Table 1. (Continued) Perennials for use in south Florida.

Botanical Name Common Name	Flowering Season	Flower Color and Cultural Information
Orthosiphon Cat Whiskers	summer through fall	Tall spikes of lavender or white flowers. Excellent background plant for full-sun to partial shade. Prefers moist, well-drained soils. Prune to maintain compact habit. Frost tender. Attractive to butterflies.
Osteospermum African Daisy	late winter through spring	Daisy-like flowers in shades of pink, purple, and white. Prefers full sun and tolerates most soil types. Cold and drought tolerant. Increased flowering during cooler temperatures. Attractive to butterflies.
Oxalis Shamrock	spring through summer	Small, single white flowers with beautiful purple clover-like foliage. Tolerates full sun to heavy shade. Excellent as edging or perennial border, very easy to grow. Dormant in winter, resprouting in the spring.
Pentas Star Flower	year round	Heat tolerant tropical sub-shrub, grown as an annual where freezes occur. Pentas are great background plants for sun-loving, lower growing annuals and perennials. Extremely attractive to butterflies. Drought tolerant once established. Few pest problems.
Rudbeckia Black-Eyed Susan	spring through fall	Nice accent plant. Good for cutting gardens. Are impressive when massed in background plantings, especially in naturalized gardens with ornamental grasses. Drought tolerant. Most cultivars will not survive south Florida summers.
Ruellia Summer Petunia Mexican Petunia	spring through fall	Lavender or pink petunia-like blooms. Useful in the flower bed or border, but it needs to be contained by a walk or edging as it is invasive. Prefers full sun, is drought tolerant once established.
Russellia	spring through fall	Tubular red flowers borne in large sprays on light green wispy foliage. Prefers Firecracker Plant full sun or partial shade. Very drought tolerant once established. Frost tender.
Salvia greggii Autumn Sage	year round	Masses of small flowers in red, white, salmon, or pink. Prefers full sun and most soils. Tolerant to heat and drought. Will not tolerate south Florida summers.
Scaevola Blue Fan Flower	spring through fall	Excellent low-growing ground cover. Prefers full sun to partial shade and fertile soil conditions. Useful in containers and baskets. Frost tender.
Scuttelaria Purple Fountain	year round	Purple or rose colored flower spikes attractive to butterflies atop low-growing ground cover. Prefers full sun and moist, well-drained soil. Frost tender.
Stachytarpheta Porterweed	spring through fall	Pink or purple flowers attractive to butterflies. Prefers full sun. Drought tolerant once established. Salt tolerant. Prune back to maintain compact shape.
Turnera Buttercup	spring through fall	Single-day blooming yellow flowers attractive to butterflies. Dark green foliage. Prune to maintain shape. Drought tolerant once established. Prefers full sun, will tolerate most soil conditions.
Verbena	spring through fall	Cultivar 'Tapien'. Heat tolerant perennial grown for their dependable bloom. Prefers full sun for optimum flowering. Drought tolerant once established. Excellent flowering ground cover or border edging and perfect for containers.

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GERMINATION AND GROWTH OF SEVEN PERENNIAL SPECIES IN SOUTH FLORIDA

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Additional index words. Natural wild seed populations, purple coneflower, blanket flower, Mexican hat, prairie bergamot, black-eyed Susan, lamb's ear, yellow coneflower.

Abstract. **The objectives of this study were to determine percent germination and to monitor growth and flowering, in a southern Florida environment, of seven natural populations of perennial seeds that had been collected from an Illinois prairie. Varieties examined were *Gaillardia* × *grandiflorida* (blanket flower), *Echinaceae purpurea* (purple coneflower), *Ratibda columnifera* (Mexican hat), *Ratibida pinnata* (yellow coneflower), *Rudbeckia hirta* (black-eyed Susan), *Stachys byzantina* (lamb's ear) and *Monarda fitulosa* (prairie bergamot). Two germination tests were conducted: 1) percent germination after 7 days in Metro Mix 500 (MM500); and 2) daily percent germination for 7 days in petri dishes lined with filter paper. All species, except black-eyed Susan, had less than 10% germination in MM500 as compared to germination in petri dishes. Germination percentages after 7 days in petri dishes were similar to percentages measured in MM500 for blanket flower, Mexican hat, yellow coneflower, and prairie bergamot. However, germination of purple coneflower, black-eyed Susan and lamb's ear were significantly greater in petri dishes than in MM500. All species grew well except for lamb's ear, that began to decline in June 1997. Only Mexican hat, black-eyed Susan and purple coneflower flowered.**

Herbaceous perennials are plants with soft, succulent shoot growth that live for 2 or more years and flower annually.

