Expectations for Cloning Technologies

Masaharu Higuchi, Senior Managing Director
Research Institute of Innovative Technology for the Earth (RITE)

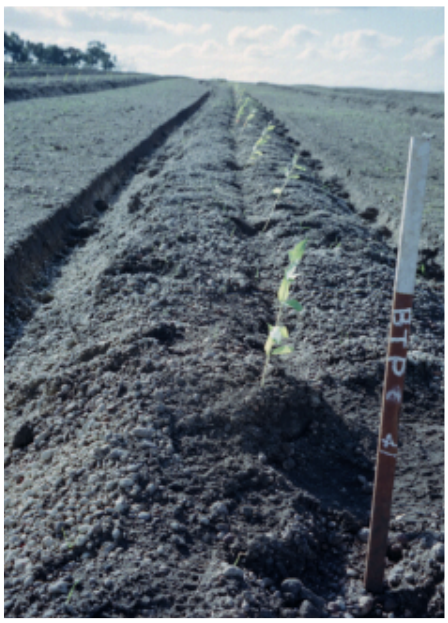
Near the end of July 2005, about 24,000 eucalyptus seedlings produced using advanced cloning technologies were planted on the outskirts of Collie, a small city located about 200 km south of Perth in Western Australia.

The Research Institute of Innovative Technology for the Earth (RITE) has undertaken these plantation activities for a test that comprises a part of a "Large-scale CO_2 Fixation Afforestation Technology Development Project" in arid regions, which has been implemented through a grant from the Japanese Ministry of Economy, Trade, and Industry. The goal of the test, which is being conducted with the full cooperation of the Nippon Paper Group Inc., is to plant 24,000 seedlings – raised from "elite" Eucalyptus globulus trees sampled from the Collie area – in a 30-hectare arid region with an annual rainfall of 600mm, and to verify the resistance of the trees to aridity and salt damage.

In ten years, the planted seedlings will grow into huge trees measuring 23-26 meters in height, with a breast height diameter of 23-25 cm (a timber volume of 1.5 times that of normal eucalyptus trees). Through this process, the trees will enable the fixation of huge volumes of CO_2, and at the same time will provide raw materials for paper pulp.

We were impressed by the rather reserved comments made by Mr. T, the on-site representative from Nippon Paper, who said: "There are many researchers in this field, but amid the shift to research in high-tech fields (gene manipulation), which are always a topic of lively discussions, we have finally achieved these significant results through slow and steady research using 'low-tech'. (cutting and grafting)"

In order to conduct research targeting genetically-modified plants in an outdoor environment, it is necessary to first complete various procedures stipulated by the Cartagena Protocol on Biosafety, which governs the protection of biodiversity by regulating the use of genetically-modified plants. It takes a considerable amount of time to gather the necessary data on the plants being raised and to apply for the necessary authorizations. As a result, some people working on-site have been heard to say that "it is extremely difficult to apply the most recent research results quickly at the site, and to find ways of making improvements based on actual observations at the site."



There are great expectations for reforestation through planting in arid regions as a means of preventing global warming, and the development of seedlings that can grow in inhospitable environments is considered an urgent issue. In a field such as afforestation research, where it is essential to use a steady and empirical approach over the course of many years, it is thus extremely important to find a way to overcome these types of time limitations.

Given the above situation, we expect that research methods based on cloning technologies (cutting and grafting technologies), which we have been using for many years and which can be used safely on the site, will contribute dramatically to the resolution of these issues, particularly given the ability to put these methods into practice quickly (i.e., their applicability in afforestation regions).

Regrettably, very few people are aware that these cloning technologies are already being put to use in the recovery of valuable old Japanese cherry trees (sakura).

There is only one "Uwamizu Sakura" remaining on the grounds of the Hono Ikazuchi Shrine in Katsuragi, a historic shrine that appears in "Ceremonies of the Engi Era," written in the early 10th Century. During the Great Thanksgiving Festival that was held after the enthronement of a new Emperor, this Sakura tree was used in a ceremony for deciding which field would grow the crops that would be presented to the Emperor's family.

As this irreplaceable tree grew older and its deteriorating health became quite noticeable, the head priest at the Hono Ikazuchi Shrine began looking for a way to ensure that this tree would remain for future generations. The latest cloning technologies have been put to use in fulfilling this request, and as a result, eight young seedlings that have been nurtured since the spring of this year are now anxiously awaiting transplantation.

The grandson of that priest, who only just recently took over responsibility for this historic shrine, appeared relaxed and hopeful as he said, "My role is to pass on this great tree, and the other trees surrounding the Hono Ikazuchi Shrine, to future generations."

The era of unlimited trust and expectation in science and technology has passed, and has been replaced by a more coolheaded view of the positive and negative aspects involved. This view has brought about a growing demand for steady and accurate clarification of phenomena that do not offer second chances. These tree cloning technologies, which have been recognized as being somewhat "low-tech" in comparison to gene manipulation, but at the same time have already achieved a high degree of familiarity, will play an important role in afforestation efforts, particularly in terms of allowing the results of the latest technological advances to be quickly accepted by society.