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Daylilies

for every Garden

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UNIVERSITY OF ILLINOIS
COLLEGE OF AGRICULTURE
EXTENSION SERVICE IN AGRICULTURE
AND HOME ECONOMICS

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for every Garden

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VARIETY FLAMBOYANT, also shown on cover, has deep yellow flowers set off by dark red halos. (Photo by Sam Caldwell)



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DAYLILIES

for Every Garden

GAINING RAPIDLY in popularity, daylilies are truly one of the most up-and-coming perennials we can choose for our gardens. Their beauty of line and color brings them instant appreciation. Furthermore, they meet with lasting approval, for they are simple to grow, require no pampering, have a long blooming season, and are resistant to most insects and diseases.

Daylilies have exceptional landscape value for the home setting as well as for large estates, parks, and public plantings. They can be easily crossed to produce new varieties. Amateur and professional breeders alike find them easy and interesting subjects with which to work, a fact foretelling even more rapid improvements in the future. All in all, daylilies rank among the best hardy perennials for Illinois conditions but are also at home in most other parts of the country.

The name *Hemerocallis* has been given the daylily group. Derived from the Greek and meaning "beautiful for a day," this name reflects only half the truth. Individual flowers last but a single day, but since new buds open daily, the flowering stalks are beautiful for several weeks and the foliage remains attractive all through the season.

Daylilies grace a pool in the garden of Mrs. William R. Bach, Bloomington, a prominent Illinois hybridizer. (Fig. 1)



One who knows the grace of the newer hybrid daylilies and their great variety of color, form, and size, would hardly suspect them of being direct descendants of such common forms as the Lemon and Tawny Daylilies (*H. flava* and *fulva*). The latter is so familiar along roadsides, in old gardens, and abandoned cemeteries that many people regard it as a native wildflower or weed. It probably came originally to the Mediterranean countries and Europe over trade routes from Asia during or before the Christian era. Perhaps the beauty of its blooms or some supposed medicinal value, or both, contributed to its importation into the Western Hemisphere. Early colonists brought this flower to America with them from Europe. The species daylilies, all of which apparently originated in some part of temperate central and northern Asia, are disappearing from gardens because they are no match for the finer, newer varieties. However, our modern daylilies have all been bred from these imported Asiatic species and their descendants.

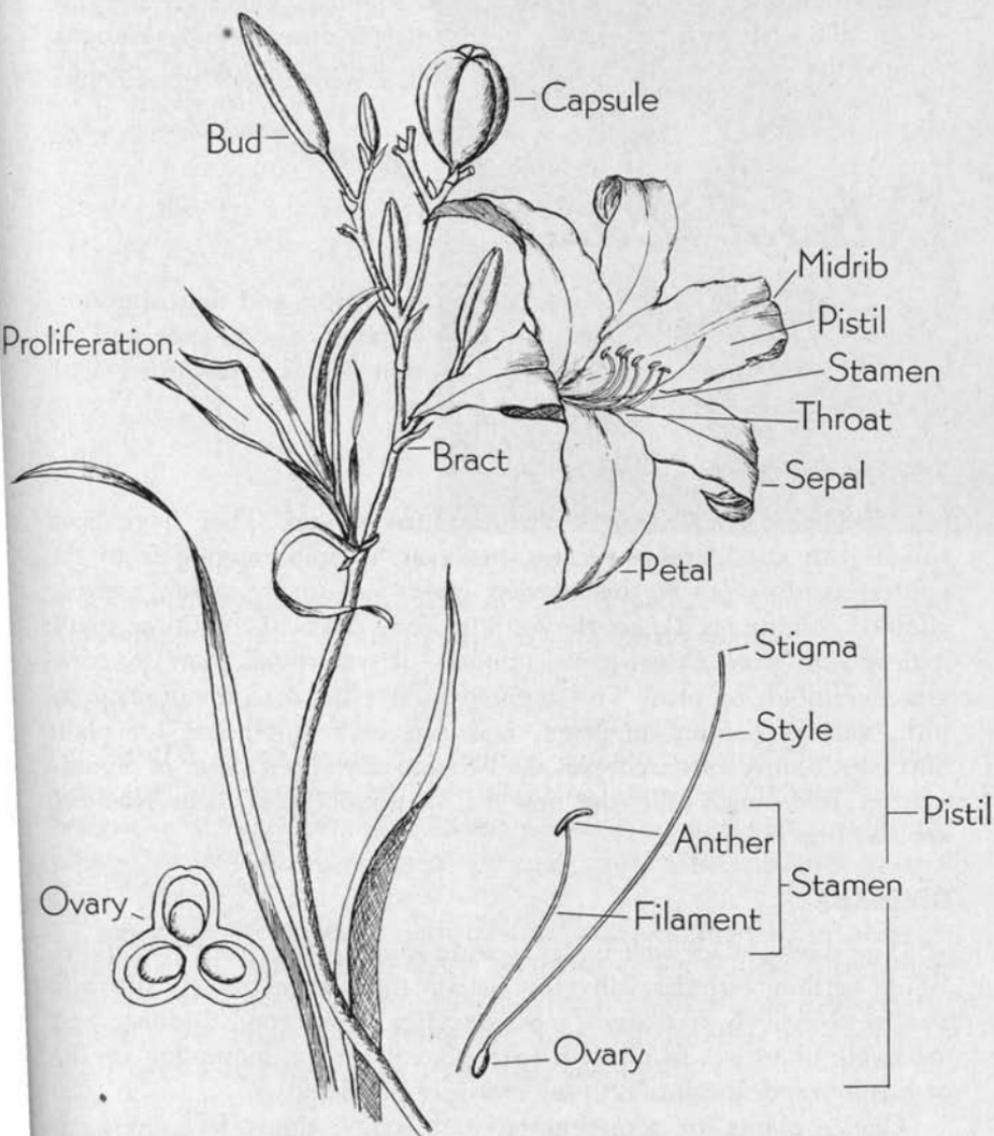
What Are Daylilies Like?

Hemerocallis are usually placed in the lily family, although some botanists hold that they are more closely related to amaryllis. Daylilies differ somewhat from the true lilies — they do not grow from bulbs, and the flowers are borne on leafless stems. The superficial similarity of the flowers is so great, however, that they are linked by their common names.

Characteristically, daylilies are hardy herbaceous perennials, with large clumps of rich green, smooth foliage. The narrow, heavily ribbed leaves are long and two-ranked, forming more or less regular fans. Some varieties have foliage which remains green all winter, while others are deciduous. The slender scapes (flower stalks) are largely naked, erect, and arise from the low crown of the plant. These scapes, which generally extend above the gracefully arching foliage, are branched near the top and bear clusters of showy lily-like flowers. Early varieties may flower with the German iris, immediately following tulips. Most, however, follow iris, some blooming later in the summer and others reblooming well into the fall months.

Although small-flowered types are to be had, daylily blooms are usually quite large. They range from less than 2 inches to over 8 in

diameter. Each flower has six stamens (pollen-bearing organs) and a single three-parted ovary (immature seed capsule). The upper portion of the perianth is divided into six parts, the inner three segments being called petals, and the outer three, sepals (Fig. 2). The perianth is tubular from the ovary up to the point where the stamens are attached.



The parts of a daylily bloom stalk, including floral anatomy. (Adapted from a sketch by Gretchen Harshbarger) (Fig. 2)

The over-all stature of various daylily species and hybrids ranges from less than one foot up to eight feet. Most commercial varieties are over 18 inches but less than five feet in height. The root systems vary from an almost fibrous type to the more common fleshy kinds. While several species and a few of the newer hybrids have underground stems known as rhizomes (Figs. 5 and 6, pages 13 and 14) which allow them to spread rapidly, most clones develop compact clumps. (A *clone* includes all the divisions from one original seedling, or "sport.")

Cultural Details

The daylily, it is often said, thrives on neglect and flourishes anywhere. Yet hardy as it is, this plant does respond to good care, and the gardener who gives it adequate attention will be rewarded with healthier plants and a multitude of flowers.

Soil requirements

Daylilies grow best in a medium-heavy loam. They have been raised with considerable success, however, in soils ranging from the lightest sandy types to the heaviest clays, and under widely varying climatic conditions. To get the soil into good physical condition, spade it deep and work in generous amounts of well-rotted manure, compost, leafmold, or peat. This organic matter helps to maintain good tilth, aids in holding moisture, and acts as a storehouse for plant nutrients. Sandy soils are especially benefited by applications of organic matter. In heavier soils, the new soil conditioners, such as Krilium, are also beneficial.

Drainage

The daylily does well under a wide range of moisture conditions. While certain varieties will grow satisfactorily in extremely dry and also in excessively wet areas, most daylilies prefer good drainage and moderate moisture. In gardens with poor drainage, mounding up the beds is a practical solution to the moisture problem.

Choice plants are sometimes seen in soggy, almost swampy locations, and along water courses and ponds. They may even be flooded periodically. Since damage from excessive moisture appears to be confined largely to regions with rigorous winters, it may be considered a form of winter injury. In Florida, for example, daylilies planted in

North Star, one of the finest of the pale yellow daylilies, was developed and introduced by David F. Hall of Wilmette, Illinois. This variety has ranked high in the Hemerocallis Society Popularity Polls for several years, largely because of its usable color and pleasing form.

(Fig. 3)



muck swamps where the crowns are occasionally covered with water have grown vigorously and multiplied with great rapidity.

Watering

Natural rainfall usually provides enough moisture for daylilies since they are not only efficient in taking up water but also carry a reserve in their thick roots. Even excessive dryness seldom kills the plants but it does injure them and may cause some varieties to drop their buds.

During a prolonged drouth daylilies will benefit from a thorough soaking of the soil to a depth of 10 inches or more. Use a seep hose or any type of overhead sprinkler. No further watering will be needed until the soil is once again quite well dried out. Daylilies respond especially to abundant moisture before they bloom.

Fertilizing

Fertilizing of daylily soil should be done sparingly, if at all. On good rich garden loam, little fertilizer is required, and an excess, particularly of nitrogen, can be detrimental. The working in of organic

matter improves the physical condition of the soil and often adds some nutrients as well. This treatment is usually sufficient.

In extremely poor soils or on light soils that leach badly, several light applications of any good *complete* fertilizer (such as 6-10-4 or 5-10-5) may be made in spring and early summer. For the average garden a single light application in early spring is enough. Apply complete fertilizers strictly according to the rates and methods recommended on the bag. Keep these materials off the foliage, and water them well into the soil. Newly planted daylilies should not be fertilized until they are fully established. Where a deficiency of plant food exists, fertilizer may stimulate or "rejuvenate" reluctant bloomers.

Regardless of the fertilizer used, daylilies are benefited by rather high levels of phosphorus (P), and potassium or "potash" (K), in the soil. Nitrogen (N), however, must be present in only moderate amounts for optimum growth. Too much N may cause yellowish foliage in early spring, later becoming coarse and a lush green. It also reduces the number of scapes, and those that do develop will be coarse and rank, bearing a few inferior flowers. The colors will be less brilliant, especially in the red and pink shades, and the flowers may lack the necessary substance to withstand the mid-day sun. Experience with other plants indicates that an excess of N reduces winter-hardiness.

Soil tests by a competent technician will help to determine the need for additions of N, P, and K, the three major nutritive elements. Where only N is needed, ammonium sulfate or ammonium nitrate is good. Organic sources of N include cottonseed and soybean meal, dried blood, and activated sludge. Cottonseed and soybean meal also provide some P and K; sludge has a small percentage of P but no K. Application rates are as follows:

For 100 square feet of soil

Ammonium nitrate	¼ to ½ pound
Ammonium sulfate	½ to 1 pound
Activated sludge (Milorganite)	4 pounds
Dried blood	2 pounds
Cottonseed meal	2 pounds
Soybean meal	2 pounds

If P alone is to be added, superphosphate is an economical source. An application of 3 to 5 pounds per 100 square feet worked deep into the soil is recommended. Another good P carrier is steamed bone meal; several handfuls may be worked into the soil around each clump. It provides a lasting supply of P and small amounts of N.

For K, unleached wood ashes, 5 to 6 pounds per 100 square feet, or potassium chloride, 1 to 2 pounds, are excellent. Wood ashes are best used on acid soils.

Soil pH (acidity or alkalinity)

Since the daylily is so undemanding in its needs, little attention has been given to its pH requirements. A slightly acid or near neutral reaction is considered best. However, the soil may apparently be somewhat acid (pH below 7.0) or alkaline (pH above 7.0) without much affecting growth. It is reported that daylilies become pale or yellowish-green where the soil is highly alkaline.

Sun or shade

For top performance the daylily should be planted where it receives full sunlight most of the day. Many varieties grow quite well, however, if they receive only morning sun and are partially shaded during the afternoon. The light shade from a distant tree or mottled sunlight, such as found in open woodland, is ideal.

It is often well to plant in a partially shaded location those varieties whose flowers tend to fade, wilt, or "burn" in direct sun. Flowering may not be so profuse, but the blooms will be of better quality than if exposed to the hot afternoon sun. In general the light yellows, pinks, reds, and dark shades profit particularly from semishade. Wilting and fading tend to be most severe on days when both temperature and humidity are high. Plants making rank, lush growth are most susceptible.

In deep shade daylilies will show abundant foliage but usually flower poorly. Moreover the flowers will lack the sheen and glow that sunlight shining through them imparts. Under trees the plants will also have heavy competition for water and nutrients.

When to plant or move

If necessary, daylilies can be divided or planted successfully any month the ground is not frozen. In warmer climates this means all the year round. In Illinois the ideal time for most varieties is probably between August 15 and September 30. Growth ceases just after blooming, followed by a period of rapid root action and the formation of buds for next year's flowers. Results are consistently good if planting or moving is done during this quiescent period, which falls in late summer for most daylilies.

Planting or dividing daylilies in late summer or early fall gives the new plants a chance to establish their roots before cold weather and helps prevent severe winter losses which may be expected if planted too late. Moreover, if the dividing is done early, the clumps from which the new plants are taken have time to heal their wounds and

are less susceptible to winter injury. When the weather is very hot or dry, it is best to wait for better growing conditions.

Some growers advocate making divisions during the last stages of blooming so that identification of clones is positive.

For very late blooming varieties, delay planting until spring. However, nearly all varieties of daylilies can be planted successfully in early spring without too serious interference with flowering. Southern grown stock should be ordered for spring delivery and planting to prevent large losses during the first winter.

Dividing daylilies

It is good practice to divide old clumps when the crowns have become so crowded that flower production seems affected. This may require the division of vigorous varieties every four to five years, others less frequently. The behavior of individual varieties should be the guide, but too frequent disturbances of the clumps is to be avoided. Most varieties do not reach their prime until about the third year after dividing, although if planted properly they will make a satisfactory display almost immediately. Dividing a limited number of clumps in any one season will insure a profusion of blooms every year.

A good division for replanting should include several strong ramets (offshoots). Cut the tops back to 8 to 10 inches but trim out only broken or decayed roots.

Although it is often stated that severe pruning of old fleshy roots results in vigorous new growth and rapid establishing of divisions, this practice is questionable, especially in late plantings.

When altering or moving clumps, take from the soil all small pieces of plants which might grow and be out of place in the garden plan.

