Some topics of cultivation and postharvest in *Narcissus tazetta* for Cha-Bana

Yasuhiko Koike and Go Hirai

Faculty of Agriculuture, Tokyo University of Agriculture, Funako 1737, Atsugi, Kanagawa, 243-0034, Japan
Correspondent email: koike@nodai.ac.jp

Summary

Narcissus is a major horticulture crop. Spcies and cultivars are found growing in every corner of the world, except the tropics. *N. tazzeta* is Mediterranean in origin. Interestingly, a narrow band of *N.tazzeta* grows naturally into China and Japan. It is postulated these were distributed, planted, and spread along ancient trade routes.Cut the flowers when the first floret is sully colored. If they must be stored, place them upright and store dry at 0-2℃. Advise wholesalers and retailers to market *N. tazzeta* when the first flower is fully colored. Cut flowers should be placed in the coolest part of the home in order to maximize their vase life. Potted *N. tazzeta* was marketed when shoots are 20-25 cm all and the flowers are visible. Do not wait until they begin to show color. If plants must be stored, place them at 5℃with the planting medium ,moist. Homeowners should keep the plants in the coolest area of the home in order to obtain maximum satisfaction. Consumers can plant *N. tazzeta* in the garden after they have finished flowering.

Introduction

N. tazetta var. *chinensis* spread from Southern Europe and Siberia via Iran and Northern India to China and Japan, where it became established as a native species, purportedly because of the fertility of this flower. In Japan this flower can be found growing wild in Echizen, Awaji and Boushu, where it has been harvested and shipped after flowering under natural conditions. The height of the flowering season is December to January, but there are hopes of bringing the shipping period forward to autumn.

Physiology of Growth and Flowering

1.1 Annual growth and growth habit

The flower buds of Tazetta narcissi such as *N. tazetta* var. *chinensis* begin differentiating from mid July and reach Stage Pc (initials of paracorolla visible) in mid September (Figure 1). Growth is rapid after bud differentiation, and under natural conditions in warm regions *N. tazetta* var. *chinensis* flowers from December, while *N. tazetta* ssp. *aureus* or ‘Grand Soleil d'Or’ flowers from January to February.

1.2 Conditions affecting flowering and control

1.2.1 *Conditions affecting flower bud differentiation*

When bulbs of *N. tazetta* var. *chinensis* are kept in dry storage from mid June after harvesting, at 20ºC there is no flower bud formation, at 25ºC some bulbs fail to reach bud differentiation, and at 30ºC or room temperature buds form on most bulbs. However, in storage from mid July most bulbs produce buds even at 20ºC. Buds also form after bulbs are moved to 20ºC following storage for 3 weeks at 30ºC, so it appears that exposure to a high temperature of 30ºC for about 3 weeks is necessary before bud differentiation begins (Koike, *et al*. 1994).

Bud differentiation and growth can be promoted by treating bulbs with smoke produced from chaff, or with ethylene, the active component of this smoke. Such treatment also increases the flowering rate of small bulbs. However, the benefits of ethylene gas treatment diminish with increased length of treatment, so it is best to keep to 3-5 hours of ethylene or smoking treatment per day , repeated for 2-4 days to be on the safe side (Imanishi, *et al*. 1983).

After exposure to high temperature, bud growth is most rapid in storage at 20ºC or 25ºC. Growth is also good at 30ºC, and is at its slowest at room temperature when daytime temperature approaches nearly 35ºC. Few bulbs produce buds at 15ºC, and there is no bud formation at 13ºC.

