

Number 53

Fall, 1994

Species Iris Group of North America

Fall, 1994 - Number 53

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Robin Director.....	Patricia Brooks, 102 Jefferson Lane, Ladson, SC 29456
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The Evansias.....	Elaine Hulbert, Route 3, Box 57, Floyd, VA 24091
The Water Irises.....	James W. Waddick, Ph.D., 3233 McGee, Kansas City, MO 64111

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President's Message

-Richard Kiyomoto-

I want to call special attention to the upcoming SIGNA Species Symposium in St. Louis on March 24-26, 1995. We are making every attempt to get this issue of SIGNA to our membership before the registration fees increase and before registrations are closed. There is a limit on the number that can be accommodated. Register as soon as possible.

I want to express appreciation to Louis Fry who has been replaced (interim) by Colin Rigby as the SIGNA Editor. Louis' professional expertise showed in the accuracy of articles in SIGNA and the improved appearance of the publication. I am certain that when time permits, we will again have access to Louis' skills. Janet Sacks has volunteered to become the permanent SIGNA Editor and will be assisted by Colin Rigby in this demanding job.

I had hoped to report sweeping changes in the organization by this time; however, our board meeting in Albuquerque did not have a quorum so I can only report on the inputs received there and the proposals that will be voted upon by mail in December. I asked that the following money be budgeted for future expenses: \$5,500 for medals and \$5,000 for checklists. The board had previously approved advancing \$3,000 to the organizing group for the SIGNA Species Symposium with the agreement that the money would be repaid to SIGNA.

I also proposed the following expenses which were modified during the discussions in Albuquerque: (1) \$500 per year Research Grant with request to AIS Foundation for matching funds which, if approved by the Foundation, would permit SIGNA to award a grant of \$1000; (2) request for \$500 per year germplasm fund for purchasing iris germplasm. Requires first the details on how seed will be distributed and maintained by SIGNA before this item will be put up for official vote; and (3) request for \$200 to sponsor the SIGNA Species Symposium registrations of Professor Yang Ju-Liang and Professor Yen Chi.

I am proposing the formation of standing committees to handle much of the business of SIGNA and to involve more members in SIGNA. At the start of the standing committees will be headed by those who have long served SIGNA. I hope this will only be temporary. We need to identify those who are willing and able to participate in running SIGNA. The standing committees proposed are as follows: (1) Checklist Committee to be formed when present committee has completed its task; (2) Species Manual Committee which will include publication of illustrations and items on species culture and will publish their reports continuously in SIGNA and periodically collect these reports for publication in manual form; (3) Finance Committee which will organize the budget (members will be the treasurer, immediate past president and president); (4) Awards Committee; (5) Display Garden Committee; (6) Research Committee to be concerned with award of the research grant and deal with all items relating to scientific research on irises including publication of lists of scientific and relevant popular articles in SIGNA (Richard Kiyomoto will head this committee); and (7) Registration Committee to be concerned with any issues dealing with registering under SPEC and SPECX categories and registering unregistered, named, species or species hybrid irises (Janet Sacks will head this committee). Any individuals interested in involving themselves in SIGNA should write to me, tell me your interests, and I will see how we can accommodate you.

About this issue. . .

-Colin Rigby-

Because of pressures at his work, Louis Fry has had to give up the editorship of SIGNA and we thank him for the excellent job he did as editor. You will find several things changed with this issue; a different format from the last several issues, both 'good' and 'bad' picture illustrations and several type styles, to name a few. We want to especially call your attention to the series of articles on seed and seed germination toward the end of this issue of SIGNA. These articles are the result of a questionnaire contrived and sent out to various iris hybridizers by SIGNA Seeds Director, Darrell Probst. Each article deals with a specific type or section of species irises and we think these articles will serve as a useful and informative reference for years to come. Our many thanks to Darrell for taking the time and effort to originate this idea, solicit the response articles and to send them to us camera ready for publication. It was a big effort but one we can all enjoy and appreciate. These articles have also made this a bigger issue than is normal. My many thanks also to all those other people who have been very helpful and cooperative in sending in material for the publication.

Editing is new to us and we want to apologize for the typos and the fact that there are to, too, two many 2's in the English language. We've also come to a wonderful understanding, the computer and I, but I must tell you that the computer is ahead so far. And, in the middle of things, we find there are several ways of doing things, thanks to modern technology. The 'bad' pictures are the old method of reproduction while the 'good' ones are the result of computer technology, discovered a little too late and a little too complex for our understanding at the time. With the next issue, we hope to be more consistent. Lest you run the risk of thinking this will be a permanent situation, let me hurriedly reassure you that Jan Sacks will become the permanent editor of SIGNA starting with the Fall 1995 issue when you will again be in good hands. In the meantime, please bear/bare (select one) with us.

Back Issues

All back issues of the SIGNA publication are available. Issues 1 through 15 are priced at \$4.00 each, and all others are priced at \$2.00 each. Back issues can be ordered from: Carla Lankow, 11118--169th Avenue SE, Renton, WA 98056.

International Symposium: Gardening with Species Iris

St. Louis, Missouri

March 24—26, 1995

Sponsored by:
The Greater St. Louis Iris Society
The Missouri Botanical Gardens
The Species Iris Group of North America
The Gateway Chapter of the American Rock Garden Society

Symposium Headquarters:
Westport Park Best Western, 2434 Old Dorsett Rd. (at I-270 & Dorsett Rd.)
Maryland Heights, MO 63043 (314) 291-8700 or 1-800-223-516.

Seminar Registration

Registration Fees:	
Postmarked before January 1, 1995.....	\$100.00
Postmarked January 1 -- March 1, 1995.....	\$125.00
Postmarked after March 1, 1995.....	\$150.00
Youth under 18.....	\$80.00

Make checks payable to **Signa Species Symposium (SSS)** and mail to:
Riley Probst, Registrar, 418 North Van Buren, St. Louis, MO 63122.

Hotel Information

Symposium Headquarters will be the Westport Park Best Western, 2434 Old Dorsett Rd. (at I-270 & Dorsett Rd.), Maryland Heights, MO 63043 (314) 291-8700 or 1-800-223-516

Room rates are \$55.00 per night, plus tax. One to four persons per room. Book room reservation directly with the hotel, stating you are with the Species Iris Symposium for the special discount rate. All unreserved rooms blocked for the Symposium will be released after March 10, 1995. Free shuttle service from the airport to the hotel arranged through the hotel.

All registrations will include a copy of the *Symposium Proceedings*. The *Proceedings* will be available after the meeting at an estimated cost of \$30.00 for each additional copy. A box lunch at the Missouri Botanical Gardens and the evening banquet at the hotel on Saturday are included in the registration fee. The Spring Flower Show will be in progress at the Missouri Botanical Gardens, along with regular features of the Garden such as the Climatron Rainforest, etc. Transportation between the Missouri Botanical Garden and the headquarters hotel is provided as part of the registration fee.

Tentative Agenda

Friday evening at the hotel, there will be informal presentations and hospitality. If you would like to show some of your own slides please note this when making your registration for the Symposium. Saturday will be lectures, interspersed with opportunities to view Iris exhibitions. Saturday evening banquet will feature a lecture by Brian Mathew on Irises in their native habitats. Sunday AM will include additional lectures. Afternoon is free for early departures or an opportunity to visit more of the Missouri Botanical Garden. There will be an open meeting of SIGNA scheduled for this afternoon. Those wishing to exhibit plants and flowers, please contact Symposium Chairman, Bob Pries, 6023 Antire Rd., High Ridge, MO 63049 (314) 677-8805.

Photo Contest

Cash awards for best photographs will be given as follows: \$100.00 first prize, \$50.00 second prize, \$25.00 third prize and five (5) fourth prizes of \$10.00 each. Photos will be judged on composition, rareness of species or species cross, and technical excellence. Winners will be announced at the end of the Symposium and in the SIGNA publication. Please send copies of your best photograph in the form of a slide and a 5" x 8" print. Photos will not be returned and may be later featured in SIGNA with credits to the photographer. Photos must be received by March 20, 1995 in order to be displayed at the Symposium. Each photo should be properly identified with specific name and/or variety. Send photos to Symposium Chairman, Bob Pries, 6023 Antire Rd., High Ridge, MO 63049, USA.

Keynote speakers to include: Brian Mathew, England; Peter Goldblatt, Missouri; Panyoti Kelaidis, Colorado; Dr. James Waddick, Missouri; Jean Witt, Washington; Phil Ogilvie, Washington, D.C.; Darrell Probst, Massachusetts; Alan McMurtrie, Canada; Eberhard Schuster, Germany; Colin Rigby, Washington; Dave Niswonger, Missouri and Robert Pries, Missouri.

Growing *I. narcissiflora*

-James W. Waddick-

Few iris species have been the cause and source of as much mystery as *I. narcissiflora*. Collected over seventy years ago it has been the cause of much discussion. Brian Mathew gives an excellent review in his book The Iris (Timber Press, 1989, rev. ed.) and accounts of a recent observation by a British tourist in SIGNA.

I searched for this iris on at least four visits in W. China without success, but urged my gracious Chinese hosts to seek it out in their travels. Last year, they obtained seeds from this species and sent them on to me. I distributed some seeds and kept a few for myself. Seedlings are now growing in various locations around the world. Doubts remain as to how to grow this iris properly.

This summer my Chinese friends from Central Sichuan came to visit and we discussed some details about this rare iris. Prof. Yen Chi and his wife Prof. Yang Jun-liang discussed their experience with this species in Sichuan.

The main collection location for this iris is in Yulingcun (also known as Yulingquo). This location covers altitudes between 3,000 and 4,000 meters (approximately 10,000 to 13,000 feet) and is snow covered in winter. It is the only species of iris growing in this location. Generally the plants spread out with a few inches between each fan of foliage and flower stems are also separate from foliage. Most plants have a single flower per stem, but rarely two can develop.

The plants are not uncommon. They grow close to streams on their wet banks or on moist to damp hillsides and slopes. They are always growing in full sun. Soil conditions are unknown for certain.

For growers lucky enough to obtain seeds or division of this plant we can make some comparisons for the home garden. The altitude suggests at least moderate hardiness, but may favor more moderate alpine conditions such as those found in the Pacific Northwest where the forty chromosome sino-siberian iris flourish. Obviously they should be grown in full sun, but with some tempering in hot, sunny, windy or drying conditions. Moisture seems a high priority. From the only known photo of this species it seems to grow in associations with various mosses and would probably prefer to never dry out completely. A brief report on my own seedlings which were started in January of this year: Now in October, the largest seedling has leaves up to 15 inches in length and barely reaching 1/4 inch in width. Most of the very erect foliage is between nine to twelve inches long and closer to 1/8 inch in width. The leaf color is medium green and the leaves are smooth and slightly glossy. So far I'd rate the growth as moderate although the germination was well under 50%. There is no sign of a rhizome or fans being produced away from the primary seedling fan as we might expect in a mature plant.

I. narcissiflora's secrets are slowly being exposed. We will soon be able to determine the position of this species in the genus, its affinity to other species, its adaptability as a garden subject and more. I am hoping we will have a delightful addition to our woodland and rock gardens to grow along with *I. cristata*, *I. verna* or *I. graminea*. With its bright yellow flat flowers it should be a new color to the palette of smaller garden irises.

Is It an Iris?

-Jean Witt-

Take a look at the photo of the horn vessel on page 97 of vol. 186, #4, National Geographic for October 1994. In the upper left hand corner there appears to me to be a group of little blue iris flowers and the tip of an iris leaf. This article is about new discoveries concerning the prehistoric Pazyryk people, whose tombs have been preserved in ice in Siberia. These are the same people whose iris designs I reported on in SIGNA 31, page 1091, October 1983.

GROWING ARILS IN THE PACIFIC NORTHWEST

An interview with Arnold Ferguson

Arnold Ferguson lives in Tacoma, Washington, and has devised a unique method of growing aril irises in the wet, maritime Pacific Northwest. Tacoma has an annual rainfall of 34 inches per year and Arnold tells us how he manages to keep the plants dry and growing.

C: Arnold, I want to ask you why the beds are raised so high.

A: Well, this type of bed for me, here in Washington, is beneficial in a couple of ways: I've got excellent drainage, it is sandy soil and it is also very easy to weed.

C: Does the soil go all the way down to the ground?

A: Yes. The beds are made of three pressure treated 2 x 10 boards set on edge. One bed is 4 foot wide by 14 foot long and the other is 4 foot wide by 19 foot long. I like to have a bed at least 16 inches deep for the root system for the irises. I considered putting a bottom in the beds, but when I got it figured out, it was going to cost me two or three times as much as it did by building the sides straight down to ground level. Also, this way, I never have to worry about replacing the bottom.

C: Right. So actually, you have almost 30 inches of good draining, sandy soil here.

A: Yes. And here in the middle of the bed, I have put a metal rod from one side to the other of each board to hold the beds together. It keeps the boards from bulging in the middle of the beds. I can actually get up here on the soil with my 9 inch Mantis tiller and till the ground. I've had less weeds in these beds than I've had in my other beds, too. Also being higher, I don't get the weed seeds that blow in like I do on the ground level beds.

C: What are the roofs made of and how do they work?

A: They are just sheets of corrugated fiberglass with two 2 x 2's screwed to the panel. The 2 x 2's just slip into this slot cut out of the roof frame of the bed and is held in place with four screws at the corners of each panel. They're very light and I can handle a panel by myself. I've made them so they overlap just a little. That way, the rain doesn't come in at the top.

C: Why do you have the thermometer laid on the soil?

A: When I had the roofs on during the summer to keep it dry, I was just curious to see how warm it would get underneath. On days when it would get 90-95 outside, I could see that it would reach 110 degrees inside. I laid the thermometer face down on the dirt and when I turned it over, it read 120 degrees.

C: So the soil surface would get up to 120 degrees?

A: Yes, and this allowed the plants to go dormant as they do in their native Israel.

C: When do you take the roof off the beds?

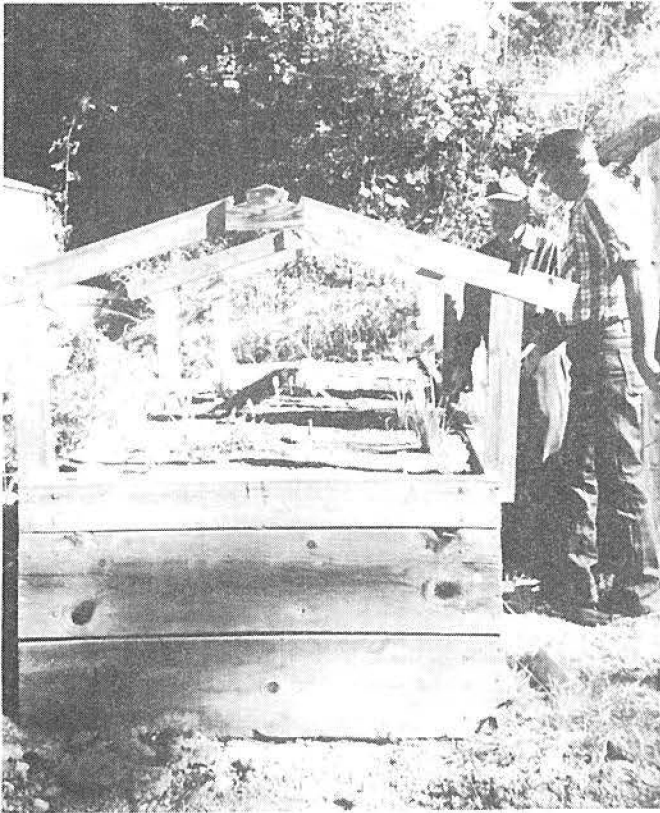
A: I wait until I start to see new growth. Even being dry all summer, they will start to grow when they are ready. The roof at the edge of the bed is 23' high and is on a 22 degree angle so there is quite a bit of head room at the center of the bed. With the sides open like that, they have good air circulation all the time. About two weeks ago, which would be the 15th of Sept., I took the tops off. I have watered them because they have started to grow a little bit, and if we don't get another rain in the next few days, I will water them again.

C: You will keep them damp from now on, is that right?

A: Yes. I put a 3 pound coffee can here on the soil and when it is filled twice, about 15-16 inches of



rain. I put the roofs back on. Then I'll water the beds myself from then on, just enough water to keep the beds moist. I'll spray now, very shortly, with a fungicide. I rotate with about four different fungicides so I don't build up a resistance to any one. Last year, I started to spray in the early part of January and you could see the plants begin to change. With the roofs on, you no longer have the water splashing on the leaves to cause rust and leaf spot and one thing or another. I'll also spray them with an agromycin spray, (Agri-Mycin, an agricultural Streptomycin. Ed.), probably twice during the winter. I had *I. nazarena* start to die on me last year, totally dark brown leaves. I sprayed with the agromycin twice and I still have the plant.



C: So then by bloom time, you don't have any leaf spot.

A: Very little.

C: When do you stop watering them in the spring.

A: When I get my first four or five plants in bloom, I'll give them a good fertilizing of 30-10-10 and then again at about 80% bloom. I give them about 4 to 5 times the amount of fertilizer that I give the tall bearded. I mix up bone meal, blood meal, potash, trace minerals and Epson salts. They are furious feeders. The arils like a pH factor of 7 to almost 8 and the recommendation is a pound to a pound and a half per two cubic feet of soil of lime and bone meal.

C: When you control the amount of rain water they get by putting the tops on your beds like you do, you don't have a lot of leaching of fertilizer from the soil.

A: No and I can control the leaf spot too. Some people say that I'm babying them but even when we fertilize our tall bearded, in a sense we are babying them. It would not be hard for people who wanted to grow some to put them into a wooden barrel and build a little cover over the top of it. You'd have 18" of soil depth and they would grow in that.

C: These plants have nice green leaves on them, is this all summer growth?

A: Some of these plants have stayed green all year

out, basically, most of the green growth on these plants are of the regelia species of the arils. This one, 'Turkish Dancer', is a clone of *I. stolonifera* and this one is an *urmiensis* hybrid.

C: *Urmiensis* is a...

A: Species, an onco species. I haven't seen enough of the species themselves in bloom to know all the variations. The *Urmiensis* hybrid has been crossed, probably with *I. atropurpurea*, and then backed crossed to *I. urmiensis* to get the hybrid. A lot of these others are crosses of one species to the other so they are hybrid in that sense of the word. Not to try to improve on the actual species itself. As the pure species go I have *I. sari*, *I. samariae*, *I. iberica*, *I. stolonifera*, *I. paradoxa*, and iris--I have a problem trying to pronounce this one, I'll spell it--*hieruchamensi.s*. Over here in the other bed we have *I. lortetii*, *I. nazarena*, *I. hermona*, and the yellow form behind it, *I. lozicola*, it is also called *I. atrofusca*, *I. jordana*, *I. haynei*, *I. mariae* and *mariae* hybrids and the last one is *I. atropurpurea*.

C: You have a nice collection. Where did you get most of them, directly from Israel or from dealers in this country?

