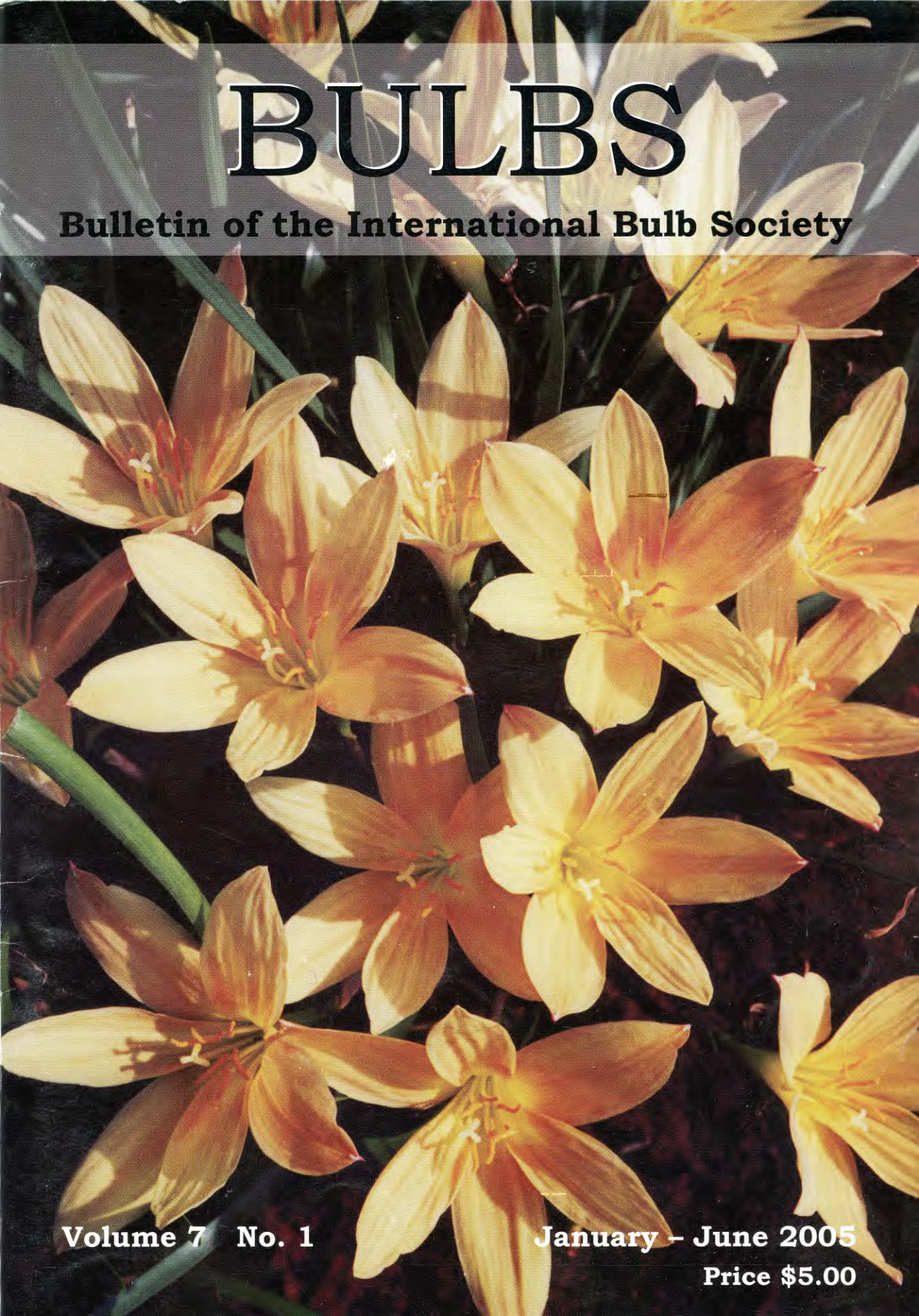

BULBS

Bulletin of the International Bulb Society

Volume 7 No. 1 January – June 2005

Price $5.00

International Bulb Society

Bulbs

The Bulletin of the International Bulb Society

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Bright yellow/apricot hybrid ***Zephyranthes*** bred by Fadjar Marta

First Words

Tony Palmer – Editor

It has been encouraging to see the recent increase in activity on the IBS Members internet forum which had been relatively quiet for some time. I urge those of you who are not yet taking part in it to join up, if only to give you the chance to benefit from Herb Kelly's stunning seed/bulb exchange. Some of the offerings this year have been amazing and are often snapped up in no time at all. You have to be in to win!

I have selected some of what for me have been highlights from the forum and published them below. This is very much my personal selection of topics that have taken my fancy and which I hope will illustrate the benefits of being online and also make available some of these interesting facts and opinions to a wider audience.

The chaotic business of assembling copy for BULBS continues. There is often a considerable time lag between my first approach to an author and final publication. Deadlines pass, especially my own. Other articles appear on my desk 'out of the blue' and these are the most welcome kind especially as I hate nagging – truly!

In this issue we have a great article by Fadjar Marta, from Indonesia, about his excellent work breeding *Zephyranthes* or rainlilies. Starting with *Zephyranthes citrina* and another called *Z.* 'Fadjar's Pink' he has produced an amazing array of hybrids of different colours and shapes, as the beautiful illustrations show.

Another major and beautifully illustrated article is contributed by Alan Meerow. Entitled "El Desierto Florido" it is about a trip of his to Chile and the remarkable geophytes he encountered on an exciting journey that spanned more than 2000 km.

A couple of the 'out of the blue' type articles are "The Big Thicket" of southeast Texas, by Dave Lehmiller and "Nerine pusilla" by Graham Duncan which is about one of the most rarely-collected species of *Nerine* – the diminutive *N. pusilla* from eastern Namibia.

Articles on *Brunsvigia josephinae* by Alberto Grossi and Bulb Chipping *Haemanthus* by Jim Shields, with a short companion piece of mine on *Worsleya procera*, complete the mix. Finally I have with permission reprinted an article from Systematic Botany (2006) about our President, Alan Meerow, who was the recipient of the 2005 Peter Raven Award. Our congratulations to him.

Some Forum Highlights

From Alan Meerow:

I have always assumed that the flattened, dry, winged seeds so common in the American Amaryllidaceae (and *Cyrtanthus* in South Africa) had short viability. When I was in Chile a few years back, I asked Maria Teresa Eyzaguirre (the re-discoverer of *Tecophilaea cyanocrocus* in the wild), why the "desert" species such as *Rhodophiala bagnoldii* and *R. phycelloides* ripened their seed at the end of the rainy season. She told me that they could retain their viability for a long time. I was dubious, given experience with *Hippeastrum* seed. Well, I decided to sow the remains of the *Rhodophiala* seed that I collected in Chile in Oct. 2002 because I wanted larger sample sizes for a molecular genetics project I am doing at work.

The seed has been sitting in a refrigerator in paper bags for over 1.5 years. We got close to 100% germination. I am intrigued by the physiological adaptations that this type of seed morphology, homologous to that of *Hippeastrum*, has been able to evolve in its Mediterranean habitat.

Sue Madison on Lycoris seed:

Proper treatment of *Lycoris* seed – I always plant them immediately, pushing them about half-way into the medium, with the scar down, seeds exposed to light. They usually germinate fairly quickly. I watch for mold. If they just won't germinate, I carefully peel off the black seed coat. Usually roots appear first, coiling around until they go back down into the medium. The nutrients from the seed are used up in making a little bulb and then some leaves begin to appear. I am told that if you can keep them growing under light and not allow them to go dormant they will grow throughout the year and maturity is greatly speeded up.

So far, I almost always forget to water them and they go dormant and then they are forever on that

regular yearly cycle. With this pattern it takes as long as 7 years to get flowers.

Every so often on forums such as ours the subject of the fungus disease *Stagonospora curtisii* (Berk.) Sacc. comes up. It is also known as red leaf spot, red blotch, and red fire and is one of the commonest diseases of amaryllis. It also attacks *Narcissus* spp. causing the disease known as leaf scorch. The following question about *Stagonospora* was posted by Jack and taken up by several others:

I have an interest in all types of *Zephyranthes* and *Habranthus* species/hybrids. Can anyone direct me to any published materials that speak to disease issues specifically or generally for this group of bulbs.Or, can anyone discuss it here briefly?

Perhaps it is not an issue with these bulbs, but I commonly see rusty red blotches and small streaks on the leaves of some varieties (e.g. *Habranthus tubispathus*). I don't know if they are just part of the leaves as they age, if it is a type of rust or if it is something more problematic. I want to expand my small collection, but don't want to spend time or money and end up with little in return if they are easily wiped out by virus or other disease issues. If this group of bulbs are known to have disease problems, would growing them from seed eliminate the disease or transfer it via the seed?

Jim Shields replied:

I have always assumed that the red fungus on *Habranthus* was the same as on other amaryllids -- *Stagonospora*. You can treat it with fungicides. There are many out there to try; I generally use Cleary 3336 (thiophanate-methyl), a.k.a. Bonomyl. The old Benlate was the best! Try almost any systemic fungicide for a cure and any fungicide to prevent *Stagonospora*.

Karl King wrote:

Have you (or anyone else) observed species or varieties that appear resistant, or even partially resistant, to *Stagonospora*?

Jim Shields again:

I have not noticed particularly, but I have had *Stagonospora* infections on *Crinum* and even on *Clivia,* as well as almost every *Hippeastrum* I've ever grown, and some *Habranthus* and/or *Zephyranthes* as well. I cannot recall having seen *Stagonospora* on *Nerine* or *Haemanthus*. I have seen it on *Scadoxus*.

We seem to do better when we keep the bulbs growing under glass in summer, at least in that we avoid *Stagonospora*. The previous two summers were quite rainy, and there was a lot of *Stagonospora* in evidence.

And Kevin Preuss also replying to Karl:

I've begun to adopt the theory that this is a reaction to wound, quite possibly caused by thrips and what not....even physical injury to many amaryllids can cause the Stagonospora to flair up. It occurs in the wild but not to the degree that you see in cultivated plants. Probably every amaryllid population in the wild that I've seen has signs of it. When plants are getting all their requirements met they are much more resistant, no doubt.

