Northern Axolotls - A guide to Morphing Axolotls

By Shawn Hayes **7/7/2019**

All axolotls are salamanders, regardless of their aquatic nature. We have bred axolotls to retain their gills far more commonly than they likely ever did in the wild. We like our feathery gilled aquatic friends. Every now and again, however, the more dominant genes that allow our aquatic axolotls to "grow up" and morph into fully functioning terrestrial axolotls crop up. This can be a frightening experience for those who love and care for their babies. I have written this guide to help you through the transition, show what to watch out for, set up for their new land based lifestyle, and to try to tell the difference between a morphing axolotl and one who is ill.

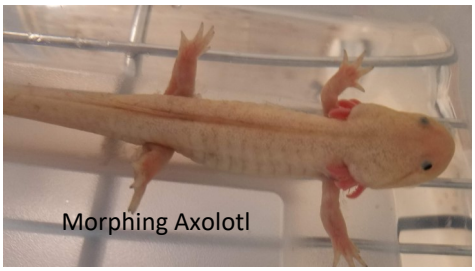
I have had the misfortune of having quite a bit of experience with the phenomenon due to the presence of the genes in our local populations. I have had to fight long and hard to weed the affected individuals from my breeding pools and work hard to keep the lines clear as much as possible. It is impossible to tell if an aquatic adult has the genes or not, unless you know their history, or you breed them and their offspring suddenly lose their gills and come to drier land. It is obviously best to keep these animals as Pet Only and not breed them further into the captive populations.

History:

It is commonly believed that axolotls in the wild never morph. This is not the case, it is actually believed that they may have had a higher natural metamorphosis rate in the wild then they do today in captivity, perhaps even as high as 75% when their conditions changed (according to one report). They have been selectively bred to retain their neotenous phenotype under laboratory conditions, and from there the pet trade. Even with the additions over the last 60-70 years of tiger salamander DNA, we have bred for them to remain neotenic. However, due to the increasingly inbred nature of the captive populations (coefficient about 35) we will probably see a higher degree of genetic expressions like morphing show up. As genetic lotteries go, morphing is a win. Many of the other prizes can be a lethal stew of mutant genes displaying cessation of growth, arrest of limb development, short toe syndrome, necrosis of gill tissue, and a barrage of other issues. Makes morphing into a healthy terrestrial adult look like a blessing.

Morphing?

I get this question quite a bit, is my axolotl morphing or not? Believe it or not, it is still quite rare for an axolotl to fully transition to land. I have found it is usually young animals, starting at about the 6 month mark, though I have seen older animals change also. In my clutches that carry the gene, only about 5% actually changed and they did it rather quick, at between 6 and 8 months of age. The morphing process is sort of like puberty for a salamander. If it is genetic, it is a perfectly natural and usually swift process, taking 2 to 4 weeks to fully transform. Unless people are hyper aware of subtle changes day to day, it's usually not spotted for the first week or so.



The first sign I usually see is a receding back fin and shortening gills. This is not to be confused with losing gill fluff on a sick or stressed animal. They do not really lose fluff as they are shortening until the end, they just slowly get shorter and shorter as the body absorbs the material back into itself. About half way through this process, I will see the legs start to bulk up. It's usually spotted more in a white or albino animals because the extra blood flow to the legs gives them a pink appearance. They are gaining the extra muscle mass they will need to support themselves on land instead of the near weightless conditions of the water. For a while the uncomfortable axolotl keeps its legs almost straight out from its body. This combined with the shrinking back fin gives it a flatter appearance as its floating along the bottom of the tank looking a bit out of place. This is the stage most people find their babies in and start to worry. The other signs are more subtle, they are growing eyelids and their skin is changing. It will no longer have a slime coat, but will start shedding as it grows.

Many ill axolotls can have the appearance of the beginning symptoms of a morphing axolotls, superficially. This is the shrinking back fin and gills. I have seen many ill animals

look this way for months while they were fighting stress, water parameters, heat, too fast current, etc. One of the tips is the time period...weeks and months. Morphing is a fairly quick process. The animal doesn't linger in a short gilled form for an extended period of time without finishing the process. Plus, the other signs...the bulking legs, the eyelids, the skin, etc. If an animal has no frills, and skinny legs, check the parameters...sounds more like a water issue than a genetic one. If you are in doubt, reach out. Ask someone, me or someone else with experience in the signs.

