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FRATERNAL

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Hoya bicolor Kloppenburg
Picture by Monina Siar

INTERNATIONAL HOYA ASSOCIATION

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Fraterna

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Our Cover Story

New Philippine Hoya Species

Hoya bicolor Kloppenburg sp. nova. Type #67050 (CAHUP) *Hoya juannguoiana* Kloppenburg affinis sed folia ovatus-cordatus, apiculatus non obovatus to ovatus-lanceolatus, et parvus; florem parvus, differt.

Like *Hoya juannguoiana* Kloppenburg but differs in that the foliage is ovate-cordate apiculate, not obovate to ovate-lanceolate and smaller; the flowers are also smaller.

The species was collected from Mt. Banahaw, Quezon Province, Luzon, Philippines. The type material was from the UPLB plant breeding program, Los Banos, Laguna, Philippines.

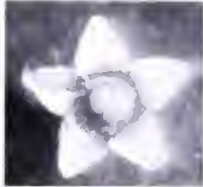
Foliage opposite, blades ovate with a cordate base and extremely short acute apiculate apex, slightly furrowed at the midrib on the dorsal surface, otherwise horizontal, edges entire, pinnately at about a 40 degree angle, ca. 4 pairs on either side, looping in before reaching the margins and somewhat anastomosing. Lower surface along the midrib with scattered hair cells. Petiole long twisted ca. 3 cm. long 0.4 cm. in diameter, slightly grooved near the blade otherwise terete; two small semicircular raised dark glands at attachment above. Internodes variable in length 5 cm. - 12.5 cm., puberulous, with nodes enlarged, leaves leaving circular scars.



Outside view of the corolla, pedicel and calyx enlarged about 8X. The pedicel is straight, terete, puberulent, short, 1.45 cm. long. The sepals do not reach the corolla sinuses, are short triangular, with ciliate edges, base somewhat granulose. The corolla outside surface is glabrous with some punctations, deeply cut. Sepal apex to the sinus 0.05 cm.



Pedicel, calyx and ovaries, side view enlarged about 8X. The ovaries narrowly domed, glabrous and waxy, 0.09 cm. tall and the base pair is 0.08 cm. wide. Calyx lays flat and outspread.



Calyx top view enlarged about 8X. Sepals are ciliate, glabrous inside, wide near the base and tapering to a narrow obtuse apex, barely overlapping, no ligules are present. Sepals 0.14 cm. long, 0.11 cm. at the widest. From apex to center 0.18 cm.



Corolla outside surface enlarged about 8X. This surface is rough and glabrous.

Sinus - sinus	0.30 cm.
Sinus - center	0.20 cm.
Sinus - apex	0.48 cm.
Widest	0.40 cm.
Apex - center	0.67 cm., flower flattened is 1.34 cm. in diameter. It is cut more than 2/3's .



Corolla inside surface enlarged about 8X. The corolla tends to cup inward to being flat rotate to slightly reflexed, very finely puberulous, corolla lobes are broad with an acute apex. In the center there is a raised thickened collar.



Side view of the flower enlarged about 8X. The corona is white and the corolla pale with rosy tips, a beautiful flower! The corona is nearly horizontal slightly raised at both apices with the dorsal somewhat concave.

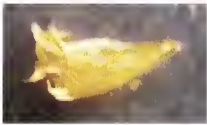


Top view of a flower enlarged about 8X. The inner coronal lobes are short and dentate and do not reach the center. Cupped dorsal surface has a raised center portion all the way to the outer apex that is acute and exceeds the corolla sinuses.



Bottom view of the corona enlarged about 8X. this surface is grooved well in from the sinuses toward a small raised column. Note the thick anther wing sides.

Apex - apex	0.30 cm.
Apex - center	0.34 cm.
Widest	0.15 cm.
Anther wing- aw.	0.20 cm.
Retinaculum - ret.	0.08 cm.
Aw.- center	0.18 cm.
Ret. - center	0.06 cm.



Side view of a scale enlarged about 8X. The scale is actually somewhat short and deep. The anther wings are deeply scythe shaped. Anthers exceed the inner lobe.



View of the pentagonal stylar table enlarged about 8X. The center is raised into a narrow white spire on a small table.



Pollinarium enlarged about 100X.

Pollinia	
length	0.54 mm.
widest	0.15 mm.
Retinaculum	
length	0.25 mm.
shoulder	0.07 mm.
waist	0.06 mm.
hips	0.07 mm.
extensions	0.05 mm.
Translator	
length	0.14 mm.
depth	0.02 mm.
Caudicle bulb	
diameter	0.07 mm.



Picture of foliage sent by Monina Siar via e-mail.



Reduced copy of the holotype herbarium Sheet (CHAUP)

New Hoya Chimera

By: Dale Kloppenburg

A little background (see Fraterna 1991 3rd Quarter pages 12-13)

Chimeras are a special type of variegation. Chimeras that arise from seedling populations; as our clone most likely has, are thought to occur between the one celled zygote stage and the many celled chimeral embryo (in addition to this rather natural evolution, a chimera can be created by grafting). Chimeras in the outer layers of plant tissue are classified as "periclinal", one layer of one genetic constitution overlaying another layer of a different genetic constitution.

The type of chimera found in *Hoya pubicalyx* and now in this new mutation is termed a sectional chimera and more specifically a "mericlinal" type. In this type of chimera the leaf may be composed entirely of one genetic type or another, or it may be a combination of types and exhibit overlaps and sections of colors. It is possible to have three to five different genetic layers in one plant.

Hoya pubicalyx var. *Chimera* was originally sent to me in 1980 from Manila by the late Peter Tsang. On one leaf in permanent ink Peter had written "Blood Red". I have no knowledge of this clones origin, or if it was recognized as being a chimera. There is no doubt that it is a variation or mutation of a Philippine species (*Hoya pubicalyx* Merrill published in The Philippine Journal of Science, Vol. 13, C5, Page 331). On the several collecting trips I have made to the Philippines, I have not seen this particular type of clone in any garden, or flower show, nor has it ever been sent to me by Philippine native plant collectors.

Being a mericlinal chimera (?), this clone can exhibit various solid colors of flower clusters along with the beautifully marked and varied floral patterns. In addition to the variegated flower clusters, it is also possible to have peduncles of solid colors like "Red Buttons", "Bright One", and "Pretty One". Most striking and interesting are the floral colorations that arise from the mixed layers of tissue where the corollas exhibit sections of different colors and striking contrasts in one crown or even in a portion of one scale. Also of note is the odd, ball shaped corona on about half of the flowers in each cluster, a striking contrast to the usual star shaped crown of the hoya flower, and added suspicion of a defective or mutant gene.

Now I have discovered a new chimera this one arising from *Hoya obovata* Decaisne. Often I have said "watch your hoyo plants closely" since they are ever elongating there is a good chance that they will mutate. It is always possible to find a cluster of flowers of a different and new color or size. Most often we should be able to find flecking from otherwise solid green foliage or even variegation. We might look for a branch with more compact growth or maybe more vigor. New and interesting clones can

be found, so watch your plants carefully. I have had the clone of *Hoya obovata* on one of the back benches in my greenhouse for so long that I do not really know when it was placed there, probably in the late 1970's. It is still in the same 8" pot, has never been repotted nor moved.

This spring I noticed a branch with reddish foliage on the new growth and then in early June, 3 peduncles formed and as they developed clusters of flowers I could see it was a chimera, very similar to our old *Hoya pubicalyx chimera*. As from this latter species I would expect that I will be able to select new growth of just one type of tissue and thus get new clones with solid colors, similar to those in *H. pubicalyx*, namely "bright one", "pretty one" etc. I shall try, it will only take time. As the new cuttings grow I will distribute them so they can be made available to all hoyo collectors.



Picture taken of this new chimera in Fresno, CA., June 2002



Buds of the new chimera showing the sectional color differences.

As with our other chimera the coronal lobes are blotched with deep red, red and white, mixed in pleasing color combinations, which carries over to the corolla but not in as striking a manner. Many pedicels are dark red and the new leaves are splotted with red pigments. This one has a lot of clear sweet honeydew.

Understanding Hoyas By Dale Kloppenburg

The Hoya flower's corolla:

On page 14 of the last issue of *Fraterna*, 15 #4, we showed a labeled hoya flower. In the genus *hoya* the petals of the flower are fused into a structure called a corolla, it is a rotate structure (like a wheel). It is a circle of petals, with the bases fused together. The free ends are termed corolla lobes, there are 5 in each flower.



peduncle
rachis
pedicel
calyx
corolla with corolla lobes
edges curled under

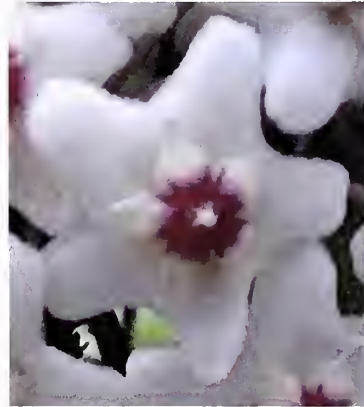
Photo by Edward Gilding.

Note that flower clusters arise from peduncles (which may be persistent or deciduous). Pedicels arise from the peduncle, specifically from the flower bearing apex of the peduncle, the area called a rachis. If it is persistent then the rachis elongates and forms a rough scaly end on the peduncle. Next the back of each corolla is supported by a calyx. Thus, peduncle-rachis-pedicel-calyx-corolla and in the center is a corona.

Corolla surfaces come in many diverse shapes and sizes. They can be urceolate as with *Hoya heuschkeliana* Kloppenburg, cupped (campanulate) as with *Hoya campanulata* Blume, nearly flat to flat as with *Hoya camphorifolia* Warburg and *Hoya carnosia* R. Br., recurved as in *Hoya lasiantha* Korthals ex Blume and revolute as in most of the acanthostemma's like *Hoya bilobata* Schlechter.



A campanulate corolla



A rotate, flat corolla



A reflexed corolla



A revolute corolla



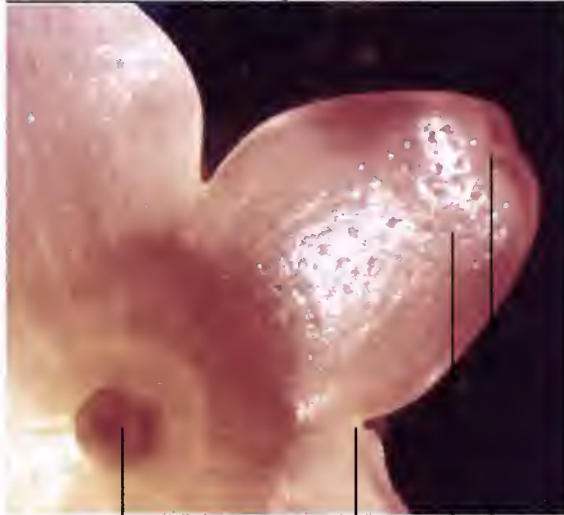
An urceolate corolla

I have mentioned and shown the basic types but there are many modifications. This is what makes collecting hoyas so interesting. It's a never ending diversity---for example, the crab-like corollas.



Corolla lobes pointing forward and rolled along the edges

Corolla surfaces vary considerably in thickness, type of hairs or lack thereof (indumentum), all of which make for good taxonomic characteristics. In addition the corollas are cut in different ways, as obvious above. The campanulate corolla exhibits almost no lobes, whereas the corolla of the reflexed one is deeply cut. Both the outside and inside corolla surfaces can be the same but most are different. They can have very fine hairs (puberulent) or a little longer (pubescent) or very long (villous) and everything in-between. There may even be mixtures of indumentum. **Glabrous** is the term for no hairs. The surface can be glabrous and still have other characteristics like fine bumps (granulose) or spots (punctate) and other surface modifications.



Central ovary space

Sinus

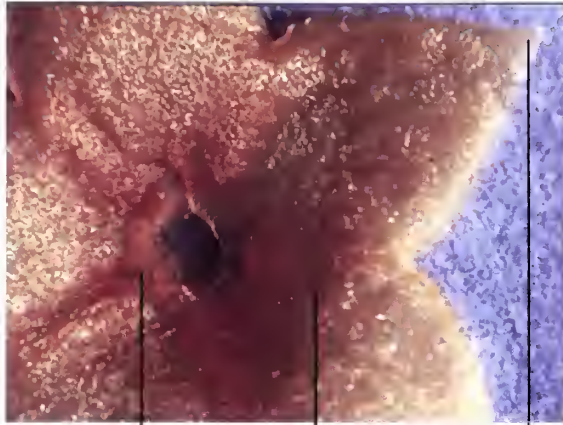
Corolla lobe

Corolla apex (rolled under)

Here is a photo of the outer surface of a corolla. The calyx has been removed by pulling it off and the ovaries have been removed with it. In the lower left corner is a hole in which the 2 ovaries were housed. This surface is glabrous (without hairs) but notice the spaced holes (punctations) especially on the corolla lobes (the free portions of the corolla). In this case the corolla is cut a little more than half way, the lobe apex is turned under (toward this outer surface, and also the edges are slightly rolled. The place where two adjacent corolla lobes meet is called the sinus.

We say upper surface, inner surface, lower surface, when we should more accurately say (for the inner surface) the dorsal surface, that surface which in the closed

flower, is inside closed over by the corona. The outer surface then is the ventral surface, the surface away from the axis, the surface on the outside of the closed flower.



Thickened area

Surface pubescent

Apex glabrous (without hairs)

A photo of the inside (dorsal) surface of the corolla. Here we see dense hairiness (pubescence). Here it extends over the entire inner surface except for the very tip of the coronal lobes (apical area). The center of the corolla has a hole left by the removal of the ovaries and crown. The area immediately around it is thickened and there are thickened linear areas running out toward the corolla sinuses.

I have failed to mention that pubescence is not always evenly distributed on a corolla surface. It may be only a pubescent rim around the margins as in *Hoya marginata* Schlechter or it could have pubescent margins and the internal area puberulent. There is no end to the variations in most hoyo structures. One more factor. The corolla can be almost minute as with *Hoya bilobata* Schlechter to gigantic as with *Hoya lauterbachii* Schumann. Photo credits go to Torill Nyhuus and Eva-Karin Wiberg for some of the corolla types depicted above.

PLANT COLLECTING and PERMITS

By Ted Green

Dale Kloppenburg and I have been working with Hoyas, for the simple pleasure and their scientific side, for over 25 years. It has been very interesting and enjoyable, collecting the literature and collecting and comparing the plants, that have come from both the wilds and other's collections. We have shared the knowledge we have gained by publishing it in books, in horticultural articles and talks to garden clubs and hoyo societies around the world. It has always been pleasurable, a two-way street.

Now, a serious problem has developed, one caused by the U. S. Department of Agriculture and the clamor of the so-called conservationists, the "Greenies", the "Tree Huggers", that is changing all of that. The USDA is now insisting that all plants and plant materials entering the U.S. must be accompanied by a Phytosanitary Certificate from the exporting country. The intent, to quote the USDA, being "to prevent the introduction of plant pests, diseases, and noxious weeds not known to occur here".

