

# CONTAINER-GROWN HIBISCUS: PROPAGATION AND PRODUCTION

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The popularity of the *Hibiscus rosa-sinensis* in the southern U.S. as a garden shrub has increased tremendously in the last few years. Hibiscus is the most popular flowering shrub in the tropics. Its unique and distinctive flower gives a lush tropical image to the surrounding landscape. The idea of using hibiscus as a color crop instead of a perennial shrub has been one of the most influential factors for the increased popularity and demand. The potential for commercial pot hibiscus production is just now being realized. Many people are unaware of the broad range of hibiscus colors, color combinations, and flower forms, and think only of hibiscus as a single red flower as so often seen. There is an almost unlimited variation in the shades of color of the hibiscus flowers.

Hibiscus may be propagated by seed (hybridizing), cuttings, grafting, or by tissue culture. Hybridizing is best done by collectors or research labs as cross-breeding hibiscus is an unprofitable method for commercial propagation. There are many factors that determine the value of commercially grown hibiscus such as uniformity, flower size and color, and bud count. It is impossible to predict the appearance or performance of hybridized plants. The first bloom should appear about 18 months after seed germination. Pink tones constitute about 80% of a progeny, followed by browns, true yellows and reds. Whites and blues are practically impossible to find.

Propagation by cuttings should begin about the time warm weather is established and the soil is warm. Cuttings may be either hardwood or softwood tip cuttings. We root the cuttings in a mix of styrofoam and peat, with Osmocote, or in Oasis Horticultubes. I prefer the Oasis Horticultubes because the brittle root system of the cutting often breaks off at the basal end during transplanting. The Horticultubes prevent such breakage. The cubes also save time and labor as rooted cuttings can be planted directly in a 1- or 2-gal. container.

Some hibiscus cultivars root much better than others. The more exotic or fancier the hibiscus, usually the more problems rooting them. Florida growers claim you cannot root many cultivars but that they must be grafted. I do not believe that to be the case; I believe you can find a way to root them all.

One of the biggest problems is that most of the more

exotic hibiscus cultivars that come from Florida are infected with *Colletotrichum* and *Graphium*. The soft rot caused by these organisms is called anthracnose. I will talk about anthracnose later, but during hot months or during stress, anthracnose can become quite prevalent, killing most cuttings in the mist beds or after transplanted. Avoid propagation during the hottest months and use clean stock.

I use a mild liquid rooting hormone on the tip cuttings and a slightly stronger hormone on wounded hardwood cuttings. The mist should be frequent enough to keep the cuttings moist but not saturated. Cuttings root in 4 to 8 weeks depending on the cultivar. I do not recommend winter cuttings, even with bottom heat, because it could take up to 3 months or more for rooting.

Grafting hibiscus is unfeasible for commercial production because of the high labor costs involved. I recommend grafting for the hobbyist. To save time some grafters in Florida graft onto a cutting before rooting. I do not know how successful this method is.

Tissue culture may be the answer to propagating the more difficult-to-root cultivars. However, in the beginning, labs will probably have a difficult time cleaning up stock plants infected with anthracnose. But if the labs succeed, the exotic hibiscus will become more available in numbers and cultivars enticing more customers to incorporate the hibiscus in their landscaping.

A rooted cutting may be transplanted into a 2-in. liner pot, a 4-in. pint pot, or directly into a gallon container. The type of container used depends on the time of the year and desired finish date. A gallon size hibiscus finishes off in 3 to 4 months during the summer. However, by the end of the summer there are few sales for hibiscus. Therefore, the hibiscus should be finished for the spring sales. This makes the growing schedule more difficult and costly. Planting time depends on when you can transplant, the growing time, winter temperature in the greenhouse, and amount of sunlight in the winter months.

We transplant hibiscus liners and Horticulture liners into gallons at the end of summer. The mix consists of peat, bark, sand, and haydite with Micromax. Hibiscus require a well-drained soil mix with a pH of 6 to 7. After transplanting we top dress with Osmocote 17-7-12. Hibiscus plants are heavy feeders and require top dressing again after a few months. I have obtained optimum growth by using Cornelius Hibiscus Food, which is a 10-4-12 formulation. Since this fertilizer should be applied monthly, it is financially unfeasible for commercial use. It is useful, however, for the hobbyist. Good

results have also been obtained using Scotts Sref and Step. We recommend spraying weekly with sequestrene iron, and monthly with a soluble 20-20-20 fertilizer. Some cultivars may need an extra foliar spray with micronutrients.

Most hibiscus require full sun, except for a few cultivars that grow better in partial shade. Too much sun for these cultivars affects flower bud number and causes bud dropping. Some growers of the florist quality 6 in. hibiscus do not use full sun, which results in the development of very dark green foliage.

Hibiscus will grow in the hot temperatures of the southern U.S. until frost. Flowering slows down if the temperature drops below 65°F. or goes above 85°F. Hibiscus is tender to frost but can often survive a mild winter outdoors if cut back to the ground and mulched over. In a greenhouse during the winter the best temperature setting is 65°F.

