

Vireya Vine

ISSUE # 12 JANUARY 1987

AN INTERNATIONAL GROUP OF "VIREYA BUFFS"

PUBLISHED BY THE EDUCATION COMMITTEE OF THE RHODODENDRON SPECIES FOUNDATION

From Herbert Tucker

Dear Vireya Vine,

Tucuman, Argentina

December 3, 1986

Since most of the Vireyas giving first and beautiful bloom here come from Pete Sullivan in San Francisco or from collectors/nurserymen there that had the good fortune to listen to Pete early on.... Tom Tatum's and Pete Sullivan's advice that Vireyas thrive on neglect seems to be something that we all need to be reminded of.

"Neglect" here means that I have reference materials that consist solely of your letters, the So. California A.R.S. Chapters bulletins and now, our Vireya Vine. (I wonder if you Statesiders know how anxiously we "outlanders" look forward to your letters, the bulletins, and the "Vine"?) Fertilizers - my "program" consists of a foliar spray meant for citrus, components unknown, given to me by an agronomist who was/is a rotten gardener. Once in a while a little Llama dung gets thrown into the pine needles that I use for a container mix. And with the onset of our (heavy) summer rains, the Vireyas do so well... I suspect that the summer rain will be my principal fertilizer for a long time to come.

Now, I don't get blooms from seedlings in two years. And I invariably have only "survivors" from my seed lots in spite of good germination. But these "survivors," which are set outside very early, seem to take an uncommon amount of neglect....and grow anyway.

So, to Tom's reminder about neglect, I'll add....patience. Maybe some of you don't get seedlings to bloom in two years either. Maybe your climate is something less than ideal too. But, with a dash of neglect and a lot of patience our Vireyas eventually flourish and their first bloom makes that extra year or so....forgettable. To each of you, the best for the Holidays and...; un abrazo!

Herbert Tucker

Fermin Cariola 985

Marcos Paz

4107 - Tucuman, Argentina

(Editor's note from E. White, It is real good to hear from Herb again, it was January 1983 "Vireya Vine # 3" that he last wrote to us. I hope that you don't wait so long next time Herb. I think that I must now come to the defense of good care for plants. If a person can give good conditions I think that it would be best to do so, but it is nice to be able to grow a group of plants like Rhododendrons that will take quite a bit of "neglect." I have lost many plants from just not being careful with the watering or from sun-burn. These plants are too slow growing to loose from neglect if it can be helped. This summer I had a plant of *R. retusum* 16" high and eight years old die from lack of water and a bit of cooking in the early spring sun. This should not have happened and I sure was unhappy with my self for it. I have seen some new "micro" sprinklers that look like the real thing for small areas. They should be much better than the mist-ers that some of us have used. These sprinklers have been developed for the orchard people where water is in short supply and where watering the whole landscape is not wanted. They are very low volume and come in many different spray shapes. They just plug into poly pipe and cost less than US \$1.00 each. If rain water can be used on your plants then I think that you will get a bit of nutrients with the rain. I don't know what happens to rain water after it is kept in a holding vessel but we see in park work a very large flush of growth each spring that we think comes from the winter and spring rains.

While I am still on the same page I ask those of you who have computers to send your letters on Disk. I can read all disk formats except "Apple or 8". This VV is being done on a Kaypro PC-10 computer which is IBM compatible. I have a program that will let me read any other disk in my floppy drive. So send them to me if you can.

I am becoming a believer of the "bloom after the 12 hour day goes by" crowd. I have many plants in bloom now, *R. christi*, *dielsianum*, *leptanthum*, *luraluense*, many *macgregoriae*'s, *rarum*, *javanicum* and five different hybrids. I have not been without at least 10 plants in bloom for at least a year now. But alas, still no sign of a bud on *R. superbum*, *blackii*, *yelliotii* and things like that. I have had a plant of *R. acuminatum* since 1973 and get only a single flash of growth per year. Has anyone ever seen *acuminatum* in bloom in captivity? This plant hardens off the new growth so fast it is even hard to get cuttings from.

From Leslie Riggall

Dear VV,

Kloof, South Africa

November 17, 1986

Replying to John Rouse's two questions, "Do grafted plants flower earlier than rooted cuttings? And do grafts that are only temporarily compatible flower even earlier?" I think that the answer is likely to be the affirmative for both questions.

