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GERMPLASM ASSESSMENT OF *NARCISSUS* (DAFFODILS) UNDER AGROCLIMATIC CONDITIONS OF KASHMIR HIMALAYA

M.A.A. Siddique, N.H. Masoodi, Muzain Masoodi and Shameen Iqbal

Division of Floriculture, Medicinal and Aromatic Plants, SKUAST-Kashmir, Shalimar, Srinagar -191121, J&K, India

ABSTRACT

Assessment of growth characteristics and floral biology of 11 genotypes of *Narcissus* (daffodils) under the agro climatic conditions of Kashmir Himalaya was under taken during 2009-2010. Wide variation was observed across the genotypes on the basis of morphological and floral indicators including plant height, days taken to floral bud initiation, bud size at goose neck stage, anthesis, spathe length, dimensions of tepal and corona, flower diameter and flowering duration. Among the genotypes, Texas out numbered all the cultivars in terms of essential attributes including plant height (28.1cm), spathe length (47.38cm), corona length (2.26cm), corona diameter (3.50cm), bud size at goose neck stage (6.25cm), length and breadth of tepal (4.20cm and 3.78cm), flower diameter (9.68cm) and flowering duration (23.20cm).Minimum values for plant height (22.48cm), spathe length (33.33cm), corona length (1.20cm), bud size at goose neck stage (3.36cm), flower diameter(4.60cm) and flowering duration (14 days) with Pheasant's eye. Apart from this, variations were recorded in floral biology among the genotypes; maximum duration to reach pencil stage (12.16 days), goose neck stage (6.83 days), days for anthesis (7 days) was noticed with Texas while as minimum days to reach pencil stage (8.83) was observed in HMMI N5 and least duration to reach goose neck stage (5.25 days) and anthessis (3.13 days) was recorded for Brandswick.

Key words: *Narcissus* (Daffodils), cultivars/accessions, morphological characteristics, flowering

INTRODUCTION

Narcissus (Daffodils) popularly known as Nargis is one of the important bulbous crops having excellent landscape value besides being valued as important cut flower (Bose and Yadav, 2003). The crop ranks second only to tulip as far as area under bulbous crops is concerned (Rees *et al.*, 1972). Its commercial cultivation for cut flower purpose is mainly confined to Europe and U.S.A. (Pizzetti and Crocker, 1975). Commonly grown species include *N. tezeta, N. poeticus, N. bulbicodium, N. albus, N. triandrus, N. odorus, N.jonquilla* and *N. cyclamineus* (Bose and Yadav,2003). *Narcissus* is among earliest spring season flowers of the hills and mountain eco system. The word *Narcissus* is derived from the Greek word narke which means numbness or stupor. Sometimes the name assigned is due to necrotic fragrance or poisonous nature of the bulb (Pizzetti & Crocker, 1975). Narcissus and Daffodils from botanical point of view belong to genus *Narcissus* of the family Amarylidacea with major differences in the size of cup or corona and the origin of flowers. Most of the species are native to Mediterranean regions.

However few species are reported from central Asia and China (Bose and Yadav, 2003). The genus is characterized by central trumpet or disc shaped corona surrounded by a ring of six floral leaves i.e. perianth which is united into a tube at the forward edge of the 3-locular ovary. However breeding programmes have yielded daffodils with double, triple or ambiguously multiple rows and segment layers. Moreover some wild species are reported to be double variants. Out of the 14 botanically classified groups by American Society of Daffodils, Poet's Daffodil is cultivated in Holland and Southern France for its essential oil, (the narcissus oil) used in perfumes (Bose and Yadav, 2003).

Around 25-30 species of daffodils are reported, however all are not cultivated (Bose and Yadav, 2003). Currently around 18000 hybrid varieties of daffodils are available but in Kashmir Himalayas despite climatic suitability the lack of authentic data about the available germplasm of the crop has not been exploited on a commercial scale. The present investigation was therefore carried out to assess various genotypes on the basis of morphological markers and floral characteristics.

MATERIAL AND METHODS

The present investigation was carried out at Research Farm of Division of Floriculture, Medicinal and Aromatic Plants, SKUAST-Kashmir during 2009-10. Shalimar is located at 1585 m (a.m.s.l). The soil is silty loam in texture with pH of 6.8. Eleven cultivars/accessions viz Texas, HMMI N1, Pheasant's eye, HMM N2, White well, HMMI N5,California,Best seller, Ice frills, Fortune and Brandswick were assessed on the basis of morphological and floral traits. The experiment was laid out in Randomized Block Design. Observations on days taken from bud initiation to pencil stage, bud size at goose neck stage, days taken to reach goose neck stage, anthesis, tepal length, tepal breadth, spathe length, spathe diameter, corona length, corona diameter, flower diameter, duration of flowering after anthesis (days) and plant height were recorded using standard procedures which include random selection of 15 plants, tagging the sample plants, assessing different stages of bud development, flower development, growth, measuring the individual parameters with vernier caliper/scale which ever appiicable, averaging and analyzing the data statistically.

