

Putting People and Research Together. Seven Aquarium Symposia Spanning Twelve Years at Atmosphere and Ocean Research Institute, the University of Tokyo. What We did, What We Learned, and What More to Do.

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ABSTRACT: Every other year since 2005, the authors have put together symposium on aquariums. The aims and goals of these symposia are to enhance and strengthen the research and educational capability of aquariums by providing an open, multi-disciplinary platform, where researchers from various fields can get together, present their research and exchange opinion related to aquatic organisms and aquariums. Each symposium was given a different theme and presenters were selected accordingly, from aquariums, universities, museums and related research institutions. Invited renowned specialists of each respective field gave a keynote presentation at each symposium. Each symposium attracted more than 100 participants from all over Japan, even from Taiwan, making it one of the largest symposia held at AORI. Two books, “Work at Aquariums. An in-depth, behind the scene tour of aquarium exhibits.”, and “Research Activities at Aquariums. An intelligent world not limited to aquarium exhibits.” were published based on these symposia. This series of symposia has met its goal as an adhesive to bond people of different discipline and affiliation together.

INTRODUCTION

Currently, 60 Japanese aquariums are member of JAZA (Japanese Association of Zoos and Aquariums). There are many more non-member aquariums. Over 33 million people visit aquariums in Japan annually. This means one in every four Japanese visit aquariums each year. A quantitative indicator of how popular aquariums are as a recreational and educational institution specializing in aquatic organisms. A total of 15,800 species, from invertebrates to mammals are displayed in Japanese aquariums and many species have reproduced under captive conditions. This shows that Japanese aquariums have accumulated extremely high level of knowledge and techniques over the years as an aquatic organism research institution. Many Japanese aquarium curators possess doctorate degrees. Aquariums are a treasure trove of research material and opportunities. More and more research collaboration of aquariums with universities, museums and related institutions should be carried out.

PURPOSE OF SYMPOSIA

These symposia were convened with one

simple purpose. To provide a stage for researchers, educators, administrative staff of aquariums, universities, museums, education and research institutions to present their research, exchange ideas and opinions and form a human network. There are no restrictions for participation, thus anybody can attend and listen to the presentations.

PREPARATION

All symposia were conducted as part of a Joint Usage/Research Center Program at either Ocean Research Institute (ORI) or at Atmosphere and Ocean Research Institute (AORI), the University of Tokyo, Japan. Venue of symposia were, ORI in 2005, 2007 and 2009, and AORI in 2011, 2013, 2015 and 2017 (Table 1).

Application to Joint Usage/Research Center Program were made during the previous year of the planned symposium. This was convenient for the conveners because one year, we applied for the symposium and the next year, we held the symposium. This cycle was not over-burdening and easy to keep our pace because each year we had a different task to carry out. Selection of invited key note presentations and oral presentations were made

at the initial planning stage of each symposium.

After receiving official notification that proposed symposium was adopted, announcements were made for poster presentations which are open and not by invitation.

THE SEVEN SYMPOSIA

The past seven symposia, each and every one was a success. Titles, dates, number of presentations and participants are presented in Table 2.

Each symposium had different themes. 2005: Research at aquariums. 2007: Environmental issues and aquariums. 2009: Research and education related to aquatic organisms at aquariums. 2011: Biodiversity and aquariums. 2013: Collaborated research with aquariums. 2015: Animal ethology and aquariums. 2017: Exhibit and research at aquariums.

2005 and 2007 symposia were convened by Genjiro Nishi (GT) and Toshiro Saruwatari (TS). Kazuhiro Sakamoto joined the two as convener of symposium held in 2007. Ikuo Ueda (IU) and Hiroshi Sakurai cooperated as members of the program committee. From 2009, TS, GN and IU functioned as conveners of the symposia.

33 aquariums from all over Japan made presentation at the symposia. See Table 2 for list of those aquariums and the number of presentations made. Locations of each aquarium are shown in Fig.1.

19 universities, 8 research institutions, 4

museums and 4 schools and others, total of 35, participated in the symposia. Table 3 provides a list of these institutions and Fig. 2 shows their locations.

As can be seen from Figs. 1 and 2, this series of symposia has succeeded in bringing aquarium curators and researchers of related fields of research together from all over Japan. We had one presentation

from Taiwan in 2005 making it an international symposium.