A: About half and half. Three sources. David Shahak in Israel. Luella Danielson in New Mexico and the Aril Society plant sales. I've got seedlings but don't ask me when the seeds will sprout. Last year we went to Forth Worth and when we got home here was 15-16 seedling come up. Here is *I. lortetii* with about 10 seedlings, a *susiana* hybrid here and a single seedling here of *I. samariae*. A lot of times I see the seedlings coming up in November.

C: What do you have them planted in, just pure sand?

A: No, the soil us underneath with about an inch of sand of top. It keeps a lot of the weeds down. Its easy to remove the weeds from the sand and the water goes down through the sand without washing the

seeds out too.

C: The sand holds the moisture in the soil in the bottom, too, doesn't it.

A: Yes. I started off with 2 inch deep flats but I didn't have very good success. Then I went to these containers that are about 6 inches deep and about 6-7 inches wide. I like the ones that are about 18 to 24 inches long better than the longer ones.

C: These pans look like they are made of plastic, something you would find at a variety store.

A: Yes, I got most of them from K-Mart, where ever I can find the kind that I like. I look for the ones with rigid sides then just drill holes in the bottom for drainage.

C: With this deeper pan, you would get a much better root system on your seedlings, too.

A: Yes. I don't remove them from here until they put up four leaves. They say three, but I let them go until they have four sets of leaves. The best success I had is when I took my 2' deep flats and just dumped them out in my beds and left them. In these containers, we've got just about 3000 aril seeds planted.

C: Are they seeds from your plants or did you get seed from the exchange, too.

A: Most of these seed came from David Shahak and a few from Sharon McAllister through the plant sale. In this past year, I've seen my first pure species seed, only a couple in each pod, but I've also got about a dozen crosses with 25-35 seeds in each pod.

C: Your crosses?

A: Yes.

C: A lot of aril growers do embryo culture. Have you ever do that with the seed?

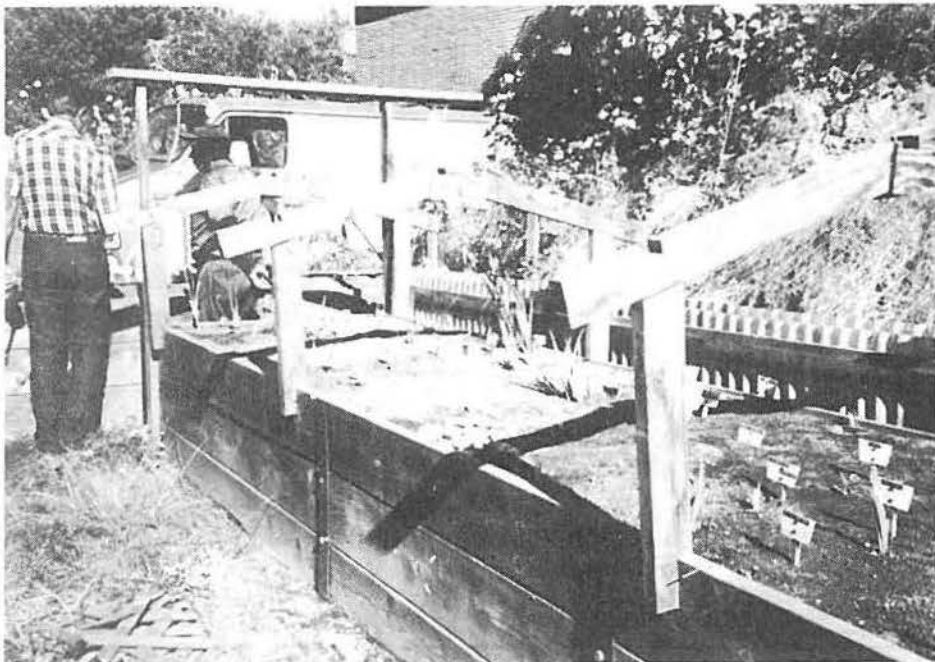
A: No, but I've read about it. I have the Yearbooks from day one.

C: How long do you leave the seed in the pan?

A: These will stay for seven years. The seed will come up, on their own, for up to 20 years time that they know of.

C: You have a lot of patience, Arnold. The secret to your success then, and the thing that controls your success, is keeping the tops of the beds on except in the fall rains.

A: Yes, that and one other thing. I did not see any increase in the plants, even though I had fertilized the year before, until I had added additional potash to the soil. It has taken me five years to learn because I had nobody else in the area to tell me. This past year I saw my first oncos in bloom. I saw *Atropurpurea*, *I. haynei*, a *hermona* hybrid, *aurmiensis* hybrid., *I. samariae* and *I. jordana*.





Photos by Arnald Ferguson of irises grown in Tacoma, WA

Growing Arils in Southern New Mexico

— Sharon McAllister —

Mountains, valleys, mesas, plains — southern New Mexico has a varied topography with many microclimates — and each one presents the iris grower with a special set of circumstances. Except for the higher mountains and river valleys, this is essentially desert country where little except native plants and wildlife can survive without supplemental water.

The aril iris aren't cacti, of course, but they require considerably less water than most other types of iris. Local conditions are close enough to those in some of their native lands that many species seem to be quite at home here. In general, the arils are about as easy to grow here as the TBs are in other parts of the country, requiring only minor adaptations of culture to accommodate local garden conditions.

My garden is on the west mesa overlooking the Mesilla Valley and the city of Las Cruces. The larger native vegetation consists of creosote bush, sagebrush, mesquite, and yucca. "Large" means that once in a while you'll find one of these old enough to be over head-high. There are also a lot of smaller native plants: bunch grass, cacti, goatheads, tumbleweeds, and sometimes (in a relatively wet year) wildflowers. Because average annual rainfall is 8", anything over 12" is considered a *very* wet year.

Here all iris — even the arils — perform best when grown in sunken beds surrounded by wooden frames so they can be irrigated without wasting water. The soil is quite sandy, with a pH ranging from about 7.0 to 8.0 and such sharp drainage that the surface will be completely dry the next day after a bed has been irrigated. Conditions here are excellent for arils and arilbreds, marginal for medians and TBs.

I have succeeded in naturalizing a few onco hybrids, though. These clumps have remained undisturbed for over 10 years, and have had neither supplemental water nor fertilizer since the spring of 1984. They have been weeded only in early spring, just enough allow access to the blooms. Most of the survivors have been sheltered by sagebrush on the southeast side, so I'd say the key has been the natural protection it provides from the summer sun.

A few miles away, down in the valley itself, is farm country. There the soil is "adobe loam", with sand and clay as well as rich loam. It is quite different from the sandy soil of the mesa and plains, and holds water so well that you need to wait several days before stepping into a bed after it's been irrigated. The most successful iris growers in the valley use water from the Rio Grande for irrigation, although the combination of valley soil and city water is also productive.

In valley gardens, it's possible to grow beautiful iris of all types. The late Gus Seligmann's garden had impressive displays of medians, arilbreds, and TBs scattered among rose bushes where 50- to 100-year-old trees provided filtered shade. To grow his gorgeous oncos, Gus planted them in a special "rock box" — a raised bed built with rock walls and filled with a mixture of builders' sand and valley soil.

Although the primary difference between the mesa and valley gardens is the soil, temperature is also an important factor. The two gardens I've described are only five miles apart, but located on opposite sides of the Rio Grande. The prevailing winds are from the west. On the mesa the wind is hot and dry, because there are hundreds of miles of desert to the west. As the air mass moves eastward, it crosses the river, picks up moisture, cools off, and slows down. The Rio Grande itself thus acts something like a evaporative cooler.

Lu Danielson's Pleasure Iris Gardens are about 30 air miles to the southeast, near the Texas border. It has still different conditions because it is located in the plains on the other side of a mountain range. The soil is a very sandy loam that is better suited to the arils than either the mesa or valley soils I've described. Neither sunken nor raised beds are needed because the soil is perfect for the use of drip irrigation and she has adapted it to support many different type of iris.

But word-pictures don't quite suffice — if you're in the El Paso/Las Cruces area in late March or early April, come see for yourself!

Approaches to garden judging species

-Bob Pries-

Many iris judges seem to throw up their hands, say they know nothing about species, and say they could not judge them. I contend that a good judge can judge any group of plants with just some minimal experience. Let me explain why.

Most judges will vote for a Dykes Medal winner. Yet every section of iris competes for the Dykes. Choosing among the diverse candidates from each of the iris sections should be no more difficult than voting for a species. Obviously there are approaches to judging that are applicable to any type of iris judging. What are these universal methods?

Let me suggest the most common answer you will get when asking a judge why they voted for something will be because they liked it.

This rather emotional seemingly non-analytical answer may hide a number of sins or self-evident virtues.

If they liked it because the hybridizer was a friend of theirs, then they obviously did not evaluate the iris and did a dis-service to the gardening public. On the other hand, if they liked it because they thought it the most beautiful thing they had ever seen, the sin was not quite so bad. Such gut feelings about a plant may actually be based upon a sound evaluation from personal experience with the plant in the garden.

The one thing a judge should never lose sight of is how the cultivar performs as a plant in the garden. Your vote is a recommendation to the public that they will have a valuable addition to their garden. If you were to advise someone as to what to buy and plant and then would be visiting their garden for the next several seasons, you you be proud or ashamed of your recommendation?

If we grow plants ourselves then we know whether they perform well over the course of years in the garden. The same knowledge could be attained by visiting other gardens over a period of years. All these things certainly make one a better judge. They help us to develop this gut feeling we have about different irises.

Many judges never get past the 'its good because I like it' stage. But the serious judge is looking for ways of rising above his own prejudices and would like some criteria to use that are more objective. Another approach is the

compared-to-what approach. The argument for it would be thus. Species iris are enormously diverse. It would be impossible to set standards for species since they are the origin of all the different types of modern hybrids. Therefore, why not take the standards from the most closely related section and apply it to that species. Certainly this would be a profitable mental exercise. It is analytical and less likely to encompass our prejudices. But even though it would be of some help, I think species would often fall short when compared to the paradigm of a particular modern hybrid. I do not believe this makes them a lesser garden iris than the modern hybrids. Differences that seem self-evident are the greater simplicity of the flowers of most species. Sometimes it is refreshing to have relief of a simple, pleasing flower that doesn't scream at you for attention.

I remember talking with an old tall bearded breeder who compared the modern tall bearded iris to a painted woman. With all their lace and ruffles, they are exciting in the garden, but if we want our garden to be serene, peaceful and elegant, would a gaudy streetwalker be the tenant we would choose?

Obviously, there is a place for both. But we need different standards for the plain but graceful species compared to the dazzling hybrid. Yet because species encompass such great variety, we can't set up a single standard that would apply to judging all of them. Too bad the cookbook judging by a set of points will really not be adequate for species.

We are left with a horrible alternative. The judge is forced to think. Since I believe all judges are capable of thinking that doesn't mean we always do. But presuming we have the inclination, let me explain the process I use to evaluate species. The judges handbook will tell you that garden judging is really about how a plant performs in the garden. When I think about the plants I choose for my garden they are of many types. I have chrysanthemums in the fall, crocus in the spring. Each serves a different purpose in the garden. I asked myself the question, how would I judge a crocus from a chrysanthemum? If you like mixing apples and oranges, we can throw them in too. Obviously they all have their place in the garden. I don't agonize over which crocus to buy. I buy what seems best for the role I have in mind for it in

the garden.

Why not approach garden judging backwards? Instead of setting standards for each plant to conform to, why not look at what each plant offers? The process might go like this: *I. cristata* is a little creeping iris that forms a ground cover in the shade of trees. It certainly doesn't compete well with the tall bearded irises in the perennial border, but for that matter, tall bearded irises make very poor carpet plants in a woodland forest. Lets evaluate a *cristata* cultivar based on the role *cristata* plans in the garden. "Abbey's Violet" is the darkest purple *cristata* I know. It is somewhat smaller than other *cristatas* but would be great for a shady spot in an intimate garden. How well does it perform this role. Certainly it is less invasive than vinca and its crested flowers have as much charm as hardy orchids. In the Pacific Northwest, it can suffer from slug damage, but here in Missouri, it is a reliable performer requiring no care once established. It probably will be around after many of me tall bearded have gone. I would give it very high marks. It is distinctive and serves its role well. It would always be high on my list of small plants for a shady garden.

As more varieties of *I. cristata* are introduced, I will have to judge whether they are better than "Abbey's Violet". If I could grow only one, a nice white variety would certainly be equally desirable and would precipitate a hard choice. Comparing two plans of the same species is certainly easier, but most of the time we will be comparing between several species.

Lets say we also had an *I. chrysographes* cultivar to evaluate. Lets say it was absolutely black with no signal. Certainly it would be as distinctive as "Abbey's Violet". We now would be looking at a plant that grows in sun in the perennial border. Many gardeners would find it to be a marvelous plant for this position. I think that each should be evaluated on how well they perform their own role in the garden.

Unfortunately, another factor enters into the question for which I have no solution. In the

Pacific Northwest, "Abbey's Violet" will probably be destroyed by slugs but *I. chrysographes* will be marvelous. In the eastern half of the nation, *I. chrysographes* will be difficult and probably only perform a few years whereas *cristata* will be easy. Making a recommendation to a local gardener would be easy but voting a national ballot makes the choice very difficult. Presently, I suspect that whatever climate has the highest population of judges would predominate. If ability for an iris to grow anywhere in the country were the central criteria, then any *I. pseudacorus* would beat any tall bearded.

But judges should encourage the plants the public is demanding, while also working to recognize others that are more adaptable to cultivation.

Another problem encountered with species judging is ignorance or denial of the proper growing conditions. *I. laevigata* is a water iris tough enough to survive growing in a perennial border although it would rather be sitting in a pot in a pond. Obviously its feeble attempt to flower in a field will not show its potential as in a pond. I will not call the plant abuse hot-line because I have also been guilty of plant torture. But as judges we should not ignore species which are misplaced. We should be certain we see them fulfilling their best garden role.

Perhaps those Pacific Coast Natives that grow in the Sierras in full sun might be encouraged to survive and even flourish in partial shade in the eastern United States.

We have much to learn concerning the genus iris and as judges should be humbled by our present ignorance. Yet I do not believe, as gardeners, we should have some concept of what a good garden plant should be. Therefore, I do not think we have any excuse for not at least attempting to judge species. If you really can judge a tall bearded iris, you should also be able to judge a species. If you don't know what it takes for a plant to be useful in a garden setting, how can you be an iris judge?

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Registering Species Iris Clones. . .or Not When. . .When Not

-Lorena Reid-

I made the mistake during SIGNA Board Meeting at the Portland AIS National Convention, May 1994, of disagreeing with Bob Pries when he urged members to "Be sure to get all your species clones registered". Since there was no time for a proper argument/debate, or what have you, it was suggested that I write an argument "against always registering species clones". My "hmmm" was apparently taken as an acceptance, and Colin Rigby reminded me by phone a couple of weeks ago, so here goes.

Some Iris species (especially *I. chrysographes* and to a lesser degree *I. forrestii* in the Sino-Siberian group) are not well known for being long-lived. With the near black form of *I. chrysographes* in particular, I need to redo the cross of black form x black form to get new clones in order to keep the thing going. A clone will last 1-4 years and then seems frequently to dwindle and disappear. Only with extreme difficulty, even here where Sino-Siberians commonly grow like "weeds" can I keep a particular clone going for any great length of time.

Take ID for example. I have had it for years, and only occasionally can I get a clump large enough to line out, or to be able to offer a few plants for sale. The only solution is to withdraw it from commerce and coddle it for a few years and try again. Two years ago I had only 2 tiny sprigs, and it has grown to a few more now. So I will, with breath held, carefully replant some of it again in hopes the whole thing doesn't expire. And ID, though attractive, is in no way superior to many other clones of *I. chrysographes* (near black form), not as wide as some, and certainly not as vigorous. . . .in a tribe quite lacking in vigor. The time when I will consider "registering" a clone of *I. chrysographes* (near black form) is when I can get one which will be vigorous enough to last, and/or (preferably and) of clearly superior form. After all when a hybridizer "registers" a clone it should mean something.

When I cross the *I. chrysographes* (near black form) with another near black form or itself, I need to select from the seedlings those which are, indeed, near black. Some will be dark red, some will be a navy blue purple, some just purple. Although these could be selected for possible future color variations, all are plants of the species *I. chrysographes*.

Years ago we grew *I. chrysographes rubella* (which was a reddish form of the species). I do not know if someone still has a piece of the original clone or not. It is not particularly important if it is gone. From the clones of the species which we do grow, a good red form is only a few years of selection from being developed again. So what if a single clone is not long lived as a plant, when just as good or better red forms can continue to be selected.

But should color variants of an iris species be "registered"? Not necessarily. Take *I. prismatica* for example. From seed, color variants are fairly frequent. You will commonly get several for each 100 seedlings you grow. Some, like the white (alba?) form crossed by itself, or even bee seed, will give nearly all whites, none any better or any worse than any other. What is the point in registering any? Likewise for the pale pink bordered white (plicata) form which appears on occasion. It is worth keeping



and propagating, but as the variant keeps cropping up in seedlings, it is more convenient to treat it as a "strain" than try to "register" a single clone of the plicata. . . toss all the other similar clones. . . and spend years trying to build a stock of just the one clone. If there were, indeed, a clone of superior form, wide-way-out color, that rebloomed a time or two each summer, then I think would be the time to think about registration. The same could be said of the maroon forms of *I. prismatica*, which have appeared in a number of gardens. If written descriptions identify the color variant, why go to the extra expense (both to the hybridizer and especially the customer) of registration?

Is it necessary to offer only registered clones of a species for sale? I think not! For clarity there is no reason not to identify the cone as a species by its source, e.g. *I. delavayi* (from Witt) or *I. clarkei* (blue from Witt). I offer an *I. clarkei* x *I. clarkei* for which I crossed various *I. clarkei* clones including those from Jean Witt and from Richland Gardens. I selected/am selecting those seedlings which have the signal described as typical for the species (white with a square base). When species clones showing the signal pattern I want show up they are retained and the less desirable of the cross discarded. When flowers of superior form (without the pinching and tucking so common in *I. clarkei*) occur, they will be retained and the less pleasing forms discarded. Yet this is staying in the species.

If I were to register one of these improved clones and offer it under a registered name, the whole thing would become less flexible. I would be less likely to discard the named clone if another proved to be a slight improvement, yet registering the slight improvement would soon involve an unwieldy number of "slight improvements". And if there is one thing we do not need in the Registration Booklets/Iris Checklists, it is dozens of names for which there are no longer any living examples!!! Multiple names for very similar clones is just as objectionable from my point of view!

Double Flowers in the Species

-Jean Witt-

How many iris species have produced double flowers? That is, flowers which consistently have six falls and no standards. Louisianas and Pacific Coast Natives in which standards and falls can be similar in size and held in the same plane don't count.

I. ensata undoubtedly has furnished the most double varieties, which constitute a considerable proportion of the varieties now in commerce. *I. laevigata* is a close second. *I. sanguinea* is represented by 'Helicopter' and 'Rikugi Sakura'. 'Dottie's Double' (D. Warrell, '83) is a collected *I. virginica*. A few years ago a double flowered *I. setosa* appeared in my garden, but did not persist. Some of the *I. setosa hookeri* which I have had in the past have had a tendency to doubling, but more often the flowers have five petals, or aberrant petals. They could not be considered good, consistent doubles. *I. gracilipes* 'Blue Rose' is also variable--a little blue powder puff deserving of its name at its best, but less attractively doubled in other seasons.