While its transitioning:

If you happen to spot an animal during the early stages of a morph, don't panic. It is still the same animal you know and love, it is just growing up a bit. I have found that if I have one animal morphing in the same tub or tank with other animals, they often will start morphing as well. The morphing animal produces a lot of hormones to get through the process, and these hormones can be transferred to the water around it, then to tank mates. I would isolate it into a tub of its own, unless you want a colony of morphed axolotls to keep.

I use my trusty 16 quart tub for my temporary morph holding facility. I put the early stage animal in about a gallon and a half or so of clean cool dechlorinated water. Roughly an inch and a half or so of water. I do continue to feed daily, but find some animals will eat, and some will not during the shift. Their bodies are rearranging, absorbing, reshaping, so some animals need the extra calories, and some just want to be quiet and let their bodies get on with it. I offer in case they are hungry, but don't worry if they don't feel like eating. I monitor their progress daily, and usually will put something in the tub they can rest their heads on or start to crawl out onto, like an inverted bowl, a pvc pipe cross, a stone, etc. Place this in the center of the tub so they cannot crawl out along the edge. They are getting stronger everyday. Daily water changes, just like any other tubbed animal. As they continue to lose their gills, I might lower the water a bit as well, but I keep them in water until they are close to being done. Once their gills are almost 100% gone, I will then transfer them to their new terrarium pond and let them come out of the water on their own time.

New Environment:

Speaking of terrariums! While your little one is morphing, it's time to think about the next phase of its life. Are you going to continue to keep it long term, or find a home after its fully settled on its land legs? Terrariums can be as simple or as complex as you make them. I will start with the most basic temporary set up and move on to more elaborate homes later on.

Bare bones: If you plan on just keeping your new morph for a little while, or this was a complete shock and you need a temporary set up until you can get something more elaborate together for it, here is a bare bones version of a terrarium. It is basically, damp green moss, a hide, and a water dish. I am liberal with my moss, packing it fairly firmly and making sure it is good and damp, though not dripping wet and lay about 3 to 5 inches in the bottom of whatever I am using as a home. It could be a glass tank, a 10 gallon minimum for 1, I prefer a 20 long tank myself. Or a big plastic tub, with high sides. Whatever you are using, make sure your new salamander cannot climb up the sides, and if it has a top, all the better. If its a tub, be sure to drill holes in the top, or make a screen top. A screen top is also good on a glass tank. This will keep animals (cats and dogs) out of your tank, and keep the crickets and axolotls in. I then put a shallow wide bowl in for water, usually submerging the dish into the moss so its even with the top and the morph can step down into the water. I like the dish to be about an inch and a half deep and wide enough to allow the morph to swim if it wants, or at least submerge and stay in the water when it feels like it wants to. Some will more than others. There should also be a hide of some sort in the tank. For a quick and easy hide, I like the half a coconut shell with the door cut out. These are lightweight and roomy and I half hide them in the moss. Mostly the axies will burrow into the moss and make their own hidey holes, but many like the convenience of a prefab house. This setup will allow them to get used to their new status as land critters. I put them into the water dish when their gills are 99% gone or so and let them get out and explore on their own. Some come out right away, and some take a few days. Be sure to keep their substrate damp but not sopping wet. They absorb a lot of moisture directly through their skin still, even on land.

Slightly more elaborate:
One step up from the bare bones set up is to add coconut dirt to the bottom of your tank, usually an inch or two. Then add the green moss to the top, again, 2 to 4 inches or so. I have seen some people just do coconut dirt, which is fine, just messy...I find the addition of the moss helps keep the axies a bit cleaner, and hence your water cleaner and the babies looking brighter. Personal preferences though.

