



a pdf magazine
devoted to Hoya
cultivation,
history
and
photography

Stemima



SPECIAL ALL PROPAGATION ISSUE

VOLUME 1 #4 AUTUMN, 2007

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Editor's Note

This issue, which marks the end of **Stemma**'s first year in publication, is dedicated to the many people who made this endeavor possible. Carol Noel, David Liddle, Torill Nyhuus, Dale Kloppenburg and Antone Jones all contributed their time and knowledge to make this publication better than it would have been without their input. Christine Burton has provided useful critiques of the first two issues, which has led to a deeper exploration of many of the topics initially addressed here, as well as the correction of some notable mistakes. I extend my thanks to her as well.

I am pleased that, through the contributions of many subscribers, **Stemma** has started to become the more community based publication I had hoped it would be. A case in point is this issue, a special **All Propagation Issue**, which was written largely by **Stemma** subscribers.

There are a number of ways in which this group of plants may be propagated, and the particulars of each method varies greatly, reflecting the personal experience and philosophy of each grower. In this series in our **Technique** section, a number of growers provide the benefit of their experience with propagating Hoya and Dischidia. While not all accounts are of completely positive results, the relation of a failed experiment may often be as instructive (or more so) than a great success.

This issue's **Chemicals** and **Materials** departments also focus on propagation, with articles touching on the various rooting mediums and agents available to amateur growers, and an article by Al Fassezke exploring the hype and reality behind one of the most commonly used rooting agents, Superthrive.

The final winner of the **Stemma Photo Contest** is Torill Nyhuus of Sweden. Her winning photograph appears on page 50. Displayed here is a detail of Kevin Mosley's painting of *Hoya clandestina* Blume, which was created for last issue's photo competition winner, Ann Strahm.

The **Back Page** feature for this issue is contributed by Antone Jones of dischidia.com, online at:
http://www.dischidia.com/dischidia_main.htm.
Antone's contribution highlights *Dischidia singularis* Craib. 🐾



Materials: Rooting Media

by Mark Randal

There are as many methods of propagating Hoya as there are collectors who grow these exotic plants, and almost as many materials that can be used to do so. Here, **Stemma** will look at some of the more commonly used and readily-available of these media. Each medium discussed will have a brief description of its origins and properties and a list of pros and cons of its use for rooting purposes.



Figure 1: Examples of (A) perlite, (B) (inset) pumice, (C) sphagnum moss, (D) peat moss, (E) orchid bark, (F) vermiculite and (G) a commercial potting mix.

Commercial Potting Mixes. These mixes are most often based on composted or uncomposted sawdust or tree bark. Other organic ingredients may include composted mushroom soil, Sphagnum moss, peat moss, worm castings and guano or other manures. Inorganic components may consist of perlite, pumice, vermiculite, sand, or gravel. Other non-structural ingredients may be present, such as chemical fertilizers, wetting agents, mycorrhizal fungi inoculants, or humic acid.

Pros: Commercial mixes are readily available and are generally very consistent from batch to batch.

Cons: Individual mixes vary widely in components. The cheapest mixes, usually available at big box stores, can consist of little more than dyed, uncomposted sawdust with a wetting agent added. High quality mixes- mostly bark based- are usually available at nurseries, and are much better mediums for plant growth and propagation, with fewer unsuitable ingredients. Commercial mixes usually retain a lot of water, which is problematic in rooting cuttings, where a more even balance of water and air is required in the mix to avoid rotting of cuttings and newly formed roots. Commercial mixes also usually have a fairly small particle size, which favors water retention rather than air retention.

Perlite is actually a kind of volcanic glass (siliceous rock) chemically similar to obsidian. The raw material is artificially heated to about 1600°F (870°C), which causes imbedded air pockets to expand and escape, creating an extremely porous, lightweight, sterile material. Because the material at this stage is composed of countless tiny cavities or cells, it has an enormous surface area compared to its size. Available in fine, medium, or coarse sized particles, the coarse being used most widely for horticultural purposes.

Pros: Perlite does not actually absorb water- rather, water will adhere to the particles surfaces and excess water will drain away freely. This creates an ideal balance of water and air in the mix, although it does require more frequent watering than do mixes containing bark or other organic material. Even when fully saturated, perlite still contains a large percentage of air, which helps to prevent rot in delicate stems and roots. Perlite does not compact easily as do some other media.

Cons: Being essentially extremely fine glass particles, perlite dust is harmful to the respiratory system, so care must be taken when working with this material. Wet perlite before use to reduce dust, and wear a mask. Perlite is extremely light, which makes it sometimes difficult to prevent small pots with large cuttings from tipping over.

Pumice is a naturally occurring rock that is formed during volcanic eruptions. Lava, frothy with volcanic gases, hardens as it flies through the air, forming this lightweight, porous rock. A sort of a naturally occurring perlite.

Pros: Pumice does not absorb water and maintains a high air content. Pumice is heavier than perlite, making pots and cuttings more stable.

Cons: Pumice is quite hard and can have sharp edges which can damage delicate new roots and stems. Care must be taken to avoid breathing pumice dust.

Vermiculite is a mineral which resembles mica in its unprocessed state. It is treated to very high temperatures causing it to expand, similar to the processing of perlite.

Pros: Vermiculite retains water longer than perlite or pumice, reducing watering frequency.

Cons: Vermiculite can compact, causing areas of water retention and low oxygen content. Vermiculite is also light-weight, and pots may need to be weighted to prevent tipping. Vermiculite has been associated with asbestos since it was discovered that a large-scale US producer of vermiculite (the W.R. Grace vermiculite mine located in Libby, Montana) was mining the mineral from a mine contaminated with asbestos. This mine has since been closed, and all vermiculite produced after 1990 is said to be free from contamination.

Sphagnum Moss is a genus of moss (also sometimes sold as Green Moss) which comprises the top layer (when living) of a Sphagnum or peat bog.

Pros: Sphagnum moss retains a great deal of water, and can help create humidity in its general vicinity. When not compressed, Sphagnum moss also retains a good amount of air. Sphagnum moss is said by some sources to have mild antibacterial and antiseptic qualities, which might help to prevent root rot. (See article "Moss, Sphagnum" on the web @ <http://www.botanical.com/botanical/mgmh/m/mossph54.html>)

Cons: Sphagnum compacts very easily, and will not retain adequate levels of oxygen when compressed. Sphagnum is very light, and needs to be weighted to prevent tipping. Some cases of sporotrichosis (caused by infection with the fungus *Sporothrix schenckii*, a fungus found in many natural settings world-wide) have been associated with handling this material- **Stemma** advises wearing gloves when working with sphagnum.

Peat Moss is the dead, partly decayed sphagnum moss from compacted subsurface layers of peat bogs. (Peat Plugs are structurally different, see Gerbrand Casper's article pg.36.)

Pros: Peat moss, like sphagnum moss, retains a great deal of water.

Cons: The texture of peat moss is too fine for solo use in rooting cuttings, as the small, absorbent particles retain far too much water and little air. Indiscriminate peat mining can be unsustainable, as the process which forms the dense layers of peat may take thousands of years.

Orchid Bark is usually made from the bark of fir trees. Fir bark is available in many different sizes, from less than .4cm (1/5") "fines" to large 5 to 8cm (2 to 3") chunks for use in the landscaping industry. Orchid bark consists of particles roughly .75cm (1/3") in diameter.

Pros: Orchid bark absorbs and retains some water, while the relatively large particle size keeps a lot of air in the mix. It is easy to tell when orchid bark is dry, the difference in weight between dry and saturated media being quite noticeable.

Cons: Orchid bark is a fairly loose medium, and cuttings may shift. Watering can be time consuming, as particles absorb water fairly slowly.

Rockwool is an inorganic material used primarily in hydroponic crop production. It is formed by heating a mixture of rock and sand to its molten state, and then “spinning” the material, creating fine fibers which are fairly flexible and can be formed into various shapes, similar in concept to the production of cotton candy.

Pros: Rockwool holds a lot of water, but even when fully saturated also contains at least 18% air, making over-watering extremely unlikely. Rockwool does not decompose, so rooted cuttings may be grown on by placing starter “plugs” containing rooted cuttings into larger pieces of rockwool. Rockwool is fairly soft, but does not compact easily and holds its shape indefinitely.