How to plant

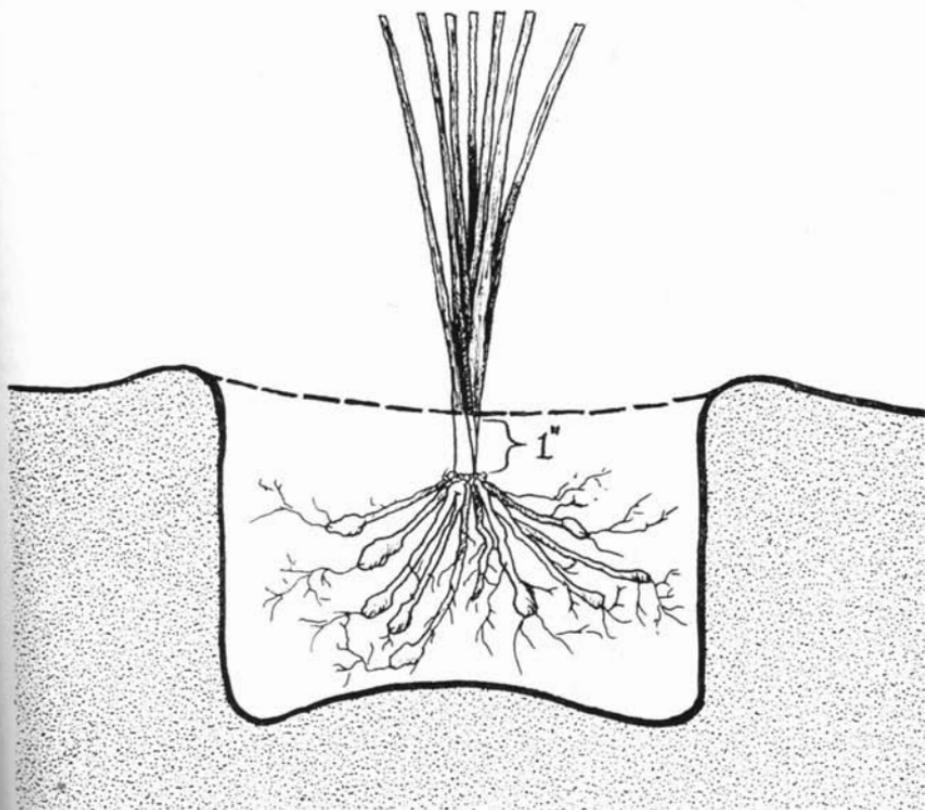
Plants received by mail or express should be set in the ground as soon as possible. If immediate planting is not practicable, leave the plants in the moist packing material or allow them to freshen for a few hours in water.

Before planting daylilies, work the soil into good friable condition to a depth of at least a foot. Dig a hole somewhat larger than the root mass, leaving a ridge in the center. Set the plant in place, with the roots well spread on each side of the ridge. New plants are usually set about as deep as they grew originally. The original depth can be determined by the white leaf bases, which indicate the parts that were

underground. A safer rule, however, is to set the plant so that the point where roots and foliage meet will be no deeper than one inch below the surface of the soil (See Fig. 4). Work the soil around and between the roots until they are covered. After firming the soil, water the plants heavily; this will help them get established and will encourage new root formation. When all the water has soaked in, finish filling in the soil, leaving a slight depression around the plant.

Daylily fanciers agree that too deep planting may cause browning of the foliage and general lack of vigor. The more vigorously growing varieties may, however, do fairly well even when too deeply planted.

Daylily plants should be spaced at least 2 feet apart each way, since some multiply rapidly and if planted any closer the clumps will soon be crowding each other. Most modern varieties lack the weedi-



When planting daylilies, spread the roots well and set with the crown an inch below the surface of the soil. Leave a slight depression for watering as you fill in the hole. (Fig. 4)

ness, however, of the Tawny Daylily. Established clumps can be kept from spreading by cutting around them with a sharp spade and removing crowns that extend out too far.

It is a good idea to put neat, permanent, but unobtrusive labels in place immediately after planting. Never rely on memory alone. There are many types of labels on the market, but those selected should be of durable metal, plastic, or wood, with lettering that will not fade or become obliterated. Before freezing weather, drive all labels well into the ground to prevent their being heaved-out during the winter. Check them again in midwinter. As a precaution, keep a record of the planting plan in a permanent plot book.

Summer and winter mulches

A mulch is not essential for daylilies, although often beneficial. Several inches of peat, compost, sphagnum, or other suitable organic material as a summer mulch helps to condition the soil. Water penetration and conservation are improved, weeds discouraged, and soil temperatures reduced.

The value of winter mulches for daylilies is frequently debated. In areas where the winters are cold and open, mulches reduce "heaving" of plants caused by alternate freezing and thawing, and they sometimes give much needed protection against late spring frosts. In most parts of Illinois, however, daylilies require no winter mulch once they are well established. For new plantings and also a few tender clones, especially some of the evergreen varieties, a mulch is desirable.

Winter mulches should be light and airy. Coarse materials such as sphagnum, straw, excelsior, ground bark, or corn cobs are good. Rock wool is also satisfactory. Leaves or similar soft materials which decay and pack quickly are not desirable. The winter mulch should not be more than 2 inches thick, and should be placed *around* the crowns, not over them. Improper or excessive mulching may contribute to winterkilling. Unless unsightly, some of the organic materials can be left on as summer mulches.

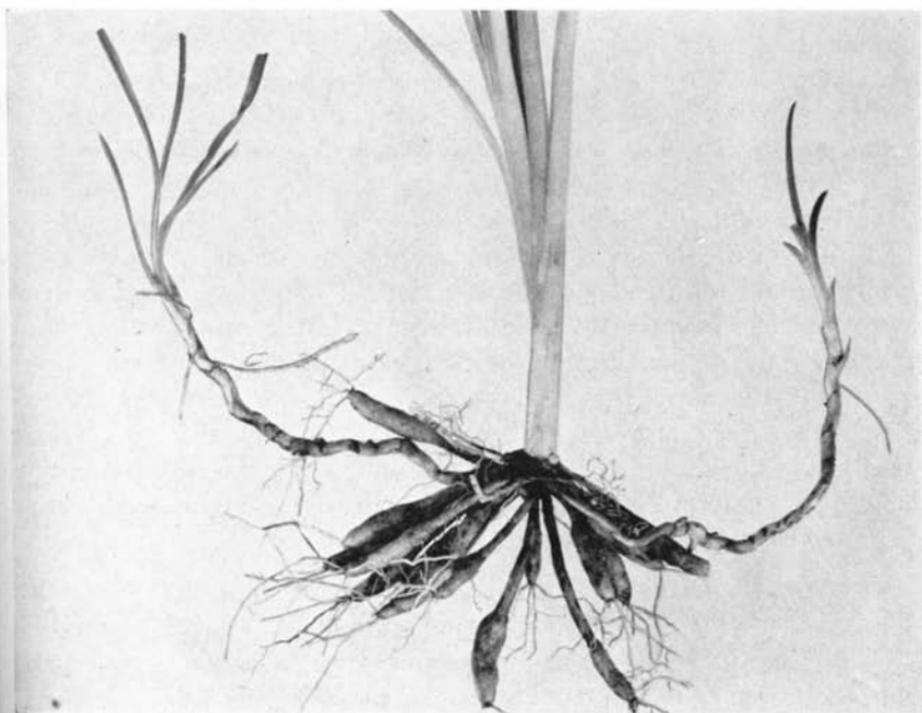
Sanitation

With daylilies as with other perennials, general sanitation pays. In spring clear away dead foliage and debris. It is also a good idea to remove damaged or diseased leaves several times a season. For appearance's sake, pick yesterday's wilted flowers if time permits.

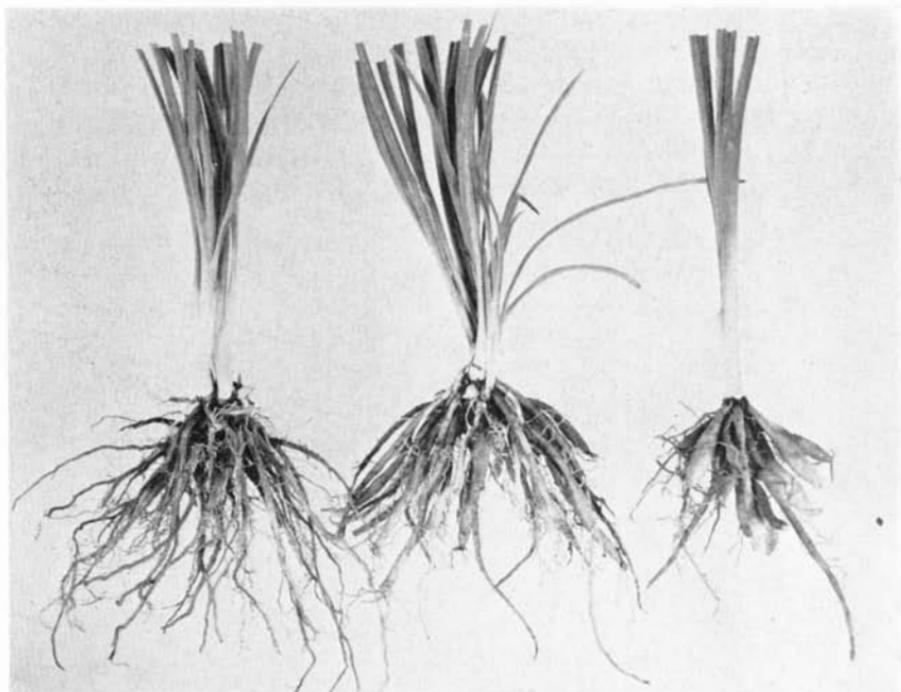
When the flowering season is over, cut off the scapes a few inches above the ground. Since developing seed pods are a severe drain on the resources of a plant, they should be left on only when seed is to be harvested. Chance seedlings in the daylily bed are a nuisance.

Cultivation and weed control

In the home garden, hoeing and mulching are the most effective weed control measures. Fortunately the foliage of full-grown daylily clumps is dense and close to the ground, serving to hold weeds in check. Any cultivation done should be shallow so that roots near the surface are not destroyed. Cultivate daylilies only often enough to keep down weeds and to break up the surface crust occasionally. Soil scientists no longer place much faith in the "dust mulch" theory. If practical, line out the stock to allow use of a mechanical cultivator with wing-foot shovels.



A root system with rhizomes such as shown is characteristic of all varieties of *H. fulva*, including the Tawny Daylily and *rosea*. Varieties of *H. fulva* have a tendency to spread. (Fig. 5)



Daylily root systems vary from the almost fibrous type on the left to the very swollen type on the right. (Fig. 6)

Although the daylily is only slightly sensitive to 2,4-D weed-killers, this material would seldom be a practical means of weed control except in large isolated field plantings or as a pre-emergent spray for seed beds. Even then it must be used with caution. Various grasses are among the most pestiferous weeds encountered and they are not affected by 2,4-D, nor are all broad-leaved weeds killed by it. Other nearby ornamentals may be severely damaged by the spray or spray-drift. Furthermore, 2,4-D may actually kill young daylily seedlings or divisions not yet well established.

Tawny Daylily as a weed

The Tawny Daylily often grows rampant in gardens, lawns, parks, and other sites. It is unfortunate that so many people have concluded that all daylilies are "weedy" because of their contact with this black-sheep of the *Hemerocallis* family.

Where the Tawny Daylily has become established, its eradication is a problem, especially since it spreads by means of rapidly growing underground rhizomes (Fig. 5). Unless the patch is very large, digging up the

plants and removing all roots and underground stems will generally get rid of this nuisance. During the following months, clean cultivation and the digging of any shoots which appear will complete the job. Plowing under or breaking up the clumps with a power cultivator may spread the plants.

Where digging and clean cultivation are not practical, *sodium chlorate* or *ammonium sulfamate* may be the answer. Sodium chlorate kills all vegetation, but it also leaves the soil sterile for a year or longer. Use it only where no planting is contemplated for a considerable time. In dry form the application rate for sodium chlorate is 1½ pounds per hundred square feet. Spread in late fall or early spring. Ammonium sulfamate ("Ammate") applied as a spray (¾ to 1 pound in a gallon of water) is fairly effective. Be careful to keep the spray off desirable plants.

Landscape Uses

Because of their fountains of attractive foliage, made even more charming when starred with lovely flowers, daylilies find numerous uses in home and public plantings (Figs. 1, 7, 14). Now available in many shades and heights and adapted to both sun and shade, their versatility is something for which any gardener should be grateful. They are effective in the perennial border, in beds, or along the edges of lawn areas. They also serve well as part of the foundation planting or along a wall, terrace, or driveway.

A long season of bloom

Few perennials can match the daylily in providing colorful blooms from early spring until frost. Their peak bloom falls in the gap between early spring and summer when color is often needed in the border. Daylilies also make their presence known during late July and August when many another perennial is sulking.

The attractive green foliage offers graceful lines and refreshing color over much of the growing season. Freedom from most insects and diseases practically guarantees presentable plants at all times.

Placing in the garden

Plan your daylily plantings so that they are displayed to best advantage against a satisfactory background. Shrubbery, evergreens, hedges, and various herbaceous plants, as well as fences, often serve

as pleasing foils. The background should be higher than the daylilies, forming a backdrop for the flowers and somewhat restricting the field of view. Such an arrangement will also cause the flowers to face away from the background and toward the viewer.

Daylilies tend to lean toward the brightest light. Each variety should therefore be placed carefully for best effect. Many of the darker shades are most attractive when viewed from the front. Some of the light shades, especially yellows and oranges, are effective when seen from any direction; they are particularly suitable for locations out in the open, where light comes from all directions.

In general, there should be contrast between the daylilies and their background. Light-colored flowers show up well against dark-green foliage, but even flowering shrubs may be used as background providing the colors do not clash or they bloom at different times. The darker varieties need brighter backgrounds. Deep reds and purples are good planted next to light buildings, walls, or fences where reflected backlight helps illuminate them. Bicolored or strongly patterned flowers are best against a neutral background, where their bold beauty is strikingly displayed. They are especially attractive as specimen clumps set off by themselves (see title page) and should be placed where they can be inspected at close range.

Ordinarily the taller varieties are best planted in the center of the bed or toward the rear of the border, where they become background for the shorter daylilies or other lower growing ornamentals. Varieties of medium stature fall logically in the middleground or on either side of taller plants. They are also attractive around the base of bird baths and beside garden seats, or flanking an entranceway. The dwarf kinds are best reserved for edgings or the foreground of borders. Occasionally they are used in the rock garden or as ground cover plants.

In all plantings the most desirable effects are usually not realized until the plants have become established. Fortunately the daylily is such a rapid grower that after a season or two a clump may have numerous scapes with 25 to 50 buds on each.

Those who want daylilies for house arrangements might well plant them in the cutting garden rather than depend on blooms from the border for this purpose.

For the patio or house

In the summertime a large daylily clump blooming in a tub on the terrace or patio will be a real conversation piece. Late in the winter, lift a clump of daylilies from the garden, plant in a tub or



Daylilies are versatile for landscape use — here they are displayed attractively in a perennial border and on a terrace. (Photos courtesy Farr Nursery Company) (Fig. 7)



large pot, and place in a warm, sunny window. You will have pleasing green foliage and a fair number of flowers, and achieve inexpensively the effect of a tropical indoor plant.

