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.

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
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 interspecies 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.
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.