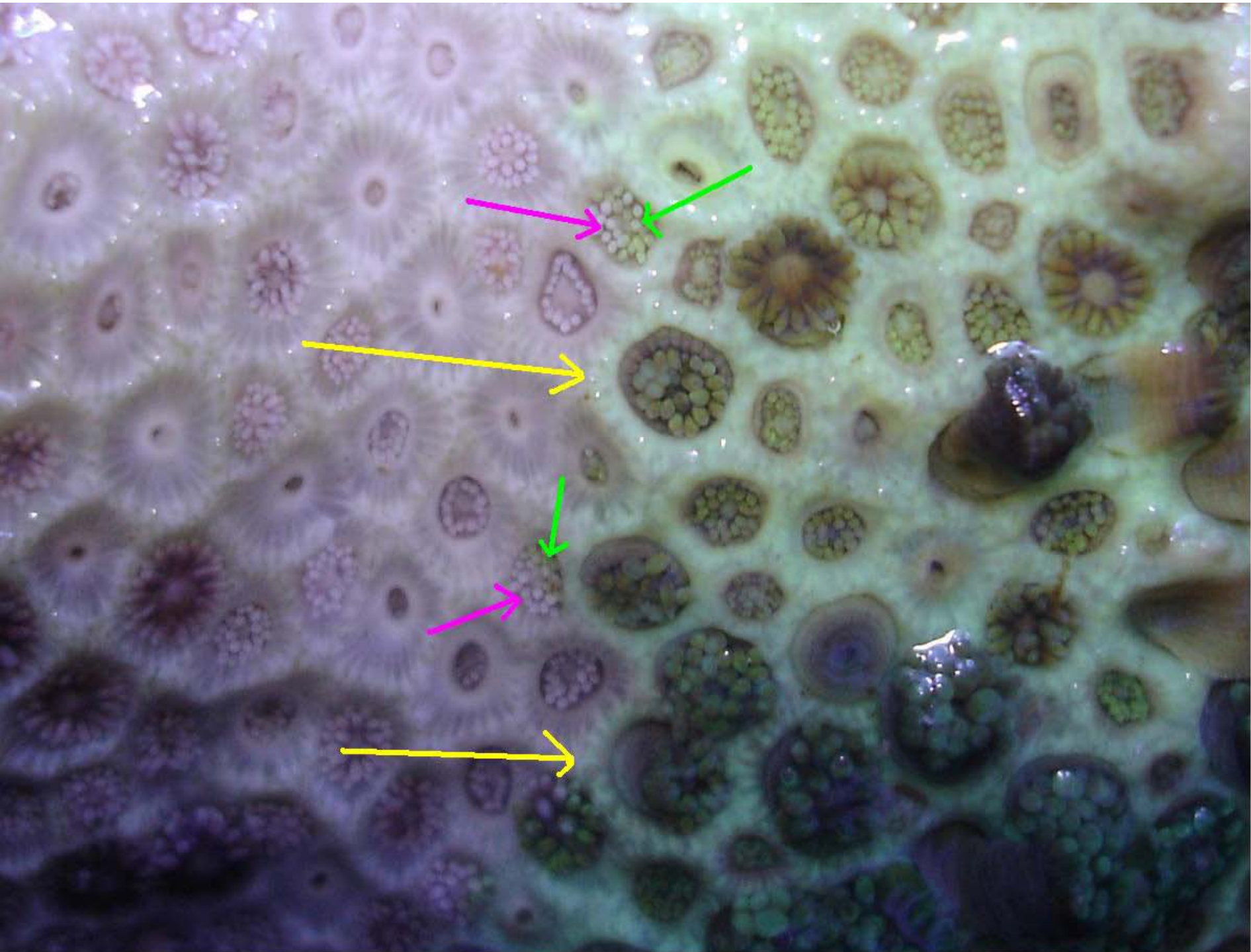
- Literature on Goniopora state that different species may fight each other (stinging, releasing of toxins)





















Watch Out!!

- Clown gobies can be a problem



How to Share Your Goniopora

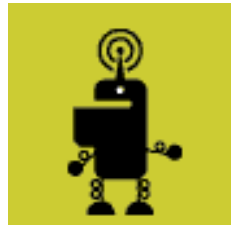
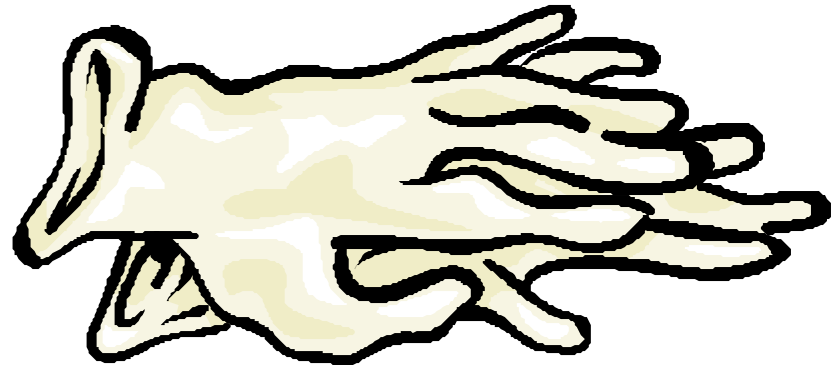


