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Ecuador 2004 Part I: July 6–August 5, 2004

Thomas B. Croat, Missouri Botanical Garden

This year’s trip to Ecuador was primarily designed to explore the southeastern part of the country, especially the Cordillera del Cóndor, but the expedition ended up covering many areas.

During the first month, which I will report on in this newsletter article, I collected with **Lynn Hannon, Greg Walhert**, a potential graduate student from San Francisco State, and **Tuntiak Katan Jua**. Tuntiak is a botany student and an indigenous Shuar, whose people inhabit the southeastern part of the country. We began our trip by driving to Baños in Tungurahua Province, then headed southeast past the base of Volcán Tungurahua, down to Shell. We were startled by a massive explosion of ash from the volcano, with the ash cloud rising like the plume of an atomic bomb. In Shell we stayed at the Hotel Germany, which we used as our headquarters during the previous two years of work on the Araceae for the Flora of Shell-Mera. The following day we revisited the area between Mera and the Río Anzu, then followed the trail into an area of virgin forest. The area turned up numerous new species since last year when we had not been able to penetrate very far into the region due

to rain and a slick trail. This year during the dry season we were able to make it all the way to the top.

The following day, we went on in the direction of Puyo, then collected along the road to Macas, where we spent the night at the Hotel California. Macas had been our headquarters during explorations made into the Parque Nacional Sangay two years ago, along the uncompleted road to Riobamba. Naturally, the hotel managers always remember us, since few quests arrive with bags of plants as part of their luggage.

Next we drove toward Limón, passing through Sucua, Tuntiak’s hometown. The road follows the valley of the Río Namangoza, which forms the western edge of the Cordillera de Cutucú, an isolated range of mountains disjunct from the Andes proper and home to many endemic species. We traveled east along a road that leads to Santiago and the Río Morona, passing through Patuca, the military headquarters that had been very active until recently because of the border conflict with the Peruvian armed forces. The road skirts the southern end of the Cordillera de Cutucú and

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we found an excellent trail leading into virgin forest. This site was rich in Araceae and we found so much material that we barely finished pressing in time to go to the field the next day. Among the species was a new terrestrial species of *Rhodospatha*. I have been unable to study the herbarium material, as it has not yet arrived, but this *Rhodospatha* is probably the same as *R. piushaduka* Croat (Fig. 1). Other species in the Cordillera de Cutucú were *Anthurium breviscapum* Kunth, *A. croatii* Madison, *A. eminens* Schott, *A. harlingianum* Croat, *A. polyschistum* R. E. Schultes, *A. rubrinervium* (Link) G. Don, *Chlorospatha pubescens* Croat & L. Hannon, *Philodendron atratus* Croat, *P. parvilobum* Croat, *P. plowmanii* Croat, *Rhodospatha brachypoda* Bunting and *Xanthosoma viviparum* Madison.

From Santiago, where we spent the night at the Hotel Intercontinental, we drove toward the Río Morona and collected on Cerro Shaime, the last hill before reaching the Amazon lowlands. From this area you can look east, into the vast Amazon lowlands stretching out in all directions. At this locality we saw *Anthurium harlingianum* Croat, *A. macdanielii* Croat, *A. michelii* Guilauman, *A. mindense* Sodiro, *A. nigrolaminum* Croat, *A. versicolor* Sodiro, *Chlorospatha boosii* Croat & L. Hannon, *Dieffenbachia smithii* Croat, *Philodendron herthae* K. Kr., *P. palacioanum* Croat & Grayum, *P. parvilobum* Croat, *Rhodospatha moritziana* Schott, *Spathiphyllum juninense* K. Kr. and *Xanthosoma hannoniae* Croat.

After several hours of collecting in this region, we returned to Santiago to press plants. The next day we drove back to the main Macas-Méendez road and on to Méendez. The timing of our arrival in Méendez was poor; the

beginning of a big celebration with very noisy, loud music went on all night long for several nights. Huge loudspeakers were set up on the square more than a block away, but they reverberated on the windows of our hotel room.

The next day we headed northwest, along the valley of Río Paute, through a part of the Parque Nacional Sangay. The road was very good one, paved most of the way, certainly much better than most of the upper part of the road that was extremely muddy in 2003. On that occasion, we tried to come down this road from Cuenca in an attempt to drive to Méendez, but the road had been closed by a huge landslide. This year we were able to make it all the way to the tunnels, so I knew we had now covered the entire road. A new species of *Anthurium* sect. *Digitinervium* (Fig. 2, Croat 90936) was found here.

After another night of pressing plants and sleeplessness, listening to some pretty dreadful singing, we took eight bags of plants to a bus terminal and arranged to ship specimens back to Quito, then headed south toward Gualaquiza, passing through Indanza and San Juan Bosco. This road passes down the valley of the Río Zamora. Although there is little virgin forest along this route, there are still outstanding displays of aroids. One of the new species near the road was *Anthurium patens* Croat, and another in *Anthurium* section *Decurrentia* with lanceolate-elliptic, epunctate blades and a slender green spadix. The latter species is similar to another unpublished species that I am calling *A. raphaelense* Croat. Other common species in the area included *Philodendron ceronii* Croat and *P. ruizii* Schott.

The year before, we had arrived in Gualaquiza late at night in a rainstorm. Bundles of specimens in paper, not yet described, were soaked and we had to



Fig. 1: Possible new species of *Rhodospatha* (Croat 90609)



Fig. 2: New species of *Anthurium* section *Digitinervium* (Croat 90936)

more or less scrape them out of the back of the truck. This time we arrived before dark and it was not raining, which was a nice change. The next morning we traveled from Gualaquiza farther south toward Yantzaza, one of the gateways into the Cordillera del Cóndor. The road between Gualaquiza and El Panguí is now in good condition. Along the way, we crossed over the Río Chuchumbleta and the border of Zamora-Chinchipec, then

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drove along the Río Zamora to the Quime ferry crossing (Fig. 3). Once across the river we drove toward Numbaima on the road to the summit of the Corillera del Condór. Many signs of past military presence were apparent with camouflaged tank garages hidden off the edge of the road. The area was relatively pristine and very rich in aroids, including what appears to be a new species of *Anthurium* sect. *Belolonchium* (Fig. 4, Croat 91015). The following species were also sighted in the area:

A. amoenum Kunth, *A. arisaemoides* Madison, *A. breviscapum* Kunth, *A. effusilobum* Croat, *A. grubbii* Croat, *A. lapponum* Croat, *A. michelii* Guillaumin, *A. penningtonii* Croat, *A. triphyllum* Brongn., *Caladium steudneriifolium* Engl., *Chlorospatha pubescens* Croat & L. Hannon, *Philodendron acutifolium* K. Kr., *P. asplundii* Croat & M. L. Soares, *P. ceronii* Croat, *P. ernestii* Engl., *P. verrucosum* Mathieu ex Schott and two species of *Stenospermation*, one *S. killipii* Croat (Fig. 5).

