



# SIGNA

SPECIES IRIS GROUP  
OF NORTH AMERICA

ROY DAVIDSON  
photo by J. Cooper

#42 Spring 1989

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# SIGNA

SPECIES IRIS GROUP OF NORTH AMERICA  
Spring, 1989 Number 42

## OFFICERS & EXECUTIVES

CHAIRMAN: Colin Rigby 2087 Curtis Dr. Pennngrove, CA 94951  
VICE-CHAIRMAN: Lee Welsh 7979 W. D Ave. Kalamazoo, MI 49009  
SECRETARY: Florence Stout 150 N. Main St. Lombard, IL 60148  
TREASURER: Robert Pries 6023 Antire Rd. High Ridge, MO 63049  
SEED EXCHANGE: Phoebe Copley 5428 Murdock St. Louis, MO 63109  
ROBIN DIRECTOR: Dot Hujsak 3227 So. Fulton Ave. Tulsa, OK 74135  
SLIDES CHAIRMAN: Helga Andrews 11 Maple Ave. Sudbury, MA 01776  
PUBLICATIONS SALES: Alan McMurtrie 22 Calderon Crescent, Willowdale,  
Ontario, Canada M2R 2E5  
SIGNA EDITOR: Joan Cooper 212 W. County Road C Roseville, MN 55113  
PAST PRESIDENT: Elaine Hulbert Route 3, Box 57 Floyd, VA 24091  
ADVISORY BOARD: E. LeRoy Davidson; Jean Witt; Bruce Richardson

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SIGNA is published two times per year, fall and spring. We welcome contributions from readers. Any Iris group has permission to reprint any material first presented here. Deadlines are February 1 for spring and September 15 for fall. Your address label indicates your current dues status. See ANNOUNCEMENTS for dues information.

## CHAIRMAN'S MESSAGE

California, like numerous other places is noted for its wildflowers; and like numerous other places the wildflowers stand endangered. Recently, a respected California environmentalist group decided they needed a 'test case' and are trying to stop the sale of a large tract of private land for future agricultural development. No one knows the eventual outcome of this case, but we think there is perhaps another way to preserve our wildflower heritage.

In SIGNA #41, Bob Pries had an article about the possible development of preservation gardens for our iris species, an idea based loosely on the preservation gardens of England. We have had enthusiastic response to this suggestion and this is an idea we would like to pursue. Where to find a particular iris species is sometimes difficult, and a "preservation garden" assures us that a particular species is still available. Since our country is so large and we have such diverse climatic conditions, it is suggested that a species be grown in three different locations to assure its survival. It is hoped that at least one of these locations is a commercial grower; then as supply meets demand, the iris is available to the general public. Setting up these preservation gardens will take a concerted effort on all our parts. It can not be done without your help. If you would like to grow an iris species collection, or keep records of where the irises are located, please contact any of the SIGNA officers whose addresses are listed inside the front cover of this publication.

Bloom season will soon be here and another important way to preserve our heritage is, of course, through pictures. SIGNA has and will continue to maintain its slide program, but here again, we need your help. The slide programs help serve as an introduction to garden groups that are not familiar with species iris. When you are out photographing species irises this spring, take an extra shot of your favorites and send them to SIGNA to add to the collection. Helga Andrews is our Slides Director and her address is also on the inside front cover.

We can lament the loss of our wildflowers in the wild, but unless we take some action, we will only lose more. Perhaps we have not yet found the answer but it seems that any action on our part is a beginning. If man can protect himself, he should be able to protect the things around him. We must act now.

Colin Rigby

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For I am become as the balmiest, stormiest zephyr of spring,  
 With manifold beads of the marvelous dew and the rain to string  
     On the bended strands of the blossoms, blown  
     And tossed and tousled and overthrown,  
 And shifted and whirled, and lifted unfurled  
     In the victory of the blossoming  
     Of the flags of the flowery world.

--- Passing of a Zephyr  
 James Whitcomb Riley

## ANNOUNCEMENTS

**ADDRESS CHANGES:** Address changes for the last issue cost SIGNA a considerable amount of money. The original postage at bulk rates is cheap, but to get the change from the Post Office is a charge of 30¢; remailing is 85¢; and the loss of a copy of SIGNA since it is not returned. The cost for forwarding and notifying us is even higher; so please notify Florence Stout immediately of any change of address, and, if it is near October or March, send notice to the editor as well. Those of you who summer in colder climates or winter in warmer ones should notify the editor of when you leave home and how long you will be gone, or request the Post Office to forward SIGNA to you. The turnaround time between printing the address labels and mailing is at least a month or two, sometimes more. Please try to cooperate in reducing this unnecessary expense.

**DUES and MEMBERSHIP:** Remember that the date on your address label is the date your dues come due. Of course, if you sent in your dues recently, they may not have been recorded by the time the labels were printed (paid through AIS takes even longer). Write Florence Stout (address inside front cover if in doubt). Otherwise send her your dues: Individual, \$3.50 annual, \$9.00 triennial, \$75 lifetime; Family, \$4.50 annual, \$10.50 triennial. There are no lifetime family memberships.

Our only Exchange Memberships so far are with the New Zealand and Aril Iris Societies. We would certainly like to enlarge this--please write Florence to get on the SIGNA list and have the publication sent to editor Joan Cooper.

Florence will provide a current SIGNA membership list hot off the computer for \$2.00. We'll try to print a new-member list each fall so you can update your list. (Oops, we didn't do that last fall. Sorry!)

**TREASURER'S REPORT:** We're sorry--this is completely unofficial. The books were audited and turned over to the new treasurer early this year, but, apparently, the editor's request for a first of the year report was not forwarded, and, by the time we are putting this together, it is too late to write for one.

## BACK ISSUES OF SIGNA

All back issues are available for \$2.00 each (from #1 to current), which includes postage. Also available is the Species Iris Study Manual for \$5.00. Send orders to our Publications Chairman Alan McMurtrie (address inside front cover). Make cheques payable to SIGNA.



## SEED EXCHANGE REPORT

The response to the seed exchange has been gratifying. The variety of seeds sent in and the number of orders received have made a successful program so far although the supplies of some seeds were exhausted almost immediately. The orders filled most satisfactorily are the ones with a list of substitutes not in the same class of seeds. If one of the arils is ordered, for instance, there is nothing that can be substituted for it except something from a different class. We can only hope people will not be too disappointed and will try again next year.

The question of a deadline for receiving seeds in the fall had to be answered this year. Last year, seeds were received up until two days before the list went to the printers. In view of the amount of work required to get the list finally ready to be printed and sent out some new plan would seem to be in order. Dr. Boussard of France sent a list of the seeds he would have available and mailed them when they were ripened. This plan would seem to be practicable if donors sent the list only for the late ripening seeds. Last year several of the donors who sent many seeds sent them at several different times. Done this way the listing and the packaging can be done more easily and quickly. This year then, seeds and/or lists should reach the Director of the Seed Exchange by NOVEMBER 1 to be included in the Seed Exchange List. Late seeds will be used as substitutes or extras or held over for the following years list. It is to be hoped that not too many seed listings will come in but it does seem worth a try and many desirable seeds do ripen slowly or come from places where the climate is colder. So please remember November 1.

November seems far away now but bloom season will soon be starting and it is a good time to plan what seeds would be of interest and what seeds the exchange could use. Probably the most ordered group of all was the hexapogon, oncocyclus, pseudoregelia group with the oncocyclus being the most ordered in the whole list. The three unguicularis were next and were followed by the entire listed Louisiana group. These seeds were all in short supply. The greater the variety of seeds sent in by donors the more successful the Seed Exchange will be.

As Jean Witt said, "Our seed exchange is as good as WE make it. Our thanks to all who assisted and participated in 1971" (1988)

184 orders as of  
today

Phoebe Copley  
February 15, 1989

## IRIS TOUR OF AUSTRALIA AND NEW ZEALAND

October 15 to November 9, 1988

Elaine Hulbert

Seventeen of us left San Francisco for Brisbane by way of Honolulu and Sydney. Leader Jean Erickson is somebody you all know; Allan and Gladys Ensminger and Francesca and Sven Thoolen were with us, and among the others were several iris fanciers, though we had a share of people who preferred roses, birds and forests--and everybody got a break or two before the three weeks were up.

Brisbane was so warm (people wear shorts to the office for six months of the year) that Louisiana irises were already over in the two botanic gardens of the city. Bearded irises aren't grown much, this far north--and indeed Queensland is so nearly tropical that people seem to be dazzled with what a range of choices they have for their gardens.

Side trips to the McPherson range and Toowoomba gave us a nice glut of tree ferns, staghorn ferns, Dendrobiums, cattle ranches--everything but sheep and irises. In fact it was a week later that we saw our first sheep.

Two private gardens in Brisbane, small but crammed with flowering plants, did yield some evansias: a tall "confusa," out of bloom (but rarely so, said the grower) and a newly-planted lower-growing thing said to be "blue" in bloom. The same plant cropped up in the next garden, also brand new. Both came from Mary Peden (?) whom unfortunately I never did meet. These were not identified as japonica, and did not look like it to me--but it is very hard to say whether japonica would appear so hard, dark-green and shiny in Queensland as it does here.

All the private gardens we saw in Australia were very small, a surprise when you consider how much room there is on that continent. An exception, an old ranch on a ridge overlooking the city, showed us a number of interesting things, the chief of which to my mind was a triple-deck daylily, all three sets of six tepals being utterly perfect. This was another anonymous pass-around, origin unknown.

Our next overnight excursion took us to the Blue Mountains with a naturalist as guide (and in a springless little coach), where we encountered welcome chilly temperatures. Birds had already become a preoccupation for most of us (not only Payson Vucovich the certified birdlover) because they are big, colorful and "tame" all over the places we visited. Payson had requested "birds" in his application for the tour, and I had requested "terrestrial orchids," never expecting actually to see any. But there were two genera widespread here in these dry scrubby mountains; I found when I got my film developed that I had seventeen shots of the blue one. (Most days I found myself without either camera or notebook when something good turned up.) Wild flowers in that area tended to be blue or blue-violet, leading one to speculate about whether they might not be competing. So, rack up Thelmitra caerulea and a yellow Diuris.

In Sydney, I really overhauled the botanic garden; it is a dandy. Down near the harbor and the financial district, it has been well looked after for so long that the trees are at maximum growth. It has few irises, but

it had a clump of Neomarica caerulea that I will long remember. I have bought plants with this designation but they have never been true. It grew here quite upright and tall, with truly blue flowers. In general South African irids seem to be getting the better of the competition with irises from the northern hemisphere; even the Californians in our group had never seen so many at home. By the way, the glasshouses were being remodeled; nine out of ten of the botanic gardens I have visited in my time have had their glasshouses closed for remodeling.

Melbourne, with more of an antique chic, was the site of the Australian Iris Convention, October 25-26. At the cocktail hour I met Hilmary Catton, who had already extended many kindnesses, and who was to answer many questions for me when we met intermittently over the next two weeks. The banquet that night was a small gathering compared to AIS banquets, but the food (I chose lamb, naturally) was infinitely better. The Australians near me agreed that irises (they meant TB's) are on their way out, in Australia; the price of land, the smaller gardens (and I think the gradual dying of the old loyalties toward English garden plants.) We were given to understand that the really spectacular Louisianas grow in New South Wales, in gardens we would not be able to see, this trip.

The next morning buses (only two, but marvelous big comfortable things) left the hotel at nine (not eight, not six-thirty) to visit iris gardens around Melbourne. Rita Caldwell's in-town garden managed to have a great many species as well as TB's and hybrid spurias in bloom for the occasion, and this is where we first noted a fondness for PCNI's. The Blyths' Tempo Two garden is of course a commercial nursery, and big enough easily for a day's browsing. In fact we were allowed several hours, and the very high winds were no deterrent. I blew down once, in fact, but there were no witnesses except Shirley Ryder, the lone representative at this convention of the British Isles. (I ought to have said that there were eight or nine from Italy. I listened enviously to Francesca chattering away with them.)

Barry Blyth gardens in a way that astounded not only the foreigners but the other growers from Victoria. His many fields of Irises are laid out in long strips of raised earth that appears to be unadulterated pumice (combed out of our hair and eyebrows when we got back to the hotel that night), and when we saw them they were perfectly dry. A system of irrigation pipes indicated that the beds are sprinkled when the Blyths judge the time is ripe. Every imaginable iris (except some bulb irises) is bedded out there; the Louisianas, the bearded classes, spurias, arils, evansias (including cristata), TB's and spurias looked very good and surprisingly, so did Louisianas. ROY DAVIDSON was blooming well. Blyth's ALPINE GARDEN with white standards and deep-velvet-yellow falls was there, and a similar TB BEACH GIRLS, with the falls velvety-pink-tan. Of several handsome Louisianas I liked best JOHN'S LUCIFER (by John Taylor) a very dark one with good petal width. SULTAN'S JEWELRY was blooming--I am losing mine here.

The Americans, Californians and non-Californians alike, spent most time pouring over the PCNI beds. These had had a splendid bloom season and still had a lot to show; they were acknowledging the drought gracefully, ready to proliferate at the next signal. Joe Ghio has sent a lot of his cultivars (and one must give credit to the Australian customs people who



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kept them in twelve month's quarantine; I don't know of course how many were lost), but there were PCNIs with the big golden sunburst patch that I associate with the original Australian seedlings many years ago. AZ AZ, a red without any visible signal caught my eye in an older bed; later I ran across about thirty of its seedlings all in bloom together, all red but spoiled by a trace of yellow signal. MITTA MITTA (most or maybe all of these names are Aborigine place-names) is the same color as GOING WEST and perhaps even more attractive. There has been work with munzii genes, too; ORBOST is very blue.

