

## **Red White and Big Blue: How Rising Ocean Temperatures Affect Red and White Muscle Recruitment in Fish Species**

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Red and white muscle recruitment in fish allow them to swim at sustained speeds or accelerate to higher velocities. Red muscle occurs only in small bands in the fish's bodies and is aerobic, while white muscle makes up the majority of the muscle they possess and is anaerobic. The goal of this research is to evaluate the recruitment of red and white muscles of Narragansett Bay fish species at varying temperatures of 20 and 24° C to determine if the different temperatures affect muscle mechanics. Other studies have been conducted that show how red and white muscle contract, but few have delved into how temperature affects them *in vivo*. We collected Summer Flounder, Winter Flounder, Black Sea Bass and Scup from the Narragansett Bay and placed electromyography electrodes into their red and white muscle at 50 and 75% of the fish's total length under different temperatures. We analyzed muscle recruitment parameters such as duration of contraction, duty factor and magnitude to determine if higher temperature leads to suboptimal muscle mechanics. Using these data as well as cross sections from each species to measure the amount of red muscle available in their bodies we will be able to compare recruitment to total area of red muscle and species specific capacity to adapt to higher temperatures in the Bay. After analyzing the percentage of red and white muscle at medial and caudal end of the four species mentioned above, we found that Summer Flounder had the largest percent of medial white muscle with 93%, while Winter Flounder had the largest percent of caudal white muscle accounting for 94% of cross sectional area.. Black Sea Bass had the largest percent of medial red muscle with 27% and the largest percent of caudal red muscle with 38%. When comparing the intensities of the muscle recruitment burst intensity was higher at 24°C than at 20°C for Winter Flounder, for all the muscles tested except red caudal. This seems to indicate that at higher temperatures Winter Flounder spend more energy in stronger muscle recruitment which could leave less energy available for growth.