A grafted plant has a much larger and stronger root system than a cutting, but apart from this the act of grafting itself seems to hasten flowering.

I have little experience with rhododendrons but plenty of experience with grafting camellias, and it is common practice for camellia breeders to graft their seedlings onto a stock, to hasten flowering by a couple of years.

It is a common experience to find that a plant which is dying will flower prematurely, or more heavily than usual, if it is already in flower, and the reason is obvious, to ensure survival of the species. The same principle would apply to a plant grafted onto incompatible stock, as the grafted plant has only a short time to live.

Five years ago the yellow camellia came into cultivation and every breeder was desperately anxious to get flowers and pollen for hybridizing as quickly as possible.. Many quite large plants have not yet produced a flower, but flowers have been obtained by taking cuttings from these plants and using them for cutting-grafts. This is a technique whereby the scion is joined to a cutting of stock, and both are placed in the rooting medium to strike roots together. Rooted cutting-grafts have produced yellow camellia flowers immediately, but have subsequently died. Since the objective was to obtain pollen quickly the experiment was a complete success.

This suggests that the use of incompatible stocks would stimulate the grafted plant into earlier flowering.

Leslie Riggall

Fern Valley Botanic Garden

Igwababa Road, Kloof 3610, South Africa

Ed Note; in issue #11, I asked John Rouse about the ratio of style lengths that he had talked about in his letter to the VV. The following might help clear it up.

From John Rouse,
Dear VV,

Toorak, Australia
November 16, 1986

Regarding your query on style length ratios, they are obtained as follows:



The style length is measured when the stigma has just become "wet" and receptive. The size of the corolla does not come into this picture. Style lengths that I have measured are; *R. anagalliflorum* - 2.5 to 3 mm; *R. gracilentum* - 17 mm; *R. macgregoriae* - 10 mm; *R. rubineiflorum* - 2 mm. So style length in a cross can be measured by the style length ratio. SLR (which by definition numbers 1.0 for a selfing). We define $SLR = \frac{\text{male style length}}{\text{female style length}}$.

R. anagalliflorum X *R. gracilentum* : $SLR = 17 \div 2.8 = 6$; > 1 and *R. macgregoriae* X *R. rubineiflorum* : $SLR = 2 \div 10 = 0.2$; < 1

These are our extreme successful crosses in *Vireya* to date. ie, we obtained viable seed and healthy seedlings. The range of SLR's in *Vireya* is large. *R. 'Gardenia AM'* has a style length of 100 to 105 mm and this may well be the longest style. *R. rubineiflorum* may well be the smallest. The range in *Vireya* is $2 \div 105 = 0.019 < SLR \text{ in } Vireya < 53$

I hope that this answers your query, let me know if you require more information.

John Rouse
House 8, Stonehaven Court
Toorak, Victoria, 3142, Australia

OK John, that is a good answer. I think that I understand now. *R. rubineiflorum* must be a very small plant, I can not even find it in the "books". ie, Sleumer or RHS handbook of 1980. But it is on the list of plants in cultivation that I have developed. EWS

From Fran Rutherford
Dear VV,

January 11, 1987
Port Orchard, Washington
NEW GUINEA, August 1986

I almost missed my flight to Sydney due to a dense fog at the Los Angeles airport. However, the Sydney flight was delayed due navigation instrument problems and I just made the flight. As United had sold my seat they moved me up to business class with no charge. We landed at the Sydney airport in the early morning of August 5. A light rain was falling which signaled the approach of Sydney's worst storm in the last 100 years. Five people lost their lives and property damage ran into the millions. Robert Stewart, Peter Shick and I had planned to see the sights of Sydney for a couple of days but we wound up spending a day and a half in the Eastside Motel. Thursday morning, Clyde Smith picked us up in his car and we went to the royal Botanical Garden where we met Dr. Walker. He showed us around the garden and the damage done by the storm. *Vireya*'s do not fare well in this garden so he has moved most to a garden outside of Sydney. Clyde then drove us to his home in WOLLONGONG. After a nice lunch, Clyde gave us a tour of the city which ended up at the Rhododendron Garden. The Garden is located on a hillside above the city and will be an outstanding rhododendron garden when fully developed. That evening the rest of the tour group arrived- Graham Smith, Oz Blumhardt, Michael Cullinane, Don Cullen, Denis Harris, Joyce Waters, and Snow and Maisie Foubister.