If all of the countries where Hoyas grow wild were sophisticated (with trained personnel, various offices, and a organized work ethic) that would be wonderful BUT the reality is that they are not. Many of the countries where I have collected are not set up to issue permits, anywhere other than the capital, and to collect a fee, only after confusion and delays (which are both expensive). This can easily amount to \$100 for \$10 worth of plants.

It is understandable that an individual country should have the right to establish a conservation program, both for the plant material and intellectual property, but many of the unsophisticated countries have been unduly influenced by the U. S. and U. K. governments. The sharing of conservation tracts has awakened them to, not necessarily to saving species, a new way to make money, permit selling. Though Hoyas are not covered by CITES, thank God!, if they were that would be another turnstile with a toll. CITES controlled plants (as, Orchids, Cycads, Nepenthes, etc.) must all be accompanied by a Phyto.

Dale and I found out another tollgate while in Vanuatu last year. Upon asking for a Phyto in the second largest town (which is on Espiritu Santo), we were told that we could get it only in the capital, Port Vila on Efate. When we contacted Port Vila, they asked why we hadn't applied for a "Collecting Permit" before we entered the country? Interestingly, in that permit we would have had to enumerate the species and number we wanted to collect! Who knows what you are going to find hopefully, a new species or two? This permit system idea is now getting to be quite common and has been "improved upon" to the point where some countries insist that a "team" (with all its expenses) accompany you in your collecting. That team might consist of a representative of the government and a district tribal member. It is extortion, pure and simple!

Some of this extortion goes back a long time. In one case I remember, from 1976, when planning on collecting on Guadalcanal in the Solomon Islands, I had to post a \$20 bond which was suppose to be returned to me if and when a scientific paper was published. I published a check-list of the Hoyas and Dischidias that I collected and turned it over to Geoff Dennis who was the curator of the herbarium at the botanic garden in Honiara. I applied several times to get my money back and to this day, zilch, nada, nothing!

Typically, branches of government seem to be working at odds with each other: Conservation vs. Forestry vs. Transportation vs. Commerce; as in Sabah where logging is licensed (under Forestry) and yet the plants growing on the trees are protected (under Conservation). Or as, in 2000 a conservation conference was held on Palawan in the Philippines, (with signs everywhere) and yet I saw hundreds of acres of plants being destroyed to build a new highway north from Puerto Princesa, toward Sabang. The over-clearing for the right-of-way was a disaster!

In June of this year, a small package of 9 un-rooted, cuttings was sent to me by my friend Eva-Karin Wiberg in Sweden and it was intercepted and destroyed because it did not have a Phyto. Eva-Karin and I have been exchanging cuttings for years with no

trouble, no Phyto, no diseases. That has stopped our exchanges for Eva-Karin tells me that the closest inspection agency is 100 miles away. Times are changing and I am sad for the new rules and regulations are completely destroying the pleasure and sharing of our collecting of new Hoyas. After collecting from the wild for nearly 40 years, it is going to be a thing only fondly remembered, gone forever.

A New Hoya Hybrid



The hybrid. *Hoya x Mathilde*



The two parents. *Hoya carnososa* R. Br. the pod parent on the left; the male parent on the right, *Hoya serpens* Hooker.

The story of this unusual occurrence:

Emilio Begine is a travel Agent (Selectair Helmet Travel Corner & Canarian Quality Travel) in Belgium. He also loves plants and has over 1000 different mostly of Cacti, succulents, orchids, Euphorbias and a few Hoyas. There is no greenhouse and the hoyas are grown outdoors in the summer under a roof. It was here that his two hoya species (pictured above) bloomed at the same time in the summer of 1994. The *Hoya serpens* seems to set a lot of pods but the *Hoya carnosa* only a single pod until now. Emilio saw a pod developing and watched it mature on the *Hoya carnosa* (the pod parent). Finally he was able to plant the seed only * two of which germinated and grew to maturity and flowered, both for the first time in 1999.

So we have a successful cross with *Hoya carnosa* as the pod parent and *Hoya serpens* providing the pollen. Undoubtedly helped along with night insects while the two species were the only two in flower at the same time. The two seedlings (one of which we are featuring here) are slightly different. One named "Chouke" has lighter foliage, more like *H. carnosa* in form, not in size and with less silvery on the leaves and a lighter colored flower center. The other new hybrid pictured above is named "Mathilde". The foliage is silver flecked and larger than the pollen parent's. This is a beautiful hybrid and a valuable addition to the world of hoyas.

* The fact that a pod had only two viable seeds (most hoyo pods would have around 50-100 viable seeds) indicates that there is some genetic incompatibility between the two parent species. It is obvious that the species are not closely related. Emilio has to be a person who pays close attention to his plants and notices things like this pod and had the foresight to grow the seedlings to maturity. The fact that the two seedlings vary, also is an indication that there is some variability in the parent species. Normally a cross of two species of long standing would have uniform seedlings from a first generation cross. The new hybrid has clear sap like the pod parent. I have encouraged Emilio to try and get pods to set on his new hybrids and to plant this seed so as to get the segregation in this second generation. This should yield plants of all intermediate characteristics between the two original parent species. Good luck and we hope to hear more from him in the future.

Note the photos above and see that the foliage is more similar to the pollen parents but larger and more succulent, more like the pod parent.



Pod parent *H. carnosa* R. Br.



Pollen parent *H. serpens* Hooker F.



The hybrid in full bloom
Picture by Emilio Begine in Belgium.

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Corrections: In the last issue of *Fraterna* 15/4 page 18 (Photo Gallery) I have the incorrect name on the first hoya, the large flowered one. It is *Hoya lauterbachii* Schumann. It was named in 1896 and it also comes from New Guinea but from the Golgol River in Northeastern New Guinea. Along with *Hoya gigas* Schlechter it has the largest flowers of all hoya species. As seen in the picture the inner coronal surface is rose to brownish-red and outside a pale yellowish-green

Accumulative Index of Species

Bold faced type indicates Photographs
 volume, quarter, pages, year.

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X Ruthie Gilding hyb.

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15, 4 Q, 1-5, 2002
- burtoniae Kloppenburg (sp. 81084)
3 Q, 12, 1990
14, 2 Q, 16 labeled
- tsangii, 2001
- callistophylla Green sp. nov.
4 Q, front cover 2000
13, 4 Q, 2-4, 2000
- calycina Schltr
4 Q, 4, 1990
4 Q, VII, 1990
12, 2 Q, 7, 1999
12, 3 Q, 3, 1999
12, 4 Q, 18-19, 2002
15, 2 Q, 18-19, 2002
- campanulata Blume
3 Q, front cover, 1994
3 Q, 2, 1994
3 Q, 3, 1994
11, 3 Q, 11-13, 1998
15, 2 Q, 15, 2002
- camphorifolia Warburg
I Q, 14, 1993
14, 3 Q, 6-8, 2001
- cardiophylla Merrill
2 Q, 11, 1991
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- carnosa, Brown
WC II, #4, 7(1989)
2 Q, 5, 1994
cultivars IO, 1 Q, 10, 1997
10, 1 Q, 14, 1997
cultivars 10, 2 Q, 2, 1997
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11,3 Q, 11, 1998
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15, 2 Q, 15, 2002
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- catalog of trivial names of hybrids and cultivars
10, 2 Q, 4, 1997
- caudata Hook f.
WC II, #3, 3, 1989
2 Q, 7, 1992
10, 3 Q, 12, 1997
11, 3 Q, 11, 1998
12, 2 Q, 8, 1999
- caudata var. crassifolia
2 Q, 7, 1992
- cembra Kloppenburg sp. nov.
3 Q, pg. II, 1990
2 Q, 11, 1991
- chlorantha Reching
4 Q, 15, 1996
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- chlorantha var. tutuilensis
WC I, #4, 2, 1988
4 Q, 7, 1996
- ciliata Elmer
10, 3 Q, 15, 1997
- cinnamomifolia Hooker (USDA 353449)
WC I, #6, 4 (1989)
WC II, #5, 9 (1989)
4 Q, front cover, 1992
4 Q, 8, 1992
10, 1 Q, 14, 1997
15, 2 Q, 9, 2002
- var. purpureofusca (Hooker)
Kloppenburg comb. nova.
14, 1 Q, 12, 2001
- clemensiorum Green sp. nov.
12, 4 Q, 8, 1999
(labeled phyllura)
14, 3 Q, 11-15, 2001
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- cominsii Hemsley
I Q, 16, 1992
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- compacta Burton
2 Q, front cover, 1994
2 Q, 4, 1994
12, 2 Q, 7, 1999
14, 4 Q, 19, 2001
- cool tolerant Hoyas
10, 1 Q, 13, 1997
- coriacea Blume
3 Q, front cover, 1992
3 Q, 2, 1992
1 Q, 8, 1993
2 Q, 11, 1993
2 Q, 2, 1996
4 Q, 11, 1996
11, 1 Q, 2, 1998
11, 3 Q, 12, 1998
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- (Elmer) Burton
14, 1 Q, 11, 2001
- coronaria Blume
4 Q, 4, 1990
4 Q, 15, 1993
4 Q, 12, 1996
- crassicaulis Elmer ex. Kloppenburg sp. nov.
3 Q, 10 1995
3 Q, 11, 1995
- crassipes Turcz.
2 Q, 2, 1996
4 Q, 7, 1996
15, 2 Q, 9, 2002
- cumingiana Decaisne
WC II, #4, 3, 1989
10, 1 Q 14, 1997
11, 4 Q, 2-4, 1998
12, 2 Q, 6, 1999
15, 2 Q, 9, 2002
- curtisii King & Gamble
3 Q, 12, 1990
4 Q, 11, 1996
10, 3 Q, 11, 1997
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- cystiantha Schlechter
13, 4 Q, 13-16, 2000
13, 3 Q, 2-7, 2000
15, 2 Q, 15, 2002
- affinis cystiantha
3 Q, front cover 2000
- dalrympliana F. Muller
11, 4 Q, 12, 1998
- darwinii Loher
4 Q, 9 1991
1 Q, 14, 1994
2 Q, 13, 1995
10, 3 Q, 12, 1997
11, 2 Q, front cover, 1998
11, 2 Q, 2-6, 1998
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- dauidcummingii Kloppenburg sp. nov.
2 Q, 10, 1995
12, 1Q front cover, 1999
12, 1 Q, 14, 1999
14, 4 Q, 15, 2001
- dennisii Forster and Liddle sp. nov.
4 Q, 5, 1993
4 Q, 14, 1993
11, 2 Q, 12, 1998
11, 4 Q, 9, 1998
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15, 1 Q, 18-19, 2002
- densifolia Turcz.
3 Q, 11, 1992
11, 4 Q, 2-5, 1998
- deykei Green sp. nov.
- Synonymous with angustisepala

- 12, 4 Q, 9, 1999 labeled
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13, 1 Q, 15-16, 2000
- dicksoniana P. T. Lee sp.
nov.
1 Q, 9, 1995
10, 4 Q, 11, 1997
- diptera Seemann
3 Q, front cover, 1996
3 Q, 2, 1996
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- diversifolia Blume
3 Q, 5, 1990
2 Q, front cover, 1996
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4 Q, 11, 1996
10, 4 Q, 11, 1997
11, 1 Q, 11, 1998
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- dodecatheiflora Fosberg
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- dolichosparta Schlechter
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- eitapensis Schltr.
2 Q, 4, 1991
- elliptica Hook f.
4 Q, 12, 1996
- el-nidicus Kloppenburg sp.
nov.
3 Q, pg. I, 1991
1 Q, 7, 1996
- endauensis Kiew
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- engleriana A. Hosseus
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3 Q, 7, 1990
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- erythrostemma Kerr
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Schltr.)
2 Q, 10, 1991
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- eugenioides Schlechter
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- excavata Teijsmann & Binnendijk
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- filiformis Rechingen
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- finlaysonii Wight
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- flagellata Kerr
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- flavida Forster and Liddle sp.
nov.
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- fraterna Blume
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- fusca Wallich
4 Q, 11, 1996
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- fuscomarginata Blume
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- gigantangensis Kloppenburg sp.
nov.
4 Q, pg. II, 1992
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- gildingii Kloppenburg sp. nov.
14, 4 Q, front cover
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- glabra Schlechter
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- globulosa Hook f.
3 Q, 10, 1990
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- golamcoiana Kloppenburg sp.
nov.
3 Q, pg. II, 1991
11, 4 Q, front cover,
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- gracilis Schlechter
II, #2. 7 (1989)
3 Q, 12, 1990
- graveolens Kerr
4 Q, 11, 1996
- greenii Kloppenburg sp. nov.
2 Q, 12, 1995
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- griffithii Hook
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- guppyi Oliver
cultivars 10, 2 Q, 4,
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- halconensis Kloppenburg sp.
nov.
3 Q, pg. III, 1990
- hasseltii Miquel
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- heuschkeliana Kloppenburg
3 Q, 10, 1993
3 Q, 11, 1993
1 Q, 7, 1995
11, 4 Q, 13, 1998
12, 2 Q, 8, 1999
14, 4 Q, 6-10, 2001
- hypolasia Schlechter
13, 3 Q, 7-8, 2000
14, 2 Q, 11, 2001
- imbricata Decne
1 Q, 10, 1994
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4 Q, 6, 1996
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- imperialis Lindley
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4 Q, 2, 1991
cultivars 10, 2 Q, 4,
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12, 1 Q, 14, 1999
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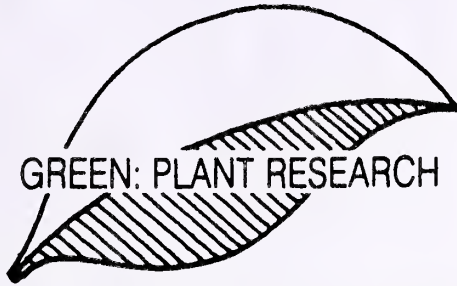
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WC I, #5, 1988
 2 Q, 5, 1994
3 Q, 11, 1995
- incurvula* Schlechter
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14, 3 Q, 7-8, 2001
- ischnopus* Schltr.
2 Q, 5, 1993
- juanguoiana* Kloppenburg sp. nov.
15, 1 Q, front cover 2002
 15, 1 Q, 1-6, 2002
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- kanyakumariana* Henry & Swaminathan
 11, 3 Q, 12, 1998
- kenejiana* Schltr.
 4 Q, 10, 1992
- kerrii*, Craib
VII, #1, 11, 1989
 2 Q, 7, 1992
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- kerrii* (variegated)
 1 Q, front cover, 1996
- keysii* F. M. Bailey
 10, 1 Q, 14, 1997
10, 3 Q, 5, 1997
 10, 3 Q, 6, 1997
 11, 4 Q, 12, 1998
- kingdonwardii* P. T. Lee sp. nov.
 1 Q, 9, 1995
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- kloppenburgii* Green sp. nov.
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- lacunosa* Blume
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 3 Q, 12, 1990
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- lambii* Green sp. nov.
2 Q, front cover 2000
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- lanceolata* Lindley
 1 Q, 12, 1995
 4 Q, 7, 1996
4 Q, 8, 1996
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- lasiantha* Korthals ex Blume
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- latifolia* G. Don
 3 Q, 12, 1990
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- lauterbachii* K. Schumann
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- leucorhoda* Schlechter
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- limoniaca* S. Moore
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- linearis* Wall
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- lobbii* Hooker
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- loheri* Kloppenburg sp. nov.
 3 Q, pg. III, 1991
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- longifolia* Wallich
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- loyceandrewsiana* Green sp. nov.
 4 Q, 3, 1994
4 Q, 4, 1994
 15, 1 Q, 18-19, 2002
- lyi* Leveille
 4 Q, 11, 1996
- macgillivrayi*, F. M. Bailey
 I, #2, 3 1988
 II, #3, 9 1989
 3 Q, 4, 1995
 4 Q, 7, 1996
4 Q, 8, 1996
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 11, 3 Q, 11, 1998
 11, 3 Q, 14, 1998
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 12, 2 Q, 7, 1999
13, 3 Q, 7-8, 2000
- macgregorii* Schlechter
 15, 2 Q, 15, 2002
- macrophylla* Blume
10, 3 Q, 6, 1997
- madulidii* Kloppenburg sp. nov.
 30, IV, 1990
2 Q, 10, 1994
- magnifica* Forster & Liddle
 4 Q, 7, 1996
 12, 2 Q, 6, 1999
13, 3 Q, 7-8, 2000
- megalaster* Warburg
 11, 3 Q, 14, 1998
- meliflua* Merrill subsp. *fraterna* Green subsp. nova
1 Q, front cover, 1995
 1 Q, 2, 1995
14, 3 Q, Front cover 2001
- meliflua* (Blanco) Merrill
1 Q, 9, 1992
 11, 3 Q, 8, 1998
14, 3 Q, front cover 2001
- membranifolia* Costantin
 12, 3 Q, 1999
- meredithii* Green
2 Q, 8, 1994
 12, 2 Q, 7, 1999
 12, 3 Q, 1999
12, 4 Q, 6-7, 1999
 15, 2 Q, 15, 2002
- merrillii* Schlechter
 2 Q, 11, 1991
 2 Q, 2, 1995
2 Q, 3, 1995
 2 Q, 9, 1996
 10, 4 Q, 10, 1997
 12, 3 Q, 12, 1999
 15, 1 Q, 18-19, 2002
 15, 2 Q, 9, 2002
- micrantha* Hook f.
 2 Q, 10, 1992

