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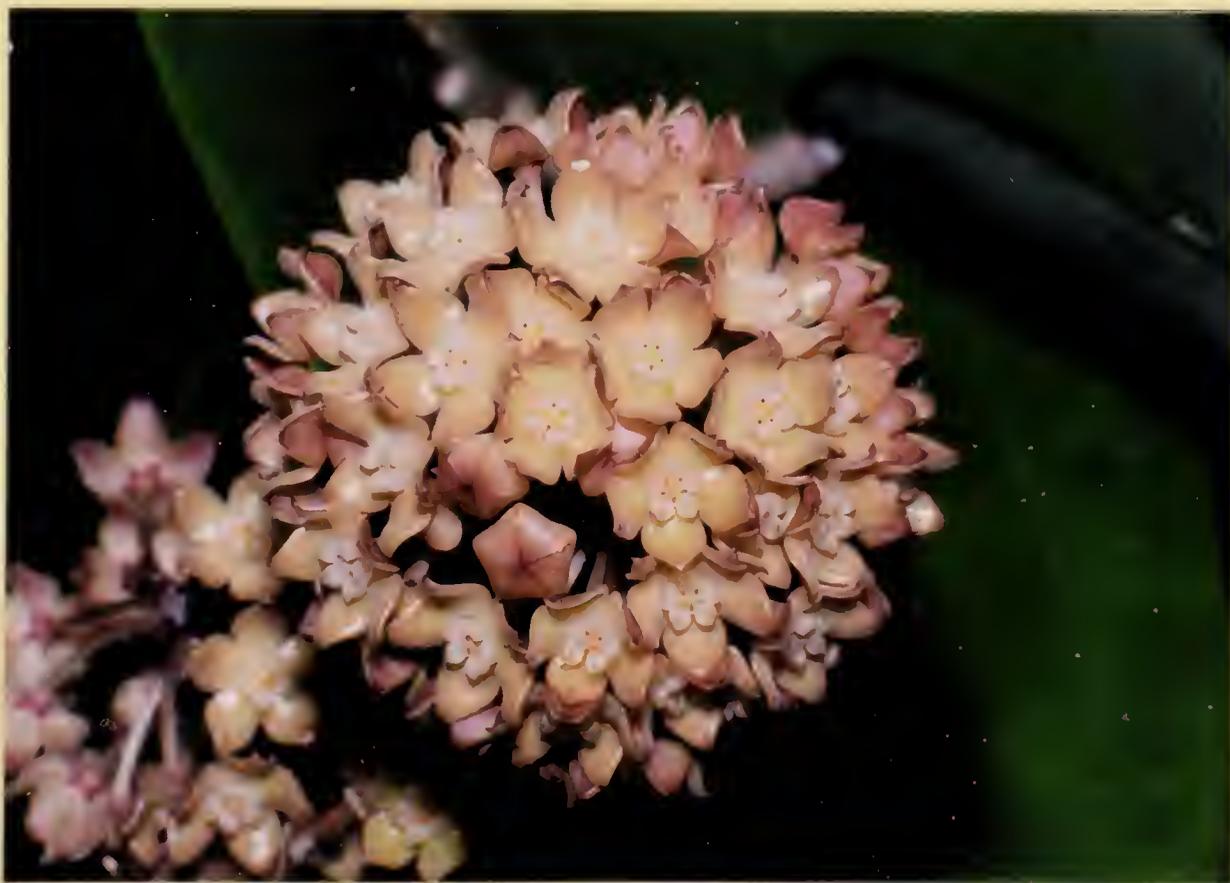
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ARBORETUM

FRATERNA

Official Bulletin for
"International Hoya Association"
2nd. Quarter 1993

ISSN 10055-4564



H. polystachya Blume

INTERNATIONAL HOYA ASSOCIATION

(Formerly Hoya Society-West Coast)

P.O. Box 5130
Central Point, OR 97502
(503) 664-6808
A Non-Profit Organization
Bulletin published quarterly.

1993 rates for a 1 year membership, which includes our quarterly publication are \$14.00 per year, \$15.00 per year Canada & Mexico, Overseas \$17.00. All overseas mail is sent by airmail.

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We have advertising available at the following rates:

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Half page camera ready ad	\$30.00 per issue
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1/8th page camera ready ad	\$15.00 per issue

You may also send us your handwritten or typed ad on a plain sheet of paper and one of your business cards and we will lay out your ad for you. There will be a one time set-up fee on this extra service of \$25.00 to be added to our research fund. A copy of your ad will be sent to you for proofing before final printing in our newsletter. The deadline for all advertising is:

February 15 for the March issue
May 15 for the June issue
August 15 for the September issue
November 15 for the December issue

We also accept advertising on a per year basis. You may deduct 10% for the same ad running consecutively in four issues. Payment in advance, Please!.

Back Issues

We now have the thirteen original issues of the Hoya Society -West Coast newsletter bound as one publication. The price of this bound text is \$25.00 U.S. and \$55.00 shipped airmail overseas. Due to the extra pages and pictures in our new publication "Fraterna", we must, out of

necessity, increase our prices for back issues of "Fraterna" to \$4.00 per issue, \$6.00 per issue shipped airmail overseas.

Honorary Board Members

Representing Thailand:	Chanin Thorut
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IT'S A FACT

PATTERN FOR A PALACE

The Crystal Palace-a vast structure of glass and iron built in Hyde Park, London, to house the Great Exhibition of 1851, was inspired by the pattern of a water lily. The designer, Sir Joseph Paxton, had been head gardener to the duke of Devonshire at Chatsworth and had successfully grown, for the first time in Europe, the giant South American water lily, *Victoria amazonica*. The plant's leaves are up to 7 feet across and the arrangement of their ribs gives them such strength that they can support the weight of a child. Paxton studied the pattern of the ribs and, years later, used a similar pattern of ribs and struts to support the roof of his iron and glass palace. The building, which was moved to south London after the exhibition, was destroyed by a fire in 1936.

UNDERGROUND BLOOMS

Two Australian species of orchid spend their entire lives buried in the earth. The only part that ever emerges is a cluster of capsules, which is pushed above the surface to disperse the dustlike seeds. Both species feed on decaying plant material in the soil, breaking it down with the aid of fungi. One of the two

orchids, *Rhizanthella gardneri*, was discovered in 1928 by a J. Trott, who plowed it up by accident on a farm in Corrigin, Western Australia. The second, *Cryptanthemis slateri*, was discovered by an E. Slater in 1931 at Alum Mount in New South Wales. Very little is known about either species because very few specimens have ever been found.

CORPSE FLOWER

Rafflesia, a parasitic plant named after the founder of Singapore, Sir Stamford Raffles, grows in the forests of Southeast Asia and has the largest and perhaps the smelliest flower in the world. The bud, which looks like a wrinkled brown cabbage, opens into a huge purplish or reddish-brown flower 1 to 3 feet across. The bloom

weighs up to 15 pounds and is covered with irregular warts. Looking and smelling like a hunk of blood-encrusted and decaying carrion, the flower is visited by vast swarms of flies, which pollinate the flower while crawling over it.

Reprinted from: Readers Digest Book of Facts
The Reader's Digest Association, Inc.
Pleasantville, New York

Cover Photo

H. polystachya Blume

This plant was purchased from HILL ~ N ~ DALE Nursery in the spring of 1987. In fact I purchased five cuttings of this species over a period of two or three months because I was fascinated by the foliage. At that particular time, I also had a lot of walk-in business at my nursery, and those huge leaves were a source of immediate interest. Fortunately H. polystachya is a fast grower, and can normally be expected to bloom at around eighteen to twenty four months from a cutting. The attractively veined leaves are spectacular for their deep, jade green color, their size and heavy substance. The flowers are small, buff colored to pale pinkish brown, and have dark pinkish brown tips. The inflorescence of this species do not grow in what we normally consider as the typical hoya umbel, but are borne instead on little clumps at the ends of short stalks called panicles or racemes that lie along the elongated side branches that are connected to the main stem. The flowers often open a few at a time, with the outer flowers opening first. This is not always the case, as just as often the flowers will all open at once forming a dense mass of flowers that completely encircle the branches (as in the cover photo).

There is also a clone of this species with pure white flowers and very dark, blackish green foliage. This white flowered form is available from Rainforest Plantes et Fleurs as H. polystachya alba.

You will need a considerable amount of room to grow this species as it is one of the largest in the hoya genus. There are no special requirements for its good health other than warm temperatures, loose, fast draining potting mix, a moderate amount of light, medium amount of humidity, and regular feeding with a balanced fertilizer.