Color considerations

As with most other flowers, pastels and blends are best planted where close inspection will bring out their beauty. Bold, clear, self-colors may be placed where they will be viewed from a distance; individual clumps or small groupings of these serve as focal points for accent effects in the garden. Maroons and purples need afternoon shade, or light shade most of the day. Their use is limited since in full sun their colors sometimes become muddy and unattractive. Pinks also frequently fade in bright sun, and a prominent position in partial or dappled shade is advised for them.

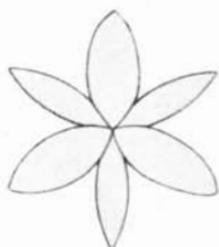
It is usually most pleasing to interplant yellows and other light shades with darker colors. This is preferable to grouping varieties according to their color classes or to establishing a gradation of colors from one part of the garden to another. The many yellow shades are by far the most usable in the garden, but the darker varieties in bold clumps of three or more add interest and contrast. The dark reds and purples ordinarily are used with restraint, but can be counted on for depth and shadows in the over-all garden picture.

This striving for contrast should extend beyond color to include flower form, size, and pattern (Fig. 8). Adjacent varieties look better if not exactly the same height. Likewise, many prefer to distribute the spring, summer, and fall bloomers throughout the entire border or garden rather than segregate them. Such a planned "random" arrangement will usually give an excellent garden effect.

A previously prepared chart showing the sequence of bloom, color, and height of varieties in your garden will be helpful in planning a new planting. Large clumps of a few varieties are more effective and less spotty than a multitude of small groups.

Pleasing garden combinations

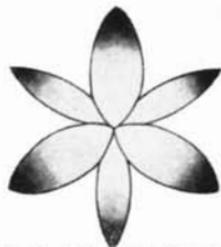
Planted among other flowering plants in the garden, daylilies offer variety of line, texture, and color. Not only do they combine well, but they usually flourish in almost any location. This is because they are relatively undemanding in their moisture, light, drainage, pH, and soil-fertility requirements.



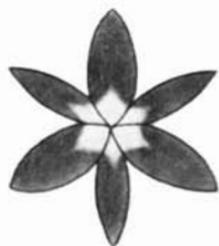
SELF PATTERN



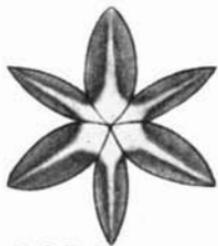
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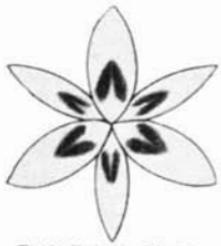
SEMI TWO-TONED; DISTAL



TWO-TONED; DISTAL



TWO-TONED; RADIATE



TWO-TONED; BANDED



BANDED; RADIATE



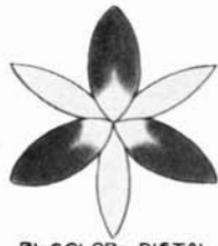
THREE-TONED; BANDED



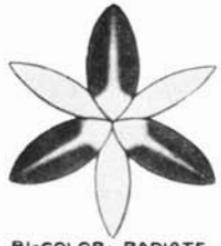
THREE-TONED; RADIATE



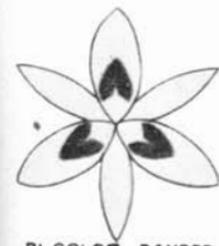
FOUR-TONED; RADIATE



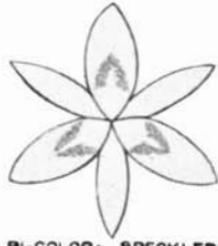
BI-COLOR; DISTAL



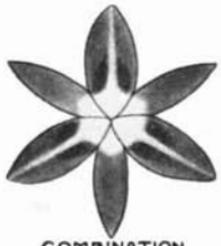
BI-COLOR; RADIATE



BI-COLOR; BANDED



BI-COLOR; SPECKLED



COMBINATION

The modern daylily exhibits a great many variations in color pattern, a few of which are shown above. (Courtesy Dr. A. B. Stout)

(Fig. 8)

Daylilies are often planted with early bulbous stock, such as tulips and daffodils. The daylily foliage does not interfere during the blooming periods of these plants. Later in the season the maturing and unattractive bulbous foliage is hidden by the expanding lush daylily clumps. The earliest blooming varieties are effectively combined with bearded iris, the whites and the delightful shades of blue and purple in iris contrasting beautifully with the gold and yellow daylilies. The later daylilies, with their main season of bloom falling in June and July, also make ideal garden companions for bearded iris and peonies. Daylily foliage does not grow very large until after the iris and peony blooming seasons are past; it is then that the daylily really comes into its own to continue the succession of color in the garden.

For pleasing effects later in the summer, the artistic gardener will think of endless combinations. Some daylilies work in well with colorful phlox, columbine, and blue delphiniums. Purple liatris is very striking with yellow daylilies. Many of the daylily colors also harmonize pleasingly with Shasta daisies, floribunda roses, oriental poppies, platycodon, hardy lilies, and even fall chrysanthemums. Highly interesting foliage contrasts are also possible with such plants as canna, coleus, dusty miller, and hosta.

The use of daylilies with annuals or biennials cannot be overlooked. Mass plantings of daylilies may be beautifully combined with foreground petunias: for example, with pink petunias for the yellow and gold daylilies, and with white petunias for the reds. Blue cynoglossum, larkspur, and salvia will also harmonize with many of the daylily shades.

Daylilies planted in a mass along an extended border, walk, or drive are especially imposing. Varieties of low or medium height are best. An all-season perennial border made up of tulips, iris, peonies, daylilies, and chrysanthemums will provide continuous interest from early spring until frost.

Evening-blooming daylilies

A number of varieties open their flowers about sundown. Certain others which open during the day remain in good shape well into evening (extended bloomers). These two types are particularly good around those features of the home grounds that are enjoyed during the evening, such as the terrace, lily pool, barbecue pit, or garden seats. Plants of medium stature would usually be most suitable here. All the better if these night-bloomers are sweet-scented. Light yellows seem

best suited for evening usage; they tend to illuminate the garden while deep colors are lost in the shadows.

Public plantings

Their ability to thrive with little attention makes daylilies especially well adapted to planting in public and semipublic areas, such as parks and cemeteries, around public buildings and churches, and along streets and parkways. When so used, they are more effective as masses of a single showy variety than in mixture. The fact that little or no winter protection is required is also an advantage here, because mulches can be expensive and unsightly.

Naturalizing daylilies

Daylilies naturalize admirably along streams or ponds, on slopes, in broken woodlands, or in open areas. For mass plantings of this kind, vigorous varieties with clear colors should be selected. At the present time, such plantings are usually limited to yellow or orange sorts because of cost. The bright reds, however, are becoming less expensive and will make a valuable addition to material now available for broad color effects.

Around summer homes or vacation cottages daylilies will thrive with a minimum of care and will bloom abundantly during the vacation season. They are unexcelled for the man who wants an attractive natural setting for his summer home but has little time for gardening. They are not likely to be molested during his absence, for they are little bothered by rodents or other animal pests.

Daylilies for erosion control

Daylilies may be planted along driveways or on sharply sloping lawns to keep the soil from washing away. For such uses and for erosion control on highway banks or cuts, inexpensive but rapidly spreading types, including *H. flava* and varieties of *H. fulva*, are best.

As a Cut Flower

As with most other flowers, daylilies are best cut in early morning while still fresh and undamaged by wind, sun, or insects. Choose those stems which have several perfect full-blown flowers and a

number of well-developed buds which will open on subsequent mornings. Varieties whose blooms remain open well into the evening in the garden are preferred for cutting purposes.

Cut the stems at an angle, then place them in deep containers of water in an icebox or coolroom for several hours. This allows the flowers to absorb water and harden off before being placed in an arrangement the same day. The use of a commercial preservative in the water is helpful. Avoid dropping water on the petals as it may cause discoloration.

Recent investigations at the University of Illinois have shown that a pH level of about 4.0 in the water helps prolong the life of many flowers.

Daylily arrangements

Daylilies have become very popular for home flower arrangements. With a little practice, almost anyone can display them to advantage. Their naturally stiff stems make wiring unnecessary. They may be used alone or in combination with other garden flowers and a wide variety of green and dried materials. Delphiniums, gaillardias, gladioli, Japanese iris, Shasta daisies, snapdragons, and zinnias are only a few of the many annuals and perennials that work up nicely with daylilies. Endless combinations can be devised that will brighten up the mantel, party table, or altar. Leaves of caladium, canna,



Daylilies combine well with zinnias, snapdragons, and many other garden flowers. (Fig. 9a)

Daylilies with their own foliage can be worked into eye-catching arrangements. (Fig. 9b)

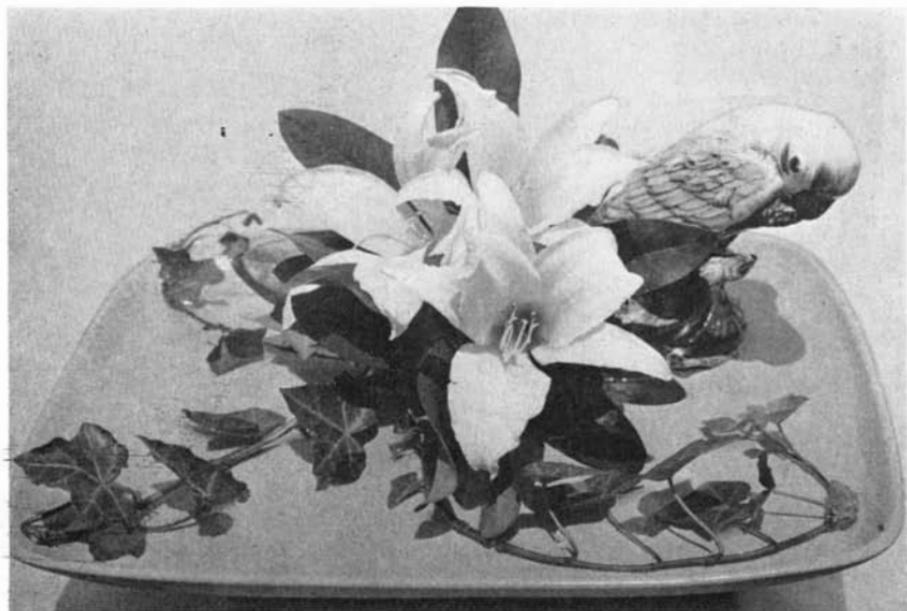


hosta, iris, and peony can be used effectively in place of the natural foliage, as can also the graceful branches of various shrubs and evergreens such as huckleberry, magnolia, rhododendron, and yew. The silvery leaves of artemisia will furnish a pleasing contrast with light yellows. But any of these interesting greens should complement the beauty of daylilies, not dominate it. Avoid very fine foliage such as that of *Asparagus plumosus* or *sprengeri*.

Utilizing the basic principles of design, work for good form and an interesting silhouette. Also strive for unity, pleasing balance and color harmony, and good proportioning of the component parts. Plan your arrangement before starting to put it together, keeping in mind that an important part of any grouping is the flower container.

Avoid top-heaviness. The buds and smaller flowers are best used at the top, with larger blooms at the base. When all blooms are nearly the same size, several may be grouped to provide a larger center of interest. With the many shades available, it is easy to achieve good color harmony. Remember that flower color as well as size can influence the balance of your arrangement.

Do not overlook the fact that daylily blossoms usually last but one day. In informal arrangements or mixed bouquets, a new set of buds opening each morning may not seriously detract from the overall effect; but in formal pieces the entire design may be altered, making complete rearranging necessary. If, therefore, the arrangement is for some particular occasion, it should not be made up until the day it is to be used. A clever idea is to make a background of com-



Individual daylily blooms grouped with sprigs of ivy and other greenery make pleasing modern arrangements. (Arrangement by Mrs. Marge Ohlemacher; photo courtesy Philip G. Corliss) (Fig. 10)

plementary greens and then add fresh daylily blooms to it each morning (Fig. 10).

In a refrigerator individual flowers will stay open for several days but will wither soon when removed to a warm room.

Arrangements to be used at night

When you need daylilies for decoration during the evening, there is more than one way of making sure the flowers will remain open. The most satisfactory way is to begin early in the evening of the preceding day. Cut only those stems showing buds slightly open at the tips. Normally these would open the following morning. Place the cut stems in deep water and store them in the refrigerator overnight and during most of the next day. Five or six hours before the blooms are needed, move them to a warm room and place them under strong incandescent light. The buds will open completely in several hours and will be in prime condition for a fine showing. Arrange the stems either before or after the buds have opened, depending on the effect you wish to achieve. Try out this method ahead of time to see if it works with the varieties you like in your arrangement.

If you must cut your flowers the day you are to use them, you can select stems from those plants you know to be extended bloomers or from others you have found to last well. Almost any of the daylilies in your collection can be used, however, if you first harden them, then work them into an arrangement and place them in the refrigerator until time for display in the evening.

Effective lighting

Indoors, as in the garden, daylilies lose much of their brilliance when out of direct light or light of high intensity. This is especially true of those in shades of red, pink, and lavender. In the daytime natural sunlight through a window is probably the best illumination.

While some yellows are more attractive under fluorescent light, many other colors, including those mentioned above, usually make a better showing under incandescent lamps. The latter more nearly approach the quality of sunlight. New types of fluorescent bulbs, however, are becoming available which enhance rather than detract from flower colors.

Other uses

Daylilies can be used attractively in corsages of all kinds. Flowers and buds of the small multiflora varieties are usually best. After cutting the single blossoms, harden them in the refrigerator. Make them up just before they are to be worn. For evening wear, it may be necessary to open the flowers under incandescent light.

Daylilies are well suited for outdoor ceremonies. They can also be used for decorating graves. If they are intended for the cemetery, place them in vases with plenty of water. Since fresh flowers will open every morning, the general effect will be pleasing for several days.

Although not often called for in American recipes, daylily flowers have long been considered a delicacy in China and in Chinese settlements elsewhere. Either dried or fresh, they are put into soups and meat dishes or cooked with noodles. The dried flowers are sold as *gum tsoy*, golden vegetable, and as *gum-jum*, golden needles.

Few Disorders or Enemies

While not completely free from insect pests and diseases, the daylily is seldom troubled by them. This relative resistance helps make the daylily one of our most dependable hardy perennials, requiring prac-

tically no dusting or spraying. No daylily diseases have yet become definitely established, although isolated reports of a possible virus disease and several fungal leafspots, root and crown rots, and a rust have come from various parts of the world. Various symptoms, however, are often seen which suggest pathogenic origin. *Fusarium* fungi have been isolated from the decaying roots of unhealthy plants at the University of Illinois, but may possibly have entered after the roots died.

It has been suggested that daylilies planted among other ornamentals may repel certain insects, possibly because of the colchicine content of the foliage. This has not been verified, however.

