GA treatment for better flowering of Cymbidium

Cymbidium is a cool-season flower, unlike other orchids. Its optimum growth temperature is known to be 20-25°C. In the far-east Asian countries like Korea, Japan, and the northern parts of China where there are four distinct seasons, the worst growth limiting factor is the high temperature in summer. Therefore, many farmers in the region transport the blooming cymbidium to the alpine area, which is over 800 meters above sea level, in the hot summer season.

This cropping practice of moving the plants to the alpine area has many disadvantages economically. Transportation of crops and equipment is costly, and management of the crops in the alpine area is difficult. There also occurs some crop loss during the transportation.

A new cropping technique using Gibberellic acid (GA) was developed to prevent cymbidium from blinding or blasting due to high temperature in summer. The technique is a good alternative to the shuttle culture between lowland and alpine areas to produce high quality cymbidium.

Materials and Methods

Cymbidium used for this study was cv. Fortissimo 'Pianist' (Gawano Mericlone Co., LTD., Japan) (Fig. 1), a 2-year-old seedling planted in plastic pot with a diameter of 14.5 cm.

GA treatment was done by inserting cotton wool with 0, 25, 50, 100, 150, and 200 mg·L^{-1} GA_3 solution between the pseudo-bulb and the flower stalk when it reached 2-3 cm in July and August (Fig. 2).

Results

The gibberellin treatment was an effective method not for leaf growth, but for pseudo-bulb growth. The diameter growth of the pseudo-bulb was highest in the treatment

Fig. 1. *Cymbidium* spp. cv. Fortissimo 'Pianist'

Fig. 2. GA_3 treatment of cv. Fortissimo 'Pianist'

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with 100 mg·L^{-1} GA (Table 1). This result was consistent with Ohno's finding (1991) that GA treatment was able to substitute for the low temperature requirement by alleviating the high temperature stress.

The growth of flower stalk was good at 100-150 mg·L^{-1} GA treatments (Fig. 3). The number of flower stalks by GA treatments increased until the middle of the growing period. The development of flower stalk was accelerated by the GA treatments in the early stage, but there was little difference among the treatments in the latter period. Flowering was also accelerated by 18 days in the GA treatment of 150 mg·L^{-1} compared to the control. In the overall growth and flowering of cv. Fortissimo 'Pianist', GA treatment of 150 mg·L^{-1} was found to be the most effective.

Benefits

From the study, it was found that GA can be used to stimulate flowering of cymbidium, enabling more flower induction and earlier flower harvest. The GA treatment can substitute for the shuttling practice to the cooler region during the summer season. Estimated economic benefits in Korea with increased number of flower stalks is US$ 4/pot, while the reduction in the cost of fuel and labor is US$ 8,500/ha^{-1} per farm per year.

Precaution

This technique may not be applicable to other varieties, as the response of the varieties to GA is known to be variable. Thus, it is recommended to conduct a preliminary testing of optimal GA concentrations with other varieties.

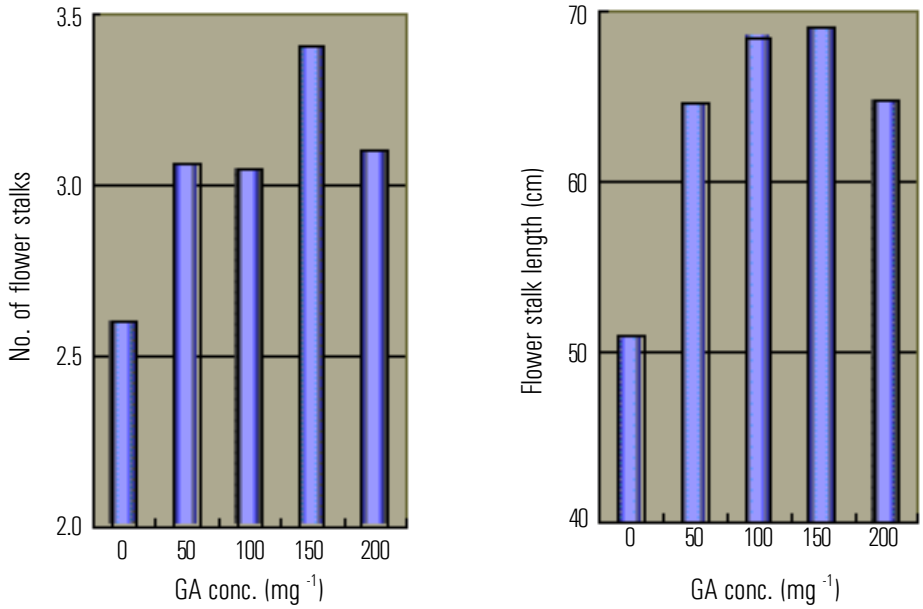

Fig. 3. Number of flower stalks and flower stalk length by GA_3 treatments in cv. Fortissimo 'Pianist'

Table 1. Effects of GA_3 treatments on the growth and flowering of cv. Fortissimo 'Pianist'

Treatment (mg GA·L^{-1})	Pseudo-bulb width (cm)	Floret width (cm)	Flowering date (m/d)	Shortened days to flowering
0	3.8	8.5	Jan. 20	
50	4.3	9.8	Jan. 13	7
100	4.8	9.5	Jan. 15	5
150	4.6	9.8	Jan. 02	18
200	4.6	9.5	Jan. 13	7
LSD $_{.05}$	0.6	0.9		