

ORNAMENTAL MUSACEAE

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Musaceae is represented in the Hawaiian Islands by four genera and many species, all of which are ornamental, as well as some being useful in other ways. The four genera are *Musa*, *Heliconia*, *Strelitzia* and *Ravenala*.

Probably the most useful and fascinating genus is *Musa* with its many types of edible bananas and fiber products. The Polynesians brought bananas with them when they migrated to Hawaii over 1,000 years ago; it was one of their main staples and generally eaten cooked. Until the kapu was broken about 1820, however, Hawaiian women were forbidden to eat most bananas under penalty of death. Probably more legends and proverbs evolved around the banana than any other plant. In sacrifices to the Gods sometimes a banana stalk was used as a substitute for a human sacrifice. Many bananas do not produce edible fruit but have such a strikingly colorful inflorescence that they are grown ornamentally or as oddities. One of the oddest is the mai'a hapai which is Hawaiian for pregnant banana. Instead of the banana bunch coming out of the top of the plant it is borne within the trunk. The trunk swells like a pregnant woman and eventually will split open to expose the bananas which are small but edible. This is not an "instant legend" and the plants can be found in a few specialized gardens. Bananas are propagated from suckers and seeds; usually the edible bananas sucker only whereas the ornamental ones sucker and/or set seed.

The heliconias, named after Mt. Helicon in Greece, mostly from tropical and South America, defy description and numerous species are now growing in Hawaii. Propagation is by suckers and seeds; the plants are cut to the ground after blooming and the new shoots will bloom the following year. They do best in shade or semi-shade.

Heliconia aurantica: Medium-sized plant to 4'; leaves small, lanceolate to 7" without a petiole. Flower spathe in several planes, upright inflorescence small, to 6", bracts orange, flowers lemon-yellow. This species is one of the more desirable inasmuch as it blooms in the winter while most heliconias bloom in the summer. It would lend itself to pot culture and should be considered by any nurseryman featuring tropical plants. Native to Mexico.

Heliconia psittacorum : Parrot heliconia: Another medium heliconia to 4', leaves small, acuminate to 9", without a petiole;

flower spathe in planes, small upright inflorescence to 5", bracts orange, flowers orangish-red. When the bud is just opening you can see the resemblance to a parrot thus accounting for both the specific and common names. This is another desirable potted plant because it blooms all year; as one plant is cut to the ground another shoot is already at the flowering stage. Planted out here, however, this plant can become a problem as it spreads in all directions. Native to tropical America.

Heliconia humilis: Lobsters claw heliconia: Large plant to 9' with large banana-like leaves with a long petiole, erect inflorescence with red bracts in several close planes to 12", flowers orange with green tips. This is probably the most vigorous and common of all heliconias in Hawaii as it is truly striking when in bloom all summer long. However, it is falling into disfavor as the bracts hold sufficient water to create a breeding place for mosquitoes. This is rather large for pot culture but perhaps with the use of a growth retardant it could become a valuable asset to the mainland grower. Native to tropical America.

Heliconia rostrata: Another medium plant to 6', leaf blades to 2' on a long petiole, 1' inflorescence hanging in several planes, spathes strongly reflexed; bracts brilliant red with chartreuse tips. This summer bloomer is not too common in Hawaii but it's bound for popularity because of the hanging inflorescence and the brilliant color combination. This inflorescence also dries perfectly for dried flower arrangements with the two-toned effect becoming beige and brown. This could be a dramatic addition for the tropical plant specialist. Native to Peru.

Heliconia flava: A smaller heliconia to 4' with 2' leaf blades on a long petiole. The 8" upright inflorescence is in several planes with the upper bracts opening white but eventually turning vivid yellow. This species is new to Hawaii and as yet very rare but is headed for popularity because it is more adaptable to the home garden than many of the larger species. The inflorescence stays very showy for about three months when it blooms in the winter, giving it great possibilities for mainland pot culture.

Heliconia marantifolia, (syn. *H. metallica*:) A rather rangy and large plant to 8' with 3' leaf blade purple beneath, green above, atop a long petiole. Upright inflorescence in several planes with 3" green to reddish bracts on long peduncles, flowers red. This species is not as popular as many but it does have merit if a contrast in foliage is desirable. Also probably not desirable as a pot plant because of the size of the plant and smallness of bracts and flowers. Native to Columbia.

Heliconia caribaea: A vigorous plant much too large (to 12') for the home garden so is seldom seen throughout the Islands. The large banana-like leaf blades are to 5' with a long petiole. It

has a brilliant yellowish-orange upright 1' inflorescence with overlapping bracts, extremely handsome when in bloom in the summer but at its peak for only about one month. Not recommended for pot culture except perhaps as a tub specimen. Native to the West Indies.

Heliconia illustris (syn. *H. insignis*): A magnificent plant to 4' with large multi-colored leaf blades atop 1' petioles. The leaves feel like skin, in colors ranging from whitish to reddish, with reddish veins, the entire plant a kaleidoscope of hues of white, red, copper, pink and rose. It does have inconspicuous greenish bracts and flowers near the base of the plant but they are completely insignificant compared to the foliage. It has never become common in Hawaii, which seems a mystery to me, but it certainly has potential as a foliage plant for pot culture on the mainland.