We arrived in Port Moresby the next afternoon and got our first taste of tropical heat. After paying our entry fee, we went directly to the Davara Hotel which is located a few blocks from the Port. This part of the city is a combination of modern high rise buildings and modest native homes. There is a great deal of litter in the streets. Betel nut stains are everywhere. That night we had a get acquainted dinner and met John who represented Pacific Tourist and who was to be in charge of all arrangements on the tour. This was his company's first experience with this type of tour which was most unfortunate for us. Venture Treks apparently was only concerned with making a profit on the tour.

The next morning they were dedicating a newly developed beach area across from our hotel and were going to celebrate with a sing-sing. Several tribes came dressed in their native finery and put on quite a show. Most of the natives wore intricate head dresses fashioned from bird feathers; the Bird of Paradise feathers being the most highly prized. The use of moss to decorate the hair is quite common. The singing and parading went on for three hours. One modern touch was a rock and roll band.

Landing at Wau is an exciting experience. The grass land strip is on a hillside. When you approach the strip, you have the feeling you are going straight into the hill. Taking off down hill would be a thrill. The Wau Ecology Institute is located about two miles from the airstrip and it is not a tiring walk. Wau is not much of a town but the locals grow some interesting plants in their gardens. The Institute guest house is run much like a Boy Scout camp. Bunk beds, community showers, community toilets, community kitchen and one large dining and living area. It is most pleasant place to stay. They also have a small zoo and aviary, providing good opportunity to see some of birds, animals and snake of the area. In New Guinea highland you hear but see few birds. The animals are mostly nocturnal and the snakes stay out of your way.

In the morning our transportation showed up late. It consisted of a Mazda van and a two ton Mazda open bed truck. We were expecting four wheel drive vehicles. These two vehicles were assigned to us for the entire trip. After a long delay, at the gas station we were off to Mount Kaindi. The road up the mountain is an all weather road(?), rather steep, lot of sharp curves with sheer drop offs and is very rough in some places. While the views are not spectacular, you do have a good view of the famous Eddie Creek gold mining areas. You find native men, women and children walking along side of the road for most of the way to the summit. Most of the men are carrying a primitive bow and arrows or machete. All wave as we pass. We were at the summit (7,800) by early morning and started our quest for *Vireya*'s. Graham remembered where he had seen some species on a previous trip on a narrow path not far from the summit. We found three species growing in rather dense forest shrubs and trees. Fortunately, they were still in bloom. These plants were reaching for the light but I would estimate receiving only direct sunlight for only a couple of hours a day. The forest floor is mostly clay with a thin layer of leaf mold and forest litter in which the *Vireyas* were growing. The soil was quite wet but well drained. We returned to the summit and started walking down the road at 9.30 a.m. The valley was obscured in fog but we were in sunshine. Very few *vireyas* were in bloom and quite difficult to spot. In fact, *Vireyas* are not overly plentiful and tend to blend in with other plants. We were lucky to have Graham along to identify plant and tell us where to look for *Vireyas*. Although I have a considerable collection of species at home the ones in nature appear quite different. It is most humbling experience to find out you know little about these plants and how they grow in the wild. We found many of the small leaf species growing on the road cuts or on rotten logs. The road cuts are almost pure clay or poor soil. These plants were usually small and growing under harsh conditions. The soil was quite damp. Those on rotten logs were in good condition and growing well. It appeared they were receiving adequate nutrients and moisture from the logs. I should point out the it is difficult to stray far off the road due to the terrain and dense growth. Again these plant were not receiving direct sun rays for most of the daylight hours. Orchids are very plentiful as epiphytes. Oz spotted a *Konori* in bloom on a broken branch and was able to retrieve one flower. Most of the epiphyte *vireyas* are so high in the trees that they are impossible to identify unless in bloom. By mid-afternoon, we were well down the mountain and had seen about all there was to see. We should have come in July according to the natives.

Those of us who were true *vireya* lover decided to take the two ton truck down to Eddie creek. Unfortunately, the road to Eddie Creek is not too well maintained and becomes impassable when it rains. We parked the truck well above Eddie Creek and decide to walk down to the creek. We had not gone far until the rain came in earnest. We did get down to Marie Creek and found a nice grove of *Herzogii* growing in tall grass. The leaves were in perfect shape with no insect damage. By the time we had taken a few cutting the rain became very heavy and we gave up the idea of reaching Eddie Creek. As this is a historic area I was looking forward to a visit but it was not to be. The road back to the truck was inundated and I was happy when we were under way to camp.