The heaviest concentration of bloom is from early spring to mid summer but it can bloom year round with good light. The worst problem this plant faces is mealy bugs on the flower buds. Since full strength alcohol seems to damage the developing flower buds, I would suggest spraying with one half strength alcohol or you may have to resort to a mild pesticide. The leaves are seldom attacked by bugs as they are extremely thick and unpalatable.

By Ann Wayman

INFO FROM IRIS

An answer to some questions posed in a letter to Iris Liddle by John Scoville, concerning where and under what circumstances certain hoyas listed in the David Liddle catalog were collected.

Dear John,

It is strange that you should have such a request, but then I suppose history has been a quest of man for a long time.

The prefix IML came about as an alternative to DL which was used for our orchid catalogue.

I was present at the collection of a number of our first IML 7 hoyas. I will list these and give some descriptions on how some of these hoyas were collected and hope that this will be enough information for you to use.

IML 1 Hoya australis ssp. tenuipes: This plant was collected during a Sunday picnic to Mungilli Falls in the

head waters of the Johnston River on the 1st of March 1978. This is a wet tropical area with an annual rainfall in excess of 300 inches. There is almost continual rainfall and mist but it is comparatively warm at an elevation of 600 ft.

IML 2 Hoya australis ssp. tenuipes: This was collected by David and I in the rain forest near our home in February 1979. It was growing on a fallen tree at Mt. Tip Tree. Mt. Tip Tree is a 4000 ft. peak covered in dense rainforest which receives about 300 inches of rain a year and can be fairly cool by our standards.

IML 3 Hoya australis ssp. tenuipes: We collected this plant in August of 1979 in a mangrove forest close to a barge that ferries vehicles across the Daintree River. This is a very warm, humid, tropical area. It rains daily in the afternoon and the mangrove forests are full of epiphytes which include some of Australia's most spectacular orchids. The mangroves in this area are actually large forest trees and can achieve a height of 80 ft. or more and are often logged for cabinet timbers.

IML 4 *Hoya australis* ssp. *tenuipes*: This plant was collected by both of us again in estuarine mangroves close to the mouth of the Daintree River in August of 1979. These are hot steamy swamps of the river estuaries of tropical Queensland whose most famous inhabitants are the crocodiles.

IML 5 *Hoya australis* ssp. *tenuipes*: This plant was found growing on a rock face in open Eucalypt forest near the Davies Creek Falls. It was growing on small trees overhanging a side creek of the main stream, and is still there today.

IML 6 *Hoya australis* ssp. *tenuipes*: This plant was given to us by a friend who lives in a small community on the western slope of the Atherton Tableland at Silver Valley. This area is given its name for the severe frosts that occur during winter.

IML 7 *Hoya australis* ssp. *tenuipes*: David collected this plant in May 1980 during one of his visits to Cape York Peninsula. It was growing in a dry monsoonal forest in trees beside a gully. This area is extremely hot and dry during the dry season with temperatures in excess of 35 ° celsius (95 ° F.) during the day and 30 ° celsius (86 ° F.) at night.

By Iris Liddle (Submitted by John Scoville)

General Care Considerations For Hoyas

Hoyas are vine-like plants whose origin can be traced to the South Pacific islands, China, India, Sikkim, Asian Nepal, Pakistan, Bangladesh, Burma, Malaysia, Indonesia, Sumatra, Andaman and Nicobar Islands, Vietnam, Laos, Celebes, New Guinea, parts of Northern and Eastern Australia and the many various islands around the Southwestern Pacific Rim. There are a hundred or so individual species of the hoya genus all of which belong to the Asclepiadaceae or "Milkweed" family. They are noted for their exotic blooms that appear as clusters of "shooting stars" with the overall aspect of an inverted parachute. The flowers have beautiful colors and an unusual "waxy" appearance. Many hoyas also have unusual and beautiful leaves. The vines can be contained by means of a trellis or just allowed to trail, if it is hanging, or go as it pleases.

The potting media is important as moisture and nutrient retention with proper drainage must be considered. A ideal mixture consists of 2 parts perlite, 1 part Canadian sphagnum peat moss with an option of up to 1 part of planting mix.

Moist soil is essential to good plant growth but holding back on excessive watering during the winter is crucial.

Careful use of plant food is important as hoyas are somewhat heavy feeders. Many enthusiasts use fertilizers with a formula such as 10-10-10 and 15-30-15 to help plants recover from winter conditions and promote blooming. If wintering over outdoors in mild climates is called for, keep the plants on the dry side but occasionally use weak solutions of fish emulsion or its equivalent. Follow directions on labels carefully.

Although some hoyas are grown outdoors in direct sunlight, various degrees of indirect sunlight should be the rule. Inside the home, south facing windows have been proven to be ideal places to grow hoyas. You may have to pull a thin curtain or set the plants back further from the glass during the heat of the day. With few exceptions, hoyas are much happier if brought inside during periods of cold weather.

Hoyas will easily win you over with their graceful and beautiful growth but some patience must be exercised as they can be tempermental at times by doing what appears to be 'nothing' only to be followed by a dazzling display of sending out new runners and leaves and often, once or more times during the year, a complete panic of blooms! Some emit wonderful fragrances like the luscious lime scent of *Hoya odorata* or the exhilarating grape-like fragrance of *Hoya* sp. BSI-#1.

A membership in the International Hoya Association includes a subscription to "Fraterna", published quarterly, and is one of the better horticulture periodicals. Some plant descriptions may be in Latin, but will always include an English translation. This publication also consists of Pictures (4 to 6 in each volume), which are actual 3" x 5" color photos taped in with double sided tape, interesting articles, growing tips, a question and answer column plus a section for "round robins" progress if space permits. Another advantage of membership is the option to participate in round robin groups and, of course, a substantial discount on books offered by advertisers. Various hoya growers put in specials once in awhile and it is a nice way to accumulate a few extra hoya species. For additional information write to:

International Hoya Association

Ann Wayman, Secretary

P. O. BOX 5130

Central Point, OR 97502

Hoyas are more than just a conversation piece. Cuttings usuallu root very easily (follow the directions included with rooting hormones such as ("Rootone") and make excellent presents to family members and friends. Cuttins should include at least two nodes (a bulge in the stem where the leaves attach) and the lower node, or nodes or for smaller hoyas, inserted directly under the soil line, even with leaves attached!

John Scoville

SAN DIEGO HOYA GROUP'S AUCTION

A HUGE SUCCESS!!



Meeting held at Quail Gardens, Encinitas, California

Photo sponsored by San Diego Hoya Group

The March 21, 1993 San Diego Hoya Group's quarterly meeting was held at Quail Gardens, Encinitas California. This was the first time ever Hoya auction, and it turned out to be a huge success. With 51 people in attendance, over \$438.00 was raised. More than 30 plants were auctioned off, including a 5 - gallon Hoya carnososa, a large Hoya lacunosa trained on a wire ring, an 8" pot of Hoya fungii, plus many others. One of the Hoyas..H. diversifolia B, was auctioned off for \$78.00, a magnificent specimen! Hoyas were not all that were in the auction. People brought large Bromeliads, Epiphyllums, Brachychitons, Easter Cactus, African Violets + more..all large and beautiful specimens! The money has been earmarked towards subsidizing travel costs for out-of-town speakers. Along with the auction was the regular business meeting, and the introduction of our food theme for each meeting..this one being Mexican Fiesta. Main dishes of enchiladas, tamale pie, refried beans, rice, hot salsa, chips..just about everything was on the tables, including three very unique Mexican desserts! A special treat was Rainbow Gardens Bookshop with a table of books including the new HOYA HANDBOOK by Dale

Kloppenburg with Ann Wayman. They were going like hotcakes!

For those of you within driving distance (and out-of-towners who want to have a lot of fun!), try to attend the June 27th meeting at Rainbow Gardens in Vista, California. Come around noon, have something to eat and attend our 2:00 p.m. meeting. At the present, the scheduled main event will be a member discussion on bugs and pests...how to identify them, and how to prevent them. The consensus of opinion with members present was that this subject was well overdue! Also, our plant-of-the-month will be conducted by David Jones, and it will be on either H. archboldiana or H. megalaster. The international food theme will be Italian! Another huge raffle of Hoya cuttings will follow the meeting, so bring your appetite, your checkbook and have a lot of fun!

Chuck Everson

H. ischnopus Schlechter

This plant was purchased from Rainforest Plantes et Fleurs as *H. ischnopus* in the spring of 1989.