Heliconia platystachys: One of the heliconias commonly called hanging heliconia, along with several other species. Plants large to 12' with waxy white powder on the underside of large leaf blades to 4', atop a very long petiole. Inflorescence hanging, to 1½', bracts not touching or overlapping, bracts reddish also with a waxy white powder. Neither in foliage or flower is this particularly outstanding but it does indeed serve a purpose where a tall whitish background plant is wanted as this heliconia does not spread as readily as some of the others. It is also a summer bloomer but would be considered too tall and rangy to make an acceptable potted plant. Native to Guatemala and Columbia.

Heliconia latispatha: Another large plant to 10' with 4' leaf blades atop long petioles; also a handsome summer bloomer and very desirable where a bright orange is wanted in an area that can accommodate large plants. The 1' erect inflorescence is in several open planes of orange bracts, flowers yellow and green. Of course this one, too, would probably be too large and open to make an attractive addition for a tropical plant collector on the mainland. Native to Central America.

Heliconia sp.: Tall plant to 12', large leaf blades to 4', 1' erect inflorescence of several planes with reddish orange bracts, flowers green and yellow. Also too large for the average small yard or effective pot culture.

Musa koa'e— Variegated maoli: While this is called one of the native bananas, this means that it was used and eaten by the early Hawaiian natives and not that the plant is native; the first bananas were brought by the Polynesians as mentioned earlier. This beauty produces very ornamental green and white striped leaves in addition to its unique green and white striped fruit which must be cooked before eating. It is fairly small, probably to 6', and a real addition to the tropical scene. It is thought to be a form of *Musa paradisiaca* which probably originated in India.

Musa ornata: A small ornamental banana growing in clumps to about 5'. Small inedible fruit is preceded by decorative inflorescences with showy bracts of pinkish-rose color, usually on erect stems. Once a clump is established there seem to be blooms most of the year consequently this would also be a fine potted plant.

Musa velutina: A prize ornamental clumping banana to 5'; 3" bright pink fruit of a velvety texture, later splitting open forming what looks like a flower made of white cotton. The fruit is inedible except to the birds who scatter the seeds throughout the gardens. It makes an excellent potted plant because by the time one plant is through blooming and has been cut off another is ready to take its place. Native to India.

Musa coccinea: Probably the showiest of the ornamental bananas, a 4' clumping species with brilliant red upright inflorescences consisting of red bracts with yellow tips, total length about 1'. These hold up for several days in flower arrangements. It sometimes sets inedible 2" greenish-yellow bananas. This has a long blooming season throughout the spring and is unsurpassed as a potted specimen. Native to S. China.

Musa zebrina: This is a taller ornamental banana to 15' with handsome variegated leaves of green speckled with copper. It is a bit too tall and sparse to be of use in a small garden but might lend itself to pot culture with one of the growth retardants.

Musa arnoldiana: A large ornamental banana to 15', propagated from seeds rather than suckers. Good possibilities for pot culture with its decorative leaves, providing its growth could be limited. Originally from Africa.

Strelitzia reginae — Bird-of-paradise: This is not only well represented in Hawaii but in California and Florida as well; it's even the city flower for Los Angeles so I know you're all familiar with it. Some of you may not realize that when the flowers have dried they can be sprayed gold for stunning dried flower arrangements. Native to Africa. You may not be familiar with *Strelitzia nicolai*, a tree-like species to 20' with large white flowers enclosed in large brownish bracts, each weighing about four pounds.

Ravenala madagascariensis — Travelers' tree or travelers' palm: Unique with its gigantic fan-shaped cluster of leaves at the top of an unbranched woody trunk, to 30'. It is commonly called travelers' tree because water will accumulate at the junction of the petiole with the trunk and could be a source of drinking water if you were stranded. This water reserve serves as an extra support to the leaves in a strong wind. From Madagascar.

MODERATOR RAUCH: Thank you, Bettie, for that fine discussion on bananas. We have some exotic happenings occurring on the mainland. Our next speaker from the "Evergreen State" also did his graduate work at UCLA and later went to Florida, then returned to the State of Washington. I would like to call on George Ryan to talk on "Chemical Control of Development." George:

CHEMICAL CONTROL OF SOME ASPECTS OF PLANT DEVELOPMENT¹

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Abstract The use of growth retardants to induce flowering of ornamental plants, especially azaleas and rhododendrons (*Rhododendron* spp.), is reviewed. Examples of recent data show approximately 200% increases in number of flower buds on outdoor container grown 'Anna Rose Whitney' rhododendrons treated with Alar, Phosfon or Cycocel in their second season of growth.

The relationship between nutrition and response to growth retardants is discussed. Nitrogen levels probably are as important for the growth retardant response as reported for P levels. Data presented show a significant reduction in number of flower buds where N fertilization was reduced or omitted, with only a reduction in leaf N from 1.9 to 1.7%.

Results are presented of the use of chemicals to prune and induce branching of *Photinia x fraseri*. The number of side branches was increased from 0.6 to 8.4 per plant by treatment with a combination of the pruning agent Off-Shoot-O and the cytokinin SD 8339.

Nurserymen have become skillful in the use of nutrients, water, temperature, and sometimes supplemental light, to grow vigorous plants to marketable size in a minimum of time. This combination of factors for optimum growth rate does not always result in a plant properly developed in terms of shape, branching habit, or presence of flower buds. Much attention has been focused in recent years on the use of growth regulating chemicals to modify these characteristics of plant development.

CHEMICALS TO PROMOTE FLOWERING

Effects of growth retardants on flowering of azaleas and rhododendrons (*Rhododendron* spp.) were first reported by Stuart

¹Scientific paper 4114 Project 0085, College of Agriculture Research Center, Washington State University, Pullman, Washington 99163.