

Preserving the *Manabe no Sakura* cherry trees for future generations
World First¹ in Propagating a Yoshino Cherry Sapling Using Tissue Culture

Sumitomo Forestry Co., Ltd. has, at the request of Tsuchiura City (Mayor: Kiyoshi Nakagawa) and the Society for the Preservation of *Manabe no Sakura*² (Chairperson: Kazue Kikuta), conducted research and development in relation to the breeding of saplings for the purpose of protecting and preserving the *Manabe no Sakura* cherry trees (Yoshino cherry), a group of trees planted on the grounds of Manabe Elementary School (Principal: Takashi Hirohara; Address: Manabe, Tsuchiura City, Ibaraki Prefecture) and designated by Ibaraki Prefecture as a protected species. On this occasion, Sumitomo Forestry succeeded in the world's first propagation of the Yoshino cherry by means of tissue culture, a biotechnological technique.

The *Manabe no Sakura* cherry trees are a variety of the *sakura* (Japanese cherry) called "Yoshino cherry" (*Somei Yoshino* in Japanese), one of the symbols of Japan. The trees were planted by graduates from the elementary school in 1907. This year marks 108 years since being planted, which means that they are one of the oldest of this variety, second only to the *sakura* planted in Hirosaki Park in Aomori Prefecture.

Previously, the Yoshino cherry had generally been propagated by grafting.³ The success in propagating a sapling by means of tissue culture is a world first.



Manabe no Sakura cherry trees
designated by Ibaraki Prefecture as a protected species

About the *Manabe no Sakura* cherry trees

The five *Manabe no Sakura* Yoshino cherry trees planted in 1907 by graduates of the Manabe Elementary School were initially planted in a corner of the school yard, but after several extensions to the campus, they now occupy a central position.

Even now, more than 100 years since being planted, they produce beautiful blossoms in spring, and are visited by many students of the school, as well as their families and the general public alike as a place well known for beautiful cherry blossoms. In 1956 and 2002, the trees were designated by Ibaraki Prefecture as a protected species.

Furthermore, since 1982, the school has held a cherry-blossom-viewing assembly, organized by the children, to welcome new students to the school. It has become customary for the new class of sixth graders to carry the first graders piggyback and do a lap around the cherry trees. This event is highlighted every year on the television and in newspapers.

Developments leading to propagation by tissue culture

It is said that the Yoshino cherry was developed during the late Edo period in Somei Village (present-day Komagome in Toshima Ward, Tokyo Prefecture), and was spread to all parts of the country by means of grafting propagation. In recent years, the root function of these Yoshino cherry trees planted in each region has become significantly impaired by the surrounding ground being paved over for roads or by the soil being trodden down by cherry blossom viewers, and there are concerns that the trees will wither or that their life span will be shortened. On the other hand, however, it has been found that the Yoshino cherry will live for more than a century if planted in a spot with good sunlight and good soil drainage. In particular, cases like the *Manabe no Sakura* cherry trees, where there is a group of five Yoshino cherry trees each more than 100 years old, is extremely rare, and so they are also a valuable sample for researching about growing Yoshino cherry trees.

For the purpose of passing down these valuable cherry trees to future generations, Tsuchiura City and the Society for the Preservation of *Manabe no Sakura* submitted a request for technical cooperation to Sumitomo Forestry with its various arbor technologies concerning tissue culture and seedling production. On receiving this request, Sumitomo Forestry's Tsukuba Research Institute set about researching and developing technologies for

propagating the *Manabe no Sakura* cherry trees using this technical know-how, and was successful in propagating a sapling using tissue culture.

It is said that the seedlings propagated using tissue culture stand a good chance of “juvenilizing” (blastogenesis) relative to the age of the subject trees. In addition, given that there is also less infection to insect pests, the technology has promise as being the best technique for protection and preservation.

Future initiatives: Donating *Manabe no Sakura* cherry trees as a way of supporting the rebuilding of areas affected by the Great East Japan Earthquake

Besides protecting and preserving the *Manabe no Sakura* cherry trees, there is also a plan for these seedlings propagated using tissue culture to contribute significantly to maintaining the landscape and carrying on the culture of Tsuchiura City and Manabe Elementary School. The Sumitomo Forestry Group and Tsuchiura City will continue to carry out surveys and research on the growth of the *Manabe no Sakura* cherry trees. In addition, they will strive to protect the culture of the Manabe Elementary School for posterity so that it can be enjoyed by all.

There are also plans for the propagated cherry tree saplings to be donated through the Society for the Preservation of *Manabe no Sakura* to places that were affected by the Great East Japan Earthquake such as Rikuzentakata in Miyagi Prefecture.