The number of participants of every symposium exceeded 150, with maximum participation of 222 in 2005. Participants were not limited to curators and researchers, but the ordinary mass and students with interest in aquatic biology and aquariums.

We are already seeing results of these symposia taking shape in the form of new multi-disciplinary research projects. Through its twelve year history, aquarium symposium held at AORI, the University of Tokyo has established its presence among aquariums and researchers alike, as a place to meet and exchange ideas and interests. The purpose and the goal of symposia to bond researchers are met. And the symposium shall continue as a unique undertaking bonding people of various disciplines and walks of life together with aquariums. A one of a kind symposium in the world. Next symposium is planned in December 2019. We look forward to your participation and presentation.

Table 1. A list of aquarium symposia held at ORI and AROI.

	Dates	Symposium Title	No. of Presentations			No. of Participants	Venue
			Invited	Oral	Poster		
1	December 5,6 2005	Aquariums as research institution of aquatic organisms. Potential of mutual use of their research resources.	0	24	4	222	ORI
			One presentation from Taiwan.				
2	December 6,7 2007	Environmental issues and aquariums. Current status, tasks and future perspectives.	0	20	0	186	ORI
3	December 7,8 2009	Research and education on aquatic organisms at aquariums. Current status and prospects.	3	18	0	185	ORI
4	December 12,13 2011	Biodiversity and aquariums. Research, exhibit and education	2	19	7	193	AORI
5	December 3,4 2013	Collaborated research with aquariums. Current status and hopes for future developments.	2	16	0	153	AORI
6	December 11,12 2015	Aquarium and animal ethology. Research, exhibit, education.	2	13	12	179	AORI
7	December 11,12 2017	Exhibits and research at aquariums. Exploring their interaction.	1	15	24	220	AORI

ORI: Ocean Research Institute, the University of Tokyo. AORI: Atmosphere and Ocean Research Institute, the University of Tokyo.

Table 2. A list of aquariums which made presentations at the symposium.

Aquarium	Year and Number of presentations						
	2005	2007	2009	2011	2013	2015	2017
1 Aqua World Ibaraki Prefectural Ooarai Aquarium	1	-	-	2	-	1	1
2 Chitose Aquarium, the Birthplace of Salmon	-	1	-	-	-	-	-
3 Enoshima Aquarium	1	1	1	1	2	2	1
4 Fukushima Ocean Science Museum, Aquamarine Fukushima	2	1	1	1	1	2	1
5 Gobius Shinjiko Nature Museum	-	-	1	-	-	-	-
6 Hekina Seaside Aquarium	1	-	1	-	-	-	-
7 Himeji City Aquarium	1	-	-	-	-	-	-
8 Inokashira Park Zoo	1	-	1	-	-	-	-
9 Joetsu Aquarium, Umigatari	-	1	-	-	-	-	-
10 Kagoshima City Aquarium	1	-	-	-	-	-	1
11 Kamogawa Sea World	1	-	-	-	-	-	-
12 Kujukushima Aquarium	-	-	-	1	-	-	-
13 Kushimoto Marine Park	1	-	-	-	-	-	-
14 Lake Biwa Museum	1	1	-	1	-	-	1
15 Marine World Uminonakamichi	1	1	1	-	-	-	-
16 Nagasaki Penguin Aquarium	-	-	1	1	-	-	-
17 NIFREL	-	-	-	-	-	1	1
18 Niigata City Aquarium, Marinepia Nihonkai	-	-	-	1	1	-	1
19 Niji no Mori Koen, Osakanakan	-	-	-	1	-	-	-
20 Notojima Aquarium	-	-	-	1	-	-	-
21 Okinawa Churaumi Aquarium	1	1	2	-	1	1	1
22 Ooita Marine Palace Aquarium, Umitamago	-	1	-	1	-	-	-
23 Osaka Aquarium Kaiyukan	1	1	-	1	1	-	1
24 Port of Nagoya Public Aquarium	1	1	1	1	1	1	1
25 Shimane Aquas Aquarium	-	-	-	1	-	-	-
26 Shimonoseki Kaikyokan	-	1	-	1	-	-	-
27 Suma Aqualife Park	-	-	1	2	-	2	1
28 Toba Aquarium	1	1	-	1	-	-	-
29 Tokai University Marine Science Museum	1	2	1	2	1	1	1
30 Tokyo Sea Life Park	-	-	2	1	2	2	1
31 Tsuruoka City Kamo Aquarium	1	-	-	-	-	-	1
32 Uozu Aquarium	-	-	1	-	1	-	1
33 World Freshwater Aquarium, Aquatotto Gifu	-	-	-	1	-	1	1

Table 3. A list of related institutions which made presentations at the aquarium symposium.