Back on the main road, we drove south to El Panguí and spent the night in a



Fig. 4: New species of *Anthurium* section *Belolonchium* (Croat 91015)



Fig. 3: Quime ferry crossing the Río Zamora, 6.8 km S of Chuchumbletza

small hotel near the bus terminal. The previous year we had spent several days around El Panguí, the home town of Pepe Portilla, the now famous orchid and aroid dealer in Gualaceo. However, since no bus goes directly from Panguí to Quito, shipping plants was not possible. For this reason, we decided to stay in Yantzaza, farther to the south.

The following day, south of El Panguí, we stopped just south of San Roche to revisit the type locality of *Chlorospatha portillae* Croat & Hannon, (Fig. 6) then drove south to Los Encuentros. In this little town,

there is a bridge over the Río Zamora and a road on the other side of the bridge leads into the mountains and to the village of El Sarsa (Fig. 7). Another road at the far end of the Los Encuentros bridge goes to the right, along the Río Zamora, then follows the Río Nangaritzza, apparently extending all the way to the town of Paquisha. At 1455 m elevation, we found a second collection of *Chlorospatha portillae*, as well as *A. lapoanumi* Croat, a very attractive new member of section *Cardiolonchium*. We have not yet made

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Fig. 5: *Stenospermation killipii* Croat & A. P. Gomez



Fig. 6: *Chlorospatha portillae* Croat & L. P. Hannon (Croat 91089)



Fig. 7: Cordillera del Condor, road to El Sarsa

it to the end of this road, so that still needs to be pursued. We pressed plants in a hotel in Yantzaza, taking over a small meeting room where we could spread the big 14 x 16 foot tarp out to its limit. From here, we were able to ship our next big shipment of plants back to Quito by bus.

Driving a road beyond Paquisha, which according to the map led to the summit of the Cordillera, eventually ended in a landslide. We were able to go only



Fig. 8: *Anthurium effusispathum*
(Croat 91000)

about 10 km, but there were still remnants of forest and interesting aroids. We found *Anthurium amoenum* Kunth, *A. angustisinus* Croat, *A. brachypodum* Sodiro, *A. effusispathum* Croat (Fig. 8, Croat 91000), *A. fasciale* Sodiro, *A. longistrosum* Croat, *A. versicolor*, *Chlorospatha pubescens*, *Philodendron schmidtiae* Croat, *P. parvilobum*, *Rhodospatha neillii* Croat, a species of *Stenospermatum* with long internodes, possibly *S. sodiroanum* Engl., and as always, a number of other species not recognized.

The farthest and probably most useful trip into the Cordillera del Cóndor occurred near Paquisha on the road to the south, going all the way to Las Orquídeas, where there is a river port for navigation up the Río Nangaritza to Míazi. There were large hand-made metal boats resembling oversized canoes. Several areas along this route that took us through Guayzimi and Pachicutza, often within view of the Río Nangaritza, were quite rich in species. This day trip yielded another locality for *Anthurium nigrolaminum* Croat, the third collection of *Chlorospatha*

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Book Review...

By Dan Nicolson

“Araceae from the Early Cretaceous of Portugal: Evidence on the Emergence of Monocotyledons”

Friis, E. M., K. R. Pederson and P. R. Crane

Proc. Nat. Acad. Sci. USA 101 (46): 16565-16570. 23 Nov. 2004.

There are two remarkable things in this publication:

1. Evidence bearing on the first verifiable appearance of monocots.
2. A new European fossil in Europe apparently related to *Spathiphyllum* (New World & Malesian) and *Holochlamys* (Malesian). This new fossil suggests how such a split distribution might have arisen.

On the first point, hitherto, the first unequivocal monocot fossil was from the Late Cretaceous (84 million years ago) and this is from the Early Cretaceous (100 million years ago).

The material (pollen grains) is quite good and they were able to study the details with both scanning and transmission electron micrographs,

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demonstrating two crossing layers of fine ribs. This is known but, with the techniques involved, it can be demonstrated that this pollen isn't like the other groups with ribbed ornamentation, i.e., gymnosperms like Ephedra and Welwitschia, nor dicots like Lauraceae, nor other monocots like Zingiberaceae and other aroids. Much of their work was studying pollen in Araceae, e.g. 269 collections from 145 species of *Amorphophallus*, etc. The result was that the closest matches were in *Holochlamys* and *Spathiphyllum*, though with differences.

This led them to conclude that this Portuguese material was a new genus, related to *Spathiphyllum* and *Holochlamys*. They named it *Mayoa*, in honor of Simon J. Mayo (Kew), "in recognition of his contributions to understanding the diversity of Araceae."

Their final sentence is worth quoting: "Such distributions have often been difficult to explain. Recognition that the Spathiphyllaeae were once present in Europe close to the margin of the Tethys Ocean implies that the trans-Pacific distribution is relictual in part, reflecting extinction in Europe, Africa, and other parts of the world."

6 Jan 05

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portillae, *C. longipoda* (K. Kr.) Madison, *Dieffenbachia cannaefolium* Engl. ex Ule, *Homalomena picturata*, *Monstera lechleriana* Schott, *Philodendron attenuatum* Croat, *P. micranthum* Schott, *P. pulchrum* G. M. Barroso, *Spathiphyllum brentberlinii* Croat, *Stenospermatum parvifolium* Croat & A. Gómez. We also collected our first *Dracontium* for the trip (Fig 9).

Since this trip involved such a long distance, we collected all day, not intending to arrive back early enough to describe and press all of our material that evening. Our typical procedure is to arrive back well before dark, so we have time to sort, describe and press material before bed time or, at worst, have only a little work to finish the next morning before departing for the field. By now, the crew had worked out a routine that was relatively efficient. Large plastic soil bags are used to store things in the field and individual plants were in turn placed in smaller bags within these big bags. This way, if parts fall off they can be found. Photo numbers are sometimes recorded on the small bags, which helps in making the photo register. Lynn wrote numbers on the papers with a big marker pen, dealt with live material and was good at remembering if we had already described some species, in the event that the material appeared in more than one bag. Greg and Tuntiak did the pressing. When the piles got unmanageable, we tied them up with two pieces of twine and set them aside. The following morning, I would wrestle these bundles into large, thick plastic bags and pour alcohol on them. It was in this state that they made the trip back to Quito, usually arriving in good condition, but sometimes with rips in the bags from poor handling.



