

## Bromeliads<sup>1</sup>

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Few families in the plant kingdom surpass bromeliads with their wide variation in size, shape, and foliage color. Many bromeliads adapt to growing conditions found indoors and, therefore, make excellent interior plants for the home. Hardier genera can also be used as landscape plants throughout most of peninsular Florida.

Bromeliads are in the pineapple family (Bromeliaceae), a family native to the American Tropics. Two widely known members of this family are pineapple (*Ananas comosus*) and Spanish moss (*Tillandsia usneoides*).

The majority of bromeliads grown as interior plants are epiphytes. In their native habitats, they attach by special root structures to trunks and branches of trees and derive their moisture and nutrients from the air and rain. Some are called saxicolous because they attach themselves to rocks, while the rest are terrestrial and grow in the ground as most plants do. Within the same genus there are sometimes tree-dwelling, ground-dwelling, and rock-dwelling species. In fact, epiphytic and terrestrial bromeliads can often thrive equally well if forced to switch places and life styles. It is this ability, in particular, that allows many epiphytic

species of bromeliads to be grown in pots like most other plants.

Plants in the family Bromeliaceae vary widely in shape, size and color. Even species of a single genus often differ drastically in appearance. Most bromeliads cultivated for interior use, however, are alike: without stems and with a central flower spike and strap-shaped, leathery, arching leaves arranged in a rosette.

Most species are grown primarily for their colorful foliage and exotic shapes. Variations in foliage are as wide as those in flowering, and leaves may be green, gray, maroon, spotted or striped. Leaves range from grass-like and less than 2 inches long in some tillandsias, to broad and several feet long in billbergias. The upper leaves of many species change color when plants are about to flower. The gray-green, grass-like foliage of *Tillandsia ionantha* turns pink, and deep purple-blue flowers arise among the pink leaves. Some species of *Neoregelia* have red tips on the apex of their leaves that resemble fingernails, and are often called "painted fingernail." Inflorescences (the flowering parts of a plant) may arise from the "cup" or be borne within the "cup." The "cup" or the "vase" is a water holding tank or

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reservoir formed in the center of many bromeliads by a rosette of overlapping leaves. Flowers are often small but colorful; however, the showy portion of the inflorescence is frequently made up of brilliantly colored bracts borne below each flower. Bracts may be separated, large and leaf-like or overlapping, forming dense spikes. Usually, the bright bracts remain on the inflorescence while fruit matures. The combination of highly colored bracts and often contrasting colored fruit, which remains on the plant for several months, adds to the aesthetic value of bromeliads.

## CLASSIFICATION

### Bromeliad family

The bromeliad family (Bromeliaceae) consists of 51 genera and about 1,500 strictly American species. They grow from the dry deserts of southwestern United States to equatorial tropical rain forests. Based on growth habits and other characteristics, Bromeliaceae is divided into the subfamilies Pitcairnioideae, Tillandsioideae and Bromelioideae.

Members of the subfamily Pitcairnioideae are mainly terrestrial plants with heavy spines on their leaf edges. They grow in soil or on rocks and do not have a leaf rosette that traps water. The genera belonging to this subfamily commonly cultivated are *Dyckia*, *Hechtia*, *Pitcurnia* and *Puya*.

The subfamily Tillandsioideae contains the least number of genera but the largest number of species, of which many are cultivated. Plants in this group have smooth or entire leaf margins, unusual foliage markings and colors. Some species produce fragrant flowers. Plants in the genera *Guzmania*, *Tillandsia* and *Vriesea* are the more commonly cultivated members of this subfamily.

Bromelioideae, the third subfamily, has the most bromeliad genera grown as garden and interior plants. It encompasses 30 genera with the widest range of plant forms, and accordingly the largest number of cultivated species. Subfamily members are mostly epiphytic, leaf edges are almost all spiny, foliage has attractive markings and patterns, and the leaves are usually arranged in rosettes which may be

cup-shaped. *Aechmea*, *Billbergia*, *Cryptanthus*, *Neoregelia* and *Nidularium* are the most popular genera of this subfamily.

### Commonly Cultivated Genera

*Aechmea*. Most of the 150 species in this genus are epiphytic, have deep cups to hold water and outstanding foliage all year long. The leaf edges are spined and the inflorescences are spectacular. *Aechmea fasciata*, one of the most popular bromeliads, is often called the urn or living vase plant because it appears to have provided a vase for its predominately pink inflorescence.