The evansias were as I say planted in the wide-open in (now) perfectly dry beds. Yet BOURNE GRACEFUL was opening a pinched little flower. As the Blyths were the only growers I met on the whole trip who were willing to export, I ordered all the evansias available. One was JAPO-WATT which Barry said he understood is japonica-confusa, making me think he is quite hip. An empty plot marked SYLVIA he explained as an Australia-wide failure of that evansia...more about SYLVIA later.

Tempo Two has a lot of Siberians, but you would hardly know it. Plot after plot was just bare ground with perhaps a few green points in the middle. How strangely the Siberians behave there! Not a trace of old foliage remained, and it had not been cut, it had simply disappeared. I do wish I knew whether the spurias and the Louisianas have a corresponding dormancy there, after bloom.

That was the last of irises for a while. We paid our respects now to the sheep, the fairy penguins on Phillip Island, and to the emus, koalas and kangaroos in the Grampians--yes, we saw these in the wild.

No, I forgot. Included in the Iris Tour out of Melbourne was a visit to the National Rhododendron Garden, a magnificent thing still expanding (and incidentally only one of three fine rhododendron gardens we visited, any of them far superior to such US rhododendron gardens that any of us could call to mind), where we saw our first black swans, with dark-gray cygnets. Just inside the gates here when I had bolted a bad lunch so as to run ahead I had one of the best iris experiences of all. Big clumps of white and pale-blue PCNI's were in bloom, with the cleanest, most perfect foliage I have ever seen anywhere, and what was most amazing, the stalks were branched over and over again, so that a single stalk could bear ten or more flowers and pods simultaneously. (I'm sorry; I jotted down the count, but I've lost the note.) I wondered whether I was looking at missouriensis! Rita Caldwell said that there is no record to this effect, but the informal historians say that these are PCNI's donated by Fred Danks a long time ago. Beyond the stream and the swans lay a rock garden with more PCNI hybrids, showing a lot of innominata form and color. But we later saw these paler, taller douglasiana types in other parks and gardens.

On our way to the Grampians we paused for lunch in Ballarat, the old mining town I first heard of in a Doctor Doolittle book. Yes, a very creditable botanic garden in this small city. With a newish rock garden, and in full bloom an excellent specimen of lacustris! (We are farther up, now, and the season is less advanced.) In the shady back precincts someone who really loves irises had divided lots of old Louisianas, but this time we saw mostly buds.



We had two naturalists with us now, Mick and his wife, Jill. And at our highest stop, in thin scrub again, Jill found for me an exquisite ground orchid, Chiloglottis gunnii, in a nicely varied population. My meter had quit some time before, and my photographic record shows only the shape of the plant. Here Francesca spotted a koala that permitted a whole leisurely camera session.

On October 31 we flew to Christchurch, dropped off Cal Bostwick and picked up Josephine Shanks, another evansia enthusiast. For a few days we sightsaw in the South Island often crossing the routes of Japanese tour-groups composed of honeymooners, so that the natives must wonder whether the Japanese are all youths with new cameras and the Americans are all geriatrics with busted meters. A curiosity that we all noticed was that lupines grow all along the roadsides in colors of pink, white and violet, whereas in the North Island they are just as common but the color is now always yellow. Our forester, Stuart Snyder, was intrigued of course with the many Eucalyptus species and the New Zealand Nothofagus, but the rest of us were so to speak pining for a pine after all these grayish-leaved, dry-looking trees. When we did see evergreens they turned out to be Monterey pine.

Back to Christchurch in time for the New Zealand Iris Society Convention November 5. First stop, Mona Vale, a fine private garden now tended by local garden clubs and gone public. The iris people had been active, with lots of new TB's and Siberians, setosas (popular in New Zealand) and the most varied Louisianas we had a chance to inspect on the whole trip. I ought to have said, way back, that ochroleuca is the iris we encountered in all the out-of-the-way places, on this trip, evidently completely at home and yet never very impressive, perhaps through benign neglect.

The first private garden, in residential Christchurch, was Dora Sparrow's. And here I had the thrill of finding a marker reading QUEEN'S GRACE. But not the iris; Dora had lost it some time before. She breeds PCNIs and has introduced a white one, IDRIS, which showed us its last blossoms of the season. The Nichols garden near by is approached by a long shady drive bordered on either side by hundreds of clumps of foetidissima, all of the yellowish color but not all one clone as was proved by a white one away down by the river (the Avon) that finishes off the premises. TB's, roses and a number of unfamiliar irids. One they called the "green ixia," with small turquoise-green flowers, made an impression on me. And yes, we saw plenty of the white native irid whose name escapes me just now. Ask Francesca: she adopted one from Dora Sparrow. (libertia, isn't it?)

Then to the Christchurch botanic garden--and this is a great iris garden! Jo Shanks and I ran from one lactea subspecies to another, to gracilipes, to the remnants of a well-bloomed cristata planting and a lacustris, to pseudocyperus the close relative of graminea, and if this was properly marked and my photo corresponds to my notes (I have never seen pseudocyperus in bloom), then it is an awful lot like some forms of lactea: much fuller-flowered but with narrow grooved pods and foliage less hard and shiny than graminea.

Japanese irises were just beginning to bloom on islands in a pond. One white cultivar shaded by a willow and intergrown with sensitive fern was so

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exactly like my Connecticut garden scene that I took a picture for comparison. Somehow tectorum didn't get into this account until now, but yes we saw it frequently, and the Christchurch Botanic Garden plantings were magnificent. Incidentally we were just in time here for Roscoea cautleyana and R. humeana, which begin to approach cannas in this garden, and in Joan Innes'.

Ron Bush's garden has probably the most up-to-date TB's in New Zealand. Here Frances Love, the breeder of HONIANA was busy judging, but I got a promise from her to look me up at tea--which was catered in, believe it or not, Ngaio Marsh University's common-room.

From Frances Love I learned several electrifying things: she has sent QUEEN'S GRACE to Dr. Jack Ellis for tissue-culturing (so that presumably it will be available at some time commercially). She has SYLVIA, which she says is the original wattii collected by Major Johnson. She has two confusas, different sizes, both sterile. Right off the bat she offered to bring me the first two when she comes to Baltimore for the AIS convention in 1992. I am hoping of course to find some earlier and legal route. The rapid-fire conversation soon turned to what she (and Hilmary, who joined us later) hasn't got: true verna, ruthenica, tridentata, white cristata, white gracilipes. I can send them all but ruthenica next spring. They have the really miniature setosa canadensis as well as any number of japonica-confusa hybrids. Hilmary thinks she has the true I. forrestii and will send me seeds.

(I saw in a Christchurch nursery a young plant labeled forrestii which I thought might have been the species all right.)

Now I am remembering all the irises we didn't even get around to mentioning--like laevigata, and the little Chinenses. Oh, yes, speculatrix was listed at Tempo Two, but Barry says he doubts it is true, and the plant looked much too robust to me, too. But I have ordered it anyway.

Back to the narrative. On this very full day we wound up in Joan Innes' garden, a masterpiece of clever landscaping to give the effect of large spaces in little--and with everything double its US size--the roses, the clematis. Little irises however stayed little: gracilipes, innominata and a small setosa were beautifully sited. This and other gardens in the area made me think I. tenuis might do very well there, and I have asked for some of Janet Logg's tenuis seeds from the Exchange for Hilmary Catton and Frances Love. This afternoon I met Ron Isles who thanked SIGNA through me for the seeds from the Exchange that he and Gwyneth have grown over the years.

And that reminds me that though I met an awful lot of people, so that I hardly had room for any more, I missed completely Paul Richardson and Trevor Nottle, and others, and scarcely spoke to Hec Collins.

I'll skip to Auckland, where we arrived on November 7 after a train ride up the length of the North Island. Here I had hoped to see Frances Love's garden--but it was not to be, since she had to stay in Christchurch. The most irisy garden here was Merrillyn (?) May's, without its proprietor, so that I could only look at the out-of-bloom plants marked DARJEELING,

-- Continued

FAIRYLAND, SYLVIA, and could not ask questions. New laevigata plants COLCHESTERENSIS and SNOWDRIFT sat in tubs, whether permanently or not I couldn't guess. An enormous yellow-flowered Moraea was, I think, the most photographed.

The municipal rose garden in Auckland had the most terrific roses of all. Today I got from the travel agents a group photograph taken there, where most of us are holding deadheaded blooms presented by the gardeners. I haven't said, but all the garden days were sunny and those in New Zealand were delicious. Even the duststorm at Tempo Two did not prevent good iris viewing.

November 9 we split at Sydney into groups going home by way of Honolulu and by way of Papeete, Tahiti. In the latter group of ten, I got to San Francisco to find that no baggage at all had been loaded in Sydney. In fact I waited ten days for mine--and the notes, such as they were, of the trip were in there. So I had an excuse to putter around the garden and greenhouse here before settling down to write this for those of you that I promised to tell about the trip. You may think I went on this trip rather ill-prepared. Well, I confess I did. As I told Jean and Bruce, I hate to go anywhere with too firm expectations; sometimes I can't remember later whether I actually saw something or only read about it. But it was stupid not to bring some names and addresses, even a list of iris questions. And obviously I'm forgetting iris things here that I'll recall later when they will be stale.

Oh, yes--one little detail. In an Auckland nursery we saw twenty little pots of japonica variegata showing intriguing degrees of variegation. They really looked like seedlings. One recognizes a great many plants in these roadside nurseries as the same Japanese offerings we see here in our plant stores. But there can be a lot of Down Under natives offered, too. Wildlife and nature books of all kinds are on sale in good looking editions. Mick said they are none of them subsidized (Jill wrote a couple).

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### Inter-specific Crosses

I got a dwarf *I. foetidissima* X *I. graminea* hybrid, three plants, foliage bright shiny green, about ten to twelve inches high. In the fall this dies back as does the pollen parent's foliage. The flower stem, about ten inches, produced a flower similar to that of *I. foetidissima*, and the pod following had the scarlet seeds.—EDITH CLEAVES, San Jose, California.

In trying for inter-specific crosses between the Spurias and the Louisianas, I hope to use the Louisianas as pod parents as the ants don't bother them as they do the Spurias.—LEONA MOON, Olympia, Washington.

Seedlings from a cross of Distinction (Tall Bearded, Cayeux '25) X *I. pseudacorus* flowered this year. Among the seedlings is a dainty white one with a touch of yellow. Foliage and flower form are like the Siberica. There is no marking.—RUTH MELDRUM, New Zealand.



## WIDE-CROSS or INTER-SERIES APOGON HYBRIDS

B. LeRoy Davidson

The citation of long lists of reported iris hybrids is of limited value and not even very interesting reading, though to somebody else they just might provoke a lot of interest. Even though most of the subjects of such lists are long dead and buried, if the compiler had been very careful they did constitute a record of what was actual once, and so what could be actual again.

The one trouble is that often the lists have been made from past records without any investigation of validity and, unfortunately, they are taken as gospel. For example, back in the early days of the AIS, research monies went to a number of persons working with Dr. Stout at the New York Botanical Gardens (between 1925-29) on the problems involved, from genetic compatibilities to pollen longevity of various iris species and garden forms. Unfortunately, whenever seed was gathered from a pollination it was regarded as having seen a successful try, no matter that the seed was not germinated! Thus a lot of supposed "hybrids" have gotten into the records--on circumstantial evidence alone. Many more of this nature are also recorded from the breeding work of Amos Perry in England among others.

What we have tried to do here is to note what are "likely" in addition to those that have been proven at least to some degree. It is interesting that there have been a surprising number of so-called spontaneous cross-pollinations, or what we have thought of as bee-crosses. One of these, actually a Cal-Sibe, was found in a pasture in Oregon where tenax was native and various of the Siberians were nearby in a garden! The long and carefully calculated lists of hybrids in the AIS publication GARDEN IRISES (1959) ran to twenty pages; THE WORLD OF IRISES was spared another such, and that text considers hybrids and hybrid groups as they relate to the major species groups; for example the Cal-Sibes which are with us in continuing numbers as an established class of good garden value were discussed in a half-chapter as were the Versi-Laev hybrids reported by Dr. Reed a long time ago--both groups being what we term examples of the Wide-Cross, and there are, of course, the "Mixed Forties," considered properly within the Sibiricae, and there are certain other hybrid groups within other Apogon sections. It is to be expected that closely related species within these sections will interbreed, and when species from dissimilar sections have intercrossed, the resulting hybrids are said to be Wide-Cross or Inter-Series Apogon hybrids.

