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COLD TOLERANCE OF DAYLILIES BRED FOR WARM CLIMATES

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Abstract. **Unlike many groups of ornamentals and fruit trees, daylilies as a whole not only survived the freeze of January, 1977, but seemed to benefit from it. Among hybrids selected and reselected for lack of chilling requirement there has been no evident loss of cold hardiness. Foliage has been lush and sturdy, scapes strong and bloom very satisfactory. Improvement of flower form, color and substance, growth habit and amount, length and recurrence of bloom has been reinforced by increased warm climate adaptibility without a corresponding loss of cold tolerance. Two major problems remain: making the existence of these reliable plants better known and making them available in quantity.**

Cultural difficulties in South Florida have largely prevented the popularity of the beautiful, many-hued daylilies available today. Foremost of these difficulties has been the inherent requirement for a certain amount of cold (4). The amount of cold required varies greatly among different cultivars, apparently reflecting the amount of evergreen forebears in the breeding line (1). The lack of understanding of this characteristic and the ready availability of non-adapted plants have both generated and sustained a basic distrust of their cultivation in this area.

For some 6 years, my experimental breeding of daylilies, using some of the finest of the new, named evergreen cultivars, together with some of the older, reliable performers here has produced new hybrids which seem to lack the cold requirement which has been the bugaboo for growers here (3).

January 19, 1977 snow fell in Miami as a bitter cold wind from the north sliced irregularly through the city and its environs, searing the tropical vegetation almost like a blowtorch. Overnight, trees, shrubs and palms turned from green to a beautiful bronze. Each successive day the damage became more apparent. Leaves fell, fruit mummified. The new daylily hybrids, however, despite my fears, not only were undamaged by cold which wreaked such havoc in the rest of the garden but they looked better than before. They flourished, robust and vigorous, their bright green perhaps accentuated by the contrast with the brown of the weeds killed by the cold.

The new vigor extended into the growing season. Leaves were lush and thick, and there were many scapes with good bud count and fine flowers. A few deciduous cultivars bought primarily for hybridizing and which had been doing poorly, perked up and bloomed. 'Jamie Douglas,' a big deciduous gold tetraploid produced a scape for the first time in years, but the flowers were late and produced no seed. On the other hand, 'Lusty Leland,' a beautiful red tetraploid, also deciduous, from whom fine offspring were expected, quietly passed away without progeny. This and others, however, were already in "dormant decline" (my own term for terminal deciduous behavior in this climate) and the cold came too late. A few dependable cvs. such as 'Enchante' succumbed, but very few of my own hybrids were lost to the cold.

In most cases time of bloom seemed unaffected by the cold, although the old orange standby 'Playboy,' which has always bloomed here starting in early summer, bloomed in the spring as it does farther north.

In another aspect of cultural difficulties the cold was, again, beneficial. There was a definite diminution of aphid infestation, which has been severe for the past 2 years, perhaps due partly to the fact that there were fewer weeds to help host their activities. Red spiders seemed unaffected by the cold, but they are easily controlled by a combination spray developed by Kenneth Durio (2). It consists of 1 teaspoon diazinon, 1½ teaspoons benomyl, 1 teaspoon cygon 2E, and 1 teaspoon spreader sticker in a gallon of water. It will control most insect and fungus problems; in addition, the benomyl inhibits the reproduction of red spiders by tending to make them sterile (2). The fact that some spray program is absolutely essential for healthy growth and perfect flowers restricts their use on the menu for humans.

As a result of the cold, another insect proved a real problem. A number of hives of honey bees in the mango grove next door, deprived of mango and other fruit tree blossoms by the storm, were hungry. They descended on the daylilies, beginning before dawn, carefully removing the pollen and often achieving undocumented pollination in the process. Rather than get no seed, some of the fatherless seed, noted with "mother's" name, only was kept. Even when I got out at dawn, my presence was resented by the bees. The only way I could make desired crosses was to drop a plastic newspaperbag over the desired parent the night before. Even then, the bees were there to contest operations when the crosses were made.

The worst problem of all, and one I believe aggravated by the storm, was weed control. The blessing of massive weed kill from the freeze proved to be only temporary as the space occupied by the frozen weeds rapidly filled with thousands of new, vigorous seedlings. Some of these were unfamiliar to me, and the seeds may have come in with the storm. Local seeds, of course, received optimum distribution, also. The worst weed is a grass which lofts itself right over the top of beds and pots, sending down long aerial roots. These caused heavy loss among potted seedlings. More chemical control of weeds, both in preparation of the beds and as a pre-emergent treatment for planted beds will be used in the future.