Cons: Rockwool dust, much like perlite, is bad for the respiratory system. Wear a mask when working with this material. Rockwool has a high pH, and must be soaked in a solution of low pH water (for 24 hours) before use to buffer the pH. pH problems may occur later, and rockwool can contain a build-up of fertilizer salts unless flushed frequently. 🐦

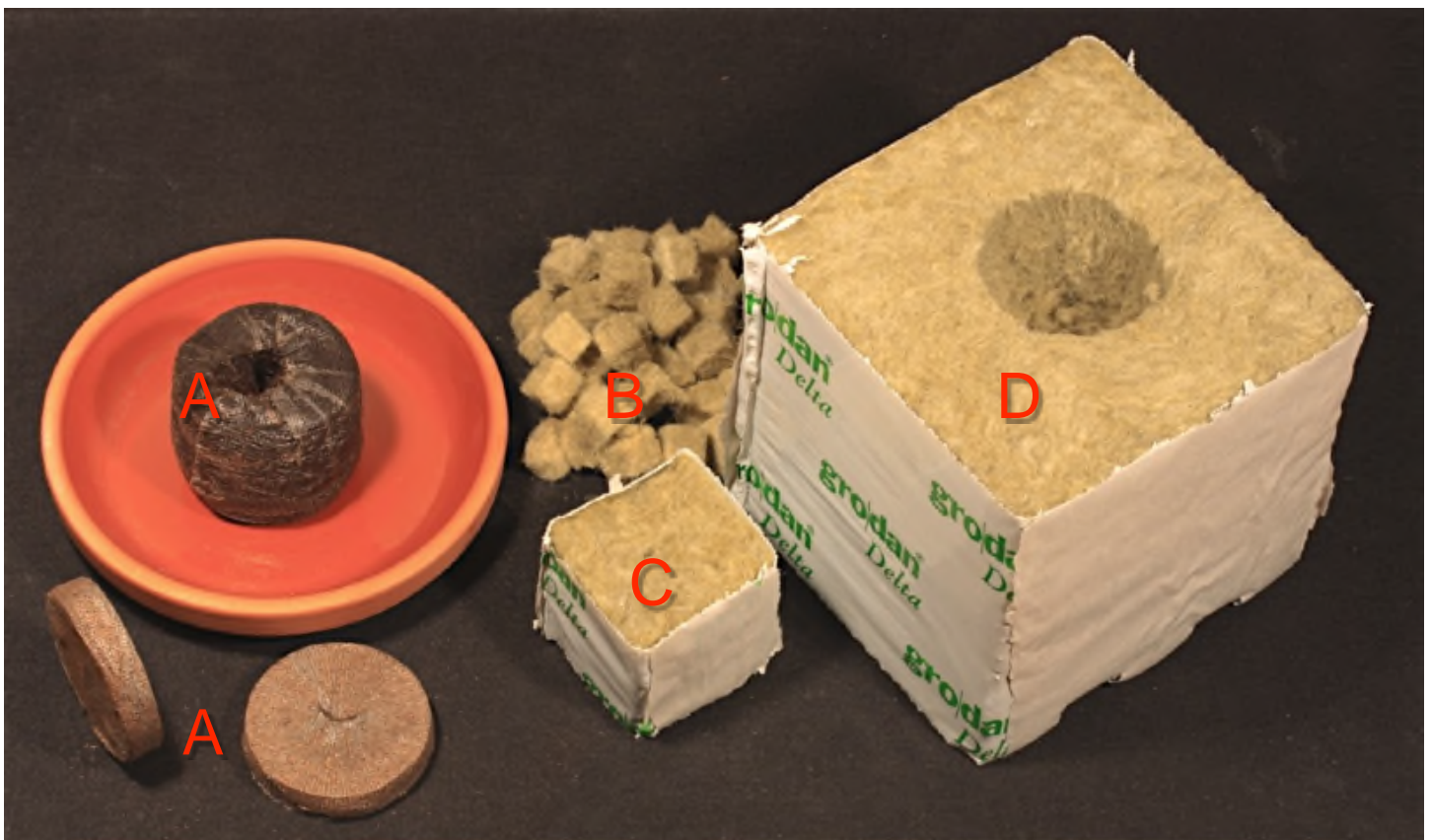


Figure 2: Examples of (A) Jiffy Peat pellets, before and after hydration, (B) loose-fill rockwool cubes, (C) rockwool starter plug and (D) a larger rockwool cube with room for a starter plug.

Technique: Propagation Methods

Part 1- Playing Plants

by Marcy Durst

When I first started collecting Hoya in the summer of 2003, the only thing I had ever rooted from cuttings were some succulents and a couple of African Violet leaves. So I am a far cry from expert enough to be writing an article on how to propagate Hoya. However, after the first few Hoya cutting deaths, I eventually become better at getting the little buggers to root instead of rot, so I at least can share much of what I learned to do that has meant better success rates for me.

In the beginning, I was told that Hoya root well in just water in colored jars or bottles, so I got my bottles all lined up and proceeded to put lots of cuttings in them with great anticipation. Bad move. I lost about half of them. I will say that the more common and hardy ones did root OK that way, but I lost too many to have stayed with that method for any of the ones I only had one of or the more rare and hard to come by ones. I kept trying

various methods and mediums with varying success, but more disappointments than I liked, so I did a little research on line and talked to a few folks that had been rooting successfully. Several of the people and nurserymen I talked to had used pure perlite to root them with good results, so I then decided to try rooting them that way in little clear plastic Dixie cups that I burned holes in the bottom and sides of.



Since we have kept reptiles for years, we had some old aquariums and reptile heating pads around. I decided to use these for keeping the humidity around them and heat under them. (See photo on previous page.) The next problem was light. They require very good light, but not sun, so I chose a north window to use as my "Hoya nursery" (I was really getting serious about this "rooting without rotting" business now). At first the heating pads were too hot under the glass, so I buffered them by placing a towel on the bottom of the aquarium under the cups. This also serves as a sort of wicking mat as it absorbs



the water but lets the cups wick it up later (I never let it get too soggy though).

Lately I have been putting down a layer of charcoal with a bit of chunky #3 perlite and then a nice mat of sphagnum moss to set the cups onto. This seems to work even better and holds the humidity well. I have one of these aquariums $\frac{3}{4}$ covered with a piece of glass and the other one covered with a clear dome I got from a hydroponics store.

Generally, I just wet down the perlite with some warm water that contains a dropper full of Superthrive. Then I poke a few holes into it and add the cuttings (I like to put two or three cuttings per cup). I like to make sure I have a few nodes or at least one buried in it. If I am having trouble getting the cutting to stay down or it is very shallow, I use paper clips (straightened out), or better still bobby pins to pin the stem down where I want it. Then I tap it down and drench it again with the water before positioning it into the aquarium.

Once I get them all crowded into their bed and set in front of the window, I leave them to do their thing except for an occasional light misting from my mister bottle. I check every few days for moisture in the cups (I can usually see it through the cups) or I lift them a bit to check for weight. I have also used a moisture meter but it tends to disturb the little cuts so I try to avoid doing that. When they start to feel light or dry, I add a turkey baster full of water to each one. If the moss around them is dry I moisten that also.

Usually within 2 to 4 weeks I will see some roots and/or new growth on the top of the cutting. Then I knock them out of the cup and add a little soil mix to the same cup. I put them back into the aquarium for a few days, but don't water them with the ones that don't have soil.

Since using this perlite method of rooting, I have had almost 100 percent success getting the cutting to root & not rot. The success is so good, I have had them root right on through the cups and into the moss. Ha. However, the transition from aquarium and perlite to soil and the "real world" can be another touchy area of Hoya death, I found out.

I now do it a little more gradually, in stages, and I never pot up to larger containers any more unless I see lots of roots all around the sides of the cup.

Now, after a few days to a week from the soil adding, I take them from the humid aquarium environment to another nursery of sorts. I have some large clear Rubbermade containers that have become the "half way house" for the cuttings. I purchased some grids that are used for ceiling lighting at Home Depot and cut them to fit inside the containers to act as a buffer from any water in the bottom. Then I add some sphagnum moss to these also and a little charcoal to keep things fresh. Then I set the cups around in these and place outside in the shade (in summer). In winter, one would have to come up with a lighting alternative like laying a light across the top. In winter I have also used the little mini greenhouses that come with shelves and a zippered cover. I leave them in these places to grow until I see lots of new growth and they are looking like they need a bigger pot. Then I decide what to put them into by the type of Hoya they are and go from there.



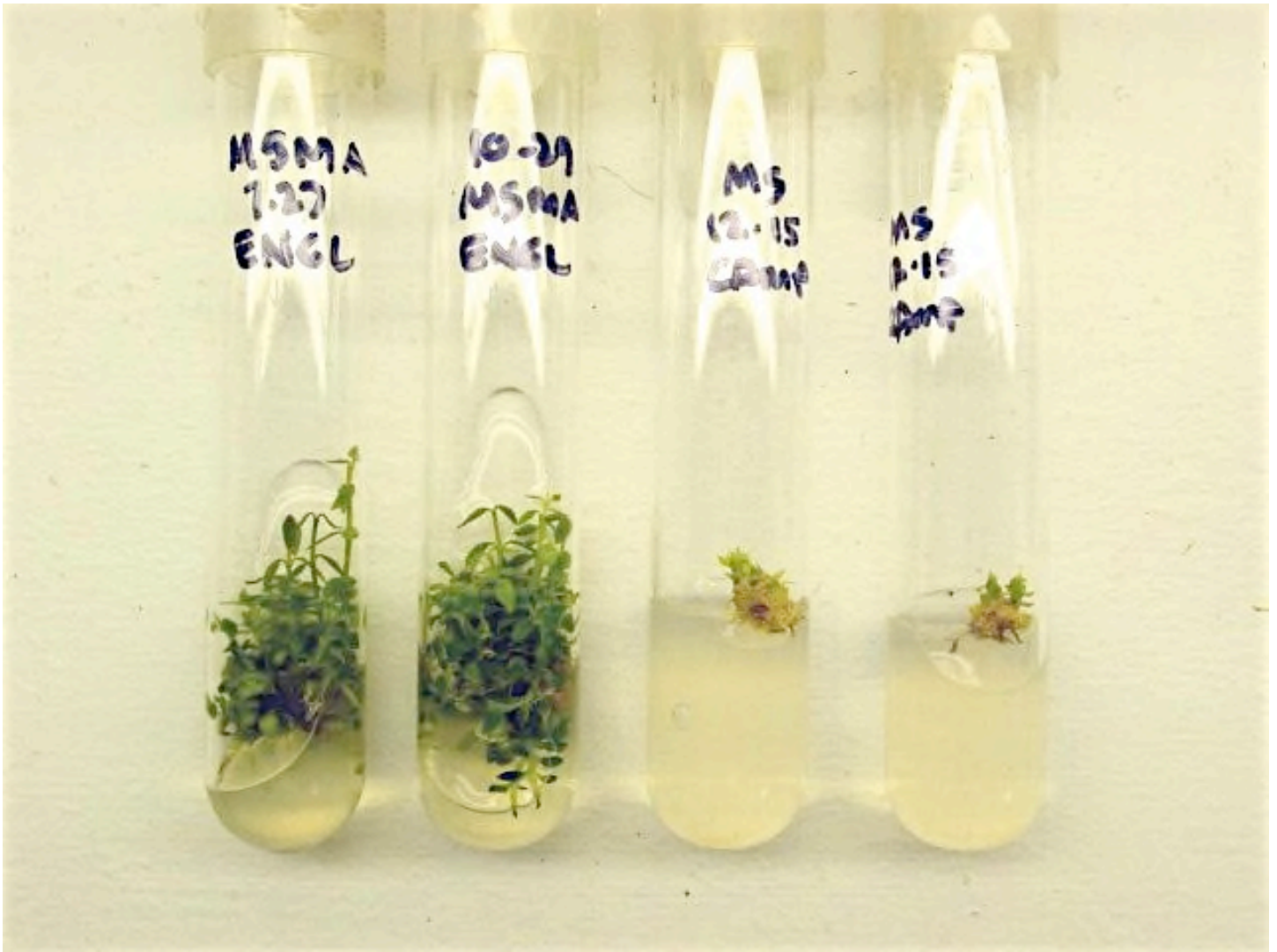
That's about it. From cutting to hanging plant usually takes about a year for most of them, I have discovered. There are of course exceptions to all the rules. I have some that languish on for years never seeming to grow much, and others that take off like gangbusters and keep me potting them up more and more.

