The National Institute of Biological Resources successfully restored the hardy yellow hibiscus, a class II endangered species

10:30 AM, Tue, Aug. 2, 2022, Director of Plant Resources Division of the National Institute of Biological Resources Kang Jae-sin (Ministry of Environment)

Hello. My name is Kang Jae-sin from the Plant Resources Division at the National Institute of Biological Resources (NIBR).

I will give a briefing on the successful restoration of the hardy yellow hibiscus.

NIBR has conducted a joint study with the research team of Professor Kim Sang-tae of the Catholic University of Korea (CUK). We analyzed the genetic diversity of the hardy yellow hibiscus populations, a class II endangered species, in their original habitat and restoration site. Their genetic diversity has been verified to be in a good state in both areas.

The hardy yellow hibiscus, whose botanical name is "hibiscus hamabo," is a shrub in the Hibiscus genus native to Korea. Also falling under the mallow genus, this has the same genus as our national flower, Hibiscus syriacus. You might already get a hint from the name of hibiscus; the hibiscus tea we drink has the same genus as well.

The hardy yellow hibiscus is a species of shrub that is short yet grows outwards, and its height ranges from 1 to 5 meters. Its gorgeous yellow flowers grow about 5 cm in width. They are the most beautiful at this time of the year in Jeju-do. They begin to bloom between June and August and are mostly found in cymes or leaf axils. They are known to grow on basalts of the coastlines.

The hardy yellow hibiscus inhabits very limited areas in South Korea, such as Jeju-do and Wando-gun, and Goheung-si of Jeollanam-do. Meanwhile, in other countries, they mostly grow in areas with warmer climates, such as Kyushu or Okinawa in Japan and Taiwan.

The species significantly reduced population size as South Korea built more coastal roads and tourist attractions, destroying their habitat. The Ministry of Environment designated the plant as a wild plant requiring attention in 1989. Later in 1998, the species was designated as an endangered wild plant. Since 2005, the Ministry of Environment has designated the species as a class II endangered wild plant for intensive protection.

NIBR has put efforts into restoring the hardy yellow hibiscus in Korea. Since 2013, we have collected seeds from its habitats in Pyoseon-ri, Seogwipo-si of Jeju-do, which germinated and proliferated. We donated 4,200 seedlings to Seogwipo-si and planted 4,000 seedlings throughout Songaksan Mountain and Hallim-eup in 2017.

The Jeju Native Plants Society, a private group based in Jeju-do, made the first move to restore the species of Hibiscus hamabo. Then, Yeomiji Botanical Garden, Dadohaehaesang National Park, NIBR, and many other private organizations and government agencies put various efforts into preserving the species.

As a result of our efforts, we have witnessed changes in the population and geographic range of the hardy yellow hibiscus. Until 2007, the species only inhabited two small areas in Jeju-do, in the east and southern parts of the island. The data until 2020 indicates that there are many more species' habitats and populations. We have several successful cases, as you can see here.

To evaluate our restoration of the species, our research team has analyzed the genetic diversity of populations of the hardy yellow hibiscus from 13 sites in Jeju-do and Southern coastal lines of Korea since June last year.

In both groups, natural habitats and restoration sites, their genetic diversity was measured at the similar level of 0.5. It signifies that their genetic diversity is relatively high. Generally, we range the genetic diversity index from 0 to 1. Anything above 0.5 is considered high diversity. The natural habitat and restoration site populations had roughly 0.5 and 0.499, respectively, meaning they retain generally high genetic diversity.

You can also tell from this genetic diversity analysis graph. We analyzed 96 individuals and 13 populations. Each dot represents each sample. The widely spread dots mean that the plant has been restored with high genetic variation in local sites.

Our artificially restored population also shows similar traits. Their outcomes are identical to those of the natural population. All of these indicate a successful proliferation. The seed setting rate is an index that indirectly shows that artificially restored species have been stably spread in the ecosystem. These data prove that the species is less likely to become extinct.

Moreover, we submitted the study report to the Ministry of Environment for them to use in their effort to update the endangered species list in 2022. The ministry prepared a delisting proposal for the hardy yellow hibiscus and held a public hearing on July 5.

The restoration of the Hardy Yellow Hibiscus is a successful case of restoration of an endangered plant species through a collaboration between private and public sectors. NIBR plans to expand our research scopes to understand better the characteristics of various organisms under the threat of extinction, analyze their genetic diversity, and restore each species to preserve them for the future.

It concludes my briefing today.

[Q&A]

<Q>

Here's my question. The internet says that Hibiscus hamabo is the only native species to Korea among the entire Hibiscus genus. Please provide us some explanations on whether this indicates that our national flower, Hibiscus syriacus, is an exotic species and that Hibiscus hamabo is, in fact, the only species native to Korea.

<A>

Yes, Hibiscus syriacus is the national flower and is more of a cultivated species than a native species. They are listed on the national wildlife species of Korea, but they are actually cultivated species.

<Q>

Do you mean that Hibiscus hamabo is the only native species?

<A>

Yes, as for now, Hibiscus hamabo is the only species native to Korea.

<Q>

Let me add some more questions. The reason why they inhabit such limited areas is because they are either tropical or subtropical plants?

Then, let me go to the part where you mentioned the genetic diversity index. There is the "native and restored population" aside from the "native population" and the

"restored population ."Is this because they are a mixed population?

<A>

Please allow me to offer a more detailed explanation. About your first question, my answer is yes.

The restored population in your second question is cultivated close to the population where we collected the seeds. The restored population then inhabits the area mixed with the native population. Here, we can naturally have a mixed population.

<Q>

(Host) Here are some questions we received online. We have one, and it is from a reporter from the Kyunghyang Shinmun. "How do you restore a species to raise their genetic diversity index? Is there a problem if the figure is too high or too low?"

<A>

(Host) Here are some questions we received online. We have one, and it is from a reporter from the Kyunghyang Shinmun. "How do you restore a species to raise their genetic diversity index? Is there a problem if the figure is too high or too low?"

<A>

A species of an organism with a "low genetic diversity index" is clearly more vulnerable to diseases and insects. A species with a higher diversity index is more likely to be preserved.

Therefore, we must manage them in such a way as to raise their diversity index. However, suppose the population of a native species is too small, and their restored

population is planted along a mountain range. In that case, it is less likely that they will have sufficiently high genetic diversity.

When planting a species for restoration, we determine the most optimal method to raise their genetic diversity. It also means that different populations of the species can mix their genetics. Some species may take some time to increase, so we select an adequate method for them.

Thank you.

<The End>