RESULTS AND DISCUSSION

A wide variability has been recorded in various morphological traits of Narcissus. Plant stature ranged from 22.48cm (Pheasant's Eye) to 28.41cm (Texas), however the cultivar Texas required longer duration to produce spathes with nearly 12.6 and 6.83 days needed to reach pencil and goose neck stages respectively. Flowers of this cultivar were last to anthesce with longest spathe (47.38cm) and largest flowers (9.68cm diameter) including longest corona (2.30cm) and maximum tepal size (Table1). The cultivar out numbered all other genotypes in the flowering duration which lasted for about 23.20 days. Texas therefore seemed to be feasible not only for garden decoration purposes but can be exploited for cut flower purposes on commercial scale. In contrast the cultivar

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Table 1 . Flora biology of *Narcissus* (Daffodils) genotypes under Kashmir agro climatic conditions

Variety/ Accession	Days taken from bud initiation to pencil stage	Bud size at goose neck stage (cm)	Days to reach goose neck stage	Anthesis days	Tepal length (cm)	Tepal breadth (cm)
Texas	12.16	6.25	6.83	7.00	4.20	3.78
HMMI.NI	12.03	5.69	6.16	6.10	2.26	1.20
Pheasant's eye	11.01	3.36	6.58	3.15	2.30	1.33
HMMI N-2	10.16	4.16	5.83	4.50	2.00	1.50
White well	9.66	4.78	5.80	4.16	2.68	1.42
HMMI N-5	8.83	5.63	6.50	6.91	3.86	2.85
Brandswick	9.16	4.26	5.25	3.13	1.93	1.85
California	12.03	6.19	6.79	6.92	4.13	1.41

Pheasant's Eye recorded shortest plant height (22.48cm), smallest spathes (33.73cm), smallest flowers (4.30cm dia.) and minimum corona length (1.20cm). Rest of the cultivars were intermediate between the two extremes in different morphological traits (Table1).The variation in morphological and floral characteristics could be a function of the genetic make up of the cultivars as all the genotypes were raised under uniform environmental conditions which minimizes the impact of environmental factors (Table 2).

Table 2. Flowering characteristic of *Narcissus* (Daffodils) genotypes under Kashmir agro climatic conditions

Variety/Accession	Spathe length (cm)	Spathe diameter (cm)	Corona length (cm)	Corona diameter (cm)	Flower diameter (cm)	Duration of flowering after anthesis (days)	Plant height (cm)
Texas	47.38	0.58	2.30	3.50	9.68	23.20	28.41
HMMI.NI	41.46	0.41	2.26	3.28	8.66	17.52	25.20
Pheasant's eye	33.33	0.32	1.20	0.80	4.30	14.00	22.48
HMMI N2	42.80	0.50	0.30	0.82	4.88	19.16	28.76
White well	34.26	0.36	1.42	3.53	5.30	15.58	25.31
HMMI N-5	40.35	0.55	1.43	2.30	8.06	17.25	24.48
Brandswick	38.73	0.50	1.30	2.16	6.43	19.00	23.80
California	46.60	0.57	2.18	3.49	9.43	18.03	26.59
Best seller	43.33	0.48	1.86	2.72	8.13	17.33	24.78
Ice frills	36.66	0.43	1.33	0.42	4.68	14.07	22.33
Fortune	37.03	0.46	1.36	0.60	5.02	14.33	23.48
C.D(P=0.05)	1.04	0.09	0.23	0.12	0.73	1.83	2.18

Variations in the time of flowering in *Narcissus* cultivars like Rijnveld's Early Sensation and Golden Harvest have also been reported by Fry (1975) and Pollock and Tompsett (1985). Rees and Wallis (1970) reported Golden Harvest to produce comparatively more Grade 1 flowers while working on forcing of narcissus cultivars Carlton, Fortune and Golden Harvest. Rees *et. al* (1972) reported earliness in Carlton(24 days) followed by Golden Harvest (17 days) and Fortune (16 days) which was attributed to the genetic make up of individual cultivar. The variability in various traits have not only been used to classify *Narcissus* into nearly 11 groups (Jefferson1969; Hay, 1971) but have been exploited in developing new varieties/cultivars. Recently Doron (2009) two cultivars including "Ariel" and "Inbal" (distinguished on the basis of flowering time, size of flowers and other morphological traits) have been released in Paperwhite Narcissus group (Cohen *et al.*, 2009)

The assessment of variability in some other ornamentals plants including Carnation (Masoodi and Panigrahi, 2007) and *Gladiolus* (Gangwar *et al.*, 2011) has been quite helpful in delimitation of cultivars for cut flower and/or garden decoration purposes.

The present assessment of variability in *Narcissus* (Daffodils) observed in the cultivars can be employed for devising strategic breeding plans for developing new and promising cultivars in this temperate bulbous ornamental so as to exploit the crop on commercial scale.

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