But to our knowledge the statement of Dykes on the subject is as true today as in 1913: there are no proven hybrids between the bulbous and rhizomatous species, nor between the three sorts of bulbous irises nor (in spite of occasional reports) between a bearded and a beardless sort. To bring a degree of orderliness we thus establish "groups" for those that we do have to deal with, those which are the "unexpected" hybrids. Mainly these are contained within the following groups, some of which are given such a group category in the SIGNA Study Manual: Section B: Intermedeae; Section E: Oncogelia; Section H: Arilpogon (Arilbred). The remainder, or most of them at any rate, fall into two further group categories within section Y of the Species Study Manual, the Pogansia (pogon-evansia) group

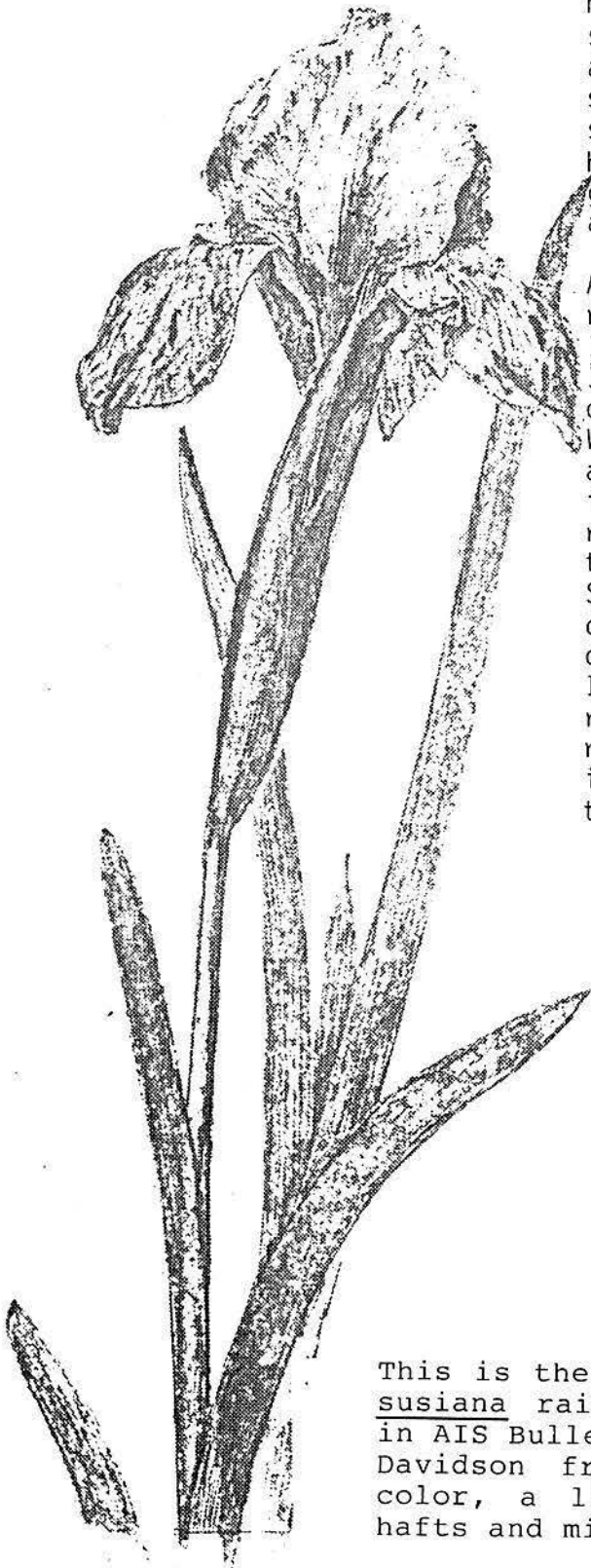


and the Wide-Cross Apogon group. The well-known old PALTEC is an example within the first group, a small one, and there are many within the second, most important subgroup, the Cal-Sibes and Versi-Laevs aforementioned, along with others. Quite surprisingly these are not all totally sterile and at least two F<sub>2</sub> generation hybrids are known in the Wide-Cross Apogon group. Perhaps others are both possible and forthcoming.

An exception to Dykes' observations is represented in the reported hybrid between Iris susiana, the black-and-white Jncocyclus, with Iris missouriensis. This questionable anomaly, raised by Bruce Williamson, was not registered although it appears in the 1939 checklist as mentioned in the July 1933 AIS bulletin, where it is recorded as (missouriensis x susiana). On the watercolor reproduced here, J. Marion Shull, the artist has recorded that the cross was made in the reciprocal direction--(susiana x missouriensis ). It is highly doubtful if missouriensis is represented here; the flower is very reminiscent of any number of the oncopogon irises of the first generation of about that period; Shull dated his painting 1915.

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This is the purported hybrid of missouriensis-susiana raised by Bruce Williamson, mentioned in AIS Bulletin 43 (July 1933). Drawing by Roy Davidson from a watercolor by Shull was in color, a light purple flushed yellow at the hafts and midrib, and with yellow beards.



## FAR CROSS HYBRIDS--SOME SCIENTIFIC ASPECTS

Jean Witt

The summaries which follow have been made from a group of papers by Dr. Tsutomu Yabuya of the Laboratory of Plant Breeding, Faculty of Agriculture, Miyazaki University, Kumano, Miyazaki, Japan, who is currently engaged in research on hybrids of Japanese species belonging to Series Laevigatae. Some of his objectives are increasing the color range of I. ensata, and lengthening its period of bloom by incorporating useful genes from other species. He has had considerable success using embryo culture to obtain plants from crosses too wide to produce viable seed, and in one case has produced a fertile hybrid using colchicine.

SIGNA has provided seeds of American species of Series Laevigatae to help him with his investigations, and we look forward to future reports on this research. Any flaws in interpretation of the papers are mine and should not be blamed on Dr. Yabuya.

An amphidiploid of an interspecific hybrid has the complete diploid chromosome set from each parental species, as opposed to a tetraploid species which has 4 sets of chromosomes alike.

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Embryological and Cytological Studies on Seed Development after Reciprocal Crosses between Iris sanguinea Hornem. and I. laevigata Fisch. Tsutomu Yabuya and Hirofada Yamagata, Japan. J. Breed. Vol. 28, No. 3 (1978) pp. 211-224.

The authors studied reciprocal crosses between I. sanguinea and I. laevigata. No viable seed resulted from hand pollinations in either direction. Embryo growth began, but failed after 1-2 weeks of seed development because of endosperm failure: this was attributed to severe cytological abnormalities in the endosperm nuclei. Chromosomes of the two species are simply too different for cell division to proceed normally.

Since seed failure appears to be caused by the endosperm failure rather than by embryo failure, embryo culture is considered. However, in this particular instance, failure occurs so early that the embryos are too small to handle. Ovule or ovary culture is suggested in place of embryo culture.

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Elucidation of Seed Failure and Breeding of F<sub>1</sub> Hybrid in Reciprocal Crosses between Iris ensata Thunb. and I. laevigata Fisch. Tsutomu Yabuya and Hirofada Yamagata, Japan. J. Breed. Vol 30 No. 2 (1980) pp. 139-150.

In a previous paper crosses between I. sanguinea and I. laevigata were determined to have failed because of degeneration of the endosperm, and it was suggested that hybrid plants might be obtained by embryo or ovule culture. In the present paper reciprocal crosses between I. ensata and I. laevigata were similarly studied with slightly different results.

Two garden varieties of I. ensata Thunb. ( $2n = 24$ ) 'Kacho' and 'Tatsutagawa' were used, and for I. laevigata Fisch. ( $2n = 32$ ), a garden variety 'Yukidoro' and a wild type were used. Embryo culture was possible only with I. laevigata x I. ensata because these hybrid embryos developed better than those of I. ensata x I. laevigata.

Development of hybrid embryos of I. ensata x I. laevigata was much the same as in the parental species at 21 days after pollination, but at 27 days signs of deterioration had begun, proceeding to degeneration after 33 days. No differentiation of leaf or root primordia had occurred. Hybrid endosperm developed normally for about 15 days, but disintegration of nuclei and cytoplasm was observable at 21 days. After 33 days seeds shriveled and were non viable.

Hybrid embryos of I. laevigata (wild type) x I. ensata 'Kacho' grew normally or better than those of I. ensata at first and initiated differentiation of leaf and root primordia by 27 days after pollination, as in the embryos of the parental species. Hybrid endosperm proceeded as in parental species until 21 days after pollination, with symptoms of disintegration visible by 27 days. No nutritive substances were formed by 33 days, and seeds subsequently became empty.

Embryo culture was used on 14 embryos of the I. laevigata 'Yukidoro' x I. ensata 'Tatsutagawa' cross but the resulting seedlings lacked vigor and most died after transplanting from test tube to flower pot. The single survivor was counted at  $2n = 28$ . This  $F_1$  plant resembled I. laevigata in shape of falls, and I. ensata in pollen color and raised midribs of the leaf, but petal color was different from either. All pollen was abortive.

It was concluded that endosperm degeneration is the most important cause of seed failure in these crosses. This is consistent with the author's previous conclusion for crosses of I. sanguinea and I. laevigata. It differs from the conclusions of Sawyer (1925) and Smith and Clarkson (1956) who reported that seed failure in I. pseudacorus x I. versicolor, and I. tenax x I. tenuis was caused by abortion of the embryo. This suggests that the cause of failure may vary with the combination of species, and that further information is needed.

In the previous paper, endosperm disintegration was ascribed to cytological abnormalities of the endosperm nuclei. In the present crosses that type of cytological abnormality was not apparent. Development of the endosperm went forward to the early stages of nutritive substance accumulation before failing. Such failure may be as important a cause of endosperm degeneration in intraspecific Iris hybrids as the cytological abnormalities described before.

The developmental limit of the embryos was notably different in the present reciprocal crosses. Hybrid embryos of I. laevigata x I. ensata differentiated shoot and root primordia, but those of I. ensata x I. laevigata failed to do so. Time of endosperm disintegration makes the difference. Thus endosperm development for at least 27 days is necessary for differentiation of embryos and also necessary for the success of embryo culture. Further studies are needed.

## FAR CROSS HYBRIDS--SOME SCIENTIFIC ASPECTS

The hybrid produced in this study is the second from *I. pseudacorus* x *I. ensata* (Tomino and Sakurai 1972 being the first). Results suggest that embryo culture offers a route to hybrids from other incompatible crosses. It is suggested that problems of poor vigor and pollen sterility in the present plant may be overcome by amphidiploidization.

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Embryo Growth and Cultural Condition in *Iris ensata* Thunb. Tsutomu Yabuya and Hirotada Yamagata. Japan J. Breed. Vol. 31, No. 4 (1981) pp 377-382

Embryos from self-pollinated *I. ensata* varieties were excized about 60 days after pollination, to be grown on various culture media in test tubes. 39 kinds of nutrient media were tried. It is concluded that for embryo culture in *I. ensata* Nitsch's inorganic medium containing 2% sucrose and 0.4% to 0.6% agar, adjusted to pH 4 or 5 is the best basic medium, and that the addition of 30 ppm. peptone, and 5 ppm. gibberellin are very effective for the growth and germination of embryos, respectively, though they, per se, are not necessarily essential to embryo culture.

Since embryo culture is a useful tool in *Iris* breeding by interspecific hybridization, the author considers that this elucidation of preferred conditions is an advancement in technique. Embryo culture is also useful to circumvent seed dormancy, thus shortening the time involved in raising the new generation of plants.

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Pollen Storage of *Iris ensata* Thunb. in organic solvents and dry air under freezing. Tsutomu Yabuya. Japan. J. Breed. 33(3): 269-274 (1983).

Difference in bloom date between *I. ensata* and other species complicates hybridization between them, so the storage of pollen using several organic solvents as well as dry air were investigated. Results with some were very poor. Acetone gave the best results, approximately the same as simple storage in dry air. When used in pollinations afterward these two methods produced not only normal seeds but also had fertility as high as that of fresh pollen. He concluded that storage of pollen in glass vials with  $\text{CaCl}_2$  at  $-20^\circ\text{C}$  was the best method. [This is good news for those of us who would like to store pollen--it works best the easy way! JGW]

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Chromosome Association and Fertility in Hybrids of *Iris laevigata* Fisch. x *I. ensata* Thunb., T. Yabuya, Euphytica 33 (1984) 369-376.

Hybrids of *I. laevigata* x *I. ensata* were studied for pollen fertility and seed fertility. Chromosomes in the process of meiosis were observed in the hybrids and compared with those of the parental species. The parental



## -- Continued

species showed high pollen fertility, but in the hybrids pollen was very poor, with many aberrations in the behavior of the chromosomes.

The crosses were as follows: hybrid x self; hybrid x I. ensata; I. ensata x hybrid; hybrid x I. laevigata. The hybrid as maternal parent in the crosses to parental species gave more capsules and seeds than did the other crosses. However, no normal seed was formed by any of these crosses.

It is concluded that hybrids of I. laevigata x I. ensata lack pollen and seed fertility because of partial homology between the two species. In order to use such sterile hybrids in a breeding program amphidiploidization is suggested. Where Avishi and Zohary (1980) found all Onco species fully homologous and not isolated from each other by sterility barriers, the situation in Series Laevigatae between I. laevigata and I. ensata is very different. It is concluded that they have been genetically well differentiated from each other.

[Note by JGW--It would appear that I. laevigata and I. ensata, though fairly close geographically are further separated from each other genetically than from some of the other members of Series Laevigatae where hybrids have occurred without benefit of embryo culture.]

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Amphidiploids between Iris laevigata Fisch. and I. ensata Thunb. Induced through in vitro Culture of Embryos Treated with Colchicine. Tsutomu Yabuya, Japan. J. Breed. Vol 35 No. 2. (1985) pp. 136-144.

The garden variety 'Kacho' of I. ensata Thunb. ( $2n = 24$ ) and the garden variety 'Shikizaki' of I. laevigata Fisch. ( $2n = 32$ ) were crossed. On the 40th day after pollination the hybrid embryos were excized, disinfected, and treated with colchicine. The embryos were treated with 0.05% aqueous colchicine for 1, 2, and 4 days, with the highest percent of amphidiploids (17.9%) resulting from the 4 day treatment. After treatment the embryos were washed with distilled water and transferred to sterile culture mediums. The amount of growth was recorded at 4 months, and the seedlings were grown on in pots.

The author concludes that his in vitro culture of embryos treated with colchicine is an effective method for producing amphidiploid hybrids of I. laevigata x I. ensata. His is the first report of this method being used to induce chromosome doubling in interspecific hybrids in the genus Iris. He feels this is a more advantageous method than the use of (full grown) hybrid plants because it shortens the time involved.

In the amphidiploids, the color of the standards resembled that of I. laevigata, while pollen color and the raised midrib of the leaf resembled those of I. ensata. Other characters differed from either species. Flowering date was intermediate between the two species--important for breeding of early flowering I. ensata. The amphidiploids were taller and had larger flowers than the untreated  $F_1$  hybrids. The latter had no pollen, but the former had high pollen fertility of 80%+. Seeds of the amphidiploids were larger and heavier than

those of the parents. In the F<sub>1</sub> hybrids 2n = 28; in the amphidiploids 2n = 56.

