‘Florida Blue Frill’ and ‘Florida Pink Frill’—Semi-dwarf Heat-tolerant *Lisianthus* with Bicolored Flowers

Brent K. Harbaugh and John W. Scott
Gulf Coast Research and Education Center, University of Florida, 5007 60th Street East, Bradenton, FL 34203

Additional index words. high temperature, rosette, potted flowering plants, *Eustoma grandiflorum*, Gentianaceae, plant breeding

‘Florida Blue’ was released in 1995 as a blue flowering, semi-dwarf, and heat-tolerant cultivar of *lisianthus* (*Eustoma grandiflorum* (Raf.) Shinners; Gentianaceae Juss.) developed at the University of Florida’s Gulf Coast Research and Education Center, Bradenton, Fla. (Harbaugh et al., 1996). It was the first semi-dwarf cultivar whose seedlings could be grown at 28 to 31 °C without rosetting. Seedlings of most commercial cultivars of *lisianthus* form rosettes when grown at or above 25 to 28 °C (Harbaugh et al., 1992; Ohkawa et al., 1991). Rosetted plants have a basal cluster of leaves, very short internodes typical of biennials, and do not bolt or flower for 3 to 6 months unless exposed to <15 to 18 °C for 3 to 4 weeks (Ohkawa et al., 1994; Pergola, 1992). Thus, commercial production of *lisianthus* for late spring or summer sales is limited by high temperatures in many areas of the United States and other countries. Also, rosetting of plugs caused by the interaction of high temperatures and short days makes fall plug production to produce flowering plants for early spring sales difficult (Harbaugh, 1995).

‘Florida Pink’ and ‘Florida Light Blue’ released in 1998 (Harbaugh and Scott, 1999) and ‘Florida Silver’ released in 2001 (Harbaugh and Scott, 2001) were F1 semi-dwarf, heat-tolerant, low rosette-forming *lisianthus* similar to ‘Florida Blue’. These cultivars provided different flower color selections in the Florida cultivar group. ‘Florida Blue Frill’ and ‘Florida Pink Frill’ plants also are semi-dwarf and heat-tolerant. They have vegetative and flower characteristics that are similar to ‘Florida Blue’ and provide blue- and pink-bicolored flower selections to the Florida cultivar group (Fig. 1).

**Fig. 1.** ‘Florida Blue Frill’ (*left*) and ‘Florida Pink Frill’ (*right*) *lisianthus*.

**Origin**

‘Florida Blue Frill’ is an F1 hybrid resulting from crossing inbred lines UF03-529 and UF03-524 (Fig. 2). Both parents were chosen for their heat-tolerance and bright white petals with violet-blue borders. In addition, UF03-529 was chosen for its branching habit and UF03-524 for its compactness.

Received for publication 4 Nov. 2004. Accepted for publication 29 Nov. 2004. This research was supported by the Florida Agricultural Expt. Station, and approved for publication as journal series R-10565. We thank Nancy West and Gail Bowman for their excellent technical support.

HortScience 40(3):861–863. 2005.
Fig. 2. Pedigree of ‘Florida Blue Frill’ and ‘Florida Pink Frill’ lisianthus.

Table 1. Percentage rosetted plants and growth and flowering characteristics of nine cultivars of lisianthus grown in 11.5-cm (0.65-L) square pots at Bradenton, Fla.

| Cultivar             | Rosetted (%) | Plant | Basal branches | Flowers and buds | Petal length | Days to flower |
|----------------------|--------------|-------|----------------|------------------|--------------|----------------|
|                      |              | ht (cm) | width (cm)     | (no.)            | (cm)         | (no.)          |
| ‘Florida Blue’       | 4            | 39     | 23             | 4.2              | 56           | 6.0            | 138            |
| ‘Florida Blue Frill’ | 0            | 33     | 21             | 4.0              | 37           | 6.1            | 138            |
| ‘Florida Pink Frill’ | 0            | 35     | 23             | 1.6              | 46           | 6.3            | 132            |
| ‘Heidi Lilac Rose’   | 100          | 84     | 17             | 2.8              | 43           | 6.0            | 150            |
| ‘Heidi Pastel Blue’  | 62           | 97     | 21             | 2.0              | 35           | 6.6            | 149            |
| ‘Mermaid Pink’       | 100          | 27     | 18             | 2.8              | 37           | 4.9            | 141            |
| ‘Sapphire Blue Chip’ | 92           | 39     | 20             | 5.4              | 45           | 5.8            | 131            |
| ‘Sapphire Pink Rim’  | 71           | 25     | 20             | 6.6              | 35           | 5.0            | 127            |
| LSD (α = 0.05)       | 16           | 7.5    | 2.3            | 1.1              | 11.8         | 0.5            | 4.6             |

Seventeen-d-old seedlings were grown at 31 °C for 5 weeks in a growth chamber and evaluated after 4 weeks for percentage of rosetted plants. Values are means of three replications with eight plants as the experimental unit arranged in a randomized block design.

Vegetative and flowering characteristics were for plants grown in a greenhouse at 33 to 35 °C day and 13 to 15 °C night. Values are means of five replications of single-plant experimental units arranged in a completely randomized design.

Plant height = distance from the pot rim to the tip of the highest bud measured after three flowers had opened.

