

Science AMA Series: We are Rising Tide Conservation and we are here for the next four hours to talk about the first instances of aquaculture of the Pacific blue tang (*Paracanthurus hepatus*)! AUA.

RisingTideAMA ¹ and r/Science AMAs¹

¹Affiliation not available

April 17, 2023

Abstract

Hi Reddit, We are members of the Tropical Aquaculture Laboratory (TAL) and the Indian River Research and Education Center (IRREC), two University of Florida labs, who have aquacultured the Pacific blue tang (*Paracanthurus hepatus*) for the first (TAL) and second (IRREC) documented times. This species is the most commonly imported member of the surgeonfish family at approximately 200,000 individuals per year. Recent popular animated movies such as Finding Nemo and Finding Dory have only increased the interest this species. Many marine fish species are collected directly from the ocean's reefs. Collection of the Pacific blue tang can cause damage to the reefs where these fish live. Rising Tide Conservation is a program designed to develop aquaculture for marine fish to provide alternative sources for these beautiful animals. You can read more about the journey here. Here are the pictures of our babies (TAL)(IRREC). Ask us anything! Our bios: Eric Cassiano, biologist at TAL who specializes in live feed production and larval rearing. Isaac Lee, masters student at IRREC who works on marine ornamentals Andrew Palau, technician at IRREC who specializes in live feed production and larval rearing Carter Cyr, Masters Student at IRREC who worked on marine ornamentals and sportfish Cortney Ohs, Associate Professor at IRREC We'll be back at 1 pm EST (10 am PST, 5 pm UTC) to answer your questions, ask us anything! Edit: Cortney, Andrew, Isaac, Carter and Eric here to answer your questions. Edit2: Thanks for your questions /r/science. Hopefully we'll be back again with more exciting news.

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RISINGTIDEAMA [R/SCIENCE](#)

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Here are the pictures of our babies ([TAL](#))(IRREC). Ask us anything!

Our bios:

Eric Cassiano, biologist at TAL who specializes in live feed production and larval rearing.

Isaac Lee, masters student at IRREC who works on marine ornamentals

Andrew Palau, technician at IRREC who specializes in live feed production and larval rearing

Carter Cyr, Masters Student at IRREC who worked on marine ornamentals and sportfish

Cortney Ohs, Associate Professor at IRREC

We'll be back at 1 pm EST (10 am PST, 5 pm UTC) to answer your questions, ask us anything!

Edit: Cortney, Andrew, Isaac, Carter and Eric here to answer your questions.

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congratulations guys. that's a big step in the environmental scheme of things. a lot of aquarists seem to forget we are keeping animals in glass boxes that have been ripped from their natural habitat, unsustainably. i'm a hobbyist reefer, and currently have a breeding pair of black ray gobies, *Stenogobius nematodes*. they've been producing weekly on and off for a couple of years now and i've tried everything i can with my limited time and resources. perhaps you can help me out. i've tried pretty much every species of zooplankton i can get my hands on. my longest lived larvae made it to day 6. they don't seem to be attracted to much. i've tried ss rotifers, parvocalanus, and all the other local pods. my most hopeful first food seemed to be with a euplotes species that is rampant in my plankton cultures. the larvae usually starve at day four, but using the euplotes gets them to day six. then they crash. i've used large aquaria, jars, bottles, substrate, no substrate even tried an oyster tank that i induced into spawning to get veligers. it didn't work. i tried a 'kriesel' style 20, didn't work. my success' (if you can call it that) was in a one gallon jar with low cell count multi phyto and euplotes. light bubble action to keep things moving. have you got any suggestions other than what is commonly available to

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us hobbyists as first and second foods? any tips that might get them passed day six?