Finally for now an exchange between Karl King and Dave Lehmiller about Sprekelias:

Karl –

A friend of mine has a few seedlings from a cross of *Habranthus tubispathus* x *Sprekelia*. He would like to attempt the reciprocal cross but his Sprekelias have never set seed.

Does anyone have or know a source for Sprekelias that will bear seeds? Or seeds for any color variants?

Dave –

In my "limited" experience with intergeneric crosses involving *Sprekelia*, I have never had success with *Sprekelia* as the seed parent unless the pollen donor had *Sprekelia* genes in it; i.e., only when a backcross was involved. But I keep trying every year anyway. Hybridization is not a predictable event; sometimes only 1–2% success rates occur even in intrageneric crosses, so if you do not make the attempt many times, you can never be certain about the possibility.

I did have success this season with an intrageneric cross of *Sprekelia* for the first time, but then I had the unfortunate experience of a mockingbird destroying the seedlings which were growing in a pot on my porch.

Also, I have never found *Sprekelia* to be self fertile. To obtain seeds, I have always needed to have 2 bulbs in bloom at the same time. But this is just my experience with my bulbs.

Well that's enough from me. I hope you enjoy this issue and do remember that this bulletin won't survive without plenty of contributions from you, because I am never going to bore you stiff by writing it all myself!

Brunsvigia josephinae

by Alberto Grossi

"The Josephine's Amaryllis comes from South Africa. Imported to Europe by a Dutch navigator, one bulb grew in a Dutch garden without blooming for twenty years. About eight or ten years ago it began to flower. Then the bulb has been purchased by HR Empress Josephine for her garden at Malmaison. Since then the bulb has flowered twice, always in summer". Pierre-Joseph Redouté honored his benefactress, Napoleon's wife, naming this new Amaryllis and depicting one of the most outstanding bulbs of his time for *Les Liliacées* – 7 (62); tav. 370-371. 1812. But the fame of this bulb has not ended even now – it is the goal of a lot of bulb fans, including me.

The plant was renamed by Ker-Gawler *Brunsvigia josephinae* and published in the Botanical Register in 1817. The genus name *Brunsvigia* is to honor Carl Wilhelm Ferdinand, Duke of Brunswick (1713-1780). 20 species occur in South Africa – 9 in the Cape. *B. josephinae* comes from Karoo, Worcester, and Malgas to Willowmore, where it is known as kandelaarblom, lantanter, or candelabra lily in English. In the wild they grow on south facing slopes, in sandy to clay soils. The bulb is huge (up to 20 cm diam.), and is one of the biggest in South Africa, partially exposed, and winter growing.

It is hysteranthous so the leaves arise after blooming; 10-20, oblong, greyish, up to 20 cm wide and 60-80 cm long. They are dry at flowering time. The stalk is 40-50 cm high, slightly compressed. The inflorescence is a spreading hemispherical umbel about 60 cm wide, with 30-40 flowers. These are zygomorphic, dark-red, and orange-yellow toward the base. Each flower has a perianth tube to 15 mm long, tepals 45-80 mm long, strongly recurved. The papery capsule is 30-50 mm long, more or less cylindrical. The seeds are small, fleshy, green and pea like. They are dispersed when the capsule ruptures as a result of the tumbling of the inflorescence blown by the wind. The flowers are pollinated by species of sunbirds, in contrast to other species of *Brunsvigia* where noctuid moths and satyrid butterflies are usually involved.

I obtained my bulbs from a Southern African

nursery. I planted a few bulbs in an unheated frame (where frost has been experienced more and more) and three bulbs in a big 60 cm diameter clay pot (free of frost). The soil in both cases was sandy. After a few years I lost all bulbs in the frame, but the three in the pot got bigger and bigger and this year they bloomed. In winter the pot is in a sunny, frost free place – when fog and clouds are absent. In spring I move the pot outside in a south facing walled place and after the leaves have yellowed (May-June).

The pot does not receive any water other than the rain in summer. I had just got back from my vacation in August and to my surprise I found two bulbs with two arising stalks each. In a few weeks they flowered, ripened seeds and detached from the bulbs. Afterwards they began to get leaves. From over 130 flowers I harvested only 5 seeds (I did not pollinate them), that in a month germinate. It is said that *B. josephinae* needs about 12-14 years before reaching blooming size from seed. Another quick way to propagate the species is from offsets, around the mother bulb. The only pest I noted on my bulbs is mealy bug.

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From original plate taken from 'Bilderbuch zum Nutzen und Vergnugen der Jugend' by F.J.Bertuch, Wien, 1801

Bulb among the roots of olive, photo taken in January 2006 at Botanic Gardens of Villa Hanbury, La Mortola, Italy

Born 1960. I am a physician with a specialization in gastroenterology and homeopathy. I am studying for a degree in Botany.

I have grown plants since I was 13 years old. My interest is in bulbs, above all Amaryllidaceae then Iridaceae, and I grow orchids, gingers, succulents and jasmines too. I am founding member and Italian correspondent of the newly founded WGI (Water Gardeners International – http://www.watergardenersinternational.org/index.html). I write monthly for an Italian magazine, *Il Giardino Fiorito.*

El Desierto Florido

by Alan W. Meerow

The Northwestern corner of Chile encompassing the Atacama Desert, considered the driest place on earth, becomes less severe as one moves below the Tropic of Capricorn. The "camanchacas," the coastal mists, provide sufficient moisture for plant survival, but it is only during an El Niño event that abundant rains bring forth a paroxysm of color and diversity from the desert sands. The "flowering desert" phenomenon brought me to Chile in 2002 – my host Miguel Gomez of the Department of Plant Science in the Pontificia Catolica University in Santiago. October is a prime month to catch the explosion of color at its peak, and it was the last week of October that I arrived in Santiago. I would be collecting seed and leaf samples for population genetics studies of *Rhodophiala* species, as well as molecular phylogenetic studies of these and other Chilean Amaryllidaceae.

Miguel and his Ph.D. mentor, Dr. Gloria Montenegro, were formerly in the Department of Ecology within the College of Biological Sciences at the University. The Dean of the University became concerned that the College of Agronomy and Forestry was lacking a faculty with a basic science orientation, and Dr. Montenegro and Miguel were transferred to the Department of Plant Science, where the emphasis is primarily on horticulture. On my visit to the department, I was pleasantly surprised to run into Dr. Mark Bridgen of Cornell University, who was in Chile to work with his former graduate student, Dr. Eduardo Olate, now a professor in the department. Eduardo and his students are involved in developing Chile's vast wealth of geophytic plants for horticultural use.

Miguel had examinations to give before we could head out to the field, so he put me in the capable hands of Luis Gonzalez, Dr. Montenegro's technician, and a superb field botanist in his own right. We headed out to a forest preserve, Sanctuario El Roble, about 30 miles northwest of Santiago. The reserve, at the western fringes of the Chilean coast range, is the northernmost outpost of the austral genus *Nothofagus*. Between 5400 and 5600 feet elevation, among rocks and low shrubs, I encountered my first Chilean amaryllid in bloom, *Phycella ignea* (Fig. 1). *Placea arzae* grew nearby, but it was still too early for flowers. *Leucocoryne ixioides* (Fig. 2-3) adorned the roadsides and forest edges, and

Fig. 1

Fig. 2

Fig. 3

two irids, *Olsynium junecum* (Fig. 4) and *Solenomelus pedunculatus* (Fig. 5) were also in full flower. Also ubiquitous was *Pasithea caerulea* (Hemerocallidaceae; Fig. 6).

The following day, Miguel, Luis and I began our journey that would span more than 2000 km. We set out towards the Pacific coast. It wasn't long before we saw masses of *Leucocoryne violescens* (Fig. 7) along the roadside, along with *Alstroemeria magenta* (Fig. 8). In Coquimbo Province near the coast, below 100 m elevation, large drifts of *Leucocoryne coquimbensis* (Fig. 9) delighted the eye. Not far inland from the coast, a large field hosted a sizable population of *Rhodophiala phycelloides* (Figs. 10-11) interspersed with patches of *Leucocoryne vittata* (Figs. 12-14). This boldly patterned species is very variable and, in my opinion, second only to *L. purpurea* for extravagent beauty. Closer to the coast, *Rhodophiala bagnoldii* was in full bloom in a pasture (Fig. 15). It seemed as if every other flower provided haven for a yellowish-green beetle which resolutely refused to be dislodged. As we pushed to the north, we discovered a second but smaller population of *Rhodophiala phycelloides* whose brilliant red flowers were over-shadowed by the beauty of *Alstroemeria magnifica* (Fig. 16). The afternoon shadows were growing long, and we decided to look for accommodation in a nearby town.

The next day, we pushed north into Atacama Province. The vegetation had grown progressively more xeric, and cacti were now frequent companions. Just north of Vallenar, we found the diminutive *Alstroemeria kingii* (Fig. 17-18) in flower, the lone spot of color in the seemingly barren and rocky soil. As we snaked through the desolate mountains, one would catch brief glimpses of the sea. Here and there, a few vicuña could be seen grazing on the steep slopes of the coast range. A few kilometers southeast of Carrizal Bajo, I was treated to the sight of the legendary *Leontochir ovallei* (Fig. 19-20) in full flower, the monotypic third genus of the Alstroemeriaceae, found only in a few


Fig. 5


Fig. 4


Fig. 6

sites near the coast of Atacama province. Growing nearby was the shrubby and succulent *Oxalis gigantea*, and a leathery, mottled-leafed *Aristolochia* species.

As we wound our way towards the shore, we spied two desert species of *Alstroemeria*, *A. pallida* (Fig. 21) and *A. werdemannii* (Fig. 22). At the foot of a fruiting columnar cactus (*Echinopsis chiloensis*), the large flowers of *A. magenta* shimmered in the dry, but cool air. It always seemed slightly incongruous to find such showy flowers erupting from the parched gravels and sands of the Atacama.