These plants are expected to serve as a bridge in future cross-breeding of I. ensata.

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Cytogenetical Characteristics in F<sub>1</sub> Hybrids of Iris pseudacorus L. and I. ensata Thunb. Tsutomu Yabuya. Bulletin of the Faculty of Agriculture, Miyazaki University, vol. 32, #1, October 1985 pp 181-186.

Hybrids of I. ensata x I. pseudacorus would be desirable to combine the anthocyanin pigments of the former with the carotinoid pigments of the latter, thus expanding the color range of the flowers. A few such crosses have been made. The author used the garden variety 'Kacho' of I. ensata (2n = 24) and the wild type I. pseudacorus (2n = 34) in his crosses. In the F<sub>1</sub> hybrid I. pseudacorus wild type x I. ensata 'Kacho,' 2n = 29. The parental species showed very high normal association of chromosomes during meiosis, and had high pollen fertility. The F<sub>1</sub> hybrids showed very poor association and did not form fertile pollen due to partial homology of their chromosomes. Neither the F<sub>1</sub> selfed nor backcrosses to I. ensata (as o and o parent) produced any fertile seed.

The author suggests that colchicine treatment of the F<sub>1</sub> hybrids to induce amphidiploidy may be worthwhile, to restore fertility.

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## FLORENCE'S MAILBOX

I have a large hybridizing program with x Pardancanda norrisii\* and its parents. I have been hybridizing x Pardancanda for four years now under the guiding hand of Sam Norris. I am happy to say that my interest in x Pardancanda has brought new life to this group of plants. This past summer I have seen the first yellow x Pardancanda that has the iris flower form. Using freshly collected Pardanthopsis dichotoma from the wilds of Korea I have re-created the original cross which makes me the second person to have ever been successful. Actually, using the newly collected material I am receiving seed from nearly 50% of the crosses made from Pardanthopsis dichotoma x Belamcanda chinensis. This cross has become so easy with the new material that Sam wonders why it was so difficult when he first tried.

Darrell Probst, Hubbardston, MA

\* Previously known as Iris dichotoma and called the Vesper Iris by gardeners.

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The "VERSIVA IRISES" (Iris X robusta)

B. LeRoy Davidson

Dr. McClelland called his hybrids between the eastern blue-flags "Versivas:" versi--from I. versicolor plus va for I. virginica; it seems like a catchy name for the group of which it appears I have flowered at least five this past season and am able to make some comparisons. As both McClelland and Edgar Anderson (he who published this hybrid as Iris X robusta) described them, all five here are extremely robust and vigorous, far better garden plants than any of the versicolors, and seemingly better suited to local conditions than any of the virginicas that have been grown.

Sometime in the 1940s or thereabouts a plant cataloged as Iris caroliniana was in good distribution (Carolina Dorman mentioned it in her discussion AIS #118, July, 1950). It was characterized by its very dark stalk and similarly dark purplish leaf bases. It was at about this time too that the name was struck down, the plants it represented renamed as I. virginica thereby, and it seems to have not been cataloged for a long time. Yet it seems that some darkly pigmented plant must have been parent to some of the stout irises I am presently growing, among them being:

"Norris Lavendar" as received from Melrose, this has a large and very well proportioned lilac or lavender flower. Foliage to 36 inches, as tall as the stalk; two branches and 8-9 flowers.

MOUNTAIN BROOK from Grady Kennedy is similar in plant, to 36 in; the stalk has a single branch with a total of 7 flowers; earliest and palest of the five. One Grady sent for comparison to Gerald Darby I tagged "Grady's Darby;" it is indeed similar but stems are not as dark.

GERALD DARBY has foliage 38-52 inches, shorter at flowering and growing taller; the stalk is 38-40 inches with 3 branches and 11-12 flowers of a pleasant blue-purple and significant yellow ornamentation. This is the most robust.

A Sarah Tiffney seedling I have called "Beetroot" in the flower is the best, a heavily veined purple-on-white, the stalk and foliage to 38 in., the latter deeply colored reddish purple rather than violet, the stalk with 3 branches and 7 flowers, so pubescent on the falls as to appear actually bearded.

All these have formed capsules but unfortunately I did not find the time to make comparisons of the seed, and then garden help took them off to the compost in the fall cleanup. Another year this will be reported on.

OLIVER PEASE is another one that undoubtedly belongs here though I do not grow it, and of course so do Anderson's INDOMITABLE and any of McClelland's garden-bred plants, if they should turn up.

## BEARDLESS QUEENS

B. LeRoy Davidson

The AIS bulletin #272 for January bore several items of interest to the non-TB gardeners, not the least of which by far is the cover, a really knock-out photo of a striking Cal-Sibe that is a show-queen candidate everybody will be wanting, not certainly as a mere novelty. Of a pastel orchid-pink--nearly white--it is washed over the mid-falls with a golden flush and a strong violet-purple or wine-tainted butterfly-wings pattern. The buds are a lovely warm buff with the veins showing, though of a muted tone. This came from the application by Jean Witt of "mixed forties" pollen on the Lenz hybrid RIPPLE ROCK, out of bracteata pollen on his innominata-douglasiana line registered as HALF MAGIC by Pat Farmer who grew the plant from seed from the SIGNA seed exchange; Jean is satisfied that it is probably the best of the Cal-Sibes to date, and the picture, from the AIS Iris Calendar, clearly shows its fine qualities with no faults.\*

From the show reports we can note an increasing number of apogons claiming thrones as show queens: Iris forrestii at Auburn, Maine, for the Hazeltons, I. setosa at Glencoe, Illinois for Russel Hintz, I. setosa Alba (the clone now called KOSHO-EN) at Waltham, Mass. for Helga Andrews, I. brevicaulis at Norfolk, Nebraska for Mary Ferguson, and the hybrid HOLDEN CLOUGH at Portland, Oregon for Joanne Deer. There were many others, seven Louisiana cultivars plus one more in the Youth Division, one of them, CLARA GOULA, winning in two separate shows. There was also one Siberian plus two others among the Youth entries and there were five Japanese cultivars crowned as well (no spurias strangely). Congratulations to all the exhibitors.

In Kalamazoo for the 25th year the Japanese Iris section sponsored its own mini-convention in the first days of July, with its own show and visits to four gardens, an event to remember after the big splash of the iris season is well past, everywhere but the northern tier, that is.

At the Oklahoma City convention the Spuria people polled the attendees to ascertain that of the seventy cultivars presently grown by at least one member only fifteen are dominantly blue, lilac, lavender, purple or violet, and by far the greater number are of the highly colored blend class which might have those colors secondarily and mostly as margins or rims. There was no mention of that fine old Monspur CAMBRIDGE BLUE, strangely enough. It is still widely grown in Britain, even though it was raised early in this century and credited in the checklist to Barr's although it very well may have come from Michael Foster actually; at least it was he who first made the cross and this may be a selection or advanced generation from that cross. Why are we not using this splendid old war-horse in spuria breeding today? It is still good!

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\*Available from Jean Witt. Order early. (The plant; the calendar is still available from AIS; send \$5 to Ron Mullin, R3 Box 84, Pawnee, OK 74058.)



# IRIS, TEJAS

Eddie Fannick

Hybrid beardless Spuria iris (Lord Wolseley X Fulva)

Leaves--Narrow lance-like and erect, 36 inches long, does not bend at the top.

Rhizome--Long and about 3/4 inch in diameter, 6 inches between forks, 3 branches at each furcation.

Stalk--Stout and erect, about 45 inches high, 4 flowers per stalk, two on lower brackets, two on terminal bracket, carried well above foliage.

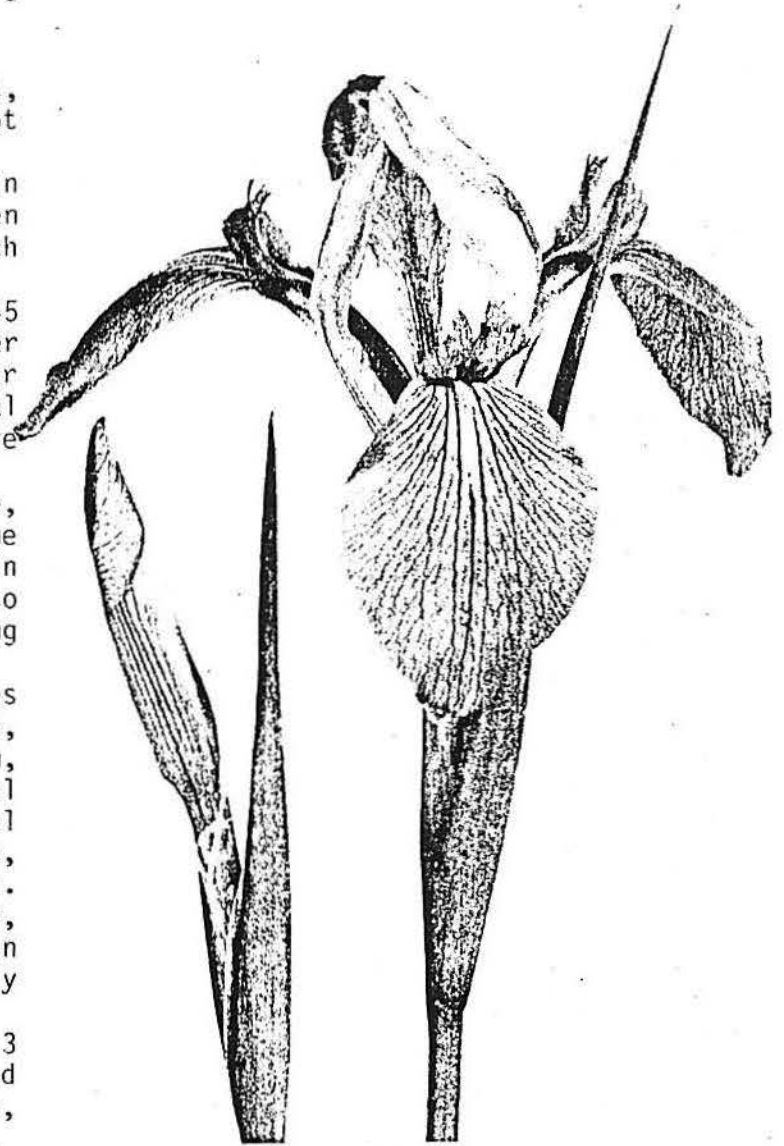
Flower--Large and of good substance, color a Blue Bonnet Blue with faint hint of fulva, in strong sunlight will fade to pale powdered blue, bringing out the dark lines.

Sepals--Spatulate, 4 1/2 inches long, 1 1/2 inch wide, flaring and curved down, dark midrib and lateral lines, light gold signal spot, small white zone, under-part of sepal whitish.

Styles--One-half length of sepals, red-purple with green mid-stripe, appendage deeply toothed.

Petals--Spatulate, 1/2 inch wide, 3 inches long, erect and in-curved, forming a dome, slightly paler than sepals.

Very hardy and a strong grower, sizes and description given from plants grown in a dry situation.



*Tejas*

(*Texas Centennial Iris*)

*Lord Wolseley x fulva* (Eddie Fannick '36)

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IRIS.--Pliny wrote, nearly two thousand years ago, that "iris" is Egyptian for "eye," and that the name "Iris" signifies "Eye of Heaven."

Tall Bearded Iris (Fleur-de-Lis)  
A Flower of Song, Walter Stager

## FLOWERS OF AN INTERSPECIFIC HYBRID BETWEEN IRIS PSEUDACORUS AND IRIS KAEMPFERI

BY SHUICHI HIRAO

TO introduce yellow colour into *Iris kaempferi* by crossing *Iris pseudacorus* pollen on *Iris kaempferi* has long been tried with no success, as the resulting seedlings invariably lack chlorophyll entirely and soon die out. However, the reverse combination succeeds occasionally and two people have flowered the hybrid independently for the first time in the summer of 1971. They were Mr Hisaharu Ueki an amateur hybridizer in Yokohama and Mr Onshin Sakurai a collaborator of Dr Koji Tomino in his university.

First, according to Mr Ueki's record, in 1969 he pollinated a white variety of Higo *I. kaempferi* on *I. pseudacorus*. The anthers of the pod parent were removed before opening but no bags were put on the flowers after pollination to avoid the bees. Six seedpods were obtained from about forty crosses, four of which were quite irregularly shaped but the other two were normal and eventually produced ordinary *I. pseudacorus*, proving the pod parent had been bee crossed. From the former four seedpods three seedlings germinated and two of them survived to maturity. Though these two hybrid plants are vigorous and rapid increasers, the new leaves are always pale yellow green but become greener afterwards. The yellowness differs, however, from that of iron-deficiency symptoms where the veins are light green on a yellower background. Looking at a leaf blade of the hybrid through sunlight the green network, which is prominent in *I. pseudacorus* but almost invisible in *I. kaempferi*, remains but vaguely. In late June 1971 one plant of the hybrids flowered for the first time. Only two bloomstalks for eighteen fans in a clump showed that probably this hybrid is a shy bloomer, or it may be that the plant had been underfed while it had been increasing rapidly. The bud was pure yellow and light lemon yellow when opened. The flower was six inches across, the fall being  $2\frac{1}{8}$  inches long,  $2\frac{1}{8}$  inches wide. One of the two bloomstalks set only one bud but another set two buds. One flower lasted for only two days, being shorter than either parent. Leaves were 23 inches at the longest,  $\frac{5}{8}$ in wide. The flower had a very small amount of pollen and using it on two *I. kaempferi* varieties was unsuccessful. But crossing *I. kaempferi* pollen on the hybrid, the pod started swelling for a while but soon died off.