Lateral stems forming from the first four to five leaf pairs before bolting.
**Flower Color Description**

Flower color was determined under natural light using the Royal Horticultural Society Colour Chart (Royal Horticultural Society, 1966). A number plus a letter are used for each color chip (e.g., 65B). Petals of lisianthus typically are one color over most of the surface, but exhibit a distinct basal eyespot (i.e., base of petals surrounding the ovary) of a different color.

‘Florida Blue Frill’ and ‘Florida Pink Frill’ flower petals are predominately white (155D) on the adaxial and abaxial petal surface. ‘Florida Blue Frill’ flowers have a violet-blue (89C on the adaxial and 90C on the abaxial petal surface) border on the petal apex that is usually 0.5 to 0.75 cm wide. ‘Florida Pink Frill’ flowers have a dark pink (55C on the adaxial and 56A on the abaxial petal surface) border on the petal apex. The eyespot is a yellow-green (145B) on both cultivars.

**Characteristics and Use**

Cultivars used in our research belonged to four cultivar-groups. Cultivars in the Sapphire and Mermaid cultivar-groups are dwarf, cultivars in the Florida cultivar-groups are semi-dwarf, and cultivars in the Heidi cultivar-group are tall (cut flowers). ‘Florida Blue’ was the only cultivar that was known to have heat-tolerance and low rosette formation. Seeds of all cultivars were planted on 16 Dec. 2003 (control) or 21 Jan. 2004 (heat stress test) at Bradenton. Seedlings (17-d-old) were grown either in a glasshouse (control) with a high of 33 to 35 °C day and 13 to 15 °C night or at a constant 31 °C for 5 weeks in a growth chamber (heat stress test). Seedlings exposed to 31 °C were rated as rosetted if they had not bolted after growth for an additional 4 weeks in the control greenhouse. Nonrosetted plants from the control greenhouse were evaluated for plant height, leaf size, number of basal branches (lateral stems originating at the first four to five leaf pairs; i.e., from the basal cluster of leaves below the bolted stem), total number of flowers and buds per plant after three flowers were open, petal length, and the number of days from sowing to flowering.

The most important and distinguishing attribute of all the Florida cultivar-group cultivars as compared with the dwarf and cut-flower commercial lines was their heat tolerance (Table 1). Only 0% to 4% of the heat stressed seedlings of Florida cultivars rosetted. However, 71% to 75% of the Sapphire cultivar-group and 100% of the Heidi cultivar-group seedlings exposed to 31 °C rosetted.

In addition to heat-tolerance, we considered that ‘Florida Blue Frill’ and ‘Florida Pink Frill’ plants exhibited sufficient similarities in flower form and display, branching habit, and in the number of days from sowing to flowering in comparison with ‘Florida Blue’ that they could be included in the Florida cultivar-group. Notable differences between the Florida cultivars were 1) ‘Florida Pink Frill’ had fewer basal branches and flowered an average of 6 d earlier than the other Florida cultivars, and 2) the number of flowers and buds was less on ‘Florida Blue Frill’ plants compared to the other Florida cultivars.

Florida cultivars are intended to be used as bedding plants or for flowering potted plants. Treatment with growth retardants is necessary to prevent production of Florida cultivars in <11.5-cm-diameter pots (Harbaugh et al., 1998). One to three plugs per 7.6 to 11.5-cm-diameter pot is recommended for optimal marketing display.

**Availability**

Distribution of seed is through the Florida Foundation Seed Producers, P.O. Box 309, Greenwood, FL 32443. Scientist interested in small amounts of seed for research purposes should contact B.K.H.

**Literature Cited**

Harbaugh, B.K. 1995. Flowering of Eustoma grandiflorum (Raf.) Shin. cultivars influenced by photoperiod and temperature. HortScience 30:1375–1377.

Harbaugh, B.K., R.J. McGovern, and J.E. Price. 1998. Potted lisianthus: Secrets of success. Greenhouse Grower 16(1):42, 46, 48, 50, 52.

Harbaugh, B.K., M.S. Roh, R.H. Lawson, and B. Pemberton. 1992. Rosetting of lisianthus cultivars exposed to high temperatures. HortScience 27:885–887.

Harbaugh, B.K. and J.W. Scott. 1998. Six heat-tolerant cultivars of lisianthus. HortScience 33:164–165.

Harbaugh, B.K. and J.W. Scott. 1999. ‘Florida Pink’ and ‘Florida Light Blue’ Semi-dwarf heat-tolerant cultivars of lisianthus. HortScience 34:364–365.

Harbaugh, B.K. and J.W. Scott. 2001. ‘Florida Silver’ A semi-dwarf heat-tolerant lisianthus. HortScience 36:988–989.

Harbaugh, B.K., J.W. Scott, and D.B. Rubino. 1996. ‘Florida Blue’ semi-dwarf lisianthus [Eustoma grandiflorum (Raf.) Shin.] HortScience 31:1057–1058.

Ohkawa, K., A. Kano, K. Kanematsu, and M. Korenaga. 1991. Effects of air temperature and time on rosette formation in seedlings of Eustoma grandiflorum (Raf.) Shin. Scientia Hort. 48:171–176.

Ohkawa, K., T. Yoshizumi, M. Korenaga, and K. Kanematsu. 1994. Reversal of heat-induced rosetting in Eustoma grandiflorum with low temperatures. HortScience 29:165–166.

Pergola, G. 1992. The need for vernalization in Eustoma russellianum. Scientia Hort. 51:123–127.

Royal Horticultural Society. 1966. Royal Horticultural Society colour chart. Royal Hort. Soc., London.