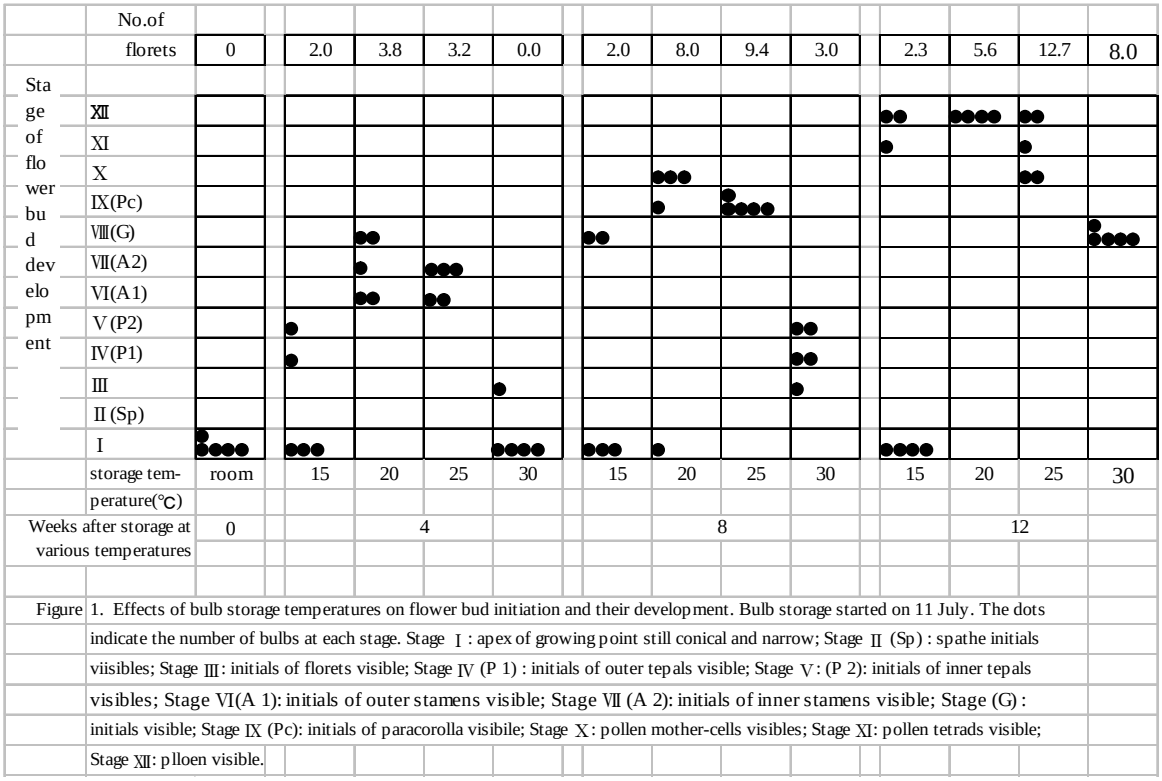


Figure 1. Effects of bulb storage temperatures on flower bud initiation and their development. Bulb storage started on 11 July. The dots indicate the number of bulbs at each stage. Stage Ⅰ: apex of growing point still conical and narrow; Stage Ⅱ (Sp): spathe initials viisibles; Stage Ⅲ: initials of florets visible; Stage Ⅳ (P 1): initials of outer tepals visible; Stage Ⅴ: (P 2): initials of inner tepals visibles; Stage VI(A 1): initials of outer stamens visible; Stage Ⅶ (A 2): initials of inner stamens visible; Stage (G): initials visible; Stage Ⅸ (Pc): initials of paracorolla visibile; Stage Ⅹ: pollen mother-cells visibles; Stage Ⅺ: pollen tetrads visible; Stage Ⅻ: plloen visible.

1.2.2 *Flowering conditions*

When cultivating *N. tazetta* var. *chinensis* bulbs at various temperatures after reaching Stage Pc, it has been found that flowering is most rapid at a daytime temperature of 20ºC and night-time temperature of 17ºC. Flowering also occurs at 15ºC/12ºC, but not at a constant 25ºC (Koike, *et al*. 1994). Because *N. tazetta* var. *chinensis* achieves flowering at 17-20ºC, as seen above, it does not require preliminary exposure to low temperature for flower bud growth and elongation, unlike the trumpet narcissus and long-cupped narcissus.

In summary, the characteristic of Tazzeta narcissi is that bud is induced by a high temperature, and 25ºC to 20ºC is ideal for subsequent bud growth and a slightly cooler 20-15ºC until flowering, indicating the optimum conditions for flowering are a gradual decrease in temperature from warm to cool.

1.2.3 *Control techniques and practicalities*

Flower bud differentiation is induced by exposure to high temperature of 30ºC for about 3 weeks. Afterwards, bud differentiation and growth are further promoted by smoking or ethylene treatment. This treatment should be for 3-5 hours each day and repeated for 2-4 days. To promote bud growth and obtain good quality cut flowers with numerous florets, after treatment bulbs should be stored at 25ºC until Stage Pc, and thereafter at 20ºC.

2. Cultivation type and regulation of flowering

Cultivation methods used are forcing cultivation, conventional cultivation and retarding cultivation (Figure 2).