Fig. 9: First *Dracontium* collected during trip, with Lynn Hannon

We made still another foray into the Cóndor, this time going south of Yantzaza to Namírez, another ferry crosses going to the town of Nambija Baja. You are not told this, but the ride over is free and you are supposed to stop at some store to purchase a ticket to return. If you don't you have to pay double the price. We drove to the town of San Carlos and made our way up the old mining road to Nambija. This little gold mining town, much like you would have expected to see in California during the gold rush, and is perched in a steep valley and covered with ramshackle houses. The road ends at the edge of town with scarcely any room to turn around, and climbs to about 1800 m. We made several stops on the way up, finding another small population of *Anthurium lappoanum* and *A. moronaense* Croat & Carlson, a new species in section *Semaeophyllum* that I first found here in 2003. Another new species of *Anthurium* in section *Belolonchium* had orange berries. We returned to this area a few days later, in search of a road extending to the other

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side of the mountain to Guayzimi because we had been told of the existence of such a road, but it did not exist. There were side roads, but these invariably dead ended at small seemingly abandoned mines, always with a vicious dog present on the property. Gold miners take no chances with their poke.

Disappointed that there was no road to Guayzimi, we pursued a side road. It ended at a steel fence with a gate and armed guard. After turning around, we stopped at an excellent site among huge boulders (this apparently discouraged attempts to clear it for farming). The area had two new,

closely related species of *Anthurium* with long internodes and a violet spadix. One of them has narrowly ovate-cordate blades (Fig. 10, *Croat 91641*), while the other is sub-3-lobed with more or less hastate blades (Fig. 11, *Croat 92058*).

The last area we visited in the region was east of Zamora to Romerillos Alto, by way of Jumbú. It is not officially a part of the Cordillera del Cóndor, since it lies to the west of the chain of hills west of the Río Nangaritzza. This area proved to be one of the best in the region for aroids, especially near the small village of La Pituca, where forest lies along the Río Pituca. Curiously, Mark Menke and I collected the same site last year, on what we thought was a road going south out of Zamora. The

map we were using even on this trip showed a road going to Romerillos, due south of Zamora. Needless to say, we were surprised when we came to a place called Romerillos. There is no road going south out of Zamora.

Common in the area east of Zamora was a new species of *Philodendron* that will probably be called *P. zamoraense*. This species is terrestrial with a creeping stem and D-shaped petioles similar to *P. plowmanii*. Other species in the area were *A. bomboizoanum* Croat & Carlson (Fig. 12, *Croat 91573*), *A. breviscapum* Kunth, and *A. penningtonii* Croat.

Our last four days in the region were spent in Zamora, at the Hotel Río

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Fig. 10: New species of *Anthurium* with narrowly ovate-cordate blades (Croat 91641)



Fig. 11: New species of *Anthurium* with sub-3-lobed hastate blades (Croat 92058)



Fig. 12: *Anthurium bomboizoanum* (Croat 91573)

Revisions For Sale!

Anyone interested in these titles for purchase (\$35.00 each) may contact Tom Croat or Emily Yates. Please make checks payable to Missouri Botanical Garden.

Annals of the Missouri Botanical Garden 91(3): This volume contains six manuscripts from 1999 International Aroid Conference at the Missouri Botanical Garden.

Annals of the Missouri Botanical Garden 91(4): This volume contains the revision of *Dieffenbachia* of Mexico, Central America, and the West Indies by Tom Croat, as well as the revision of *Dracontium* by Guanghua Zhu & Tom Croat.

**See "Recent Aroid Literature" in this issue for a more complete review of these titles.

Zamora. We sent another shipment of plants to Quito from Zamora, before heading for Loja. On the way up the slope to Loja, we collected at the Estación San Francisco, and spent the night. The field station is spacious, located at the bottom of a steep road that is not open to traffic. The biological reserve is located on steep slopes with montane vegetation and is rather high for a very rich aroid flora, but a large percentage of the species that occur there appear to be new to science. Reaching the forest requires crossing a deep river on a cable car pulled by hand. On the other side, the slope is so steep that it is equipped with stairs for much of the ascent. Among the new species is a member of *Anthurium* sect. *Decurrentia*, *A. chloros* Croat (Fig. 13, Croat 92092), *A. cutucuense* Madison (Fig. 14, Croat 92105), *A. obpyriforme* Leimbeck. Other species seen there included *A. longinternodum* Croat, *A. variegatum* Sodiro, *A. trilobum* André, *A. scandens* (Aubl.) Engl., *Philodendron ceronii*, *P. ruizii*, and *Rhodospatha densinervia* Engl. Along with **Florian Werner**, a German biologist studying epiphytes at the station, I am planning to do an aroid florula of this biological reserve. The emphasis on the study of epiphytes at the reserve would make this a good place to do a florula.

We collected in the elfin forest near the summit of the divide just east of Loja, then stopped in Loja to purchase supplies and headed south to Vilcabamba. We found a convenient tourist hotel where we were able to back right up to the door, and it also had a large party area for pressing plants. Vilcabamba has a nice, sunny climate and is popular with tourists. We had our first experience with a dead battery here. Fortunately, we were able to push the truck to a mechanic, who cleaned the terminals, and we had no problem with it for nearly a week.

Then we drove south toward Valladolid through terrain that is very dry between Vilcabamba and Yangana. At this point you climb steeply before reaching the border with Zamora-Chinchipe Province. The vegetation becomes more mesic and the road passes through the southern edge of the Podocarpus National Park. We collected about 30 km north of Valladolid, at about 2250 m, finding a number of aroids including *Anthurium amoenum* Kunth, *A. longegeniculatum* Engl., *A. soukupii* Croat, *A. variegatum* Sodiro, *A. nigrescens* Engl., and a new species, *A. tuntiakii* Croat (Fig. 15, Croat 92687).

The rest of our journey to the southern border of Peru was interesting, but the vegetation became dryer and dryer, with fewer aroids. Alternatively, there were many interesting species in other families. We made it all the way to the border at La Balsa, south of Zumba. We were surprised to learn that there was a new road on the other side of the border that was not on the map and was unknown to anyone I talked to.