I have also concluded that this is a continual learning experience with no hard and fast rules that should be followed. What works for some obviously does not for others, so one must use a trial & error method of learning your own environment and what works in it.

However, that is what some of us have called "playing plants", and it can be a lot of fun to learn as we go with lovely results for our successes! 🌿

Part 2: Hoya Tissue Culture

by Ted Green



It is not as easy as making cuttings but tissue culturing (cloning) Hoya is a way of producing plants in quantity – when seed is not available. Actually, tissue culturing in the lab is, in some ways, making cuttings in a bottle – under sterile conditions. Of course, for sterile conditions one must have a lab. I do have a lab in which I have cloned orchids, bananas and some other house plants.

I had an idea that I should raise backup material of some of the rarest, new plants from my collection in the lab. It is not as easy as cloning orchids and some other things, as some plants are very specific about the media they will grow and proliferate in. I think the gods are against me when it comes to some of the Hoya!

When I collect in the wild I bring back only small pieces of each species (my ingrown conservation attitude!), so in addition to starting them as cuttings, I take a tip of new growth (called an explant, defined as living tissue transferred from an organism to an artificial medium for culture) and pop it into the lab. I want a back-up in case something goes wrong with the cuttings. Some times the cuttings do well and the lab plants don't.

The first step in starting these Hoya is the risky part, for to introduce it into a sterile test-tube it must be sterile. The small tip, usually 2 - 5mm long, must be cleaned and I do that with Chlorox, with a drop of a wetting agent (detergent). Usually, 15 minutes in 20% Chlorox followed by a good rinse of sterile water cleanses the material without killing it – USUALLY, I said. It seems that the rarest (and in shortest supply) plants usually get killed in the decontamination process.

Hoya like to be started on solid agar (A vegetable gelatin based medium made from various kinds of algae or seaweed) that contains about 20 chemicals, the greatest one being sugar. To simplify the process I use pre-packaged media that is inexpensive, readily available and offered by several companies – Sigma, Caisson Labs, etc. These formulas are based on the work done by Murashige and Skoog at UC Riverside. There are three formulas- starting, multiplication and rooting- and the main difference is in the variety of hormones in each medium. I have found that once the plantlets are starting roots they will do very well in liquid media on the same rotary shaker (a rotating apparatus with a platform on which containers can be shaken) that I use for cloning orchids. The liquid media are the same as the solid media but lack the gelatin.

Starting: First growth is elongation of the tip, with no development of the side buds – with no proliferation. This happens within the first weeks of planting. The smallest tip explant is best at about 1/8th of an inch (4mm), with all leaves removed – to avoid fungus spores that might be in the leaf's stomata (breathing pores). Larger ones with any hard stem material produce tannins which will eventually kill the explant*. The media that I use is for a wide spectrum of plant material, but it is obvious that it is not for all species of Hoya. Most plants are quite specific, but to find the right formula for each would be very time consuming and expensive.

Controlled proliferation, with growth of the lateral buds and with minimal callus formation is what's desired. Rampant callus formation is not desired for in some cases, sprouts do not develop, and the only thing produced is amorphous (cancerous) forms. Rampant callus formation is avoided by limiting the use of BA (Benzyladenine), dividing and replating of the multiple growth when they are about 1/2" high and continuing until the desired amount is achieved.



Root production is to be desired when the plantlets are about 1" (2.5cm) high and demonstrate normal growth. Normal in this case means with typical leaves, 2 to each node (in Hoya; or 1 or 2 in Dischidia) and not stunted or elongated. Interestingly, *Hoya (Absolmsia) spartiodes* in nature produces leaves when it starts out as a seedling, but once established the leaves abort and the photosynthesis is carried out in the persistent flower peduncles. *H. spartiodes* in tissue culture acts like seedlings, for all of the new growth has beautiful leaves – that do not abort!



In the lab I maintain the temperature at 25 to 28°C (78 to 82°F), the light intensity at 200-300 foot candles for 12 hours a day (0600 to 1800) and a pH of ± 5.7 in the flasks. I have no control over the humidity, but it is normally over 50%

The first success story (adult plant from tissue culture) was with *Hoya meredithii*. (A tissue culture produced plant is pictured to the left). I

have also cultured *H. australis*, *H. engleriana*, *H. campanulata*, *H. praetorii*, *H. lasiantha*, *H. darwinii*, and some others. I have failed several times to get *H. megalantha* and *H. Weebella* to grow in tissue culture.

So, why don't more nurseries grow their plants by tissue culture? Too expensive- it can't compete with growing seedlings, as with *D. vidallii* at Cornelius Bak's in Holland, or the 1" cuttings used to propagate *H. carnosus* varieties at Cobia's in Florida.

But it is fun. Spend a couple of thousand dollars and try it!

Ted Green
Green: Plant Research
Kaaawa, Hawaii



Part 3: What Works for Me

by Sara Hutcheson

For avid growers and collectors there are fewer things more exciting than acquiring a new species of their chosen genus. While starting with large plants often provides instant gratification, the feelings of success and accomplishment that come with the reward of seeing what were once cuttings thriving and growing on their own are hard to beat.

Often, successful propagation is a trial and error experience. Occasionally a first attempt at rooting cuttings or germinating seeds will fail, while a second or even third attempt at rooting the same thing will be wildly successful. Why? Well, who can really say, with so many variables related to successful propagation? Factors to be taken into account include: light, temperature, season, rooting medium and humidity, and the list goes on and on.

My Hoya collection began in 2000 when I purchased an heirloom Hoya at an estate sale. Until it bloomed, I was unaware of what genus of plant I actually had, and honestly really wasn't interested. Upon further research, I discovered the numerous Hoya species, and then the various cultivars and varieties among the species. For several years I purchased only rooted, established plants, until one that I was interested in was only available as a cutting. When asked how I was with cuttings, I honestly didn't know, but was willing to try propagation in order to get the species I was looking for; thus the research began again, only this time I needed to know how to root cuttings.

Living in a cold, very dry area, I did not have the advantage of a greenhouse or high humidity environment to aid my rooting attempts. My search results yielded instructions for rooting in water, perlite, soil and sand mixes; using rooting hormones, including using honey and "willow water" as rooting agents; air layering, and grafting. I began by asking everyone I could think of how to root cuttings. An elderly neighbor, one who always told me to steal plants whenever possible, and never thank anyone who gives you cuttings, said that she always rooted plants in willow water. That not being anything that I had ever heard of, I asked her what "willow water" was. I was instructed that willow water was made from soaking the bark of a willow tree in water for twenty-four hours before adding to cuttings to help them root. While I found this information interesting, I did not have ready access to a willow tree, and have never actually experimented with this method, but may give it a try in the future.

A very patient nursery proprietor told me that adding $\frac{1}{4}$ cup of honey to $\frac{3}{4}$ cups boiling water was what he used to root the majority of the plants he grows in his establishment. His wife added that she also dusts the cuttings with confectioner's sugar. After doing a bit of research about the rooting properties of honey, I found that it has been proven to have fungicidal properties and also supplies sugar to the cuttings as a source of energy. I did use this concoction with my first cutting and noticed successful roots with in a few days. I can't credit my success to the honey mixture however, as it could have had as much to do with the type of cutting, or any of the factors listed above.

With further research came more opinions and suggestions. All of the following suggestions I have found in books, have been told by successful gardeners, or have read in publications. I find them all to be valid and potentially important suggestions, yet can honestly say that I probably follow none of them.