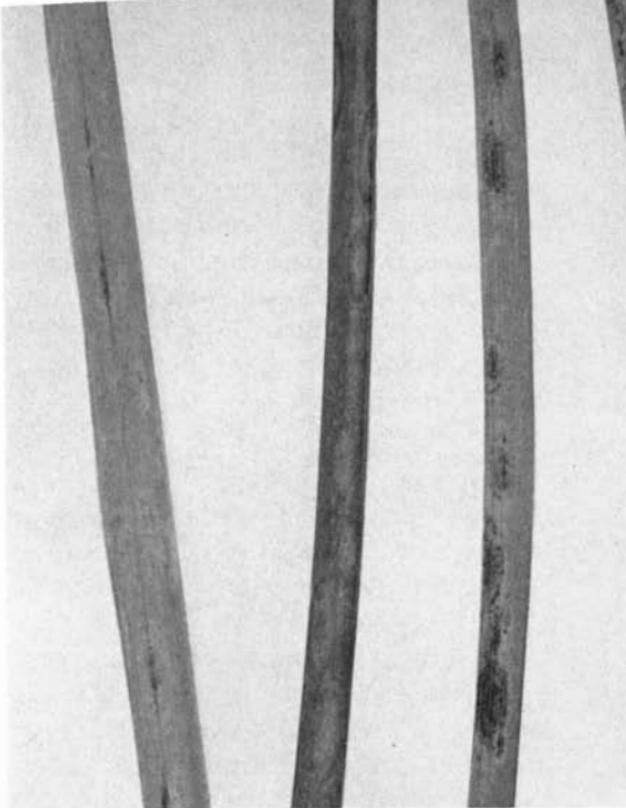
Winter injury. In early spring some daylilies start slowly, showing a few yellowish malformed leaves and little vigor. This is often due to lack of winter hardiness and is particularly common with the evergreen types. You will likely find some decaying and dying of the crowns. Shoots are often stunted or spindling. Frequently these plants will recover completely only to suffer further setbacks in following winters.

Frost injury, the result of late frosts or freezes after spring growth has started, is characterized by brown and tattered leaf tips and margins, later followed by normal development and flowering. A mulch will help delay early growth until danger of frost is past.

Too deep planting. Symptoms arising from too deep planting are often confused with disease or insect injury. They include low vigor, poor flowering, and a yellowing or browning of leaf tips or whole leaves during the entire growing season. By late summer the plant may appear dead. The root system, however, will be found more or less intact; but if the clump is not lifted to a more suitable depth the fleshy roots which are too deep usually disintegrate. Weak varieties succumb entirely; the more vigorous ones, on the other hand, will develop heavy roots at a more favorable depth. Once this has occurred, the plant sends out a flush of new crowns and recovers quickly. This ability to correct improper planting is somewhat unique among plants.

Russet spot. The leaves on occasional clones show greenish-yellow spots which gradually enlarge and turn orange-brown (Fig. 11). As the season advances, the tips or even the whole leaves may dry up and die. No fungus or bacterium has been definitely associated with this non-contagious difficulty, which some have suggested may be caused by a virus. According to reports, such varieties as *H. fulva rosea* and others derived from it are among the most susceptible. Fairly satisfactory flowers are usually produced despite the leaf browning, which one investigator has labeled "russet spot." Partial shade seems to reduce the symptoms.

Orange-brown spotting of day-lily foliage has been termed "russet spot"; the cause of this disorder is unknown. (Fig. 11)



Daylily blight. Another disorder of unknown origin is sometimes called "blight." One or more flower scapes on a plant suddenly wither and die, even though the buds are well formed and some flowering may have already occurred. Part or all of the foliage becomes yellow-brown and dies, usually after the scape has blighted. Examination of the root mass shows that a large portion of it has decayed. Usually, however, the plant recovers in the same or the following season, sending up shoots from the surviving portions. Although the symptoms lead one to suspect a bacterial infection, this has not been verified. Mud-daubers, which gather nectar from the buds, may spread the "disease." Dust or spray with DDT to reduce their numbers.

Thrips on daylilies. By far the most serious insect pest of daylilies is a thrips (*Frankliniella tritici* (Fitch)). These tiny insects find their way into the crowns and developing buds even before the flower scapes appear and damage stems and flowers. The foliage is not usually injured. In severe cases there may be complete loss of flowers even though the plant survives. Thrips injury later in the season usually produces misshapen, discolored flowers.

Spraying with DDT or dusting with 5-percent DDT powder is very effective against thrips and does not injure the plants. A good spray formula consists of 2 tablespoons of 50-percent wettable DDT and 1 teaspoon of detergent powder in 1 gallon of water. Apply several times at 10-day intervals in early spring and in the fall. One of the newer insecticides, Lindane, is also currently being recommended for the control of thrips.

Among the types of daylilies most susceptible to thrips are *H. citrina*, *multiflora*, *thunbergi*, and their hybrids.

Wasps, Japanese beetles, red spiders, grasshoppers, and slugs.

Wasps and mud-daubers in search of nectar may injure daylily buds by gnawing them. Japanese beetles have also been known to attack the daylily. DDT sprays or dusts are effective against both of these pests, but not against red spiders (two-spotted mites). Dusting with sulfur will somewhat discourage spider infestations, usually at their worst in hot periods. To get rid of them completely, spray with wettable powders containing Aramite or chlorobenzilate; use these materials according to the manufacturer's directions. Grasshoppers are best controlled with chlordane, used either as dust or spray. Against slugs, which occasionally damage daylilies, use any good commercial slug bait. These usually contain metaldehyde.

Root-knot nematodes (eelworms). Fortunately, daylilies are seldom attacked by root-knot nematodes (eelworms), although apparently susceptible. These soil-infesting parasites, most troublesome in the South, are found as far north as Canada. They cause gall-like growths on the roots of many plants and make them more subject to winter injury. A single report from Florida of nematode injury on *Hemerocallis* was unusual enough to warrant publication.

Buying Daylilies

Buy from a specialist

It is wise to purchase daylilies from a specialist rather than a general nurseryman. The specialist handles a wider selection of varieties, including many of the newer and superior introductions. The average nurseryman, on the other hand, usually stocks only a limited number of older, often obsolete, varieties. Advancements are coming so fast in the daylily field that a gardener should include a few of the later introductions along with the old standards. Reliable daylily dealers are located in all parts of the United States. Their advertisements are carried in gardening magazines, and catalogs are available upon request.

See before you buy

It is a good rule to buy only daylily varieties which you have seen and liked. Catalogs almost invariably describe their offerings in all

too glowing terms. The recommendations of fellow-gardeners are helpful but are often tempered by personal taste. Be sure to notice how the blooms on the varieties you have chosen hold up through a hot, sunny day. (See pages 52 to 55 for more suggestions on what to look for in a good daylily variety.)

Although vegetative characteristics can be described satisfactorily, coloration of the flowers is most difficult to portray in words. Their color is derived from both plastid (orange, yellow) and sap (red, pink) pigments, present in various combinations and overlays (Fig. 8). No good plan for describing flower colors has yet been devised, although several commercial color charts have been helpful. Furthermore, colored pictures and slides often exaggerate or distort true shades.

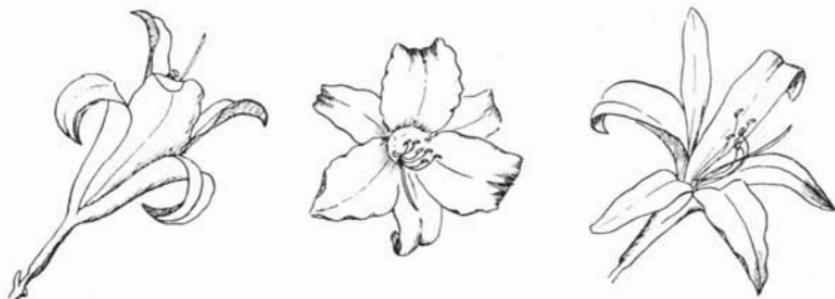
It is not only necessary to see the color of flowers a variety bears before buying, but to note whether its other floral and vegetative habits will fit into the landscape picture. A visit to the plantings of local dealers during the blooming season will be valuable. Almost every city also has several daylily fanciers who gladly open their gardens to visitors and volunteer helpful advice. The Hemerocallis and American Plant Life Societies both maintain test gardens in various parts of the country. These are open to the public, and the hundreds of varieties growing in each, both old and new, are readily compared and evaluated.

In form and size of blossom as well as in color and habits, daylilies vary greatly. For some idea of how wide the variation is, see the borders on pages 30 to 35.

Regional adaptation

Regional adaptation is a very real thing with daylilies. A variety which does well in one section may lack hardiness or brilliance of color in another. Likewise, its growing habits and season of bloom may be modified by varying climatic, soil, and light conditions. This is so true that a variety which looks superior in one area may prove entirely unacceptable in another. Seek the advice of growers in your own community, even though purchasing from firms remotely located.

In general, evergreen or semi-evergreen varieties (varieties that retain some live foliage over winter) are best for southern and west coast areas, while deciduous varieties (foliage dies down in the fall) are preferred for the colder zones. Many catalogs include descriptions of foliage characteristics.



What about prices?

Prices for daylily plants range in various catalogs from 50 cents to \$25. The premium prices are placed on newer introductions which are short in supply. When the stock of these becomes more plentiful, prices drop accordingly. Accept only strong, well-rooted divisions, regardless of cost.

The current intense interest in daylilies has resulted in far too many new seedlings being named and introduced. A few of these are truly superior, while others are little or no better than varieties already on the market. The thrifty gardener will do well to buy cautiously from among the more expensive offerings. Only persons with unlimited resources can hope to keep up with the newest and finest introductions. It is often possible to build up a fine collection inexpensively by buying a few good varieties and trading them with other fanciers.

Daylilies for the beginner

The great number of daylily varieties listed in catalogs may well baffle a gardener who wishes to become acquainted with this plant. Also, a beginner may hesitate to spend much money on daylilies until they have proved themselves in his garden. Fortunately, however, an excellent planting can be made up entirely of varieties costing a dollar or less a plant. Following is a selected list of twelve top-notch daylilies that fall in this price range:

BLACK PRINCE — Satiny black-red flowers with yellow deep in throat. Flowers remain open into the evening. (38")

CABALLERO — A large-flowered bicolor with vermilion petals and yellow sepals and throat. (40")

DAUNTLESS — Medium-sized flowers of pale yellowish-orange with pastel blended midzone. Petal segments are wide. Flowers have excellent substance and do not close until well after dark. Very fragrant. (36")

HESPERUS — A lemon-chrome of large size and wide petals; good form and substance. (42")

HONEY REDHEAD — Flaring brownish-red flowers with distinct creamy-yellow midribs and borders. Should be grown in partial shade to minimize fading. (38")

MIKADO—Large rich orange with contrasting deep mahogany-red throats. Fragrant. (36")

MOONRAY—An evening bloomer; pale yellow with a semi-halo effect of Pompeian red. Widely flaring flowers with gracefully recurved petals. (30")

MRS. HUGH JOHNSON—Rich red with satin sheen; wide petals. Flowers remain open evenings. (42")

PATRICIA—Large pale-yellow blooms with greenish throats. Fragrant, and flowers last into the evening hours. (36")

PINK CHARM—A pleasing deep coral or rosy pink, with widely open flowers and recurving petals. (40")

QUEEN OF GONZALES—Large deep-yellow flowers with wide overlapping petals and unusually heavy substance. Blooms early, often reblooming later in season. (36")

RAJAH—Bright flame-scarlet with mahogany eye zone. A repeat bloomer. (42")

The total cost of these varieties is about ten dollars.

"One hundred best"

Any list purporting to enumerate the finest daylily varieties in the various color classes would soon be out of date. Following is a list of the 100 favorite daylilies for 1953, as selected by members of the Hemerocallis Society in all sections of the country. A beginner would be safe in buying any of these varieties. Remember, however, that several years are often required for a new daylily to attain the popularity necessary to place it in this list; also that really outstanding introductions rise very rapidly in popularity. (See "Daylily Awards," pages 56, 57, and 58.)

The varieties are listed in the order of their popularity. The number in parenthesis after the name is the 1952 rating, then follows the variety's color class. Complete descriptions for each of these varieties are available in numerous commercial catalogs.

(The sketches bordering these and adjoining pages are not intended as illustrations of specific daylilies appearing in the list. They merely show the great diversity of daylily form. For similar diversity in color patterns, see Fig. 8 on page 19.)



DAYLILY POPULARITY POLL, 1953

Variety	Originator and year
1. ORANGE BEAUTY (23) Orange	H. P. Sass 1945
2. PAINTED LADY (7) Poly	Russell 1942
3. NARANJA (50) Orange	Wheeler 1947
4. CABALLERO (5) Bicolor	Stout 1941
5. GARNET ROBE (8) Red	Milliken 1948
6. VALIANT (28) Orange	P. Cook 1943
7. PRIMA DONNA (15) Poly	B. Taylor 1946
8. PINK PRELUDE (22) Pink	Nesmith 1950
9. GEORGIA (3) Poly	Stout 1946
10. GAY TROUBADOUR (34) Bicolor	Nesmith 1941
11. REVOLUTE (7) Yellow	H. P. Sass 1944
12. JEAN (49) Bicolor	McDade 1943
13. HIGH NOON (10) Yellow	Milliken 1949
14. SU-LIN (25) Bicolor	Nesmith 1941
15. QUEEN OF GONZALES (55) Yellow	Russell 1942
16. ATHLONE (20) Bicolor	Russell 1942
17. MRS. HUGH JOHNSON (12) Red	Russell 1942
18. DAUNTLESS (4) Yellow	Stout 1935
19. MRS. B. F. BONNER (13) Yellow	Russell 1942
20. BROCADE (32) Poly	B. Taylor 1949
21. HESPERUS (6) Yellow	H. P. Sass 1940
22. WINDSOR TAN (31) Poly	Nesmith 1948
23. PINK DAMASK—Pink	J. C. Stevens 1951
24. ROYAL RUBY (16) Red	Nesmith 1942
25. PINK BOWKNOT (37) Pink	B. Taylor 1948
26. BOLD COURTIER (41) Bicolor	Nesmith 1939
27. GLOWING GOLD (80) Orange	Nesmith 1940
28. CIBOLA (53) Orange	H. M. Hill 1950
29. PINK CHARM (9) Pink	Nesmith 1940
30. BAGGETTE (39) Bicolor	Russell 1945
31. LINDA (63) Poly	Stout 1937
32. MABEL FULLER (45) Red	Kraus 1950
33. CHLOE (40) Poly	Nesmith 1938
34. PARTY GOWN (84) Bicolor	Milliken 1948
35. COLONIAL DAME (11) Bd	Milliken 1948
36. RUFFLED PINAFORE (26) Poly	Milliken 1948
37. PICTURE—Pink	Lester 1951
38. COLONEL JOE (64) Yellow	Lester 1951
39. MAID MARIAN (18) Pink	Lester 1950
40. GOLDEN HOURS (89) Orange	H. P. Sass 1950
41. DOROTHEA (24) Bicolor	Lester 1948
42. BLACK PRINCE (14) Red	Russell 1942
43. CRIMSON GLORY (87) Red	Carpenter 1952
44. PINK DREAM—Pink	F. Childs 1951
45. EVELYN CLAAR (62) Pink	Kraus 1950
46. HOWDY—Bicolor	Bremken & Armstrong 1952
47. MAMIE LAKE (75) Bicolor	Russell 1945
48. MISSION BELLS (17) Yellow	D. F. Hall 1945
49. QUEEN ESTHER (29) Red	H. P. Sass 1949
50. SWEETBRIAR (44) Pink	Nesmith 1938