During summer overhead sprinklers are turned on twice a day for 40 minutes each time. Hibiscus need a lot of water in summer to remain healthy and to retain their lower leaves in the heat.

Hibiscus are susceptible to many insects. Spider mites are by far the worst problem. The mites hide up inside the cupping of the leaf between veins. We had good control with Vendex (fonbutatin-oxide) followed by either Kelthane (dicofel) or Pentac (dienochlor). Other insect problems are caused by aphids, which attack the tender growth, and grasshoppers, which chew on the leaves. Use Sevin or Orthene for most insect problems; however, never use Malathion because it causes defoliation. Some growers claim Diazinon will cause leaf drop also. If worms become a problem, Thuricide or Dipel (*Bacillus thuringiensis*) should take care of the problem.

The major fungal problems are *Colletotrichum hibisci* and *Graphium*. Their infection causes lower stem rot in cuttings, transplants, and vigorously growing plants. The most effective fungicides for this problem are Benlate (benomyl) and Daconil (chlorothalonil). It is critical that the lower stem be thoroughly wet with the fungicide during spraying. A good sanitation program will prevent introduction of this pathogen from stock plants. Careful roguing of diseased stock plants should be practiced. Also, tissue culture indexing would insure clean stock for propagation. Drip irrigation would be advantageous, especially on stock plants, since overhead irrigation splashing helps spread the fungus.

Another disease problem is bacterial. These black or brown circular or irregular shaped spots may be controlled by weekly sprays, rotating Benlate, Daconil, and Kocide, copper

hydroxide. It is important that the foliage not remain wet overnight. Cold water drops from plastic in the winter can also cause spotting.

The two main physiological disorders are leaf and bud drop. These may be caused by lack of water, sudden humidity change, and change in sunlight such as occurs when plants are moved from outdoors to indoors. Also, during mid-winter hibiscus in the greenhouse may shed some of their leaves. This is the annual leaf shedding which occurs in one or two weeks.

Selective pruning can maintain or develop a desired form on some cultivars. Hibiscus should be pruned as one would trim roses. When trimming, the cut should be made just above a leaf pointing towards the outside of the container. This helps the plant grow outward and larger instead of inward and crisscross. One should make the cut close to a node to prevent dieback of the stem and entry of diseases.

Growth characteristics vary greatly among cultivars. A plant may be compact and densely leafed, or leggy and open. Some plants grow upright while others are short and broad. In frost-free areas some plants may become 20 ft. trees while others will always remain low and drooping. Different cultivars may be more suitable for standard trees while others may do better in other forms. *H.* 'Cooper', a variegated hibiscus, does well in hanging baskets. *H.* 'Mrs. Jimmie Spangler' is a 6-in. florist type, *H.* 'New Ruffles' is a collectors item, etc. The different climates around the country will affect the growth habit of the same hibiscus cultivar.

Following is a list of those I consider to be the best cultivars:

<i>Single red</i>	<i>Single white</i>
Brilliantissima	Ander's White
Gypsy Queen	White Wings
<i>Double red</i>	<i>Double white</i>
Lamberti	Elephant Ear
<i>Single yellow</i>	<i>Single pink</i>
Butterfly	Texas Star or
<i>Double yellow</i>	Pink Lady (Amour)
Mrs James Hendry	Seminole
(Fullmoon)	<i>Double pink.</i>
<i>Single orange</i>	Fulviolaceus
Red Sheen	<i>Hanging basket</i>
<i>Double orange</i>	Silver Queen
Jigora	Cooperi
	<i>Trees</i>
	Brilliantissima
	Gypsy Queen

Once the plants in the containers have reached a saleable size, they are ready for a foliar chemical treatment with Cycocel. Spraying Cycocel induces budding, causes a more compact plant, and changes the foliage appearance. Cycocel causes budding on all the branches. Usually hibiscus set buds only on new growth. The flowers only last one day except for a few cultivars, where they may last two days. Therefore, as many branches as possible are needed and all branches must be heavy with buds to have a succession of flowering and an attractive plant for sale. Cycocel will induce budding in about 8 weeks during warmer months and about 12 weeks during cooler months.

Along with bud production, Cycocel causes slower plant growth which makes for a more compact plant. Depending on the strength of the Cycocel and the cultivar, plants grow much slower, or cease to grow, which effect could possibly last up to a year. I see many benefits to this growth reduction. Hibiscus then set a bud in between the nodes and, if the internode space is close, the buds will be closer also and can bloom sooner. Another benefit to the growth reduction is for the homeowner. If, normally, the cultivar grows vigorously, the homeowner may need to cut back the plants several times a year to maintain its size, thus losing several weeks of blooming time. Also, the smaller, compact plant allows space for more hibiscus plants in the garden or on the patio. Therefore, the Cycocel-treated, or dwarfed hibiscus, is more marketable and pleasing to the consumer. (Notice, I did not call them dwarf hibiscus, a term often misused since the hibiscus are dwarfed by a chemical).