Over the years a number of flattie Tall Bearded have been registered, but never seem to have become very popular. I have enjoyed 'Unfurled Flag' (Hager, '82) which has six medium blue ruffled falls with white beards--but this year it reverted to proper iris form, much to my disappointment.

Obviously the potential for doubles is widespread. So watch your seedlings. Perhaps we can add to this list....

Bearded Iris as Species Crosses

-Bob Pries and Jean Witt-

Editors Note: Reprinted from The Medianite, Vol. 35, No. 1, Spring 1994

Two new AIS awards were instituted two years ago last fall and their classifications appeared on the AIS Ballot last spring. They were an award for pure species and an award for species crosses. The designation of "species cross" is somewhat confusing because the resultant plants are no longer species but hybrids. But if we called this the "hybrid iris award" then we would be including almost all other categories of irises. Understandably, there has been a lot of confusion concerning this award. This is an attempt to sort out these problems and to show how they relate to bearded iris hybridizing.

To understand the award, we should first examine why it was created. For years interesting crosses have been made which did not fit into the current categories. Pacific Coast Native irises were crossed with the 40 chromosome Siberians creating Cal-sibes. Indeed, the first English Dykes Medal was awarded to MARGOT HOLMES, a Cal-sibe, yet this cross could not compete in the American awards system for lack of a category. A goal of this award was to provide orphan irises with a category or venue for examination and evaluation.

Since most of these unusual crosses involved species, it was appropriate that the Species Iris Group of North America offer an award. There has been a long standing interest by SIGNA members in unusual crosses. Obviously, any effort which encourages experimentation with iris species in hybridizing also enhances the likelihood that the species themselves will be grown and maintained to provide the resources for these hybridizing efforts.

Bearded species such as *I. pandurata* and *I. marsica* are relatively new to science and may contribute unknown variables to the bearded iris gene pool. An obvious trait that might be worth developing is the purple bracts below the flowers of *I. purpureobracteata*. This iris crossed with a bearded hybrid certainly would be of interest to the species enthusiast and the innovative hybridizer.

This type of cross would very likely produce a plant which would fall into the Miniature Tall Bearded class, which raises another issue. Should

it be registered as an MTB or as a SPECX? If it is a good example of an MTB, the hybridizer would certainly choose this category. (*Note: SPECX=Species Cross.)

But let's assume it was small for an MTB. It could still be a valuable plant for the proper garden situation. The hybridizer might choose the SPECX category so it would be evaluated just as a garden plant and not forced into the rather strict guidelines governing the MTBs. Because something is a misfit in one class, should not prejudice our judgment of its garden value.

The species cross category challenges judges more than any other class, because the value of each plant must be considered individually. It can be used as a way of calling attention to irises with unusual traits within their class. The person registering the iris is the one who decides whether to use the SPECX classification.

Could a Standard Dwarf Bearded be registered as a SPECX? The original SDBs were created by crossing Tall bearded irises with *I. pumila*. Contemporary TB x *I. pumila* would qualify as SPECX, but if it were good enough would be better registered as an SDB.

A concern with Tall Bearded irises, which may or may not be valid, is that they are becoming so adapted to garden culture, that they no longer offer the durability of the species. The fear that this may happen to the SDBs has been expressed, although presently they have a reputation for being robust growers. The plea to go back and repeat the *I. pumila* tall bearded crosses has merit for maintaining this vigor. Also the enormous amount of variation within the *pumila* species and in the modern Tall Bearded suggests that great things might be accomplished by repeating this type of cross with different parents. If these offspring could not compete initially with the modern SDBs, the SPECX category offers recognition for new blood.

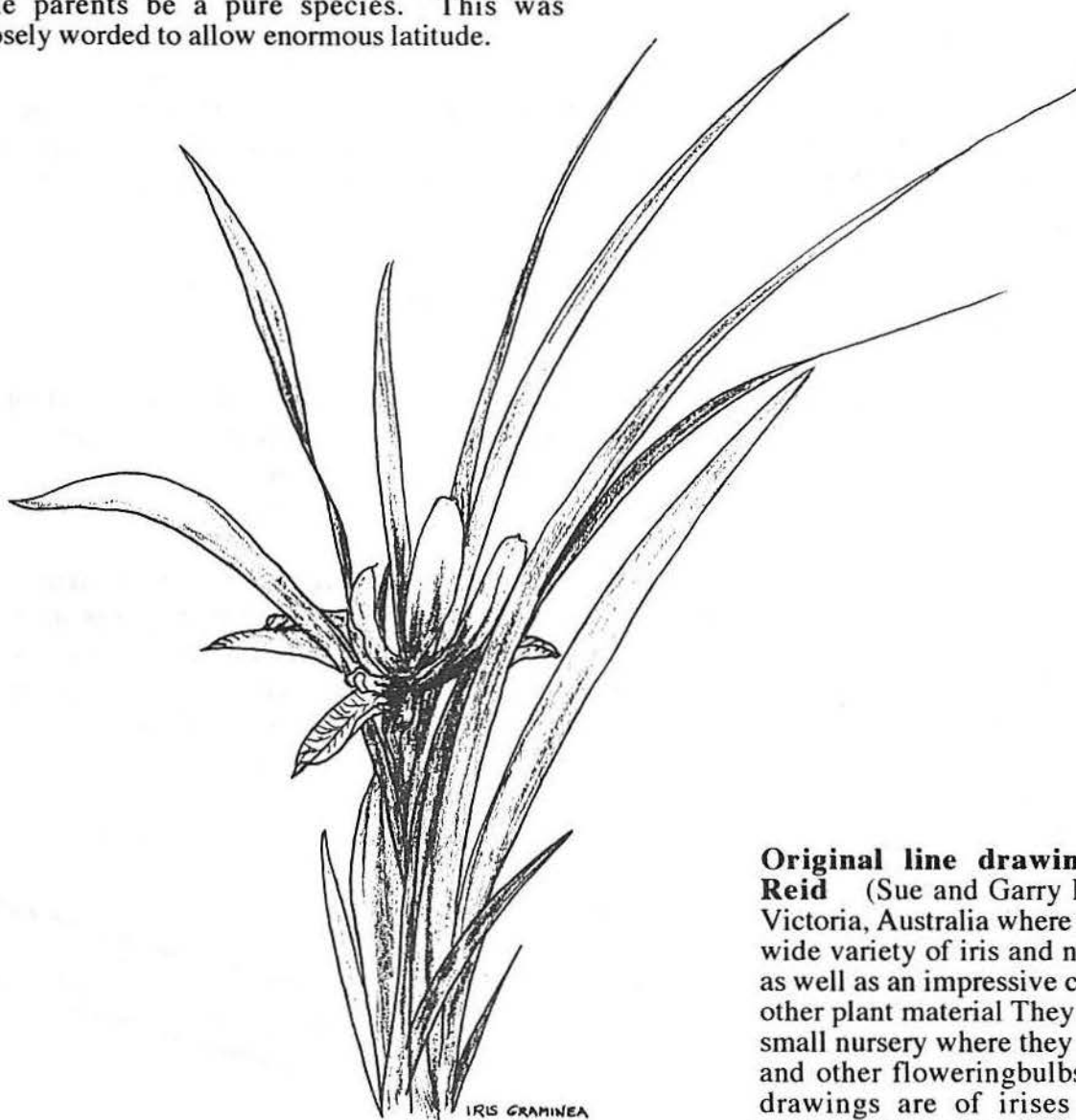
Which plants then are eligible for an SPECX award? Some plants fit in no other category and others may technically belong in another category, but would be swamped by more modern examples. How do we define the SPECX class? It has been suggested that a plant be at least one half pure

species to qualify as SPECX. At first this seems a viable definition until we consider a major goal of the award, experimentation.

In the beardless iris, much work is being done with species that fits in no other category. Obviously, an *I pseudacorus* X *I. versicolor* seedling fits the SPECX category. But not all of such crosses turn out to be completely sterile. The second or third generations could be more exciting than the first. To stop consideration at the first generation because one of the parents is no longer a pure species makes for a tidy definition of an SPECX, but stymies the major goal of the award.

Fortunately, the award as approved by the AIS Board states that it is for a cross involving more than one species, and no restriction is made that one of the parents be a pure species. This was purposely worded to allow enormous latitude.

Who then carries the burden of choosing the SPECX category? It was agreed early on that the only workable plan is for this decision to be left to the hybridizer. Of course judges may cast fewer votes for something which could be better placed in another category. But any plant showing characteristics of more than one species should be considered acceptable in the SPECX class and then be judged on its garden value compared to the garden value of the species from which it was derived.



Original line drawing by Sue Reid (Sue and Garry Reid live in Victoria, Australia where they grow a wide variety of iris and non-iris irids as well as an impressive collection of other plant material. They also have a small nursery where they offer plants and other floweringbulbs. The line drawings are of irises they have grown their garden. Ed.)

DON'T CONFUSE SPHAGNUM MOSS WITH PEAT MOSS

By Gerry Hood

President, Canadian Sphagnum Peat Moss Association

You may have read about a fungal disease called *Cutaneous Sporotrichosis*, a chronic infection identified by skin lesions. The fungus which causes this disease has been found in several kinds of organic material and, because in extremely rare cases this disease can cause death, gardeners are rightfully concerned about protecting themselves from contracting it. Unfortunately, however, some of the information circulating about how gardeners can contract this disease has been inaccurate. It confuses two separate products; one of which is known to carry the fungus and one of which does not.

One of the materials known to carry the sporotrichosis fungus is **sphagnum moss**. Most frequently used by the floral industry to line wire baskets, this product frequently is being confused with sphagnum *peat* moss, a soil conditioner known for its ability to bind sandy soils, loosen clay soils and retain water. The difference is an important one. While there have been cases of sporotrichosis resulting from handling sphagnum moss, I'm aware of no cases as a result of handling sphagnum peat moss. Sphagnum moss and sphagnum peat moss are *not* the same product, as many avid gardeners know.

Sphagnum moss is the living moss that grows on top of a sphagnum bog. The fungus *sporotrichum schenckii* is known to live in this growing moss.

Sphagnum peat moss is the dead material that accumulates as new live material grows on top and exerts pressure on the peat moss below. The fungus is not known to live in the levels of a sphagnum bog where peat forms. Harvesters of horticultural peat moss remove the top few inches of the live sphagnum moss and only harvest the peat from the lower layer.

"Living" sphagnum moss is used in the floral industry to make wreaths and to line hanging baskets. Workers in that industry have been warned to protect themselves with gloves and heavy clothing to avoid puncture wounds or scrapes. Gardeners wishing to use sphagnum moss to create their own baskets or for other uses should simply follow the same advice: Wear gloves and long sleeves to prevent coming into contact with the dried moss. No similar warning appears on Material Safety Data Sheets (MSDS) for handling sphagnum peat moss.

Gardeners worldwide use sphagnum peat moss as a soil amendment because its unique cell structure enables peat to:

- Aerate plant roots by loosening heavy clay soils;
- Add body to sandy soil; and
- Save water by absorbing and holding moisture.

Peat moss is not only effective, it's organic and safe to use.

Reprinted in and for the
benefit of our readers.

I. lazica

-Colin Rigby-



Last spring, *I. lazica* of the series *I. unguicularis*, bloomed for me for the first time. The plant, sent to me by Elaine Hulbert, was obtained in England where it is, apparently, more widely grown than in this country. The leaves of *I. lazica* are shorter, broader and more shiny green than other types. Flowers were held slightly above the foliage and of a rich medium blue-violet color. Reverse side of the falls were a light, pale violet. There was a white signal area that extended about half-way down the fall, veined in a precise pattern of the same color as the fall and highlighted by a strong line of orange-gold. Petals of both the standards and falls were slightly pointed at the tips. The plant bloomed in March during a brief snow shower but did not set seed. Three other plants, raised from seed given to me by Louis Fry obtained through the BIS Seed Exchange, have yet to bloom so I do not know if there is any color variation in these plants or not. *I. lazica* seems adaptable to a wide range of garden conditions. I have had it growing in an acid, moist, partly shaded bed with Japanese iris hybrids and in among other

unguicularis types in full sun with no summer moisture. Plants thrived in both locations although the plant grown with the Japanese irises increased much faster and grew throughout the whole summer. Apparently, *I. lazica* is not extensively grown in this country only because it is not widely distributed. It is a worthy garden plant worth seeking out but I do not know of a commercial source yet. (See SIGNA, No. 48, Spring, 1992 and Mathew's The Iris for more information on *I. lazica*.)

Original line drawing by Evelyne Lennette.

A Day with *Iris tenuis* in Oregon

-Adele Lawyer-

Claude and Joanne Derr have often taken visitors to see *Iris tenuis* in the mountains above their home in Estacada, Oregon. On May 27th, the day following the 1994 AIS Convention at Portland, they took Lewis and me, and Gene and Joanne Loop on a trip to the *tenuis* habitat.

We had hoped to see this species in 1991 when the Society for Pacific Coast Native Iris had a field trip to the area on June first. Unfortunately, the winter had been especially cold, and the few that were in bloom on that date were found at a lower elevation in Roaring River Camp Ground. Even so, we were charmed by the 15 or so clean, bright little flowers which called attention to themselves in the mostly shady, green environment.

Fortunately, 1994 was a "normal" winter, and on May 27th, we drove about 12 miles past the Derr's home on Squaw Mountain Road to Road 120 where we turned off, and were overwhelmed to see an entire hillside of *I. tenuis* in full bloom.

This time they were a glory! No "shy violets" here, appearing frugally in the shadows. It was open and sunny, and there were so many that it was difficult to step without crushing them underfoot. The beauty of the area took our breath away! *Tenuis* carpeted the ground with their bright white petals sparked with yellow crests and a touch of purple. Although there were millions of them, the landscape was not limited to their 9 to 12 inch height. It was relieved by the stumps of harvested trees, new growth firs, and dwarf dogwood, beargrass, and Rhododendrons in bloom. Our cameras had a feast, with lovely compositions to photograph in every direction.

Claude Derr guided us to the highest limit of the *tenuis* growth. It stopped abruptly where the trees were tall, close together, and provided insufficient light. Below this point we could look down the mountain for many miles, seeing *tenuis* in the foreground interspersed with rhododendrons, and fading to purple hills and forests stretching into the distance.

Claude has been campaigning with U. S. Forest Service representatives to set aside an area where tree growth would be restricted. This exceptional stand of *tenuis* would then be preserved for native plant lovers to visit both in the present, and also for the pleasure of future generations.

Iris tenuis is an Oregon endemic which, according to Roy Davidson, appears to be related to the smaller temperate Evansia species, *Iris cristata* and *Iris lacustris* of eastern North America, but particularly to *I. gracilipes* of Japan. Dr. Lee Lenz agrees that these four species constitute a natural grouping. *Iris tenuis* was first described in 1881 in an area at 450 feet elevation near the Clakamus River. This stand has now been displaced by homes. Carl Starker noted that *tenuis* was growing in a woodland setting, but in the company of deciduous trees. The *tenuis* were able to establish themselves before these trees leafed out in late spring. It is probable that the plants growing at the higher elevation which we enjoyed, (about 5000 feet), would be less likely to be overrun by human population expansion. The evergreen fir trees are their principal threat. It is our hope that Claude Derr will be able to preserve a portion of this prime location so that it can be available to visitors far into the future.



Photos by Lewis and Adele Lawyer

Cape Gladiolus, Distinctly Different

-Richard L. Doutt-

When most of us gardeners see or hear the word Gladiolus our minds immediately picture the array of cultivars made available to us by the great bulb firms of Holland. Their corms are readily available at all nurseries and in the garden sections of supermarkets. These produce flowers on stiff spikes in an endless array of colors. They are easy to grow and common as dirt.

Clive Innes in his book, "The World of Iridaceae" published in 1985, recognized about 216 different species of Gladiolus worldwide. While the genus Gladiolus is very widespread the concentration of species and the probable place of origin of the genus Gladiolus is in the Cape Province of South Africa. Although the genes of several South African species are present and evident in the modern cultivars, most of the Cape species are distinctly different.

These Cape Gladiolus have a delicacy of color, a gracefulness of form, and fineness of texture not seen in the ordinary garden Gladiolus. In addition many species are deliciously fragrant. The Cape Gladiolus species have occupied widely varied habitats and bloom at such different dates that there is not a time of the year when there is not at least one of them in flower within 248 miles (400 kilometers) of Cape Town. These wild, Cape Gladiolus are awaiting discovery by gardeners for they can be selected for special garden situations. Many bloom so early in the season that they escape attack by trips.

Structurally the flowers range from open, star-shaped, primitive types to complex, zygomorphic and hooded forms. Many have nectar guides marking the path for pollinators. Others produce fragrance at certain times of the day to attract specific pollinators. The array of colors is impressive.

At first I was a purist and maintained a collection of true Cape species, but I yielded to the temptation to make crosses among them. I find that it is an exciting and inexpensive hobby in which any patient gardener can easily get involved. The scope for hybridization within the group seems limitless.

My favorite species for breeding is *Gladiolus tristis* because it is a bit hardier than others and will tolerate some water in the summer whereas others need to be dry during that season. It produces its fragrance only in the evening or after being taken into a dark room. It has long, slender reed-like foliage quite unlike the sword shaped leaves of other species. The flowers are yellowish white with some dark penciling. Its hybrids have produced other colors. Among the Cape Gladiolus it is a species to be recommended.

Note: The Feature Sections, **Water Iris, Evansias and Non-Iris Irids**, need membership participation. If you have a comment, a growing experience or would write a short article, please send it to the Feature Editor whose address is listed on the title page of each publication. No comment or article is too small or insignificant. Unless we hear from you, these Feature Sections will have to be dropped for lack of member participation. **Please help.**

New Robin Director

After many years of keeping the 'birds' flying Dot Husjak has passed on the job to new SIGNA Robin Director, Pat Brooks. Our thanks to Dot for her many years of service and we welcome Pat as the new Director..

