Through the efforts of University of Florida—Institute of Food and Agricultural Sciences, the International Palm Society, the Division of Forestry—Florida Department of Agriculture and Consumer Services, commercial nurserymen and the Repalming Committee of the Metro-Dade County Extension Service, education of consumers and producers alike will assure increased availability of palm plants to lend a hint of the tropics wherever they are seen.

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TROPICAL DAYLILIES: AN UPDATE

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Abstract. **Daylily hybridization undertaken in Miami in the early 1970's to produce daylilies which could reliably survive the absence of winter chill has produced a full color range including bicolors, color blends and contrasting eyezones; a range of flower characteristics including ruffling, doubling and reblooming; and a range of plant habit from tall and robust to miniature. New named cultivars have been crossed into the breeding line resulting in a race of plants with properties vying with the finest available elsewhere. Favorable notice has slowly increased the reception of tropical daylilies in landscaping and home gardening in southern Florida.**

Moving from "Up North" to southern Florida can be viewed in gardening terms as something like a step back in time. "Up North," the rather meager palette of garden color of our distant gardening forebears—fence-border hollyhocks and goldenrod and sunflowers and foxgloves, the occasional edging of pansies or forget-me-nots, the flower bed of transported wildflowers: columbines and poppies, perhaps some near-antediluvian daylilies among varieties of daisies—has exploded over the last two or three generations to a massive rainbow of color in elegant perennial borders and eye-riveting flower beds punctuating neighborhoods of gardeners.

"Up North" to the southern Florida gardener needs definition. It has less to do with the Mason-Dixon line than with a line across mid-Florida. North Florida from this perspective is much like Georgia and South Carolina, and not so different from North Carolina and Virginia. Southward from Maryland and Virginia, spring comes a little earlier, fall a little later. The cold of winter regularly reaches down on arctic front wings into northern Florida, and when it hangs on for a while it often does mortal damage to plants from warmer climates. Almost never do they inflict mortal damage to plant usually populating perennial borders, but southern Florida is another matter.

On reaching southern Florida, arctic fronts have mostly lost their sting, but the cold they bring sometimes can do damage. The occasional real frost, maybe once in ten years, can be devastating. But to perennial plants from the North cold weather—even frost—can be as invigorating as a letter from home. The enemy—the mortal enemy—of these "foreigners" is the *lack* of cold. "Chill requirement" is the two-word explanation of why the equivalent of the northern perennial border or flower bed is so little in evidence in southern Florida. Foliage plants so dominate the landscaping of dooryard, driveway, backyard, terrace in southern Florida that it's as if the technological revolution in flower color and form has yet to happen. It is not suggested that southern Florida lacks flowering plant materials but, as with tropical and subtropical plants generally, they have lacked the selective improvement evidenced in temperate climate plant materials, with notable exceptions such as the hibiscus. The paucity of flowering plant materials is inescapably evident in the use of such plants in gardening and landscape applications. Northern visitors to Fairchild Tropical Garden are sometimes heard to ask, "But where are the flowers?"

Moving from Virginia to Coral Gables twenty years ago, as a landscape architect and flower lover I brought some of my favorite irises and daylilies with me. The irises, planted in October, barely lasted into the heat of the following summer. One valiant large tall white, untriggered to dormancy, rebloomed several times at irregular intervals, each time at reduced height and bloom size, until it expired as a six inch miniature. The daylily experience was happier but marred by selective attrition.

I have discussed elsewhere the complex relationship between evergreen and deciduous daylilies (3, 8). Briefly, the evergreen quality derives from but one ancestor, *Hemerocallis aurantiaca* Baker, although more than a dozen species contribute to the highly genetically mixed modern daylily population (2). It is a dominant characteristic, however. The evergreen daylily understandably does not survive the rigorous winters of New England and the upper reaches of the mid- and far west. The deciduous daylily does well in both the North (except in regions with extreme winters) and South.

The usual assumption has been that deciduous daylilies need cold weather to trigger dormancy and ultimately the bloom of the next season. Both the North and the South

down to mid-Florida have such weather and, as a practical matter, the question does not arise. Evergreens, needing no such trigger of dormancy, presumably could do well in the warm winter region of southern Florida. Deciduous daylilies should not.

