

A-561 YOHEI SHIMIZU, HIROSHI TAKAHASHI, SHIRO TAKAYANAGI, TAKASHI HORII, MOTOHITO YAMAGUCHI, NOBUYUKI TANAKA, DAIKI TAZONO, AKIO TAKIYA, TAKUMA KAWASAKI, SHIN-ICHI TAKABATAKE, TAKASHI FUJIOKA and HIROYA MIYAKE

Population structure of the Pacific herring, *Clupea pallasii*, around Hokkaido Island inferred on the basis of mitochondrial DNA sequences

We investigated the genetic population structure of the Pacific herring (*Clupea pallasii*) around Hokkaido by sequencing a 410 base pair segment of the 5' end of the mitochondrial DNA control region in 3,810 specimens collected from 41 sampling sites between 1998 and 2015. A total of 463 haplotypes, described by 137 variable nucleotide sites, were identified. Seven populations were identified by differentiation of the sampling sites and spawning seasons and genetic data such as haplotype diversity and pairwise F_{ST} values. In the Sea of Japan, Hokkaido, two populations appeared to spawn in the same region in different seasons. On the shore of the Ishikari Subprefectural Bureau, a population showed relatively low haplotype diversity between 0.8614 and 0.9310 visits from January to February, and another population showed relatively high haplotype diversity between 0.9189 and 0.9667 visits from May to June. The former and latter populations were supposed to be the Ishikari and Hokkaido-Sakhalin populations, respectively. The Tomakomai population, individuals of which were collected from the sea of the Iburi General Subprefectural Bureau, was characterized as having Pacific Ocean-specific haplotypes. Furthermore, distribution of the Hiyama-Tsugaru Strait, Okhotsk Lagoon, East Hokkaido Lagoon, and Lake Yudonuma populations around Hokkaido was assumed.

A-562 KAZUTAKA SHIMODA, TOMOHARU WATANABE and DAISEI ANDO

Variation in body silvering of chum salmon juveniles in seasonally spawning stocks

In this study, body silvering in chum salmon juveniles (*Oncorhynchus keta*) was analyzed using a chromameter. For this, we observed *O. keta* juveniles in early- and late-run stocks (fertilized from late Sep to early Oct and from mid Nov to early Dec, respectively) in six rivers

(Abashiri R., Shibetsu R., Tokachi R., Chitose R., Shizunai R. and Torisaki R.) in Hokkaido, Japan. L-value was used as body silvering index for comparison on a weekly basis between two seasonal stocks following spawn emergence. Higher L-values were noted for the late-run stocks than for the early-run stocks. Thus, our results suggest that the developmental level of physiological traits of late-run stocks was faster than that of early-run stocks in chum salmon.

A-563 TAKANORI HORIMOTO, YOKO GOTO, YOSHIAKI KAI, YUTARO SUZUKI and TADASHI MISAKA

Growth of three species of *Ammodytes* (Perciformes: Ammodytidae) caught off the northern part of Hokkaido, Japan (Short paper)

The growth pattern of three species of sand lances (*Ammodytes japonicus*, *Ammodytes. heian*, and *Ammodytes. hexapterus*) in the northern part of Hokkaido were examined.

For *A. japonicus* and *A. heian*, standard length (in mm), body weight (in g), and age of the fish (in years) were fitted to the von Bertalanffy growth equations: $L_t = 263.74 \times [1 - e^{-0.316(t + 1.778)}]$ and $W_t = 77.14 \times [1 - e^{-0.466(t + 1.134)}]^3$ for *A. japonicus* and $L_t = 291.91 \times [1 - e^{-0.213(t + 2.771)}]$ and $W_t = 89.84 \times [1 - e^{-0.342(t + 1.849)}]^3$ for *A. heian*. No significant sexual and inter-species differences in body length and body weight were observed. Although we could not construct a growth model for *A. hexapterus*, the standard length of the two-year-old fish was significantly smaller than that of the other two species.

A-564 DAISEI ANDO and SHUNPEI SATO

Variation in the vertebral number of naturally spawning chum salmon among migrating seasons (Short paper)

Naturally spawning chum salmon *Oncorhynchus keta* adults were collected from three rivers in Hokkaido during three different migrating seasons to represent early, middle, and late migrating populations. Vertebral numbers were then measured; the highest mean vertebral number was observed in the early migrating population. Remarkably, the difference in the mean vertebral number was larger between the (naturally spawning)

early and late migrating populations than the differences reported in previous studies of hatchery-reared chum salmon populations. These results suggest that the vertebral number is useful to estimate the spawning environments of chum salmon.