Next, according to Mr Sakurai's record, since 1967 he has crossed 94 flowers of *I. pseudacorus* with *I. kaempferi*, obtaining seven seedpods containing 145 seeds, from which 43 seedlings were obtained. With the reverse combination of crossing, however, 27 seedpods were obtained from 691 crossings but none of them germinated. One of the former seedlings

flowered in June 1971. The colour was very light yellow and the flower was about six inches across. The colour of foliage and the prolific habit were quite similar to Ueki's plants. An interesting difference was that the brown marking around the eye of *I. pseudacorus* was almost invisible with Ueki's plant while it was prominent with Sakurai's plant, the former seeming nearer to the pollen parent and the latter to the pod parent. The chromosome on Sakurai's plant was  $2n=29$  showing the mean half of its parents.

From these two experiments, it does not appear easy to carry on breeding with the  $F_1$  hybrids because they seem highly sterile, but it may be interesting to use different varieties of *I. kaempferi* as pollen parent because hundreds of garden cultivars are at hand, in the same way as *Paeonia lutea* was pollinated with many different Chinese tree paeonies to produce many new hybrids in each combination.

### 'PAL-VERNA'

#### POGON-APOGON HYBRID?

(Persisting in the records of wide-cross hybrids is Pal-Verna. Here is the original description from its breeder. AIS BULLETIN (July 1928))

In the season of 1926, having flowers of Irises verna and pallida at the same time, I thought I would act upon the suggestion of the late Mr. Dykes in his Handbook of Garden Irises, pp. 147 and 8, in which he says, speaking of Iris verna, "This small species seems to be the one approach to the development of a bearded iris that is found in America. It has every appearance of a small pumila or chaemaeiris except that there is no visible beard but merely a pubescent orange band on the falls consisting of short unicellular processes." So I attempted the cross and secured eight seed on a MANDRALISCAE\* or pallida seedling, five of which germinated the first spring out of which I saved four plants and last spring two more seed came up making six plants saved of this cross one of which was strong enough to bloom last season. The plants have the foliage of a pallida, with a stem some 12 to 15 inches in height just about topping the foliage, the spathe was more herbaceous and keeled than in pallida, containing three buds on very short pedicels all coming out on the same side of the stem. The beard is rather scant and the odor is somewhat different from that of pallida. Standards are spreading or open, somewhat different from that of pallida; falls are a little narrower than the standards like the pollen parent verna--color a dark lavender blue marked like pallida. The beard is rather scant and there was absolutely no pollen. I tried to cross again with pollen from verna but so far without success.

Dr. J. R. McLeland, Pleasanton, Kansas

\*[Registered as TB-M-B1M (Todaro-186†Sicily). ED]

## TWO NEW AND UNUSUAL IRIS HYBRIDS\*

LEE W. LENZ

A report of new interspecific hybrids in iris is in most instances not unusual since it is well known that species belonging to certain groups within the genus hybridize very readily with one another and produce vigorous and fertile offspring. As an example, almost all the species belonging to the *Californicae* series (Lawrence's classification 1953) will cross with one another and the hybrids in most instances will be slightly, if at all, less fertile than were the parent species.

Hybrids between more widely separated taxa are less common although by no means unknown and a number of the modern tall-bearded iris incorporate species belonging to two, or even three, distinct subsections of the genus. In this case members of the subsections *Pogoniris*, *Oncocyclus* and *Hexapogon* (better known as *Regelia*) are involved. While placed in different taxonomic pigeon-holes, these plants all have one character in common, i.e., they are all bearded iris. Hybrids between more remotely related species are quite rare. One of the hybrids produced at the Rancho Santa Ana Botanic Garden and described here is a hybrid between a bearded and a non-bearded iris. This plant resulted from a cross between the diploid bearded iris 'Ariel' (Sect. *Pogoniris*, subsection *Pogoniris*) and the common Roof Iris of Japan, *Iris tectorum* (Sect. *Spathula*, subsection *Evansia*) one of the crested iris.

The second hybrid was produced by pollinating a Pacific Coast species, *I. douglasiana* with pollen from *I. sibirica* 'Caesar's Brother.'

*Iris* 'Ariel' ♀ × *I. tectorum* ♂

Buds of the variety 'Ariel' were opened slightly prematurely, the anthers were removed and the stigmas brushed with fresh pollen from a flower of *I. tectorum*. The flowers were then bagged to prevent contamination. In all six flowers were pollinated. Later it was noted that four capsules appeared to be developing although they were smaller than normal for that variety. By early July the capsules from the flowers pollinated by *I. tectorum* appeared to be turning yellow and shriveling. Early work (Lenz, 1954) had shown that it was sometimes possible to remove immature embryos from developing seeds and grow them by using the embryo culture technique. Since it appeared that these capsules would not reach normal maturity if left on the plants, two of them were harvested and brought to the laboratory. Upon examination it was found that they contained a few somewhat normal appearing seeds. These were dipped into alcohol, flamed and opened. The cavity in the seed which is normally filled with a fairly firm white endosperm at the end of eight to ten weeks was found to contain a colorless liquid or a sticky gray substance. When probed with a needle it was possible in almost every instance to find an embryo, somewhat smaller in size than normal but otherwise quite healthy in appearance. These embryos

\* Reprinted with permission from *El Aliso* 3:345-349



were placed on standard iris embryo agar in test tubes and incubated under the same conditions as are embryos removed from mature seeds. Germination was normal and the seedlings, while small and slow growing, were healthy. When large enough to handle they were transplanted to individual pots and grown on as any other seedling. The two capsules which had been left on the plants were allowed to remain until they showed signs of dehiscing at which time they were harvested and examined. Only a few badly shrunken seeds were present and when these were opened they were found to be hollow.

In the spring of 1955 two of the plants from the embryo-cultured seed bloomed. It was clearly evident when the flowers opened that they were of hybrid origin, since they combined the characters of the two parents as might be expected in an interspecific hybrid (Figure 1). In color 'Ariel' is a clear lavender-blue self while the usual form of *I. tectorum* is a lavender-blue with lighter hafts and the flower parts, especially the falls, are flecked with reddish-violet. The hybrid is a smooth lavender with no haft markings or fleckings. One of the greatest floral differences between the parents is in form. The flowers of *I. tectorum* open out very flat while those of 'Ariel' have the typical form of a bearded iris. The hybrid, while intermediate, tends more to the form of *tectorum* and as the flower ages it becomes quite flat. The most interesting difference between the parents is in the matter of the cockscomb-like crest of *tectorum* and the 'beard' of 'Ariel'. The hybrid shows a relatively sparse beard superimposed on a crest. Still another conspicuous difference is that the spathe-valves of 'Ariel' are thin and papery while those of *tectorum* are green and herbaceous. The spathe-valves on the hybrid are quite similar to those of 'Ariel.'

(See Fig. 1, page 1525)

Dykes in 1910 reported a hybrid which he had obtained from a cross between the dwarf form of *I. pallida* that Sir Michael Foster had obtained from Monte Loppio (later called *I. cengialti* var. *loppio*) and *I. tectorum*. In the first report of this hybrid (Dykes, 1910) he states that he had obtained "a pod of sound seed and from this, seedlings were raised early in 1909, of these, the strongest (Lop-tec) has just come into bloom for the first time, and it is obvious that *tectorum* pollen has had considerable influence." In a later paper Dykes wrote (Dillistone n.d) that he had obtained two seeds from this cross which gave him two plants. From Dykes' description of the flower and plant, it is obvious that 'Lop-tec' was very similar to the one described here which was tentatively called 'Ariel-tec,' 'Lop-tec' also had a sparse beard superimposed on a crest and the flower lacked the dark splashes of color so characteristic of *tectorum*. In 1928 F. Denis, a French horticulturist, recorded a cross between *I. tectorum* and 'Edina,' a bearded iris, that he called 'Pal-tec.' This unusual little hybrid is found occasionally in iris collections today. Figure 2 shows 'Pal-tec' and the present hybrid together. While both were produced from *I. tectorum* and a bearded iris, both presumably

diploid, there are considerable differences between the hybrids. From illustrations seen the hybrid described here is more nearly like 'Lop-tec' than it is 'Pal-tec.'

Hybrids between such widely separated taxa are usually sterile and since 1928 when 'Pal-tec' was registered to the present time no seedlings have been obtained from that variety. Pollen from the 'Ariel' X *tectorum* cross was treated with a lactophenol-aniline blue solution and when examined later a number of pollen grains were found to be stained. This was surprising considering the extreme differences between the parental species. Plans were made to attempt backcrosses with the parental plants, but unfortunately this hybrid and its sibling succumbed during the extreme heat wave in southern California in September, 1955.

*Iris douglasiana* ♀ × *I. sibirica* 'Caesar's Brother' ♂

(See Fig. 2, page 1526)

This hybrid, while not resulting from as "wide" a cross as the one described before, is, nevertheless, a most interesting new record. During the spring of 1949 and 1950 a very large number of flowers of *I. douglasiana* were emasculated and pollinated with pollen from 'Caesar's Brother,' probably one of the finest of the 'Siberian' irises. Later the capsules were harvested and the resulting seeds were sown in the greenhouse. In appearance, the hybrid seeds ranged from chaff to a few that appeared to be semi-normal. Of the seeds sown during the two-year period one germinated and produced a slow-growing but healthy seedling. This plant (RSABG #50-130) was later transplanted to the experimental field where it grew rapidly and in the spring of 1953 it bloomed for the first time. Because of its horticultural interest this clone has been registered with the American Iris Society as 'Royal Californian.'

With a few exceptions, both floral and plant characters of this hybrid are intermediate between its parents (Figure 3). 'Caesar's Brother' is deciduous, *douglasiana* is evergreen, the hybrid is semi-deciduous. In 'Caesar's Brother' the sepal is separated into a distinct claw and an expanded blade. In *douglasiana* the sepal tapers to the point of attachment without a distinct claw. The hybrid shows an intermediate condition. In color 'Caesar's Brother' is very deep velvety purple. The form of *douglasiana* used was blue-lavender with darker veining. 'Royal Californian' is almost a royal purple with a few darker veins. The flower stalks in 'Caesar's Brother' are hollow, in *douglasiana* they are solid, the hybrid here has the character of the Siberian parent and has hollow flower stalks. This apparent dominant character was also reported by Dykes (1913) in hybrids between *sibirica* and *clarkei* and *delavayi* and *clarkei*. In this case *clarkei* has solid stems while those of *delavayi* and *sibirica* are hollow. The F<sub>1</sub> hybrids in all cases had hollow stems.

Taxonomically the parents of 'Royal Californian' are both members of the subsection *Apogon* but they belong to different series according to

Lawrence's classification. 'Caesar's Brother' being a member of the *Sibiricae* and *douglasiana* a member of the *Californicae*.

Cytologically the species belonging to the *Sibiricae* appear to fall into two groups, one with forty somatic chromosomes and the other with twenty-eight. With but one exception, all the *Californicae* possess forty somatic chromosomes, the one exception being *I. tenuis* which has twenty-eight. Hybrids between the forty chromosome *Sibiricae* and the forty chromosome *Californicae* are not unknown and over a period of years Dykes reported a great many of them. Probably the finest of these hybrids is 'Margot Holmes' which was awarded the Dykes Medal in England in 1927. It is reported to be a hybrid between *douglasiana* and *chrysographes*. So far as is known, all these hybrids have proven to be sterile.

'Royal Californian' is the first record of a hybrid between the twenty-eight chromosome *Sibiricae* and the forty chromosome *Californicae*. As might be expected it is sterile and an examination of the pollen showed almost 100% aborted grains. Horticulturally this clone is attractive and quite distinct from any other known iris.