Fig. 7


Fig. 8

The sandy flats along the Pacific were a sight to behold. There, vast stands of *Rhodophiala bagnoldii* (Figs. 23-25), literally tens, if not hundreds, of thousands of yellow to yellow-orange flowers, stretched on for kilometers. Every possible shade of yellow was represented. The local people are justly proud of their native "añañucas" (the most common vernacular name for *Rhodophiala* species in Chile), and fiercely protective of the large stands contained within the borders of national parks. Anyone seen picking the flowers is likely to get a furious tongue-lashing (or worse) from residents. In other sandy washes, the delicate, pale blue-tinged flowers of *Zepyhra elegans* (Tecophilaeaceae; Fig. 26) contrasted beautifully with the deep purple flowers of *Conradinia* (Portulacaceae).

The next morning we climbed to about 480 m above sea level as we pushed on toward the north, encountering two additional *R. bagnoldii* populations. The throats of many of the flowers were filled with a dark-bodied bee; in some cases as many as five of the insects were jammed into the perianth. The bees were sluggish in the cool morning air and tended to retreat further into the flower when disturbed (though a few buzzed past my face angrily if I shook the stem vigorously enough). As with the beetles observed in the previous population, I couldn't say whether these were in fact the pollinators of *R. bagnoldi* or merely opportunists seeking shelter until the day warmed up.

In the afternoon, we turned back towards the


Fig. 9


Fig. 10

southeast, heading inland towards Vicuña from La Serena and rising to nearly 1400 m. Flowering among the rocks on leafless stems, the spotless *Alstroemeria schizanthoides* (Fig. 27) provided occasional relief from the sparse vegetation of the desert hills. At times, mounting a pass into a new valley, there would suddenly appear a vast swathe of green where irrigation supported vineyards or orchards of cherimoya (*Annona cherimola*).

On the morning of our last day in the desert, we visited the Fray Jorge National Park, designated as a World Biosphere Reserve by UNESCO. Amidst coastal desert, across a 400 hectare (880 acres) area, grows a remnant humid Valdivian forest, a relict of the Quaternary when the Atacama supported moist forest. Annual rainfall is only 113mm (4.4 in), and the forest exists only because of the life-giving condensation of the coastal fog, the *camanchaca*. Tree, shrub and fern species are found in this area, along with *Lapageria rosea*, the national flower of Chile, that are next seen 1,250 km (781 miles) to the south.

The hills flanking the forest are typical Chilean coastal desert, rich with cacti, spiny shrubs, and, of course, geophytes. *Rhodophiala phycelloides* (Fig. 28) was in full bloom, at about the same density as the first large population we had seen to the south, but at higher elevation (300 m) and on sloping ground. But the mystery of the day was encountered just outside the park, at the edge of pasture and cultivated fields. A lovely, reddish-orange *Rhodophiala* was in bloom, looking like a robust *R. advena* (Fig. 29). It occurred sporadically in a relatively small area, along with variants such as a pink form (Fig. 30) and a light apricot (Fig. 31).

We continued south to Valparaiso, one of Chile's most picturesque and prosperous cities. Near Ligua, *Alstroemeria pulchra* (Fig. 32) was in full bloom. On the coast between Papudo and Valparaiso, in rocky cliffs near the sea, *Alstroemeria angustifolia* (Fig. 33) grew with an orange-flowered form of *Rhodophiala bagnoldii*. A beautiful ground orchid, *Bipinnula fimbriata* (Fig. 34), with its curious fringed sepals, was in full flower as well. The dainty nodding blue flowers of *Conanthera campanulata* (Fig. 35; Tecophilaeaceae) were seen in abundance.

After lunch in Valparaiso, we zoomed back to Santiago. The following day, I had the opportunity to head up into the Andes west of Santiago with Luis,. The snows were rapidly retreating, but it was still far too early for the Andean wildflower show. Still, where the snow had exposed the bare ground, *Rhodophiala rhodolirion* had produced a flush of leaves, and a small *Tristagma* was already beginning to flower. These would serve to whet my appetite for another visit sometime in the future, when the Andean bulbs would be in full flower.

FIGURE LEGENDS

Fig. 1. *Phycella ignea.*
Fig. 2-3. *Leucocoryne ixioides.*
Fig. 4. *Olsynium junceum.*
Fig. 5. *Solenomelus pedunculatus.*
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Fig. 11


Fig. 12


Fig. 13

Fig. 14

Fig. 17

Fig. 15

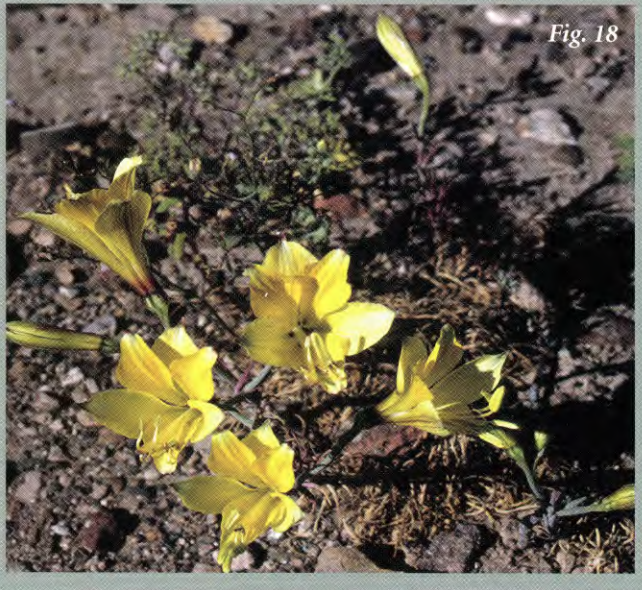

Fig. 18

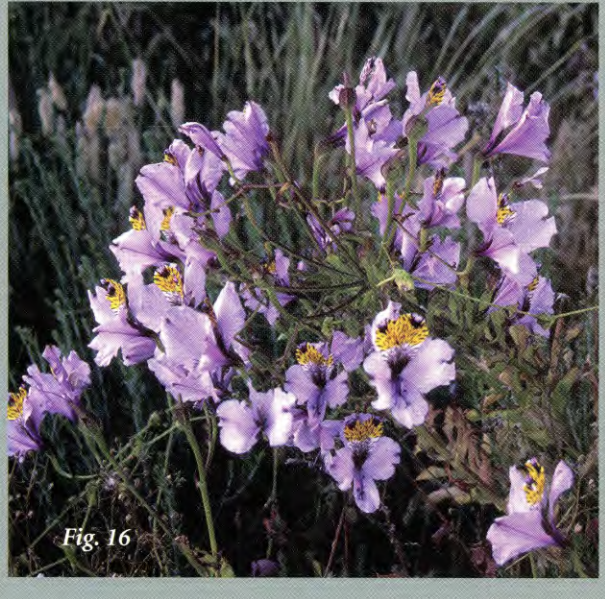

Fig. 16

Fig. 19

Fig. 20

Fig. 21

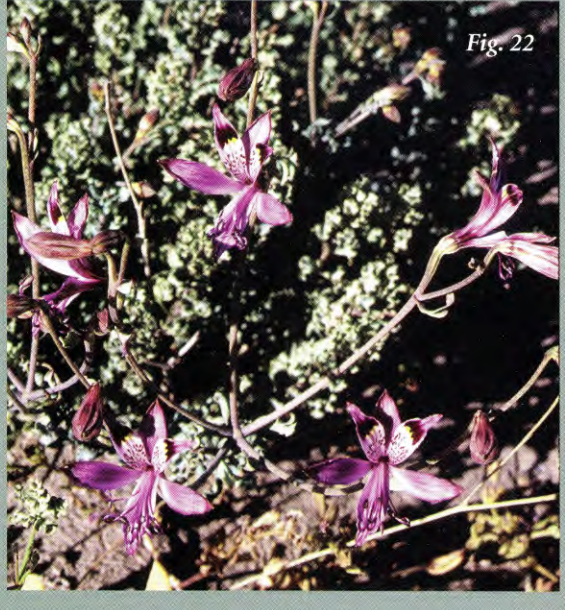

Fig. 22

Fig. 23

Fig. 24

Fig. 25

Fig. 27

Fig. 28

Fig. 26

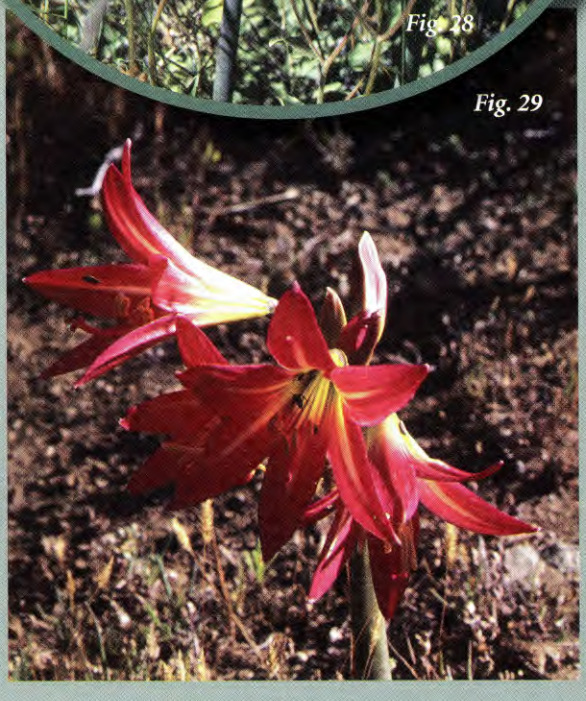

Fig. 29

Fig. 30

Fig. 33

Fig. 31

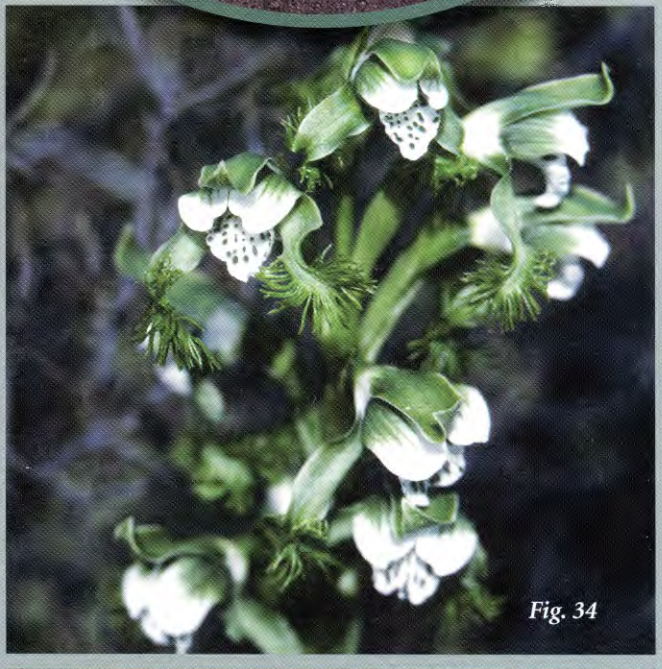

Fig. 34

Fig. 32

Fig. 35

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Alan W. Meerow—Recipient of the 2005 Peter Raven Award

JAVIER FRANCISCO-ORTEGA

Department of Biological Sciences, Florida International University, University Park, Miami, Florida 33199 and Center for Tropical Plant Conservation, Fairchild Tropical Botanic Garden, 11935 Old Cutler Road, Coral Gables, Miami, Florida 33156 U.S.A.