- 2 Q, 7, 1996
4 Q, 12, 1996
10, 1 Q, 14, 1997
10, 4 Q, 13, 1999
- microphylla Schltr.
10, 1 Q, 14, 1997
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- mindorensis Schlechter
12, 3 Q, 7 1999
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- mindorensis Schltr. (syn. *Hoya erythrostemma* Kerr)
2 Q, 11, 1991
4 Q, 12, 1991
4 Q, front cover, 1993
4 Q, 9, 1993
- minibella (hybrid)
10, 1 Q, 14, 1997
- mitrata Kerr
4 Q, 8, 1991
1 Q, 14, 1994
4 Q, 12, 1996
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- motoskei Teijsm & Binn
4 Q, 16, 1990
- mucronulata Schltr.
2 Q, 2, 1996
- multiflora Blume
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- multiflora var. *variegata*
4 Q, 15, 1996
- myanmarica P. T. Lee sp. nov.
1 Q, 9, 1995
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- nabawanensis Kloppenburg & Wiberg sp. no.
2 Q, 2-6, 2002
- naumannii Schltr.
2 Q, 12, 1992
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- neobudica, Guillaumin
WC II, #3, 8, 1989
4 Q, 7, 1996
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- nicholsoniae F. Muell (IML #37)
3 Q, 4, 1991
- 4 Q, 14, 1996
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cultivars 10, 2 Q, 4, 1997
10, 4 Q, 7, 1997
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15, 2 Q, 9, 2002
- nummularia Decne ex Hook f.
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- nummularioides Costantin (puber)
2 Q, 9, 1992
4 Q, 10, 1993
3 Q., 14, 1996
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- oblanceolata Hooker
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- obovata, Decaisne
WC II, #4, 11, 1989
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4 Q, 1996
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- obscura Elmer ex Burton
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- obtusifolia Wight
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- odetteae Kloppenburg sp. nov.
11, 2 Q, 8-10, 1998
- odorata Schltr.
WC I, #6, 5, 1989
10, 1 Q, 14, 1997
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15, 4 Q, 18-19, 2002
- oligotricha K. Hill
11, 4 Q, 12, 1998
- onychoides P. I. Forster, D. J. Liddle & I. M. Liddle sp. nov.
3 Q, 4, 1995
10, 4 Q, 14, 1997
- orbiculata Wall ex. Wight
2 Q, 2 1996
2 Q, 7, 1996
- oreogena Kerr
4 Q, 11, 1996
- pachyclada Kerr (Perpich-574)
1 Q, 12, 1992
4 Q, 11, 1996
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- padangensis Schltr
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- palawanica Kloppenburg sp. nov.
3 Q, pg. V, 1990
2 Q, 11, 1991
10, 3 Q, 12, 1997
- pallida Lindley
10, 3 Q, 11, 1997
- panchoi Kloppenburg
11, 3 Q, 1, 1998
- parasitica (Roxb.) Wall ex. Wight
var. *hendersonii* Kiew, var. nov.
2 Q, 7, 1996
- parasitica (Roxb.) Wall. ex Wight
1 Q, 3, 1996
4 Q, 5, 1996
cultivars 10, 2 Q, 4, 1997
12, 3 Q, 11, 1997
- parasitica var. *citrina* Ridley
2 Q, 7, 1996
- parviflora Wight
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- parvifolia Schlechter
3 Q, 13, 1990
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4 Q, 11, 1996
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- pauciflora, Wight
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- paziaae Kloppenburg sp. nov.
3 Q, VI, 1990
2 Q, 11, 1991
4 Q, front cover, 1994
4 Q, 2, 1994
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- pentaphlebia Merrill
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2 Q, 11, 1996
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14, 3 Q, 12, 2002
- picta Siebold
12, 4 Q, 11, 1999
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- pimenteliana Kloppenburg sp. nov.
12, 3 Q, 7-12, 1999
14, 2 Q, 8, 2001
- plicata King and Gamble
12, 4 Q, 12, 1999
- polyneura, Hooker, f.
WC I, #6a, 6 1989
4 Q, 16, 1990
3 Q, 3, 1991

- 1 Q, 14, 1995
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- polystachya Blume
3 Q, 12, 1990
2 Q, front cover, 1993
2 Q, 2, 1993
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- pottsii Traill
4 Q, 14, 1996
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- pruinosa Miquel
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- pseudolittoralis Norman
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- puber Costantin
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- puber Blume
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- pubescens Reinecke
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- pubicalyx WC I
#4, 9, 1988
- pubicalyx Merrill
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cultivars 10, 2 Q, 2, 1997
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- pubicalyx cv. "jungle Garden"
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- pubicalyx cv. monstrose
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- pubicalyx var. "Grey Lady"
4 Q, 11, 1990
- pubicalyx var. Chimera
3 Q, 12-13 1991
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- pubicalyx "pink silver"
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- pulchella Schlechter
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- purpureofusca Hooker
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- quinquinervia Warburg
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- quisumbingii Kloppenburg sp. nov.
4 Q, pg. III, 1992
- recurvula Kloppenburg sp. nov.
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- revoluta Wight
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- rigida Kerr
4 Q, 11, 1996
- rizaliana Kloppenburg sp. nov.
3 Q, pg. IV, 1991
- rumphii Blume
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- salweenica Tsiang & Li
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- scortechinii King & Gamble
2 Q, 9, 1994
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- serpens, Hooker, f.
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- shephardii Short ex Hooker
4 Q, 3, 1995
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- siamica Craib
4 Q, 11, 1996
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- siariae Kloppenburg sp. nov.
3 Q, Front Cover 2002
3 Q, 1-4, 2002
- sipitangensis Kloppenburg & Wiberg sp. nov.
3 Q, 4-7, 2002
- solaniiflora Schlechter
12, 2 Q, 7, 1999
- spartioides (Kuntz) Kloppenburg
Genus change
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- sp. BSI- 1
- WC 1, #3, 4, 1988
15, 2 Q, 18-19, 2002
- sp. "Borneo Beauty"
12, 4 Q, 6, 9, 1999
- sp. "Borneo 85-1981"
4 Q, 9, 1994
- sp. Cebu
2 Q, 2, 1995
- sp. DAV 816
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- sp. from Palawan
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- sp. "Germany"
12, 4 Q, 6, 1999
- sp. "Green's Gaudy Giant"
3 Q, front cover, 1993
3 Q, 3, 1993
- sp. IML #37
3 Q, 4, 1991
- sp. IML #232
3 Q, 10, 1991
- sp. IML #454
1 Q, 3, 1991
- sp. IML 557 Sabah
15, 2 Q, 18-19, 2002
- sp. "India #1"
4 Q, 16, 1990
- sp. in the Eriostemma section
1 Q, 10, 1995
- sp. J. P. Ceram
4 Q, 14, 1996
- sp. "New Guinea White"
4 Q, 4, 1990
- sp. Perpich-574
1 Q, 12, 1992
- sp. Philippine #3
4 Q, 14, 1996
- sp. "Tanna"
3 Q, 12, 1990
- sp. "Truncate"
12, 4 Q, 6, 9, 1999
- sp. "truncate leaved species from Borneo"
10, 4 Q, 12, 1997
- sp. #557
2 Q, 12, 1991
2 Q, front cover, 1991
- sp. #CMF-8
1 Q, front cover 1993
1 Q, 7, 1993
- sp. #F-428
VI, 6A, 2, 1989
3 Q, 13, 1990
- sp. #F-484
4 Q, 10, 1990
- sp. (N1)
4 Q, 12, 1996
- sp. (N2)

- 4 Q, 12, 1996
- sp. (NW) 4 Q, 12, 1996
- sp. (S) 4 Q, 12, 1996
- sp. 94027 (Green) **2 Q, front cover, 1995**
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- sp. USDA #354244 4 Q, 4, 1990
- sp. WMZ **4 Q, VII, 1990**
4 Q, IX, 1990
- sp. Sabah 3 Q., 14, 1996
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13, 3 Q, 7-8, 2000
- subquintuplinervis Miquel 4 Q, 11, 1996
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- sussuela Merrill **II, #6, 8, 1990**
4 Q, 3, 1996
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- teretifolia Griffith ex Hooker 12, 3 Q, 6, 1999
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- tsangii Burton **WC I, 6A, 13, 1989**
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- vitellina Blume 1 Q, 6, 1993
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14, 3 Q, 1, 2001
- vitellinioides Bakh. f. 12, 4 Q, 6, 1999
15, 2 Q, 9, 2002
- wibergiae Kloppenburg sp. nov.
14, 1 Q, 5-8, 2001
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as H. sp. from **Palawan,**
- wayetii Kloppenburg sp. nov.
2 Q, 10, 1993
10, 3 Q, 15, 1997
11, 4 Q, 13, 1998
- waymaniae Kloppenburg sp. nov.
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11, 3 Q, 1, 1998
- whistlerii Kloppenburg sp. nov.
1 Q, 7-10, 2002
- zollingeriana Miquel 2 Q, 2, 1998
- X tuafanua Whistler & Kloppenburg hyb. nova
3 Q, 13-17, 2002
- Madangia**
- inflata Forster, Liddle & Liddle 11, 1 Q, 4-9 1998

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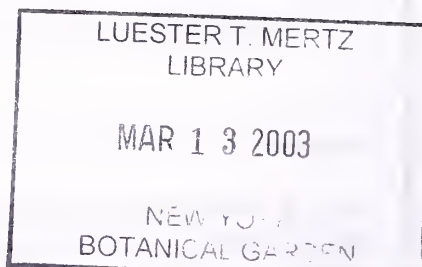
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Hoya fetuana Kloppenburg
Photo by Dr. Art Whistler

INTERNATIONAL HOYA ASSOCIATION

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Our Cover Story

A New Samoan Hoya Species

Hoya fetuana Kloppenburg species nova. Typus # W 2865 (UHAW). *Hoya chlorantha* Rechinger affinis sed folia 5.3-5.5 cm. longis vs. 10 cm. longis; pedunculi 3 cm. longis vs. 5-6 cm. longis et pagina interiora corollae marginatus pubescentus non intus puberules, differt. Speciem haec novem per Fetu Tamaleaa dedicamus.

Like *Hoya chlorantha* Rechinger but differs in the foliage is 5.3-5.5 cm. long versus 10 cm. long and the peduncle is 3 cm. long versus 5-6 cm. long and the interior surface of the corolla is pubescent margined (centrally glabrous) not inside puberulous.

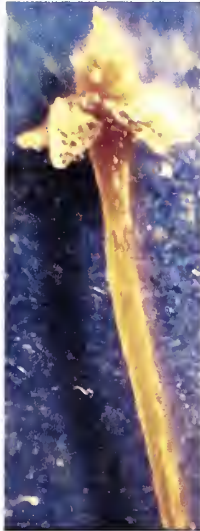
Description of the Type Herbarium sheet W 2765:

* *Hoya betchei* (Schltr.) Whistler. 5 July 1975. Tutuila, Samoa. Vine with milky juice and dark red flowers, climbing in a tree on the Alava Ridge; elevation 500 m. 1 branched stem + 1 intertwining 2 pairs of leaves 1 small pair developing, 1 peduncle, 7 pedicels, 1 flower separate. Envelope 2 flowers 1 pedicel. Leaves short elliptic attenuate 5.3 - 5.5 cm. long, thin but possibly a little fleshy, apex subacute, base rounded 1.2 - 2 cm. at the widest near the middle; midrib narrow, visible below, pinnate netted nerves all the way to the apex. Petioles fine 0.5 cm. long, grooved above. Internodes 6 - 10.2 cm. long, terete, glabrous, 0.12 cm. in diameter, nodes slightly enlarged. Peduncle 1/2 diameter of stem, a little longer than pedicels ca. 3 cm., terete, glabrous, first bloom from fine bracteoles. Pedicels filiform, terete, glabrous, 3 cm. long. Calyx small. Corolla glabrous outside, cut more than half way, marginally pubescent in a narrow border otherwise glabrous. Corona glabrous, narrowly elliptic, outer apex rounded, almost reaching the corolla sinus; dorsal concave with slight keel.

Note the type sheet was identified as *Hoya betchei* (Schltr.) Whistler. This new species differs from that species by not having a campanulate corolla, having the inner corolla surface pubescent margined not puberulous all over, with the leaves shorter and more narrow, with petioles 1/2 as long and with smaller flowers and shorter pedicels. The Pollinarium is very different, namely the retinaculum which is large not minute as in *H. betchei*. It is the opinion, at the present time, of Dr. Art Whistler that *Hoya chlorantha* Rechinger and *Hoya betchei* (Schltr.) Whistler are synonymous. I do not agree with this determination, even though the pedicels and peduncles are of the same length. The two species have been placed in different Sections, however, placing them there does not negate error. The former species is a flat flower 1.7-2.0 cm. in diameter, with 15-25 flowers in a cluster. The latter is a campanulate flower 2.4 cm. in diameter with few flowers per cluster. In addition the calyx in the former is ciliate not glabrous and, oblong lanceolate not ovate-obtuse. The peduncles on *Hoya chlorantha* differ in being described as deciduous which may not be a stable characteristic (this needs more study). The

pollinia on *Hoya betchei* are 3.5 times longer than the retinaculum (overall length). This new species less than 2.6 times longer.

