

Climate Witness The Matagi (bear hunter)

Mitsuharu Kudo

“Loss of beech forests in Shirakami-Mountains, the spiritual home of Princess Mononoke”



I grew up in a family who had been Matagi (mountain hunters) for generations, and I myself entered a Matagi group at the age of 15. During the 50 years since then, I have lived in the Shirakami-Sanchi. I am now working as a tour guide, telling people about the importance of preserving the wonder and nature of the beech forest to people visiting the Shirakami-Sanchi. I feel that something quite unusual has been taking place in recent years with the beech forest, even though it looks fertile at first glance from a distance. Snowfall has been decreasing and there have been large-scale outbreaks of insects that eat beech nuts every year.]

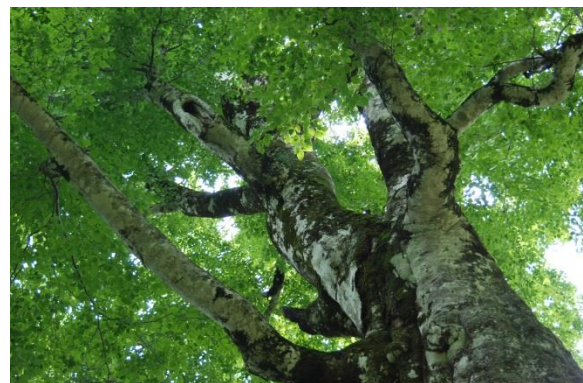
Something unusual is taking place with the forest cycle

Over the past several years, the situation of the forest, which was once bountiful, has gradually changed due to rising temperatures. The biggest change has been a decrease in snowfall. When the snowfall decreases, the water level of streams falls as well. The average temperature of the streams of Shirakami is about 17 degrees centigrade. The areas near the streams feel nice and cool even in the summer. But a vicious cycle is taking place with the fall in the water level leading to a rise in the temperature of the forest as a whole.

Insect outbreaks

What concerns me most about among the various changes of the forest is the large-scale outbreaks of insects that feed on beech nuts. When insects eat the nuts before they ripen, like in recent years, the trees put forth their blossoms the following year, in an attempt to reproduce. This has been happening now for eight years or so. Observing this, I am worried that the beech trees will get too tired to bear nuts. I am also worried that there will be no nutrition sources in the surrounding area.

Bears have also been affected by this. Bears mate early in the summer, eat a lot in the fall, and it is when they have sufficient nutrition stored up that the fertilized eggs get implanted in the uterine wall leading to pregnancy. When there is a poor crop of beech nuts and acorns, bears cannot obtain enough food and cannot give birth to offspring.



Blessing of the beech forests

Beech trees usually put forth buds around the May holiday season. Their vigor is amazing. The budding quickly spreads from the low-lying streams to the ridges. It looks as if a green carpet is running up the mountains. We call it the “beech ridge run.” When you wake up in the morning after rainfall, you can see the green coming right up to you. It really is a tree with a powerful life force.

When you walk in a beech forest, it feels like you are walking on sponge and you can feel moistness even on the sunniest day. Beech forest floors are covered with a rich leaf mold, under which the roots spread. Rainwater seeps down into the ground with the help of the leaf mold and then penetrates even deeper with the help of the beech roots. This water, full of nutrients, takes 15 years to trickle back up to the surface, eventually seeping out and being carried to the sea as rivers. This nutritious water is said to have a very positive effect for plankton and seaweed. Thus, beech trees nurture the animals and plants of the forest and even the creatures of the sea.

It is said that in the ecological system that we see today in the beech forest of Shirakami was already established 8,000 years ago. It is predicted, however, that if global warming continues at its present rate, 90% of the beech forest area will have vanished by the end of the 21st century. Can we simply let this beech forest die out during the coming century? I would argue that we share the responsibility to pass down this precious treasure, which has been passed down from the Jomon period, to future generations.



<Scientific Background>

Beech forests are the representative form of Japanese deciduous broadleaf forests, and the best known is the beech forest of Shirakami-Sanchi, which is registered as a World Heritage Site. It is predicted, however, that if global warming continues, with temperatures rising, the distribution of beeches will diminish greatly. This could have an enormous impact on Japan's forest ecosystem.

According to *“Climate Change Impacts to Japan- Comprehensive impact assessment and adaptation based on new scenarios”*, published by the Ministry of the Environment on March 2014, analysis using a tree classification model to predict beech forest distribution probabilities, shows that beech forests will diminish to 25% of their present area by 2081-2100, in the RCP 8.5 scenario (worst case scenario). Even in the preserved area, it will diminish to 20%, and in the western parts of Japan as well as on the pacific coastal area, they are facing extinction. Beech forests in the Shirakami-Sanchi will also diminish greatly.

The report stresses the need to monitor the expected rapid changes of the forests, predict the causal

relationship between global warming and the forest environment, and take necessary measures to ensure that the beauty of nature will be passed down to coming generations.