[gogo67](#)

This is Eric. I, personally, don't have a lot of experience with gobies. Andy Rhyne and his crew have recently raised the yasha goby for the first time and you might want to ask him what protocols he used. You might also be able to access that info through the rising tide website. In any event it is difficult to say what might be working or might not be working. It may be a broodstock nutrition issue and no matter what you do after that it will not be good. My instinct tells me that the feeding environment is not right. Perhaps the water flow is too high or too low. Perhaps the light is too bright or not enough. There are too many variable unknown to speak wisely about what might help you....outside of addressing how Rhyne and company did there goby and trying to mimic that as best you can

congratulations guys. that's a big step in the environmental scheme of things. a lot of aquarists seem to forget we are keeping animals in glass boxes that have been ripped from their natural habitat, unsustainably. i'm a hobbyist reefer, and currently have a breeding pair of black ray gobies, stonogobiops nematodes. they've been producing weekly on and off for a couple of years now and i've tried everything i can with my limited time and resources. perhaps you can help me out. i've tried pretty much every species of zooplankton i can get my hands on. my longest lived larvae made it to day 6. they don't seem to be attracted to much. i've tried ss rotifers, parvocalanus, and all the other local pods. my most hopeful first food seemed to be with a euplotes species that is rampant in my plankton cultures. the larvae usually starve at day four, but using the euplotes gets them to day six. then they crash. i've used large aquaria, jars, bottles, substrate, no substrate even tried an oyster tank that i induced into spawning to get veligers. it didn't work. i tried a 'kriesel' style 20, didn't work. my success' (if you can call it that) was in a one gallon jar with low cell count multi phyto and euplotes. light bubble action to keep things moving. have you got any suggestions other than what is commonly available to us hobbyists as first and second foods? any tips that might get them passed day six?

[gogo67](#)

Cortney here: I agree with Eric not enough know but these are the things I would try.

1 improve brood nutrition, get them additional HUFAs 2 keep the water quality of the larvae perfect, not sure if you are in a jar or a recirculating system. I would recirc because the water quality has to be perfect and feeding can foul water quality. 3 increase the food organism density, you don't mention density but we feed Parvocalanus nauplii at 5/mL two or three times daily in addition to rotifers. increased feeding density allows larvae to open their mouth and eat without expending much energy.

This is great work! I've always heard tank raised fish do better/live longer than wild caught ones. Considering how many fish die in transport from the stress of being caught and shipped or die when they don't acclimate to new tank conditions, why are there so few marine fish that you can find captive raised?

[dansunafe](#)

Wild fish can be stressed from shipping and the greater the distance they are shipped the stress can increase. Wild fish have a higher parasite load than cultured fish this also contributes to stress. The difficulty of captive raising marine fish is broodstock development, spawning, and culturing a larvae that is very small and requires small live food organisms. The number of successfully cultured marine ornamental fishes increases each year.

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[dansuncafe](#)

This is Eric. There are so few captive raised marine fish species available mostly because we haven't worked out the protocols yet to produce most species in a lucrative manner. Also, some fish are so difficult to raise that the cost of doing so far outweighs the cost of wild harvest.

What other well characterized species of fish have recently been aquacultured for the first time? Is it typically for conservation reasons, or to research some part of the fish reproductive cycle we don't fully understand?

P.S. Have you considered calling yourselves the Blue Tang Clan?

[StupidName2010](#)

This is Eric. Rising tide has been very detailed about the species that have been raised in relation to this project. Visit the webpage <http://risingtideconservation.org/> for a list of those species. Fish species are raised for a variety of reasons but typically the academic world will define the reproductive cycle of a fish species. What other organizations choose to do with that information is up to them. The 'why' can be very diverse and include the reasons you gave such as conservation. Perhaps, too, the species itself has some sort of medical benefit, therefore, it may be produced for that reason. There are actually a lot of reasons for a fish to be explored. A lot of the pressure in the ornamental world does, however, come from conservation efforts.

If we were the blue tang clan, then I'm calling myself Ol' Dirty Copepod.

Hi, aquaculture undergrad at the University of Rhode Island here. It's not often threads in [/r/askscience](#) show up that I can respond to, so I hope you can pardon the large number of questions.

I was wondering if there were any hard numbers on the effect of the aquarium industry's harvesting of the tang and, if there is a significant issue with wild populations as a result of their capture. If there's been any research into it, did you also consider possibly using culture of the tropicals to help remediate the reefs they are common to?

Recently I've been looking into the interaction between stocked and native populations of rainbow trout, and some of the research is incredibly interesting, relating to how the stocked fish interact with the wild fish, and how the populations respond, and I'm curious to see if issues like this could be common outside of the salmonid industry.

Also, what are your plans for getting your fish out into the industry and to private and commercial aquariums? Are you taking an approach connecting with aquarium fish distributors or making a push towards consumers and generating public awareness, or both?