It is suggested that tools be sterile- I tend to use whatever is handy and sharp. I have read that leaves should be stripped, yet I keep as many as I possibly can. I have heard that stems should be cut at a forty-five degree angle, yet I cut straight across. I even saw on a gardening show that cuttings should be taken in the morning... I cut stems whenever I feel like it. I have heard many theories regarding the time of year in which plants will successfully root. This hasn't been my experience, as I have seen successful root formation in the fall and extensive growth in the winter as well as in the spring and summer months. Due to this observation, the only reservation I have in ordering new plants or cuttings is the potential for freezing in transit, not a lack of root formation or retarded growth. I don't use sterile potting medium, and have even gone so far as to reuse the leftover soil mix from repotted plants.

I have successfully rooted cuttings in soil mix, but have found that it is hard to tell early on when plant material is failing and still have enough time to fix the problem, thus often resulting in a complete loss. I have also had much success rooting Hoya cuttings in perlite. Not knowing what perlite was, I again did a search, this time online, to gather a little more information. According to Wikipedia, "perlite is an amorphous volcanic glass that has a relatively high water content. It occurs naturally and has the unusual property of greatly expanding when heated sufficiently."

I find perlite to be my rooting medium of choice when dealing with cuttings that have very little stem for rooting. Because I like to keep as many leaves on my cuttings as possible rather than removing them for ease of rooting, I will stake a cutting in a small pot of straight perlite with a bamboo grill skewer, and have successfully rooted cuttings with as little as ½ inch (1.2cm) of stem. Perlite is also my choice of rooting medium when I receive cuttings that are too green, or too woody, with few or no adventitious root bumps. I find that perlite does not dry out much faster than soil, and that plants can remain in it for quite some time, often over a year, and thus be fairly well established by the time they are potted into their soil mix.

My favorite method of rooting however is to use simple tap water, supplemented with Eleanor's VF-11 fertilizer. I use long neck, colored beer bottles as they aid in keeping the long Hoya vines in place. I perform weekly water changes, and usually have generous, healthy roots within two weeks of receiving the cutting. There are many who hold the opinion that water roots are different than soil roots, and to date I have not found information to confirm or dispute that idea. I do know that I have not found my cuttings that were rooted in water to suffer or decline after being potted in soil. I find the plant growth to be both steady and rapid, and at this time it is my opinion that roots are roots, be they formed in water, soil or perlite.

With my newfound confidence in rooting, I have been more successful in keeping previously established plants in which I observe signs of distress. In the past I would simply watch as a beloved specimen would stop growing, yellow, wither and eventually die. Now, the moment I notice leaves losing their firmness and beginning to take on a wrinkled, leathery appearance, I will, with no hesitation, remove all roots, cut a plant into multiple cuttings, and start over fresh. In most instances I will have a thicker, fuller, healthier plant in very little time. While I may not have known exactly what was wrong with my plant at first it inevitably, every time, was root related.

Having learned multiple methods of successful rooting, I have not only been able to expand the diversity of my Hoya but consistently maintain my extensive and expensive collection of different Hoya species and varieties. 🌿

Part 4: Propagating Dischidia

By Antone Jones



(Seedpods of *Dischidia cornuta* aff)

If you're like me, then you too want to always have more of the things you like. Plants are no exception and getting more of them isn't so difficult and actually quite easy. Here I will show you a couple of easy ways to propagate Hoya's little brother, Dischidia.

There are basically two techniques used for propagating Dischidia: cuttings and seed. The only things you will need aside from the plant itself are some of the common gardener's tools and supplies like peat, perlite, scissors, small pots, Sphagnum moss and fertilizer (liquid or time release).

We will begin with sowing seed. Dischidia seed can be collected from the seedpods just as they open. They look very much like Hoya seed, fluffy white tufts attached to small brown capsules.



Fresh Dischidia seed

Dischidia seed is best sown fresh. I have not had luck germinating seed much older than two weeks. I've read that the seed floss (the white fluffy stuff) is important to leave attached to the seed because it helps keep fungus away. Not sure how true that is but I leave it attached because mother nature does too.



There are two mediums in which you can sow your Dischidia seed. Sphagnum moss is great to use because it has natural anti-fungal properties and retains moisture quite well. To do this first make sure your hands are completely dry. If they aren't then you will NEVER get the seed off of your hands onto the medium. You can use a small pot or a nice piece of cork bark or tree fern panel.



Soak the Sphagnum moss in a dilute fertilizer/water mixture to re-hydrate it. Wring it out so that it is just damp and then lay it out across the cork. Once this is done, dry those hands and then lay the seed across the top of the moss. I usually try to put at least 20 or so seeds on the moss.

After this is done you can either leave the seed exposed or you can cover it with a loose layer of sphagnum. You may also want to tie it all down with fishing line to

keep it in place but this is not necessary. Place this in a humid area like a terrarium, large plastic bag or on a mist table. Dischidia seed germinates rather quickly and it is not unusual to see small plantlets in just a week or so.

Sowing Dischidia seed in a mix also works quite well and is very easy to do. I like to use small 4" (10cm) pots for this as they are easier to store and keep track of. Fill your pot up 2/3 of the way with your choice of seed mix. I use a mix of 3 parts peat, 1 part fine bark and 1 part perlite. Once this is done place a handful of seed on top of the mix (remember to dry those hands first).

After the seed is in, sprinkle a very thin layer of peat moss over them. Make sure not to over do it as you don't want to bury them too deep or they will have a harder time reaching the light.

Once the seed is lightly covered, they need to be fed with any good time release fertilizer (I use Nutricote) and watered in really well. Once they are watered in they need to be placed in a humid place like a terrarium, large plastic bag or a mist table.

Like with the sphagnum moss method, you should also see plantlets in about a week so long as the seeds are kept warm, moist and in bright shade.



Once the plantlets reach the appropriate size, they can be removed very carefully and potted singly or in small groups of 2-3 in a 4" (10cm) pot. Any well draining epiphyte mix works. Make sure they have food!

"Well what if I don't have seed?" No problem! Dischidia are equally easy to propagate by cuttings. The important thing to remember about cuttings is to always choose the healthiest plant to take cuttings from. Also make sure the cutting isn't fresh soft green growth as these types of cuttings tend to rot. Here we have a cutting of *Dischidia griffithii* Hook. f. (see next page.)

I like to pot the cuttings in the small clear plastic drink cups that you can find at the grocery store. I like these because they allow you to see the root growth through the sides which is a good indicator for when the cutting is ready to be repotted. Make sure to poke 3 or 4 holes in the bottom of the cup for drainage.

To start, mix up your favorite rooting mix. I like to use 2 parts perlite to 1 part peat for my cuttings. Your mix may be different depending on where you live and your relative humidity. Some use 100% perlite, others 50/50.



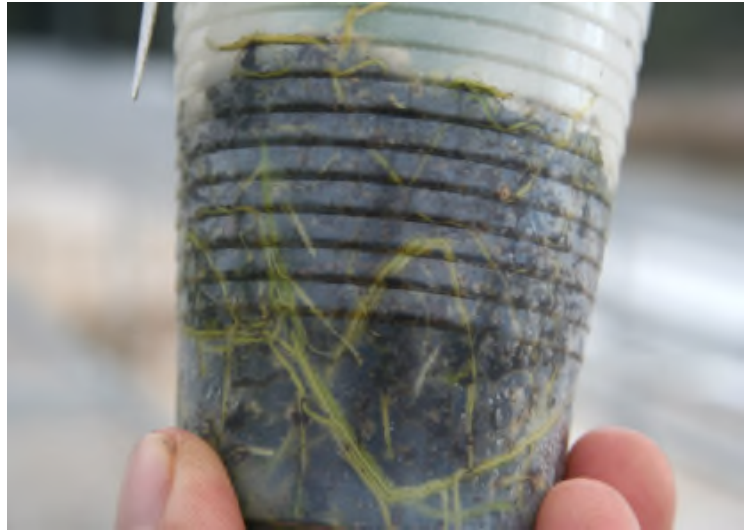


After your mix is made you can fill your cup (or pot) to about $\frac{1}{4}$ to $\frac{1}{2}$ of the way up. Then you can place the cutting in the cup and then proceed to fill the cup up the rest of the way to about $\frac{2}{3}$ full. I like to bury at least one node when I root cuttings. Burying more nodes is even better if you can.

After the cup is full of your mix, then add a few granules of time release fertilizer and water it really well. Place the freshly potted cuttings in a humid area with bright shade and a bit of air flow. Try to keep the mix damp and warm at all times.

As mentioned before, I like to use these cups because they allow you to see the root growth. Once the cutting has put on a decent amount of root growth I like to repot them. The cutting should also have a good amount of top growth as well but it may not be considerable in all cases.

I've noticed that like some Hoya, Dischidia also seem to appreciate being a bit root bound in their pots. I take this into consideration when repotting as well as the size of the species I'm working with. This particular species, *Dischidia griffithii*, gets rather large foliage and grows to be a large plant. Because of this, I put them in 5" (12cm) pots. Any good epiphyte mix will work well. Just make sure to feed them. A little trick for those of you that live in wet/humid areas is to add a layer of straight bark to the bottom of the pot to aid in drainage.



Cuttings can also be mounted and do pretty well grown this way too. To learn how to do this please see the article, "*Mounting Dischidia*" in **Stemma** Volume 1, #2.

Finally we've come to the most important part of propagating dischidia (or anything for that matter). LABELS! Always make sure to label your plants. I can't stress enough how important this is. None of us are robots and we all forget names of things at one time or another. If your plants are labeled then this will never be an issue!



I hope that this article has been of some help to you. Dischidia are a great addition to any plant collection. They are easy to grow, easy to enjoy and most importantly, easy to increase! Happy growing!

