A CRITICAL EVALUATION OF THE COMMERCIAL GLADIOLUS CULTIVARS GROWN IN FLORIDA

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ABSTRACT

Twenty Gladiolus cultivars which are grown for commercial cut flowers in Florida were evaluated in Fall and Winter plantings. The seven principal cultivars (Beverly Ann, Friendship, Spic & Span, Hopman's Glory, Traveler, Valeria, and White Friendship) were obtained from at least five sources. The remaining cultivars were obtained from small plantings of selected growers. Half of each lot of corms was planted in October and the remainder, following storage for three additional months at 5°C, was set in January.

Data were recorded on both vegetative and floral characteristics of each cultivar, including number of growths, number and quality of flower spikes and florets, and number of corms and cormels produced. Flower quality indices (FQI) ranged from 0.8 to 6.1, representing Orange Gold and Wild Rose, respectively. Wild Rose was the best overall cultivar grown based on flower quality and quantity and on corm production.

INTRODUCTION

Gladiolus (Gladiolus grandiflorus) is the most valuable cut flower grown in Florida with a wholesale value of $13.1 million in 1969 (7). Approximately 64% of the total United States production of gladiolus flowers is grown in this state. Although thousands of gladiolus cultivars have been available since the first artificial hybrid was recorded in 1818 (1), few have been suitable for commercial use by Florida growers. Over 3600 different cultivars have been evaluated at the Gulf Coast Experiment Station since 1942 and less than 200 of these have been recommended for limited commercial trial (5). Of these 200 cultivars, less than 10 have been used in large commercial operations.

Sheely (6) and Jenkins (3) have listed several characteristics a cultivar must possess to be acceptable to the commercial trade. These characteristics included floret color, size, texture, and placement; yield of spikes, corms, and cormels; ability to open from tight bud; resistance to foliage and corm diseases; and other factors of interest to growers and consumers. By combining the data of Sheely and Jenkins with information obtained from commercial growers, eight criteria which the ideal cultivar must possess were established as follows:

1. Florets of a clear color, at least 11.4 cm across, with good texture and placement.
2. Straight strong spikes with at least 60% of fancy grade (≥ 109 cm).
3. At least one marketable spike per corm planted.
4. Rachis with at least 17 florets.
5. Good keeping quality and bud opening characteristics following cold storage.
6. No differences in yield and quality from October through May.
7. Good corm and cormel production.
8. Resistance to foliage and corm diseases.

The purpose of this research was to evaluate the commercial cultivars presently grown in Florida and to compare them with the criteria established for the ideal commercial gladiolus.

METHODS AND MATERIALS

Corms of twenty gladiolus cultivars which had been stored at 5°C at least five months were provided by seven Florida growers. The seven principal cultivars grown in Florida (Beverly Ann, Friendship, Hopman's Glory, Spic & Span, Traveler, Valeria, and White Friendship) were obtained from five sources. Each remaining cultivar was available from only one or two commercial operations (Table 1). Half of each lot was planted October 8, and the remainder, following storage an additional three months at 5°C, was planted on January 29. The experimental design was a randomized block with two replications consisting of 25 jumbo (≥ 4.4 cm in diameter) corms each.

Corms were immersed for 10 minutes in Ceresan L (3 pt/100 gal) one day prior to planting and were allowed to drain overnight. Spacing of the corms was 5 per foot in a single row on 4.5 foot ground beds which had been treated...
with Vorlex (35 gal/A) three weeks previously. Parathion (10% granules) was placed over the corms in the furrow at 10 lb/A before covering and the beds were side-dressed with 600 lb/A of 4-8-8 (30% organic) fertilizer. Weeds were controlled by the use of Vegiben (4 lb/A) applied pre-emergence but immediately after corms had been covered. During the growing season the plants were side-dressed with a total of 180 lb N/A and 130 lb K/A. Insects were controlled with bi-weekly sprays of Thiodan (2 lb/100 gal) alternating with Parathion (2 lb/100 gal). Maneb (1 lb/100 gal) was used twice weekly for controlling fungus diseases. Watering was by open ditch seep irrigation.