The description written by Schlechter and translated by Dale Kloppenburg in his book "Hoyas of Northeastern New Guinea" says of this species "Throughout the main portion and middle, the corolla section is bare. Moreover, the rest of the inside (surface) is broadly and thickly pubescent. The corolla appears to be surrounded by a completely pubescent rim. Similar phenomena are also known among other species; e.g., *H. marginata* Schlechter. The blooms are brown yellow, at times light flesh colored or salmon with bright rose middle and a light yellow crown." I deliberately chose this picture because it depicts so clearly what Dr. Schlechter was describing in the fuzzy or pubescent petal tips. Notice also the prominent, dark rose/red ridges on the buds.

Young leaves of this species are pinkish bronze, rather thin and slightly puckered. As the plant matures they become glossy emerald green, and the texture is stiff and brittle but still quite thin.

The flowers are approximately 1/2" across, and open a few at a time over a period of 2 or 3 days. Although a very pretty hoya, there is nothing spectacular about this species. It is easy to grow if kept warm (above 55 degrees F.). Like many of the thin leaved species, It benefits from high humidity, appears to be sensitive to chemicals and responds by developing dry, crinkled leaf edges.

Grow this plant in bright filtered light, no direct sun. It should bloom within 24 months from a cutting.

Ann Wayman

Photo sponsored by:
Various IHA Round Robin members



Questions & Answers

Question: I'm sending a picture showing damaged foliage on some of my hoyas, and another picture of tiny reddish brown spiders that I have in my greenhouse and which I feel are responsible for this damage. Can you tell from this picture what kind of spiders these are? W.W.

Answer: First, let me say...there are NO vegetarian spiders! All spiders are meat eating predators. The lesions and the dry, dusty, shriveled appearance of the foliage in your picture is indicative of severe mite damage. Your photo is a very good close-up shot and I can see that the little critters in this picture are not mites of any kind but are actual 8 legged spiders with big jaws. I can guarantee that these spiders are not your problem. I would suspect that your problem stems from a bad infestation of spider mites, or some other type of mite that is invisible to the naked eye, and too small to show up in the picture. There are many types of mites that feed on green growing things but the treatment for all are the same. Spray plants thoroughly three or four times several days apart with a miticide, or spray the entire plant (front & backs of leaves) with half & half water and alcohol. Do this several times to make sure that all adults and eggs are destroyed. A preventative measure is to keep soil moist in the summer, and mist spray the plants often to avoid dry conditions. Let the spiders live...they're probably eating a large share of the mites.

Question: Some of the cuttings I have purchased are described as having medium sized leaves, and arrive here with medium sized leaves. Within a year or so these leaves have reached very large proportions, and I'm running out of room for these oversize plants. How can I guarantee that the plants I buy will remain a manageable size? L.R.

Answer: Like most of us you're probably buying plants from a plant list or catalog that gives very little, if any information on a plants eventual size. If choosing by sight from plant sale tables, raffles etc. we all have a

tendency to pick foliage with very fancy markings, heavy prominent veins or some other feature that makes them stand out in a crowd. With few exceptions, this type of fancy foliage requires a great deal of light and can get quite large if kept in subdued light. I would suggest purchasing species that are described as semi-miniature or small growing, have thin leaves and require less light to bloom. Some of the most beautiful hoya flowers are in this category but normally have rather plain leaves. The major reason for oversize leaves on thick fleshy species is 1. potting soil kept too wet (the plant no longer has the need to store water, and so become thin) 2. not enough light (the leaves become very large in order to absorb what available light there is).

Question: I saw one of your earlier issues (5 years ago) with a membership roster. Are there any plans to print an updated membership list in *Fraterna*? J.L.

Answer: If we were to publish a membership roster, it would have to be a separate printing, and not included in *Fraterna*. The main reason being that there are now over 25 pages of names and addresses with new ones being added weekly. There would also need to be a charge for this directory, as the expense to print out this many pages plus the mailing costs would be horrendous. There is also the matter that many of our members objected to having their names and addresses on any kind of a list, claiming that all kinds of eccentrics were getting their names and addresses and contacting them for various reasons. I will take this up with the board of directors at our annual meeting to see if we can come up with a feasible solution.

Question: I'm on a fixed income and don't feel that I can afford to heat an enclosed sun porch where I grow my hoyas. Can you publish a list of all the hoyas that prefer cool temperatures? M. W.

Answer: There are no hoyas that prefer cool temperatures, but there are some species that can tolerate

cooler conditions better than others. Among these are the hoyas we think of as *H. carnosa* types, and all have *carnosa* type flowers (krinkle 8, hindu rope, snowball etc.). *H. shepherdii* and *H. serpens* can also take fairly cool temperatures. Most of these cool tolerant species evolved in cool mountainous regions where the temperature is just barely pleasantly warm in the daytime and downright chilly at night, but not freezing. If you own a copy of *The Hoya Handbook* or have access to one, all the 144 hoyas pictured have the minimum temperature requirements specified.

Question: I have several pots of *H. macgillivrayi* that just don't grow at all. I've seen other peoples plants that grow and bloom beautifully. Can you give me some hints on growing this species, or tell me what I'm doing wrong? I've had them for three years, and fertilize regularly with Peters 5-50-17 formula. E.K.W.

Answer: *H. macgillivrayi* is normally a fast and sturdy grower, and blooms at an early age. You might try repotting them in a different mix, giving them more light and make sure they are in a warm spot. Feed with a balanced fertilizer 20-20-20 or 10-10-10 and stay away from extremely high phosphorous fertilizers unless you are pushing for bloom.

Question: The leaves on some of my hoyas are suddenly turning a sickly yellow color, especially on the margins of the leaves. What's causing this? L.F.

Answer: I can think of several reasons why leaves would turn yellow. Old age, excessive heat, lack of nitrogen, and in the case of yellowing on the leaf edges...a phosphorous deficiency. The fact that you specified the term "suddenly" leads me to conclude that your plants are being affected by direct sun and/or excessive heat. You can remedy this situation by moving your plants to a shadier, cooler spot and feeding regularly with a balanced fertilizer to correct any nutrient deficiencies.

Ann Wayman

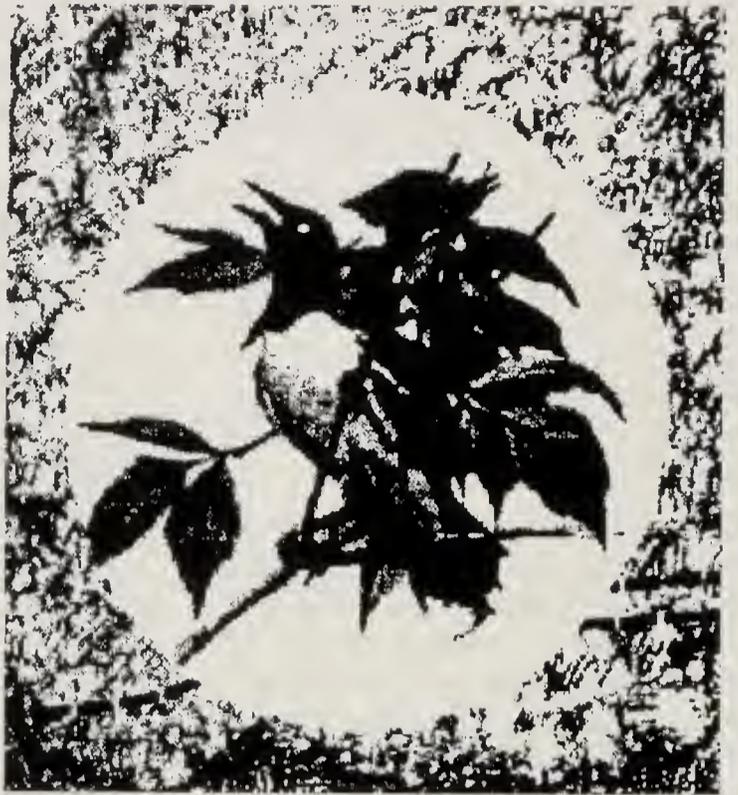
BIRD TRACKS

Round Robin # 5..October 1992..Ann Wayman..Oregon...Adult lady bugs eat very few if any mealy bugs or aphids. By the time they get to the adult stage, their only purpose left in life is to mate, lay eggs and then die. The larvae that hatch out of the eggs is the great mealy bug and aphid eater. This larvae looks like tiny, brown alligators with orange spots. They are horrible looking little critters, but can eat their weight in mealy bugs and aphids every day for about 22 days, then they go into a metamorphosis for about 5 days, then re-emerge once again as adult lady bugs, then fly away to find a mate. As with most creatures they don't stay around and inbreed.

Round Robin # 3..November 1992..Rosemary Peterson...California...Hoya growing in Long Beach is grinding to a halt, although many of them are confused about which season it really is. One question I have is about *H. serpens*. I have three seed pods (the 4th dropped) But they have been there since mid-summer. I am waiting for them to open. They are turning sort of yellow. Should I pick them before they open? How will I know if they are ready? The best thing is that one of them still has the flower on the end. The others are still in the nylon stocking I have enclosed around the pods.