-Antone



Part 5: Confessions of a Bag Lady

by Christine Wootton

I have to confess that I'm strictly a bag user for rooting my cuttings. When I was baking bread a few years ago I purchased a roll of 1,000 fruit and vegetable bags from my local grocery store. The bags are semi-opaque and have the chain store's name on them. Since my manic bread making days ended after about 400 loaves, the remaining bags needed a new use- Voilà- rooting Hoya cuttings!

Method Number One - "Mini Jungles"

The method that I use most often to root my cuttings is the following. After snipping a small bit off the bottom of the cutting with a slanted cut, I pot the cuttings up in 3" (7.5cm) plastic pots. I use my regular Hoya potting mix, which is 1 part regular potting soil, 1 part orchid potting mix and ¼ part perlite. I do not use rooting hormones as a rule nor do I use a heat pad. Once the cuttings are potted up, I soak the potting medium, put the entire pot into the large plastic bag, spritz the foliage with water, and seal the bag up with a twist tie for about a week.



I put the "mini jungles" in a location where they receive plenty of bright light, but no direct sun. I'll open the bag after two days and spritz the leaves again, and seal it back up. It almost never fails that I'll find aerial roots in less than a week. If not, I seal it up again and check every couple of days, spritzing with water each time. Water does collect in the bottom of the bag, and I will drain this off periodically. Once I do find the aerial roots, I will vent the bag slightly and spritz water in a couple of times a week until I see new growth, and will then gradually remove the pots from their bags. The entire process usually takes about four to six weeks, during which time I will gradually provide a little more ventilation to the plant each week. This method has never failed for me.

Method Number Two - “Little Jungles”

I acquired cuttings at various times this year, and so decided that I would use an alternate method and compare the results. After potting up the first 15 cuttings in my Hoya potting mix, I put them in shallow trays and covered the trays with my plastic bags. I would spritz these cuttings with water once or twice a day. This method provided more than adequate ventilation from day one. The location I put these cuttings in received a bit of hot mid-day direct- but dappled- sunlight. Someone suggested that this may cause their “little jungle” to fry them, but it didn’t appear to affect them negatively and may have actually helped. The cuttings appeared very healthy and perky throughout the time they were covered, but at no time did I see aerial roots. To ensure that they were getting enough humidity for a long enough period to root, I left them covered for about eight weeks. I still did not see very much new growth, but after this time simply trusted that they were rooted enough to withstand life outside of their coverings. Most of these cuttings had new growth within another couple of weeks.



For cuttings I received after this first 15, I used the Method Number One, described above.

Method Number Three - “Green Hoyouse”

Two of the cuttings I received in the first order, which were both thin-vined plants, did not do well from day one. For those two I used a method I’d had explained to me which involved winding the cutting around the surface of the potting medium and covering it with a small amount of soil. I also placed small, inverted and vented Zip-Lock bags over the pots. Neither cutting survived for me, although they appeared to do very well at first; I even saw some roots. I think I probably should have removed the bags once I saw roots, or I should have asked questions of the experts.

Comparison

Method Number One, putting the entire pot into a plastic bag, appears to have the quickest results for both rooting and new growth appearing. However, I was concerned at various points that the cuttings weren't receiving enough ventilation and were too saturated with water. I also found it quite a bit more time-consuming than Method Number Two. Also, while Method Number Two took longer to produce new growth, it did not produce aerial roots, which is more aesthetically pleasing to me. Method Number Three I'd probably try again, but I obviously need a better understanding of the method in order to risk any more valuable Hoya cuttings to it. 🌱



Part 6: The Experiment

by Carol Noel



A long bald vine stares me in the face. No leaves (or maybe one right in the middle) but the stem is at the perfect stage of 'woodiness' to propagate. I hate to throw out any Hoya material, and since David Liddle told me some years ago that "you *can* root a leafless cutting", I decided to try.

I had a very large *H. walliniana* growing for years on an upside-down tomato cage. For some reason it started to die and I was faced with this HUGE mess. I made a number of cuttings to root and I was left with about 14' (4.25m) of leafless and healthy vine. I simply could not throw it out.

I thought about the way Hoya grow and how I have also rooted them by laying vines, still attached to the "mother plant", on a bed of fine perlite with a heavy rock on top of them. In no time I would find roots growing. Cutting those rooted vines where the roots started and then planting them gave me great plants!

Back to the question at hand...what do I do with this vine? The fact that I had a couple of leaves on the vine for continued photosynthesis gave me a slight advantage, but even that isn't necessary as I have had success with bald vines with no leaves at all.

My favorite "pots" for these projects are the plastic saucers made to hold big pots. I drill/poke holes in them for drainage. For the beefier vines I use deeper pots...thin vines seem to prefer the shallow ones. As you see in the photo, regular pots work too.



My favorite medium for rooting is #2 perlite and for this rooting process I use a mixture of 10% of my regular soil-less mix (orchid bark/perlite/cinder/scant peat-moss) to 90% perlite. Starting with the "bottom end" of the vine, I start to wind the vine around the pot going along closest to the edge of the pot and spiraling inwards. I clip the vine to the edges of the pot on the first circle (with those butterfly clips),

and then wind the rest of the vine around on the inside, covering the nodes with rooting medium and holding it down with rocks, or with hairpins (which work with very fine vines like *H. walliniana* or *H. lacunosa*).

Keeping the pot warm in indirect light, it gets misted often (with about 1/4 strength fertilizer) and watered with water to which I have added Hormex. Once I see new growth appear, I water with a 1/2 strength fertilizer (MSU). I find that when propagating cuts/vines, if they are stressed on the dry side they are more inclined to throw out roots to grab moisture.

My success rate with this method has been about 95% with: *H. walliniana*, *H. macgilivrayi*, *H. pusilla*, *H. obovata*, *H. australis*, *H. archboldiana* and *H. mindorensis*. As you can see, a variety of Hoya.

As my alternative has been to throw out the material, for me this is a no brainer!



Additional notes:

Old woody vines have not been successful.

Soft new growth has had mixed success: the very newest baby vines will dry up, but the growing end of the vine where the older wood is often “takes”.

Often I have secured the beginning of the vine and wound it in the pot and only had to secure the new end: the vine itself provides the pressure against the rim of the pot to stay in place. The older/bigger the vine is, the wider the pot I choose (only because it is easier to wind it around).

Once the “experiment” has worked and I have growth and roots, I usually transplant the whole “experiment” to a deeper/larger pot. This method makes a great large pot! It is possible to cut the rooted vines into individual or groups of plants for smaller pots.

This is a great way to get nice full pots out of an otherwise questionable vine.

I always label this process “Experiment”, That way if it doesn’t work I am not as bummed out as if I lost a regular cutting.

Keep in mind that my relative humidity is quite high. Different conditions would require different adjustments to this method as in the amount of water, etc. During an extremely humid period, I rooted a thin-leaved Hoya in perlite that received no water for 2 weeks! 🐦

Part 7: Case Study

by Ann Strahm



I do not have one way of rooting Hoya. Rather, I root based on what I believe the conditions of the cutting call for. Ninety percent, however, of my cuttings are rooted in potting soil, using rooting hormone (smeared all over the stem and portion of leaf axel that will be placed in the potting soil). The recipe that I typically use for potting mix is approximately one-half general-purpose potting soil, one-third perlite, and one-fifth orchid mix. This mixture al-

lows for more of a free-draining, loose mix for the Hoya roots, yet retains enough water that the roots don't get too dry too quickly. After I smear the rooting hormone over the stem and leaf axel, I fill a 2.5 to 3 inch (6 to 8cm) pot halfway full of my potting soil mixture, place the cutting into the mix, then fill the pot up the rest of the way, firmly patting down the soil mixture around the cutting. I pour enough water into the pot that it drains out the bottom, and then I place the newly-planted cuttings in an aquarium with a piece of plastic over the top, and put the aquarium in a bright, warm place (no direct sun). A few weeks later, I have healthy rooted cuttings that grow like weeds.

For cuttings that have little viable stem, I place what is left of the stem and leaves into a shallow dish of water. As long as the entire leaf is not submerged it won't rot. I leave that cutting in the shallow dish of water until I have roots that are more than one-inch long. Please note the photographs of *H. acuta* IML 0738 (next page, upper photos) where all but one-half of an inch (1.25cm) and two leaves had died. It took me around two months to root this tiny bit of plant, but it did root and I will be potting it up shortly. In this case I will fill a small pot two-thirds full with either perlite or ceramic pellets, then place the potting soil mix on top of that, creating a small, raised mound in the middle of the pot. I will plant the rooted cutting up on the mound, so that the leaves are not shoved down into the pot leading to potential breakage.

As for troublesome cuttings- those cuttings that, because of root-rot or trauma have withered somewhat and whose leaves are showing signs of stress, I turn again to good old-fashioned water. The first thing I do is get a nice deep bowl of water and Superthrive and submerge the entire cutting in the water. I leave it this way for a couple of days, then I rinse the Superthrive infused water out of the bowl and continue to keep the cutting submerged for a few more days until I feel the leaves begin to thicken/harden up to normal. At this time I decide what portion of the plant will continue to be



submerged (including leaves), and keep that section that I wish to develop roots submerged in the water (make sure to change-out the water every couple of days) – please note the photograph of *H. padagensis* IML 0421 (right). I often lose a few leaves in this process (they get waterlogged), but for the most part even the leaves that are submerged maintain a healthy look. Eventually I get roots long enough (about one-inch) to pot up – and I take advantage of the several inches of stem that has roots by potting the entire section of stem with roots on it into a pot (this time potting in more of a horizontal fashion rather than vertical), which will ultimately create multiple shoots of new growth, and I once-again have a happily-growing plant. 🌱



Part 8: Growing *Hoya Australis* from Seed

by Brenda Medel



I live at 5,200 feet (1600m) in elevation in the mountains of Idaho and have recently become enamored with Hoya after being gifted an heirloom plant from my aunt. Research on that original *Hoya carnosa* led me to want more of them and so I ordered some cuttings from Hawaii. I wanted to start simple and ordered cuttings of a basic *H. australis*. When the cuttings arrived on the 6th of June they had a spent bloom on them and a SEED POD! Here I am a complete newbie and I have a seed pod on my hands! I potted up the cuttings and left the seed pod attached.

