COOL CHAIN FLOWER DISTRIBUTION OF NARCISSUS

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The UK narcissus flower crop has a major impact upon the markets during the early spring months. Production begins in November from forced crops and Isles of Scilly tazettas and follows on with outdoor production commencing in the South West, followed by Eastern England and ending in the north and Scotland in April/May.

The vase life of narcissus is not particularly long at room temperatures and seldom more than a week. It is therefore important to ensure that everything is done to ensure the best possible vase life and this means that deterioration in store or during transportation must be avoided. The crop is able to grow at relatively low temperatures and consequently bud development after picking and consequent spoilage of the product can only be arrested by low temperature handling (circa 1-2°C). A considerable amount of experimental work has shown the importance of low temperature treatment not only to remove field heat but also for storage and distribution. The product clearly requires a cool chain from farm to customer if it is to:

Remain in bud
Stay fresh and turgid
Retain a good vase life
Show minimum stem bending.

The HDC project in 1987 and 1988 sought to define more closely certain aspects of the cool chain but in particular study vacuum cooling of market packs as a prelude to distribution. A second objective was to solve the problem of stem bending.

Results of previous narcissus marketing trials have recently been incorporated into MAFF leaflet P3059 which should be consulted for general guidance. The additional aspects covered by this work include:-

1. The use of vacuum cooling
2. Broken cool chain and cool counter retailing
3. Factors influencing stem bending
4. The use of STS for tazettas
5. Design of market pack.

Vacuum cooling

Since 1985 a total of 7 tests have been carried out at Rosewarne or Kirton using local vacuum units. In all but two cases these failed to achieve the expected or required pull down of the produce.

In a comparison of 72 hours at 1° with the same period at 4° or 10° and a broken cool chain of 24 hours each of 1°, 10° and 1° the continuous 1° storage gave the best vase life and least stem bending. Continuous storage at 4° gave a similar but slightly better performance than the 1°, 10°, 1° series (these treatments have the same theoretical mean over a 72 hour period). Clearly the broken cool chain is undesirable, as are the higher storage temperatures of 4° or 10° which increase bending and reduce vase life. A period of 24 hours at 10° during 1° storage reduced vase life by half a day and storage at 4° a reduction of 0.3 days compared with 1° storage. The angle of stem bending was greatest at 10° but the length of curved stem zone was greatest at 4° storage. This again tends to confirm that stem bending is a complex matter.

The differences recorded in this trial were not large and since in practice transporters may not be able to achieve 1°C it would appear that periods of up to 24 hours at 4°C may be acceptable provided produce is already at 1°C at the outset.

Cool counter display

This is highly desirable and likely to be an increasing feature in larger retail outlets especially in heated retail stores. Such displays should always have watering facilities since cool counter temperatures will fluctuate and as the flowers develop their water requirements will increase. The advantages of a well designed display pack will be increasingly recognised in this situation.

Bunches were stored on a cool counter averaging 3.5°C upright with or without water and sleeves for up to 14 days. The upright bunches suffered no stem bending. The longer the bunches were kept on a cool counter the shorter their subsequent vase life. Bunches stored for more than 3 days benefitted from having water. Sleeves had little effect.

Beyond 7 days on the cool counter the flowers were half open and would have been increasingly unsuitable for sale. Moreover, beyond 7 day period the subsequent vase life at 20°C was reduced to an unacceptable level. In this trial fresh flowers were placed on the cool counter. In practice flower presented for retail will generally already have undergone some storage and so the acceptable period on the cool counter may in fact be only a few days.

Sell by date

This may be a controversial matter but must be considered as a means of controlling supplies and safeguarding the customer. Those of us old enough to have worked in the pre-bud era will recall simple tests which indicated the age of open daffodil flowers. With today's pencil marketing no such tests can be applied and in consequence the accummulated periods during storage and distribution may be considerable but show no clear evidence as such. Only in the subsequent degree of opening, flower colour, texture, size and vase life may such problems be exposed - possibly leading to disappointed customers. Packs and sleeves marked with a sell by date 10 days after picking could be a very good starting point for the industry but it would of course only be applicable to cool chain at or below 2°C. At ambient storage the product may well be as good as spent after such a period.

