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JUST ASK A SCIENTIST!

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Question: What is really behind the mysterious "livebearer wasting disease" that is so prevalent, especially among pet store fancy livebearers? I have heard it's an internal parasite, fish tuberculosis, or columnaris, etc. Is there one disease that is most common, or could it be one of many diseases?

"Livebearer wasting disease" describes the phenomenon where individual fish continuously lose weight and eventually die despite consuming food. This is a slow process that stretches across weeks or even months, often affecting only a single or a few individuals in a given tank. The term "livebearer wasting disease" – while commonly used in the hobby – is not actually a diagnosable disease defined in the scientific literature. So, my response here is primarily based on my own experience with similar cases.

In my experience, wasting disease primarily occurs in individuals with a low body condition and a compromised immune system that are unable to fend off pathogens that are common in fish tanks but do not typically cause disease in healthy individuals. That would explain why the wasting disease has been associated with a number of pathogens, including larger parasites (such as worms) and microscopic pathogens (such as bacteria that cause fish tuberculosis, columnaris, or fungi). In that sense, wasting disease is really not caused by any of these pathogens, but rather visible infections are simply as sign that something is else wrong with a particular fish.

I have had very poor success in reversing the wasting disease phenomenon once it is really obvious, and I typically euthanize affected individuals to avoid them spreading infections in their colony. Consequently, dealing with wasting disease is more about prevention than treatment. Below, I will describe some of the risk factors that can contribute to the incidence of wasting disease and how to potentially avoid them.

Age: Many fish that I have seen to be affected by wasting disease are large, old females that stopped reproducing. Declines in body condition and

increased susceptibility to infections in these cases may simply be an indication that an individual is reaching its maximum life expectancy. We do not really have good information about how old our livebearers get in nature, but I doubt that life expectancy is much higher than one year for most species. So, many fish in our aquaria that have lived for two, three, or even more years are likely facing age-related declines. In these



cases, there is not much that can be done to prevent the onset of wasting disease.

Chronic stress: We know that chronic stress can have very serious health consequences in animals, including humans. Chronic stress can arise through many ways. In our aquarium fish, it is typically caused inadequate maintenance conditions, including poor water quality, insufficient space, inadequate group composition (e.g., lots of males, few females), or inadequate co -housing of multiple species. The good news is that chronic stress is easy to prevent. It starts by understanding the environmental conditions our fish are exposed to in their natural environment. What are the water parameters, and how does their habitat look like? Recreating the preferred conditions is the first step to successfully keeping the fish without any problems. To maintain adequate water quality. I typically rely on effective filtration (large filter surfaces; most commercially available products miserably fail in that regard), live plants that assimilate some of the fish's waste products, and generous, weekly water changes. I strictly follow the "one species per tank rule" and try to make sure that there are more females than males in a tank (males can be relentless in their pursuit of females). Daily health checks help to identify problems as they arise. Are all fish exhibiting normal behavior? Or are some individuals hiding, lethargic, or slow to eat? If there are any issues, breaking up groups or isolating affected individuals for some period of time can help to nurse them back to health.

Diet: Most commercially available fish foods are at best "goodenough" for fish nutrition. Commercial products are made to last on your shelf for as long as possible, not to be the perfect food source for your fish. Fish foods are particularly poor in fats and fatty acids, because these compounds turn rancid and have a much shorter shelf life than other diet components. Inadequate diets that primarily consist of dry goods can cause issues with fish condition and health, and extra efforts in terms of preparing foods pay off, especially in species that have a reputation to be "hard to keep". Broadening the palette of foods is most easily done by providing some frozen foods (I use frozen rotifers, cyclops, and brine shrimp; although bloodworms, tubifex, and mosquito larvae work as well). Live food items from feeder colonies work as well, but the colonies take some extra effort to maintain. Finally, I have had great success with supplementing the fish diet with highly unsaturated fatty acids (from SELCO). SELCO is usually emulsified into the water of hatching artemia, where the nauplii feed on the product and increase their nutritional value. While this works really well, I found it to be a time-consuming process, and producing enriched artemia nauplii for the thousands of fish in our facility is also financially costly. Hence, I found a more efficient way of enriching the fish diet by adding the highly unsaturated fatty acids directly to gel foods (as offered by Mazuri and Repashy). Note that enriching the fish's diets can be a double-edged sword, as high diet quality often also has negative consequences for water quality. I.e., ramping up food quality only works when accompanied by regular water changes.

Inbreeding: Finally, poor condition of individual fish can be caused by inbreeding. Matings between closely related individuals (e.g., siblings or parent-offspring) increases the likelihood that hidden genetic defects become visible, especially when inbreeding is continued over many generations. Inbreeding can become an issue especially in linebreeding, where matings between siblings or between parents and offspring are used strategically to favor the development of desirable color and fin traits. Inbreeding depression can be avoided by regular outcrossing with unrelated individuals.

I imagine that most readers of the Livebearer have encountered fish with wasting disease, but many of you only rarely. That's because you already do most of the things I have mentioned above. However, the phenomenon is very common in fancy livebearers from the pet store, and many a novice has lost loads of supposedly easy to keep guppies, platies, and mollies. The reason that many pet store livebearers are in such bad shape is exactly for the reasons described above: they suffer from chronic stress (transport and inadequate maintenance conditions) and poor nutrition. This really highlights that the best thing you can do to avoid livebearer wasting disease is to start your colonies with fish you obtain from a trusted source. I recommend your local club or your fellow ALA members. If the breeders look like this gorgeous Limia sulphurophila, nothing can go wrong...

"Just Ask a Scientist!" will hopefully be a regular component of Livebearers in the future. However, this requires your input. Have you ever wondered about the meaning of observations you made in your fish tank? Do you have questions about the behavior, reproduction, ecology, or evolution of livebearers? Submit your questions directly to Michi (tobler@ksu.edu). He will do his best to answer your question or find somebody that can.