Records were taken on both vegetative and floral characteristics of each cultivar. The specific characteristics measured in the Fall and Spring were are summarized in Table 1. Each spike was harvested, measured, and graded when the first floret showed at least one-half inch of color. A flower quality index (FQI) was established to evaluate each cultivar. The FQI is the sum of the values assigned to individual spikes divided by the number of corms planted. A value of five was assigned to the fancy grade (≥ 109 cm), three to the special (≥ 94 < 109 cm), and two to the standard (> 81 < 94 cm). Culls which included all short or deformed spikes, were given a value of zero. All corms were dug, cleaned, counted, and weighed in both plantings. Cormel production was determined by weighing the cormels formed and dividing by the number of corms planted.

Representative spikes were cut in tight bud stage, stored in hampers at 5 C for three days without water, and allowed to open at 3 C in water. The ability of each cultivar to open under these conditions was determined.

Table 1. Vegetative and floral characteristics of commercial gladiolus cultivars.

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Season</th>
<th>Average Flowering (days)</th>
<th>Net Return of Corms (%)</th>
<th>Average Weight of Corm (g)</th>
<th>Cormel Production (corms/corm)</th>
<th>Growth/Corm</th>
<th>Total spikes/Corm</th>
<th>Harvestable Spikes/Corm</th>
<th>Spike Characteristics (Avg)</th>
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<tr>
<td>#1029</td>
<td>F</td>
<td>86.0</td>
<td>62</td>
<td>49</td>
<td>2.2</td>
<td>1.9</td>
<td>0.8</td>
<td>83</td>
<td>34 61</td>
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<td>S</td>
<td></td>
<td>79.8</td>
<td>18</td>
<td>34</td>
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<td>2.2</td>
<td>1.0</td>
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<td>31 58</td>
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<td>61</td>
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<td>1.3</td>
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<td>97</td>
<td>34 106</td>
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<tr>
<td>S</td>
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<td>0.9</td>
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<td>46 113</td>
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<tr>
<td>Elizabeth The Queen</td>
<td>F</td>
<td>88.4</td>
<td>-6</td>
<td>73</td>
<td>1.3</td>
<td>0.8</td>
<td>0.4</td>
<td>84</td>
<td>33 106</td>
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<tr>
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<td>67</td>
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<td>46</td>
<td>85</td>
<td>1.7</td>
<td>1.4</td>
<td>1.0</td>
<td>110</td>
<td>46 106</td>
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<tr>
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<td>30</td>
<td>51</td>
<td>1.6</td>
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<td>0.8</td>
<td>110</td>
<td>49 94</td>
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<td>Hopman's Glory</td>
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<td>73</td>
<td>67</td>
<td>2.0</td>
<td>1.6</td>
<td>0.8</td>
<td>102</td>
<td>39 109</td>
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<tr>
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<td>66</td>
<td>2.0</td>
<td>1.1</td>
<td>0.7</td>
<td>101</td>
<td>43 110</td>
</tr>
<tr>
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<td></td>
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<td>-67</td>
<td>57</td>
<td>1.7</td>
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<td>Showpiece</td>
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<td>26</td>
<td>85</td>
<td>1.6</td>
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<td>0.6</td>
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<td>44 135</td>
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<tr>
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<td>0.6</td>
<td>110</td>
<td>54 127</td>
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</tbody>
</table>

* Fall (F) or Spring (S) flowering dates
** Sum of values assigned to individual spikes divided by number of corms planted

RESULTS AND DISCUSSION

Data measured during the Fall and Spring seasons are summarized in Table 1. Conditions were generally favorable for good growth and spike development during both seasons. Spike development of the mid- and late-flowering cultivars was delayed by cool weather in the middle months.
of December. Very warm and dry weather in April and May accelerated the maturation of the flower spikes. Friendship and White Friendship were harvested twice daily in the Spring to keep all measurements uniform.