Institution	Year and Number of presentations						
	2005	2007	2009	2011	2013	2015	2017
1 Sagami-hara Aquarium, Sagami-hara Hureai Kagakukan	-	-	-	1	-	-	-
2 Biodiversity Research Center, Academia Sinica, Taiwan	1	-	-	-	-	-	-
3 Japan Sea National Fisheries Research Institute	-	-	-	-	-	-	1
4 National Institute for Educational Policy Research	-	-	1	-	-	-	-
5 National Research Institute of Far Seas Fisheries	-	1	-	-	-	-	-
6 National Research Institute of Fisheries and Environment of Inland Sea	-	-	-	1	-	-	-
7 Okinawa Churashima Foundation Research Center	-	-	-	1	-	-	-
8 Tokyo Zoological Park Society	-	1	-	-	-	-	-
9 Coastal Branch of Natural History Museum and Institute, Chiba	-	-	-	-	-	1	-
10 Iwate Prefectural Museum	-	-	-	-	1	-	-
11 Kanagawa Prefectural Museum of Natural History	-	-	1	-	-	-	-
12 Wakayama Prefectural Museum of Natural History	1	1	-	-	1	-	-
13 Group for Making a School of Fujisawa Rice Fish.	-	-	1	-	-	-	-
14 Bunrin Junior High School, Bunkyo Ward	-	-	-	-	-	-	1
15 Iwate Prefectural Miyako Fisherise High school	1	-	-	-	-	-	-
16 Atmosphere and Ocean Research Institute, the University of Tokyo	-	-	-	2	1	3	2
17 Chukyo University	-	-	-	-	-	1	-
18 Department of Marine Bio-Science, Fukuyama University	-	-	-	-	-	-	1
19 Faculty of Fisheries Sciences, Hokkaido University	1	-	1	-	-	-	-
20 Faculty of Regional Studies, Gifu University	-	-	-	-	1	-	-
21 Faculty of Science, Yamagata University	-	-	-	-	1	-	-
22 Gene Research Center University of Tsukuba	-	-	-	-	1	-	-
23 Kitasato University School of Marine Biosciences	-	-	-	-	-	1	-
24 Nippon Veterinary and Life Science University	-	-	-	-	-	1	-
25 Ocean Research Institute, the University of Tokyo	1	2	-	-	-	-	-
26 Ochanomizu University	-	-	-	-	-	-	1
27 Sado Marine Biological Station, Niigata University	-	-	-	-	-	1	-
28 School of Marine Science and Technology, Tokai University	-	-	-	-	-	-	2
29 Seto Marine Biological Laboratory, Kyoto University	-	-	-	-	1	-	-
30 Tateyama Station, Tokyo University of Marine Science	-	-	-	-	-	5	7
31 Teikyo University of Science	-	-	1	-	-	-	-
32 Tokai University	-	-	1	-	1	-	-
33 Tokyo University of Marine Science	-	-	1	-	-	-	9
34 Wako University	-	-	1	-	-	-	-
35 Zakotou	-	1	-	-	-	-	-



Fig. 1. Locations of aquariums which made presentations at the aquarium symposia. Numbers in each symbol correspond to numbers in Table 2 indicating each aquarium

OUTPUT

Two books were published based on presentations made at the symposia.

NISHI, G., SARUWATARI, T. 2007, *Work at Aquariums. An in-depth, behind the scene tour of aquarium exhibits.* Vi+243 pp. Tokai University Press. (in Japanese).

This book is widely accepted as a book describing in detail the actual work of aquarium curators. It is currently in its third print.

SARUWATARI, T., NISHI, G. 2009, *Research Activities at Aquariums. An intelligent world not limited to aquarium exhibits.* Vi+238 pp. Tokai University Press. (in Japanese).