*Ananas*. The commercial edible pineapple (*Ananas comosus*) is a member of this genus. There is a variegated form of this species (*Ananas comosus variegatus*) that has green, cream and pink striped leaves that form rosettes 2 feet or more across. There is a smaller species, *Ananas nanus*, that is commonly grown as an interior plant. It has arching, 12 to 15-inch grayish-green leaves surrounding a 15-inch spike of red buds resembling a pincushion. The buds open into purple flowers which are followed by a 2-inch high, fragrant, edible pineapple.

*Billbergia*. Billbergias are tall and urn-shaped with spiny edged leaves. They are usually epiphytic and the foliage is often attractively variegated, banded or mottled. Although short-lived, inflorescences are very colorful.

*Cryptanthus*. These plants are small, terrestrial, sometimes stoloniferous with flat, basal, symmetrically arranged, variously colored mottled or striped leaves. They are grown mainly as foliage plants but their tiny white flowers, emerging low in the cups, are very attractive. Plants of this genus are commonly referred to as "earth stars" because their leaves grow low and parallel to the ground in a star-like arrangement. The species *Cryptanthus bivattatus* and several of its cultivars are among the most widely grown for use as interior plants.

*Guzmania*. Bromeliads in this genus have thin, glossy, strap-like, smooth-edged leaves which form a water-holding rosette. There are thin brown, purple or maroon lines which run parallel along the length of the leaves. Clusters of red, white or yellow flowers appear from behind orange, yellow or red bracts on a terminal spike. They are mostly epiphytic, however, a few are terrestrial.

*Neoregelia*. These epiphytic bromeliads develop blue or white flowers just above the water level in the cup. The central portion of the leaves surrounding the flowers turn rosy red. The spiny-edged leaves may also have red spots and markings. Some of the species develop red leaf tips and are often called "painted fingernail."

*Nidularium*. Plants in this genus are often confused with those in the genus *Neoregelia*. They both have bird's nest type flower heads; however, *Nidularium* inflorescence shows the bracts rather distinctly while the inflorescence is buried in the leaf rosette of *Neoregelia*. These medium-sized, epiphytic plants have broad, flexible, lightly spined leaves that form an open rosette.

*Tillandsia*. With nearly 400 species this genus is the largest, most diverse and widely distributed genus in the bromeliad family. Most are epiphytic, except for a few species that grow on rocks. Plant species vary in size from tiny to large. Some species have leaves that are tough and string-like; others have soft, thin, strap-like leaves. In still others the lower part of the leaf is spoon shaped. Often, the leaves are covered with a gray fuzz or scales. The inflorescence is spectacular in some species consisting usually of blue flowers with brightly colored bracts.

*Vriesea*. With more than 200 species this genus is the second largest but most hybridized and cultivated genus in the bromeliad family. These are medium

size, mostly epiphytic plants with soft or firm, variously green but often spotted, blotched or distinctly marked leaves. The usually long-lasting inflorescences have yellow, green or white flowers and brightly colored bracts. The inflorescences may be upright like a spear, pendulous or even curved. Plants in this genus are very susceptible to injury from cold temperatures.

## GROWING BROMELIADS INDOORS

Bromeliads are excellent indoor plants. They have colorful, long-lasting inflorescences and some have brilliantly colored foliage as well. Bromeliads also readily adapt to the unfavorable growing conditions that exist in most homes.

Although many bromeliads are epiphytic, living on branches and trunks of trees or on rocks in their native habitat, most can be grown in containers. Clay and plastic pots are equally satisfactory as containers unless plants are large, in which case the heavier clay pot is more stable. Because plastic pots retain moisture longer than clay pots, plants grown in the former need watering less frequently than those in the latter. Epiphytic bromeliads can also be grown in perforated plastic baskets and clay pots like those used for other epiphytic plants such as orchids.

Because bromeliads rarely have extensive roots, relatively small pots are adequate for most plants. The larger varieties can usually be brought to flowering in 5 to 7-inch pots. Terrestrial plants do not have to be moved into larger pots until their roots completely fill the current container. Move young epiphytes into pots one size larger every spring, however, until the maximum convenient pot size has been reached.

