

Persönliche Interpretation zu Aquabiomics Mikrobiom Analyse durch Dr. Eli Meyer:

I'm writing to follow up personally on this automated email, and share my perspective on your report.

Your tank had a more diverse community than the majority I've sampled, with 473 different types detected in your sample. You're probably familiar with the debates over the benefits of microbial diversity. I consider diversity a positive feature because it's generally associated with productivity and stability in a variety of ecosystems including coral reefs, and because healthy coral reefs show higher microbial diversity than degraded reefs. From this perspective, your sample's diversity score is a positive result, a level I'd be happy to find in my own tanks.

the balance score, on the other hand, was very low at 0.06 (). This score reflects the overall similarity or difference between your tank's community and a 'typical' tank (calculated as the average of all normal tanks I've sampled).

I always emphasize that a low score on its own shouldn't be taken as a negative result; it simply quantifies how different your tank's community is from the typical tank.

The community barplot (part 2) shows the basis for this score. I find it useful to focus on the top five most abundant families from the typical tank. Four of these are present at lower levels in your tank than usual: Pelagibacteraceae and Flavobacteriaceae are barely detected, and Alteromonadaceae and Rhodobacteraceae are present but less abundant than typical. (Anmerkung Christoph Denk in Absprache mit Eli Meyer: Vermutlich eine Konsequenz von sehr stark dimensionierter UV-C Klärung)

In their place, your tank has higher than typical levels of Vibrionaceae. The sample also includes several families not typically found at these levels in typical tanks, including Fusobacteriaceae, Oleiphilaceae, and Peptostreptococcaceae.

The Vibrionaceae may deserve special attention, since this group includes some known pathogens. In your case, about half of these come from a few *Vibrio* species (two unclassified *Vibrio* sp. and *Vibrio fortis*), and the other half from 5 types of *Photobacterium* (*P. rosenbergii* and 4 unclassified *Photobacterium* sp.) Nothing on the list immediately jumps out as a clear pathogen.... *V. fortis* is associated with disease in seahorses, and *P. rosenbergii* is associated with coral bleaching... but I don't see any of the known pathogens.

I will say I generally associate high *Vibrio* levels with high Cnidarian biomass -- I've seen things like this in some coral aquaculture tanks or in some mature tanks with lots of e.g. anemone and soft corals. I'd be curious to know how your tank ranks in terms of Cnidarian biomass -- high or low relative to other tanks you've seen?

Nitrifying microbes -- your sample contained both ammonia-oxidizing and nitrite-oxidizing microbes. Both groups had levels within the typical range, even if ammonia-oxidizing levels were on the low end of typical. The types that showed up here are typical too -- most tanks like yours have ammonia oxidizing Archaea (Cenarchaeaceae) rather than Bacteria, and Nitrospiraceae is the most common family of nitrite oxidizing Bacteria. So at this level, I'd rate your tank's community as pretty typical, reflecting a functional nitrifying community.

Your sample contained no evidence of any Cyanobacteria. I see that you noted Cyano as a problem in your tank. Counter intuitively, we see this a lot. It's becoming clear that the Cyano populations in water and biofilm samples are quite disconnected from the nuisance populations. If your cyano problem persists we should take a sample of it directly in a future round of sampling.

Your sample contained none of the known bacterial pathogens of fish or corals included on our pathogen

screening list. I also looked for the bacteria associated with the Caribbean coral disease SCTLD, and likewise found no sequences from those bacteria.

I also ran the 18S test for non-bacterial pathogens and parasites on your water sample:

1. None of the AEFW sequences showed up in your water sample.
2. However, your water sample does show convincing evidence of *Uronema marinum*, albeit at a low level (18 DNA sequences). I've seen this before, including in one of my tanks -- persistent low level populations of *U. marinum* existing in tanks without obvious symptoms in the fish.

So, how are your fish doing? It would be interesting to think about any fish mortality you've seen in the past few months, in the context of a known *U. marinum* signal.

I hope this was useful, and would be happy to discuss further.