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NARCISSUS VARIETY ASSESSMENT: TRIALS AT KIRTON 1989-1994

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AUTHENTICATION

I declare that this work was done under my supervision according to the procedures described herein and that this report represents a true and accurate record of the results obtained.

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SUMMARY

A range of narcissus varieties was grown in standardised plots at HRI Kirton, to provide information on flowering dates, flower characteristics, flower and bulb yield, etc. Data for 311 varieties are presented.

INTRODUCTION

The Royal Horticultural Society's database of narcissus (daffodil) names currently lists over 22,000 distinct varieties (S. Kington, personal communication). Few of these varieties, according to estimates around 5 per cent, are widely grown, and perhaps only around 1.5 per cent are cultivated extensively (Beaumont, 1950). Many varieties on the list are enthusiasts' or show-bench varieties or are specialities, and doubtless many are of dubious value or are rapidly lost. Against this background, it is essential for commercial bulb-growers and forcers to be able to identify good varieties, and to make sound judgements on varietal suitability for different purposes. Bulb yield, flower yield, floral characteristics, susceptibility to pests, diseases and physiological disorders, and ability to produce forced flowers, all need to be taken into account. Further, although traditional large-flowered yellow daffodils remain, and are likely to remain, the mainstay of the UK bulb industry, recent years have seen increased diversity in the types of narcissus traded. Major trends have been the strong demands for dwarf varieties (like Tête-à-Tête) for garden use and as pot-plants, and for tazetta cultivars (such as Ziva). There are also limited demands for double varieties, split-corona types, late-season flowers, species, and others. But even with the traditional daffodil, increasing consumer sophistication demands improved varieties, with excellent flowers and good keeping quality.

Varietal assessments were carried under MAFF-funding at Rosewarne Experimental Horticulture Station (EHS) over the period 1955 to 1989, and the results were summarised in 1993 as part of the HDC-funded project BOF17. The report included data on 2186 cultivars and other taxa (Hanks, 1993). With the closure of Rosewarne EHS in 1989, the bulbs from the variety trial were transferred to Kirton EHS, now part of Horticulture Research International. Following a brief period under continuing MAFF funding, HDC funding was secured in 1990 to continue the variety assessment. Although some of the protocols have been changed to keep pace with present-day demands and to meet economic considerations, the essential aim of the project has continued to be the provision of independent assessments on narcissus cultivars grown in standardised field plots, forming a database for growers to use.

It is planned that cultivars for assessment will now generally be grown for three, two-year-down cycles, taking most records in the second year of each cycle. A number of standard cultivars will be maintained permanently in the assessment, for comparative purposes. At Kirton, the initial objective has been to complete assessments on the cultivars transferred from Rosewarne, but some new cultivars have been added at intervals. Varieties selected for assessment are generally ones where some potential commercial interest is perceived, but where little or no objective data are available. The variety range covers traditional

mainstream daffodil types, as well as more diverse groups (such as dwarf or split-corona varieties) for which there is an increasing interest amongst the bulb trade and consumers. Although primarily a variety assessment, appropriate élite stocks could be included, as some virus-tested (VT) stocks have been already.

The present report, the first to describe assessments at Kirton, includes data taken from 1989 to 1994. Reports will be updated annually. The HDC usually arranges an open day for viewing the trial plots in the second year of each two-year growing cycle. Suggestions for cultivars which should be considered for adding to the trial are welcome.

MATERIALS AND METHODS

Plant material

Bulbs included in the trial in 1989 were obtained from Rosewarne EHS on the closure of the station in 1989; at Rosewarne, the bulbs had been grown for a number of years as described earlier (Hanks, 1993). Varieties added to the trial after 1989 were obtained by HRI-Kirton from various commercial sources, either by purchase or on a 'loan and return' basis. As well as the trial plots, small stocks of the test varieties were grown to provide bulbs for experimental plots in future years, if necessary.

The following cultivars were designated as 'standards' for comparative purposes: Dutch Master, Golden Harvest, Mount Hood, Rijnveld's Early Sensation and Standard Value (Division 1), Carlton, Fortune, Hollywood, Ice Follies, Red Devon and St. Keverne (Division 2), Bassett Browning and Edward Buxton (Division 3), Cheerfulness and White Lion (Division 4), Hawera (Division 5), February Gold (Division 6), Golden Dawn (Division 8), Actaea (Division 9) and Tête-à-Tête (Division 12).