SIGNA has several Robins flying. If you are interesting in joining one, including the Special Feature Robins, please contact :

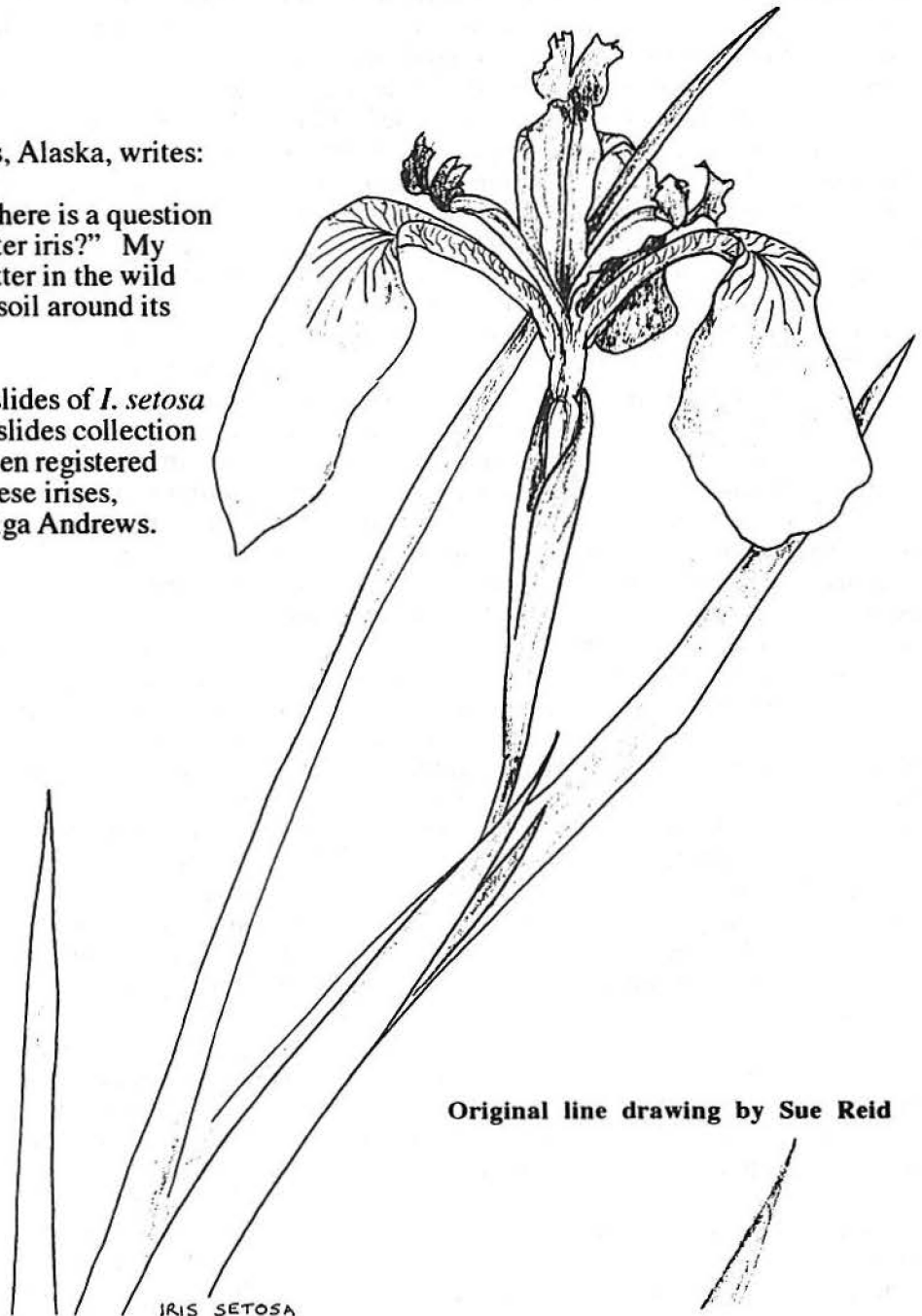
Patricia Brooks, 102 Jefferson Lane, Ladson, SC 29456

I. setosa:

Lawrence Duffy, Fairbanks, Alaska, writes:

"On page 1897 of SIGNA there is a question asked: "Is *Iris setosa* a water iris?" My answer is Yes. It grows better in the wild with standing water or wet soil around its base."

Lawrence has sent several slides of *I. setosa* var. *interior* to the SIGNA slides collection including some that have been registered by him. To see slides of these irises, contact Slides Director, Helga Andrews.



Original line drawing by Sue Reid

Of Seeds and Germination

-Marion Ball-

Editors Note: Reprinted from The Bulletin of the New Zealand Iris Society, No. 131, September, 1993

I've been somewhat miffed by the poor germination from iris species seeds acquired from our Pool and planted up to eighteen months ago. Did I give them the right soil mix, keep them damp enough or perhaps the seed was old and unviable? In all probability lack of patience is my chief failing as well as ignorance of one of the prime reasons for the slow and staggered germination of iris seeds of both wild species and the more 'domesticated' hybrids. A hunt through some of my iris manuals and some old SIGNAs gives food for thought.

Australian Bob Raabe tells us that "few plant genera would be found in such diverse habitats as the genus *Iris*. Ranging from the arctic to near tropical, the two hundred plus representatives are found naturally in deserts, swamps, rock crevices, open meadows, dense forests, on mountain tops and in just about any other ecological system imaginable". Realizing this, many iris growers acquire scarce and valuable seeds from any number of sources, but plant them like radishes and bemoan poor or no germination. 'It must have been old seed' is a fairly common excuse.

The experts tell us that iris seed matured and kept dry may be stored for years at temperatures slightly above freezing, and even at room temperature, dry seed will remain viable for some years. I have just proved this. One of my few successes recently has been with tall bearded seed from a cross I made just before we moved house and garden eight years ago. The seed in an envelope has languished in a drawer until I had a clean out last November. I thought they deserved a chance and planted them. Two plants germinated almost immediately and several have followed, I expect there may be more in the spring.

The fact we have to keep in mind is that iris seeds contain an inhibitor against germination. This cunning trick of nature ensures that not all seeds will germinate at the same time, but rather over a period of months or even years thus making certain the survival of the species. Apparently the arils are notorious for slow germination and it is recorded that Sir Michael Foster waited eighteen years for an

oncocyclus to germinate! Now most of us have neither the time nor the space to wait so long and we need to speed up the process a little. We should study the natural habitat of our species before they are planted and give them suitable treatment and planting medium for best results.

Mr. Dykes in his monograph The Genus *Iris* has some pertinent observations which are still worth repeating. He found that it is the seeds of those species which produce the most abundant seed which germinate the most readily, eg, *setosa*, *versicolor* and members of the *siberica* group, all of which are self fertilized and seem to germinate in the first spring. On the other hand he found the tall bearded and members of the *oncocyclus* group which had been artificially pollinated were very slow to germinate. Another interesting fact was that generally species were likely to germinate at the same time of year as the reappearance of growth in the mature counterparts.

Now we have some understanding of this inhibitor or 'block' to germination we must decide our method of propagation and how we can speed up the process. Obviously the plant breeder who is working on a specific line needs to have as good germination percentage as possible in the shortest time in order to evaluate plants and blooms of any particular cross. There are several methods involved. The first is that which applies to most amateurs, natural planting, ie, the method we usually use, following directions from the Seed Pool Director. According to Sharon McAllister this has many advantages, not the least of which is that it provides a self selective mechanism in the long run. Some species which have the reputation of sprouting readily on natural planting sometimes pass this trait on to their offspring. There have been reports that the rate of early germination improves in a line, after selection of only early germinating seedlings for several generations. She also comments that the most obvious thing about the various reports on success with natural germination is the similarity in moisture control; the combination of climate and soil conditions that keep the seed bed moist for a long period of time, but never too, and never ever downright wet.

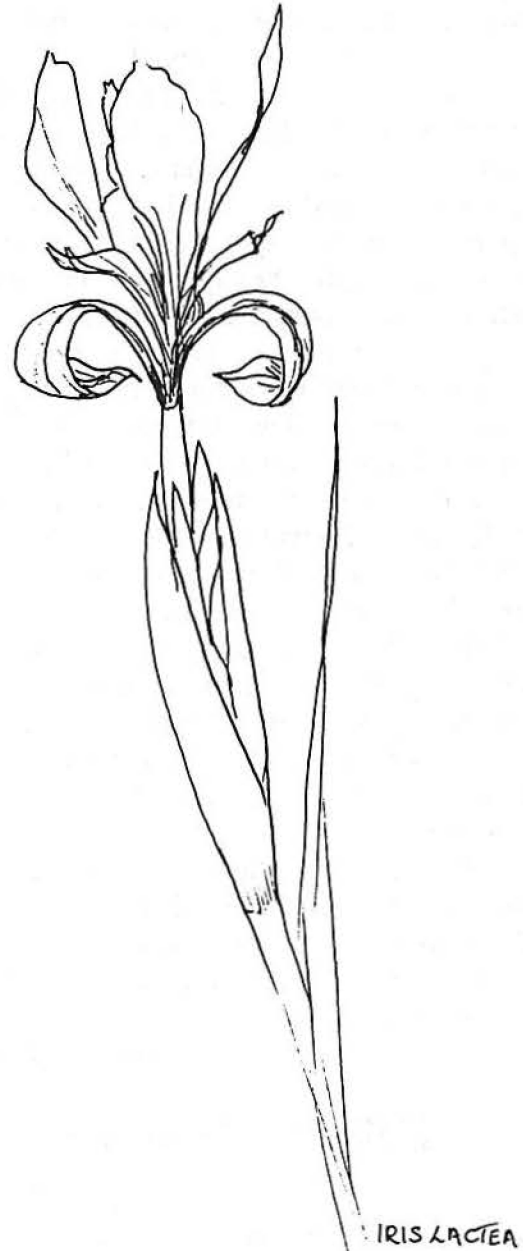
At this point we should consider our own harvested seed or that we know to be really fresh.

A number of the experts advocate planting seeds as soon as they have been gathered. Germination of these is said to be good before the seed had dried out completely and seems to beat the "block" in this way. We are told that seed planted in the autumn in moist soil and subjected to winter freezes will germinate the following spring. However, you do need to think about this one. Some species planted too early will germinate in the autumn and the resulting tender shoots are at the mercy of wintry conditions. As a general guide Dykes suggests planting the seeds of bulbous species as soon as the capsules burst whilst those of non-bulbous species should be kept until late autumn. Some of our members consider spring a better time to plant, but again we need to study the particular species and its natural habitat. Some of the cooler climate irises will only germinate after being frozen through winter.

The second method of propagation is forced germination, whereby we try and give nature a push by using little tricks to unblock the inhibitor factor. From The World of Irises we read: "Some seed treatments prior to sowing increase germination. An adequate supply of oxygen and moisture along with a favorable temperature are necessary for germination of all seed, including iris. The many innovations practiced by breeders, if successful, are related to providing these three essentials. Chipping of the seed to expose the radicle of the embryo has proved successful. This may permit the radicle to elongate and overcome the inhibitor present in the endosperm or permit better intake of water which may leach out the inhibitor. Whole or chipped seeds subjected to moist storage at temperatures of 0-5 degrees C (32-45 degrees F) for 30 to 90 days will afterripen sooner and have increased germination percentages. Soaking seeds in running oxygenated water or frequent watering of planted seeds probably leaches out germination inhibitors and may substitute for or aid in the natural cold-moist afterripening period. Some hybridizers soak dry seed for one or two days, then mix the seed with moist vermiculite or perlite, place in a plastic bag, and store in a refrigerator for 30 to 90 days. These afterripened seeds are then planted. Chemical treatments of iris seed prior to planting, while reported by some workers to be effective, have not been successfully duplicated others and have questionable value. The time-tested recipe for increased germination centers around moist, cold stratification, soaking or leaching out endosperm inhibitors and increasing water intake through chipping." Seeds treated in this way may be planted in the normal manner though many of the

northern hemisphere breeders grow their irises under light. Useful where weather conditions are more severe than we experience and if the breeder wants to hurry things along.

The third method of propagation involves embryo culture which requires special equipment and techniques not available to the home gardener. Again this method is for the specialised grower.



IRIS LACTEA

**Original line drawing by Sue Reid
Via Wodonga, Vic., Australia**

Pollinating & Germinating Irises

Introduction

As Seed Exchange Chairman, it is my goal to make the Seed Exchange the best that it can be. Members often request germination advice along with their orders. Unfortunately I haven't always been that successful myself, and so that is why this series was conceived.

I compiled a list of primarily SIGNA members who specialized in particular groups of Iris species. Noticing the list was comprised of people who also hybridize I thought it would be the perfect opportunity to inquire about that as well. In mid-September I mailed the following questionnaire to these unsuspecting targets, with all except two replying. Using a "prompt list" the answers given were turned into organized articles in such a way that members can use them as references for easy comparison.

You may note that there are three missing groups, series *Laevigatae* (Group N on the SIGNA Seed List), *Reticulatas* (Group V) and *Junos* (Group W). If you or someone you know can help with these groups, or if you have additional pollinating and/or germinating tips for specific groups or individual species you'd like to share with SIGNA members, please write to me at the address listed in the front of this bulletin.

A gracious thank you goes out to those who contributed to this series. It provides a great deal of information that will be of use to SIGNA members and other iris growers for years to come.

Darrell R. Probst

QUESTIONNAIRE

Instructions: Please answer in as much detail as possible (as if answering for a complete novice) and add any additional information that I may

have overlooked. Give answers for your specialty group in general, adding any special requirements for specific species.

A. POLLINATION

1. What is the usual time of year pollination is undertaken in your area? (e.g. 2nd week in June)
2. How many days is an individual flower open?
3. How many days is the stigma receptive and which days? (e.g. 2nd and 3rd)
4. How many days is the anther/pollen ripe and which days?
5. What is the protection method you use to prevent contamination of the stigma? (e.g. cover flowers with paper bag, remove standards and falls)
6. What protection method do you use to prevent contamination of the anther/pollen?
7. Do you store pollen? What method do you use?
8. Do you prepare the flower any other way before or after pollination? (e.g. cover flower 2 days before opening, tie the bud closed)
9. Please describe the tools and methods you use for pollinating.
10. Describe any aftercare you give the flower after pollination.
11. Are there any critters, diseases or other factors that affect pollination? (e.g. thrips destroy pollen, bees remove pollen from stigma lip, humidity, temperature)
12. Are there any pollination problems? (e.g. won't self, high probability of sterility from sibbing)
13. Are there any individual species quirks?

B. LABELING

14. Describe materials and methods used to label crosses.
15. Describe information recorded on labels, in hybridizing books, etc.

C. SEED RIPENING

16. Are there any critters/diseases that affect the seed capsule during the maturation process?
17. What is the control method/protection you use to protect the capsule?
18. What time of year do the seeds mature? (e.g. mid-August)
19. What is the estimated number of days between pollination and the day the seeds are ripe/harvested?
20. What are the identifiable characteristics on the capsule which indicate when seeds are ready to harvest? (e.g. *Pardanthopsis* splits open, *I. cristata* turns tan)
21. Describe your methods used for harvesting seed. (can be as simple as pick off capsule and shell seeds directly into packet)
22. What is the average number of seeds per capsule? (e.g. *I. cristata*- 5, *Pardanthopsis* 40-60)
23. What care is necessary once collected? (e.g. spread out to dry on paper towels, in the sun on windowsill, refrigerate immediately)
24. What kind of seed envelopes do you use?
25. Where did you purchase envelopes or how did you make them? (describe method and materials)
26. What info do you record on the envelope?
27. Describe your care of the seeds during storage (time period between harvesting and planting)

D. SEED PLANTING, GERMINATION AND AFTERCARE

28. How many years have you been

- germinating seeds from this group?
29. How many years have you been using the method you are about to describe?
30. What is your estimated percentage of germination with this method? (e.g. 75%)
31. How long do seeds from this group remain viable?
32. What time of year do you plant seeds?
33. Do you plant directly into the ground or in pots? If in the ground, please describe: when, how deep, how thickly sown, when to expect germination and when to transplant.
34. Do you give the seeds a cold treatment? If so, describe length, method and materials used. Is it necessary?
35. Do you soak the seeds? If so, describe length of time, method and materials used. Is it necessary?
36. Please describe soil/soilless medium used for planting: Divide into parts if you create your own mix (e.g. I use 3 parts Pro-mix sifted through 1/4" square wire mesh called hardware cloth, and 1 part fine vermiculite)
37. Where do you find/purchase the materials you use?
38. What containers do you use to plant seeds in?
39. Where do you purchase your containers?
40. How thickly do you plant the seeds?
41. To what depth are they covered and with what if a different material is used?
42. Where do you place the containers during germination? If under lights, describe your set up (e.g. time period lights are on/off, distance away from lights, type of lights used etc.)
43. Is light required to stimulate germination?
44. What temperature is the medium/the area in which containers are placed?
45. Describe how often/what signs you use to know when to water-- before and after germination.
46. Is there any special method of watering that you use? (water from above, soak from bottom?)
47. Special water/fertilizer requirements? If so,

- how often, with what and where to get it, both before and after germination.
48. How long before leaves emerge above the soil/seeds sprout? In essence, the germination time.
 49. What average rate of growth do you expect after germination? (e.g. 4"/4 leaves after 45 days)
 50. When do you transplant the seedlings? (e.g. after 2 months, immediately when it has 3 leaves, etc.)
 51. Describe your method for transplanting and what do you transplant the seedlings into? If the first transplanting is not into the ground outdoors, continue describing your methods until you reach the point where they are planted into the ground.
 52. What type of garden soil (e.g. sandy, well-drained, acid) and what exposure are they planted into once planted in the location where they are to bloom?
 53. Describe any special care given until they are established. Estimate the time from germination until you see the first/most blooms? (e.g. 3 years until first bloom, most will bloom within 4 years)
 54. Now that you have described the optimum method you use, can you briefly describe a simple method members can use to get at least some germination. (e.g. plant seeds in pots in Feb, set them outside to expect 10-20% germination in spring or by planting in the ground directly in spring you will achieve 30% germination within 2 months.
 55. Any additional advice?
 56. Further suggested reading?
 57. What USDA Zone do you live in?
 58. What is the average minimum temperature in the winter where you live?
 59. What are the highest temperatures your area reaches in the summer?
 60. Are there any seasonal changes that may affect the survival rate of your seedlings? (e.g. 3 months of summer drought, 2 months of heavy rains in fall, heavy snow cover or none at all over the winter?)
 61. When do you usually have the first killing frost in fall in your area?
 62. When is the last frost date in spring?
 63. What is the average annual rainfall amount for your area?
 64. How many of the 3 stigmatic lips on a single flower do you pollinate?
 65. If less than all 3, do you feel it makes a difference?



I. suaveolens.

Pollinating & Germinating Bearded Irises

(Species from the Groups A-C in the SIGNA Seed List)

W. Terry Varner

Terry lives in Marietta, Ohio, USDA Zone 6. Minimum temperature in the winter is between 0 and -10 degrees F. Summer temperatures can reach as high as 100 to 105 degrees F. Average first killing frost is between October 15 and 30, last frost in mid-April. He has been germinating Bearded Iris seeds for 22 years.

Pollination

Pollination is undertaken in early April for the pumila species with the others following into the MTB season. Individual flowers are open normally from 2-3 days, but may last less time if weather is hot or more if it is cool. The stigma is receptive to pollen the first day. Seldom is a second day flower used for pollination. Weather affects the anther and pollen. However, in most species I have found the pollen is ready on the first day. To protect the stigma from contamination, I remove the falls either before they open or immediately upon opening. Otherwise, the flower isn't used for pollination. I find it best to pollinate all three stigmatic lips for Bearded species. To protect the anther from contamination, it is picked upon the opening of the flower. To store pollen for later use the pollen is saved when it is picked, placed in coin envelopes and refrigerated. At the end of bloom season, special pollen is selected, placed in a coffee can with silica gel and frozen for use the following spring.

Tools used when pollinating include envelopes to save the pollen, though generally I carry fresh pollen from one plant to the other, and a set of hair tweezers, preferably slanted, to gather pollen.

Pollination may be affected by insects such as thrips, aphids and bees, time of day and weather. Internal problems can range from refusing to self, to difficulty in producing inter-species crosses and wide crosses. *I. Mellita* itself is difficult to keep as a plant in the garden. It is best transplanted after two years and done so immediately after blooming.