A popular missconception about stem bending is that it is due to the stems drying out (like the edges of a sandwich). Trials show that this is not so, in fact when bunches are stored over long periods loss of turgidity gradually reduces the degree of bending, gravity acting directly upon the flaccid tissues to straighten them. Turgid or damp bunches will bend more than dry ones, the available moisture increasing cell elongation on the underside of the stems.

1. What is the cause of stem bending?

   Horizontal arrangement or packing causes gravity to act on the auxin system to cause differential cell elongation between the upper and lower sides of the stem.

2. Is stem bending affected by picking stage?

   Yes, it affects the degree and shape of the bending. An early picking stage increases bending and produces a "banana" shape. Later stage picking results in less bending with most of the upper stem remaining straight. (Trial 10).

3. Do vertically arranged stems bend?

   No, not whilst they remain upright. An upright handling and packing system prevents bending. (Trial 6).

4. Does moisture affect stem bending?

   Yes, freshly picked, turgid or wet stems or humid conditions increase bending. Dry or flaccid stems cease to bend and may straighten under gravity. (Ref 31/04535 (1980) and trial 5).

5. Is bending dependent upon temperature?

   Yes, very much so. It is slight at 1-2°C and increases with rising temperatures. (Ref 31/11193 (1985) and trial 11).

6. Does prolonged cool storage reduce subsequent bending?

   Yes and no. Prolonged vertical cool storage (ie more than 1 week) reduces subsequent bending.

   Duration of horizontal storage makes little difference to the amount of subsequent bending. (Trial 11).

7. Is stem bending counteracted by inversion?

   Yes, inverting stops further bending and partially corrects it but bending appears to occur more rapidly than straightening. (Trial 12).

8. Does holding down with extra cross ties reduce bending?

   Yes, it lessens it but does not prevent it. It is only partially effective and not very practical. (Trial 12).

9. Are their varietal differences?

   Yes, varieties appear to very considerably in their degree of stem bending. (Main report RW 1987).

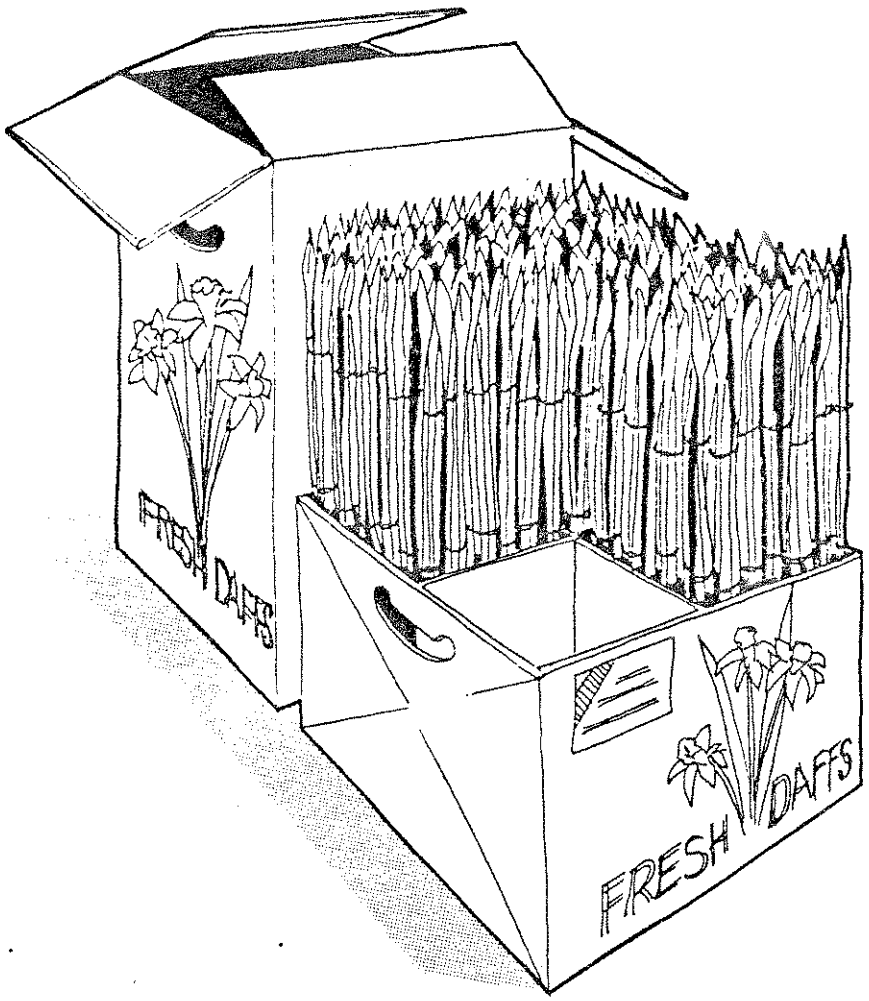
3. Watering made easy at retail display stage.