On the 21st of June I was making one of my frequent checks on my new cuttings and I saw that the seed pod had burst open. It was an amazing sight! I had ordered a grow light set up that came with 2 bio domes (miniature greenhouses) and styrofoam inserts with bio sponges in them. The sponges were a fancy form of a peat pellet. I decided to use this set up to put the *H. australis* seeds into as it was all I had and I really had no idea what to do with them. So I used tweezers and picked up 120 individual seeds and put them each into their own bio sponge. Then I filled the bottom container with the ½ inch of water the instructions indicated (with Eleanor's VF-11 added to it) and put the dome top on. I placed both bio domes under the grow light upstairs. I did not use a heat mat or anything other than just the grow lights set up on a card table. I kept the water level at 1/4 to 1/2 inch at all times, usually with the Eleanor's added to it.



One week later I was enthralled to see some green starting to sprout up! About 1/3 of the 120 seedlings were beginning to sprout already. I watched them grow taller and add more leaves week by week. At about 4 weeks a dozen more of the little sponges were showing some green but these seedlings did not sprout up tall and lanky like the first. They stayed short and squat, with darker green leaves just barely out of the sponge.

I wondered in my own mind if the seed pod could have been pollinated by different plants and thus I would have some different seedlings, but I have been told that this is not likely at all and somehow (maybe because the seeds were originally put too far down into the sponge) these ones were just dwarfed. I guess they are *australis* runts? I'm still waiting and watching to see what they will do.



Now it is the end of August and about half of the taller seedlings were touching the top of the dome, making them 4-½ inches (10cm) tall. When I lifted the styrofoam block that holds all the bio sponges I saw white roots going everywhere. But the sponges are easily pulled up, with each set of roots easily coming up with it's seedling. I've been told by an expert that the bio sponges may hold too much water and to try and remove them before planting the seedlings but I find this impossible to do as the roots have completely impregnated the medium.

So at this point I have taken the seedlings that were touching the dome top and planted them in a couple of ways. I've done two hydroponically since in essence that is how they were growing once the roots came out the bottom of the sponge. The others I've planted, sponge and all, into a Hoya mix hoping that the roots that extend out of the pellet will grab hold and take off, despite their beginnings with a complete Hoya novice! 🌱

Part 9: Experiments in Propagating Hoya

by Gerbrand Caspers



My first propagating efforts were actually forced upon me a few years ago when I was given a chunk of Hoya by a friend, who said “Just put it in a glass of water and it will soon grow roots. Then stick it in a pot. You soon will have a nice plant of your own”. All went as predicted and the cutting has grown into my first self-made *Hoya carnosa*.

I had no idea at that moment that this first shot of Hoya would be the cause of my present addiction!

Further efforts rooting other Hoya “the wet way” were not always successful. Some rooted and some rotted.

I tried *H. Linearis*, *H. australis*, *H. bella*, *H. lacunosa*, etc...all the common Hoya plants I found at my local garden centre or at the grocers. I took them apart and cut them up. I asked for and followed other people's experiences. I ordered and read Dale Kloppenburg and Annie Wayman's new edition of **World of Hoyas** (you must!) and roamed the Internet.

I found, visited and asked advice of Paul Shirley, a native Englishman, Hoya grower and collector in the Netherlands, who gave me much useful advice, especially regarding the use of Jiffy grow-plugs (pictured below).



My experiments trying to root directly in soil had in the beginning not been very reliable, and had often unpredictable outcomes. My first soil mixes I formulated (modified Epiphyllum mixes) still were far too heavy and “un-open”, I now know was the problem.

I found it all out the hard way, discovering afterwards the best way, of course, after having had many moments of grief and despair! In most cases a lethal form of rot was

the diagnosis and cause of death of my dear, cherished and pampered little ones. After that rotting period, afraid to over-water, of course I managed to kill them also by the dehydration/ starvation method.

So eventually I copied Paul’s method and bought the plugs (compressed peat pellets) on Ebay. But I still was losing cuttings, mostly by rot. I found out that these plugs stayed moist for quite a long time and that in our spare bedroom where the Hoya propagating took place, in winter temperatures fell to about 12-14C (about 55°F) and that was what I now know (and should *have* known), was a sickening combination for man, most plants, and most definitely for tropical Hoya.

Conclusion 1:

Wet + Cold = how to kill your Hoya

Today, I have built a nice greenhouse with space, light and a heating system, keeping the minimum temp. at 19-20°C (about 67°F). In summer temperatures can rise to 35°C (about 95°F). I only have a fan and spill rainwater on the floor to cool somewhat down. I bought a simple heating mat and I continued my efforts. I started using Seramis (fired clay). Seramis plain, Seramis mixed with peat, Seramis in clay pots, Seramis in plastic containers. At last my success rate went up. I abandoned the direct in-water method altogether. After two years of trial and error I have now chosen three ways of rooting Hoya (see the next section). This allows me to multiply Hoya and Dischidia summer or winter.



Conclusion II:

Damp + Warm = conditions for new Life

Some methods this conclusion led to:

- 1) The Seramis Method (or in perlite or a combination/mix) in a small plastic container on the heating mat. This has proven to be a safe and reliable way with most Hoya. In clay containers the Seramis or perlite dry out quickly on the mat (drying out time- clay: plastic containers = 3:1). When propagating without the heating mat I use clay containers instead for the opposite reason. You can leave the plants alone for quite some time. After rooting I now often just repot soil-less into a bigger pot and fertilize while watering. Hoya I raised this way seem to love it and thrive. No negative experiences so far. It's clean, stable and re-usable. The plants stay damp but never sopping, and watering intervals are down to once every 2 to 3 weeks (!). Recently I've found a perlite supplier and I noticed when Seramis and perlite are mixed (I try everything) new roots *seem to favor Perlite* to clay Seramis.

2) The Grow-Plug Method- placed in a small clay pot with Seramis. Bigger Hoya I plant in two mounted plugs. Larger sized plugs are available. A hole can be punched in the wetted plug with a piece of bamboo sharpened in a pencil sharpener. This combination more or less “controls” the drying out of the Jiffy peat plug (at least I think it does). It could be a totally superfluous ritual, but within weeks roots invade this damp borderland of peat and air, which does not seem to be a problem. Intake of nutrients may be easier this way, in theory. This combination is stable and easy to handle.

3) The Sphagnum-moss Method. Lately I have been trying rooting bigger Hoya cuttings by wrapping a node in lightly moistened Sphagnum moss, putting a plastic bag or a piece of wrapping plastic around, and placing the cutting on the heat-mat or an old glass covered aquarium near the radiator. Also I sometimes plant the cutting in a clay container filled with Sphagnum moss, covering it with plastic so I can put it on its side when dealing with a cutting with “upside-down” leaves or twisted stems, thus turning the green side “up” into the light.

3a) Auto-rooting or Layering Method. Finally, I experimented to induce root formation by layering a node (still attached to the mother plant) and pinning it to the soil or wrapping Sphagnum moss around a node, severing it only when root formation was successful. Quite safe and natural. No roots no separation!

3b) Antone Jones Mounting method. Small Hoya and Dischidia are mounted on a piece of cork bark or a piece of pressed coco-fiber block covered with Sphagnum moss and sprayed daily.

Conclusion III: Most (maybe all) of my failures are most likely due to bad water and temperature control.

Conclusion IV: Newbie Hoya collectors sometimes do not initially follow the excellent, expert experience and Hoya propagating guidelines available. Like bringing up a child: most eventually will fall in line!

Conclusion V: In asexual propagation the rootless Hoya cutting is relatively vulnerable. Surviving this period, and finding conditions favorable, the adult plant shows great adaptability and wonderful skills for survival.

Conclusion VI: All Hoya are equal but some Hoya are more equal than others! 🐼

Part 10: Propagation of Hoya

By Gabi Rothman

There are many different methods used to propagate Hoya. Many people find a method that works best for them and decide to stick with it. Propagation of stem cuttings is usually done to start a new plant or to add to an existing plant in order to create a “fuller” look. Creating roots from a cutting can be accomplished several ways, including water rooting or rooting the cutting in a medium (e.g., Sphagnum moss, perlite, potting soil).

I have tried rooting cuttings in water, but I find that the transition from water to a soil mix can be difficult on the root system. The “water roots” that develop in water will need to change into soil roots after they are transferred, and this can cause some stress on the new plant. I have also found it difficult to get roots when propagating cuttings in water. However, this method works quite well for many people.