Variety	Originator and year
51. LADY BOUNTIFUL (27) Yellow	Lester 1950
52. MING (83) Orange	Stout 1949
53. COPPER COLONEL (77) Poly	Sass Bros. 1948
54. KANAPAHA (38) Red	Watkins 1942
55. MIDWEST MAJESTY (59) Yellow	H. P. Sass 1950
56. SPRING FANTASY—Bicolor	Lester 1951
57. DUCHESS OF WINDSOR (47) Poly	Traub 1939
58. SWAN—Orange	Watkins 1942
59. PATRICIA (19) Yellow	Stout 1935
60. CELLINI (36) Yellow	Wheeler 1949
61. NORTH STAR (33) Yellow	D. F. Hall 1948
62. TARUGA (65) Yellow	Stout 1941
63. ROSALIND (95) Pink	Stout 1941
64. HYPERION (27) Yellow	F. Mead 1925
65. SKYLARK (43) Yellow	Russell 1947
66. DISPLAY (98) Red	D. F. Hall 1951
67. MARY GUENTHER—Bicolor	Russell 1942
68. LOCHINVAR (56) Red	B. Taylor 1947
69. SHOW GIRL (42) Pink	Wheeler 1951
70. PINK RADIANCE (86) Pink	Douglas 1949
71. AFTERGLOW (91) Poly	Stout 1941
72. CRIMSON STAR (82) Red	Douglas 1950
73. BERTRAND FARR (76) Pink	Stout 1941
74. RUBY SUPREME (35) Red	Wheeler 1943
75. BOUNTIFUL (66) Yellow	P. Cook 1943
76. POTENTATE (2) Red	Nesmith 1943
77. THE DOCTOR (96) Red	Claar 1950
78. JOANNA HUTCHINS—Orange	Kraus 1944
79. GOLDEN ORCHID—Yellow	Dennett 1948
80. BESS VESTAL (74) Red	House 1949
81. COMET—Bicolor	Russell 1943
82. KNIGHTHOOD (67) Red	Schroeder 1948
83. MOROCCO RED (69) Red	Nesmith 1940
84. MARIE WOOD—Pink	W. T. Wood 1950
85. GOLDEN TRIANGLE—Yellow	Traub 1948
86. JEWELL RUSSELL—Yellow	Russell 1950
87. TEJAS (60) Red	Russell 1945
88. LAUREL—Pink	Lester 1950
89. DOMINION (30) Red	Stout 1941
90. MYONNE—Bicolor	Vestal 1948
91. SALMON SHEEN—Poly	B. Taylor 1950
92. NASHVILLE—Bd.	Claar 1951
93. CONSTANCE—Bicolor	H. M. Hill 1948
94. DEVON CREAM (68) Yellow	Nesmith 1945
95. GOLD CARGO—Yellow	Russell 1945
96. RUTH LEHMAN—Poly	Kraus 1948
97. SCARLET SUNSET (73) Red	Wheeler 1947
98. CATHEDRAL TOWERS (70) Bd.	Milliken 1948
99. GOLDEN WEST (71) Yellow	H. P. Sass 1932
100. BRULEE—Yellow	B. Taylor 1949

[Bd = banded (eyezone, halo, spot). Poly = polychromes, pastels.]



Vegetative Propagation

Daylily seeds do not come true, hence seedling production is valuable only as a means of producing new varieties. When breeders find a seedling that appears worthy of further trial, they allow it to produce offshoots, which they later remove and grow as separate plants. This is a form of vegetative propagation. Seed propagation is discussed in the section on daylily breeding.

Division of clumps

Daylily clones are propagated by dividing older plants into as many individual ramets, or parts, as possible. Commercial growers will find it best to line these out in the field and sell them only when each has made sufficient growth to be a blooming-size plant with one or more large fans and perhaps several smaller ones.

A daylily clump is easily lifted after several deep cuts have been made around it with a sharp spade. The soil should be carefully shaken and washed off. Then it is a simple matter to separate and cut the old plant into the desired number of single or multiple-ramet segments, with an equal portion of the root system on each division. On varieties which spread by means of rhizomes, or underground stems, the ramets are less closely ranked and easier to cut apart.

Since a commercial grower is dependent largely on the natural rate at which a variety divides, it is to his advantage to grow the more vigorous kinds. Home gardeners also are interested in varieties that form nicely flowering clumps in a minimum of time. Increase is much faster under the best growing conditions, such as plenty of light, moisture, and nutrients. Vigor and rapid increase do not necessarily imply weediness.

Proliferations

Leafy shoots which appear on the scapes of certain varieties are known as proliferations (Fig. 12). They can be removed and rooted





in moist sand or vermiculite, thus producing new plants of the same variety. Usually not enough proliferations are found to make this a large-scale method of propagation.

Proliferations can also be rooted while still on the plant by a method known as air-layering. A ball of sphagnum moss is tied around the proliferation base and kept constantly wet. A polyethylene sack tied over the moss will retain moisture and make further wetting unnecessary. In several weeks roots will have formed in the moss, and the small plant can be removed and planted directly in soil.

A hormone rooting powder, such as Rootone or Quickroot, speeds up rooting when applied to the proliferation bases.

Specialized methods

Several other vegetative methods are sometimes employed, but these are seldom practicable for the home gardener. The specialist, however, may occasionally use them where very rapid increase of stock is wanted.

Experiments have shown that daylily crowns can be split vertically into several segments, each of which will grow into an individual plant. For best results, do not cut the crown into more than four parts and leave at least one good root on each division. Start these divisions in pots or flats filled with a light, well-drained soil mixture, and later plant them out. Crown-cutting practiced on plants that have not been lifted from the soil has not been very successful.

Excised leafy crown tips, either whole or cut vertically into halves or quarters, can be rooted in moist sand or vermiculite. Considerable care in the control of moisture is necessary to get good rooting. Hormone rooting powders should be used. The decapitated crown bases with their attached root systems are best left in the ground and watered well after the tips have been removed. The crown bases usually send up new shoots, giving still further increase. These cutting methods are most successful in spring when the plants are growing rapidly. Certain varieties respond more favorably than others. This method is not recommended for the amateur.

Another method is to thrust a heated needle diagonally into the crown to kill the growing point. By this treatment numerous lateral buds



Proliferations are found on the bloom stalks of some daylily varieties. They may be used by the home gardener for propagation. (Fig. 12)

are stimulated into growth, each forming a new crown. Still another method is to remove sections of the branched upper portion of the flower scape and treat the nodes with rooting hormones. When these sections are kept in moist sand, shoots sometimes develop at the nodes. These shoots will then root to form new plantlets.

Where daylily divisions are being carried over winter in the greenhouse for more rapid reproduction, supplemental light will speed up their growth. Six hours a night of high-intensity artificial illumination has been shown to be definitely beneficial. A night temperature of 55° to 60° F. in the greenhouse is recommended, with daytime temperatures 10 to 15 degrees higher. Evergreen varieties will grow well in the greenhouse, but deciduous types will give better response if subjected to low temperatures and allowed to pass through a period of dormancy before being forced.

In the Business

The average *Hemerocallis* dealer has a business of limited scope and raises stock in his own backyard or on a small tract nearby. He probably does most of the work of growing and selling, and the

chances are that the bulk of his sales are local, although he may circulate a price list. Usually this small-scale producer has gone into business in the town where he lives, without further thought about a location.

Fortunately daylilies do well in most parts of the country; every section has a number of suppliers as well as many potential buyers. Illinois, with its rich soil and abundant rainfall, offers excellent conditions for daylily production, at least on a limited commercial scale. Illinois producers may capitalize on the fact that most northern-grown plants acclimatize more quickly in the Midwest than stock from warmer climates.

Selecting a location

One who plans to be a large-scale propagator and expects to produce mainly for the shipping trade will want to give careful thought to location. Climate is a prime consideration. A region with mild winters and long, sunny growing seasons is ideal because winter losses are nil, and the stock multiplies rapidly. One of the largest daylily producers in the United States is located in southern Texas. Dealers in mild areas such as this will not have firsthand knowledge of varietal performance under more rigorous climatic conditions, but they should try to get this information promptly and pass it on to their customers.

Soil is also important. From the propagator's standpoint, a light, quick-draining soil is better than a heavy loam. Nutrient deficiencies, however, which necessitate heavy fertilization are a serious disadvantage in such soils. Areas depending upon natural rainfall rather than irrigation are preferred.

Other important points to keep in mind include labor supply and costs, land values, taxes, shipping facilities, and nearness to markets.

Business layout

Elaborate and expensive equipment, buildings, and field plots are not needed. Using essentially the cultural methods already outlined, a grower should line out the stock so that tilling, cultivation, and fertilizing can be done efficiently with power machinery. A system of permanent labeling of varieties is absolutely essential. This is especially important if prospective purchasers are allowed to visit the fields to make their choices. Where field plantings are quite extensive, a small trial garden near the sales room with specimen clumps of each variety is desirable.

The packing room need not be large or elaborate, but arranged for convenience and rapid handling of orders. Neatness and orderliness pay both here and in the field.

Dealer-customer relations

A reputable shipper prides himself on selling only quality stock — strong, heavy-rooted divisions with one to several crowns. Each ramet, or division, should preferably be grown to blooming size in the field before being offered for sale. Label each plant accurately before shipping. Carelessness on these points can lose customers in a hurry. Prompt filling or acknowledgment of orders is imperative.

Many shippers include planting and growing instructions with each order. The enclosure of bonus plants makes a good impression and builds good will. There should be a clear-cut policy regarding replacements in case plants fail to grow, or are accidentally mislabeled or poorly packed.

Many daylily suppliers ship only during the fall, usually in August and September. Nursery stock and other perennials such as iris may absorb their attention earlier in the season. Nevertheless, a shipper might well try to regulate his activities so that he can fill orders any time a customer desires, whether it is spring, summer, or fall. Even though early fall planting is generally preferred, daylilies thrive when planted any time during the growing season, and the customer may have good reasons for wanting plants at a specific time.

Packing for shipment

Shake and wash the freshly dug clumps free of soil. Be very careful not to damage the roots unnecessarily. If the clumps are to be divided, ease the portions apart cautiously, cutting rather than breaking any connection between the crowns. Preparing the plants for shipment includes cutting back the tops and roots to 6 or 8 inches with a sharp knife, and removing any dead or damaged parts.

For packing the roots, use moist (not wet) sphagnum moss, and wrap in heavy-grade waxed paper to retain moisture. A rubber band will hold the waxed paper securely around the crown of the plant. Place dry excelsior loosely around the leaves so that the bulk here is the same size as the root bundle; then roll the plant in a piece of cardboard, preferably light-weight corrugated, to provide rigidity and protection.

Individual bundles are best packed firmly in a shipping box. Cover the box with kraft paper and tie with twine. Provide air vents in hot weather. For small orders, several of the bundles may be rolled up together in a piece of corrugated cardboard and wrapped with heavy kraft paper for shipment.

Packing as described will insure safe delivery to any part of the United States. It is well, however, to know express and parcel-post schedules so that the plants will not be in transit too long. For parcel-post shipments to distant locations "special handling" stamps are ad-

vised. Daylilies weather a long ocean voyage to a foreign country best when dug mature, washed and dried, and shipped in dry packing material.

In most states it is necessary to have all stock inspected for freedom from diseases and insects and to attach a certificate of inspection to each package. Check with your state department of agriculture on this point.

Business problems

As in any other business enterprise, it is essential to follow sound business methods. This includes the establishing of credit and the keeping of complete records. Even though the business may be largely mail order, good business ethics, or their lack, soon become common knowledge. Wise advertising is also a major part of any modern business venture.

The preparation of a catalog or price list is a big task each year. Next to a dealer's business reputation, his catalog is his best advertisement and should be as complete and well prepared as time and money allow. Every effort must be made to have all descriptions accurate and reliable. Additional information, such as the name of the introducer, whether or not the variety is deciduous or evergreen, its habits and seasons of bloom, height, regional adaptation, etc., are appreciated by the purchaser. Also, attractive illustrations can do much to sell daylilies. Mailing lists should be as up-to-date as possible.

A big problem is that of keeping up with new varieties as they are released by hybridizers. This calls for good judgment and wise selection, since no dealer can or should attempt to grow every daylily that becomes available. It is therefore necessary to attend meetings, to keep up with the activities of daylily societies, and to become well acquainted with the work of important daylily breeders over the country. A supplier who deals largely in his own introductions must be equally discriminating and familiar with what is already on the market.

The practice of selling or buying various color series of unnamed seedlings is to be discouraged.

Pricing daylilies

How to price daylilies is a thorny question. Fortunately most standard varieties reach a somewhat uniform price in the trade. This price reflects the supply of available stock, the demand for it, and the length of time since the variety was introduced. The catalogs of long-established businesses are a safe guide for the beginner.

*Newer introductions are often priced as high as \$25. Some nurserymen hold that new kinds should be released when the stock is still scarce, even though very high prices must be asked. They reason that such varieties should be available for breeding purposes, and also that

they will not be out of date before they are released. Other nurserymen refuse to introduce new varieties until they are thoroughly tested and abundant stock has been built up. They feel that new kinds should not be offered until they can be priced for everyone rather than for the few who can afford the higher figures.

Breeding Daylilies

It would be hard to find a plant better suited to the amateur or professional hybridizer than the daylily. This flower is passing through the same cycle of development that dahlias, gladioli, and irises experienced some years ago. Unlike the breeding programs with many other ornamentals, the point of "diminishing returns" has not yet been reached. Even the novice can anticipate finding exceptional plants among his seedlings.

No formal training is needed for daylily breeding. The flower parts are large and easily found, and the actual mechanics of crossing are quite simple. While the professional hybridizer may grow thousands of seedlings annually, the backyard hobbyist, with his limited time and space, will find a fascinating diversion in growing but a few hundred. These same amateurs have contributed much to the recent improvement of daylilies.

Making Crosses

Producing seed

The essential flower parts for seed production are the *pistil* and the *stamens* (Fig. 2). *Pollination* is the process of dusting *pollen* from an open *anther* onto the *stigma* at the end of the long protruding *style*. From these pollen grains embedded on the stigma, tiny microscopic pollen tubes grow down through the style. In a relatively few hours they reach the *ovary*, and find their way to the *ovules* (immature seeds).

The first pollen tube to reach an ovule discharges a male or *sperm nucleus*, which unites with an *egg cell* in the ovule. This is *fertilization*. Thus each new seedling obtains half its hereditary potentialities from each parent. This fusion initiates the development of the young ovule into a *seed*, which is really an embryonic plant encased in stored food. Each *seed pod* (matured ovary) contains a number of shiny, black seeds which range from $\frac{1}{8}$ to $\frac{1}{4}$ inch in length.

Technique of pollinating

Make your crosses as soon after the flowers open in the morning as possible. Early pollination is advised because pollen dries rather quickly on a hot day. By noon it may no longer be capable of producing a good seed set or may have blown away entirely. Likewise the stigmas dry as the day advances.