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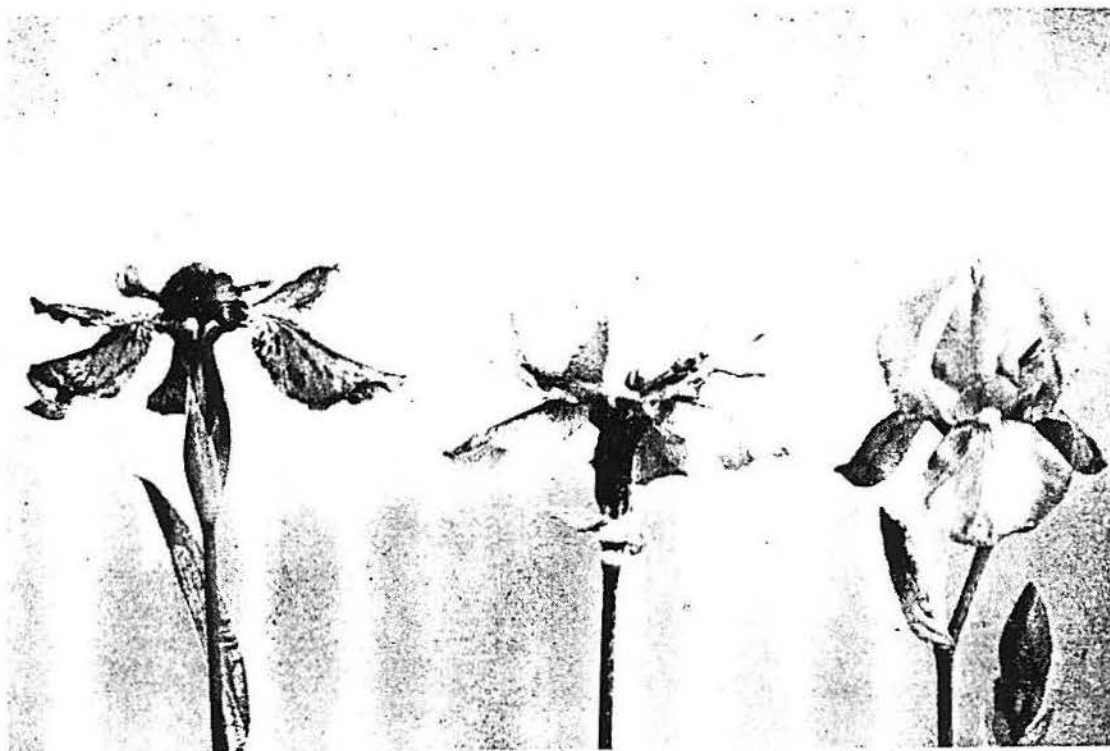


Fig. 1. Left to right: *Iris tectorum*, *I. tectorum* X *I. 'Ariel'*, *I. 'Ariel'*



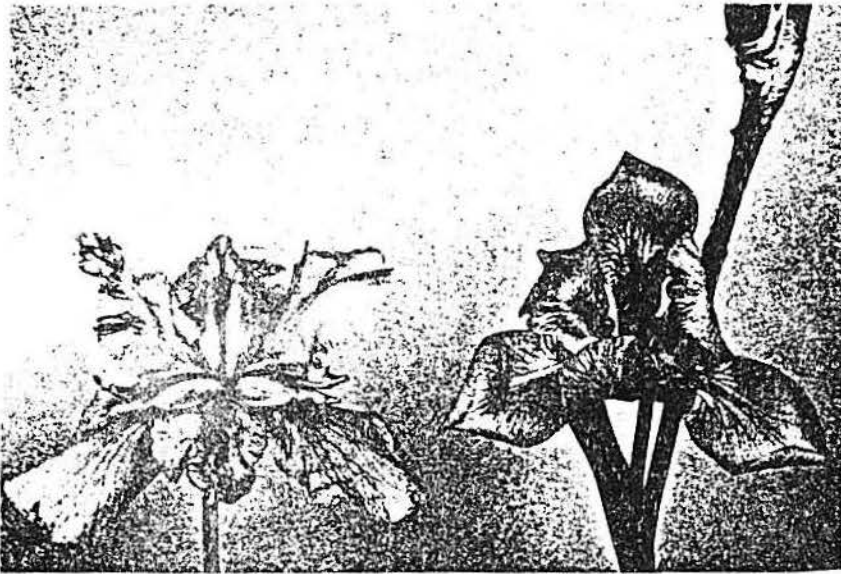


Fig. 2. Left to right: *I. tectorum* x *I. 'Ariel'*, *I. 'Paltec'*



See Page 1522, Two New and Unusual hybrids. →

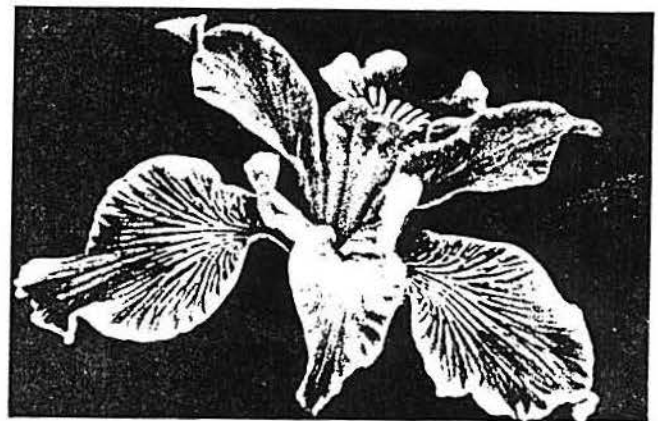


Fig. 3. Left to right: *I. douglasiana*, *I. douglasiana* x *I. 'Caesar's Brother'*, *I. 'Caesar's Brother'*



*I. sibirica* hybrid X *I. setosa*

See page 1527, Hybrids Involving Siberian Irises



STARTING CALSIBE



## HYBRIDS INVOLVING SIBERIAN IRISES

Tomas Tamberg, Germany

Reprinted from AIS Bulletin No. 258, July, 1985

This article is not meant as a comprehensive description of all hybrids ever obtained between siberian irises and other beardless irises, but deals with recent developments in this field.

Siberians, as seen by systematic botanists, are not a homogenous group of species. Series *Sibiricae* is divided into subseries *Sibiricae* proper (28 chromosomes) and subseries *Chrysographes* (40 chromosomes), and the two groups behave quite differently in hybridization. Hybrids between these two siberian subgroups are not easily obtained and are nearly always sterile.

Among the interseries hybrids involving siberians, the "calsibe" hybrids (*Californicae* X *Sibiricae*—40-chromosome) were the first group to produce a well-known cultivar. MARGOT HOLMES, an *I. douglasiana* X *I. chrysographes* hybrid, won the first British Dykes Medal in 1927. The more modern development of the calsibes has, however, been accomplished in the United States, and the names of Jean Witt and Lorena Reid are the most notable ones in this connection.

Calsibes of the parentage (*Californicae* X *Sibiricae* —28-chromosomes) have been produced and even registered in one case (ROYAL CALIFORNIAN, Lenz 1955), but nothing has been heard since about hybrids of this type. A possible exception may be an interesting yellowish hybrid of uncertain parentage shown by Jean Witt during the 1984 Seattle Convention.

Unfortunately, calsibe hybrids, as a general rule, are sterile and cannot be used for further breeding. They can be produced in a wide range of colors and shapes, but each plant is the end of a very short breeding line. (Apart from the breeding aspect, sterility is not always a drawback, since sterile plants often have a special vigor.)

To overcome the sterility barrier in the calsibe group, we started colchicine treatment of small calsibe seedlings in 1976. Our approach was not a very systematic one at this time, and so we used seedlings from the cross BERLINER RIESES, *I. delavayi* x *I. clarkei*, X *I. fernaldii* light yellow. This was a combination of a giant with a pygmy, but the only *Californicae* available at this time and so we used it. From a big batch of treated seed we got three tetraploids of different shapes which all produced masses of fully developed pollen.

One of the three, after pollination with pollen from a sister seedling, produced five seeds. All these seeds were grown to mature plants by the use of the embryo-cutting method. The plants were very similar and proved to be much stronger and more beautiful and fertile than the converted plants. The best one was registered in 1981 as the first tetraploid and fertile calsibe hybrid. Its name is STARTING CALSIBE, and it was introduced in 1983.

In the meantime, we have found a number of other converted calsibes among the survivors of later colchicine treatments. The *Californicae* parents were *I. innominata*, *I. douglasiana* and BANBURY GNOME. Siberian parents

## HYBRIDS INVOLVING SIBERIAN IRISES

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were our best 40-chromosome hybrids. All these tetraploids were fertile with the second generation tetraploids already mentioned. The first plant of a third generation tetraploid calsibe flowered in 1984, but showed no progress compared with the second generation. The bulk of the seedlings will flower in 1985/1986 and some new colors and flower shapes are expected. In addition, we have increased the number of treated calsibe seedlings each year. Due to the generosity of Francesca Thoolen, we received two batches of pollen from latest PCI hybrids. From the first batch we got a few capsules using the pollen on our best 40-chromosome siberians. Colchicine-treated seedlings from those seeds should start flowering in 1985.

As soon as tetraploid calsibes were available, it was of interest to explore the type of fertility now available. We did a lot of pollinations with other tetraploid beardless irises, but got seeds only with other tetraploid siberians of the 40-80 chromosome type. The resulting seedlings, preliminarily called "sibcal hybrids," are of extreme vigor and produce up to five flowers per stem. They are  $\frac{3}{4}$  siberian (*Chrysographes*),  $\frac{1}{4}$  *Californicae* hybrids at the tetraploid level. The fact that they have been sterile until now is an additional proof that the *Californicae* and *Chrysographes* are not analogous to each other in spite of the identical number of chromosomes per set. This means that in the process of forming sexual cells, *Californicae* and *Chrysographes* chromosomes cannot be arranged in corresponding positions on both sides of the polar plane. This blocks the meiotic divisions and makes the diploid calsibes sterile. Both types of chromosomes can, however, exist in the same cell and can express themselves in the hybrid plant. In the tetraploids, fertility is possible since each set of chromosomes finds a corresponding set of the same type on the other side of the polar plane. The sexual cells formed by the division along the polar plane always contain a full set of *Chrysographes* chromosome and of *Californicae* chromosomes. The tetraploid hybrids are therefore always in the middle between *Chrysographes* and *Californicae* characteristics. The genetic variability is restricted to the free exchange of chromosomes between the two *Chrysographes* sets and between the two *Californicae* sets. The hybridizer should have in mind, furthermore, that even this variability is restricted as long as only converted plants are involved. They are produced by doubling of two different chromosome sets and will produce identical sexual cells as is found in the case of true species. Seedlings produced by selfing or intercrossing converted plants will, therefore, be very similar. Only the next generation will then show the potential of variability mentioned above.

The pattern described is derived from the limited information available from our own breeding. Since irregularities are always possible, the breeding behavior of tetraploid calsibes may well prove to be much more varied.

Another important and genetically quite similar group of interserial hybrids with siberians are the sibtosia hybrids (*Sibiricae* X *I. setosa*). The first registered cultivar of this origin was Eckard Berlin's STILLES WASSER. It is derived from *I. sibirica grandiflora* ELMENEY X *I. setosa* and is a tall, free-flowering and sterile hybrid of good garden value.

We repeated Eckard's cross in 1979 and got two additional diploid and sterile seedlings which are vigorous and extremely floriferous. Furthermore,

we managed to convert a single remaining seedling by colchicine treatment and this tetraploid proved to be fertile in both directions. It was named STARTING SIBTOSA and was registered as the first tetraploid sibtosa hybrid in 1984. It is not a very beautiful plant, but is important for breeding experiments. From the first two flowers of STARTING SIBTOSA we got two capsules by selfing. The pollen was used on tetraploid 28/56-chromosome siberians and produced seeds in all cases. The resulting tetraploid ( $\frac{3}{4}$  *Sibiricae*— $\frac{1}{4}$  *setosa*) hybrids produced some first weak flowering stems in 1984 and proved to be sterile, as was the case for the corresponding sibcal hybrids. All the seedlings had one side branch and three buds in the terminal position. The flowers were of moderate size and had short standards.

Also in 1984 we did pollinations of STARTING SIBTOSA with pollen of a tetraploid *I. setosa* of Eckard Berlin's origin and got an apparently normal capsule.

The fertility pattern of the sibtosa hybrid group should be the same as described for the calside hybrids (see above). Due to the small number of species involved, the sibtosas will perhaps not have the same variability potential as the calsibes, but there are numerous forms of *I. setosa* varying in color as well as flower shape and there is, of course, the quickly developing spectrum of siberian cultivars.

Sibtosa hybrids are easily produced by using *I. setosa* as the pollen parent. Wide-petaled forms of both parents should be used. For the colchicine treatment, solutions of .02% concentration instead of the .04% normally used are preferable, since sibtosa seedlings are frequently killed by the poison.

We have noticed that both hybrid groups, calsibes and sibtosas, have a rather late flowering period at the tetraploid level, compared to the diploid level.

A third group of interseries hybrids are the chrysata hybrids (*Chrysographes* X *Ensatae*). They can be obtained in good number by crossing 40-chromosome siberians with *I. lactea* (formerly *I. ensata* or *I. biglumis*) from the 40-chromosome series *Ensatae*. Pollen of the early-flowering *I. lactea* has to be stored for this purpose. We have grown many of such hybrids to the stage of strong plants, but only two of them have flowered up to now. Both were diploid and sterile; in 1985 we hope to see the first flowers from a batch of seedlings treated with colchicine.

This hybrid group doesn't give too much promise as far as garden value is concerned, but the drought resistance, the size of the standards and the color pattern of the falls are at least interesting. Hybrids of the type ( $\frac{3}{4}$  *Chrysographes*— $\frac{1}{4}$  *Ensatae*) could also be quite interesting. The use of *I. lactea* clones more floriferous than the one we used could be promising.

Finally I have to mention some hybrids of siberians which are known as single clones only:

HOLDEN CLOUGH, reported to be *I. chrysographes* X *I. pseudacorus*, but parentage still uncertain. Some seedlings have been grown from it, but there is still a mystery about this plant.

LONGSIB, from *I. longipetala* X *I. sibirica*, is a rather spidery thing and has a single even more spidery child.

## HYBRIDS INVOLVING SIBERIAN IRISES -- cont

*I. chrysographes* X *I. foetidissima*: a seedling from a pollination of this type has flowered in our garden in 1984, but the flowers are still unseen due to a business trip. The hybrid character of this plant has still to be confirmed.

Many other interserial hybrids are recorded in the relevant table of *Garden Irises*, but it is uncertain whether they were true hybrids and whether they are still in cultivation.

The most important aspect of the recent hybrids is the possibility of starting new breeding lines that have never before been possible. The use of the most advanced cultivars or the best selected species forms in the subgroup to be combined is advisable and will lead to the development of irises never even imagined before.

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## OUR READERS WRITE

I visited Ina Mumberton in November when I attended our Iris convention at Christchurch. I don't know whether you know but she had to leave her lovely garden and is now living in a tiny flat--but she has the use of quite an area for garden--and has performed miracles as they say. When she went there it was all under grass and rubbish waist high. She had the most beautiful bed of bearded iris that I have seen for a long time and a lot of species in flower and a plastic house full of seedlings of alpines and species of iris. She was wonderfully cheerful. Most people I think would have found it hard to start up again as she isn't young. I closed my commercial nursery 18 months ago and moved from my 3/4 acre patch to a 1/4 acre. That was a hard enough wrench but at least this place had been well looked after and possibly what was an advantage from my point of view is that it was nearly all lawn--so I could go ahead and redesign the garden as I want it. It takes time as I also am not as young as I used to be (73) and have no one to help me. I made a bed for TBs and had to choose about 20 out of 600 or 700 and have used dwarfs in the front of borders. I dug out two quite big areas and threw the soil up in a heap--now I have two damp areas for sibericas, setosas, louisianas, etc. and with the addition of rocks, I made the heap of soil into a rockery. Have established pockets, some shade and some sun, for different small species. Have verna, minutoaurea, and suaveolens doing well. But a lot is still in pots and I won't be able to grow spurias and will have a job to place evansias.