The usual assumption is incorrect. Selected deciduous types do well indeed in southern Florida. Many evergreens do not. The line between the two, so visually evident "Up North" is by no means so clear in southern Florida. Such is the basis for the widespread observation that "modern daylilies don't reliably grow in southern Florida, you know." It seems clear that modern daylilies have a mix of properties which cannot be sorted by a dormancy criterion, visually identified. Thus if one buys a $100 newly-introduced evergreen daylily for growing in southern Florida, a very expensive disappointment may be in store. A deciduous new introduction might prove a welcome surprise. Trial and error is an expensive way to find out about southern Florida daylily survivability, but in the present state of knowledge it seems the only way.

There is a different approach to successfully growing daylilies in warm-weather regions and that is to create a breeding line of survivables. In exasperation after three or four years I began crossing a few of the survivors. Early success brought addiction. The metamorphosis of a persistent effort to grow daylilies into a serious program of hybridizing has been detailed in a previous papers(4, 6). Named cultivars from Texas, Alabama, Louisiana, northern Florida, and occasionally farther north were incorporated in early experimentation. Tetraploids as well as diploids were included.

The new hybrids for the most part did well except during a succession of warm winters. Summer heat was not a problem except as those of darker hue demanded afternoon shade. Winter warmth was another matter. The growing mortuary list of the named departed did not reflect a total loss, nevertheless. Crosses into a growing survivor breeding line preserved many important genes and gene combinations. I selected seedlings for blossom characteristics, fragrance and plant habit; the weather, the ultimate critic, selected them for climate tolerance. Fragrance in daylilies, curiously, is a characteristic given scant recognition by the American Hemerocallis Society and is seldom even mentioned in its quarterly publication, The Daylily Journal. Yet fragrance has become through selection, a prominent characteristic in tropical daylilies. The scent varies in a wide range with a quite realistic similarity to rose, narcissus and lilac fragrances in various cultivars. The fragranmce is often quite poerful. In a perverse sort of way, the "good news from Up North" for daylilies in the form of cold—for southern Florida—winter weather in which daylilies flourish, sets back the selection process for a viable breeding line of tropically tolerant daylilies. Warm winters, especially in a succession, harm individuals but profit the race (7, 8).

Several major breeding developments have recently occurred, some reflecting new developments in the national daylily population, some being gratifying spontaneous mutations. Contrasting eye zones are striking variation in color from the center of the blossom out to petals and sepals. "Picotees" are petals edged with a sharply deeper color. Other features include extra petals; mutation of the stamen cluster to produce petal-like formations; wide variation in ruffling of petals and sepals; variation in fragrances; and new and more subtle colorations.

The continual infusion, year by year, into the gene pool of the tropical breeding line from new named daylily introductions from nationally known breeding programs keeps it dynamically related to the world of daylilies "Up North." Climate culling, meanwhile, though bringing disappointments, keeps this infusion from destroying the salient quality of the tropical breeding line, reliable warm winter tolerance.

A program to name and register tropical daylilies is now under way. 'Sonrisa' is a low, wide, ruffled lemon with green throat, very well branched with up to forty buds on a scape, a good rebloomer, with handsome foliage and a lovely fragrance. 'Miami Jonquil', a unique light yellow miniature of an entirely new shape—like a *Narcissus triandrus* with the petals cupped forward, the sepals flipped back—makes an appealing low clump. It is a vigorous bloomer and has outstanding rebloom. When the plant is well-established, part of the bloom is double. It has been distributed as far north as Maine, which raises the interesting point that possessing warm winter tolerance in daylilies does not necessarily diminish cold winter tolerance (5).

'Nell Jennings', named for the patron saint of Fairchild Tropical Garden, is a wide true pink, 21 inches high, is early and has good rebloom. Several outstanding new cultivars will be named and registered in the coming year.

As the breeding program has progressed, diversity along with dependability has been extended with each new generation. The blooming season now extends far beyond that of daylilies "Up North." There the blooming season extends for a six-week period in early summer, with some reblooming into early autumn. The southern Florida bloom starts in early March, increasing to a long "peak" season from April to the end of June, followed by gradually lessening rebloom and tailing off into November. Length of blooming has been added as a selection criterion for the breeding line of tropical daylilies.

Overall there has been broad improvement in blossom characteristics and plant dependability, a bit each generation. New cultivars are comparable in beauty with the most recent cultivars developed throughout the country, with color running from near white, cream, many degrees of yellow, gold, fluorescent oranges, melon, coral, pink, lavender, true purple, flame red, cerise and deep to nearly black reds and purples. Some new colors have to be seen to be believed. Plant habit and foliage are handsome year round—even after a rare hard frost such as that of 1977.