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Some herbaceous perennials are evergreen while others die back and survive dormant periods as crowns or as specialized underground structures (Brown et al., 1996).

Florida growers are selling more perennials each year due in part to their low maintenance requirement (Behe and Walker, 1996). Perennials do not have to be replanted once established, have a low water requirement, and need only yearly fertilizing. A well-prepared perennial bed will persist.

However, many perennials are not suited to Florida's climate and soils (Brown et al., 1996). Furthermore, seed companies selling perennial seeds do not offer the varieties and colors of many perennials found in native prairies. Many people *living in Florida* prefer wildflower mixes that remind them of their former homes in other areas of the U.S.

The objectives of this study were to determine percent germination and to monitor growth and flowering, in a southern Florida environment, of seven natural populations of perennial seeds that had been collected from an Illinois prairie.

Materials and Methods

Seeds from seven wild populations of perennial plants were collected from an Illinois prairie. Varieties collected include: *Gaillardia* × *grandiflora* Van Houtle (blanket flower), *Echinaceae purpurea* (L.) Moerch (purple coneflower), *Ratibida columnifera* (Nutt.) Woot and Standl. (Mexican hat), *Ratibida pinnata* (Venten.) Barnh. (yellow coneflower), *Rudbeckia hirta* L. (black-eyed Susan), *Stachys byzantina* C. Koch (lamb's ear), and *Monarda fitulosa* L. (prairie bergamot).

Seeds were manually cleaned of debris and separated into three lots of 100 seeds each. On 17 February 1997, seeds were sown into seed flats filled with Metro Mix 500 (MM500) (The Scotts Company, Maryville, OH) and placed in a greenhouse under 60% shade with 27 ± 5°C day temperature and 21 ± 3°C night temperature. Flats were irrigated with mist for ten seconds at ten-minute intervals, continuously. Percent germination was measured after 7 days.

Twenty-one days after sowing, 10 seedlings were transplanted into 804 cell packs (Hummert International Earth City, MO). On 20 June 1997, plants were transplanted into 3.8 L containers filled with MM500 and were fertilized with ≈6g of 14N-6.2P-11.6K Osmocote (The Scotts Company, Maryville, OH). Height was recorded throughout the experiment as well as time to first flower and number of flowers.

On 9 September 1997, a second germination test was initiated to measure daily percent germination. Seeds were separated in three lots of 10 seeds each and were sown on Whatman no. 1 filter paper placed in petri dishes. Filter paper was moistened with 1 ml of distilled water and petri dishes were placed in a controlled environment room held at 24 ± 1°C continuously and with 24-h continuous lighting from fluorescent lights.

All experiments were conducted at the University of Florida, Fort Lauderdale Research and Education Center. All data were analyzed by analysis of variance procedures (SAS Institute, Cary, NC).

Results

Seven days after sowing, all species, except black-eyed Susan, had less than 10% germination in MM500 (Table 1). Germination percentages after 7 days in petri dishes were similar to percentages measured in MM500 for blanket flower, Mexican hat, yellow coneflower and prairie bergamot (Table 1). However, germination of purple coneflower, black-eyed Susan, and lamb's ear were significantly greater in petri dishes than in MM500 (Table 1). All species examined reached half of their final germination percentage 3 to 5 days after sowing (Fig. 1).

Table 1. Percent germination 7 days after sowing of seven wild populations of perennials collected from an Illinois prairie.

Species	Percent Germination	
	Germination Test 1[z]	Germination Test 2[y]
blanket flower	9.3	8.3
purple coneflower	1.0	80.0
Mexican hat	4.3	5.0
yellow coneflower	4.8	3.3
black-eyed Susan	63.6	83.0
lamb's ear	4.7	83.0
prairie bergamot	5.8	5.0

[z]Conducted in Metro Mix 500 under intermittent mist in a greenhouse.
[y]Conducted in petri dishes in a controlled environment room.

Height varied with species, but all plants grew well (Fig. 2). However, only Mexican hat, black-eyed Susan, and purple coneflower flowered. Mexican hat and black-eyed Susan flowered 150 days after sowing while purple coneflower flowered 180 days after sowing. Lamb's ear began to decline in June and all specimens were dead by 15 July (Fig. 2).

Discussion

Because the seeds used were from natural wild populations, high germination percentages were not expected. Poor seed germination can result if the seed is not viable, the proper environmental conditions are not met, or a seed dormancy exists (Hartmann et al., 1997). Furthermore, in seeds collected from wild populations, many physical contaminants such as soil particles, plant debris, and other inert materials can reduce the amount of pure seed in a sample (Hartmann et al., 1997). Low germination percentages observed may have been due to the presence of physical contaminants as well as a low percentage of viable seeds.

