Detailed Sampling Protocols

1. Salmon External Marks

2. Visceral Adhesions (VAs)

Protocol

1) Check visceral organs and gonads of salmon when the body cavity is dissected.
2) Record it as visceral adhesion (VA) if they are surrounded by a thick connective tissue sheath (Figure 1).

Figure 1. Visceral adhesion (arrow) in sockeye salmon. A: Visceral organs and gonads are enveloped by a thick connective tissue sheath; B: normal fish. (From Nagasawa 2003).

Note

Visceral adhesions (VAs) are a common disease of sockeye salmon caused by a parasitic nematode, *Philonema oncorhynchi*. The parasite infects the body cavity of Pacific salmon both in North America and Asia. The intermediate host is a freshwater copepod (*Cyclops bicuspidatus*). Young sockeye salmon get infected by feeding the copepods during their lake residence. The nematode larvae develop in the visceral tissues and move to the body cavity during the host's ocean life. It may be difficult to find the tiny nematode larvae during the immature stage of host fish. Visceral adhesions are induced by the host reaction associated with the nematode infection and migration. Visceral organs and gonads are tightly bound and compacted to a mass (Figure 1). They are surrounded by a thick connective tissue sheath. Nagasawa (1985) reported the prevalence of visceral adhesions was 4.0-6.9% in sockeye salmon caught in the central North Pacific during spring and summer, while no data was available during winter. It is unknown whether visceral adhesions cause the ocean mortality of sockeye salmon.