The breeding program has also provided an unofficial rating service for southern Florida use of new daylily introductions from elsewhere. Many are initially so expensive that it pays to wait a season or more before buying them. A list of the names of some of the best of these found useful for breeding—and which of course are meritorious for their own beauty—is available upon request. Self-addressed stamped envelope is requested.

Although daylilies are still seldom seen in southern Florida gardening and landscaping, the existence of daylilies suitable for the region is becoming better known. The Miami Herald has carried a number of articles about them, one featuring 'Nell Jennings', life size in full color in a half-page spread. Articles have appeared in the Fairchild Tropical Garden Bulletin (7, 8), the South Florida Home

and Garden Magazine (1) and the Ft. Lauderdale News and Sun-Sentinel. Classes have been conducted at the Fairchild Tropical Garden on growing daylilies. I will conduct an additional one there and one at Flamingo Gardens in Ft. Lauderdale during the coming spring. Frequent requests from garden clubs for daylily presentations are honored. A memorial planting of tropical daylilies is now featured at the Fairchild Tropical Garden. Tropical daylilies have recently found homes in the Bahamas, Key West and Hawaii.

Daylilies, when warm-winter tolerant, are superior plants for southern Florida with year round attractive foliage and great beauty when in bloom. As perennials, best of all, their plants multiply and their blossoms become more numerous each year, magnifying the display, year by year. They could become a part of an overdue revolution in landscape and gardening color in the southern Florida region.

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BROMELIADS FOR SOUTH FLORIDA LANDSCAPE

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Abstract. **There are many species of bromeliads that naturally occur in full-sun habitats throughout the tropical Americas. Some of these have adapted well in the southern Florida environment and offer colorful new character to landscaping. In addition, sun tolerant hybrids offer exciting new colors for bright-light ground cover. Since most species are both epiphytic and xerophytic, there appear to be few limitations for use on rock and stone walls, in trees, on driftwood logs, or in any imaginative setting. Some of the varieties tested will be discussed.**

Bromeliads for tropical landscaping in Florida have been given only modest consideration up to the present time, with interest largely from collectors and hobbyists. This is indeed surprising when you consider the wide ranges of characters available in bromeliads.

In the first popular book to discuss this group of plants (1) the authors summarized some of the special features of bromeliads in terms of foliage colors, variegations, flowers, attractive fruit, and unusual shapes. These were for bromeliads in cultivation in 1964. Consider this partial list of foliage colors: red, maroon, or purplish, within 13 genera and 42 species; pink, or pinkish, 8 genera and 13 species; golden or yellow-green, 4 genera and 5 species; silvery, 4 genera and 5 species; colored centers, 9 genera and 17 species; colored leaf tips, 4 genera and 9 species; longitudinal stripes, 4 genera and 9 species; spotted or mottled, 7 genera and 14 species; hieroglyphs or zig-zags, 3 genera and 5 species; and, crossbanding, 9 genera and 24 species. Variability in the other features described is similarly great. A few other familial parameters are of interest. Opinions differ but most authorities believe that there are between 2500 and 4000 valid species. Several new species are described each year. And lastly, hybridization activity has been conducted for over 100 years and has recently become intense. As of 1974, approximately 1950 bromeliad hybrids have been registered (2), and this represents only a small portion of the hybrids made.

Although bromeliad gardens of some stature began to appear in the two decades following World War II, serious and considered use of the family in a tropical landscape was rare, if it existed at all. Perhaps one of the earliest to appreciate and use bromeliads for landscapes was the internationally known architect Roberto Burle-Marx of Brazil. His designs using bromeliads in the 1950's and 1960's attracted attention in Brazil and other South American countries. The spectacular use of giant *Vriesea imperialis* for the roof gardens of the Foreign Ministry Palace in Brasilia was a classic example. In the early 1970's a southern Florida landscaper began importing large *Adrolepis skinneri* collected in the wild in Nicaragua. It was a striking addition to Florida horticulture, and to many landscape architects and contractors this species continues to represent "the bromeliad" landscape plant to many commercial users.

However, over the past 15 years a large number of additional species have been introduced and tested in southern Florida with clear success. Two important factors have been at work. First, bromeliads are tropical to subtropical plants and have minimum temperature limitations that cannot be ignored. Second, literature on the care and culture has been inadequate for horticultural purposes.

Experience has shown that the various species tested have demonstrated widely differing tolerances in minimal temperatures. As might be expected, species normally found at the higher altitudes where frosts and drastic temperature changes are the norm can withstand some of the worst winter conditions in southern Florida. On the other