The drive from Wau to Lea takes most of the day. The first part of the trip follows Eddie Creek which is in a deep gorge below the road. Eddie Creek is very muddy its entire length due to gold mining activities. We stopped several times to enjoy the views and to look for *Vireyas*. Unfortunately, the area were they were last reported had been burned off. Once you leave the highlands, the road enters a wide flat valley. From here on in the road is almost straight through undeveloped plains. We found a few small *aurigeranum* plants growing along a creek in dense shrubs. I doubt if these plants will survive much longer due to competition from other plants. We stopped along the way at the Orchid House on the outskirts of Lea. Interesting with many plants but mostly common types. From here we went directly to the Lea Lodge which is a first class motel with excellent accommodations. A short walk from the Lodge took us to the Botanical Gardens. This is by far the best botanical garden in New Guinea and has an outstanding herbarium. Adjacent to the Botanical Garden is a War Memorial Garden which is well worth a visit. On our walk back to the Lodge, we were caught in a flash rain storm and became soaked to the skin.

The next morning we spent sometime seeing the city and then drove on to Goroka. The road to Goroka is in excellent condition but tiring and uninteresting. As you leave the valley floor the road climbs steeply up to Daulo Pass (8,100 feet) where we took a rest stop. The views from here are spectacular. We found numerous small *Vireya* growing on the road cuts in clay and large plants in the tall grass. Children were selling head bands made of bamboo and decorated with flowers. It was a relief to get out of the hot humid climate of the valley. From here to Goroka, you see many native huts with there small vegetable gardens. As always there are many fire ablaze on the hillsides where the natives are clearing brush for gardens. For some reason they never get out of control and resulting in a major forest fire. We past several areas where there were stands of *MacGregoriae* but we did not have time to investigate.

By late afternoon we reached Goroka and went directly to the Minogere Lodge. The Lodge is located on a hillside above the city. The accommodations are substandard and you had the feeling "Mr. Clean" had not visited this establishment for sometime. Goroka is the most modern of the highland cities and is quite interesting. This is the place to purchase anything you forgot to bring along. The J.K. McCarthy Museum is well worth a couple hours of your time.

In the morning we met Rev Norman Crutwell and he led us up the rough steep road to the Gahavisuka National Park. We parked on a ridge below the main park area and walked up his "rhododendron walk" through the brush to the developed areas. Growing in tall grass along the path were large plants of *scabridibracteum*, *superbun*, *dielsianum* and *culminicolum*. He was most generous in letting us take cutting of the plants. The cultivated area contain a line collection of *vireyas* both species and hybrids collected from the wild. There is also an excellent collection of native orchids. His term as director is coming to an end but I expect he will except an offer to stay on. I would urge anyone visiting Goroka to spend a day in the park.

Nigliguma village is located at about 8,000 feet and the main part of the village consists of about six native thatched huts. When we arrived, the entire population turned out to greet us. As is the custom in the high lands, our group had to shake hands with all the villagers. Our gear was quickly unloaded by the men and children and we were led to the guest house. This was a large hut built mainly of bamboo. The interior of this house was bare except for a sleeping platform about 18 inches off the floor. This platform, was made of woven bamboo slats and was not too comfortable. The toilet, was located in a small hut located 15 feet from the guest house. The exterior again was bare with a 55 gallon metal drum sunk into the ground. A rather small hole was cut in the middle of this drum. As the drum was sunk to ground level, using it required some dexterity especially for those with dysentery. Our water supply was a stream which ran by the huts. The stream was popular with the many pigs in the area.