I'd also like to know, if any of you have aquariums of your own, what do you keep in them?

Thanks, and best of luck.

[DrPineappleButts](#)

Andy Rhyne at Roger Williams University has actually been working on a project looking at the imports

of fish collected for the aquarium trade into the US. He has a [site](#) now that shows number of imports, where they are coming from, and where they end up.

None of the fish we grow here will end up getting stocked out into the wild, but perhaps maybe in the future? However, invasive species is a big problem, especially the lionfish in the Caribbean, which is eating up a lot of small species and juvenile stages. There's nothing here that naturally feeds on these individuals so their populations are going completely unchecked.

Rising tide is actually composed of several different entities: Research organizations, producers, aquariums and other organizations involved in the aquarium industry like distributors. You can check them out [here](#).

I've got one rectangular trigger and 4 hermit crabs.

Thanks,

-Isaac

Can you talk about how aquaculture for preservation purposes differs from commercial fish farming?

[divvyflax](#)

This is Eric. It depends. Aquaculture for preservation purposes usually includes some sort of stock enhancement protocols that prepare the fish species for stocking into the natural environment, so it can be a little more complex from this angle. Having the fish be able to compete in a natural environment is important for its continued success. Also, these crops usually have to be inspected so they can verify what is being released into the wild is what they say it is. Commercial fish farming doesn't have to address that as the product is usually consumed either for an aquarium or for eating. Those fish will not be returned to the wild, so the process doesn't have to include that aspect.

This is a really cool organization. I have two questions:

How do you see your jobs changing over a period of 50 years as we deal with climate change?

What are some ways people can help conservation efforts at home?

[Bocaj1000](#)

Climate change? What climate change? Just kidding. In all honesty, no I don't see the job changing all that much. We determine the production protocols for marine fish species and by determining those protocols we can provide a means to create an artificial population for us to enjoy that species with; whether it be for food, bait, ornamental, or other purposes. If the oceans become uninhabitable, and I'm not saying they will or will not, then those production protocols will become very important for maintaining certain species, but we'll do our jobs regardless. The pressure may be higher and maybe the pay will be better.

Go to the rising tide webpage <http://risingtideconservation.org/> and it can direct you how to get involved. Every little bit helps, no matter how small you feel the effort is....it always helps.

This is Eric, BTW.

Hey guys. Two questions, have you had success past the first brood? and what were the survival rate past the larval stage?

I wanted to also personally thank you guys for the work you are doing. I am an avid reef aquarium keeper, and i want to continue to keep these beautiful animals, without having to take them from the ocean.

[alex2208](#)

We (IRREC) have two different batches, one that has turned blue and have yellow tails, and the other batch has not colored up yet. The survival is quite low, less than 0.001%, which means of the 25,000 eggs we started with, only 4 guys made it in our first batch and 5 in our second. Ruskin has had slightly higher success - 26, but the Oceanic Institute, which raised the yellow tang (*Zebrasoma flavescens*) has produced more than a 1000 total individuals.

I am with you about taking from the ocean, but there's a caveat. The wild collection trade is a complex entity, and there are many people whose jobs rely on collecting and distributing wild caught fish. For some, it is their only possible source of income. However, when these natural resources are not properly managed, it can lead to habitat destruction or over collection, limiting wild diversity. Fishing with cyanide is also very detrimental to reefs, and some places have stopped doing it. Others have not, and until there is an easy way to tell if cyanide was used to collect the fish, it will be hard to stop. Add global warming and ocean acidification to the mix, and you can see the future is not particularly bright for many of these habitats.

-Isaac

Hey guys. Two questions, have you had success past the first brood? and what were the survival rate past the larval stage?

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[alex2208](#)

This is Eric and I'm only going to answer with what has happened here at the Tropical Aquaculture Lab. We've had some success past the first brood (or cohort). We had 2 cohorts that made it to settlement, but they didn't fair well past that. The reason is mostly neglect. We were short handed at the time. One of our biologists left and I was at MACNA talking about the first success. The fourth attempt is happening right now for us and they look pretty good. They are at day 55 ish and are turning blue. It's hard to say how many we have at this point, but I would guess about 20 or so. Since we started with 7000 then it's easy to see that the survival is better than it was the first time, but still pretty low.

What programs at the University of Florida did you guys go through to get where you are?

