



DIWPA: DIVERSITAS in the Western Pacific and Asia

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**Shin-ichi
Nakano**

Message from the chairperson

It has been a long time! In the coming July, the 10th Congress of the East Asian Federation of Ecological Societies (EAFES) is going to be held in Jeju Island, South Korea. At this stage, the congress is going to be held in person. EAFES is the organization where ecological societies of China, South Korea and Japan collaboratively established a federation to promote ecological science in East Asia. The three Ecological Societies take turns organizing the joint meeting (EAFES Congress) at least once in 2 years. In the last time, the Ecological Society of China (ESC) hosted the 9th Congress held in Hohhot, the capital of Inner Mongolia in the north of China, and it was very greatly successful. According to the ESC's website, the 9th EAFES had 450 registered participants from 9 countries (China, South Korea, Japan, Mongolia, France, Pakistan, Russia, Sri Lanka and Thailand) attended both onsite and online. The number of abstracts was 249 (Chinese 150, foreign 99) with 136 oral presentations (Chinese 84, foreign 52) and 82 posters (Chinese 42, foreign 40) focusing on the 8

sessions. The presentations in the 9th EAFES were dominated by young researchers such as post-docs and graduate students, and all those talks were so excellent and impressive. EAFES Congress covers a wide range of topics in ecology, and I believe that everyone interested in ecology, biodiversity, conservation and environmental sciences would enjoy joining there. The important information of the 10th EAFES will be released on the website of the Ecological Society of Korea (ESK). So, as the capacity of the EAFES Secretary General for the Ecological Society of Japan, I warmly welcome all of you to join the 10th EAFES!

The website of ESC:
<http://www.esc.org.cn/tdetail.html?id=184&contentId=1941>

The website of ESK:
<http://www.ecosk.org/>



Jeju Island



**Atsushi
Ishida**

Message from the Secretary General

Now Japan is entering the 8th wave of the new corona virus (COVID-19). Currently, there is concern about the spread of the XBB.1.5 variant in Japan. However, social restrictions for COVID-19 have gradually eased in Japan. In 2022, we were able to hold the DIWPA International Field Biology Course (IFBC) for the first time in two years. However, only young international students and researchers who were staying in Japan could participate in the DIWPA IFBC in 2022, because it was not easy to obtain the VISA from abroad. As the result, I am pleasure to publish the report on that DIWPA IFBC in this newsletter. In 2023, we hope to open the door to the DIWPA IFBC as much as possible. In the next volume, we will be able to provide more information on the DIWPA IFBC in this year. Together with the DIWPA newsletter, we hope to continue to enhance its function as the platform for the exchange of information among countries on biodiversity conservation and related ecosystems and societies. To this end, we look forward to receiving your reports to the DIWPA newsletter.

Research experience at Chichijima, Ogasawara Islands: Examining tree-habitat relationships and revisiting island biogeography theory

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Last November 16-23, I had a chance to visit Ogasawara Islands through a field biology course/training provided by the DIVERSITAS in the Western Pacific and Asia (DIWPA), Center for Ecological Research (CER). Ogasawara is designated as a World Natural Heritage Site in 2011, located 984 km from Tokyo. I joined a research survey on the growth of endemic dwarf trees in Ogasawara with Prof. Atsushi Ishida (CER, Kyoto University), Prof. Yuzou Sano (Hokkaido University), Ms. Maruyama and Mr. Kanji (the last two are students who are involved in the survey as part of their thesis study). Prof. Ishida is the lead investigator of the research and he has been conducting research projects and awareness-raising activities for the locals in Ogasawara. When I asked how many times he has been in the island, he answered that he cannot count as he has been going back and forth since more than 20 years ago. The research project of Prof. Ishida is located Chichijima, Ogasawara and involves monitoring growth of plant species (Fig. 1) examined at the drought dwarf forests such as Shimamura (*Juniperus taxifolia*), Shima-

isunoki (*Distylium lepidotum*), Himetsubaki (*Schima mertensiana*), Himefutomomo (*Syzygium cleyeraefolium*), and Terihahamabou (*Hibiscus glaber*), among others.

The research survey aims to investigate on the growth of the endemic trees given the limited soil and water availability on the island. I am grateful and lucky to be able to be selected as a participant for the International Field Biology Course (IFBC) under this theme, which is very much aligned with my research interest. Specifically, my participation to the IFBC has provided me the opportunity to: (1) observe the growth of endemic dwarf forest species in Ogasawara; (2) gain knowledge and field experience on climate-growth response of trees in drought-prone ecosystems such as those with poor soil quality/condition; (3) engage in knowledge-exchange with other young students/researchers on topics such as forest/plant science, biodiversity conservations in islands, control of invasive species, etc.



Fig. 1. Left image shows the needle of *Juniperus taxifolia* while the right image shows the survey team doing maintenance on a dendrometer device installed in one of the monitored trees.