Much more elaborate:
If you want to go all out and create a paradise environment for your new morphed pet, do some research on bioactive terrariums! These involve live mosses and plants, live bugs to help keep the system clean, and can be very elaborate and gorgeous. I will let your imagination run wild with these plant filled and lush terrariums, but I will give you the basics.
The gist of a bioactive terrarium is a balanced ecosystem between plants, animals, and bug life to maintain a more natural environment that requires minimal care and cleaning. It is usually created in a larger glass tank, with a thick layer of rocks on the bottom for drainage. This is covered by a mess or screen layer that the soils are layered up on. The soils can be a blend of many materials, including peat, coconut soil, sphagnum moss, mulches, orchid barks, sand, etc. You can create your own soils, or buy expensive blends specially created for bioactive terrariums, it's up to you. The soils are the foundation of the live plants and mosses you use to decorate and give your terrarium its natural feel. Then you add in the most important ingredient, the clean up crew! These are the live decomposers and small bugs that help consume and break down waste products and keep your soil fresh and fertile. They are usually terrestrial isopods, springtails, worms, millipedes, and various beetles as determined by the compatibility with your tank. Many people source these themselves in the wild, or buy them from specialty exotic breeders. The isopods and springtails especially come in a wide variety of colors and sizes. These will also have a secondary function as an occasional treat. Just make sure your morph isn't eating them all, and keep enough of a population to do their job in your terrarium.

There are many websites dedicated solely to bioactive terrariums, so I will let you explore and be creative if this is where you want to go. I can say, since your morph will spend much of its time burrowed away, it's nice to have a pretty environment to enjoy when playing "spot the morph". I also find the peaceful nature of maintaining the plants and invertebrates in the terrarium to be rewarding in and of itself.

Feeding:
While your morph is still in transition and aquatic, feed worm bits like normal. Offer food and if you have an animal that eats throughout its morph, feel lucky. Many go off food completely. Once they have transitioned to land they eat a bit differently. They are no longer vacuums, they have to catch their prey, which is a change for them. I find them to be just as derpy at catching food on land as they are in the water. I mostly allow mine to self feed on crickets. I drop a good number of crickets in once a week or so and let the axies set to. They eat their fill and then some and go back to their burrows until they get hungry again. They can eat quite a few. If I have been lax in getting them worms and I have a bunch of axy heads sticking up and looking hungry at me. I feed them earthworms, which they also love. I put the earthworm right in front of them and help them catch it before it gets away. They are fiercely adorable on land as they are in the water when they catch their food. They do the whole shake their heads to kill it as they eat their food down. So stinkin cute! It's best to vitamin coat or gut load your crickets before feeding them out to make sure your axies get all the calcium and minerals they need. I have also heard of people training their morphs to eat soft sinking axy pellets from plates, but I have yet to manage it. You could feed silkworms, waxworms, hornworms, or other soft bodied insects to them as well. I would stay away from mealworms. Young roaches who have just shed would be a good treat, though they are fast.

Other notes:

I have found my morphs do well in room temps, but my room temps are still cool, typically mid 60's. They are still nocturnal and continue to grow past their initial morphing to their fully adult sizes. They will still express sexual maturity at about 9-10 months or later and males will carry a larger set of gonads at the base of the tail and be leaner than the females. The color of the axolotl will stay through the change, though it may develop a bit. If your aquatic axolotl is a GFP Lucy for instance, it will still be a GFP Lucy on land. I find that the phenotypes with more leucophores will show more spotted when they change...however, the golds will still be gold, etc. The basic color type of the axolotl doesn't change as dramatically as say a tiger salamander, who goes from an olive green to a bared green and black as an adult.

I have yet to find the long term average lifespan of a natural morphed axolotl. Given that the average lifespan of an aquatic axolotl is 10-15 years, I would hope that my morphs will be happy and healthy for at least that span or longer. The naturally changed morph is much healthier than those forced to change through manipulation. I do not condone or recommend anyone trying to force their axolotl to change.

It is also very difficult to have morphed axolotls breed. As it obviously has the genetics to morph, I would not recommend anyone trying that either. If I have a clutch that ends up with any that morph, I consider the entire batch Pet Only animals, as they could all be het for morphing. As I mentioned in the beginning, there is no way to tell from one aquatic axolotl to another just by looking at them if they carry the genes for morphing. Let's all do our part to keep this to the rare few and love those that do happen to morph as pets.

If you decide that you do not want to keep a morphed axolotl long term and have managed to successfully help it through its transition and getting it adjusted to land. You can usually find someone who would like one. I have taken in a couple and usually have some that are looking for homes. It is very easy to ship them, you can look for information about shipping salamanders online, or feel free to pm me and I can help you. I find it much safer to ship a morphed axolotl than an aquatic one. Feel free to share this guide if you know anyone else who may need this information. I am always happy to help.