Where practical, the identity of varieties was verified by reference to published descriptions or with the help of visiting experts. The name and classification of each variety have been checked against 'The International Daffodil Checklist (1989)' of the Royal Horticultural Society, and its supplements (ie, the 15th to 20th supplements (1989 to 1994) to 'The International Daffodil Register (1969)'), or, for wild species, etc. (Division 10), against the abridged classified list of the American Daffodil Society (1989). These official classifications are the ones quoted in the tables of results, even where observations differ. One variety, Silver Sand (received by Rosewarne EHS from T Harper & Sons) was not traced in these publications.

Trial protocol

Each variety in the assessment (except standards) is grown for three, two-year-down cycles, unless aborted earlier for some reason or unless further years' data are required. Standard cultivars are kept permanently in the trial. All varieties are planted and assessed together (ie, over the same two-year periods). This report contains data for the first two, two-year-down cycles at Kirton, 1989-91 and 1992-94 (the two-year cycle begun in 1991 was aborted due to late delivery of new varieties of bulbs). A number of cultivars included in the 1989-91

growing cycle were deemed to have been assessed adequately in the Rosewarne trialling, and these were not carried forward; for these the detailed flower measurements in Table 1 were not taken again, but mean values were transposed from the earlier Rosewarne summary report. Some new cultivars were added in 1992. Cultivars currently in trial (1994-96) are listed in Appendix 1.

Each variety is planted as a single plot of 24 bulbs, wherever possible comprising eight double-nosed, eight single-nosed and eight offset bulbs of a size typical of the variety. To aid recovery, each plot is planted in a 1 m-long length of tubular nylon netting ('Netlon Oriented 1'). The plots are laid out alphabetically within Divisions. Each plot is 1 m long (giving a planting density of *ca.* 15 t/ha for an 'average' variety), and paths are left between plots for isolation and recording purposes. The trial area is surrounded by 'guard' plants (of cv Carlton) to reduce 'edge effects'.

Assessments

The records taken included the following, which were the agreed records for 1994 onwards, being the records most relevant for cut-flower production:

Before planting	-	bulb number and weight
Year 1 of each cycle	-	date of first shoot emergence
	-	general check for pests, diseases, disorders and trueness-to-type
Year 2 of each cycle	-	date of first shoot emergence
	-	date when first and 50% of flowers were at commercial cropping stage (taken as 'upright fat pencil' stage for most cultivars, 'bud burst' for doubles, and full flower for non-cutting varieties such as miniatures; note that prior to 1993 flowering dates were recorded at bud burst)
	-	stem length at flowering (from soil level to base of bud or flower)
	-	number of flower stems (or of florets where multiheaded)
	-	general check for pests, diseases, disorders and trueness-to-type, and notes on any unusual features (eg, scent)
Year 2 of two cycles only	-	perianth diameter (taken across widest extent of fully open flower)

- corona diameter and length (taken across the widest part of corona and as the height of the corona rim above the base of the corona) where practical (not for double and split-corona types)

- brief flower description (based on cut flowers opened in the vase-life room). Flower colours should be regarded as guides, as age and the conditions under which flowers open affect colour. The other main elements of the flower descriptions are perianth segment shape (eg broad/narrow, pointed/rounded, overlapping, whether reflexed, twisted, etc), corona shape (eg, straight-sided, funnel-, bowl- or disc-shaped) and corona end and margin (eg, flared or rolled end, entire, lobed, crenate or frilled edge). Further details of the terms used can be found in the supplements to The International Daffodil Checklist and earlier reports of the Rosewarne variety assessments (eg, ADAS, 1971).

