Simple Genetics, Yeah Right!

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Remember high school biology when we learned about basic genetics? You can have a dominant or recessive gene, and you can create a nice little chart to show what the offspring will have for characteristics based on what the parents have for genes. When you have two fish that show the recessive characteristic, it must have 2 recessive genes. OK, sounds simple. So the offspring must all show the same recessive gene, right? Well not in my case! I have had a very nice albino male Ancistrus for a few years, I don't even remember where I got him from. I do remember it was from a club auction, and there were a few in the bag, but he was the only one that I raised. He grew up to show a great orange coloration, had a nice set of upper lip growth, and had the pink albino eyes.

On one business trip, I visited Larry Jinks in NJ. He had a bunch of albino ancistrus, and offered to give me fish to take home, so I accepted two females. They were much paler than my male, but I figured that was just because they were stressed a little by the trip. They were also females, so maybe they just wouldn't show the nice orange coloration of my male. Anyways, I got them home safely, put them in a tank and fed them lots of veggies; zucchini and other squash, green beans and frozen peas (shelled). They adapted to their new home nicely and started to fatten up. I finally was able to catch my male out of our heavily planted 70 gallon display tank and put him in the 20 gallon tank with the 2 females.

It did not take long before there was a clutch of eggs inside a broken conch shell being guarded by the male. The eggs were bright orange. I had spawned the non albino ancistrus a few years back, and remember that their eggs were also orange. After the eggs hatched I still had 30 or 40 very orange eggs with tails hundling in the shell with the male. After a couple of days the fry began venturing out on there own and right before my eyes, they were turning brown! How could this be? They should be albino, not brown! I thought that maybe it wasn't really pigmentation, but just their internal organs developing, but they kept getting darker and after a few days were definitely not albino. They had dark eyes, and their bodies were very dark.

So what went wrong? Why was I getting non albino offspring from 2 albino adults? I also had a couple of smaller non albino ancistrus in the tank, but was pretty sure that the male had spawned with one of the albino females, but I was not 100% sure. So, out came the smaller non albino ancistrus. I took out the fry from that tank and started feeding the adults lots more veggies. It did not take long for them to spawn again, just three or four weeks from the first spawn. I had actually seen the male and female together I the shell, so this time I was 100% sure it was the 2 albino fish spawning, not just 95% like before. I was hopeful that maybe one of the non albino ancistrus had spawned in the first spawing, but a few days after the fry from the second spawn began coming out of the shell, I noticed they started to turn brown again! Now what was wrong? Science doesn't lie. It just isn't always as simple as they tell you in high school I guess.

I had a chance to talk to Gene Lucas at the NEC convention, and I asked him his thoughts. Unfortunately this conversion happened very late one night in the hospitality room, so the details are kind of fuzzy in my mind. But he did offer some possible explanations, none of which I will probably ever be able to prove. But I would like to try a few experiments. One possibility is that there is more than one gene that is responsible to making an ancistrus appear albino. If this is true, then that simple chart gets a lot more complicated.

The male could be expressed as ddMM, where dd is responsible for the albino trait and MM is the normal dominant gene that causes the female to show albino traits. The female could be expressed by DDmm, where mm is the combination that causes her to show albino traits and DD are the normal dominant gene that causes the male to show albino traits. The first generation offspring from the 2 adult albinos could be represented by DdMm where D is one of the dominant genes for normal coloration which would come from the female. They would still have a d from the male from his recessive albino gene. They would also get an M for normal coloration from the male, and one recessive m from the female. Cool, so they show no albino traits since both sets contain one dominant and one recessive gene.

My options for experiments could be; spawn the offspring together, spawn the offspring back to the male, or spawn the offspring back to the female. In theory, what we should see if we go with option 1 is a whole lot of possibilities, and I would not be able to tell the offspring that showed albino traits from the dd from the male apart from the mm from the female. The chart is included below. Of course these experiments will take time, I have to wait until I get sexually mature ancistrus from the first spawns, and then hope they spawn as readily as the parents did.

If I take a male offspring from the initial spawn, and spawn it back to the original female, what would we get? We should see albinos having the mm pair, since that is all the original female could contribute. They could be either Ddmm or DDmm. All of the non albino offspring would be either DdMm or DDMm. This chart is also included below.

If I take a female offspring, and spawn her back to the original male, we should see similar results, the only difference is that the albinos would have the dd pair, either ddMm or ddMM. The non albinos would be DdMM or DdMm.

Non albino male offspring mated to non albino female offspring

Male DdMm Female DdMm

	DM	dM	Dm	dm
DM	DDMM	DdMM	DDMm	DdMm
dM	DdMM	ddMM	DdMm	ddMm
Dm	DDMm	DdMm	DDmm	Ddmm
dm	DdMm	ddMm	Ddmm	ddmm

1/16 albino from both parents
3/16 albino from male gene
3/16 albino from female gene
1/16 no albino gene
8/16 non albino carrying albino genes

Non albino male offspring mated to albino female

Male DdMm Female DDmm

	Dm	Dm	Dm	Dm
DM	DDMm	DDMm	DDMm	DDMm
dM	DdMm	DdMm	DdMm	DdMm
Dm	DDmm	DDmm	DDmm	DDmm
dm	Ddmm	Ddmm	Ddmm	Ddmm

8/16 albino from female gene

8/16 non albino carrying albino genes

Are you lost yet, and you thought genetics were simple? There are of course other possibilities. We could be dealing with a mix of different species. How sure are we that there is only 1 species of ancistrus involved in the albinos, for that matter, how many species are involved in the common ancistrus that has become fairly common. There could be some other genetic oddity at play too. But I think I will leave those to the genetic experts.

For more information on genetics, check out http://www.newenglandreptile.com/genetics_intro.html. It references reptiles, but has lots of good basic information on genetics. There are also a ton of other sites with information on human genetics, and many specific to albinos. There are at least 4 different genes in humans that could be involved with albino traits. Have fun!