Round Robin # 3..November 1992..Harriett Schapiro..San Diego, Calif....Here it is almost Thanksgiving and Southern California is already over an inch behind in rain fall. This could be a bad year for plants in San Diego. Two years ago when we first had water restrictions I decided that the Hoya and Bonsai would live, the back yard would go and if possible I would keep the front yard sort of green. The Hoyas out in the yard have started taking off up the Juniper trees. In another year I should have a dash of tropical rain forest back there. (Realizing that the word "RAIN" may be a joke!)

Round Robin # 3..December 1992..Benigne Dohms..Florida.....There was a cold spell in mid-October so I brought all my hoyas inside, then put them back out again for a about a week in early November. All growth and blooming stopped as soon as I brought them in again, but there has not been the yellowing and leaf drop that I have had in the past. It's as if they all flipped some sort of switch when they left their outdoor setting and decided to hibernate. I'm sure the shutdown mechanism was activated as the days gradually began to cool and have both less sunlight and less intense sunlight, not to mention the decrease in humidity. Of all the variables I have tried to play around with and provide for my plants during the last 4 years, sunlight seems to be the one thing that results in active growth. My problem is that most of the windows in my



house face north and in the colder time of the year the sun stays either right above the house, providing very little indirect bright light, or it comes in for a short time from the south.

Round Robin # 3..November 1992..Jackie Pendergast...I had mealybugs on the old buds this summer. I sprayed some with alcohol, some with indoor plant spray, some I scrubbed some (very gently) with a toothbrush, and poked a few with my fingernails. They look alright now but wonder if I have destroyed the next blooms? Is there another way of treating them?

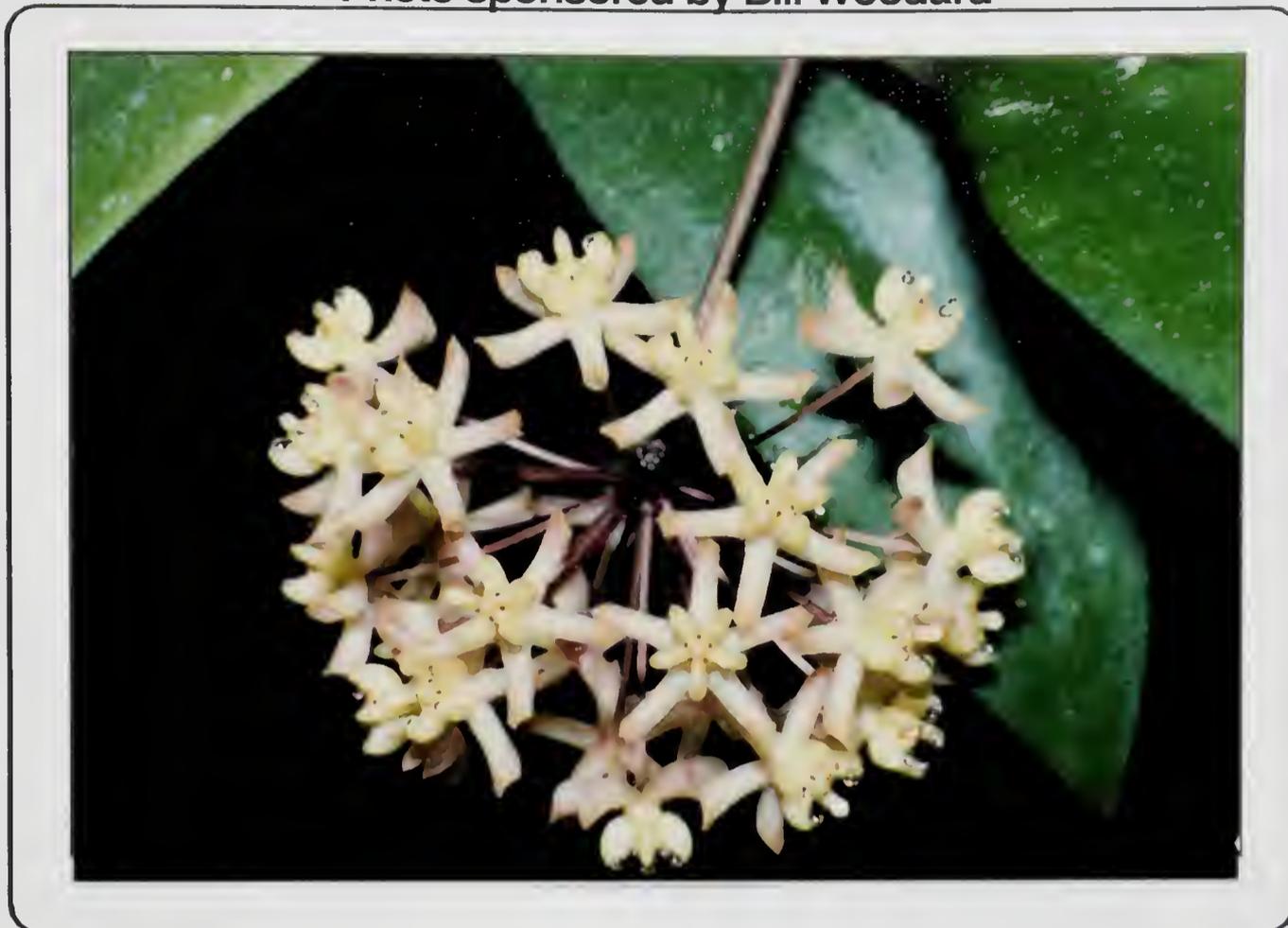
Round Robin # 3..January 1993..Joyce Blumenstock..Michigan...I have found that spraying old peduncles (bloom spurs) with alcohol has killed them (that is, killed the bloom spurs).

Round Robin # 3..February 1992..Ted Green has collected some exciting new species in N. Borneo this last year. He called to say he has acquired a number of new species from Ruurd Van Donkelaar. The Dutch are very active in tropical plant work and Ted is fortunate in having good contact with Ruurd who has access to all the material that the botanists bring back from their collecting trips. *H. halophila* is one he mentioned. My book on Philippine hoyas is being used by many of the collectors in the Philippines and as a result they have been able to collect five species that we didn't have before.

Notice

We are in need of a new round robin director. If anyone is interested please contact Ann Wayman, P.O. Box 5130, Central Point, OR 97502

Photo sponsored by Bill Woodard



H. padangensis Schlechter

This plant was added to one of my orders as a bonus plant back in the fall of 1987. I read the description, and although it didn't strike me as a plant I would ever purchase...as a bonus, and for free it was acceptable. The months went by and the plant grew. It quickly became a big stringy plant with few leaves and a wild grabbing habit. In fact, it latched on to every other plant within reaching distance. Every time I went into the greenhouse it was entwined in some other plants pot and hanger. I took to carrying the pruners with me at all times just for cutting back the runners of this plant. Several times I thought about cutting off its head completely but out of sheer stubbornness and a desire to see at least one flower, I resisted the urge. More months went by and one day in February of 1989, I noticed that my stringy, wild vine was no longer stringy, but from the heavy pruning, had become a beautiful dense leaved plant with elegant cascading branches. Not only that, but there were a dozen or more

umbels of tiny star shaped buds forming. I was excited because at last I was going to see some flowers, but still had my doubts that it was even a hoyo...It certainly didn't look like any hoyo I had ever seen. When the flowers started opening, I discovered that not only was it a hoyo, but a most unique and unusual looking hoyo. I loved it at first sight...I love it still!

Among the lessons I've learned in the course of collecting and growing many different hoyo species, is that we often come across a distinctive array of hoyos with a very different look. Like some other hoyos that don't quite seem to fit in with our notion of what hoyos should look like, H. padangensis has all the correct parts but they have been arranged in a totally different pattern than what we normally think of as being typical for a hoyo, even the unopened buds are perfectly star shaped. The crown stands tall, and the corona scales appear to slightly curve claw-like over the top of the crown. The petals stand out stiffly,

double under lengthwise, and are considerably broader at the tip than they are at the base. The flower color is white to pale pink with a pure white crown. I cannot detect any fragrance on this flower. The leaves are rather thin, deep olive green and have random flecks of white and silver throughout.

This hoyo is extremely easy to grow but should never be allowed to dry out completely. Once it has wilted, it may not survive for a second try. It is a heavy bloomer in bright filtered light and will even bloom sporadically in partial shade.