Labeling

To label the pollinated flower I use cardboard sales tags and write on them with a permanent Sanford Sharpie Fine Point pen. Information recorded on the label is the pollen parent. I record in a book both the pod and pollen parent and the date the cross was made. If I make more than one cross using the same pollen, I number the tags and indicate this in the book.

Seed Ripening

The seed capsule may be affected by verbena bud moths which occasionally bore a hole in the seed capsule and destroy the seed. Dogs, deer and people will sometimes break off a capsule. To protect the seed capsule make a paste of Sevin and paint the capsule at the first sign of any moth damage. The seeds usually mature in mid-July, (approximately 70-90 days between pollination and seed collection).

When ready for harvest, the top of the seed capsule begins to turn brown and split. To harvest, shell the seeds into a small container (I use old snuff cans). Each container has the pod and pollen parent written on it. The average number of seeds to expect from a single capsule varies as to species and type of cross. This is

caused by both internal and external conditions. Once collected they should be placed on a shelf to dry for 3 to 4 weeks.

Storing seeds

For storing seeds coin envelopes are used. They can be purchased at a local office supply company. Information that is recorded on the packet is the pod and pollen parents plus the number of seeds. After the seeds are dried, counted and placed in coin envelopes, the information is entered in a notebook entitled, "Crosses". The envelopes are then placed in the freezer from mid-August until planting.

Growing Plants from Seeds

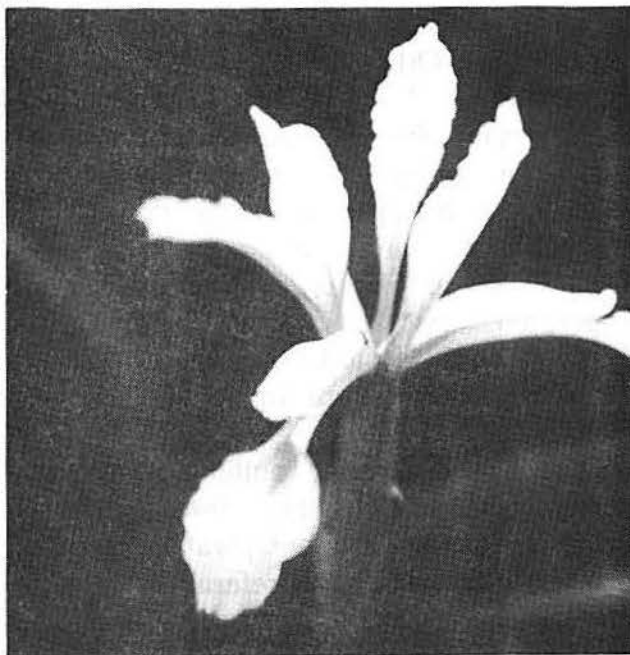
I've used the following method for germinating Bearded Iris seeds for 22 years. **Percentage of germination** with this method varies, but normally about 35%; however, sometimes 0%. Seeds remain **viable** for at least 5-6 years. The **seeds** are normally planted in late October in pots. Seeds of bearded iris prefer a **cold stratification** to germinate well. I receive higher germination success by freezing the seeds prior to planting as described under storing seeds. It is not necessary to **soak** them.

The seeds are planted in a mixture of purchased top-soil, humus, sand and compost. Sand and compost compose about 1/3 of the mixture. The components were purchased at local discount stores and a cement plant. Plastic pans and pots are used as containers and can be found at local garage sales. They are planted in a 3" x 3" area per seed capsule, regardless of the number of seeds and covered with about 1/2" of sand. **Once planted**, containers are placed in a safe place in the garden. The containers are soaked thoroughly when planted, then covered with about 6" of straw. When it snows I normally pile extra snow over the straw. Once the seeds begin to germinate, I remove the straw.

After planting, the seeds are generally never **watered** until after they begin to germinate,

then watered from above almost daily. Liquid seaweed or Miracle-Gro, mixed in water, is used about once a week. The seeds will begin to sprout from the last week of March through mid-April. The rate of growth varies according to the weather. The seedlings are normally **transplanted** by June 1, regardless of size, directly from seed flats into the ground. The garden soil they are transplanted into is a mixture of sand, river silt and compost (which is added yearly). All my beds are raised and edged with 6" treated lumber. Once planted into the garden/nursery beds the seedlings are watered regularly, often daily. They are fed sprayings of liquid fertilizer every 15 days. They are also fed alfalfa pellets after being in the ground two weeks. Monthly feeding of alfalfa pellets continues until September 1. About 65% bloom in the first year. If they fail to bloom by the second year they are tossed, except in a very rare cross.

A **simple method** that provides at least some germination would be (1) freeze seeds upon drying, (2) plant in flats in October (3) cover with straw until germination. Germination should be at least 25%. I hold flats for 3 years, keeping them in a dry, protected place until the following October. I generally get seeds to germinate in all three years.



I. carthaginiensis alba

Pollinating & Germinating Aril and Arilbred Irises

*(Species from the Groups D-H in the SIGNA Seed List;
though observations are not confined to D-H)*

Samuel N. Norris

Sam lives in Owensboro, Kentucky, USDA Zone 6. Minimum temperature in the winter is -5 degrees F. Summer temperatures may reach as high as 105 degrees F but usually not over 100 degrees F. Average first killing frost is around November 1 with the last frost varying greatly from year to year. Often there can be a light frost during bloom season that causes no visible damage but can injure the reproductive portion of the blooms to the extent they will not set seed. Average rainfall is 42 inches. He has been germinating Aril Iris seeds for 25-30 years.

Pollination

Pollination is undertaken anytime from mid-March to mid-July, depending on the type of iris. Individual **flowers are open** 3-4 days on the average. The **stigma is receptive** from the day before the bloom normally opens through the second day after the bloom opens. If the anthers are removed the day before the bloom opens, the **pollen is ready** for use on the following day. Anthers can be opened manually and the pollen used the same day the anthers are gathered. The pollen will be good for several days if placed where insects can't get to it. To **protect the stigma** from contamination, I remove the standards, falls and anthers. This is sufficient in most cases. To **protect the anther** from contamination remove them before they dehisce. To **store pollen** for later use I keep it dry in an open container. For longer storage than a few days, place it over a desiccant. For periods of up to one year, pollen that is thoroughly dried over a desiccant can be kept in the deep freeze in a sealed container. The container and pollen must be brought up to

room temperature before the container is opened. Otherwise moisture can condense on the pollen if the container is opened while it is still cold. When pollinating, I feel it is better to pollinate all three stigmatic lips when plenty of pollen is available, though I've never run any tests to prove it. This is more likely to prove beneficial in wide crosses or when either of the parents is only slightly fertile.

Tools used when pollinating include tweezers to remove anthers and a small brush, such as artists use, to apply pollen.

Pollination may be affected by very low humidity, which can cause premature drying of the stigmatic lip preventing pollen from germinating. Rain shortly after pollination can destroy pollen on the stigma. Many species won't self, and closely inbred progeny from these seedlings are difficult to cross. The use of auxins will help in some cases mostly by preventing premature loss of the capsule when only a few seeds are formed. It may be part of Murphy's Law, but the crosses you are most interested in making will be the ones most likely to produce no seed. It is recommended to provide extra water when it is extremely dry in order to help give full capsules.

Labeling

To label the pollinated flower, paper tags that are 1" x 1-1/2" are used. These tags come with a string attached and are tied below the ovary (if this can be done without injury to the ovary or bloom). Information to record on the label includes the numbers assigned to the parent plants which are used to designate the cross.

When named plants or species that have not been assigned a number are crossed the names are usually abbreviated. If a cross is made with some particular character in mind, a note is made on the opposite side of the tag.

Seed Ripening

The seed capsule may be affected by the larvae of the verbena moth which are very destructive to most kinds of seeds. To protect the seed capsule a fairly heavy wrapping of cheesecloth can be placed around it. Usually, if there are plenty of capsules, no protection is used. The seeds usually **mature** from June 1 to mid-September, (approximately 2-3 months between pollination and seed collection).

When ready for **harvest**, the seed capsule will turn colors, from yellow to brown, and have a tendency to split at the suture lines. To harvest, pick the capsule and spread the seeds on paper to dry, then place the clean seeds in coin envelopes. The average number of seeds to expect from a single cross may be 0-100, because some crosses are almost completely sterile.

Storing seeds

For storing seeds 2-1/4" x 3-1/2" paper coin envelopes are used. They can be purchased at local office supply stores. Information that is recorded on the packet includes the cross number, ploidy of the seed, quantity and condition of the seed, and in some cases what might be expected from the seedlings. During storage, be sure to keep the seeds dry and out of extremes of temperature.

Growing Plants from Seeds

I've used the following method for germinating Aril seeds for 20 years. **Percentage of germination** with this method is 80-90%. Seeds remain **viable** 10-15 years for the Bearded Group. Others possibly 5-10 years. The seeds are normally **germinated** prior to planting.

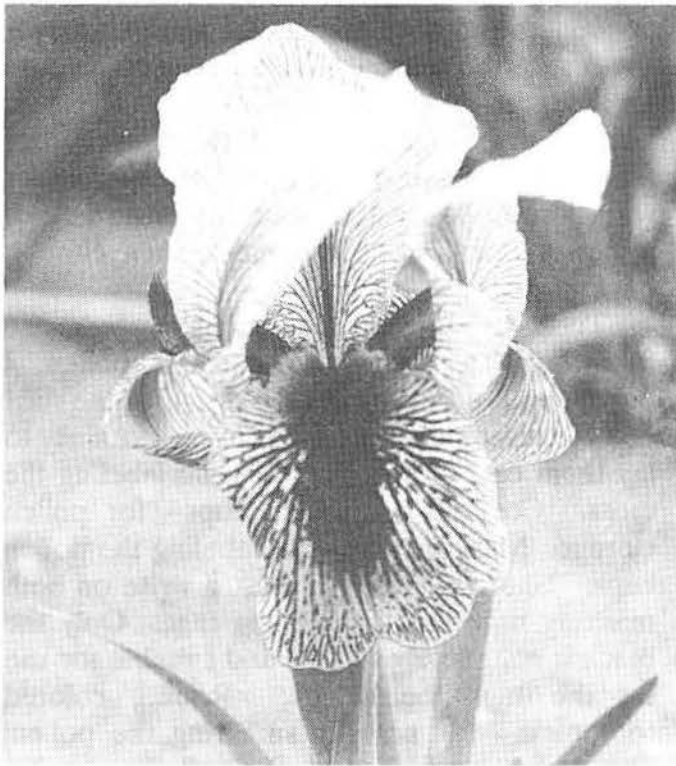
Once germinated, they are planted in pots. Seeds of Arils prefer a **cold stratification** to germinate well. (See SIGNA pp 1874 & 1875, #57, Autumn 1993 for more information.) The cold treatment is needed for the bearded iris, but for many of the non-bearded species it isn't necessary although it doesn't interfere with germination. It is also necessary to **soak** them. (See SIGNA pp 1874 & 1875.)

The seeds are planted in PRO-MIX that is well moistened before use. It can be purchased at a local feed and grain store. Clay pots are used as containers and can be found at a local nursery. They are planted twenty or so seeds in a six-inch pot, 6-7 in a four inch pot and covered 1/4" with the same material. **Once planted**, containers are placed about 12-15" beneath fluorescent lights that are on 16 hours per day. To my knowledge, light is not needed for the seeds I have checked to stimulate germination, but when germinated in complete darkness the seedlings become etiolated and very weak. Once germinated, the seeds are **watered** from above when the soil feels dry to the touch with water-soluble fertilizer used as directed. Larger plants take more than the smaller ones. With the method described in SIGNA, the seeds will begin to sprout usually in less than one week. The rate of growth, like so many other things, depends not only on the species but on the particular cross. At this time the seedlings are drawing on the reserve of nutrients in the endosperm as well as on any fertilizer they might be given. If they are given a luxury amount of fertilizer they can easily make twice the growth they make without it.

As soon as all chances of a late freeze are past the pots are set outside to allow the seedlings to harden off. After they are hardened off and the soil can be readily worked, the seedlings are bare-rooted and **transplanted** into the soil. The garden soil they are transplanted into is a slightly acid clay. The seedlings are planted out where they are expected to stay until they bloom. Once planted into the garden/nursery beds, they are watered only if there is no rain within the first

week after they are planted. This continues as needed. Excess summer moisture can kill Aril or Arilbred seedlings, but I have been giving the Arilbred seedlings an excessive amount of water in an effort to kill off the weaker ones so that only the genetically stronger plants survive. Summer drought can throw them into a premature dormancy from which some fail to recover. First bloom is expected the year after they are planted out at which time they are not yet two years from seed. Most will bloom the third year after they are set out. As a general rule, any that do not bloom by the time they have been set out four years are discarded.

A simple method that provides at least some germination for most species is to plant seeds directly in the soil in late fall. The seed distribution is usually too late to allow this but if the soil isn't frozen it would still be a good idea to try it.



Aril hybrid 'Hipermestra'

Seed Exchange Report

Darrell R. Probst

Thanks to the generosity of the donors, 1993 was a bountiful year for the Seed Exchange. Over 5,500 packets were sold through the 247 orders received. There were at least 50 requests each for the following iris species: 89 bulleyana, 95 chrysographes, 97 chrysographes-black, 198 crocea, 207 notha, 334 loczyi (the most popular with almost 70 requests), 346 verna, 351 gracillipes, 352 gracillipes alba and 377 leptophylla. The most popular Irids were 387 Crocus niveus, 411 Neomarica nothiana, 426 Trimeza martinicensis and 427 Watsonia spectabilis.

I was very pleased to see many "wild-collected" seeds donated. All sold out early. I wish that more members would make a trip out to collect seeds from the wild especially for SIGNA. There was a time when wild collected and hand pollinated seeds were offered at a higher price which signified the value of such seed and the extra effort involved. Perhaps a return to this policy would encourage more donations of this sort.

If you are planning a trip outside of the U.S. or are a member living overseas, keep SIGNA in mind. Financial assistance may be available from SIGNA for seed collecting trips targeting specific species. Notify me well in advance.

Include:

- List of the target Iris species
- An estimate of the likelihood of finding these species
- Countries involved
- Cost estimate
- Dates collecting is expected to take place

Pollinating & Germinating Aril and Arilbred Irises

(Species from the Groups D-H in the SIGNA Seed List)

Sharon McAllister

Sharon lives in Fairacres, New Mexico, USDA Zone 8. Minimum temperature in the winter is between 10 and 20 degrees F. Summer temperatures exceed 115 degrees F in some years, though are usually around 110 degrees F. Average first killing frost is between November 5 and 20. Last frost may be anytime from late February until the end of April. She has been germinating Aril and Arilbred Iris seeds for 15 to 20 years.

Pollination

Pollination is undertaken mid-March to mid-April. Oncos are usually blooming by St. Patrick's Day, but may bloom as early as late February if the winter is mild. Regelia species soon follow, usually about the first of April. Aril species bloom is usually over by late April. Individual Onco flowers are open 5 or 6 days, Regelias 2 or 3. The stigma is receptive for only a few hours, not days. It is usually best to cross the flower as soon as it opens enough to expose the stigmatic lip because after a couple of hours the lip will have dried out so much that the cross won't take. I pollinate all three stigmatic lips. The pollen has usually dehisced by the end of the first day (usually not until after the stigmatic lip of that flower is no longer receptive) and remains viable until the flower starts to close or the pollen has been used up-- whichever comes first. It is not necessary to protect the stigma from contamination because I harvest and store the pollen of *all* arils that bloom in my garden. The closest other aril irises are about 30 miles and a mountain range away so there's no pollen available even if there were an insect interested in visiting my flowers. Actually "Bee Pods" aren't a problem here in the desert. Several different times, I've set

aside an area containing hundreds of proven fertile varieties and left it completely untouched by any hybridizing activity just to see what would happen. Not a single capsule has ever formed in one of these test beds.

I collect and store the anthers from each variety in a separate, clearly labeled cup. I use the disposable, covered condiment cups like you find at fast-food restaurants. I also use a fresh toothpick for each variety of pollen. I hold the anthers in open cups at room temperature for a few days, until they are completely dry. (They dry quickly, without special provisions, with our low relative humidity.) Then I seal the containers and store them in the refrigerator for the rest of the season. I also freeze some cups for use on early-blooming varieties the next year. Further protection of the flower after pollination is used only for special experiments with hard-to-pod varieties. Sometimes I force a flower open, make the cross, then close it back up to open "naturally".

Tools used when pollinating include the following: Tweezers-- to harvest the pollen. I buy several sets of the cheapest style at the start of each season because I do have a tendency to lay them on the bed frames while labeling the cross. Covered condiment cups-- for pollen storage. Masking tape-- for labeling the pollen cups. "Sharpie" pens-- black, to write on both masking tape and hybridizing tags. Only the black is completely sunfast and suitable for use on the tags themselves. Round, colored toothpicks-- for actually smearing the pollen. This makes it easier to see the pollen and judge the right amount to use so I don't waste any if I'm working with something rare. Marking tags-- the posterboard type with a string attached that's easy to loop around the stem. These

come in different colors, which makes it possible to color-code crosses for subsequent processing. Small cake pan-- holds all needed tools and one pollen cup (for a fast, efficient session of intensive crosses) Fishing tackle box-- holds all of the needed tools and has separate compartments that hold a number of pollen cups (more convenient for making a variety of crosses in a given area).

Making the Cross

I select a flower that I expect to be receptive: the stigmatic lip is slightly exposed, but still glistening with moisture. I select a toothpick of contrasting color (e.g. yellow for blue pollen, red for creamy pollen, blue for yellow pollen). I load the toothpick-- by wiping it across the anther for the first cross, by wiping it around the sides of the cup to pick up loose grains later. I hold the toothpick horizontally against the stigmatic lip and carefully rotate it, to transfer the pollen. I replace the toothpick in the cup and return the cup to the tray or box I am using. Once the seed capsule begins forming, I clip the dried flower off above the newly forming capsule so it can't catch the wind and break off the capsule.

Pollination may be affected by low relative humidity, high temperature (above 85 degrees F, one might as well quit) and wind. All can cause crosses to be less likely to take. If it is windy enough to blow the pollen off the toothpick, it's definitely time to quit! Few arils can be selfed without chemical treatments. It's not too difficult to find compatible clones of the same species, but sometimes sibs will not be compatible. Of all of the Arils, I've succeeded in selfing only a few clones of *I. stolonifera*.

Labeling

To label the pollinated flower I use a Sharpie to write the cross on a marking tag and fasten the tag low on the stalk where it's somewhat protected from the wind. (Oncos have only one flower per stem, regelias usually have two. If I

cross the second flower, I always use the same pollen parent so a single tag will do). Information to record on the label varies, depending on such things as the type of cross and the nature of the experiment. The front of the label always contains the cross: Pod Parent x Pollen Parent. The back may have any type of note, such as: weather conditions, reason for cross, treatment of seeds, etc.