Some epiphytic bromeliads, such as the gray-scaled *Tillandsia*, grow poorly if planted in a conventional potting mixture. They grow best in a medium such as tree-fern bark, cork-oak bark, or on a tree-fern slab, or pieces of wood. To mount a plant on one of these materials, wrap the base of the plant (including roots, if any) in sphagnum moss, and tie the wrapped base to its support by winding plastic-coated wire around the moss and the

supporting material. Fasten the ends of the wire firmly but in such a way that it can be easily untied. Hang the mounted specimens in a convenient place. Spray the sphagnum moss and plant with water frequently enough to prevent complete drying of the moss.

After supportive roots grow over the sphagnum moss and around the mount, remove the temporary wire. To keep the plant alive and healthy, water the plant, its roots, and the supportive materials twice weekly throughout the year. Water can be applied as a spray or the entire mounted plant can be submerged in water for a few minutes. The humidity around plants will influence their need for water. The humidity in a home which is heated during the winter months or cooled with air-conditioning during the summer months can be very low and plants may need to be watered more frequently than those grown in a moist environment.

## GROWING BROMELIADS OUTDOORS

Bromeliads can be used in the landscape in frost-free areas of the state or grown in containers that can be moved indoors in areas where freezes occur. Since bromeliads require minimal care, they are an asset in the landscape.

In south Florida, bromeliads can be grown outdoors unprotected during most winters. In this area, people enjoy bromeliads for their graceful and decorative foliage, flowers, and fruit year round.

Some bromeliads tolerate low temperatures. The graceful, spiny *Bromelia pinguin* survives north Florida conditions, provided it is grown in a protected area. However, extreme cold temperatures will scorch and injure it. Cold damage to a few leaves will destroy the symmetry and beauty of the plant for a long time.

In areas where frost and freezing temperatures are common, covering with plastic or cloth may offer some protection. However, it is an extremely tedious job to cover the plants, and the covers are unsightly. In addition, mechanical breakage of leaves often occurs. A more practical way to prevent cold damage is to grow bromeliads in containers with a potting mix

and sink the containers into the ground. When freezing temperatures are predicted, pull the containers out the ground and move them into a garage or other protected area. While indoors, the plants should receive some light during the daytime. When temperatures are above freezing and no more frosty nights are predicted, the plants can be placed back into the landscape and mulched to hide the pot edges.

## CARE AND CULTURE

### Light

Bromeliads tolerate a wide range of light intensities, including low light, for long periods without ill effects. The plants, however, will look better when they receive proper light.

Although optimum light levels vary considerably, the following characteristics are helpful in selecting a spot for a particular plant. Generally bromeliad species with hard, thick, gray, gray-green or fuzzy foliage withstand the highest light levels, while species with soft, green, thin leaves grow best under lower light levels.

A general recommendation is to grow bromeliads where the light level is approximately 1,500 foot candles or where orchids grow well. In a home, a window with a southern, eastern or western exposure is satisfactory for bromeliad growth, but most species must not be exposed to the direct rays of the sun.

In most instances, a bromeliad will indicate by its growth habit whether light levels are satisfactory. A yellowish or pale green plant may indicate that the light level is too high. Conversely, a darker green than normal, with a more open or elongated shape, may indicate low light levels.

It is difficult to categorize bromeliad genera into optimum light levels, because light requirements of species within a genus may differ. The following generalizations can be used as a guideline, however, when selecting bromeliads for a particular site. Plants in the genera *Dyckia*, *Puyas*, *Hechtias*, *Ananas* and the hard-leaved species in *Aechmea* and *Billbergia* grow best at high light levels. Plants in the genera *Guzmania*, *Neoregelia*, *Nidularium*, *Cryptanthus* and

*Vrieseas* can grow under lower light levels.

### Temperature

The majority of bromeliads are tropical or subtropical and thrive outdoors in Florida's high summer temperatures. Many tolerate temperatures in excess of 100°F. In a home environment, however, bromeliads do best at 70-75°F during the day and between 60 and 65°F at night. Bromeliads native to central and north Florida tolerate temperatures slightly below freezing for short periods, but most introduced species should not be exposed to temperatures below 40°F. As a general rule, the softer-leafed species need a higher temperature, while those with very hard, stiff leaves are much more tolerant of cold.