Are there any volunteer opportunities to work with you guys in Gainesville?

Do you do research in gainesville or is it largely in the field or elsewhere?

Edit: Sincerely, y'all are heroes. Great work.

[thefishestate](#)

I am currently getting a masters of fisheries and aquatic sciences. We are expected to have about 30 credits worth of classes and research. At the end we will have written a thesis and given a thesis defense, which is happening next week.

There are two branches- Eric works at the [Tropical Aquaculture Laboratory](#), based in Ruskin, and we work at the [Indian River Research and Education Center](#), based in Fort Pierce. If you're interesting in volunteer opportunities just send us a pm. There is some aquaculture stuff going on in [Gainesville](#), but I'm not sure what kinds of opportunities there are. We could ask around.

There are also other branches of the Rising Tide Conservation group: [Hawaii Pacific University's Ocean Institute](#), [Florida Keys Community College](#) and [Hubbs Seaworld Research Institute](#).

-Isaac

Marine biology and conservation work is literally my dream field to get into professionally. I really want to help our oceans and lakes. That being said, where (as a young person wanting to get their foot in the door) would someone like me start these days to get into this particular field? What sort of educational backgrounds and paths did you all travel to get to this point professionally?

[TheCryForum](#)

Carter here, When I was applying to colleges i was interested broadly in marine Biology. The school I went to (Roger Williams University) had a well renowned program. There were a lot of faculty within the program doing a wide array of research. During my Jr. year after taking a lot of classes and learning about the the different job opportunities and research sectors I had a strong interest in fin fish aquaculture. there was one professor who specialized in this and plenty of students who wanted to work in his lab (from helping with research projects to just feeding the fish). I harassed the professor for some time and eventually I began volunteering. After doing this for a while pro-bono he offered to pay me. Be persistent and separate yourself from the pack. My grades were never stellar and there were plenty of people at the lab with better knowledge of this stuff when I started. Work on weekends and stay at school over holidays. There are more than one ways to get to where you want to be and figure out where that is along the way.

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[TheCryForum](#)

I went to college for just a regular biology degree. I didn't have any aquaculture experience whatsoever. I ended up contacting a local aquarium for an internship to get my hands wet as they were doing a good deal of aquaculture. I made a few connections there and after reaching out to the University of Florida, heard that there was potentially a masters student position here. I would try and see if there were any research institutes or aquariums doing aquaculture locally and start there. I'm sure they wouldn't mind the help.

-Isaac

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[TheCryForum](#)

This is Eric. Start early, local, and go often. Volunteer at your local aquarium. I don't know how old you are, but it's always a good idea to start with your science teacher. They would have a good idea of how to get involved. Once you start, it'll take on a life of its own. Don't be shy about calling or talking with people. I have a master's degree and took a relatively winding path to get it. It doesn't matter how long the path is you take as long as you continue to take steps.

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[TheCryForum](#)

Cortney here: Get a job or volunteer with a public aquarium or zoo. Attend field days for environmental groups. Go out and get involved.

Hello TAL team,

Thank you for presenting at the MBI workshop and MACNA.

Hopefully the MACNA recording will be out soon.

I was able to catch the end of the MACNA presentation but missed the part about live food choice.

Can you expand on if you know what live foods were selected by the less than 40 day old pre-settled fish? I think all I have read is "massive amounts of copepods and other live food, managed water quality, feeding, lighting and other things to closely mimic what had worked in Hawaii." from Craig.

If you don't know, are you going to try to figure it out, or just continue replicating the previous successful mixture?

Also, can you expand on how 'fat and fecund' the parents were? I know it was mentioned that LRS was used to feed the parents, and Larry isn't about to give up his recipe, but LRS isn't available in some countries, and understanding the parent's feeding regime would be helpful.

Lastly, I know it isn't the goal of research like this to worry about commercialization, but could you estimate how long it would be until these methods could be published, replicated, and commercialized?

Thanks!

Edit: Larry from LRS saw this and let me know that the ingredients of his foods are on the back of every package. So, a modified question is, what essential foods should be offered to the parents? Anything high in EPA and DHA? What ratio would you recommend for the fatty acid content?