Seasonal differences in the number of days for average flowering within the cultivars ranged from 0.5 to 13.2 days, representing Victory and Hopman’s Glory, respectively. During the Fall spike development of the latter cultivar continued for three weeks within the experimental units. Cool weather apparently delayed the maturation of the spikes. Friendship and White Friendship were the earliest to flower and showed little seasonal variation. T-590 was the latest to flower, requiring an average of 98.6 days in the Fall and 88.6 days in the Spring.

Spike length, which is synonymous with quality in the current commercial grading system, was highly variable among the cultivars. Average lengths in the Fall ranged from 83 to 115 cm, representing #1029 and Minaret, respectively. In the Spring, #1029 again produced the shortest spikes, 89 cm, while Victory surpassed the remaining cultivars with an average of 135 cm. The ideal length should be at least 109 cm, which is the minimum for the “fancy” grade. Victory also exhibited the greatest seasonal variation in length, 24 cm. Established commercial cultivars, such as Traveler and Valeria, varied no more than 7 cm between the seasons. Many of the cultivars produced longer spikes in the Spring with either no increase or a decrease in weight. This combination reduced the quality of the spikes, especially those of Friendship which decreased 8 g in average weight in the Spring.

Since most of Florida’s gladiolus flowers are shipped in hampers throughout the United States, spike weight is an important factor. The spike weight of Friendship, ranging from 100 to 120 g, is ideal for shipping. Cultivars such as Valeria, Victory, and T-590 have thick heavy stems which prevent efficient packing and shipping. Whereas 22-24 dozen spikes of Friendship will fill a standard hamper, only 17-19 dozen of T-590 will fit in the same area. Other culti-
vars whose spike weight and thickness are acceptable for shipping are Hopman's Glory, Wild Rose, and Traveler.

Two of the cultivars met the criterion of at least 17 florets per spike in both seasons. Peter Pears, which has replaced Orange Gold as the commercial orange, averaged 18 florets in the Fall and 20 in the Spring. Showpiece was the other cultivar with similar number of florets. Generally floret number was reduced from one to four per spike in the Fall.

Yields were expressed by the number of marketable spikes per corm, the percentage of spikes which were “fancy” grade, and the Flower Quality Index (FQI). Only Traveler and Wild Rose consistently had at least one saleable spike per corm. Peter Pears, Hopman’s Glory, and Friendship met this requirement in one season but not the other. Valeria, T-590, and Orange Gold exhibited the least number of marketable spikes. In the Spring Victory had 62% “fancy” spikes but only 37% in the Fall. No “fancy” spikes were recorded for #1029 and Elizabeth The Queen. Although Traveler produced many marketable spikes per corm, their short length is reflected in only 2 to 3% being of the top grade. The FQI, which measures both quality and quantity of the spikes, ranged from 0.3 to 6.1, representing Orange Gold and Wild Rose, respectively. The ideal FQI, assuming one saleable spike per corm in a ratio of 70% fancy, 20% special, and 10% standard grades, would be 4.3. Only Victory in the Spring and Wild Rose in both seasons surpassed this ideal.

Since all of the cultivars in this test are grown commercially at least on a limited basis, no major differences were expected or observed in their ability to open from tight bud following cold storage. Valeria opened even when no color was showing in the buds while Victory did better when at least 3/4” of color was showing. Although Hopman’s Glory opened well from tight bud, only 4-5 florets would be open at one time. These florets were also cupped and poorly placed. The opposite extreme was Traveler, which held 7-8 florets open before the lower floret wilted.

Corm and cormel production indicate not only the reproductive capability of the cultivar but also its tolerance to various corm diseases. The net return of corms ranged from -65% to +142%, represented by T-590 and Wild Rose, respectively. Corms of T-590 were destroyed primarily by Fusarium oxysporum f. gladioli Snyd. & Hans. while those of Elizabeth The Queen, with a net return of -58%, were infected by this fungus and Curvularia trifolii (Wakker) Boed. Fusarium was also isolated from corms of Wild Rose but this isolate apparently had little effect on the development of new corms and cormels of the cultivar. Wild Rose also produced the largest number of cormels, 26.5 g of cormels per corm. Elizabeth The Queen and #1029 produced the least.