Returning to Loja, we put Greg and Tuntiak on a bus for Quito, with 12 bags of plants. Greg had agreed to work with me for only one month and was due back in Quito. Lynn and I headed for Guayaguil. We collected in the cloud forest areas between Balsas and Piñas in El Oro Province at 400–1000 m. This is a strange phenomenon because most of the western slopes are very dry, but this narrow band of rich forest lies where the afternoon clouds gather on the mountainside and it is surprisingly rich in aroids. Species found here include: *Anthurium argyrostachyum* Sodiro, *A. cavispatha* Croat & J. Rodríguez, *A. dolichostachyum* Sodiro, *A. mindense* Sodiro, *A. propinquum* Sodiro var. *albispadix* Croat, *A.*



Fig. 13: *Anthurium chloros* (Croat 92092)



Fig. 14: *Anthurium cutucuense* (Croat 92105)



Fig. 15: *Anthurium tuntiakii* (Croat 92687)

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Konnyaku

Eating Amorphophallus Konjac

By Albert Huntington

Why is it that the greatest cuisines of the world seem to be based on taking something that would normally be considered completely inedible, and magically transforming it into a delicacy? Who would have thought that a fattened duck liver could taste so good when prepared by the French? Who could have predicted that the Thai could create a whole sublime cuisine based on peppers so hot they can blister your skin, and a sauce basically composed of rotted fish?



The absolute masters of food transformation may be the Japanese, who have convinced much of the world that it's hip to eat completely uncooked fish on top of a little vinegared rice. They've also got things like Fugu – one of the most poisonous fish in the world, carefully detoxified and rumored to taste like chicken. Or consider Natto – fermented soybeans with the texture of lumpy mucus – and a great delicacy in Japan.

Yes, if any culture could come up with a palatable way to eat the stinky, astringent, and possibly poisonous *Amorphophallus Konjac*, popularly sold in the west as a “voodoo lily bulb,” known for its huge, pungent flower and single leaf borne on a bizarre mottled stalk, it would have to be the Japanese.

Amorphophallus Konjac has been eaten in Japan for over 1500 years, and the first written record of konnyaku consumption dates back to the 6th Century AD. Currently in Japan, it's available as noodles, as sweetened dessert jelly, as little round balls and as a block which can be cut to resemble seafood. The noodles are slippery yet firm, similar in texture to bean thread noodles. Flavored blocks of konnyaku resemble steamed calamari, with the familiar firm jelly texture.

Konnyaku is made by first washing the tubers of *Amorphophallus Konjac*, cutting them up and leaving them out to dry. The dry strips of konjac are milled into a flour, then mixed with water and precipitated with a little calcium hydroxide. The resultant paste is formed into blocks or noodle shapes, then steamed and boiled.

Konnyaku noodles, called shirataki, are commonly used in sukiyaki, a sort of Japanese hot pot dish, and konnyaku is also a common ingredient in the famous ozoni stew, eaten during new years celebrations. Slices of konnyaku are often served as a vegetarian sushi substitute, and it may even be cooked as a steak. MOS Burger, a famous Japanese burger joint, even offered a konnyaku burger for sale at one point.

In recent years, konnyaku has been touted as a health food. It is low in calories, high in dietary fiber, and has almost no fat. It has recently been advertised to reduce cholesterol, assist in weight loss, prevent high blood pressure and help with blood sugar regulation.

Konnyaku has little flavor of its own, and is often mixed with other ingredients during the manufacturing process for the purpose of adding flavor. Seaweed powder gives it a seafood flavor, and sweeteners are added to turn it into a dessert. Plain konnyaku takes on the flavor of the sauce it is cooked with.

Konnyaku can be obtained from your local Asian grocery store, usually in the refrigerated section. It is commonly packed wet in sealed plastic packages, and may be white or dark in color, depending on how it is been processed. Sealed in its original packaging, konnyaku keeps for months in the refrigerator, but once it has been opened, it should be used within a week or so. Blocks of konnyaku should feel firm and spring back to their original shape when bent. The darker colored konnyaku is the same as the lighter colored version, but it has been mixed with a little seaweed powder for flavor and color.

It is possible, but not common even in Japan, to make your own Konnyaku at home. Pickling lime can be obtained from suppliers of products for canning. You can grow your own *Amorphophallus konjac* tubers. Closely related *Amorphophallus paeoniifolius* is sometimes seasonally available at Indian markets.

HOMEMADE KONNYAKU

Ingredients:

1kg *Amorphophallus Konjac* tubers, fresh
200cc lime (calcium hydroxide = pickling lime solution)

Steps:

1. Obtain *amorphophallus konjac* tubers from your local *amorphophallus* farmer. (Yes, they have these in Japan.)
2. Wash *amorphophallus* tubers in water, then cut into 1/2" chunks. You will want to wear rubber gloves during this time to prevent skin irritation.
3. Boil 2 hours until a skewer can be inserted easily all the way through.
4. Allow to cool overnight, then remove skins.
5. Place *amorphophallus* tubers in blender, adding approximately 3x the amount of water. Blend 20 minutes.
6. Pour *amorphophallus* slurry into a large bowl. Add the limewater slowly, stirring.
7. Magic occurs – the paste will separate and firm up. You want it to firm up, but not too much or too little. So be controlled about how much limewater you put in. Don't dump in the whole thing.
8. Form into balls and boil for one hour.
9. You've got konnyaku.

The real origins of Sukiyaki, a Japanese stew of thinly sliced beef, noodles and vegetables, have been forgotten in the mists of time. One thought is that the word means "plowshare grilling", and that the dish originally was cooked by farmers on plowshares out in the fields, due to strictures against eating meat at home. In 1873, the Meiji Emperor declared that beef was acceptable for consumption, and the dish gradually moved into the mainstream. What follows is a simple konnyaku dish with basic sukiyaki flavorings, but without the meat.

SIMPLE SUKIYAKI TYPE KONNYAKU NOODLES

Ingredients:

1 pkg. Shirataki Konnyaku Noodles
4 green onions, sliced in half
1/4 cup water
2 tbsp. sugar
1/4 cup soy sauce
2 tbsp. cooking sake or white wine

Steps:

1. Drain shirataki konnyaku noodles and set aside.
2. Combine liquid ingredients and bring to a boil.
3. Add shirataki konnyaku noodles and simmer for 10 minutes.
4. Add green onions, cook for additional 2-3 minutes
5. Serve in bowls plain or garnished with a little pickled ginger, fresh tomatoes, cucumbers, boiled eggs, etc.

The Japanese often eat Konnyaku plain or flavored with a little sauce. The recipe below is in a similar style.