[hawaii4485](#)

This is Eric. At this point, we don't know what they were eating at specific life stages prior to (or even after) settlement, which for us was roughly 40 days post hatch. Yes, we are going to figure that out. Right now, we just want to replicate the effort (which we are close to doing), then we will systematically determine what steps were necessary in what we did to achieve settlement. It's difficult to address the 'fat and fecund' part of the question. We definitely feed our broodstock in a healthy manner, satiation about 3 times a day (give or take a feeding here and there). They do not look overweight by any means, but healthy. I think that is what you are trying to achieve....a healthy looking fish. I would

estimate that with the two research facilities working on it, then we should have commercially available blue tangs in approximately 2 years. I'm fairly pessimistic in general, but feel that this is accomplishable.

With continued success of breeding blue tangs would you attempt to captive breed other species of tangs? Thank you for the work you do - A wonderful step forward for conservation!

[jennychanlubsdeg](#)

Yes. I think now that the Yellow and Pacific Blue have been grown, you'll see other facilities that have other species spawning start to have some success. I know there is interest in the Purple tang and multiple facilities have broodstock spawning or close to it. It wouldn't surprise me to see this closely related species be next. Also, expressed interest in species such as the gem tang are also reasons to explore. I don't know of anyone that has broodstock of this species, but I know it is extremely popular.
Eric

With continued success of breeding blue tangs would you attempt to captive breed other species of tangs? Thank you for the work you do - A wonderful step forward for conservation!

[jennychanlubsdeg](#)

Cortney here: yes other species of tangs are a possibility. First we want to take our research production methods for blue tangs and help commercial producers successfully culture them and sell them to meet the demand from the aquarium industry.

First, thank you so much for your hard work and congratulations on your successes! I will look forward to having my aquarium completely stocked with captive bred fish. I understand that for people in the wild caught trade this may be their only source of income, as Isaac mentioned in an earlier response. Are there any programs to provide them with an alternative livelihood?

[socccergal1](#)

Cortney here: We cannot state that collection is the only source of income for wild collectors. There are collectors worldwide and we cannot comment accurately on this. In a perfect world we could train every collector to culture fish instead, but this is not a perfect world. We will keep culturing fish because each one produced is one less being supplied from the wild. I love the idea of an aquarium with only cultured fish. Even today the diversity of species that are cultured that you can purchase and stock in your tank is high. We will keep doing research to increase the number of species that are cultured and available for your aquarium.

First, thank you so much for your hard work and congratulations on your successes! I will look forward to having my aquarium completely stocked with captive bred fish. I understand that for people in the wild caught trade this may be their only source of income, as Isaac mentioned in an earlier response. Are there any programs to provide them with an alternative livelihood?

[socccergal1](#)

One of the reasons for the creation of marine protected areas, and regulation of collection of ornamentals, is to encourage tourism to these areas. Tourism and the associated economies formed can provide a more substantive income in some situations. Whether or not marine protected areas are

effective or not is another issue. It's pretty difficult to really assess as every location is different. I'm sure there's a lot of work being done to look at the human economics ecosystem that wild collection is part of.

-Isaac

Hey guys! Thank you taking the time to do this AUA!

I have a couple questions for you...

How big are the PBT broodstock holding tanks? How long were the broodstock held until egg production/spawning was recognized? How old does a PBT have to be to be sexually mature? What do you feed the larvae? I'm interested in aquaculture as a hobbyist... what's the best species to start learning with?

You guys are fantastic - I'm a big fan of all the work you do! Thank you!!

[RomeoTangCharlie](#)

Broodstock tanks are 600 gallons. One population was held for five months before it started spawning but the other took almost a year. Sometimes it requires that you get the right sex ratio, but I'm sure there are a lot of combinations that work and don't work. We have not run any studies looking at that quite yet. I don't know how old they have to be, but some of ours weren't the full-sized blue tangs you see in aquariums when they started spawning. We fed the larvae a combination of rotifers and copepod nauplii, and in the later stages they received artemia and dry feed too.

As a starter species, clownfish are great. Easy to obtain, and the larvae are relatively easy to grow.

No problem. We appreciate it.

-Isaac

What was the survival rate for the blue tangs and what are you going to do to improve upon that? Do you see the culturing of blue tangs becoming commercially viable while producing a fish that will cost the same as a wild caught fish?

Personally I am all for this movement towards cultured fish but I am not convinced that the average aquarist will care where their fish came from and will buy the cheapest version of what they want.

