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Force Production of *Mastigocladus laminosus* Hormogonia W. BRAD ROBINSON, University of Memphis — The cyanobacterium *Mastigocladus laminosus* is a colonial bacterium living near hot springs in densely packed filaments of cells. Under certain conditions, some of these filaments break off and move away from the main body. These motile filaments, or *hormogonia*, can move through extremely viscous environments by extruding slime out of nozzles in a process reminiscent of the gliding motility exhibited by some myxobacteria. The slime-producing nozzles of these hormogonia are apparently very powerful nano-scale motors. Through TEM, we have observed these 9nm diameter nozzles spaced at 21nm intervals arranged in concentric rings along the septa separating hormogonial cells. Assuming theis arrangement to be ubiquitous and that all anzzles are active, we were able to approximate the number of active nozzles per hormogonium (typically 10-100 thousand). We then observed hormogonia embedded in and moving through tremendously viscous 1-4% agar solutions, and maintaining an average velocity of 0.5 microns per second. We then found the viscosities of these agar solutions at low shear rates appropriate for a gliding hormogonium and determined that the average force per nozzle was incredibly high, 71pN in 3% agar, and 126pN in 4%.

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