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Short paper

Hormonal Induction of Ovulation in the Coho Salmon, *Oncorhynchus kisutch*

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은연어, *Oncorhynchus kisutch*의 호르몬에 의한 산란유도

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The effectiveness of intraperitonial injections of human chorionic gonadotropin (HCG) followed 4 days later by either HCG, salmon pituitary extract or des-Gly^{10}[D-Ala^{6}] LHRHa-ethylamide on ovulation of the coho salmon, *Oncorhynchus kisutch*, were investigated and the results were discussed.

Key words : Hormonal ovulation, Coho salmon (*Oncorhynchus kisutch*)

With hormonal induction technique, synchronization of ovulation in fish is achieved on the predetermined date and gametes can be obtained earlier or later than natural spawing time (Lam, 1982). Such manipulation of spawning period also allows us to produce genetically distinct intraspecific hybrid strains (Hunter et al., 1981 ; Park et al., 1994). Although the coho salmon, *Oncorhynchus kisutch*, has been imported and cultured since late 1980 (Park et al., 1996), some problems including synchronization of ovulation are still remained in seed production from coho salmon broodstock in Korea. Therefore, the effect of some hormones on ovulation of the farmed coho salmon was investigated to develop a simple and cost-effective method for accelerating and synchronizing ovulation.

In such a purpose, three-year-old coho salmon females (n=500) were held at the salmon production hatchery located in Kangwon-do of Korea in 1988. Surface water temperature in a flow-through raceway was mainteined to be 12.4± 0.2(SD)℃. Fish, assumed to be mature, were first injected with 1,000IU human chorionic gonadotropin (HCG)/kg-BW on day 1 and then another injection was followed by using 1,000IU HCG/kg-BW, 50㎎ salmon pituitary extract (SPE)/kg-BW, 25㎎ SPE/kg-BW, 1.0㎎ des-Gly^{10}[D-Ala^{6}] LHRHa-ethylamide (LHRHa)/kg-BW or 0.5㎎ LHRHa/kg-BW in 0.65% NaCl saline on day 4. Saline (0.65%) injection alone was used as a control. Later, fish were anaesthetized with lidocaine-HCl/$NaHCO_3$ and checked for ovulation at 4-day intervals after the second injection.

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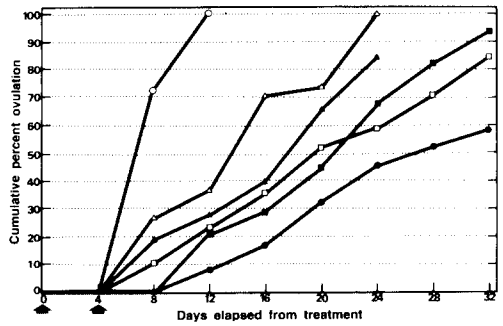

Fig. 1. Hormonal induction of ovulation in coho salmon, *Oncorhynchus kisutch* by intraperitoneal injection. Arrows indicate the days of 1st and 2nd injections.
[○, 1,000IU HCG/kg-BW+1,000IU HCG/kg-BW ; , △ 1,000IU HCG/kg-BW+50mg SPE/kg-BW ; ▲, 1,000IU HCG/kg-BW+25mg SPE/kg-BW ; □, 1,000IU HCG/kg-BW+1.0mg LHRHa/kg-BW ; ■, 1,000IU HCG/kg-BW+0.5mg LHRHa/kg-BW ; ●, saline control (0.65%)]

As a result, ovulation acceleration was observed in all treated groups with hormones compared to the saline control group (Fig. 1). The fish, received a primer injection of 1,000IU HCG/kg-BW with following injection with 1,000IU HCG/kg-BW or 50mg SPE/kg-BW, had ovulated within 8 days and 20 days after the second injection, respectively. Cumulative percent ovulation of hormone treated groups of 1,000IU HCG/kg-BW+0.5mg LHRHa/kg-BW, 1,000IU HCG /kg-BW+25mg SPE/kg-BW, 1,000IU HCG/ kg-BW+1.0mg LHRHa/kg-BW and saline control group during this experiment were 93.8% (76/81), 84.3% (70/83), 84.1% (69/82) and 58.3% (49/84), respectively. When fish were administered with the HCG primer, the higher effectiveness of SPE in ovulation of coho salmon than that of LHRHa suggested that unknown synergistic factors might be present due to the whole pituitary preparation. The acceleration and synchronization of ovulation in LHRHa treated coho salmon was also reported by Fitzpatrick et al. (1987) and Donaldson et al. (1981).

This study reported here the first use of HCG in coho salmon and demonstrated that SPE and LHRHa, when used with a HCG primer as mentioned above, might be useful for successful induction of ovulation in coho salmon during the normal spawning period. Further studies were necessary to determine when the most appropriate time for a single injection regime would be. A single injection procedure would facilitate and contribute to the more effective seed production of coho salmon.

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