Edit: I see that you really are just starting to crack the code of this species, so to speak. So to switch up my question, what are your next research goals in regards to the larviculture of the blue tang?

Thanks and good luck!

[scooterscooter](#)

Cortney here: the survival of the blue tangs was less than 1% to juvenile stage. This is lower than desired but our research efforts are focused on improving the survival by defining optimal feeding regimes, nutrition, live food type and density, and culture tank parameters. We see increased mortality during two stages of larval morphological changes. Reducing mortality at these stages is important to improving survival.

Any concerns about the impact of aquaculture on the environment?

[lamnotburgerking](#)

Cortney here: no especially with marine ornamental fish. All of these fish are raised in contained tanks with filtration, there is no discharge. Some concerns about aquaculture and the environment have occurred many years ago with shrimp ponds and their construction near coastlines in South America and Asia. There has been restoration efforts to restore mangroves and move production ponds inland to protect the coastlines.

What species after the blue tang will your team pursue successful aquaculture of next?

[BalusBubalis](#)

This is Eric. We are going to work on the melanurus and yellow coris wrasse. Also, still working on the milletseed butterfly fish. We also have some flame hawkfish that if they start spawning could be fun to play with.

What species after the blue tang will your team pursue successful aquaculture of next?

[BalusBubalis](#)

Andrew here, we are currently working on the Reef Butterfly Chaetodon sedentarius

So you guys keep your own personal fish/aquariums?

[Strikerj94](#)

Cortney here: I had reef tanks for years but not currently. When I was a teen I was breeding or trying to breed fish in my basement. I had no idea I would make a career of it.

So you guys keep your own personal fish/aquariums?

[Strikerj94](#)

Eric here. I have a 10 gallon tank with 2 paradise gourami females in it at home. I get all the fish tank attention I need at work.

It seems like this has been a long, challenging process. Do you think your success will be able to be replicated by other aquaculture retailers so that the cost of tank-bred tangs will be reasonable for a hobbyist? That'd be a great step in encouraging the purchase of only tank-bred fish.

Which species is next?

[mithril_marc](#)

Andrew- Our main goal is to have our success replicated by other producers so the cost of tank-bred blue tangs and other species are reasonably priced for the common hobbyist. The quicker the better in this situation from a conservation standpoint.

Your success is inspirational to me. I like seeing the photos and information you have shared about your work with the blue tang and other species, and wish you continued success! Thank You! As an educator who has worked on designing a curricular sequence of project based, STEM-Oriented and aquatic ecosystem themed learning activities - (for secondary students) - I envision "a someday" when students will be able to carry on with your groundbreaking work. If you have ideas about ways to support this mindset, I'd like to hear them :-).

[BtheCA](#)

Cortney here: google "teach aquaculture" We developed a curriculum for middle and high school students six years ago and all the info is free on the website. We do not cover blue tangs because they are more difficult, but there are a lot of potential species that are well suited for classrooms. Email me directly if you have further questions or have access problems to the website. There is a website glitch with new logins that UF is fixing right now but it should be fixed in a couple of days.

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[BtheCA](#)

There are actually several aquaculture themed programs at the high school level. Off the top of my head is the [Southampton Marine Science Wet Lab](#). Roger Williams University also has an undergraduate lab run by Andy Rhyne so you could check them out for ideas.

-Isaac

Your success is inspirational to me. I like seeing the photos and information you have shared about your work with the blue tang and other species, and wish you continued success! Thank You! As an educator who has worked on designing a curricular sequence of project based, STEM-Oriented and aquatic ecosystem themed learning activities - (for secondary students) - I envision "a someday" when students will be able to carry on with your groundbreaking work. If you have ideas about ways to support this mindset, I'd like to hear them :-).

[BtheCA](#)

This is Eric. UF has a great program started a few years ago by a group of individuals including Cortney Ohs (who is on this AMA) called Teach Aquaculture. It is designed to teach kids aquaculture in the classroom and has a uniform curriculum for doing such a thing. This program is in its infancy, but has loads of potential. Either I or Cortney can tell you more about it. Email or PM us.

I have heard that tangs were never bred in captivity, but it seems you have succeeded. Are you getting viable offspring that are living into adulthood, and are you obtaining large brood sizes?