Seed Ripening

The seeds usually mature in May and June (approximately a couple of months between pollination and seed collection). When ready for harvest, the seed capsule fades from green to ivory, then turns tan. When it starts to split open, the seeds are ripe. To harvest, I pick *one* capsule with its corresponding tag, mark it on a list and take it inside. I shell the seeds onto a plate, count them, and write the number of seeds on the hybridizing tag. If the seeds are scheduled for curing, I prepare a dish of moist perlite, spread the seeds out on the bed of perlite and cover them with more perlite. I then fasten the tag to the dish with masking tape. If the seeds are scheduled for drying, they are just left on the plate to dry. The average number of seeds to expect from a single capsule varies greatly, mostly with the weather conditions. Oncos usually have at least 20, sometimes over 100, but I'd say the average is about 50. Regelias may have only a few, or over 50, the average is about 20-25.

Storing seeds

For storing seeds empty 35 mm film canisters are used for short-term storage, because it's easy to just tape the hybridizing tag to the canister. For shipping, and my "Seed Bank", I use 2-1/4" x 3-1/2" coin envelopes. They can be purchased at the local office supply store-- the same place I buy marking tags (they're cheaper by the thousand), Sharpies, and embossing tape for garden labels. Information that is recorded on the packet is the Pod Parent x Pollen Parent,

the # of seeds and year collected. During storage, dried seeds are stored in coin envelopes, filed by type in boxes. The boxes are kept on a closet shelf, with no special provisions. (This probably wouldn't work in a moister climate, but here the seeds remain viable for years.)

Growing Plants from Seeds

I've used the following enhanced germination method for germinating Aril and Arilbred seeds for at least 10 years. I've tried a number of variations in media and cycle time, but the principles are essentially the same. As I learn from my experiments, I find that I have more success with enhanced germination techniques and less need to resort to forced germination. **Percentage of germination** with this method for forced germination is close to 100% for diploids and tetraploids; perhaps 50% with triploids. The problem isn't the germination rate-- it's the survival rate, and if the seedlings are not hardened off properly that may approach 0%. For enhanced germination there's a great deal of variation among the species. For example, both *L. atropurpurea* and *L. stolonifera* respond quite well, but many other aril species have not responded at all. For 1/2 bred, however, germination often approaches 100%. Seeds remain **viable** for over 20 years, from what I've heard, but I haven't been in a position to test this myself. I've germinated 5-year old arilbred seeds as easily as year-old seeds. I don't try to store seeds from wide crosses, but culture them while they are still fresh.

I don't **soak** them when I work with fresh seeds. When I work with dried seeds I soak them first, both to separate the good seeds from the bad ones and to improve the response of the viable ones. I use plain water, checking the seeds and changing the water twice a day. Good seeds will plump up and sink to the bottom of the glass, empty ones will float. As long as the floating seeds are firm to the touch, I let them soak. The complete separation process usually takes less than 72 hours,

depending on how dry the seeds are. It seems to be necessary to soften the seed coats for enhanced germination. It's the only practical way to prepare the coat for the peeling and chipping involved in forced germination.

Dishes (pint-size refrigerator dishes and clear plastic wrap) can be found at a grocery store. Potting soil and pots at the local nursery. Perlite can be purchased from a builder's supply. Gro-lites from an orchid supply house and Timers at the hardware store. Various sizes of pots are used as containers (a 6" pot will accommodate 7 seedlings).

The seeds will begin to sprout with enhanced germination in about 5-7 days under lights-- it depends somewhat on room temperature. For forced germination, about 7-10 days in the refrigerator. The rate of growth varies. Some won't survive for a week after potting. Some will succumb during the second or third weeks. A seedling that has four leaves by the age of four weeks, however, will probably survive.

The seedlings are **transplanted** as soon as the first leaf breaks free of the sheath-- when the leaf is less than 1/2" and the root is about 1-1/2" long. I start by checking the dishes under lights and separating out those that have leaves showing above the perlite. I work with one dish at a time, emptying it into a 9" square glass pan. I then replace the bottom layer of perlite in the dish. Put the firm, ungerminated seeds back in the dish and discard any soft seeds. Update the # of seeds now in the dish on the label. Move any seeds that have germinated to a plate for further processing. Then return the dish to the refrigerator.

Seedlings that have started to germinate but whose leaves are still encased in the sheath get special treatment. I fold a paper towel three times in alternate directions to make a pad that will fit into a sandwich-sized Baggie. I moisten the pad, transfer sprouting seeds to it, put it in the Baggie, and place the Baggie in a dish that will fit in the refrigerator easily. I'll then take that dish out of the refrigerator every morning and put it back in every night, checking it daily

and potting any seedlings that are ready.

I select the appropriate number and size of pots, based on the number of fully germinated seedlings. I put a tissue or paper towel in the bottom of each pot, to keep the sandy soil from seeping out of the drainage holes, then fill it with soil to within 1 to 2" of the rim. Once they've germinated the seedlings are planted in the native soil, which is extremely sandy, mixed half and half with standard potting soil. I keep the mixed, slightly moist potting soil on hand, because I'm usually potting seedlings at night and have no desire to go out in the dark to get sand from the domain of centipedes, scorpions and spiders. I use an old steak knife to open a slot in the soil, then tuck the newly-sprouted seedling into it-- making sure that the tip of the leaf remains above the surface. I fasten a piece of plastic wrap over the top of the pot, holding it in place with a rubber band, then water the pot from the bottom. When the soil is properly moist, a slight film of water will appear on the plastic. This provides a miniature "greenhouse" environment for a day or two. When the seedlings have grown tall enough to touch the plastic, I remove it.

Potted seedlings seem to require watering about twice a week-- but the only way to tell that the time has come is to check every pot, every day. For the first few weeks, the newly transplanted seedlings are kept under separate lights where they can be watched more closely. There, the pots can be spread out enough to be watered from the bottom so that the soil doesn't pack down too much around the small seedlings. Once the seedlings are large enough, they "graduate" to other lights where the pots are packed together more closely and have to be watered from the top. After the seedlings are potted, a weak solution of fertilizer (one teaspoon of Miracle-Gro to a gallon of water) is used with every watering. I find that this is easier than keeping track of which pots have been fertilized when. The pots will stay under lights until the first signs of spring. Then I move them outside to a protected area where they can harden off without being whipped by

the wind. If a hard freeze is predicted, they can be brought back inside for the night.

When established irises have broken dormancy and started their spring growth, I move the seedlings to the garden and line them out in seedling beds. The garden soil they are transplanted into is extremely sandy, with rocks and other debris screened out. It is very well-drained, so much so that one of the prime considerations in preparing iris beds is to add enough humus to retard the drainage, quite alkaline (pH around 8.0). The climate is both hot and dry. Each freshly-planted seedling bed gets a shade cloth frame to protect the seedlings from both wind and sun. There is more sun than any iris could possibly want. TBs can't survive here without shade cloth. Even the arils perform better when I put shade cloth over them as soon as the capsules are harvested. Once planted, the nursery beds remain under shade cloth until fall, are exposed to the winter sun, and then have shade cloth placed back over them for the following summer. Arilbreds first bloom is usually two years from the cross, about 14 months from lining out, with much more bloom the following year. Arils usually take an extra year for me.

A simple method that provides at least some germination is offered here from other's reports as I have only used enhanced and forced germination techniques. In a climate that provides adequate chilling and soil that can be kept sufficiently moist it should be possible to plant the seeds about 1" deep and 4" apart, in a seed bed that can be left undisturbed for a number of years. As the seeds sprout, they can be transplanted to seedling beds. The appearance of the second leaf is the signal for spring transplanting-- at the stage the food reserves of the seed haven't been exhausted and it can complete the transition to living on its own in its new home. If the spring transplant window is missed, the seedlings can be moved in the fall at the normal transplanting time.

Pollinating & Germinating Sino-Siberian Irises

(40 chromosome species from Group J in the SIGNA Seed List)

Carla Lankow

Carla lives in Renton, Washington, USDA Zone 7. Minimum temperature in the winter is usually between 10 to 15 degrees F, but has been as low as -2 degrees F. Summer temperatures can reach as high as 90 degrees F for a few days, on occasion up to 100 degrees F. Average first killing frost is between late October and mid-November, last frost in mid-April. Average annual rainfall is 34 inches. She has been germinating Sino-Siberian Iris seeds for 10 to 12 years.

Pollination

Pollination is undertaken through most of the month of June. The various species bloom at different times (I. forrestii and I. chrysographes early and I. delavayi and I. clarkei later) so though one plant may not bloom the whole month, we will have some plants in bloom for about 6 weeks. Individual **flowers** are **open** for about 2 to 3 days. The **stigma** is **receptive** as soon as the flower is fully open and stays so until it wilts. We've had takes on day 3. The **pollen** may begin to spill before the flower is open and is usually gone at the end of the first day. To **protect** the **stigma** from contamination you must open the bud and remove the standards and falls for the 40's. Then come back in a few hours or the next day to apply pollen. It is very important to protect the flowers from contamination because they are so fertile. I pollinate all three stigmatic lips to increase the chances that the cross will take. To **protect** the **anther** from contamination it must also be collected from a "loose" bud. With these plants you really must **store pollen** as the pollen is lost so soon. We use small folded paper envelopes and simply store at room temperature away from the sun. We can get

takes on rebloomers with two month old pollen this way.

The **tool** we use when pollinating is a very small watercolor brush to apply pollen. It is dipped in alcohol, then allowed to dry between applications. **Pollination can be affected** by rain right after pollination (within 3 or 4 hours) and very hot weather. Both seem to lessen the number of takes but do not prevent it altogether.

Labeling

To label the pollinated flower we use a 3/4" x 3" strip cut from disposable aluminum oven liners. We write with an old ball point pen to indent the #s in the aluminum. Then we fold this around the stem below the flower. Information to record on label includes the cross number and the pollen parent number or name. Then we record all crosses (because we get a high % of takes) in a notebook to be transferred to the computer later. We sometimes make some notes as to weather or temperature if it is extreme.

Seed Ripening

To protect the seed capsule, the stem is staked if it leans. The **seeds** usually **mature** in mid to late September, even into October for late bloomers.

When ready for **harvest**, the seed capsule begins to turn brown and the tip splits. To harvest, I usually pick the capsule with the stem and tag attached and place this "bouquet" in a big vase or jar in a cool room away from the sun to ripen and dry a little more. When I have

a spare moment I pick the capsules and place them with the tag in an open letter envelope and stand them up in a shoe box until they are truly dry. When I have a rainy day I shell the seeds and place them with the tag in coin envelopes with the number recorded on the outside. Then they go back into the shoe box and are stored at room temperature until they are planted. The average number of seeds to expect from a single capsule varies with the species. Hybrids with predominantly I. forestii or I. chrysographes parentage may only have 30 to 40 seeds. I counted some I. delavayi crosses this year with over 120 seeds.

Growing Plants from Seeds

I've used the following method for germinating Sino-Siberian seeds for 10 to 12 years. **Percentage of germination** with this method has not been calculated. Seeds remain **viable** for three years if stored in airtight containers in the refrigerator and give relatively good germination. The seeds are normally **planted** in October or November in one gallon plastic pots. Seeds may prefer a **cold stratification** to germinate well. We plant in the fall and bury the pots up to the rim and let nature take its course. We **soak** seeds from SIGNA or any other seeds that are planted in the spring. They are soaked for 10 days changing the water at least once a day. The easiest method is to use the legs from old panty hose. Put one lot of seed in the toe and tie a knot then another lot and tie another knot, etc. all the way up the stocking. I don't include a tag but rather keep a list starting at the toe. If we have more than one stocking, I try to use different colors. I then soak the seeds, stocking and all, in a large jar. I have heard it suggested that you tie the stocking to the bar on the inside of your toilet tank, presto, fresh water every time you flush! We've never tried that.

The seeds are planted in 1/2 commercial potting mix and 1/2 coarse sand. The components were purchased at a local nursery and gravel pit. One gallon plastic pots are used

as containers. They just seem to appear, we save them and use them over and over. The seeds are planted one cross per pot with no more than 60 seeds per pot so they are at least 1/2" apart. We lightly tamp the soil mix then plant on top of the mix and cover with about 1/4 to 1/2" of #2 granite turkey grit from a local feed store. **Once planted**, containers are **buried** up to the rim and left until germination occurs. After planting, the seeds are **watered lightly or misted** when the gravel is dry. In large gallon pots very little water is needed until the plants get to be 6 or 8 inches tall, then just enough to keep moist. Don't let the 40's dry out!

The seeds will begin to sprout usually in mid-spring. We bring them up near the house in a sunny spot for easy access and watering. Once germinated, the seedlings are fertilized when they are up about 1". We use 5-10-10 or 16-16-16 slow release pellets such as Osmocote. We just sprinkle it over the gravel. The amount varies according to the amount of germination. That will usually keep them growing until we transplant in the fall. They are usually about 10 to 12" when they are transplanted. **Transplanting** takes place as soon as we get the fall rains, (late September to late October). We line them out in the ground a hand's reach (about 8" or 9") apart in double rows 1 foot apart with 2 feet between the double rows. They are left there until they bloom. The garden soil they are transplanted into is very sandy and well-drained, on a south-facing slope in full sun. We are adding more humus each time we till, but we still have problems keeping them wet enough. Once planted into the garden/nursery beds we just keep them wet and fed. We have used Subdue if we see PCN crown rot or Agrimycin for soft rot. Many will bloom in two years, most in three.

A **simple method** that provides good germination would be to just plant the seeds in the ground in fall and let nature take its course. It would be the best method and least work if you have the room.

As with all plants, don't over-water in the pots and don't let them dry out.

Pollinating & Germinating Siberian Irises

(28 Chromosome Species from Group J in the SIGNA Seed List)

Marty Schafer

Marty lives in Carlisle, Massachusetts, USDA Zone 5. Minimum temperatures in winter average between -10 degrees F and -17 degrees F. Summer temperatures reach as high as 100 degrees F. Average first killing frost is around October 5, last frost about May 15. He has been germinating Siberian Iris seeds for 12 years.

Pollination

Pollination is undertaken from May 25 to June 25. Individual flowers are open for two days. The stigma is receptive on the second day only. The pollen is ready on the first day. To protect the stigma from contamination the pollen is placed on the stigma the first day before it curls down, thereby insuring that my pollen is the first. To protect the anther from contamination, a soon-to-open flower is manually opened and the anther removed before insects have a chance to contaminate the pollen. I may pollinate only one or all three stigmatic lips, depending if I'm in a hurry, though I've never tested to see if it makes a difference. To store pollen for later use, Bee Warburton suggests placing stamens in small, labeled pieces of paper towel and putting them in the freezer in an empty ice cream container until needed.

Tools used when pollinating include a cross-action tweezer, (or reverse-action tweezer), the kind that is at rest in the closed position. They are sold at hobby stores. The points of the tweezer are long enough to reach into the flower and grasp the anther. They are also just sharp enough to scrape the pollen out of its chambers and broad enough to carry the pollen to the stigma and deposit it there. For

convenience I suspend the tweezer from a large loop of string or fabric placed around my neck. This allows me to drop the tweezer when I make the label or need my hands free for other tasks. **Pollination may be affected by high temperatures** which seriously reduce the chances of success.

Labeling

To label the pollinated flower I use yellow plastic tags fastened with a green twist tie. The bright color (could be red, orange or pink) shows up against the green iris foliage when the time comes to harvest the capsules. The plastic also accepts writing from lead pencils which does not fade during the time that the capsule is maturing. Another hybridizer, Bob Hollingworth, uses Dymo tape folded on itself with the cross punched into the surface. Sounds a little laborious to make, but it is permanent and easy to attach to the stalk. Information to record on the label includes the names of the parents-- pod parent first followed by an "X", followed by the pollen parent. Sometimes I also write the date of the cross and often I describe important features of each parent, (e.g. height, vigor, bud count, flower color, etc.)

Seed Ripening

The seed capsule may be affected by a weevil that eats the seed. This is more common in Iris versicolor capsules than in sibiricae capsules, but it does occur. To protect the seed capsules that have been pollinated, all non-labelled capsules are removed early in the season and burned or sent to an incinerator. This is done

in the hope of reducing next year's weevil population. The seeds usually mature in late August, (approximately 80-90 days between pollination and seed collection).

When ready for harvest, the seed capsule is full and begins to turn brown. To harvest, the capsules are picked with their labels and placed into net bags until there is time to shell them. If the capsules are quite brown they can be left longer in the bag without shelling, however, if they are picked somewhat green, it is preferable to shell them as soon as possible to avoid any fungus from growing in the capsule. Once shelled, the seeds are allowed to dry before packaging or planting. The average number of seeds to expect from a single capsule ranges widely from 10 to 100. Once collected it is important to keep them dry. The seeds are hung from a clothesline in a cool, dry room. If necessary, because the seeds are moist or if the weather is humid, an oscillating fan is used to move the air around.

Storing seeds

For storing seeds I use paper coin envelopes. They can be purchased at a stationer. Information recorded on the packet is the names of the parents as they appear on the label. At some point each package receives a number designation containing the type of iris (S=Siberian, J=Japanese, SP=species), the year the capsule was made, and a number for each different cross or collection. If the pollen parent is unknown I write the pod parent X unknown or pod parent OP (open pollinated).

Growing Plants from Seeds

I've used the following method for 12 years. Percentage of germination with this method is unknown. Seeds remain viable from 1 to 3 years (possibly more).

The seeds are normally planted in pots, or if there are large numbers of seeds, in penpaks, from October 1 to November 1. (Once I planted seeds in late August and they

germinated in September). Seeds do not require cold stratification to germinate well. It is not necessary to soak them. However, when seeds are received late (for example from SIGNA or ARGS in January) I sow them in a moist medium, give them a week of warmth to allow them to absorb water and then put them out in the cold.

The seeds are planted in PRO-MIX with no amendments. It can be purchased at local nursery supply companies and sometimes Agway. Pots and penpaks are used as containers and can be found at nursery supply companies. The seeds are planted very thickly, with some seeds touching, and covered 1/4" deep. Once planted, the containers are placed outdoors under an upside-down plant carrying tray (which has an open grillwork) to protect the seeds from cats and birds. Otherwise they get sun, rain and snow whenever they come. I prefer to put them where they will not get too much sun in winter which causes constant freezing and thawing, and drying. If they get dry, I water them. Remy can be used over the plant carrying tray to reduce evaporation.

To my knowledge, light is not required to stimulate germination (though the seeds planted in August as mentioned above were planted on the surface so light may have played a part in their germination). Experiments with seeds planted over winter on the surface of the medium led to no germination and the death of the seeds. The temperature where they are planted fluctuates from 70 degrees F to -10 degrees F. After planting, the seeds are **not regularly watered** until germination takes place, then, if there is no rain, they are watered once a day from above. When germination takes place the seedlings are placed in full sun. Ideally a weak fertilizer solution would be used every time they are watered (such as Peters 20-20-20). The seeds will begin to sprout in May. (The seeds planted in August germinated in 30 days.)

On a few occasions, flats have been brought inside in March to speed up germination. These were placed in a warm room and

germination occurred in 10 to 20 days. The rate of growth with May germination is a hefty 5" tall by July 1. At this point, they are still in the original seed pot. If they had been transplanted into individual cells or small pots soon after germination, I am sure they would be larger.