First remove the anthers of the flowers on the *seed-parent* (plant which bears the seed pods). This emasculation is necessary because the anthers open soon after sunrise, and the ripe pollen may be spread onto the stigma by insects. You can usually tell by examining the stigma whether an insect has been there first. Since the stigma is held well out from the anthers and petals, it is not easily touched by insects.

Gather the pollen you want for your crosses by putting the opened anthers into small glass vials. Hold the flower to be pollinated in one hand and force its style down into the vial where the sticky stigmatic surface will become liberally caked with pollen. Some prefer simply to hold the anthers with small tweezers or in their fingers and rub the pollen masses against the stigmas; others find a small camel's-hair brush convenient for pollinating. Brushes and vials used for one kind of pollen must be completely sterilized with alcohol and dried before being used for other pollen. This is necessary in order to prevent foreign pollen from producing seed set in your carefully planned crosses.

If it can be spared, give pollen from any of your varieties to fellow hybridizers who want it. In turn, you can probably borrow pollen of excellent varieties which you are not growing.

Sterility and incompatibility

Most crosses are successful and produce seed. Occasionally, however, sterilities or incompatibilities are encountered. There are various causes for these conditions, some of them not fully understood. Sometimes a clone will be found that has no viable pollen but has fertile pistils, and vice versa. Certain clones will produce no seed with one *pollen-parent* but abundant seed with another. Others are self-incompatible. Occasionally a cross will not be successful while the *reciprocal cross* (the original pollen-parent used as a seed-parent) is. It is often wise, then, to make reciprocal crosses to insure success with a particular pair of parents. The experienced hybridizer who keeps records and "stud-books" comes to know the clones which consistently display these difficulties.

Hybridizers rather frequently use mixed pollen from selected clones in making their crosses. Some of this pollen is certain to be effective and the seed set, as a result, may be better than in planned crosses. However, since the crosses are not controlled, the record of parentage is lost, and it is impossible to accumulate data concerning the breeding qualities of particular clones.

Storing pollen

Storage of pollen for use in later crosses is sometimes necessary, particularly when a hybridizer wishes to cross varieties which bloom at entirely different seasons or do not happen to bloom simultaneously. Small gelatine capsules available in any drugstore are very satisfactory containers. These are labeled and placed in small open vials suspended over a saturated solution of *zinc chloride* in sealed glass fruit jars. The zinc chloride reduces the relative humidity to about 10 percent. At a temperature of 37° to 41° F. pollen thus handled has remained viable for three to six months.

When stored in an ordinary refrigerator at about 37° F. *without* controlled humidity, or at 50° F. *with* reduced humidity, daylily pollen seldom remains usable for more than about two weeks. With uncontrolled humidity and temperature, it stays viable for only a few days.

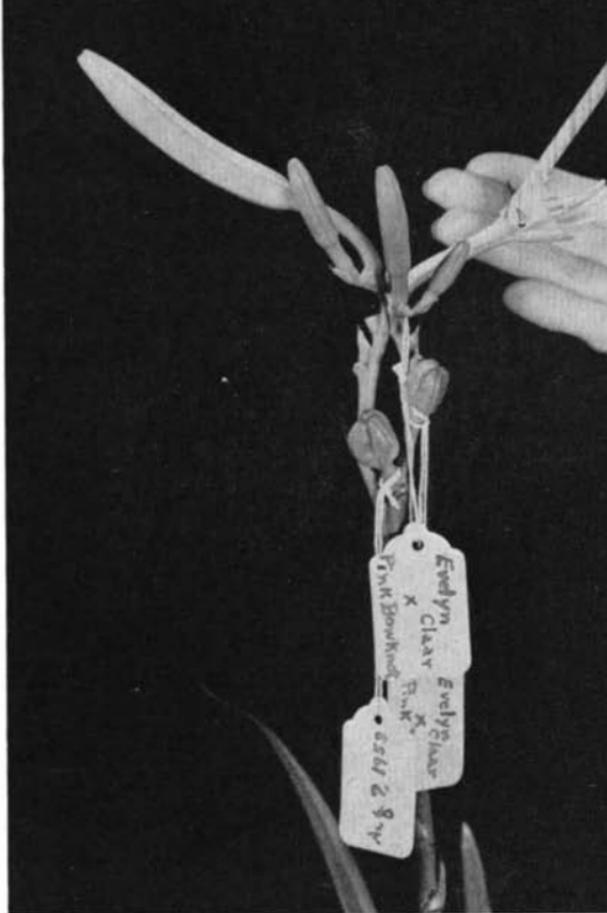
It has recently been reported that some perishable pollens, after being stored as long as three years in sealed glass vials at 0° F. in an ordinary deep freezer, still showed a reasonable percentage of viability. This may be worth trying with daylily pollen.

Bagging the pollinated flowers

Ordinarily hybridizers either assume that no unwanted pollination will occur or they remove the lower petals and sepals so that there will be no place for insects to land. However, when the crosses are part of a carefully controlled genetic study, it is advisable to "bag" the emasculated flowers, both before and after pollination, to prevent the introduction of foreign pollen. Bagging involves tying a paper bag over the flower for the protection of the pistil.

A piece of soda straw crimped shut at the outer end and put over the stigma and style (Fig. 13) also works well. To hold it on, slit the bottom end of the straw for half an inch, and clip the flattened portion to a petal base.

A piece of ordinary soda straw can be used to "bag" or protect the pistil, before and after pollination. Tag each flower after it has been pollinated; write on the tag the names of the parents and the date the cross was made. (Fig. 13)



Tagging the cross

After making a cross, mark the flower by tying a tag just below the ovary. With a weather-proof pencil, write the names of both parents on the tag, placing first the name of the seed-parent. If, for example, pollen of PINK BOWKNOT was placed on a pistil of EVELYN CLAAR, write on the tag EVELYN CLAAR X PINK BOWKNOT, the X standing for "pollinated by." On the back of the tag write the date. At the same time, record the cross and the date in the "stud-book." In this way you will have a complete record of all crosses.

When the pods are harvested, the tags give positive identification of the seeds. They also indicate successful and unsuccessful crosses, good information for future reference.

Seed pods develop rapidly

You will be able to tell in several days whether a cross has been successful. If it has not taken, the withered flower will drop off, including the shriveled pistil. When, however, fertilization has occurred, the small pod swells rapidly and in several days breaks through the remnants of the old perianth, which is soon shed. The pods reach full size in two to four weeks, the seeds maturing in several more

weeks. But do not be surprised to find swollen pods occasionally with few seeds or none at all.

As the pods ripen, they gradually become yellowish, then brown. Gather the seeds just before the pods begin to break open at the top; otherwise they will be shaken out onto the ground. Remove seeds from pods and dry them in shallow pans in a warm, airy place for a week or two; then store them under dry, cool conditions until planting time. Be sure to keep the seed from each cross properly labeled.

Breeding Methods and Problems

Unfortunately there are no simple rules for making crosses. The Mendelian laws of inheritance hold for daylilies as they do for all plants and animals, but the complex ancestry of most modern clones, along with insufficient genetic information, makes it difficult for even a professional breeder to set up a scientific breeding program. A beginner may strike out on his own, but he is wiser if he draws where possible on the experience of others.

A great deal can be learned from conversations with daylily specialists and breeders. Much practical data can also be gleaned from daylily publications. One of the best ways to learn what crosses others are finding most fruitful is to consult recent issues of *Plant Life*, or the *Yearbook* and *Newsletter* published by the Hemerocallis Society. Many of the registrations include parentage as well as descriptive information.

Choosing the breeding stock

Do this with the utmost care. Making planned crosses means crossing the best possible parents, hoping to bring together certain desirable qualities from both in one or more of the offspring. Fine-appearing clones often prove worthless in breeding, while others consistently pass on many of their good qualities. Such prepotent clones are valuable and will be watched for by the good hybridizer. For lack of better information, use as parents those that have the qualities most nearly approaching your ideal. *By all means have an ideal or goal, and work toward it.*

It is usually a waste of time to utilize the original species or early hybrids in crosses unless you are seeking to recover some character which has been lost in later clones. If it is impossible for you to grow more than a few of the newer, top-notch daylilies, your breeding program need not suffer too much. Perhaps you can secure pollen from nearby gardens or purchase seed of crosses you specify.

Knowledge of the ancestry of each parent for as many generations back as possible is desirable. Records from a few seasons' crosses will provide valuable information as to the breeding characteristics of various clones. You can then proceed toward your goal with greater assurance of success and with less wasted effort. Your crosses can be planned well in advance, perhaps at your leisure during the previous winter.

Some characters are found to be dominant in crosses, while others appear recessive. The evergreen habit of foliage, for example, is decidedly dominant over the dormant deciduous habit. Consequently when an evergreen variety is used in a cross, the chances are that half or more of the seedlings will be evergreen. When two "dormant" clones are crossed, the offspring usually will all be of the same dormant type.

Selective breeding

Most of the progress in improving daylilies has come as a result of selective breeding. It has been repeatedly demonstrated that new and superior types can be developed by intercrossing existing clones. Your hope is that the recombination, or rescrambling, of genes which occurs will give you a seedling with a larger proportion of the characteristics you seek. Only the very best seedlings are retained for use in later crosses. By carefully planning the crosses, producing large numbers of seedlings, and selecting rigidly, advancements are made. Entirely new colors, forms, and types are produced.

The first dark red daylily was developed through selective breeding. This intensifying and diversifying of flower color has also brought us numerous other shades, none of which appeared in the original species. By similar processes, true white daylilies and blue daylilies may also eventually be developed. For example, one working for a white daylily would be likely to use as parents the most nearly white clones he could find. Then by selecting among the seedlings he would perhaps come upon individuals that were lighter than either parent and use these in later crosses.

Other breeding methods

* Because of the modern daylily's complex genetic makeup, many known breeding techniques are not too easily applied to this plant. While selective breeding is most commonly used, other more exacting methods should also be considered.

Many hybridizers practice what is sometimes called *line breeding*. Rather than making only random, haphazard crosses, the hybridizer's efforts are narrowed down and aimed at developing good breeding lines. If two clones of similar flower color are crossed, more often than not the seedlings will be of the same general coloring. Thus if one were seeking a superior yellow daylily, he would probably work first of all toward yellow breeding lines, each showing some of the desired characteristics. By means of various intercrosses between these lines, and perhaps some *inbreeding* or *selfing*, he would hope to produce the better yellow.

Occasionally *outcrossing*, or *outbreeding*, with a dissimilar clone is done to bring in new "blood" (other desirable genes). A related approach is to cross a particular clone (*a*), which has numerous good qualities, with another (*b*) which has one or more characteristics badly needed in the first. Then by *backcrossing* to the more desirable parent for several generations, a form may be obtained which has retained the best qualities from parent *a* as well those sought in *b*. This method also requires critical selection in each generation.

Ordinarily wide crosses between highly different types or colors will tend to give a peculiar assortment of seedlings, often with very few good individuals. Occasionally, however, they yield some unique and very worthwhile clones.

Pure lines and their potentialities

At present there are no pure lines of daylilies. Such lines, in any plant group, are usually produced by continued selfing of lines until they do breed true. A number of generations are required, and oftentimes self-incompatibilities interfere. When and if such inbred lines of daylilies are developed, it will be possible to cross them to produce *hybrids*. These may show considerable vigor, such as seen in hybrid corn, the new F₁ hybrid petunias, etc. Pure lines would also be useful in genetic studies. Furthermore, the possibility of raising daylilies inexpensively from seed which "comes true" is intriguing.

Excised embryo technique

This method, so successfully used with iris,¹ can also be applied to the daylily. The embryo is removed from the seed and cultured, under aseptic conditions, on a nutrient agar jelly. Development is

¹ RANDOLPH, L. F., and COX, L. G. Factors influencing the germination of iris seed and the relation of inhibiting substance to embryo dormancy. Am. Soc. Hort. Sci. Proc. 43, 284-300. 1943.

rapid. When the embryo has made sufficient growth, the new seedling is removed from the flask and planted in soil. Although very successful, this is a tedious process requiring much time and specialized equipment. Its use with daylilies is seldom justified, especially if the seeds receive cold treatment. It might be warranted when the seeds are from a particularly valuable cross or from one that tends to produce weak embryos.

Polyploidy

With but few exceptions, daylilies are *diploid* (that is, each cell contains two sets of chromosomes, one from each parent). The diploid number is 22. There are several *triploid* clones (clones with 3 sets of chromosomes) in the species *H. fulva*, including the Tawny Daylily

Whether in a small garden or on a large estate such as pictured, daylilies provide a spectacular display. Here they are seen interplanted with iris. (Photo by courtesy of The Flower Grower) (Fig. 14)



and the doubles *kwanso* and *florepleno*. Triploids are usually sterile and valueless in breeding work. Several aneuploids (clones with irregular numbers of chromosomes) are also known.

Another type of polyploid, the *tetraploid* (having double the normal number, or 4 sets, of chromosomes), is practically unknown in daylilies. Great promise lies in this direction, however, judging by the form of tetraploids in other genera, such as the German iris. Although it is not easy to do, several persons have succeeded in producing tetraploid daylilies by applying colchicine to seeds, small seedlings, the growing points of individual ramets, or to complete sections of ramets in active growth. Colchicine is a poisonous, expensive alkaloid obtained from bulbs of the autumn crocus. It must be handled with great care. Ordinarily used at low concentrations (ranging from .02 to 1.5 percent) in water or in lanolin paste, it is applied for varying lengths of time. Only a small percentage of treated individuals are affected.

Colchicine does not give magical results, and its use should be left to persons thoroughly familiar with the colchicine technique. The few tetraploid daylilies thus far produced show greater flower size and substance and sturdy vegetative characteristics. More often than not, colchicine induces *chimaeras* (mixed diploid and polyploid tissues in the same plant) rather than complete tetraploids. Many tetraploids and chimaeras are fertile and can be used in producing other tetraploids, triploids, etc.

An excellent pamphlet on the use of colchicine can be obtained from the Bureau of Plant Industry, Beltsville, Maryland: *The Use of Colchicine in Plant Breeding*, by Dermen and Emsweller (C-24).

Mutations or "sports"

Very few clear-cut cases of *mutations* (spontaneous, permanent genetic changes) are to be found in daylilies. Apparently the only ones of any importance thus far have been the several types of doubles. *H. fulva kwanso* and *florepleno*, so familiar in old gardens, are termed *para-doubles*. These show an increase in petals or petal-like structures, and the pistils are usually aborted or sterile. There may be some viable pollen, however.

Several selections of another type, the *semi-doubles*, may reach commerce soon. Here, part or all of the stamens are transformed into petal-like "petaloids," which sometimes are crinkled and ruffled attractively. Both the pistil and one or more stamens are usually func-

tional. Some true semi-doubles have arisen as mutations, although others have been produced by selective breeding. This group promises to be a rather important one.

So-called *super-doubles* also arise occasionally. They are completely sterile, and show a considerable increase in petalage. No important clones of this type are on the market at present. Super-doubles arise through spontaneous mutations, rather than as segregates in breeding progenies. *Pseudo-doubles* are sporadically reported by excited gardeners. They occur on various garden clones occasionally, along with normal single flowers. Pseudo-doubles are probably only freaks of nature, representing a fusion of two flowers during the early developmental stages. Although they appear more frequently on certain clones than others, they are valueless in a breeding program so far as we know.