After unpacking, we decided to look for *vireyas* on the hillsides. The village children decided to follow us and see what we were going to do. Once they found out we were after the flowering plants on the steep hillsides, they were off and running up the steep hills like mountain goats. Soon they returned with a large bouquet of *herzogii* and *macgregoriae*. By the time we returned, the women had already started to prepared dinner. This was being done in a 55 gallon metal drum. First they had put in hot rocks, then banana leaves, local potatoes etc, corn, peas, cabbage, chicken and then a few hot rock plus a sprinkle of water. Another layer of banana leaves and food. Thus the food was cooked by steam. Sanitation is unknown so you hoped a shot of pyridium would cure all. We ate in a smoke filled hut and set on the floor in hopes of a little fresh air. Later in the evening, three of the married ladies, there are no unmarried ladies in this tribe, came in and gave us a mini sing-sing. At first, they were a little hesitant as this is a missionary post and their tribal dress is almost nothing. Soon they got into the spirit of the sing-sing and continued singing long after we had retired.

We were up early the next morning but our transportation was late. I spent the time climbing the hill opposite the village but did not find any new *Vireyas*. Transportation finally arrive and we were taken up to an abandoned airstrip at 8,000 feet. Fortunately, porters were available to carry the food and sleeping bags. A day pack, camera gear and collecting bag is about all you can manage and still enjoy the hike. After a short walk to the end of the road, we entered the montane forest. The trail is well worn and easy to follow. In fact the forest growth is so dense that straying off the trail would not be advisable. The first flowering plants we saw were orchids and the red and yellow *dimorphanthera*. We also found an exceptionally beautiful white *dimorphanthera* which I planned to obtain cutting of on the return trip. However, on the return trip I was unable to locate the plant. A few *vireya* were growing along the trail. The light intensity on this part of the trail is not too great and it was difficult to photograph with only ASA 64 film. The ground is very wet and slippery in spots and I often had an outstanding view of the sky. After what seemed like a couple of hours hiking we reached the grass land and the going became easy. We were in a large valley which was bisected down the middle by a stream. From here on in to the Pindule Lakes is some of the most spectacular scenery in the world. Small palm trees, numerous streams, waterfalls and rugged mountains. In one area we found *comonae* growing on almost bare rock in just a little humus. Fresh water was running over the area. The plants were very old and straggly with a few inferior flowers. We also found epiphyte *vireyas* growing on palm trees and terrestrial *vireyas* at the base or in the shade of the palms. I would have liked to spend more time in this area as there probably was more interesting plant material to be located. Just before you reach the camp area, there is a large waterfall cascading down from Lake Piunde. Several *vireyas* were growing next to the falls and benefiting from the mist. The camp was a very pleasant surprise. A wooden structure with a stove, bunk beds, a piece of foam for a mattress, an eating area and on occasion electric lights. A few *vireyas* grow along side of the lake. A very nice *R. womersleyi* was found on the lake bank not far from camp.

While at the camp we hiked around the lower lake (Piunde) and up to the upper lake (Aunde). We found quite a few *vireyas* and orchids. Again time did not permit a thorough search of the area. We explored the hillside by the camp and found a couple of nice stands of *culminicolum* in bloom. None of our party made the hike to the top of Mount Wilhelm but stopped at about 12,000 feet. I understand the hike from the upper lake is quite rugged and I was feeling the effects of the altitude. The hike down from the camp to the airstrip was much easier then going up. It would have been fun and perhaps rewarding to follow the stream down but it would not be an easy hike. As the trail is well marked we did not go down as a group as each had some special area to see. Being the slow poke, I arrived about a half hour after the others at the airstrip. I expected a big raspberry greeting but our transportation had not arrived.

The trip back to Kundiawa and the Chumbu Lodge was pleasant. After three days sleeping in your clothes the prospects of a hot shower, clean clothes, a soft mattress and clean sheet was exciting.

Chimbu Lodge is a quality establishment with a good restaurant. In the morning we were on our way to Wabag along the Highland and Enga Highways. Its a pleasant drive and we did see a few *MacGregoriae* in bloom. We were scheduled to stay at the Kaiap Orchard Lodge but found we had no reservations and ended up at the Talumua Potato Research Station. Our quarters here was a medium sized wooden building apparently built for transient workers. Back to bunk beds, sleeping bags, one inadequate toilet, coleman lanterns and ice cold showers. Fortunately, I had my own towel and soap or I would have been out of luck. The food was excellent and the location just above the Kain Swamp was perfect for our purposes.