SPICY KONNYAKU

Ingredients:

1 pkg. konnyaku (block form)
2 tbsp. soy sauce
1 tbsp. oil
1-1/2 tbsp. sugar
Ground red pepper to taste

Steps:

1. Score konnyaku diagonally on both sides, but in opposite directions (/ on side A, \ on side B), then cut into 1" cubes.
2. Heat oil in large skillet over high heat and stir-fry konnyaku cubes, browning all sides. 🍴

**Review of Bogner, Josef. “Aronstabgewächse,
Anmutige und vielgestaltige Exoten”
[Aroids, Graceful and Variable Exotics]: pp. 26-29.**

In: Die Sukkulantenwelt (Magazin der Sukkulanten-Sammlung Zürich) nr. 8: 1-[84]. Oct 2003. Cost: Swiss Fr. 10 (ca. \$8). It is available from the Sukkulantensammlung Zürich, Mythenquai 88, CH-8002 Zürich, Switzerland.

This is a beautifully illustrated journal (in German) with 144 remarkable and handsome photographs and maps, this particular issue focused on “Madagaskar – Ein schwindendes Paradies” [Madagascar, a Vanishing Paradise].

The editors did well to approach Josef Bogner, the now retired head gardener at Munich Botanic Gardens who recently (March 2004) was made Ehrendoktor, i.e., awarded an honorary doctorate by Ludwig-Maximilian University (Munich), a signal and rare honor. Bogner collected, studied, and published earlier on the aroids of Madagascar, as well as Mauritius.

He points out that although there are over 100 genera and 3300 aroid species in the family, there are only 10 genera with 21 species on Madagascar about half being endemic or near endemic such as the giant *Typhonodorum lindleyanum*, over four meters tall (illustrated with fruits and in situ) which looks more like a banana plant than an aroid until you see the inflorescence. This has a curious similarity with North American *Peltandra* and the report cites new fossil evidence from North America increasing the linkage: one involving *Nitophyllites limnestes* (until recently thought to be identifiable with *Philodendron*) as well recently discovered *N. zaisanicus* (Kazakhstan) and *N. bohemicus* (from Bohemia).

Photos are included of *Amorphophallus ankaranus* (with spathe white inside), *A. mangelsdorfii* with flowers and leaves at the same time, as well as *A. hildenbrandtii*.

The one endemic group is the Tribe *Arophytoneae* with three genera (*Arophyton* – seven species [two illustrated], *Carlephyton* – two species, and *Colletogyne* – one species [illustrated]). The final question is what is *Arophytoneae* related to???? The author closes with the interesting suggestion that new DNA studies might reveal a relationship to *Peltandreae*!

Dan H. Nicolson

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ECUADOR 2004 PART I

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Fig. 16: Possible new species of *Philodendron* (Croat 92783)

umbricolum Engl., *Dieffenbachia killipii* Croat & Grayum, *Philodendron acutissimum* Engl., *P. clarkei* Croat, *P. sparreorum* Croat, *P. subhastatum* Engl., *P. tenue* K. Koch, *P. verrucosum* Mathieu ex Schott, *Stenospermation densiovulatum* Engl. and *S. sodiroanum* Engl. We also collected what appears to be a new species of *Philodendron* (Fig. 16, Croat 92783). Later we saw the same species at 580 m near Guasaganda in Cotopaxi Province.

After a stop in Guayaquil, where we spent the night at the home of **Xavier Cornejo**, we headed to Quito. I'd made arrangements to make a trip to Cerro Samana with Xavier about a week later. After sending Lynn off for the States, I set to work drying the rest of the 2400 collections made on this first part of the expedition. It had been the most extensive, one month trip I've taken and the number of aroids collected was a record. In the next issue of the newsletter, I will report on that trip and subsequent trips to the Ecuadorian Oriente, a first-ever trip from Lumbaquí to Santa Barbara in the northeastern part of the country, and my first trip to the El Chical Region in the northwestern part of the country. 🍷

Recent Aroid Literature

By Emily Yates, Missouri Botanical Garden

Carlsen, M. & T. B. Croat. 2004. New Species of *Anthurium* section *Semaeophyllum* (Araceae) from Central and South America. *Novon* 14 (4):401-412.

Seven new species of *Anthurium* with tri-lobed leaves belonging to section *Semaeophyllum* (Araceae) have been discovered and are published for the first time. They include: *Anthurium ancushii* from Peru, *A. chimborazense* from southern Ecuador, *A. ternifolium* and *A. pinkleyi* from northeastern Ecuador, *A. constrictum* and *A. moronense* from southeastern Ecuador and Peru, and *A. rotundatum* ranging from southern Costa Rica and Panama to northern Colombia.

Chen, J., P. S. Devandand, D. J. Norman, R. J. Henny & C-C. T. Chao. 2004. Genetic Relationships of *Aglaonema* Species and Cultivars Inferred from AFLP Markers. *Annals of Botany* 93: 157-166.

Aglaonema is an important ornamental foliage plant genus, but genetic relationships among its species and cultivars have not been reported. This study analyzed genetic relatedness of 54 cultivars derived from nine species using amplified fragment length polymorphism (AFLP) markers. Initially, 48 EcoRI + 2/MseI + 3 primer set combinations were screened, from which six primer sets that showed clear scoreable and highly polymorphic fragments were selected and used for AFLP reactions. AFLP fragments were scored and entered into a binary data matrix as discrete variables. Jaccard's coefficient of similarity was calculated for all pair-wise comparisons among the 54 cultivars, and a dendrogram was constructed by the unweighted pair-group method using the arithmetic average (UPGMA). The number of AFLP fragments generated per primer set ranged from 59 to 112 with fragment sizes varying from 50 to 565^obp. A total of 449 AFLP fragments was detected, of which 314 were polymorphic (70 %). All cultivars were clearly differentiated by their AFLP fingerprints. The 54 cultivars were divided into seven clusters; cultivars within each cluster generally share similar morphological characteristics. Cluster I contains 35 cultivars, most of them are interspecific hybrids developed mainly from *A. commutatum*, *A. crispum* or *A. nitidum*. However, Jaccard's similarity coefficients among these hybrids are 0.84 or higher, suggesting that these popular hybrid cultivars are genetically much closer than previously thought. This

genetic similarity may imply that *A. nitidum* and *A. crispum* are likely progenitors of *A. commutatum*. Results of this study demonstrate the efficiency and ease of using AFLP markers for investigating genetic relationships of ornamental foliage plants, a group usually propagated vegetatively. The AFLP markers developed will help future *Aglaonema* cultivar identification, germplasm conservation and new cultivar development.

