New cherry blossom cultivars induced by C-ion beam irradiation

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A new color cherry blossom with pale-yellow flowers, 'Nishina Zao' was created by irradiating the greenish 'Gyoiko' scions with C ions.[1] It became the first plant to be registered under the Seeds and Seedlings Law by RIKEN a decade ago. Another cultivar of the cherry blossom tree, 'Nishina Otome' does not require a certain period of cold winter weather to induce flowering in the spring.[2] The winter temperatures have not been sufficiently low due to the global warming in recent years. This climate change has resulted in a decrease in the number of cherry blossoms in spring. These two cultivars are propagated clone plants of the mutant branch. We have succeeded in creating three new cherry blossom cultivars by irradiating cherry scions with C ions. With the original cultivars, 'Shungetsuka' and 'Beniyutaka', it is difficult to obtain seeds with germination capacity. The irradiation treatment on scions increased the germination rates of seeds from 0.5 to 12% and 0 to 56%, in 'Sungetsuka' and 'Beniyutaka', respectively. Three new cultivars were selected from the progeny plants of the irradiated plants.

'Nishina Haruka' and 'Nishina Komachi'

'Shungetsuka' is a Japanese ornamental cherry cultivar having double flowers (ϕ 3–3.5 cm) with 21 to 50 petals. Its scions were irradiated with carbon-ions (135 MeV/u, LET 22.6 keV/μm) at the doses of 5, 7.5, and 10 Gy. The irradiated scions were grafted on rootstocks. Twenty of the irradiated plants showed no change in their flower color and shape in 2008. Subsequently, we attempted natural crossing between irradiated plants from 2008 to 2009. Plants irradiated at a dose of 5 Gy showed good growth and bore 300 – 500 cherries per plant. The original cultivar 'Shungetsuka' bears cherry fruits with low germination capacity. Specifically, only 23 plants were grown from approximately 5000 cherry seeds of the original cultivar. On the other hand, 296 plants were grown from approximately 2500 cherry seeds from the fruits borne by the irradiated plants. The progeny plants bloomed in 2012, and the characteristics of the mutant lines were confirmed to be stable. We produced two new cultivars, named 'Nishina Haruka' and 'Nishina Komachi', from the mutant lines irradiated at 5 Gy. 'Nishina Haruka' had double flowers (ϕ 4.1–4.2 cm) with 23 to 25 petals: they were 1.3 times larger than the flowers of the original cultivar. This cultivar also bore sweet cherries (ϕ 1cm). 'Nishina Komachi' had small single flowers (ϕ 1.3–1.4 cm) with five petals, which do not open fully. These two cultivars were submitted for cultivar registration in September 2012.

'Nishina Tomoka'

'Beniyutaka' (*Prunus lannesiana*) has double flowers (ϕ 5 cm) with 15 – 20 petals. Its scions were irradiated with carbon-ions (135 MeV/u, LET 22.6 keV/μm) at a dose of 10 Gy in 2005. The irradiated scions were grafted on the rootstock. No change was observed in the flower color and shape of the three irradiated plants in 2007. Even though the original cultivar 'Beniyutaka' does not bear cherries, one of the irradiated plants bore 9 cherries. We sowed the seeds from these cherries. Of these nine seeds, five germinated. Three of these germinated seeds grew into progeny plants that bloomed in 2011. One mutant line, named 'Nishina Tomoka', had single flowers (ϕ 3.2–3.6 cm) with 5 petals. The rim of its flowers was deep pink. 'Beniyutaka' was bred in the Hokkaido area because the cold region was suitable for its cultivation. However, 'Nishina Tomoka' showed good growth even in the relatively warmer Shizuoka Prefecture. This cultivar was easy to propagate by cuttings, and was submitted for cultivar registration in September 2016.

Fig. 1. Flowers of new cultivars.
(a) Nishina Haruka, (b) Nishina Komachi, (c) Nishina Tomoka

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References

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