'Morning Mist' Gladiolus

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'Morning Mist', a gladiolus (*Gladiolus ×hortulanus* L.H. Bailey) with light-violet florets, was released in 1988 by the Univ. of Florida (Fig. 1). It combines good cut-flower characteristics, such as tall spikes with a floral bud count of 20 to 24 and the ability to open from the "tight-bud" stage, with tolerance to *Fusarium oxysporum* Schlecht. f. sp. *gladiolus* Snyder & Hans, based on field studies in *Fusarium*-infested soil. *Fusarium* has led to the demise of many lavender or violet cultivars such as 'Beverly Ann', 'Lavender Spire', and 'T-609', which have been grown commercially in sandy soils in central and southern Florida. Although violet-blue cultivars constitute a minor percentage of commercial gladiolus cut-flower production in the United States, they are valued for mass market and roadside sales. 'Morning Mist' placed fourth out of 39 seedlings in the 1981 North American Gladiolus Council (NAGC) trial gardens, evaluated at 10 locations in the United States and Canada.

Origin

'Morning Mist', developed and evaluated as W-633, was selected in 1975 from a cross made in 1972 in the breeding program at the Gulf Coast Research and Education Center, Bradenton, Fla. (Fig. 2). The seed parent (GC-354) originated from across between two commercial cut-flower cultivars, 'Blue Baron' and 'Beverly Ann'. 'Blue Baron' was chosen for its clear violet-blue florets and production of 20 to 24 floral buds per spike. A minimum of 18 florets is required for spikes of the highest commercial grade. 'Beverly Ann' was the major lavender cut flower grown in 1972 and had the combined qualities of opening from tight bud and *Fusarium* tolerance. The resulting seedling (GC-354) had medium-violet florets with a cream-colored throat mark, upright foliage, and *Fusarium* tolerance. The pollen parent (GC-143) originated from across between 'China Blue' and 'Beverly Ann' (Fig. 2). 'China Blue' has large, clear, light-violet florets with a dark lip blotch but is susceptible to fusarium crown rot. GC-143 has up to 24 large violet-blue florets on a short, willowy spike and exhibits field tolerance to *Fusarium*. 'Morning Mist' corms and cormels were propa-

gated on nonfumigated land that had been inoculated with a population of *Fusarium*. They were not dipped in fungicides for disease control during preliminary observations from 1975 to 1978.

Description

Large (≥3 cm in diameter) 'Morning Mist' corms, planted 15 cm deep in EauGallie fine sand, produce seven to eight upright leaves up

to 80 cm long and 4 cm wide before flowering. Foliage is 2.5 to 3 cm wide at the soil surface. Leaves are medium light green (yellow green 146A) (Royal Horticultural Society, 1966) with slightly lighter (yellow green 146C) parallel veins. Sepal color in the lowest floret is visible 80 to 85 days from outdoor planting in central Florida in fall (September to November) and 85 to 90 days from planting in winter (December to March). Maximum spike length, measured in the tight bud stage, is 125 cm, and spike diameter at the base of the flowerhead is 1.0 cm. Spikes are slightly curved but exhibit good stem strength, as observed in the field. Florets number from 20 to 24 on a 48- to 52-cm rachis and are arranged in a close formal double-row placement. Eight to ten florets are open at one time in the field with five to six floral buds showing color.

The round florets are 11 to 12 cm in diameter with lightly ruffled, almost recurved petal margins. Sepals and two lateral petals are light violet (violet blue 92C) on the margins, diffusing to pale violet (violet blue 92D) in the center. The lip is uniform light violet (violet blue 92C) with dark-violet (violet blue 92B) throat veins. A narrow cream-colored (yellow white 158D) pencil-width line bisects the lip base. Anther color is pale violet dorsally (violet blue 91D) and dark violet ventrally (violet blue 91B). The stigma is cream colored (yellow white 158D) and attached to a white style (white 155B). Spikes are light green (yellow green 146C) and the floret is enclosed by two dark-green spathe valves (green 143C). 'Morning Mist' classification number is 482 according to NAGC standards (Euer, 1990).