Fig. 2. The team with the mascot of Ogasawara-maru before leaving Tokyo.



meaning, some species of plants and animals are only found in Ogasawara. I always feel amazed by the fact that island systems not only possess rich biodiversity, but they are also characterized by rich culture and history. Because of being remote geographically, similar with that of the case of plants and animals, the culture in islands is generally different from the mainland. There are also differences with regards to climate and this ultimately results to an increase in a species' acclimation potential to the existing conditions in the island. For example, trees are sessile organisms and thus, they are unable to move or run away from adverse environmental and climatic conditions. Some tree species persist and continue to grow and survive even if the habitat conditions are not good. In the case of the dwarf species in the forest of Ogasawara, the trees there have to balance physiological functions and processes such as photosynthesis and respiration with that of growth and survival. If there is enough source of water or soil moisture needed for photosynthesis, they could maximize growth or develop a growth strategy based on physiological and morphological factors.

I have always dreamt of visiting Ogasawara since I have been to Japan. This group of islands is a good model of island biogeography, where processes of island birth and growth and the high endemism it provides can be observed. For me, being able to go to Ogasawara is like a dream come true. Even though it takes a 24-hour journey by Ogasawara-maru ferry (Fig. 2), I think that the journey is part of the reason why the island is worth to see. In fact, during the sea travel, we were able to have a chance to enjoy the unique species of sea birds that are inhabiting the small islands of the Ogasawara group of islands. It is my first time to see “Katsuodori” (Brown Booby or *Sula leucogaster*) so I was very amazed observing their flying and feeding behavior (Fig. 3). I read that November to December are the breeding and nesting months for Brown Booby and that they typically lay two eggs per breeding season. They must have favored the availability of many breeding sites in Izu islands and Ogasawara islands.

I love the biodiversity which islands such as Ogasawara and the islands in my home country, the Philippines, possess. It is very interesting how that level of endemism and biodiversity has been created,



Fig. 4. Collecting data from dendrometers at tree trunk.



Fig. 5. Installation of the soil moisture sensor.



Fig. 6. Micro-weather station at the study site, Mt. Chuoizan (the highest mountain in Chichijima, Ogasawara).

Research survey on ecophysiology of trees in Ogasawara

Changes in the stem growth of a tree can be measured through a dendrometer device which records the diameter of the tree as well as daily and periodical expansion and shrinkage of tree stem in high temporal resolution. I observed and learned how dendrometers in the field are monitored and how data are recorded using a simple data collector (Fig. 4). On the hand, Figure 5 shows how a soil moisture sensor is being installed.

By analyzing the stem growth changes, we will be able to determine the period of the day when the tree experience water stress or drought. The growth information can also be correlated with the climatic variables such as precipitation and temperature. Figure 6 shows a photo of the microclimate monitoring equipment available at the study site. These are essential equipment for research topics that are related to climate and tree relationships. More importantly, studying how climate is affecting plants and trees are very relevant these days due to the global climate change.

To be able to identify specific effect of environmental and climatic changes on the trees, investigation of xylogenesis (the formation of water conducting vascular tissue) can be conducted by way of collecting microcores from the stem of the trees. Figure 7 illustrates how microcore collection is done and this particular activity (morpho-anatomical analysis) is led by Prof. Sano. I learned from Prof. Sano the basic techniques of wood micro-core collection and sample storage. He also provided me some advice and tips on how to process the samples for subsequent analysis of the cambium or the growing part of the tree trunk.

In my study in Miyazaki experimental forest, I am investigating on the effect of increasing temperature on the stem growth of *Cryptomeria japonica*. I also conduct the same analysis as Prof. Sano as a third component of my PhD research, and therefore, I am very

grateful to have received advice and tips from an expert such as Prof. Sano.

Aside from acquiring knowledge from professors, I was also able to acquire knowledge from fellow students. Our group stayed in the Tokyo Metropolitan University Ogasawara Field Research Station and since the field station has a joint use policy with other groups/



Fig. 7. Prof. Sano collecting microcores from a tree at the study site.

universities/institutions, it is also expected that there will be an opportunity to meet other students and researchers. At the kitchen, while we are cooking, I was able to have some talk/knowledge-exchange with fellow participants and with other students of Kyoto University and I got to know about their own research interests and topics. As an example, Kanji Minagi taught me how to use the pressure chamber to determine leaf water potential (Fig. 8). Mio Maruyama, who is analyzing dendrometer data of dwarf trees, have talked with me about her study as both of our research topics are similar. Additionally, we practiced tree-climbing together and she helped me familiarized myself once again with the basic techniques of tree-climbing.