Photomicrographs and data from the flower from the herbarium sheet W 2765:

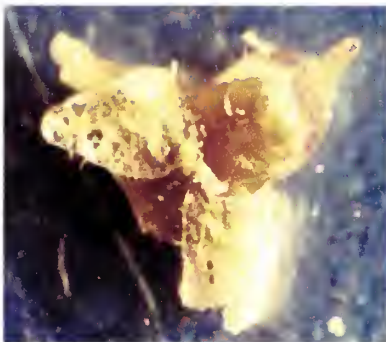


Pedicel, calyx and ovaries side view enlarged about 8X.

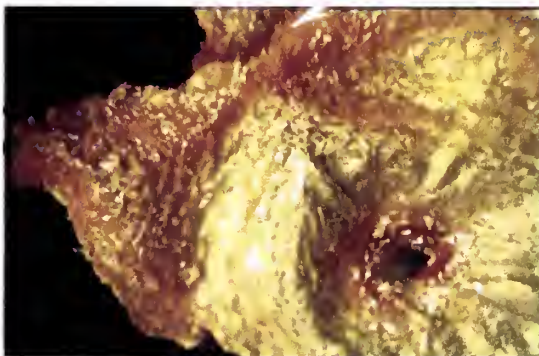
Pedicle curved, terete, glabrous, 3.1 cm. long, translucent 0.06 cm. in diameter.

Calyx glabrous, ligules present, an occasional cilia, 0.17 cm. long, 0.16 cm. at the widest, apex narrowly obtuse, overlap ca. 1/4.

Ovaries shortly domed, 0.10 cm. tall and base pair 0.10 cm. wide, glabrous.



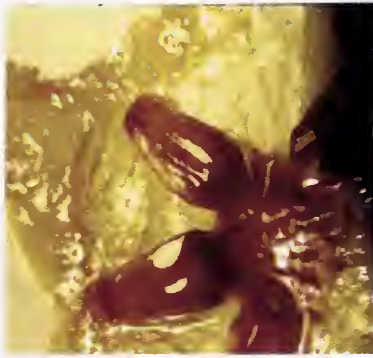
Top view of the calyx and ovaries enlarged about 16X, rather membranous, ovaries very stubby; with an occasional cilia.



Corolla outside enlarged about 8X, surface is glabrous and granulose, lobes deeply cut, apex acute, collar a little thickened.

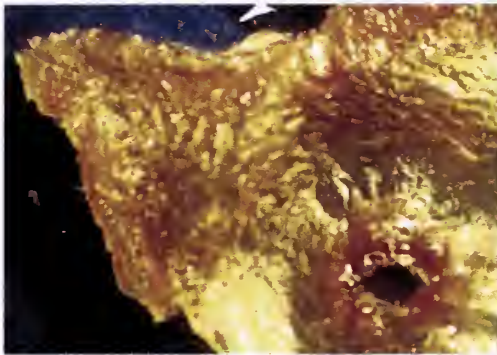
Sinus - sinus	0.80 cm.
Sinus - center	0.43 cm.
Sinus - apex	0.65 cm.
Apex - center	0.95 cm.
Widest	0.84 cm.

Flower flattened is 1.90 cm. in diameter.

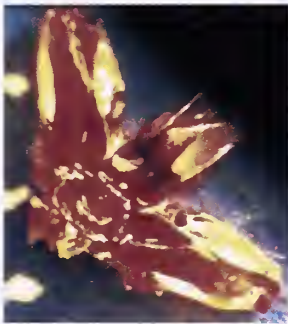


Inside view of the flower enlarged about 8X. Corolla surface is marginately pubescent and covering most of the lobe otherwise glabrous. Corona center raised with inner lobes spatulate touching in the center, glabrous. Outer apex emarginate, rounded.

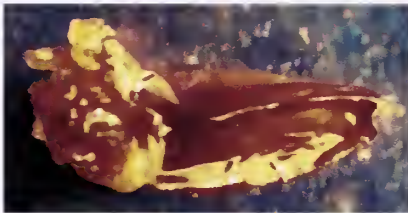
Apex - apex	0.40 cm.
Widest	0.15 cm.
Anther wing - aw.	0.20 cm.
Aw. - center	0.20 cm.
Retinaculum - ret.	0.10 cm.
Ret. - center	0.08 cm.



Corolla inside view with the corona removed enlarged about 8X. Note the pubescent on the lobes but not in the central region.



Lower side of the corona with 2 lobes removed, enlarged about 8X. Lobes are grooved all the way to the short central column. Lower side lobes are rather flat and extend to the outer apex. Anther wings are narrow and protrude.



Coronal scale side view enlarged about 16X. Inner lobe raised, dorsal almost horizontal, cupped a little with a domed ridge down the center; anther wings fairly deeply curved.



Top view of the corona showing the Styler crown enlarged about 6X. Crown in a mealy dome.

Styler crown.



Pollinarium enlarged about 165X.

The retinaculum is skewed a little so there is the normal flat on view below. In this photo the dome shaped caudicle bulb is plainly visible at the base end of the pollinium, supported by the translator arm. In this view it is evident that the shoulders of the retinaculum curve backward (Right side). The pollinium is a little distorted on the lower right side.

Pollinium
 length 0.65 mm.
 widest 0.23 mm.

Retinaculum
 length 0.25 mm.
 shoulders 0.18 mm.
 hip 0.08 mm.
 waist 0.14 mm.
 extensions 0.08 mm.

Translators
 length 0.15 mm.
 depth 0.03 mm.

Caudicle bulb diam. 0.08 mm.



Same enlargement as above.

Overall length 0.33 mm. caudical relatively small.

SOME INTERESTING LEAF ADAPTATIONS by Ted Green

Maybe someone can explain it: Why have some species of *Hoya* and *Dischidias* developed specialized leaves or a leaf arrangement to take advantage of a symbiotic relationship with ants or to capture water? Notable among these are ***Hoya mitrata***, ***Hoya darwinii***, ***Dischidia vidallii***, ***Dischidia major*** and ***Hoya lambii***. This is a very interesting subject that is being studied at the university level.

H. mitrata Kerr is the vine from tropical Thailand to Eastern Malaysia that lives with a close association (symbiosis) with ants. The ants build a nest within the specialized leaves that are curled into a ball. Within this nest, are roots that pick up the nutrients from the dead ant bodies and other debris. The debris also helps to conserve water and carry the plant through dry spells.

Normally, there are 2 forms of leaves on ***H. mitrata*** – the ones produced on the climbing stem and those produced at certain clustered nodes – that produce a weird “cabbage” – 3 to 8 inches in diameter. The first leaf form is long, ovate with a sharp tip and nearly flat; whereas, the cabbage leaves ones are nearly round and inwardly cupped to form a ball.

The growth is such that it produces long vines, in spurts, to about 6 feet, and then produces a “cabbage” of clumped leaves, then another spurt of vine, etc.

The wild plants that I have seen are usually in semi-shady to shady areas, with acidic soil conditions – one, in Sabah, was with standing water, hummocks of moss amid small trees. By contrast, I have noticed that *H. mitrata* and *H. darwinii* seldom create “cabbages” if regularly fertilized and grown in good light.

Dischidia major (syn. *rafflesiana*) Merrill, in all of its forms, is found from Australia to Thailand and is close to being a true xerophyte for it inhabits open, dry areas, such as the sparse *Casuarina* trees of the seashore. The swollen leaves become hard and dry and when shaken, rattle. In Australia they are called “Rattle Skulls”, because of the sound they make when shaken.

In contrast to the other ant dischidias and hoyas, the bullate leaves of *D. major* outnumber the flat, typical leaves. The bullate leaf has an opening at the bottom to allow ants and moisture to enter and when opened up reveals a root system that takes advantage of nutrients from the dead ants and moisture that accumulate there.

Hoya darwinii, is a species from the Philippines and possibly Northern Sabah with growth a lot like *H. mitrata* but not organized into spurts. The modified leaves may occur anywhere along the stems and not as commonly as the *H. mitrata*. *H. darwinii* readily roots along the stems, in contrast to *mitrata* that roots only at a “cabbage”.

I have not found *H. darwinii* growing wild (though I have tried to find it on Palawan, exactly where it was collected by others) but by its general growth and leaf texture I assume that it comes from drier areas than *H. mitrata*. I have noticed that *H. darwinii* produces more roots (and tenacious ones!) at the cabbage than *H. mitrata*.

Dischidia vidallii (syn *pectenoides*) Hortus, is from the Philippines and is said to grow upon bamboo - though I have search many bamboo groves, have never found it growing wild. It seems that it would be easy to spot because of its brilliant crimson flowers.

This is the species that has been grown in great quantity in Holland, as novelty house-plant, and is the only “commercial” *Dischidia* that I know of. It was there, at the Cornelius Bak Nursery, that I noticed that even though the plants were being grown under controlled conditions (no insects to pollinate them) tiny 2” plants had produced bullate leaves. So, this answers the question: Does the plant produce the modified leaf to attract ants or does the presence of ants (formic acid?) cause the leaf modification? The answer: They are produced without ants!

Hoya lambii is a odd species from Eastern Malaysia (Sabah) that takes advantage of a leaf arrangement that makes a “funnel” and thereby collects debris at the bottom, within the debris roots form, ants build a nest and water collects, letting the plant take advantage of the ant bodies for fertilization and moisture for growth.

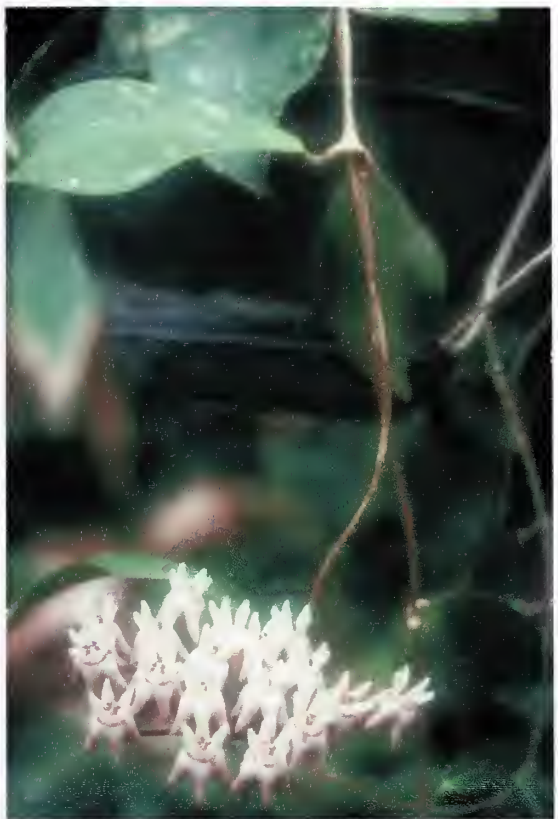
H. lambii is a plant from areas of moderate shade and high moisture.

Summary

This group of adaptive species is very interesting but if you grow your plants inside and use insecticides you will not see the normal relation between them and ants – of course, the exceptions are *D. vidallii* and *D. major*. Try them anyway for they are definitely a good conversation piece.



H. darwinii, normal leaves without cabbage



Normal growth with flowers but without cabbage leaves



Normal leaves of H. mitrata



Cabbage leaves of H. mitrata (notice the new leaf not curved yet)



Normal and Bullate leaves of *D. vidalii*



Variegated form of *D. vidalii*



Thousands of seedling *D. vidalii*, at C. Bak Nsy.



4" pots of *D. vidalii* at C. Bak Nsy.



Normal and bullate leaves of 2 forms of *D. major*



Funnel-arranged leaves of *H. lambii*, showing debris at base of leaves

She Won, She Won!

Crystal Swartzfager a happy young lady, congratulations !!!

In mid November 2002 I received an E-mail from a 15 year old student in Florida. She was doing a science fair project on *Hoya carnosa* she believed to have pest resistance.

Dear Mr. Kloppenburg, This is the abstract of my *Hoya carnosa* project.

The purpose of this project is to promote genetic variation in the *Hoya carnosa* species through sexual reproduction, while identifying a unique trait in the *Hoya carnosa* that will give the breeding program direction. Can a *Hoya carnosa* be sexually reproduced and maintained in Florida? If so, will the pest resistant gene be passed to the F1 generation? *Hoya carnosa* can be sexually reproduced and maintained in Florida therefore pest resistance could be the factor responsible for this success and the pest resistance passed on to the F1 generation. First *Hoya carnosa* flower reproductive organs were positively identified under a microscope. Next the insect population carried out pollination naturally. After 2-3 weeks the matured pods burst and the seeds were collected in a net pod bag. The seeds were placed on soil in an 8 inch pot, where they germinated at the following rates: set 1- 90%, set 2- 100%, set 3- 80%. Though germination rates were high set 1-22 plants, set 2-48 plants, and set 3-20 plants were tested. 92 plants were exposed, for five-weeks, to mealybugs and scale. Daily observation showed no infestation of mealybugs or scale.

Conclusive evidence was derived from this experiment during this specific exposure to mealy bug and scale. The F1 generation showed evidence of pest resistance. Subsequent periods of exposure will be carried out over the next three years. Continued monitoring of the three sets of plants and exposure to mealybug and scale is required to prove that pest resistance is indeed a trait of the F1 generation.

Certainly research suggests that specific genetic traits, pest resistance, can be passed onto offspring, and these traits should be used to direct the breeding program. Genetic variation through sexual reproduction ensures conservation of *Hoya carnososa*.

Would you like a picture of my project board?

Mr. Kloppenburg,

This is Crystal. I won, I won. There were 101 science fair projects and I won over all of them. I won my category Botany and I won over all the others. I was worried that others would not see the importance of my project but they did and they thought it was great. I just wanted you to know that and with out you I would not be saying I won. The information you sent me was why I could speak so freely about my project and what other scientists (botanists) were doing around the world. I did have a question I couldn't answer. How many pods are on the plants in their native habitat. Also why don't botanists or do botanists harvest seed when they harvest part of the plant? I have moved all the little plants up to the 4 inch hanging pots. (68plants) survived out of 150 most were lost when the dampening off happened (36) and the others were broken tragically in heavy rain. My mom and I could have cried. My next three sets will be better protected from rain and all the little silks will be off of the seed. I will continue to monitor and gather data on the plants now growing. Next year I will be attempting to artificially pollinate. Ok don't laugh I said attempt and I will be trying to identify the natural pollinator by setting out FDA traps....our Greenhouse inspector said he would get some. I think I will also put out fly tape to see what I catch near the flower. I don't want to catch too many because I want to have the seed. I will let you know how I do at the Regional Science Fair Competition.

Thank you

Crystal in Florida

Please Note: In my estimation it is youth, like Crystal, who will lead us into the future. We need more young people in our Society. I would encourage all members to do their best to encourage young people you know to share your interest in hoyas, to lead the way into the future..... your editor.....Dale Kloppenburg.