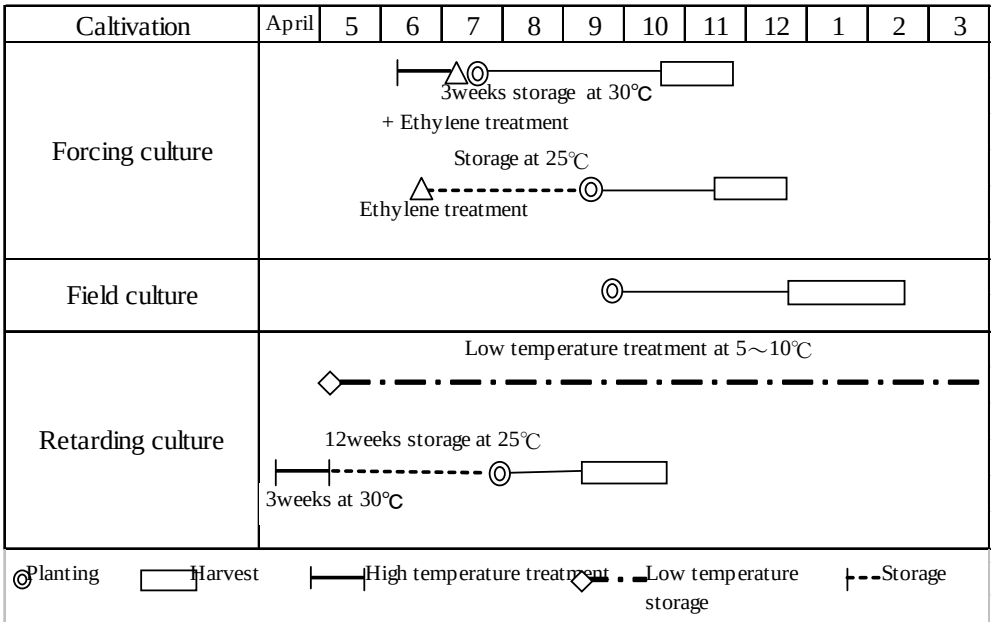


Figure 2. Cultivation of *Narcissus tazzeta* var. *chinensis*

2.1 Forcing cultivation

2.1.1 *Flowering in mid- to late October*

Because *N. tazetta* var. *chinensis* requires exposure to high temperature for flower bud differentiation, the bulbs are dug up in early May and then, after the leaves have died back treated for 3 weeks at 30ºC. This is followed either by immediate planting or planting after dry storage at room temperature until mid July. Flowering then occurs in mid to late October, with a high flowering rate of 88% to 100%.

If digging is brought forward to April, flowering can be achieved in September, but with a low flowering rate. Also, high temperature treatment becomes more effective the higher the temperature above 25ºC, but bulbs are easily damaged at or above 40ºC. Treatment for 3 weeks at 35ºC is therefore considered ideal for early flowering, or treatment for 3 weeks at 30ºC for normal flowering.

2.1.2 *Flowering in November*

For shipment in October and November, bulbs are dug up in mid May, then treated at 30ºC for 3 weeks. Smoking or ethylene treatment is then carried out to promote flower bud differentiation and growth and hasten flowering. Bulbs are planted after storage at room temperature until mid to late July. After planting, the beds are covered with straw or the like. It is important to keep the soil as cool as possible, for example by using cheesecloth as a sunshade to prevent heat and dryness in the intense summer sun.

2.1.3 *End of year flowering*

For shipment at the end of the year, the excavated bulbs are treated by smoking or ethylene in late June to promote flower bud differentiation and growth. The bulbs are then either stored at about 25ºC through summer and planted in the cooler autumn, or planted immediately in soil kept at a low temperature.

2.2 Retarding cultivation

In retarding cultivation the bulbs are kept at a low temperature before flower bud differentiation begins, then stored dry (Yahel, 1986).

N. tazetta var. *chinensis* can be stored at high temperature of 30ºC for a long period, but this gives poor quality flowers with few florets, while storage at 1ºC can cause malformed flowers. The ideal storage temperature is therefore 5-10ºC (Table 1). *N. tazetta* ssp. *aureus* can be stored for long periods even at 1ºC.

If bulbs are removed as appropriate after storage and kept at 30ºC for 3 weeks followed by 25ºC for 12 weeks, then planted and cultivated at 15-20ºC, they can be made to flower at times other than midsummer. The flowering rate can be increased effectively by treating bulbs with ethylene gas for 6 hours after keeping at 30ºC.

Table 1. Effects of temperature during long term bulb storage on flowering of *Narcissus. tazzeta* var. *chinensis.*

Storage temperature (℃)	Percent of bulbs		Date of flowering	Scape length (cm)	Perianth length (cm)	No. of floets	Leaf length (cm)	No. of leaves
	sprouted	flowered						
1	100	83	18 Nov. c[y]	31.0 a	4.0 b	4.1 a	41.4 b	4.0 b
5	100	90	15 Nov. b	31.5 a	3.9 b	4.6 ab	40.8 b	4.1 b
10	100	97	15 Nov. b	30.1 a	3.9 b	4.7 b	41.0 b	3.6 a
30	100	90	24 Oct. a	30.3 a	2.5 a	7.2 c	29.3 a	6.4 c

Bulbs were stored from 2 July, 1987 at 1°, 5°, and 10℃ and then transferred to high temperature from 8 June, 1988 as shown in Fig. 2.

Bulbs stored at 30℃ were moved to 20℃ from 24 Aug., 1988.

All bulbs were planted in the plastic house on 26 Sept., 1988 and the temperature maintained above 8℃. Twenty plants were used in each teatment.

[y] Mean separation in columns by Duncan's multiple range test, 5% level.

3. Postharvest

Cut the flowers when the first floret is fully colored. If they must be stored, place them upright and store retailers to market *N.tazetta* when the first flower is fully colored. Consumers should be advised to place cut flowers in the coolest part of the home in order to maximize their vase life.

References

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