Chen, J., P. S. Devanand, R. J. Henny, D. J. Norman, C.-C. T. Chao. 2004. Interspecific relationships of *Alocasia* revealed by AFLP analysis. *The Journal of Horticultural Science and Biotechnology* 79 (4): 582-586.

This study analyzed genetic relationships of 23 *Alocasia* cultivars across 17 species using amplified fragment length polymorphism (AFLP) markers. Six primer sets, selected from an initial screening of 48, generated a total of 578 scorable AFLP fragments of which 334 (58.4%) were polymorphic. All cultivars were clearly detected by their AFLP fingerprints. A dendrogram was constructed using the unweighted pair-group method of arithmetic averages (UPGMA). Principal coordinated analysis (PCOA) was carried out to show multiple dimensional distributions of cultivars. Both UPGMA and PCOA analyses separated the 23 cultivars into three clusters. Cluster I comprises 16 cultivars, mainly derived from *A. crassifolia*, *A. cuprea*, *A. longiloba*, *A. grandis*, *A. guttata*, *A. plumbea*, *A. macrorrhiza*, *A. micholitziana*, and *A. villeneuvei* or hybrids of *A. lowii* X *A. sanderiana* and *A. cuprea* X *A. veitchii*. Jaccard's similarity coefficients for these species ranged from 0.43 to 0.77. Cluster II contains six cultivars, which include *A. cadieri*, *A. cucullata*, *A. gageana*, *A. odora*, and *A. portei*. Jaccard's similarity coefficients varied from 0.52 to 0.83. There is only one cultivar, "Hilo Beauty," in the cluster III, whose low similarity (0.21) with the rest of the *Alocasia* species may suggest that it could actually belong to another genus of *Araceae*. Based on documented interspecific hybrids, it appears that hybrids were developed from species exclusively within the identified clusters. This may suggest that *Alocasia* species sharing high Jaccard's similarity coefficients are more likely to be intercrossable. The interspecific relationships detected by the AFLP analysis could provide the genetic basis for selecting parents for future hybrid development.

Croat, T. B. 2004. Revision of *Dieffenbachia* (Araceae) of Mexico, Central America, and the West Indies. *Ann. Missouri Bot. Gard.* 91(4): 668-772.

The genus *Dieffenbachia* Schott has approximately 135 species, most of them occurring in South America. Major centers of diversity for the genus include Colombia with 37 species, Ecuador (34), Peru (30), Brazil (27), Panama (20),

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RECENT AROID LITERATURE *Continued from page 11*

and Costa Rica (13). There are 26 species in Central America, with 20 species (77%) new to science. These are *D. burgeri* Croat & Grayum, *D. copensis* Croat, *D. crebripistillata* Croat, *D. davidsei* Croat & Grayum, *D. fortunensis* Croat, *D. fosteri* Croat, *D. galdamesiae* Croat, *D. horichii* Croat & Grayum, *D. isthmia* Croat, *D. killipii* Croat, *D. lutheri* Croat, *D. nitidipetiolata* Croat, *D. obscurinervia* Croat, *D. panamensis* Croat, and *D. standleyi* Croat described herein and *D. beachiana* Croat & Grayum, *D. concinna* Croat & Grayum, *D. grayumii* Croat, *D. hammelii* Croat & Grayum, and *D. tonduzii* Croat & Grayum described elsewhere. Most species range from Nicaragua to Panama. Belize has only one species of *Dieffenbachia*; Mexico, El Salvador, and Guatemala have two species, followed by Honduras (3), Nicaragua (6), Costa Rica (13), and Panama (20). Only a few Central American species could be considered widespread. Among the most widespread are *D. oerstedii* Schott and *D. wendlandii* Schott, both of which range from Mexico to Panama, as well as *D. nitidipetiolata* and *D. tonduzii*, which range from Honduras to Ecuador. Species endemism is high, especially in Costa Rica (3) and Panama (9). A total of nine species are shared between Panama and Costa Rica. Eight species, almost 31% of the total, range into South America. These are *D. davidsei*, *D. isthmia*, *D. killipii*, *D. longispatha*, *D. nitidipetiolata*, *D. obscurinervia*, *D. seguine*, and *D. tonduzii*. Most of these only extend to Colombia, but three species, *D. killipii*, *D. nitidipetiolata*, and *D. tonduzii*, range to Ecuador. Only *D. killipii* ranges to the eastern slope of the Andes. *Dieffenbachia seguine* ranges into Brazil and Bolivia, from the West Indies.

Friis, E. M., K. R. Pedersen & P. R. Crane. 2004. Araceae from the Early Cretaceous of Portugal: Evidence on the emergence of monocotyledons. *Proc. Natl. Acad. Sci. U.S.A.* 101(47):16565-16570.

A new species (*Mayoa portugallica* genus novum species novum) of highly characteristic inaperturate, striate fossil pollen is described from the Early Cretaceous (Barremian-Aptian) of Torres Vedras in the Western Portuguese Basin. Based on comparison with extant taxa, *Mayoa* is assigned to the tribe Spathiphyllae (subfamily Monsteroideae) of the extant monocotyledonous family Araceae. Recognition of Araceae in the Early Cretaceous is consistent with the position of this family and other Alismatales as the sister group to all other monocots except *Acorus*. The early occurrence is also consistent with the position of Spathiphyllae with respect to the bulk of aroid diversity. *Mayoa* occurs in the earliest fossil floras (from circa 110 to 120 million years ago) that contain angiosperm flowers, carpels, and stamens. The new fossil provides unequivocal evidence of monocots in early angiosperm assemblages that also include a variety of key "magnoliid" lineages (e.g., Chloranthaceae) but only a limited diversity of eudicots.

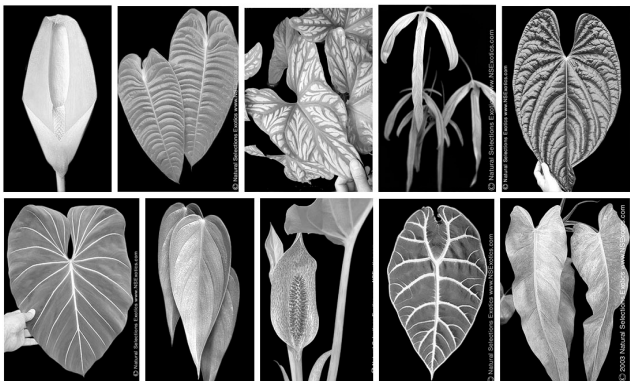
Grenand, P., C. Moretti, H. Jacquemin, M.-F. Prévost. 2004. *Pharmacopées traditionnelles en Guyane*. IRD Editions, Institut de recherche pour le développement, Paris, France.