Follow up e-mail Feb 7, 20003:

Mr. Kloppenburg! I won, I won! I am going to Florida State Science Fair and I was chosen to represent Sumter County at the International Science and Engineering Fair!!! I am so excited. I wanted you to know.

Crystal Swartzfager

Understanding Hoyas

By Dale Kloppenburg

The hoya corona (continued)-- its other parts.

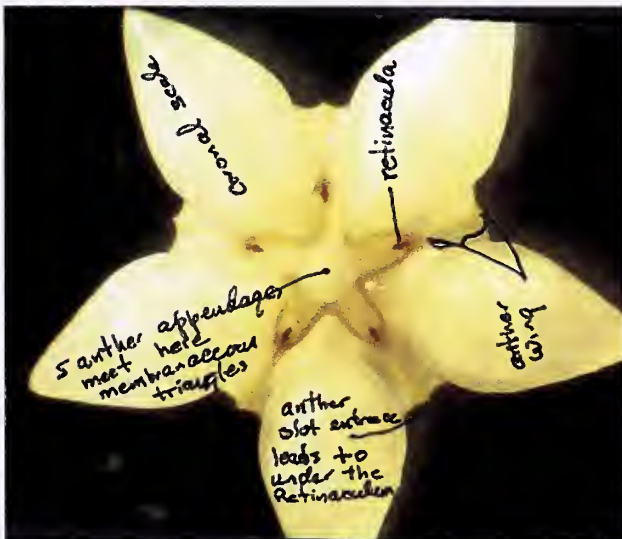
Let's review a little: Hoyas have one of the most complicated flowers of all the Dicots. They have evolved to a peak of complexity and dare say to beauty also!

We see all the usual floral parts but greatly restructured. There are the 5 sepals (**calyx**), 5 petals (**corolla**), the 5 stamens (**corona**) and 2 carpels (**ovaries** with ovules), 5-5-5-2. Occasionally we find a mutant form with 4 stamens. The organs are very variable in size, color, texture, and form that makes for highly differentiated flower forms, this is especially true of the corona. It is the complicated coronal system, which allows for nectar flow. Further complex evolutionary organization has led to the formation of the **gynostegium** and the **pollinaria**.

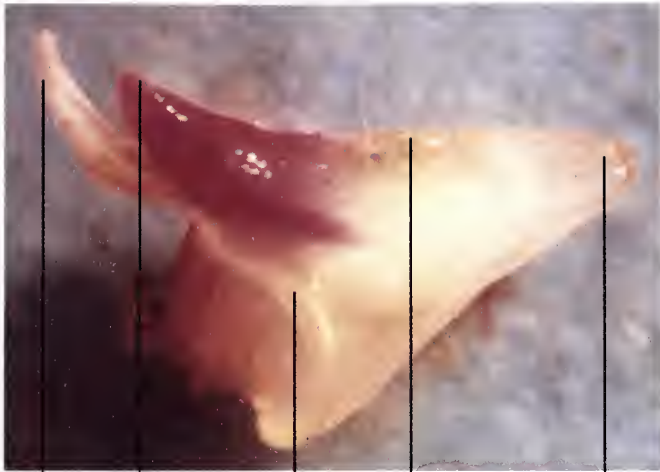
Neighboring coronal scales have led to the formation of a complex mechanism for pollination, the guide rails (**anther wings**) that form a channel leading to the stigmatic receptive surface on the lower corner edge of the central pentagonal **stylar table**. All these parts are joined at various points, sepals are connected to the corollas and the corona is connected to the corolla in its central region. To study them you must pull them apart. The corona at its central part is fused to the central column that surrounds the carpels (ovaries) that are fused loosely at their apex to material, which above and in the flower center forms a pentagonal stylar table. The coronal inner lobes and the thin **anthers** cover this central region so it is not visible without probing. Remember each anther has two pockets, which hold **pollinia**.

The style is the stalk that supports the stigma, in hoyas the styles are fused forming a complex 5 cornered table with a raised center. Each coronal scale is attached in part to the edge of this table, 5 edges 5 coronal scales. At each of the 5 corners you can easily see (in larger hoyas flowers) the dark colored **retinaculum** (they are secreted by the stigma) and below each is the receptive area of the stigma. Finally there has evolved between each coronal scale along its adjacent lower sides the anther wings that form a channel leading to the stigmatic receptive area, where pollination can occur.

Now some labeled photos to try and make the above understandable.

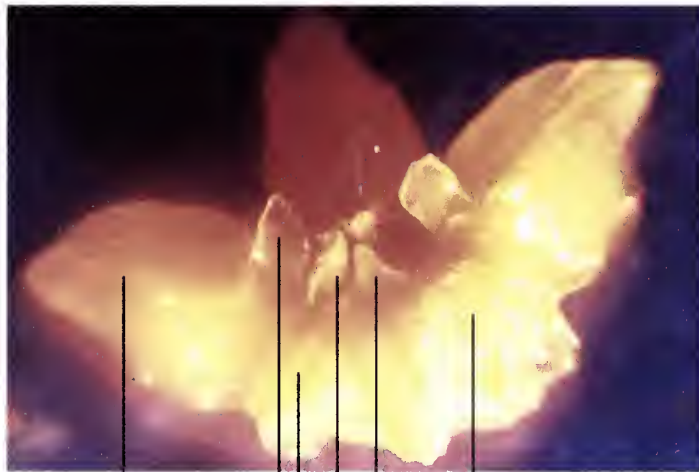


Top view of a corona labeled. There are 5 coronal scales, 5 anthers meeting in the flower center, 5 dark retinacula between each scale and just above the stigmatic receptive area and 5 anther wings forming channels leading to the stigmatic receptive area.



A side view of an individual coronal scale. Inner lobe is here red and raised toward the flower center, extending beyond it is the membranous anther. Dorsal appears to have a raised ridge down the center and the outer apex is blunt (obtuse). Below centrally is one side of an anther wing curved, cartilaginous (Scythe shaped).

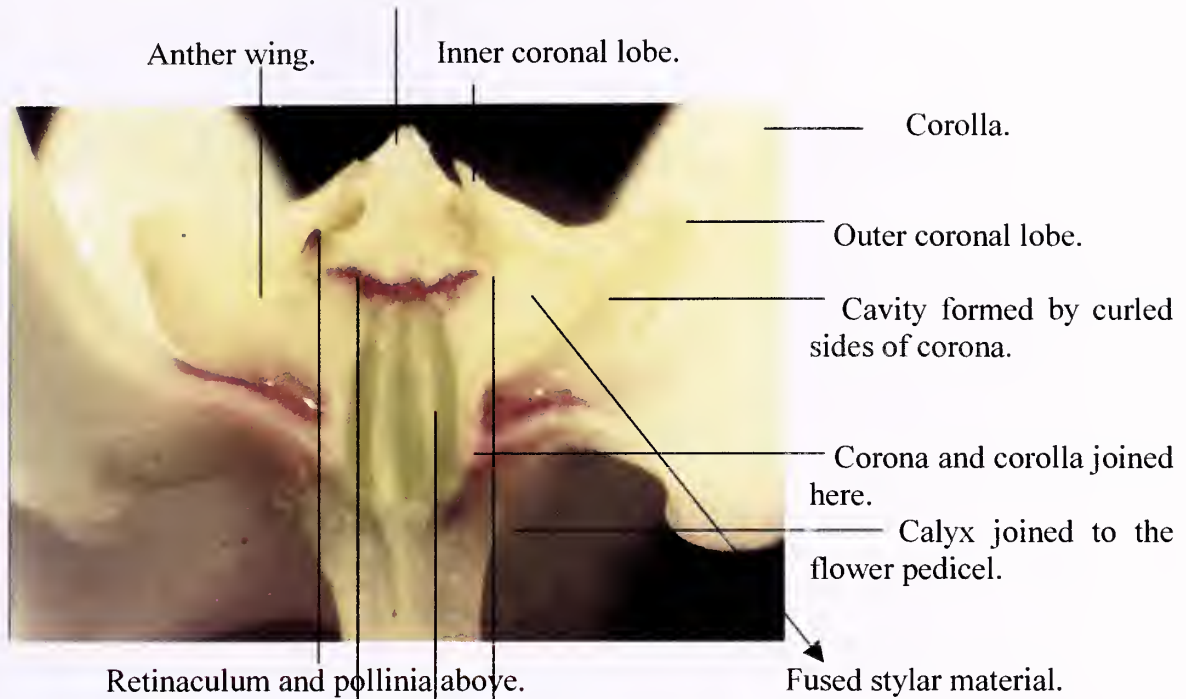
Anther
 Inner lobe apex
 Anther wing
 Dorsal (back)
 Outer lobe apex



View showing the stylar table. Two coronal scales have been removed to expose the domed raised style center. Here the anthers are shorter than the inner coronal lobes. The edge of this pentagonal table is exposed where the 2 scales were removed, front center and two darker yellow anther wings.

Coronal scale
 Center of stylar table
 Anther wing forming slot
 One of 5 sides of pentagonal crown where a coronal scale and anther are attached
 Anther
 Inner coronal lobe

Raised stylar center covered by anthers.



Spongy tissue leading from stigma to ovaries.

Two ovaries with light green placentas and attached ovules.

Stigmatic receptive area at edge and under corner of the styler table, the retinaculum would be just above and is secreted by the split stigma's dorsal surface.

Photo Gallery Descriptions

Hoya australis R. Br. Top photo. Here we have a white slightly cupped flower with usually some clear red coloration under the crown. It is an easy plant to grow but in some areas difficult to bloom, In happy environments it is a prolific bloomer. It adheres to its southern hemisphere origin, in that it wants to bloom in the early spring (late fall in the northern hemisphere). Herein we find some difficulties as if it experiences cold weather at this time it will drop most of its buds. In warm areas or if protected it will outdo itself in rewarding you with beautiful clusters of fragrant flowers. Photo by DK.

Hoya merrillii Schlechter. 2nd row left photo. A waxy yellow flower with large waxy deep green beautiful foliage. A compact grower that loves a rich loose soil mix and lots of warmth and water. This makes a beautiful hanging plant, both compact and attractive and easy to grow. A prolific bloomer, easy to grow, always attractive even when out of bloom.

Hoya bella Hooker. Center. This has been called an amethyst in a pure white snowy field. Beautiful flowers. A native of India, first discovered in 1847 and taken to England where it bloomed in 1848. This species central corona is a blocky crown. It is fairly easy for most people to grow and flower. The plant is a little weak and in the past has been grafted to stronger growing plants like *Hoya carnosa*. If not in your collection, this is one you should surely add. Photo by Ann Wayman.

Hoya neobudica Guillaumin. 2nd row right photo A native to the Vanuatu Islands in the South Pacific ocean. Formerly a British and French condominium protectorate. Described in the Linnean Society Journal, 1937. Very little has been written about this hoyo. A beautiful and unusual colored flower, waxy and pleasingly soft creamy pink. Not in many collections but well worth acquiring. There is some doubt in my mind that this is the correct species since the type description says the corolla segments are lanceolate, apex acute, and ours is surely broadly ovate. In addition the flowers are listed as yellow.

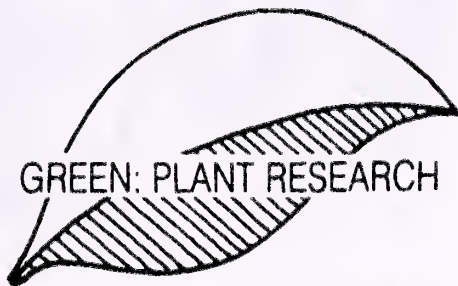
Hoya chlorantha Rechinger. Bottom photo. A soft green fuzzy flower from the Samoan Islands. This species has been lumped together with *Hoya betchei* (Schltr.) Whistler, but I feel this is incorrect. Here we have flat flower as opposed to a campanulate one. *Hoya chlorantha*, like *Hoya camphorifolia* is supposed to have a deciduous peduncle bit. Ted Green informs me that his plant has a persistent peduncle. This is a beautiful species with nice clean foliage, loves the warmth and humidity of tropical conditions. Get this novel colored species for a complete collection. The clusters are made up of 15-25 flowers on a fairly long peduncle. Just a super nice species. Photo by Ted Green.

For the two photos without credits, I do not know who the photographers were.

Hoya Photo Gallery



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Hoya nyhuusiae Kloppenburg
Photo by Astrid Boström

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Editor's e-mail address: rdk03@cvip.net

Our Cover Story

Hoya nyhuusiae Kloppenburg

Hoya nyhuusiae Kloppenburg sp. nov. *Hoya patella* Schlechter affinis sed corollae et coronae albus non "hell-rosenrot mit karminroter Korona"; pedicellis et calycis extra granulose et sparsim ciliata non glabris. Retinaculum amplius non minutissimum. Typus (UC) Torill Nyhuus #2003 ex hort. Torill Nyhuus, Sweden. From Mt. Kinabalu, Sabah, Malaysia.

Related to *Hoya patella* Schlechter but the corolla and corona are white not rose red and carmine-red; the calyx and pedicel are granulose with sparse ciliation and not glabrous as with Schlechter's species. The retinaculum of the pollinarium is here large not minute. The corolla is campanulate and the inner coronal lobes are similar to *Hoya patella* Schlechter, which has been placed in the Sect. *Physostelma* (Wight) Blume. This new species has the lower surface of the corona extending beyond the outer apex in a manner similar to the Section *Acanthostemma* (Blume) Kloppenburg bilobes, giving the outer apex an emarginate ending.

Critical Measurements:

Leaves: paired, elliptic, glabrous, netted nervation, 4 - 7 cm. long, 2 -3 cm. wide at maturity, deep green above lighter below; midrib extended on lower surface. Petioles curved, grooved above 1 - 1 ½ cm. long.

Pedicel: curved, terete, with a few scattered hair cells, with granulose lenticellar bumps, very fine lengthwise sulcations, ca. 2.2 cm. long and 0.38 cm. in diameter.

Calyx: outside granulose, lobes small, outspread, ciliate, inside glabrous and waxy in appearance. Sepals 0.17 cm. long, 0.15 cm. at broadest, with small basal overlap, apex obtuse.

Ovaries: short columnar shaped, flat topped, glabrous, white, 0.20 cm. tall and the base of the pair 0.18 cm. wide.

Corolla: campanulate (bowl shaped) apex of the lobes flared outward, outside glabrous, inside beautifully straight single celled white ciliated pubescence even to the apex, hairs shorter in the bowl also more dense in fairly wide lines from under the corona radiating outward from under the coronal lobes toward the sinuses. Color white.

Sinus to sinus	1.02 cm.
Sinus to apex	0.80 cm.
Sinus to center	0.95 natural.
Center to apex	1.25 cm. natural, 1.70 cm. flattened.
Collar	thickened with cilia continuous from corolla inner surface.