Alan Meerow. Field studies in Puerto Rican forests, 2005.

Alan W. Meerow was born in the Bronx, New York, the second son of a garment center laborer. His blue collar neighborhood was ringed by greenery, and perhaps most importantly, it was within walking distance of the New York Botanical Garden. "The proximity of that august institution would, apparently at least, invade my subconscious mind," he suggests. Yet science, and more specifically botany, was far from his mind in adolescence, even while a student at the Bronx High School of Science. He attended the State University of New York at Buffalo, intending to study creative writing, but left after one year and moved to California.

While "trying to write the next great American novel" in Santa Cruz, California, Alan began to work in the landscape and nursery industry that flourished around Monterey Bay, and became fascinated with the plant communities of the Santa Cruz Mountains. "John Hunter Thomas' flora of the region became my botanicalprimer," and he used that book to learn how to use a dichotomous key and understand botanical terminology. As the years went by, he broadened his botanical horizons, visiting the Mohave desert in a particularly good spring, Munz' *A California Flora* in hand. He began writing a gardening column in a local weekly newspaper. "As I became more involved with botany and horticulture, the two fields began to look like a fair trade to support my still active artistic pretensions as a writer." This led him back to college, this time at the University of California, Davis, where he pursued a course of study equally divided between botany and environmental horticulture. At 23, he was four years older than the typical sophomore, and dove enthusiastically into plant taxonomy, anatomy, morphology, ecology and paleobotany with the likes of Grady Webster, John Tucker, Ernest Gifford, Mike Barbour, and Daniel Axelrod. "Incoming *Systematic Botany* editor-in-chief Alan Whittemore sat behind me in John Tucker's plant systematics class." He also made the acquaintance of Bijan Dehgan, a graduate student of Webster's, who supervised the UCD Botany Conservatory while finishing his doctorate on the systematics of *Jatropha* (Euphorbiaceae). "Bijan, who had also successfully integrated horticulture and botany in his career, had accepted a faculty position with the University of Florida Environmental Horticulture Department," Alan recalls. "We discussed the possibility of my pursuing graduate studies in plant taxonomy with him in Gainesville once I graduated

from UC, Davis."

One of the most formative experiences of his time at Davis would forever orient him towards the tropics. Alan spent the summer of 1977 in Costa Rica, living and working at Linda Vista S.A., the company run by legendary flower breeder Claude Hope. At times by himself, or in the company of the company's plant breeder and orchid aficionado Leon Glicenstein, Alan traversed Costa Rica's diverse territory, adding thousands of new plants to his taxonomic vocabulary. "I became particularly intrigued by the many species of *Bomarea* (Alstroemeriaceae) and epiphytic Ericaceae, and began to consider both as prospective subjects for graduate work." The experience in Costa Rica would also later inspire Alan's first contribution to *Horticulture* magazine, "The Cloud Forests of Costa Rica."

Leaving California upon graduation in December, 1978, Alan returned to the east coast with little else planned other than beginning graduate school in the fall. He began to look for something to occupy himself for the nine month duration, and, through Davis connections, landed the position of interim greenhouse manager at the Marie Selby Botanical Garden in Sarasota, FL. When asked, a few months later, to consider staying on in the permanent position, Alan decided to postpone graduate school for at least a year.

"Selby was a wonderful experience," he recalls. He quickly began to acquaint himself with Florida's subtropical flora with the same alacrity as he had with California's vegetation, as well as the extensive collections of epiphytic plants that had become Selby's specialty. "Cal Dodson, Selby's director at the time, knowing that I intended to pursue graduate study in plant systematics, began urging me to consider a family whose representation in the South American flora was significant but poorly understood, the Amaryllidaceae." Adding his encouragement in that direction was the late ethnobotanist and taxonomist Tim Plowman of Field Museum, who was a frequent visitor at Selby on his way to and from his extensive field trips.

In 1981, Alan formally began his graduate work at the University of Florida under Bijan Dehgan's supervision, choosing the genus *Eucharis* (Amaryllidaceae) as the subject of his dissertation work. Walter Judd joined his graduate committee and became "like a second major professor to me," Alan relates. "It was in Walter's advanced plant taxonomy class that I also met one of his master's degree students, Linda Fisher." Linda and Alan were married one year later at her family's summer cottage on Lake Ontario. "The old growth lake shore woods were carpeted with *Trillium grandiflorum* on our wedding day," Alan remembers, "as good an augury as any for a monocot specialist." The couple honeymooned in Peru and Ecuador, hunting amaryllids in the Andes for two months.

In December 1986, Alan graduated with his doctoral degree, for which he received both NSF and World Wildlife Fund/Garden Club of America support. He already had five peer-reviewed journal articles published. His dissertation, "A Monograph of *Eucharis* and *Caliphruria* (Amaryllidaceae)" was awarded that year as the best dissertation published by the Institute of Food and Agricultural Sciences of the University of Florida. That month also heralded the birth of theMeerow's first daughter, Sara Anne. He began a post-doc in Gainesville.

"It was not an easy time in the job market for budding plant systematists," Alan recalls. "Fortunately, my dual background in botany and horticulture gave me some leeway in the search for an academic position I was encouraged by UF Environmental Hort chairman Tom Sheehan to apply for a teaching and extension position at UF's Fort Lauderdale Research and Education Center. It wasn't exactly what I had in mind, but to my surprise, an offer was tendered." In July, 1987 his family moved to Fort Lauderdale, and Alan attended his first International Botanical Congress in Berlin.

The next thirteen years would be hectic ones for Alan. His family grew by two; Andrew, born in 1989, and Erica, who arrived in 1993. He created and taught three courses in UF's satellite campus teaching program: "Principles of Horticultural Taxonomy," "Palm Production and Culture," and "Orchidology." As extension "Palm and Tropical Ornamental Specialist" for the University of Florida, Alan gave nearly 400 presentations on plant related topics to audiences of nursery and landscape professionals, national and regional garden clubs, Master Gardeners, botanical garden support groups, public school classes, and 4H clubs. He published 4 books oriented to a lay audience, over 30 extension publications, videos or software, and nearly 70 articles in the popular press on plants. While at UF, he published a quarterly newsletter called "TropicLine," which reached an audience of nearly 10,000. He is known widely in horticultural circles for his popular books "*Betrock's Guide to Landscape Palms,*" and "*Betrock's Cold Hardy Palms*" as well his co-authorship of "*Betrock's Reference Guide to Florida Landscape Plants*" and "*Ornamental Palm Horticulture.*" Alan published the first research articles in the U.S. on the use of coir dust as a peat substitute in horticulture. He has also released over two dozen new ornamental plants to the greenhouse and nursery industry, and has patented one alstroemeria and three amaryllis hybrids. "Whenever possible, to whatever audience, I have striven to impart some message about the importance of plant systematics and plant conservation relative to horticulture," Alan relates. He was recognized by

the Florida Nurserymen and Growers Association as Horticultural Writer of the Year in 1990, and Educator of the Year in 1991.

Impressively, Alan also maintained his activity as a plant systematist, publishing nearly 100 papers in diverse scientific journals and receiving National Science Foundation support for his work. He began an active research collaboration with Brazilian scientists that would bring him to Brazil on six separate occasions. He spent an academic sabbatical at the Royal Botanic Gardens, Kew and the National Botanic (now Biodiversity) Institute in Kirstenbosch, South Africa. He was named 1998 recipient of the International Bulb Society's William Herbert Medal in recognition of his work on Amaryllidaceae. He was promoted to Associate Professor in 1992, and, in 1994, successfully petitioned for a change in his academic appointment to 50% research. In 1998, he was promoted to Full Professor.

"Oddly enough," Alan notes, "my reputation among lay audiences mostly centers around palms, and people are often surprised to find that my active research projects are focused around tropical geophytes."

In 1999, Alan accepted the position of lead scientist in a new genetics and germplasm program for tropical ornamentals at the USDA National Germplasm Repository in Miami. "What attracted me to Chapman Field was, first of all, the history of the place (David Fairchild spent his USDA career directing the tropical plant introduction program at the site), and secondly, the fact that my new colleague Ray Schnell was rapidly building up the best plant molecular biology lab in South Florida." There, Alan has continued his work on the traditional and molecular systematics of Amaryllidaceae and other families, and expanded into population genetics of *Iris, Zamia,* and other taxa.

In addition to his extensive efforts at public communication, Alan has served as chair of the Bulb Specialists Group of the IUCN/ Species Survival Commission, chair of the ASPT Publicity Committee and ad hoc Outreach Committee, and as a member of the Public Education and Natural Resources Committees of the Systematics 2000 Task Force. He is currently an associate editor of *Systematic Botany,* and was a former associate editor of the journal *HortScience.* He is also President of the International Bulb Society, and editor of the IBS scientific journal *Herbertia.* He is a research associate of Fairchild Tropical Botanic Garden.

"No matter what the subject of my talk," Alan states, "I always find some way to weave the significance of basic botanical knowledge into the fabric of the everyday use of plants. There is no greater reward than, at the close of a garden club or school class presentation, being told, 'I really learned a lot from your talk.' I firmly believe that we cannot afford to reside in an ivory tower and expect our science to thrive into this new century."

