MOUNTAIN WHITEFISH (*Prosopium williamsoni*)

Ecology and Life History

The mountain whitefish is a member of the Salmonidae family and has large scales with a long slender body (Scott and Crossman, 1973). The fishes' range occurs in the north western corner of North America. In British Columbia the fish occurs in the Columbia, Skeena, Peace, and Liard River systems (Scott and Crossman, 1973).

The mountain whitefish is primarily a bottom feeder but will feed throughout the water column if bottom forage is not available (Coker *et al*, 2001; Roberge *et al*, 2002). Mountain whitefish prefer small aquatic insect larvae including dipterans (e.g., chironmids), Ephemoptera (mayflies), Plecoptera (stoneflies), etc. (Scott and Crossman, 1973; Coker *et al*, 2001).

Mountain whitefish spawn in lakes and rivers (Scott and Crossman, 1973l; Roberge *et al.*, 2002) and age at maturity varies between systems, with fish typically maturing at 3 years (Coker *et al*, 2001) but as early as two years of age in the Columbia System (Roberge *et al.*, 2002). This fish species spawns over boulder cobble substrates in streams and over gravel/rubble substrates in shallow water (<1 to 20 m) in lakes (Scott and Crossman, 1973; Coker *et al*, 2001; Roberge *et al.,* 2002). Eggs are deposited over substrates and very little site preparation or guarding occurs (Coker *et al*, 2001). Spawning typically occurs in the late fall when water temperatures fall between 3 to 5 ºC (Roberge *et al*, 2002). In BC, spawning typically occurs between November and February (Roberge *et al*, 2002). Juvenile fish undergo diel movements from shallow to deep water to avoid predators and forage. Forage and rearing substrates of juveniles are dominated by silts and sands (Roberge *et al*, 2002).

Okanagan Lake System

In the Okanagan Lake system the relative abundance of young of the year (YOY) mountain whitefish made up less than 1% of the population sampled using beach seine techniques during all sampling seasons. During spring and summer sampling using beach seine and snorkelling techniques, abundance of YOY was greatest along sandy beaches that were in close proximity to stream mouths, or in areas with cobble/boulder substrates that were associated with potential shore spawning. Numbers of YOY sampled were greatest in the spring and fall.

The relative abundance of juvenile and adult mountain whitefish was 3.0 to 4.1% (using gill nets) during the spring and summer, respectively. During the fall, the relative abundance of mountain whitefish increased to 10%. Adult mountain whitefish were typically associated with deeper, cooler water habitats, such as cliff/bluff, low rocky shoreline, and gravel beach shoreline types. Juveniles (most likely Year 1 to 3) were associated with cliff bluff, vegetated shore, or low rocky shoreline habitats, and their numbers were greatest during the fall season. However, the increases of juvenile captures witnessed in the fall may not accurately portray habitats used because juveniles may have been able to pass through the gill net during spring and summer sampling due to their small size. It is most probable that juvenile mountain whitefish associate with their adult conspecifics during Year 1 through 3.

Spawning areas for mountain whitefish were identified primarily in the southern ends of the Kelowna waterfront area near Bertram Creek, and a select few regions in the northern end of the study area. Substrates in these areas had some boulders and large percentage of cobbles. The typical substrate composition would be greater than 25% gravel and 60% cobble, with some boulders. Mean (±S.E.) size of adult spawning fish was 30.9±0.6 cm, and the largest spawning individual captured was 41.5 cm. Water temperatures during fall sampling ranged between 9 and 13 ºC, suggesting that these fish were not likely spawning but staging or preparing to spawn in late November or early December when temperature reach 5ºC in these areas. Females contained a large number of eggs that were not quite ripe.

A cursory investigation of stomach contents and presence of gastrointestinal parasites was performed[1] for mountain whitefish during the spring and summer sampling events. Stomach contents consisted mostly of chironomids and other small insect larvae, but in many cases individuals had empty stomachs. No parasites were found in the intestinal tracts of any individuals, indicating that intensities and prevalence of infection or large parasites in the intestinal tract are likely low. However, given that most systems have a well-established parasite assemblage, it is probable that mountain whitefish in the Okanagan system also have an associated parasite assemblage. Further investigation is required to characterise the parasite assemblage of the mountain whitefish and is recommended.

Differentiation between the pygmy whitefish (*Prosopium couteri*) and mountain whitefish can be difficult (Mackay, 2000), particularly because these fish have parr like marks (Scott and Crossman, 1973). The pygmy whitefish is the most divergent branch of the whitefish (Vourinen *et al*, 1998), and their small size and early maturation may be a result of a survival adaptation to glacial waters (Hallock and Mongillo, 1998). The habitat of this fish is typically deep, cool waters (Scott and Crossman, 1973). Due to the difficulties distinguishing juvenile pygmy whitefish from mountain whitefish, it was assumed that all small fish captured were juvenile mountain whitefish. A detailed investigation of the specific habitat requirements of this species and the status of the population should be performed.

References

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[1] Individuals selected for dissection had not survive gill net sampling. No individuals were euthanized for this analysis.

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