### Humidity

Most bromeliads grow best indoors at a relative humidity of 40 to 60 percent. Unfortunately the average humidity in most homes is well below 40 percent, especially during winter months when heating systems are operating.

Humidity levels in the home can be increased by installing an inexpensive humidifier. Humidity in the vicinity of plants can be improved by placing potted plants on a 2 or 3-inch bed of wet gravel. Water evaporating from the gravel increases the humidity. The bottom of the plant pot should never be in or under water, because this causes waterlogged medium, possibly resulting in root damage. Another method of increasing the humidity around plants is to mist them with water frequently during the day.

### Air Circulation

Bromeliads, due to their epiphytic nature, require good air circulation. Fresh air supplies them with carbon dioxide and moisture. Plants grown in stagnant air are more apt to be attacked by scale insects and fungal organisms causing the bromeliads to deteriorate rapidly. Air circulation can be improved in a home by simply opening a window on days that are not too cold or by turning on a fan at low speed for most of the day.

### Water

Bromeliads are extremely tolerant of low-moisture conditions and will survive prolonged periods of drought. Most of the problems encountered with bromeliads are usually associated with rot caused by overwatering. Growing these plants in light, porous potting mixes that drain rapidly should help prevent this problem.

Bromeliads grown in a potting mix or in the landscape should be watered when the soil surface feels dry. Plants grown in pots should be watered thoroughly, until water runs out of the bottom of the pot and then not watered until the medium surface feels dry. Under normal household conditions watering thoroughly once a week is usually sufficient. In homes where the relative humidity is low (during winter months and in air-conditioning) plants must be checked and watered more often.

Many bromeliads are formed of a rosette of broad leaves which creates a "cup" or "vase" in their centers. If the plant is supplied with moisture by wetting the soil around its roots, it is not necessary to keep the cup filled with water. Most bromeliads adapt so well to culture in a pot that they absorb the needed moisture and nutrients through their root systems. Keeping the cup filled with water under low light conditions that exist in most homes encourages bacteria and fungus problems. If the cup is kept filled with water, it should be flushed out with plenty of water periodically to prevent possible stagnation. Periodic flushing also prevents a build up of salts left when water in the cup evaporates. Water should be removed from the cup if the temperature is likely to fall below 40°F. This practice will prevent cold damage which appears as a brown line across each leaf at the water level.

Epiphytic bromeliads, such as those found in the genus *Tillandsia*, are often grown secured to a board or bark. Because these plants have no distinct cup to collect water, they absorb moisture from the air through their scaly leaves. Unfortunately, in an indoor situation, where the humidity is usually very low, they are unable to obtain adequate moisture from the air. Moisture can be supplied to these plants by misting or dousing them in a container of water daily.

## Planting Bed Soil

Bromeliads have a limited root system compared to other flowering annuals and perennials. Roots function primarily as a support or anchoring system. Bromeliads absorb water and minerals through their leaves from the moisture in the air and through their cups. They are not as dependant, therefore, on their root system as are most other plants. It is important, however, to keep their root system alive and in good health.

The epiphytic nature of bromeliads prevents plants from tolerating heavy clay soil. To improve these soils, incorporate 2 to 3 inches of organic matter (peat, leaf mold, compost, etc.) into the planting bed. The sandy soils of Florida are usually well drained and good for growing bromeliads.

## Potting Media

Most bromeliads grow best in a very porous organic medium which permits quick water drainage and sufficient air circulation around the roots. There is no one potting mix which is better than any other, however, the following mixes are suggested:

1. One part peat, one part bark, one part coarse sand
2. One part peat, one part bark, one part perlite
3. One part peat, one-half part leaf mold, one part coarse sand.

Osmunda fiber, unshredded sphagnum moss or tree-fern fiber may substituted for peat moss in these mixes. Some bromeliads thrive best when grown in a medium composed only of osmunda fiber.

## Fertilization

Actively growing bromeliads respond to light applications of fertilizer. During the winter months, or under conditions of low light, they require little or no fertilizer.

A general purpose, liquid houseplant fertilizer can be applied to the potting mix at 1/3 to 1/2 of the recommended dosage every 1 to 2 months. It is best not to add fertilizer in the cup because this could lead to an accumulation of fertilizer salts that may burn newly emerging leaves.