Below is a list of IBS members who made contributions to the Society's various funds during calendar year 2005:

James Denning
Timothy Evans
Kirby Fong
Charles Gorenstein
Alastair Gunn
Sue Haffner
Byron Hershey
Kristin Jakob
Herb Kelly
Deanna Larson
Dave Lehmiller
David McLean
Alan Meerow
Elizabeth Winston Mize
Nickolas Nickou
James Shields
Everett Skinner
Sir Peter Smithers
Prof. Karl Zimmer
LEF Foundation

Nerine pusilla

NAMIBIA'S DWARF NERINE

Graham Duncan

PHOTO BY THE AUTHOR

One of the most rarely-collected species of *Nerine* is the diminutive *N. pusilla* from eastern Namibia. It was discovered in 1912 by the German botanist and botanical collector, Moritz Kurt Dinter (1868-1945), who in the late 1890's served as Curator of the large collection of primarily South African succulent and bulbous plants at the gardens of La Mortola on the Italian Riviera. In June 1897 he arrived at Swakopmund in the former German territory of South West Africa, where he served as official botanist until 1914. He travelled extensively throughout the country and collected *N. pusilla* for the first time in January 1912 near Steinhausen, north-west of Gobabis in Hereroland in arid eastern Namibia, where he found it growing in large numbers. He cultivated it at his headquarters at Okahandja in central Namibia, and published it as new in his book titled *Neue und wenig bekannte Pflanzen Deutsch-Südwest-Afrika,* in 1914.

Only known from around Steinhausen, *N. pusilla* is recorded as growing in limestone pans and river beds. Under its harsh natural habitat, where summer rains are highly erratic, and prolonged droughts may span years, it is not surprising that it has been so seldom collected. The opportunistic, dormant bulbs respond rapidly to summer rain storms from October to January, first producing leaves, followed by flowers from late December to mid-January. Under cultivation, the unscented individual flowers last five to six days, and seed maturation is extremely rapid with the fleshy rounded seeds ripening within two weeks. They then drop to the ground and germinate immediately. Following seed maturation, the infructescence desiccates quickly within a couple of weeks and the scape breaks off at the base. The bulbs lose their leaves in late summer and undergo a completely dry winter dormant period.

The specific epithet *pusilla* refers to the small overall size of the plant that reaches only 120-180 mm high when in flower. It is easily recognised in a vegetative state by its oblong-ovoid bulb and two to four thread-like, spreading leaves with a shallow longitudinal groove along the upper surface. The scape and pedicels are minutely pubescent and the latter are rather variable in length, even within the same inflorescence, growing from 22-60 mm long. The white tepals have pinkish median keels and are strongly recurved, with their tips distinctly bearded on the inner side. The stamens are strongly bent downwards and upwards, and the filaments may be dark pink for their entire length or dark pink at the base, shading to pale pink above. The style is similarly strongly bent downwards and upwards, and has a conspicuously large, three-lobed stigma.

N. pusilla is vaguely reminiscent of another endemic Namibian geophyte - the dwarf *Ammocharis nerinoides,* previously known as *Crinum nerinoides.* The distribution of the two species overlaps in the Gobabis district, but *A. nerinoides* has a wider distribution in northern, north-eastern and eastern Namibia, also occurring in seasonally inundated limestone pans and river beds. *A. nerinoides* has a spreading, few-flowered umbel of much larger, funnel-shaped, pale to deep rose-pink flowers that are heavily sweet-scented, and similar long, spreading linear leaves that are wider and more deeply grooved and minutely toothed along their margins. The flowering

period of the two species overlaps in December and January with *A. nerinoides* usually beginning flowering a month earlier in mid-November.

The accompanying photograph was taken of a pot of plants kindly donated to the Kirstenbosch bulb collection by bulb enthusiast Eric O'Neil of Somerset West, near Cape Town. He had originally received them from another bulb enthusiast Dannie Gildenhuys of Cape Town, who had gathered the bulbs in eastern Namibia in December 1990 on a farm east of Steinhausen, in Hereroland. According to Dannie Gilden huys, *N. pusilla* grows together with *Ammocharis nerinoides* at this locality. Following heavy rains, both may at times be seen in flower with their bulbs and leaves fully submerged.

In the publication *Grow Nerines,* I speculated that *N. pusilla* might possibly fall into the evergreen group of species when grown in temperate climates or under greenhouse protection, which is in line with other members of the genus with filiform leaves that follow this growth cycle. I had at that stage not cultivated the plant myself, but having subsequently obtained living material, it has clearly shown itself to fall into the exclusively summer-growing group of six species that currently includes *N. bowdenii*, *N. duparquetiana*, *N. krigei*, *N. laticoma* subsp. *laticoma*, *N. laticoma* subsp. *huttoniae* and *N. marincowitzii.*

Within the developing field of genome size measurement, it has been shown that when species in a genus have the same chromosome number, as in *Nerine* ($2n = 22$), differences in nuclear DNA content have proven to be very effective in delimiting species and infrageneric divisions in a number of taxa. In a recent study of the species of *Nerine,* correlation was demonstrated with their nuclear DNA content, growth cycle, leaf width and other morphological characters. When arranged according to increasing nuclear DNA content, the species fell into three distinct groups if growth cycle (under temperate conditions) and leaf width were also considered: a narrow-leafed, evergreen group of 13 species had a DNA content from 18.0–24.6 picograms (pg), a broad-leafed, winter-growing group of four species had a DNA content from 25.3–26.2 pg, and a broad-leafed, summer-growing group of six species had a DNA content from 26.8–35.3 pg. *Nerine pusilla* proved to be exceptional in that despite falling into the latter group on account of its high DNA content of 28.0 pg and its summer growth cycle, it has narrow leaves, which may be a secondary adaptation to its habitat in Namibia.

Cultivation

Although extremely rare in bulb collections, *Nerine pusilla* is an excellent species to grow as a pot subject and presents no great difficulty in this regard provided that its summer growth and winter dormancy cycles are simulated as closely as possible. It is tender and should be grown in exactly the same manner as its Namibian counterpart, *Ammocharis nerinoides.* The dwarf habit and deciduous nature of *N. pusilla* renders it unsuitable for general garden use even in mild climates, and cultivation in pots is really the only practical manner in which to maintain it successfully over an extended period. As with most geophytes, the growing medium should have perfect drainage and a recommended mixture is three parts course river sand and one part finely milled bark or compost, with a 2-3 cm layer of compost or finely milled bark placed at the bottom of the container into which the roots can penetrate. The elongated bulbs are planted with the tops of their long necks resting just below soil level. Like *Ammocharis nerinoides*, this strictly summer-growing species thrives on heavy drenching approximately once every ten days to two weeks, from early to late summer. During winter dormancy, the bulbs should not be watered at all and they prefer to remain in their dry soil medium throughout the winter months in order to prevent desiccation of their perennial fleshy roots.

Like the bulbs of *A. nerinoides*, those of *N. pusilla* are solitary and thus the only feasible means of propagation for the home gardener is by means of seeds harvested just before the membranous fruit walls rupture and disintegrate. Seeds should be sown as soon as possible just below the surface of the same medium recommended for adult bulbs, and placed in an area receiving bright light. The plants are generally pest-free although a close watch should be kept on mealy bugs that would almost certainly find themselves at home at the bases of leaves and between the bulb tunics. Fungal rotting of the bulbs would result from a poorly drained medium and failure to adhere to a dry winter regime.

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The Big Thicket

David J. Lehmiller, M.D.

ALL PHOTOS BY THE AUTHOR

The Big Thicket of Southeast Texas, once known as The Big Woods, is an ill defined geographical area that originally encompassed three million acres, lying just to the north of Beaumont and to the northeast of Houston. Considered to be the crossroads of North American ecology, the Big Thicket harbors eight distinct plant communities, making it one of the most biological diverse localities in the world. Nature brought together this clustering of ecologies during the last glacial period. It is estimated that greater than 1,000 different geophytes are found within this region, and it is also home to more than 350 bird species.

Following the Civil War, this area was subjected to intense lumbering activities, and vast expanses of pine and cypress trees were cut down. Farming and oil exploration followed, and soon the original Big Thicket was carved up and exploited. Today, only remnants remain, largely confined to the nine land units of the Big Thicket National Preserve centered about the Pine Island Bayou, a major tributary of the Neches River. Tracts of land in the Alabama-Coushatta Indian Reservation still preserve islands of virgin pine forest.

The diversity of ecologies in the Big Thicket brings an unusual assortment of flowering plants to within close proximity of one another. Within the Big Ticket, one may encounter orchids, cacti, pitcher plants, legumes, iris, and bulbous plants. Ajilvsgi (1979) recorded 475 different wild flowers within the Big Thicket.

The Visitor Information Center of the National Preserve is located seven miles north of Kountze, Texas. There are several walking trails though portions of the land units, and additional access is afforded via four separate water corridors. My experiences have largely centered about the Pine Island Bayou, a swampy waterway that I have explored extensively in a flat bottom boat (Lehmiller, 1987). I reside on property that once was part of the Hunter's Thicket or Traditional Thicket, a swampy wooded ecology nestled within the southern portion of the Big Thicket. The water drainage from my property flows into a branch of the Pine Island Bayou.