Toemon Sano "Cherry Blossom and Climate Change"



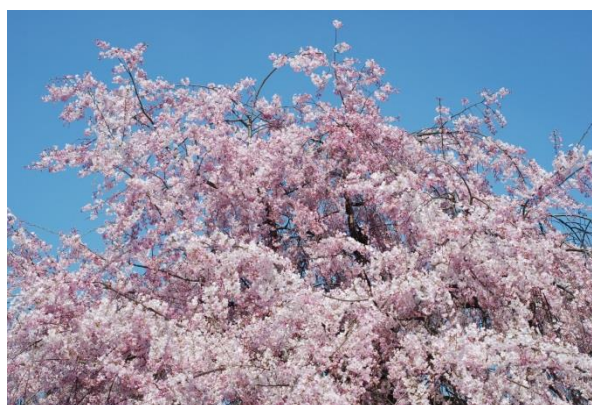
I operate a landscape gardening business in Yamagoe, a place in the Ukyo district of Kyoto. My ancestors took care of the Imperial grounds of the Ninnaji temple domain in Kyoto. In the old days, cherry blossoms were used as a yardstick for rice planting and fishing. That shows how close cherry trees were to people's lives. The number and color of cherry blossoms differ from year to year. This is mostly due to the weather of the preceding summer. Lately, we don't have cold winters, and the cherry blossoms have completely changed. Somei Yoshino cherry trees are vulnerable to heavy rain because their roots get easily rotten. If the climate continues to change, Somei Yoshino cherry trees planted around the country will face a crisis.

Cherry blossoms differ according to the weather

The number and color of cherry blossoms differ from year to year. This is mostly due to the weather of the preceding summer. For cherry trees, summer is a season of growth. The trees absorb nutrients through the roots and carry them to the branches to promote photosynthesis. When this process settles down, the nutrients are sent to the trunk. It is after the Buddhist Bon season in August (the hottest season in midsummer), that the trunk begins to grow in earnest. Around this time, the buds that will become next spring's blossoms begin to form. We call them "zero buds." In other words, the preparation for blossoms has begun.

The physiology of cherry trees is that these zero buds accumulate energy during the winter time. At some point in the spring, they suddenly start to grow, and when the temperature reaches a steady 15 to 20 degrees Celsius, they open.

In 2009, the temperature had already risen to 15 degrees Celsius by the end of February. So when the buds were still small, they were surprised and opened up. Then it got cold again in March. Thus, the buds remained open in an incomplete way.



Somei Yoshino cherries suffer from climate change

There are three kind of cherry trees that grow naturally in Japan; Yama-zakura (*Prunus jamasakura*), Higan-zakura (*Prunus subhirtella*), and Oshima-zakura (*Prunus lannesiana* var. *speciosa*).

There are more than 300 kinds of cherry trees including gardening varieties. The Somei Yoshino cherry, which is the dominating cherry trees in Japan because of its popularity, is cultivated by human beings. They do not have real trunks, as they are actually branches coming directly out of the soil. As a result, they cannot withstand harsh weather conditions such as rain and heat. They are destined to depend on human beings until their end

Lately, there are more heavy rains in summer time. Somei Yoshino cherry trees are vulnerable to heavy rain because their roots get easily rotten. If the climate continues to change, Somei Yoshino cherry trees planted around the country will face a crisis.

When a famous cherry tree faces its extinction, people try to protect that tree. But I think only trying to save the plants in front of us is meaningless. It's not that there is something wrong with nature, but the problem lies with our way of livings. Isn't it the life of human beings, with our unquestioning consumption and throwaway lifestyle, that must change?



<Scientific Background>

The Somei Yoshino breed that has spread throughout Japan is actually a clone, and this is the reason why all of them bloom at the same time. Temperature has a strong influence when these trees bloom. As the average temperature increases over the years, the blossom of cherry trees are becoming earlier and earlier. According to the Japan Meteorological Agency, the cherry blossom season across all of Japan has advanced an average of 4.2 days over the past 52 years. In big cities, the impact of the heat island phenomenon has accelerated this trend, resulting in an advance of 6.1 days over a 50 year period in average. In mid-sized cities, the advance is 2.8 days in average.¹ (The study in question measured temperatures at 11 cherry blossom observation sites from among a total of six large cities and 17 medium cities in Japan.)

The blooming of cherry trees, however, depends not only on the warmth of the early spring, but also on winter temperature. Cherry trees enter a dormant state in autumn, and for them to come out of this state, there must be a prolonged period of low temperatures. Once they do come out of this state, another prolonged period of warmth is required before they actually start to bloom. In warm regions where the winter temperature has risen, this period

of cold temperatures has become too short, and this impacted the cherry tree ecology. In some regions, the very survival of cherry tree is facing threat.²

According to the June,2008 report, "Kikohendo eno kashikoi tekio (Clever Adaptation to Climate Change)" issued by the Ministry of the Environment, by the period between 2082 and 2100, the average bloom date in the east and north of Japan is expected to advance a further 14.5 days over the average date as measured between 1981 and 2000. There is also the possibility of larger fluctuations in the cherry blossom period.³ Historically, the blooming of cherry trees has always been deeply intertwined with Japanese life, employed in virtually everything from agriculture to tourism. The shift in the cherry blossom season could alter the very way that Japanese people feel about the seasons.