In the morning we all walked down to the Swamp. The Kain Swamp (8,000 ft) is a fresh water swamp of about 100 acres. To my surprise, the native children were fishing for trout in this swamp. Also surprising was the absence of a swamp odor and virtually no insects. Most of swamp is covered with a relatively thin layer of forest litter and humus which supports a growth of low grass. The *vireyas* and other shrubs grow on raised island tussocks above the water level but the roots appear to extend down into the water. The *vireyas* grow in small clumps in competition with other shrubs. *Vireyas* are not delicate plants in the wild which need ideal conditions to prosper.

The proper dress for *vireya* hunting in this swamp is shorts and no shoes. Quite a few children had gathered to watch the fun and were willing to carry our shoes. Walking in this swamp is not an unpleasant experience as the water is clean and the muck is mostly peat. One soon become over confident

following the kids and finds themselves knee deep in muck or sitting in water. This is what the children had come to see and we were happy to oblige. It quite a long tiring walk to the area containing vireyas. We were fortunate to find many commonae in bloom in various colors along with a few macgregoriae and orchids. The kids soon got into the act and would run ahead of us picking the flowers and bringing them back to us. We had a hard time convincing them they were not being helpful as we wanted to photograph the flowers on the plants. Some of the natives thought we were chasing the pigs and had to be assured by our guide this was not our aim. Pigs are a menace to vireyas as they uproot them for bugs. In time, most of the vireyas will be lost because of to activity. By midday, we had walked the "vireya area" and returned to camp.

In the afternoon we went down to the village where they were holding a sing-sing. The main attraction was a tribe dressed in there traditional festive dress. They march into the open field to the accompaniment of drums and whistles. Both men and women were dressed in the same fashion. Each wore a huge black hat. Face and neck had also been painted jet black. All were bare from the neck to the waist. All wore the same baggy pantaloons and were bare footed. They would line up in a chorus line and at a signal from the director start dancing. The dancers carrying native drums beat out the rhythm along with those who blew shrill whistles. Dancing is not a correct description. It was more of a jumping motion up and down in one place. Their toes never left the ground. They would do this same dance over a over again. It seemed to have a hypnotic effect on the audience. The rest of the natives were either in western style dress or tribal finery. The show was a high point in our trip and something one could not see outside of the highlands.

We got a reasonable early start in the morning but were delayed in obtaining gas and by a stop at the Orchid Station. The road to Mount Yakopimandi goes through several small villages and is not too scenic. The mountain is quite a ways off the main road. The climb to the village is up a well worn path and is an easy walk. Along the path we observed a few macgregoriae, blackii and plants which were probably hybrids. The village chief, who in theory owns this part of the mountain gave us a brief talk. He was dressed in a yellow tee shirt advertising a local product and blue jeans. It is not a large village but has a nice vegetable garden. Soon after leaving the village, the trail become quite steep as you enter the forested area. The chief stops and places a few fern fronds on a tree stump. This is to protect us from shakes, demons, unfriendly neighbors and forest creatures. We play it safe and add a few more fronds. A young boy named Yalo took my day pack and stayed with me during the rest of the trek. Beyerinckianum was plentiful along the trail and some were in bloom. The new growth on these plant was a very attractive. We also discovered large plants of pleianthum. None of these plants were in bloom. The village chief advised against going to the very top due to local feuds. The walk down the mountain was over some very slippery clay and I was happy to have Yalo helping me.

THIS STORY WILL BE CONTINUED IN VV # 13 IN A COUPLE OF MONTHS

FOR THE GOOD OF THE ORDER

HERE IS A DATE TO MARK DOWN AND PLAN FOR. The Australian Rhododendron Society and the International Rhododendron Union will be co-sponsors of an International Rhododendron Conference in Wollongong (just south of Sidney on the coast) in October 1988. The Theme of this meeting will be Azaleas and Vireyas. Save up some money and lets go. I have been to Wollongong and I know that the Australian people will put on a fine show. Also Think about going to New Zealand and having a look at Pukeiti. I am sure that Graham Smith at Pukeiti will set up something. I will pass more info on as it comes in.

VIREYA SEED

Seed of Vireya Rhododendron is not handled by the American Rhododendron Society Seed Exchange. Vireya seed should be sent to,
Esther Berry
617 Fairway Drive
Aberdeen, Wa. 98520 USA

The demand for Vireya seed, both species and hybrid far exceeds seed received for distribution. Please send as much seed as you can spare. The cost is \$1.00 per packet.

VIREYA VINE
RHODODENDRON SPECIES FOUNDATION
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