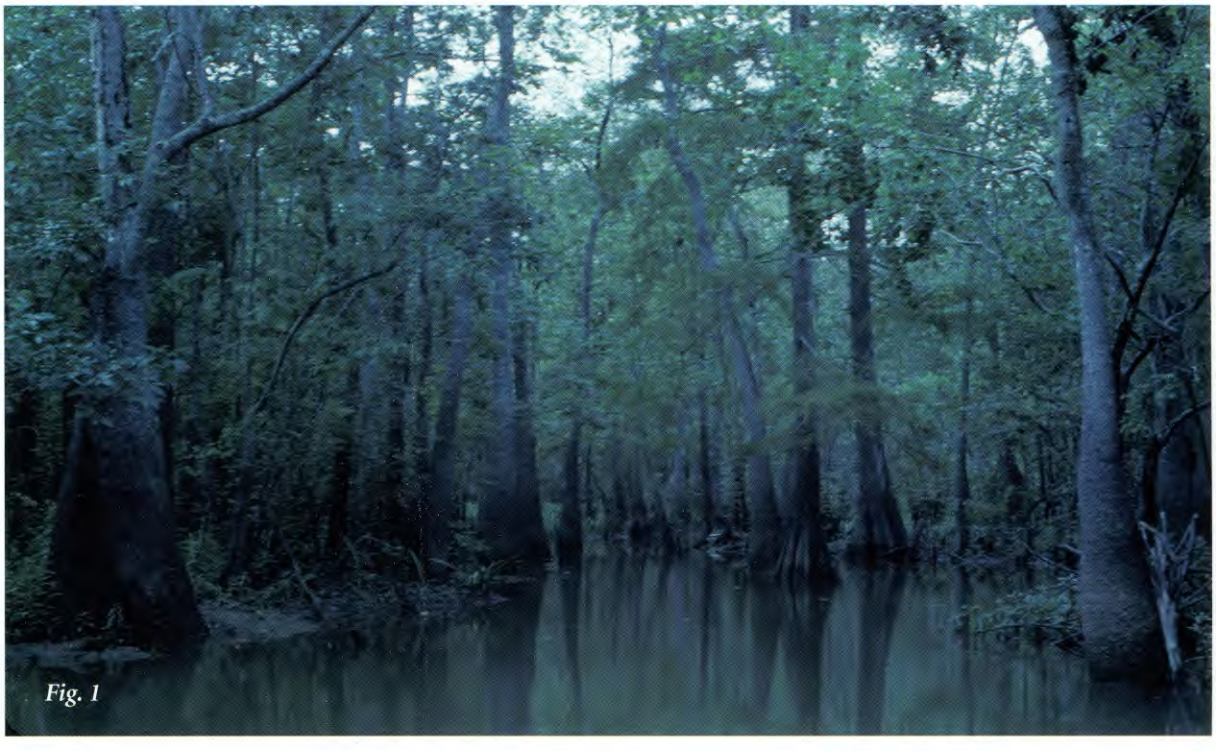

Fig. 1

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FIGURES

1. Cypress swamp, Pine Island Bayou, Big Thicket Preserve, Southeast Texas.
2. *Crinum americanum* L.
3. *Hymenocallis liriosme* (Raf.) Shinners.
4. *Iris virginica* L.
5. *Iris brevicaulis* Raf.
6. *Nymphaea odorata* Ait.
7. *Allium canadense* L. var. *mobilense* (Regal) M. Ownbey.
8. *Alophia drummondiana* (R.C. Graham) R. Foster.

Fig. 2

Fig. 3

Fig. 4

Fig. 5

Fig. 6

Fig. 7

Fig. 8

Breeding Rainlilies *

by Fadjar Marta

ALL PHOTOS BY THE AUTHOR

Around 25 years ago, when I visited one of my best friends, Jack Craig in Tambun, West Java, he gave me some seeds of *Z. citrina* and some bulbs of a large pink flowering *Zephyranthes* which I thought was *Z. grandiflora*. Within quite a few years those starts had multiplied into around 7,000 flowering sized bulbs of each of those species of Zephyranthes and I started my hybridizing project by utilizing them as my parent stocks.

With the pink flowering one as mother plant and *Z. citrina* as pollen donor, I got 100% true hybrids, however, with *Z. citrina* as mother plant and the pink flowering one as pollen donor, I got no hybrids. Later on I was informed by Dr. Thad Howard, John Fellers and Paul Niemi that *Z. citrina* is apomictic and that was why I didn't have any success when I utilized it as mother plant in my hybridizing project.

Being apomictic, *Z. citrina* could not be utilized as a seed parent in hybridizing, because the flower will still set viable seeds even though no pollination has taken place. When I told them that I have propagated thousands of *Z. grandiflora* from seeds, none of them believed what I said and told me that *Z. grandiflora* is seed sterile. I insisted that my strain of *Z. grandiflora* is seed fertile and thus I claimed that I have a fertile strain of *Z. grandiflora*.

Everything became clear when I sent some bulbs of my "*Z. grandiflora*" to them. The flowers of my "*Z. grandiflora*" were evaluated and the conclusion is that it is not really *Z. grandiflora* and surprisingly, it is not known so far in the U.S. Its color is superior (darker) than that of *Z. grandiflora*. Dr. Thad Howard asked me to trace back the origin of this species (?) of *Zephyranthes*. I contacted Jack Craig and he told me he got some bulbs of this species from an orchid nursery in West Jakarta. Unfortunately, I could not go further as the land where the said orchid nursery was situated is now a large shopping mall claimed as the largest in Asia. Paul Niemi told me that since I have the largest quantity of this pink flowering Zephyranthes in my collection, I have a right to name it and suggested *Z.* 'Fadjar's Pink'.

I really do not have any idea about its origin, but I could just guess that it is a mutant of *Z. grandiflora*. *Z.* 'Fadjar's Pink' is true to type but its seed pod is not

I am really overwhelmed by the sight of this "blitz" of hybrid rainlilies. A big job selecting, uprooting, relocating, including self pollinating and cross breeding

From 3 "blitzes" in November 2005 we have harvested over 1000 seed pods of this red hybrid containing over 5000 viable seeds. Up until now cross breeding with this variety is aimed at getting deeper and larger reds. It is extremely prolific and sets suckers

plump like that of *Z. citrina* and the size of its seed is half of that of *Z. citrina*. A special characteristic of *Z.* 'Fadjar's Pink' which made it suitable as seed parent in hybridizing is that it won't set any seed if it is not pollinated by hand, and so far I have never found any flower of *Z.* 'Fadjar's Pink' which set seeds as the result of pollination by wind, because for an effective pollination it needs a relatively large amount of pollen. That is why together with one of my gardeners I could pollinate over one thousand flowers within a few hours, because we need not emasculate the flowers prior to cross-pollination. Unfortunately the color of *Z.* 'Fadjar's Pink' fades, but the color of the resulting hybrid with *Z. citrina* (which does not fade) does not always fade.

I have carried out my hybridizing activities in complete isolation in many years, wasting a lot of time by utilizing the apomictic *Z. citrina* as seed parent. I have tried to contact a few nurserymen in my attempt to purchase some species of rainlilies, but again I have wasted a lot of my time because none of them were willing to supply any.

When I joined the International Bulb Society and Bulb Robin, I put forward my difficulties in getting parent stocks. Paul Niemi, John Fellers, and Dr. Thad Howard not only sent me bulbs and seeds of a lot of species and hybrids of rainlilies, but they also kept on enlightening me in my project. From Patrick O'Farrell of Argentina and from John Wagner, Dirk Wallace and Daryl Geoghegan of Australia I got some more bulbs and seeds of several species and bulbs of hybrids, and Alison Tiley bought for me a bottle of Surflan (Oryzalin) so that I could carry out an experiment for tetraploid conversion of rainlilies. Moreover, Karl King has helped me to publish the pictures of my selected hybrids and also created a website for me. Last but not least, Tony Avent of Plant Delights Nursery helped me by marketing some of my hybrids so that I could pay my gardeners to keep my project going on. So, it is not without reason that I feel I have received abundant Lord's

I prayed on the spot when I saw this beautiful red hybrid. The petals are round with a bright yellow center. This is my favorite among the reds and is of medium size

Some variations of "fully" double light pink hybrid. There is no pollen or pistil in this double hybrid so it is totally sterile. Medium size and it is an extremely prolific bloomer

blessings because He has generated so many friends who have helped me to make my dream come true.

Hybridizing is really interesting, because by so doing it we can bring something new to our world. We make the unavailable become available and our world will become even more convenient to live in. That is why in my opinion, hybridizing also means participating in the creation of the Lord. Moreover, I heard that in the U.S., rainlilies set flowers 2 years after seed sowing, but in my garden they set flowers just around 6 to 8 months after seed sowing. I cannot describe how happy I am when I get up in the morning and come into the garden to see thousands of flowering hybrid rainlilies and select some of them to be transplanted in special raised beds as my selected hybrids. I am really happy and enjoy life with these activities and such a kind of happiness could not be bought with any amount of money!

Being a weekend gardener, I could only maintain my garden on Saturday and Sunday as until now in my sixties, I am still working in a company to support my family. Therefore, in case I have "blitz" of flowers in workdays, I really do not want to lose any chance of hybridizing when thousands of flowers have appeared. So, if it is not rainy at night I have to cross-pollinate a lot of those flowers by utilizing a miner's headlamp, sometimes until midnight - neglecting the advices of some of my neighbors not to do that as they believe that my garden is haunted! That is not what I am worrying about; what I am really worrying is about poisonous snakes which sometimes can be found in my garden. Once a snake came into our bedroom at night and crawled on my chest. I thought that was a rubber snake jokingly thrown by my wife like she had done a day before, so I grabbed it and threw it back in the direction of my wife. I was so surprised that there was no reaction from her side that I switched on the lamp and saw

This semi-double does not look "neat", but I like the new floppy characteristic with its combination of colors. It sets seeds, but only a few

that a real snake ran down from our bed!

Usually rainlilies set a lot of flowers 3 to 4 days after heavy rainfalls. In case after pollinating a few thousand flowers, suddenly we have a heavy rainfall, it could be a complete failure because the pollen is washed away by rainfall. To avoid this matter, if I have pollinated a lot of flowers during the rainy season, right after pollinating I cover the pollinated flowers with plastic glass used for packaging drinking water, supported with palm leaf stems, and take those plastic glass off the following day.

From time to time, I have learned a lot from my activities. I have found out that the appearance of the seed pods we could harvest from a mother plant will depend on the pollen of which species we have utilized for pollination. For example, if you pollinate *Z.* 'Fadjar's Pink' with the pollen of *Z. citrina* you could harvest relatively small seed pods with small seeds, but if it is pollinated with the pollen of *Z. subflava*, the seed pod will become larger and plump with almost 100% viable seeds. Rainlilies will set a lot more flowers if the bulbs are divided from their clumps and replanted separately as individual bulbs. Also sometimes we have failed to get seeds from flowers that appeared in a clump, but if the bulbs from the clumps are divided, the flowers which appear later may start to set seeds.