The book deals with plants of French Guiana that are used for pharmacological purposes, and is filled with beautiful photographs of most species treated. The Araceae section (p. 164–183) treats approximately 20 different aroid species with synonyms, vernacular names, descriptions of morphology and ecology, specimens cited, and medicinal uses for the French Guiana. The book contains an extensive bibliography, and an index of common names that will be immensely useful for anyone working with plants in the Guianas. Also important is an extensive tabular analysis of chemical constituents of the species studied with amounts of each chemical constituent present.

Kreft, H., N. Köster, W. Küper, J. Nieder & W. Barthlott. 2004. Diversity and biogeography of vascular epiphytes in Western Amazonia, Yasuní, Ecuador. *Journal of Biogeography* 31(9): 1463.

Although vascular epiphytes are important components of species richness and complexity of Neotropical forests, vascular epiphytes are under-represented in large-scale biogeographical analyses. The diversity, biogeography and floristic relationships of the epiphytic flora of the Yasuní region (Western Amazonia) were studied in a Neotropical

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context, with special emphasis on the influence of the Andean flora on floristic composition and diversity of surrounding lowland forests. The vascular epiphyte flora of Yasuní with 16 published Neotropical epiphyte inventories were compared. Secondly, based on a floristic database with records of more than 70,000 specimens of vascular epiphytes from the Neotropics the elevational composition of eight selected inventories was analyzed in detail. The vascular epiphyte flora of Yasuní is characterized by a very high species richness (313 spp.). A moderate portion of species are endemic to the Upper Napo region (ca. 10%). However, this figure is much higher than previous analyses primarily based on woody species suggested. Geographical ranges of these species match with a proposed Pleistocene forest refuge. Compared with Northern and Central Amazonian sites, Western Amazonian epiphyte communities are characterized by a higher portion of montane and submontane species. Species richness of vascular epiphytes at the sites was correlated with the amount of rainfall, which is negatively correlated with the number of dry months. Recent and historic patterns of rainfall are the driving forces behind diversity and floristic composition of vascular epiphytes in Western Amazonia: high annual rainfall in combination with low seasonality provides suitable conditions to harbor high species richness. The proximity to the Andes, the most important centre of speciation for most Neotropical epiphytic taxa, in combination with the climatic setting has allowed a continuous supply of species richness to the region. At least for epiphytes, the borderline between the Andean and Amazonian flora is much hazier than previously thought. Moreover, the comparatively moist climate in Western Amazonia during the Pleistocene has probably led to fewer extinctions and/or more speciation than in more affected surrounding lowlands.

Yin Jian-Tao, Li Heng, Xu Zai-Fu. 2004. *Arisaema menghaiense* (Araceae), a New Epiphytic Species from South Yunnan, China. *Novon* 14: 372–374.

Arisaema menghaiense J. T. Yin, H. Li & Z. F. Xu. (sect. *Pistillata* Engler) is described and illustrated as a new species of Araceae from South Yunnan, China. It is closely related to *Arisaema lobatum* Engler in having a globose tuber, trifoliolate leaf blades, a unisexual spadix, and an erect cylindrical appendix. It differs in its epiphytic habit, the inflorescence that appears before the leaf, a green (female) or pale purple (male) spathe with a filiform acumen ca. 60 cm (male) or 25 cm (female) long, a pale green, erect, sessile cylindrical spadix appendix with a few acute neuter flowers basally and anther thecae opening by an apical slit.

Zhu, G. & T. B. Croat. 2004. Revision of *Dracontium* (Araceae). *Ann. Missouri Bot. Gard.* 91(4): 593–667.

A taxonomic revision of the genus *Dracontium* L. (Araceae) is presented predominantly from morphological, anatomical, and phytogeographic data. *Dracontium* is treated as comprising 23 species, including ten new species: *D. amazonense* G. Zhu & Croat, *D. angustispathum* G. Zhu & Croat, *D. asperispathum* G. Zhu & Croat, *D. bogneri* G. Zhu & Croat, *D. grandispathum* G. Zhu & Croat, *D. grayumianum* G. Zhu & Croat, *D. guianense* G. Zhu & Croat, *D. peruvianum* G. Zhu & Croat, *D. plowmanii* G. Zhu & Croat, and *D. prancei* G. Zhu & Croat. Five names are newly lectotypified herein: *Amorphophallus nivosus* Lem., *A. papillosus* hort. ex Rafarin, *Dracontium elatum* Masters, *D. pittieri* Engl., and *D. soconuscum* Matuda. The following species are newly synonymized: *D. carderi* Hook. f., *D. costaricense* Engl., *D. dressleri* Croat, *D. lineare* G. S. Bunting & Tillett, *D. lorentense* K. Krause, *D. ornatum* K. Krause, *D. trianae* Engl., and *Echidnium regelianum* Engl. All taxa are described and illustrated.

MANUSCRIPTS FROM THE VIII INTERNATIONAL AROID CONFERENCE

Missouri Botanical Gardens, St. Louis, 9–11 August, 1999
Contact Tom Croat if you would like to purchase this volume, including all of the following papers:

Cardona, F. 2004. Synopsis of the Genus *Spathiphyllum* (Araceae) in Colombia. *Ann. Missouri Bot. Gard.* 91(3): 448–456.

The last revision of *Spathiphyllum* was published over 40 years ago, and there is considerable need for additional new work throughout the tropics. Preliminary results are presented here for the genus *Spathiphyllum* in Colombia, where 18 of the 50 known species occur. In this geographical region, all species appear restricted to the lowland to middle-elevation forests of interandean valleys and Amazonia and Chocó regions, from sea level to 1300 m. The middle Río Magdalena valley in northwestern Colombia, with 9 species, exhibits the highest concentration of taxa.

Gonçalves, E. G. 2004. Araceae from Central Brazil: Comments on Their Diversity and Biogeography. *Ann. Missouri Bot. Gard.* 91(3): 457–463.