This book is comprised of chapters describing examples of research conducted at aquariums. It is regarded as an introductory book on marine biology because many pages were spent describing the underlying knowledge and science of each research activity.

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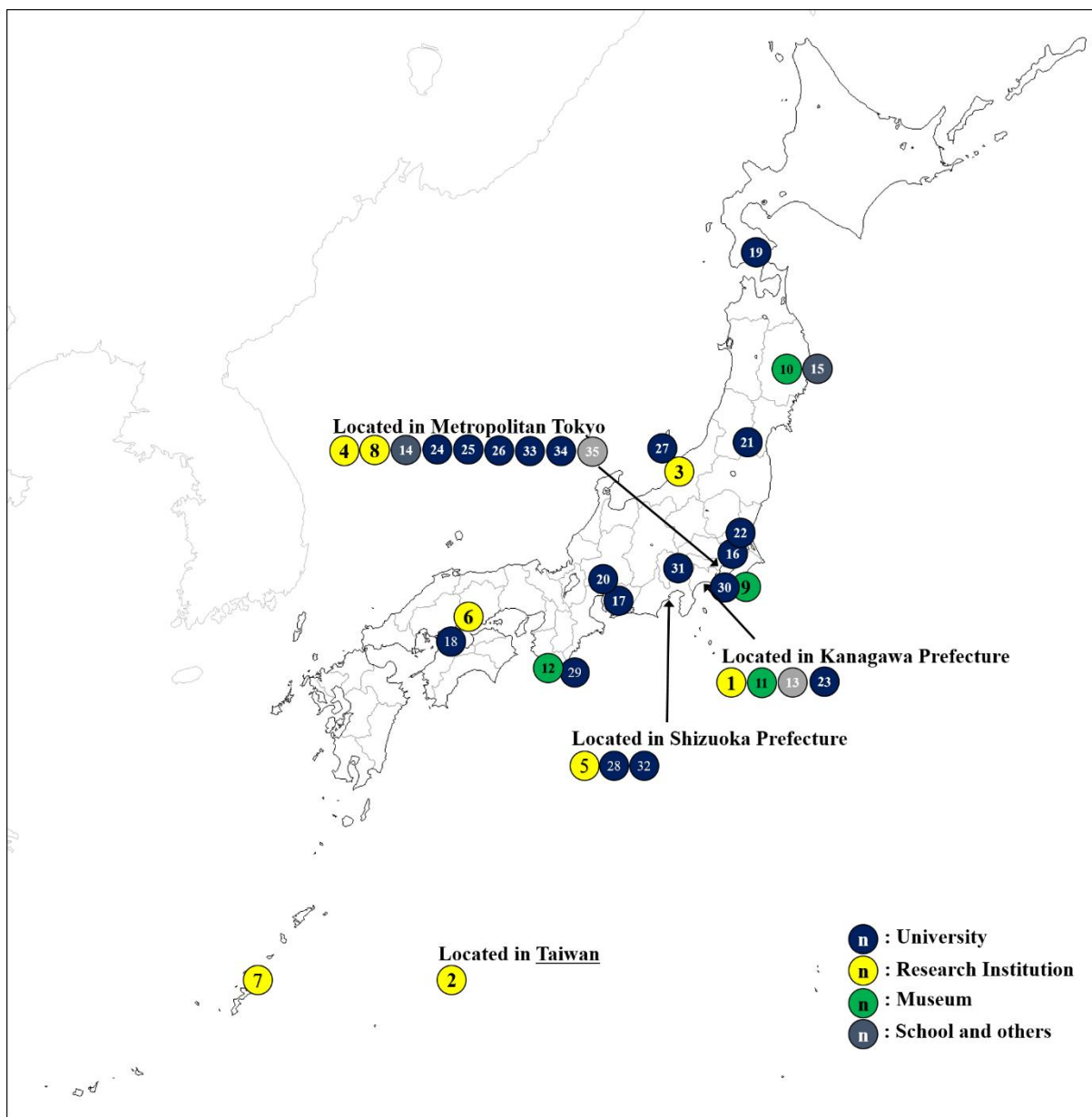


Fig. 2. Locations of institutions which made presentations at the aquarium symposia. Numbers in each symbol correspond to numbers in Table3 indicating each institution.

publishing the two symposium volumes.

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