**CRM-2000
with
Diamond
Wheel
Dremel
attachment**





If you insist on not using a robot, use the correct safety precautions



Coral Micro-propagation







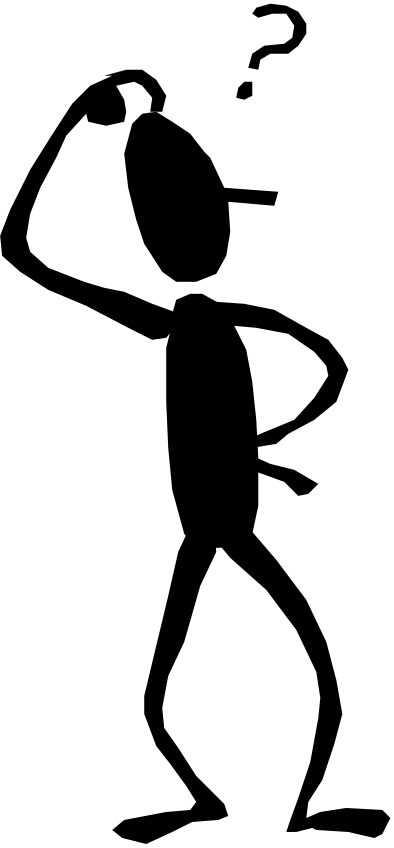


Check my Flow






Questions raised



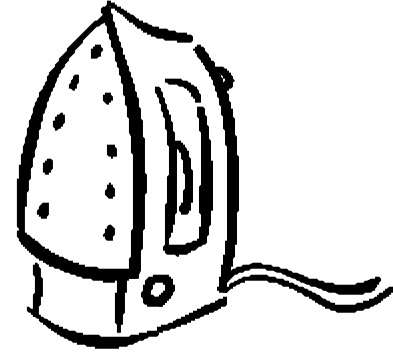


Questions raised

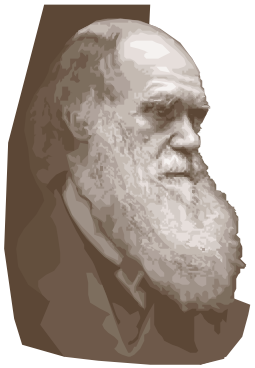
- What benefit does the iron supplement have?

- May help support zooxanthellae tissue
- Darkening of many long term colonies upon addition of iron supplement in multiple systems
- Does the increase of zooxanthellae in the coral tissue benefit the coral?



Questions



- Perhaps the addition of iron and manganese supplements allows more phytoplankton to grow in the system feeding *Goniopora* prey items.
- Do *Goniopora* directly eat most ingested phytoplankton or receive it from the gut of zooplankton prey?

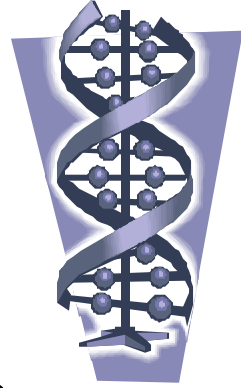


Questions

- **What causes the corals' appearance to change so much over time?**
- Is it different strains of zooxanthellae being picked up by coral?
- Are the zooxanthellae themselves evolving and changing to adapt to captive environment?



Questions




- Are bacteria and other organisms within the coral changing and adapting also? How readily can they swap these symbiotic organisms?
- Are genes in the coral shutting off and on, or are RNA translating DNA differently, in response to changes in environment causing most of the change?

A large, reddish-brown, textured object, possibly a piece of wood or a large nut, resting on a bed of green moss and small plants. The object has a rough, porous appearance and is the central focus of the image. The background is a dense layer of green moss and small, leafy plants, creating a natural, earthy setting.

The Wrap Up

- Like many corals before, Goniopora was considered impossible to keep.
- Development of plankton friendly systems and availability of appropriate commercial foods are perhaps the biggest reasons for their long term success.
- In short: **FOOD,,
FOOD,,FOOD**

- 
- **Many more species of Goniopora are being imported.**
 - **Some of these varieties are from shallow areas and have similar care to commonly kept SPS**

- 
- **Over time Goniopora appear adapt and change like many common captive propagated coral species**
 - **Many examples of Acropora changing color and growth form**
 - **Captive grown coral are reported to be hardier and grow faster.**

In Conclusion

Goniopora

Rock!!



Germany

Rocks!!!



Yeah!!!