Corona: relatively small for the size of the corolla, outer apices do not come near the corolla sinuses. Inner lobes are narrow finger like projections, somewhat rounded but nevertheless spatulate, raised in an arch like configuration, apex somewhat acute, do not reach the center so the whole anther apical area is exposed. This narrow inner lobe configuration leaves considerably distance between lobes so the retinacula and anther wings are well exposed. Outer lobes slope slightly downward, apices obtuse, lower side openly channeled, surface finely sulcate, with a curved shelf-like side along the anther groove projecting outward to form an emarginate apex beyond the outer lobe apex. Anther wings strict and narrow, well defined projecting only slightly beyond the surrounding coronal material. The column thickened and outside densely hirsute.

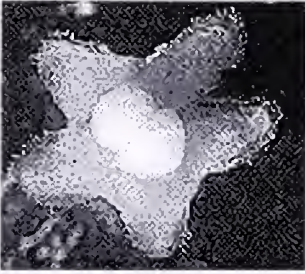
Apex to apex	0.30 cm.
Apex to center	0.42 cm.
Widest (top)	0.23 cm.
Ret. to ret.	0.15 cm.
Ret. to center	0.15 cm.
Ret to anther wing	0.10 cm.

Pollinarium: pollinia short and broad with rounded apices. Pellucid outer edge from outer apex to even with inner apex; adjacent vacuole narrow at top widening toward inner apex. Translators curved, rather short, widest as they leave the retinaculum, thinning outward. Caudicles bulbous, well defined, clear. Retinaculum broad, more than ½ the length of the pollinia, a domed head with winged shoulders, waist narrower, hip area broad with extensions widely separated.

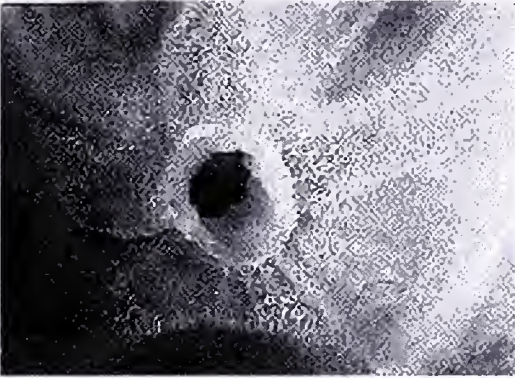
Pollinia	0.29 mm. long, widest 0.13 mm.
Retinaculum	0.11 mm. long, excluding extensions (0/03 mm.); head 0.07 mm. with 0.01 mm. projections, waist 0.04 mm. wide, hip 0.07 mm. wide.
Translators	0.06 mm. long, curved upward semi-opaque.
Caudicles	0.05 mm. in diameter, clear.



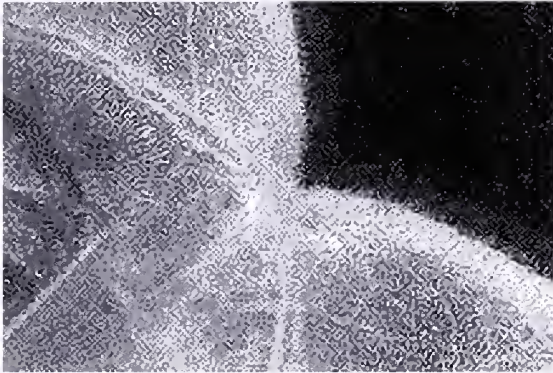
A side view of the pedicel, calyx and ovaries (enlarged). The pedicel is straight, round, with a few hair cells and enlarged below the calyx. The sepals are ciliate, relatively short and glabrous and smooth inside. The paired ovaries are columnar with a flat slightly sunken apex.



Top view of the calyx (enlarged). The sepal apices are obtuse, edges ciliate. There is about a $\frac{1}{4}$ overlap and ligules are present at the sinuses.



Central view of the inside of the corolla with the corona removed (enlarged). This surface is unevenly covered with a pubescence. Note the radiating paths of heavier pubescence that flow from the center toward the sinuses from under the coronal lobes. The collar is thickened.



The sinus area, inside corolla surface (enlarged). Note the heavily and prominently veined surface. The pubescence might be called hirsute since the cells are so long.



Inside view of the corolla apex (enlarged). Pubescence covers all of the lobe to the apex, which folds outward from the cupped corolla.



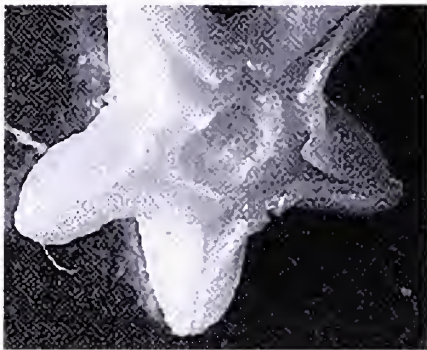
Top view of the corona, inside the corolla. Here again the unusual corolla venation is clear (enlarged). This is a white flower.



A skewed view of the corona above the cupped corolla. (enlarged). Note the unusual inner lobe formation and positioning, the apex does not reach the center but is curved up over the anther bases. The enhanced pubescent trail leading from under the coronal lobes is visible here. The outer lobes are swollen, curve down slightly from the raised center. Anther wings are thick.



Top view of the corona (enlarged). The emarginate apex of the outer coronal lobes are evident as a result of rudimentary side lobes reaching the apex, in some instances these lobes curve over each other at the apex.



Bottom view of the corona (enlarged). The lobes are openly channeled only as far as the sinuses. The curved edges forming the groove are unusually thick, their surfaces are finely sulcate.

All the above photos were taken with a 10X microscope lens (which yields 16X with camera mounted). They were then scanned and reduced 50%.



The pollinarium of this species is relatively small. Enlarged about 165X and then reduced 50% in scanning. The pollinia are broad and rounded at both ends. See the critical measurements above for details. The one thing I would have you note is the small horned projections from the head area of the retinacula which are unusual. The translators are narrow and the caudicles clear and bulbous.



Photo by Astrid Boström, Sweden
Photo sponsored by: Frances Wilkes, San Diego, California



Photo by Astrid Boström, Sweden



Photo by Astrid Boström, Sweden

Photo sponsored by Los Angeles Cactus & Succulent Society, Northridge, California

The World of Hoya Societies

The first in a series depicting Hoya Societies. See the next issue of Fraterna for more.

Color Photo sponsored by: Jean Costanzo, Encinitas, CA

HOYATELEGRAFEN

Nr 1, 2003

Årgång 10



Hoya salweenica

foto Sylvia Soldefore

HOYATELEGRAFEN is the publication of the Swedish Hoya Society. It is published 4 times a year. The above issue is 5.75" x 8.25" on heavy glossy white paper stock, beautifully done. The cover and inner page as well as the inside and outside of the back contains color pictures. In addition the four center pages are in color.

The editor and web editor is Torill Nyhuus torillnyhuus@bredband.net. Others involved are Eva-Karin Wiberg, Birgitta Forsberg, Carin Wahlström, Astrid Boström, Arne Gustafsson, Birgitta Hellström, Thomas Jansson, Maria Blom and Lena Molander.

Go to their Website: <http://SwedishHoyaSociety.com>

This issue covers *Hoya pentaphlebia*, *Hoya quinquinervia*, *Hoya plicata*, *Hoya salweenica* and more. There are 17 color photos and an interesting story about a collecting trip to Sumatra. An excellent and interesting publication in Swedish.

There is a set of color pictures in the center fold by Torill Nyhuus showing clearly the differences in *Hoya lanceolata* and *Hoya bella* even though these two species have been (in my opinion) erroneously placed into synonymy. Their crowns and corolla are entirely different.



MY 5 FAVORITE HOYAS by Ted Green

Chuck and Jerry wanted me to write about my 5 favorite hoyas, which isn't easy for I like a lot more than that. It is like trying to pick a favorite child. They know that I talk too much so they wanted this limited to 100 or less pages!

Most of the hoyas that I care the most for are sentimental for I remember exactly where I collected them – in a sun-lit bit of forest or sliding down a steep cliff – but there are a few that I got from a friend. For instance:

ERIOSTEMMA (HOYA) GUPPYI was the first large flowered hoyas I had ever found or seen and it was the start of my Hoya-mania. In 1963 I was collecting plants for the Honolulu Botanic Gardens and while on Guadalcanal in the Solomon Islands, I hiked with Geoff Dennis up the Poha River. Later, on the Island of Tulagi we found many in several different forms.



ERIOSTEMMA (HOYA) GUPPYI

Color photo sponsored by: William Woodard, Des Moines, Iowa

Up until then, the only hoya I was familiar with was the small (1/2") flowered **H. australis** R. Br. ex Trail but then to see a cluster of large (2") red flowers was like looking at a neon sign!

For me, both **H. guppyi** Oliver and its close relative **H. affinis** Hemsley grow like weeds and have to be chopped back to keep them in bounds. At least one of the plants is in bloom any time of the year. But, since these are Eriostemmas, growing them under greenhouse conditions might be hard to get them to flower.

Some might find the nocturnal, musky fragrance over-powering but to me that is what all of the Eriostemmas smell like. Without even seeing it, I know that it is blooming somewhere in the garden. *Hoya guppyi* is my sentimental hoyo.

HOYA MEREDITHII Green is one that I did not personally collect for that was done by my friend, York Meredith of Dee Why, Australia (whom I subsequently named it after). He luckily found it near Bau, Sarawak -- I have been back there several times and never found it (probably on the other side of the tree from where I was standing). In 1999 I did find another, less spectacular, form at Long Miao near the south border in Sabah.



HOYA MEREDITHII Green

Photo sponsored by: Lee Miller, Washington, D. C.

The beauty of **H. meredithii** Green is in its handsomely veined, large leaves for the 1/2" flowers are sort of a non-descript yellow-straw color. The leaves and stems actually look more like an Apocynacaceae than an Asclepiad – even down to the milky sap.

This plant is easy to grow, providing it is kept warm and given medium light, and is now (from that single original piece that I brought back) grown by collectors all over the world.

This is the first hoya that I named.

HOYA CAMPANULATA Blume was one that I found by pure serendipity, for I had looked for it many times and in many places. This time I was lucky for the plant was nothing like what I had expected (from the picture on the front of the *Malayan Nature Journal*). In fact, it was like all of the scrambling vines around it, except that it had milky sap.



HOYA CAMPANULATA Blume

Photo sponsored by: Frances Wilkes, San Diego, California

H. campanulata Blume is somewhat hard to root but once established it takes off as a scrambling viney-shrub that roots only from the base, not along the stem. As far as I know, all of the campanulatas being grown around the world are from my single collection (just outside of the Nature Preserve) in Danum Valley, Sabah.

I guess that this hoya is my claim to fame! At least it helped pay for part of one of my many trips to Borneo.

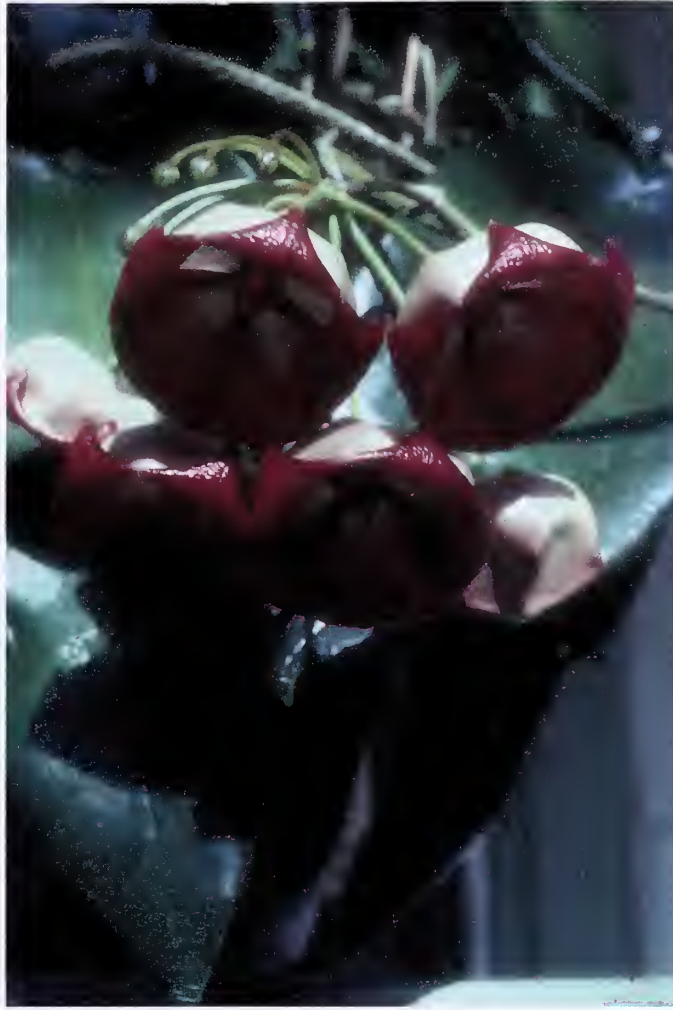
HOYA CAUDATA Hooker f. is one that I have found several times in both Sumatra and the Peninsular Malaysia – in 3 different forms. Interesting flowers with their “tails” (caudate means tailed) on the anthers and their handsome mottled silver and red leaves.



HOYA CAUDATA Hooker f.

Photo sponsored by Los Angeles Cactus & Succulent Society, Northridge, California

HOYA ARCHBOLDIANA C. Norman takes us back to York Meredith again for I got it from him (about 20 years ago) and he got the 2 forms from Andree Millar of Port Moresby, New Guinea. I got 2 small cuttings, without seeing the flowers and only based on his description and a poor drawing he made. I have never been sorry! Andree got hers from the area east of Port Moresby and just below Sogeri. I have been there several times but unfortunately never found it.



HOYA ARCHBOLDIANA C. Norman

Photo sponsored by: Anonymous member San Diego Exotic Plant and Hoya Group

H. archboldiana is easily rooted and grown and its handsome big, shiny leaves are surpassed only by its spectacular heads of campanulate flowers in either all pink or white with red tips to the cup. Under my conditions, my plants flower about every other month and with about 10 plants, there is one up every week.

I have never had a seedpod on my plants for I must not have the right pollinator – despite a wonderful night fragrance that attracts moths. If you want to have an interesting and outstanding hoyo collection you definitely have to have one or all of these favorites of mine.

Ted Green
Green: Plant Research
Kaaawa, Hawaii

Go to Ted Green's website: www.rare-hoyas.com

A Danish Hoya Nursery



Hoya retusa Dalzell (hanging) & **Hoya carnososa** R. Brown on the bench in the foreground



Hoya picta Siebold (staked)

Photos sponsored by: Anonymous member San Diego Exotic Plant and Hoya Group

This is a beautiful nursery with excellent management, with clean, neat and well cared for hoyas. This material was recently sold as the owners were 65 years old and wanted to retire. Information sent to me by Lise Rastrup Larsen, daughter of the nursery owners. Thank you Lise.



Hoya cumingiana Decaisne



Hoya serpens Hooker f.

Photos sponsored by: Frances Wilkes, San Diego, California

One Came Home to Singapore – *Hoya finlaysonii* Wight 1834.