This species is from Sumatra and prefers warm temperatures. It enjoys high humidity but will adapt to a lower humidity level if carried out gradually. Packaged all purpose potting mix suits it fine, as long as it is coarse and fast draining (you may have to add some perlite or sharp sand). Keep some extra cuttings going...This is one hoyo you won't want to be without.

Ann Wayman

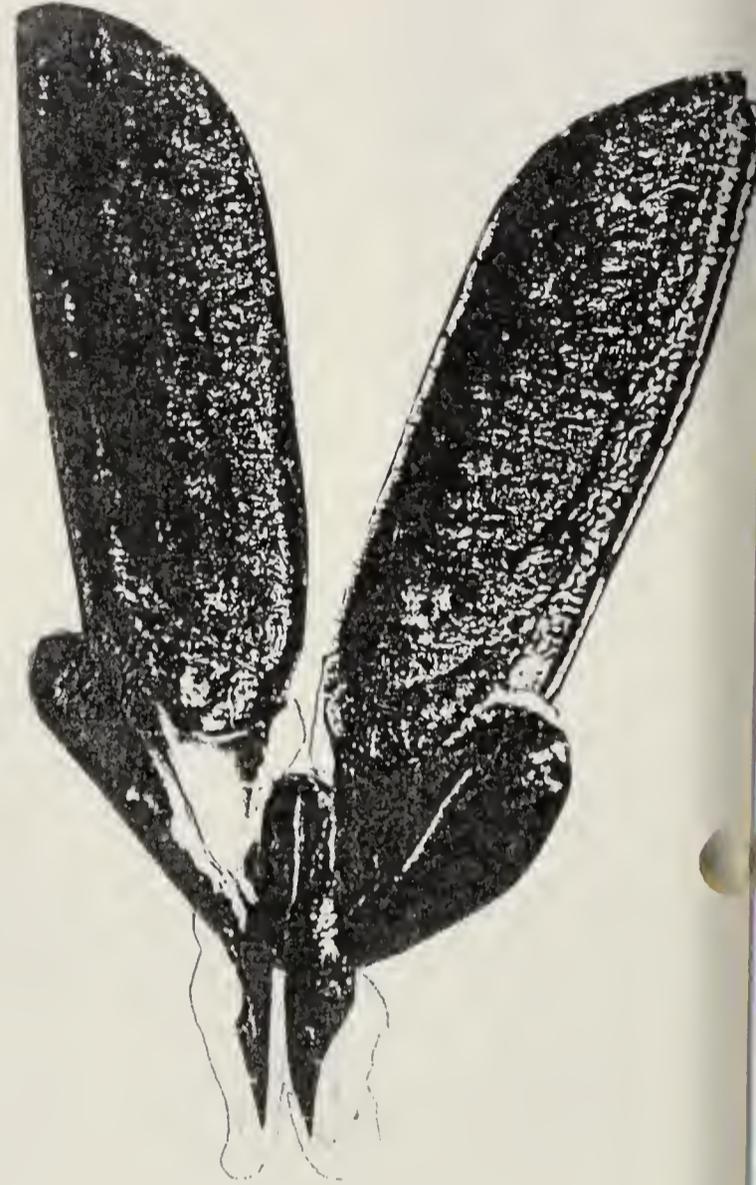
HOYA WAYETII KLOPPENBURG SP., NOV.



CALYX TOP VIEW



CORONA SIDE VIEW



POLLINARIUM



SCALE TOP VIEW



SCALE BOTTOM VIEW



SCALE SIDE VIEW

ALL PARTS APPROXIMATELY 11 TIMES NATURAL SIZE EXCEPT THE POLLINARIUM WHICH IS ABOUT 160 MAGNIFICATION.

Hoya Wayetii Kloppenburg sp. nov.

Holotype sheet Maximo K. Wayet #1989 (CHUP) from Baguio area, Benguet Province, Luzon Philippines, collected Nov. 1989. Isotype sheet Kloppenburg #90148 (UC), Section: *Sperlingia* (Vahl) Miquel (*Acanthostemma*).

Subsuffrutex vel pendulus, epiphytus, ramosus, scandens. Rami, filiformes, flexuosi, lax foliati, teretes glabri. Foliis anguste lanceolatis basi et apice attenuatis acutis utriusque glaberinis, petiolatis. Inflorescentiae umbelliformes pedunculatae, c. 12-18 florum, pedicellis gracilibus, aequilongis, glabris. Calycis segmenta ovato-triangularia obtusiuscula glabra, quam corolla multo breviora, margine ciliata. Corolla revoluta usque supra medium 5-fida, lobis ovatis, acuminatis, extus glabris, intus apice glabrato excepto papulis recurvis subulatis crystallinis obtectis. Coronae foliola ovata apice rostrato-acuminata, infra apicem et supra medium gibbo obscura donata supra marginata-carinata, postice obtusa subtus in ligulas 2 oblongas foliolam superantes; antheris paulo breviora. Pollinia oblique oblongoidea, translatoribus triangularibus, obliquis; retinaculo anguste linearibus.

This species is similar in leaf morphology to *Hoya angustifolia* Elmer (nomen nudum) and *Hoya kentiana* Burton. It is entirely glabrous except for the inner corolla surface as in the latter species. The leaves in this new species however, are, for the most part larger (wider, thicker and longer). As for the color they are generally darker green with a leaf edged in even darker green indicating the presence of more anthocyanin pigmentation in this species, recognized as non taxonomic characters. The calyx segments are larger in this species than the former species, the apex rounded, the central width greater, the margins ciliate, each overlapping, having broad flat ligules. The flower is larger. The corona is different. The corona is not sessile to the corolla but slightly raised on a short column. There is a central longitudinal ridge on the upper surface of the scales with an umbo above the middle, and a concave surface on either side leaving a rather sharp raised edge to the corona scale

especially opposite the umbo and inward from it; at this point the scale is relatively wide. The bilobed outer extensions are not markedly curved upward at the outer apex as they are in *H. kentiana* Burton. The retinaculum is different in being longer and narrower. The stylar (stigma) apex is like that described by Elmer for *H. angustifolia* in being conical tapering erect with a blunt tip covered with a fuzzy pubescence. It is easy to recognize this species from *H. kentiana* Burton when the two are seen together even when not in bloom.

Internodes: 3.0-5.0 cm. long x .02 cm. in diameter, glabrous, becoming woody at the base, terete, flexible, with small, short, thickened adventitious roots just below the enlarged nodes.

Petiole: 0.5-1.5 cm long, terete, thick, glabrous. Not evidently grooved, deep green.

Leaf Blade: 5.0-14.5 cm. long x 1.5-2.7 cm. wide, thick, succulent, convex to nearly flat on the upper glabrous surface, triangular below and lighter green covered with granulate lighter colored punctations. Upper surface deep green with deeper green edging especially in younger leaves. Some rusty tones may be exhibited in newly formed leaves. Blades tapering to both ends, especially narrow toward the petiole which merges with the blade, leaf gland very small almost non-existent.

Peduncle: 7.0 cm. long terete, glabrous, deep green.

Pedicel: 1.0-2.0 cm. long. x 0.11 cm. diameter, curved variable in length, glabrous medium shiny green.

Calyx: lobes 0.17 cm. tall x 0.13 cm. at widest (at overlap), bright pale green, with ciliate margins, apex rounded, inside glabrous, outside granulate, broad flat ligule at sinus 0.03 cm. wide x 0.02 cm. long.

Corolla: revolute; outside glabrous except for apical triangle, 1.08 cm., bare, inside pubescent, with individual hair cells pointing inward toward the crown, cells long and crystalline white c. 0.05 cm. long decreasing in length as they approach the corona. Corolla color deep rose red. Sinus to sinus 0.33 cm.; Apex to sinus 0.35 cm. Center to Apex 0.80 cm. making flower diameter

flattened 1.6 cm. in diameter; widest 0.38 cm. above the sinus.

Corona: lobes 0.38 cm. long + 0.04 cm. to include bilobed extensions; overall length 0.42. 0.17 cm. at the widest, just outward from the inner lobe. Inner lobe tapers inward but is long and spatulate, meeting at raised center or nearly so. Scale very wide just back of inner lobe, at this point the central keel has a small umbo, with a sunken trough on either side leaving the edge of the scale raised. Scale thick c. 0.17 cm. at outer end. Lobes form a groove below extending from apex to 1/2 way to the center. Bilobed extensions 0.15 cm. thick. Color deep red except apical area of outer lobe yellow.

Pollinium: inwardly truncate 0.475 mm. long x 0.145 mm. wide at outer apex 0.02 cm. wide here tapering toward the caudicle. Rail along outer edges extending to caudical envelopment of inner apical area. Vacuole inward widest at inner apical area.