Starting July 1, the seedlings are **transplanted** directly from the original seed pot into the ground after cut worms have abated. Cut worms are death to newly transplanted iris seedlings and must be controlled. Sunflower seeds are planted in the iris beds in May and the beds are patrolled daily to look for sunflower shoots which have been "cut". We use a dinner fork to search the ground around each sunflower that is down and kill the cutworm. The garden soil they are transplanted into is acid soil, but they are less fussy about this than is thought. They tolerate a wide range of soil conditions from moist to dry, though Siberian seedlings resent standing water in winter. Once planted into the garden/nursery beds it is important to keep them moist until they are well attached. If the soil is dry, they should be watered daily. Fertilize weekly with

a weak solution, increasing the fertilizer strength as they grow. I have recently begun using alfalfa pellets as a top dressing fertilizer. Can't comment yet as to its value. I mulch as soon as possible. In moist, full sun 75% will bloom in one year, while only 25% will bloom in dry full sun. 100% bloom in the second year can be expected under either condition.

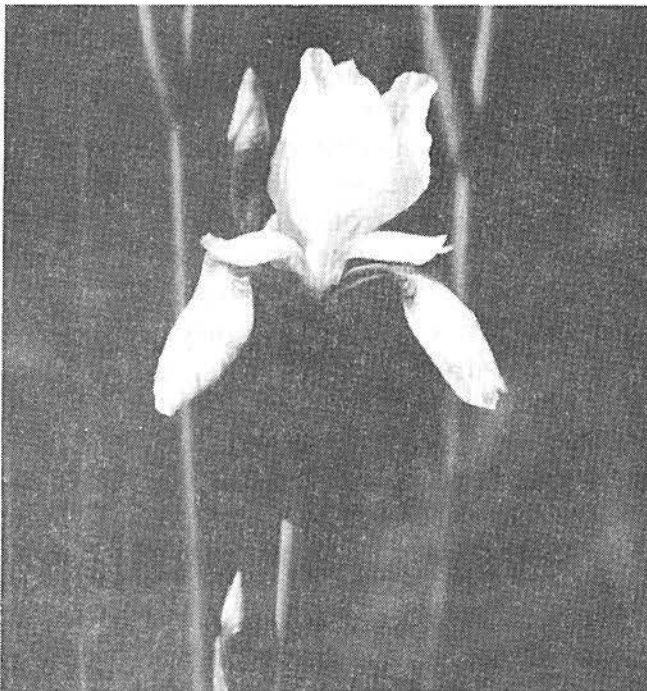
A **simple method** that provides at least some germination would be to plant the seeds directly into the ground whenever the soil is warm.

Additional Advice:

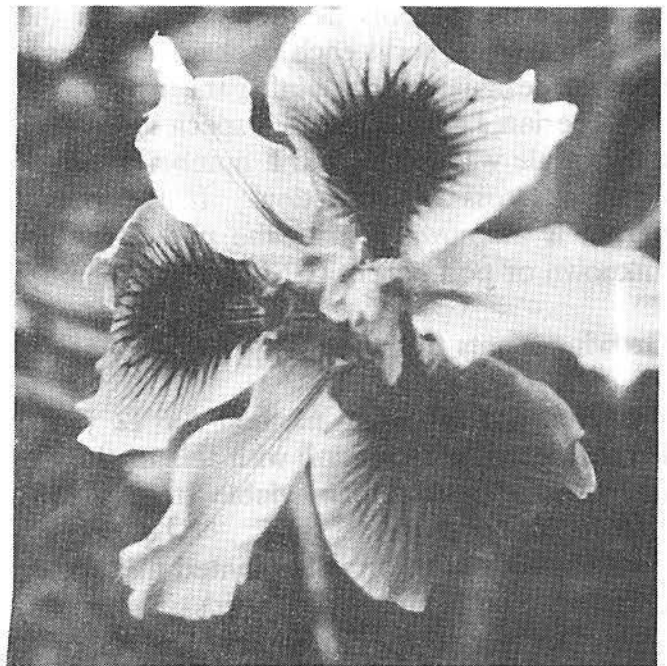
Start making crosses as soon as you can, it's a lot of fun and the field is wide open.

Suggested Further Reading:

Siberian Irises by Currier McEwen. There have been some good articles in "The Siberian Iris", the twice-yearly publication of The Society for Siberian Irises. They regularly have information on breeding behavior of certain known parents, sources of breeding material, and descriptions of families of plants.



I. siberica 'Snow Prince'



Joe Ghio hybrid 'Simply Wild'

Pollinating & Germinating Pacific Coast Native Irises

(Species from Group K in the SIGNA Seed List)

Joe Ghio

Joe lives in Santa Cruz, California, USDA Zone 9. The temperature rarely drops below 32 degrees F in winter and rarely rises above 80 degrees F in summer. Occasional light frosts may occur from mid-December through mid-February but are not damaging. Average rainfall is 28 inches. He has been germinating Pacifica Iris seeds for 30+ years.

Pollination

Pollination is undertaken the end of March/early April. Individual flowers are open 3 days or so. The stigma is receptive from opening. The pollen is ready from opening. No protection is undertaken to protect the stigma or anther from contamination. In theory, it is only necessary to pollinate one of the three stigmatic lips, but I pollinate all three, just to be sure.

Tools used when pollinating include tweezers for handling the anthers. The ease of selfing by wind may affect pollination.

Labeling

To label the pollinated flower cardboard sales tags are used. Information to record on label includes both the pod and pollen parents.

Seed Ripening

The seed capsules of Pacificas are not affected by anything. The seeds usually mature in June and July, (approximately 60+ days between pollination and seed collection).

When ready for harvest, the seed capsule begins splitting. To harvest, pick the capsules and allow them to dry, then shell the seeds into milk carton bottoms. The average number of seeds to expect from a single capsule may be a lot to only one. Once collected they should be dried in the sun.

Storing seeds

For storing seeds I use milk carton bottoms.

Growing Plants from Seeds

I've used the following method for germinating Pacifica seeds for 30+ years. Percentage of germination with this method for some crosses is 100%, others 0%. I do not know how long the seeds remain viable. The seeds are normally planted in the ground in October, about 1" deep and sown thickly. Seeds do not require a cold stratification to germinate well. It is not necessary to soak the seeds before planting.

The seeds are planted right into the garden. After planting, they are watered by winter rains. They will begin to sprout in 2-3 months. The seedlings are transplanted by April 15 directly into beds that have been fumigated. The garden soil they are transplanted into is a sandy, clay soil in full sun. Heavy rains in late March and early April can cause rot problems in young seedlings. Once planted into the garden/nursery beds I get nearly 100% bloom the following spring.

Pollinating & Germinating

Spuria Irises

(Species from Group M in the SIGNA Seed List)

Dave Niswonger

Dave lives in Cape Girardeau, Missouri, USDA Zone 6. Minimum temperature in the winter is between 0 and -10 degrees F. Summer temperatures reach as high as 100 degrees F. Average first killing frost is between mid to late October, last frost at the end of April. He has been germinating Spuria Iris seeds for 24 years.

Pollination

Pollination is undertaken the last week of May and the first week in June. Individual flowers are open 3 days. The stigma is receptive the 2nd and 3rd days. The pollen is ready 1st through 3rd. To protect the stigma from contamination I remove the falls just as the flower is about to open, then pollinate the 2nd day after. To protect the anther from contamination I collect the pollen just as the flower is opening. It is placed in a plastic box designed for fishing lures (flies) which has a cover but I don't close the cover completely because the pollen will mold. The chances of wind blowing the pollen into the stigmatic lip is practically nil. If you try to pollinate the flower on the first day, the pollen won't stay there and usually you won't get any seed.

Tools used when pollinating include large tweezers to collect the anthers (stamp collecting tweezers work pretty well). They are also used to pick up the anther when pollinating. If short on pollen, I use a small brush and flip the brush with my fingers and blow at the same time. The pollen is light and doesn't stick very easily. Of course, the safest thing to do would be to rinse the brush in alcohol but this takes too much time and there hasn't been a contamination problem by doing it this way.

It is recommended to check the capsule after it has set to see if the tag is fastened below the capsule and not hanging on the old dried bloom which could be lost if the wind blows hard. **Pollination may be affected** if it rains the same day the flower is pollinated. It will probably destroy the chances of getting seed. There is a possibility of sterility between some of the species hybrids. For example, if you cross a 38 chromosome species with a 40, 42, or 44 chromosome hybrid of which most of the named varieties of Spurias are composed, it is hard to get seed from the first generation hybrids because of an odd number of chromosomes. Seedlings from I. klatti, I. demetrii, I. maritima, I. notha and I. pseudonotha have this problem. But if you make lots of crosses or even look for chance pollinated seed, if it germinates, you should have fertile clones from there on.

Labeling

To label the pollinated flower regular string tags can be used to write the cross which is the least expensive method but wind and rain can blow the tag off and only the string is left telling you that it is hand-pollinated but you don't know the pollen parent. Copper wired plastic labels are probably the best method using a felt tip marker that is waterproof. Again be sure it is placed below the seed capsule; otherwise, as the bloom dries, it may fall off. Information to record on the label includes the pod parent first, then an "X", then the pollen parent.

Seed Ripening

The seed capsule may be affected by the verbena bud moth which will lay eggs on the seed capsule and the larva will eat the seeds. When shelling the seed you may find this little green worm having a fine time eating the seed. This is another reason for planting the seed just as the seed capsule starts to crack so you can beat the green worm from eating the seeds. Spraying early after pollination may help to control this problem but it cannot be depended upon since the moth uses other plants as hosts. Burning the old bloom stalks may help also, but again they may come from other plants. It is almost impossible to control.

The seeds usually mature around mid-August to the first of September (approximately 80-94 days between pollination and seed collection). *I. demetrii* is the latest to bloom so it takes longer to mature. When ready for harvest, the seed capsule turns from green to yellow and starts to split open. For harvesting the seed, I cut the bottoms off of milk cartons, which are about three inches deep, and carry about 15 or 20 in a cardboard box whose top has also been cut off. As the seed capsules mature, I pick them along with the tag listing the cross and drop them into the box. Usually there isn't time to shell them at that point but within the next week or two, they are shelled and planted immediately. The average number of seeds to expect from a single capsule is around 20. Sometimes with a species cross there may be only one or two but some seed capsules may have as many as fifty seed. Once collected they should be planted green, but if this cannot be done, they should be stored in a dry place to keep them from molding; however, molding doesn't hurt the germination of the seed. They're just nicer to handle and don't stick together when planting them and look nicer if you are going to mail a packet of them to someone, like the SIGNA Seed Exchange.

Storing Seeds

I don't use seed envelopes to store the seed. I just leave them in the milk carton boxes. Information that is recorded and placed in the boxes is the name of the species or the cross and how many seeds are in the box. Sometimes the color/colors to be expected may be listed and also the year collected. Once the seed dry out and go dormant, it may take two years for them to germinate. I have had seed germinate after being four years in the ground. This may be a good reason to plant the seeds in pots, so they can be kept for several years. However, I don't plant mine in pots. I prepare seed beds that have been fumigated with methyl bromide.

Growing Plants from Seeds

I've used the following method for germinating *Spuria* seeds for 24 years. **Percentage of germination** with this method can vary quite a bit depending on the species or the particular hybrid. Often seeds of hybrids from wide crosses may not germinate at all. Normally, with most present day cultivars of hybrid *spurias*-- if the seeds are planted green, there will be close to 100% germination. If the seeds are dried out, none of them may germinate the first year. Sometimes half of the seed may come up if they are dry but with *spurias*, a grower should give them at least two years to germinate. Seeds remain **viable** for several years. In fact, dried two year old seed may germinate better than dried one year old seed. I wouldn't hesitate to plant five year old seed but this hasn't really been tested.

The seeds are normally **planted** in the latter part of August or even into the winter. (One year I planted dry seeds of *I. mulsulmanica* in February and they came up that spring.) They are planted in a fumigated seed bed that has plenty of organic matter in it. Pots can be used but I usually forget to keep them watered. Plant the seed about 1" deep. They are so light in weight that they may float out of the ground during a heavy rain if not buried deep enough.

Sow them fairly thickly, like radish seed. The pressure from the germinating seed may force some of the others to germinate and weeds and grass don't grow as well if they are thick (even in fumigated soil, wind and birds will bring in other seed and the beds will become contaminated with weeds eventually.) With spurias, ungerminated seeds should be left planted at least two years. I may dig up the seedlings that germinate the first year and make another marker for these. Seedlings are transplanted when they are three inches tall (before the tall bearded iris bloom).

When you plant the seed green in August, they may germinate before winter sets in. I have had them one inch tall and worried whether the freezing would kill them but they can take it. When spring comes, these fall germinated seeds get the jump on the others and are ready to transplant sooner. Sometimes a very light mulch of straw around them is beneficial, but not during the cold weather. One year the spuria seedlings were planted after the tall bearded irises had bloomed and they all disappeared. I thought I had lost them but when fall arrived, all grew again but I had lost a year's growth. They had gone dormant which mature plants can do if transplanted in the late spring or early summer.

The seeds are not given a special cold treatment since I'm far enough north to have below freezing temperatures in the winter but they will germinate green without cold treatment. I don't know if they would need one after the seeds have gone dormant. It is not necessary to **soak** the seeds. They are so light they would probably float. The seeds are planted in regular garden soil to which I may have added organic matter. I have the feeling that if the soil particles are not coming into close contact with the seed, in other words, if there were lots of air space, germination would not be as good. Peat or sterilized cow manure can be purchased at most garden supply stores, or you can make your own compost and add it.

Once planted, containers are placed outside. I keep them watered once a week unless it rains

or unless they are frozen. To my knowledge, light is not required to stimulate germination, though I would keep the containers outdoors and let nature take its course. After planting, the seeds are **watered** only if the soil is dry at 1" deep. After germination, water at least once a week keeping the soil moist at all times. Spurias like lots of water when in active growth. Water from the top being careful not to disturb the soil which may cause the seeds to float out.

Once germinated I use a 1/2 strength solution of Peters, Miracle Gro or Rapid Gro about every two or three weeks during the regular watering. The seeds will begin to sprout at about three months depending on the weather. The rate of growth is probably about 3" per month in early spring in Missouri. The seedlings are **transplanted** when they are 3" tall. Some may germinate earlier than others so some may be 6" high and others 3" tall in which case, I would cut off two or three inches from the taller ones so they would not fall over when planted. They are transplanted directly into the garden in rows about 6 to 8" apart. Use a soluble fertilizer as mentioned above at about one half strength to give them a good start. Plant them about 1" deep from where the roots begin.

The garden soil they are transplanted into is a loose soil that is nice and loamy. They will grow in all types of soil but Spurias do like some organic matter in the soil with good fertility and plenty of water. Some of the seedlings will bloom the first year after lining out but the second year is more likely. I would grow them at least three years to make sure I didn't miss something unusual.

A **simple method** that provides at least some germination would be to plant them in pots using a soil mix from a garden supply store. If the mix has no fertility, use a soluble fertilizer when watering them. Set them out as soon as possible in the spring if you live in the upper midwest. Keeping them outside, one may get 50% germination the first year but keep the pot an extra year to catch late germinating seeds. Most should germinate by the second year.

Additional Advice:

When first starting out growing seedlings it seems like a long time to see the results of your labors. But, if you do just a few each year soon you will have something new to look forward to each year. You will also realize that when growing from seed, you are the only one in the world who has that particular clone.

Suggested Further Reading:

Belonging to the American Iris Society and getting their quarterly Bulletins will continually give new information as it becomes known. Further, a membership in SIGNA will add to

that from AIS. The British Iris Society has a very fine year book and a newsletter is published by a section of BIS interested in the beardless irises. It contains letters from members relating their experiences with different species. Books are helpful such as The World of Irises published by AIS, The Iris by Brian Mathew and Irises by Fritz Koehlein. Many of the sections of the American Iris Society produced books on Siberian, Japanese, etc. The Spuria Iris Society has prepared a Check List of all Spurias known with a cross reference to tell of their parentage and hybridizers and the Median Iris Society has done the same. Everyone should grow some of the other irises besides tall bearded.

Pollinating & Germinating Louisiana Irises

(Species from Group O in the SIGNA Seed List)

Dr. Kevin C. Vaughn

Kevin lives in Stoneville, Mississippi, USDA Zone 8. Minimum temperature in winter is 15 degrees F. Summer temperatures reach as high as 105 degrees F. Average first killing frost is between November 15 and December 1. The last frost is usually around the end of March. Average annual rainfall is 56 inches. He has been germinating Louisiana Iris seeds for 5 years.

Pollination

Pollination is undertaken from April 15 to May 15. Individual **flowers are open** for 3-4 days for most diploids, 4-5 days for tetraploids. The **stigma is receptive** on day 1 after 11AM. The **pollen is ready** only on the 1st day, it either gets

blown away easily, or insects grab it! To **protect the stigma** from contamination remove the falls prior to the flower opening. Nothing else is required to **protect the anther**. There is little need for me to **store pollen** for later use because so much fresh pollen is available. When pollinating, it is only necessary to pollinate one of the three stigmatic lips on the diploids, though it may be beneficial to pollinate all three for the tetraploids.

I use fine forceps when pollinating to pry open the stigmatic lip, while applying the pollen. I recommend removing dead blossom parts after successful pollination. **Pollination may be affected** by insects like thrips and weevils that destroy the pollen. Tetraploids are

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very difficult to work with because the percentage of capsules that form is very low and few seeds are produced in those that do.

Labeling

To label the pollinated flower I use price tags. Information recorded on the label includes the pod x pollen parents. For tets I also record all crosses that fail and the ones that take in a notebook before removing the crossing tags.

Seed Ripening

The seed capsule can be affected by verbena bud moth, but hasn't for me. The stalks are staked to protect the seed capsule because they're heavy. The seeds usually mature in late July through early August, (approximately 2 months between pollination and seed collection). When ready for harvest, the seed capsule will turn light tan. The seeds are also pale tan. If they are left in the capsule much longer after this point, they are very difficult to germinate. Once harvested, I package the shelled seeds in coin envelopes and label. The average number of seeds to expect from a single capsule is usually 5-10 in tets, 20-80 in diploids.

Storing seeds

For storing seeds I use coin envelopes. Information that is recorded on the packet is the pod x pollen parents.

Growing Plants from Seeds

I've used the following method for 3 years. **Percentage of germination** with this method is 50-75%. Seeds remain **viable** for several years.

The seeds are normally **planted** in August and September in pots. They do not require a **cold stratification** to germinate well, but it is desirable to **soak** the seeds prior to planting for 1 to 2 days. They are planted in a local nursery's mix which is similar to PRO-MIX.

6-8" pots are used as containers and can be found at a local nursery or nursery supply company. They are planted up to 50 seeds in a pot and covered 1/2". **Once planted**, containers are placed in a shaded area, in the coolest, most protected spot in the yard. To my knowledge, light is not required to stimulate germination. After planting, the seeds are **watered** by fall rains which usually are abundant. If none, they are watered from above at least once a week.