Article and pictures via Kim F. Yap, Singapore

One fine day in August 2002, I received an e-mail from our Andrew Tay. It said I was to pick up a hoya cutting from the NSS office at the Sunflower. I rushed there the next day and saw a rather disappointing sight. It was a chewed-up one-leaf cutting of an unknown species sitting in a cut-up recycled mineral water bottle. The neatly written plastic label said it was collected in January, 2002 at Kota Tinggi, Johor. I told myself that, after a week, this poor bit of vegetation will not see the light of day. I took it home tenderly (16-08-2002) and immediately placed it in my magic solution of diluted fertilizer and a pinch of rooting hormone. Then, what a great surprise! The miserable insect-chewed cutting rooted. I potted it lovingly (29-09-2002) in my special potting mix. It grew healthily, sending out a couple of stout trailing shoots. A solitary peduncle was observed forming on a leafless vine (19-04-2003). The globose umbel of 40 flowers bloomed during the early hours of 09-05-2003.

It proved to be a species no longer living in Singapore. The Singapore Red Data Book listed it as being extinct. *Hoya finlaysonii* was cited by subsequent authors that Wallich (undated) found it in Singapore, way back when. It was recorded for both West and East Malaysia. In West Malaysia it was recorded for Penang, Perak, Selangor, Pahang and Malacca, but not for Johor. Finding it in Johor represents a range extension southwards toward Singapore.

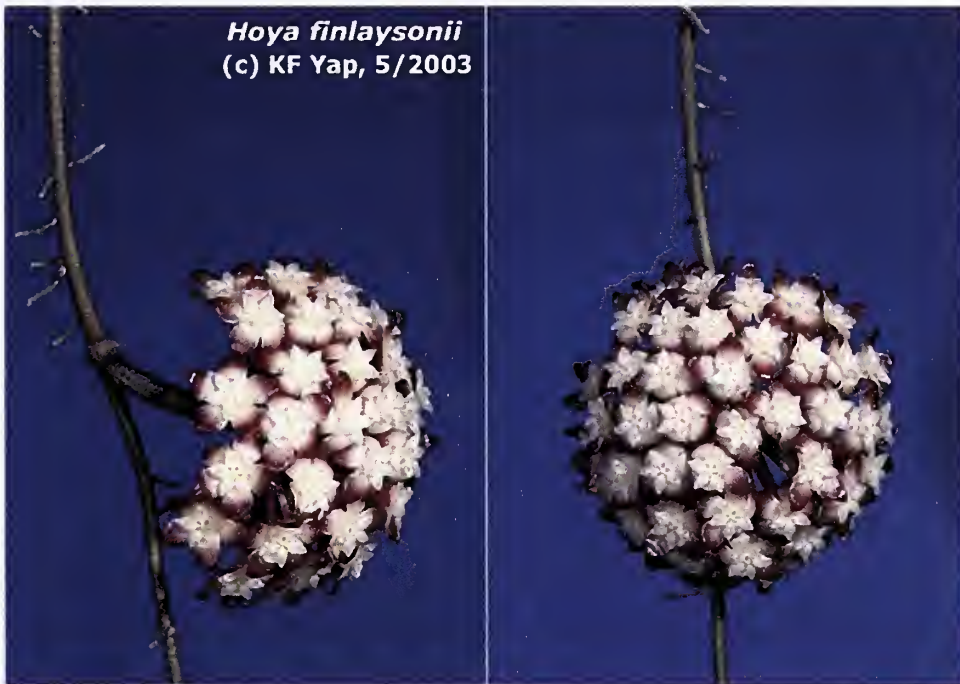
The pretty 5 mm flowers are short-lived. They open for only 12 hours and abscise after 24 hours. They give off a spicy scent. The leaves are really spectacular - dark green anastomosing veins on sand-papery light green laminae and with finely serrated leaf-margins. It is one of the few species you can easily identify from the leaves.

Now just sit back, enjoy and welcome the return of an extinct hoya species to Singapore.

Thank you Andrew for bringing it home.

K. F. Yap, 15-05-2003. Vesak Day.

Following are pictures sent via E-mail from Kim F. Tap, Singapore.



Photos sponsored by donations from the Norma Lewis Hoya clan meeting of June 2003



Photos sponsored by donations from the Norma Lewis Hoya clan meeting of June 2003

Hoya Gathering in North Hollywood

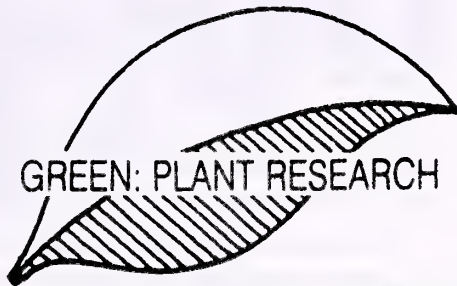
On Saturday June 14, over 45 people attended a meeting of Hoya lovers sponsored by Norma Lewis (The Crassula Lady) at her home. Norma and her helpers served a wonderful luncheon while everyone chatted and became acquainted. There were people attending from as far away as Sweden (Torill Nyhuus); from Florida, New York and Oklahoma; North, Central and Southern California. Norma had arranged two long tables where there were hoyas for exchange and purchase. In the end all remaining materials were auctioned off to raise money for the IHA. Michael Kartuz and Dale Kloppenburg lead a demonstration and question and answer session on all aspects of hoyas. This was an excellent meeting with great people and lots of interaction. Thank you Norma and all the guests for your wholehearted participation.

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In the lush jungle of Borneo, hoyas grow wild and this is a unique opportunity of participating in an expedition through the lowland rainforest and coastal areas of the Northern part of Borneo in search of the Hoya species of Sabah. With support and guidance from a British botanical expert we arrange an exploratory tour of Sabah's hoyas species scattered around forest and coastal areas and also visit a small hoyas garden with a beautiful collection of Sabah species at the Agricultural Park in Tenom.

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Hoya kastbergii Kloppenburg
Photo by Lise Rastrup Larsen

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Editor's e-mail address: rdk03@cvip.net

New Borneo Hoya Species

via Lise Rastrup Larsen (Denmark)

obtained from Arne Kastberg, who collected it on a travel to Borneo.

Hoya kastbergii Kloppenburg sp. nov. Holotypus 102003 (UC), affinis **Hoya diptera** (Seemann) sed folia fere circularis non ovato-ellipticus acuminatus, glabra, carnosus nervis et costa obscura. Floribus eburneus sed coronae lobis rubra, differt.

This species is closest to *Hoya diptera* Seemann but the foliage is circular not ovate elliptic acuminate, glabrous (both species are) with obscure nervation. The flower color is cream colored with a phoeniceous red corona. The species was collected by **Arne Kastberg** in the area of Bau, South West from Kuching, Sarawak, Borneo. It was growing as an epiphyte, 4-5 meters up in a large tree in partial shade at an elevation of about 300 meters. The ground there was limestone. Arne has operated a garden center for twenty years "Stenåsa Garden Center", in Sweden.

Leaves: nearly round 6 cm. long x 4.5 cm. wide, with variation, nerves obscure, glabrous, medium green.

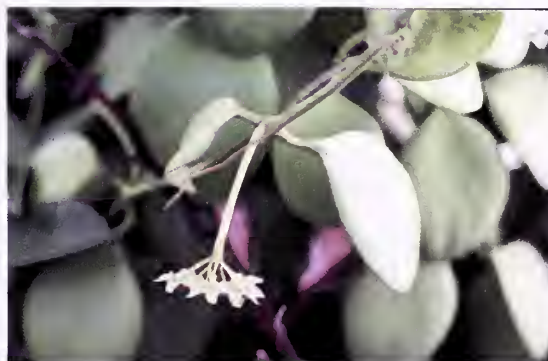
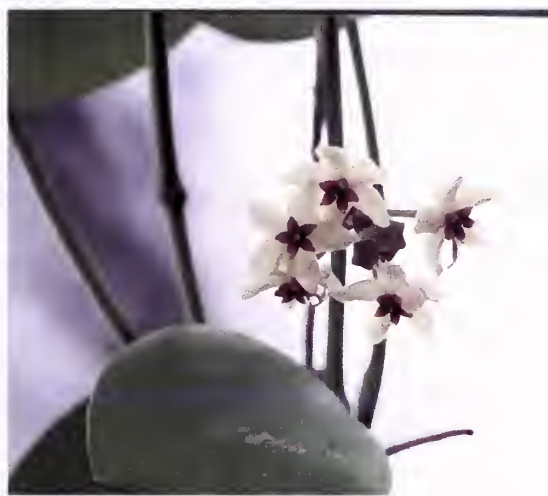
Flower: ca. 1.5 cm. in diameter color pale yellow with a red-lilac corona, no fragrance, lasts ca. 10 days.

peduncle ca., 5.5 cm. long.

pedicel ca. 1.0 cm.

Plant: has clear sap, grows like *H. carnososa* R. Br.

Pictures below sent by **Lise Rastrup Larsen**





The following are photomicrographs and data from material sent via **Lise Rastrup Larsen**.



Photo ca. 16X of pedicel, calyx and outer corolla area.

Pedicel: terete 2 cm. long, glabrous with lenticels and extremely short bent hair cells pointing apically.



Side view of the pedicel, calyx and ovaries.

Calyx: outside glabrous from a bulbous base. Center - apex 0.15 cm. Base - apex 0.10 cm. Very slight overlap at the base.

Ovaries: very short, glabrous, 0.15 cm. tall, 0.14 cm. at base pair.



Top view of the calyx and ovaries. There is a piece of the corolla left attached at the lower Right. Calyx is very membranous, apex rounded to narrowly rounded. I did not note any ligules present.



Outside surface of the corolla enlarged. This surface is glabrous, pale yellow color, deeply cut broad above the sinus area.

Sinus - sinus	0.35 cm.
Sinus - center	0.30 cm.
Sinus - apex	0.50 cm.
Center - apex	0.75 cm.
Widest	0.48 cm.



Corolla inside view enlarged. This surface is finely pubescent most dense on lobes less so under the corona.

There is a raised collar ca. 0.04 cm. tall with an opening here 0.07 x 0.12 cm. in diameter.



View enlarged of the corona and inner corolla surface. The center is raised, scale lobes tapering outward and outer apices emarginate and nearly reaching the corolla sinuses. Naturally deep red-lilac color, with corolla a pale yellow-rose. Note the thickness of the scales and the lower narrow lobes at the base which extend to the apex.



Top view of the corona enlarged, about 8X, natural color rose-lilac. Dorsal surface rounded with elongated groove in center. There are narrow side lobes, which extend from near the retinacula to the apices.

Apex - apex	0.30 cm.
Apex - center	0.32 cm.
Retinacula- ret.	0.07 cm.
Ret. - center	0.07 cm.
Anther Wing - aw.	0.17 cm.
Aw. - Center	0.17 cm.



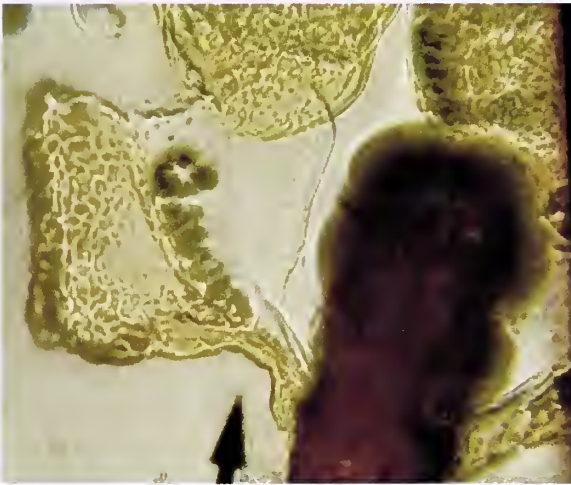
Lower view of the corona. enlarged about 8X. The sides are sulcate and center grooved. The narrow extensions curve inward more tightly toward the apex. There is a thickened collar in the center. All surfaces here are glabrous.



Side view of a coronal scale enlarged over 16 times. Inner lobe is spatulate and turned up over the anther. The narrow shelf along the lower side of the scale is typical of the subsection *Angusticarinata* Kloppenburg. This shelf extends to the apex making it emarginate. Anther wings are not deeply scythe shaped. Surface is finely sulcate.



An enlarged view of the staminal crown, to the back and right are two scales (the other 3 removed) exposing the pentagonal table. The center is a raised column with a short tapered apical area. In the old literature this was mistakenly thought to be the stigma. It is plane to see the spatulate nature of the inner lobe on the upper left scale.



Magnified over 400X is the translator caudicle area of the pollinarium showing how the darker (more structured) translator arm supports the clear caudicle; both narrow greatly as they enter the retinaculum, where they are attached internally. The translators and bulbous clear pollywog like caudicles enter the retinaculum at the hip area. The translators supports the caudicle which in turn adheres to the pollinium. The bi- symmetrical nature of the retinaculum is due to secretions from a split in the top of the stigmatic surface.

A distinctive pollinarium, with delta winged translator arms.

Pollinia

length 0.44 mm.
widest 0.18 mm.

Retinaculum

length 0.17 mm.
head 0.07 mm.
waist 0.04 mm.
hip 0.06 mm.
extensions 0.06 mm.

Translators are delta wing shaped

ret - lower end 0.12 mm.
outer edge 0.10 mm.

Caudicle bulb 0.07 mm.



The Hoyas of Sabah

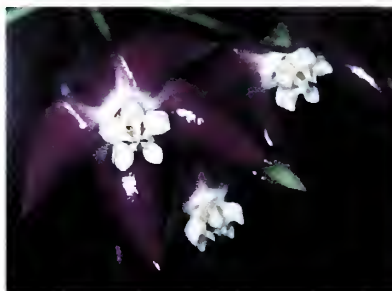
The Hoyas belong to the Milkweed family, Asclepiadaceae with about 3,000 species in 315 genera. The genus *Hoya* today has probably 150 species distributed from India & China, south to Australia, including most of South East Asia.

The genus *Hoya* was named for the plant cultivator to the Duke of Northumberland, Thomas Hoy, who was very successful in cultivating them in a huge conservatory in London. Hoyas with their unusual waxy and scented flowers were very popular during Victorian times when hot houses for growing tropical plants such as orchids & pitcher plants became such a craze with the aristocracy.

Hoyas are distinguished by the milky sap or latex, with the pollen of the flowers massed in pollinia as they are in the orchids. They are mostly epiphytic shrubs or climbers. It is interesting to compare how pollinia have evolved in a parallel way between the Orchids in the Monocotyledons and the Hoyas and related plants in the Eudicotyledons (Dicotyledons).

In the Orchid flower one of the petals has evolved into a platform or pouch for insect pollinators to land when they come to visit. The pollinia containing the pollen masses gets stuck onto their heads or backs, as they passed under the column to which the pollinia are attached. The same column structure contains the stigmatic surface and the pollinia are brushed off onto this when the insect visits the next flower. In *Hoya* the corollas are in most cases open, and surmounted with a corona of five lobes between which are grooves. In each groove lie two

pollinia attached to a brown or black point (photo 1).



1. Flower of *Hoya imperialis* showing the waxy purple corolla, and white lobes of the corona in the grooves of which lie the pollinia.