1. Search of sites providing access to academic materials: Web of Science / Google Scholar / J Dream III
2. Organization established in 2008, centering around graduates of Manabe Elementary School, for the purpose of protecting and preserving the *Manabe no Sakura* cherry trees
3. Technique of taking two or more plants and making them into one by attaching one to an artificially slit section of another

Propagating saplings from old Yoshino cherry trees

Recently, information is being received from people in the industry that cherry trees with different shaped or colored blossoms from Yoshino cherries are being distributed as “Yoshino cherry trees.” For the purpose of ensuring that the genes of the Yoshino cherry, which determine the native shape of this valuable variety, are carried on, the Sumitomo Forestry Group began work for protecting and preserving it. In specific terms, instead of propagating from a young Yoshino cherry which is at risk of being different in character to the original Yoshino cherry tree having been propagated several times already, because Yoshino cherry trees of about 100 years in age are more likely to have been propagated from the original tree, it was decided to locate these trees in different regions of Japan, to examine their respective DNAs, and to propagate saplings from them. The old Yoshino cherry trees that were selected have been designated as standard trees for each region, and there are plans to produce grafted seedlings using the saplings propagated from these old trees as the stock. By doing so, not only will protection be given to the character of the Yoshino cherry, which is valuable both horticulturally and culturally, but because the trees will be provided added value as character-confirmed Yoshino cherries, they should also contribute to development of seed and seedling production in each region. Thus far, DNA identification of old trees has been completed for the *Manabe no Sakura* cherry trees in the Kanto area, the “Iwateken-Otsuchicho no Sakura” in Tohoku, and the “Daigoji no Somei Yoshino” in Kansai, and going forward, it is hoped standard trees will also be selected in various other areas including Kyushu, Chugoku, Shikoku and Hokuriku.

Sumitomo Forestry also plans to begin providing advice on the propagation of historic trees and old trees nationwide based on the technologies developed in this initiative.

For further details, please contact the division in charge: Forest and Landscape Research Center (<http://sfc.jp/flrc/>).

Past activities of the *Manabe no Sakura* Research Project

2012	March	Request received by Sumitomo Forestry from the Society for the Preservation of <i>Manabe no Sakura</i> concerning the tissue culture propagation of the <i>Manabe no Sakura</i> cherry trees
2012	April	“Tissue Propagation Permit” issued by Tsuchiura City to the Society for the Preservation of <i>Manabe no Sakura</i> and Sumitomo Forestry Work begins on propagating the <i>Manabe no Sakura</i> cherry trees
2012	May	Prunings collected as material
2014	January	Success achieved in propagating saplings using tissue culture
2015	March	Check of all culturing conditions completed and confirmed

Overview of propagation using tissue culture [workflow]

- (1) Collect winter buds, and from them use a microscope to extract only the meristematic tissue of the shoots (shoot apex).
- (2) Transfer the shoot apices to test tubes, pour in a culture solution developed for the *Manabe no Sakura* cherry trees, and cultivate vertically using the roller tube method to produce a large quantity of shoots (multiple shoots).
- (3) Grow long shoots from the multiple shoots by cultivating the multiple shoots in a solid medium.
- (4) Divide the large quantity of long shoots into individual shoots, and transplant them into artificial compost with an added culture solution to encourage the shoots to take root. The shoots will take root in about 4 weeks, reproducing a whole plant (seedling). The steps to this point are conducted under sterile conditions.
- (5) Cultivate the seedlings in a greenhouse to acclimatize them to outside conditions (acclimatization process).



Prunings collected as material

Use a microscope to extract only the meristematic tissue (shoot apex) from the shoots



Multiple shoots (3rd month of culture)



Seedlings planted in artificial soil
(6th month of culture)



Seedlings removed from their sterile beakers

About Sumitomo Forestry

Founded in 1691, Sumitomo Forestry Co., Ltd. and its Group companies have broadened business activities focused on wood. Based on its corporate philosophy—“utilize timber as a renewable, healthy and environmentally friendly natural resource, and contributes to a prosperous society through all types of housing-related services”— and with its approximately 250,000 hectares of owned and managed forest, the global network that spans more than 20 countries and expertise and technology in housing-related businesses, Sumitomo Forestry Group is developing the Forestry and Environment Business, the Timber and Building Materials Business, the Housing Business, the Overseas Business, the Lifestyle Service Business and other businesses both in Japan and abroad. Adding such businesses as wooden biomass power generation and Timber Solution, it will continue to pursue the potential of timber.

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