Every gardener should be on the alert for mutations, or "sports." It is thought that the heterogeneity (complex ancestry) of modern daylilies may increase the chances that mutations of value will occur. At present no important color breaks arising from mutations are known in the daylily. These color mutations have occurred in other plant groups, however, and may someday give us the elusive but much-sought-after white daylily. Chimaeras (mixed tissue due to a mutation) are sometimes seen which give flowers of two different colors on the same stalk, or individual blooms which are half one color and half another.

Handling Seed and Seedlings

Since the viability of daylily seed declines rapidly, it is best to sow it in the fall of the year harvested or early the following spring. Even one-year-old seed will germinate poorly unless it has been held under ideal conditions. For prolonged storage, place the seed in dry, tight containers and keep in the refrigerator.

When and where to plant seed

Most daylily seed germinates rapidly, even if sown immediately after it has been gathered. Seed from certain crosses shows dormancy, however, and germination will be poor until it has undergone a cold treatment.

Daylily seed planted outside in late fall or early winter (from mid-October on) will not ordinarily germinate until spring. At that time,

however, almost every seed should sprout since it has been exposed to cold winter temperatures. These seedlings will also come up earlier than if planting is delayed until the soil can be worked in the spring. Some advocate early fall planting, but this is ordinarily not a good recommendation for the colder areas. Considerable germination will take place before cold weather sets in, and these seedlings will require winter protection, the need for which is avoided by the other methods.

The seeds are planted in rows in well-prepared beds at a depth of $\frac{1}{2}$ to $\frac{3}{4}$ of an inch. Sometimes these seed beds are located inside cold frames. The protection thus provided causes late fall-sown seed to germinate earlier in the spring and also gives any seedlings which appear in the fall a better chance to survive.

Some gardeners prefer to sow their daylily seed in pans or flats of soil, shredded sphagnum, or vermiculite. Vermiculite is particularly good, especially if a one-inch layer is used over soil. For complete germination give the containers a cold treatment once the first flush of seedlings is removed. Either place them outside in winter for about six weeks or put them in a cooler just above freezing for the same time.

Care of young seedlings

As soon as the seedlings are a few inches tall, line them out in the garden or field. (This is usually done in the spring.) Space the plants about 6 to 8 inches apart in the rows, with the rows separated 2 to 3 feet, and keep them watered until they are well established. It is sometimes practical to sow the seed thinly in drills and allow the seedlings to grow to blooming size without transplanting.

If warm greenhouse space (60° F. at night) is available, young seedlings can be transplanted into small clay pots or flats and kept growing continuously. Should some of them go dormant, several weeks of cool temperatures will bring them back into vegetative growth. Seedlings started in early fall and grown on in the greenhouse will have reached good size by spring when they are planted out. In this way one whole year may be saved in bringing seedlings into bloom.

How many seedlings?

Growing large numbers of seedlings increases your chances of producing a truly superior daylily. Experienced hybridizers find, moreover, that only one or two seedlings out of several thousand are really worthy of introduction. No one can fail to be thrilled, however, at the galaxy of colors, types, and forms which greets him each morning.

No two seedlings are exactly alike, and it is interesting to watch the inheritance of the various characters.

While it is desirable to grow large numbers of seedlings, the number must be limited to a figure which can be satisfactorily handled. Pollinating alone takes considerable time. The number must also be small enough so that the seedlings can be properly planted, cultivated, and finally evaluated. Eliminate weak-growing seedlings at every step.

Testing selected seedlings

Preliminary selections are based on the first flowers of the seedlings. Final judgment on promising individuals should be deferred until the clumps are several years old. This much time is required after the first bloom before a plant produces fully typical flowers and vegetative growth. As a rule, five years or more of observation are essential before a new seedling is introduced. It must be compared critically and objectively with other seedlings and with named clones of its particular type or class. If a large and up-to-date collection of daylily varieties is accessible to you, you will find it of great value as a base of reference and comparison.

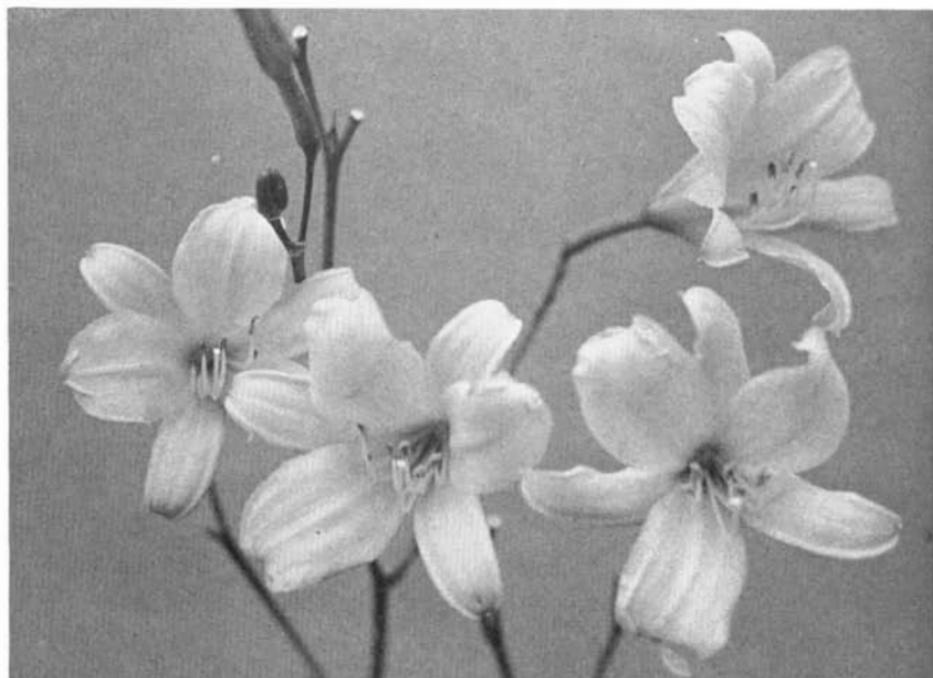
New clones must also be tested under widely varying soil and climatic conditions, so that their adaptation and performance can be checked on a regional basis. This information should enter into your decision about introduction, and it is also invaluable to prospective purchasers. Test gardens, nurseries, and private gardeners will often accept new clones for trial growing.

Above all, be restrained and objective when making selections and introductions. Remember that "fond parents are seldom good judges of their own offspring." If at all possible, have an accredited judge decide whether your selection is really superior or not. Too many mediocre varieties continue to flood the market.

Evaluating Seedlings

Although we now have excellent daylily varieties, there is still room for improvement. About every potential new variety two questions are to be asked: Is it superior to, an improvement over, or distinct from other daylilies? Does it vary enough from other available varieties to warrant introduction?

Every breeder should consider the following points carefully, evaluating his seedlings conscientiously and introducing conservatively.



Mignon, one of the multiflora type with flowers only an inch in diameter, is a charming specimen for the foreground of the border and for cut flower use. (Fig. 15)

Flowering habits

Color. The present color range extends from the palest yellows through gold, orange, pink, rose, scarlet, red, maroon, purple, chocolate, brown, peach, buff, salmon, and various pastels. There are also many combinations of color, designated as bicolors (petals and sepals of different shades), blends, overlays, and polychromes; and eyed, banded, and radiate patterns. Numerous modifications and combinations of these types also exist (see Fig. 8).

Color is one of the most important points in selection. Above all, select for clear, pure colors, and reject those which are dull, muddy, washed-out, or objectionably "fulvous." New colors are needed, and the present color range must be expanded. Some hybridizers are striving for whites and blues, but better varieties in the present shades are welcome. Patterns should be interesting, not ordinary.

Flower form. A broad-petaled, full flower is usually preferred, although there is certainly a place for other types. Some varieties are bell-shaped, with gracefully recurving petals; others show a broad, flaring form. Still others may be starlike or trumpet- or cup-shaped. Many people like long, strap-shaped petals that are twisted and curled to give a spidery effect. See border figures on pages 30 to 35 for some idea of

the diversity of flower form. Ruffling and crinkling often add to the charm of the bloom.

There should be no rigid rules as to correct form. Above all, strive for gracefulness and charm. Discard seedlings that lack distinction or are too thin and stringy. Avoid structural weakness or grotesque proportions.

Flower size. Most hybridizers seek large flowers, although there is a distinct place in gardens for medium- and small-flowered (multiflora) types (Fig. 15). If the flowers are large, they should not be coarse and ungraceful; if small, they must not be insignificant. Remember also that flowers should be correct in size and shape for the height and spread of the leaf mass and for the diameter of the stems.

Fragrance. This quality is most pronounced in night bloomers and extended bloomers, and seldom very noticeable in the new and darker shades. Hybridizers should attempt to retain or increase fragrance wherever possible.

Earliness of bloom and recurrent blooming. More varieties, particularly of the newer colors, are needed for early blooming, along with the German iris. Little progress has been made in this sphere. Most of the present early varieties are either orange or yellow. From the standpoint of full-season bloom, more late-blooming and recurrent (repeat) blooming varieties are also in demand. A number of the midseason types undergo a short rest period following blooming, then develop a second set of buds in 4 to 6 weeks. This recurrent blooming habit is to be desired.

Durability of petals and pigmentation. Ideally daylily petals should unfold perfectly in any weather and retain full pigmentation and substance despite wind, sun, or rain. Flower color, particularly in the reds, pinks, and purples, is frequently unstable in strong sunlight. Some of these colors become unattractive later even though they are very pleasing shortly after opening. This fading can be minimized by planting in partial shade. It is, however, a serious flaw unless it happens to result in a more attractive color.

Durability of substance and color seems to be affected by many factors, including temperature, humidity, soil fertility, pH, etc. Substance of petals must show no serious deterioration from opening until closing. Be sure to select for seedlings whose petals do not wilt, curl, bleach, burn or "scald."

Profusion of bloom. Generous blooming is a must with clones to be introduced. Landscape value is tied up largely with the mass effect derived from the color displayed by a variety at any particular time. The number of buds per scape roughly reflects the period of bloom to expect. The more buds, the more attractive the clump and the longer the blooming season. Certain clones show 50 to 60 buds per scape and many scapes per plant. Thus it is not unusual for individual clumps to bloom for 3 to 6 weeks.



Because it has poor branching, a seedling of this type should be discarded, even though the individual flowers may be attractive. Amateur breeders often overlook such major flaws as poor branching when making their selections. (Fig. 16a)

Extended and evening bloomers. Most of the daylilies on the market today close their flowers at or

shortly after sundown. Consequently they add nothing to the garden during the evening when many people wish to see them most. Some varieties, however, will remain open until nearly midnight. This extended blooming habit should definitely be sought when making seedling selections. Other clones, particularly those derived from *H. citrina*, open in early evening rather than in the morning, like most varieties. These blooms then remain open all night and well through the next day. More effort should be placed on breeding not only extended and evening bloomers, but clones whose flowers remain good for several days.

"Self-cleaning" habit. A daylily clump is much more attractive if wilted flowers and shriveled buds drop quickly rather than having to be picked off each day. There is a great difference between varieties in this regard.

Branching of the scape. Not only must the stalk be strong enough to require no staking, but it should rise far enough above the foliage to display the flowers to best advantage. Daylily judges look particularly for wide, well-spaced branching of the scape so that the flowers are arranged in an uncrowded, pleasing manner for maximum effect (Fig. 16). The stem should not be too massive, nor so tall that the flowers are above eye-level.

Vegetative habits

Hardiness. Daylilies must be able to survive winter weather and subzero temperatures without special mulching or protection. The so-called deciduous varieties are usually best for northern areas, although many semi-evergreens and some evergreens are adapted to these conditions also. In warmer climates the evergreen types are generally preferred.

Vigor. Vigor is necessary not only so that plentiful flower scapes will be produced, but in order that the plants will make large clumps and many divisions quickly.

Foliage characteristics. Daylily plants should show clean, dark green foliage all season, which is free from the tendency to "russet spot," or become "blighty." It should also remain upright, with no sprawling or flopping. Not only does the foliage serve to foil the blooms attractively, but it also beautifies the garden when the blooms are gone.

Root characteristics

If vigorous enough to support a healthy blooming plant, the root system need be given little attention. If, however, it has spreading underground rhizomes like *H. fulva*, this "weedy" habit may make it undesirable (Fig. 5).

Unnamed seedlings

What should be done with good seedlings which are not quite good enough to name and introduce? It is poor practice to dispose of these commercially in collections or color classes; this is usually only a way

A splendid example of good branching is variety Mission Bells, a fine yellow introduced by David F. Hall. Such branching on stiff, erect stems provides for many flowers, individually displayed. (Fig. 16b)



to get revenue out of "trash" and serves to fill gardens with inferior stuff.

Good seedlings or other surplus stock may well be donated or sold at low cost for use around hospitals, schools, churches, and public buildings, or in parks, cemeteries, roadside and institutional plantings, etc. Daylilies will be much appreciated in public places where garden upkeep receives a low budget. Excess stock also makes pleasing gifts for friends and neighbors and bonus plants with other plants you sell. All poor seedlings, however, should be promptly discarded.

Registration, Introduction, and Awards

Once a seedling has proved worthy of dissemination, the next step is registration. Both the Hemerocallis and American Plant Life Societies sponsor registration and cooperate in this effort (see page 63).

Registration procedure

The above societies will supply appropriate data sheets and full information on request. Registration includes naming the clone and providing an accurate description of flower color. A color designation system set up by the societies is advised, but such references as *The Dictionary of Color* by Maerz and Paul or the *Color Chart of the Royal Horticultural Society of London* by Wilson may also be used. Other information requested includes height, size of flower, season of bloom, type of foliage, etc. The registration fee is nominal.

Naming a new daylily

A major purpose of registration is to prevent duplication of names. Therefore avoid a name that is the same as or similar to one already used. A good variety deserves a good name — make it simple, descriptive, and meaningful, and preferably short, usually only one or two words. Personal names are to be discouraged since they have only limited sentimental appeal. A wisely chosen, easy-to-remember name will help popularize and sell a variety.

Keep the seedling under number until the registrar has approved your selection of name.

Daylily awards

Awards are given to stimulate competition among breeders, thus encouraging continued improvement and higher levels of attainment. In the Hemerocallis Society a large group of accredited judges each year evaluates officially registered and introduced varieties.

To be eligible for the Hemerocallis Society awards, with the exception of the Junior Citation, varieties must be officially registered and duly introduced.

Stout Medal. This is the highest award and is given only on the specific recommendation of a majority of the judges voting for the top-ranking variety. To be eligible for this medal, a variety must have received the Award of Merit (or its initial equivalent) not less than three nor more than six full years prior to the then current award year. The first Stout Medal was awarded in 1950 to the variety HESPERUS. In 1951 PAINTED LADY was the recipient; in 1952, POTENTATE; with REVOLUTE the 1953 winner.

