

## Keynote Lecture

### **100 YEARS OF TIGER BAMBOO - THE UTILIZATION OF SUSTAINABLE LOCAL RESOURCES**

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Good afternoon. I am Yoshihiro Yamagishi from Japan, the president of a Japanese bamboo product company. I am truly grateful for this opportunity to talk to you today.

First, I would like to tell you about my company, Taketora. Founded in 1894, the company has been specializing in tiger bamboo crafts for 124 years. I am the fourth generation of this family business. We are the sole trader dealing with tiger bamboo in Japan.

A unique form of Japanese bamboo - Toratake

Distinct from wood or grass, bamboo has the special advantage of being strong but flexible. Since bamboo is available nearby and easy to process, it has been used for daily goods, tools, crafts, building materials, and as food. Bamboo is found in regions with a mild, humid climate, such as Southeast Asia, Australia, Latin America and Africa. It is said that there are 1,300 species of bamboo in the world and some 600 of them grow in Japan. Nevertheless, only three species are widely utilised. The three most commonly-used species are moso bamboo, madake bamboo and hachiku bamboo. Tiger bamboo, the one we deal with, is extremely rare.

Tiger bamboo is officially called "Tosa torahu take". It is (thought to be) a variety of hachiku bamboo. An unusual characteristic of tiger bamboo is the mottled, tiger-like pattern on its surface. It grows only in a valley in my hometown, Awa, part of Susaki city, in Kochi prefecture. With a width of 1.5 kilometres, it naturally grows from the foot to the top of the mountain valley. Strangely enough, however, not a single tiger bamboo is seen beyond the peak. The world-famous botanist from Kochi, Tomitaro Makino, named the bamboo "Toratake" in 1916. However, the bamboo was well-known among locals long before it was given the official name. Historical documentation says that, in the Edo era, tiger bamboos were presented to the feudal lord of Tosa as the land tax payment instead of rice.

The colours and patterns of tiger bamboo are entirely natural; therefore, they can be quite different from one another. Some have patterns all over, and others have no clear patterns and look like normal hachiku bamboo.

The cutting period of tiger bamboo is from early September to the end of January. This period is fixed for the purpose of quality control. We cut them only during this period. After

cutting we sort the bamboos carefully, checking their colours one by one as each one of them is distinctive.

Why does tiger bamboo have such patterns in the first place? Some university researchers suggest that it could be the work of fungus in the soil peculiar to this area. A definitive answer has yet to be found. Some mountain specialists who have been cutting tiger bamboo for many years say that it may be a result of the combination of sea breeze, sunshine and temperature. We have a botanical garden named after Dr Tomitaro Makino in Kochi. There, I saw a map of Kochi prefecture's geological features. The colour was different where tiger bamboo grows, showing that the soil there was unique. This unique soil may have something to do with the unusual quality of tiger bamboo.

Personally, I feel that it is the miraculous result of various natural factors. Whatever the cause may be, the tiger patterns on the bamboo are curiously absent when it is transplanted elsewhere.

As tiger bamboo is a kind of hachiku, the surface looks powder-coated. Contrary to its appearance, bamboo is, in fact, an oil-rich plant; therefore, when heated by a gas burner at 700 degrees Celsius, oil comes to the surface. After the oil is wiped away by cloth, tiger patterns clearly emerge along with a beautiful gloss. Our customers sometimes ask if some sort of paint is applied, but the shine is entirely natural, caused by the oil from the bamboo itself.

It is nearly 30 years ago that the BBC came to Awa for footage. In addition to some attention from foreign media, we have made some collaborative products with a famous fashion brand. This is not only because tiger bamboo is rare and beautiful. It is part of a long history in bamboo crafts and reaches people nationwide. Tiger bamboo is interwoven with people's lives, in the form of indispensable everyday goods.

## 2. Our challenges

In general, moso bamboo blooms at the same time once every 60 years, and the madake and hachiku bamboos bloom every 120 years. However, a small-scale partial blooming of bamboo can be seen occasionally. The flowers are just like rice flowers, and so we can clearly see that bamboo is part of the rice family. Rice farming occurs throughout Japan, producing delicious brand rice such as koshihikari and sasanishiki. This is thanks to abundant clean water and the mild climate with four distinct seasons. A suitable natural environment for quality rice is equally good for bamboo. That is why Japan has some of the best quality bamboo in the world.

Bamboo grows rapidly, reaching a full size of around 20 meters in about three months. After three years, we can use it for materials. In famous folklore, "The Tale of The Bamboo Cutter", the heroine was born from bamboo and became fully grown in three months, just

like bamboo. The author of the story is unknown; the story evolved from the lives and culture of everyday people, illustrating the deep, enduring connection between bamboo and the lives of Japanese people.

Due to its rapid growth, bamboo is considered to be the only renewable plant resource that is both practical and easily sustainable. Since 1985, our company has repeatedly claimed that “the 21st century is the age of bamboo” because we believe in the unlimited possibility of bamboo. Its potential lies not only in its renewability but also in its potential for antibacterial action, deodorisation and healing. Sadly, however, effective utilisation of these properties has yet to be fully explored.

Plastic products started appearing in the middle of 1950s, and have come into wide use since then, taking the place of bamboo. As a result, bamboo products are rapidly disappearing from the Japanese lifestyle.