My first deep yellow with bright red picotee. Unfortunately, its petals are narrow. I hope improvement can be achieved soon as it could set seeds. The size of the flower is medium

Almost all my selected hybrids published in Karl King's website have the bloodline of *Z.* 'Fadjar's Pink' and *Z. citrina*. My reason for cross breeding both species is because I like to hybridize contrasting colors. I didn't think before that the result could

My favorite gold and orange hybrid. The shape of its petals is beautiful and exclusive. Unfortunately my camera is too poor to capture its beauty. As it is a prolific bloomer and sets seeds I am utilizing it as a seed parent

An unusual golden hybrid with a yellow center. It is really eye catching with an extra long stem. Also a very prolific bloomer. Its flower size is medium to large. So far it has not set any seed although I keep on pollinating it

be so variable, such as multicolor, with many variations of yellows, reds, tans, pinks, picotees, stripes and even whites and some extra large (around 25% larger than the largest flowering species, *Z. grandiflora*). Moreover, the resulting shapes are also variable such as goblet shaped, flatly opened, wavy-edged, broad, narrow, crepe petal and doubles. From the beginning I have an obsession of achieving red and blue colored rainlilies. I did achieve red colored hybrids with a lot of variations but getting the blue one is still unsuccessful. Dr. John Mason, the great breeder of beautiful blue carnation, has helped me to observe whether necessary genes for blue color are present in *Zephyranthes*. However, unfortunately no blue colors are observed primarily as the pH in the petal cells is too low, and how to achieve higher pH is still not known. Maybe the only chance for me to get blue colored *Zephyranthes* is by carrying out gene splicing. However, with my limited know how and without any research laboratory which could support me, this is just a mere dream. Meanwhile I am also very much impressed by the achievements of the breeders of daylilies in the U.S. Maybe it will take tens of years until someone could do the same with rainlilies.

So far I have only utilized a limited species of *Zephyranthes* in my project. I do want to utilize species of *Habranthus* and *Cooperia*, but I have a problem with *Habranthus* because certain species of *Habranthus* won't set any flower in the tropical lowland of Jakarta. I believe that the largest yellow flowering Habranthus is *H. howardii* which I have been looking for since a long time ago. Carl Schoenfeld of Yucca Do Nursery has kindly sent some bulbs of this yellow rare species to me, but it rarely sets flower in Jakarta and still I could not get any chance of pollinating the flowers of *H. brachyandrus* with the pollen of *H. howardii*.

As a matter fact, except for the enlightenment given to me by the above mentioned authorities in rainlilies, I have also got free consultations from time to time from Greg Hambali, one of my best friends and a freelance horticultural consultant. As I have no educational background in horticulture which could support me in my breeding activities (I studied law at the Parahyangan Catholic University, specializing in International Law & International Relations), I have never so far studied about hybridizing scientifically. I have just followed my instinct in choosing parent stocks in cross-breeding, while waiting expectantly that good results will appear.

So far assisted by my gardeners, I have cross-pollinated tens of thousand flowers of *Zephyranthes*. Maybe this could explain why I have got quite a lot of selected hybrids of rainlilies and there are almost around 400 of them. This will be added to from time to time with

newly selected hybrids. Because the flowers of the newly selected ones are much more beautiful than those selected at the early stage, I have to reselect among them for the less prospective hybrids and discard them because the space is so limited in my garden.

I have planted my rain lilies in 34 raised beds of 20m long and 1.1m wide in a piece of land of around 1,000m^2. In the rainy season the rainwater floods the ground between raised beds without causing any damage to the bulbs in the beds. So, there is no problem with heavy rainfalls, except that the weeds grow so prolifically that extra work to settle this problem is necessary. The soil in my garden is volcanic and it is very fertile, so that there is no need for heavy fertilizing, and I just fertilize it with cow manure to make it more porous.

In the past I have worked with Surflan and Treflan diluted with isopropyl alcohol and added with dimethyl sulfoxide which is commonly called DMSO for tetraploid conversion. However, I have stopped such kinds of experiment after getting a warning that it is too risky for my health. Oryzalin and trifuralin as well are highly poisonous and according to a report, DMSO could penetrate into our bodies so fast that within seconds after a drop of this substance gets contact with our skin, we will feel bitter taste at the tip of our tongues! I learn that the utilization of colchicine could be more effective in tetraploid conversion but with much greater danger as the toxicity of colchicine is much higher than the pre-emergence herbicides like Surflan and Treflan, because colchicine is highly carcinogenic and thus might cause lung or thyroid cancer. There are some other safer ways for tetraploid conversion including the application of paradichlorobenzene (PDF) and hydroxyquinoline, but in my sixties, time is running out for me.

I am very happy that in his website, www.bulbnrose.com. Karl King has pronounced my hybrid rainlilies as Indonesian beauties, even though the habitats of rainlilies are very far away from my country. Therefore, in Indonesia we could never find rainlilies in the wild as the real habitats of rainlilies are in South and Central America and southern parts of the U.S. such as Texas, California and Florida.

Some foreign visitors to the above websites are so enthusiastic that they expressed their willingness to visit my garden which I could not accept, because the rainfall is beyond my prediction and I am unable to predict exactly when the rainlilies will set a lot of flowers. I just do not want to disappoint anybody else,

This bright yellow apricot hybrid is really eye catching. It sets flowers freely. The flower size is medium and it also sets seeds so it is good for cross breeding

but Marcelo de Oliveira of Rio de Janeiro, Brazil has managed to pay me a visit on his own risk. He was very fortunate that there was a "blitz" of rainlilies at the time of his visit and was amazed.

I do hope that my project could be continued by one of my children in the future, but unfortunately none of them pay any attention to what I am now doing. They do not even take a glance at the "blitz" of rainlilies in my garden. Apparently not all people are blessed with the ability of enjoying the sight of all the beautiful creations of the Lord. The usefulness of rainlilies for gardening lies in their mass application in landscaping (in suitable climates); otherwise they will only become collectors' items. Hopefully some time in the future, even after I have died, my hybrid rainlilies will be extensively utilized in landscaping, so that with more beautiful landscapes, life could be even more enjoyable for a lot of people.

My first narrow petalled semi-double ivory. It has no pollen at all, but I have not yet tried to pollinate it with the pollen of other cultivars

This is my best medium saffron yellow hybrid without any bronzing. I am going to propagate it for further hybridizing

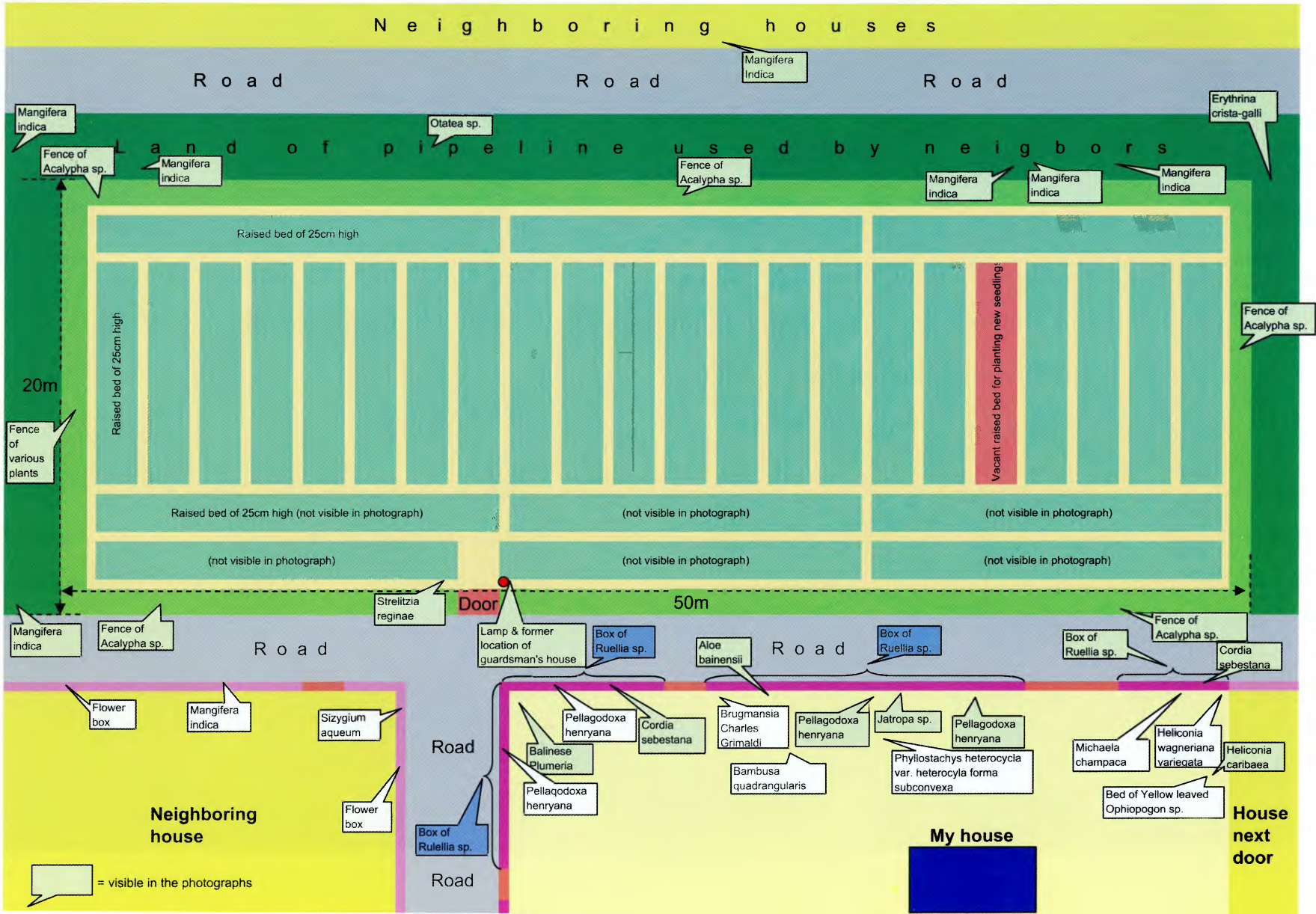
* Rainlilies belong to the amaryllis family and are classified in 3 genera: *Zephyranthes*, *Habranthus* and *Cooperia* though the latter is often treated as part of *Zephyranthes*. They get their name because they bloom in response to rain.