Current knowledge about the diversity and biogeography of aroid taxa from central Brazil is presented here and discussed. For practical reasons, the study area was limited to the Cerrado phytogeographic province. In all, 18 genera and 64 species of Araceae were found naturally occurring in the studied area. The Jaccard similarity index between the aroid flora of the Cerrado province and the two main

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RECENT AROID LITERATURE *Continued from page 13*

contiguous forested provinces (Mata Atlântica and Amazonia) was calculated for both genera and species. The values obtained show a closer similarity in species composition between the Cerrado and Amazonia (0.127) than between the Cerrado and Mata Atlântica (0.088). However, the generic similarity with Mata Atlântica (0.591) is higher than with Amazonia (0.414). Approximately 32% of the aroid species of central Brazil can be considered endemic to the Cerrado province; the only genus known to be endemic to the Cerrado is *Gearum*.

Henny, R. J., D. J. Norman & J. Chen. 2004. Progress in Ornamental Aroid Breeding Research. *Ann. Missouri Bot. Gard.* 91(3): 464–472.

Interest in development of new tropical ornamental aroid cultivars has accelerated rapidly during the past 20 years. This was stimulated by high market demand and newly published research that presented potential breeders with techniques to control aroid flowering by application of gibberellic acid sprays. In addition, research demonstrated how seed production could be enhanced by controlling relative humidity in aroid genera that were previously difficult to hybridize. Subsequent genetic studies showed foliar variegation patterns to be simply inherited, which made planning crosses easier. This paper reviews some of the important techniques used in developing new ornamental aroid cultivars.

Gonçalves, E. G., E. A. S. Paiva & M. A. Nadruz C. 2004. A Preliminary Survey of Petiolar Collenchyma in the Araceae. *Ann. Missouri Bot. Gard.* 91(3): 473–484.

This article presents a preliminary systematic survey of 115 species from 56 genera (approximately 51% of the genera) of Araceae in which the pattern of petiolar collenchyma (or its absence) is described and classified. This feature appears very conservative within the genera, apparently not changing qualitatively with developmental or environmental conditions. Cross sections at the midpoint between petiole base and apex were mainly studied, but apical and basal sections were also observed in those genera where the collenchyma is absent at petiole midpoint. Three patterns are defined: (1) collenchyma absent at the midpoint between petiole base and apex; (2) a peripheral continuous or interrupted ring of collenchyma (philodendroid pattern); (3) rounded strands of collenchyma concentrically disposed and associated with peripheral vascular bundles (colocasoid pattern). No genera with bisexual flowers so far analyzed have collenchyma at petiole midpoints, although this usually occurs at apex and base. Monoecious genera can display all

three patterns, but pattern 1 appears restricted to tribe Zamioculcadeae and the genus *Anubias*. The presence of a fully collenchymatous petiole seems to appear only in more derived genera in the Araceae: it may be an apomorphic feature within the family.

Keating, R. C. 2004. Vegetative Anatomical Data and Its Relationship to a Revised Classification of the Genera of Araceae. *Ann. Missouri Bot. Gard.* 91(3): 485–494.

A recent compilation of anatomical literature and original anatomical investigations of the leaf and petiole of Araceae led to a search for the most concise systematic organization of the genera within this family. Among structural data sets summarized, useful observations included those of type and position of conducting and mechanical tissue, aerenchyma, raphide crystals, and laticifers. These data were superimposed on three lines of evidence using DNA sequences. The revised classification presented here resulted in fewer anomalous generic placements and provides a framework for understanding the evolution of the family. Currently 106 genera are recognized and divided among 9 subfamilies and 21 tribes. The new subfamily Schismatoglottidoideae is described.

Keating, R. C. 2004. Systematic Occurrence of Raphide Crystals in Araceae. *Ann. Missouri Bot. Gard.* 91(3): 495–504.

The presence of idioblastic cells bearing calcium oxalate raphide crystals is a defining character for Araceae. This light microscopical survey of vegetative organs, mostly leaf and petiole tissues, of 104 out of 106 recognized genera of the family, plus *Acorus*, demonstrated the presence of several distinctive raphide crystal types and the sometimes specialized cells that bear them. Cell types may be unmodified with respect to neighboring cell shapes, or may be idioblastic and become wide, elongated, tubular, articulated, spindle-shaped, or biforine-shaped. Crystal bundles may be simple, compound, or oblique-overlapping. This variation is posted against a new classification of the family. While each of the nine subfamilies has a unique collection of types, specialization trends are obscure. Biforines are found only among the unisexual-flowered genera.

EDITOR'S NOTE: *This section of the newsletter is ongoing. Additional reprints, copies, or citations of articles, books, etc., encompassing recent publications about aroids can be submitted for inclusion in "Recent Aroid Literature" in upcoming issues of the IAS newsletter to: Emily Yates, Missouri Botanical Garden, P.O. Box 299, St. Louis, MO 63166-0299, Emily.Yates@mobot.org. 🍷*

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AROIDIA RESEARCH

Alocasia "calodora" and/or "portidora"

This information is directed toward those readers who may have one or both of the above two Alocasia hybrids in their collections and/or nurseries.



I am LariAnn Garner, the Director of Aroidia Research, <http://aroidiaresearch.org/>, and the Alocasia x calidora (aka "calodora," "caladora," "persian palm") and Alocasia x portora (aka "portidora," "portadora," "portodora") are two of our earliest hybrids, released to the trade in the early 1980s. Because Aroidia Research was inactive for a number of years after the release of those plants, we were unaware of the extent to which these plants have been propagated, sold, and distributed throughout the world. Now that Aroidia Research has resumed full activity, we have become aware of the widespread distribution and acceptance of these two plants, and we have decided to provide this information about their true origin and nomenclature to all those who own, are selling, or are propagating these plants.

Since our nomenclature for these plants was published in the journal of the International Aroid Society (the International Cultivar Registration Authority [ICRA] for aroids), Vol. 6, No. 3, July 1983, before they were released to the horticultural trade, the original published grex names we gave these hybrids take precedence over any other names that collectors, marketers, distributors and/or growers have attributed to them subsequently. This is in accordance with the International Code of Botanical Nomenclature (Saint Louis Code), Appendix 1, Article H.4.1.

Therefore, we ask that you please make the necessary change(s) in reference to these plants to reflect both the valid nomenclature and the true origin of these two plants. Our only remuneration from the wide distribution of these plants will be that the correct naming and origin is known and used by all who own, sell, distribute, or propagate them.

To recap, the Alocasias being sold as "calodora," "caladora" and/or "persian palm" are really our Alocasia x calidora, and the Alocasias being sold as "portidora," "portadora" or "portodora" are really our Alocasia x portora.

Thank you for your consideration and attention to these matters.

LariAnn Garner
Aroidia Research
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