[ghostoftsavo](#)

Cortney here: getting fish to breed is the first step. Several species of tangs have spawned in captivity. Culturing the larvae through to the juvenile stage has occurred with yellow tangs and Pacific blue tangs.

Yellow tangs were successfully cultured first in Hawaii last year so they are not old enough to be brood fish. I am not sure how long this will take but 3+ years is a good guess. Tangs can live more than a decade.

We obtained adult sized fish from display aquaria and private sources. It is unknown how old these fish were but 5+ years. Once they established a happy harem natural spawning started.

I have heard that tangs were never bred in captivity, but it seems you have succeeded. Are you getting viable offspring that are living into adulthood, and are you obtaining large brood sizes?

[ghostoftsavo](#)

Andrew here, we currently have two broodstock populations that spawn regularly for us. Our first batch of cultured tangs are about an inch and a half long at this point and are doing great. With that said, it is assumed that they will live to adulthood.

First of all congrats! Do you think its possible to reproduce this in a home reeftank? What conditions do I need to first get the tangs to spawn and secondly to raise the fry (what kind of food exactly)? When do you think we will be able to buy tank raised tangs? What are the next fish you are trying to raise?

[FunnyFreshSC2](#)

Cortney here: no this will not occur in a reef tank. A pair of fish may spawn in the tank but normal filters will remove the eggs. Special egg collectors will be needed to prevent the filter from getting the eggs.

You will need copepod nauplii, we use Parvocalanus crassirostris. We also use enriched rotifers and Artemia as the larvae grow.

We are working to have producers use our methods to produce tangs commercially. It could be within a year depending on success of private producers.

Our main efforts now are to improve the survival of the larvae to make blue tangs more commercially viable or interesting as a species to culture by private producers. We are always trying different species, with the methods used for yellow and blue tangs being successful, we will apply these methods to other species in the future and will likely have more successes.

First of all congrats! Do you think its possible to reproduce this in a home reeftank? What conditions do I need to first get the tangs to spawn and secondly to raise the fry (what kind of food exactly)? When do you think we will be able to buy tank raised tangs? What are the next fish you are trying to raise?

[FunnyFreshSC2](#)

This is Eric. I do think it is possible to reproduce this in a home set up. The difficult part is going to be able to maintain all the food items that are required. Right now, there is a lot of redundancy and this process will likely be streamlined in the future. Once that happens preparing for home rearing will be easier. Being able to grow multiple species of microalgae and zooplankton (particularly Parvocalanus sp. copepods) will be paramount. I'm thinking in a couple of years we should be able to have commercially available blue tangs. We are working on melanurus and yellow coris wrasse as well as the blue tang.

First of all congrats! Do you think its possible to reproduce this in a home reeftank? What conditions do

I need to first get the tangs to spawn and secondly to raise the fry (what kind of food exactly)? When do you think we will be able to buy tank raised tangs? What are the next fish you are trying to raise?

[FunnyFreshSC2](#)

I don't know how easy it would be, but i have definitely heard of people recording spawning in their reef tanks. Granted, it will be difficult to collect the eggs. You will need to grow rotifers and copepods to raise these larvae, and even then it will still be difficult.

I couldn't tell you when you will be able to buy captive bred tangs. However, people do sell "tank-raised" tangs as a marketing ploy. Essentially, small juveniles are collected off the reef, and grown to larger sizes in captivity and then distributors will label it "tank-raised". Captive bred tangs for the regular consumer may not be in the pipeline for a while, but it really depends on how many breakthroughs we can make. Our next species here at IRREC is the reef butterflyfish, (*Chaetodon sedentarius*).

-Isaac

Good morning, congratulations for the work. My name is Veronica Takatsuka, I am master student in Brazil and I want to develop my PhD with the reproduction and larval rearing of *Pomacanthus paru* and *P. ciliaris*. So, I wonder how are research on the Koran angelfish (*Pomacanthus semicirculatus*) and have started to play the emperor angelfish. And where I can find the publications you. Thanks for listening.

[VeronicaTakatsuka](#)

Veronica, are you in the same lab as Isabelle? Do you guys by any chance know Wesley? He was here in our lab for almost a year.

