Population structure of Dall's porpoises

Masao Amano
Otsuchi Marine Research Center, Ocean Research Institute, The University of Tokyo

Cetacea, whales and dolphins, is a mammalian order containing about 80 species. Although this number is not large compared with other taxa in the marine environment, cetaceans are placed at the higher trophic level in a marine food chain, and many various organisms are required for the existence of an individual cetacean. This means that we have to conserve a whole ecosystem when we would like to conserve cetaceans. We call such kind organisms "umbrella species." Cetaceans are also regarded as "flagship species," since they have popularity that roses public attention to the conservation. Therefore, cetaceans are very important for conservation of marine ecosystem and biodiversity. Each organism plays an important role in its local habitat as a part of local ecosystem, and we have to think conservation very locally, or in a smallest unit, i.e. population. Thus, to know population structure is the basis of the conservation. I here look over some results of the studies on the population structure of the Dall's porpoise. Dall's porpoises are small toothed whales belong to the family Phocoenidae and distributed widely in the northern North Pacific. About fifteen thousand porpoises are hunted by the hand harpoon fishery in Japan and an unknown number is incidentally taken by the Japanese salmon drift net fishery operated in the Russian exclusive economic zone. The conservation and management of the species is a matter of global concern. Two distinct color morphs, *dalli*- and *truei*-types are known. The former has a small white flank patch and the latter has a larger patch. Sighting surveys found that the mother and calf pairs were found in particular areas after the calving season. It was suggested that these areas are calving grounds and different population uses each area. To test this, scientists examined morphological and genetic markers that may indicate inter-population differences. Skull morphology of the Sea of Japan porpoises was found to be different from that of other localities. Canonical discriminant analysis on external morphology clearly discriminated the Sea of Japan specimens from others. This was caused by the difference of size of the white patch, which is smaller in the porpoises from the Sea of Japan. This means that the third color morph exists in the Dall's porpoise. Although the results of genetic studies are various, they showed larger differentiation between the Sea of Japan specimens and others. The different color morphs were not discriminated by the genetic markers. These morphological and genetic results all suggested the uniqueness of the Dall's porpoises from the Sea of Japan. However, population differentiation in the *dalli*-type porpoises in the North Pacific and Bering Sea was not clear. The studies on the Dall's porpoise suggested that we should examine all possible markers, not depend on a small number of markers to determine the population structure. We should also consider that genetic markers are not always effective and ecological information is very important.

New approach to the biological study on marine animals

Yasuhiko Naito
National Institute of Polar Research

The human beings has opened windows to the planet and space, and obtained the grand views on what is our earth in comparison to other planets to find out that the earth is very exceptionally unique with huge amount of water and a lots of diversified life. Increased information from the space on our planet has developed a new view on our earth as global system. The idea of global system requires huge amount of integrated information from all over the world, and simultaneously it require preciseness and quickness in collecting information on total system without lacking parts of the global system. Despite of advanced technologies of the global observing system like satellite observing system, marine system still remains very remote in the context of global system and global information, because the satellite system allow us to observe only earth surface. The world oceans occupy the major parts of our earth and important role in the global system yet only sea surface is monitored by space eye. No precise information on the marine system particularly regarding marine animals is available.

In above context, marine living animals are far beyond the understanding as objectives of the modern science. We still do not know how they live in the ocean, how they interact in the marine environment. How can we answer these questions? How can we develop the visions on the animals in dark and deep water? Unless we achieve this goal, global system will not be understood. On the other hand, once we can obtain information beneath the surface, we can use information from satellite and from the depth and we can obtain more complete system for observation and monitoring the whole system.

For large marine animal like whales and seals the satellite linked observation service like Argos system and GPS system has been used. Although it can allow us to know data on their geographical position, we still lack in spatial and temporal precise information. Further difficulty we face is under water