Controlled-release fertilizers can be incorporated uniformly throughout the potting mix at planting and applied on the medium surface of established plants. Bromeliads usually grow much better with a continuous nutrient supply. Labor is also reduced because controlled-release fertilizer application frequency is less than for rapid-release fertilizers.

## PROPAGATION

Bromeliads can be propagated by removal of "pups" or "offsets" from the "mother plant" (asexual) or by seed (sexual).

Bromeliads slowly die over a period of a year or two after flowering. However, several pups usually develop during the flowering cycle and usually emerge from the soil near the edge of the container. The pups should be separated from the mother plant after they have developed a small rosette of leaves similar to the mother plant. To remove a pup, use a serrated knife, pruning shears or small saw. Coarse hacksaw blades may also be used for this purpose. Push the saw blade into the growing medium, between the pup and mother plant, and cut through near the base of the mother plant. The young pup may or may not have developed a root system of its own. Don't be alarmed if it hasn't. Add more potting medium to the area where the pup has been removed and transplant the newly cut pup into another pot. The mother plant, especially if helped along with a small amount of dilute fertilizer, will continue to produce pups until it dies. Pups should begin growing soon even though initially roots may be absent. Don't overwater. These plants will normally flower in 1 to 3 years. Propagation by vegetative means (pups) is by far the best and most satisfactory method for home gardeners.

Seed propagation is a long and tedious method of producing large numbers of bromeliads at a relatively small expense. Seeds can be sown in pots or flats on a surface of moist sphagnum moss or finely screened potting soil containing 50 to 75 percent organic matter. Because seeds are sown on the surface, a glass cover should be placed over the pot or flat to maintain a high humidity and prevent the medium from drying out too rapidly.

Seedlings are usually left in the propagation container until they are 1 1/2 and 2 inches tall and then transplanted directly to small pots. Plants grown from seeds normally require 3 to 6 years to attain flowering size.

## FORCING BROMELIADS TO BLOOM

Many factors cause bromeliads to bloom such as plant age, day length, light intensity, water and temperature. Some bromeliads bloom quite regularly while others do not. Research on the flowering process has shown that bromeliads can be induced to flower by exposing them to ethylene gas (a product of burning wood and leaves and ripening fruit and vegetables). After exposure to ethylene gas, the flowers appear, depending on the genus involved, within 6 to 14 weeks. A simple method that a home gardener can use to start bromeliads' flowering is to place a healthy, mature plant with all the water drained from its cup inside a tightly closed, clear plastic bag for a week to 10 days with a ripe apple. During senescence (aging process), the apple releases ethylene gas that, in turn, induces the bromeliad to flower.

Chemicals such as "Ethrel" and "Omaflora" are available and are effective for inducing flowering in bromeliads. However, these chemicals are tricky to regulate and may interfere with pup development.

## DISEASES

Many problems commonly attributed to diseases are the result of unfavorable growing conditions. Low temperatures (40°F and below) and overwatering can cause the crown of many bromeliads to rot. Also, plants subjected to mechanical injury, insects or sunburn may be invaded by one of many fungi. This invasion usually appears as a dark spot on the leaf, either with sunken or water-soaked areas and frequently with a radiating yellow area.

For severe infections or where large numbers of plants are involved, chemical control may be needed. For recommendations on selection and application of fungicides, contact your county agriculture extension agent.

## INSECTS

Few insects bother bromeliads, and those that do can be controlled. A number of scale insects attack bromeliads. Appearing as small round or oval objects on the leaves, scale insects multiply rapidly. They make plants unsightly by producing yellow spots on the leaves where the insects suck plant juices.

Mealybugs and root mealybugs, both characterized by their cotton-wool protective covering, may also attack bromeliads. When mature, mealybugs vary from 1/5 to 1/3-inch long and some species have long wax filaments extending from the rear of the body. They damage bromeliads by sucking plant juices.

Spider mites may also attack bromeliads. They are about 1/50-inch long when mature and may be greenish, yellowish, reddish or virtually colorless. Commonly found on the undersides of leaves, they suck juices from plants through their needle-like mouthparts. A 10- or 15-power hand lens is very helpful in detecting infestations before severe damage occurs.

After bringing a bromeliad home, isolate it for a month and carefully examine it for pests before placing it with other bromeliads. If a pest is found, either discard the plant or contact your county agriculture extension agent for recommendations on appropriate pest-control methods.