Corms are light yellow orange (yellow orange 16C) with a light-brown husk (grayed orange 167D) when dug; corms are slightly darker (orange 26B) when cured and the husk develops a reddish overlay (grayed red 179B). Corms are flat with a vertical axis about one-third that of the horizontal axis. Many (50 to 60) small (0.6 to 0.8 cm in diameter) cormels form at the base of the daughter corm. Cormel husks are intact, smooth, and light brown (brown 199B). Corms produce an extensive fibrous, contractile root system.

Performance

'Morning Mist' flower, corm, and cormel production were compared in field-replicated trials to those of 'Dr. Magie', 'Florida Flame', and 'Jessie M. Conner', recent introductions from the Univ. of Florida (Wilfret, 1981, 1986), and to those of several cultivars used commercially as cut flowers in Florida. Yield comparisons made during Spring 1980 (Table 1) on nonfumigated land that had been inoculated with *Fusarium* the previous year indicated that 'Morning Mist' spike production was similar to that of the three previously released cultivars and higher than that of 'Friendship', a commercial cultivar that once comprised 35% to 40% of production in Florida. 'Morning Mist' mean spike length was surpassed only by that of 'Florida Flame'. Rachis length was similar for all cultivars except 'Florida Flame'. The number of florets per inflores-

Fig. 1. Floral morphology of 'Morning Mist' gladiolus.

Fig. 2. 'Morning Mist' gladiolus pedigree.

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Table 1. Flower, corm, and cormel yield comparisons of 'Morning Mist' and commercial gladiolus cultivars.

Cultivar ^a	Total spikes	Length		Florets/ spike (no.)	Corms dug		Mean corm wt (g)	Wt of cormels dug (g)
		Spike (cm)	Rachis (cm)		No.	Wt (g)		
Spring 1980 ^y								
Morning Mist	28.3 a ^x	106 b	47.3 ab	17.3 a	31 b	1170 bc	37.5 ab	370 a
Dr. Magie	31.8 a	103 b	43.1 b	13.9 c	36 a	1010 c	27.9 b	240 b
Florida Flame	29.2 a	131 a	55.0 a	12.7 c	31 b	1396 ab	44.3 a	340 a
Jessie M. Conner	29.8 a	101 b	44.0 b	16.0 ab	32 b	1566 a	49.4 a	328 a
Friendship	20.0 b	100 b	44.8 b	15.7 b	16 c	648 d	40.0 a	226 b
Spring 1981 ^y								
Morning Mist	31.2 bc	109 b	47.2 abc	16.8 ab	34 ab	1281 ab	37.5 bc	171 a
Dr. Magie	40.3 a	101 bc	41.0 bcd	14.7 c	40 a	1425 a	35.9 c	122 ab
Saga	8.3 e	93 cde	39.8 d	12.3 d	12 d	608 c	52.0 a	8 c
Friendship	28.7 c	99 cd	40.4 c	13.6 c	28 bc	867 c	31.3 c	117 b
Florida Flame	35.3 ab	127 a	49.5 a	11.8 d	40 a	1383 ab	34.3 c	92 b
Limelight	16.0 de	120 a	48.1 ab	18.2 a	24 b	1100 b	46.4 ab	28 c
Jessie M. Conner	20.7 d	90 e	40.1 cd	15.2 bc	22 cd	875 c	40.3 bc	100 b

^aTwenty corms (≥3.5 cm in diameter) planted per treatment, with each treatment replicated four times in a randomized block design and grown on nonfumigated land previously inoculated with *Fusarium*.

^bCorms treated preplant with methyl{1-(butylamino)carbonyl]-1*H*-benzimidazol-2-yl} carbamate (benomyl, Benlate) (200 g/100 liter) and 2,4,5,6-tetrachloro-1,3-benzenedicarbonitrile (chlorothalonil, Daconil 2787) (120 g/100 liter) as a 30-min dip.

