A-578 Takayuki HONMA, Hiroya MIYAKE, Osamu SHIDA, Yukio MIHARA4 and Kazuhiko ITAYA

Recent changes in the distribution of walleye pollock *Gadus chalcogrammus* eggs in Ishikari Bay, Hokkaido

To explore the possibility of detecting walleye pollock *Gadus chalcogrammus* strong year classes distributed in the Sea of Japan in Hokkaido, we examined the results of egg distribution surveys conducted yearly in February from 2006 to 2017 in Ishikari Bay. The density of eggs was extremely high in the years that strong year classes occurred. There were many differences in the occurrence of the dominant developmental stage among these years. However, there was no significant relationship between water temperature and the density of eggs. These results strongly indicate that the occurrence of strong year classes can be predicted using the densities of eggs in Ishikari Bay. Additionally, abundant stage 1 eggs have appeared in Ishikari Bay since 2014, suggesting that egg production has possibly increased. This study confirmed the importance of monitoring the egg distribution in Ishikari Bay.

A-579 TOMONORI KANETA AND SHINICHI TAKABATAKE

The influence of light and first feeding day on the growth and the survival rate of fox jacopever *Sebastes vulpes* larvae

In order to establish the efficient production of fox jacopever *Sebastes vulpes*, we investigated the influence of light and first feeding day on the growth and survival rate of fox jacopever larvae. Fox jacopever larvae were reared for 12 days under high illuminance (1,700 lx), medium illuminance (200 lx), or low illuminance (0 lx), with first feeding day being on days 0, 3, 6, 9, or 12. The total length was measured, the rotifers in the alimentary canal were counted, and the number of dead larvae was counted every 3 days. Under high and medium illuminance conditions, the length and survival rate of the day 0 first feeding groups was greater (survival rates were 86.7% and 61.1% for high

and medium illuminance conditions, respectively) than the other groups (survival rates were under 1.3%). Under low illuminance all fish died by day 9, regardless of feeding regime. The larvae could not recover from being starved until 3 days after birth. Hence, illuminance greater than 200 lx and feeding immediately after birth are necessary for the production of fox jacopever.

A-580 NAOYUKI MISAKA, MAKOTO HATAKEYAMA and KUNIO SUZUKI

Development of quantitative RT-PCR targeting *gyr*B mRNA for *Flavobacterium psychrophilum* infecting chum salmon *Oncorhynchus keta*

We developed reverse transcription quantitative real-time PCR (RT-qPCR) targeting *Flavobacterium psychrophilum gyr*B mRNA for rapid detection of live bacteria in chum salmon *Oncorhynchus keta* fry. The mRNA was detected at 6.0 × 101-6.0 × 109 copies/μl with high correlation (R2 = 0.9998). In March 2008, a BCWD outbreak occurred among chum salmon fry in a salmon hatchery in Hokkaido, Japan. The daily mortality peaked in mid-late March and decreased in early April when cumulative mortality reached 2.3%. During the disease course, the culturable cells and *gyr*B mRNA in kidney tissue samples from moribund individuals were identified and quantified by culture and RT- qPCR, respectively. The prevalence and concentration of *gyr*B mRNA was 60% and 4.9 × 103 copies/mg on March 21, and 100% and 5.6 × 104 copies/mg on March 26, respectively. No *gyr*B mRNA was detected on March 31, whereas culture prevalence was 95%, 100%, and 40% on March 21, 26, and 31, respectively. These results suggest that the RT-qPCR assay provides rapid quantitative detection of live bacteria in chum salmon fry.

A-581 Mitsuru TORAO

Validity of fish triglyceride content and liver glycogen content as indicators of nutritional status in chum salmon *Oncorhynchus keta* fry

Changes in triglyceride (TG) and phospholipid (PL) content in fish body, and glycogen (GC) content in liver of chum salmon *Oncorhynchus keta* fry during fasting and refeeding treatments were examined for their validity as nutritional status indicators. TG content and TG/PL ratio

linearly increased or decreased in relation to fasting and refeeding days. On the other hand, GC content reacted more rapidly. The change in PL content was small and decreased relative to fed controls after 20 days. Fasting until the third day results in GC consumption, followed by TG consumption. After the 20th day of fasting, lipids are almost all consumed, and energy may have been obtained by digestion of body tissues. These results suggest that the TG content in the fish body is suitable for evaluating the nutritional status of salmon fry after release.

A-582 Yasuyuki MIYAKOSHI, Katsumi TAKEUCHI, Tomoya AOYAMA and Mitsuhiro NAGATA

Egg-to-fry survival of masu salmon planted in artificial spawning redds

Embryo planting in artificial spawning redds has been examined as a cost-effective means for enhancement of salmon. To evaluate effectiveness, eyed masu salmon *Oncorhynchus masou masou* eggs were experimentally planted in artificial redds, and egg-to-fry survival was surveyed in six tributaries of the Ishikari River in 1999 and 2000. The egg-to-fry survival rates were 0-11.9 % in the five of the study rivers, while it was 49.4 % in the final river. Clear relationships were not observed between stream conditions, e.g. gravel composition, stream width, and egg-to-fry survivals.