Fadjar Marta born Lee Ka Tjoen in April 17th, 1941 in the town of Bukittinggi, West Sumatra, Indonesia. Failed to study agriculture as his father did not agree to it. Enrolled at the Parahyangan Catholic University in 1962 where he studied law and majored in International Law & International Relations and graduated in 1970.

In September 1973 he married Liem Chiaw Yuen and has 4 children: Tessa (32), Selma (30), Sheryl (21) and Andros (19). When he was a child, he lived in the small town of Padangpanjang (West Sumatra) where his grandmother ran the only florist and plant nursery in town. This childhood experience has brought him to enjoy the hobby, love and passion for flowers and ornamental plants.

Birdseye view of my Rainlillies garden

LAY-OUT OF JAKARTA RAINLILIES GARDEN



Bulb Chipping Haemanthus

Jim Shields

I have been interested in the propagation of bulbs for some time. In 2005, I had the opportunity to experiment with the propagation of some *Haemanthus* bulbs. At the time, with the available facilities, the best method seemed to be chipping or cutting the bulbs.

Haemanthus montanus

Having received a good supply of mature bulbs of *Haemanthus montanus* from David Human in July 2005, I decided in August to experiment with propagating one. I used a bulb about 4 inches (ca. 10 cm) in circumference, and sliced it vertically into quarters. Each quarter-bulb was further divided by cutting horizontally through the basal plate. The lower or outer chip was approximately a twin-scale. The inner or core chips had much more bulk.

The chips were soaked in diluted Consan 20 ® (ca. 100-ppm after dilution) for 2 hours. The pieces were next soaked in ca. 0.5% sodium hypochlorite (household bleach diluted 1:10 with water) for 5 minutes and then rinsed in tap water twice.

Just before planting, the chips were soaked for 1 hour in thiophanate-methyl (Cleary 3336 ®, ½ teaspoonful in 200 ml water).

***Haemanthus montanus* core chips after ca 105 days**

***Haemanthus montanus* bulb halved**

Finally, the chips were inserted into 1 quart (ca. 960 ml) plastic food containers filled with moistened vermiculite, and the tops were sealed on. The lower or outer chips were put in one container, and the upper or core chips were put in a separate container.

The containers were held in an air-conditioned, heated room maintained at ca. 70–75°F (ca. 21–24°C).

Three and one-half months later, the containers were opened and the chips were removed from the vermiculite and rinsed. In each container, it was found that three of the four chips had produced one bulblet each. The bulblets grew in all cases from the basal plate tissue rather than from the bulb scales. The core chips in two cases had produced a root. None of the outer chips produced any roots. The yield at this stage was a total of 6 bulblets from a single bulb.

Haemanthus humilis subsp. *hirsutus*

In August 2005, I discovered that one of my mature bulbs of *Haemanthus humilis hirsutus* had suffered severe rotting of the basal plate. I attempted to salvage as much as possible of the remaining healthy tis-

sue. This amounted to about 8 pieces of bulb scales, without any basal plate remaining, and a couple of small pieces of basal plate with attached root.

The pieces were first soaked for ca. 1 hour in 100-ppm Consan 20 ®, followed by ca. 20 minutes in 0.5% sodium hypochlorite solution. After rinsing in tap water, the pieces were finally soaked in thiophanate-methyl (Cleary 3339 ®; see above). The pieces were inserted in moistened vermiculite in 1-qt. containers, sealed, and held as above.

Haemanthus humilis hirsutus chips

After ca. 90 days, green leaves were observed coming up from the vermiculite, so the containers were placed under fluorescent lights (40–W daylight type, 16 hrs. per day, ca. 6 inches/15 cm above the tops of the containers).

After a total of ca.105 days, the containers were opened and the pieces were removed from the vermiculite and rinsed clean.

Seven of the bulb scale pieces produced one bulblet apiece. Each bulblet had at least 2 roots as well as one leaf at the time the pieces were removed from the vermiculite.

It was noted that only the pieces of bulb scale produced bulblets, and that no basal plate was left attached to any of the bulb scales. All the bulblets were produced from the bulb scale abaxial (outer) surfaces, never from the cut edges of the scales. The fragments remaining from one mature bulb of *hirsutus* produced a total of 7 bulblets.

All the bulblets from both species were individually potted in 2 x 2 x 3 inch plastic pots in potting mix, and all were then placed under fluorescent lights at ca. 70-75°F (ca. 21–24°C).

Conclusions

Although the two different approaches to bulb chipping both produce roughly the same yield per parent bulb (6 or 7 to 1), the sites where the bulblets appeared were quite different between them. *H. montanus* bulblets grew from the residual basal plate tissue. *H. humilis hirsutus* bulblets grew from the abaxial surface of the bulb scales.

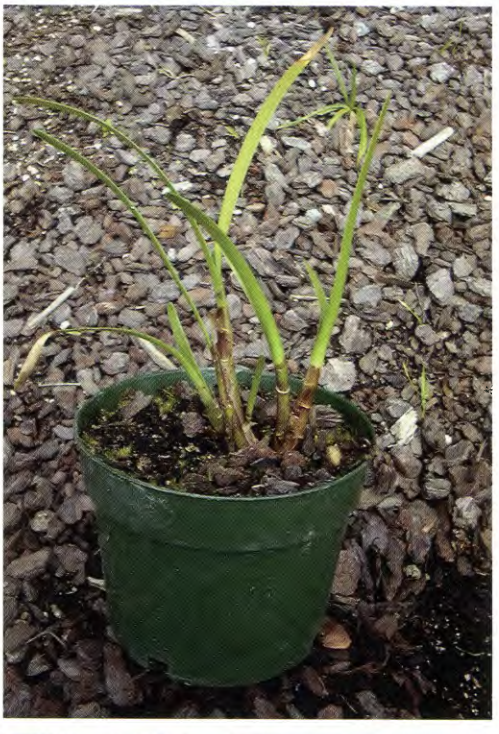
An unusual way of propagating *Worsleya procera*

Tony Palmer

Following on from the experience of Jim Shields with bulb chipping I would like to tell you of an unusual thing that happened to me with *Worsleya procera*. Although I don't find them particularly difficult to grow successfully, they are somewhat prone to narcissus bulb fly – one of the few pests or diseases that seem to bother them here.

Last year I noticed a 3 year old plant looking decidedly sick. I tipped it out of the pot and to my dismay there was unmistakeable evidence that the bulb was indeed 'occupied' by a narcissus bulb fly larva. If it had been a common *Narcissus* I would probably just have destroyed the bulb and its lodger and moved on. But being a *Worsleya* I had to at least make an attempt to salvage it. So I used a sharp knitting needle up through the hole in the base plate and rummaged around in the bulb until I had impaled the hapless grub and removed it. Nowhere near as easy as it sounds and by the time I had got my prey the bulb was very badly damaged. It still had one or two healthy roots however, so I decided to repot it and just see what happened.

To my amazement after a few months several new growing points emerged around the remains of the now rotting original bulb. I have just recently lifted the pot and there were six very healthy new small bulbs which separated quite easily, each with some roots attached. They are now potted individually and looking good. It looks as though I achieved accidentally much the same sort of results that Jim did on purpose. I would never have dared to use bulb chipping as a means to propagate something as rare and precious as my *Worsleya*, but as a result of this fortuitous accident maybe it is something we should seriously consider in future. Anything that results in this bulb becoming more widespread in cultivation must surely be good.



Guidelines for IBS Members . . .

who would like to take part in the online seed and bulb exchanges run so successfully by Herbert Kelly

First let me explain that most of the offerings that IBS provides through its BX & SX, are extremely rare, elusive, and unobtainable anywhere else in the country. Twenty to thirty years ago, these botanical treasures were only available to a select few. We have made it convenient for the Amateur, as well as the Professional Botanist, to obtain these items at one convenient location. Without this service obtaining these treasures would come at a prohibitive cost. Listed below are Guidelines to help you use the IBS BX & SX, successfully.

1 DO NOT SEND YOUR DONATION UNTIL YOUR REQUEST HAS BEEN CONFIRMED

2 Please send your mailing address with every request. Your phone number would be appreciated also.

3 Please send your requests, *with the original subject heading that I've sent to the IBS forum, (for each bx or sx), each time.* Not doing so creates more paper work for me. Send this to me privately, NOT to The IBS Forum.

4 All donations must be sent to:

International Bulb Society
PO Box 336
Sanger California 93657-0336

1 All IBS MEMBERS PARTICIPATING IN THE BX & SX MUST KEEP THEIR ACCOUNTS PAID IN FULL, EVERY 30 DAYS, OR PRIVILEGES WILL BE SUSPENDED, UNTIL BROUGHT CURRENT. Payment can be made by Check, Money order or Cashiers check. Master card or Visa can be used, by contacting IBS Treasurer, Pam Kelly, at (559) 324-7676 or pkelly1668@aol.com

2 Many of the rare seeds and bulbs offered are in short supply, so unfortunately we cannot supply all wants, each time something is offered. We cannot list Bulb and Seed availability at convenient times to please everyone - as much as we try - in all Time Zones. Try to keep a watchful eye on the IBS Forum postings as it is first come, first served.

3 All material is shipped from us in fresh condition. Once it is delivered to the shipper, it becomes your property. We cannot be responsible for loss or damage. Donations are due once the package is shipped. There are no warranties expressed or implied.

4 Please watch IBS forum, to see if a particular BX OR SX is closed, before making your request.

5 You must be a paid member of IBS, to participate in any BX OR SX offerings, so make sure your membership is kept up to date.

6 Please mark you remittance with the specific BX OR SX number, or numbers , each time, before sending to the IBS TREASURER.

7 Please reply to me privately at herbk76@aol.com not to ibsmembers@yahoogroups.com

If you have any questions, or need help, email me at herbk76@aol.com

Herbert Kelly Jr.
Director IBS BX AND SX

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IBS has now produced TWO International Bulb Society pins. Both have been produced in a very limited quantity and are destined to become valuable collector's items. Actual size is one inch (25 mm) high x .75 inch (19mm) wide with a tie tack-type back. Number one features *Galanthus nivalis* on a dark blue field (enamel) with "IBS" in gold tone and the whole framed in a gold tone edge surrounding the enamel. The second pin features a photo of *Hippeastrum papilio* with IBS in orange on a maroon background.

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