Deleted chunks from discussion.

Our observations in phenology match up and add additional context into cyanobacteria timing in Lake Mendota (Beversdorf et al., 2013). Filamentous-1, primarily the diazotrophic Aphanizomenon flos-aquae, is the only clade detected early in the time series in concordance with observations made prior with 20 year 16S time series (Rohwer et al., 2023). Post Filamentous-1 dominance, the cyanobacteria community evolved to include members of the Microcystis, Cyanobium, Nodosilinea, and Snowella clades. All clades were detected by early August, which echoes Rohwer et al. that the cyanobacteria community gets continuously more diverse towards the end of Summer (2023). In Figure 2.3B, we also detected a noticeable interruption in the rolling average time series that coincides with the period before average Fall turnover timing (date?) or the breakdown in Summer stratification that results in a mixing event. This period tended to limit sampling opportunities with strong wind and turbulent waters. The onset of colder waters and high turbulence, we suspect, reduces overall cyanobacterial biomass and detection of Vulcanococcus and Nodosolinea.

The Snowella morphology is a mixture of autoaggregation held together by gelatinous stalks radiating from the center that as the colony matures break down into smaller colonies or solitary cells similar to Coelosphaeriaceae (Häggqvist et al., 2016). The gelatinous matrix has the ecological advantage to protect against predation and environmental stress () and their radial cell arrangement enables dispersed light capture and nutrient acquisition (). We observed that our one mOTU (MCYST\_56) had pi values between colonial and filamentous, and within the Vulcanococcus clade (Figure 3.5A). Along with, a positive asymptotic pi and iRep relationship (Figure 3.7C), and medium recombination potential (Figure 3.8B, Figure S3.2). Based on its life history, we suspect the commonalities it shares with filamentous and solitary morphologies can explain…why it falls in the middle.

Microcystis populations’ colonial structure provides many benefits to its survival from predation (Van Wichelen et al., 2012; Yang et al., 2006), buoyancy to control position in the water column (Yamamoto & Nakahara, 2009), and reduce environmental stress.

The filamentous genera in TYMEFLIES have variable characteristics, but in general long chains inhibit predation, increase range to acquire nutrients, and with autoaggregation greatly reduces their population diversity.

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Additionally, this range could be heavily influenced by differences in susceptibility to viral infections as cyanophages that target the Nostocacea genera has been documented to be in high abundance relative to the cyanobacteria community in TYMEFLIES (Zhou et al., 2025).

Im not certain where my mind was with saving these citations.. [(McArthur et al., 1988, 1988; Meziti et al., 2019; Pérez-Carrascal et al., 2019; Segawa et al., 2018)](https://www.zotero.org/google-docs/?12s4xA). I think possibly poking and probing mutations between cyanos.