My method of choice when it comes to propagating stem cuttings is using the same soil mix that I use for my adult plants. This eliminates the need to move the cutting into its “permanent” medium once it has established a root system. My soil mix consists of three ingredients: regular potting soil, perlite, and orchid bark (or fir bark). I use a 1:1:1 ratio of each ingredient. I find that Hoya benefit from a very loose and fast draining mix like the one described above. I like this mix as a rooting medium because it is loose enough to provide sufficient aeration but can also hold enough moisture so that it doesn't have to be watered frequently. In fact, I only moisten the soil once (prior to inserting the cutting) during the rooting process – but this will be explained later.

Although cuttings can be taken any time of year, I find the warmer months to be the easiest time to root cuttings (from April to September). If you live in a warm environment year-round, then you should be able to root cuttings anytime with no problem. If I decide to propagate cuttings during the off-season, all I do is add bottom heat (i.e., a heating mat). However, it seems to take longer for roots to develop in the colder months, unless you have a greenhouse or a set-up similar to greenhouse conditions.



When taking a cutting, I make sure that it has at least two nodes. I will then cut the stem at an angle. If I receive a cutting through the mail or if a cutting I took off a plant has been sitting out for a while, I will make a fresh cut at the bottom of the stem and then place the entire cutting in some warm water with a few drops of Superthrive added. I then allow the cutting to soak for anywhere from several hours to overnight.

Next, I take the freshly cut (or soaked) cutting and prepare it to be potted up. First, I take the two bottom leaves off so that I can bury the node into the medium (that is where the roots will develop from). If the cutting does not have many leaves (or if I would rather not remove the bottom two leaves) then I will bury the bottom node with the leaves still attached. Before putting the cuttings into the pot, I moisten the soil thoroughly and I make sure the medium remains moist until roots have developed. As for pot size, I like to use small pots ranging from 2 to 4 inches (5 to 10cm) in diameter, depending on the size and amount of cuttings.

After the cutting has been inserted into the soil I put the entire pot into a large plastic ziplock bag in order to maintain high humidity. I find ziplock bags easy to open and close, but any clear plastic bag can be used. I always poke several holes into the plastic bag to allow outside air inside the bag. Before closing the bag, I spray the inside of the bag with water mixed with Eleanor's VF-11, and make sure I mist the entire cutting (top and underside of leaves along with the stem). If you don't have any particular plant food or hormones that you like to mist your plants with, then plain water can be used. It is important to keep the inside of the bag moist. If the cutting and/or pot does not fit inside a plastic bag, I will either use the extra-large ziplock bags used for storing clothing or I will just place the bag over the top of the pot instead of placing the pot inside the bag.



The cutting is then placed in bright but indirect sunlight and is misted on a regular basis (approximately every 2-3 days; or sometimes everyday if the cutting dries out quickly). Rooting time varies depending on several factors, such as the temperature (i.e., time of year), type of cutting (old woody growth is more difficult to root than newer growth), and environmental conditions. Typically I find that cuttings will root within 7-10 days. However, I have found that it can take up to 3 weeks if the conditions are not ideal. If I am propagating a cutting during a colder season I find that use of a heating mat speeds up the process and helps to ensure success of rooting.

When I see that aerial roots have developed, there is new growth on the cutting, and/or there is resistance when I gently tug at the cutting, then I assume that roots have developed. At that point I open up the bag to acclimate the cutting to its “new” environment. After a few days, I will completely remove the bag and put the cutting with the rest of my Hoya! 🌿

Part 11: Rooting Procedure

by Awanda Clark



It has taken me a couple of years to finally get a rooting procedure that works well for me.

Every time someone posted about a rooting procedure that worked for them, I tried it, but it didn't seem to work for me. I've used perlite, pumice, perlite/vermiculite, Sphagnum moss, water, and baggies, you name it I've used it. I found what works great for me, especially during the summer months, is organic soil mixed with perlite. I use a rooting hormone with fungicide and insert the cuttings into the mix and water.

I have a greenhouse and the humidity during the summer months runs around 55-60%. I'll just sit the cutting into a tray in the greenhouse and within 2-3 weeks, it has rooted. I find that with the cutting being in the greenhouse, I don't check it everyday like I would if it was inside the house. I have also used water with great success. I find that

for those cuttings without a node water rooting is the best way to root. During the summer months, I don't use bottom heat, just put the cutting in a dark cup, add some Eleanor's and put the cutting in it. I find that if I change the water every 2-3 days it helps with the rooting process. The last

cutting I rooted in water rooted in about 3 weeks, and that one didn't have a node.

Woody stems seem to root much faster in water, rather than soil. Thin-stemmed Hoya are still a problem for me, but I find putting them into a blown up baggie that I re-inflate every couple of days works pretty well. I also mist with Eleanor's and water before I put the cuttings into the baggie. 🌿



Chemicals: Rooting Agents

Part 1: A Sampling of Common Rooting Agents

by Mark Randal

It is not strictly necessary to use any rooting agent to propagate Hoya. Many species will root easily and burst into growth while sitting in plain water. With difficult to root species, however, rooting agents may make the difference between rooting and rotting. Even easy to root species benefit from the rooting hormones and mild fertilizer found in most reputable products.

Rooting agents are products which contain synthetic or naturally derived rooting hormones* (or auxins*), most commonly either Indole-3 acetic acid (IAA), Indole-3 butyric acid (IBA) and/or Naphthalene acetic acid (NAA). Some products also contain a mild complete fertilizer which is specially formulated for use on young plants, the regular strength of most fertilizers being too strong and liable to burn the roots of these delicate new starts.

All rooting agents should be handled carefully as some of the chemicals or carriers may be toxic or caustic. Gloves are recommended while using these products, as are masks for powdered formulations.

There are many rooting agents available for use by amateur growers- perhaps too many, as the qualities and properties of each can become rather confusing when the available products are compared. These agents range from purely synthetic chemical hormones to organic infusions or concentrates of bark, herbs, or seaweed.

Choosing from the many agents available is made more difficult by the sometimes hyperbolic claims of the various manufacturers; some companies cite their products as being “miraculous” or working “like magic”. These terms are not particularly useful, as good plant propagation and nutrition is more a matter of applied science than supernatural intervention.

Some of these same manufacturers complicate matters further by refusing to reveal the ingredients, active agents and nutritional breakdown of their products. Any company which claims miraculous properties for their products should be viewed skeptically, especially when they refuse to tell their customers what they are actually buying. A few companies have made strange claims to the effect that the USDA (the US Department of Agriculture) will not allow them to list their product’s ingredients on their labels. The truth is that the USDA reviews claims made by manufacturers, and may halt the sale of items claiming properties not proven to exist based on chemical analyses, so this may be a way of avoiding closer scrutiny of exaggerated claims.

Here is a list of some of the more commonly available rooting agents with some of the pros and cons of each pointed out. This list is not exhaustive, as there are many more items on the market than can be reviewed effectively here.

[Vitamin B1 \(Thiamin hydrochloride\)](#) has been suggested as an agent to promote root formation and reduce transplant shock for many years (since the 1930s). Later studies, many at University of California locations, failed to prove that B1 reduces transplant shock or stimulates root development. (See [Source Materials](#) for further details.)

[Superthrive](#) is probably the chemical rooting agent most widely used and discussed (by amateur growers) in the western world. See the following article "[Superthrive or Superjive](#)" by Al Fassezke for a more detailed review of this product.

[Eleanor's VF-11](#) is another product sold in the US and Europe. Its advertising suggests, in a very vague way, that it has some beneficial properties as a rooting agent. Like Superthrive, this product does not list its ingredients on the label or at its website, though it does list its N-P-K balance as .15-.85-.55. **Stemma** contacted the offices of the company which produces VF-11 (Eleanor's of California) and asked if the product contained recognized rooting hormones such as IAA* or NAA*. The answer contained, in addition to a surplus of exclamation points, the following passage: "It is a 'controlled product.... you can depend on it to perform perfectly at all times!!! Everything you mentioned for cuttings is hormone based. The man who formulated VF-11 said, 'Man has not learned to control hormones yet. You can trust VF-11 at all times !!!! Eleanor.'" **Stemma** will hazard a guess that this would be a "no" in response to our question, although the quoted statement was quite vague. Eleanor's was also asked to what they attributed any special capacity of VF-11 to induce rooting if there were no auxins contained in its recipe, but unfortunately Eleanor's of California declined to answer this question in any specific way. Therefore **Stemma** will view this product as a weak complete fertilizer with no other proven ability to instigate or hasten the formation of roots.

[Dip 'N Grow](#) is a concentrated liquid with an alcohol base sold as a "dip" for cuttings. The to-be-rooted end of the cutting is inserted into the product to absorb the rooting agents, which consist of 1 percent IBA and one half percent NAA.

[Dyna-Gro K-L-N- Root Stimulator](#) contains the two most common root auxins, IBA* and NAA*, vitamin B1 and a mild complete fertilizer. Refreshingly, this product is clearly labeled, makes no exaggerated claims, and seems to have all of the essential components of a good rooting agent.



Hormex is a series of rooting powders which contain the auxin indole-3 butyric acid (IBA). A liquid version of the rooting powder is available which is said by the manufacturer also to contain vitamin B1.

Rootone is a chemical rooting powder which contains the auxin Naphthaleneacetamide (NAD) and a chemical fungicide, Thiram. This product can be useful for rooting material prone to rotting, but caution must be exercised with use. A mask, gloves, and long-sleeves should be worn when handling this product.



Clonex is a dipping solution which contains the rooting hormone IBA along with a mild complete fertilizer and various vitamins.

Green Light Rooting Hormone is a straight-forward product containing only the auxin IBA, with no additional bells or whistles.