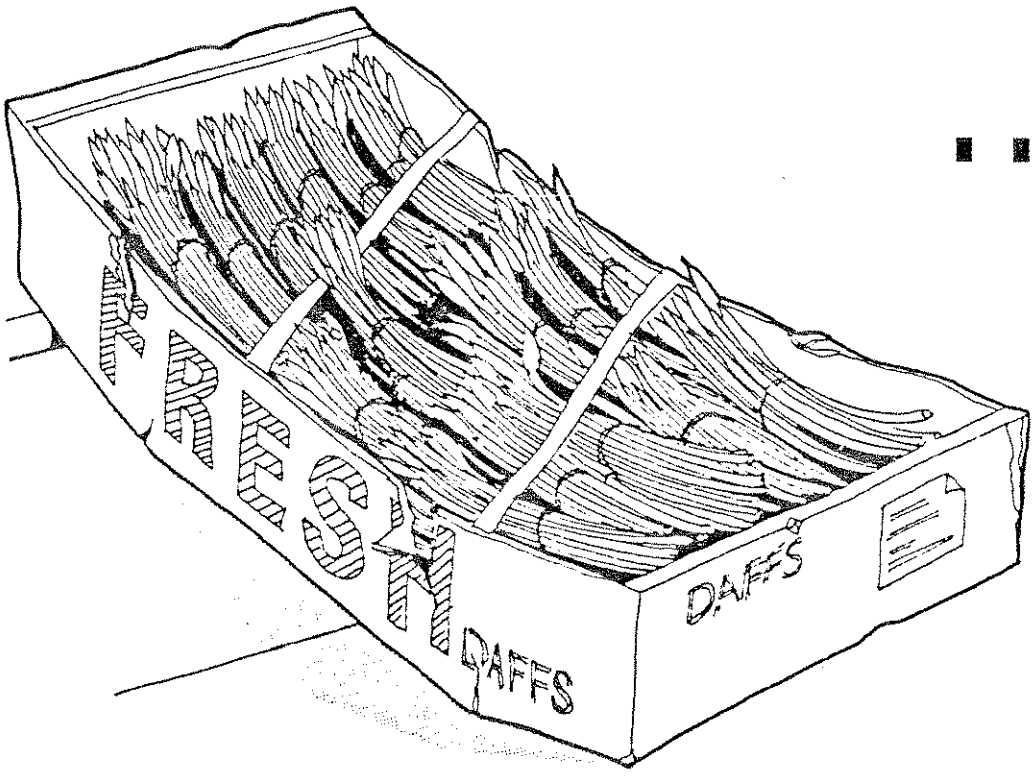
4. Improved display and presentation and a vast improvement over the flat pack which when used for retail display is probably the greatest deterrent to sales today.

5. Labour saving at the retail point.

CHANGE THE PACK - AND BEAT THE BEND

Change the pack...





...and beat the bend