We currently have rock beauty angelfish (*Holacanthus tricolor*) that spawn, but they are often infertile. There are a variety of reasons why, but they are at the same temperatures and conditions as our tangs. I've heard that *P. paru* and *P. ciliaris* can be really aggressive towards each other, almost to the point where they can't be kept together. We don't have any publications out on that at the moment, but feel free to pm us your contact information and we can talk more.

-Isaac

Good morning, congratulations for the work. My name is Veronica Takatsuka, I am master student in Brazil and I want to develop my PhD with the reproduction and larval rearing of *Pomacanthus paru* and *P. ciliaris*. So, I wonder how are research on the Koran angelfish (*Pomacanthus semicirculatus*) and have started to play the emperor angelfish. And where I can find the publications you. Thanks for listening.

[VeronicaTakatsuka](#)

This is Eric. We had some *Pomacanthus* broodstock but were never able to get them to spawn. We are not currently working on them. We put out a pub on what little work we did with them based on eggs collected in public aquariums. They were relatively easy to grow from the larviculture standpoint, but like I said, we were never able to get them to spawn. Citation below:

Cassiano et al., 2015. *Aquaculture International* 23(1):253-265.

Not science related, but are any of you going to be making an appearance at the Chicago Aquatic Experience next month so that the people of Chicago can get to meet you and really learn about the progress you have made?

[icedearth15324](#)

This is Eric. At this point there is no plan to send someone.

Not science related, but are any of you going to be making an appearance at the Chicago Aquatic Experience next month so that the people of Chicago can get to meet you and really learn about the progress you have made?

[icedearth15324](#)

Not I, said the broke graduate student.

-Isaac

Hello my name is Isabelle, I'm a PhD student of Brazil. Congratulations for all work you've been doing. I wonder which parameters of water that were used for fish breeding and how the breeding animals were fed up (food type and frequency)? It was used some substrate for reproduction? Were used some different technique in the act of reproduction of the fishes related to reproductive behavior of the species? I have the same questions for *Chaetodon miliaris*. We've been trying to reproduce *Chaetodon striatus* for a while and need some help with that, including larviculture. Thanks

[ibayonaperez](#)

isabelle, off the top of my head, the water parameters for our brood stock range between 26-28 C, salinity 34-35 ppt, and ph 8.1-8.2. we've been feeding a varied diet of PE mysis, Top dressed otohime EP1 pellet, and larry's fertility frenzy. We put pvc in the tanks for the tangs to use as habitat, but as far as spawning goes, they are pelagic spawners and don't require any substrates. We actually have a pair of *Chaetodon striatus* and *Chaetodon ocellatus* for more than a year now, but they never panned out for us. I've seen a lot of aggression between the 'pairs' and I'm not sure what to make of it. On the other hand, our pair of *Chaetodon sedentarius* spawned after 3 months of captivity. Feel free to PM us with your contact information and we will send you more information to your questions.

For the *Chaetodon miliaris*, we can give you an email to ask questions to and I'm sure Avier will be happy to answer.

-Isaac

Hi all! Thanks for doing this. First, what do you think is the future of this field? At what point would you consider not culturing a species? Second, as an undergrad interested in pursuing this field (marine ornamental aquaculture), what should I look for in a graduate program? And last, what considerations are made when setting a market price? Is there some kind of formula made with the man-hours and equipment/feed costs to calculate a price?

[Leand134](#)

This is Eric. With the number of species not yet cultured or very little info available on them, I would say that the future of this field is quite sound. I would never consider not culturing a species (although I might protest if it was too boring). What you want to look for in a graduate program is a facility that is

doing work that you would like to be involved in. Is there funding available to support you and your time at the facility? Do you get along with the major professor and the lab mates? You'll find that a few visits and talks will help decide where to go. You'd also be amazed at how much you already know about what you do want to do based on what you don't want to do. For the most part, we don't have a say in setting the market price of fish. I believe this is set by what the cheapest avenue of availability is....usually wild caught fish. Don't know about an economic formula off-hand, though I'm sure someone has tried one....guys?

It is advised not to keep wild blue tangs in aquariums smaller than 6ft, ~150 gallons. Can aquacultured tangs do better in aquariums smaller than this?

[Tripod1404](#)

Our babies are about an inch and a half long, so I'm sure at this stage you could keep them in a nano tank, but as they get older, it would definitely stunt their growth. You definitely want to keep adults in large tanks. For reference, our broodstock are kept in 600 gallon tanks.

-Isaac