Hilmary Catton, Hawkes Bay, New Zealand

I have just spent an afternoon organizing and reorganizing my copies of SIGNA. I noticed a number of notes about publication of pictures of Iris species in various publications, so I thought I would pass on this one: Defenders, the Magazine of Defenders of Wildlife, Volume 673, Number 6, November/December 1988 has as its cover picture a photo portrait of I. versicolor taken by Fred Siskind. It is used in connection with an article about Huntley Meadows Park across the Potomac from Washington, D. C.

Marilyn Mollicone, Augusta, ME

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HYBRIDS OF IRIS LAEVIGATA  
WITH I. VERSICOLOR AND I. VIRGINICA

George M. Reed

Reprinted from AIS Bulletin #62, June 1936

The three species Iris laevigata, I. versicolor, and I. virginica are closely related, evidently belonging to the same section of The Iris genus. They are all moisture loving plants, thriving in marshes and along the margin of streams. I. laevigata is found in Eastern Siberia, Northern China, and Japan. I. versicolor and I. virginica are the Blue Flags of Eastern North America. These two species have been greatly confused in the past, and their exact range is not definitely known. The former is very common in Northeastern United States, extending south to Virginia. Formerly it was assumed to extend throughout most of the Mississippi Valley, but recent studies indicate that it is confined to the northern portion of this region. I. virginica extends along the coast of the Atlantic from Virginia southward. It is also found in the Gulf States and in most of the Mississippi Valley region.

Iris laevigata. This iris has robust rhizomes up to 6 inches or more in length and  $\frac{3}{4}$  inch in diameter. The leaves are a foot and a half to 2 feet long, an inch or more broad, smooth, without a well defined midrib, and pale greenish yellow. The flower stem is as much as 2  $\frac{1}{2}$  feet long, rising at an angle from the rhizome and curving upward, with four or more leafy bracts, usually unbranched and bearing a single cluster of two to three, rarely more, flowers. The flowers are large, with good substance. The blade of the falls is 2  $\frac{1}{2}$  inches long by 1  $\frac{3}{4}$  inches wide, sharply recurved at its attachment to the claw, the latter being 1 inch long by  $\frac{3}{8}$  inch wide, narrowing towards the base. The standards are erect, oblanceolate, 2  $\frac{1}{2}$  inches long by  $\frac{5}{8}$  inch wide. The style branches are 1  $\frac{1}{2}$  inches long by  $\frac{1}{2}$  inch wide at the base of the crests, narrowing toward the point of attachment. The crests are very conspicuous, being erect and about  $\frac{3}{4}$  inch long.

The mature pods are somewhat rounded triangular, about 1 inch in diameter and sometimes as much as 2  $\frac{3}{4}$  inches long. The seeds are rather thin, flat, and usually D-shaped. The seed coat is slightly pitted, shiny, varying in color from tan to darker shades depending upon the amount of weathering. The seeds mature early, being ripe around the first part of August. In size, shape and color, the seeds are very similar to those of Iris versicolor.

The color of the flower varies greatly. In the common type the falls are royal purple with a bluer tone surrounding the pale yellow area at their base. The standards and crests are slightly lighter tones; the style branches are darker violet-purple. Among seedlings, however, there is a good deal of variation. In some the falls and the standards are distinctly red-purple; in other clones the blue tones predominate; in fact, certain varieties possess the bluest flowers found in the Iris genus.

The Japanese name of the iris is Kakitsubata, and it has been in cultivation in Japan for many centuries, with the result that many varieties have been developed and named. It is commonly found in the

temple and private landscape gardens, bordering the streams or ponds. The usual blue-purple type is also extensively used in the flower arrangement, to which it admirably lends itself.

Quite distinct from the common type is the variety "albo-purpurea" first described by Baker, but undoubtedly long known in Japan under the name Washi-no-o. There are, however, marked differences among seedlings which may be grouped under the general term "albo-purpurea." Some are very pale, lightly spotted with blue-violet; others are deeply colored with blue or red-purple, leaving only a definite white margin. White varieties are also known, but in most of these the standards and falls have some color at their base. Double flowered types also occur. In these, the standards have become enlarged and have the same general shape and position as the falls. A common double flowered variety has the characteristic markings of "albo-purpurea;" the variety "caerulea," which is very pale grey sky-blue, has long been in cultivation. Double flowered white varieties are also known.

Iris versicolor. This species has rather broad, moderately stiff green leaves. The stems are weak, more or less reclining rather than erect, and somewhat longer than the leaves. The stem branches extensively, so that a large number of flower clusters are borne on one main stalk. The flowers are small, with the falls extending horizontally or more or less reflexed. The standards are much shorter than the falls, lanceolate in shape and, instead of rising vertically, incline outward. The color of the flower varies in different clones. It is usually some shade of pale blue-purple. Plants with distinct red-purple, as well as albino forms, are known. There is a distinct white zone at the base of the fall surrounding a yellow blotch.

The pods are rather narrow, more or less triangular, 1 1/2 to 2 1/2 inches long. The seeds are usually in two rows in each chamber, D-shaped, flat, thin, with a shiny and regularly pitted outer layer.

Iris virginica. This species is very similar to Iris versicolor in its main characteristics. In general, it is a more robust plant with thicker rhizomes, longer and wider leaves, larger flowers, capsules, and seeds. The flower stem is somewhat less branched. The standards are ovate spatulate, nearly as long as the falls. Both the falls and standards are somewhat wavy, pale bluish purple in color, with a distinct yellow blotch at the base of the fall. The whitish zone of I. versicolor is not so well marked.

The capsules are long and rather slender. The seeds usually occur in one row, and are rather large, rounded or sometimes D-shaped, with a thick corky wall, and dull appearance.

Iris virginica has a very wide range and variation occurs in clones from different localities. Plants sent from Florida by Prof. H. H. Hume are quite different from those obtained in the Central Mississippi Valley.

No improvement of these two species as garden plants, comparable to that of Iris laevigata, has taken place. A few garden varieties of I. versicolor have been developed, of which the variety "kermesina," with red-purple

flowers, has long been known. In recent years some additional varieties have been developed in England but, for the most part, they are only minor color variations.

Hybrids of Iris versicolor and I. laevigata. During the past few years a number of attempts have been made to obtain crosses between these two species. In some experiments Iris versicolor and in others, I. laevigata, has been used as the female parent. The only successful crosses have been obtained by the use of I. versicolor as the female parent and I. laevigata as the male.

The plants resulting from this cross are more vigorous in their vegetative characters than either of the parents. In most respects, however, they resemble the female parent more closely than the male. The leaves are somewhat broader, longer and stiffer than those of I. versicolor. The stem is rather long, weak, and only partially erect. It branches repeatedly, so that many flowers in clusters of two or more are borne at the ends of the branches. The flowers are rather small, about the size of the usual flower of I. versicolor, and the shape and arrangement of the parts is also similar to the latter. The standards, however, are somewhat larger in proportion. The color is a deep, rich blue-purple. Other variations, in color especially, would doubtless be obtained if the crosses were made between other clones of I. laevigata and I. versicolor.

The hybrid plants have proved to be completely sterile. Usually the ovary, following pollination, has grown to some extent, but only abortive seeds have been formed.

The hybrids might be described as more robust or vigorous types of I. versicolor, with an improvement in the substance and color of the flowers. However, they are distinctly inferior to I. laevigata in the flower characters, although they have the advantage of producing many more flowers on the branching stems and possessing more vegetative vigor.

Hybrids of Iris virginica and I. laevigata. Successful crosses were secured between these two species in which Iris virginica was used as the female parent and I. laevigata as the male. Vegetatively the hybrids show a very marked increase in vigor. The leaves are broad and long, not quite so stiff as in I. virginica nor as drooping as in I. laevigata. The stems are weak, branching repeatedly, each one bearing a cluster of terminal flowers. The bracts are large and resemble closely those of I. laevigata. The flowers are much larger than those of I. virginica, but smaller than those of I. laevigata, and in general shape and position of parts resemble the latter. The falls are 1 1/4 inches wide by 2 1/2 inches long, the claw being about 1 inch long. The standards are about 2 inches long by 5/8 inch wide and somewhat wavy. The crests are fairly large and somewhat erect. The falls show the characteristic recurring habit of I. laevigata. There is a conspicuous yellow blotch at the base of the falls. The color of the latter is a rich violet, while that of the standards is a pale blue-violet. The color of the freshly opened flowers fades out in the sunlight to lighter tones of violet. Except for some reduction in size, the flower strongly suggests that of the I. laevigata parent.

Most of the flowers are sterile, only abortive seeds being produced in the partially developed capsules. Many attempts have been made to self the flowers and also back-cross with the two parental species. However, only a very few good seeds have been formed, some of which have germinated, giving rise to new plants.

The flowers of the hybrid plants are not the equal of those of the Iris laevigata parent. However, the plants are vigorous, the flower stem branches and bears several clusters of flowers which have good substance and, although fading out to some extent in the sun, they still retain a good color. Exceptional vigor in the vegetative parts is a distinct advantage over the I. laevigata parent.

Hybrids of Iris versicolor and I. virginica. Crosses have been made between these two iris species. Dr. Edgar Anderson (Annals Mo. Bot. Gard. 15:241-332. 1928) has described Iris robusta, which is a hybrid of I. versicolor X I. virginica. He has also reported the occurrence of natural hybrids in the wild. We have also succeeded in crossing these two species, using I. virginica as the female parent. There is a good deal of fertility in our hybrids, although seed production is not as abundant as in either of the parental species. The plants, however, show much more vigorous growth and development than either parental species. The flower stems branch out extensively, bearing more numerous terminal clusters of flowers. As garden plants they are certainly improvements over either of the two original parental clones.

Comparisons between the three species, together with other iris. These three species, Iris laevigata, I. versicolor, and I. virginica, have many points in common. They are all characteristic marsh plants, thriving in wet situations. Their seeds are very similar and adapted for wide distribution by water. The resemblances in the main characters are much greater between I. versicolor and I. virginica than between either of these and I. laevigata. The fact that hybrids have been obtained between I. laevigata and I. versicolor, I. laevigata and I. virginica, and I. versicolor and I. virginica, is another evidence of their close affinities. It is interesting to note that the hybrids between the two latter species are much more fertile than the others.

Dr. Charles Peter Thunberg was one of the early collectors of Iris laevigata, having observed it during his stay in Japan during 1776-1777. In his account of Japanese plants, in 1784, he described it under the name of I. versicolor. Doubtless he was not particularly familiar with this American species, but it is interesting that he identified his collection of the Japanese plant with it.

Dykes, in his Genus Iris, did not attempt to distinguish between Iris versicolor and I. virginica. Under the former name, he grouped the plants, with I. laevigata, in the same section of the Apogons, namely, the laevigata group, including in this section, however, two additional species, I. pseudacorus and I. kaempferi.

Iris pseudacorus differs from the three species just mentioned in a number of important characteristics. In every way it is a much larger plant with tall, rather stiff, leaves with a marked midrib. The flower, of course, is



very different in color. The seeds, however, resemble somewhat closely those of I. laevigata or I. versicolor, being somewhat larger and more circular in outline. It is also a characteristic water iris, thriving best in marshes and running streams.

Miss M. Louise Sawyer (Proc. Ia. Acad. Sci. 26:363, 364, 1919; Bot. Gaz. 79:60-72, 1925) has described her experiments in attempting crosses between Iris versicolor and I. pseudacorus. When I. pseudacorus was used as the female parent the ovaries, following pollination, enlarged for some days, but produced only abortive seeds. It is stated, however, that when I. versicolor was used as the female parent, fully developed seeds were produced. The latter, however, were not germinated, and the question may be raised as to whether these seeds actually resulted from cross-pollination.

The Japanese Hana-shobu, Iris ensata (I. kaempferi) in its vegetative characters, shows a close resemblance to I. pseudacorus, differing markedly from I. laevigata and the other species. The leaves are stiff, erect, with a conspicuous midrib. The flower stem is also erect. The seeds, however, are very distinct, being thin, flat, circular in outline with a sterile marginal edge. Hana-shobu is not a typical swamp plant. It naturally grows in moist situations where the roots do not have to penetrate very deeply before reaching water. The Japanese have developed a large number of varieties and cultivate them in depressed beds flooded with water during the growing season. They thrive, however, under ordinary cultural conditions.

We have made many attempts to cross Iris laevigata with I. ensata, but so far no hybrids have been secured whether I. laevigata or I. ensata was used as the female parent. In most cases there was a slight enlargement of the ovary, extending even to the formation of abortive seeds. In rare cases fairly well developed seeds have resulted, but these were without viable contents and no germination has been secured.



*Iris laevigata* x *I. virginica*

It is a matter of common belief that Iris laevigata is one of the ancestors of the garden forms of Hana-shobu. At the present time, however, there is no evidence that these two wild species have ever been hybridized. The facts, on the contrary, indicate that the garden forms of Hana-shobu have been derived from the wild types which, in different locations in Japan, show marked variation in the size of foliage and stem, as well as in the color of the flowers. These results have an interesting bearing on the relation between these iris species. Undoubtedly Iris laevigata, I. versicolor, and I. virginica, form a closely related group. I. pseudacorus and I. ensata certainly differ in both morphological characteristics from the above species, as well as from each other.

