シンポジウム記録 環境変動下におけるサケの持続可能な資源管理

I-1. 国際サーモン年：太平洋サケマス類の
資源変動機構を解明するための国際協力

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I-1. International Year of the Salmon (IYS):

Teaming up internationally to understand

Pacific salmon production

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I like to say that after about 100 years of research, we know much about Pacific salmon, but what we need to know most, we mostly do not know. We are not able to forecast Pacific salmon returns because we do not understand how climate and a changing ocean ecosystem affect salmon abundances. I will talk about three problems that when solved will bring us closer to understanding the fundamental mechanisms that regulate Pacific salmon production. I also will suggest why the International Year of the Salmon could be the beginning of how we might do some of our research differently and solve the problem of declining chum salmon abundance in Japan faster. My message is that finding a cure for something is much easier when we know the cause.

Pacific salmon catches are at historic high levels, however there is no understanding of why the abundances continue to be so high or how long the high abundances will last. There is agreement that it is the early marine period that most affects salmon survival in the ocean. There are numerous studies that show that juveniles survive better if they grow faster in the early marine period and store more lipids later in the summer and fall that will be needed in the first ocean winter. I suspect that after the first few months in the ocean there are genetically-based, photoperiod-stimulated, metabolic thresholds that determine how an individual will continue to use energy for growth and storage. There are numerous examples of critical periods and thresholds relating to smolting and maturity in salmonids, but the possibility of programming metabolism in the early marine period in relation to energy densities in the first ocean winter, needs to be studied as this may help understand marine survival and help hatchery practices adapt to ecosystem changes.

I want to talk about resilience as one more example of

problems that need to be addressed if we are to manage our Pacific salmon fisheries in the changing ocean ecosystem. We recognize the diversity of life history types and behaviors that exist for the various salmon species. We understand that these diversities developed as the populations adapted to changing ecosystems over thousands of years. As the productivities of some of the many divergent populations increased, there would be small abundances of the remaining populations that maintained their ability to increase when the right conditions returned. If resiliency was the key to Pacific salmon survival for thousands of years, how can we include resiliency in our management for the future?

My suggestion, especially to the younger researchers around the rim of the subarctic Pacific, is that you team up and work out the mechanisms that regulate the production of Pacific salmon which I think will turn out to be quite simple. In Japan, this will provide the answers you need to maximize hatchery production as well as providing reliable forecasts for all Pacific salmon producing countries. The International Year of the Salmon could be the beginning of this new teamwork. As part of this new approach there could be an annual international expedition that focuses research in particular ocean ecosystems and on particular problems. By agreement, all data would be public and funding would be shared by all countries including contributions from industries that depend on Pacific salmon. The Gulf of Alaska expedition in March 2019 as part of the International Year of the Salmon is an example and could be the first in a series with the next expedition in the Sea of Okhotsk in 2020. The International Year of the Salmon is an opportunity for researchers to work as a team, but it also is an opportunity to inform the public how an understanding of the mechanisms regulating salmon abundance is also an understanding of how we are affecting our environment.

和文要旨：気候や海洋生態系の変化がサケマス資源にどのように影響を及ぼしているかは未だに良く分からない。降海直後の海洋生活期は生残率が最も減少する時期で、高い成長速度と多くのエネルギーを蓄積した魚ほど生残率が高いと推定される。サケマス類の資源変動メカニズムを解明するため、国際協力が不可欠である。国際サーモン年は、チーム研究を行う良い機会であると共に、人類が環境に及ぼす影響とサケマス資源の変動メカニズムを人々に理解してもらう良い機会でもある。

(帰山雅秀 訳)