^cMean separation within columns, by year, by Duncan's multiple range test, $P \leq 0.05$.

cence of 'Morning Mist' was similar to that of 'Jessie M. Conner' and higher than that of the other cultivars. Yield of good-quality corms dug is indicative of the *Fusarium* tolerance of the cultivar, and only 'Dr. Magie' yielded more, but smaller, corms. Weights of cormels, which are used for mass propagation of the cultivar, were similar for 'Morning Mist', 'Florida Flame', and 'Jessie M. Conner'. In the Spring 1981 test on nonfumigated land that had been inoculated with *Fusarium* in 1979, only 'Dr. Magie' produced more spikes than 'Morning Mist', although the spikes were shorter than those harvested from 'Morning Mist'. 'Limelight' and 'Florida Flame' spikes were longer, but their rachis lengths were similar to those of 'Morning Mist'. Number of florets per spike of 'Morning Mist' was similar to that of 'Limelight' and 'Jessie M. Conner' but greater than that of the other cultivars evaluated. 'Morning Mist' total corm weight was similar to that of 'Dr. Magie', 'Florida Flame', and 'Limelight'.

Inoculating corms with a spore suspension made from a mixture of seven pathogenic isolates of *F. oxysporum* f. sp. *gladiolus* (Wilfret and Woltz, 1973) indicated that 'Morning Mist' was more tolerant than 'Friendship', 'T-704', and 'T-609' but not as tolerant as 'Florida Flame' (unpublished data).

Postharvest studies (Table 2) using spikes cut in the tight-bud stage indicate that 'Morning Mist' produces more open flowers than 'Dr. Magie', 'Friendship', and 'Florida Flame' when the spikes are placed in water or a floral preservative [8-hydroxyquinoline citrate (HQC) plus sucrose] after 3 days of cold storage (5C). More 'Morning Mist' floral buds were in color than the other cultivars. 'Morn-

Table 2. Field-opened and postharvest flower development of gladiolus cultivars.

Cultivar ^a	Flowers open ^c (no.)			Floral buds in color ^c (no.)		
	Field	Water	HQC ^b	Field	Water	HQC
Morning Mist	8.6 a ^w	7.0 a	9.1 a	7.0 a	5.7 a	6.7 a
Dr. Magie	6.9 b	5.8 b	7.2 b	5.2 b	5.1 ab	5.4 b
Friendship	5.4 c	4.2 c	6.0 c	4.8 b	4.6 b	5.1 b
Florida Flame	5.7 c	4.8 bc	5.9 c	3.8 c	3.4 c	3.9 c

^aDetermined when basal flower lost turgidity; mean of 10 spikes per treatment.

^bSpikes opened intact in field or cut with 1.0 cm of color in basal floral bud, stored for 3 days at 5C, and kept in deionized water or 600 ppm 8-hydroxyquinoline citrate plus 2% sucrose at 24 ± 2C.

^cHQC = 8-hydroxyquinoline citrate plus sucrose.

^wMean separation within columns by Duncan's multiple range test, $P \leq 0.05$.

ing Mist' spikes remain turgid and upright longer than those of 'Friendship' but not as long as those of 'Dr. Magie' when placed in water or HQC. 'Morning Mist' spikes kept in HQC will hold eight to ten florets open before the basal floret wilts, compared to five to six for 'Friendship' and 'Florida Flame' or six to seven for 'Dr. Magie'.

Culture and use

'Morning Mist' is intended for use as a cut flower when cut in the tight-bud stage for shipping or with one floret open for mass market sales, where its novel violet-blue color is visually appealing. Although extensive research and evaluation have been performed on small areas of this cultivar when grown in west-central Florida and other selected areas of the United States, growers are encouraged to plant only limited quantities of 'Morning Mist' until they have gained experience in its performance and production. Standard corm preplant and postharvest fungicide treatments are recommended to prolong the life of the corm stock and to reduce the possibility of

corm infestation by new strains of pathogenic fungi.

Availability

Information on the availability of 'Morning Mist' corms may be obtained from Florida Foundation Seed Producers, P.O. Box 309, Greenwood, FL 32443.

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