A visiting insect will feed on nectar produced at the base of the corona and on flying off takes with it pollinia attached to its feet, if its feet are of the right size to fit into the grooves. At the next flower of the same species, the insect in its attempts to get rid of the pollinia, will drag its feet through the grooves. If successful, the pollinia will get caught under the upper lobes where the receptive stigmatic surfaces are located.

Hoya flowers are mostly night scented, and probably visited by moths. During the day, ants and honey bees are often seen on the flower mopping up the leftover nectar (photo 2).



2. An *apis cerana* Honey Bee licking up nectar from the flowers of *Hoya meredithii*.

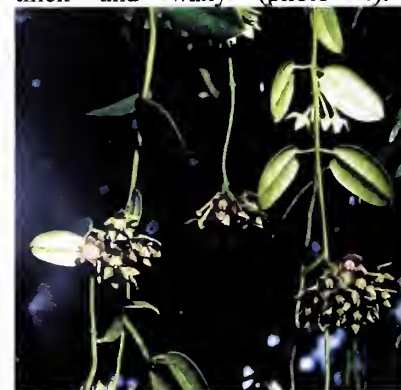
A flower when pollinated develops into the fruiting pod very rapidly, reaching full size in a month. The

pod ripens in about three months and splits open down one side. The closely packed seeds, each with a parachute of fine silky hairs, are blown out into the air currents (photo 3).



3. A seedpod of *Hoya imperialis* that just split open to show the closely packed, symmetrically arranged seeds each with a parachute of silky hairs. They are blown out by air currents and dispersed.

Most Hoyas are climbers with opposite leaves, that are often thick and waxy (photo 4).



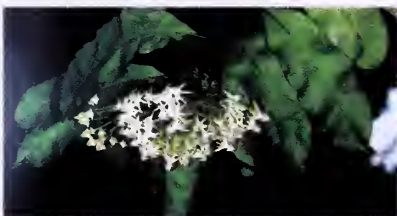
4. *Hoya coronaria* is a common and widespread species. In the photo, the opposite leaves and umbels of flowers coming from leaf axils are clearly shown. In this species the flowers can be white, cream or pink often turning a reddish colour when old.

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4. *Hoya coronaria* is a common and widespread species. In the photo, the opposite leaves and umbels of flowers coming from leaf axils are clearly shown. In this species the flowers can be white, cream or pink often turning a reddish colour when old.

They either start from the ground and climb using vigorous roots that arise from nodes or along stems, or are epiphytes; rarely are they scandent shrubs. They derive nutrients from rotten wood and pockets of organic matter in tree forks or from rain water. Epiphytic Hoyas include *Hoya multiflora* (photo 5), *Hoya campanulata* (photo 6) and *Hoya cumingiana* (photo 7).



5. *Hoya multiflora* is an epiphytic scrub often growing from the forks of trees the flowers like shooting stars make it a very desirable plant for a hanging basket.



6. *Hoya campanulata* is another epiphytic scrambling shrub with beautiful pendulous umbels of large waxy flowers.



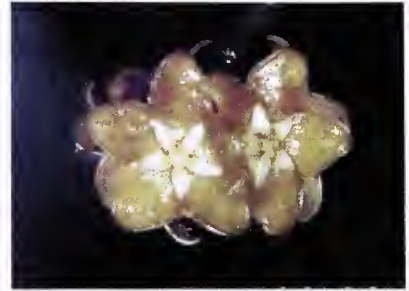
7. *Hoya cumingiana* (Syn *H. densifolia*) is often found on cliffs, and rocky places as well as in forks on large trees. The habit with closely packed leaves along the stem is unusual, and the plant flowers nearly continuously.

An unusual epiphytic Hoya that is often mistaken for a hemi-parasite is *Hoya spartioides* (photo 8).

It appears that its seeds are carried by ants into rotten cavities in tree trunks or branches. On germinating, the plant produces a single short stem with a few basal leaves. Long flowering stalks are produced, bearing orange, night opening flowers (photo 9). The basal leaves soon fall off and the flower stalks take over the function of photosynthesis. This species was previously considered to be a separate genus *Absolmsia*, but the flowers are identical to that of Hoyas.



8. *Hoya spartioides* is a species that loses its true leaves at an early stage, and continues photosynthesis through the flower stalks.



9. The scented orange flowers of *Hoya spartioides* open at night, and one can often see large globules of nectar on the corolla lobes.

Some epiphytic species that are subject to extreme water stress behave like many succulents by closing the stomata in daylight to conserve moisture and opening them at night when it is cool and humid.

Favourite habitats for Hoyas in Sabah are on trees along rivers and cliffs especially limestone areas, and in heath forests with a deep peaty layer on the forest floor; some species favour coastal forest.



10. *Hoya erythrostemma* is one of the most stunning flowering hoyas in Sabah.



11. *Hoya fraterna* was re-discovered 150 years after it was described by the Dutch botanist Blume. The yellow flowers covered with silvery hairs are stunning.



12. *Hoya mitrata* a heath forest species in Sabah starts off producing a cluster of leaves

to form a home for ants that provide additional nutrients for it to take off as a climber.

The interest in Hoyas in Sabah has only really taken off in the last ten years, leading to the setting up of a small *Hoya* garden with a collection of Sabah species at the Agricultural Park in Tenom. Visits by *Hoya* experts Dale Kloppenburg from

California, and Ted Green from Hawaii in the 1990's, and other members of the International *Hoya* Association that produces the *Hoya* Bulletin called *Fraterna*, has greatly stepped up the elucidation of



13. *Hoya callistophylla* is a species with beautiful leathery bright green leaves with dark green veins.



14. *Hoya telosmoides* a newly described species from lower montane forest in the Crocker Range Forest and Mount Kinabalu has an unusual corolla that forms a protective cup around the corona, the entrance of which is full of hairs.

species. Pia Nutt of Muenster Botanic Gardens in Germany, who has recently completed an MSc Thesis on Hoyas of Borneo, has added to this information pool. She is currently collaborating with the author in producing an *Introductory Pictorial Guide* for the Hoyas of Sabah. With the recent naming of new species found in Sabah we have at least 25 named species with a further 20 to be named.

new species and identification of existing ones, and the discovery of many new and as yet unidentified

New Species from Sipitang, Sarawak, Borneo by Dale Kloppenburg

Hoya walliniana Kloppenburg & Nyhuus species nova. Typus # 112003 (UC) Section Otostemma (Blume) Miquel. Collected by a group in 1997 including both authors et al. at Sipitang, Sarawak, Sabah, Malaysia ex hort. Torill Nyhuus, Sweden. *Hoya* affinis *Hoya sipitangensis* Kloppenburg & Wiberg, sed calycis lobis linearis triangula 0.15 cm. longa vs late triangular 0.08 cm longa; cum coronae lobis interiore acuta non spatulatus: corolla complanatus, multus parvo, 0.68 cm. diametro vs 1.24 cm. diametro. Pollinaria multus differt.

Like *Hoya sipitangensis* Kloppenburg & Wiberg but the calyx lobes are longer 0.15 cm. long versus 0.08 cm. long in *H. sipitangensis*, which has short broadly triangular calyx lobes. The flower here is much smaller, 0.68 cm. in diameter when flattened versus 1.24 cm. in diameter. The inner lobes of this new species are acute versus spatulate and the whole structure here is more upright on a longer column. The outer lobes also are different in that the central ventral thickening on this species does not extend to the outer apex and thus it sub-membranous and turned up not horizontal. In this new species the pollinaria are broader and shorter, The retinaculum has unusual arm-like extensions from the head area; the translators are more narrow than in *H. sipitangensis*, also the caudicle bulb here is much larger and thus more prominent. Growing naturally at 10-20 m altitude. Internodes 3 - 7 cm. long with aerial roots, leaves 2.2 x 5 cm. to 3 x 10 cm. Leaves become very dark red-brown when exposed to the sun.



Photos above are by **Pierre Wallin**, March 2003.



Pedicel, calyx with ovaries enlarged about 16X.

Pedicel: 0.7 cm. long, of variable lengths, to form a flat cluster, deep green lenticled, rigid, rachis circular with fine bracts layered evenly, surface tan.



Outside view of a flower showing the small calyx; lobes of which reach only about 1/2 way to the corolla sinuses. Corolla is revolute, glabrous on this outer surface. Inner surface is puberulous with a large apical area glabrous. Enlarged about 16X.



Calyx and ovaries greatly enlarged. The sepals are small, centrally thickened with very short basal overlap, both surfaces are glabrous. Sepals 0.15 cm. long; from center 0.15 cm. Small dark ligules are present. Ovaries are glabrous, narrowly domed shaped with flaring apex. 0.15 cm. tall and base pair 0.06 cm. wide.



Top view of the calyx enlarged about 16X. The sepals are triangular shaped with a small basal overlap. Edges are irregular (slightly) and an occasional cilia., Small dark ligules are present.



Corolla outer surface enlarged less than 16X. This surface is glabrous with no thickened collar. Apex is acute, lobes cut about 1/2 way.

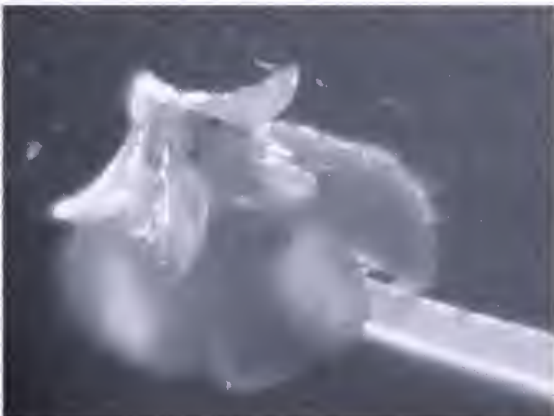
Sinus - sinus	0.27 cm.
Sinus - apex	0.27 cm.
Sinus - center	0.23 cm.
Apex - center	0.34 cm.
widest	0.31 cm.



Corolla inside surface enlarged about 32X This surface is puberulous except under the corona where it is glabrous as the the apical apex area.



Side view of a flower enlarged about 16X. The corona sits on a skirted column, corolla is reflexed to revolute depending on flower stage. (The oval splotches on the corolla lobes are due to liquid on the surface.) Crown is upright. The flower belongs to the Section Otostemma (Blume) Miquel.



Another view of the flower, here the corolla is more revolute. The flaring outer coronal lobes are shown, this dorsal surface is keeled all the way from apex to apex. The inner lobes are spatulate and do not reach the center or cover the anthers.



View of the corona removed from the flower and enlarged about 32X. The center is much raised, scales are keeled almost from apex to apex. Outer lobes are broadly rounded and appear spatulate, thinner around the edges and apex. Inner lobe is also spatulate and does not reach the center.

Apex - apex	0.20 cm.
Ret. - ret.	0.07 cm.
Ret.- apex	0.09 cm.
Aw. - aw.	0.10 cm.
Aw. - center	0.14 cm.



Bottom view of the corona enlarged as above. Note the bottom of the outer coronal lobes are also keeled but not to the apex, as they are above. The pentagonal skirt is well developed and notched between the area of the scales. There is a separate central thickened column that raises the corona above the corolla surface.



Side view of a coronal scale enlarged about 32X. The center is raised and this inner lobe is spatulate as is the curved up outer apex. The membranous anther extends slightly higher than the inner lobe (pollinarium still attached). A portion of the pentagonal skirt can be seen below the scale proper as a loop. The scales dorsal keel is easily visible.



A pollinarium enlarged about 165X. The pollinia are inwardly truncate on the inner apex. The translators are long and narrow with large clear caudicles. The appears to have a bifid head but I believe it is the viewing angle. Well developed head and waste, extensions are tight together and not well developed.

Pollinia

Length 0.30 mm.
Widest 0.13 mm.

Retinaculum

Length 0.10 mm.
Shoulders 0.04 mm.
Waist 0.02 cm.
Hip 0.06 mm.
Extensions 0.05 mm.

Translators

Length 0.15 mm.
Wide 0.02 mm.

Caudicle bulb. 0.10 x 0.05 mm.



Another photomicrograph of the Pollinarium to show the unusual arm formations in the head area of the retinaculum the unusual leg formations below the waist and long and lighty differentiated (extensions).

Photo Gallery Descriptions

Top row: **Hoya dennisii** Forster & Liddle. This plant was first collected by Geoff Dennis at various elevations on Mt. Gallego, which is at the northern end of Guadalcanal in the Solomon Islands. Geoff was an avid plantsman and it is befitting that such a beautiful hoya species should be named for him. It grows according to the authors in montane and submontane situations from 650 - 1200 meters elevation, usually epiphytic in bryophyte mats in the rainforest. This campanulate species is a beautiful clear pink, always attractive in bloom. The plant is well foliated with glossy pinnately veined opposite leaves, a very clean and neat plant.

Second row: **Hoya tsangii** Burton ex Kloppenburg. This is a bilobed species from the Philippines. It was originally named by Elmer as *Hoya angustifolia*, meaning narrow foliage. In the Philippines it is an epiphyte on large trees, at relatively high altitudes, making a mass of dangling glabrous foliage. The forests on Mt. Bulusan are open with plenty of light, an upper story of tall trees with smaller under-story foliage. As with most bilobed species the corollas are revolute and the umbels are pendant to ascending with usually 8-14 flowers. Flowers have little fragrance but smell of honey. Give this one lots of light and when mature flowers easily.

Third and bottom row:

Left: **Hoya diversifolia** Blume an old time favorite. This is a widespread species that forms rambling masses of vines at low altitudes, often on limestone cliffs and rocks along the seashores. It may even be found with the ocean sprays lapping over it. A little inland it can be found in huge dangling masses, a strong grower, from giant trees, often with hundreds of flower clusters in bloom at one time. Note that this clone from Malaysia has more pointed outer coronal lobes than some early clones from Indonesia. This will make a large plant quickly so plan to give it plenty of space, as it needs lots of light for good flowering.

Right: **Hoya bilobata** Schlechter. Probably the smallest of all hoyo flowers and like *H. tsangii* also from the Philippines and also a bilobed species. This species has been mixed and confused with other small flowered small leaved bilobed hoyo species. It has been confused with *Hoya panchoi* and *H. leytensis*, but is readily distinguished from both by its small round leaves. Leaves are relatively uniform, relatively thick cupped mostly downward seldom if ever an elliptic leaf. This species makes an excellent small basket plant, well foliated with close set leaves. A good bloomer when mature. You could keep five plants like this in the space occupied by large vigorous species.

Hoya Photo Gallery



Photos by Torill Nyhuus, Sweden of **Hoya dennisii**, flower and foliage



Hoya tsangii photos by Ann Wayman, Central Point, Oregon.

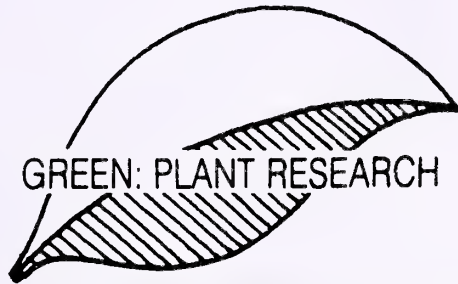


Hoya diversifolia photographed by Kim Yap, Singapore. Collected in Johor Lama, Malaysia.



Hoya bilobata photo by Ann Wayman

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