In spite of problems, however, bloom was very heavy with many scapes with many buds. This year's hybrids have included some very lovely wide, ruffled pinks and corals; wide, flat creams and pale yellows with green throats, creams flushed with copper and fine oranges. Miniatures and small flowered hybrids have been especially free blooming this year, and rebloom of all has been heavy. Continued selection has resulted in noticeable improvement in sun and weather resistance.

A problem not directly related to culture is the slow rate of increase in South Florida. Specific cultivars must be reproduced asexually, since they will not come true from seed. Unless a plant has proliferations (small plantlets that sometimes appear in the axils of the inflorescence and are genetically identical to the parent plant) it multiplies slowly in number of fans. It seems in general much slower to increase desired plants here than in North Florida, although different cultivars will vary in increase rate. This may be an asset to the homeowner with a small space, but for the grower it limits production to the point where plants are not sufficient to market.

While evergreen daylilies are for sale by growers in the middle and northern areas of Florida, there are no color catalogs for information and encouragement. The few varieties offered in local nurseries are not much of an inducement to grow them, and if one is looking for the beauty of hemerocallis he has grown elsewhere, the easy way out is to give up the project. The existence of evergreen daylilies *per se* is not well known; the existence of fine locally bred and adaptable daylilies is virtually unknown. Those scattered few in South Florida growing modern daylilies are likely to remain few in number for the present.

And yet, as a group of plants, daylilies offer great promise as landscape material with fine foliage and flowers. For florists, the miniatures and small flowered cvs. bloom nicely in pots. For the housewife, they offer color in the garden and flowers for the house. For the hobbyist, they offer challenge and excitement.

Finally, this winter's experience has shown that improvement of daylilies in form, color, substance, vigor and adaptability to tropical climate seems not to have lessened an innate tolerance to cold. This should make such daylilies dependable performers in a variety of mild winter areas.

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FINDING THOSE SMALL BUT HIGHLY INJURIOUS PESTS ON INDOOR PLANTS[1]

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Abstract. **Increasing use of plants indoors necessitates the need for the detection of insect and mite pests, especially those hardly visible to the unaided eye. Major small or hidden pests include spider mites, tarsonemid mites, false spider mites as well as root infesting mealybugs. This article discusses indoor plant injury symptoms, pest biology, and a listing of major indoor plants most likely to become infested by these specific pests.**

The increasing use of ornamental plants indoors by the American public has increased demands for better quality plants. These same consumers are anxious to develop their skills in detection of pests injurious to these plants, especially those pests hardly visible to the unaided eye. Infestations by these pests must be detected early to avoid irreversible damage and plant losses. All this seems easy enough except that injury caused by these tiny pests is often mistaken by growers, florists, consumers and researchers for spray injury, disease or cultural mismanagement. We are not talking about aphids, foliar inhabiting mealybugs and scales for these are discussed in an earlier publication (13) and are large in comparison and easily detected. The small pests described in this article include mites and root infesting mealybugs. These pests often gain entry into interior environments by escaping detection during commercial production during which they may survive even the most rigorously applied chemical control program. Personnel caring for indoor plants are likely to be confronted by these pests and should become familiar with the characteristic damage they cause.

Spider Mites—The most common and destructive small pest on tropical foliage plants indoors is the red spider or two-spotted spider mite, *Tetranychus urticae* Koch. A complex of species appear to occur with the more common green species with 2 black spots referred to as *T. urticae,* while a reddish-carmine mite is identified as *T. cinnabarinus* (Boisduval) (1).

Adult *T. urticae* females are about 1/50 inch long, 8 legged and hardly visible to the unaided eye. A 10X or greater hand lens is needed to readily see them and populations often become quite large before detection. Most people in the interior plant business readily recognize this pest when populations have become dense and webs are produced over the foliage, especially on the new leaves (Fig. 1). Mites usually feed on the underside of newly developed leaves by piercing the leaf surface with their mouthparts and sucking out the plant fluids. Affected leaves exhibit a greyish or yellow speckled appearance which is particularly prominent on the upper leaf surface and very diagnostic of spider mite injury. Infestations under the low relative humidity of indoor culture often cause severe leaf injury and leaves may become dry, parchment-like and drop off.

Female *T. urticae* can lay an average of 144 eggs over a 19 day period either on the leaf surface or attached to strands of silk (4). Incubation time is highly dependent on temp as this period varies from 3 days at 90°F to 28 days at 50°F (15). Development from hatch to adult takes about 7 days; however, this again can be shortened by increased temp (2, 4). Spider mites pass through 8 developmental stages including the egg, 6-legged larva, first quiescent, protonymph, second quiscent, deutonymph, third quiescent

[1]Florida Agricultural Experiment Stations Journal Series No. 775. Appreciation is expressed to Dr. R. W. Henley for his assistance in obtaining the photographs.