Breeding Diploid New Variety from Tetraploid Cyclamen persicum Victoria Through Anther Culture©

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Recently in Japan market demand for cyclamen (*Cyclamen persicum*) has shown a preference for plants in small pots (under 12 cm) over large (over 18 cm) pots.

In cyclamen, most of the flower characteristics such as bicolor, stripe, and fringe are restricted to tetraploid cultivars. Currently, the suitable cultivars for small-pot production are not tetraploids but diploids because of plant size. In addition, it is reported that the cross between tetraploid and diploid forms is very difficult in *Cyclamen*; even if it is successful at setting seeds, all of them are triploid. We have confirmed this by our experience and hybridization tests also.

Since 1994, we, Snow Brand Seed, have been breeding and developing micropropagation techniques for *Cyclamen*. We use anther culture in *Cyclamen* breeding, especially to produce diploid from tetraploid cultivars such as 'Victoria'. In addition, we are breeding F1 cultivars using such diploids. Here, we illustrate two diploid clonal cultivars which we have successfully developed from tetraploid cultivar 'Victoria' through anther culture.

Five plants were obtained through anther culture of one tetraploid 'Victoria' (individual code CV1), and they bloomed in 1998. From them we have selected the best one which has a fringed bicolor flower and good plant shape. We carried out propagation by tissue culture, and finally in 2000, we have confirmed the uniformity and

Figure 1. *Cyclamen persicum* 'Primo' a new diploid cultivar through anther culture directly from tetraploid 'Victoria' . Pot size is 15 cm.

Figure 2. Difference of flower and plant size. Center: *Cyclamen persicum* 'Primo' in 15-cm pot. Left: Tetraploid 'Victoria' in 15-cm pot. Right: Common diploid miniature cultivar 'White with Eye' in 9-cm pot.

Figure 3. *Cyclamen persicum* 'Marinara' a new diploid cultivar from selection of F1 generation between diploid 'Victoria' and common diploid medium-sized cultivar. Pot size is 10.5 cm.

Figure 4. Difference of flower and plant size. Center: *Cyclamen persicum* 'Marinara' in 10.5-cm pot. Left: Tetraploid *C. persicum* 'Prologue' in 15-cm pot. Right: Common diploid miniature cultivar 'White with Eye' in 9-cm pot.

stability of the clone. This diploid cultivar 'Primo' (Fig. 1) has as large a flower as tetraploid 'Victoria', but the numbers of flowers and leaves are more than 'Victoria' (Fig. 2). Since the leaf size is smaller, we think this cultivar is suitable for 12-cm to 15-cm pot production.

Thirteen plants were obtained through anther culture of one tetraploid 'Victoria' (individual code CV5), and they bloomed in 1998. From them, as pollen parent, we selected one diploid plant, which is strongly fringed and a clear bicolor flower. We crossed the pollen parent with a white medium-sized flower (an ordinary diploid form) and easily obtained seeds. We obtained 39 flowering plants from these seeds (F1) in 1999. Out of these 39 plants, we selected the best one with a good flower and a compact plant habit (Fig. 3). Finally the uniformity and stability by tissue culture was confirmed in 2001.

This diploid cultivar, 'Marinara', is compact in size (Fig. 4) and its growth is faster than tetraploid 'Victoria'. This cultivar is suitable for 9-cm to 12-cm pot production.

In a previous report (Fuwa et al., 2000), we have introduced the concept of production of *Cyclamen* tubers from somatic embryos. By utilizing the system of *Cyclamen* microtuber production we are planning to supply clone seedlings of these two cultivars for commercial pot production.

In addition, we are breeding more compact F1-seed cultivars of 'Victoria'-type cyclamen. These will be suitable for 8-cm to 9-cm pot production.

LITERATURE CITED

Fuwa, N., A. Kuboki, K. Okawa, Y. Tahahashi, T. Fujita, K. Sugimura, and **T. Kadowaki.** 2000. Production of tubers in cyclamen from somatic embryos. Comb. Proc. Intl. Plant Prop. Soc., 50:678-680.