Brooklyn Botanical Garden, Brooklyn, N.Y.

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\* According to Dr. G. Kotzumi (Tokyo Bot. Mag. 39:322, 1925), the correct scientific name of Hana-shobu is Iris ensata Thunb., and the plant that for so many years has masqueraded under this name is correctly called I. hispidus Vahl. Accounts and photographs of the latter iris have appeared in recent Bulletins of the American Iris Society under its incorrect name--I. ensata.

Apparently Baker (Gard. Chron. 6:324), in 1876, is responsible for the error in misapplying the name ensata. Dykes in his Handbook on Garden Irises, remarks that it is uncertain as to what character this iris owes its name of "sword-like," a description which is extremely applicable to the leaves of Hana-shobu.

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## OUR READERS WRITE

Although I grow a wide variety of IRIS, I've developed a special fondness for evansias. Iris cristata grows like a weed and I've recently figured out how to get I. tectorum to bloom reliably (water and fertilizer). Seeing PALTEC form a mass of bloom in my garden, it occurred to my perverted mind that I would like to see more hybrids of this sort and perhaps some which are fertile. I'm trying to assemble all types of evansias for breeding between themselves and also between evansias and other eupogons and apogons. At this point I don't have enough stock to use colchicine so I'm trying the triploid route to amphidiploids, using I. pumila, TB's, aphylla, stolonifera, etc. One of my questions is; do you know of anyone else interested in such projects or perhaps an evansia Robin where kindred spirits might wish to share information, seed, etc. The evansias seem like a neglected group.

I'm aware of some work which has been done with I. japonica. I purchased NADA from you this summer and hopefully it will bloom in a year. This winter I have blooming size plants of japonica which I hope to cross to tectorum, milesii, cristata, and pumila. I'm looking for sources for watii and confusa hybrids with which to try the same crosses. My goal is not to produce more greenhouse plants but something with the beauty of japonica and the hardiness of tectorum, etc.

Bob Pries, High Ridge, MO

## Iris Sources Update

By Alan McMurtrie

The original "Iris Sources" article appeared in the April 1984 (#32) issue of SIGNA. This is the fourth "Iris Sources Update". In the last update (#39, Nov 87), I mentioned that the most exciting development in 1986 was the surfacing of Jaroslav Cuba. He had a number of rare Iris species for sale, particularly Junos. Several of the ones I bought have now bloomed. The bulbs of *Nicolia* and *Rosenbachiana* turned out to be *Baldschuanica*, though I understand someone did get true *Nicolia*. I certainly can't say I mind the extra bulbs of *Baldschuanica*, though I would have liked true *Nicolia* and *Rosenbachiana*. Someone else got *Nicolia* in place of *Willmottiana*, and *Baldschuanica* instead of *Tadshikorum*. Another person's *Willmottiana* turned out to be *Vicaria*. My bulbs of *Willmottiana*, and *Tadshikorum* have not yet bloomed, so I can't offer further comment.

The *Caerulea* turned out to be *Kuschakewiczii*, which interestingly had not been on Jaroslav's 1986 list. That was a very pleasant (and welcome) surprise!

The *Reticulata* (from Armenian Caucasus) appears to be the same as Potterton & Martin's collected form: a lovely pinkish-lavender colour, with falls about the size of *Histrioides* '. It's also a tremendous seed setter; better than any other variety! It is unknown at this time whether it is  $2n=16$  or  $2n=20$ . A bulb of *Kolpakowskiana* bloomed for the first time. It was absolutely BEAUTIFUL! The falls are a rich velvety purple, with a large pure white tip area. I certainly hope it becomes much more available over the next few years.

I bought some more Iris from Jaroslav in 1988 (see page 1339 for his address). As you might imagine, I'm eagerly looking forward to seeing how true-to-name the bulbs are. Highlights from his list were:

<p>Oncocyclus  <i>Ewbankiana</i> (<i>Acutiloba</i> ssp <i>Lineolata</i>)  <i>Paradoxa</i></p> <p>Reticulata/Iridodictyum  <i>Kolpakowskiana</i>  <i>Reticulata</i> (from Armenia Caucasus)</p>	<p>Juno  <i>Baldschuanica</i>  <i>Caerulea</i> (Albo-marginata)  <i>Caucasica</i>  <i>Kopetdaghensis</i>  <i>Kuschakewiczii</i>  <i>Nicolia</i>  <i>Orchioides</i>  <i>Parvula</i>  <i>Rosenbachiana</i>  <i>Vicaria</i></p>
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A new source for Iris, including a number of scarce Junos, is Cambridge Bulbs. In 1988 their catalog listed the following:

<p>Junos  <i>Bucharica</i>  <i>Caucasica</i>  <i>Kopetdaghensis</i>  <i>Kuschakewiczii</i>  <i>Nicolia</i>  <i>Orchioides</i> (true species)  <i>Parvula</i>  <i>Vicaria</i>  <i>Warlyensis</i></p> <p>Reticulatas            9 typical hybrids &amp; species  <i>Kolpakowskiana</i>            "Katherine Hodgkin"            'Species from Caucasus' (blue/violet - some paler)</p>	<p>Oncocyclus  <i>Acutiloba</i>  <i>Acutiloba</i> ssp <i>Lineolata</i>  <i>Iberica</i> ssp <i>Elegantissima</i>  <i>Paradoxa</i>  <i>Paradoxa</i> var <i>Choschap</i></p> <p>Miscellaneous  <i>Cretensis</i>  <i>Forrestii</i>  <i>Reichenbachii</i>  <i>Setosa</i>  <i>Schachtii</i></p>
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Cambridge Bulbs  
 40 Whittlesford Road  
 Newton, Cambridge  
 ENGLAND CB2 5PH

The most exciting new source of iris in 1988/89 is Friesland Staudengarten. Friesland Staudengarten is run by Uwe Knöpnadel. Would you believe Uwe lists over **700** species/hybrids in his catalog! These are predominantly beardless Iris (~95%), consisting of 60 Louisiana hybrids, 10 Cal-sibs, 28 40-Chromosome Siberian hybrids (not counting 40-Chromosome species, of which, for example, 5 forms of *Chrysographes* are listed), 74 Japanese hybrids, 14 *Laevigata* hybrids, 16 *Pseudacorus* varieties, 11 *Setosa* varieties, over 250 Siberian hybrids, ~70 *Spuria* hybrids and species, 22 *Versicolor* clones, with the remainder being various species. I would highly recommend getting a catalog and seeing what is available!

A number of Thomas Tamberg's hybrids are available.

My German is not very good, but I believe the minimum overseas order is 500.DM (~\$270U.S.). I would suggest you ask what the minimum overseas order is when you write for a catalog. Prices start at 5.DM

Uwe Knöpnadel  
HUSUMER WEG 16  
D-2942 JEVER 3  
WEST GERMANY

Another source for beardless Iris is Eberhard Schuster. He has been sending Iris overseas for a number of years. Perhaps some of you met him at last year's AIS convention. He specializes in water loving plants. He has quite a large collection of Iris (over 300), which is added to every year. The more recent acquisitions will not be available for 2 or 3 years (ie. until they have a chance to start to multiply). Write to him for a list of iris available and prices.

Eberhard Schuster  
Gartenbaubetrieb  
POST GÄDEBEHN  
2711 AUGUSTENHOF  
EAST GERMANY

#### New / Changes For 1988 (see page 1114 for addresses)

Paul Christian - did not receive a 1988 catalog. I sent in an order based on the 1987 catalog.

Avon Bulbs - only minor changes in 1988

Note the new address: AVON BULBS

UPPER WESTWOOD, BRADFORD ON AVON, WILTSHIRE  
ENGLAND BA15 2AT

- Potterton and Martin - selling *Histrioides* "Angels Eye" (also known as "Angels Tears") in 1989
- selling *Purpureobractea* in 1989 (described in 1982)
  - for the past 2 years they have sold *Orchioides*, but it is possible that this is the hort. form which is believed to be a yellow form of *Bucharica*. Potterton & Martin's description is: 'A very rare species from Central Asia, pale yellow flowers with light suffusion of purple'.
  - sold *Vicaria* in 1988. Unfortunately it is not listed this year.
  - the 1989 price for the lovely *reticulata* hybrid "George" (named after George Rodionenko) is 10 for £2.40, which is not bad at all! In 1987 it sold for £0.50 per bulb. Prior to that, the last time it had been available was 1983!

#### Seed Sources

Moncot Seeds had collected seeds of a number of especially rare Iris species available in their 1988/89 list (address on page 1266). These included *Edomensis*, *Postii*, and *Regius-Uzziae*, all Junos, as well as *Masia*, and *Tingitana Fontanesii*. As would be expected, *Edomensis* and *Postii* sold out quickly (I missed out on them!). There were a number of other collected species including *Chamaeiris*, *Filifolia*, *Jordana*, *Nigericans*, and *Planifolia*.

Jim and Jenny Archibald were again collecting seeds in Turkey during 1988; as well as other places. Unfortunately they weren't able to list many iris species: *Taurica*, *Caucasica ssp Turcica*, *Latifolia* (France), *Orientalis* (Greece), *Spuria ssp Musulmanica*, and *Taochica* (which I must mention is VERY susceptible to rot). Also listed were seeds from cultivated plants: *Aitchisonii* var *Chrysantha*, *Albomarginata*, *Graminea* var *Pseudocyperus*, *Kopetdaghensis*, *Kuschakewiczii*,



*Magnifica*, *Setosa 'Alba'*, *Sintenisii*, *Subbiflora*, and *Trojana*. Jim and Jenny do not expect to get back to Turkey until atleast 1991 (they will be collecting in the American West in 1989).

Note their new address: Jim & Jenny Archibald  
 'BRYN COLLEN'  
 FFOSTRASOL, LLANDYSUL, DYFED, WALES  
 ENGLAND SA44 5SB

*Please Write!*

Please DO write to me. I need your help to know of any changes, new sources, companies going out of business, complaints/problems, incorrectly labeled species, etc. My address is listed on the inside front cover.

ROY'S MAILBOX

Bob Fabel-Ward writes from Little Rock, in response to the article about hummingbirds in irises, that the Rubythroats do visit his many Iris fulva clones as well as many other tall irises, and that this past year he also saw several birds visiting Pacificas. Additionally he reports that the local educational TV channel had aired an episode of Wild America having to do with hummers and their feeding habits, showing Rubythroats in I. missouriensis.

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From California, Jim Rhodes has written of the hybrid Louisiana iris CACIQUE as commonly grown in his area (Glendora), asking for any information on seedlings grown from it. (SIGNA 1258, 1269). Somehow this had been lurking in the back of my mind and in thumbing through old bulletins for an index, had somehow rubbed off, now verified: in bulletin 106 (July 1947) Dr. Reed of the Brooklyn Botanic Garden had written of breeding experiments commenced in 1925; among the reports were two seedlings from the backcross (CACIQUE X fulva), one colored a dark pansy violet and the other one diluted with gray, a dull tourmaline pink. This report was illustrated, incidentally, with color reproductions of paintings of several of Small's irises obtained directly from him, and of several plants from the breeding work, not however of either of these two, but I. fulva, I. foliosa and none other than I. giganteaerulea were included.

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As long ago as 1973 we were promising a fourth Appendix to the SIGNA Study Manual to consist of a chromosome table of the species of the genus *Iris*, and Homer Metcalf had taken it on as a special project. Some time ago, he had forwarded what he considered to be a preliminary manuscript, and on the occasion of my visit to Phoenix the year prior to his death he was still at work on completing the blank spaces, and he had gone on to include all the genera of the *Iris* family. We hope to have the Chromosome Atlas of Irises ready for distribution shortly, incomplete as it may be.

B. LeRoy Davidson

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## EDITOR'S COMMENTS

Another issue with more material than we could get into it. We have been ever so lucky and the Execs, especially, have been more than helpful in providing material. Number 43 will focus on irises for warmer climates, and possibly, if we get some material that is suitable, growing tender irises in cold climates. We have some start on the southern focus already. We would like to hear more from some of you we haven't heard from. Of course, we are always glad to hear from our regular contributors too.

We have had some suggestions of ongoing features and some requests we didn't feel we could comply with, such as requests we ask in SIGNA who can supply certain species they are looking for. We'd like to hear from quite a few of you as to whether you would want us to have a feature where readers could ask growers of certain species to contact them. Or should we try to find a chairman to coordinate a finding program, that is, to put people looking for a certain species in contact with people who grow them (especially when no commercial source can be found). Many amateurs would not want themselves published as a source.

Alan M. (page 1537) does a fine job of keeping us up to date on commercial sources of bulbous irises but we have not found anyone to do a similar job on other species (though he occasionally mentions these, they are not the focus of his articles). Do we have any volunteers?

We also wonder if our readers have forgotten about the Questions Please feature--"He that nothing questioneth, nothing learneth." (Th. Fuller, 1608-1661). We would certainly try to find answers to any species iris questions that are presented.

One more reminder that Olive Rice is still looking for especially good slides of American species iris. Her address is 1914 Napa Ave., Berkeley, CA 94707. See page 1496 of fall, 1988, SIGNA for details.

With this issue, I am breaking in a new electronic typewriter that does a lot of the thinking for me, is easily correctable and can probably be interfaced with my computer. When I get the hang of it, I may be able to do more of SIGNA myself. Lots of fun learning all the gimmicks.

I am hoping to meet many of you at Memphis. Having missed last year, I am really looking forward to it. Conventions are such fun, meeting people, seeing all kinds of iris (notice how many more species and beardless irises are being grown now) and getting new information that helps us decide what we cannot do without and how to grow and judge it. But mostly it is the people we meet, people with interests like our own.

*Joan C.*