Foliar diseases encountered in the trials were characterized by small lesions caused by Botrytis gladiolorum Timm, and C. trifolii and mottling caused by virus infections. Leaf lesions caused by the fungi were not severe enough to reduce spike quality. The virus complexes, which were not identified, affected spike quality of Traveler by discoloring the leaves and causing a color-break in the florets. Beute (2) reported five viruses in gladiolus in North Carolina and Jenkins (4) described Traveler as being very susceptible to virus infection. No inoculations were made to study differences in levels of susceptibility of the cultivars to the fungal or viral diseases.

Wild Rose was rated the best overall cultivar in the test. It surpassed all others in marketable spikes per corm, in corm and cormel production, and in FQI. Unfortunately, its color, which is medium rose with diffuse white blotches in the throat, is not widely accepted by florists. Since florist demand dictates what colors are grown, no substantial increase in the use of this cultivar is expected.

**EVALUATION OF INDIVIDUAL CULTIVARS**

#1029. Medium orange florets. Spikes were short and weak with poor production of cormels.

Beverly Ann. Light lavender florets. Spikes were short-budded in Fall. Stem wilted in hot weather. Good clear color with good spike production.

Elizabeth The Queen. Light lavender florets. Produced short spikes and corms are highly susceptible to Fusarium and Curvularia rot.

Friendship. Medium pink florets with diffuse white blotch in throat. Showed little seasonal variation in spike quality but spikes were weaker in warm weather.

Hopman’s Glory. Dark yellow florets. Florets were cupped with poor placement and keeping quality was poor. Had poor production of cormels.

Minaret. Medium salmon florets. Floret color
was not clear. Spikes were long but crooked. Leaves were yellowish.
Orange Gold. Dark orange florets. Spikes were short in the Fall. Florets were cupped and exhibited poor keeping quality.
Peter Pears. Light orange florets. Spike production was good and had many buds per rachis. Stems were strong and sturdy.
Professor Goudriaan. Cream-white florets. Produced short spikes in Fall. Corms were highly susceptible to Fusarium rot.
Showpiece. Light lavender florets with cream clutches in throat. Color was not clear or uniform. Produced few marketable spikes. Corms were infected with Fusarium.
Spic & Span. Medium pink florets. Keeping quality was good. Poor production caused by Fusarium.
Tequendama. White florets with lavender anthers. Produced few saleable spikes. Showed poor keeping quality. Spikes were short in cool weather.
Traveler. Light rose florets. Production of "special" grade spikes was excellent. Keeping quality was outstanding. Plants highly susceptible to virus infection.
Trophy. Deep lavender florets. Wilting in warm weather caused crooked spikes. Production of marketable spikes was poor.
T-500. White florets. Florets had blush tinge in cool weather. Produced short spikes and large clean corms. Cormel production was poor.
T-590. Deep yellow florets. Production was poor. Spikes were heavy and crooked. Corms were highly susceptible to Fusarium rot.
Valeria. Scarlet florets. Opened well from tight bud. Spikes were short budded. Corms were highly susceptible to Fusarium rot.
Victory. Scarlet florets. Spikes were heavy but was a good Spring producer.
White Friendship. White florets. Spike, corm, and cormel production was good. Stems were long and strong.
Wild Rose. Medium rose florets with diffuse white blotch in throat. Color was not clear. Best production of spikes, corms, and cormels in the test.

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LITERATURE CITED


POULTRY MANURE AS A SOIL AMENDMENT FOR CONTAINER-GROWN LIGUSTRUM JAPONICUM AND PODOCARPUS MACROPHYLLA MAKI

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University of Florida
Gainesville

Abstract

Two experiments were arranged in randomized complete block design to test effects of untreated and amended poultry manure on growth and quality of Ligustrum japonicum and Podocarpus macrophylla maki in containers using 3 rates of manure by volume, 5%, 7.5% and 10%, with