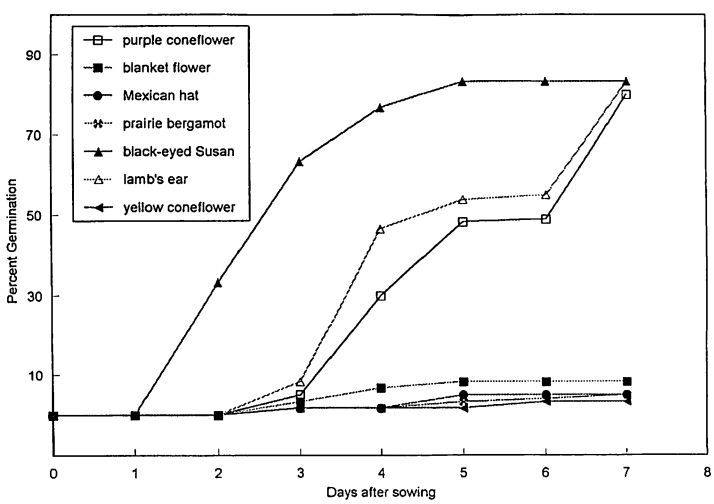

Figure 1. Daily percent germination of seven wild populations of perennials collected from an Illinois prairie. Germination test was conducted on moistened filter paper placed in petri dishes in a controlled environment room.

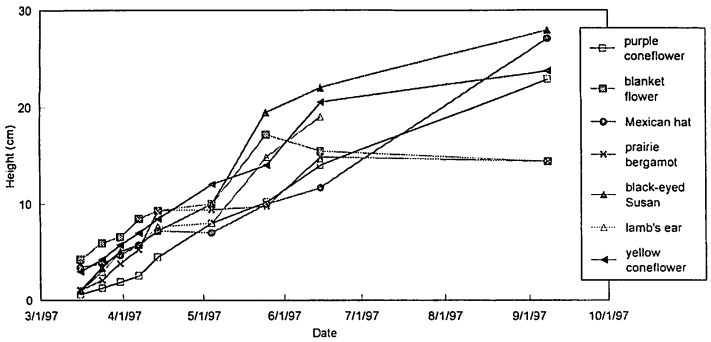

Figure 2. Height of seven wild populations of perennials collected from an Illinois prairie. Values are means of 5 replications.

The significant increase in germination of purple coneflower, black-eyed Susan, and lamb's ear between the MM500 test and the petri dish test may be due to damping off of seedlings in the MM500 test. Cool night temperatures (<20°C), long nights, and a continuously moist media are favorable conditions that predispose plants to the root rot Pythium (Powell and Lindquist, 1992).

All of the perennials, except lamb's ear, grew well. This is in agreement with Brown et al. (1996) and Black and Gilman (1997) who reported that purple coneflower, blanket flower, Mexican hat, and black-eyed Susan grow well in full sun in southern Florida. We suspect that the decline of lamb's ear probably resulted from excessively wet conditions. The total rainfall at the University of Florida Fort Lauderdale REC for June 1997 and July 1997 was 32.05 and 24.18 cm, respectively. Lamb's ear requires well-drained soil and subirrigation is recommended because the foliage is hairy and retains moisture which may cause leaf disease (Armitage, 1989).

The lack of flowering of yellow coneflower, prairie bergamot, and blanket flower could be the result of low light levels because these varieties require full sun (Armitage, 1989). However, many perennials will not flower the first year after they are planted.

Conclusions

This project was conducted to determine if perennial seeds collected in Illinois would germinate and grow in southern Florida. Our results are in agreement with other researchers that purple coneflower, blanket flower, Mexican hat, and black-eyed Susan will grow and eventually flower in southern Florida. Yellow coneflower and prairie bergamot also grew well and have the potential for use in southern Florida. However, we would not recommend planting lamb's ear in southern Florida due to high rainfall and humidity that could lead to potential plant loss.

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FLOWERING PERENNIALS FOR SOUTHERN FLORIDA—AN UNDERUTILIZED RESOURCE FOR THE LANDSCAPE

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Abstract. **Perennial plants were evaluated for their ability to survive in south Florida under typical environmental conditions. Included are recommendations for culture and habit for various types of perennial flowering shrubs. Recognized in the subtropics are three distinct type of perennial growth habits, evergreen, perennial and biperennial. This distinction will assist homeowners and landscape professionals to better select the proper perennial plants for various situations.**

Introduction

A perennial plant is defined with specific connotations in areas with distinct seasonal fluctuations characterized by change in temperature, sunlight and moisture. However, in the tropical and subtropical regions of the continental United States the