The seeds will begin to sprout anytime from 2 weeks to 2 years. Once germinated, they are fed by a slow release fertilizer that was incorporated into the potting mix. The rate of growth is variable. Earliest to germinate will make 6-8" plants by November 1. The seedlings are **transplanted** directly into beds in the fall or the following spring. There is no major difference in the size of the plants by the next fall, no matter which time of year they had been transplanted. The garden soil they are transplanted into is heavy loam amended with ground pine bark, (1 bale/ 4 sq. ft. of bed). Be cautious about late freezes in the spring as they can be detrimental to the health of the young plants. Once planted into the garden/nursery beds most will bloom in the second season from spring germinated seed. Many of the plants from the fall planting will have multiple bloomstalks.

A **simple method** that provides at least some germination would be to collect the seeds as soon as the capsule is tan and plant them immediately.

Suggested further reading:

Sam Norris is preparing a report for the Society for Louisiana Irises special publication. His protocol involves removing the seed coat and then nicking the embryo end of the seed. This may be too tedious to use for large quantities of seeds, but I did treat one half of my tetraploid seeds this way and already have greater than 50% germination. Tetraploids are generally slow and poor germinators.

Pollinating & Germinating

Tender Evansias

(*I. confusa*, *I. formosana*, *I. japonica*, *I. wattii*)
& their hybrids

Darrell R. Probst

Darrell lives in Hubbardston, Massachusetts, USDA Zone 5. Minimum temperatures in winter average between -10 degrees and -20 degrees F. Summer temperatures reach as high as 100 degrees F. Average first killing frost is between October 5th and 10th, last frost in mid-May. The tender Evansias are brought indoors when the temperatures drop below 28 degrees F in fall and are placed out again in spring in a shady spot after all danger of freezing is past. He has been germinating Evansia Iris seeds for 4 years.

Pollination

Pollination is undertaken from late December through late March. Individual flowers are open usually for 3 days unless the temperature is too high (75+ degrees F), then maybe for only a day or two. The stigma is receptive a few hours after the flower opens. The pollen is ready shortly after the flower opens. To protect the stigma from contamination one might remove the standards and falls, but since the plants are indoors, there is only a minimal chance of contamination so they are left. To protect the anther from contamination they are removed as soon as the flower opens.

To store pollen for later use, 3 to 6 anthers are placed in 1-1/2" lengths of plastic drinking straws that have one end bent over and taped (some people use gelatin capsules, but using them for storing anthers has never been a convincing enough excuse to get a pharmacist to sell me a thousand). The straw pieces are stood upright, (with taped end down), in silica gel, (trade name Petalast purchased at craft store), for 3 days and allowed to dry. The pollen parent or number is written on the side

of the straw in indelible

ink. After 3 days, the straws are removed, the opposite end bent over and taped closed, then 3 or 4 are placed in an empty plastic 35 mm. film canister which is then filled with fresh silica gel. The top, which is labeled with contents and dated, is closed and they are placed in the freezer. When removed later, the canister is allowed to return to room temperature before the straw sections are removed. The sections are then opened and the contents dumped into a clean film canister. A few gentle shakes back and forth and the white pollen can be easily seen against the black of the film canister. It is then applied to desired stigmas with a soft, small paint brush. Due to the high amount of incompatibility, I pollinate all three stigmatic lips, though I have never tried otherwise to see if it made a difference.

Tools used when pollinating include tweezers that have an angled tip. They are used to remove the anther from the pollen parent, then hold it while rubbing the anther across the stigmatic lip to disperse the pollen. A small paint brush is used to disseminate pollen that had been stored.

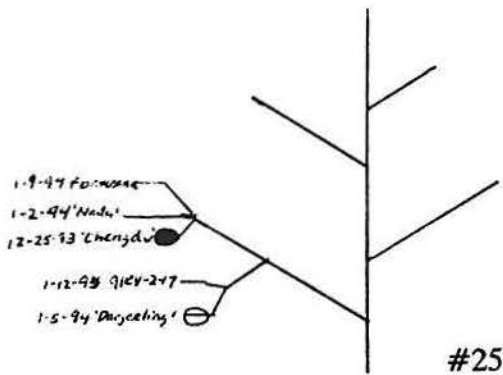
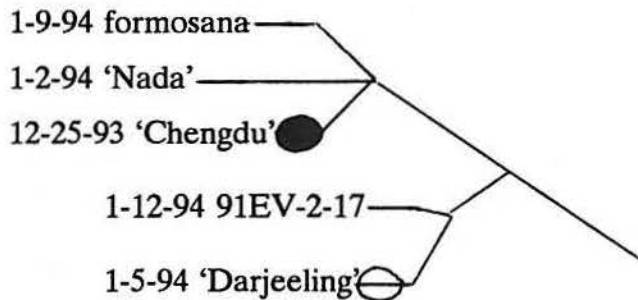
Pollination may be affected by heavy infestations of thrips which tend to destroy the pollen long before the flowers open. Except for the strain going around as "Nova", most other clones appear to be self-sterile. There is also a high amount of incompatibility between different clones, due in part to variability in chromosome counts, and an even higher amount of incompatibility amongst most siblings. All of the clones of *I. confusa* I have tried, *I. japonica pallescens* and those that are

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going around as *I. formosana* and "Valley Blue" give the most seeds when used as pod parents.

Labeling

To label the pollinated flower 1" x 3/4" paper tags with strings are used once a real capsule is forming. Because they are viewed daily as house plants and generally only 10% of the crosses tried actually form capsules, instead of labeling each pollinated flower, only individual scapes are labeled with a number. The scape is then drawn or "mapped" on an 8-1/2" x 11" sheet of paper in pencil with the given number. The lowest branch is always on the same side when it is viewed (See below). Each flower that blooms from a branch tip, (there may be 1 to 5 per spathe), is shown as a line. If it is pollinated, the date pollinated and the pollen parent is written by the line.



If, when the next flower opens from that branch tip (spathe), a capsule appears to be forming from the last cross made, a circle is drawn around the line. If, when the third flower is opening, there is still a capsule then the circle

is colored in and a paper sales tag is placed around the pedicel just below the ovary with the pollen parent and date pollinated written on it in indelible ink with a Sharpie extra fine point pen.

Seed Ripening

The seed capsule may be affected by thrips, if there is a bad infestation, which cause the capsule to shrivel up long before maturity. To protect the seed capsule spray the plants twice before bringing them indoors with a systemic insecticide for thrips. The seeds usually mature June through August, (approximately 3 to 4 months between pollination and seed collection).

When ready for harvest, the seed capsule will split first at the tip, then down along the side. To harvest, I collect the seed capsules as they begin to split. The seeds are shelled out and placed directly into paper coin envelopes. The average number of seeds to expect from a single capsule may range from only a few in many of the hybrid progeny to 20 or 30 from interspecies crosses or even 60 to 70 from "Nova" strain or 'Chengdu' x *I. confusa* crosses. Once collected the packets are laid out flat, one packet deep, in a dry area for a week or so.

Storing seeds

For storing seeds 2-1/4" x 3-1/2" manilla coin envelopes are used. They can be purchased at any local office supply store. Information that is recorded on the packet is both the pod and pollen parents, dates successful pollinations took place, dates seeds were collected, number of capsules seeds were collected from, number of seeds in the packet and a brief description of what to expect from the seedlings. The seed packets are stored in a box in a room that is 50-55 degrees F in winter and dry.

Growing Plants from Seeds

I've used the following method for 4 years. Percentage of germination with this method is

10% if started under lights, 80-90% if given a cold stratification and set outside in the spring. Seeds remain **viable** for at least 3 years.

The **seeds** are normally **planted** in January in cell flats. Seeds appear to prefer a **cold stratification** to germinate well. It is not necessary to **soak** them prior to planting. The seeds are planted in 3 parts PRO-MIX that has been sifted through a 1/4" wire mesh screen (commonly called hardware cloth) and 1 part fine Vermiculite. The components can be purchased at a local Agway or garden center. Once the flats are filled with the soil mix, they are watered with boiling water and set aside to cool (mixes comprised primarily of dry peat moss soak up water much easier if the water is hot- they shed cold water). I use 400- cell plug flats as containers. They can be found at wholesale greenhouse supply outlets. A local greenhouse operation may be willing to part with a few at a reasonable price. They are very helpful because the seeds are spaced out evenly and receive adequate light. The flats are the usual 11" x 22" size. The seeds are planted one per cell and covered with about 1/4" of soil after each seed is pressed down into the medium with the flat side of a knife. **Once planted**, containers are placed under fluorescent lights about 12" below the bulbs. The lights are 48" long, double tubed shop lights with three of these placed side by side, 15" apart center to center. The area is enough to fit 8 flats. The lights are on 16 hours per day. To my knowledge, light appears to help stimulate germination. The basement where the light table is located is usually around 55 degrees F at the time of planting.

After planting, the seeds are **watered** from above whenever the top of the soil begins to look dry. The seeds will begin to sprout after 30 days. Once germinated I water once every 3 weeks with 1 tsp. of Miracle Gro to 1 gallon of water. The rate of growth is slow, but they may be 4 or 5 inches tall by the end of April. The seedlings are **transplanted** when the fourth true leaf begins to show. By the end of March, 10% of the seeds have germinated with this

method which usually means 200+ seedlings (more than enough to fill my window sills). At this time, those that have sprouted are transplanted into 1-1/2" diameter cells that are 2-1/2" deep. They remain in these until mid-June when they are potted into 4" square pots, usually remaining in the pots through the first winter. The following spring they are potted into 6" diameter pots in which they will bloom the next winter.

From the first transplanting, the Evansias are planted in a mix of 2 parts PRO-MIX, 1 part bark mix (individual "chips" are about 1/2" in diameter) and 1 part coarse sand. During frost-free periods of the year they are placed outside in the shade of an oak tree. In the winter they are placed in south facing windows or under fluorescent lights which are 12" above the leaf tips. At all times it is very important to make sure the soil doesn't dry out completely. If it does just once, the roots will be killed and the plants will most likely die or at least be severely set back until new roots form. It is usually the second winter after germination before the first flowers are seen and the third winter before all will bloom.

A **simple method** is to plant the seeds in ordinary potting soil, in pots and set them outside while it is still cool in spring. Probably 30 to 50% will germinate in staggered fashion from late May until August.

Additional advice: One year, after the first 10% were transplanted, I ran a test. I filled a large cooler nearly full with snow (we still had a few feet on the ground outside in early March). Next I sat the flats of ungerminated seeds on top and closed the cooler. The cooler was left in the basement. It took the snow inside two weeks to completely melt. I kept draining the accumulated water, which the flats were never allowed to sit directly in, and refilling with snow until mid-April. Then the flats were set outside in very bright light, but out of direct sun except for 2 hours per day. By the end of June another 70 to 80% germinated. Whether it was cold stratification, or the different wavelengths of light, I don't know!

Pollinating & Germinating x Pardancanda norrisii, Pardanthopsis & Belamcanda

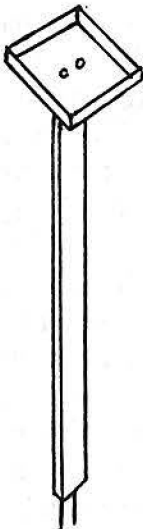
Darrell R. Probst

Darrell has been hybridizing and germinating seeds of x Pardancandas and the parents for 10 years.

Pollination

Pollination is undertaken in late July and early August. Individual flowers are open from 4 PM until dusk for Pardanthopsis, 8 AM until dusk for Belamcanda and anywhere in between for the x Pardancandas. The stigma is receptive within a half an hour after the flower opens. The pollen is ready at least 4 or 5 hours before the flower opens. To protect the stigma from contamination the standards, fall and anthers are removed before the flower opens naturally. To protect the anther from contamination they are removed prior to the flower opening and stored on trays. I pollinate all three stigmatic lips to improve the odds of getting filled seed capsules, though I've never run any test to learn if it makes a difference.

Tools used when pollinating include tweezers for handling anthers and homemade trays using roofing paper, (that which is used under shingles), stapled to 5" by 5" square pieces of plywood with a lip formed around the edge to keep the anthers from blowing off. The squares are nailed to the tops of 3' tall 1" x 2" wood stakes that have two 3" long finishing nails sticking out of the opposite (bottom) end. The nails make it easier to poke them into the ground and keep them standing upright. When kept in the sun, the roofing paper trays stay very



warm. Anthers, collected a few hours before the parent flower would open naturally, will "pop" and be ready for use within a few minutes after being placed on a warm tray. If I'm not ready to use the pollen, the tray stands are placed in the shade so the anthers don't dry excessively and become too brittle to handle easily. The stands are conveniently moved around the nursery and are easy to use because they are at elbow level. They are rinsed off at the end of the day.

Pollination may be affected by many things. Thrips can destroy all pollen and deform stigmas long before the flowers open. Small bees, less than 1/4" long, often pry their way into the flowers and remove the pollen before they actually open. Short, but heavy rain storms at the end of the day, common during bloom season, brutalize the frail stigmas and often eliminate all pollinations made that day. Both Belamcanda and xPardancandas with the same flower type usually are easily self-fertile whereas many Pardanthopsis and x Pardancandas with the iris flower form are self-sterile and may not respond well to being "sibbed".

Labeling

To label the pollinated flower 1" x 3/4" paper tags with strings are used. Information to record on label includes the pollen parent and date the pollination was made. When 200 or so crosses are made in a single day and the same parent is used to pollinate 10 or more flowers, only a brief number is placed on the label (e.g. 28-1, 28-2, 28-3, etc.). All flowers pollinated by the same pollen parent that day are labeled

with the same number. The number is then recorded in a small notebook followed by the actual pollen parent and date pollinated. So for 28-1, the 28 refers to the date pollinated and the 1 refers to the first pollen parent recorded in the notebook that day. What is written in the notebook might be: 28-1=89XPMPIWCY-1-24, 7-28-94. The next line would read: 28-2=, the third line 28-3 and so on for all pollen parents used on the 28th of July.

Seed Ripening

The seed capsule may be affected by verbena bud moth larvae which bore a hole in the capsule and eat the seeds. To protect the seed capsule, only one capsule is usually allowed to form per spathe. They seem to prefer capsules that are side by side, with much less damage occurring on individual capsules. The seeds usually **mate** in mid-September to early October, (approximately 45-60 days between pollination and seed collection).

When ready for **harvest**, the seed capsule will turn tan and begin to split at the top. To harvest, the stems usually have to be cut in early September to avoid being damaged by early light frosts. All stems cut from the same pod parent are tied together with orange survey ribbon on which the number of the parent is written in indelible ink. They are cut off at ground level and placed in a 5-gallon bucket that has about 3" of fresh water in the bottom. I then place them by a south-facing window until the capsules are ready for harvesting. At harvest, each tied group of stems is removed from the bucket individually. All capsules tagged with the same number are clipped from the stems at the same time and shelled immediately into previously labeled seed packets. The packets are labeled with the pod parent number, found on the survey ribbon, and the pollen parent, found on the paper label or in the notebook. The average number of seeds to expect from a single capsule is between 20 and 40, though anywhere from a few to 70 can be expected. Once collected they should be laid

flat, one packet deep, to dry out for a week or so.

Storing seeds

For storing seeds 2-1/4" x 3-1/2" manilla coin envelopes are used. They can be purchased at an office supply store. Information that is recorded on the packet is the pod parent x the pollen parent numbers, the dates of successful pollinations, the dates the seeds were harvested, the number of capsules seeds were collected from, the number of seeds and any special characteristics to look for in the seedlings. The seed packets are stored in a box in a room that is 50-55 degrees F in the winter and dry.

Growing Plants from Seeds

I've used the following method for germinating x Pardancanda seeds for 8 years. **Percentage of germination** with this method is 80 to 90% for x Pardancanda with the iris flower type, 50 to 70% for seeds collected from intermediate type parents and only 10 to 30% for Belamcanda type seeds. The reason for the poor germination results with Belamcanda is because it appears to require a cold treatment. Seeds remain **viable** for at least three years for seeds collected from iris type parents, only a year or so for Belamcanda seeds.

The seeds are normally **planted** in January and early February. Seeds from iris type and intermediate type parents do not require a **cold stratification** to germinate well. It is not necessary to **soak** them.

The seeds are planted in three parts PRO-MIX sifted through 1/4" mesh and 1 part Vermiculite. The components were purchased at a local Agway or garden center. I use 400-cell plug flats as containers. They can be found at wholesale garden supply outlets. They are planted one per cell and covered with about 1/8" of soil after each seed is pressed into the medium with the flat side of a knife.

Once planted, containers are placed under fluorescent lights about 12" below the tubes. To

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my knowledge, light appears to help stimulate germination. The area around the light table is 55 degrees F when the seeds are planted. I enclose the light table with "flip-up" sides and use 3- 60 watt incandescent light bulbs among the fluorescent lights to warm up the soil to 70 degrees F. If it warms up above 70 degrees F a light is either turned off or a lower wattage used. After planting, the seeds are **watered** from above whenever the top of the soil begins to look dry. The seeds will begin to sprout in 15 to 20 days. Once germinated the seedlings are watered once every three weeks with 1 teaspoon of Miracle Gro to one gallon of water. The rate of growth can vary depending on air temperature, but generally seedlings should have 3 or 4 leaves a month after germination.

The seedlings are **transplanted** into 200 cell plug flats when the majority have 4 fully-expanded leaves. This way there is no wasted space under the lights from crosses that gave poor germination, nor overly crowded seedlings from those with excellent germination-- all will have adequate room to grow until spring.

Around mid-April, when most nights are frost-free, the flats are moved outdoors into the cold frame for a few weeks to harden off. At the end of May they are planted in the nursery. The garden soil they are transplanted into is a clay-loam with an inch or two of decomposed compost added, in full sun. They are planted in beds that are 4' wide and 30' long. Each bed has 36 4' rows that are 10" apart. The seedlings are planted 4" apart in the rows. Each bed contains 432 seedlings, that will remain uncrowded for 2 years, then selections are saved and the rest are composted. Once planted into the garden/nursery beds nearly 100% will bloom by the end of August, 6-7 months after germination!

A **simple method** that provides at least some germination would be to plant the seeds in pots or in the ground in spring, 1/4" below the soil and transplant them to where they are to bloom by late June. It is possible to still achieve some bloom the first year in warmer climates.

I. clarkii hybrid

Additional Advice:

Belamcanda and Belamcanda-type x Pardancanda seeds germinate much better if planted outside in the fall, just below the soil surface. Expect 80 to 100% germination the following spring.

When it is possible to germinate a plant, bloom it, hybridize with it and create another generation before that plant lives through its first winter. for plants like x Pardancanda that are at the northern limit for their hardiness range, it is very easy to end up with a race of non-hardy plants within only a few generations. Four years ago nearly 75% of the seedlings from the previous year died over winter, I believe because of my intensive hybridization of borderline hardy plants. Fortunately, I learned my lesson before all of the advancements made were also lost. Now I have a stockpile of clones that have survived 5 to 9 winters here and am constantly going back to these and using them as parents.

Using the plug flats for germination speeds up the process considerably. Each cell has a large hole at the bottom which "air prunes" the root tips (as long as they are kept elevated). This pruning causes the roots to form numerous side branches, producing a strong root system early on. As long as they are not left in the cells so long that they become rootbound, when transplanted into the nursery there is no transplant shock whatsoever. With the strong root system they begin to grow right away and become established much more quickly.

