Title of dissertation			
Risk Assessment of Myxosporean Parasites on Aquaculture Development in Vietnam			
RONPAKU Fellow			
Name	Nguyen Ngoc Chinh		
Position	Researcher	ID No.	R12206
Department	Department of Parasitology		
Institution	Institute of Ecology and Biological Resources, Vietnam Academy of Science and Technology	Nationality	Vietnam
Japanese Advisor			
Name	Sho Shirakashi		
Position	Associate Professor	Institution	Kindai University

Myxospores parasites are economically significant pathogens that infect freshwater and marine fishes in diverse habitats worldwide. These parasites belongs to the phylum Cnidaria and include nearly 3,000 described species found in both farmed and wild fish. However, our understanding of their diversity remains limited. While most myxosporean species are harmless and have little effect on their fish hosts, some can cause serious problems in both wild and farmed fish populations. These pathogenic species can lead to high levels of morbidity and mortality, posing a significant challenge to the sustainable development of aquaculture and fisheries, particularly in countries with developing fishery industries, such as Vietnam. Additionally, some myxosporean species can cause food poisoning in humans when heavily infected fish are consumed raw. As a results, myxosporean parasites are of great interest to researchers, fishery managers, and fish farmers worldwide.

Vietnam has a rapidly growing aquaculture and fisheries industry, yet knowledge about myxosporean parasites in the country remains limited. Research on these parasites has been scarce, and before this study, only 44 myxosporean species have been reported in Vietnam−a number far below the estimated potential diversity in the region. The primary objective of this thesis was to conduct a comprehensive survey of myxosporean parasites in both farmed and commercially important wild fish in Vietnam, assess their potential risks to the aquaculture industry, and contribute to broader understanding of myxosporean diversity in Southeast Asia.

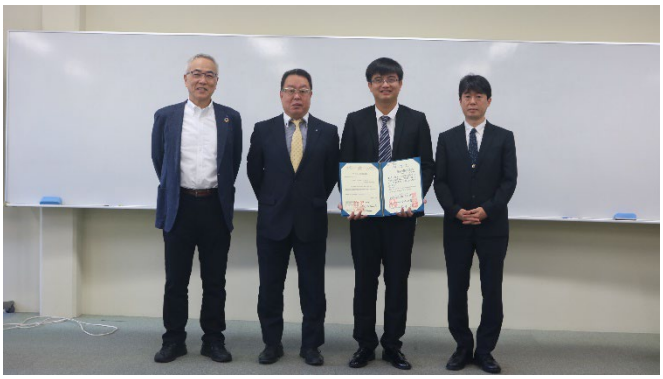
In the study, I examined a total of 273 individual fish collected from wild and farmed populations across northern, central, and southern Vietnam, including the Gulf of Tonkin, Hoa Binh Hydroelectric Lake, and the south-central coast. Using a combination of morphological and molecular methods, I identified seven new species, three newly recorded species for the region, one redescribed species, and two unidentified species. Chapter 1 provides a general introduction, followed by Chapter 2, which highlights the limitation of past myxosprean research in Vietnam. A comprehensive literature review was conducted to reassess previously described species, leasing to the exclusion of *Henneguya cerebralis* due to inaccuracies and insufficient data in its original description.

Chapters 3 through 6 describe new species from the genera *Myxobolus*, *Henneguya*, and *Ceratomyxa,* which were found in various commercially important fish across different regions of Vietnam. Although these newly described species did not show clear effects on farmed fish under normal conditions, they have the potential to cause disease outbreaks in aquaculture when environmental conditions deteriorate or stocking densities are high.

Chapters 7 and 8 focus on species from the genus *Kudoa*, which have a considerable impact on fish growth and market value. Among them, *Kudoa thyrsites*, which secretes enzymes that rapidly soften fish flesh—leading to loss of the market value—was found in Russell's mackerel scad *Decapterus russeli* for the first time in Vietnam. Another important species, *Kudoa yasunagai,* was also detected for the first time in Vietnam, infecting the brain of barhead spinefoot *Siganus virgatus*. This parasite is known to cause significant losses in marine aquaculture worldwide. Both *K. thyrsites* and *K. yasunagai* have a broad host range, suggesting a high risk of disease outbreaks in Vietnamese aquaculture if suitable conditions arise.

In the final chapter, I assess the risks associated with the myxosporeans species identified in this study and emphasize the urgent need for Vietnam to implement preventive measures. Controlling the spread of these parasites is crucial to ensuring the sustainable growth of the country's aquaculture and fishery industries. This research provides essential baseline data on myxosproean diversity in Vietnam and highlights the need for continued monitoring and management to protect the industry from potential disease outbreaks. The findings from this PhD thesis have contributed significantly to the field of fish parasitology and have been published in seven articles in international peer-reviewed journals, further demonstrating the impact of this research on a global scale.

Photos



Receiving PhD diploma during the doctoral convocation at the Nara campus of Kindai University.

Field sampling of parsites in Vietnam with my advisor, Dr. Sho Shirakashi, holding a microscope.