平成２０年度　環境科学院　修士論文内容の要旨

Effects of fighting experience on the occurrence of downstream migratory behavior and olfactory imprinting in masu salmon, *Oncorhynchus masou masou*

(サクラマスの攻撃行動経験が降河行動および嗅覚記銘に及ぼす影響)

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Abstract

In the early part of life-history in anadromous salmon, juvenile salmon would migrate to the ocean and have some neural, endocrine, physiological and structure changes to prepare for seawater adaptation. These developmental changes are called as parr-smolt transformation or smoltification. During the same period of smoltification, anadromous salmon are believed to memory the odor in their natal stream and using this long-term memory to guide adult salmon back to the natal stream for reproduction. Past researchers have already showed that smoltification was initiated by the elevation of cortisol level through photoperiod and water temperature changes during spring. But, masu salmon (*Oncorhynchus masou masou*) have two types of life-history, resident type and anadromous type, in the same stream. Therefore, environmental factors are not strong enough to explain the initiation of smoltification in masu salmon. It may have another factor to modulate the initiation of smoltification in masu salmon. Through cross-matching the hormone levels between fighting experiences and smoltification, fighting experience was assumed to determine the initiation of smoltification in masu salmon. In the present study, electro-olfactogram (EOG) and migratory behavior experiments were conducted to clarify the olfactory imprinting, salinity sensitivity and downstream migratory behavior of masu salmon after contests. While an individual got a losing experience from contest during the presumed smoltification period (April to June), it became much like to be an anadromous smolt. The losers would become much sensitive to salinity in June and much significant to imprint the odor of glutamic acid in May. The losers also migrated early to the downstream part of a flowing tank in March, April and May. No matter winners or losers, they did not become like an anadromous smolt after contests in July and August. These results showed that masu salmon would transfer from fresh-water resident parr into anadromous smolt after getting losing experience during the smoltification period. In the population projection matrix model, it was also found that fighting-experience-decide is the most dominance strategy for masu salmon through comparing the population growth rate with the strategies of whole-smolt and whole-resident. The results of present study could explain why masu salmon have significant strategy for territory behavior in parr stage and why resident type individuals and anadromous individuals co-exist in the same stream, since the smoltification in masu salmon might be determined by the fighting experience and environmental factors.