- vase-life (determined by cropping five flowers at the usual stage and placing in a vase of clean tap water in a shelf-life room under uniform fluorescent lighting (12 hours per day) at 18°C and 65% relative humidity. Flowers were examined daily and discarded when the edges of the perianth segments began to wither)

After lifting

- bulb weight (in Results, yields are expressed as the percentage weight increase:

$$\frac{\text{(weight lifted after 2 years) - (weight planted)}}{\text{weight planted}} \times 100$$

Hence, an increase of 100% means that the lifted weight was double the planted weight and 200% means it was three times the planted weight)

Crop husbandry

Plant husbandry in the field and bulb handling followed the usual practices at HRI-Kirton, based on good commercial practice for eastern England (eg, ADAS, 1985). The trial site is on a medium to heavy silt loam soil, rather exposed and typical of the area. The rotation involves brassicas, onions, cereals and grass. Following soil analysis, fertilisers are applied according to MAFF recommendations, $P_2 0_5$ and $K_2 0$ in the base pre-planting and nitrogen pre-emergence in the first year of the cycle. Weed control is typically by 'dormant season' diquat

+ paraquat, pre-emergence cyanazine, chlorpropham + linuron early post-emergence and post-flowering bentazone. Fungicides are applied from shoot emergence as a five-spray programme in the first year and a three-spray programme in the second, typically involving iprodione, chlorothalonil and vinclozolin. Because of the diversity of varieties in the trial, there will be some compromises in the dates of various treatments (eg, time of fungicide application in relation to stage of development).

Bulbs are harvested (following flailing where necessary) in June to July. They receive a post-lifting fungicide dip (thiabendazole and formaldehyde) and are dried, initially at 35°C for three days and then at ambient temperatures under fans. Bulbs are cleaned by hand and weights recorded, after removing and noting any unmarketable bulbs (eg, rotted or with large narcissus fly). Hot-water treatment (3 hours at 44.4°C with thiabendazole and formaldehyde) is carried out in mid-August, following two weeks' storage at 18°C. Bulbs are re-dried, and stored at ambient temperatures under fans. Plots for re-planting are allocated, and bulbs are netted and planted in early to mid-September.

RESULTS AND DISCUSSION

For the years reported, crop growth was considered generally satisfactory. The main problem seen was that severe, late frosts in 1994 caused extensive damage to the shoots of early emerging varieties (namely, Armynel, Banallan, Barenwyn, Charity May, Crewenna, Emblyn, February Gold, Gaylord, Jedna, Melyor, *Narcissus x medioluteus*, Rijnveld's Early Sensation, Rosenwyn, Spring Dawn, Talwyn and Tamara).

In 1991 almost all bulbs of varieties Chillagoe and Woodgreen rotted, so no data are available. Following harvest in 1994, the following varieties had significant numbers of rotted bulbs (>5%): Actaea, Alabaster, Anacapri, Barrett Browning, Best Seller, Cassata, Charity May, Crewenna, Doubledale, February Gold, Finmacool, Gay Colours, Geranium, Golden Day, Golden Harvest, Ice Wings, Jumblie, Karelia, Knockstacken, Little Witch, Maid of Ulster, Mrs David Calvert, Pink Chiffon, Rijnveld's Early Sensation, Romance, Rosenwyn, Rossini, Royal Regiment, Scarlet Gem, Stainless, Sweet Charity, Tawny Lad, Tête-à-Tête (ordinary stock), Texas, Thalia, The Knave, Toujours, Ulster Queen, Unique, Veryan, Whitehead and White Lion. Large narcissus fly damage was evident in a significant number (>5%) of bulbs of the following varieties: Acropolis, Bridal Crown and Magnet.

Data for one variety, Rugulosus, were excluded as the stock was clearly of another variety. Doubts were raised over the trueness-to-type of Golden Amber (mixed stock or unstable?) and Tamar Fire (largely reverted to single flowers), so data for these should be treated with caution. In the case of varieties Delibes, Doublet and Sugar Bush less definite doubts were raised about identity, and verification will be attempted at a later date.

Table 1 summarises the quantitative information for the 311 varieties included in the trial over the 1989 to 1994 period: emergence and flowering dates, bulb and flower yields, flower sizes and vase-life data. Where a variety was included for more than one two-year growing cycle, a poor correspondence between data for the years is often seen: once more data are available from further years of the trial, these variations will be examined in more detail in relation to meteorological information, and it is also hoped that similar investigations will be possible

using the data accumulated from the many years of previous trialling at Rosewarne. Very poor bulb yields were seen in some cases, and these correlate with the occurrance of basal rot (see above), a probable consequence of a run of warm summers.

Table 2 gives flower descriptions for the varieties. These brief descriptions will be checked and expanded as necessary in future years of the trial.

Further discussion of results will be deferred until a further two years' data have been collected.

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