Award of Merit. This award is given each year to ten varieties that have received Honorable Mention (or its initial equivalent) not less than three nor more than six full years prior to the then current award year. The award falls to those varieties receiving the most recommendations from the judges. The judges are not permitted to vote for more than ten varieties annually for this honor. Selected in the following order, the Award of Merit winners for 1953 were:

- | | | |
|--------------------|-------------------|---------------|
| 1. Garnet Robe | 5. Naranja | 8. Flanders |
| 2. Midwest Majesty | 6. Scarlet Sunset | 9. Flamboyant |
| 3. Valiant | 7. Rose Gem | 10. Baggette |
| 4. Queen Esther | | |

Honorable Mention. Any variety that is eligible to be voted on in the Popularity Poll will be eligible to receive Honorable Mention, provided it has not already received this award. It must receive not less than ten recommendations from the judges, each of whom cannot vote for more than ten varieties annually for this honor. Twenty-six varieties received Honorable Mention in 1953:

- | | | |
|-----------------|--------------------|-------------------|
| 1. Cibola | 10. Neyron Rose | 19. Taffy |
| 2. Brocade | 11. Brulee | 20. Canyon Purple |
| 3. Colonel Joe | 12. Challenger | 21. Constance |
| 4. Salmon Sheen | 13. Pink Dream | 22. Glory |
| 5. Show Girl | 14. Meadow Gold | 23. Myonne |
| 6. Raven | 15. Fascination | 24. Magnolia |
| 7. Display | 16. Griselle | 25. Primula |
| 8. Friar Tuck | 17. Prairie Boy | 26. Soledad |
| 9. Ming | 18. Spring Fantasy | |

Junior Citation. Varieties that may or may not be officially registered but which have *not* been introduced can be considered for this award. A variety must receive recommendations from more than five judges in order to qualify. In this category for 1953 were:

- | | | |
|------------|------------------|------------------|
| 1. Alan | 4. Swansdown | 6. Sweet Refrain |
| 2. Premier | 5. Sweet Mystery | 7. Tootie |
| 3. Quincy | | |

Other recognition. The Hemerocallis Society also sponsors an annual Popularity Poll (see pages 31 to 33), with all members of the Society participating. Eligible varieties must have been registered and introduced.

The American Plant Life Society has under consideration an award called the George Yeld Medal. This would presumably be given each year to the most outstanding and valuable variety observed by a special committee of the Society.

Set up to honor outstanding personages working with *Hemerocallis* are the Helen Fischer and the Bertrand Farr Awards. Both are awarded annually, under the sponsorship of the Hemerocallis Society.

Introducing a new variety

This involves only placing a variety on sale when enough stock has been built up, and listing it as such in a printed and dated catalog, price list, or other publication.

Daylily Family Tree

The daylily is only now coming into its own in the gardens of the world, yet it was cultivated many centuries ago. Some of the earliest known Chinese writings recommend the eating of daylily petals to kill pain. A Roman naturalist, Pliny, wrote about daylilies as early as 70 A.D. Dioscorides, the Greek herbalist, referred in his *Materia Medica* to a form now called the Lemon or Custard Daylily (*H. flava*). This daylily is still popular in gardens and prized for its fragrant, long-lasting light yellow blooms in early spring. The plant is semi-robust and bears many flowers on well-branched scapes.

Early history of the daylily in Europe

The first books on garden plants printed in Europe mention the daylily. Pena and Lobel (*Historia*, 1570) described the Lemon Daylily, and gave it the title *Asphodelus luteus liliflorus*. Records show that it was growing in France and Belgium at this date. In 1576 Lobel published a woodcut which clearly illustrated an entire flowering plant with fleshy roots. At this time he also described the second daylily known at this period, the summer-blooming *H. fulva* (Clone "Europa"), the familiar Tawny Daylily. He called this medium-tall fulvous (mahogany-red) species *Liriosphodelus phoeniceus*. Its "at home" appearance caused some Europeans even then to consider it native.

The daylily received its accepted generic name, *Hemerocallis*, in 1753 when Linnaeus, the great Swedish naturalist, published the first

edition of his *Species Plantarum*. In the same volume Linnaeus assigned the Lemon and Tawny Daylilies to the same species, *H. lilio-asphodelus*. The Lemon was listed as variety *flavus*, and the Tawny as *fulvus*. He considered *fulvus* a hybrid since it produced no seed and was largely sterile. In his second edition in 1762, both varieties were elevated to specific rank and designated as *H. flava* and *H. fulva*, the botanical names still used. *Flava* is probably native to Siberia, China, Japan, and other parts of temperate Asia. The native habitat of *fulva* is uncertain, but might have been Japan, central China, or the temperate trans-Caucasian region. Both species spread by means of rhizomes. Many clones of *fulva* have been discovered which differ slightly from the original species.

Various early writers mentioned a form they considered a variety of the Lemon Daylily. Philip Miller, in his *Garden Dictionary* (1768), chose to make this so-called Grass-leaved Daylily a species, naming it *H. minor*. Although somewhat similar to *flava*, it is without spreading rhizomes, has narrower foliage and inferior flowering habits. Its native range is supposedly East Siberia, North China, and Japan.

Later importations to Europe

A species sent from Japan to the Botanical Gardens at Ghent, Belgium, by Siebold, flowered about 1832 for the first time. This semi-dwarf form was named *H. dumortieri*. It grows less than 2 feet tall. The buds are strongly tinted brownish-red, the flowers are light orange, and the plant blooms in early spring. Another early-blooming semi-dwarf, orange, *H. middendorffi*, was collected by Middendorff in the Amur region and first described in 1856. Both have scapes that are largely unbranched, a characteristic considered undesirable in modern hybrids. These scapes are short, being but little longer than the leaves.

Between 1860 and 1864 double-flowered fulvous daylilies, one with pure green and the other with striped foliage, came into culture in Europe, arriving apparently from Japan. It is believed they had long been under cultivation in China and Japan, having been seen there earlier by Kaempfer (1712) and Thunberg (1784). These forms appeared closely related to *H. fulva*, and were later named *H. fulva* var. *kwanso* (green and variegated forms available) and *H. fulva* var. *flore-pleno* (more double than *kwanso*). Their origin is a mystery, but they were probably mutations which attracted attention and were preserved by cultivation.

Between 1890 and 1900 several valuable new species and more fulvous clones were first described. *H. thunbergi* (*serotina*), with small pale-yellow flowers produced abundantly in early summer, was first fully described in 1890. Thunberg's daylily was growing then in the Royal Botanic Gardens at Kew, England, but apparently had been cultivated

in Europe and placed on sale as early as 1873. It is a robust grower, and may be native to the mountains of Japan. The flowers are sweet-scented and day-and-night blooming. This species was much used in early hybridizations.

Another medium-height early-summer form, also probably from Japan and first described in England in 1890, was *H. aurantiaca*. It displayed fulvous-orange flowers and rather coarse, decidedly evergreen foliage. In hybridizations it has been found to be heterozygous for several important characters and may not be a valid species. Another clone, *H. aurantiaca Major*, with large orange flowers, was noted in 1895. *H. citrina*, the Citron Daylily, arrived at the Sprenger-Mueller nursery in Italy from Shensi Province, China, about 1897. Its night-blooming habits caused it to be much used by daylily breeders. It is a strong grower, with large, fragrant, pale lemon-yellow blooms, but has narrow petals and sepals. It is an early-summer bloomer.

Daylilies in the twentieth century

Although there is some confusion as to what constitutes a true species in *Hemerocallis*, about eight so-called species (plus a number of clonal varieties of several of these) were in cultivation in Europe or America at the turn of the century. Only a few horticultural or hybrid varieties other than the imported wild types had appeared. The interest in daylilies, however, was gradually accelerating. Existing stocks were quickly exchanged between botanical gardens, nurseries, and private gardens where they were being grown. In succeeding decades more clones of *fulva* plus several new species and a multitude of hybrids appeared.

The botanical explorer, Forrest, brought to England from southwest China three dwarf spring-blooming species that have played an important part in producing hybrids of low stature. Plants of the original species are, however, seldom seen today. Characteristically they have relatively short, sparsely branched scapes with few flowers each. These are the orange-yellow *H. forresti* (described in 1912), *H. nana* (1917), and *H. plicata* (1923). The last two species have orange flowers with reddish-brown reverse.

A floriferous orange-flowered daylily, *H. multiflora*, was found in Honan, China, by Dr. Albert N. Steward and named in 1929 at the New York Botanical Gardens. This small-flowered species is very late blooming. While only a fair garden form, it has been a wonderful gene source for extending the blooming period of new hybrids. In addition to numerous flowers per scape, it has excellent branching.

Some unusual specimens bearing flowers of bright pink and red shades were also sent to the New York Botanical Gardens by Steward from Kuling, Kiangsi Province, China. The type definitely resembled *fulva*, and was named *H. fulva* var. *rosea* in 1939. It is still regarded as

an excellent garden variety primarily because of its color. *Rosea* has also been important in the production of many red and pink seedlings.

Still another early-summer species to be described about this time was *H. exaltata*. It is the tallest of the orange-colored species, with scapes reaching a height of 4 to 6 feet. *Exaltata* was obtained by T. Susa in 1934 from the Tobi Shima Islands off West Japan. It has rather small flowers, poor branching, and is not a suitable garden form. Collections by Steward included another species, *H. altissima*, the Tsu-kin-shan Daylily. This is the tallest species known, ranging up to 8 feet in height. Its pale-yellow flowers are fragrant and nocturnal opening; the blooming period falls in late summer. *Altissima* is also a poor garden subject. Although found about Nanking, China, somewhat earlier, it was not given a specific name until 1942 by Stout of the New York Botanical Gardens.

Apparently little or no intentional hybridizing was done with daylilies in their native lands. It is largely through the efforts of hybridizers in the United States and England that great improvement has taken place during the last 75 years. Whereas the main color classes among the original wild types were yellow, orange, and fulvous red, complex hybridizations and selective breeding have brought us daylilies ranging from near white through yellow, orange, pink, red, crimson, brown, plum, pastel shades, etc. Flower form and size have been diversified, entirely new color patterns originated, and the flowering period greatly extended. These and other improvements, both floral and vegetative, have decidedly increased the garden value of the daylily. It is estimated that over 3,500 daylily varieties have been named and introduced.

New daylilies which could prove valuable to breeders may be found on further explorations into Asia. To date at least fourteen wild clones have been classified as species, all having reached us from an area extending from Siberia and Manchuria as far south as Nepal, west to the Caucasus, and east to China and Japan.

Daylily Pioneers

The first recorded hybridizing of daylilies was done in 1877 by George Yeld, an English school teacher and hobby-gardener. His variety, APRICOT (*H. flava* × *H. middendorffi*), was first exhibited in 1892. All-time favorites introduced by Yeld over a period of nearly fifty years include J. S. GAYNER, RADIANT, SOVEREIGN, TANGERINE, and WINSOME.

Another real pioneer is Amos Perry. A nurseryman by trade, he has been one of the most enthusiastic daylily growers in England.

Perry started crossing daylilies in 1885, and made his first introduction, AMOS PERRY, about 1900. In 1920 Perry named a promising seedling GEORGE YELD, after his friend who was visiting his garden. Offered for sale in 1925, it is still a good garden variety. Further Perry introductions of note are BYNG OF VIMY, CISSY GIUSEPPE, MARGARET PERRY, and VISCOUNTESS BYNG.

Other European daylily pioneers include the Italian nurserymen Karl L. Sprenger and his nephew, Willy Mueller. They imported several clones from Asia, including *H. citrina*; carried on a breeding program, and introduced new varieties as early as 1903. The English firm of R. Wallace and Son, Ltd., imported *H. aurantiaca Major* from Japan in 1895. They were also early introducers of new hybrid varieties, as were Peter Barr and Sons of England, C. G. van Tubergen of Holland, V. Lemoine and Son of France, and H. Christ of Germany.

A. Herrington (New Jersey) registered the first known American-produced clone, FLORHAM, in 1899. It was an *H. aurantiaca Major* × *H. thunbergi* hybrid. Luther Burbank (California) is credited with introducing four varieties, including CALYPSO, between 1914 and 1924. It is not known whether they were hybridized, or merely chance seedlings. The Pennsylvania nurseryman, Betrand H. Farr, originated, among others, the popular variety OPHIR in 1924. He also supplied a complete collection of cultivated daylilies to the New York Botanical Gardens for their breeding program. Later his firm arranged to name and distribute all daylilies developed by that institution. Paul H. Cook (Indiana) has introduced many important varieties since he began daylily breeding in 1924.

Perhaps no other daylily is so well-known and widely grown as the light yellow HYPERION. It was originated by Franklin B. Mead (Indiana) about 1925, and placed on the market in 1928. Carl Betscher, an Ohio nurseryman, made many fine introductions beginning in 1928. These included such old favorites as EARLIANNA, J. A. CRAWFORD, MRS. W. H. WYMAN, and MODESTY. The noted hybridizer Hans P. Sass (Nebraska) became interested in daylilies early in the century but made no introductions until 1933. Among his many outstanding originations were GOLDEN WEST, GRETCHEN, HESPERUS, MIDWEST MAJESTY, ORANGE BEAUTY, and REVOLUTE. Mrs. Thomas J. Nesmith (Massachusetts) who has since become one of the world's outstanding daylily breeders, introduced her first variety in 1933.

Dr. A. B. Stout has perhaps contributed more than any other person to the development of the modern daylily. Beginning in 1916, as Director of Laboratories at the New York Botanical Gardens he assembled a collection of all known daylilies in the Western Hemisphere and also sought new forms in Asia. Dr. Stout's interest in and study of the genus

Hemerocallis began even prior to this date. A trained geneticist, Stout made numerous controlled crosses and carefully observed the progenies. Complete records allowed him to determine the inheritance of many characters. Stout's approach set a high standard for daylily breeding, and literally ushered in a new era of daylily development. His publications have supplied a wealth of information on every aspect of the daylily.

One of Stout's greatest achievements was the production of the first dark red daylily, THERON. This is particularly noteworthy since only *H. fulva* and *H. aurantiaca*, among the original species, showed any decided red or pink flower coloration. Through the years Stout's varieties have been thoroughly tested before release and are consistently reliable. The list includes such well-known clones as CABALLERO, DAUNTLESS, DOMINION, MIKADO, RAJAH, and VIKING. In 1939 the American Plant Life Society awarded Stout the William Herbert medal for his outstanding work with *Hemerocallis*.

During the last several decades an increasing number of avid hybridizers, both amateur and professional, have shared in the rapid progress made in daylily improvement. While their contributions have been great, it is not possible to include all their names in this publication. Many of them will be found in the "one hundred best" list on pages 32 and 33.

Daylily Societies

Important work has been done by the *Hemerocallis* and the American Plant Life Societies in fostering the culture, use, and breeding of daylilies, and in the registration and evaluation of new varieties. Their activities also include the sponsoring of flower shows and test gardens, the appointment of accredited judges, and the making of appropriate awards for superior new varieties.

The official publications of these societies contain much useful information for all daylily enthusiasts. The older of the two, the American Plant Life Society, founded in 1933 as the American Amaryllis Society, includes daylilies in its scope. A much younger but very active group is the *Hemerocallis* Society, organized in 1946. Both societies deserve much credit for their accomplishments. Their addresses may be obtained by writing to 100 Floriculture, University of Illinois, Urbana. Membership fees are nominal.

The *Hemerocallis* Society has recently prepared official point tables for judging daylilies, as well as rules for show competition. This information is available for a small fee from the secretary of the society.

FOR MORE INFORMATION ON DAYLILIES

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