Translators: long narrowly scapula shaped, narrow and joining retinaculum well below the center, opaque granular. Caudicle clear, large bulbous at pollinia attachment, narrow inward and joining retinaculum just above translator.

Retinaculum: 0.16 mm. long and narrow, rounded inner apex, widening at the attachment points, bowed outward below this point, outer apex bifid, covered below with a clear membrane extending up the sides to the base of the inner translator arm.

Stylar Head Referred to as the stigma head conical erect above the stylar table the apical head feathery (pubescent).

Follicles: not seen.

I have named this *Hoya* in honor of its discoverer Maximo K. Wayet. Max worked for Professor Juan V. Pancho until the latter's retirement. I consider Max my good friend, a diligent self directed employee. An honest, hard worker concerned for the welfare of others. He has collected numerous Hoyas and Dischidias for me, being the first to recollect a living specimen of *H. mindorensis* Schlechter, also from the Baguio area.

Dale Kloppenburg

For A Better Understanding

The Hoya coriacea Bl., H. fraterna Bl. story

Participants:

Dr. Carl Ludwig Blume
Mr. Thomas Lobb

Dr. Blume 1796-1862 (66 years) born in Brunswick Germany. He was a Medical doctor. He went to Java in 1918 (then under Dutch administration) and became an inspector of vaccines at the Bogor Botanical Garden. In 1822 he was made director. He returned to Holland in 1826 with much Herbarium material (his own and other collectors) where he was appointed director of the Rijks Herbarium (State Herbarium at Leiden) in 1829. Note: all his collecting was done on the island of Java.

Thomas Lobb 1820-1894 (74 years) from Cornwall England was employed by the rich firm of Messrs Veitch, Exeter England from 1843-1860 to collect plants of horticulture value. In 1843 he was in Singapore visiting Java and adjacent islands. On his second expedition in 1848 he collected in Borneo, Laburn & Sarawak. He also visited the Philippines, collecting in the neighborhood of Manila. He again visited Borneo in 1854 & 1856.

To get the complete picture I have arranged chronologically the descriptive publications of the two Hoya species:

Hoya coriacea Blume

1826 Bijdragen tot de Flora von Nederlandsche Indie (Bijdr. 1825) p.1063 C.L. Blume

1830 Prodromus Syst. Veg. V.8 p.638 De Candolle

1837 General System of Gardening and Botany V.4 s.23 (A) p.127 G. Don

1840 Synopsis Plantarum V.6 p.892 Dietrich

1843 Tijdschrift von Natur. Geschieden Physiol. V.10 p.125 Hoev. & De Vriese (Hassk.)

1848 Rumphia V.4 p.52, t.187, C.L. Blume

1849 Museum Botanicum Lugduna-batavorum V.1 p.44 C.L. Blume

1850 Botanical Magazine t..4518 (blossomed in August 1849)

1850 Fleur des Serres V.6 t.578 p.143 (picture from Bot. Mag.)

1850 Flower Garden V.1 p.77 fig.55 (1850-1851) Paxton & Lindley

1851 Jardin Fleur V.1 t.37 Lemaire

1853 Tuinbouw Flora V.1 p.68 De Vriese

1856 Flora von Nederlandsch Indie Bataviae V.2 p.521 Miquel & Zollinger

1883 Flora of British India V.4 p.61 J.D. Hooker

1895 Die Naturlichen Pflanzenfamilien t.4 abteil 2 p.288 (A. Engler & Prentl.) Schumann

1907 Journal of the Royal Asiatic Society, Bengal Branch "Flora of the Malay Peninsula" V.27 p.573 K. & G.

1912 Exkursionsflora, Flora von Java V.3 p.100 S.H. Koorders

1967 Flora of Java V.2 p.267 C.A. Backer

1978 Malay Nature Jour. V.30 #3/4 "The Peninsular Malaysian Species of Hoya" p.497-498 R.E. Rintz

Hoya fraterna Blume

1849 Museum Botanicum Lugduna-batavorum V.1 p.43 C.L. Blume

1848 Rumphia V.4 p.32 name only C.L. Blume

1850 Botanical Magazine t..4684 Hooker

1852 Fleur des Serres V.8 t.815 p.179 (picture from Bot. Mag.)

1853 Tuinbouw Flora V.1 p.69 W.H. De Vriese

1856 Flora von Nederlandsch Indie Bataviae V.2 p.522 Miquel & Zollinger

1858 Annales Botanisches Systematicae V.5 p.505 C.G. Walpers

1884 Flower Garden V.3 p.639 Paxton & Lindley

1912 Exkursionsflora, Flora von Java V.3 p.99 S.H. Koorders

Discussion: H. coriacea was found by Blume in 1822 on Mt. Salak and published it in 1826.

H. coriacea Blume was first described in "Bijdragen tot de Flora von Nederlandsch Indie" p. 1063 as follows:

H: foliis subvenosis ovalibus acutis vel acuminatis coriaceis glabris, corolla intus sericea.

Crescit: in fruticentis ad pendem montis Salak. Floret: Octobri, etc.

Translation: Hoya: with leaves a little (or somewhat) nerved oval acute or acuminate coriaceous, glabris corolla inside silky (long straight closely pressed glossy hairs).

Growing: shrublike to pendulous among the Salak mountains.

Floret: Octobri, etc.

In 1844 Decaisne in De Candolle's Prodrumus V. 8 p. 638, describes this species under the key "folia trinervia coriacea v. carnosae pallide virentia".

Translated: "leaves trinerved leathery or fleshy, pale green".

In 1848, Blume in Rumphia Volume IV page 52 placed *H. coriacea* (also *H. fraterna*) in the Section Physostemma. (Coronae stamineae foliola subinflata, subtus marginibus revolutis fissura longitudinali hiantia.

Translation: leaflets of the staminal corona somewhat inflated, below with the margins revolute with gaping longitudinal split (fissure).

His Latin description is lengthy and full of details as follows:

H. coriacea Tab. 187: volubilis, glabra; foliis coriaceis ellipticis acutis v. acuminatis basi rotundatis v. obsolete emarginatis subvenosis supra petiolum calloso-glandulosis; umbellis longissime pedunculatis multifloris; corollae intus sericeo-velutinae laciniis triangulari-ovatus acutis; coronae stamineae foliolis supra convexis angulo exteriori obtusiusculo subreclinato Bl. Bydr. Flor. Ned. Ind. p. 1063. DeCaisne in De Cand. Prod. Syst. Veg. VIII p. 638.27 - Habit. In sylvis montanis Javae Occidentalis. Speciem huic valde affine, *H. fraternam* MIHI, in collibus calcareis circa Kuripan indagavi, tam floribus minoribus, segmentis calycis multo longioribus, quam foliolis coronae stamineae angulo exteriori obtusis diversam. - Caulis suffruticosus, volubilis, teres, radicans, intervallo 6-8 poll. nonnunquam minori folia opposita patentissima gerens. Petioli 1/2-3/4 poll., teretiusculi, supra obsolete canaliculati. Folia 4-5 poll., 2-2 1/2 poll. lata, plana, ad basin supra glandula minuta fusca sessili praedita, coriacea, nitida supravenosa, venis in pagina aversa pallide viridi distinctioribus. Pedunculi in parte superiore caulis v. ramorum, iidem extrapetiolares, solitarii, 2-2 1/2 poll. longi, teretes, subpubescente v. glabrati, ex apice elevato-incrassato bracteolis squamaeformibus minutissimis triangulari-ovata obtusis imbricatis puberulis obsessis umbellato-multiflori. Pedicelli 1-1 1/3 poll., graciles teretiusculi, supra aliquato crassiores, patuli, pubescentes. Calyx quinquepartitus, extus puberulus, intus glabra; laciniis 2 lin., subulatis, margine tenuioribus. Corolla pollicaris, subcarnosa, quinquefidia, extus sordide pupurascens papillisque minutissimis scabrida, intus luteola et sericeo-velutina; laciniis ovatis, acutis, erecto-patentibus v. reflexis. Coronae stamineae foliola subinflata, carnosae, pallidae, supra obtuse carinata, subtus excavata et marginibus utriusque revolutis quasi fissura longitudinali excisa, angulo interiori in

dentem acutum antherae incumbentem purpurescentem et angulo exteriori in acumen brevi obtusiusculum leviter reclinatum producta. Antherae sagitatae, membrana tenui margine crispata cinctae. Pollinia lineari-oblonga, recta, plana, margine exteriori pellucida, basi per crura breviter cuneata corpusculo retinaculi oblongo complicato brunneo corneo supra medium connexa. Stigma abbreviato-prismaticum.