Our company has held a summer internship every year since 2000. One time, I was surprised to learn that a participant did not know of “Aodake-fumi”. This simple semi cylindrical health product, made from a length of bamboo cut in half, helps relieve fatigue or swollen legs simply by treading on it. It has been a regular household item in Japan for generations, so I was shocked to hear that the student had never seen one. Deeply-rooted bamboo culture, part of our lives for so many years, has been disappearing over the past few decades. Our company now offers a bamboo grove visit to address this lack of familiarity with bamboo. To my surprise, young people who live in the countryside have hardly ever stepped into a bamboo grove. Even among people in their 50s or 60s, there are those who have never set foot in a bamboo grove. This is the present situation in Japan.

Anyone who visits our tiger bamboo grove feels relaxed. There are smiles accompanied by a sense of calm. Every time I see such smiles, I feel the connection between the Japanese people and bamboo. I think Japanese people have a deep-seated nostalgic fondness for bamboo, but they just do not realize it. It is like something they have forgotten.

On our mountain, many paths lead us to the tiger bamboo grove like capillary vessels. These are the same paths that my father walked, my grandfather walked, and my great-grandfather walked. I am proud of the fact that these narrow paths have been used for over 100 years and are still used for transporting the bamboo. Even though they look like ordinary mountain paths, they are our lifelines supplying tiger bamboo every year. They are the treasure that we must protect.

The carefully-tended bamboo grove of ours is not a farm for bamboo shoots. Our bamboo is used for materials to be processed as bamboo goods. Nowhere else in Japan can such a

beautiful bamboo grove be seen. Our challenge is how to deal with tiger bamboo and maintain its culture as a valuable local resource in the next 100 years.

### 3. The only bamboo electric vehicle, Take-Tracker

With our challenging task in mind, we needed a breakthrough to transform the situation. We wanted the younger generation to know about bamboo. We wanted people to realise the potential of bamboo. That is the reason why we made the first electric car with a bamboo body, the Take-Tracker.

There are a few significant aspects in making a bamboo car. Firstly, it is mobile. Usual bamboo goods are of course immobile and to see tiger bamboo, people need to come all the way to the only habitat, in Kochi, Japan. But a bamboo car enables us to visit customers. It may attract the attention of people who had no interest in bamboo before. Secondly, with a bamboo car, we can demonstrate the advantages of bamboo effectively. Bamboo is often used to make rulers, since it is quite hard and remains straight. However, the same material becomes flexible when it is split and peeled into thin slices; as a result, it can be bent into gentle curves. Bamboo is a fantastic material which can be hard or soft depending on requirements. The Take-Tracker is an ideal demonstration of this unique versatility and our traditional skills. Bamboo as a practical material enables the car to run at the 50 km/h, with two adults inside.

We wanted a lot of people to take part, so we opened a crowdfunding campaign for our Take-Tracker project. Then, as we promised to our contributors, we carried out a trial named "Challenge Run Yokohama". We attempted to run the Take-Tracker 1,000 km from our home Awa, in Kochi, to Yokohama in 11 days. Take-Tracker's battery only allows the car to keep running for two hours, then it takes six hours to recharge it. So, we repeated a two-hour run and six-hour recharge pattern, again and again, day after day. Thanks to the support from convenience stores along the route, we coordinated with three stores each day to charge the battery and relayed from one convenience store to another for 1,000 km from Kochi to Yokohama. It was a tough run, but I believed in my craftsmen's skill and the tiger bamboo. We made it. After 1,000 km, the woven bamboo was not loosened or deformed. Take-Tracker completed the challenge run as scheduled and proved its strength and potential.

This trial had another important message to convey, which is a warning against global warming.

There is an old saying in my hometown; "When the frost comes, tiger bamboo patterns become clearer". I did not pay much attention to this saying when the bamboo harvest was abundant decades ago, but recently the tiger patterns have been fading. Even though Kochi

is well known as a warm place in Japan, when I was a child it snowed enough to have snowball fights.

Since the global warming issue became apparent, it has been noticeable that the temperature does not drop as much as before. Perhaps this change and the fading tiger patterns have some connection.

To be honest, climate change used to feel like an abstract concept to me. However, having seen the changes in the nearby mountains around our bamboo grove, I feel the threat more closely. If the warming of the earth progresses, we will face the danger of losing our long-inherited bamboo culture in this area.

When I came up with the idea of a bamboo car, I only considered an electrically-powered one, as a non-emission fuel cell is most suitable for bamboo as an eco-friendly material. We wanted more people to think about global warming by looking at the Take-Tracker and considering the threat posed to the tiger bamboo.

#### 4. For the future

Now we are facing various problems, such as environmental issues, which individuals cannot possibly solve alone. When considering such problems, I think that we have something to learn from bamboo.

Bamboo grows straight up into the sky, focusing upon its purpose without any hesitation. Bamboo is so supple that it is never broken by strong winds; it endures and persists through adversity.

And bamboos are firmly connected to each other by their subterranean stems (roots), as if to demonstrate the importance of supporting one another.

The time has come for people around the world, regardless of race or nationality, to learn some valuable lessons from bamboo.

#### 5. Closing

Finally, I have a favour to ask of you. Please give us an opportunity to run our Take-Tracker in your town or city. We will bring the car wherever we can in order to help raise people's awareness of environmental issues. This will lead us to a better future for our home of tiger bamboo. The potential of bamboo is indeed unlimited.