Cycocel is applied when the plant has reached its desirable size. The rate of Cycocel application depends on several factors. Do you want a reduction of plant growth, or a nearly total halt to growth? Cycocel at 250 to 500 ppm will cause a growth reduction; at 750, 1000, or 1500 ppm it will stop the plant's growth depending upon the cultivar. (1 oz./gal. gives approximately 1000 ppm) The newer cultivars, especially those with heavy, waxy, wavy leaves, need a very low rate to set buds. I have seen some cultivars treated with higher levels of Cycocel that did not grow for several years; however, they did bloom well. The more vigorous plants need a heavier application to keep the plant's size under control. Different areas of the country will observe different results with the same cycocel application. A 250 ppm rate may cause bud production in some areas, such as the north, while 250 ppm in the south may just slow down growth or have no effect at all.

Some growers use several low-rate applications of Cycocel throughout the growing season. They believe these low con-

centrations start bud set sooner. This idea is very popular with the 6-in florist hibiscus.

Cycocel also affects the leaves. They turn a very dark green and have a leathery texture within a few weeks after spraying. High concentrations will cause severe cupping of the leaves and they become very brittle.

The marketing of a Cycocel dwarfed hibiscus should be much easier since the plant will be compact, dark green, and heavily budded. A hibiscus plant in bloom is very attractive and difficult for a customer to pass up. When the plant is not in bloom and showing off its spectacular flowers, it looks like an ordinary woody ornamental. In a retail store, display all the hibiscus in bloom together, or if this is not possible, pull the blooms off and display them with a label in a peg board. Display them with annual bedding plants, not with woody ornamentals. Since the plants in bloom are usually the first to sell, this allows each customer to know exactly what flower he is purchasing. It is important to label each hibiscus plant by cultivar. The label should give the name and a short description of the flower. This allows the customer to become familiar with the cultivar and become more informed. Once the homeowner catches hibiscus fever, he may return for different cultivars, rebuy the same one next spring or talk to the neighbors about their favorites.

The new sales tactic for selling hibiscus is to sell them as an annual color crop instead of a perennial garden shrub. Discourage homeowners from trying to save hibiscus through the winter. Hibiscus in the ground, cut back and mulched over may make it through the winter, but half the growing season will pass before the plant blooms. It would be a much better idea to sell a tropical colorful plant in March or April for the homeowner to enjoy until November or until the first freeze.

Often one hears the complaint about hibiscus, "I don't want to spend that much money on a plant that freezes." Compare the hibiscus to a garden mum, which blooms for a month, or to a poinsettia. No one complains about the short time these last while hibiscus will last the whole growing season.

Hibiscus may be marketed in numerous methods. Hibiscus, besides being sold as a color plant for the yard, makes an excellent patio container shrub or tree. Hibiscus can be grown as accent plants in the form of espaliers and braided trees, which are very popular. Hibiscus can be grown as a hedge or in a mass color planting in commercial or residential landscapes. The more exotic hibiscus are collector items for the

hobbyist. The 6-in. pot could be grown and available to the consumer year round.

Commercial production of *Hibiscus rosa-sinesis* has a great potential as a color crop, especially when grown as a green, compact flowering plant by the use of good growing practices and by Cycocel treatments, which enables the hibiscus to be in bloom for early spring sales, and the year around.

## **ROOTING HORMONE FORMULATIONS: A CHANCE FOR ADVANCEMENT**

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The effects of synthetic auxins indolebutyric acid (IBA) and naphthaleneacetic acid (NAA) have been known since 1935 (8). Since that time work with these chemicals and other compounds such as 2,4-dichlorophenoxyacetic acid (2,4-D) (2), and willow extracts (6) have been reported. Commercial mixtures such as Wood's Rooting Compound (7), Rootone products, and Dip'N-Grow are successfully used throughout our nursery industry.

Flowerwood Nursery practices specific use of combinations of IBA, NAA, potassium-IBA, alcohol, water, talc mixtures and solutions, as root-promoting treatments. We find species and cultivar variations by treatment demonstrated by *Raphiolepis indica*, *Rhododendron*, *Camellia sasanqua* and almost all species that we produce. Our auxin formulation program offers opportunities for great progress for plant propagators in time, quality, and quantity of rooting.

Hormone-induced rooting of cuttings is a common practice among nurseries of all sizes. Many purchase commercially-available packaged rooting compounds. Others purchase chemical-grade auxin and formulate their own solutions. Most common is the use of crystalline IBA, diluting it with alcohol and water for desired concentrations.

Flowerwood Nursery produces 80% of all its liners from stem cuttings. Typical cuttings are from 3 to 7 in. in length. These cuttings are taken from container or field stock plants. Cuttings are bundled with rubber bands and trimmed for uniformity. Most cuttings are not stripped. All cuttings are rinsed in a fungicide solution before auxin treatments. The balance of