Translation: *H. coriacea* plate 187, twining, glabrous; with the leaves leathery elliptic acute or acuminate with the base rounded or obsolete, emarginate (slightly notched) almost veined, above the petiole with a calloused gland; umbels with long multiflowered peduncles; with the inside of the corolla (silklike) sericeous-velvety, with the (lacina) narrow lobes triangular-ovate; with the leaflets of the staminal corona convex above, with the exterior angle somewhat obtuse turned or bent downward a little. Blume in Bijdragen tot de Flora von Nederlandsch Indie (see first entry above) page 1063. Decaisne in De Candolle's Prodrumus System Veg. - Volume 3 page 638.27 - Habitat. In the forest mountains of Occidental (Western) Java. The specimen strongly points in the direction of the closely related *H. fraterna* known to me from the place in the calcareous hills about Kuripan as the flowers are smaller with the segments of the calyx much longer, with the exterior obtuse angle of the staminal corona different. Stem slightly woody twining, round rooting (putting forth aerial roots) spacing 16.2-21.6 cm. (long) somewhat round, above obsolete grooved. Leaves 10-13.5 cm. (long) 5-6.7 cm. wide, flat, at the base on the top side provided with a minute brown sessile gland, leathery, shiny, veined above, veins very distinct, on the lower surface pale green. Peduncles on the above part of the stem or branches, above the petioles, solitary 5.4-6.7 cm. long, round, somewhat pubescent or glabrous, outer tips expanded-thickened with bracteoles shaped like scales, very minute triangular ovate obtuse overlapping puberulous, occupying multiflowered umbels. Pedicels 2.7-3.6 cm. (long) very narrowly rounded above to some extent thickened outspread pubescent. Calyx 5 parted, outside puberulous, inside glabrous, flaps 4.5 mm. (long) awl shaped (tapering from the base to a very fine point), with the margins thin. Corolla 1" long (2.5 cm.) somewhat thick 5-fid, outside dull purplish with minute nipple like projections (papillate) somewhat scabrous, inside yellow and silky-velvety, lobes ovate, acute spreading erect or reflexed. Leaflets of the staminal corona somewhat inflated, thick, pale, above obtusely keeled, below hollowed out and on both sides revolute, nearly cut into a longitudinal fissure (channeled) with the purplish interior angle a pointed tooth, incumbent upon the anther and with the exterior angle acuminate briefly very obtuse slightly bent downward. Membrane of the

anthers sagitate (arrow shaped) with thin curled margins enclosed. Pollinia linearly oblong, erect, flat, with the exterior margin translucent, with the base portion narrowly cuneate, connected above the middle of the corpuscle of the brownish oblong horny (hard) folded upon itself retinacula.

Hoya fraterna Blume is described in "Museum Botanicum Lugduna- Batavorum" V.I p. 44 in 1849. (well after his return to Holland) This is 23 years after *H. coriacea* Blume was described. The species was, however, collected in 1824. The name of this species is mentioned in the above text (*Rumphia*) as noted. Blume placed this species in the Section *Physostemma* along with *H. coriacea* Blume; *H. vitellina* Blume; *H. polystachya* Blume and *H. clandestina* Blume. The text under #104 reads as follows:

104. *Hoya* (*Physostemma*) *fraterna* Bl.: *volubilis*, *glabra*; *foliis coriaceis ovato-oblongis ellipticisve acuminatis basi rotundatis subvenosis supra petiolum calloso-glandulosis*; *umbellis longissime pedunculatis multifloris*; *corollae intus sericeo-velutinae laciniis triangulari- ovatis acutis*; *coronae stamineae foliolis supra convexis angulo exteriori obtuso recto*. Bl. in *Rumphia* IV. - *H. coriacea* maxime affinis, *cujus flores majores, segmenta calycis breviora et foliola coronae stamineae angulo exteriori minus obtusa atque subreclinata*. In *calcareis Kuripan Javae occidentalis*.

Translation: 104. *Hoya* (*Physostemma*) *fraterna* Blume: twining, glabrous, leaves leathery ovate-oblong elliptical acuminate with the base rounded somewhat veined, on the upper side of the petiole a little callous glandular; with long peduncled many flowered umbels, with the corona inside silky-velvety with lobes triangular ovate acute; with the leaflets of the staminal corona convex above, the exterior angle obtuse erect. Blume in *Rumphia* IV - very close to (related) *Hoya coriacea* whose flowers are larger, with segments of the calyx smaller and leaflets of the staminal corona outer lobe (angle) less obtuse and somewhat reclined (turned downward). In calcareous soil at Kuripan Western Java.

Now on to the plant depicted in Curtis Botanic Magazine published 1 December 1852 which was collected by Lobb and sent to the Veitch Nursery. Since it has been determined that the two species are synonymous and within the bounds of species variation what is the Curtis Drawing of? It is known that Lobb falsified the collecting localities of his plants. This was most common among collectors, especially orchid collectors, since they did not want the competition to know the source of new and rare plants. In *Hortus Veitelis* 1906 p.41 E.D. Merrill writes "Genera and species erroneously credited to Philippine Flora" in *Philip. Jour Sci. C. Botany* V.10 1915 p.171-194 Merrill even suggests "The labels of Lobb's specimens seem to have been

purposely falsified as to localities in which they were collected".

Where did the Curtis plant originate? Where was Lobb collecting prior to the Curtis publication? Note that in 1848 on his 2nd trip he collected in N. Borneo and in the vicinity of Manila. This is very close to the probable time that the Curtis plant was received by Veitch. It is my measured guess that this species is from the Philippines and possibly also from N. Borneo and synonymous with *H. melaflua* (Blanco) Merrill or is a closely related species. I have received many clones of *H. melaflua* (a Philippine *Hoya*) from Dexter Heuschkel. One cutting, has foliage identical to the plant in commerce (a poor bloomer) known as *H. fraterna*. This cutting has been labeled 900118 DH, and I believe was collected in Sinaloan not too far from Manila. This plant has been shared with Ted Green, Ann Wayman and Chuck Everson. It is hoped that one of us will soon bloom this plant so a close comparison can be made with *H. melaflua* and (Our so called) *H. fraterna*. I believe any publications after 1852 of *H. fraterna* Bl. should be looked at skeptically and critically since they may be based on the Curtis drawing and not Blume's type sheet. They may even be a mixture of both as sometimes has occurred.

Some questions still remain. Since the Curtis publication was only 10 years prior to Dr. Blume's death, is it likely he was not aware of the colored drawing and did not see the publication? If he had I feel he would have commented on the discrepancy. Are the species *H. melaflua* (Blanco) Merrill and our *H. fraterna* identical and if not, are they within the realm of species variation? Since Dr. Blume named and described both *H. coriacea* and *H. fraterna* (and pointed out 3 differences between the species how do we now find the two type sheets to be nearly identical (and different than what we are familiar with as *H. fraterna*)? It is assured that the Type sheet of *H. Fraterna* at Leiden is not our species that we know as *H. fraterna*. I may be mistaken but it seems the original Type sheet of *H. coriacea* Blume was not present in the Leiden material, or was not presented in the previous article. In a way this is immaterial since it does not effect the *H. fraterna* validity. I am curious as to where the flower of *H. coriacea* Bl. that Ruurd boiled up came from. Is the holotype sheet of *H. coriacea* at Leiden? There is also the question of Sectional designation. Although Blume was the one who established the section *Physostelma* (calling it *Physostemma*) based on Wight's Genus, the species he placed here do not seem to fit with the genera delineations. I will leave these differences for another discussion. Like all good mysteries there seems to be more questions than answers.

Dale Kloppenburg

Food For Your Plants

Plants in the wild are ragged, mixed with yellowed, insect chewed leaves, dead and dying stems, and usually, leaves that are smaller and thicker than cultivated plants. The transformation to culture is often amazing, and proves that our cultivated plants certainly get more attention and loving care.

Every living thing on our planet requires food for energy. The essential elements for health and growth are sugar and other carbohydrates. Unlike animals, however, plants utilize the energy of the sun to manufacture their own food, through a process called photosynthesis.

In photosynthesis, light energy, carbon dioxide, and water combine with the green plant pigment, chlorophyll, to produce plant sugars and oxygen, which is released into our atmosphere.

Photosynthesis requires an environment with a sufficient amount of light, warm temperatures, and the proper amount of humidity.

So called "plant foods" can never compensate for a poor environment, since fertilizer provides only the nutritional building materials, not the plant's real food...the sugar it manufactures by photosynthesis.