Maxicrop Seaweed Powder & Liquid is a concentrated form of Norwegian seaweed (*Ascophyllum nodosum*) that is naturally rich in a large number (over 60) of minerals and contains some mild naturally-occurring auxins* and cytokinins*. Not a complete fertilizer, as it lacks phosphorous, but it contains a small amount of nitrogen and a slightly larger amount of potassium. Many further claims are made about the many enzymes, bio-stimulants and trace elements found in this organic, sustainably harvested product, but not much has been proven about many of these claims. This product is concentrated and when reconstituted yields a brownish liquid which smells pleasantly of the sea. 🐚



Part 2: Superthrive or Superjive

by Al Fassezke

The question regarding the value of Superthrive as a miracle tonic for plants is often bandied about in horticultural circles. Over the years, I had read claims that ranged from, "I put it on my plant, which had never bloomed, and it was in full bloom the next day." to, "It was dead - I just put Superthrive on it and the next day it was alive and beautiful, growing better than it ever had before." I decided to find out for myself.

If you look for information on the net, you will probably only find the manufacturer's claims and anecdotal observations, both so in want of anything that resembles a control. Though my experiments were far from purely scientific, I tried to keep some loose controls in place so that I could make a fair judgment of its value based my own observations. Here is what I did, what I found, and the conclusions I made about any value the product Superthrive might hold for me.

On four separate occasions, I took multiple cuttings of plants in four different genera. In each case the group of cuttings were taken from the same individual plant to reduce genetic variance. The plant materials I used were: *Ficus benjamina*, (a tropical weeping fig) *Luna apiculata* (Peruvian myrtle), *Chaenorrhinum minus* (a dwarf snapdragon), and an unknown variety of *Coleus* (*Solenostemon*). In each instance, I prepared cuttings from the same plant and inserted them into a very fast, sterile soil. The containers containing half of the cuttings were immersed/soaked in a Superthrive solution of approximately 1/2 tsp per gallon of water to the upper soil line. The other half of the cuttings were watered in with water only. In subsequent waterings I would water the "Superthrive batch" of cuttings with a solution of 10 drops per gallon and the others with only water. The same fertilizer regimen was followed on both groups of cuttings. In all four instances, the cuttings that I used Superthrive on rooted and showed new growth first. For this reason, it follows that they would naturally exhibit better development, though I could see no difference in overall vitality once rooted. I can also say that a slightly higher percentage of cuttings rooted that were treated with the Superthrive treatment at the outset. I suspect that is directly related to the effects of the auxin in Superthrive hastening initiation of root primordia before potential vascular connections were destroyed by rot causing organisms.

In particular, something I looked for because of my affinity for a compact form in plants was branch (stem) extension. (The writer is a bonsai practitioner.) Though the cuttings treated with Superthrive rooted sooner, they exhibited the same amount of branch extension. In other words, internode length was approximately equal and no difference in leaf size was noted.



As a second part to each of my “experiments”, I divided the group of cuttings that had not been treated with Superthrive into two groups. One of the groups remained on the water/fertilizer only program, while the other group was treated to an additional 10 drops of Superthrive in each gallon of fertilizer solution. Again, the fertilizer regimen was the same for both groups. By summer’s end, I could detect no difference in bio-mass or vitality between the two groups of plants.

Since I replicated the above experiment in four different trials, using four different plant materials, I am quite comfortable in drawing some conclusions as they apply to me and my growing habits or abilities. First, and based on my observations, I have concluded that Superthrive does hold value for me as a rooting aid, or stimulant if you prefer. I regularly soak the soil, usually overnight, of my newly root-pruned and often bare-rooted repots in a solution of 1/2 tsp Superthrive per gallon of water. Second, and also based on my observations, I no longer bother with its use at any time other than at repotting. No evidence was accumulated

through the 4 trials to convince me that Superthrive was of any value as a “tonic” for plants with roots that were beyond the initiation or recovery stage.

Interestingly, the first ingredient listed as being beneficial to plants on the Superthrive label is vitamin B-1 (or thiamine). Growing plants are able to synthesize their own vitamin B-1 as do many of the fungi and bacteria having relationships with plant roots, so it's extremely doubtful that vitamin B-1 could be deficient in soils or that a growing plant could exhibit a vitamin B-1 deficiency.

Some will note that I used more of the product than suggested on the container. I wanted to see if any unwanted effects surfaced as well as trying to be sure there was ample opportunity for clear delineation between the groups. I suspect that if a more dilute solution was used, the difference between groups would have been even less clear.

It might be worth noting that since the product contains the growth regulator (hormone) auxin, its overuse can cause defoliation, at least in dicots. The broad-leaf weed killer Weed-B-Gone and the infamous “Agent Orange”, a defoliant that saw widespread use in Viet Nam, are little more than synthetic auxin.

Photo Competition- Winner: Torill Nyhuus



The final **Stemma** Photo Competition has been won by Torill Nyhuus of Sweden. The subject of this well-composed shot is *Hoya* aff. *megalantha* NS05-038, a recent collection that differs from the clone of *megalantha* previously introduced by Ted Green in the delicate pink tones of these large (4.8cm or almost 2") flowers, as opposed to the deep port wine color of the previous collection.

This plant was collected on Fiji by Nathalie Simonsson in 2005, and as the aff. in the name indicates, this plant is at this time thought to be a clone of *H. megalantha*.

For this winning photograph, Torill will receive a painting by San Francisco artist Kevin Mosley portraying this beautiful species. 🌸

Department of Corrections

by Mark Randal

In the last issue of **Stemma**, Volume 1, #3, several photographs (figure 9 and those of *Hoya lanceolata* ssp. *bella* and *H. engleriana* in Appendix A) were attributed incorrectly to Bob Noel. The correct name should have read, in all three instances, Bob Ely.

In the article “*Collecting: In the Philippines*” by Carol Noel the plant depicted in figure 23 was cited as *Dischidia oneata*. It is most likely *Dischidia oiantha* Schltr., but was not identified conclusively.

It was pointed out to your editor that the capitalization and plural usage in regards to the genus name “*Hoya*” have been applied improperly in the pages of **Stemma**. Apparently the most correct plural form for “*Hoya*” is “*Hoya*”, which rule **Stemma** will write 100 times on our office chalkboard. The capitalization for the genus name is apparently to a degree subjective, depending on the technical or casual usage of the name. **Stemma** will err on the side of caution and use only the capitalized form henceforth.

Source Materials:

for **Chemicals** part 1: “A Sampling of Common Rooting Agents”- “Vitamin B-1 (Thiamin Hydrochloride) Efficacy: Literature Review and Local Test Results”, **Flower and Nursery Report** (UC), Spring 1982; “Does Vitamin B-1 Help Transplants Take Root?”, Swezey, **Sunset Magazine**, May 1992; Parker et al, 1941 **Proc. Am. Soc. Hort. Science** V.38:49-58; Laurie & Kiplinger, 1941, **Proc. Am. Soc. Hort. Science** V.38:662; **Wikipedia** @<http://www.wikipedia.org> ; **The California Master Gardener Handbook**, Pittinger, 2002

Glossary

Auxins: a class of plant growth regulators, commonly called “hormones”.

Betaines: “in chemistry (are) any neutral chemical compound(s) with a positively charged cationic functional group (courtesy **Wikipedia**). These compounds (amino acids in the case of Maxicrop) may help in plant hydration and drought resistance by aiding in maintaining osmotic pressure within cells.

Cytokinins: a class of plant growth regulators which promote cell division.

Explant: living tissue removed from an organism to an artificial medium for culture.

Hormone: a chemical substance that is formed in one part of an organism but is transferred by mechanical means to another part of the organism where it affects a specific group of cells. In the context of rooting plants, this refers to plant growth regulators, also commonly called auxins or cytokinins.

IAA (indole-3-acetic acid): the most commonly used naturally occurring auxin

IBA (indole-3-butyric acid): another common auxin.

NAA (naphthaleneacetic acid): the most common synthetic auxin.

NAD (naphthaleneacetamide): another synthetic auxin similar to NAA.

[Back Page:](#) *Dischidia singularis* Craib

by Antone Jones

Synonyms: “Dep pla cha lam” (Thai)

Country of Origin: Chiang Mai, northern Thailand

Related/Similar Species: Based on floral characters *D. singularis* is related to *Dischidia formosana* Maxim., *Dischidia scortechinii* King & Gamble, *Dischidia tricholoba* Kerr and *Dischidia rimicola* Kerr.

Flower Color: Creamy yellow to yellowish green. Has small purplish-brown spots at the base of each corolla lobe.

Flower Size: c. 3.18mm by 2.7mm (at the base).

Flower Form: Urceolate.

Scent: None detectable.

Leaf size: Culturally dependent. If grown hard, foliage is c. 2.5cm x 1.6cm (at widest point because the foliage is lobed). Greenhouse grown plants tend to have foliage double in size.

Collector: Unknown.

Temperature Range: Collected from cooler areas but can grow in lowland conditions with little issue.

Water Requirements: *Dischidia singularis* can be allowed to dry quite a bit between watering. Better growth is obtained if kept slightly moist however.

Light Requirements: Seems to do best for me in filtered sun but grows well in bright shade or even early morning full sun followed by filtered sun.

Cultivation Notes: This plant isn't all that difficult to grow. The problem is that it is rather slow. This is also one of the few *Dischidia* that I do NOT grow mounted. This species is a non-climber/twiner and doesn't appear to root along the stem much (if at all), like many of the other *Dischidia* species will. It is a pendant/hanging species and seems to fare much better if grown potted.