Biogeography is the study of the patterns of geographic distribution of organisms and the factors that determine those patterns. Being both a student and a researcher, I am always fascinated with the concept of endemism and biogeography. Ogasawara Islands are a chain of volcanic islands created about more than 40 million years ago formed along the oceanic subduction zones. As these islands have never been connected to the mainland, they have produced plants, animals and other organisms that are unique to the area. The theory of island biogeography predicts that species diversity on an island is positively related to the size of the island, but negatively related by the island's distance to the mainland. There are a number of ways and possibility by which we can evaluate and re-confirm the theory of island biogeography in Ogasawara through studying its biodiversity and the ecological processes in the islands. For instance, what I noticed is that the island vegetation is dominated by scrub communities such as Maruhachi (*Cyathea mertensiana*), Takonoki (*Pandanus boninensis*), and Ohama-gikyou (*Lobelia boninensis*). It would also be interesting to analyze the relationship of these species with endemic faunal species such as insects, mammals and birds which could be helping in the dispersal of trees in the island (Fig. 9).

Environmental education led by volunteer groups and people's organizations

In addition to working in the field, I also had a chance to observe first-hand the conservation activities in Ogasawara. For instance, we visited a facility led by NPO Institute of Boninology called “Nekomachiaisho” (ねこ待合所), which literally means “waiting for cats” (Fig. 10). This non-government organization deals with the population of cats in the island especially in taking care of turned-over cats that were caught in the island and in making them ready for adoption. Feral cats in Ogasawara pose threat to the population of endemic species such as birds and other small endemic animals. Thus, in order to conserve endemic species, it has been an initiative from Tokyo Metropolitan Government to



Fig. 8. Practicing measurement of the leaf water potential using the pressure chamber.

promote trapping and transport of cats from the island to Japan's mainland. Neko-machiaisho has been instrumental in sending cats for adoption in Tokyo.

Aside from efforts regarding feral cat management, there are other conservation efforts which promotes citizen science. One group called NPO Ogasawara Wildlife Research Society (NPO法人小笠原野生生物研究会)

seems to be very active in the island as well particularly in terms of endemic plant species conservation and protection. We had a chance to meet representatives of this group and I observed their passion and advocacy towards the island's endemic and endangered flora and fauna/wildlife and natural environment. They are conducting volunteer activities such as controlling invasive plant species, tree planting of endemic species, beach cleanup and awareness-raising activity in cooperation with various people from the academe, government and the public and with the overall aim to



Fig. 9. Left image shows herb and scrub vegetation in the island. Right image shows seeds of *Pandanus boninensis* indicating it has been eaten by a mammal (likely an endemic rat).



Fig. 10. The cat-shaped facility called Neko-machiaisho.

contribute to the conservation of the Ogasawara Islands (Fig. 11).

Unique culture and local practice in Ogasawara

Matching the high biodiversity of the island is the people's culture and way of life. People in Ogasawara are very much appreciative of the nature and aware of the changing conditions in the island. The history of the island is complex, and the local people are modern-day descendants of a multitude of racial and ethnic groups based on the events of the past. However, one would notice that similar with other island regions or nations, the people in Ogasawara has a way of life that is aligned with their surrounding and thus, helps in the deepening of the connection between nature and humans.

Ogasawara has a rich local culture and practices. After staying there for a week for the IFBC, I feel like going back again to do some research activities there in the future. I was very amazed not only by the unique natural environment of Ogasawara but also at how local people express their gratitude to the visitors of the island. When I boarded Ogasawara-maru for my journey back to Tokyo on the last day of the IFBC, I was surprised to have witnessed how local people honored visitors by letting us experience the local tradition/practice. Passengers received good wishes for a safe journey and a hope to be back in the island again. This was done by way of giving an island symbol made from Pandanus leaves and Hibiscus (Fig. 12). As Ogasawara-



Fig. 11. Our team's photo with some members of the NPO Ogasawara Wildlife Research Society.

maru ferry departs, we were shown send-off performances from the local people and island tour operators (Fig. 13). I was lucky because I surprisingly saw a group of dolphins swimming nearby after the send-off and while our ferry gets further away. I feel very humbled by this experience and it made me remember some tradition in and affinity with my home country, Philippines.

Acknowledging knowledge gained and expressing gratitude

I thank Prof. Ishida and the whole DIWPA, Center for Ecological Research, Kyoto University, for this great opportunity to participate in a research activity in Ogasawara and to experience its unique natural environment (Fig. 14). I acquired various knowledge from the IFBC and I feel more connected to nature after joining the trip. I also thank the Tokyo Metropolitan University (TMU) for providing such kind of research facility in the island. My gratitude goes to Prof. Sano as well for sharing his knowledge on wood anatomy. I also would like to thank my fellow students (Maruyama-san and Minagi-san) for the knowledge-exchange and cooperation they have extended me. I wish to connect with all participants and collaborate with them once again in a future research endeavor.



Fig. 12. Left: Our team together with all students who are doing research in Ogasawara and with the local people. Right: The island accessory with Hibiscus and Pandanus as main components.



Fig. 13. Performances from the local people and tour operators.



Fig. 14. The scenic beauty of Chichijima from mountains to coast.

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