The organic decomposition of peat moss, sphagnum, bark and other plant potting media will provide your plants with a lot of their nutritional "building blocks". In nature, we have decomposed bark, litter, dust, animal manure from birds, bats, ants etc. even rain water contains nitrogen the most essential in plant nutrition. These provide the necessary nutrients, but we want our home grown Hoyas to look better than plants struggling in the wild, so we protect them from the wind, the driving rains, the scorching sun...and we try to provide them with any minerals that they might be lacking. The question that arises is what is necessary and what is excess. Too much fertilizer, and we have a dead or badly burned plant. Good common sense tells us to use fertilizers judiciously, and on potted plants in weak solutions or concentrations. If the plant is continuously in growth it needs a constant source of food. The plant takes up nutrients in the form of ions and can not tell the difference between organic and inorganic sources. They also can not tell the difference between cheap and expensive substances.

Let's look at plant nutrition and nutrients closely. Of the more than 100 chemical elements known to man today, 16 are known to be essential for plant growth. Others may eventually be found to play some role in plant growth or function in very minute amounts. Many of us would mentally skip over the 3 major ones (carbon, hydrogen, and oxygen) because they are so common. In a sense they are "free" because they are taken from the air and water. The 13 other essential elements are normally absorbed from the soil by the root system, or to a lesser degree, by being absorbed through the foliage,

such as in foliar feeding. These 13 elements are divided into primary, secondary, and micro plant nutrients, and are separated into these divisions on the basis of the relative amounts required for plant growth. None is more essential than any other, regardless of the amounts required.

Briefly, carbon is a basic building block for plant life. It is taken from the air in the form of carbon dioxide. Photosynthesis combines the carbon with hydrogen and oxygen to form carbohydrates. Oxygen is required for plant respiration, and hydrogen, along with oxygen, forms water, which constitutes a large portion of the total plant weight. This water is required for the transport of minerals and plant food and the chemical reactions necessary for plant growth.

The primary plant nutrients are nitrogen, phosphorous, and potassium. Most of the nitrogen is taken up by plants in the nitrate form (negative ions or the chemical formula NO_3^-). The phosphorous is absorbed as HPO_4^- , H_2PO_4^- or PO_4^{3-} , depending on the soil pH (its acidity). Plants take up the potassium in the form of a positive ion, K^+ . In the fertilizer we purchase for our Hoya plants, the various 3 numbered formulas on the labels, e.g. 8-24-10, 12-36-14, 20-20-20 etc. stand for these 3 primary nutrients, nitrogen, phosphorous, and potassium, and, in that order as N P K represents the percent by weight.

The secondary plant nutrients are calcium, magnesium, and sulphur. The 7 micronutrient's are zinc, iron, manganese, copper, boron, molybdenum, and chlorine. Balance is important in plant nutrition, and our objective should be to supplement the capacity of our potting mix to supply nutrients for ideal growth and flower production.

there are many choices for the consumer. Keep in mind what you want, what you are getting, and what price you are paying. In most instances you need only supplement the nutrients already present. It may be well to occasionally supply micronutrients. Though the majority of the better known brands of specialty plant foods contain these micronutrients, they are usually quite expensive, as they are packaged in small quantity. On the other hand, huge bulk sacks of plant food may go to waste if it takes years to use. Foliar sprays and slow release fertilizers also have their place. The former for quick response and the latter because they need be applied so infrequently. Many growers will apply a high nitrogen fertilizer in the spring when rapid growth is desirable, then switch to high phosphorous in the fall when growth slows in order to promote bloom, and to harden off the plants for the cooler winter months.

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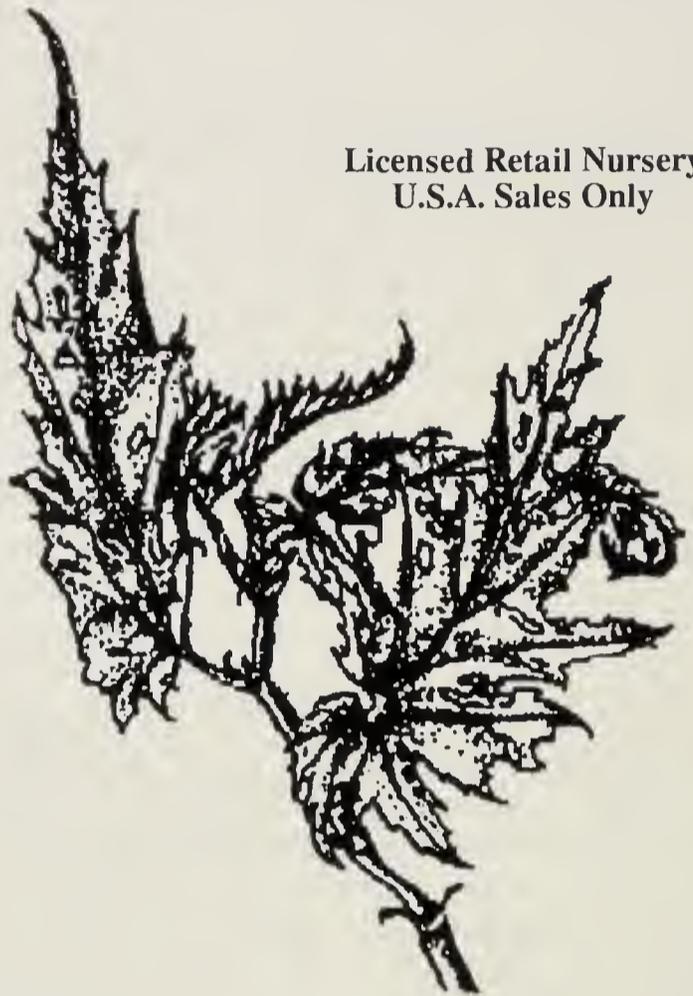
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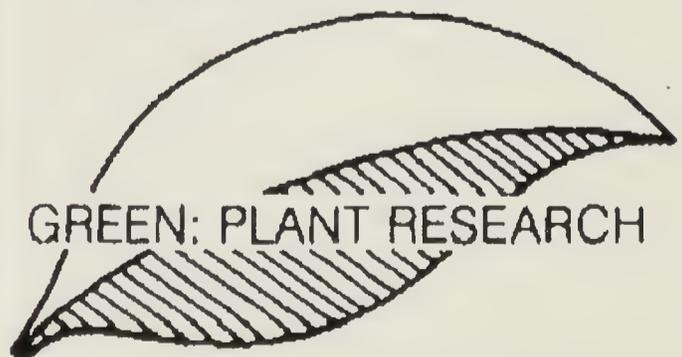


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Volume 5

- H. diversifolia
- H. nicholsoniae # IML 39
- H. cumingiana
- H. neo ebudica
- H. padangensis
- H. camphorifolia
- H. inconspicua
- H. caudata var. crassifolia
- H. Spec. PNG-1
- H. erythrina

Volume 6

- H. fraterna
- H. coronaria Form 1
- H. limoniaca
- H. bilobata
- H. spec. PNG-6
- H. tsangi
- H. diptera
- H. acuta (bronze)
- H. fungii
- H. diversifolia-B

Volume 7

- H. carnosa cv. "Krinkle 8"
- H. sp. Saba, Malaysia
- H. Sp. WMZ
- H. polyneura
- H. sp. WMZ (Back of flower & calyx)
- H. nummularioides (formerly called H. pubera)
- H. acuta Penang
- H. plicata
- H. carnosa cv. "Dapple Gray"
- H. sanae

Volume 8

- H. purpureo fusca
- H. odorata
- H. pottsii
- H. Sp. IML 33
- H. picta
- H. pseudo littoralis
- H. nicholsoniae (from Logee's)
- H. micrantha
- H. vitiensis
- H. curtisii (foliage)

Volume 9

- H. sp. USDA #354236 (calycina)
- H. merrilli

- H. affinis
- H. darwinii
- H. pubicalyx 'Chimera'
- H. sp. 'Gold Star'
- H. sp. # BSI-1
- H. archboldiana (Red Form)
- H. finlaysonii
- H. naumanii

Volume 10

- H. pubicalyx (Silver Pink)
- H. rupicola
- H. vitellina
- H. sp. IML # 234 (obscura)
- H. meliflua
- H. engleriana
- H. megalaster
- H. archboldiana (Pink Form)
- H. sp. Bangkok Red
- H. sp. cebu

Volume 11

- H. mitrata
- H. sp. DAV-817
- H. dimorpha
- H. multiflora
- H. sp. Sabah, Malaysia #IML 557
- H. erythrostemma
- H. sussuella (ariadna)
- H. kentiana
- H. incrassata
- H. chuniana

Volume 12

- H. eitapensis
- H. curtisii/pruinosa
- H. sp. (New Guinea White)
- H. poolei
- H. pallida
- H. sp. Kuching, Borneo # IML 232
- H. chlorantha var. tutuilensis
- H. diptera (from Fiji)
- H. cominsii
- H. vitellina



Pictures

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